

Impacts of Visitor Spending on the Local Economy: Yosemite National Park, 2005



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January 2007



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Executive Summary

Yosemite National Park hosted 3.3 million recreation visits in 2005. After adjusting for re-entries to the park, there were just over two million person trips to the area in 2005. Based on the 2005 visitor survey, 35% of these trips were day trips not including an overnight stay within 50 miles of the park. Forty-four percent of the trips involved an overnight stay in motels, lodges and cabins, a third inside the park and two thirds outside. Eighteen percent of visitors were camping, 6% outside the park and 12% inside.

The average visitor group consisted of 3.1 people and spent \$394 within 50 miles of the park. Visitors reported expenditures of their group inside the park and in the surrounding communities within 50 miles of the park. Forty-three percent of the spending occurred inside the park. On a party trip basis, average spending in 2005 was \$71 for non-local day trips, \$240 for campers staying inside the park, \$337 for campers staying outside the park, \$646 for visitors in motels and lodges outside the park and \$841 for visitors staying in park lodges or cabins. On a per night basis, visitors staying in motels, lodges or cabins spent \$316 if staying inside the park and \$288 if staying outside the park. Campers spent \$101 per night if staying outside the park and \$84 if staying inside. The average per night lodging cost reported by the sample of visitors was \$188 for park lodges/cabins, \$151 for lodging outside the park and \$20 for camping.

Total visitor spending in 2005 within 50 miles of the park was \$255 million¹ including \$108 million spent inside the park. Forty-seven percent of the total spending was for lodging, 19% restaurant meals and bar expenses, 9% gas and oil, 8% groceries and 8% souvenirs. Overnight visitors staying in motels outside the park accounted for 51% of the spending, visitors in park lodges and cabins 30%, campers 13% and day trips 7%.

Three out of four visitors indicated the park visit was the primary reason for the trip to the area. Counting only a portion of visitor expenses if the park visit was not the primary trip purpose yields \$231 million in spending attributed directly to the park.

The economic impact of park visitor spending was estimated by applying the spending to an input-output model of the local economy. The local region was defined as the four county region including Madera, Mono, Mariposa and Tuolumne counties. This region roughly coincides with the 50 mile radius for which spending was reported.

¹ Revenues received by the park (park admissions and donations) are excluded. Impacts of spending that accrues to the park are covered as part of park operations.

Including direct and secondary effects, the \$255 million spent by park visitors supports 5,281 jobs in the area and generates \$310 million in sales, \$125 million in personal income and \$191 million in value added².

The park itself employed 710 people in FY 2005 with a total payroll of \$35.2 million. Including secondary effects, the local impact of the park payroll in 2005 was 1,000 jobs, \$42 million in personal income and \$47 million total value added. Including both visitor spending and park operations, the total impact of the park on the local economy in 2005 was 6,281 jobs and \$238 million value added. Park operations account for 16% of the employment effects and 20% of the value added effects.

² Jobs include full and part time jobs. Personal income consists of wages and salaries, payroll benefits and income of sole proprietors. Value added includes personal income as well as profits and rents to area businesses and sales and excise taxes.

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Introduction

The purpose of this study is to estimate the local economic impacts of visitors to Yosemite National Park (YOSE) in 2005. Economic impacts are measured as the direct and secondary sales, income and jobs in the local area resulting from spending by park visitors. The economic estimates are produced using the Money Generation Model 2 (MGM2) (Stynes and Propst, 2000). Three major inputs to the model are:

- 1) Number of visits broken down by lodging-based segments,
- 2) Spending averages for each segment, and
- 3) Economic multipliers for the local region

Inputs are estimated from the Yosemite NP Visitor Survey, National Park Service Public Use Statistics, and IMPLAN input-output modeling software. The MGM2 model provides a spreadsheet template for combining park use, spending and regional multipliers to compute changes in sales, personal income, jobs and value added³ in the region.

Yosemite National park and the Local Region

The local region was defined to encompass a four county area around the park including Madera, Mariposa, Mono and Tuolumne counties in central California. There were 93,198 full or part time jobs in the region in 2001 (Table 1). The largest employers were services, government, agriculture/forestry and retail trade. The four primary tourist sectors (hotels, other accommodations, restaurants, and amusements) accounted for 12% of all jobs regionwide. These sectors accounted for 30% of the jobs in Mono county and 22% in Mariposa county.

The Bureau of Labor Statistics (BLS) reports 8,200 jobs in accommodations and food services in the region in 2005, an increase of 9% over 2001⁴. IMPLAN reported just over 9,000 jobs in accommodations and food services for the region in 2001. Dean Runyan Associates has estimated tourist spending for the area, which would include spending of park visitors, business travelers, visitors staying in vacation homes, visiting friends and relatives or visiting other attractions in the area.

³ Value added is the preferred measure of the contribution of an industry to a state or local economy. Value added includes wages and salaries, profits and rents, sales taxes and other indirect business taxes.

⁴ BLS reports “covered employment” which excludes jobs not covered by state unemployment insurance programs.

Table 1. Employment by County and Economic Sector, 2001

Sector	Madera	Mono	Mariposa	Tuolumne	Region Total	Pct
Agric., Forestry, Forest Products	12,102	117	314	1,276	13,810	15%
Mining	396	59	10	97	562	1%
Construction	3,046	902	529	2,385	6,862	7%
Food processing	475	33	11	43	561	1%
Manufacturing	1,944	30	97	636	2,706	3%
Transportation	1,223	19	48	337	1,627	2%
Retail Trade	4,533	1,015	611	3,298	9,457	10%
Wholesale Trade	755	96	17	265	1,133	1%
Finance, Insurance & Real Estate	2,277	945	369	1,781	5,373	6%
Amusements	595	234	47	891	1,768	2%
Hotels	292	1,258	1,083	198	2,831	3%
Other accommodations	167	152	37	187	543	1%
Food Services	2,312	1,050	436	1,853	5,652	6%
Other Services	13,881	1,469	2,165	6,979	24,494	26%
<u>Government</u>	<u>7,835</u>	<u>1,712</u>	<u>1,483</u>	<u>4,790</u>	<u>15,820</u>	<u>17%</u>
Total	51,833	9,092	7,258	25,015	93,198	100%

Source: IMPLAN 2001 county data files.

