



# Assessing Recreational Use and the Need for Enforcement on HCP Preserves

Betsy Miller

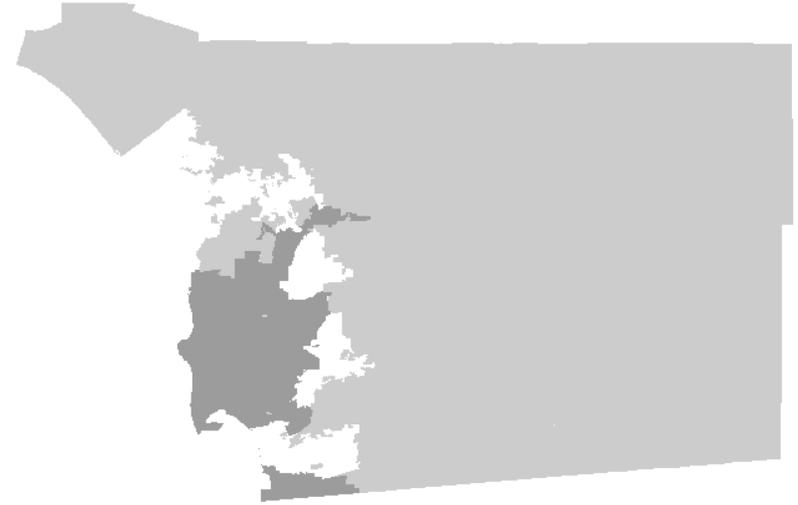
San Bernardino Valley Water  
Conservation District



# Overview

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- Multiple Species Conservation Program
  - Background
  - Setting
- Recreational Use Study
- Recommendations for Future Plans



Location

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# Multiple Species Conservation Program

- Adopted 1997
- Federal Habitat Conservation Plan
- California Natural Communities Conservation Plan



