California Department of Parks and Recreation
Natural Resources Division

Small and Meso Mammal Monitoring at Wilder Ranch State Park

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I.) Introduction

Very little information exists on mammalian diversity and abundance at Wilder Ranch State Park. This project consisted of identifying species presence, distribution and status and developing a long-term monitoring strategy. Small and meso (middle-sized mammals with body mass of 2.5-25 kg) terrestrial mammals were surveyed using live-trapping, track-plating and trip camera techniques, large mammals with track-plating, trip cameras and spot lighting, and marine mammals were assayed by conducting point counts.

II.) Methods

A.) Development of Methodology

Current species lists for the Park and the immediate area were assembled. A Checklist of Mammals from the Animal Life section of the Wilder Ranch State Park Inventory of Features from July 1979 had been entered into California State Parks CalParks Fauna Biological Inventory System. This list was compared to some of the known authorities on mammals such as Mammals of the Pacific States by Ingles and California's Wildlife, Volume III, Mammals by CDFG to make sure the research site was within range for the mammals on the list.

It was important to become familiar with the mammals that might be present so they could be identified in the field, especially small rodents. Materials available to determine the key features used to determine the identity of specific species included published keys and reliance on experts. The variability between different age groups and potentially between the sexes, or sometimes just variability due to location was a complicating factor. In certain instances it was impossible to identify certain small mammals to the species level by external characteristics alone. These animals were sacrificed and cranial and skeletal features examined to make a final determination.

In our case, we were able to form an alliance with a known expert to help us with field identifications and when necessary, laboratory identifications. We contacted Dr. Douglas A. Kelt, Associate Professor with the Department of Wildlife, Fish and Conservation Biology (WFCB) at the University of California, Davis (UCD) who was willing to work with our team on our mammal-trapping project at Wilder Ranch State Park.

Copies of the probable species living at Wilder were made and distributed to the mammal team for their information (Appendix A). Dr. Kelt also lent our team study specimens from the UCD Museum of Wildlife and Fisheries Biology collection so we could become better acquainted with some of the species. Before our first trapping session, Dr. Kelt gave our team a short training using the pelts to point out similarities and differences among the more confusing species types we were likely to encounter.

B.) Small and Meso Mammal Trapping

One widely accepted method for determining the species at a given location is by using live traps. We used a combination of Sherman traps (for small mammals) and Tomahawk traps (for middle-sized mammals). Because of the possibility of capturing kangaroo rats at this location, we used long Sherman traps (3"x3 3/4"x12") to avoid clipping tails. Medium-size mammals in this region range in size from woodrats to raccoons, so we used medium-sized (9"x9"x32") Tomahawk traps (Model #206). We used double door traps (door at either end) since these could be placed in runways and trap animals coming from either direction. Also, some shyer species or individuals may not enter a trap if they don't detect an escape route at the other end. All traps were collapsible (folding) to minimize storage space. Folding traps are also easier to transport in the field especially if distances are involved. One draw back is that the treadles need to be sensitized each time the traps are reused to make sure they operate properly.

We employed both standard trapping grids and more flexible linear trapping arrays, depending on habitat structure. At our first two locations we chose to use a grid array of 10 x 10 traps for a total of 100 traps. The first grid was set out in grassland, but even then, it was difficult to line up 10 even rows of 10 traps due to difficulty sighting over undulating terrain and through tall grasses. The second location was in a redwood community along a rather steep slope. It became apparent that trying to lay square grids was going to be too difficult for the majority of terrain and vegetation types encountered in Wilder. Because grids are useful primarily for determining density, we opted for using linear transects which provide information on relative (not absolute) abundance.

Traps were set on traplines about ten to fifteen meters apart. It is important to keep variables such as habitat complexity and the home range sizes of the animals to be captured in mind when determining distance between traps. The accepted standard when dealing with small rodents is ten to fifteen meters, which allows for at least one trap per individual home range. To accomplish this, all members of the trapping team paced along a meter tape to accurately gauge their individual paces and calibrate themselves for trap placement.

When placing traps, habitat features such as downed logs, bushes, or other signs of mammal presence like runways, burrows and scat that were within about 2 meters of the transect point were selected.

Traps were set each afternoon prior to dark and checked at sunup the next morning. If the morning weather forecast predicted hot weather, boards were prepared to be placed over the top of exposed traps to help keep them in shade. If the weather was predicted to be cool, some type of bedding material can be placed inside the traps. Neither of these steps was necessary during the time we conducted our survey.

In order to get an indication of population size in each location we used the mark-recapture method. Permanent marking was not necessary since we only needed to keep

track of the animals during this single survey. It was also not necessary to identify individual animals. We also wanted to keep our study as humane as possible so permanent mutilation marking strategies such as toe clipping were rejected. Instead, we choose to mark the underbellies of the mammals with indelible markers. Blue and green colors seemed to work best, although, the colors were faint on some recaptured animals at our grassland array due to early morning dew washing the colors off.

Although it was not known at the time of this survey if subsequent surveys would be conducted, certain information such as weight, reproductive status and health condition were collected. This data can be compared to future data to determine basic health of the populations and population trends.

Since weather can be a factor on the success of trapping, basic information such as temperature, lunar phase, cloud cover, wind and precipitation was also collected.

