Midpeninsula Regional
Open Space District

Memorandum

DATE: August 9, 2023

MEMO TO: Board of Directors

THROUGH: Ana Ruiz, General Manager

FROM: Deborah Bazar, Management Analyst II, Visitor Services
           Matt Anderson, Chief Ranger, Visitor Services

SUBJECT: Total District Visitation Estimation for Calendar Year 2022

SUMMARY

This report summarizes the estimated visitation for the Midpeninsula Regional Open Space District (District) for calendar year 2022 based on the data collected by 26 visitor counters located at selected preserves. The total estimated number of visitors in 2022 is approximately 2,700,000. Historical information about the preceding two years is included for perspective.

DISCUSSION

In 2019, the Visitor Services Department began a project to estimate total visitation for the District's Open Space Preserves. Because of the large number of preserves and accompanying trail system with multiple access points per preserve, an index system was developed to estimate total visitation across the entirety of District lands.

Preserves are classified into four different categories based on similar use patterns, location, and other factors to allow one Representative Preserve to be selected for each category (Attachment 1). To determine the relative ratios between the Representative Preserves and the other preserves in their category, staff referenced a series of visitor estimate survey projects conducted by the Public Affairs Department between 2007 and 2011 (Attachment 2). In 2019 and 2020, Visitor Services staff conducted further analysis and ground truthing of visitation between preserves resulting in some updated visitation ratios.

There are certain preserves that are, for various reasons, not included in the categories mentioned above (Rancho San Antonio, Sierra Azul, Bear Creek Redwoods, and Ravenswood). Visitation counts for those preserves are included in this report but are derived directly from counters installed at those locations. Numbers for Sierra Azul and Bear Creek are determined from one counter located on Mt. Umunhum Road at gate SA39 and one counter located in the Bear Creek parking lot, respectively. Staff is currently investigating placing more counters at these preserves to improve the count accuracy. Ravenswood counts are represented by a trail counter located at the pedestrian bridge near Bay Road; vehicles using the preserve parking lot and pedestrians entering from Bay Road to visit Cooley Landing Park are not accounted for.

La Honda Creek Open Space Preserve was not part of the original Public Affairs surveys, so a relative ratio for estimating visitation was not available. At the inception of the project, La Honda was only partially open, and the visitation at the time was not considered significant enough to deploy counters, as it was very low compared to the other preserves and overall visitation. Now that the Upper and Lower portions of La Honda are open, staff has identified suitable locations to deploy counters at the preserve so that La Honda visitation counts can be included in future reports.

In late 2019 and early 2020, two types of counters were strategically deployed at the Representative Preserves:

- Pedestrian Counters: Infrared counters that send an invisible beam across a trail and monitor foot traffic through changes in the heat signature.

- Vehicle Counters: Magnetometers that measure vehicle traffic through changes in the magnetic field. Vehicle occupancy multipliers are applied to these counters to determine the number of *people* in those vehicles.

Counter Limitations and Correction Methodology
The counters collect data constantly and aggregate it daily. Both the pedestrian and vehicle counters can be finicky and experience errors or malfunctions that result in very low (or null) counts, or in some cases, extremely high counts. Reasons for these anomalous counts can include vandalism, theft, insects, dead batteries, collection errors, high winds, groups traveling very close together, and many other possible occurrences.

In 2021, Visitor Services staff partnered with IST Department staff to develop a machine learning (artificial intelligence) system that utilizes historical data, weather data, and pollution data to identify, predict, and correct counter errors. Because artificial intelligence systems improve their predictions as they receive more data, counts are recalculated every time new data is input. Therefore, numbers published in any report may look slightly different than previously published reports. Staff has determined the difference to be negligible, averaging a variance of 0.2%.

Total visitation counts for 2020, 2021 and 2022 by month and by preserve, with any appropriate data corrections, are provided in the charts and tables in the next section.

