Lower Fryingpan River and Ruedi Reservoir Economic Impact Study

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EXECUTIVE SUMMARY

Fishing in Colorado provides unique recreational opportunities and generates economic activity through the purchase of gear and clothing, guide services and other recreation-related expenditures such as travel, food and lodging. Fishing generates economic activity beyond these direct expenditures by anglers because the direct expenditures create spin-off activity in the economy. This report analyzes the direct and spin-off economic activity created from recreational fishing on the Lower Fryingpan River and Ruedi Reservoir. This research was conducted by Colorado State University in partnership with Roaring Fork Conservancy.

This study looked at the economic impact of recreational fishing on the Lower Fryingpan River and Ruedi Reservoir for Pitkin, Eagle and Garfield counties. To evaluate the regional economic impact, we developed and conducted two visitor surveys which gathered demographic information along with information on angler expenditures, frequency of trips and opinions about stream flows. One survey was conducted with anglers on the Lower Fryingpan River, and the other was conducted with anglers on Ruedi Reservoir. We surveyed the Lower Fryingpan River from March 2014 through August 2014 and Ruedi Reservoir from May 2014 through July 2014. In order to aggregate our sample population (the actual survey respondents) to the entire population of anglers on the Lower Fryingpan River and Ruedi Reservoir, we conducted car counts on the Lower Fryingpan River and utilized visitor data from the U.S. Forest Service for Ruedi Reservoir.

Economic impact assessment determined the effects of recreational fishing on the three-county study region. This type of analysis looks at linkages in the economy, and takes into account the fact that the economic impact of recreational fishing is not just limited to the 'direct effect,' defined as the activity itself. Recreational fishing expenditures are also linked to other related sectors, in this case, 'indirect effects' such as input suppliers (e.g., accountants for fly shops) and 'induced effects' such as employee spending in other industries (e.g., fly shop employees' restaurant purchases). Together, the direct, indirect and induced effects create the 'multiplier effect' of visitor spending on the local economy. Because local economic development depends on bringing outside money into the economy – and preventing local money from leaking out – economic impact calculations distinguish between spending by local visitors and visitors from outside the defined three-county region. We used non-local visitors' expenditure estimates and the IMPLAN economic modeling software to generate annual estimates of employment, labor income, value added and output supported by recreational fishing in the region. Survey data was used to estimate annual angler spending by category (e.g., food service and drinking places), as well as the total number of annual anglers.

LOWER FRYINGPAN RIVER - SUMMARY OF SURVEY RESULTS

The vast majority (92%) of anglers on the Lower Fryingpan River were male. On average, respondents travelled in groups of 3.1 people and the average trip length was 4.3 days. 96% of respondents stated that the primary activity they participated in on the Lower Fryingpan River was fishing. For non-local respondents the average per person, per day expenditure for a fishing trip on the Lower Fryingpan River was $100.88, with higher average values in the summer months of June, July and August. This translates

to total expenditures for the year of $3.3 million. This spending translates to almost $3.8 million in output, 38 jobs, and $2.4 million in value added to the three-county region.

In the survey, we also asked two questions to help us understand the potential economic impacts of governmental policies to manage stream flows. First, we looked at the management of winter stream flows to reduce the occurrence of anchor ice and second, we looked at the management of summer stream flows for angler wadeability. In both cases management practices to achieve stream flows more suited to fish survival in the winter and wadeability in the summer resulted in a stated increase in the number of trips taken by respondents. In the case of winter flows, this translated to a potential increase in economic activity in the region of $1.5 million in output, 15 jobs and $944,401 in value added. In the case of summer flows, the economic impact was estimated at $1.1 million in output, 11 jobs and $706,300 in value added. The added economic output from increased trips due to increased winter river flow management translated to a 40% increase in the regional economic impacts from angler recreation on the Lower Fryingpan River, while the added output from increased trips due to wadeable summer flows management translated to a 30% increase.

Ruedi Reservoir- Summary of Survey Results

Gender was more balanced for Ruedi Reservoir visitors, but still predominantly male (73%). On average, respondents travelled in groups of 5.2 people. 22% reported fishing from a boat and 24% reported fishing from shore (there was overlap, with some respondents reporting fishing both from a boat and from shore). Average per person, per day expenditures for local respondents was $18.41, and total expenditures were $144,237. Under our model, this spending translates to $145,326 in output, 1.2 jobs and $91,009 in value added. The relatively small numbers for economic impacts is due to the fact that the majority of Ruedi Reservoir users are local, living in the study area, as well as the smaller expenditures per day, as compared to anglers on the Lower Fryingpan River

PURPOSE OF THE STUDY

Each year hundreds of thousands of anglers visit Colorado's rivers and streams. In addition to providing recreational opportunities for participants, fishing generates a substantial amount of economic activity in the state through the purchase of gear and clothing, guide services and other recreation-related expenditures on items such as travel, food and lodging.

Fishing's contribution to the regional and state economies is more extensive than the economic activity generated by direct angler spending. Direct expenditures' effects are transmitted throughout Colorado's economy through spin-off jobs from fishing-related businesses, as well as the purchases their employees make with their own incomes. These spin-off jobs are known as the 'spillover'-or 'multiplier'-effects.

Some areas of Colorado are more dependent on tourism than others. The Roaring Fork Valley, ranging from Aspen to Glenwood Springs, is heavily reliant on tourism for income and employment. During the spring, summer and early fall, recreational fishing on the area's rivers and streams generates a tremendous amount of economic activity by anglers visiting from across the state, as well as the rest of the U.S. and abroad. The Lower Fryingpan River is of particular importance because it is designated a 'Gold Medal' trout stream by Colorado Parks and Wildlife. In 1979, a 2-mile reach of the Lower Fryingpan became the first state-recognized 'Gold Medal' trout stream. This endorsement was later extended to a 43 mile stretch including the length of the Lower Fryingpan River and past its confluence, including the Roaring Fork River from Basalt to Glenwood Springs. These waters are able to produce 60 pounds of trout per acre, and at least twelve 14" or larger trout per acre. Only 322 miles of Colorado's 9,000 miles of trout streams, and three lakes, carry the 'Gold Medal' signature (Gold Medal Streams, 2015). Water released from Ruedi Reservoir influences not only the quality of the fish habitat but also the 'fishability' of the Fryingpan River. Both high and low water levels can impact anglers. Low flows (especially in the winter) can compromise the quality of trout habitat, while high flows in the summer can make it difficult for anglers to wade into the river to fish.

The purpose of this study is to provide an estimate of both the direct and spin-off effects on the regional and local economies of recreational fishing on the Lower Fryingpan River and Ruedi Reservoir, and how that economic situation might change with different seasonal river flows.

BACKGROUND

This study was conducted by Colorado State University researchers in partnership with Roaring Fork Conservancy, and focuses on the Lower Fryingpan River and Ruedi Reservoir. The Lower Fryingpan River is a 14-mile stretch that begins below the dam at Ruedi Reservoir. It is one of the longest reaches of 'Gold Medal' fishing opportunities in the state. Approximately 8 miles of this stretch of the Fryingpan River are available for public fishing access, with the remaining access privately-held.

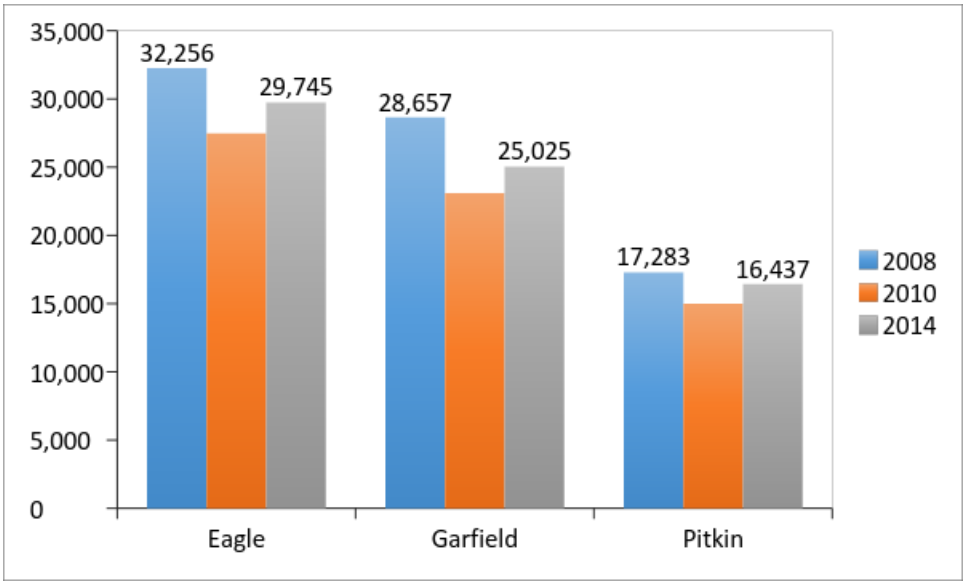
Ruedi Reservoir is on the Fryingpan River, about 15 miles east of the Town of Basalt. With a capacity of 102,000 acre-feet, Ruedi Reservoir is a federally-owned facility operated by the U.S. Bureau of Reclamation (BOR). Ruedi has many beneficial uses, including municipal and industrial, agricultural irrigation, hydroelectric power generation, recreation, and fish and wildlife conservation. Recreation

facilities on the reservoir include 81 campsites and 2 boat-launching ramps. This report focuses on recreational fishing.