In order to trap and collect specimens a Scientific Collecting Permit from the Department of Fish and Game is required which Dr. Kelt already had. In addition to the DFG Permit, State Parks required Dr. Kelt to apply for a Permit to Conduct Biological Collections (Form DPR65). Please see copy in Appendix B. If any subsequent trapping projects are to occur, an application for renewal must be sent to Headquarters. Allow one week for processing.

Site Selection

At Wilder Ranch SP 48 vegetation alliances have been identified by air photo interpretation and subsequent analysis. Since it was infeasible to conduct a small mammal survey in each of these types, more general groupings were sampled. One sample grid was placed in each of the following seven vegetation types: prairie/grassland, redwoods, chamise/chaparral, mixed evergreen, oak woodland, marsh, and knobcone. The knobcone pine area was especially important since it was a plant community type that had been added to the park by recent land acquisitions since the last inventory list was created.

The sandhills complex is another important area in the park since it occurs on a special soil type that is found in only a few locations within Santa Cruz County. The Sandhills is also home to a rare plant species, Ben Lomond Spineflower (*Chorizanthe pungens* var. *hartwigiana)* and an endangered mammal, the Santa Cruz Kangaroo Rat, (*Dipodomys venustus*). Through communications with the Santa Cruz District ecologists, we became aware of a study being conducted by a graduate student, Caitlin Bean, who was trying to determine if *D. venustus* was still present. After contacting Caitlin, we learned that she had conducted a small trapping survey in the Sandhills in September of 1999 and was planning to try once more in May of 2001. Therefore, we decided not to duplicate her efforts in the Sandhills.

When determining the actual location of the grid in each of these chosen habitat types, several factors were considered. Locations that were near to roads with the least amount

of difficult terrain were preferred, keeping in mind that grids needed to be hidden from public view to minimize potential disruption to the survey. Notices were printed and laminated and posted at a few of the sites that had potential to be seen by passersby.

Study Area
Please Do Not Disturb

Ecologists working for California State Parks are monitoring mammal populations in the park. Traps are checked regularly to ensure no animals are harmed. If you have questions please call 916-653-9365.

(Actual size of notice is 8½ by 5½)

Incidentally, to our knowledge no traps were disturbed by park visitors, although feral pigs mutilated several Sherman traps in the Scaroni grasslands and Enchanted Loop redwood grids.

The GIS map (Figure 1) shows the locations of each trapping grid. A list of plant species found at each of the grids was compiled by Tamara Sasaki and can be found in Appendix C.

Equipment

1. Sherman live traps (90 per grid):
   Keep in original boxes and add handles using lounge chair ribbing or rope with a heavy-duty staple gun, for ease in carrying
2. Tomahawk live traps (10 per grid):
   Bundle using bungee cords and use framed backpack to carry if available
3. Scales (cover clips with mole cloth):
   300g capacity
   60g capacity
4. Handle bags:
   Can hand make using pillowcases, 4 bags per pillowcase. Have plenty on hand so each team member has their own. Can become soiled easily so be ready to wash every other night, or have plenty available. Plastic bags are not advised.
5. Gloves
6. Pin flags
7. Bait:
   Millet seed for Sherman traps, pour into several Ziploc bags for each team member. Used peanut butter with oats and enough water to make sticky balls, jelly and cutup apples for Tomahawk traps. Have these ready and in enough bags to distribute among team members.
8. Data sheets (write-in-rain paper)
9. Field guides

10. Digital camera
11. Pencils
12. Clipboards
13. Carrying bag or vest with pockets
14. Pliers
15. Roll flagging
16. Cover boards, if necessary
17. Indelible markers, green and blue preferred

Field Methodology

Since transect lines are the preferred method for sampling small terrestrial mammals, the points listed are for this technique only.

Laying transect lines

1. Carry all equipment to site.
2. Select starting line, usually a trail or road.
3. Fill out the Small/Meso Mammal Grid Information Sheet.
4. Predetermine the two points along each transect line where the Tomahawk traps should be placed making sure they are as spread out as possible and note on data sheet.
5. Spread team members along starting line, at least 10-15 meters apart. Locate and use game trails if grid is in dense vegetation.
   Each team member should have:
   18 Sherman traps and 2 Tomahawk traps
   Pin flags or roll flagging depending on vegetation and terrain with marking pen.
   Bait for both types of traps.
6. Each member should find a landmark straight ahead and proceed along their transect line. The first trap should be placed several paces from the trail to be out of sight of any passersby.
7. Place a pin flag or flagging to mark where trap is being placed.
8. Write Station # on pin flag or flagging. Make sure each Station is properly labeled as this will aid in entering data during processing.
9. Open trap and check to make sure the trigger to close the door is sensitized properly.
10. Place trap in mammals preferred microhabitat – think like a rodent!
11. Insert appropriate bait. Add cover board or batting if needed.
12. Pace off 10-15 meters to next point along transect line. Use landmark and team members on either side to keep to straight line as much as possible where feasible. Or follow (or in some cases, crawl) along game trails.
13. Repeat until grid is completed.

Processing traps

1. Enter information regarding trap site, the previous evenings weather conditions, and current weather conditions at top of Small/Meso Mammal Trap Data Sheet.