Yosemite National Park received 3,304,144 recreation visits in 2005 and almost 1.6 million overnight stays (person nights) in the park (Table 2). There were 819,638 overnight stays in park lodges/cabins and 650,653 overnight stays in park campgrounds.

Table 2. Recreation Visits and Overnight Stays, Yosemite NP 2005

Month	Recreation Visits	Overnight stays				Total OVN Stays
		Lodge/Cabin	Camp	Back country	Misc	
January	91,238	25,143	2,453	733	0	28,329
February	103,756	29,729	2,328	1,000	0	33,057
March	143,335	49,414	6,505	1,050	0	56,969
April	195,385	54,151	35,625	1,092	288	91,156
May	304,552	75,738	52,166	6,205	1,743	135,852
June	413,124	128,268	67,770	9,980	2,851	208,869
July	554,567	112,997	146,804	22,745	4,007	286,553
August	485,643	114,731	155,883	22,922	6,250	299,786
September	430,134	94,849	106,703	1,256	2,282	205,090
October	318,508	55,829	57,211	3,056	0	116,096
November	152,671	41,767	13,928	482	0	56,177
<u>December</u>	<u>111,231</u>	<u>37,022</u>	<u>3,277</u>	<u>282</u>	<u>0</u>	<u>40,581</u>
Total	3,304,144	819,638	650,653	70,803	17,421	1,558,515

Source: NPS Public Use Statistics

Methods

A park visitor study was conducted at Yosemite NP from July 8-17, 2005 (Littlejohn, Meldrum and Hollenhorst, 2006). The study measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed to a sample of 1,204 visitors at park entrances. Visitors returned 781 questionnaires for a 65% response rate. Data generated in the visitor survey were used as the basis to develop spending profiles, segment shares and trip characteristics for Yosemite NP visitors.

MGM2 Visitor Segments

The MGM2 model divides visitors into segments to help explain differences in spending across distinct user groups. Seven segments were established for Yosemite National Park visitors based on reported trip characteristics and lodging expenditures⁵:

Day trips⁶: Visitors from outside the region, not staying overnight within 50 miles of the park. This segment includes day trips as well as pass-through travelers, who may be staying overnight on their trip outside the local region.

Motel-in: Visitors reporting lodging expenses (lodges or cabins) inside the park

Camp-in: Visitors reporting camping expenses inside the park (developed campgrounds).

Backcountry campers : visitors camping in Yosemite backcountry sites.

Motel-out: Visitors reporting motel expenses outside the park within 50 miles of the park

Camp-out: Visitors reporting camping expenses outside the park within 50 miles of the park.

Other OVN: Visitors staying overnight in the area but not reporting any lodging expenses. This segment includes visitors staying in private homes, with friends or relatives or other unpaid lodging.

The 2005 visitor survey was used to estimate the percentage of visitors from each segment as well as spending averages, lengths of stay and party sizes for each segment. Segment shares from the survey were adjusted to be consistent with park overnight stay figures. As the sample size for backcountry visitors was small, this segment was grouped with the “other overnight” segment when estimating spending.

Based on the visitor survey and park overnight stay figures, 21% of park visits (entries) were classified as day trips, and 79% were classified as overnight trips that included an overnight stay in the local area (Table 3). The average spending party ranged

⁵ Visitors reporting multiple lodging types and expenditures were classified based on the highest lodging expense.

⁶ No day trips by visitors living within 50 miles of the park were sampled, so all visits are treated as coming from outside the local region.

from 2.5 to 3.5 across the seven segments with the average visitor party consisting of 3.1 people⁷. The average length of stay in the area on overnight trips was 2.6⁸.

Seventy-five percent of visitors indicated that visiting the park was the primary reason for the trip to the area. Other stated reasons were visiting friends and relatives in the area, business or visiting other area attractions.

Table 3. Selected Visit/Trip Characteristics by Segment, 2004

Characteristic	Day Trip	Motel-in	Camp-in	Back country	Motel-out	Camp-out	Other ovn
Visit Segment share (park entries)	21%	14%	11%	1%	39%	10%	4%
Average Party size	3.0	3.5	3.4	2.5	3.0	3.3	2.7
Length of stay (days/nights)	1.0	2.7	2.8	2.4	2.2	3.3	3.5
Re-entry rate (park entries/trip)	1.0	1.5	1.6	1.0	2.2	2.4	2.4
Percent primary purpose trips	61%	79%	84%	100%	73%	75%	35%

The 3,304,144 recreation visits in 2005 were allocated to the seven segments using the visit segment shares in Table 3. Since spending is reported for the stay in the area, park visits (entries) were converted to trips to the area by dividing by the average number of times each visitor entered the park during their stay. Park re-entry rates were estimated based on the number of nights spent in the area for those staying overnight outside the park. For visitors staying overnight inside the park, re-entry rates were set to balance estimates of person nights with park overnight stay figures.

Recreation visits were converted to 656,093 party trips by dividing recreation visits by the average party size and park entry rate for each segment (Table 4). Total person trips in 2005 were just over two million. Total visitor spending is estimated by multiplying the number of party trips from each segment by the average spending estimated in the survey.