**Chart 1: Total Estimated District Visitation in 2020, 2021, and 2022**

Chart 1. Total Estimated District Visitation in 2020, 2021, and 2022
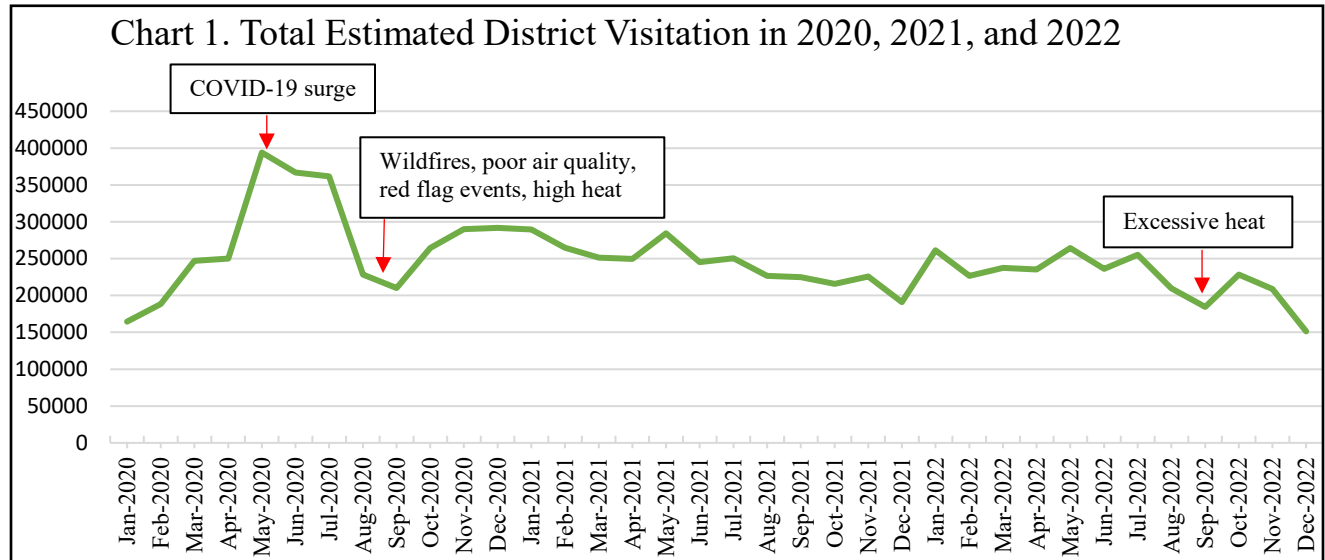
Table 1: Total Estimated Monthly Visitation in 2020, 2021, and 2022

Month	2020	2021	2022
Jan	164,316	289,783	261,190
Feb	188,562	264,660	226,805
Mar	247,143	251,262	237,349
Apr	249,909	249,789	235,149
May	393,956	284,325	264,492
Jun	366,796	245,153	236,106
Jul	361,750	250,540	255,081
Aug	228,511	226,480	209,484
Sep	210,061	224,940	184,542
Oct	264,453	215,947	228,515
Nov	290,088	225,941	208,608
Dec	291,743	190,959	151,291
Total	**3,257,288**	**2,919,779**	**2,698,612**

Chart 2: Total Estimated Visitation by Preserve in 2022

Chart 2. Total Estimated Preserve Visitation in 2022
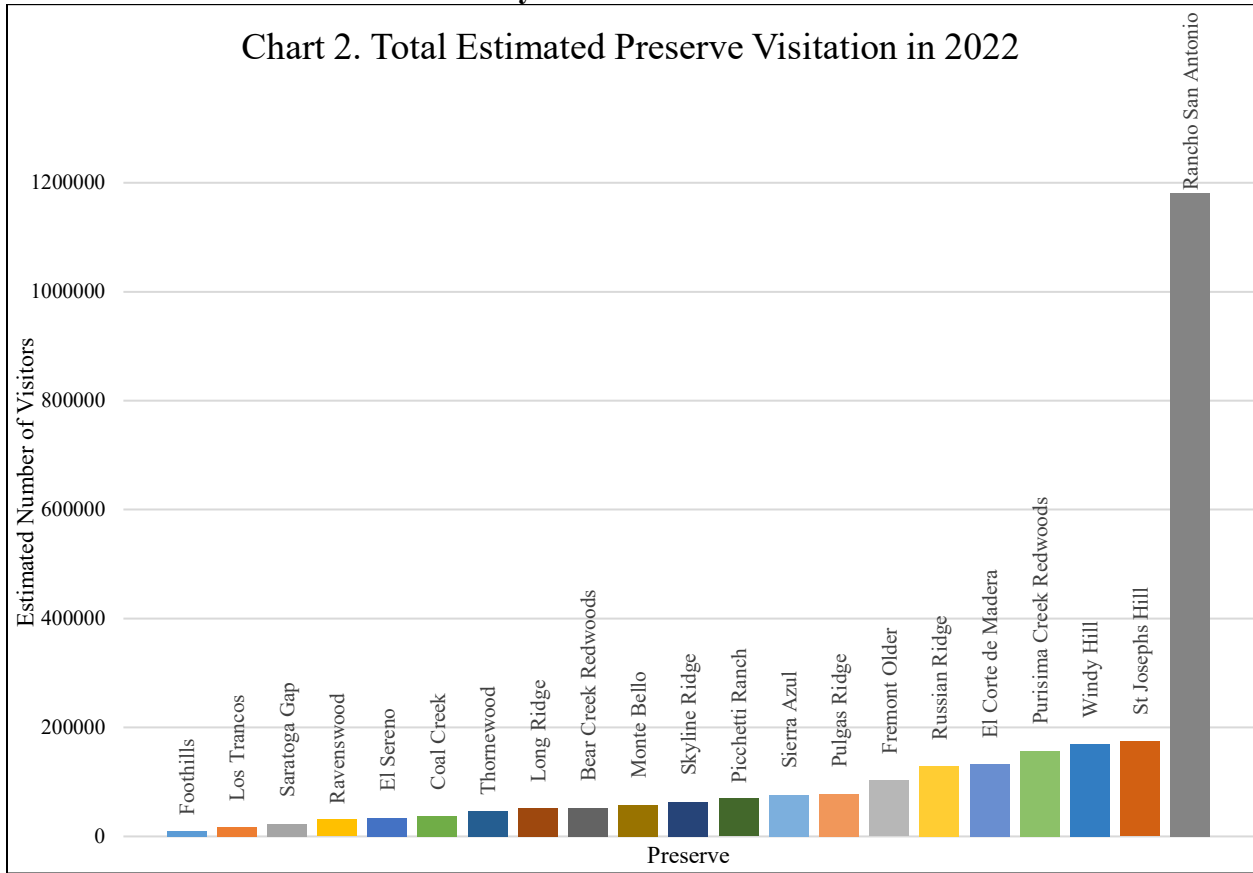
Chart 3: Total Estimated Visitation by Preserve in 2022
Excludes Rancho San Antonio Preserve and County Park