2. Start at first transect line and start checking traps one by one to see if they are occupied. Be systematic to make sure that all traps have been checked. Depending on number in party, it can be helpful if one or two members stay ahead of the processing team, turning traps on end that have an occupant and baiting and setting empty traps for next trap session. This works only if it is later in the day and traps are protected enough that they can be baited and left open for the upcoming evening.
3. If there is a mammal in the trap, remove by using the "Doug Kelt swing-over-the-shoulder" technique. Place open end of cloth handle bag over door end of trap and fold around till it is securely flush around all four sides of trap. With forefinger, open trap door through fabric of bag making sure the mammal is not hiding behind the opening door. With trap door facing up, gently shake trap up and down a few times and feel if animal is at the bottom. Swing trap back over shoulder so animal, then swing forward quickly so mammal drops into the bag without having a chance to cling to treadle or edges of door on his way back.
4. With other hand, immediately grasp the bag just below trap and clamp tight so animal cannot rush back up and escape. Place trap on ground.
5. Support bag with animal on thigh and gently work mammal's head toward the top of the bag. Firmly grasp loose skin at the back of the animal's neck through the bag, and then gently peel the handle bag back to expose the mammal.
6. Identify the species, and determine its sex, reproductive status and age class and enter onto datasheet. Use 4-letter code located in upper right corner of data sheet for species and codes at bottom of datasheet for age and reproductive status. Check animal over for any apparent signs of injury or infestation of mites or ticks and rate an overall health condition to be entered onto datasheet. Enter any specific information in the 'Diagnostic Features/Comments' section. If this is after the first morning of processing, check for marking to see if the mammal is a recapture.
7. Mark the underside of animal's neck with an indelible marking pen.
8. Place scale clip near base of tail and allow mammal to swing freely. Read and record weight.
9. Release animal near the spot they had been trapped preferably near their burrow or edge of bush so they can find cover readily.
10. The Recorder should enter rest of information on data sheet and make sure all information is complete before proceeding to next trap station.
11. Make sure traps are sprung before leaving. In fact, Sherman traps can be left on end so they are easier to locate and bait later in the day.
12. Repeat until whole grid is complete.

Baiting and Setting Traps

Sherman Live Traps:

1. Millet seed (i.e. commercial bird seed) was used for the small mammal traps.
2. Tap on top of trap to test how easily door closes. Adjust lever if necessary.
3. With trap in hand, gather small handful of seeds and toss into back of the trap.
4. With door facing you, use upward and forward sweeping motion so seeds land on treadle.

5. Place trap in spot animal is likely to encounter it, making sure to not dislodge seeds from treadle.
6. Tap on top of trap to make sure door still closes with right amount of pressure.
7. Reopen door.
8. Repeat until grid is complete.
9. Bait should be checked and reapplied each day if necessary.

Tomahawk Live Traps:

1. Combination of peanut butter/oat balls, jelly and apples were used.
2. Peanut butter/oat balls can be made the day before. Use equal amounts of peanut butter and oats and just enough water to hold ball together. Make them about the diameter of a half dollar. Balls can be stored in Ziploc bags or small plastic containers (i.e. used butter containers).
3. Jelly can be stored in squeeze tubes.
4. Apples should be cut into midsize pieces just prior to placing in traps.
5. Open trap making sure side stabilizer bars are in place.
6. Press treadle to test tension. Make adjustments if necessary using pliers.
7. Place trap in runway or under bush where likely to catch mammal.
8. Place two balls and several pieces of apple on treadle. Locate leaf or other natural object to squeeze jelly onto and place on treadle.
9. Sprinkle oats around doors on both ends to help attract mammals into trap.
10. Repeat until grid is complete.
11. Day old bait should be removed and new bait reapplied each day.

C.) Track Plating

Site Selection

There were a number of middle-sized species possibly present at Wilder Ranch SP that had not been observed. These became our target species when using the track plating technique. The mammals targeted were Western spotted skunk, *(Spilogale gracilis*), Long-tailed weasel, *(Mustela frenata*), American Badger *(Taxidea taxus*), and Ringtail *(Bassariscus astutus*). Literature research was conducted to determine their habitat preferences and behaviors in order to place track plates in the most predictable locations.

All four species need water, so track plating was conducted in late July and August in sites along ephemeral streams that still had puddles of water. With the focus narrowed to streams, preference was given to easily accessible sites near roads so the plates would not have to be carried long distances. Once an area was chosen, usually two track plates were laid near the area to keep travel time to a minimum.

See the GIS map (figure 2) for placement of track plates.

Equipment

1. Aluminum plates (40.0 cm x 80.0 cm x 1.0 cm):
   Borrowed from Twin Cities OHV
2. Stiff-bristled short-handled broom (like a whitewash brush):
   Used to sweep sand and clear debris to place plates flat on ground
3. Concrete finishing tool:
   Used to clear debris to place them flat on ground
4. Cat food cans (6 oz.):
   Smelly fish varieties seem to work best
5. Can opener
6. Spike nails, about 6 inches long
7. Hammer
8. Acetylene torch
9. Igniter
10. Welding face shield
11. Safety mitts
12. Safety barriers
13. Saw horses
14. Flagging
15. Data sheets
16. Pencils
17. Ruler
18. GPS unit
19. Camera
20. Tracks & Scat Field Guide
21. Cellophane wrap and rubber bands
22. Garbage bags
23. Ziploc bags
24. Wide masking tape

Field Methods

Sooting track plates:

1. The acetylene torch, igniter, face shield, mitts and barriers can be obtained from the Maintenance Shop. Call ahead as they will need to conduct a short safety training in order to allow the use of this equipment.
2. Setup safe area to use torch. Area should be on concrete or dirt with no flammable materials nearby. We used the concrete pad in front of the barn (check with personnel to make sure there are no special events). Use safety barriers to define perimeter and restrict access

with flagging.