Economic Overview of the Area

The economic impact evaluation considered the broader Roaring Fork Valley region, including Pitkin, Eagle and Garfield counties. Communities in the region include Aspen, Basalt, Glenwood Springs, Carbondale, Eagle, Snowmass Village and Rifle. The 3-county region was hard hit by the Great Recession (December 2007-July 2009) and the recovery, although steady, has been slow. **Figure 1** shows recent employment trends for Eagle, Garfield and Pitkin counties. Combined employment totaled 78,196 in 2008; in 2014, the region was home to 71,207 jobs, a 9% reduction. By comparison, the state of Colorado's 2014 employment total was nearly 5% higher than in 2008. These employment figures include both full- and part-time positions of wage and salaried workers and proprietors.

Figure 1: County Employment Totals for Select Years: 2008, 2010 and 2014



Source: Quarterly Census of Employment and Wages/Colorado Department of Labor and Employment

Tourism is an important part of the regional economy. According to a report prepared for the Colorado Tourism Office (CTO) (Dean Runyan Associates, 2014), overnight tourism in the three counties in 2013 accounted for $1.6 billion in travel spending, supporting more than 13,110 jobs, and nearly $500 million in local earnings. In 2008, overnight tourism supported 12,830 jobs, meaning that the overnight tourism sector, unlike the rest of the economy, actually added jobs since the recession. Further, tourism-related spending makes important contributions to county and municipal tax revenues. In 2013, the CTO estimated $67.2 million in local tax revenue was generated from tourism in the 3-county region.

Table 1: Travel Spending, Earnings, Employment and Local Taxes in the Three-County Region

	Eagle	Garfield	Pitkin	3-County Total
Travel Spending ($M)	897.8	144.2	619.0	1,661.0
Earnings ($M)	216.4	40.9	239.1	496.4
Employment (Jobs)	6,870	1,580	4,660	13,110
Local Taxes ($M)	34.7	6.1	26.4	67.2

Source: Dean Runyan Associates, 2014. *Colorado Travel Impacts: 1996-2013*. Colorado Tourism Office. www.deanrunyan.com/doc_library/COImp.pdf.

DATA

To evaluate the regional economic impact of anglers fishing the Lower Fryingpan River and Ruedi Reservoir, we developed and conducted two visitor surveys. These surveys gathered a variety of data, including basic demographic information, angler expenditures, frequency of angling trips, and opinions about stream flow. These surveys were supplemented with stream flow/reservoir level and visitor count data.

VISITOR SURVEY DATA

Two visitor surveys were developed, one for visitors to the Lower Fryingpan River and one for visitors to Ruedi Reservoir. These surveys asked questions about the use of the recreational sites as well as seeking general information on what was important to visitors. They also gathered expenditure information by various categories, which was used in performing an economic impact analysis.

Starting March 21st 2014, anglers on the Lower Fryingpan were surveyed an average of two days per week through April 2014, surveyed four to five days a week through July 2014, and surveyed one to two days a week in August of 2014. All surveys were conducted by two interviewers trained in car count and survey methods by Colorado State University researchers. A total of 76 survey days were spent on location. These days were strategically spread out to give a good sampling of each day of the week, as well as different times of day. Each interviewer would drive along the river and stop to conduct interviews with one member from each group of anglers that they encountered along the river. They would also record the number of cars as they drove along the river. Starting on May 26th, the interviewers also began interviewing respondents on Ruedi Reservoir. Interviews were conducted through July 12th, with the interviewers spending a total of ten days on the reservoir. The interviewers intercepted respondents at the main boat ramp on Ruedi and the campground.

In addition to recording total expenditures in Eagle, Garfield and Pitkin counties, respondents were asked to list the percentage of their expenditures made in Pitkin County and downtown Basalt to better understand specific economic impacts to each area. In addition, the Lower Fryingpan River visitor survey included questions exploring how changes in river flows (one question related to summer flows and one

question related to winter flows) would affect the number of recreational trips the respondent would take. Copies of the surveys are provided in **Appendices A** and **B**.

Surveys were collected with online survey software Qualtrics, and conducted on iPads. The on-site survey approach was adopted because response rates for such surveys tend to be very good; respondents are able to ask clarification questions, and Qualtrics automatically enters the data, avoiding human error that can occur when manually entering responses. For the Lower Fryingpan River, 369 surveys were collected and 159 surveys were collected for Ruedi Reservoir.

VISITOR COUNTS DATA

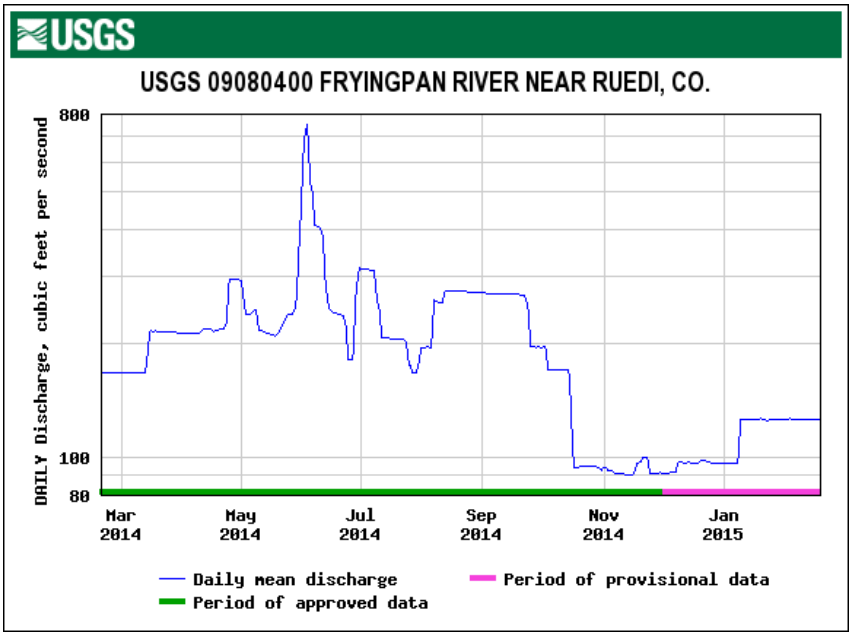
In order to aggregate the sample (survey) population to the entire population of visitors to the Lower Fryingpan River and Ruedi Reservoir, we conducted car counts on the Lower Fryingpan River and utilized visitor use data from the U.S. Forest Service for Ruedi Reservoir. Surveyors counted cars each time they drove up the Frying Pan Road. All vehicles along the road, including both parking lots and road pull-offs, were recorded. Visiting the river at different times of day helped clarify both turnover rates on the river and the number of total cars on the road per day. The U.S. Forest Service collects data on the number of cars that enter the Ruedi Reservoir parking lot each day that the reservoir is open and shared this data with us for our economic impact analysis.

STREAMFLOW DATA

River flow releases from Ruedi Reservoir can influence both the productivity of the river for trout and the fishability of the river during the summer for anglers. The flows out of Ruedi Reservoir are controlled by the U.S. BOR to meet the project's purposes, including a variety of downstream needs. The BOR has some latitude in determining how much water to release and when to release water from Ruedi Reservoir into the Lower Fryingpan River. Part of the purpose of this study is to provide feedback to the BOR on the economic consequences of different flow release patterns on angler use of the river. Different levels of angler use translate into different levels of angler spending in the area, and hence income and employment generated by fishing. Flows that are too high can "push" wading anglers off the river, as it becomes unsafe or extremely difficult to wade in the river - which is the preferred fly fishing method on the Lower Fryingpan. The streamflow data presented below in **Figure 2** is for the U.S. Geological Survey Fryingpan River stream flow gauge near Ruedi Reservoir. The 2014 water year represents preferred flows for optimal river health and fishery management. Winter flows remained above the recommended flow of 70 cfs (Miller Ecological Consultants, 2006). Spring flushing flows lasted over a week, and late summer flows were optimal for angling and maintained cold temperatures.

Ruedi Reservoir has a maximum storage capacity of 102,000 acre-feet. The U.S. Department of the Interior reports daily values of the reservoir storage content of Ruedi Reservoir (station RUERESCO). Reservoir storage content is reported in **Figure 3**.