Chart 3. Total Estimated Preserve Visitation in 2022, excluding Rancho San Antonio
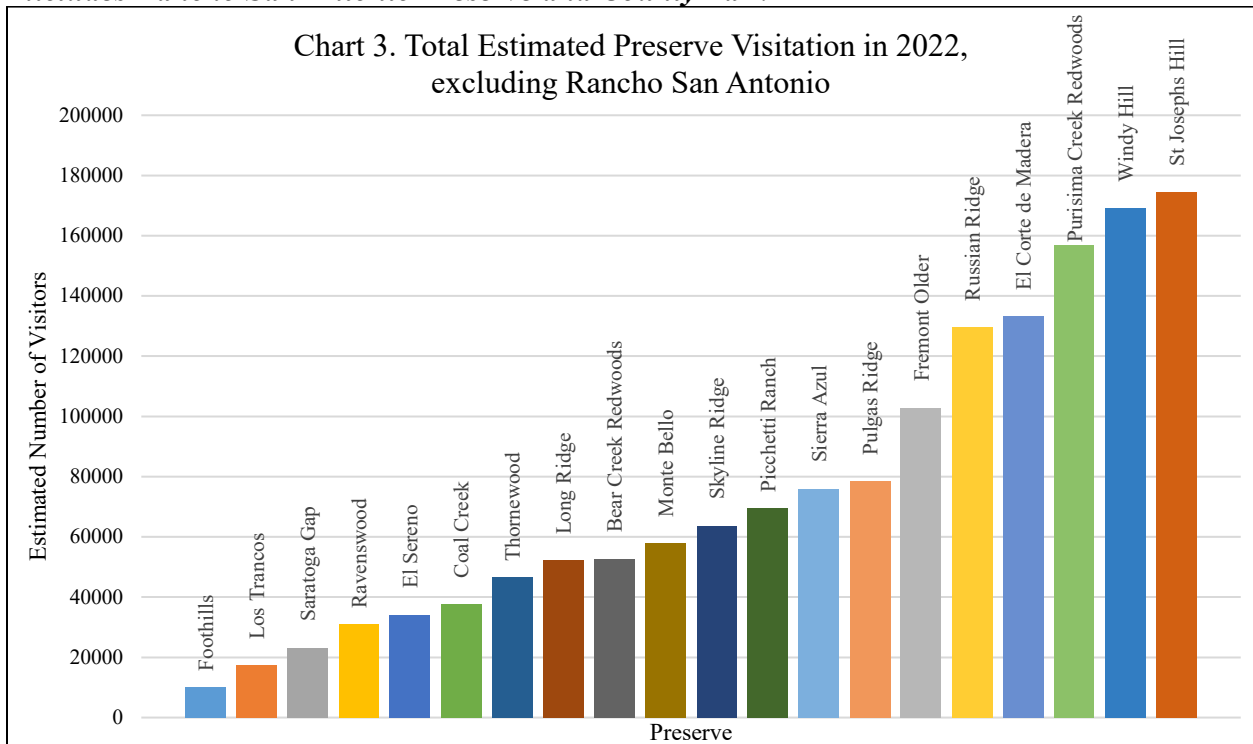
Table 2: Total Estimated Visitation by Preserve in 2022

Preserve	Estimated Visitation 2022
Foothills	10,269
Los Trancos	17,383
Saratoga Gap	23,167
Ravenswood	31,015
El Sereno	34,211
Coal Creek	37,651
Thornewood	46,722
Long Ridge	52,125
Bear Creek Redwoods	52,765
Monte Bello	57,927
Skyline Ridge	63,735
Picchetti Ranch	69,721
Sierra Azul	75,905
Pulgas Ridge	78,435
Fremont Older	102,827
Russian Ridge	129,754
El Corte de Madera	133,298
Purisima Creek Redwoods	156,820
Windy Hill	169,075
St Joseph's Hill	174,306
Rancho San Antonio	1,181,501
Total	**2,698,612**