3. Set sawhorses near middle of area and set first two aluminum plates on top.
4. Put safety face shield on. Turn acetylene torch on, keeping the O_2 turned off and ignite using igniter. Adjust knob and wait a few seconds for black sooty smoke to appear.
5. Place tip of torch about three inches from top of plate at a 45-degree angle.
6. Lay soot by using smooth sweeping motion across entire width of plate. The soot should be laid as consistently as possible so the surface is completely blackened, but not too thick.
7. Wearing safety mitts, place plates on ground to cool.
8. Continue to soot all plates using same procedure.
9. When plates are cooled, use wide masking tape to adhere two plates together with sooted sides facing each other. We found that the best method was to use two strips of tape along each long edge of the plates, one near each end, and tightening as much as possible so sooted plate faces would not rub against each other. Use as little pressure as possible or fingerprints will show through the soot. Handle plates along edges only.
10. Place sets of plates into vertical grooves of wooden storage box for transport into the field, or lay flat in a stack.

Placement of Track Plates

1. Find flat surface away from trees and other plants that may drop debris if possible. Use concrete finishing tool and brush to clear an area slightly larger than the track plates.
2. Start GPS unit to begin collecting points.
3. Place set of plates along one edge of clearing. Remove tape strips from one edge, then open plates using tape along other long edge as hinges. Holding only the edges of the plates, life one side up off of tape and move plate out about ¼ to ½ inch. Repeat for other end.
4. Remove paper label from can of cat food and puncture opening on all four sides using can opener. Place in middle of seam that was just opened between plates. Use 6" spike to secure can into ground. If ground is very soft, such as sand, use two nails. We found that it was best to open cat food cans two to three days prior. This allows the smell to get ripe and permeate the air quickly to attract mammals in less time. Use cellophane wrap and rubber band to secure top of punctured can and then place in Ziploc bags. If there is some juice in bag, sprinkle it on ground around track plate to help draw mammals.
5. Take picture of track plate in place, then four more pictures, one in each direction.
6. Complete data sheet.

Processing Track Plates

1. If tracks exist, use field guides to help determine species identity.
2. Take photo of tracks, use ruler for scale.
3. Fill out data sheet if tracks were present or not.

4. If cat food can has been removed, replace with new can.
5. Carefully remove any debris that may have fallen onto track plate.
6. Resweep around edges if substrate allows.

Cleaning Track Plates

1. Lie flat on the ground and wipe as much soot off as possible using towels or dry sponges.
2. Spray liberally with a degreaser and allow to sit for up to an hour.
3. Hose down and buff dry.

D.) Trip Camera

Site Selection

Due to the fact that we borrowed the camera equipment and we didn't want to take any chances with theft or vandalism, the camera was only tried in one location. During the Track Platting Survey, unidentified skunk tracks were found on the plate located under the Historic Barn. Since the spotted skunk was a target mammal, and the site was secure, we used the camera to try to catch a picture of the skunk. The area had a nice sandy substrate so no track plate was used since it was easy to read prints in the sand.

Equipment

1. Wildlife Pro Camera System with 35mm Yashica T4 Super cameras (sold by Forestry Suppliers): mounted on T-bar
2. 35mm film, 800 speed, 12 frames
3. C batteries for camera
4. Brush
5. Canned cat food
6. 6" spike nails
7. Ruler for scale
8. Tracks field guide
9. Flashlight

Field Methodology

1. Determine location for bait. Use two 6" spike nails to secure can into sandy substrate.
2. Sweep area around bait.
3. Place T-bar into sand. Place batteries in camera and mount camera securely to T-bar.
4. Aim camera towards bait. Lighting was pretty poor beneath the barn so a flashlight was placed on top of the can of cat food in order to sight the camera.
5. Turn camera on and make sure LED light is working.
6. Return each day to see how many pictures had been taken and if film needs to be replaced.

III.) Findings

A.) Small & Meso Mammal Trapping

The following charts summarize the field data for the trapping efforts at each trapping grid in Wilder Ranch State Park. In cases were an animal escaped (designated by an *) not all data was collected.

Grid 1 – Prairie (on second terrace of Scaroni property)

Mammal Name	Number Captured	Number Recap	Adult	Sub-adult	Juvenile	Male	Female
Microtus californicus California vole	72*	†	1	69	1	21	50

*one escape prior to examination
†recapture total not available – marking method did not work in wet grasslands

Grid 2 – Redwood Forest (near Enchanted Loop Trail)

Mammal Name	Number Captured	Number Recap	Adult	Sub-adult	Juvenile	Male	Female
Neotoma fuscipes Dusky-footed woodrat	13*	7	10	1		4	7
Peromyscus boylii Brush mouse	20	11	18	2		12	7
Peromyscus californicus California mouse	16	4	6	10		10	6

* 2 escapes prior to examination

Grid 3 – Chamise (near Wild Boar Trail)

Mammal Name	Number Captured	Number Recap	Adult	Sub-adult	Juvenile	Male	Female
Neotoma fuscipes Dusky-footed woodrat	6	1	5			2	3
Peromyscus californicus California mouse	51	21	46	3	2	28	23
Peromyscus maniculatus Deer mouse	63	27	41	16	3	37	23
Reithrodontomys megalotis Western harvest mouse	3		3			3	
Sylvilagus bachmani Brush rabbit	3ϕ						

ϕ Rabbits were not processed, so no data was collected.

