

Greater Yellowstone Wildlife- Related Activity Valuation Study



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Introduction

The Outdoor Recreation Economy

Nationally, the Outdoor Recreation industry generates an estimated \$887 billion in consumer spending, supporting millions of jobs throughout the country.¹ Outdoor recreation is a vast category, spanning activities ranging from camping, to hunting and fishing, to water sports, and wildlife viewing. The industry spans both consumptive and non-consumptive activities, and involves both the purchase of equipment to participate, as well as transportation, travel tickets, and guides needed to access the varied opportunities.

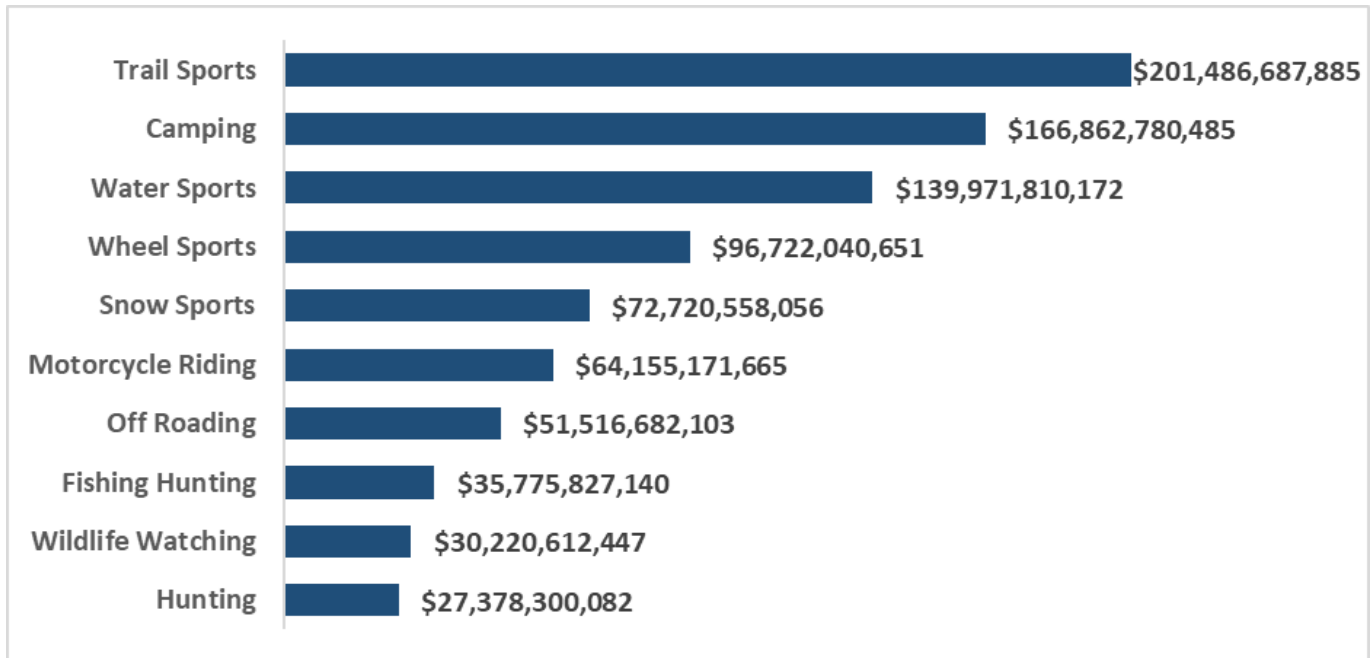


Figure 1. Annual Spending on Outdoor Recreation Activities in the U.S.

Focusing in on wildlife related recreation, the U.S. Fish and Wildlife Service (USFWS) has conducted two recent nationwide surveys in 2011 and 2016 on fishing, hunting, and wildlife-associated recreation. The studies have served as a baseline for participation in various wildlife-related recreation, including both consumptive and non-consumptive recreation. The original 2011 study was massive in scale, surveying over 48,000 households across the country. Detailed interviews were also conducted in waves to capture additional in-depth information from various types of participants identified as likely anglers, hunters, and wildlife watchers. The survey captures a variety of information, from participation rates to economic impact.

In 2011 the USFWS estimated 90.1 million participants, spending \$144.7 billion across both consumptive and non-consumptive wildlife-based recreation types. When repeated in 2016, the USFWS identified participation had grown to 103.7 million and expenditures to \$156.7. Both reports break wildlife related recreation in hunting, fishing, and wildlife watching, and identifies significant differences between activity type. As displayed, 2011 combined expenditures for fishing (\$41.8 billion) and hunting (\$33.7 billion) equate to approximately \$75 billion in expenditures. Wildlife watching as an activity alone accounted for approximately \$54.9 billion in expenditures (Figure 2). Likewise, the

¹ Outdoor Industry Association (2017): https://outdoorindustry.org/wp-content/uploads/2017/04/OIA_RecEconomy_FINAL_Single.pdf

total number of participants equate to 71.8 million, a higher number than 33.1 million anglers and 13.7 million hunters (Figure 3).

in 2016, the study repeated many of the same metrics and surveyed over 22,000 households. The estimates are deemed directly comparable to the 2011 study and represent a real shift in results. In 2016, wildlife watching expenditures had grown to \$75.9 billion, an increase of 38% (not adjusted for inflation), and participation increased by 20%. Meanwhile, fishing and hunting expenditures changed by 10% and -22%, and participation by 8% and -16% respectively.

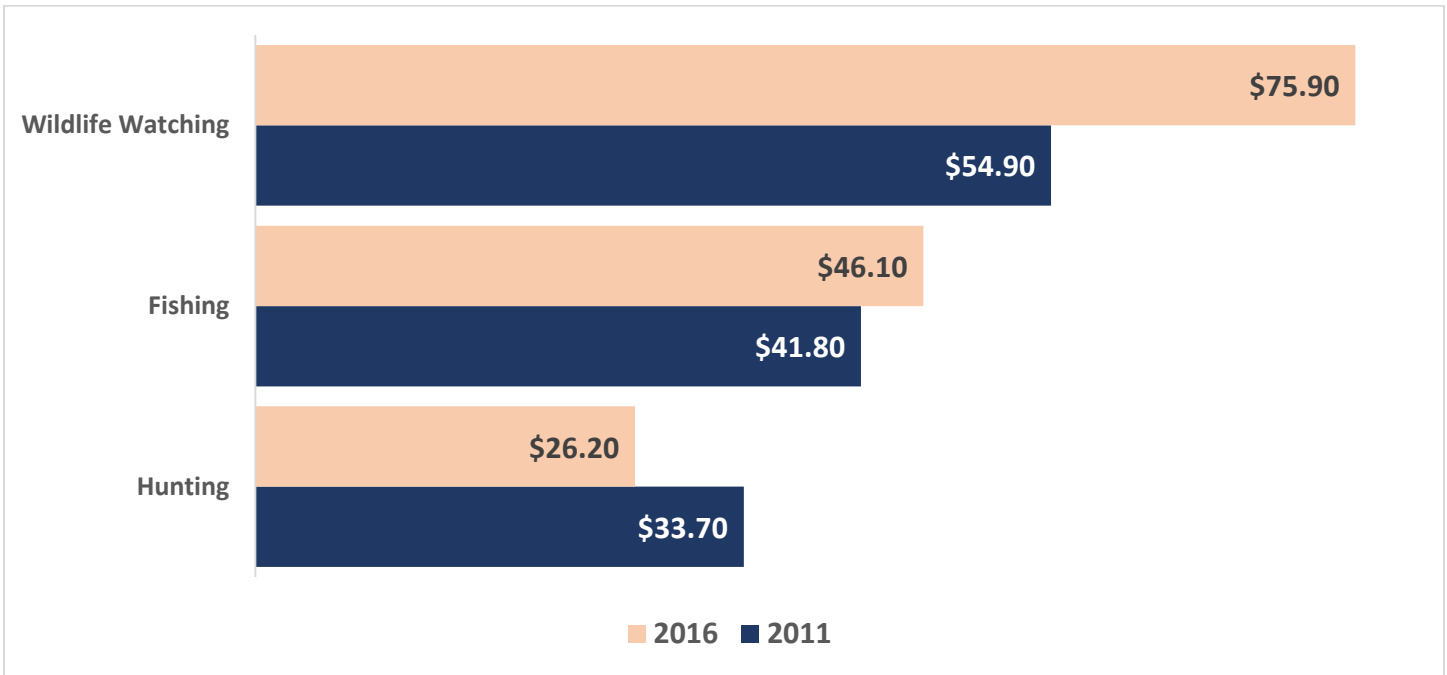


Figure 2. Expenditures (Billion US\$) by Wildlife Recreation Category.

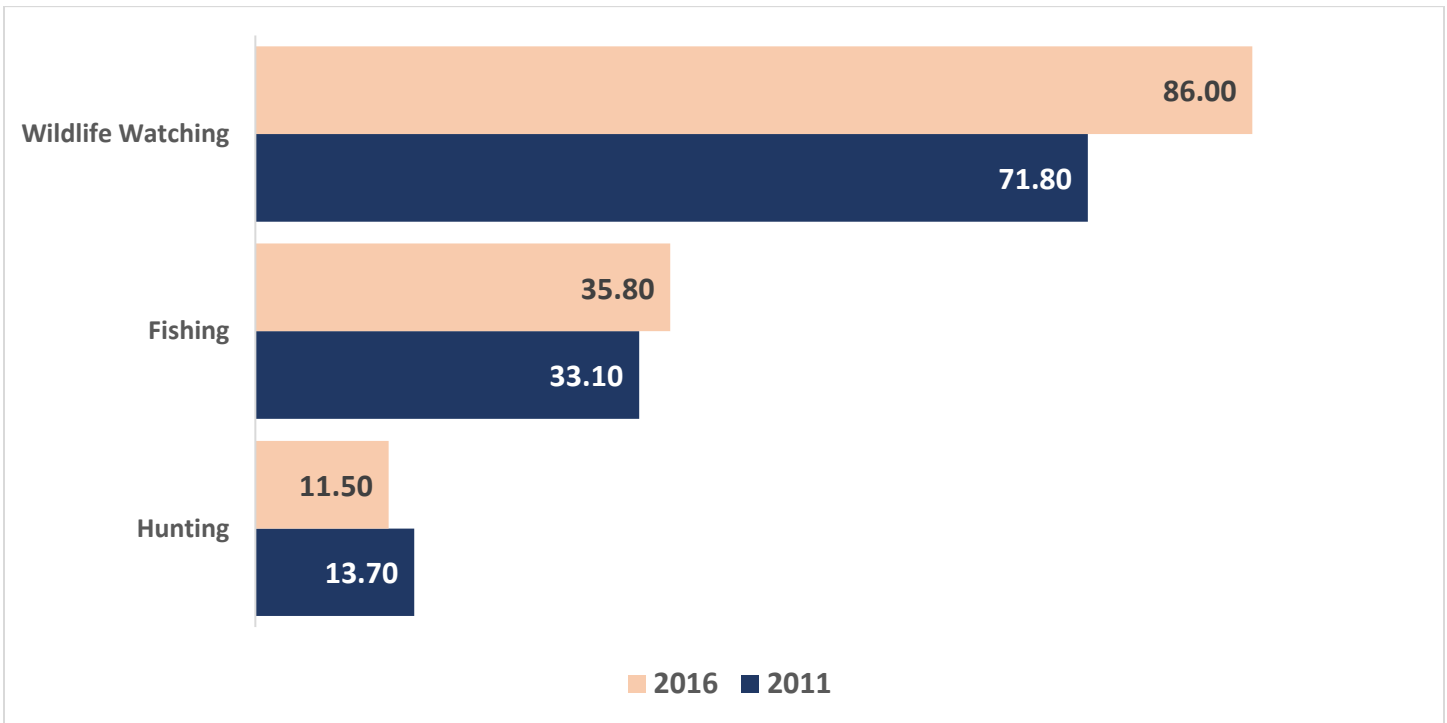
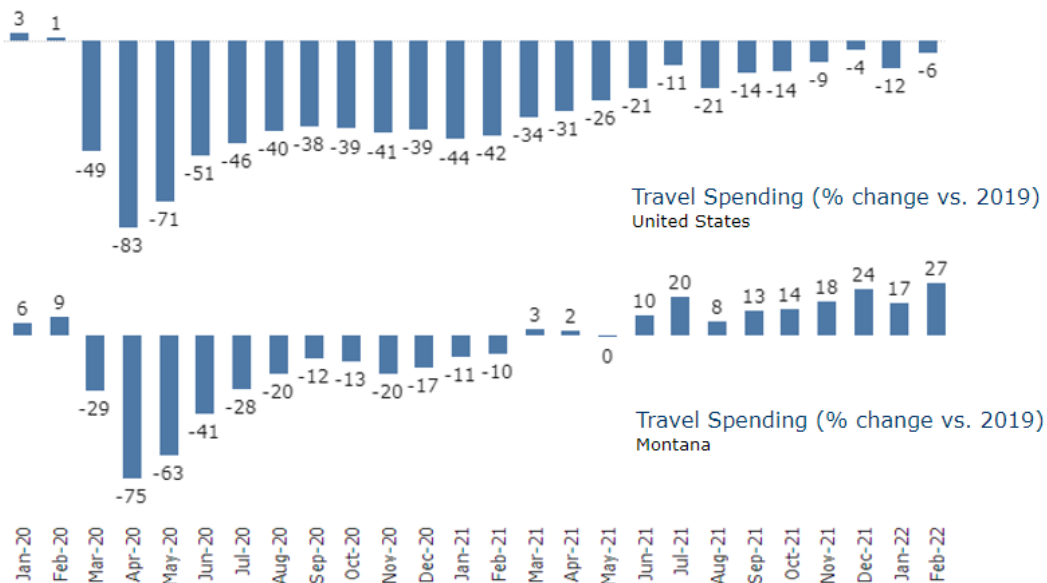