Discussion of Data

Year 2020 started out with typical visitation during the first few months of the year. However, visitation during the early months of the COVID pandemic (April, May, June) was at unprecedented levels. Later in 2020 (August and September), several preserves were closed due to fires, poor air quality, high heat, and/or red flag events that resulted in a steep reduction in visitation. The number of visitors began to climb again in October 2020 and leveled off until a small surge in April and May 2021. This surge was not unexpected, since this is the time of the mildest weather and usually experiences increased activity. Visitation during the latter half of 2021 slowly declined, with small increases in July and November. Note that in 2021 there were no closures or restrictions to preserve access, as was the case in 2020 and 2022. The estimated total number of visitors in 2022 declined 17% compared to 2020 numbers and decreased 8% from 2021. Standard seasonal variations are observed throughout 2022, with the exception of the impact of severe heat conditions evident in September on Chart 1.

Conclusions

Under this project, 2020 was the first year that a reasonable estimation of total visitation across the District was possible, which was a *very* atypical year due to several events. These events include record-breaking high visitation due to the COVID-19 pandemic followed by complete closures of preserves due to fires, heat, and poor air quality. As expected, the visitation in 2021 appeared to settle back to more normal levels and patterns, and year 2022 totals appear to reflect a continued move towards normalization. A comparison of 2022 with the visitation estimates from Attachment 2 suggests a 79% increase from 2010. Analyses of trends of historical data from counters installed prior to 2020 show that visitation has been steadily increasing, and is still

climbing, despite the 2020 anomalies. Trends suggest an overall increase of visitation from 2017 to 2022 at 32%. Future years of the project will continue to provide information about visitation trends.

Operational Impacts
Parking has been the biggest operational impact of increased visitation. The parking challenges during 2020 and 2021 have subsided, however, parking capacity is regularly exceeded in many preserves on weekends during nice weather. For the most part, the increased visitation has not had apparent visible impacts on trail and road infrastructure except in the busiest preserves. In general, preserves and trails seem to absorb the increased visitation well, with the primary challenge and limiting factor being parking availability. Additionally, there does not appear to be a direct correlation between increased visitation and District ordinance violations.

Increased visitation and the resulting parking and traffic issues also affect the District's planning efforts for public access projects. Parking and traffic are often the top concerns raised by members of the public, whether it is the challenge of finding parking or the impact of parking and traffic on neighboring cities and neighborhoods. Public access projects require enhanced public engagement to address these concerns, consider parking constraints, or seek ways to encourage non-vehicular modes of transportation. Two multimodal access projects are currently underway for the most parking-challenged preserves: Rancho San Antonio and Purisima Creek Redwoods. These projects have taken additional staff resources and time to plan for improving existing or developing new parking areas and conduct enhanced public engagement.

In addition, the increase in visitation has also deepened an interest in studying preserve visitor capacity and the impacts on natural resources. The natural resource impacts due to visitation was a topic studied by the Science Advisory Panel (SAP) consultants (SFEI) during their work in 2021 (see R-21-158):

> "What are the visitation and recreational use benefits and trade-offs to fulfilling District goals, including natural resource protection and ecologically sensitive public enjoyment and education?"

The SAP evaluated the available scientific literature to assemble the main findings that can be applied to visitor management, which are well summarized in their final report, identifying that "Midpen has a growing body of scientific research, decision-support tools, and other resources to bring to this management challenge. With these assets and additional resources, Midpen can steer management of its preserves to achieve its braided mission."

Attachments
    Attachment 1 - Preserve Categories and Multipliers
    Attachment 2 - 2010 Report Visitor Use Survey

Preserve Categories and Multipliers

As part of the District Visitation Estimation project, preserves were classified into four categories. The factors taken into consideration to establish each category are below.

Category A:
- More urban
- Weekday use
- High exercise usage
- Multiple use types (bikes, dogs, people)
- All (except Picchetti) allow dogs
- Visitation times are typically 30 to 45 mins (except Windy Hill and Picchetti on weekends)

Category B:
- "Destination" preserves
- Multi-use
- 30-minute drive or more
- Weather dependent
- Large preserves with long loops
- Popular for beginning mountain biking
- Variety of different loops/trail options
- Interconnected with other preserves

Category C:
- High use, single common-type-of-use preserves
  - Thornewood: dogs
  - Ravenswood: birders
  - El Sereno: bikes
- Limited parking
- Pass-through capability

Category D:
- Regional draw
- Easy access to redwoods
- Shaded in summer, nice in hot weather
- Creeks and/or other water features
- Biking in El Corte de Madera very popular

One Representative Preserve was selected for each category based upon the following criteria:
- Controlled ingress and egress both for parking lots and trail entrances
- Stable and predictable use patterns (loop vs. out-and-back)
- Preserves with parking lots where people drive in to visit features with limited or no use of trails. (Vehicle visits might be important to Planning in some instances.)
- Characteristics such as urban interface, interconnection with other trails/parks/roads, remoteness, trail use types, preserve features, parking availability, trail characteristics, elevation and seasonal conditions, visitation levels

Ratios between the Representative Preserves and the other preserves in their category were derived from a series of visitor estimate survey projects conducted by the Public Affairs Department between 2007 and 2011, wherein yearly visitation was estimated for each preserve. In 2019 and 2020, Visitor Services staff conducted further analysis and ground truthing of visitation between preserves using temporary counters and surveys, resulting in some updated visitation ratios. The ratios calculated for each group of preserves per category are presented in the table below.