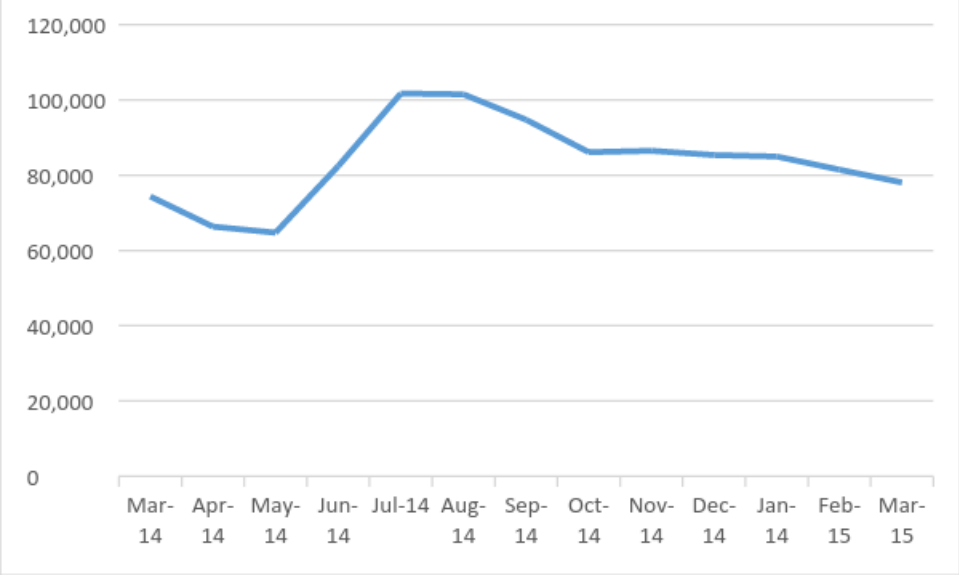
Figure 2: Daily Streamflow for the Lower Fryingpan River in Cubic Feet per Second (cfs)



Source: U.S. Geological Survey. http://waterdata.usgs.gov/nwis/dv/?site_no=09080400&agency_cd=USGS&referred_module=sw.

* Note that due to scaling the axis labels are through January but the streamflows represented are through March.

Figure 3: Ruedi Reservoir Storage Content (Acre-Feet)



Source: U.S. Bureau of Reclamation. http://www.usbr.gov/gp-bin/arc050_form.pl?RUERESCO

METHODOLOGY

Using the angler expenditure data collected from our surveys, we were able to model the regional, annual economic impacts of recreational fishing on the Lower Fryingpan River and Ruedi Reservoir. The analysis followed a standard approach, as outlined in "*Approaches to Estimating the Economic Impacts of Tourism; Some Examples*" (Stynes, 1999). Because local economic development depends on bringing outside money into the economy – and preventing local money from leaking out – we distinguished between spending by local visitors and visitors from outside our defined region. We then used the information on non-local visitor spending in a model to generate annual estimates of employment, labor income, value added and output supported by recreational fishing. (For definitions of employment, labor income, value added and output please see the Survey Results section or Glossary below.)

While this conceptual approach is simple, the study was fairly involved. This is due to the fact that there are no available estimates of total annual angler spending (or even the number of anglers) on the Lower Fryingpan River and Ruedi Reservoir. We used our two surveys to estimate the total annual angler spending as well as the total number of anglers. The survey enabled us to determine how much a "typical" visitor spends per day in the region due to their recreational fishing activities. We combined this spending profile with an annual visitor count (determined by car counts and U.S. Forest Service data) to generate estimates of total spending, by category. This information was entered into our model to create economic impact information for the region.

ECONOMIC IMPACT ASSESSMENT METHODOLOGY

Economic impact assessment is commonly used to determine the effects of an activity (in this case - recreational fishing) on the broader economy (in this case - our study region of Pitkin, Eagle and Garfield counties). Typically, any recreation-related industry's economic impact on a local economy originates from participants spending money in the region. Generally we report this effect in terms of 'output' (total sales), employment, and 'value added' (net revenues, the difference between what someone sells a good for and what one pays for all of the components used in producing the good. For reference, this is the same measure as Gross Domestic Product).

The economic impact of recreational fishing in the region is not limited to just fishing activities (the 'direct effect'). Direct expenditures affect related sectors of the economy, such as input suppliers (e.g., accountants for fly shops) and employee spending in other industries (e.g., a fly shop employees' restaurant purchases). To account for the full economic impact of recreational fishing we must analyze these two separate effects.

The direct effects of recreational fishing are the economic effects created by angling-related expenditures. For the most part, these are purchases at related businesses, such as expenditures for lodging, food, transportation, gear and bait. However, the total economic impact of recreational fishing is larger than just this direct spending; there are spin-off effects from that spending. These spin-off effects arise from additional economic activity generated by direct angler spending (commonly referred to as the 'economic multiplier' effect), which measures how the value of a dollar of initial sales may be

multiplied throughout the economy. We calculated the total economic impact to be the combination of the following direct and spillover effects:

- ***Direct effects***: These effects are a result of actual recreational fishing expenditures which were estimated using the survey data. For example, a purchase of $20 for flies would be a $20 direct effect of recreational fishing.
- ***Indirect effects***: These effects arise due to linkages in the supply chain, such as local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain. For example, the store from which an angler buys flies will use part of that money elsewhere in the economy, such as for buying more inventory, paying rent or hiring an accountant.
- ***Induced effects***: These effects are a result of employee household spending. For example, when an angler buys flies, some small portion of that dollar amount goes toward paying the wages of the sales attendant, who then re-circulates those wages in the form of household purchases of things such as clothing or groceries.

Because of the spin-off effects (indirect and induced effects), we see that an initial dollar of purchases by an angler at one fishery-related business can generate more than a dollar of total activity in the regional economy as it ripples through the other businesses and households buying goods and services. The multiplier process continues with each additional round of income/spending, but typically becomes smaller as money "leaks" out of the region to purchase goods and services from outside the region.

The most common approach to estimating the economic impacts of recreation-related activities is the use of the IMPLAN software model to examine how much economic activity is generated by visitor activity, in our case, anglers. The IMPLAN software (www.implan.com), originally developed by the U.S. Forest Service, establishes the characteristics of economic activity in terms of 528 economic sectors. Drawing on data collected by federal and state government agencies, the IMPLAN model uses regional industry purchasing patterns to examine how changes in one industry will affect others. The IMPLAN model has been used as the basis for thousands of economic analyses throughout the United States. The most recent version of IMPLAN data (2013) was used to determine the economic impacts of recreational fishing. For more details on the IMPLAN model and the analysis please reference **Appendix D**.

The modelling approach consists of a two-step process. First, the total unique angler local expenditures are estimated, by expenditure category. These expenditures are then applied to the IMPLAN model in order to estimate the total economic activity generated, including multiplier effects.

The first step, approximating total expenditures by category, was accomplished using information generated from our surveys. Based on the responses to our surveys we considered spending in the following categories related directly to the recreational fishing trip:

Fishing on the Lower Fryingpan River:

- Fishing tackle and other fishing gear
- Equipment rental
- Guide fees
- Fishing license (specifically for this trip)
- Food and drink from grocery stores
- Food and drink from restaurants
- Other (non-fishing related) retail
- Gasoline
- Rental car
- Camping
- Hotel/Motel

Fishing on Ruedi Reservoir:

- Equipment/boat rental
- Boat repairs
- Fishing tackle and gear
- Fishing license (specifically for this trip)
- Food and drink from grocery stores
- Food and drink from restaurants
- Other (non-fishing related) retail
- Gasoline
- Rental car
- Camping
- Hotel/Motel

Once expenditures by category were determined, we used the IMPLAN input-output model to examine the economy-wide effects of these total expenditures. This involved matching the expenditure data with the IMPLAN industry sectors, and entering the appropriate expenditure amounts into the model. In doing so, we were able to estimate both the direct and indirect economic effects to the region.

Note that not all recreation-related spending calculated from survey responses accrues to the region as final demand. The reason for this is related to the nature of the retail purchase of goods. For goods that are manufactured outside the region, only the retail margin appears in the final demand calculated for the region. The cost (the producer's price) to the retailer or wholesaler of the good itself leaks immediately out of the region's economy, and cannot be considered a local impact. Recognizing this fact, we applied IMPLAN's default household margins for all retail sectors.

Expenditure Calculation/Aggregation from Survey Data

The economic impact analysis began with estimates of total expenditures by anglers collected in our two surveys. We used this expenditure data to create a spending profile for several categories of anglers

(based on the respondent's reported home zip code): the local, the in-state nonlocal and the out-of-state nonlocal. Distinguishing between locals and non-locals allowed us to only examine new dollars brought to the region due to recreational fishing on the Lower Fryingpan River and Ruedi Reservoir. The income and spending of anglers that reside locally is already present in the local economy. If fishing on the Fryingpan River and Ruedi Reservoir was not available, the assumption is that local anglers would choose instead to spend their money on other local activities, such as fishing on another river in the study area (e.g., the Crystal River), or engaging in some other local activity (e.g., hiking, golfing, or rafting). In this case, the economic impacts generated by fishing on the Fryingpan River or Ruedi Reservoir are simply substituting for other local economic activity. To measure the true economic impact of fishing on the Fryingpan River or Ruedi Reservoir on the local/regional economy we must consider only economic activity in the region relating to recreational fishing on the Fryingpan or Ruedi Reservoir that would not have occurred otherwise. In order to only capture spending unique to recreational fishing, we only included expenditures of non-locals (both in the State of Colorado—but outside of Pitkin, Eagle and Garfield counties, and out-of-state non-locals).[1] This is not to say that local anglers do not benefit from fishing in the Fryingpan River or Ruedi Reservoir, only that an economic impact analysis is not designed to measure the benefits to the anglers themselves. (See *Loomis and Walsh, 1997* for more discussion of economic impacts versus economic benefits to visitors).