Figure 3. Participants (millions) by Recreation Category.

When breaking down these expenditures from the original 2011 survey, each activity program tends to spend the most on equipment (nearly 50% of all spending per group) with trip-related activity comprising approximately 31-36% of total spending. All other spending ranges from 16-19% of the total. In 2016, the proportion of what participants spent their money on changed as well, with a larger share of every group spending more on equipment (52-73% of total), and trip-related spending decreasing overall. Equipment has become very specialized for outdoor recreation which contributes to the increase in expenditures just on equipment alone.

In summary, the FWS studies indicate significant interest in both consumptive and non-consumptive recreation. Both types of wildlife-related activities draw a large volume of participants and expenditures. Wildlife watching appears to be growing at a much faster rate than hunting in terms of expenditures and participants. However, wildlife-watching is a broad category that does include people participating at home as well as during trips. For the GYE’s purpose, these studies display large interest in both types of activities. It’s likely that similar trends are seen with wildlife watching growing at a fast pace and may even be higher due to the area promoting wildlife watching. Such areas generate economic impact as a result of visitors travelling to areas of exceptional wildlife viewing opportunities, such as large western national parks.

While outdoor recreation takes place across a variety of landscapes, large open spaces such as National Parks and Forests play significant roles in providing an array of recreation opportunities. In 2018 National Parks welcomed over 316 million visits, contributing more than \$20 billion in spending.² As the U.S. and the world entered the COVID pandemic in the spring of 2020, economies that relied on travel and tourism were among the hardest hit, and remain well below 2019 spending levels. However, multiple tourism economies relying on large open spaces and outdoor recreation as a primary attractant have recovered more quickly, and even grown; Montana is one such economy. Beginning in the summer of 2021, Montana experienced positive monthly travel spending compared to that same month in 2019 (Figure 4).



Source: U.S. Travel Association and Tourism Economics

Figure 4. Comparison of U.S. and Montana Travel Spending Change

² 2018 National Park Visitor Spending Effects: https://www.nps.gov/nature/customcf/NPS_Data_Visualization/docs/NPS_2018_Visitor_Spending_Effects.pdf

Montana’s Outdoor Recreation Economy

In 2020, no state’s economy relied more on outdoor recreation than did Montana; 4.3% of state GDP. Wyoming, at 3.4%, ranked third. Both states fall well above the U.S. as a whole, in which 1.8% of GDP is attributable to Outdoor Recreation (Figure 5). These values represent not only local residents taking part in outdoor activities in and around their communities, but also is an indicator of the type of attractants that bring visitors to the states and get Montanans out beyond 50 miles from home. Of the nearly \$800 million in GDP from outdoor recreation travel activities in Montana, 76% is attributable to travel over 50 miles, directly infusing new money into Montana communities that may not otherwise be captured (economic impact). This infusion of funds supports more than 25,000 jobs annually throughout the state, across multiple industries, including hospitality and retail.³

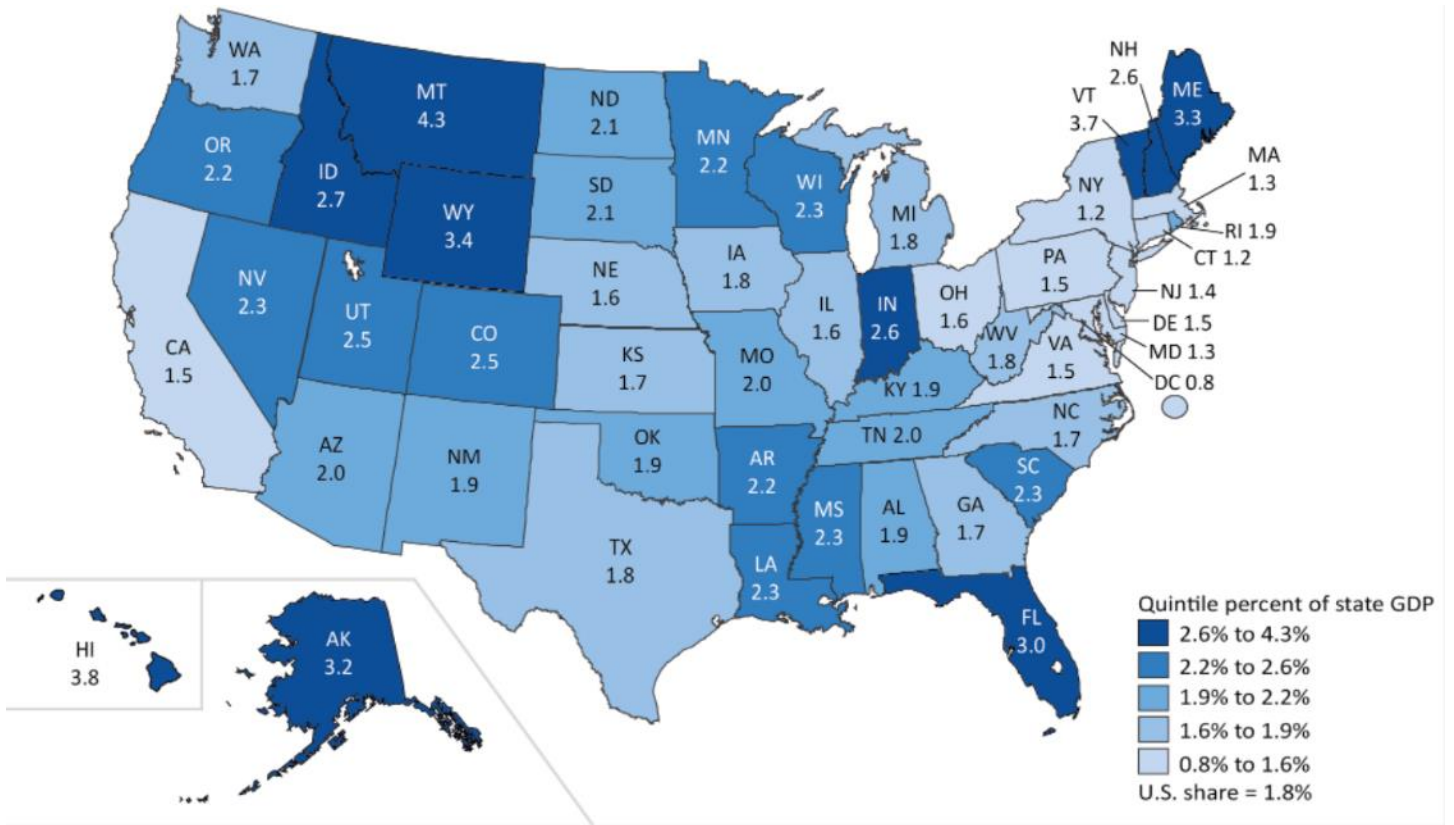


Figure 5. State Outdoor Recreation Value Added as a Percent of State GDP, 2020.

Though not perfectly synonymous, Montana’s outdoor recreation economy, and its tourism economy share considerable overlap. This impacts region of the state differently. We examine this by first focusing on the state’s total tourism and then narrowing in on the Yellowstone Country Tourism Region (Figure 6), then Park County specifically. The goal here is to consider the varying roles of outdoor recreation in tourism, with particular interest in wildlife watching.

³ Bureau of Economic Analysis, Outdoor Recreation Satellite Account and Regional Economic Accounts as reported by Headwaters Economics: <https://headwaterseconomics.org/economic-development/trends-performance/outdoor-recreation-economy-by-state/>

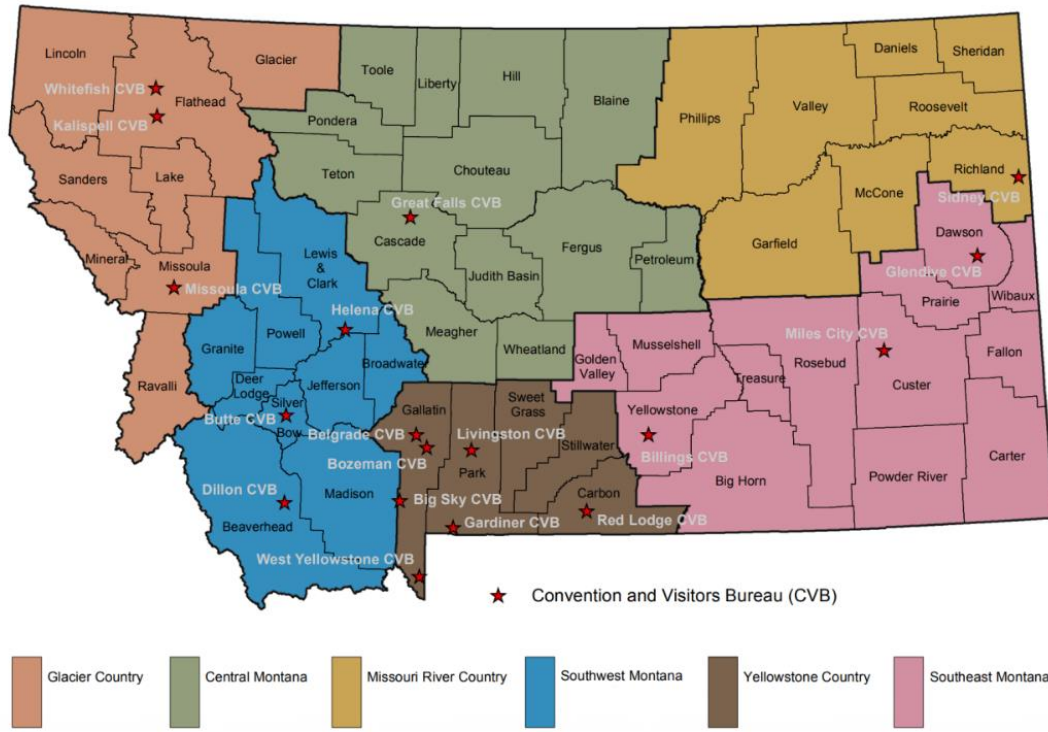


Figure 6. Montana Tourism Regions.