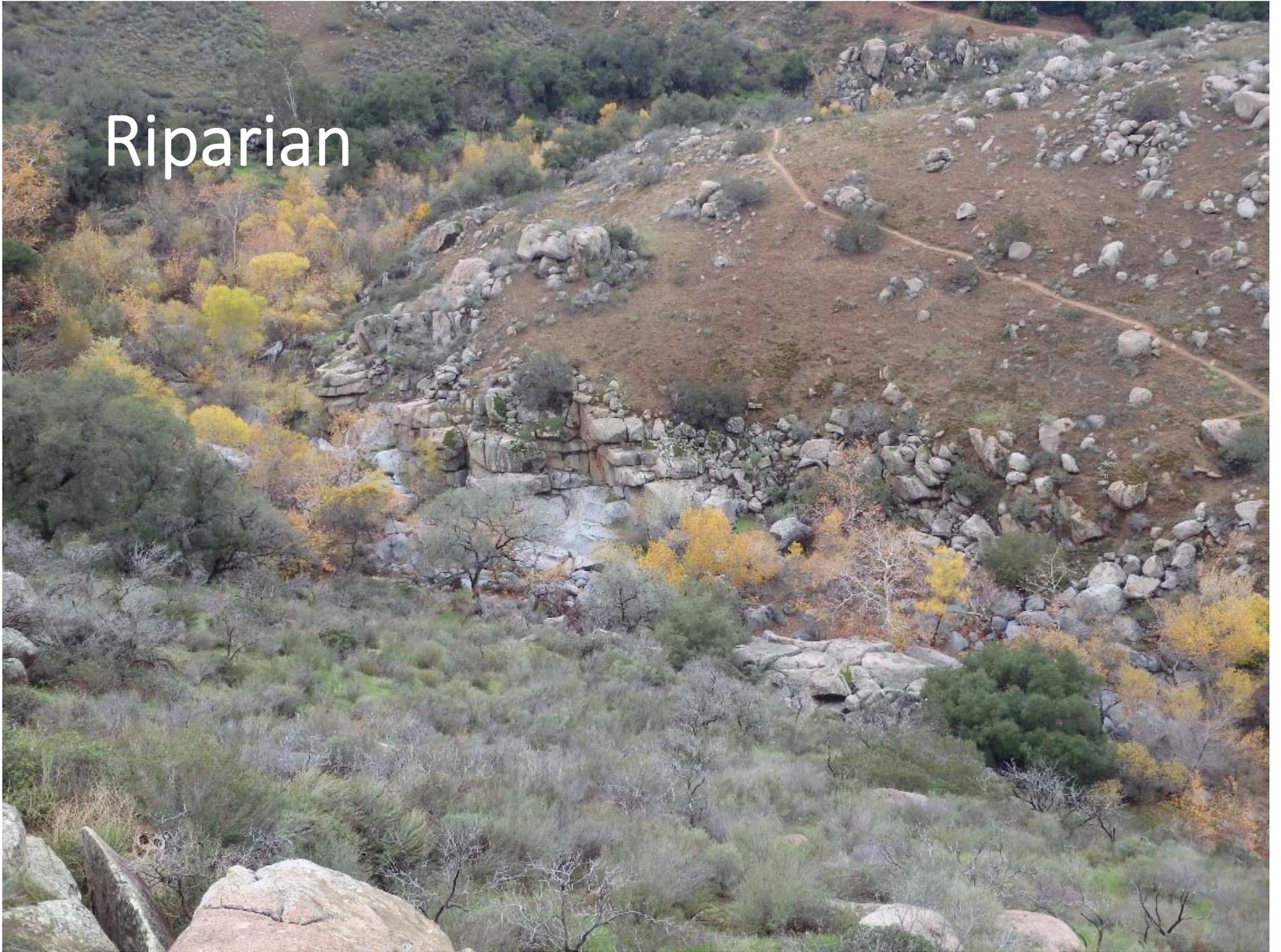
# Chaparral



# Coastal Sage Scrub



Riparian



# Vernal Pools



# Preserve System

- 50,000 acres
- 27,000 acres open to the public
- 85 rare/threatened/endangered species
- 178 trailheads
- 225 trail miles



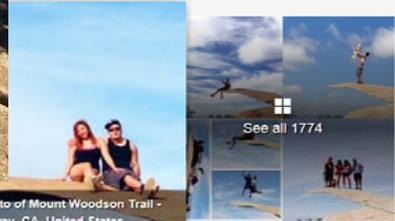








US



(858) 668-4770

- "A lot of **parking** and a variety of activities to enjoy inside this beautiful park, but we went to hike Mount Woodson." in 161 reviews
- "Our total mileage was 11.4 from where we parked at Lake Poway up to **potato chip rock** and back." in 321 reviews
- "wear pants instead of shorts if you're planning on boulder climbing or **taking pictures** on the potato chip." in 17 reviews

Photo of Mount Woodson Trail - Poway, CA, United States

Work here?

**Hours**

**More business info**

# Multiple Species Conservation Program

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1. To **ensure the long-term viability** and sustainability of **native ecosystem function** and natural processes throughout the MHPA.

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2. To **protect the existing and restored biological resources** from intense or disturbing activities within and adjacent to the MHPA while **accommodating compatible public recreational uses**.

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3. To enhance and restore, where feasible, the full range of native plant associations in strategic locations and functional wildlife connections to adjoining habitat in order to **provide viable wildlife and sensitive species habitat**.

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4. To **facilitate monitoring of selected target species, habitats, and linkages** in order to ensure long-term persistence of viable populations of priority plant and animal species and to ensure functional habitats and linkages.

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5. To provide for **flexible management** of the preserve that can **adapt to changing circumstances** to achieve the above objectives.

# Multiple Species Conservation Program

- MSCP Subarea Plan Section 1.5.2:

Limit recreational uses to passive uses such as birdwatching, photography and trail use.