Using reported expenditures of non-local anglers, we calculated the average per person, per day expenditures by category. We then used car count, average party size and U.S. Forest Service data to estimate the total number of visitors. Recreational activities are likely to be different based on the month of recreation; for example, early months in the season tend to have a larger proportion of local recreationalists, so we categorized respondents by the month they were surveyed. We performed unique calculations for each month before aggregating up to total expenditures for the Lower Fryingpan River. Due to limited data, we were not able to break out monthly Ruedi Reservoir expenditures, and instead were only able to estimate total annual expenditures for fishing-related activities on Ruedi Reservoir. Further, we only surveyed from March to August 2014 on the Lower Fryingpan, leaving us with no survey data for September, October, November, December, January and February. To estimate expenditures in these months, we used a question on the survey that asked "during which months do you fish on the Lower Fryingpan River in a typical year?" This question allowed us to estimate the number of visitors in the months that we did not survey relative to the months that we did survey. Summary results for this question are reported in **Figure 5** in the Survey Results section below.

SURVEY RESULTS

This section sets the stage for the results of the economic analysis by highlighting some general results from the surveys. In addition to the expenditure data needed for the impact analysis, questions about demographics and trip information were asked. The following sections summarize the results from these

1 For example, during a Federal government shutdown, U.S. Forest Service recreation facilities at Ruedi Reservoir might be closed down and unavailable to the public for boat launching, etc. The spending that would have taken place at Ruedi Reservoir by locals living in the three-county study area would probably occur in connection with recreation somewhere else in the three-county area.

questions. Because the profiles of recreationalists on the Lower Fryingpan River and Ruedi Reservoir are very different, the two survey results are reported separately.

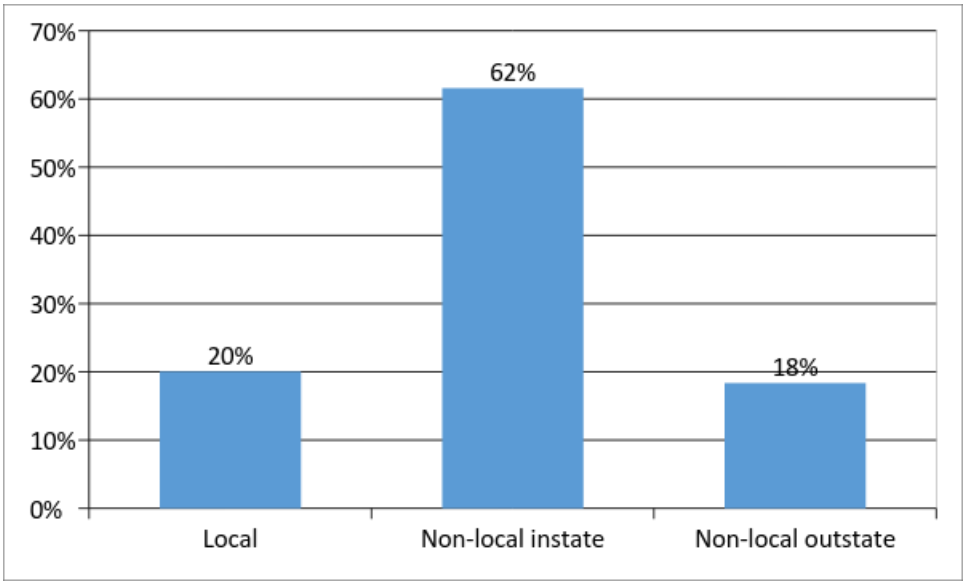
LOWER FRYINGPAN RIVER SURVEY

DEMOGRAPHICS

The majority of anglers on the Lower Fryingpan River were male (92%). The predominance of male anglers is unsurprising, as a 2011 National Trout Fishing Survey conducted by the U.S. Fish and Wildlife Service found that 76% of freshwater anglers who fished for trout were male (U.S. Fish and Wildlife Service, 2011). The average age of the survey respondents was 48, with ages ranging from 17 to 83 years. The average household size of respondents was 2.5 people, while the average size of the group they were travelling with was 3.1. We also asked survey respondents to report their employment status: 66% were employed full time, 11% part time, 3% unemployed, 17% retired and 3% reported "other" (the majority of "other" responses were students; self-employment was also an acceptable "other" response). Survey respondents tended to self-identify as expert (49%) or intermediate (40%) skill level as anglers; only 9% stated that they were beginners, while 1% reported that it was their first time fishing.

Figure 4 displays the area of origin of the respondents. Area of origin was determined using an individual's self-reported home zip code. Local respondents had a zip code within the region (Pitkin, Eagle or Garfield counties), non-local, in-state visitors had a Colorado zip code that was not in the region and non-local, out-of-state visitors had a non-Colorado zip code.

Figure 4: Area of Origin of Lower Fryingpan River Survey Respondents

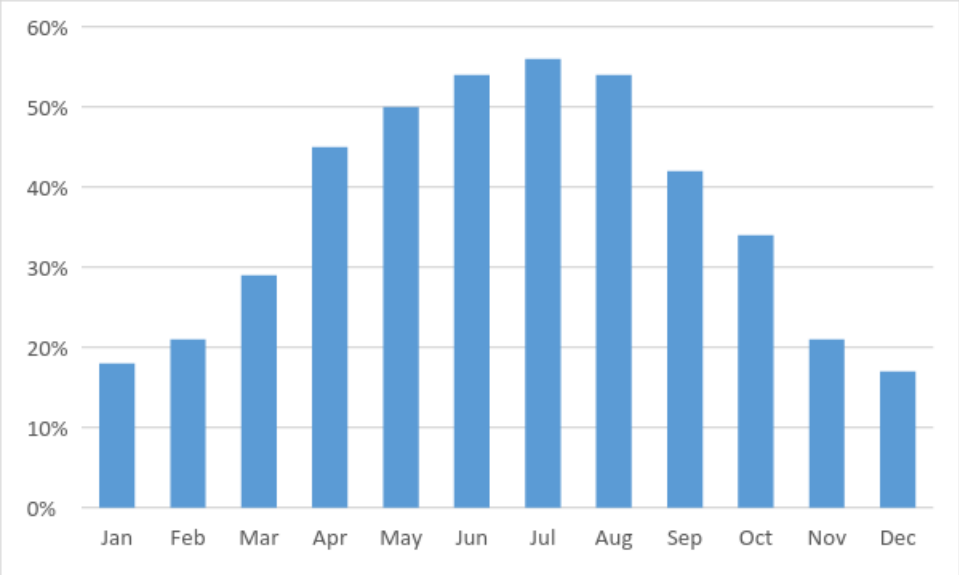


TRIP INFORMATION

The average length of trip for survey respondents was 4.3 days. The average number of trips respondents took to the river was 10.7 trips per year. The median number of annual reported trips was 2 per year, with local visitors often taking much longer trips. 96% of survey respondents stated that the

primary activity they participated in during their trip on the Fryingpan was fishing (other answers included: sightseeing, hiking, Trout Unlimited meeting, biking, golfing, camping, and visiting family). When asked about their trip to the Fryingpan, 61% of respondents stated that it was the sole or primary reason for their trip, 32% stated that it was one of many equally important reasons and only 7% stated that it was an incidental stop on a trip for other purposes. 77% of the Fryingpan survey respondents stated that they did NOT recreate on Ruedi Reservoir. 11% of the survey respondents reported taking an airplane on this trip, 98% reported driving to the Fryingpan (they sum to greater than 100% because some respondents selected taking both a car and an airplane). **Figure 5** illustrates the months which respondents stated they engaged in fishing on the Lower Fryingpan River in a typical year (respondents selected all months that applied so percentages add up to greater than 100%).

Figure 5: Months Survey Respondents Stated They Engaged in Fishing on the Lower Fryingpan River in a Typical Year



We asked survey respondents to identify how important a list of items were to their choice to visit the Lower Fryingpan River. Available responses were: not important (given a value of 1), somewhat important (given a value of 2), important (given a value of 3) and very important (given a value of 4). Therefore, the higher the mean score the more important the characteristic was to respondents, on average. The characteristics are listed below in descending order of importance with the survey mean in parenthesis:

- Insect hatches (3.14)
- Wadeable flows on the river (3.13)
- Stream clarity (3.12)
- River crowding (3.05)
- Gold Medal designation (2.97)
- Number of fish caught (2.69)

- Size of fish caught (2.60)
- Parking availability (2.43)
- Weather (2.18)
- Being close to where I live (2.03)

The majority of respondents reported that they were targeting rainbow trout (73%), cutthroat trout (50%) and brown trout (68%). Another 26% of the respondents stated that they were targeting 'other,' which they described as whatever they could catch, or that they were not targeting a particular species (percentages sum to greater than 100% because respondents were instructed to select all that applied).

WATER LEVELS

Both high- and low-water levels in the river can impact anglers. To gain a better understanding of how survey respondents felt about the level of the river we asked them to state their opinion of the water level during their current fishing trip. 74% said that the level was just right, while 20% said it was too high and 4% said it was too low. We also asked two questions regarding how water level management would affect their annual fishing trips to the Lower Fryingpan River, as described in the following sections.

