

**California State Parks
Inventory, Monitoring, and Assessment Program**

Topic: Monitoring Feral Pig Damage

Unit: Wilder Ranch State Park

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Date: June 2001

I. Introduction

One of the missions of the California Department of Parks and Recreation is to preserve the natural biodiversity of parklands. In keeping with this mission, the goal of the Inventory, Monitoring, and Assessment Program (IMAP) is to have a clear idea of the natural resources contained in each state park and to monitor them regularly. As part of a comprehensive program to inventory and monitor these natural resources, it is very important to adopt an ecosystem approach and to view the whole in terms of the relationships between its parts.

The effects of exotic species on the natural communities of parklands can be devastating. In the case of larger mammals, such as feral pigs, behaviors can cause physical damage to certain environmental features, introduce exotic plant species, and degrade the quality of the ecosystem. Feral pigs have been a part of California since they were introduced by agriculture in the 1800s. Recently, land-owners have purposefully introduced pigs on their properties for sport hunting purposes. In some instances, these pigs have roamed off private lands and onto public lands, including state parks. One problematic feature of pig biology is their high reproduction rate. A sow can have as many as 6- 8 young in a litter and have two litters in a year. Populations can grow very quickly. Another factor is their highly nomadic nature. Pigs will cover a lot of area in a short amount of time, changing their feeding habits with the seasons.

Wilder Ranch State Park has had a large population of feral pigs for some time. The rooting damage to the soil can be seen in most grassland areas, as well as within the oak forests. A control program of trapping and removal was started to control the number of pigs in the park. This study plan addresses monitoring of

pig presence and areas pigs use to assist in assessing the effectiveness of these efforts.

II. Sampling Objective:

The objectives are to:

- 1.) Locate the general areas of pig activity in the park.
- 2.) Monitor for presence/ absence of pig activity over time.
- 3.) Assess extent and types of damage to vegetation and soils from pigs. This will include detection of exotic plant species in areas of pig rooting.

III. Study Site(s)

Pig damage has been found all over the park, in open grassland as well as in dense woodlands. Because two methods will be used to monitor pig activity, sample sites will be divided into two groups: large grasslands (1 km-long transect method) and woodlands/small grasslands (randomly placed plots along a transect method). Using aerial photos and vegetation maps, the large grassland areas of Wilder Ranch State Park have been divided into 10 polygons and each designated with a code (PG 1, PG 2, etc.). It was determined that within these areas, it would be possible to fit one or more 1 km transects. For woodlands and small grassland areas, sample sites will be identified by the trails or roads that are used to access them (i.e., a woodland off of Wild Boar trail will be labeled WBW). See attached map of the park. The following trails or roads may be used to access woodlands/small grasslands:

North Greywhale Road (NGR)	Old Cabin Trail (OCT)
Brian Campbell Road (BCR)	Enchanted Loop Trail (ENLT)
Woodcutter's Trail (WT)	Twin Oaks Trail (TOT)
Chinquapin Trail (CT)	Wild Boar Trail (WBT)
Long Meadow Trail (LMT)	Engelsman Loop Trail (ELT)
Eucalyptus Loop Trail (EULT)	Cowboy Loop Trail (CLT)
Wagonwheel Trail (WWT)	Wilder Ridge Loop Trail (WRLT)
Baldwin Loop Trail (BLT)	Access Road (AR)

The study sites will include grassland polygons PG 1, PG 3, PG 6, PG 7, PG 9, & PG 10. For the woodlands, the study sites will be located along North Greywhale Road, Woodcutter's Trail, Wild Boar Trail, Enchanted Loop Trail, Access Road, and Wagonwheel Trail. Total number of plots for large grasslands will be sixty and for woodlands/small grasslands will be forty-two. Locations of the study areas were purposefully stratified to get a representative view of the whole park.

IV. Methodology

Two methods will be used to monitor feral pig activity, one for large grassland areas and another for woodlands/small grassland areas. The goal of each method

is to express pig activity as the proportion of total plots that have some sign of disturbance by pigs.

A.) Large Grasslands

10 m by 10 m plots will be arranged every 100 m along a 1 km-long transect. Plots will be monitored to detect presence or absence of pig activity, to describe type and extent of pig sign, and to identify dominant plant species composition.