Representative Preserves are in bold and underlined text at the top of each category.

Category	Preserves	Multiplier Based on Representative Preserves
A	**St. Joseph's Hill**	**1.00**
	Fremont Older	0.59
	Picchetti Ranch	0.40
	Pulgas Ridge	0.45
	Windy Hill	0.97
B	**Monte Bello**	**1.00**
	Long Ridge	0.90
	Los Trancos	0.30
	Russian Ridge	2.24
	Saratoga Gap	0.40
	Skyline Ridge	1.10
C	**El Sereno**	**1.00**
	Coal Creek	1.10
	Foothills	0.30
	Thornewood	1.40
D	**Purisima Creek Redwoods**	**1.00**
	El Corte de Madera	0.85

Note: Rancho San Antonio, Sierra Azul, Bear Creek Redwoods, and Ravenswood are not included in the categories mentioned above. Visits to those preserves are derived directly from the counters installed at those locations.

Midpeninsula Regional
Open Space District

Memorandum

To: MROSD Board of Directors

Through: Steve Abbors, General Manager

From: Kristi Britt, Public Affairs Specialist
              Veronica Davis, Public Affairs Intern

Copy: Rudy Jurgensen, Public Affairs Manager

Date: May 3, 2011

Re: Visitor Estimate Survey Project Report – Fall 2010
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EXECUTIVE SUMMARY

This fall, under the guidance of Public Affairs staff, the Midpeninsula Regional Open Space District continued with the Visitor Estimate Survey Project begun in summer 2007 to estimate the number of visitors to eight District preserves, including St. Joseph's Hill, Ravenswood, Fremont Older, Sierra Azul, Windy Hill, Purisima Creek Redwoods, El Corte de Madera Creek, and Thornewood. Each of these preserves was previously surveyed during either Summer 2007 or Spring 2008. During the months of September, October, and November 2010, each of these preserves was surveyed at all major entry locations for a designated minimum two-week period. (See Appendix A: Entry Gate Locations Surveyed. Applicable preserve maps are also attached.) Below are the results for the surveyed preserves:

Preserve	Total Visitors	Average/Day	Average/Year (Estimate)
El Corte de Madera Creek	2,309	127	46,355
Fremont Older	10,002	593	216,445
Purisima Creek Redwoods	4,644	284	103,660
Ravenswood	437	25	9,125
Sierra Azul	2,757	129	47,085
St. Joseph's Hill	8,260	508	185,420
Thornewood	411	18	6,570
Windy Hill	4,414	398	145,270

*With completion of the fall 2010 survey, the Visitor Estimate Survey project has now been implemented across the four calendar seasons (summer 2007, spring 2008, winter 2009-2010, fall 2010) and each preserve that's open to public access has at least one season of visitor count data available and two seasons available for many.

METHODS

The method used for data collection was infrared trail counters. These were mounted at preserve entrances where visitors would have to cross the counter's beam. The counters record an "event" along with the date and time in every instance its beam is broken.

Data captured by the trail counters were uploaded to a computer using software provided by the counter manufacturer. Graphs generated by the counter software (TrailMaster StatPack) showed general usage patterns and made it possible to differentiate periods of obvious over- and under-counts from those periods where the counter collected valid data. Counts that came close to the overall usage pattern or had reasonable explanations were considered valid, while those that greatly deviated were considered flawed and eliminated from consideration.

The total number of events for each entrance was divided by two to correct for double counts when a visitor exited, then divided by the number of days of valid data to arrive at an average number of visitors per day at that entrance. The averages of all the preserve entrances surveyed were totaled to get the overall average visitors per day. The following table from the St. Joseph's Hill survey is a sample of how the data was compiled.

ST. JOSEPH'S HILL

	Event Count	Estimated Visitors	# Days of Valid Data	Average Visitors/Day
Jones/Manzanita Trail	9,951	4,976	15.8[*]	315
Alma Bridge Rd	6,567	3,284	17	193
Total	16,518	8,260		508

RESULTS

Based on the trail counter results, following are the numbers for the eight preserves surveyed. Data for each of the entry gate locations surveyed are also attached in Appendix B. Please note: these are estimates only. Visitation varies by season, weather, day of the week, holidays, public school schedules, and other factors. For example, visitation tends to be higher on weekends rather than weekdays.