Montana’s Tourism Economy

Statewide Tourism

Across the state of Montana more than 12.5 million visitors arrived in 2021, nearly reaching pre-pandemic highs achieved in 2019 (Figure 7). These visitors contributed more to Montana’s economy via their spending than in any previous year. Visitors spent \$5.15 billion dollars, directly contributing to nearly 48,000 jobs across the state. Visitors spend across a variety of businesses and industry sectors in the state. While fuel is the highest expenditure category at the state level (23% of total), sectors made up of many small businesses like restaurants (20%), hotels (13%), outfitters and guides (10%), or retail outlets (8%) make up considerable portions of visitors’ spending portfolio (Figure 8).

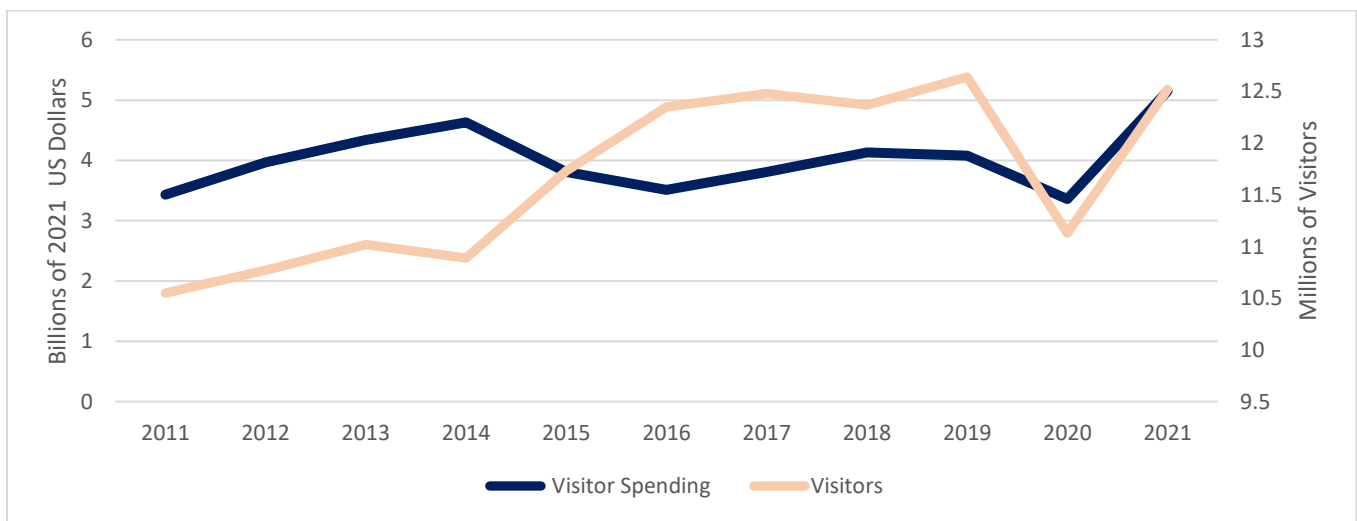


Figure 7. Montana Visitor Volume and Spending (inflation adjusted).

<i>Expenditure Category</i>	<i>Total Expenditures</i>	<i>Percent of Total</i>
Gasoline, Diesel	\$ 1,204,670,000	23%
Restaurant, Bar	\$ 1,021,820,000	20%
Hotel, Motel	\$ 663,160,000	13%
Outfitter, Guide	\$ 506,100,000	10%
Groceries, Snacks	\$ 489,030,000	9%
Retail sales	\$ 392,110,000	8%
Auto Rental	\$ 250,110,000	5%
Rental Cabin, Condo	\$ 209,670,000	4%
Licenses, Entrance Fees	\$ 142,240,000	3%
Made in MT Products	\$ 128,900,000	3%
Other	\$ 144,120,000	3%
Estimated Total	\$ 5,151,930,000	

Figure 8. Montana Visitor Spending by Category

The outfitting and guiding category is made up of numerous types of activities, from more traditional hunting and fishing, to white water rafting, to wildlife watching and hiking. Though only a small portion of visitors hire an outfitter or guide, these visitors tend to be in market longer and spend more than a typical visitor. On average, over the past five years (2017-2021)⁴, roughly 5% of visitors to Montana report having hired an outfitter of some type. Though they were not asked which activity they hired an outfitter or guide for, they were asked what activities they participated in while in Montana. Figure 9 below highlights several of the key activities in which a visitor might hire an outfitter or guide. As can be seen, those visitors who do hire an outfitter or guide are substantially more likely to engage in these activities.

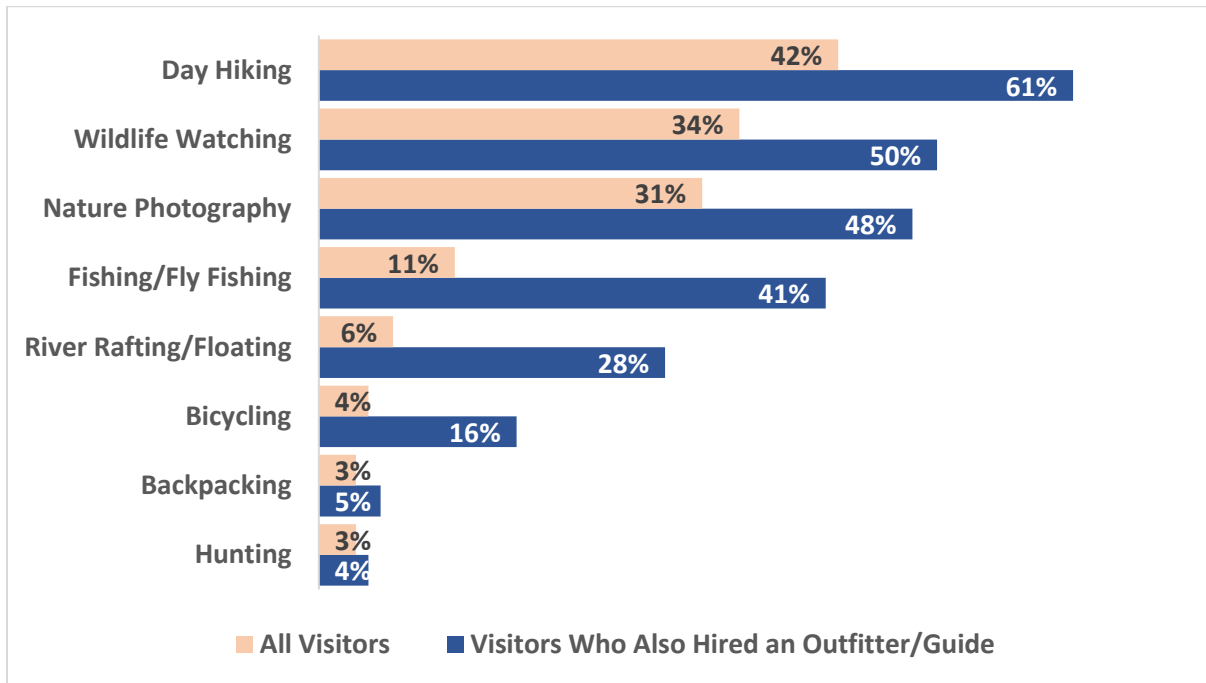


Figure 9. Activity Participation Rates by Visitors While in Montana.

⁴ Five-year average was used to increase the observed sample size (n=520).

Though not all visitors arrive in the state on vacation, or for recreation, many do. In fact, in 2021, 41% of visiting groups indicated that their primary reason for coming to Montana was for vacation and recreation. These vacationing visitors spend more than the typical visitor daily; \$237 per day versus \$177. They additionally stay more than a day longer on average; 6.3 days compared to 5.2 in 2021. Of the nights these vacationers stayed in Montana, 38% were in Glacier Country, and 30% were in Yellowstone Country. These two tourism regions typically make up roughly two-thirds of all visitor nights in most years.

Focusing more on these visitors who are in Montana for vacation and recreation, the Top-5 activities they report to participate in include scenic driving, day hiking, wildlife watching, and nature photography. All five activities are outdoor recreation based (Figure 10).

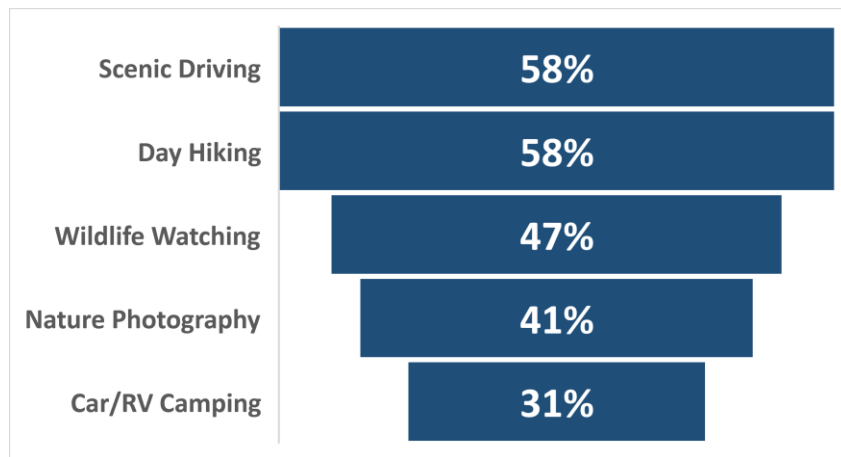


Figure 10. Percent of Vacationers who participate in activities (Top-5).

Yellowstone Country and Park County Tourism

Having explored the visitor spending profiles of all those visitors coming to Montana and specifics of those coming for vacation and recreation, we can now look closer at those who specifically travel through or stay in Yellowstone Country and Park County. On average, over the last five years, Yellowstone National Park has remained one of the major draws for vacationers to Montana as a whole. Its importance, and that of wildlife more specifically, increases the closer to the park a region is (Figure 11).

Average of 11.7 million visitors to Montana

- 40% primarily here for vacation, recreation, pleasure.
- 16% of vacationers attracted primarily for Yellowstone National Park
- 34% of vacationers indicate wildlife as one of several reasons for trip

Average of 7.0 million visitors to Yellowstone Country

- 54% primarily here for vacation, recreation, pleasure.
- 22% of vacationers attracted primarily for Yellowstone National Park
- 38% of vacationers indicate wildlife as one of several reasons for trip

Average of 4.5 million visitors to Park County

- 51% primarily here for vacation, recreation, pleasure.
- 23% of vacationers attracted primarily for Yellowstone National Park
- 41% of vacationers indicate wildlife as one of several reasons for trip

Figure 11. Importance of Yellowstone and Wildlife to Montana Tourism.

When considering just those visitors who spend at least one night in Yellowstone Country between 2017 and 2021, 63% were in the state for vacation or recreation; outpacing the state rate by 21-points. This number increases to 74% if considering only those that indicate they spent a night in Park County during this same period. Vacationers staying at least one night in Yellowstone Country between 2017 and 2021 stayed in state an average of 7.5 nights, well exceeding the average of vacationers statewide on average (6.4 nights).

Of those vacationers who stay at least one night in Yellowstone Country, 28% indicate their primary reason for being in Montana was to visit Yellowstone National Park, followed by 14% who indicate Glacier National Park was their primary destination, and 10% who indicated open spaces was that primary driver. While many visitors may have a primary draw that is a National Park, many have

ancillary reasons as well. Two-thirds (67%) indicate that mountains and forest were one of those reasons, and 39% indicate wildlife as one of their reasons for visiting (Figure 12).

