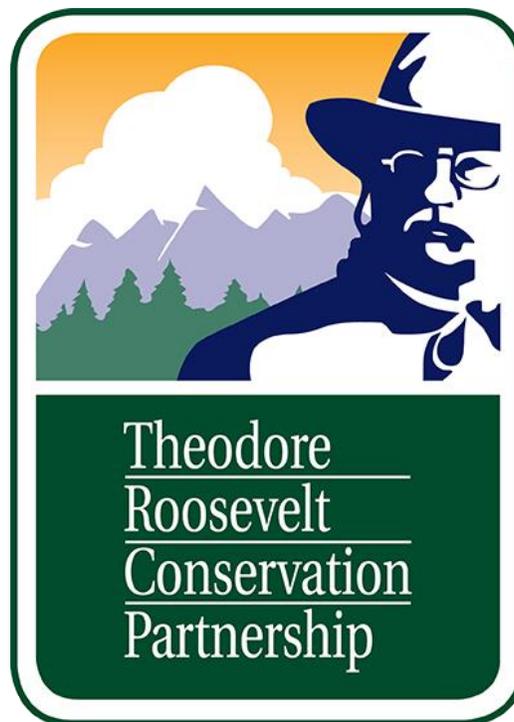


Estimating the Economic Contributions of Outdoor Recreation in Pennsylvania:

An analysis of 2020 state-level economic contributions made by hunting, fishing, and other outdoor recreation activities.

March, 2022



Prepared for the Theodore Roosevelt Conservation Partnership

by Southwick Associates



Executive Summary

Each year, millions participate in outdoor recreation activities in Pennsylvania. These activities affect Pennsylvania’s economy in an important way, creating jobs and wages, generating tax revenue, and contributing to the state’s GDP. These economic contributions are the direct result of participants utilizing natural areas within Pennsylvania for recreation. Therefore, conservation of natural resources is critical if outdoor recreation is to remain a large part of Pennsylvania’s economy.

In 2020, the economic contributions generated by outdoor recreation in Pennsylvania accounted for more than \$58 billion in economic output, supported more than 430,000 jobs and provided salaries of nearly \$20 billion (Table 1). In fact, more Pennsylvania jobs were supported by outdoor recreation in 2020 than by the production of durable goods (U.S. Bureau of Labor Statistics, 2020). In addition, these activities contributed more than \$32 billion to Pennsylvania’s state GDP and over \$6.5 billion in tax revenue at the federal, state, and local levels.

TABLE 1. ECONOMIC CONTRIBUTIONS OF ALL OUTDOOR RECREATION IN PENNSYLVANIA, 2020

	Jobs	Salaries and Wages	GDP	Total Output	State and Local Taxes	Federal Taxes
Biking	45,969	\$2,026,003	\$3,293,574	\$6,104,078	\$238,904	\$439,190
Camping	104,960	\$4,792,832	\$7,732,291	\$14,033,823	\$547,264	\$1,036,561
Fishing	8,215	\$352,166	\$559,091	\$1,043,934	\$34,670	\$75,508
Hunting	13,335	\$649,986	\$1,089,225	\$2,125,611	\$63,624	\$140,936
Motorcycle Riding	26,540	\$1,281,236	\$2,097,289	\$3,939,614	\$147,413	\$278,140
Off Roading	20,085	\$1,008,059	\$1,609,717	\$2,962,860	\$111,136	\$217,443
Snow sports	41,939	\$1,895,227	\$2,969,011	\$5,260,280	\$207,582	\$407,016
Trail sports	114,708	\$5,134,663	\$8,356,810	\$15,205,278	\$612,201	\$1,114,204
Water sports	53,747	\$2,481,386	\$3,933,297	\$7,142,105	\$277,006	\$534,378
Wildlife Watching	8,030	\$372,777	\$576,767	\$1,042,109	\$37,682	\$79,709
Total	437,527	\$19,994,335	\$32,217,072	\$58,859,691	\$2,277,480	\$4,323,086

**All dollar figures are reported in the thousands of dollars (\$000s).*

While hunting and fishing may not generate economic contributions equivalent to other activities presented in this report, such as camping and trail sports, hunting and fishing do serve a vital role in terms of conservation. The Federal Aid in Wildlife Restoration Act, as well as the revenue generated by the sale of hunting and fishing licenses, permits and tags, all go toward restoring and maintaining wildlife populations and habitat across the state.

