



Impacts of Visitor Spending on the Local Economy

Yellowstone National Park, 2011

Natural Resource Report NPS/NRSS/EQD/NRR—2013/637



ON THE COVER

Visitors viewing geyser at Yellowstone National Park
Photo by Park Studies Unit staff

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Executive Summary

Yellowstone National Park hosted 3.4 million recreation visits in 2011. Adjustments for visitor group size and re-entries resulted in 635,360 visitor group trips to the park in 2011. Based on two Visitor Services Project surveys conducted July 23–29, 2011, and February 15–21, 2012, 39% of visitor group trips involved an overnight stay in lodges, hotels, motels, cabins, B&Bs, etc. either inside the park or outside the park within 150 miles of the park.¹

Visitors reported their group's expenditures inside the park and within 150 miles of the park. The average visitor group size was 3.4 people and spent an average of \$638 inside the park and within 150 miles of the park.

Total visitor spending in 2011 inside the park and within 150 miles of the park was \$405.5 million, including \$135.7 million inside the park. The greatest proportions of expenditures were for overnight accommodations (36%). Overnight visitors staying in lodges, hotels, motels, cabins, B&Bs, etc. outside the park but in the local region accounted for 56% of total spending.

Sixty-six percent of visitor groups indicated the park visit was the primary reason for their trip to the area. Counting only a portion of visitor expenses if the park visit was not the primary reason for the trip yields \$344.9 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 a six-county region including Park and Teton counties in Wyoming, Carbon, Park, and Gallatin counties in Montana, and Fremont County in Idaho.

Including direct and secondary effects, the \$344.9 million in visitor spending attributed to the park generated \$422.9 million in direct sales in the region, which supported 5,355 jobs. These jobs paid \$148.1 million in labor income, which was part of \$245.8 million in value added to the region.²

A separate study estimated impacts of the park employee payroll on the local economy.³ The park itself employed 566 people in FY 2010 with a total payroll including benefits of \$38.0 million. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$13.5 million in sales, supporting 691 jobs, \$41.9 million in labor income, and \$46.1 million in value added.

¹ Results in this study sometimes differ from those reported in the VSP study reports (Kulesza et al. 2012a, 2012b) for two reasons. First, the results in this report adjust for seasonal differences in visitor group trip characteristics and combine data from the two VSP surveys. Second, the current analysis excludes some cases as outliers. See Study Limitations and Errors section and Appendix D.

² Jobs include fulltime and part-time jobs. Labor income consists of wages and salaries, payroll benefits and income of sole proprietors. Value added includes labor income as well as property income (dividend, royalties, interest and rents) to area businesses and indirect business taxes (sales, property, and excise taxes).

³ Stynes (2011).

Local Economic Impacts of Yellowstone National Park

	<u>Sales</u>	<u>Jobs</u>	<u>Labor Income</u>	<u>Value Added</u>
Park Visitor Spending	\$422.9M	5,355	\$148.1M	\$245.8M
Park Payroll	+ <u>\$13.5M</u>	+ <u>691</u>	+ <u>\$41.9M</u>	+ <u>\$46.1M</u>
Park Visitor Spending + Payroll	\$436.4M	6,046	\$190.0M	\$291.9M

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Introduction

Yellowstone National Park (NP), America's first national park, is known for its wildlife and geothermal features. The 2.2 million acre park is located primarily in northwestern Wyoming in Park and Teton counties, with parts of the park extending into Gallatin and Park counties in Montana and Fremont County in Idaho. Yellowstone NP received 3.4 million recreation visits in 2011, including 1.3 million overnight stays (Table 1).

Table 1. Recreation visits and overnight stays, Yellowstone National Park, 2011

Month	Recreation visits	Overnight (OVN) Stays				Total OVN stays
		Concession lodging	Tent and RV campers	Backcountry campers	Group campers	
January	24,517	4,414	128	50	0	4,592
February	28,174	4,815	157	357	0	5,329
March	18,728	1,617	294	138	0	2,049
April	28,147	0	1,159	89	0	1,248
May	207,842	26,558	19,292	580	434	46,864
June	634,316	133,143	112,922	3,228	2,180	251,473
July	906,935	133,835	202,402	11,107	6,123	353,467
August	805,173	130,668	183,438	13,875	4,592	332,573
September	536,349	133,167	105,828	6,488	1,303	246,786
October	175,433	18,673	11,661	887	163	31,384
November	12,198	0	397	417	0	814
<u>December</u>	<u>16,514</u>	<u>4,211</u>	<u>112</u>	<u>76</u>	<u>0</u>	<u>4,399</u>
Total	3,394,326	591,101	637,790	37,292	14,795	1,280,978

Source: NPS Public Use Statistics 2011.

The purpose of this study is to estimate the annual, local economic impacts of visitors to Yellowstone NP in 2011. Economic impacts are measured as the direct and secondary sales, income, and jobs in the local region resulting from spending by park visitors. (See Appendix A: Glossary for definitions of terms.) In addition, a separate study estimated the impacts of the NPS park payroll on the local region (Stynes 2011), and those results are reported herein. Neither study estimated the economic impacts of park operations or construction spending on the local region.

The local economic region defined for this study includes Park and Teton counties in Wyoming, Carbon, Park, and Gallatin counties in Montana, and Fremont County in Idaho. This six-county region has a population of 177,968 (USCB 2010), gross regional product of \$8.4 billion (MIG,

Inc. 2008), median household income of \$47,397, and family poverty rate of 6.9% (USCB 2010). Food services and drinking places and real estate establishments are the major employers in the region (MIG, Inc. 2008), and the region experienced a 6.5% unemployment rate in 2011 (BLS 2011).

Methods

The economic impact estimates are produced using the Money Generation Model 2 (MGM2) (Stynes et al. 2007). The three main 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 Yellowstone NP Visitor Services Project (VSP) survey data (Kulesza et al. 2012a, 2012b), National Park Service Public Use Statistics (2011), and IMPLAN input-output modeling software (MIG, Inc. 2008). The MGM2 model provides a spreadsheet template for combining park use, spending, and regional multipliers to compute changes in sales, labor income, jobs, and value added in the region.