Grid 4 – Oak Woodland (near Eucalyptus Trail)

Mammal Name	Number Captured	Number Recap	Adult	Sub-adult	Juvenile	Male	Female
Microtus californicus California vole	3	0	0	2	0	0	2
Neotoma fuscipes Dusky-footed woodrat	2	1	2	0	0	0	2
Peromyscus boylii Brush mouse	32 †	8	27	2	3	15	16
Peromyscus californicus California mouse	29 †	9	22	0	6	12	16
Peromyscus truei Pinyon mouse	2	1	2	0	0	1	1

1 escaped before complete examination
† one identification uncertain

Grid 5 – Mixed Evergreen Forest (near Sandhills)

Mammal Name	Number Captured	Number Recap	Adult	Sub-adult	Juvenile	Male	Female
Microtus californicus California vole	1	0	1	0	0	1	0
Neotoma fuscipes Dusky-footed woodrat	13	5	9†	2	0	5	6
Peromyscus boylii Brush mouse	48	28	40	4	1	30	16
Peromyscus californicus California mouse	24	10	22	1	0	14	7
Peromyscus truei Pinyon mouse	1	1	1	0	0	1	0
Rattus rattus Black Rat	1	1	0	1	0	0	0
Sorex trowbridgii Trowbridge's shrew	1						

1 PECA, 1 RARA, 2 NEFU, 3 PEBO escapes before complete examination
† 1 uncertain of age group

Grid 6 – Knobcone Pine

Mammal Name	Number Captured	Number Recap	Adult	Sub-adult	Juvenile	Male	Female
Neotoma fuscipes Dusky-footed woodrat	5	2	3	0	0	3	1
Peromyscus boylii Brush mouse	8	4	6	1	1	4	4
Peromyscus californicus California mouse	24	11	21	2	1	12	12
Tamias merriami Merriam's Chipmunk	9	2	7	0	0	3	3

3 TAME, 2 NEFU escapes before complete examination

Grid 7 – Marsh (near Wilder Beach)

Mammal Name	Number Captured	Number Recap	Adult	Sub-adult	Juvenile	Male	Female
Microtus californicus California vole	33	3	13	19	0	18	14
Peromyscus maniculatus Deer mouse	18	6	17	1	0	10	8
Rattus rattus Black Rat	1	0	0	1	0	1	0
Reithrodontomys megalotis Western harvest mouse	2	0	2	0	0	1	1

1 escaped before complete examination

Grid 8 – Sandhills (Survey conducted by Caitlin Bean)

Mammal Name	Number Captured
Chaetodipuss californicus California pocket mouse	5+
Neotomus fuscipes Dusky-footed woodrat	9
Peromyscus californicus California mouse	10+
Peromyscus maniculatus Deer mouse	9+
Peromyscus truei Pinyon mouse	12+
Tamias merriami Merriam's chipmunk	1

Between the eight different habitat types where a small mammal survey was conducted, twelve different species were encountered. These are *Chaetodipus californicus, Microtus californicus, Neotoma fuscipes, Peromyscus boylii, Peromyscus californicus, Peromyscus maniculatus, Peromyscus truei, Rattus rattus, Reithrodontomys megalotis, Sorex trowbridgii, Sylvilagus bachmani,* and *Tamias merriami.* The mixed evergreen forest had the most diversity with seven species and the sandhills came in a close second with six different species. The oak woodland and chamise communities each had a total of five species. The prairie had the least diversity with only one species being found there. The mammals caught in the different habitat types were representative with no surprises.

Neotoma fuscipes and *Peromyscus californicus* were the most widespread being found in six different habitat types. *Microtus californicus* and *Peromyscus boylii* had a decent representation in four of the habitats. *Chaetodipus californicus* was found only in the Sandhills (during Caitlyn's survey), and *Sylvilagus bachmani* was caught only in the chamise grid. One *Sorex trowbridgii* was found in a trap at the mixed evergreen site. This is unusual since these fossorial mammals are usually only caught in pit traps, so this incident does not necessarily mean that this species is not found in other habitats of the park.

431 total animals were caught in our traps. Eighteen of these escaped before they could be completely processed. This total also does not take into consideration the two babies that were born to a *Peromyscus* mother in the trap overnight, or the rubber boa or the grey fox that were trapped. With a total of 2500 trap nights (the number of traps used multiplied by the number of nights trapping occurred) this is 17.24% trap success, which is considered to be standard.

The general health of the mammals observed in-hand was good to very good. Some of the small rodents had fleas and ticks and one had a botfly hole. A few others had broken or scruffy tails or tattered ears, but judging by other small mammal trapping efforts in California, the large majority of animals were in good condition.

Caitlin did not catch or see any sign of *Dipodomys venustus* in the sandhills which were known to exist there in 1990 (Bean 2001).

See Appendix D for copies of datasheets from IMAP's survey and Caitlin's survey.