Table 4. Recreation Visits and Party Trips by Segment, 2005

Segment	Recreation visits	Person Trips	Party visits/trips	Percent of party trips	Percent of overnight trips
Day Trip	690,566	690,566	229,049	35%	
Motel-in	462,580	308,387	89,172	14%	21%
Camp-in	376,672	235,420	69,131	10%	16%
Backcountry	29,737	29,737	11,895	2%	3%
Motel-out	1,291,920	587,237	195,980	30%	46%
Camp-out	327,110	136,296	41,708	6%	10%
<u>Other ovn</u>	<u>125,557</u>	<u>52,316</u>	<u>19,158</u>	<u>3%</u>	<u>4%</u>
Total	3,304,144	2,039,958	656,093	100%	100%

⁷ Party sizes represent the spending unit which may not include everyone in the travel party.

⁸ These figures vary slightly from the VSP report (Littlejohn, Meldrum and Hollenhorst. 2005) due to omission of outliers. Some visitors listing motels or campgrounds as lodging types did not report any lodging expenses and are classified here in the other OVN category.

The segment mix based on party trips is somewhat different than based on park visits (entries) as visitors staying outside the park enter the park more times than those staying inside the park and visitors on day trips only enter once. Thirty-five percent of visitor parties are classified as day trips and 30% are staying in motels and other commercial lodging outside the park. Twenty-six percent of visitor parties are staying overnight inside the park compared to 39 percent staying outside. Park lodges and cabins account for 14% of visitor parties, while 10% of visitor parties are staying in park campgrounds.

Visitor spending

The visitor survey covered expenditures of the travel party inside the park or within 50 miles of the park. Spending averages were computed on a party trip basis for each segment. The average visitor group in 2005 spent \$394 on the trip, excluding park admission fees⁹. On a party trip basis, average spending was \$71 for day trips, \$841 for visitors in park lodges or cabins, and \$240 for park campers (Table 5). Visitors staying in

Table 5. Average Visitor Spending by Segment (\$ per party per trip)

Spending Category	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other ovn	All Visitors
Spending Inside Park							
Motel, hotel cabin or B&B	0.00	478.28	0.00	0.00	0.00	0.00	66.96
Camping fees	0.00	9.18	55.95	1.13	0.00	0.00	7.71
Restaurants & bars	15.02	124.93	26.97	24.37	25.86	17.96	35.35
Groceries, take-out food/drinks	5.29	31.92	28.91	10.76	13.88	6.35	13.85
Gas & oil	2.42	23.40	11.08	6.10	18.27	5.81	8.53
Local transportation	0.00	8.52	24.39	1.62	1.79	0.00	4.45
Amusements	2.64	19.93	4.13	7.10	16.32	2.19	7.48
Souvenirs	13.30	41.07	35.55	23.08	32.96	16.42	23.96
Spending Outside Park within 50 miles							
Motel, hotel cabin or B&B	0.00	21.63	0.00	339.59	0.00	0.00	107.52
Camping fees	0.00	0.00	1.73	0.84	67.95	0.00	4.89
Restaurants & bars	8.91	13.70	7.49	94.29	16.38	59.23	37.13
Groceries, take-out food/drinks	3.46	19.27	7.76	25.41	31.48	44.23	15.49
Gas & oil	15.13	19.07	16.92	41.43	51.59	52.46	27.05
Local transportation	2.30	26.52	15.20	38.71	44.64	0.00	21.02
Admissions & fees	0.79	0.00	0.91	13.94	5.16	4.92	5.10
<u>Souvenirs and other expenses</u>	<u>1.71</u>	<u>3.67</u>	<u>2.53</u>	<u>17.85</u>	<u>10.38</u>	<u>6.85</u>	<u>7.70</u>
Grand Total	70.97	841.05	239.52	646.20	336.64	216.42	394.18
Total in park	38.67	737.21	186.97	74.16	109.07	48.73	168.28
Total Outside park	32.30	103.84	52.55	572.04	227.57	167.69	225.90

⁹ The average of \$394 is significantly lower than the \$681 spending average in the VSP report (Littlejohn, Meldrum, and Hollenhorst 2005) due to the omission of some outliers, treatment of missing spending data, and adjustments for oversampling of overnight visitors relative to day trips. The median spending in the VSP report was \$370. See Appendix B for further explanation of these differences.

motels, cabins, lodges or B&B's outside the park spent \$646 on their trip and those camping outside the park spent \$216 (Table 5).

About 43% of the spending was inside the park, 57% outside. As one would expect, visitors staying overnight inside the park spent the majority of their money inside the park, while visitors staying outside the park spent most of their money in surrounding communities. A higher percentage of camper's spending is on groceries, while visitors staying in lodges, cabins and motels spend more on restaurant meals.

The sampling error at a 95% confidence level for the overall spending average is 10%. A 95% confidence interval for the overall visitor spending average is therefore \$394 plus or minus \$39 or between \$355 and \$433.

On a per night basis, visitors in park lodges or cabins spent \$316 in the local region compared to \$288 per night for visitors staying in motels or lodges outside the park. Campers spent slightly more per night if staying outside the park (\$101 per night) than inside the park (\$84). The average reported per night lodging expense was \$188 for park lodges or cabins, \$151 for motels outside the park, and \$20 for camping fees inside or outside the park (Table 6).