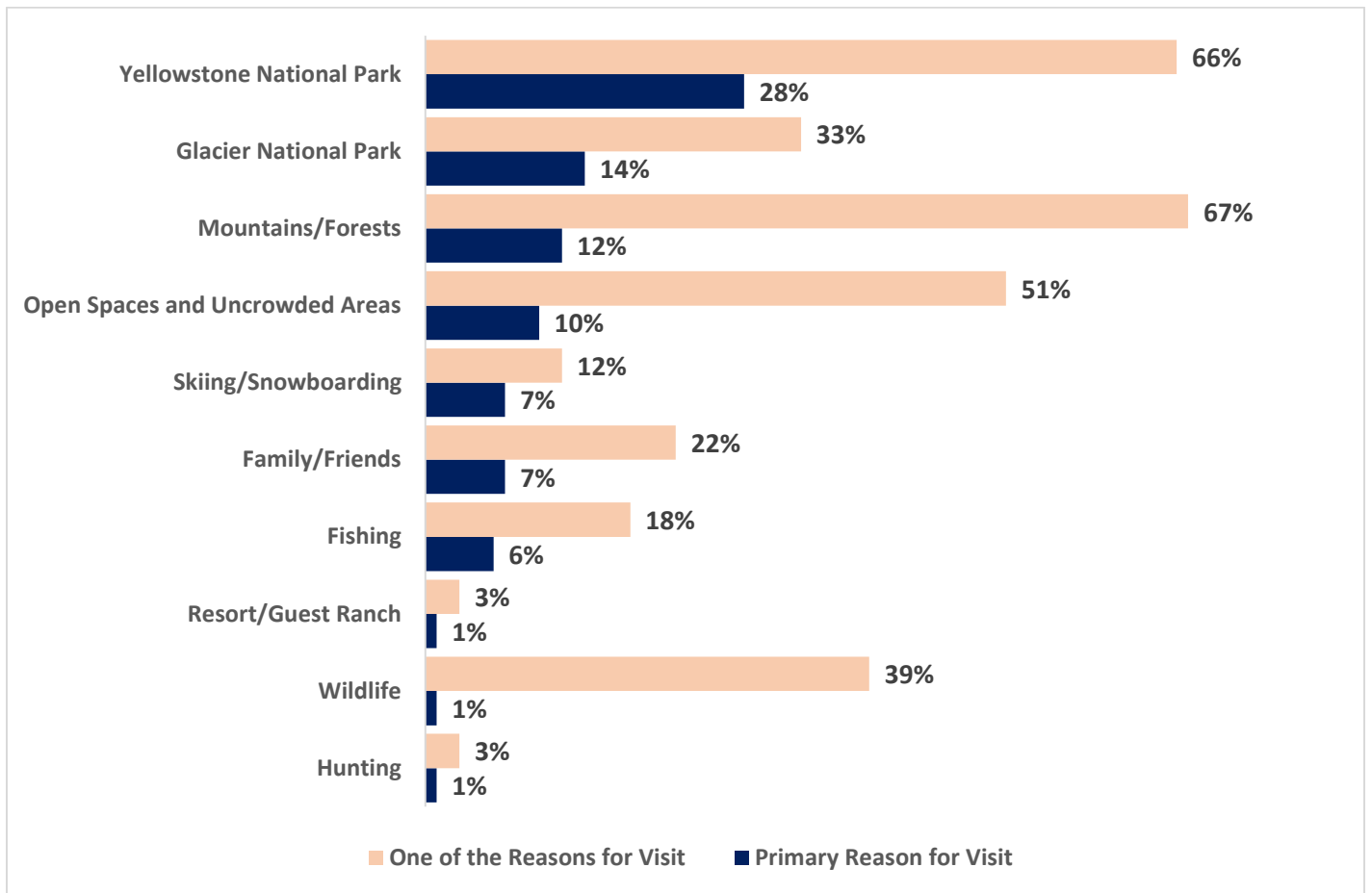


Figure 12. Vacationers Reasons for Visiting Montana.

Yellowstone Country and Park County Visitor Spending

Due to the COVID pandemic, and disruptions created for data collection by ITRR, the most recent comparable spending data at the regional or county level is that of 2019. In 2019, 34% of visitor spending (\$1.27 billion) was spent in Yellowstone Country; the highest of any tourism region (Figure 13). This spending directly contributed to 14,000 jobs in the region. Unlike at the state level in which fuel is the highest spending category, in Yellowstone Country, restaurants and bars make up the top category at \$229 million (18%), followed by outfitters and guides at nearly \$211 million (16.5%). This spending distinction is important, as it indicates a destination where time and activities are being spent in the region, as opposed to passing through and stopping only for fuel. The activities participated in by those who hired an outfitter or guide and visited Yellowstone country remain very similar to those as the state level as previously shown in Figure 9.

When broken out by county, Gallatin County received the largest share of visitor spending (25%), followed by Flathead (16%), Yellowstone (8%), Missoula (7.5%), and Park (6.3%) (Figure 13). In Park County, the \$237 million in visitor spending directly supports almost 2,600 jobs. The largest spending

category for Park County is on outfitted or guided experiences, making up 23% of all the spending by visitors in the county.⁵

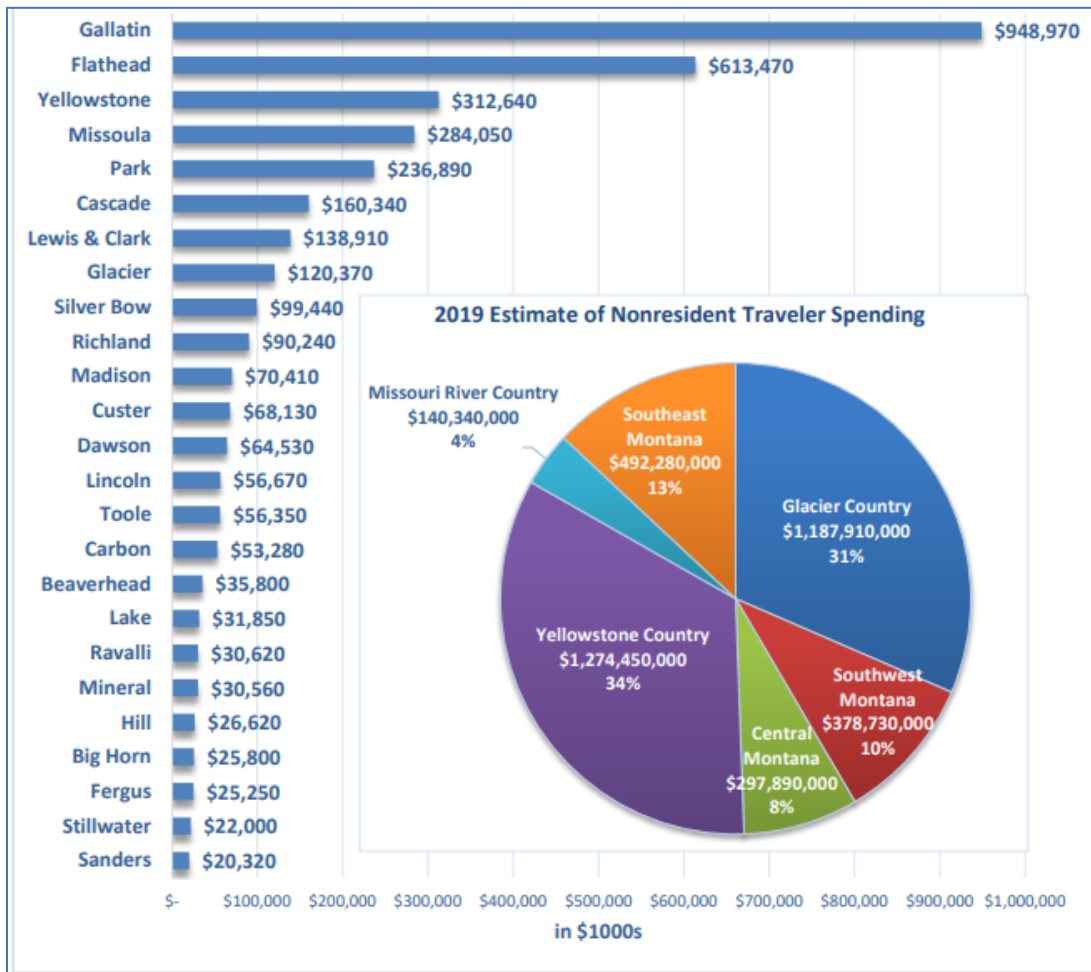


Figure 13. 2018-2019 Estimate of Nonresident Traveler Spending by Region and County (counties with at least \$20 million).

Tourism Supporting Jobs

The tourism industry is an aggregate of multiple sectors that provide not only goods and services for those travelling to and through a region, but also for those that live in the region. Headwaters Economics uses definitions supported by the Federal Reserve Bank of Kansas City to consider travel and tourism as generally consisting of retail trade (gas stations, clothing and accessory stores, miscellaneous store retailers), accommodation and food (ski resorts, hotels, casino hotels, campgrounds, guest ranches, food service and drinking places), passenger transportation (air transportation, scenic and sightseeing transportation) and amusement and recreation services (performing arts and spectator sports, museums, parks and historical sites, amusement, gambling, and recreation).⁶

⁵ Grau, Kara, "2019 Economic Contribution of Nonresident Travel Spending in Montana Travel Regions and Counties" (2020). Institute for Tourism and Recreation Research Publications. 411.

https://scholarworks.umt.edu/itr_pubs/411

⁶ Headwaters Economics: Economic Profile System - <https://headwaterseconomics.org/eps>

In 2019, 30.5% of Park County, MT private employment was based in tourism supporting industries. Roughly 10% more than Montana as a whole (Figure 14). For both Park County (23.4%) and Montana (13.9%), Accommodations and Food Services made up the bulk of this employment.

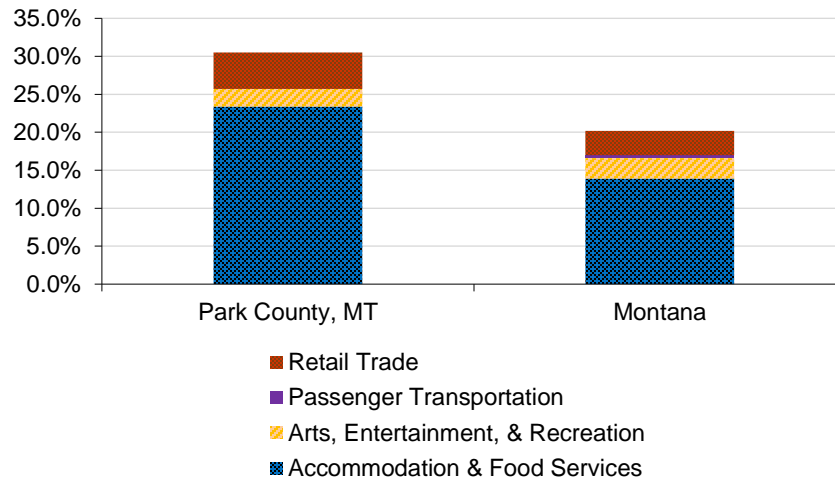


Figure 14. Percent of Total Private Employment in Industries that include Travel & Tourism, 2019.⁷

Since 2001, employment in accommodation and food services has outpaced all other industries in Park County, followed by those in retail trade (Figure 15). Not only are total employment numbers of importance when considering the economic vitality of a county, but so are the total earnings of those employed in the county. For much of the time between 2001 and 2020, total earnings by those employed by a government entity exceeded that of each individual private industry. Government employee (federal, military, state, and local) earnings remained relatively flat during this time; however, leading up to the COVID-19 pandemic, earning by those in the accommodation and food service industry increased from about \$26.2 million in 2001, to \$61.7 million in 2019. This represents the largest increase of any industry earning over this time period and coincides with growth in visitation to Montana and Yellowstone National Park more specifically. If considering 2020, this sector still outpaced most others, with the exception of healthcare and social assistance and real estate and rental leasing (Figure 16).

