BREN SCHOOL OF ENVIRONMENTAL SCIENCE & MANAGEMENT
UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Tejon Ranch CONSERVANCY

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Wild Pig Management on Tejon Ranch

ON THE WEB: http://www2.bren.ucsb.edu/~chanchos/ GROUP PROJECT BRIEF | SPRING 2014

Tejon Ranch Overview

Tejon Ranch is located approximately 60 miles north of Los Angeles and encompasses 270,000 acres of native grasslands, pine forests, and oak and Joshua tree woodlands. The Ranch represents some of the most spectacular and ecologically important wildlands in California and is at the intersection of four ecological regions. The 2008 landmark conservation agreement between the Ranch's owner, the Tejon Ranch Company (TRC), and five leading conservation and environmental groups - Sierra Club, National Audubon Society, Natural Resources Defense Council, Endangered Habitats League, and the Planning and Conservation League - permanently protected 240,000 acres via a conservation easement while allowing the remaining 30,000 acres to be slated for future development. The conservation agreement created the Tejon Ranch Conservancy, which is responsible for protecting and managing the open space on the Ranch. In June 2013, the first Ranch-Wide Management Plan (RWMP), a collaborative management strategy between the TRC and the Tejon Ranch Conservancy, was signed into practice.

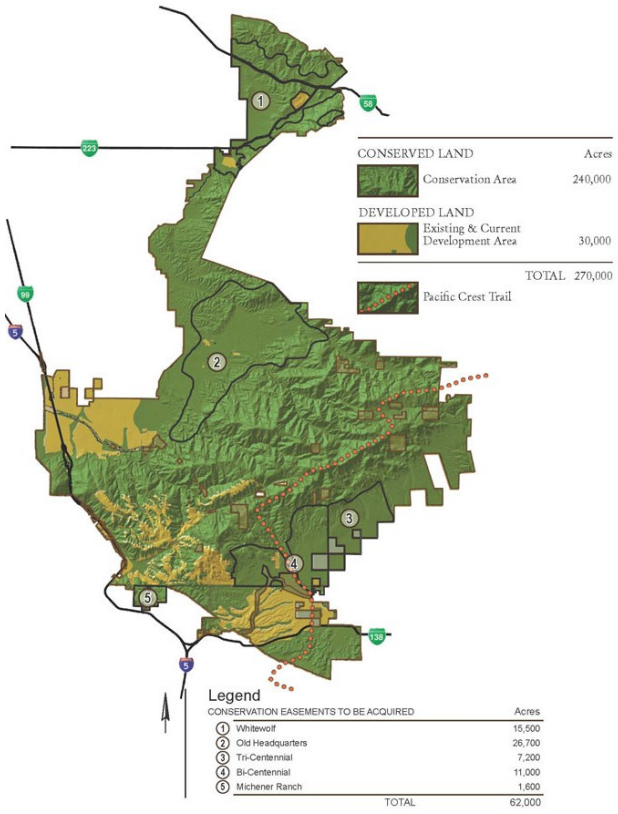



Photo: I. McCullough

Wild Pigs on Tejon Ranch

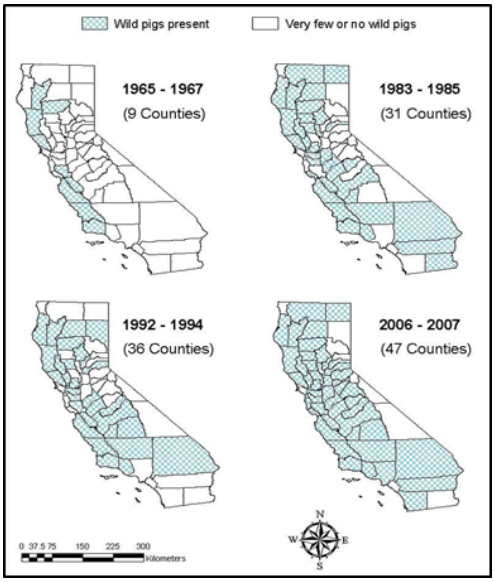
Tejon Ranch is home to a host of wildlife, including herds of antelope and elk, a plethora of bird species, and several iconic endangered, threatened, and special status species. Among the wildlife on the Ranch are herds of invasive wild pigs (*Sus scrofa*) that it is believed were accidentally released on the ranch in the late 1980s from a neighboring pig farm. This original population became feral and has spread throughout the Ranch, creating a wild population. The presence of wild pigs has directly impacted the quality of Tejon Ranch's ecosystems. The destructive population is not expected to decline without intervention; under optimal conditions, pig populations have the potential to triple every year as mature sows typically birth two litters of three to eight piglets each year[1]. TRC currently operates a commercial wild pig hunting program on the Ranch, but there is no other active management of wild pig populations.