The protocol is as follows:

- 1.) Using a map, drive or walk to a point along the road or trail that will allow for a 1 km-long transect to be readily accessed.
- 2.) Walk to a randomly chosen point (by # steps and compass bearing) away from the road or trail. This will be the starting (0 m) point.
- 3.) Take a compass bearing, using the topo map, that will allow for a 1 km-long transect in grassland and record it on the data sheet (Table 1). The transect will follow this bearing. Take four photographs, in clockwise order, at 90° angles from each other. Begin with the view at 180° from the direction the transect will take.
- 4.) Use a GPS unit in “data” mode to start a new data file, recording the rover file #, the appropriate code for that grassland polygon (i.e., PG 7), and plot number (0- 10). Following this example, the starting point will be coded PG 7-0, then PG 7-1 at 100 m, PG 7-2 at 200 m, etc. Record the northing and easting coordinates for this waypoint from the “navigation” mode. This step will be repeated every 100 m along the transect. Note: no plot will be surveyed at the start point.
- 5.) Following the designated compass bearing measure out 100 m by tape, hip chain or by calibrated footsteps. Record the northing & easting coordinates and pertinent location information as described in step 4.
- 6.) Randomly choose where the 10 m by 10 m plot will be positioned in relation to the transect line (there are four possibilities). The transect line will form one of the edges of the plot. Record the position on the data sheet.
- 7.) Measure out a 10 m by 10 m plot, flagging each corner.
- 8.) Scan the entire plot for any sign of pig activity. Record presence or absence of pig sign, type of pig sign and all other pertinent information on the data sheet. Types of pig sign include rooting, feces, tracks, wallowing and cover. Check any bushes or wet spots in the plot for tracks, feces, or hair that would indicate use. If the plot includes brush or wet areas that could potentially be used by pigs, but are not, make a note of this.
- 9.) Use the California Native Plant Society (CNPS) Vegetation Rapid Assessment field method to record the dominant species of grasses, forbs, shrubs or trees in the plot.
- 10.) Follow the designated compass bearing to the next 100 m point and repeat steps 4 – 9. At the last sample point, take four photographs in the same manner as described in step 3.
- 11.) If repeated transects are being done in one grassland polygon, make sure they are separated by at least 200 m at any given point.

B.) Woodlands/ Small grasslands

10 m by 10 m plots will be randomly placed 10 – 100 m perpendicular from the trail or road, at a spacing of 100 m. Plots will be monitored to detect presence or absence of pig activity, to describe type and extent of pig sign, and to identify dominant plant species composition. The protocol is as follows:

- 1.) Begin at a point along the road or trail that has entered one of the two habitat types described (woodland or small grassland). The starting point will be a random number of steps (0 – 100) into that habitat. Its letter code will be the letter code of the trail or road used as a transect. See part III or Map 2 for the codes. This code will be followed by a number, zero for the starting point. Enter that as a new data file in the GPS unit, recording the northing and easting coordinates.
- 2.) Measure off 100 m along the trail, using footsteps calibrated to meters. Record northing & easting coordinates for this point under “trail waypoint” on the datasheet.
- 3.) Randomly choose either side of the trail (i.e. a coin toss) and step a randomly chosen number of meters (10–50) into the small grassland or woodland, in a direction perpendicular to the trail. Record this information on the datasheet. “Side of trail” is considered while facing the direction of the transect on the trail. Make sure that the plot will end up enclosing one or the other habitat type. Record the northing/ easting coordinates under plot waypoint on the datasheet. This point will represent one of the four corners of a 10 m by 10 m plot, each side facing one of the four cardinal directions. Randomly choose which corner this will be. Take four photographs from each of the four cardinal directions.
- 4.) Measure off the 10 m by 10 m plot, placing flagged stakes at each corner.
- 5.) Scan the entire plot for any sign of pig activity. Record presence or absence of pig sign, type of pig sign and all other pertinent information on the data sheet. Types of pig sign include rooting, feces, tracks, wallowing and cover. Check any bushes or wet spots in the plot for tracks, feces, or hair that would indicate use. If the plot includes brush or wet areas that could potentially be used by pigs, but are not, make a note of this.
- 6.) Use the CNPS Rapid Assessment method to record the dominant species of grasses, forbs, shrubs or trees in the plot.
- 7.) Return to the trail and repeat steps 2 –4, until seven plots have been surveyed.

V. Data Analysis and Archiving

To detect proportionality of pig presence, the total number of surveyed plots will be added. Then the total number of plots with pig sign will be tallied and divided by the total number of plots. The resulting number will be a proportion of pig presence. The higher the number of plots done in a season, the more accurate

proportionality will be detected. However, to compare one year to the next, a standard number of plots per year will be necessary. It may take a few seasons to determine the minimum number of plots necessary for an accurate statistic. Although the nature of the plant composition data may not be rigorous enough to perform sophisticated statistical analysis; it may be enough to encourage further study of possible exotic species invasion or habitat selection.

Field datasheets will be filed and data transferred to a computer-based data system (Excel or Access) for electronic archiving and statistical analysis.

VI. Materials Needed

- 1.) Trimble GPS unit
- 2.) Four flagged stakes
- 3.) Datasheets and clipboard
- 4.) 100 meter measuring tape (optional)
- 5.) Hip chain (optional)
- 6.) Compass
- 7.) Regional plant field guide
- 8.) Ziploc bags to keep plant specimens
- 9.) Camera
- 10.) Magnifying lens

VII. Estimated Field Time and Staffing

For one person, three large grassland transects (ten plots/ transect) can be done in a day. For woodland/ small grassland areas, one person could cover approximately twelve plots in a day.