WINTER WATER LEVELS

One survey question focused on how low flows during the winter months impact the quality of fishing throughout the season. The question was as follows:

"*Fishing on the Lower Fryingpan River occurs year round, but flows during the winter months impact the quality of fishing throughout the season. Currently the minimum flows in the winter are about 40 cubic feet per second (cfs). At 40 cfs anchor ice is more common. Anchor ice in the winter can adversely affect fishing quality in the summer. When winter flows are 70 cfs anchor ice is less common, contributing to improved fishing quality in the following summer. If water managers maintained winter flows to at least 70 cfs throughout the winter (making anchor ice less common), how would it affect your annual fishing trips to the Lower Fryingpan River?"*

Survey respondents could state that enhanced winter flows would increase, decrease, or not change the number of fishing trips they took to the Lower Fryingpan River. 48% of respondents stated that they would increase their fishing trips, 51% said they would not change their fishing trips, and only 1% said they would decrease their fishing trips. If the respondent stated that they would increase their trips, they were given a follow up question asking how many more trips to the Lower Fryingpan River they would take in a typical year. For those who stated that they would increase their number of trips, the average increase in number of days was 4.6, with a range of 1 to 50 days and a median of 2 days. For non-locals (the only individuals used for economic impact calculations), 46% stated that they would increase their fishing trips and the average increase in trips was 3.1 trips.

SUMMER WATER LEVELS

Another survey question focused on high river flows. The question was as follows:

"Flows above 250 cubic feet per second (cfs) result in currents that make it difficult to wade into the river to fish and most anglers find it safer to fish from the banks. Currently on average 77 days a year the

Lower Fryingpan River flows are above 250 cfs. If the number of days on average each year that the river was non-wadeable decreased from 77 to 29 days (a gain of 48 wadeable days), how would it affect your annual fishing trips to the Lower Fryingpan River?"

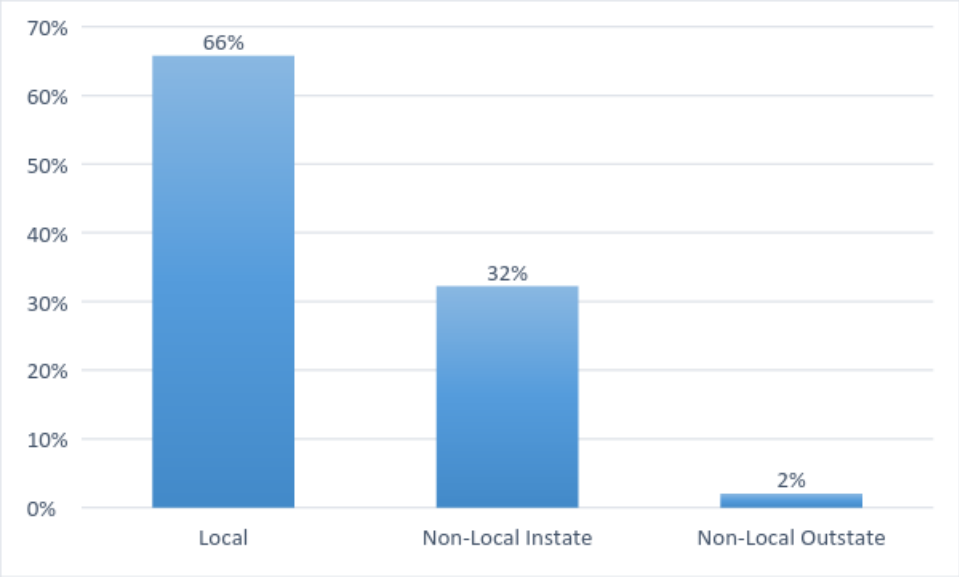
Survey respondents could state that an increase in wadeable days would increase, decrease, or not change the number of fishing trips they took to the Lower Fryingpan River. 37% said they would increase their trips, 60% indicated they would not change their number of trips and 3% said they would decrease their trips. If the respondent stated that they would increase their trips they were given a follow up question asking how many more trips to the Lower Fryingpan River they would take in a typical year. For those who stated that they would increase their number of trips the average increase in number of days was 4.0 with a range of 1 to 30 days and a median of 2 days. For non-locals (the only individuals used for economic impact calculations), 37% stated they would increase their trips and this was by an average of 2.9 trips.

RUEDI RESERVOIR SURVEY

DEMOGRAPHICS

A separate survey was conducted on Ruedi Reservoir. Angler gender on Ruedi was more balanced than on the Lower Fryingpan River, but still predominantly male, at 73%. The average age of respondents was 46, with a range from 22 to 83. The average household size of survey respondents was 2.8, while the average size of the group they were traveling with was 5.2. 79% of the respondents reported being employed full time, 6% employed part time, 1% unemployed, 9% retired and 5% reported "other" (the majority of "other" responses were self-employed, student was also an acceptable response under "other"). **Figure 6** displays the area of origin of the Ruedi respondents. Area of origin was determined by using the individual's self-reported zip code. Local respondents had a zip code within the region (Pitkin, Eagle or Garfield counties), non-local, in-state visitors had a Colorado zip code that was not in the region and non-local, out-of-state visitors had a non-Colorado zip code.

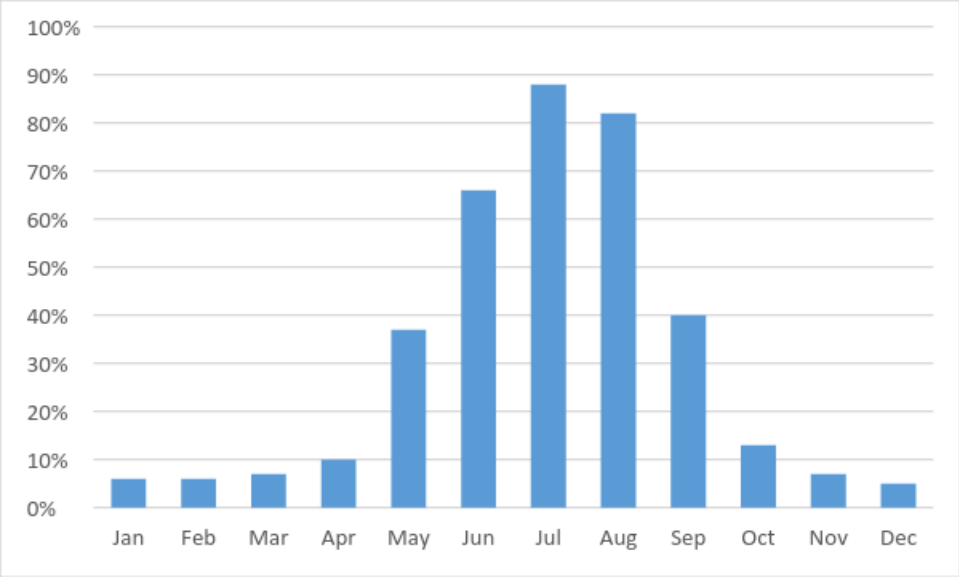
Figure 6: Area of Origin of Ruedi Reservoir Survey Respondents



TRIP INFORMATION

While the vast majority of individuals on the Lower Fryingpan were fishing, the activities of those surveyed at Ruedi were much more diverse. Individuals surveyed at the Ruedi marina reported the following activities: motorized boating (57%), non-motorized boating (23%), water sports - such as water and jet skiing (22%), fishing from shore (24%), fishing from a boat (22%), picnicking (28%), swimming (26%), and camping (50%). In our economic analysis we focused only on individuals that were involved in fishing from shore or a boat. 89% of respondents reported that Ruedi Reservoir was the primary destination of their current trip, 10% said it was one of many equally important reasons for their trip, and only 1% said it was an incidental stop. Only 1% of those surveyed took a plane as their primary method of travel to the reservoir; all others reported taking a car, truck or RV. During a typical year the majority of those surveyed only visited the reservoir between the months of May and September (**Figure 7** provides details by month). When asked if they also recreated on the Lower Fryingpan River, 26% stated that they did.

Figure 7: Months Survey Respondents Stated They Visit Ruedi Reservoir in a Typical Year.



We asked survey respondents to identify how important a list of items was to their choice to visit Ruedi Reservoir. Responses were: not important (given a value of 1), somewhat important (given a value of 2), important (given a value of 3) and very important (given a value of 4). Therefore, the higher the mean score the more important the characteristic. The characteristics are listed below in descending order of importance with the survey mean in parenthesis:

- Reservoir water levels (3.03)
- Weather (3.03)
- Being close to where I live (2.95)
- Main marina boat ramp open (2.73)
- Number of fish caught (1.63)
- Size of fish caught (1.54)

ECONOMIC IMPACT RESULTS

Visitor surveys asked detailed questions on angler spending patterns in the region. This expenditure data was used to estimate new economic activity that could be attributed to fishing on the Lower Fryingpan River and Ruedi Reservoir. Only dollars brought into the economy from visitors that live outside the region are considered new economic activity; thus, our economic impact analysis only included expenditures from non-local fishing tourists (non-local, in-state and non-local, out-of-state) to the Lower Fryingpan River and Ruedi Reservoir. Total direct spending in the region was calculated by multiplying the average per person daily expenditures by the estimated tourist visitation. For the Lower

Fryingpan River this was done separately for each month and then aggregated up to annual expenditures. For Ruedi Reservoir this was done only at the annual level.