In fact, over 945,000 Pennsylvania hunters spent more than \$37.8 million in 2019¹ via purchases of licenses, tags, permits, and stamps, amounting to roughly \$40 per licensed hunter. Additionally, over 995,000 anglers contributed more than \$23.9 million and licenses, permits and stamps equaling about \$24 per licensed angler in 2019. Pennsylvania also received over \$20.9 million in wildlife restoration excise tax revenues in 2020 based on its hunter population and land size, and over \$8.9 million in Sport Fish restoration appropriations based on its angler population and water area. Altogether, hunting and fishing provided Pennsylvania with over \$91 million in conservation funding from the sale of licenses and excise taxes paid on firearms, ammunition, archery gear and fishing tackle. The conservation resulting from hunting and fishing in Pennsylvania creates and enhances opportunities for other types of outdoor recreation throughout the state. For Pennsylvania's rich tradition of outdoor recreation to continue, hunting and fishing must be seen as cornerstone activities on which many conservation efforts rest.

¹ 2019 is the most recent year available for certified license sales data from the USFWS.

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Introduction

Year after year, millions of Pennsylvania residents and nonresidents engage in fishing, hunting, and other outdoor recreation activities in the state, spending large amounts of money on equipment, travel and supplies to engage in these pursuits. These activities also provide crucial economic support to several rural communities throughout the state. Spending on outdoor recreation creates economic contributions not only in communities where the spending takes place, but across the entire state of Pennsylvania.

This study quantifies and reports the economic contributions associated with fishing, hunting, and other outdoor recreation activities within Pennsylvania in 2020. Results provide several useful economic measures: participant expenditures, employment, total economic output, salaries and wages, and contributions to the state's gross domestic product (GDP). Additionally, the economic contributions made by Pennsylvania residents in the Delaware River watershed are highlighted to approximate the overall contributions of outdoor recreation to the communities and economies within the watershed specifically.

This study updates the results of a similar study conducted by Southwick Associates on behalf of the Theodore Roosevelt Conservation Partnership in 2017.

Methods

Region of Study

The economic contributions of the recreational activities analyzed here are limited to the state of Pennsylvania. Only activities that took place in Pennsylvania during 2020 are considered in this report, including activity, and spending by residents and nonresidents. While Pennsylvania residents likely ventured out of the state to participate in fishing, hunting, and other outdoor recreation activities, their activity and spending are not estimated in this analysis.

Definitions

In the following paragraphs we define a number of terms and concepts key to the analysis of the economic contributions of hunting and fishing activities in Pennsylvania during 2020.

Participation includes the estimated number of individuals who participated in a given type of outdoor recreation activity in Pennsylvania during 2020. These figures were estimated using data from the National Survey of Fishing, Hunting, and Wildlife Associated Recreation (FHWAR) made available by the U.S. Fish & Wildlife Service (USFWS), as well as the Outdoor Recreation Survey produced by the Outdoor Industry Association (OIA). To provide greater context, we will define the concept in more depth in the ‘Data Overview’ section.

Expenditures encompass two different categories: trip expenses and durable goods expenditures. Trip expenses include the retail spending made by participants to directly support a trip to engage in each type of outdoor recreation (e.g., fuel, food, lodging). Durable goods expenditures include activity-specific equipment and accessories (e.g., firearms, decoys, fishing rods, tackle) purchased by hunters and anglers. It also includes multi-purpose equipment, which has been allocated to specific types of activity based on the distribution of the reported days recreators participate in each activity (e.g., boats, tents, ATVs).

Economic Modelling

Input-output models describe how spending in one industry affects other industries within an economy. For example, once a consumer makes a purchase, the retailer buys more merchandise from wholesalers, who buy more from manufacturers, who, in turn, purchase new inputs and supplies. In addition, the salaries and wages paid by these businesses stimulate more economic activity as workers spend their incomes. Simply, the first purchase creates numerous rounds of purchasing. Input-output analysis tracks the flow of dollars from the consumer through all of the businesses that are affected, either directly or indirectly.