The VSP visitor surveys were conducted at Yellowstone NP from July 23–29, 2011 and February 15–21, 2012.⁴ The VSP surveys measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed to a systematic, random sample of 1,314 visitor groups in summer 2011 and 433 visitor groups in winter 2011. Response rates were 68.5% and 77.1%, respectively.

Spending and economic impact estimates for Yellowstone NP are based on the summer 2011 and winter 2012 VSP survey data. Spending averages for summer visitor groups were estimated using the summer 2011 VSP survey data and applied to visitor groups between May and October. Winter visitor group spending averages were estimated using the winter 2012 VSP survey data and assumed to represent visitor groups from November through April. Although winter visitor spending data were collected in February 2012, spending averages and patterns are assumed to apply to all winter visitors in 2011.

Visitors were asked to report expenditures within 150 miles of the park. The local region for determining economic impact was defined as a six-county area around the park including Park and Teton counties in Wyoming, Carbon, Park, and Gallatin counties in Montana, and Fremont County in Idaho. The defined local region is slightly smaller than 150-mile radius for which visitor spending was reported, but includes most places where visitors reported spending the nights before, during, and after their trip to the park.

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

Local: Visitors from the local region, not staying overnight inside the park.

⁴ Results in this study sometimes differ from those reported in the VSP study reports (Kulesza et al. 2012a, 2012b) because of the omission of cases considered to be outliers in the current analysis. See Study Limitations and Errors section.

Day trip: Visitors from outside the local region, not staying overnight within 150 miles of the park.

Motel-in: Visitors reporting motel expenses inside the park.⁵

Camp-in: Visitors reporting camping expenses inside the park.

Motel-out: Visitors reporting motel expenses outside the park within 150 miles of the park.

Camp-out: Visitors reporting camping expenses outside the park within 150 miles of the park.

Other overnight (Other OVN): Visitors staying overnight in the local region but not reporting any lodging expenses. This segment includes visitors staying in private homes, with friends or relatives, or in other unpaid lodging.⁶

The VSP survey data were used to estimate the percentage of visitors from each segment as well as spending averages, lengths of stay, and visitor group sizes for each segment. Segment shares from the VSP surveys were adjusted to be consistent with the park's NPS Public Use Statistics (2011) overnight stay figures.

⁵ The questionnaire asked about expenditures for "Lodges, hotels, motels, cabins, B&B, etc." For convenience, these expenditures are referred to as "motel" in this report.

⁶ Visitors reporting multiple lodging types and expenditures were classified based on the greatest reported lodging expense. Some visitors listing motels or campgrounds as lodging types did not report any lodging expenses and were classified in the other overnight (Other OVN) category.

Results

Visits

Based on the VSP survey data, 12% of park entries were classified as day trip visits by either local residents or visitors from outside the region, and the remaining 88% were classified as overnight visits including an overnight stay in the local region (Table 2). The average visitor group size ranged from 2.9 to 4.2 people across the seven segments with an average visitor group of 3.4 people.⁷ The average length of stay in the park and the local region on overnight trips was 3.7 nights.

Table 2. Selected visit/trip characteristics by segment, 2011

Characteristic	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Visitor segment share (park entries)	3%	9%	8%	8%	36%	10%	26%	100%
Average visitor group size	4.2	2.9	3.2	3.8	3.3	3.4	3.3	3.4
Length of stay (days or nights)	1.0	1.0	4.0	4.3	3.5	3.9	3.5	3.7
Re-entry rate (park entries per trip)	1.3	1.1	1.4	1.4	2.1	2.1	1.5	1.7
Percent primary purpose trips	100%	46%	84%	88%	67%	76%	48%	66%

Sixty-six percent of visitor groups indicated that visiting the park was the primary reason for their trip to the area. Other stated reasons included visiting Grand Teton National Park, visiting other attractions in the area, visiting friends and relatives in the area, business, and traveling through.

The 3,394,326 recreation visits in 2011 were allocated to the seven segments using the visit segment shares in Table 2. Because spending is reported for the stay in the area, recreation visits were converted to visitor group trips to the area by dividing recreation visits by the average number of times each visitor entered the park during their stay and the average visitor group size. Park re-entry rates were estimated based on the number of entries into the park reported by survey respondents. The 3,394,326 recreation visits represented 635,360 visitor group trips (Table 3).

⁷ Visitor group size reported herein is based on the number of people covered by expenditures reported in the VSP surveys.

Table 3. Recreation visits and visitor group trips by segment, 2011

Measure	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Recreation visits	101,830	310,620	267,698	261,284	1,238,634	326,605	887,656	3,394,326
Visitor group trips	19,084	98,996	61,942	50,043	184,466	45,961	174,867	635,360
Percent of visitor group trips*	3%	16%	10%	8%	29%	7%	28%	100%

*Segment percentages do not total 100% due to rounding.

Visitor Spending

The VSP surveys collected data about expenditures of visitor groups inside the park and within 150 miles of the park.⁸ Spending averages were computed on a visitor group trip basis for each segment. Spending averages for the year were computed by weighting seasonal spending averages by the percentage of visits occurring during each season (summer or winter; see Appendix D).

The average visitor group spent \$638 on the trip inside the park and in the local region (Table 4). On a visitor group trip basis, average spending was \$77 for day trips by local residents and \$122 for day trips by non-local visitors. Visitor groups staying in motels inside the park spent an average of \$1,362 on their trips, while visitor groups staying in motels outside the park spent \$1,232 on their trips. Visitor groups camping in the park spent an average of \$578 on their trips, while visitor groups camping outside the park spent an average of \$675 on their trips. Visitor groups spent about 33% of their total spending inside the park and 67% outside the park.