FALL 2010

Preserve	Total Visitors	Average/Day	Average/Year
El Corte de Madera Creek	2,309	127	46,355
Fremont Older	10,002	593	216,445
Purisima Creek Redwoods	4,644	284	103,660
Ravenswood	437	25	9,125
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Thornewood	411	18	6,570
Windy Hill	4,414	398	145,270

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[*] A decimal point indicates a time period less than a full day, but long enough to influence the results. 15.8 days indicates a time period 4.5 to 5 hours short of 16 full days.

All of the preserves in the fall 2010 survey were previously surveyed (either in summer 2007 or spring 2008) and the results were combined (shown in the table below). The combined results for each of the preserves follow:

Preserve	Previous Survey Season	Previous Survey Average/Day	Current Survey Season	Current Survey Average/Day	Combined Overall Average/Day	Average/Year (Estimate)
El Corte de Madera Creek	Summer 2007	362	Fall 2010	127	245	89,425
Fremont Older	Summer 2007	451	Fall 2010	593	522	190,530
Purisima Creek Redwoods	Summer 2007	163	Fall 2010	284	224	81,760
Ravenswood	Spring 2008	36	Fall 2010	25	31	11,315
Sierra Azul	Summer 2007	77	Fall 2010	129	103	37,595
St. Joseph's Hill	Spring 2008	336	Fall 2010	508	422	154,030
Thornewood	Summer 2007	28	Fall 2010	18	23	8,395
Windy Hill	Summer 2007	283	Fall 2010	398	341	124,465

The numbers in the table above provide a further refined comparison of the average/year estimates, as the numbers are based on two seasons (equal weight should be assumed for each set of results, as each survey was representative of half of the year), compared to the numbers in the tables on pages 1 and 2 under the Executive Summary and Results which are based on one season.

To highlight a few locations: the large changes between the two seasons seen at El Corte de Madera Creek, Thornewood, and St. Joseph's Hill could be due to many different factors, possibly acting in combination. While St. Joseph's Hill does not have any single identifiable factor that altered the counts, the other two preserves do. One factor is technical problems the first time each preserve was surveyed. The first survey at El Corte de Madera Creek was the first time many of the technical issues occurred, and staff was initially unaware of the counter malfunctions or how to correct them. Thornewood's Dennis Martin entrance was closed for construction just prior to the second survey period, and visitation was likely impacted. It is also possible that there have been changes in popularity or seasonal preferences for the preserves. Without further study it is impossible to know if one or both sets of results should be considered more accurate.

The Thanksgiving holiday weekend provided an opportunity to compare holiday versus non-holiday preserve usage. Staff left the counter equipment in place for an additional week and compared the period from the Wednesday before to the Monday after Thanksgiving with same days of the previous week. The results follow:

Thanksgiving 2010

		11/17-11/22	11/24-11/29 (Thanksgiving)	% Change
Sierra Azul				
	SA01 (Kennedy Rd.)	116	1,964	1,593%
	SA06 (Hicks Rd.)	101	241	139%
	SA21 (Alma Bridge Rd.)	197	424	115%
	Total	414	2,629	535%
Thornewood				
	TW01a (Main lot)	42	125	198%
	Dennis Martin Rd.	153	88	-42%
	Total	195	213	9%

Both preserves showed an increase in overall usage, despite the significant drop at the Dennis Martin entrance to Thornewood. The numbers for both columns of gate SA01 only take into account Wednesday through 9:00 a.m. on Friday morning of each week because the counter filled to capacity the day after Thanksgiving. The non-District sponsored annual "Turkey Ride" event on Thanksgiving is the cause of the large number of people at gate SA01. The weather for both time periods was similar and should not be considered a reason for the change in usage.

With at least one season of data available for each preserve, and two seasons available for many, staff has compiled a chart of overall visitation for the District. Referencing the table below, average visitation increased for five of the eight preserves, with the greatest increase at Purisima Creek Redwoods. The other preserves with increased visitation were: Fremont Older, Sierra Azul, St. Joseph's Hill, and Windy Hill. The preserves that showed decreased usage were: El Corte de Madera Creek, Ravenswood, and Thornewood. It is unclear to what degree these changes, either positive or negative, are a result of confounding variables, such as construction or early technical issues that staff had not yet corrected for, and not an overall change in popularity or seasonal preferences for preserves.