Table 6. Average Spending per Night for Visitors on Overnight Trips (\$ per party per night)

Spending Category	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN
Motel, hotel cabin or B&B	188.07	0.00	151.31	0.00	0.00
Camping fees	3.45	20.34	0.88	20.31	0.00
Restaurants & bars	52.15	12.15	52.87	12.62	22.05
Groceries, take-out food/drinks	19.26	12.93	16.12	13.56	14.45
Gas & oil	15.98	9.87	21.17	20.88	16.65
Local transportation	13.18	13.96	17.97	13.88	0.00
Admissions & fees	7.50	1.78	9.37	6.42	2.03
<u>Souvenirs and other expenses</u>	<u>16.83</u>	<u>13.43</u>	<u>18.24</u>	<u>12.95</u>	<u>6.65</u>
Total per party per night	316.41	84.47	287.92	100.63	61.84

Total spending was estimated by multiplying the number of party trips for each segment by the average spending per trip and summing across segments. Yosemite National Park visitors spent a total of \$255 million in the local area in 2005 (Table 7). Overnight visitors staying in motels outside the park account for 51% of the total spending, visitors in park lodges and cabins 30% and campers 13%. Lodging expenses represent 47% of the total spending and restaurants and bars 19%. Gas and oil, groceries, local transportation and souvenirs each account for between 6% and 9% of the total (Figure 1).

Table 7. Total Visitor Spending by Segment, 2005 (\$ Thousands)

Spending Category	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	All Visitors
Spending Inside Park							
Motel, hotel cabin or B&B	0	42,649	0	0	0	0	42,649
Camping fees	0	818	3,868	222	0	0	4,908
Restaurants & bars	3,441	11,140	1,865	4,776	1,078	558	22,858
Groceries, take-out food/drinks	1,211	2,846	1,998	2,109	579	197	8,940
Gas & oil	555	2,087	766	1,195	762	180	5,544
Local transportation	0	759	1,686	317	74	0	2,837
Amusements	606	1,777	286	1,391	681	68	4,809
Souvenirs	3,046	3,662	2,457	4,524	1,375	510	15,573
Spending Outside Park within 50 miles							
Motel, hotel cabin or B&B	0	1,928	0	66,553	0	0	68,481
Camping fees	0	0	120	164	2,834	0	3,118
Restaurants & bars	2,041	1,222	518	18,478	683	1,839	24,781
Groceries, take-out food/drinks	792	1,718	536	4,980	1,313	1,373	10,713
Gas & oil	3,466	1,700	1,170	8,118	2,152	1,629	18,235
Local transportation	526	2,365	1,051	7,587	1,862	0	13,390
Admissions & fees	180	0	63	2,731	215	153	3,342
<u>Souvenirs and other expenses</u>	<u>392</u>	<u>327</u>	<u>175</u>	<u>3,498</u>	<u>433</u>	<u>213</u>	<u>5,038</u>
Grand Total	16,256	74,998	16,558	126,642	14,041	6,721	255,216
Total in park	8,858	65,738	12,926	14,533	4,549	1,513	108,118
Total outside park	7,397	9,260	3,633	112,109	9,492	5,207	147,097
Segment Percent of Total	7%	30%	7%	51%	6%	3%	100%

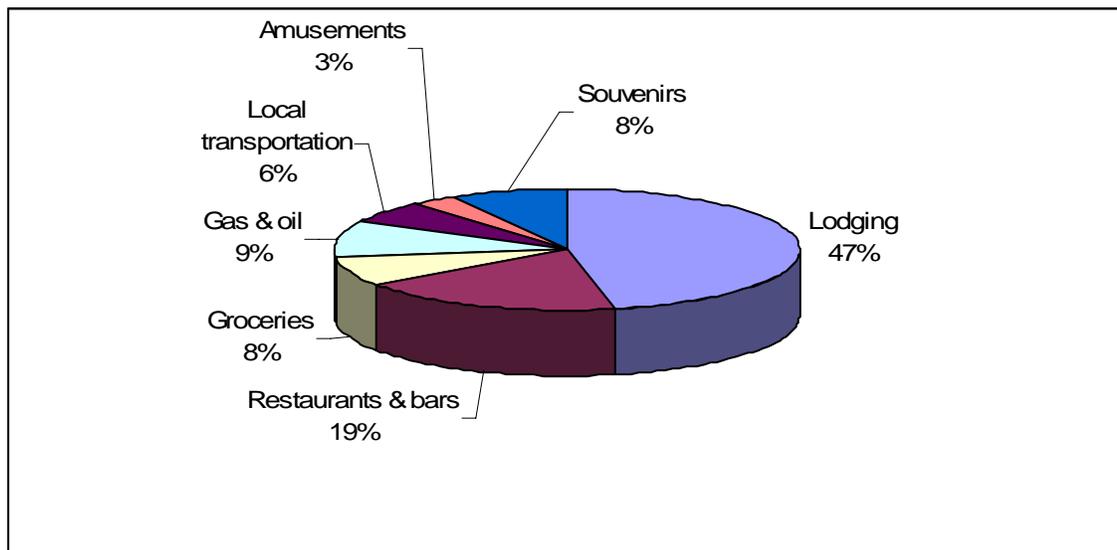


Figure 1. Yosemite National Park Visitor Spending by Spending Category

Park concession receipts provide a check on the validity of the spending estimates. The total spending inside the park estimated from the visitor survey data and park visit statistics is within 8 percent of reported park concession receipts for 2005. Concession receipts are within the sampling error for the survey estimate of spending inside the park.

Not all visitor spending would be lost to the region in the absence of the park, as some visitors did not make the trip primarily to visit the park. Spending directly attributed to park visits was estimated by counting all spending for trips where the park was the primary reason for the trip. If the park was not the primary trip purpose, one night of spending was counted for overnight trips and half of the spending outside the park was counted for day trips. All spending inside the park was treated as park-related spending. With these assumptions, a total of \$231 million in visitor spending is attributed to the park visit. This represents 93% of the overall visitor spending total (Table 8) .