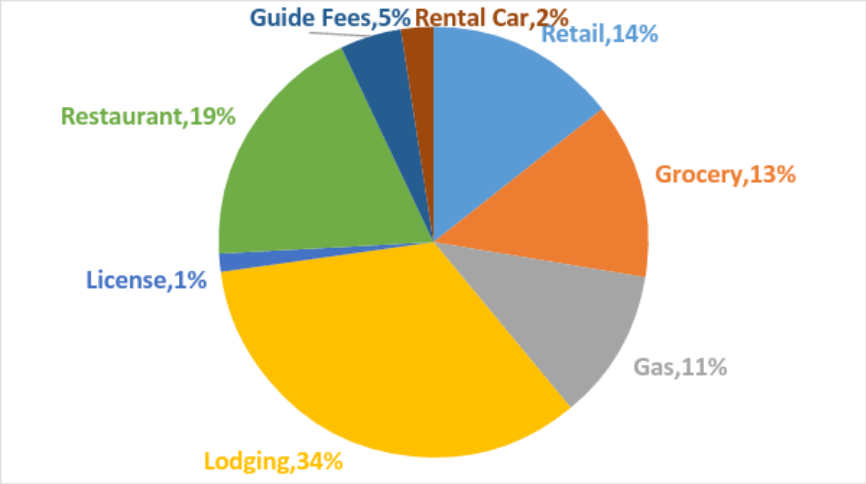
Lower Fryingpan River Results

We calculated the average expenditures per person, per day for each month and then multiplied that number by our estimated total number of visitors per month. **Table 2** below outlines each month's average per person, per day expenditure, as well as total monthly expenditures. The table shows that the annual average per person, per day expenditure is $100.88, with higher values in the summer months of June, July and August. Total angling expenditures for the year on the Lower Fryingpan River were $3.3 million, with almost half of the expenditures coming in the three summer months of June, July and August. To give a better idea of the makeup of this $3.3 million in expenditures, **Figure 8** shows, on average, what categories the expenditures fell into: 34% of all expenditures were on lodging, followed by 19% of expenditures on restaurants.

Table 2: Lower Fryingpan River - Average Per Person, Per Day Expenditures and Total Expenditures by Month

Month	Average Per Person, Per Day Expenditure	Total Expenditures
Jan	Used March Average	$ 102,788
Feb	Used March Average	$ 102,861
Mar	$ 77.15	$ 257,079
Apr	$ 99.30	$ 235,043
May	$ 84.64	$ 222,761
Jun	$ 110.25	$ 410,106
Jul	$ 145.56	$ 739,291
Aug	$ 106.70	$ 506,375
Sep	Used August Average	$ 371,291
Oct	Used March Average	$ 179,933
Nov	Used March Average	$ 102,861
Dec	Used March Average	$ 102,788
Annual	$ 100.88	$ 3,333,176

Figure 8: Annual Expenditure Breakdown for the Lower Fryingpan River



The expenditure information from the survey provides valuable information on the magnitude and composition of gross spending generated by recreational fishing activities on the Lower Fryingpan River. However, 1) not all of these expenditures stay within the community, and 2) there are additional spillover impacts (indirect and induced effects, as described above) from this spending. The total annual expenditures reported in **Table 2** were broken down into IMPLAN sectors and the IMPLAN software was used to incorporate this into our economic impact analysis of recreational fishing on the Lower Fryingpan River. Direct, indirect and induced impacts generated from the economic impact analysis are found in **Table 3**. **Table 3** reports the three effects for the following variables:

- Employment (Jobs) – The total number of wage and salaried employee and self-employed jobs in a region. The figure includes both full-time and part-time workers.
- Labor Income – All forms of employment income, including wages, benefits and proprietor income.
- Value Added – The difference between total output and the cost of intermediate inputs.
- Output – The sales revenue or value of industry production.

Notice that direct output is $2,420,179, which is less than the total expenditures calculated from the survey. This difference is due to "margining," an important (and misunderstood) economic impact modeling concept that reflects the fact that not all initial expenditures stay in the region in some industries, such as retail. Instead, only a portion of the receipts stay local, with the rest leaking out to the region where the goods were produced. For example, think of the purchase of waders at a sporting goods store. If those waders were not produced in the region then some share of the money spent on the waders goes to the outside region that produced the waders. To correctly model this phenomenon, the retail margin only includes the amount of expenditures that stay in the region.

Once the direct, indirect and induced effects are combined, the total economic impact to the region (Garfield, Eagle and Pitkin counties) of recreational fishing on the Lower Fryingpan River is $3.8 million. Recreational fishing on the Lower Fryingpan River also contributes 38.3 jobs to the region and almost 2.4 million in value added.

Table 3: Annual Direct, Indirect and Induced Economic Impacts from Non-Local Recreational Fishing Expenditures in the Study Area

	Employment	Labor Income	Value Added	Output
Direct Effect	27.7	$ 1,152,169	$ 1,555,493	$ 2,420,179
Indirect Effect	4.6	$ 191,478	$ 345,806	$ 610,293
Induced Effect	6.0	$ 264,279	$ 465,452	$ 768,771
Total Effect	38.3	$ 1,607,925	$ 2,366,751	$ 3,799,242

We also wanted to understand the distribution of expenditures within the immediate region. Specifically, respondents were asked to report what percentages of their expenditures were made in Pitkin County and downtown Basalt. The response rate to these two questions was lower than for other questions, so results need to be considered cautiously. 71% of those surveyed reported the proportion of their expenditures that were made in Pitkin County and 35% reported the proportion of their expenditures that were made in downtown Basalt (note that these percentages represent the response rate to the question, not the percent of individuals who had expenditures in the given area; many people responded that they spent $0 in the given area). Using this survey information we were able to get an estimate of what proportion of the $3.8 million dollars in economic impact is attributable to Pitkin County and what proportion occurs in downtown Basalt.

Based on the survey results we found that, on average, 21% of the expenditures occur in Pitkin County, corresponding to $813,887 in economic impact, 8 jobs, and $497,017 in value added in Pitkin County due to recreational fishing expenditures of anglers on the Lower Fryingpan River. The survey results also indicated that, on average, 44% of expenditures associated with recreational fishing on the Lower Fryingpan occur in downtown Basalt, corresponding to $1,692,454 in economic impact, 17 jobs and $1,041,370 in value added in downtown Basalt.

ECONOMIC IMPACTS OF FLOW CHANGES

The U.S. Bureau of Reclamation manages water flows in the Lower Fryingpan River through releases from Ruedi Reservoir. In order to get an idea of the recreational impact of policy decisions designed to manage river streamflows, we asked survey respondents how different management decisions would change the number of fishing trips they would take in a season to the Lower Fryingpan River. One of these questions looked at managing streamflow in the winter months and the other addressed streamflow in the summer months. (For the actual language of the questions, see the Winter and Summer Water Levels sections above).

46% of non-local anglers stated that they would take more trips to the Lower Fryingpan with managed winter flows (no non-locals reported that they would take fewer trips). Of the 46% of respondents that stated they would take more trips, the average number of increased trips was 3.1. Increased trips by non-locals to the region translates into economic activity in the region that would not occur otherwise. Using our survey information on the percent of non-locals who would take more trips and the increase in the number of trips they would take, we were able to estimate the economic impact of policies designed to manage winter flows on the Lower Fryingpan River to create optimal conditions for anglers.

The additional economic impact to the regional economy of a policy managing winter flows for angler recreation is estimated to be $1.5 million dollars in additional output, 15 jobs and $944,401 in value added.

Table 4: Potential Annual Direct, Indirect and Induced Economic Impacts from Increased Trips Due to Increased Winter River Flow Management

	Employment	Labor Income	Value Added	Output
Direct Effect	11.1	$ 459,947	$ 620,985	$ 967, 609
Indirect Effect	1.8	$ 76,192	$ 137,692	$ 243,709
Induced Effect	2.3	$ 105,452	$ 185,724	$ 307,376
Total Effect	15.2	$ 641,592	$ 944,401	$ 1,518,694

37% of non-local anglers stated that they would take more trips to the Lower Fryingpan River with managed summer flows (1% of non-local residents indicated that they would take fewer trips). Of the 37% of respondents that stated that they would take more trips, the average number of increased trips was 2.9. The estimated additional economic impact from spending in the region from the increased trips is displayed in **Table 5** below. The economic impact is estimated at $1.1 million dollars, 11 jobs and $708,300 in value added.

Table 5: Potential Annual Direct, Indirect and Induced Economic Impacts from Increased Trips Due to More Wadeable Summer Flow Management

	Employment	Labor Income	Value Added	Output
Direct Effect	8.3	$ 344,960	$ 465,739	$ 725,706
Indirect Effect	2.4	$ 57,144	$ 103,269	$ 182,782
Induced Effect	1.8	$ 79,089	$ 139,293	$ 230,532
Total Effect	11.4	$ 481,194	$ 708,300	$ 1,139,020

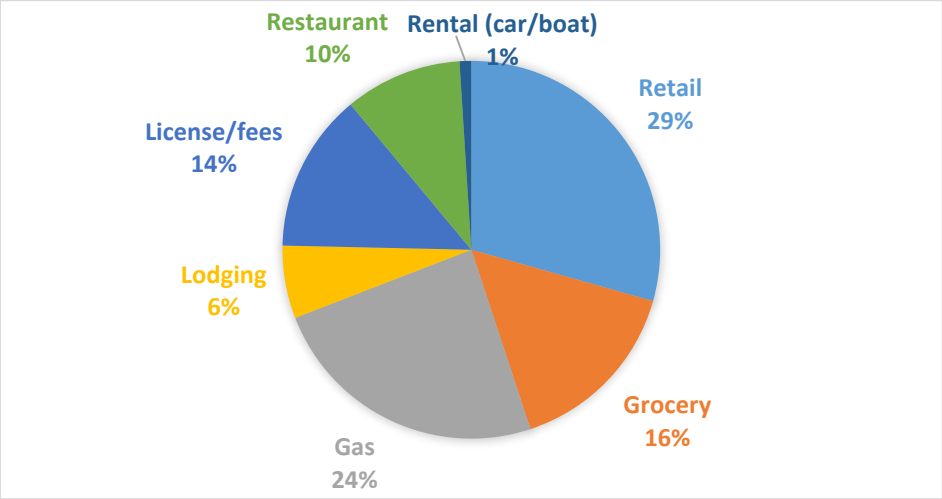
The added economic output from increased trips due to increased winter river flow management translates to a 40% increase in the regional economic impacts from angler recreation on the Lower Fryingpan River, while the added output from increased trips due to wadeable summer flows management translates to a 30% increase.