Table 4. Average spending by segment , 2011 (dollars per visitor group per trip)

Expenditures	Segment							All visitors*
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
<u>Inside Park</u>								
Motels	0.00	0.00	556.48	0.00	14.57	0.00	0.00	58.48
Camping fees	0.00	0.00	3.83	90.14	3.93	11.65	0.00	9.46
Restaurants & bars	10.46	13.46	220.54	65.06	37.82	30.06	14.40	46.16
Groceries & takeout food	2.27	1.73	35.45	40.65	8.56	8.44	2.96	10.91

⁸ Some expenditure categories in the VSP questionnaire were combined for reporting herein and MGM2 analysis. See Appendix B.

Table 4. Average spending by segment , 2011 (dollars per visitor group per trip)

Expenditures	Segment							All visitors*
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Gas & oil	1.14	5.44	55.83	65.66	12.20	24.26	4.29	17.97
Local transportation	0.00	2.83	17.44	11.79	5.16	0.00	2.12	5.15
Admission & fees	7.46	22.47	55.02	50.38	28.21	23.70	13.36	26.64
<u>Souvenirs & other expenses</u>	<u>5.00</u>	<u>20.14</u>	<u>83.29</u>	<u>95.60</u>	<u>45.86</u>	<u>40.47</u>	<u>13.48</u>	<u>38.89</u>
Total Inside Park	26.33	66.05	1,027.87	419.29	156.30	138.58	50.62	213.65
<u>Outside Park</u>								
Motels	0.00	0.00	104.77	2.17	488.20	0.58	0.00	152.17
Camping fees	0.00	0.00	1.18	10.88	2.23	150.18	0.00	12.48
Restaurants & bars	7.12	10.41	56.10	13.06	151.22	65.50	10.43	59.85
Groceries & takeout food	3.78	2.71	14.11	22.12	44.69	76.42	9.96	24.90
Gas & oil	14.81	24.93	40.55	53.68	78.75	122.22	13.50	47.93
Local transportation	22.71	4.20	62.87	42.31	154.93	12.21	8.98	59.13
Admission & fees	0.00	7.14	39.84	6.11	96.27	57.34	12.69	41.07
<u>Souvenirs & other expenses</u>	<u>2.27</u>	<u>6.40</u>	<u>15.01</u>	<u>8.57</u>	<u>59.20</u>	<u>51.55</u>	<u>10.54</u>	<u>27.02</u>
Total Outside Park	50.69	55.79	334.43	158.91	1,075.48	536.01	66.10	424.55
Total Inside & Outside Park	77.02	121.84	1,362.31	578.19	1,231.78	674.59	116.72	638.20

*Weighted by percent visitor group trips.

The relative standard error at a 95% confidence level for the overall spending average is 14%. A 95% confidence interval for the overall visitor group spending average is therefore \$638 plus or minus \$90 or between \$548 and \$728.

On a per night basis, visitor groups staying in motels inside the park spent \$337 in the local region, while visitor groups staying outside the park spent \$357 per night (Table 5). Campers staying inside the park spent \$134 per night, while campers staying outside the park spent \$172. The average reported per-night lodging expense was \$163 for motels inside the park, \$146 for motels outside the park, \$23 for camping inside the park, and \$41 for camping outside the park.

Table 5. Average spending per night for visitor groups on overnight trips, 2011 (dollars per visitor group per night)

Expenditures	Segment				
	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN
Motels	163.38	0.50	145.56	0.15	0.00
Camping fees	1.24	23.42	1.78	41.21	0.00
Restaurants & bars	68.35	18.11	54.73	24.34	7.15
Groceries & takeout food	12.24	14.55	15.42	21.61	3.72
Gas & oil	23.81	27.67	26.33	37.30	5.12
Local transportation	19.84	12.54	46.35	3.11	3.19
Admission & fees	23.44	13.10	36.04	20.64	7.50
<u>Souvenirs & other expenses</u>	<u>24.29</u>	<u>24.15</u>	<u>30.42</u>	<u>23.43</u>	<u>6.91</u>
Total per visitor group per night	336.59	134.04	356.62	171.79	33.60

Total spending was estimated by multiplying the number of visitor group trips for each segment by the average spending per trip and summing across segments. Yellowstone NP visitors spent a total of \$405.5 million in the local region in 2011 (Table 6). Overnight visitors staying in motels outside the park accounted for 56% of the total spending, while overnight visitors staying in motels inside the park accounted for 21%. Motel expenses represented 33% of the total spending, and restaurant & bar expenses represented 17% (Figure 1).

Table 6. Total visitor spending by segment, 2011 (thousands of dollars)

Expenditures	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
<u>Inside Park</u>								
Motels	0	0	34,470	0	2,687	0	0	37,157
Camping fees	0	0	237	4,511	724	536	0	6,008
Restaurants & bars	200	1,332	13,661	3,256	6,976	1,382	2,519	29,325
Groceries & takeout food	43	171	2,196	2,034	1,579	388	518	6,929
Gas & oil	22	538	3,458	3,286	2,250	1,115	751	11,420
Local transportation	0	280	1,080	590	951	0	370	3,272
Admission & fees	142	2,224	3,408	2,521	5,204	1,089	2,337	16,926
<u>Souvenirs & other expenses</u>	<u>95</u>	<u>1,994</u>	<u>5,159</u>	<u>4,784</u>	<u>8,459</u>	<u>1,860</u>	<u>2,357</u>	<u>24,709</u>
Total Inside Park	502	6,539	63,668	20,982	28,832	6,369	8,852	135,745
<u>Outside Park</u>								
Motels	0	0	6,489	108	90,057	27	0	96,682
Camping fees	0	0	73	545	412	6,902	0	7,932
Restaurants & bars	136	1,031	3,475	654	27,895	3,011	1,824	38,025
Groceries & takeout food	72	269	874	1,107	8,243	3,512	1,741	15,819
Gas & oil	283	2,468	2,512	2,686	14,526	5,617	2,361	30,453
Local transportation	433	415	3,894	2,117	28,580	561	1,569	37,571
Admission & fees	0	706	2,468	306	17,758	2,635	2,220	26,093
<u>Souvenirs & other expenses</u>	<u>43</u>	<u>633</u>	<u>930</u>	<u>429</u>	<u>10,920</u>	<u>2,369</u>	<u>1,842</u>	<u>17,167</u>
Total Outside Park	967	5,523	20,715	7,952	198,390	24,636	11,558	269,742
Total Inside & Outside Park	1,470	12,062	84,384	28,934	227,222	31,005	20,410	405,487
Segment Percent of Total	<1%	3%	21%	7%	56%	8%	5%	100%