# WARNING

LEWD ACTS  
IN PUBLIC PLACES  
ARE UNLAWFUL

ALL AREAS  
WITHIN THIS PARK  
ARE PUBLIC PLACES

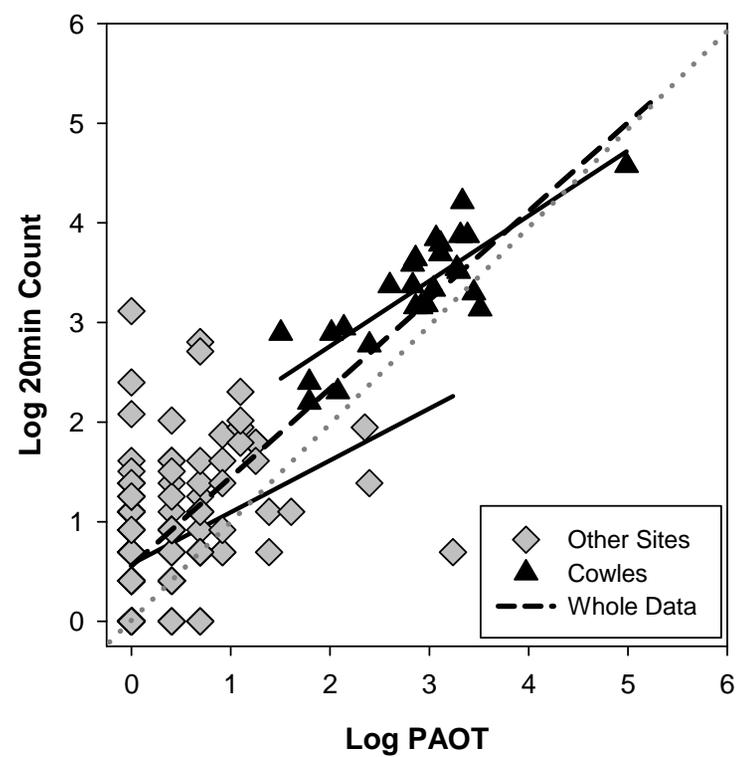
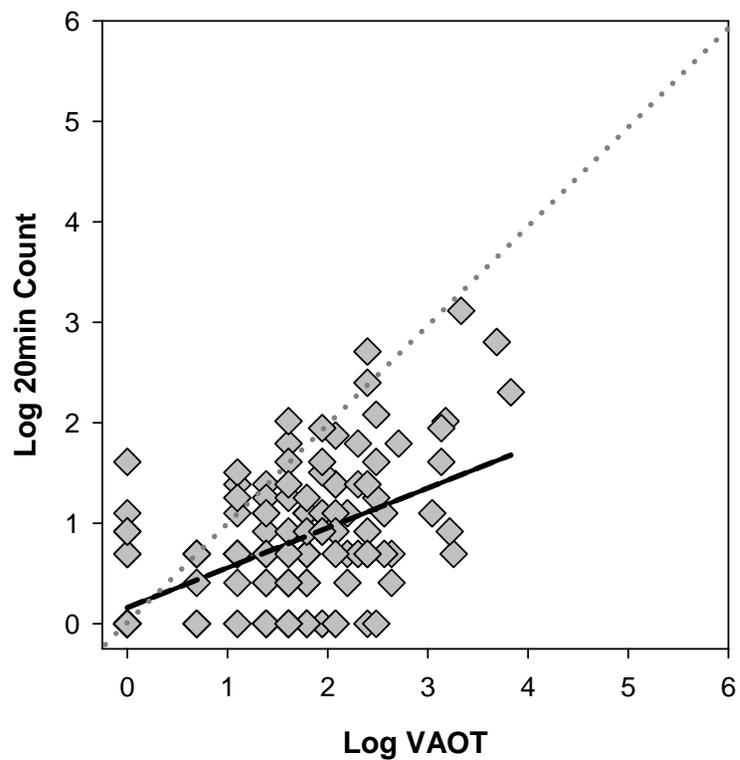


# Park Use Study

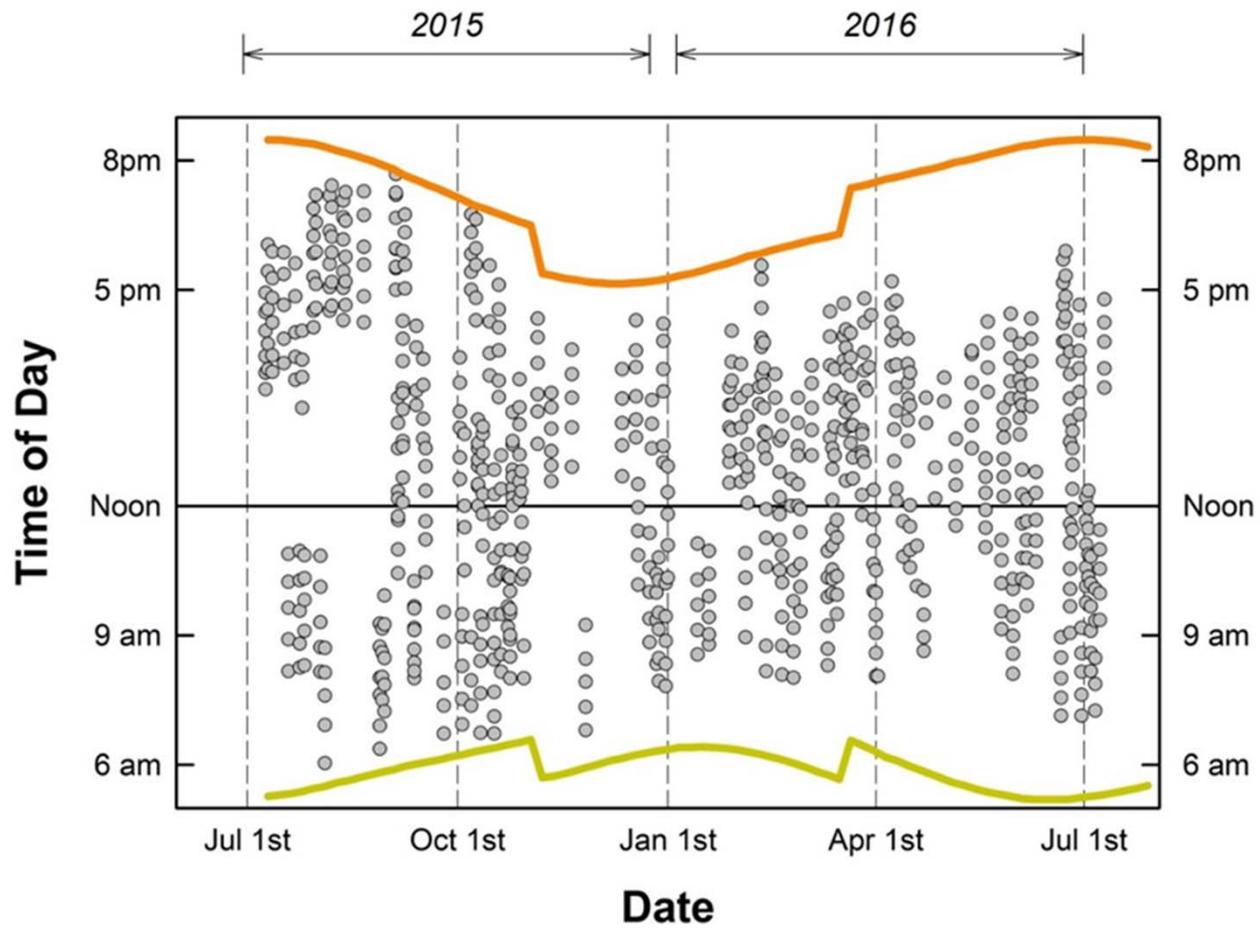
- Multiple access points
- Park use varies by
  - Park
  - Trailhead
  - Time of day
  - Day of week
  - Season
  - Weather
  - School schedule
  - Work schedule
  - Holidays