⁷ Data Sources: U.S. Department of Commerce. 2021. Census Bureau, County Business Patterns, Washington, D.C., reported by Headwaters Economics' Economic Profile System, headwaterseconomics.org/eps.

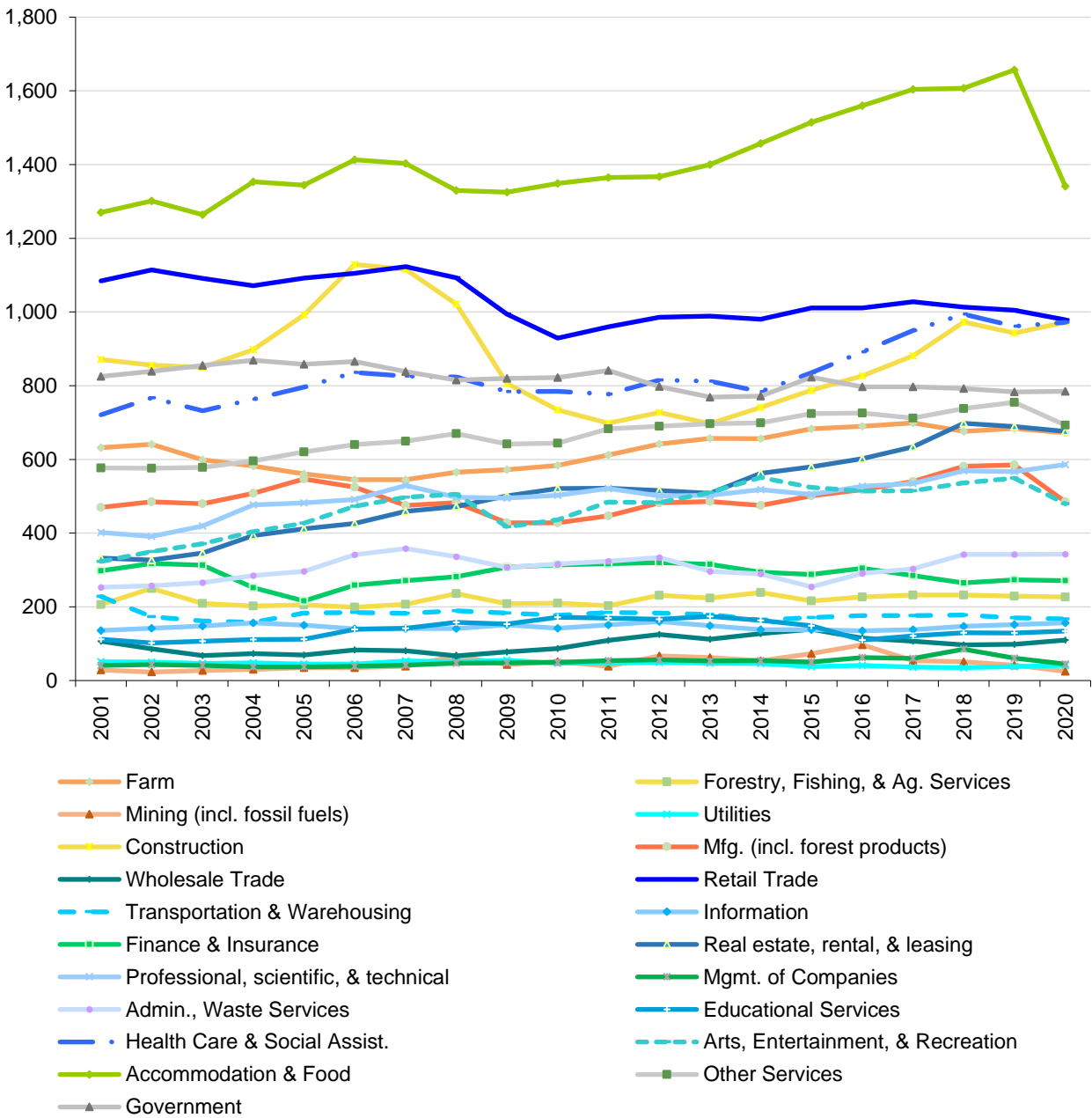


Figure 15. Park County Employment by Industry, 2001-2020.⁸

⁸ Data Sources: U.S. Department of Commerce. 2021. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C., reported by Headwaters Economics' Economic Profile System, headwaterseconomics.org/eps.

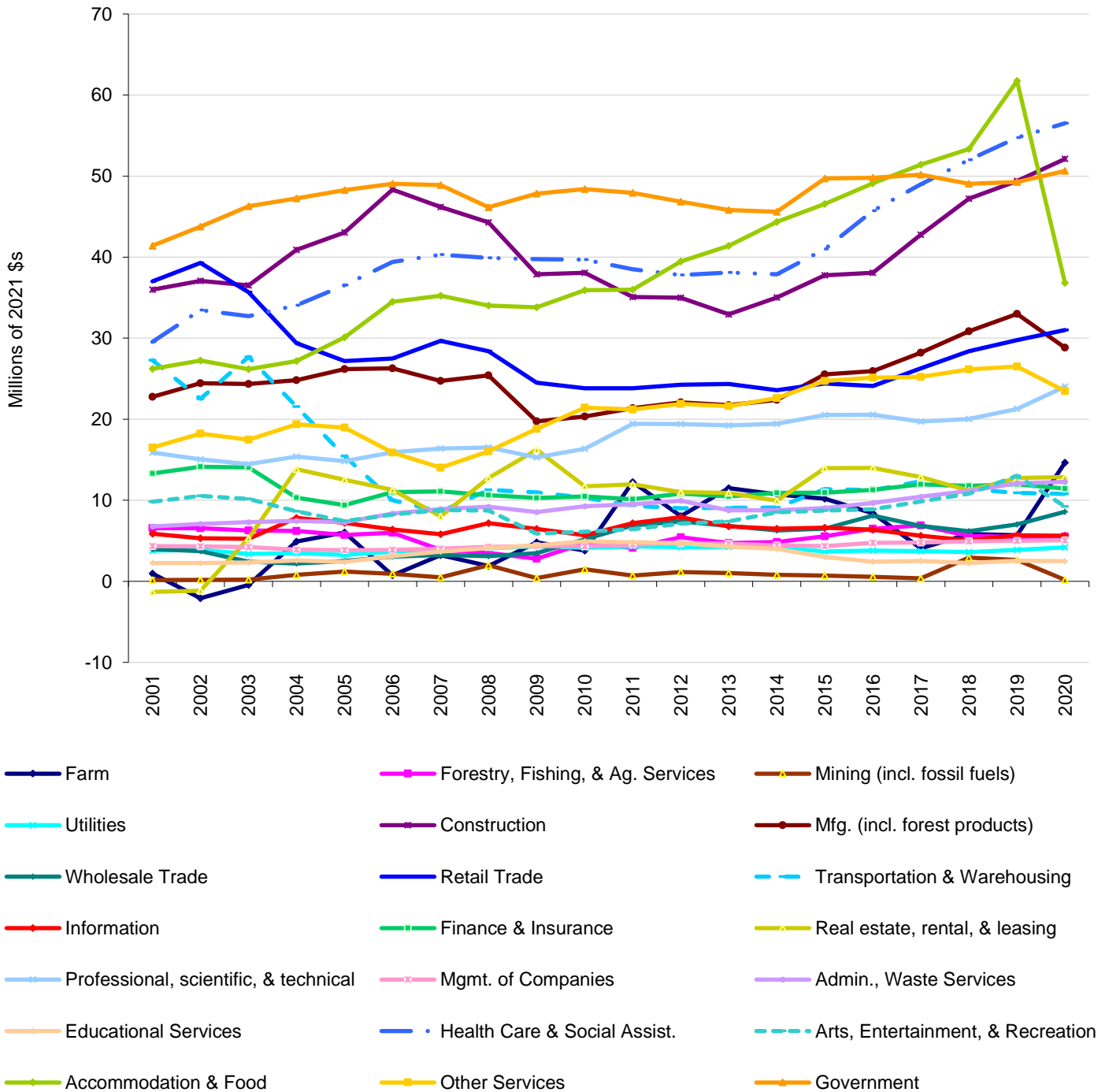


Figure 16. Earnings by Industry in Park County, MT, 2001-2020.⁹

Digging below the total earnings by all those employed, individual average annual wages can also be explored. Within the identified tourism related industries, trade retail trade sector yields the highest average at \$28,374, followed by arts and entertainment at \$26,431, and accommodation and food

⁹ Data Sources: U.S. Department of Commerce. 2021. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C., reported by Headwaters Economics' Economic Profile System, headwaterseconomics.org/eps.

service at \$24,390 (Figure 17). Beyond just those involved in these three sectors, the service industry on average yields average annual wages (2020) of \$39,651, while nonservices related yields \$51,356.¹⁰ It is often assumed that services sector jobs are low wage; especially in food service and other leisure and hospitality sectors. However, just comparing wages to other sectors is incomplete. Such sectors are often seasonal. In Park County, MT in 2020, 24% of workers worked less than 40 weeks over the course of the year.¹¹ In addition to these seasonal, or gig workers, Park County possesses a strong and growing base of proprietor employment (self-employment). Since 2000, the number of proprietors has grown by 41.3% in the county, through 2020. In 2020, these proprietors made up 39.6% of jobs. This suggests strong entrepreneurial activity in the county.

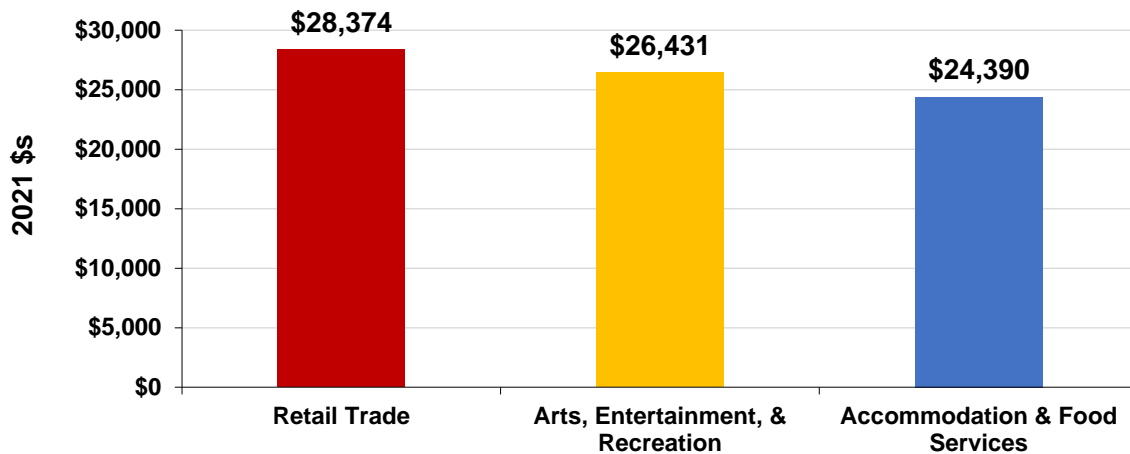


Figure 17. Avg. Annual Wages in Industries that Include Travel & Tourism, Park County, MT, 2020

Related Yellowstone National Park Studies

Having shown the importance of Yellowstone to Montana tourism, and even to a greater extent, Park Country tourism, it is valuable to now explore the various influence of key attributes to Yellowstone visitation specifically. Two recent studies highlight these attributes.