Ranking (greatest to lowest av/year visitation)	Preserve	Survey 1 (Season)	Av/Day (Survey 1)	Survey 2 (Season)	Av/Day (Survey 2)	Av/Day (Total)	Av/Year
1	Rancho San Antonio	Summer 2007	1,498	Winter 2009-2010	1,197	1,348	492,020
2	Fremont Older	Summer 2007	451	Fall 2010	593	522	190,530
3	St. Joseph's Hill	Spring 2008	336	Fall 2010	508	422	154,030
4	Windy Hill	Summer 2007	283	Fall 2010	398	341	124,465
5	El Corte de Madera Creek	Summer 2007	362	Fall 2010	127	245	89,425
6	Purisima Creek Redwoods	Summer 2007	163	Fall 2010	284	224	81,760
7	Russian Ridge	Spring 2008	194			194	70,810
8	Pulgas Ridge	Summer 2007	148	Winter 2009-2010	197	173	63,145
9	Picchetti Ranch	Spring 2008	155			155	56,575
10	Sierra Azul	Summer 2007	77	Fall 2010	129	103	37,595
11	Skyline Ridge	Spring 2008	89			89	32,485
12	Monte Bello	Spring 2008	79			79	28,835
13	Long Ridge	Spring 2008	68			68	24,820
14	Saratoga Gap	Winter 2009-2010	35			35	12,775
15	Ravenswood	Spring 2008	36	Fall 2010	25	31	11,315
16	Los Trancos	Winter 2009-2010	26			26	9,490
17	Thornewood	Summer 2007	28	Fall 2010	18	23	8,395
18	Stevens Creek Shoreline*	Winter 2009-2010	21			21	7,665
19	Coal Creek*	Winter 2009-2010	18			18	6,570
20	El Sereno	Spring 2008	22	Winter 2009-2010	10	16	5,840
21	Foothills	Winter 2009-2010	4			4	1,460
	Total					4,137	1,510,005

* Coal Creek and Stevens Creek Shoreline estimates should be considered low due to storms during the survey period and unrelated problems (battery failure and counter alignment problems) leading to data loss.

COMPARISONS/CONCLUSIONS

Changes in preserve visitation could be a result of many factors other than issues related to technical issues of the surveys or activities at the entrances during the survey periods. Natural seasonal variations may result in higher visitation during spring and fall as people find the weather more comfortable than summer heat or winter cold and rain. Reported increases that ran counter to expected seasonal drops could correlate with the economic downturn, as more people look for less expensive entertainment and are more in need of escape from daily stress. The economic downturn may also lead to turnover in area residents who have different activity preferences than previous residents. Increases at Fremont Older, Pulgas Ridge, St. Joseph's Hill, and Windy Hill could be the result of dog owners bringing their canine companions to these preserves as a result of San Mateo County closing their parks to dogs. There may also be a natural visitor hierarchy based on infrastructure, preserve size, location, and popularity of a specific activity (e.g. bike riding, dog walking).

SUMMARY

The Visitor Estimate Survey project has now been implemented across the four calendar seasons (summer 2007, spring 2008, winter 2009-2010, fall 2010) and each preserve that's open to public access has at least one season of visitor count data available and two seasons available for many. The Visitor Estimate Survey project has provided District staff with valuable data and useable knowledge about visitors. The data collected to date has enabled staff to better and more accurately respond to the media and other land management agencies, provide an improved visitor experience through our planning and operations projects, and, combined with resource data, better protect our natural resources.

In order to obtain a more refined estimate of visitation at the preserves (a further refined comparison of the average/year estimates), the District would have to survey each preserve during all four seasons. In order to accomplish this, it would require an additional four surveys of eight preserves each, exactly as they've been performed in the past, and four surveys of only five preserves each. This would require a 3- to 5-year time span. In the near term, staff recommends this project be deemed complete, given the department Action Plan projects planned for Fiscal Year 2011-2012 and continued conservative budget resources. In the future, if further refined preserve visitation numbers are required, staff can re-implement the Visitor Estimate Survey as part of a future Action Plan Key Project.

Appendix

DISCUSSION

Enhancements

Similar to the previous seasons, one of the potential concerns in conducting this survey was that the trail counter equipment would be vandalized. To prevent this, they were placed in tamper-resistant metal boxes. Fortunately, none of the boxes or the electronic equipment was vandalized. There were two cases where foreign objects were placed in the boxes to block the counters at gate WH06 in Windy Hill, along Alpine Road, and the intersection of the Jones and Manzanita Trails in St. Joseph's Hill. The objects were removed and are not believed to have significantly affected the data. There was one other case at the North Ridge entrance of Purisima Creek Redwoods, where a visitor had scribbled over the lens with a pencil. This did not damage the counter and also is not believed to have significantly affected the data, as the usage pattern in both locations didn't change.

Staff continue to refine guidelines for equipment installation. While some technical issues continue to arise, as described below under "Logistical Issues," the surveys are designed to capture sufficient data even when faced with occasional problems such as failed batteries or counters falling out of alignment. For example, a minimum two-week time period for surveying each site allows staff to collect a representative sampling even if days are lost due to these issues, and frequent checks on the equipment keep the amount of data loss to a minimum. Set up at each site and data collection was a smooth process this season.

Because usage at most locations varies greatly according to weather conditions, future revisions to the survey taking into account temperature, rainfall, and other conditions may result in more refined data collection.