B.) Track Plates

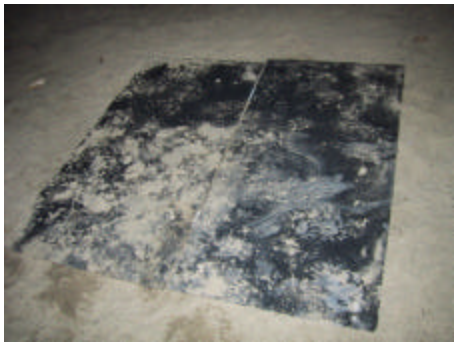
The track plating method proved to be reasonably successful. Seven of the sixteen track plates had mammal prints that could be identified to species. Unfortunately, none were positively identified as one of our four target species (Western spotted skunk, *(Spilogale gracilis*), Long-tailed weasel, *(Mustela frenata*), American Badger *(Taxidea taxus*), and Ringtail *(Bassariscus astutus*)). The prints found on Track Plate 1 located under the historic barn in the ranch complex could possibly be those of the spotted skunk or a younger striped skunk. Track Plate 8 was placed in an area where long-tailed weasel scat had been found earlier in the season, but no tracks were found on these plates during this survey.

All the equipment necessary for sooting the plates is available through the maintenance department. Special thanks to Jim Pfluger and his maintenance staff for providing the equipment and training necessary to prepare our track plates. Several plates can be sooted at the same time and then stored several weeks for later use.

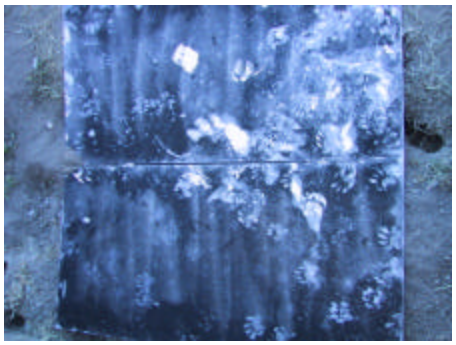
No mammal tracks were found on the plate located in the Scaroni prairie on the second terrace. This was interesting since we caught 72 *Microtus californicus* during our small mammal live trapping survey that was conducted a bit further inland along the same road on the third terrace. Raptors are usually seen flying over the third terrace but not the second, which was why a track plate was located at this site. After discussion with Tim Hyland, we realized the reason was that the second terrace, being closer to the coast, gets more moisture so the ground is too soft to support burrowing animals.

Track plates can be a useful tool when determining presence of certain species. When notified of a potential sighting, track plates can easily be laid in the area to verify presence of the species.

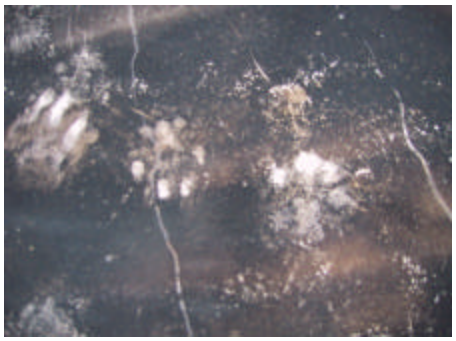
Following is a short summary of the tracks observed on each of the track plates, with a brief heading describing the location and habitat type.



Track Plate 1 – Historic Barn (Riparian)
Skunk - track size appears small enough to be Spotted skunk but positive identification was not possible
Raccoon (*Procyon lotor*)- several, probably three individuals, one adult and two younger
Opossum (*Didelphis virginiana*)
Small rodent

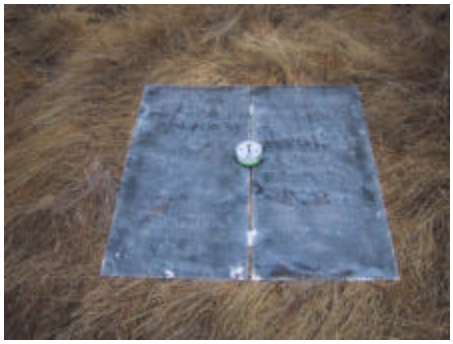


Track Plate 2 – Historic Cabin (Riparian)
Striped skunk (*Mephitis mephitis*)
Raccoon (*Procyon lotor*)
Small rodent
Unidentified scuff marks, possible feral pig

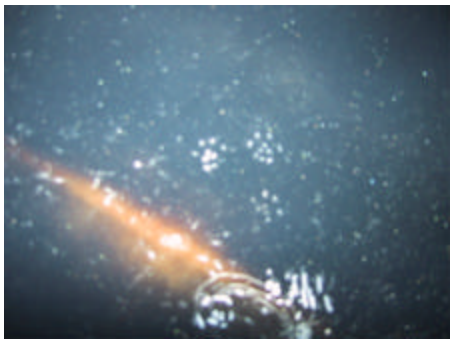


Track Plate 3 – Wilder Beach Natural Preserve (Wetland)
Bobcat (*Felis rufus*)- also left behind scat, entrails from brush rabbit and head of gopher
Small rodents
Insects