Specific to this research, dollars spent by outdoor recreators, referred to as their **direct spending**, cycles through the economy generating additional spending by businesses who provide supporting services and goods. This is known as “output”, or the multiplier effect, and includes indirect **contributions** arising from spending by businesses supporting those who serve outdoor recreators as well as **induced contributions** generated by household spending of wages earned by employees of directly or indirectly affected businesses. The total economic contribution from outdoor recreation as provided in this report is the sum of the direct effects of recreators’ retail spending plus the measurable effects of indirect and induced spending.

All economic contributions in this study were estimated using a 2019 model of the Pennsylvania economy available from IMPLAN[®] with inflation adjustments to reflect 2020 spending.² IMPLAN has advised use of the 2019 model to estimate 2020 economic contributions due to irregularities appearing in the 2020 model as a result of the COVID-19 pandemic. Five types of economic activity are measured and reported:

Jobs: The number of full- and part-time jobs created or supported as a result of hunting, fishing, and other outdoor recreation activities within the state of Pennsylvania.

Salaries and wages: Total payroll, including salaries, wages and benefits paid to employees and proprietors.

GDP: The contribution to the state or regional economy from hunting, fishing, and other outdoor recreation activities within the state of Pennsylvania net of spending on intermediate inputs.

Total output: The total value of all sales, including both the final purchase as well as the sale of intermediate inputs, by businesses throughout the economy under study associated with hunting, fishing, and other outdoor recreation activities within the state of Pennsylvania; and

Tax Revenue: Estimated local and state, as well as federal taxes, generated as a result of the economic activity associated with hunting, fishing, and other outdoor recreation activities within the state of Pennsylvania.

To apply direct spending for each recreational activity to the IMPLAN model, each specific expenditure was matched to the appropriate industry sector that received the initial purchase. For each set of state-level estimates, the results report economic contributions that occurred within the state. The results do not include any economic activity or indirect contributions that leak out of the state; because of this, it is possible that the overall effect of these activities is greater than the state-level estimates reported.

² IMPLAN[®] is a platform that combines a set of extensive databases, economic factors, and demographic statistics with a customizable modeling system to measure economic contributions within a given area. This platform allows for an understanding of how participants' expenditures contribute to the local, regional, and state economies.

Data Overview

This report makes use of two main data sources. The economic contributions of fishing and hunting activities were estimated for the purpose of this report from the FHWAR dataset. Economic contributions from “other outdoor recreation activities” were taken from a 2016 report produced by Southwick Associates for the Outdoor Industry Association (Outdoor Industry Association, 2017).

Fishing and Hunting Activities

Recreational Fishing

The economic contributions of fishing activities in 2018 were reported for all fifty states by the American Sportfishing Association in 2021 (American Sportfishing Foundation, 2021). These estimates were calculated using expenditures and participation data derived from multiple sources, including the 2016 FHWAR (U.S. Fish & Wildlife Service, 2016), 2011 FHWAR (U.S. Fish & Wildlife Service, 2011), and USFWS Historical Fishing License Data (U.S. Fish & Wildlife Service, 2021). The 2018 Pennsylvania angler spending estimates were collected from this study and updated to 2020 levels using the participation trend in resident and nonresident fishing license sales in Pennsylvania. Those participation trends were calculated using fishing license data shared directly with Southwick Associates by the Pennsylvania Fish & Boat Commission. Updated angler spending estimates were then used to calculate the economic contributions of fishing in Pennsylvania using the updated IMPLAN models described in the previous section.

Recreational Hunting

The economic contributions of hunting activities in 2020 were reported for all fifty states by the Sportsman’s Alliance Foundation in 2021 (Sportsmen's Alliance Foundation, 2021). These estimates were calculated using expenditures and participation data derived from 2011 FHWAR (U.S. Fish & Wildlife Service, 2011), and USFWS Historical Hunting License Data (U.S. Fish & Wildlife Service, 2021). Spending and participation data for Pennsylvania hunters was gathered from this study, and economic contributions were estimated using the updated IMPLAN models described in the previous section.