Table 8. Total Spending Attributed to Park Visits, 2004 (\$000s)

Spending Category	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	All Visitors
Motel, hotel cabin or B&B	0	44,327	0	56,669	0	0	100,995
Camping fees	0	818	3,975	361	2,337	0	7,492
Restaurants & bars	4,426	12,203	2,329	20,510	1,642	1,867	42,977
Groceries, take-out food/drinks	1,618	4,341	2,479	6,349	1,662	1,175	17,624
Gas & oil	3,247	3,566	1,815	8,108	2,536	1,340	20,611
Local transportation	425	2,817	2,628	6,777	1,610	0	14,256
Admissions & fees	634	1,777	342	3,716	858	177	7,505
<u>Souvenirs and other expenses</u>	<u>2,775</u>	<u>3,946</u>	<u>2,614</u>	<u>7,502</u>	<u>1,732</u>	<u>661</u>	<u>19,232</u>
Total Attributed to Park	13,125	73,795	16,182	109,993	12,377	5,220	230,692
Percent of spending attributed to the park	81%	98%	98%	87%	88%	78%	93%

Economic Impacts of Visitor Spending

The economic impacts of Yosemite National Park visitor spending on the local economy are estimated by applying the spending to a set of economic ratios and multipliers representing the economy of the four county region. Economic ratios convert spending to the associated jobs, income and value added in each sector¹⁰. Multipliers for the region were estimated with the IMPLAN system using 2001 data¹¹. The tourism sales multiplier for the region is 1.44. Every dollar of direct sales to visitors generates another \$.44 in secondary sales through indirect and induced effects¹².

¹⁰ Jobs include full and part time jobs. Personal income consists of wages and salaries, payroll benefits and income of sole proprietors. Value added includes personal income as well as profits and rents to area businesses and sales and excise taxes

¹¹ Economic ratios and multipliers for the region are reported in Appendix C.

¹² Indirect effects result from tourism businesses buying goods and services from local firms, while induced effects stem from household spending of income earned from visitor spending.

Impacts are estimated based first on all visitor spending (Table 9) and then based on the visitor spending attributed to the park (Table 10). Including direct and secondary effects, the \$255 million spent by park visitors¹³ supports 5,281 jobs in the area and generates \$311 million in sales, \$125 million in personal income and \$191 million in value added (Table 10).

Personal income covers wages and salaries, including payroll benefits and incomes of sole proprietors. Value added is the preferred measure of the contribution to the local economy as it includes all sources of income to the area -- payroll benefits to workers, profits and rents to businesses, and sales and other indirect business taxes that accrue to government units. The largest direct effects are in lodging establishments and restaurants.

Table 9. Economic Significance of Visitor Spending, 2005.

Sector/Spending category	Direct Sales \$000's	Jobs	Personal Income \$000's	Value Added \$000's
Motel, hotel cabin or B&B	111,130	1,650	48,471	78,701
Camping fees	8,025	51	1,166	2,793
Restaurants & bars	47,639	1,060	21,509	24,286
Admissions & fees	8,091	173	2,987	5,013
Local transportation	16,227	656	7,517	8,500
Retail Trade	20,581	389	9,797	12,831
Wholesale Trade	3,186	30	1,204	2,109
<u>Local Production of goods</u>	<u>1,427</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Direct Effects	216,305	4,009	92,653	134,233
<u>Secondary Effects</u>	<u>94,210</u>	<u>1,271</u>	<u>31,915</u>	<u>56,600</u>
Total Effects	310,515	5,281	124,567	190,833

Note: Impacts of \$255 million in visitor spending from Table 7.

Excluding some spending on trips where the primary trip purpose was not to visit Yosemite NP reduces the overall impacts by about 10% (Table 10).

Impacts of Park Operations

The park itself employed 710 people in FY 2005 with a total payroll of \$35.2 million. Including secondary effects, the local impact of the park payroll in 2005 was 1,000 jobs, \$42 million in personal income and \$47 million total value added¹⁴. Including

¹³ Revenues received by the park (park admissions and donations) are excluded in estimating visitor spending impacts as the impacts resulting from park revenues are covered as part of park operations.

¹⁴ Impacts of park operations are estimated as the induced effects of the park payroll on the region's economy. Impacts include the wages and salaries of park employees and the economic activity resulting from their household spending in the region. Impacts are estimated using IMPLAN's spending patterns for households with incomes of \$50-\$75,000. Seasonal park jobs are converted to annual equivalents, i.e., four jobs for three months equates to one job on an annual basis. .

both visitor spending and park operations, the total impact of the park on the local economy in 2005 was 6,281 jobs and \$238 million value added. Park operations account for 16% of the employment effects and 20% of the value added

Table 10. Economic Impacts of Visitor Spending Attributed to Park Visits, 2005.

Sector/Spending category	Sales \$000's	Jobs	Personal Income \$000's	Value Added \$000's
Direct Effects				
Motel, hotel cabin or B&B	100,995	1,500	44,051	71,524
Camping fees	7,492	47	1,089	2,608
Restaurants & bars	42,977	956	19,404	21,909
Admissions & fees	7,446	160	2,749	4,613
Local transportation	14,256	577	6,604	7,468
Retail Trade	18,671	353	8,888	11,641
Wholesale Trade	2,870	27	1,085	1,899
<u>Local Production of goods</u>	<u>1,255</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Direct Effects	195,961	3,619	83,870	121,661
<u>Secondary Effects</u>	<u>85,394</u>	<u>1,151</u>	<u>28,913</u>	<u>51,286</u>
Total Effects	281,355	4,770	112,784	172,947

Note : Impacts of \$231 million in visitor spending from Table 8.