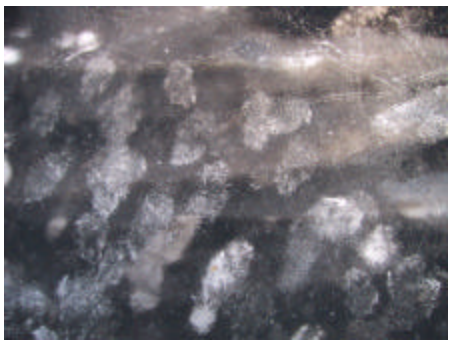
Track Plate 4 – Agricultural Field by Culvert (Riparian)
Western gray squirrel (*Sciurus griseus*)



Track Plate 5 – Scaroni Prairie (Grassland)
Insects
Morning dew drops

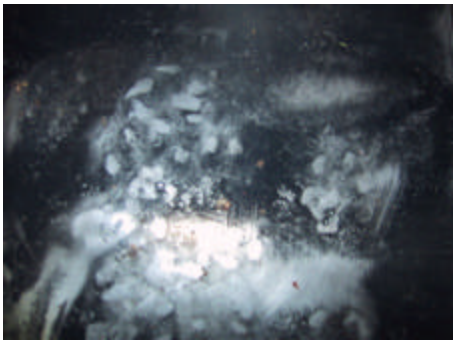


Track Plate 6 – Scaroni Dam
(Redwood Riparian)
Small rodents
Insects
Banana slug



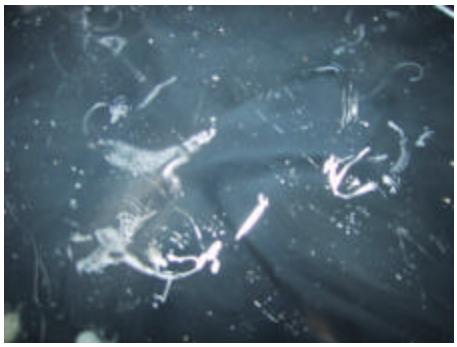
Track Plate 7 – Three Mile Pump House
(Wetland)
Rabbit, probably *Sylvilagus bachmani*
Saw Raccoon tracks in mud nearby

Track Plate 8 – Twin Oaks footbridge
(Oak Woodland- dry creek bed)
Small rodent
One unidentified blurred print
Large frog seen near plate



Track Plate 9 – Twin Oaks forest edge
(Oak woodland)
Small rodents
Unidentified prints

Track Plate 20 – Enchanted Loop One
(Redwood riparian)
Insects
Plate wiped clean by beetles



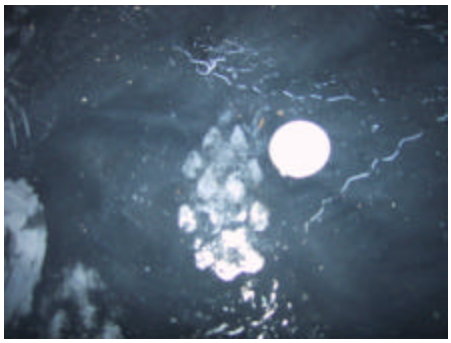
Track Plate 21 – Enchanted Loop Two
(Redwood riparian)
Raccoon *(Procyon lotor)*
Rough-skinned newts *(Taricha granulose)*
Whole body prints, not just foot tracks

Track Plate 22 – Enchanted Loop Three
(Redwood riparian)
Small rodents
Insects

Track Plate 23 – Sandhills Bridge West
(Redwood riparian)
Small rodent
Unidentified lizard
Insects

Track Plate 24 – Sandhills Bridge East
(Redwood riparian)
Unidentified claw marks
Small rodent
Insects

Track Plate 25 – Old Cabin Trail Left
(Redwood ephemeral creek)
Western gray squirrel (*Sciurus griseus*)
Coyote (*Canis latrans*)



Track Plate 26 – Old Cabin Trail Right (no pictures were taken)
(Redwood ephemeral creek)
Insects

See Appendix E for copies of the original datasheets.

C.) Trip Camera

The first roll of film came out with pictures of butts (we kept setting off the camera as we prepared the site) and what appeared to be blank shots. Small animals such as small rodents or lizards kept setting off the camera proving that the camera was working but also that it was highly sensitive.

The camera was set to go off every three minutes so that if some inquisitive animals stayed in the area, a whole roll of film would not be wasted. Even then, we captured a series of raccoons and an opossum:

We also captured a shot of one of the local barn cats:

But the best shot is the following (check out the woodrat in the bobcat's mouth):

D.) List of Species

This list is compiled from the small/meso and marine mammal surveys conducted as well as actual observations of IMAP staff during the course of the project work performed at Wilder Ranch State Park during 2001-2002.