All Other Outdoor Recreation Activities

Outdoor Recreation Survey

Estimates of participation and spending for trail sports, biking, camping, snow sports, water sports, wildlife watching, motorcycle riding, and off roading were gathered from a 2016 report for the OIA by Southwick Associates (Outdoor Industry Association, 2017). Those 2016 estimates were updated to 2020 levels using participation data reported by the Outdoor Foundation and the Environmental Systems Research Institute (ESRI), along with inflation data provided by the U.S. Bureau of Labor Statistics (U.S. Bureau of Labor Statistics, 2021). A full list of the activities captured in the OIA study is provided in Appendix A.

Updating OIA Estimates to 2020 Levels

To update the 2016 participation estimates to 2020 levels, Southwick Associates used two methods described below:

Nonmotorized Activities

To update the biking, camping, snow sports, trail sports, water sports and wildlife watching estimates, Southwick Associates utilized data from the 2021 Outdoor Participation Trends Report published by the Outdoor Foundation³ (Outdoor Foundation, 2021). This annual report provides national participation trends for a variety of nonmotorized outdoor activities. The 2016-2020 national participation trends were used to update the Pennsylvania participation estimates from 2016 to 2020 levels. A list of the specific activities from that report used to estimate the changes in participation for each of the 6 broader nonmotorized activity categories is presented in Table 7 in Appendix A.

Motorized Activities

To update participation estimates for motorcycle riding and off-roading to 2020 levels, Southwick Associates used a commercial data source obtained from ESRI known as *Business Analyst*. ESRI uses detailed geographic, socioeconomic and lifestyle information in combination with third-party sources of data to estimate participation for various activities at both the state and congressional district levels.⁴ These data are stored in ESRI's Market Potential Database and are accessible via the Business

³ The Outdoor Foundation is a nonprofit organization created by the Outdoor Industry Association.

⁴ Market Potential data is derived from MRI-Simmons' Survey of the American Consumer, which captures insights related to demographics, lifestyles, consumption, and activities.

Analyst software. The set of ESRI variables used to estimate the changes in participation for each of the motorized activity categories is presented in Table 8 in Appendix A.

By comparing 2016 and 2020 participation estimates for each of the outdoor sports listed above, the participation and associated spending estimates were updated to 2020 levels.

Economic Contributions of Outdoor Recreation in the Delaware River Watershed

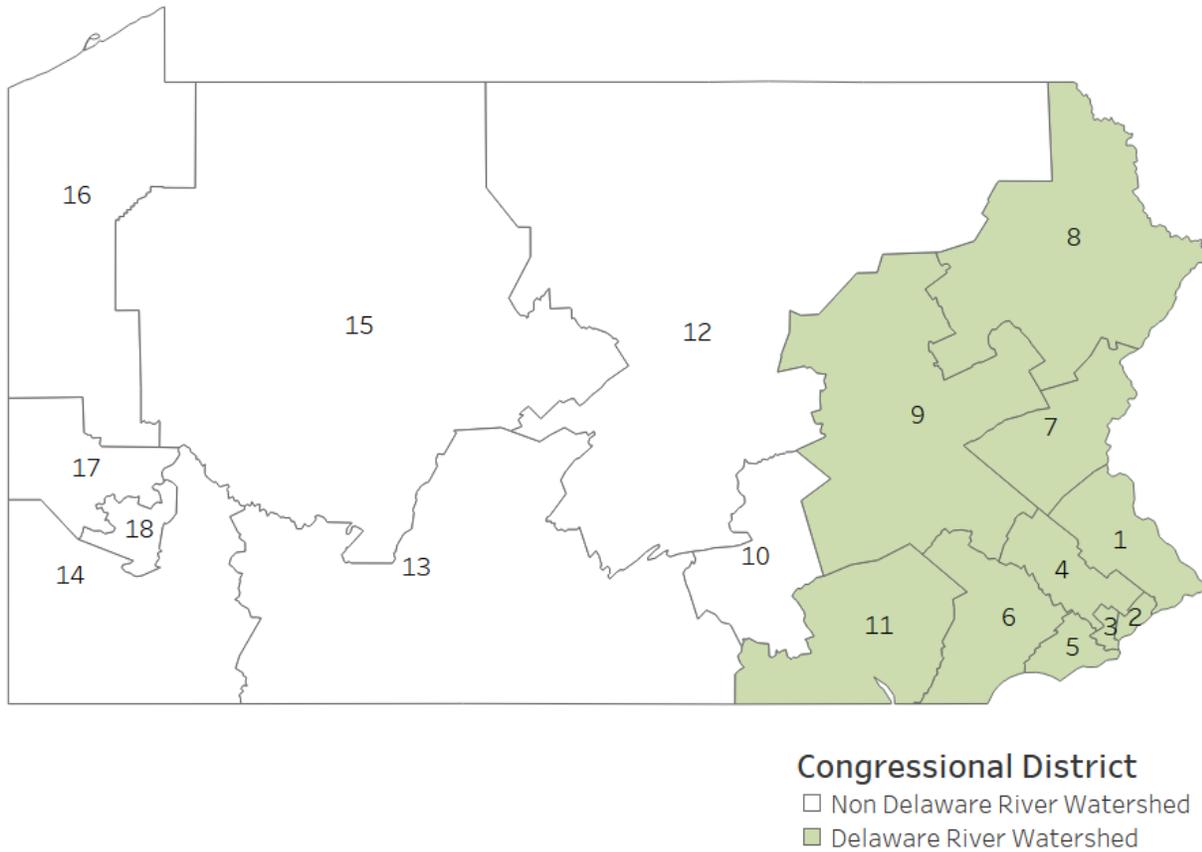
This study also estimates the economic contributions of outdoor recreation occurring within the Delaware River Watershed. However, the fishing, hunting, and outdoor recreation datasets used for this study only provided results at the state level. Considering data is limited at this smaller geographic scale, Southwick Associates was required to define the scope of study differently for these estimates:

- **PA residents only:** Although non-residents represent an important part of outdoor recreation contributions in the Delaware River Watershed, there is no practical way to determine where the spending of non-resident participants occurred, whether inside or outside of the Delaware River Watershed. Therefore, only Pennsylvania residents are included in these estimates.
- **Allocation to Delaware River Watershed:** Resident spending on outdoor recreation was allocated to congressional districts based on County Business Pattern data from the U.S. Census Bureau (U.S. Census Bureau, 2021). These data served as a proxy in the absence of data from recreators about where they spent money on outdoor recreation within the state. The assumption made was that the distribution of establishments, employees, etc. by congressional district is reflective of where outdoor recreator spending occurred. This distribution was used to estimate the percentage of resident outdoor recreation spending that occurred inside the Delaware River watershed. Figure 1 shows a map of the congressional districts that make up the Delaware River watershed.
- **Regional Contribution Model:** To further refine the results of this analysis, the economic contributions of spending by PA residents within the Delaware River Watershed were estimated using a regional IMPLAN model, rather than a statewide model. The regional model included only counties in Pennsylvania that are located within the Delaware River Watershed, whether fully or in part. This regional model allows for more precise contribution estimates, as it includes only the industries and businesses present in the Delaware River Watershed. A full list of the counties included in this model is included in Appendix B.

It is important to note that the methods described above represents a departure from the approach used to produce the Delaware River Watershed estimates presented in the original 2017 study. The

current approach provides more precision, as it utilizes more specific information on Pennsylvania’s economy to estimate contributions to the Delaware River Watershed.

FIGURE 1. PENNSYLVANIA CONGRESSIONAL DISTRICTS



Results

Statewide Results

Millions of people participated in outdoor recreation in Pennsylvania in 2020. These outdoor activities supported more than 430,000 jobs in Pennsylvania, paying salaries of nearly \$20 billion. Collectively, resident, and nonresident spending on outdoor recreational activities in Pennsylvania in 2020 generated an estimated \$58 billion in economic output. Outdoor recreation contributed more than \$32 billion to Pennsylvania’s GDP, and over \$6.5 billion were generated in tax revenue at the federal, state, and local levels. See Table 1 for detailed economic contributions by activity.

Fishing and Hunting

Fishing and hunting both remain very popular outdoor activities in Pennsylvania with nearly 1.2 million anglers and 780,000 hunters across the state. Collectively, Pennsylvania hunters and anglers spent more than \$1.6 billion in 2020 while pursuing their passions.