Project Objectives

- Assessment of regulatory policy and framework for managing wild pigs in the context of California and on Tejon Ranch.
- Assessment of pig abundances, spatial distributions, and ecological effects in California and on Tejon Ranch
- Assessment of economic effects of wild pigs in California and on Tejon Ranch.
- Assessment of monitoring techniques available to the Ranch.
- Explore different management options available to the Ranch to manage wild pig populations.

Wild Pigs in California

Pigs have been present in California since Spanish settlers first brought domesticated swine to the coastal portions of the state in 1769[2]. Many of these pigs escaped and became feral, and resident populations expanded throughout the coastal oak woodlands of the state. Wild boars were first introduced to California in Monterey County in the 1920s and eventually interbred with their feral kin[6]. Since the State of California classified wild pigs as a big game species in 1957, pigs have consistently spread throughout the state and now occupy 56 of California's 58 counties. Dispersal has been by both natural movement as well as relocation by landowners attempting to generate hunting opportunities[2].



Sweitzer and McCann, 2007

Unlike most states, California manages wild pigs as a big game species rather than a pest species, and commercial and recreational hunting of pigs is widespread and popular. This classification has important implications for their management, as more stringent regulations apply to their harvest than if they were managed as a pest species.

Current policy allows landowners to control pigs via three primary methods:

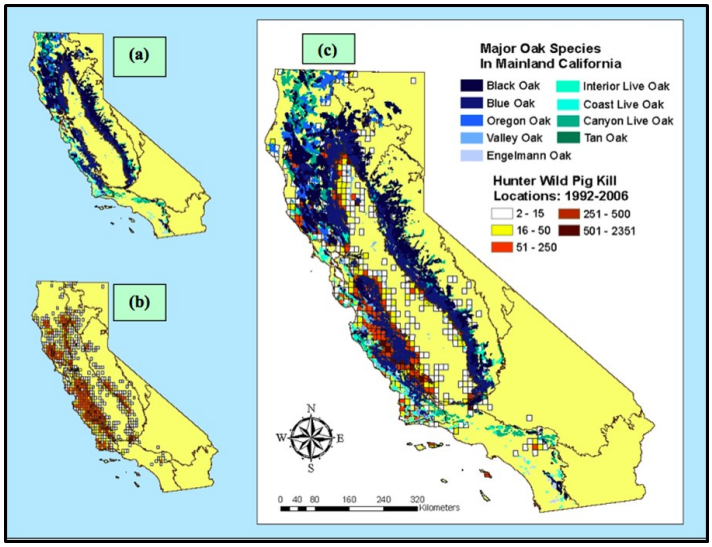
- Recreational Hunting
- Depredation Permits
- Encounter Law

Wild Pig Facts

- Wild pigs can run at speeds up to 30mph.
- Wild pigs can eat 1300lbs of acorn mast in one year.
- Wild pigs can jump five feet.
- Wild pigs can have as many as eight piglets twice a year.
- Wild pigs can swim across rivers and lakes.
- Wild pigs come in a variety of colors and patterns including black, brown, red, spotted, and striped.