Mammals at Wilder Ranch SP

Order **Family** **Scientific Name**	**Common Name(s)**	
DIDELPHIMORPHIA		
Didelphidae		
Didelphis virginiana	Virginia Opossum	Picture
INSECTIVORA		
Soricidae		
Sorex trowbridgii	Trowbridge's Shrew	Trapped
Talpidae		
Neurotrichus gibbsii	Shrew-mole	Collected specimen

Scapanus latimanus	Broad-footed Mole	Observed sign
CHIROPTERA		
Vespertilionidae		
Corynorhinus townsendii	Townsend's Big-eared Bat	Observed
LAGOMORPHA		
Leporidae		
Sylvilagus bachmani	Brush Rabbit	Collected specimen
Sylvilagus audubonii	Audubon's Cottontail	
Lepus californicus	Black-tailed Jackrabbit	
RODENTIA		
Sciuridae		
Tamias merriami	Merriam's Chipmunk	Collected specimen
Spermophilus beecheyi	California Ground Squirrel	Observed
Sciurus griseus	Western Gray Squirrel	Tracks
Geomyidae		
Thomomys bottae	Botta's Pocket Gopher	Observed
Heteromyidae		
Chaetodipus californicus	California Pocket Mouse	Trapped
Muridae		
Reithrodontomys megalotis	Western Harvest Mouse	Collected specimen
Peromyscus californicus	California Mouse	Collected specimen
Peromyscus maniculatus	Deer Mouse	Collected specimen
Peromyscus boylii	Brush Mouse	Collected specimen
Peromyscus truei	Pinyon Mouse	Collected specimen
Neotoma fuscipes	Dusky-footed Woodrat	Collected specimen
Rattus rattus	Black Rat	Trapped
Microtus californicus	California Vole	Collected specimen
CARNIVORA		
Canidae		
Canis latrans	Coyote	Tracks
Urocyon cinereoargenteus	Gray Fox	Trapped
Phocidae		
Phoca vitulina	Harbor Seal	Observed

CARNIVORA		
Procyonidae		
Procyon lotor	Raccoon	Picture
Mustelidae		
Mustela frenata	Long-tailed Weasel	Found scat
Enhydra lutris	Sea Otter	Observed
Mephitidae		
Mephitis mephitis	Striped Skunk	Tracks
Felidae		
Puma concolor	Mountain Lion	Visitor observed
Lynx rufus	Bobcat	Picture, Tracks
ARTIODACTYLA		
Cervidae		
Odocoileus hemionus	Mule Deer	Observed

IV.) Data Management

Copies were made of the data sheets and included in this report. The originals are located in the filing cabinet at the IMAP office at the Resources Building in Sacramento. The original data was also transferred to a Microsoft Excel spreadsheet. The report, GPS rover files, digital photos and GIS project files are stored on one of the headquarters server in the IMAP directory and is backed up nightly.

In addition to this printed report is a CD containing:

- a copy of the report.
- GPS rover files (corrected)
- Digital pictures
- GIS project files in ArcView3.2

An extra copy of the CD will also be kept in the official IMAP files at Headquarters.

V.) Recommendations

With existing data, observations by the IMAP team and Park Personnel, and the survey work performed during this project, a baseline inventory list of mammals has been compiled. Mammals that are arboreal, aerial and fossorial require special survey techniques, which were not conducted due to time and budget constraints. Other species

that are cryptic or elusive may exist within the park boundary, but were not observed or caught using the many techniques employed during this project. The data collected can however, be used as baseline information to detect changes in species composition and abundance over time.

Monitoring programs are designed to detect changes and to predict trends in natural resources, in this case, the mammals of Wilder Ranch SP. Time and budget permitting, the initial work should be continued to survey for the other mammal groups not surveyed for during the initial study.

Time constraints limited the survey conducted in 2001 to a two-week time frame in the fall season. Trapping should be conducted during all four seasons in order to get a complete picture of all the species occurring within the Park. A relationship has been established with Dr. Douglas Kelt at UC Davis, so subsequent trapping surveys can be conducted for the winter, spring and summer seasons as well as all ongoing monitoring in following years.

Our recommendation is to conduct mammal surveys every three to five years in order to determine the overall health and abundance of these many species. All subsequent monitoring should be done at the same sites using the same methods as the original survey. The number of traps, type of trap, bait, and time of day should all be consistent for all trapping occasions. Biotic factors and environmental conditions can greatly skew the results; therefore, it is also important to trap during the same season to have comparative data to analyze. Trends can be derived when data is collected using comparable methodology during each sampling period.

When targeting a specific species, researching their natural history is important since some mammals vary considerably in their seasonal behaviors including hibernation and estivation.

VI.) References

Bean, Caitlin. 2001. Taxonomy, distribution, and demography of the Santa Cruz kangaroo rat (*Dipodomys venustus venustus*). Unpublished Master's proposal. Dept. of Environmental Studies. California State University, San Jose.

Cooperrider A. Y., R. J. Boyd, and H. R. Stuart, eds. 1986. Inventory and monitoring of wildlife habitat. U. S. Dept. Inter., Bur. Land Manage. Service Center. Denver, CO; 858 p.

Ingles, Lloyd G. 1965. Mammals of the Pacific states. Stanford University Press. Stanford, CA; 506 p.

Jameson, E. W. and Hans J. Peeters. 1988. Mammals of California. University of California Press. Berkeley, CA; 403 p.

Wilson, Don E., et al, eds. 1996. Measuring and monitoring biological diversity: standard methods for mammals. Smithsonian Institution Press. Washington, D. C.; 409 p.

Zeiner, David C., et al, eds. 1990. California's wildlife: volume 3, mammals. California Statewide Wildlife Habitat Relationships System. Department of Fish and Game. Sacramento, CA; 407 p.

Zielinski, William J. and Thomas E. Kucera. 1995. American marten, fisher, lynx, and wolverine: survey methods for their detection. Gen. Tech. Rep. PSW-GTR-157. Albany, CA: Pacific Southwest Research Station, Forest Service, U. S. Department of Agriculture; 163 p.

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