Ruedi Reservoir Results

Just as with the Lower Fryingpan River, Ruedi Reservoir were calculated the average expenditures per person, per day and then multiplied that number by our estimated total number of visitors. Unlike the Lower Fryingpan River survey, however, there was not enough data to calculate average expenditures by month; instead, only annual average expenditures were calculated for Ruedi Reservoir. Average per person, per day expenditures in our survey for non-local recreational anglers on Ruedi Reservoir was $18.41, and total expenditures were $144,237. To give a better idea of the makeup of this $144,237 in expenditures **Figure 9** shows, on average, what categories the expenditures fell into: 29% of all

expenditures were in retail, which includes expenditures on tackle and other retail. This is closely followed by expenditures on gas, which accounts for 24% of expenditures.

Figure 9: Annual Expenditure Breakdown for Ruedi Reservoir



The expenditure information from the survey provides valuable insight on the magnitude and composition of gross spending generated by recreational fishing activities on Ruedi Reservoir. Just as with the Lower Fryingpan River, expenditures on Ruedi Reservoir have spillover effects. The IMPLAN software model incorporated these spillover effects, as well as to margin the retail expenditures. Results of the economic impact analysis for Ruedi Reservoir are shown in **Table 6** (refer to the Lower Fryingpan River Results section above for definitions of table variables).

Notice that direct output is $87,429, which is less than the total expenditures calculated from the survey. This difference is once again due to margining. Once the direct, indirect and induced effects are combined, the total economic impact to the region (Garfield, Eagle and Pitkin counties) of recreational fishing on Ruedi Reservoir is $145,326. Recreational fishing on Ruedi Reservoir also contributes 1.2 jobs to the region and $91,009 in value added. The relatively small numbers for economic impacts are due to the fact that the majority of Ruedi Reservoir users are local, living in the study area, as well as the smaller expenditures per day, as compared to anglers on the Lower Fryingpan River.

Table 6: Annual Direct, Indirect and Induced Economic Impacts of Non-Local Recreational Fishing Expenditures in the Study Area

	Employment	Labor Income	Value Added	Output
Direct Effect	0.8	$ 49,309	$ 57,622	$ 87,429
Indirect Effect	0.2	$ 7,955	$ 13,591	$ 25,183
Induced Effect	0.3	$ 11,253	$ 19,797	$ 32,714
Total Effect	1.2	$ 68,518	$ 91,009	$ 145,326

The Ruedi Reservoir survey also asked respondents to state the proportion of their expenditures that were made in Pitkin County and downtown Basalt. Due to the smaller sample size, as well as a low response rate to this question, expenditures are not broken out by sub-regions.

A Note on Local Visitors

While only the expenditures of non-local visitors are included in the economic impact calculations, local visitors also spend money in the economy and benefit from the river and the reservoir. (For a discussion on why local expenditures are not included in the economic impact calculations, please see the **Expenditure Calculation/Aggregation from Survey Data** section above.) . On the Lower Fryingpan River our survey indicated that 20% of visitor days were by locals, and on Ruedi Reservoir the survey indicated that 66% of visitor days were by locals. Survey data shows an additional $649,296 is spent annually in the region by local anglers on the Lower Fryingpan River. Local anglers on Ruedi Reservoir spend an additional $872,655 in the region on an annual basis.

CONCLUSIONS AND DISCUSSION

The implementation of two surveys allowed not only the calculation of economic impacts of fishing on the Lower Fryingpan River and Ruedi Reservoir, but also the ability to uncover important demographic and preference characteristics of recreational anglers at the two areas. **Table 7** shows some of the key results. The economic impact of fishing on the Lower Fryingpan River ($3.8 million dollars annually) was over 22 times greater than the economic impact of fishing on Ruedi Reservoir ($145,326 annually). The combined impact of recreational fishing on both the Lower Fryingpan River and Ruedi Reservoir in our three-county study region (Pitkin, Garfield and Eagle counties) was just under $4 million dollars. Recreational fishing on the Lower Fryingpan supports 38.2 jobs and fishing on Ruedi Reservoir supports 1.2 jobs.

There are key differences between anglers on the Lower Fryingpan River and anglers on Ruedi Reservoir. First, as one would expect, a much greater proportion of visitors to the Lower Fryingpan fish than do visitors to Ruedi, 96% compared to only 41%. Those fishing on the Lower Fryingpan are more likely to be from outside the region than those on Ruedi, with only 20% of the survey respondents on the Lower Fryingpan listing home zip codes within the region, compared to 66% for Ruedi Reservoir. In addition, the average expenditures of non-locals surveyed on the Lower Fryingpan were much greater than those on Ruedi, $101.88 as compared to $18.41.

Table 7: Comparison of the Lower Fryingpan and Ruedi Reservoir Results

	Lower Fryingpan River	Ruedi Reservoir
Visitor Area of Origin		
Local	20%	66%
Non-Local, In-State	62%	32%
Non-Local, Out-of-State	18%	2%
Percent Participation in Fishing	96%	41%
Average Per Person, Per Day Expenditure (Non-Locals)	$100.88	$18.41
Output	$3,799,242	$145,326
Employment	38.2	1.2

Survey results indicated that stream flow levels in the Lower Fryingpan River impact the number of trips anglers take to the river. In the case of winter flows, these increased trips could translate into $1.5 million in output, 15 jobs and $944,401 in value added. For summer flows, the increased trips could translate into $1.1 million in output, 11 jobs and $706,300 in value added.

Colorado continues to face difficult decisions about water allocations, and more detailed research into this angler behavior could be helpful to policy makers. In addition, further analysis could be conducted on the detailed data collected in these surveys. Such an analysis for local anglers could provide a monetary indicator of the contribution of fishing on the Lower Fryingpan River to the quality of life of local residents. In addition, more detailed profiles of visitors could be created to assist in regional marketing efforts.

GLOSSARY

Direct Effect – These effects are a result of the actual activity expenditures.

Economic Activity –Dollars spent within a region that are attributable to a given industry, event, or policy.

Economic Impact – The net changes in new economic activity associated with an industry, event, or policy in an existing regional economy. It represents "new" money injected in the local economy from spending by visitors residing outside of the local economy.

Employment – The total number of wage and salaried employee and self-employed jobs in a region. It includes both full-time and part-time workers. The data sets used to derive Employment totals in the IMPLAN model are the ES-202 data, County Business Patterns, and the Regional Economic Information System (REIS) data.

Indirect Effect – These effects arise due to linkages in the supply chain, such as local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain.

Input –Output Models (Analysis) – A specific methodological framework that characterizes the financial linkages in a regional economy between industries, households, and institutions. Input-Output only measures economic activity and does not include any non-market values.

Induced Effect – These effects are a result of employee household spending.

Labor Income – All forms of employment income, including wages, benefits and proprietor income.

Multiplier – A key component of input-output analysis is the production of multipliers that indicate the extent of linked economic activity within a study region resulting from a change in production in a sector of the economy. An income multiplier of 1.75 means that for every dollar of direct income, a total of $1.75 of income is generated in the local economy.

Output – The sales revenue or value of industry production.

Retail Margin – Sales receipts less the cost of goods sold. It consists of the "mark-up" or retail trade margin plus sales taxes and excise taxes that are collected by the trade establishment.

Value Added - Net revenues - the difference between what someone sells a good for and what one pays for all of the components used in producing a good. This is the same measure as Gross Domestic Product.

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APPENDIX A: LOWER FRYINGPAN RIVER SURVEY

(Note that the survey was created for and administered by an online application Qualtrics, and so is not formatted for paper copy)

The Roaring Fork Conservancy, in conjunction with Colorado State University, is conducting this study to understand visitor use and spending related to the Lower Fryingpan River. This survey will only take 15 minutes and all of your answers will be anonymous. Please answer all questions to the best of your ability. If you need to go to a previous page please use the back button on the BOTTOM of the page, do NOT use the browser back button.

Section A: Please tell us about this trip to the Lower Fryingpan River where you are being interviewed

What was the PRIMARY activity you participated in during your trip on the Fryingpan? (check only one)

- ❍ Fishing
- ❍ Picnicking
- ❍ Sightseeing
- ❍ Wildlife viewing
- ❍ Hiking
- ❍ Photography
- ❍ Other _____

What species of fish were you targeting on this trip? (check all that apply)

- ❑ Rainbow trout
- ❑ Cutthroat trout
- ❑ Brown trout
- ❑ Other _____

What was the total amount of time spent on this trip away from home?

_____# of days

How much of this time did you spend fishing on the Lower Fryingpan River?