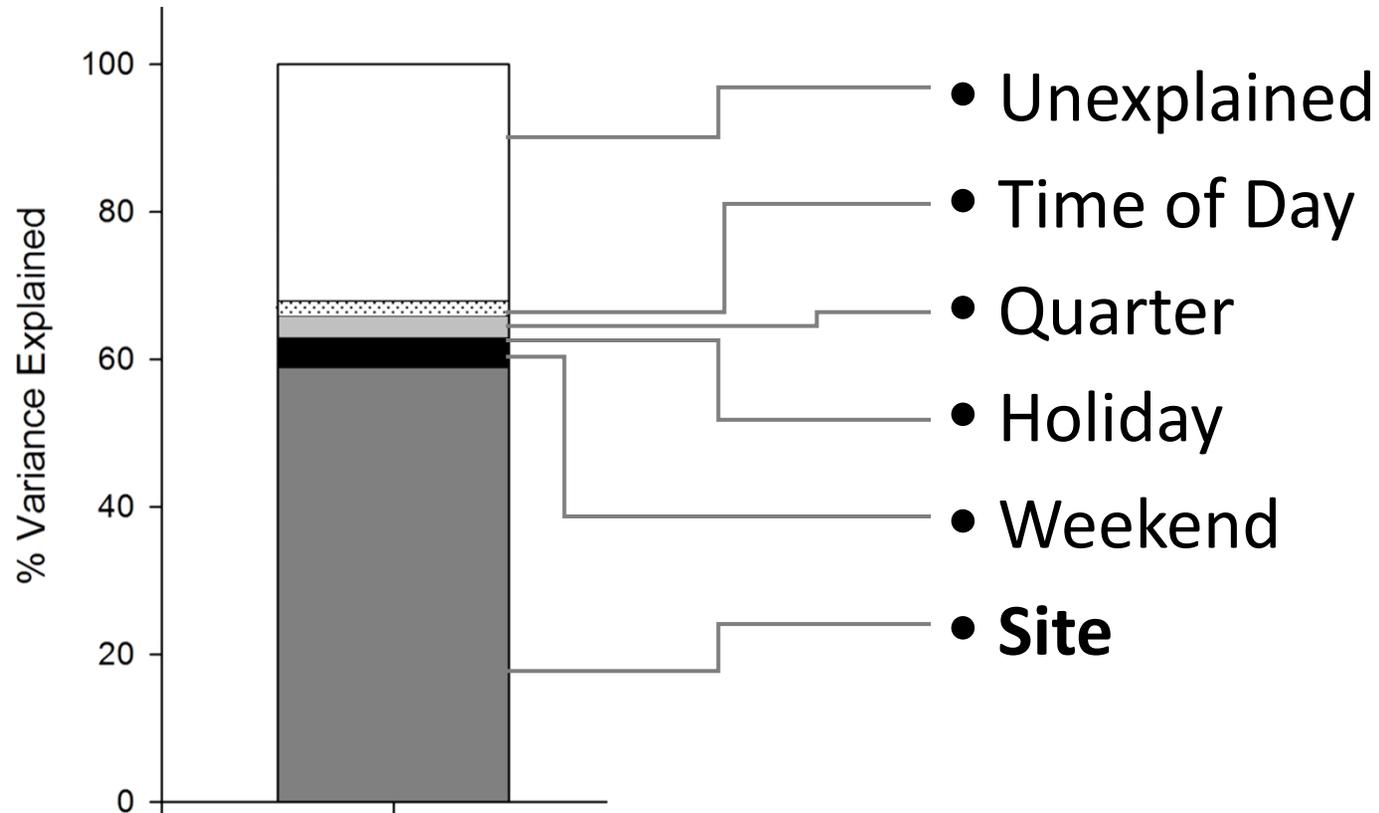
# Protocol Development



# Data Collection

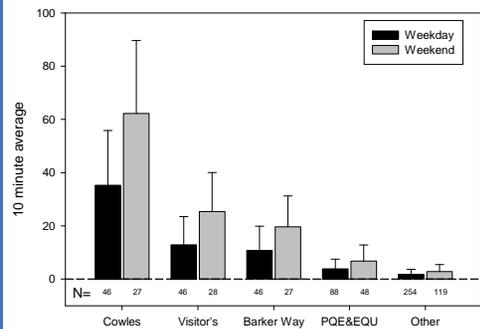
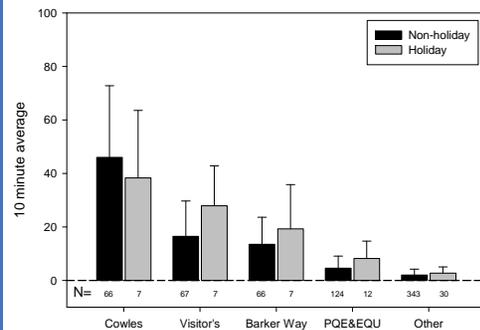
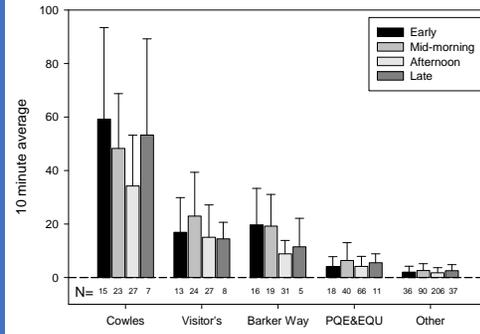
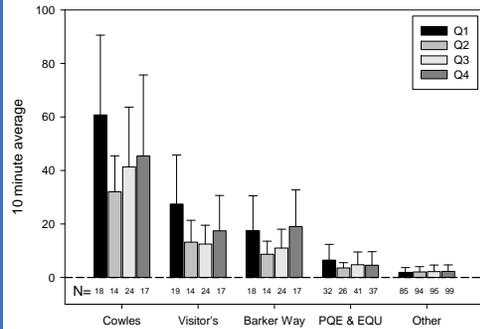


# Factors Driving Use



# Four Factor Model