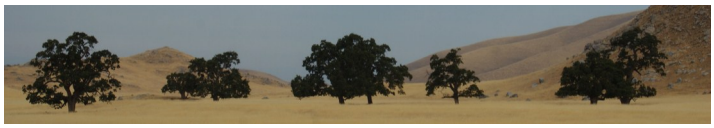
Wild Pig Ecological Damages

Wild pigs negatively affect other wildlife in three main ways: direct predation, competition for food and habitat, and destruction of habitat. Wild pigs are omnivores and will consume the eggs of ground-nesting birds, amphibians, and reptiles[8,5]. Studies have documented them preying on small mammals, amphibians, reptiles, fish, deer fawns, new-born calves, and invertebrates[9]. Pigs affect oaks through predation on acorns and uprooting of seedlings[11,12], thereby creating indirect effects on other species that prey on acorns and seedlings. Acorns are recognized to be one of the most important food sources for wildlife species throughout California and the decline of acorns has been linked to numerous declines in wildlife species[4].



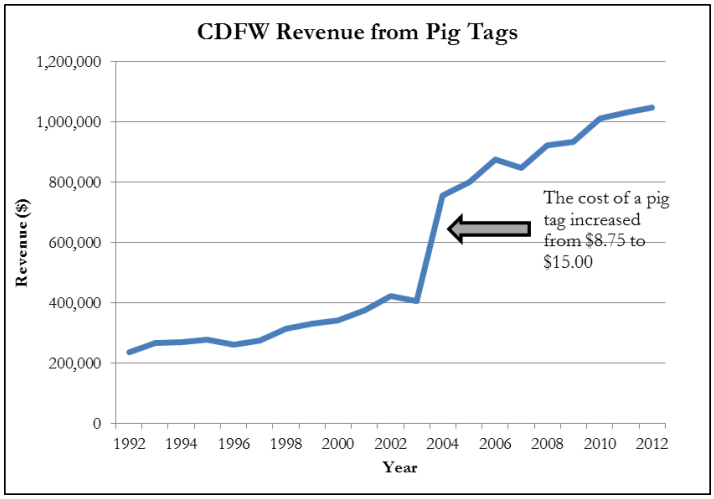
Sweitzer and McCann, 2007

Acorn consumption by wild pigs has been extensively documented. It has been estimated that one adult wild pig can consume up to 1300lbs of mast per year[3]. Other food habit studies indicate significant predation by pigs of rodents, which are predators on acorns and oak seedlings[7,12].



Wild Pig Economic Damages

Hunting wild pigs has become an important component of game management in the state of California. The revenue from wild pig tag sales accounts for over $1 million in annual revenue for CDFW. Revenue is collected in the general fund and currently makes up about 4.5% of CDFW's total hunting revenue of approximately $24.5 million.

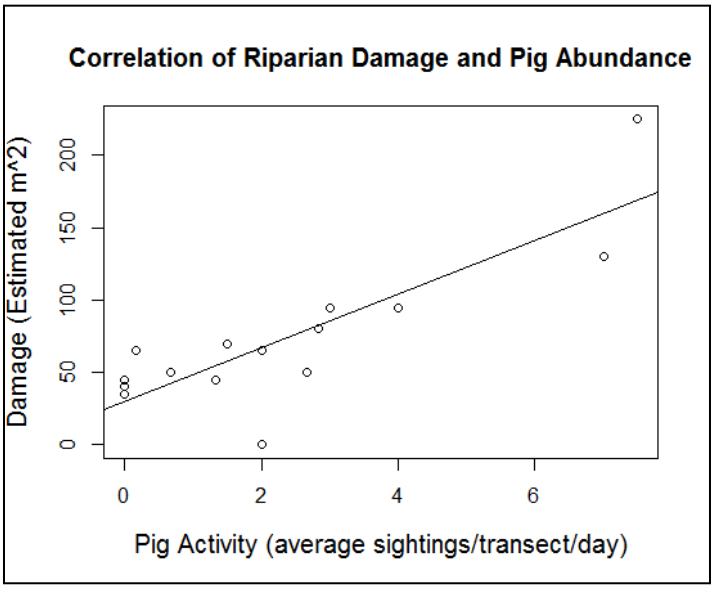


Wild pig damage and control measures taken by landowners incur costs, and USDA APHIS Wildlife Services estimated $28 million in damages in California in 2012 to agriculture, rangeland, and developed land for the counties they work in. Thirty diseases and thirty-seven parasites transmissible to people, domestic animals, and livestock have been documented in wild pigs[9]. Tejon Ranch leases portions of its land for agriculture and ranching, and potential damage to these operations should be a concern for Ranch management.