TABLE 2. FISHING AND HUNTING PARTICIPATION AND SPENDING IN PENNSYLVANIA, 2020

	Participants	Expenditures (\$000s)	Expenditures per Participant
All Fishing	1,175,673	\$574,876	\$489
All Hunting	780,364	\$1,141,898	\$1,463
Deer Hunting ⁵	718,549	\$703,133	\$979

Spending by hunters and anglers supported nearly 30,000 jobs which paid more than \$1.4 billion in salaries and wages in 2020. That spending also generated over \$400 million in local, state, and federal tax revenue.

⁵ Deer hunting is the only subtype of hunting in Pennsylvania for which there was reliable sample size in the FHWAR 2011 dataset, therefore it is the only subtype that could be projected to 2020 levels with confidence.

TABLE 3. ECONOMIC CONTRIBUTIONS OF FISHING AND HUNTING IN PENNSYLVANIA, 2020

	Jobs	Salaries and Wages	GDP	Total Output	State and Local Taxes	Federal Taxes
All Fishing	8,215	\$352,166	\$559,091	\$1,043,934	\$34,670	\$75,508
All Hunting	13,335	\$649,986	\$1,089,225	\$2,125,611	\$63,624	\$140,936
Deer Hunting	8,009	\$401,567	\$666,019	\$1,310,241	\$38,984	\$86,816
Total	29,559	\$1,403,719	\$2,314,336	\$4,479,786	\$137,278	\$303,260

*All dollar figures are reported in the thousands of dollars (\$000s).

Other Outdoor Recreation

Millions participated in outdoor recreation in Pennsylvania during 2020, with camping (3.7 million), trail sports (3.3 million) and water sports (2.4 million) being among the most popular activities.

TABLE 4. OTHER OUTDOOR RECREATION PARTICIPATION AND SPENDING IN PENNSYLVANIA, 2020

	Participants	Expenditures (\$000s)	Expenditures per Participant
Biking	2,237,374	\$3,704,799	\$1,656
Camping	3,744,274	\$8,492,581	\$2,268
Motorcycle Riding	1,216,024	\$2,399,363	\$1,973
Off Roding	1,541,238	\$1,790,725	\$1,162
Snow sports	748,697	\$3,111,514	\$4,156
Trail sports	3,348,935	\$9,297,096	\$2,776
Water sports	2,445,756	\$4,321,275	\$1,767
Wildlife Watching	1,228,581	\$735,636	\$599

There were more than 415,000 jobs supported by resident and nonresident outdoor recreation in Pennsylvania in 2020, not including hunting and fishing activities. These jobs paid nearly \$19 billion in salaries and wages and generated over \$6.2 billion in tax revenue at the federal, state, or local level. The total contribution to the state's GDP made by these outdoor recreation activities was over \$30 billion.

Table 5. Economic Contribution of Other Outdoor Recreation Activities in Pennsylvania, 2020

	Jobs	Salaries and Wages	GDP	Total Output	State and Local Taxes	Federal Taxes
Biking	45,969	\$2,026,003	\$3,293,574	\$6,104,078	\$238,904	\$439,190
Camping	104,960	\$4,792,832	\$7,732,291	\$14,033,823	\$547,264	\$1,036,561
Motorcycle Riding	26,540	\$1,281,236	\$2,097,289	\$3,939,614	\$147,413	\$278,140
Off Roding	20,085	\$1,008,059	\$1,609,717	\$2,962,860	\$111,136	\$217,443
Snow sports	41,939	\$1,895,227	\$2,969,011	\$5,260,280	\$207,582	\$407,016
Trail sports	114,708	\$5,134,663	\$8,356,810	\$15,205,278	\$612,201	\$1,114,204
Water sports	53,747	\$2,481,386	\$3,933,297	\$7,142,105	\$277,006	\$534,378
Wildlife Watching	8,030	\$372,777	\$576,767	\$1,042,109	\$37,682	\$79,709
Total	415,977	\$18,992,183	\$30,568,756	\$55,690,147	\$2,179,187	\$4,106,641

**All dollar figures are reported in the thousands of dollars (\$000s).*

Economic Contributions to the Delaware River Watershed Region

Outdoor recreation such as fishing, hunting, boating, and camping are immensely popular among residents of the Delaware River Watershed. Therefore, the economic contributions of outdoor recreation to the Delaware River Watershed are greater than elsewhere in Pennsylvania. Spending on outdoor recreational activities supported more than 160,000 jobs in the Delaware River Watershed, compared to approximately 137,000 jobs supported by outdoor recreation occurring in other parts of the state.