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8 Million  
Annual  
Visits

= Attendance at 81 San Diego Padres home games

= Twice the visitation at the San Diego Zoo

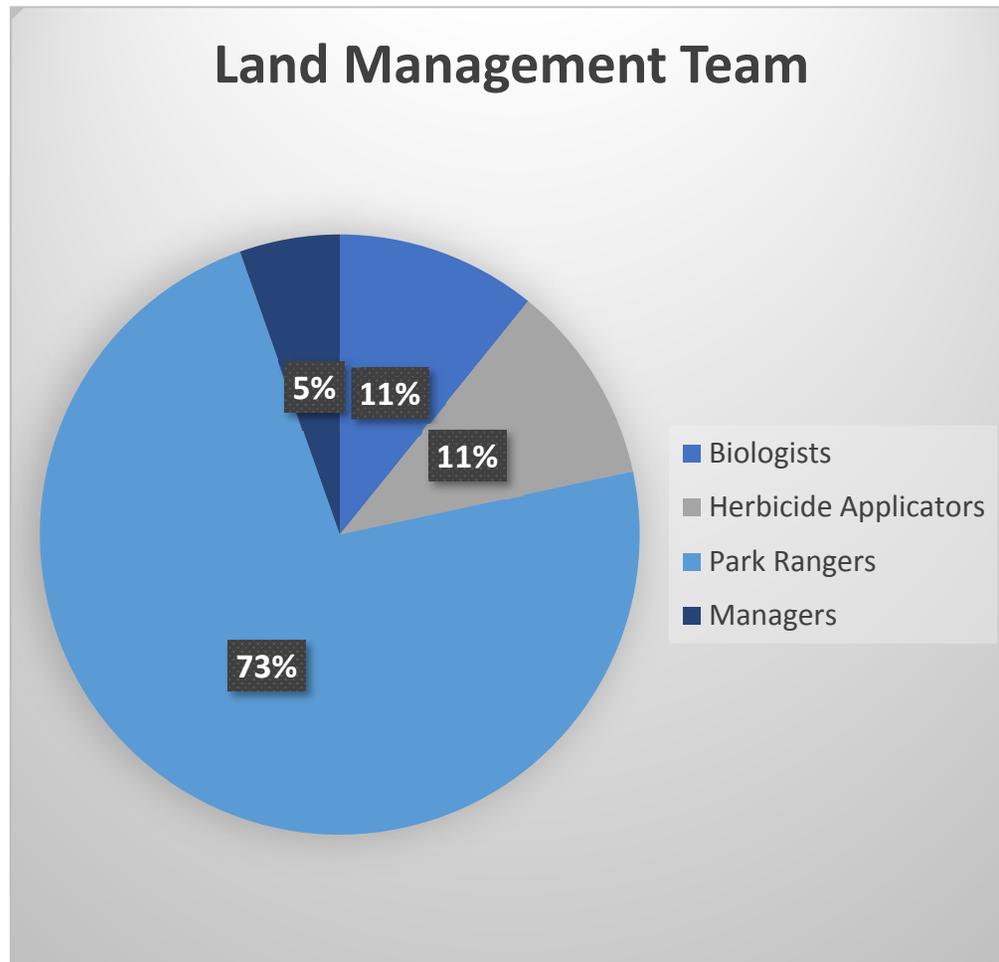
= Combined visitation of Yellowstone and Yosemite (2,969,876 acres of park area)