In a 2018 study in Yellowstone National Park, researchers asked visitors to rate (on a scale of 1 being not at all important, to 5 being extremely important) how important viewing wildlife was to their experience while visiting the park. On average, the 2,700 visitors ranked viewing wildlife at 4.6 (standard deviation of 0.745). This ranked slightly higher than a similar question regarding geysers and thermal features, in which visitors rated it an average of 4.48 (standard deviation of 0.815). The high importance of wildlife viewing was not isolated to one demographic, or visitors in one area of the park. While U.S. residents scored viewing wildlife the highest (4.7), international visitors ranked it as high (4.5).

Visitors whose most recent entrance to the park was via the north entrance at Gardiner ranked the importance of wildlife viewing (4.63) to their experience higher than viewing geysers and thermal features (4.39). Similarly, those visitors most recently entering from the northeast gate at Cooke City

¹⁰ Data Sources: U.S. Department of Labor. 2021. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Washington, D.C., reported by Headwaters Economics' Economic Profile System, headwaterseconomics.org/eps.

¹¹ Data Sources: U.S. Department of Commerce. 2022. Census Bureau, American Community Survey Office, Washington, D.C., ACS 5-year estimates used. 2020 represents average characteristics from 2016-2020.

ranked viewing wildlife (4.48) higher than viewing geyser and thermal feature (4.05). Those that entered from the east gate from Cody, WY scored wildlife viewing the highest (4.7), while those entering from the west gate near West Yellowstone, MT scored viewing geysers the highest (4.55). In sum, wildlife viewing is very important to the overall experience of the large majority of visitors, independent of where a visitor is from, how much time they’ve spent in the park, or where they are entering from.¹²

In an earlier 2016 study of Yellowstone visitors, similar results to the 2018 study were identified. In this study, of those visitors entering the park from Gardiner, 30% identified that “viewing wildlife in their native habitat” was their primary reason for visiting the park. This was on par with those who indicated “viewing natural scenery” was their primary reason. At the northeast entrance, 32% indicated wildlife viewing as their primary reason.¹³

<i>Reason</i>	<i>East</i>	<i>North</i>	<i>Northeast</i>	<i>South</i>	<i>West</i>
View Wildlife in Their Natural Habitat	28%	30%	32%	29%	31%
View Natural Scenery	30%	30%	30%	28%	26%
View Geysers and Other Thermal Features	21%	17%	13%	24%	22%

Figure 18. Top Three Reasons for Visiting Yellowstone National Park, by Gate of Recent Entry.

¹² Jorgenson, J., Sage, J., Nickerson, N., Bermingham, C., Roberts, M., & White, C. (2019). Yellowstone National Park Visitor Study Report. Institute for Tourism and Recreation Research Publications. 397. https://scholarworks.umt.edu/itr_pubs/397

¹³ RSG (2016). Yellowstone National Park Visitor Use Study (Summer 2016).

Additional Wildlife Valuation Studies

Aside from Montana-specific examples, other destinations have attempted to quantify the value of wildlife watching as an economic contributor to the region. Some destinations have relied on wildlife viewing opportunities as a major driver of economic impact, even more so than the GYE. A number of these studies and examples are summarized to provide more context to how wildlife viewing can be valued.

In 2019, *Cook Inletkeeper* commissioned a large economic valuation study of bear viewing to Southcentral Alaska. The purpose of the study was to estimate the economic significance and contribution of bear viewing to the local and regional economy. The study aimed to collect primary data and review secondary data from existing studies to help generate some estimates for wildlife viewing in the region. The researchers used two main approaches to assess economic contribution:



Source: *The Economic Contribution of Bear Viewing to Southcentral Alaska*

- 1) Examining existing research that assessed the regional economic contributions associated with wildlife viewing activities and visitation to Katmai National Park and Preserve, Lake Clark National Park and Preserve, and McNeil River SGS.
- 2) Using primary data through an online survey of bear viewing service providers. Data was gathered on proprietary information to economic contribution of bear viewing. IMPLAN was then used to model economic contribution.

The first approach found from a 2017 study that visitors to Katmai National Park and Preserve spent approximately \$417 to \$1,002 per person per trip to view bears. Further a 2018 study found that virtual bear viewing also brought in significant impact. In total, viewers spent 2.4 million hours watching bears online, generating \$27 million in impact. This total does not include any in-person trips, which would significantly increase the totals. Additionally, the National Park Service and United States Geological Service (USGS) estimated in 2018 that visitor spending at Katmai supported 756 jobs and approximately \$84.6 million in economic output. Similarly, Lake Clark supported 455 jobs and \$50.9 million in output.

Finally, the primary data collection avenue found that bear viewing service providers contributed to the following metrics:

- 1) 109 providers.
- 2) \$34.5 million in sales.
- 3) \$10 million in wages and 371 jobs.
- 4) Additional spending by service providers contributed to \$17.3 million in labor income and 490 jobs in the Southcentral region.

2005 GYE Wolf Watching Update

In 2005, a team of researchers studied the economic impact of wolf-related visitation to Yellowstone National Park. At the time, wolf watching was starting to grow into a legitimate activity in the region after reintroduction of the species in the 1990s. Visitors were starting to come to the area solely for the purpose of watching wolves. Because of this, a study explored how this activity economically impacted the local area.

In 2022 and for purposes of this study, the original research team took the estimates they produced in 2005 and updated it with known data. While it would be ideal to do a full study, many of the key metrics could be vetted with area experts and using statistical procedures to produce a new estimate. With the GYE changing rapidly, there was a need to understand how these totals have changed since the original study. Below is the update to the 2005 economic impact.

Economic Impact of Wolf-Related Visitation to Yellowstone National Park: An Update of 2005 Estimates

May 2022

Chris Neher, John Duffield, Alec Patterson



Bioeconomics, Inc.

Missoula, MT

Introduction

In 1995 and 1996, 31 wolves were reintroduced to the Greater Yellowstone Ecosystem (GYE) to restore the endangered gray wolf to the Rocky Mountains. The restoration of wolves to Yellowstone National Park has become one of the most successful wildlife conservation programs in the history of endangered species conservation. As of 2004 there were, approximately 301 wolves in the Yellowstone ecosystem and Yellowstone National Park (YNP) were then considered one of the best places in the world to watch wild wolves. Visibility of the wolves within the park and public interest in wolves and wolf-based education programs, have far exceeded initial expectations.

In 2005 the Yellowstone Park Foundation sponsored a yearlong survey of park visitors to collect the most extensive data available on YNP visitor attitudes about wolves, and visitor motivations regarding their trips to YNP.¹⁴ The 2005 visitor survey and study gathered original data from a random sample of Yellowstone National Park visitors between December 2004 and February 2006. The survey targeted two samples: all park visitors (sampled at park entrances) and Lamar Valley visitors (sampled randomly at parking locations throughout the valley). Throughout the sampling period a total of 2,992 surveys were distributed and 1,943 were completed and returned for an overall response rate of 66.4%. Respondents from the Lamar sample had higher response rates (74.2%) than did respondents from the entrance station sample (64.4%).

Estimates from the 2005 visitor survey indicate that conservatively 325,000 park visitors saw wolves in 2005 (95% C.I. 273,000-379,000). This is considerably higher than previous estimates. Additionally, 44% of visitors list wolves as one of the top three species they most would like to see on their trip (second only to grizzly bears). A majority of visitors favored reintroduction (61% to 68% across seasons) with only a small minority opposing the reintroduction (15% to 19%). The remaining visitors were unsure of their position on reintroduction (18% to 23%).

A key element of the 2005 study involved estimating the share of YNP visitors who came to the park specifically to see or hear wolves, and to estimate the total spending in the local area by this wolf-watching public. Responses to the 2005 visitor survey showed that visitor spending in the local

¹⁴ Duffield, J., Patterson, D., & Neher, C. J. (2006). Wolves and people in Yellowstone: Impacts on the regional economy.

economy due to wolf presence, was estimated at +\$35.5 million (confidence interval of \$22.4 to \$48.6 million).

Over the 16 years since the original 2005 survey, wolves and wolf-watching in YNP have continued to maintain a place of high interest and controversy in Montana, Idaho and Wyoming. During this time, visitation to YNP has increased dramatically and visitors have continued to come to the park to experience these animals, as well as the other flora and fauna of the park.¹⁵

This paper is intended to provide a conservative updating of the estimates of the annual value of expenditures in the local economy by visitors to Yellowstone National Park (YNP) who say they would not have gone to the park without the presence of wolves. These updates should better inform the continuing debate over the importance and place Yellowstone wolves hold in our economy.

2005 YNP Visitor Spending Attributable to the presence of Wolves in the Park

A key estimate of the economic importance of YNP wolves to the local area economy that was reported in the 2005 study was the amount of visitor spending in the 3-state region (ID, WY, and MT) that was entirely due to the presence of wolves in the park. To estimate this value, the 2005 survey included a series of questions designed to identify the percentage of YNP visitors who would not have visited the park if wolves were not present. Survey respondents were asked the following questions:

Was the possibility of seeing or hearing **wolves** one of the reasons for your visiting Yellowstone National Park on this trip?

NO YES

IF YES, would you still have chosen to take this trip even if **wolves** were not present in the Yellowstone National Park? (please check one)

DEFINITELY YES DEFINITELY NO NOT SURE

Table 1 shows the percentage of visitors who responded that one of the reasons for their trip to Yellowstone National Park was the possibility of seeing or hearing wolves, what percentage of visitors would not have come had it not been for the presence of wolves in Yellowstone, and the calculated percentage of park visitation attributable to wolves. The estimated percentage of Yellowstone visitation attributable to wolves, ranges from 1.5% in the spring season to nearly 5% in the fall.

¹⁵National Park Service. (2022). NPS Stats. NPS Stats - National Park Service Visitor Use Statistics - Yellowstone NP (YELL) Reports - Yellowstone Detailed Report.

<https://irma.nps.gov/STATS/SSRSReports/Park%20Specific%20Reports/YELL%20Detailed%20and%20Seasonal?Park=YELL>

Table 1. 2005 Yellowstone Visitor Responses to Contingent Behavior Questions on the Importance of Wolf Presence in their Decision to Visit the Park.

<i>Statistic</i>	<i>Spring N=495</i>	<i>Summer N=477</i>	<i>Fall N=322</i>	<i>Winter¹ N=221</i>
(A) Percent responding that “the possibility of seeing or hearing wolves was one of the reasons for visiting Yellowstone N.P. on this trip.”	48.9%	50.04%	55.7%	35.9%
(B) Percent of those above who said they would definitely not have taken trip if wolves were not present in Yellowstone N.P.	3.1%	7.18	8.88%	10.2%
(C) Percent of total visitation attributable to the presence of wolves (A X B)	1.49%	3.59%	4.95%	3.66%

¹ Winter season statistics are from 1998-99 winter Yellowstone National Park survey results asking the same question.

A key consideration when estimating regional economic impact of spending is the definition of the economic impact area. The 2005 study estimated the impact of wolf-related spending in the 3-state recovery area (WY, MT, and ID). Therefore, only spending within the 3-states made by visitors who lived outside of the three states was included.

The data needed to estimate wolf-related 3-state expenditures by YNP visitors includes:

- 1) The proportion of visitation from outside the 3 states (ID, MT, and WY).
- 2) The average spending per trip within the 3 states by these non-residents.
- 3) The percent of non-residents who would not have visited without the presence of wolves.
- 4) Total annual recreational visitation for the park (by season).

Table 2 shows the derivation of an estimate of impacts to the three-state region. In total, it was estimated that visitors coming from outside the three-state region, who came specifically to see or hear wolves in the park, spent \$35.5 million annually within the 3 states.