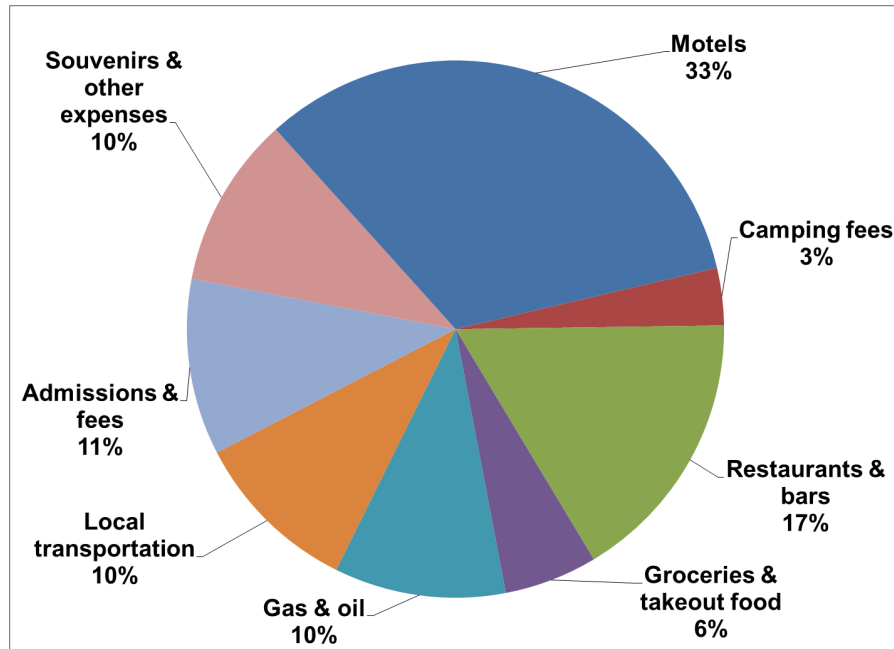


Figure 1. Yellowstone NP visitor spending by category, 2011

Because visitors would come to the region whether or not the park existed, not all visitor spending can be attributed to the park. Thirty-four percent of visitor groups did not make the trip primarily to visit Yellowstone NP. Spending directly attributed to park visits was estimated by counting all spending on trips for which 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 in the region was counted for day trips. All spending inside the park was treated as park-related spending. With these assumptions, a total of \$344.9 million in visitor spending was attributed to park visits (Table 7). This represented 85% of the overall visitor spending total.

Table 7. Total spending attributed to park visits, 2011 (thousands of dollars)

Expenditures	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Motels	0	0	40,187	98	71,772	22	0	112,080
Camping fees	0	0	301	5,004	1,040	6,187	0	12,532
Restaurants & bars	200	2,086	16,722	3,848	28,375	3,846	3,665	58,743
Groceries & takeout food	43	368	2,966	3,037	7,902	3,263	1,612	19,192
Gas & oil	22	2,344	5,671	5,720	13,393	5,714	2,234	35,098
Local transportation	0	584	4,511	2,508	22,876	459	1,357	32,295
Admission & fees	142	2,741	5,583	2,798	18,827	3,247	3,732	37,070
<u>Souvenirs & other expenses</u>	<u>95</u>	<u>2,457</u>	<u>5,978</u>	<u>5,173</u>	<u>16,836</u>	<u>3,800</u>	<u>3,515</u>	<u>37,854</u>
Total Attributed to Park	502	10,579	81,920	28,186	181,022	26,538	16,115	344,865
Percent of Spending Attributed to the Park	34%	88%	97%	97%	80%	86%	79%	85%
Percent of Attributed Spending	<1%	3%	24%	8%	52%	8%	5%	100%

Economic Impacts of Visitor Spending

The economic impacts of Yellowstone NP visitor spending on the local economy was estimated by applying visitor spending to a set of economic ratios and multipliers in MGM2 representing the economy of the six-county region— Park and Teton counties in Wyoming, Carbon, Park, and Gallatin counties in Montana, and Fremont County in Idaho.⁹ Economic ratios and multipliers for the region were estimated using the *Impact Analysis for Planning (IMPLAN) Professional software* (version 3, MIG, Inc. 2008) with 2008 data.¹⁰ Multipliers were updated to take into account price changes from 2008 to 2011 (see Study Limitations and Errors section below).

Not all visitor spending was counted as direct sales to the region. The amount a visitor spends for a retail good is made up of the cost of the good from the producer, a markup by a wholesaler, and a markup by a retailer. In MGM2, retail and wholesale margins for grocery & takeout food, gas & oil, and souvenirs & other expenses are applied to visitor spending to account for mark-ups by retailers and wholesalers. The retail margins for the three sectors are 25.3%, 22.3%, and 50.0%, respectively, and the wholesale margins are 12.3%, 8.3%, and 11.4%. In addition, regional purchase coefficients from IMPLAN for all sectors are used to account for the proportion of demand within the region satisfied by imports into the region.

The tourism output sales multiplier for the region was 1.45. Every dollar of direct sales to visitors generated another \$0.45 in secondary sales through indirect and induced effects.¹¹ (See Appendix A: Glossary for further explanation of terms.)

The economic impacts to the local region are presented in two ways: (1) based on all visitor spending and (2) based only on visitor spending attributable to the park. The first estimate—including all visitor spending—shows the overall contribution park visitors make to the local region. The second estimate—including only visitor spending attributable to the park—shows the impact or contribution the park makes to the economy of the local region.