# Recommendations

- Recognize and evaluate recreational use on HCP preserves as part of the planning process
- Integrate rangers and biologists into seamless land management teams
- Allow for adaptive staffing to meet real land management needs

# Adaptive Staffing



- 2 FTE Managers
- 4 FTE Biologists
  - Includes two part-time interns
- 4 FTE Herbicide Applicators
- 27 FTE Park Rangers

# The Pros of Recreation

- Health benefits
- Mental health benefits
- Environmental education
- Building future stakeholders
- Political capital for HCPs



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# Questions





# Problem Statement

- Problem Statement:

**Why is this important? Why is this hard?**

The gathering of information on visitor use patterns is essential for facilities planning, determination of demand trends, and calculation of the social/economic/political importance of the recreational use.

(Wolf et al. 2012. Visitor monitoring along roads and hiking trails: How to determine usage levels in tourist sites. *Tourism Management* 33 16-28.

Data on public use of parks and protected areas are important for most aspects of management. In addition, natural resource protection is partially dependent on visitor use type and volume.

(Eagles et al. 2000. Estimating the Tourism Volume and Value in Parks and Protected Areas in Canada and the USA. *The George Wright Forum* 17(3).

Data on visitor use are essential to the planning and management of National Park units in order to assess visitor impacts to the resource

(Pettebone et al. 2010. Estimating visitor use at attraction sites and trailheads in Yosemite National Park using automated visitor counters. *Landscape and Urban Planning* 97 229–238

AILS  
RK



# Problem Statement

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**Why is this important? Why is this hard?**

There is no accepted international standard for public use measurement in parks and protected areas.

(Eagles et al. 2000. Estimating the Tourism Volume and Value in Parks and Protected Areas in Canada and the USA. The George Wright Forum 17(3).

Typical visitor use patterns in protected areas are patchy where visitor numbers, their activities, group sizes and the locations and facilities that they use vary in time and space

(Wolf et al. 2012. Visitor monitoring along roads and hiking trails: How to determine usage levels in tourist sites. Tourism Management 33 16-28.

Lack of funding and personnel time, logistical problems and lack of training about available methods to collect and analyze visitation data have been identified as primary reasons why visitor use has not been measured more systematically in national parks and related protected natural areas

(Pettebone et al. 2010. Estimating visitor use at attraction sites and trailheads in Yosemite National Park using automated visitor counters. Landscape and Urban Planning 97 229–238

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# Common Approaches

- Literature provide a fairly robust collection of methods/approaches
- Number of users, types of use, intensity, impact, and value are potentially different metrics – so care should be given to objectives of any monitoring program.
- Use patterns are structured (specific places, times etc) so random sampling is inefficient





# Common Approaches

- Sampling should be structured in some way to allow matching effort to high value sites/times
- Automated sensors (beam counters, pressure plates, induction loops, and even social media) are an important emerging tool
- Often multiple sources of data are synthesized in a statistical or simulation model. Calibration among types or models is required.