TABLE 6. ECONOMIC CONTRIBUTIONS OF OUTDOOR RECREATION IN THE DELAWARE RIVER WATERSHED, 2020

	Jobs	Salaries and Wages	GDP	Total Output	State and Local Taxes	Federal Taxes
Delaware River Watershed	164,439	\$7,630,569	\$12,047,749	\$21,887,758	\$794,179	\$1,550,653
Non-Watershed	136,528	\$6,176,983	\$10,224,896	\$18,888,707	\$778,839	\$1,435,459
Total⁶	300,968	\$13,807,552	\$22,272,645	\$40,776,465	\$1,573,018	\$2,986,112

**All dollar figures are reported in the thousands of dollars (\$000s).*

⁶ This represents the total contribution of outdoor recreation spending by Pennsylvania residents.

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Appendix A: Other Outdoor Recreation Activities by Category

The following activities are included in the activity categories detailed in the OIA report.

Biking: bicycling off road, bicycling on a paved road, skateboarding. This activity is referred to as “Wheel Sports” in the OIA report.

Camping: RV-ing, camping in a tent/lodge

Motorcycle Riding: motorcycle riding off-road, motorcycle riding on a road

Off Roding: driving off-road trucks/jeeps, riding ATVs, riding dune/swamp buggies, riding ROVs

Snow Sports: snowmobiling, downhill skiing, snowboarding, Telemark skiing, cross-country/Nordic skiing, snowshoeing

Trail Sports: day hiking, horseback riding, backpacking, mountaineering, rock or ice climbing, trail/road running

Water Sports: cruising/sightseeing in a power boat, knee boarding, tubing, wakeboarding, waterskiing, canoeing, kayaking, rafting, stand-up paddle boarding, surfing, sailing, scuba

Wildlife Watching: wildlife viewing

TABLE 7. OUTDOOR FOUNDATION ACTIVITIES USED FOR UPDATING NON-MOTOR SPORT PARTICIPATION ESTIMATES

Activity Group	Outdoor Foundation Activities
Biking	Bicycling (BMX)
	Bicycling (Mountain/Non-Paved Surface)
	Bicycling (Road/Mountain/BMX)
	Bicycling (Road/Paved Surface)
	Skateboarding
Camping	Camping (Car, Backyard, Backpacking, & RV)
Snow Sports ⁷	Skiing (Cross-Country)
	Snowboarding
	Snowshoeing
Trail Sports	Backpacking Overnight (more than 1/4 mile from vehicle/home)
	Hiking (Day)
	Running, Jogging, & Trail Running
Water sports	Boardsailing/Windsurfing
	Kayaking (Recreational)
	Kayaking (Sea/Touring)
	Kayaking (White Water)
	Rafting
	Sailing
	Scuba Diving
	Stand Up Paddling
Wakeboarding	
Wildlife Watching	Wildlife Viewing (more than 1/4 mile from vehicle/home)

TABLE 8. ESRI VARIABLES FOR UPDATING MOTOR SPORT PARTICIPATION ESTIMATES

Activity Group	ESRI Market Potential variable description and code
Motorcycling	Participated in motorcycling in last 12 months
Off-Roading	Household owns ATV/UTV

⁷ A skiing category called “Skiing (Alpine/Downhill/Free ski/Telemark)” could not be included, since there were no reliable estimates for participation in 2016.

Appendix B: Counties in Delaware River Watershed

Counties included in Delaware River Watershed

Berks
Bucks
Carbon
Chester
Clinton
Columbia
Cumberland
Delaware
Lackawanna
Lancaster
Lebanon
Lehigh
Luzerne
Monroe
Montgomery
Montour
Northampton
Northumberland
Philadelphia
Pike
Schuylkill
Wayne
York