⁹ Economic ratios convert between various economic measures, e.g., direct spending to the directly associated jobs, labor income, and value added in each sector. Economic multipliers capture the secondary effects of economic measures.

¹⁰ See Appendix C: Economic Ratios and Multipliers for the region.

¹¹ 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 of All Visitor Spending

Using all visitor spending and including direct and secondary effects, the \$405.5 million spent by park visitors generated \$497.6 million in sales, which supported 6,311 jobs in the local region (Table 8). These jobs paid \$174.4 million in labor income, which was part of \$289.1 million in value added to the region.¹²

Table 8. Impacts of all visitor spending on the local economy, 2011*

Sector/Expenditure category	Sales (thousands of dollars)	Jobs	Labor Income (thousands of dollars)	Value Added (thousands of dollars)
Direct Effects				
Motels	133,838	1,369	41,656	74,507
Camping fees	13,940	124	4,046	8,041
Restaurants & bars	67,350	1,195	24,860	34,791
Groceries & takeout food	5,755	101	2,983	4,856
Gas & oil	9,338	134	4,752	7,775
Local transportation	40,843	906	20,367	25,421
Admission & fees	43,020	741	18,308	28,025
Souvenirs & other expenses	20,938	373	11,057	17,993
Wholesale trade	5,674	39	2,110	3,635
<u>Local production of goods</u>	<u>1,901</u>	<u>11</u>	<u>464</u>	<u>749</u>
Total Direct Effects	342,596	4,994	130,605	205,793
<u>Secondary Effects</u>	<u>154,967</u>	<u>1,317</u>	<u>43,763</u>	<u>83,285</u>
Total Effects	497,563	6,311	174,367	289,079

*Note: Impacts of \$405.5 million in visitor spending reported in Table 6. Totals may not equal sum of individual categories due to rounding.

Value added is the preferred measure of the contribution of visitors 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. Value

¹² Jobs include full and part time jobs. Labor income consists of wages and salaries, payroll benefits and income of sole proprietors. Value added includes labor income as well as profits and rents to area businesses and sales and excise taxes.

added impacts are also comparable to Gross Regional Product, the broadest measure of total economic activity in a region. The largest direct effects are in restaurants & bars and motels.

Impacts of Visitor Spending Attributed to the Park

Using only visitor spending attributable to the park by including only some spending on trips where the primary trip purpose was not to visit Yellowstone NP reduces the overall impacts by about 15% (Table 9; see spending inclusion assumptions in previous section). Including direct and secondary effects, the \$344.9 million spent by park visitors and attributable to the park generated \$422.9 million in sales, which supported 5,355 jobs in the local region. These jobs paid \$148.1 million in labor income, which was part of \$245.8 million in value added to the region.

Table 9. Economic impacts of visitor spending attributed to the park, 2011*

Sector/Expenditure category	Sales (thousands of dollars)	Jobs	Labor Income (thousands of dollars)	Value Added (thousands of dollars)
Direct Effects				
Motels	112,080	1,147	34,884	62,394
Camping fees	12,532	111	3,638	7,229
Restaurants & bars	58,743	1,042	21,683	30,345
Groceries & takeout food	4,856	86	2,517	4,097
Gas & oil	7,827	112	3,984	6,517
Local transportation	32,295	717	16,105	20,101
Admission & fees	37,070	638	15,776	24,149
Souvenirs & other expenses	18,927	337	9,995	16,265
Wholesale trade	4,925	34	1,832	3,156
<u>Local production of goods</u>	<u>1,716</u>	<u>10</u>	<u>420</u>	<u>677</u>
Total Direct Effects	290,972	4,235	110,833	174,930
<u>Secondary Effects</u>	<u>131,890</u>	<u>1,120</u>	<u>37,222</u>	<u>70,901</u>
Total Effects	422,862	5,355	148,055	245,831

*Note: Impacts of \$344.9 million in visitor spending attributed to park reported in Table 7. Totals may not equal sum of individual categories due to rounding.

Economic Impacts of the NPS Park Payroll

In addition to visitor spending, spending by park employees also impacts the local region. A separate study (Stynes 2011) estimated the impacts of park payroll by applying economic multipliers to wage and salary data to capture the induced effects of NPS employee spending on local economies. Yellowstone NP itself employed 566 people in FY 2010 with a total payroll including benefits of \$38.0 million.^{13,14} Including secondary effects, the local impacts of the park payroll in FY 2010 were \$13.5 million in sales, 691 jobs, \$41.9 million in labor income, and \$46.1 million value added (Stynes 2011).

Combined Economic Impacts

The combined impacts to the region of visitor spending attributable to the park and NPS payroll were \$436.4 million in sales, which supported 6,046 jobs with labor income of \$190.0 million, which was part of a total value added of \$291.9 million.

¹³ The number of employees was estimated by totaling the number of distinct social security numbers in each pay period and dividing by the number of pay periods. The figure is therefore an annual average. Four seasonal jobs for three months count as one job. No distinction is made between part-time and full-time employees. Jobs, salary, and payroll benefits are assigned to the park where the employee's time was charged, which may differ from their duty station (Stynes 2011).

¹⁴ This number of employees at Yellowstone NP includes only NPS employees and not concessionaire employees. The effects of concessionaire employees' spending on the local economy are accounted for as induced effects of visitor spending.

Study Limitations and Errors

The accuracy of the MGM2 estimates rests on the accuracy of three inputs: visits, spending averages, and multipliers. Visits are taken from NPS Public Use Statistics (2011). 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 group trips to the region rather than park entries. Re-entry rates were estimated based on best available knowledge about park visitor-counting methods and visitors' responses to a park re-entry question on the VSP visitor surveys.