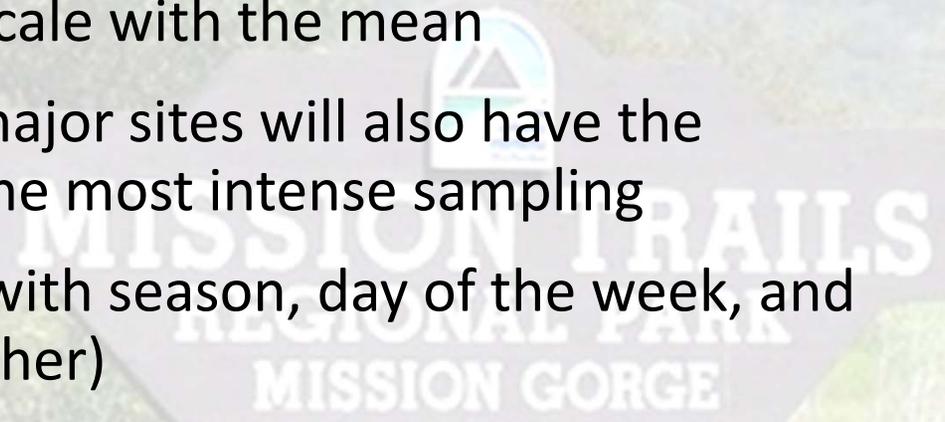
# Common Approaches

$$\text{Site total} = \sum_{d=1}^{365} \sum_{t=6am}^{9pm} \text{Count}$$

$$\text{Total} = \sum A_{\text{Total}} + B_{\text{Total}} + C_{\text{Total}}$$

**Implications for  
Precision**  
(i.e. Variance of a Total)

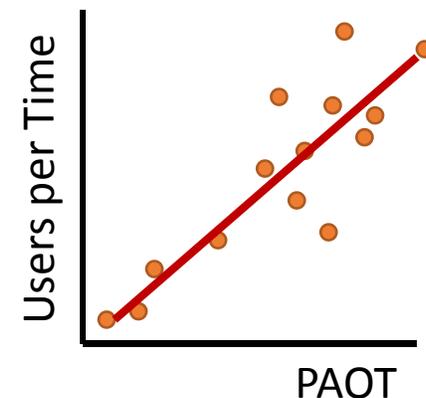
- The total will be most influenced by major sites at peak periods
- We are collecting count data (visitor numbers) and we expect the variance to scale with the mean
- Thus, those peak times at major sites will also have the largest variance and need the most intense sampling
- These peak times will vary with season, day of the week, and time of day (as well as weather)





# Initial Recommendations

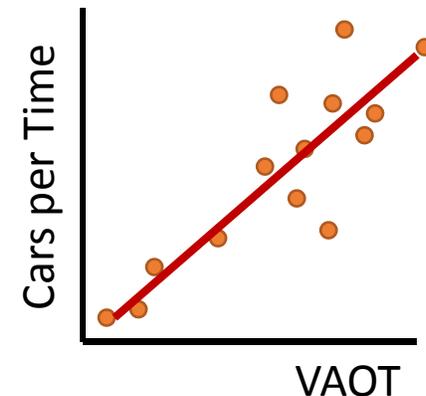
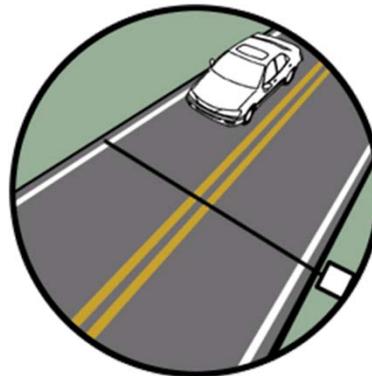
- **PAOT and 1-way passage:**
  - When arriving at a predetermined location, scan the sample region (a defined radius or polygon) and record PAOT.
  - Count number of individuals that pass a reference point on a trail or access point for a fixed time
  - Repeat PAOT at the end of the counting period (to adjust for increasing or decreasing use)