Logistical Issues

Occasional equipment failure continued to occur when heat caused the adhesive holding the Velcro to the inside of the boxes to fail, dropping the counters out of alignment. Attempts to correct this using a stronger grade of Velcro met with limited success. Field staff had in previous seasons successfully improvised providing additional support using other available materials. This season permanent support blocks were made to hold the weight of the counters; the Velcro now secures the units in place but does not bear any of the units' weight. This addition to our setup has eliminated Velcro failure as a cause of data loss.

Based on previous survey results, staff placed a high-capacity, 4,000-event counter at gate SJ03, which had been the higher-use gate at St. Joseph's Hill during the spring 2008 survey, and a standard-capacity, 1,000-event counter at the Jones/Manzanita Trail junction. This led to data loss when the large increase in visitors caused the standard counter to fill to capacity. Staff observations confirmed the large increase in visitors (the trail use was comparable to visitation at Rancho San Antonio). This was corrected by replacing the standard 1,000-event counter with an 8,000-event capacity counter, purchased during the winter 2009-2010 survey when Rancho San Antonio experienced a similar issue.

Alignment problems and other concerns have only been a minor issue because the problem is corrected on the next data-collection day. The project calls for survey periods of at least two weeks to make it possible to eliminate days containing invalid data and still have a good sample. If the Visitor Estimate Survey project is repeated in other seasons/fiscal years, staff will continue to adjust for unforeseen logistical issues.

Appendix A: Entry Gate Locations Surveyed

- St. Joseph's Hill (Jones Trail at gate SJ03 and at intersection of Manzanita Trail)
- Windy Hill (lower parking lot, upper parking lot, WH01, WH06, Sequoias entrance)
- Ravenswood (gate RW01, gate RW02)
- Purisima Creek Redwoods (gate PC01, gate PC03, gate PC04, gate PC05)
- Fremont Older (gate FO01, gate FO03, gate FO07, Coyote Ridge Trail at Stevens Creek County Park)
- El Corte de Madera Creek (gate CM01, gate CM02, gate CM03)
- Sierra Azul (gate SA01, gate SA06, gate SA21)
- Thornewood (gate TW01a, Dennis Martin Road)

Appendix B: Counter Data by Location

FREMONT OLDER

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
FO01 (Prospect Rd.)	16,194	8,097	17.1	474
FO03 (Regnart Rd.)	1,211	606	14.1	43
FO07 (Garrod Farms)	1,207	604	17.1	35
Coyote Ridge Trail at County Park	1,389	695	17.1	41
Totals	20,001	10,002		593

SIERRA AZUL

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
SA01 (Kennedy Rd.)	3,645	1,823	20.8	88
SA06 (Hicks Rd.)	632	316	23.2	14
SA21 (Alma Bridge Rd.)	1,235	618	23	27
Total	5,512	2,757		129

EL CORTE DE MADERA CREEK

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
CM01	1,792	896	18.8	48
CM02	2,616	1,308	18.8	70
CM03	210	105	12.3	9
Total	4,618	2,309		127

THORNEWOOD

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
TW01a (Main lot)	353	177	22.3	8
Dennis Martin Rd.	467	234	23.2	10
Totals	820	411		18

PURISIMA CREEK REDWOODS

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
PC01 (North Ridge)	3,770	1,885	17	111
PC03	911	456	12.2	37
PC04 (Tunitas Creek Rd.)	432	216	17.2	13
PC05 (Purisima Creek Rd.)	4,173	2,087	17	123
Total	9,286	4,644		284

ST JOSEPH'S HILL

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
(Jones/Manzanita Trail	9,951	4,976	15.8	315
SJ03 (Alma Bridge Rd.)	6,567	3,284	17	193
Total	16,518	8,260		508

RAVENSWOOD

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
RW01 (Bay St.)	451	226	17	13
RW02 (Dumbarton Br.)	421	211	16.9	12
Total	872	437		25

WINDY HILL

	Actual Count	Est. Visitors	# Days of Valid Data	Av. Visitors/Day
WH01	1,355	678	15.7	43
WH05 (Lower Parking Lot)	2,424	1,212	8.3	146
WH06 (Willowbrook)	2,535	1,268	14.3	89
Sequoias Entrance	339	170	15.1	11
Upper Parking Lot	2,171	1,086	10	109
Total	8,824	4,414		398

Please note: the # Days of Valid Data listed in Appendix B represents the time period from when the trail counter equipment was switched on – often times on a Friday prior to the Monday of the official two-week survey time period – and when it was switched off – sometimes on the Monday after the official survey period – and thus the number of days is sometimes greater than 14.

Although accuracy is reduced slightly when data breaks occur, whether it's a result of capacity issues, when data are downloaded, batteries die, etc., the methodology for determining the visitor counts doesn't change. The number of visitors is calculated per unit of time (or not included in the count if there's a data break). The graph of Ravenswood gate RW01 shows a fairly typical usage pattern for a low-visitation gate, with daily visitor counts typically fewer than 100, while the graph of St. Joseph's Hill gate SJ03 shows a typical usage pattern for a high-visitation gate, with daily visitor counts of at least 500.