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Table 2. 2005 Estimated Three-State Direct Expenditure Impact Associated with Wolf Presence in Yellowstone National Park.

<i>Statistic</i>	<i>Spring</i>	<i>Summer</i>	<i>Fall</i>	<i>Winter^a</i>
Total recreational visitation to Yellowstone	382,598	1,819,798	547,777	85,478
% of visitors from outside the three-state area	70.5%	83.68%	67.59%	82.2%
(A) Recreational visitors from out of the three states	269,770	1,522,807	370,242	70,289
(B) % of visitors who would not have visited without the presence of wolves	1.93%	4.78%	3.45%	3.66%
(C) Average spending per visitor within the three states by visitors from outside the area ^b	\$361.89	\$369.12	\$425.50	\$510.84
(A) * (B) * (C) Total estimated annual three-state visitor spending attributable to wolves	\$1,885,178	\$26,889,668	\$5,431,916	\$1,314,167
Total estimated annual visitor spending in the three states attributable to wolves	\$35,520,929			
95% Confidence interval	\$22,404,274 to \$48,637,585			

^a winter estimates utilize 1999 winter visitor survey estimates.

^b average spending was for all visitors from outside the analysis area. Average spending for those who only come for wolves was nearly identical, but due to a much smaller sample size, had a much higher variance.

Updating the 2005 estimates to 2021 levels

Since the 2005 survey and analysis, much has changed related to YNP visitation and overall price levels. It is reasonable to assume that spending in the local economy by YNP visitors who come to the area specifically to see or hear wolves has also changed.

Ideally, a new visitor survey would be conducted to estimate each of the spending estimate components in Table 3. Such a survey as was done in 2005 is costly and, because the survey itself take a year to administer, very time-consuming. In the absence of new current survey data, the parameters used in the 2005 analysis can be updated with current parameters where available, and conservatively estimated updated parameters based on non-survey information where needed. Table 3 shows the assumptions used in updating the 2005 wolf-related spending estimate to 2021 levels. These components and their associated assumptions are discussed below.

Table 3. Assumptions used to update 2005 spending estimates to 2021 levels.

<i>Component of Estimate</i>	<i>Assumption used in Update</i>
Total recreational visitation to Yellowstone (2021)	Known value from YNP
% of visitors from outside the three-state area (2021)	Assumed as equal to 2005 percentages
% of visitors who would not have visited without the presence of wolves (2021)	Assumed as equal to 2005 percentages
Average spending per visitor within the three states by visitors from outside the area (2021)	Assumed to have increased the same as overall consumer prices (CPI-U)

Total Recreational Visitation to YNP

One of the key known data changes from 2005 to 2021 is the total level of recreational visitation to YNP. Between 2005 and 2021, recreational visitation to the park has increased by 71%, from 2.83 million visitors to 4.86 million. This base increase is used to adjust the level of wolf-related visitation to the park.¹⁶

Percent of YNP Visitors from outside the 3-state region

In updating the spending estimates, no evidence that the percentage of YNP visitors coming from outside the 3-state area has decreased from 2005 to 2021. While no year-round survey data has been collected in recent years, a Summer 2016 survey of YNP visitors found that approximately 9% of visitors were from the 3-states of ID, MT, and WY.¹⁷ Therefore, 91% of summer visitors in 2016 were from outside the 3-state region. This compares to an estimated 83.68% of non-3-state visitors used in the 2005 estimates. Because summer visitation (Table 2) contributes over 75% of the estimated wolf-related spending estimate, use of the original estimates of the percent of non-local visitors is likely a strongly conservative assumption for the updated spending estimates. In line with the conservative goal of this spending update, the same percentages of out-of-area visitors from the 2005 data was employed in the 2021 updated estimate.

Percentage of YNP visitors who would not have visited without the presence of wolves

This component of the wolf spending estimate is both one for which we have no current survey-based information, and which is very important in the estimation of spending levels for wolf-motivated YNP visitors. Anecdotally, it seems, that the presence of wolves in YNP has been a consistent subject of interest since 2005. A Google search term trend graph between 2005 and 2021 for the term “wolves Yellowstone” shows substantial variability month to month in search activity, but no discernable downward trend in interest for the subject.

One aspect of evidence for non-declining wolf-related YNP visitation is related to the areas of the park where wolves are most visible and where wolf-watching is most highly concentrated. Much of the organized, non-incident wolf-watching activity in the park occurs in the Lamar Valley between the North Entrance and the Northeast Entrance to YNP. A comparison of the trends in visitation both to the park as a whole, and through the North and Northeast Entrances is shown in Figure 19. The figure shows that compared to 2005, visits through the North and Northeast Entrances has grown faster than all visits to the park. While this data does not necessarily show that the percentage of visitors who come to the park to primarily view or hear wolves has also increased over the 2005-2021 period, it does bolster the assumption that the percentage of wolf-oriented visitors has not decreased over that period. Reliance on evidence from visitation trends for the North and Northeast Entrances is also supported by the 2016 YNP visitor survey where these entrances combined had the greatest percentage of visitors who said “wolves” were “extremely important” for their YNP trip (47% for the North Entrance and 53% for the Northeast Entrance).

¹⁶ National Park Service. (2022). NPS Stats. NPS Stats - National Park Service Visitor Use Statistics - Yellowstone NP (YELL) Reports - Yellowstone Detailed Report. <https://irma.nps.gov/STATS/SSRSReports/Park%20Specific%20Reports/YELL%20Detailed%20and%20Seasonal?Park=YELL>

¹⁷ Resource Systems Group. (2017). Yellowstone National Park Visitor Use Study Summer, 2016.

Another source of information on observed trends in wolf-watching in YNP comes from Yellowstone NP staff. In the Summer and Winter of 2022-23 YNP will be conducting a study of visitor use patterns in the northeast corridor as well as wolf ecological data to better understand the socio-ecological systems at play. For future estimates of the visitor-wolf relationship, this study should establish solid reference data. Regarding trends in YNP visitor wolf-watching patterns since 2005, park staff report anecdotal impressions by staff that wolf-watching has increased over time. Most noteworthy is that wolf-watching has expanded to be a year-round activity in the park. As a result of expanding wolf-watching in the park, there has been a large increase in the number of companies operating wolf-related tours in the park.¹⁸

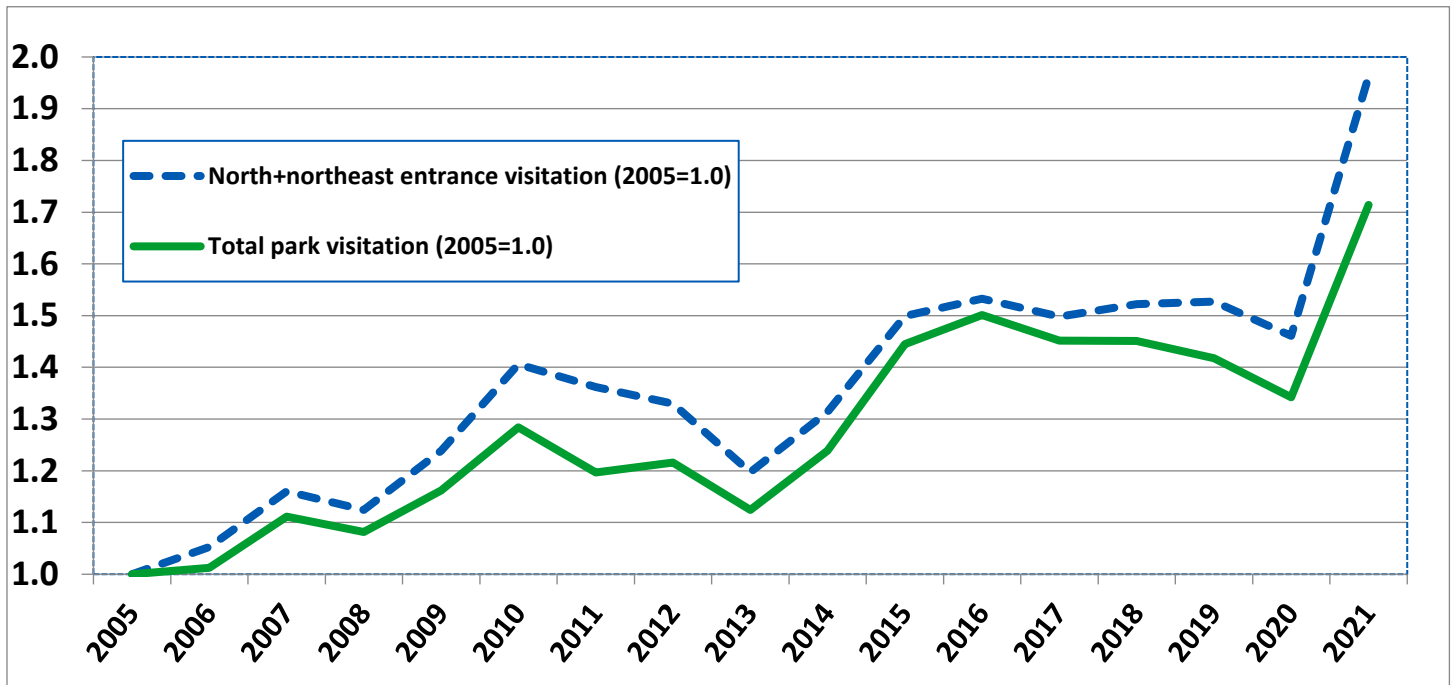


Figure 19. Comparison of changes in Total Yellowstone NP Visitation and YNP Entries through the North and Northeast Entrances

Average spending per visitor within the three states by visitors from outside the area (2021)

For this updated analysis it was assumed that average YNP visitor trip spending in the 3-state region has grown at the same rate as the consumer price index for all US consumers (CPI-U) over the 2005 to 2021 period. Figure 20 shows a simple graph of the CPI-U over the period. Based on the CPI-U, overall consumer prices have increased by approximately 42% between 2005 and 2021.¹⁹ In order to evaluate whether YNP visitor spending per trip has increased at the same rate as the CPI-U, we looked at a secondary source of information—State of Montana lodging tax revenue. Since lodging is a significant component of total trip costs for YNP visitors, trends in total lodging tax revenue for Park and Gallatin County MT were adjusted for inflation and compared to trends in YNP North and Northeast Entrance visitation (Figure 21).

Since 1987, Montana has collected a “Lodging Facility Use Tax” of 4% on stays in overnight accommodations. The MT Department of Revenue reports revenue from this tax by county. Total real

¹⁸ Personal communications, Doug Smith, Wolf Restoration Project Leader, and Lauren Miller, Social Scientist, Yellowstone NP (April 20, 2022).

¹⁹ U.S. Bureau of Labor Statistics. (2022, April 12). Consumer Price Index. Archived Consumer Price Index Supplemental Files : U.S. Bureau of Labor Statistics. <https://www.bls.gov/cpi/tables/supplemental-files/home.htm>

lodging tax revenue for Gallatin County, MT and Park County, MT, north of the park, has increased at a much faster rate than visitation for the North and Northeast Entrances.^{20,21} Park County, MT contains the North and Northeast entrances of the park which provide access to the Lamar Valley. The increase in real spending on lodging in these two Montana counties in excess of the increase in visitation provides support for the assumption that inflation-adjusted per visitor spending did not decrease from 2005 to 2021.

It is readily evident from Figure 21 that while North and Northeast Entrance visitation has nearly doubled from 2005 to 2021, Montana lodging tax revenue for the two counties more than tripled. Even when the increase in Park and Gallatin County, MT Lodging tax revenues is adjusted for increases in YNP North and Northeast Entrance visitation, and adjusted for changes in the CPI-U, lodging tax revenues have increased between 2005 and 2021 by almost 20% more than would be implied by changes in visitation and overall price levels.