Study Limitations and Error

The accuracy of the MGM2 estimates rests on the accuracy of the three inputs: visits, spending averages, and multipliers. Recreation visit estimates rely on counting procedures at the park, which may miss some visitors and count others more than once during their visit. Re-entry rates are important to adjust the park visit counts to reflect the number of visitor trips to the region rather than park entries. Re-entry rates were estimated based on nights in the area for visitors staying outside the park and based on official park overnight stay figures for visitors staying inside the park.

Spending averages are derived from the 2005 Yosemite NP Visitor Survey. Estimates from the survey are subject to sampling errors, measurement errors and potential seasonal/sampling biases. The overall spending average is subject to sampling errors of 10%. Spending averages are also sensitive to decisions about outliers and treatment of missing data. In order to estimate spending averages, incomplete spending data was filled with zeros. Cases reporting large party sizes (> 8 people), long stays (>7 nights) or spending greater than \$5,000 were omitted from the analysis (see Appendix B for details).

The sample only covers visitors during a single week in July. To extrapolate to annual totals, it was assumed that these visitors were representative of visitors during the rest of the year.

Multipliers are derived from an input-output model of the local economy using IMPLAN (MIG., Inc. 1999). Input-output models rest on a number of assumptions¹⁵. Visits are taken from NPS public use statistics.

Sorting out how much of the spending to attribute to the park when the park is not the primary motivation for the trip is somewhat subjective. However, since most visitors to Yosemite NP made the trip primarily to visit the park and quite a bit of spending occurs inside the park, adjustments for non-primary purpose trips only has a small effect on the overall spending and impact estimates.

The Yosemite NP visitor spending and impact estimates may be partially validated by comparisons with other data. As noted earlier, the estimates of visitor spending inside the park are consistent with concession receipts for 2005, which suggests that the spending averages and visitor expansion factors are reasonably accurate. Estimates of spending and employment may also be compared with tourism figures and government employment statistics for the area.

Dean Runyan and Associates (2006) has estimated overall tourist spending in the four county region at \$1.0 billion for 2004 (Table 11). Dean Runyan estimates that visitors staying in hotels, motels, cabins and lodges in the region spent \$656 million in 2004 including \$290 million on lodging. Visitors on day trips, campers and those staying in vacation homes each spent about \$100 million in the area. Mono and Mariposa counties are especially dependent on tourism as they have small population bases and receive two thirds of the tourist spending in the region.

Table 11. All Tourist Spending in the Yosemite Region by County and Accommodation Type, 2004 (\$ Millions)

Lodging Type	County				Region Total
	Madera	Mariposa	Mono	Tuolumne	
Hotel, Motel	67	236	299	54	656
Private Campground	48	7	13	15	82
Public Campground	8	4	8	2	22
Private Home	22	7	5	24	58
Vacation Home	14	9	36	37	95
<u>Day Travel</u>	<u>26</u>	<u>25</u>	<u>35</u>	<u>17</u>	<u>102</u>
Total	184	288	395	147	1,015
Pct	18%	28%	39%	15%	100%

Source : Dean Runyan and Associates, 2006.

Based on comparisons with government employment statistics, the Dean Runyan tourism spending estimates appear to be inflated by as much as 60%. Dean Runyan reports that tourist spending supported 9,540 jobs in the accommodations and food

¹⁵The basic assumptions of input-output models are that sectors have homogeneous, fixed and linear production functions, that prices are constant, and that there are no supply constraints. The IMPLAN system uses national average production functions for each of 509 sectors based on the NAICS system.

service sectors in 2004. Based on Bureau of Labor Statistics¹⁶ and IMPLAN figures, total employment in accommodations and food services in the region was about 9,500 in 2004. While almost all hotel jobs are attributable to tourist spending, restaurants and bars serve both tourists and local residents. Nationally, 18% of restaurant sales are attributed to tourists. Assuming as much as two thirds of restaurant jobs in the Yosemite region are attributable to tourist spending yields a total of about 6,000 jobs that can be attributed to tourist spending in accommodations and restaurants.

Our estimate of \$255 million in spending by Yosemite National Park visitors is only 25% of the Dean Runyan estimate of one billion dollars in tourist spending in the region. As the principal attraction in the region, we would expect park visitors to account for a larger share of tourism expenditures in the region. If the Dean Runyan tourist spending figure is reduced to \$600 million, park visitors account for 43% of the tourist spending in the region.

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¹⁶ Covered employment figures are reported at <http://www.bls.gov>.

Appendix A: Definitions of Economic Terms

Term	Definition
Sales	Sales of firms within the region to park visitors.
Jobs	The number of jobs in the region supported by the visitor spending. Job estimates are not full time equivalents, but include part time positions.
Personal income	Wage and salary income, sole proprietor's income and employee payroll benefits.
Value added	Personal income plus rents and profits and indirect business taxes. As the name implies, it is the net value added to the region's economy. For example, the value added by a hotel includes wages and salaries paid to employees, their payroll benefits, profits of the hotel, and sales and other indirect business taxes. The hotel's non-labor operating costs such as purchases of supplies and services from other firms are not included as value added by the hotel.
Direct effects	Direct effects are the changes in sales, income and jobs in those business or agencies that directly receive the visitor spending.
Secondary effects	These are the changes in the economic activity in the region that result from the re-circulation of the money spent by visitors. Secondary effects include indirect and induced effects.
Indirect effects	Changes in sales, income and jobs in industries that supply goods and services to the businesses that sell directly to the visitors. For example, linen suppliers benefit from visitor spending at lodging establishments.
Induced effects	Changes in economic activity in the region resulting from household spending of income earned through a direct or indirect effect of the visitor spending. For example, motel and linen supply employees live in the region and spend their incomes on housing, groceries, education, clothing and other goods and services.
Total effects	Sum of direct, indirect and induced effects. <ul style="list-style-type: none"> ▪ Direct effects accrue largely to tourism-related businesses in the area ▪ Indirect effects accrue to a broader set of businesses that serve these tourism firms. ▪ Induced effects are distributed widely across a variety of local businesses.