Spending averages are derived from the summer 2011 and winter 2012 Yellowstone NP VSP visitor surveys (Kulesza et al. 2012a, 2012b). Estimates from the surveys are subject to sampling errors, measurement errors, and potential seasonal biases. The overall spending averages are subject to sampling errors of 14%.

Spending averages are also sensitive to decisions about outliers and treatment of missing data. In order to estimate spending averages, incomplete spending data were filled with zeros. Visitor groups of more than 10 people in the summer sample (28 cases) or 8 people in the winter sample (11 cases), visiting the local region for more than 14 nights in the summer sample (13 cases) or 10 nights in the winter sample (6 cases), or arriving in more than 12 vehicles in the summer sample (1 case) or 5 vehicles in the winter sample (1 case) were omitted from the analysis. In addition visitor groups with total spending greater than \$4,813 in the summer sample (36 cases) and \$7,300 in the winter sample (15 cases; the mean for each sample plus two times the standard deviation of the mean for spending) were omitted from the analysis. These are conservative assumptions about outliers and likely result in conservative estimates of economic impacts.

The sample only covers visitors during a single week in July for summer visitors and a single week in February for winter visitors. To extrapolate to annual totals, it was assumed that the summer sample represented visitors from May thru October, and the winter sample represented visitors from November thru April. Visitors in February 2012 were assumed to be similar to winter visitors throughout 2011.

Multipliers are derived from an input-output model of the local economy using IMPLAN (MIG, Inc. 2008). The 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 440 sectors based on the NAICS system (see Appendix B, Table B2). The most recent local IMPLAN datasets available for this analysis were 2008. National IMPLAN multiplier data were available for 2009, so local employment, labor income, and value added multipliers were updated to 2009 using 2008/2009 national ratios. In addition, local employment multipliers were updated to 2011 based on changes in consumer price indices.

Sorting out how much spending to attribute to the park when the park is not the primary reason for the trip is somewhat subjective. Because 34% of visitor groups to Yellowstone NP did not make the trip primarily to visit the park and most spending occurred outside the park, adjustments for non-primary purpose trips have a significant effect on the overall spending and impact estimates.

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Appendix A: Glossary

Term	Definition
Direct effects	Changes in sales, income and jobs in those business or agencies that directly receive visitor spending.
Economic multiplier	Captures the size of secondary effects and are usually expressed as a ratio of total effects to direct effects.
Economic ratio	<p>Converts various economic measures from one to another. For example, direct sales can be used to estimate direct effects on jobs, personal income, and value added by applying economic ratios. That is:</p> <ul style="list-style-type: none">• Direct jobs = direct sales * jobs to sales ratio• Direct personal income = direct sales * personal income to sales ratio• Direct value added = direct sales * value added to sales ratio.
Indirect effects	Changes in sales, income and jobs in industries that supply goods and services to the businesses that sell directly to visitors, i.e., businesses in the supply chain. For example, linen suppliers benefit from visitor spending at motels.
Induced effects	Changes in economic activity in the region resulting from household spending of income earned through a direct or indirect effect of 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. IMPLAN's Social Accounting Matrix (SAM) multipliers also include induced effects resulting from local/state/federal government spending.
Jobs	The number of jobs in the region supported by visitor spending. Job estimates are not full time equivalents, but include both fulltime and part-time positions.
Labor income	Wage and salary income, sole proprietor (business owner) income and employee payroll benefits.

Term	Definition
Regional purchase coefficient (RPC)	The proportion of demand within a region supplied by producers within that region.
Retail margin	The markup to the price of a product when a product is sold through a retail trade activity. Retail margin is calculated as sales receipts minus the cost of goods sold.
Sales	Direct sales (retail goods and services) of firms within the region to park visitors.
Secondary effects	Changes in the economic activity in the region that result from the re-circulation of money spent by visitors. Secondary effects include indirect and induced effects.
Total effects	<p>Sum of direct, indirect and induced effects.</p> <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.
Value added	Labor income plus property income (rents, dividends, royalties, interest) 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 motel includes wages and salaries paid to employees, their payroll benefits, profits of the motel, and sales, property, and other indirect business taxes. The motel's non-labor operating costs such as purchases of supplies and services from other firms are not included as value added by the motel.
Visitor group	A group of people traveling together to visit the park. Visitor group is the basic sampling unit for VSP surveys; each visitor group receives only one questionnaire.

Term	Definition
Wholesale margin	The markup to the price of a product when a product is sold through wholesale trade. Wholesale margin is calculated as wholesale sales minus the cost of the goods sold.

Appendix B: Expenditure Sector Assignments

Tables B1 and B2 show expenditure categories visitors were asked to estimate in the Yellowstone NP VSP questionnaires for summer and winter, respectively. Some expenditure categories were combined and renamed for MGM2 analysis.

Table B1. Expenditure categories in Yellowstone NP questionnaire and MGM2 sector assignment, summer questionnaire

Questionnaire expenditure categories	Inside park	Outside park	MGM2 sector
Lodges, hotels, motels, cabins, B&B, etc.	X	X	Motels
Camping fees and charges	X	X	Camping fees
Guide fees and charges	X	X	Admissions & fees
Restaurants and bars	X	X	Restaurants & bars
Groceries and takeout food	X	X	Groceries & takeout food
Gas and oil (auto, RV, boat, etc.)	X	X	Gas & oil
Other transportation expenses (including airfare, rental cars, auto repairs, etc.)	X	X	Local transportation
Fishing/boating	X	X	Admissions & fees
Admission, recreation, entertainment fees	X	X	Admissions & fees
All other purchases (souvenirs, film, books, sporting goods, clothing, etc.)	X	X	Souvenirs & other expenses
Donations	X	X	Souvenirs & other expenses

X = category included in questionnaire.

Table B2. Expenditure categories in Yellowstone NP questionnaire and MGM2 sector assignment, winter questionnaire.