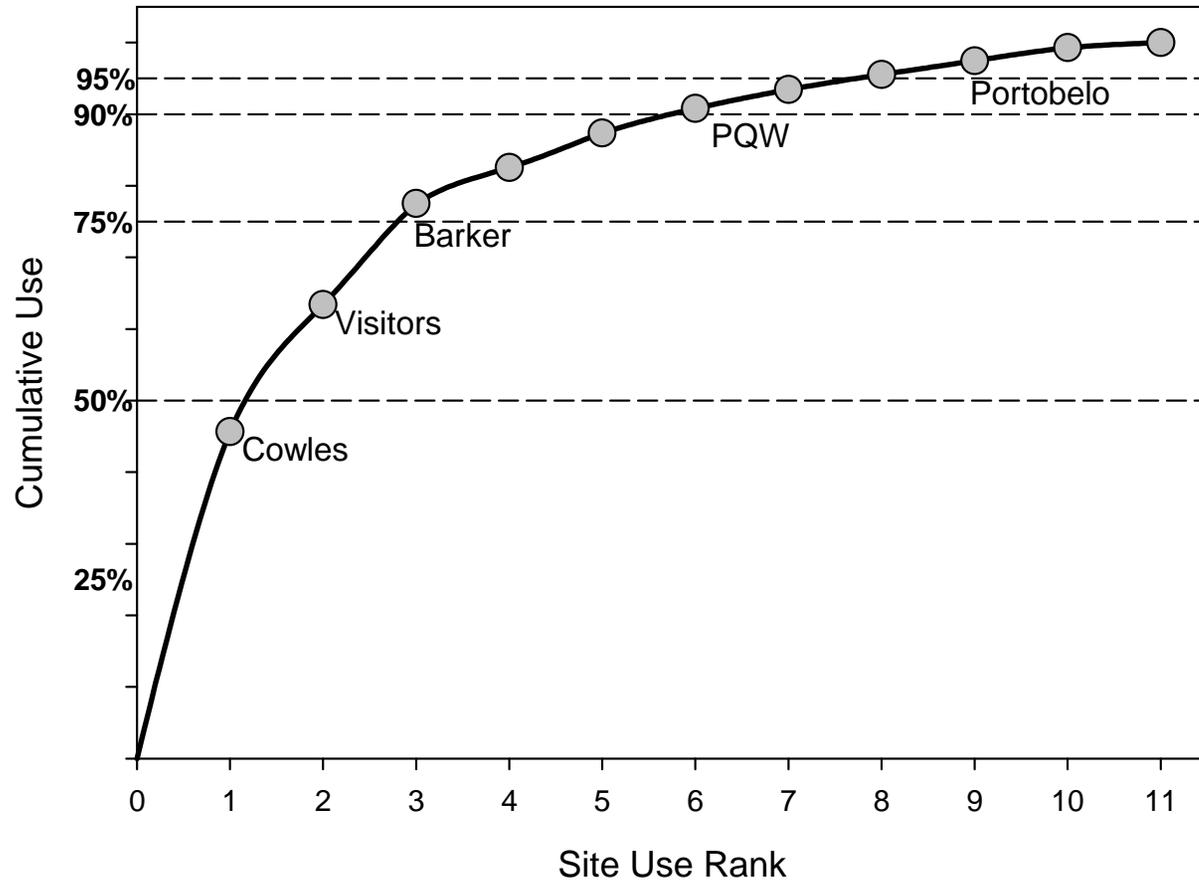


# Initial Recommendations

- VAOT and 1-way passage:
  - When arriving at a predetermined location, scan the sample region (a defined radius or polygon) and record VAOT.
  - Count number of vehicles (cars) that pass a reference point on a trail or access point for a fixed time
  - Repeat VAOT at the end of the counting period (to adjust for increasing or decreasing use)



# Site



<b>Site</b>	<b>Cowles</b>	<b>Barker Way</b>	<b>Vis. Center</b>	<b>Equest /PQE</b>	<b>Others</b>
Average ± SD	45.8 ± 26.4	14.0 ± 10.9	17.6 ± 13.6	4.89 ± 4.82	2.12 ± 2.18
Median [IQR]	39 [27.5 - 57]	10 [6.5 - 20.5]	13 [8 - 22.5]	3.5 [2 - 6]	1.5 [0.5 - 3]
Sample Size	n = 72	n = 71	n = 74	n = 135	n = 373
<b>GLM</b>	<b>F ( p value)</b>				
Quarter	7.65 (<.001)	4.28 (0.004)	8.73 (<.001)	1.37 (0.255)	1.03 (0.381)
Weekend	33.2 (<.001)	17.1 (<.001)	34.5 (<.001)	17.0 (<.001)	25.5 (<.001)
Holiday	0.000 (0.971)	5.38 (0.024)	11.2 (0.002)	12.3 (<.001)	7.04 (0.008)
Time of Day	11.0 (<.001)	10.4 (<.001)	6.47 (<.001)	3.41 (0.020)	5.23 (0.002)
<b>Model R<sup>2</sup></b>	56.6%	52.8%	55.1%	23.4%	10.6%

**64 bins/strata**

Include quarter of the year (4 levels), time of day (4 levels), weekday/ weekend (2 levels) and holiday/non-holiday (2 levels).

$4*4*2*2= 64$  unique bins/ time slices though out the year.

10 minute visitor entries were estimated for each bin using an additive general linear model (GLM)

**2016 Calendar for Day Multiplier**

Number of days in 2016 belonging to each bin

Quarter	Weekend No		Weekend Yes		Total
	Hol = N	Hol = Y	Hol = N	Hol = Y	
1	63	2	26	0	91
2	64	1	26	0	91
3	64	2	26	0	92
4	62	3	24	3	92
<b>Total Days (Leap Year)</b>					<b>366</b>

**Model Estimate**

10 minute visitor entries estimated for each bin using an additive general linear model (GLM)

**10 Minute Multipliers**

Number of 10 minute time slices in each time class

Time Class	Length	Multiplier
1	1.5 hrs	9
2	3 hrs	18
3	5 hrs	30
4	2 hrs	12

Holiday	Weekend	Quarter	Time Class	Model Estimate	Day Multiplier	10 Minute Multiplier	Adjusted Estimate
N	N	1	1	67.8	63	9	=E23*F23*G23
N	N	1	2	54.5	63	18	61,787
N	N	1	3	39.1	63	30	73,991

**Adjusted Estimate**

Number of visitor entries estimated for each of the 64 bins.

Y	Y	4	3	46.2	3	30	4,155
Y	Y	4	4	85.3	3	12	3,073

**Grand Total**

The sum of all 64 individual estimates.

Grand Total =SUM(H23:H86)