Appendix B: Handling of Missing Spending Data and Outliers

Missing Spending Data

To compute spending averages and to sum spending across categories, spending categories with missing spending data had to be filled. The spending question included two columns, one for spending inside the park and one for spending outside the park. If spending was reported in any category within each column, the remaining categories in that column were assumed to be zero.

Sixty-five percent of the sample reported some spending both inside and outside the park. Seventy-seven cases reported expenses outside the park, but left the section for expenses inside the park blank. Conversely, 133 cases reported expenses inside the park, but left the section for spending outside the park blank. An additional 13 cases entered zeros in all spending categories and fifty-one cases (7% of the sample) left the entire spending question blank (Table B-1).

With written mailback questionnaires, it is difficult to sort out whether blanks in spending questions represent refusals or a lack of spending. We adopted a conservative approach and treated omitted spending data as representing zeros. This decreases the overall spending averages by about 7% compared to treating blanks as missing observations. The largest differences are for day trips and “other overnight” visitors, both of whom can be expected to include non-spenders. Fourteen percent of the cases classified as day trips had missing spending data and 10% of the “other overnight” segment did not complete the spending question. Seven percent of visitors staying overnight inside the park left the spending question blank, compared to 3% of visitors staying outside the park.

Table B-1. Sample cases by reporting of spending inside and outside the park

Segment	In and out	Neither	Out only	In only	Zero spending	Total
Day Trip	81	20	6	34	6	147
Motel-in	63	10	0	64	0	137
Camp-in	58	7	0	26	2	93
Motel-out	231	10	58	3	3	305
Camp-out	54	1	12	2	0	69
<u>Other ovrn</u>	<u>20</u>	<u>3</u>	<u>1</u>	<u>4</u>	<u>2</u>	<u>30</u>
Total	507	51	77	133	13	781
Pct	65%	7%	10%	17%	2%	100%

Outliers

The treatment of outliers can also influence the spending estimates. Our general procedures are to omit cases involving large parties, long stays or very high spending. These omissions typically do not significantly alter estimates of total spending for a given park, as reductions in per trip spending averages are generally offset by corresponding reductions in average party sizes. With lower party sizes, the spending averages per party are applied to a larger number of parties (estimated by dividing person visits by party size). Similarly, the omission of longer stay trips reduces trip spending averages, but it usually increases per night spending averages as longer trips typically entail lower rates of spending per day.

Omitting outliers reduces the variances in the estimates and especially the sensitivity of estimates for individual segments to the inclusion or exclusion of a handful of atypical cases. Treating large parties arriving in multiple vehicles as representing multiple spending units is more consistent with how they are handled in the park visit statistics. For example, one case at Yosemite reported paying for 40 people for a seven night stay in the park lodge and spending over \$20,000. Treating this as twenty couples two to a room spending \$1,000 each is more consistent with the average spending of \$894 per party for visitors staying in a park lodge.

For the Yosemite visitor sample, cases were considered to be outliers if :

- Nights in the area > 7
- Party size (People paid for) >8
- Total spending > \$5,000.

The sample of visitors at Yosemite NP included 50 cases reporting expenses for more than eight people, 29 cases with stays of more than 7 nights, and 10 cases spending more than \$5,000 in total on the trip (Table B-2). Omitting just the 10 spending outliers reduces the overall average spending estimate by 7%. However, the estimate of total spending for the park is actually 4% higher when all 89 outliers are omitted compared to when they are included.

Table B-2. Outliers by segment for Yosemite NP sample

Segment	Valid case	People paid >8	Nights >7	Total spending >\$5,000	Total Cases
Day Trip	135	12	0	0	147
Motel-in	120	9	2	6	137
Camp-in	75	6	12	0	93
Motel-out	280	13	8	4	305
Camp-out	56	9	4	0	69
<u>Other ovrn</u>	<u>26</u>	<u>1</u>	<u>3</u>	<u>0</u>	<u>30</u>
Total	692	50	29	10	781
Pct	89%	6%	4%	1%	100%

Tables B-3 and B-4 show the estimates of spending with and without outliers. Notice that the estimate of total visitor spending is only slightly lower when outliers are included in the analysis. The largest difference in spending averages with and without outliers is the motel-in segment. Omitting the 17 outliers in this segment reduces the average spending from \$1,268 per party trip to \$841 per party trip. Yet the overall contribution of this segment to total spending remains at about \$75 million as the reduction in the spending average is offset by the greater number of party trips resulting from a lower average party size. The average party size for the motel-in segment is 5.16 with outliers compared to 3.46 without them. Omitting outliers has the effect of redistributing the spending of large parties to smaller subgroups.