Questionnaire expenditure categories	Inside park	Outside park	MGM2 sector
Lodges, hotels, motels, cabins, B&B, etc.	X	X	Motels
Camping fees and charges	X	X	Camping fees
Guide fees and charges	X	X	Admissions & fees
Restaurants and bars	X	X	Restaurants & bars
Groceries and takeout food	X	X	Groceries & takeout food
Gas and oil (auto, RV, snowmobile, etc.)	X	X	Gas & oil
Other transportation expenses (including airfare, rental cars, auto repairs, etc.)	X	X	Local transportation
Admission, recreation, entertainment fees	X	X	Admissions & fees
All other purchases (souvenirs, film, books, sporting goods, clothing, etc.)	X	X	Souvenirs & other expenses
Snowmobiles and coaches	X	X	Admissions & fees
Donations	X	X	Souvenirs & other expenses

X = category included in questionnaire.

MGM2 sectors names correspond to similar sector names and numbers in IMPLAN (Table B2). IMPLAN sectors also correspond to 2007 North American Industry Classification System (NAICS) sectors.

Table B3. MGM2 sector correspondence to IMPLAN and 2007 NAICS sectors

MGM2 sector	IMPLAN		2007 NAICS
	No.	Name	
Motels	411	Hotels and motels, including casino hotels	72111-2
Camping fees	412	Other accommodations	72119, 7212-3
Restaurants & bars	413	Food services and drinking places	722
Groceries & takeout food	324	Retail - Food and beverage	445
Gas & oil	326	Retail - Gasoline stations	447
Local transportation	336	Transit and ground passenger transportation	485
Admissions & fees	410	Other amusement and recreation industries	71391-3, 71399
Souvenirs & other expenses	329	Retail - General merchandise	452
Local production of goods	317	All other miscellaneous manufacturing	339993, 339995, 339999
Wholesale trade	319	Wholesale trade	42

Source: IMPLAN (MIG, Inc. 2008).

Appendix C: Economic Ratios and Multipliers

Table C1. Economic ratios and multipliers for selected tourism-related sectors, Yellowstone NP region, 2010

Sector	Direct effects			Total effects multipliers				
	Jobs /\$MM sales	Income /sales	Value added/ sales	Sales I	Sales SAM	Job II/ MM sales	Income II/ sales	Value added II/sales
Motels	10.23	0.31	0.56	1.25	1.46	14.19	0.44	0.79
Camping fees	8.89	0.29	0.58	1.27	1.44	12.84	0.42	0.81
Restaurants & bars	17.74	0.37	0.52	1.24	1.45	21.33	0.49	0.76
Groceries & takeout food	17.61	0.52	0.84	1.24	1.49	21.64	0.65	1.12
Gas & oil	14.35	0.51	0.83	1.21	1.40	17.58	0.62	1.05
Local transportation	22.19	0.50	0.62	1.12	1.36	25.42	0.61	0.82
Admission & fees	17.22	0.43	0.65	1.37	1.53	21.75	0.57	0.95
Souvenirs & other expenses	17.82	0.53	0.86	1.23	1.49	21.87	0.66	1.13
Local production of goods	6.03	0.25	0.40	1.18	1.35	8.66	0.34	0.58
Wholesale trade	6.94	0.37	0.64	1.20	1.43	10.59	0.50	0.88

Source: IMPLAN (MIG, Inc. 2008) updated to 2011.

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, salaries, and employee benefits.

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 I captures only direct and indirect sales.

Sales SAM is the SAM sales multiplier = (direct + indirect + induced sales) /direct sales.

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

$\text{Income II /sales} = \text{total income (direct + indirect + induced) per \$ of direct sales.}$

$\text{Value added II/sales} = \text{total value added (direct + indirect + induced) per \$ of direct sales.}$

Using the motels sector row to illustrate

Direct Effects: Every million dollars in motel sales creates 10.2 jobs in motels. Fifty-six percent of motel sales are value added, including 31% that goes to wages and salaries of motel employees. That means 44% of motel sales goes to purchase inputs by motels (e.g., linens, cleaning supplies). The wage and salary income creates the induced effects and the 44% spent on purchases by the motel starts the rounds of indirect effects.

Multiplier effects: There is an additional 25 cents of indirect sales in the region for every dollar of direct motel sales (type I sales multiplier = 1.25). Total secondary sales are 46 cents per dollar of direct sales, which means 25 cents in indirect effects and 21 cents in induced effects. An additional 4.0 jobs are created from secondary effects of each million dollars in motel sales (14.2 total jobs – 10.2 direct jobs per million dollars). These jobs are distributed across other sectors of the local economy. Similarly, the secondary effects on income for each dollar of motel sales are 13% (44%-31%), and the secondary effects on value added for each dollar of motel sales are 23% (79%-56%). Including secondary effects, every million dollar of motel sales in the region yields \$1.46 million in sales, which supports 14.2 jobs. Those jobs pay \$440,000 in labor income, which is part of the overall value added of \$790,000.

Appendix D: Comparison of Summer and Winter Visitors

There were differences in spending and trip characteristics between the summer and winter samples (Table D1). Winter visitor groups were less likely to camp, had smaller visitor group sizes, and entered the park fewer times. However, winter visitors stayed longer on average than summer visitors.

Table D1. Visitor segment mix and conversion factors, summer versus winter

Characteristic	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
<u>Summer</u>								
Visitor segment share (park entries)	3%	9%	8%	8%	36%	10%	26%	100%
Average visitor group size	4.2	2.9	3.2	3.8	3.3	3.4	3.3	3.4
Length of stay (days or nights)	1.0	1.0	4.0	4.3	3.4	3.9	3.4	3.7
Re-entry rate (park entries per trip)	1.3	1.1	1.4	1.4	2.1	2.1	1.6	1.7
Percent primary purpose trips	100%	46%	84%	88%	67%	76%	47%	66%
<u>Winter</u>								
Visitor segment share (park entries)	3%	13%	5%	—*	49%	—*	30%	100%
Average visitor group size	3.0	3.4	2.6	—*	2.7	—*	3.1	2.8
Length of stay (days or nights)	1.0	1.0	4.3	—*	3.8	—*	5.4	4.4
Re-entry rate (park entries per trip)	1.1	1.0	1.2	—*	1.2	—*	1.2	1.2
Percent primary purpose trips	100%	46%	97%	—*	68%	—*	66%	72%

*In the winter sample, only 1 visitor group reported camping in the park and 2 visitor groups reported camping outside the park. Trip characteristics were not estimated due to the small sample sizes and missing data.