Pilot Monitoring Program

We conducted a pilot monitoring study in summer 2013 and identified a wild pig monitoring strategy to be implemented throughout the year on the Ranch. We monitored riparian and terrestrial zones using camera traps and 10m x 10m damage plots to estimate indices of pig abundance and damage.

In the terrestrial areas, we examined the relationships between pig abundance and elevation, distance to a stream, distance to an alternative water source, and other mammal activity using multiple regression. Our analysis revealed a statistically significant relationship between pig abundance and elevation. Analysis of Variance (ANOVA) was used to examine the relationship between damage and different habitat types that were sampled (grassland, savannah, woodland, chaparral, and conifer).

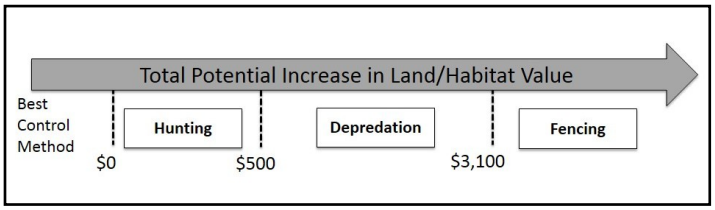


We found that there was a statistically significant difference between damage in different habitat types. It is important to note, however, that our pilot study was limited to the dry summer months and we feel that it is important to conduct these studies in all seasons in order to establish the seasonal relationships between pig damage and habitat type.

In the riparian zones, we found a statistically significant relationship between pig abundance and damage. This has important implications for management because damage is much easier to monitor than pigs themselves, and if this relationship can be seasonally linked to other habitats, then the Conservancy can use damage plots to estimate the pig population on the Ranch.

Cost Benefit Analysis

We conducted a cost benefit analysis to establish the relative costs and benefits of each management strategy available to the ranch. In this analysis, we focused on three main management strategies: hunting, depredation, and exclusion fencing. We treated hunting as a baseline estimate because it is a reserved right for the Tejon Ranch Company. The other options are assumed to take place in conjunction with hunting efforts. For depredation and fencing, we made assumptions about the success rate of each method, the cost associated with implementing each method, and how much each method could improve the value of the land. The cost benefit framework created in this analysis can be adjusted to reflect changes in management strategies.



Management Strategies

A number of options exist to manage wild pig damage. These strategies can be generally grouped into three categories: eradication, population control, and exclusion.

- **Eradication**
- **Lethal Control**
  - Targeted Hunting
  - Trapping
  - Aerial Gunning
  - Snaring
  - Contraceptive Vaccines
  - Lethal Toxicants
- **Non-Lethal Control**
  - Exclusion Fencing

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Management Recommendations

We recognize that any management regime adopted requires a working, collaborative relationship between the Conservancy, Tejon Ranch Company, and CDFW.

1. Identify priority habitats

We recommend that the Conservancy identify and classify primary and secondary priority areas for protection from wild pig damage. The Conservancy should also identify quantitative damage reduction objectives to guide their wild pig management program.

2. Conduct monitoring

We recommend that the Conservancy continue a monitoring program that occurs throughout the year in order to reflect any effects of seasonality.

3. Implement pig damage controls

We recommend that the Conservancy adopt a strategy that is a combination of targeted hunting, depredation trapping, and exclusion fencing. Adopting a targeted hunting program and a night hunting program to supplement the current hunting program on the Ranch can help to reduce population densities. Exclusion fencing should be erected in highest priority areas. A depredation effort should be implemented in secondary priority areas to reduce pig damage.

4. Develop Pig Action Network

Wild pigs impact lands across the state without regard for property boundaries. The Conservancy should partner with other affected landowners to collaboratively work together to reduce the impacts of wild pigs.

Acknowledgements

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Tejon Ranch Company

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