Table B-3. Estimates with Outliers Omitted

Segment	N	Mean Spending	Std. Dev.	Pct Error ^a	Party trips	Total Spending (\$ Millions)
Day Trip	135	71	98	23%	229,049	16.256
Motel-in	120	841	849	18%	89,172	74.998
Camp-in	75	240	260	25%	69,131	16.558
Motel-out	280	646	630	11%	195,980	126.642
Camp-out	56	337	356	28%	41,708	14.041
<u>Other ovrn</u>	<u>26</u>	<u>216</u>	<u>251</u>	<u>45%</u>	<u>31,053</u>	<u>6.721</u>
Total	692	389 ^b	619	10%	656,093	255.216

a. Pct errors computed at a 95% confidence level

b. Overall mean is a weighted average of segment averages weighting by the percentage of party trips. The raw sample average is \$482 due to over-sampling of overnight trips.

Table B-4. Estimates with Outliers Included

Segment	N	Mean Spending	Std. Dev.	Pct Error ^a	Party trips	Total Spending (\$ Millions)
Day Trip	147	76	107	23%	150,482	11.405
Motel-in	137	1,268	2,234	29%	59,758	75.781
Camp-in	93	264	279	21%	59,015	15.592
Motel-out	305	772	1,026	15%	162,438	125.357
Camp-out	69	440	493	26%	30,834	13.560
<u>Other ovrn</u>	<u>30</u>	<u>202</u>	<u>241</u>	<u>43%</u>	<u>27,245</u>	<u>5.505</u>
Total	781	505 ^b	1,216	14%	489,772	247.200

a. Pct errors computed at a 95% confidence level

b. Overall mean is a weighted average of segment averages weighting by the percentage of party trips. The raw sample average is \$616 due to over-sampling of overnight trips.

The trip spending average of \$389 per party in Table B-3 is substantially lower than the average of \$681 reported in the VSP report (Littlejohn, Meldrum, and Hollenhorst 2005). With the above analysis, we can trace the reasons for the difference. The raw sample average in our analysis omitting outliers is \$482. This estimate is biased upward due to over-sampling of overnight visitors and more specifically visitors who enter the park multiple times during their trip. The VSP sampling procedure over-represents visitors staying overnight outside the park, as they typically enter the park each

day of their stay. The sample under-represents visitors on day trips and others who only enter the park once during their trip.

The omission of outliers lowers the overall spending average for the raw sample from \$616 per party to \$482 . However, as demonstrated above, it doesn't lower the total spending estimate. The remaining difference in the overall spending average is due to the interpretation of missing spending observations as zeros.

Appendix C: Multipliers

Table M2. Multipliers for selected tourism-related sectors, Yosemite National Park Region, 2005

Sector	Direct effects			Total effects multipliers				
	Jobs/ MM sales	Personal inc/sales	Value Added /sales	Sales I	Sales II	JobsII/ MMsales	IncII/ sales	VA II/sales
Hotels and motels	14.9	0.44	0.71	1.18	1.43	20.4	0.58	0.96
Other accommodations	6.3	0.15	0.35	1.37	1.50	13.0	0.31	0.65
Food services and drinking places	22.2	0.45	0.51	1.18	1.44	27.9	0.59	0.77
Amusements	21.4	0.37	0.62	1.22	1.45	27.7	0.52	0.88
Automotive repair and maintenance	5.9	0.22	0.50	1.21	1.36	10.4	0.34	0.69
Transit and ground passenger transportation	40.4	0.46	0.52	1.22	1.49	48.1	0.63	0.81
Sporting goods manufacturing	6.5	0.15	0.21	1.31	1.44	11.4	0.30	0.44
Misc manf.	10.2	0.20	0.29	1.24	1.38	14.5	0.32	0.49
Retail Trade	18.9	0.48	0.62	1.22	1.50	25.8	0.65	0.92
Wholesale trade	9.4	0.38	0.66	1.16	1.38	14.8	0.51	0.89

SOURCE: Input-output model of four county region economy (Madera, Mariposa, Mono and Tuolumne counties) estimated with the IMPLAN system using 2001 data. Job to sales ratios are adjusted to 2005 based on CPI. Other ratios and multipliers are assumed unchanged from 2001.

Brief explanation of table.

Direct effects are economic ratios to convert sales in each sector to jobs, income and value added.

Jobs/\$MM sales is jobs per million dollars in sales

Income/sales is the percentage of sales going to wages and salaries

Value added/sales is the percentage of sales that is value added (Value added covers all income, rents and profits and indirect business taxes)

Total effects are multipliers that capture the total effect relative to direct sales

Sales II is the usual Type II sales multiplier = (direct + indirect + induced sales)/ direct sales

Sales I captures only direct and indirect sales

Job II/ MM sales = total jobs (direct + indirect + induced) per \$ million in direct sales

Income II /Sales = total income (direct + indirect + induced) per \$ of direct sales

VA II/ Sales = total value added (direct + indirect + induced) per \$ of direct sales

Using the Hotel sector row to illustrate.

Direct Effects: Every million dollars in hotel sales creates 15 jobs in hotels. Forty-four percent of hotel sales goes to wages and salaries of hotel employees and 71% of hotel sales is value added. That means 29% of hotel sales goes to purchase inputs by hotels. The wage and salary income creates the induced effects and the 29% spent on purchases by the hotel starts the rounds of indirect effects.

Multiplier effects: There is an additional 18 cents of indirect sales in the region for every dollar of direct hotel sales (type I sales multiplier = 1.18). Total secondary sales is 43 cents per dollar of direct sales, which means 18 cents in indirect effects and 25 cents in induced effects. An additional 5.5 jobs are created from secondary effects of each million dollars in hotel sales (20.4 total jobs – 14.9 direct jobs per \$million). These jobs are scattered across other sectors of the local economy. Similarly, secondary income is 14% of each dollar of hotel sales (58%-44%) and secondary value added is 25% (96%-71%). Including secondary effects, every million dollar of hotel sales in the region yields \$1.43 million in sales, \$580,000 in income, and \$960,000 in value added.