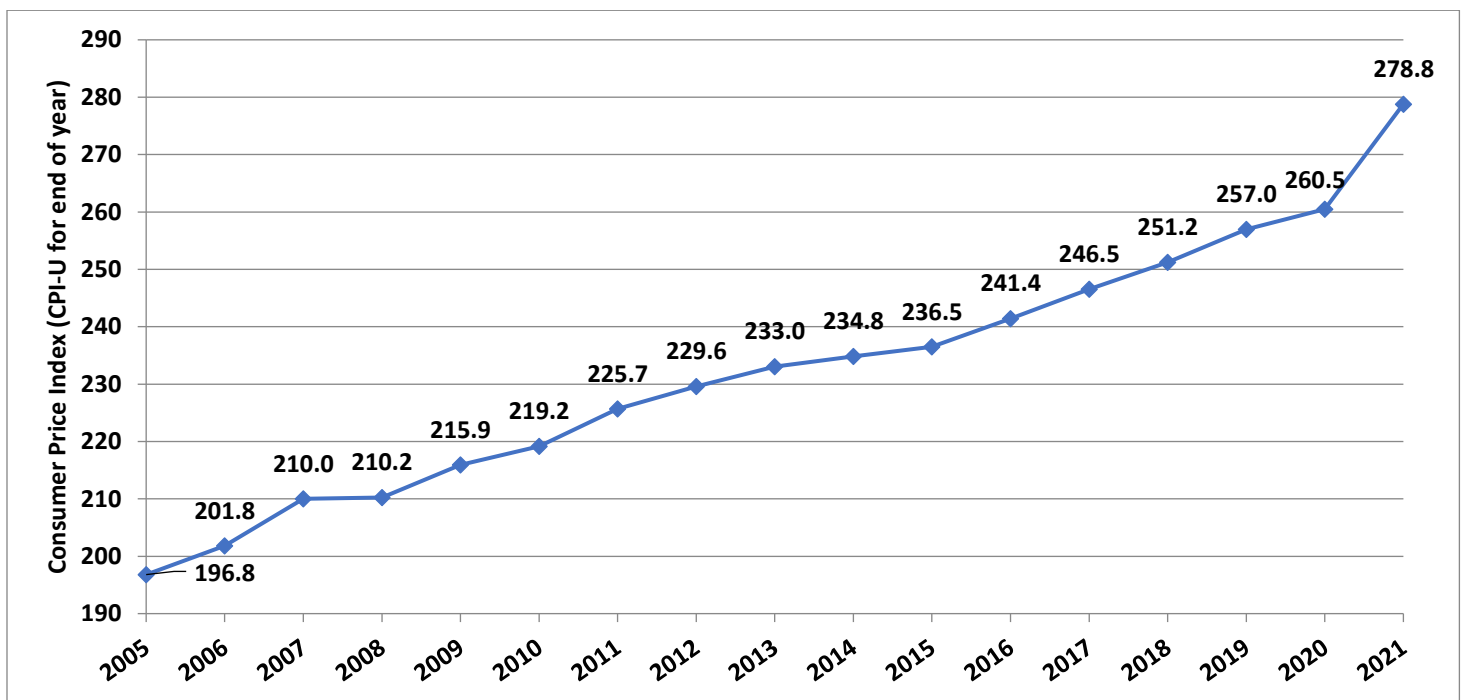


Figure 20. Trends in the Consumer Price Index for all Consumers: 2005-2021.

²⁰ Montana Office of Tourism and Business Development. (2022, April 12). Lodging Facility Use Tax. Lodging Facility Use Tax - Office of Tourism and Business Development. <https://marketmt.com/Programs/Industry-Services-and-Outreach/Lodging-Facility-Use-Tax>

²¹ National Park Service. (2022). NPS Stats. NPS Stats - National Park Service Visitor Use Statistics - Yellowstone NP (YELL) Reports - Yellowstone Detailed Report. <https://irma.nps.gov/STATS/SSRSReports/Park%20Specific%20Reports/YELL%20Detailed%20and%20Seasonal?Park=YELL>

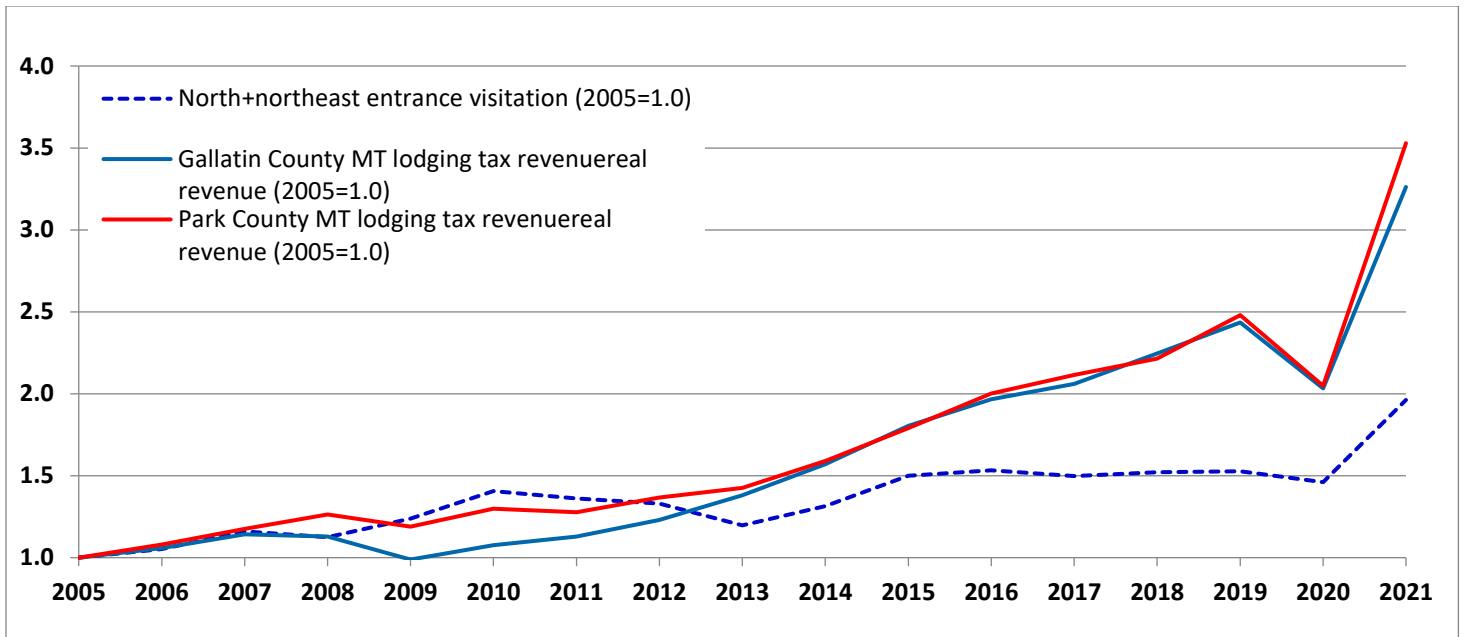


Figure 21. Comparison of Trends in MT lodging tax revenue for North and Northeast gateway counties and Park Visitation (2005=1.0) (Tax Revenue is in inflation-adjusted dollars)

Table 4 details the re-estimation of the current (2021) expenditures in the 3-state region made by YNP visitors who would not have visited the park without wolves being present. As described previously, each of the key parameters in this calculation was reexamined in this update. Total YNP visitation was updated to NPS-reported 2021 levels. Evidence from surveys between 2005 and 2021 suggest that the percent of visitors to YNP coming from outside the states of ID, MT, and WY is currently at least as high as was reported from the 2005 survey data. Evidence from local bed tax data, YNP entrance-level visitation data, and communications with YNP staff suggest that it is reasonable to assume the percent of YNP visitors coming to the park to specifically see/hear wolves has remained constant (if not increased) since 2005. Finally, based on local lodging tax data and visitation data, the assumption that average visitor spending per trip has increased at the rate of inflation appears to be appropriate.

Based on the assumptions and supporting evidence examined in preparation of this update, it is estimated that current (2021) direct spending by YNP visitors who would not have visited the park without the presence of wolves is likely at least \$82.7 million. It must be noted that this value includes only direct spending and does not account for the “multiplier” effect within the 3-state economy of re-spending portions of this amount by workers and business owners.

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Table 4. 2021 Estimated Three-State Direct Expenditure Impact Associated with Wolf Presence in Yellowstone National Park.

2021				
<i>Statistic</i>	<i>Spring</i>	<i>Summer</i>	<i>Fall</i>	<i>Winter^a</i>
2021 Total recreational visitation to Yellowstone	760,371	2,722,392	1,231,884	145,595
% of visitors from outside the three-state area (assumed the same as 2005 survey)	70.50%	83.68%	67.59%	82.20%
(A) Recreational visitors from out of the three states	536,061	2,278,098	832,630	119,679
(B) % of visitors who would not have visited without the presence of wolves (assumed the same as 2005 survey)	1.93%	4.78%	3.45%	3.66%
(C) Average spending per visitor within the three states by visitors from outside the area. (Assumed equal to 2005 estimates adjusted for inflation)	\$512.68	\$522.92	\$602.80	\$723.70
(A) * (B) * (C) Total estimated annual three-state visitor spending attributable to wolves	\$5,304,192	\$56,942,774	\$17,315,766	\$3,169,969
Total estimated annual visitor spending in the three states attributable to wolves	\$82,732,702			

Conclusion and Summary

More than any other state, Montana's economy depends on the outdoor recreation industry. This dependence manifests itself both in the activities of its residents, as well as that of its visitors. Many Montanans cite the outdoor quality of life as a prime reason for their living in the state, and while certainly not everyone agrees on just what that means, it can be readily concluded that a quality natural environment is key to maintaining that quality of life and the economy that depends on it. Not having a large urban amenity draw anywhere in the state, travelers to Montana (and its neighbors in Wyoming and Idaho) routinely come for the wide-open spaces and natural environments contained within it. Largely, this is primarily driven by the state's two National Parks (while the vast majority of Yellowstone is in Wyoming, roughly 60% of all entries come through Montana based gates).

Though the biggest effects of Yellowstone visitation can be felt in the gateway communities like Gardiner and West Yellowstone, its broader effects span much of Montana, Idaho, and Wyoming. In fact, of those visitors to Montana who said that visiting Yellowstone National Park was at least one of their reasons for visiting the state, more than half (53%) of their nights spent in the state were outside of the gateway counties, thus generating statewide economic impacts. As ones then narrows in the focus of visitation, the importance of Yellowstone grows. Subsequently, it becomes valuable to understand why visitors come to Yellowstone. Several efforts to understand just this reasoning have been undertaken in recent years and show that wildlife viewing is a major factor, if not the primary factor, in visitation for many travelers.

While wildlife viewing is spread across the many megafaunas to be found in the park, several key species rank at the top, including bison, elk, bears, and wolves. Since their reintroduction to the GYE in the mid-1990s, the benefits and costs of wolf reintroduction have been a rather political hot-button issue. While it is beyond the scope of this report to unfold all the potential benefits and costs of the presence of wolves on the landscape, we can identify some of the benefits that accrue as a result of wolf watching in Yellowstone. In 2005, this direct benefit was just over \$35 million accruing to the states of Montana, Idaho, and Wyoming. Through this report, it is estimated that this value has conservatively increased to more than \$82 million across the states in direct spending alone. The degree to which we might understand just how conservative this estimation is, is uncertain.

To gain a more detailed understanding of the magnitude of not only wolf watching, but the broader contribution of wildlife watching to the regional economy, an updated participant survey should be conducted along with a business-based survey to identify the influence of these activities on local economies. Such surveys can better distinguish the specifics of the activities compared to previously collected information that was not necessarily directed at them.