Differences in spending patterns between summer and winter visitor groups reflected the differences in trip characteristics (Tables D2 and D3). Winter spending averages were higher because of longer stays and snowmobile and snow coach fees.

Spending averages for visitor groups throughout the year were computed by weighting seasonal spending averages by the percentage of visits occurring during each season (summer or winter).

.Table D2. Average visitor spending by segment, dollars per visitor group per trip, summer 2011

Expenditures	Segment							All visitors*
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
<u>Inside Park</u>								
Motels	0.00	0.00	552.79	0.00	15.35	0.00	0.00	59.48
Camping fees	0.00	0.00	3.96	90.14	4.36	11.65	0.00	10.03
Restaurants & bars	11.06	13.54	220.03	65.06	39.28	30.06	13.28	46.73
Groceries & takeout food	2.41	1.81	36.55	40.65	9.33	8.44	3.08	11.49
Gas & oil	1.21	5.70	57.54	65.66	13.36	24.26	4.49	18.97
Local Transportation	0.00	0.00	14.56	11.79	5.67	0.00	2.23	4.62
Admission & fees	7.92	8.11	46.93	50.38	19.04	23.70	5.91	19.13
<u>Souvenirs & other expenses</u>	<u>5.23</u>	<u>17.29</u>	<u>83.91</u>	<u>95.60</u>	<u>49.33</u>	<u>40.47</u>	<u>13.22</u>	<u>39.67</u>
Total Inside Park	27.83	46.45	1,016.27	419.29	155.70	138.58	42.21	210.11
<u>Outside Park</u>								
Motels	0.00	0.00	104.54	2.17	471.87	0.58	0.00	141.48
Camping fees	0.00	0.00	1.16	10.88	2.48	150.18	0.00	13.24
Restaurants & bars	7.56	8.80	55.60	13.06	142.65	65.50	8.81	55.25
Groceries & takeout food	4.02	2.60	14.03	22.12	44.70	76.42	8.94	24.50
Gas & oil	15.74	25.58	40.20	53.68	82.10	122.22	13.50	48.86
Local Transportation	24.13	1.24	59.10	42.31	130.79	12.21	5.79	49.14
Admission & fees	0.00	0.00	38.89	6.11	47.44	57.34	4.52	23.19
<u>Souvenirs & other expenses</u>	<u>2.41</u>	<u>6.61</u>	<u>14.30</u>	<u>8.57</u>	<u>52.81</u>	<u>51.55</u>	<u>9.62</u>	<u>24.50</u>
Total Outside Park	53.86	44.83	327.81	158.91	974.85	536.01	51.19	380.16
Total Inside & Outside Park	81.69	91.29	1,344.08	578.19	1,130.55	674.59	93.40	590.27

*Weighted by percent visitor group trips.

Table D3. Average visitor spending by segment, dollars per visitor group per trip, winter 2012

Expenditures	Segment							All visitors**
	Local*	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
<u>Inside Park</u>								
Motels	0.00	0.00	661.16		7.53		0.00	42.13
Camping fees	0.00	0.00	0.00	-**	0.00	-**	0.00	0.00
Restaurants & bars	0.95	11.81	234.88	-**	24.71	-**	32.68	36.73
Groceries & takeout food	0.00	0.11	4.30	-**	1.63	-**	0.95	1.35
Gas & oil	0.00	0.00	7.34	-**	1.78	-**	1.14	1.64
Local Transportation	0.00	60.40	98.97	-**	0.54	-**	0.34	13.78
Admission & fees	0.00	315.03	284.48	-**	110.87	-**	134.63	150.07
<u>Souvenirs & other expenses</u>	<u>1.33</u>	<u>78.12</u>	<u>65.68</u>	<u>-**</u>	<u>14.59</u>	<u>-**</u>	<u>17.69</u>	<u>26.08</u>
Total Inside Park	2.29	465.48	1,356.80	-**	161.64	-**	187.44	271.79
<u>Outside Park</u>								
Motels	0.00	0.00	111.15	-**	635.28	-**	0.00	327.95
Camping fees	0.00	0.00	1.68	-**	0.00	-**	0.00	0.10
Restaurants & bars	0.00	43.29	70.32	-**	228.41	-**	36.84	135.42
Groceries & takeout food	0.00	4.97	16.52	-**	44.55	-**	26.46	31.49
Gas & oil	0.00	11.75	50.54	-**	48.54	-**	13.42	32.72
Local Transportation	0.00	64.43	169.91	-**	372.37	-**	60.77	223.38
Admission & fees	0.00	152.58	66.98	-**	536.03	-**	145.66	335.06
<u>Souvenirs & other expenses</u>	<u>0.00</u>	<u>2.01</u>	<u>35.05</u>	<u>-**</u>	<u>116.71</u>	<u>-**</u>	<u>25.38</u>	<u>68.41</u>
Total Outside Park	0.00	279.02	522.16	-**	1,981.90	-**	308.53	1,154.53
Total Inside & Outside Park	2.29	744.50	1,878.96	-**	2,143.54	-**	495.97	1,426.32

*Only 6 visitor groups reported being local residents. Results should be interpreted with caution due to small sample size.

**Weighted by percent visitor group trips.

***Only 1 visitor group reported camping in the park and 2 visitor groups reported camping outside

Table D3. Average visitor spending by segment, dollars per visitor group per trip, winter 2012

Expenditures	Segment							All visitors**
	Local*	Day trip	Motel-in	Camp -in	Motel-out	Camp-out	Other OVN	

the park. Spending averages were not estimated due to the small sample sizes and missing data.

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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