_____# of days (decimals ok)

Was your trip to the Lower Fryingpan River? (Check only one)

- ❍ The primary purpose or sole destination of your trip from home
- ❍ One of many equally important reasons or destinations for your trip from home
- ❍ Just an incidental stop on a trip taken for other purposes or to other destinations

What were your primary methods of travel from your home to the Lower Fryingpan River? (Check all that apply)

- ❑ Car/Truck
- ❑ RV
- ❑ Airplane
- ❑ Other _____

Approximately, what was your one-way travel time from your home to the Lower Fryingpan River?

_____# of hours

_____# of minutes

Approximately, what was your one way travel distance from your home to the Lower Fryingpan River?

_____# of one way miles

Including yourself, what is the number of people in your group that are traveling with you on this trip?

_____# of people in your group

During which of the following months do you fish on the Lower Fryingpan River in a typical year? (check all that apply)

- ❑ Jan
- ❑ Feb
- ❑ Mar
- ❑ Apr
- ❑ May
- ❑ Jun
- ❑ Jul
- ❑ Aug
- ❑ Sep
- ❑ Oct
- ❑ Nov
- ❑ Dec

Including this trip how many fishing trips on the Lower Fryingpan River have you taken in the last 12 months?

_____# of annual fishing trips

Do you also recreate at Ruedi Reservoir?

❍ No
❍ Yes

Answer If Do you also recreate at Ruedi Reservoir? Yes, I have taken the following number of trips in the last 12 months Is Selected
You indicated that you also recreate on the Ruedi Reservoir. How many trips have you taken to the Ruedi Reservoir in the last 12 months?

_____# of trips

Section B: Trip Expenditures

Before answering the questions below please refer to the REGION MAP handout from your interviewer. Please indicate the amount you and members of your group with whom you shared expenses (e.g. other family members, traveling companions) spent in the region (Pitkin, Eagle and Garfield Counties) on each category during your trip to the Lower Fryingpan River. An estimate is fine.

Fishing Expenditures: What amount did you spend in the region on the following:

Fishing tackle and other fishing gear: _____

Equipment rental: _____

Guide fees: _____

Fishing License (specifically for this trip): _____

Fishing Expenditures in Pitkin County: Of all your fishing expenditures what percent was spent in Pitkin County? (Enter a number between 0 and 100): _____%

Fishing Expenditures in Downtown Basalt: Of all your fishing expenditures what percent was spent in Downtown Basalt? (Enter a number between 0 and 100):_____%

Fishing Expenditures in West Basalt: Of all your fishing expenditures what percent was spent in West Basalt? (Enter a number between 0 and 100):_____%

Food Expenditures: What amount did you spend in the region on the following:

Food and drink from grocery stores: _____

Food and drink from restaurants: _____

Food Expenditures in Pitkin County: Of all your food expenditures what percent was spent in Pitkin County? (Enter a number between 0 and 100): _____%

Food Expenditures in Downtown Basalt: Of all your food expenditures what percent was spent in Downtown Basalt? (Enter a number between 0 and 100):_____%

Food Expenditures in West Basalt: Of all your food expenditures what percent was spent in West Basalt? (Enter a number between 0 and 100):_____%

Other Retail Expenditures: What amount did you spend in the region on the following:

Other (non-fishing related) retail: _____

Other Retail Expenditures in Pitkin County: Of all your other retail expenditures what percent was spent in Pitkin County? (Enter a number between 0 and 100)_____%

Other Retail Expenditures in Downtown Basalt: Of all your other retail expenditures what percent was spent in Downtown Basalt? (Enter a number between 0 and 100): _____%

Other Retail Expenditures in West Basalt: Of all your other retail expenditures what percent was spent in West Basalt? (Enter a number between 0 and 100):_____%

Travel Expenditures: What amount did you spend in the region on the following:

Gasoline: _____

Rental Car: _____

Other: _____

Travel Expenditures in Pitkin County: Of all your travel expenditures what percent was spent in Pitkin County? (Enter a number between o and 100): _____%

Travel Expenditures in Downtown Basalt: Of all your travel expenditures what percent was spent in Downtown Basalt? (Enter a number between o and 100): _____%

Travel Expenditures in West Basalt: Of all your travel expenditures what percent was spent in West Basalt? (Enter a number between o and 100): _____%

Accommodation Expenditures: What amount did you spend in the region on the following:

Camping (Tent/RV)

Hotel/Motel

Other

Accommodation Expenditures in Pitkin County: Of all your accommodation expenditures what percent was spent in Pitkin County? (Enter a number between o and 100): _____%

Accommodation Expenditures in Downtown Basalt: Of all your accommodation expenditures what percent was spent in Downtown Basalt? (Enter a number between o and 100): _____%

Accommodation Expenditures in West Basalt: Of all your accommodation expenditures what percent was spent in West Basalt? (Enter a number between o and 100): _____%

Including yourself how many people in your group shared the majority of expenses?

_____# sharing expenses

Section C: Important features in your decision to visit the Lower Fryingpan River today

How important were each of the following characteristics of the Lower Fryingpan River in your decision to visit today.

Please check one box for each item

	Not Important	Somewhat Important	Important	Very Important
Gold medal designation	❍	❍	❍	❍
Number of fish caught	❍	❍	❍	❍
Size of fish caught	❍	❍	❍	❍
Wadeable flows on the river	❍	❍	❍	❍
Being close to where I live	❍	❍	❍	❍
Parking availability	❍	❍	❍	❍
River crowding	❍	❍	❍	❍
Stream clarity	❍	❍	❍	❍
Weather	❍	❍	❍	❍
Insect hatches	❍	❍	❍	❍
Other	❍	❍	❍	❍

Based on your fishing experience during this trip, would you say the river level was:

- ❍ Too high
- ❍ Too low
- ❍ About right
- ❍ Did not notice river level

Section D: Changes in winter flows

Fishing on the Lower Fryingpan River occurs year round, but flows during the winter months impact the quality of fishing throughout the season. Currently the minimum flows in the winter are about 40 cubic feet per second (cfs). At 40 cfs anchor ice is more common. Anchor ice in the winter can adversely affect

fishing quality in the summer. When winter flows are 70 cfs anchor ice is less common, contributing to improved fishing quality in the following summer.

If water managers maintained winter flows to at least 70 cfs throughout the winter (making anchor ice less common), how would it affect your annual fishing trips to the Lower Fryingpan River?

- ❍ I would increase my fishing trips to the Lower Fryingpan River.
- ❍ I would not change my fishing trips to the Lower Fryingpan River.
- ❍ I would decrease my fishing trips to the Lower Fryingpan River.

Answer If I would increase my fishing trips to the Lower Fryingpan River is selected
You indicated that you would increase the number of trips you would take to the Lower Fryingpan River if winter stream flows were maintained at least 70 cfs, by how many more trips to the Lower Fryingpan River would you take in a typical year?

_____# of Trips

Answer If I would decrease my fishing trips to the Lower Fryingpan River is selected
You indicated that you would decrease the number of trips you would take to the Lower Fryingpan River if winter stream flows were maintained at at least 70 cfs, by how many fewer trips to the Lower Fryingpan River would you take in a typical year?

_____# of trips

Section E: Changes in summer flows

Flows above 250 cubic feet per second (cfs) result in currents that make it difficult to wade into the river to fish and most anglers find it safer to fish from the banks. Currently on average 77 days a year the Lower Fryingpan River flows are above 250 cfs.

If the number of days on average each year that the river was non-wadeable decreased from 77 to 29 days (a gain of 48 more wadeable days):

- ❍ I would increase my fishing trips to the Lower Fryingpan River.
- ❍ I would not change my fishing trips to the Lower Fryingpan River.
- ❍ I would decrease my fishing trips to the Lower Fryingpan River.

Answer If I would increase my fishing trips to the Lower Fryingpan River is selected
You indicated that if the number of days on average each year that the river was non-wadeable decreased from 77 to 29 days you would increase the number of fishing trips to the Lower Fryingpan River. How many more trips would you take to the Lower Fryingpan River in a typical year?

_____# of Trips

Answer If I would decrease my fishing trips to the Lower Fryingpan River is selected
Q46 You indicated that if the number of days on average each year that the river was non-wadeable decreased from 77 to 29 days you would decrease the number of fishing trips to the Lower Fryingpan River. How many fewer yearly trips would you take to the Lower Fryingpan River in a typical year?

_____# of Trips

Section F: Please tell us something about yourself:

These last few questions will help us in evaluating how well our sample represents visitors to the area. Your answers will be kept strictly confidential and will only be used for the analysis of this study. Statistics will only be reported in average form, and <u>you will not be identified in any way.

Are you?

- ❍ Male
- ❍ Female

What year were you born? _____

How many members are in your household?

_____# of persons

What is the status of your employment?

- ❍ Employed full-time
- ❍ Employed part-time
- ❍ Unemployed
- ❍ Retired
- ❍ Other _____

How would you rate your skill level as an angler?

- ❍ Total novice (1st time today)
- ❍ Beginner
- ❍ Intermediate
- ❍ Expert

What is your zip code? _____

Thank you for taking the time to complete this survey. Please use the space below for any comments or suggestions you have for us:

APPENDIX B: RUEDI RESERVOIR SURVEY

The Roaring Fork Conservancy, in conjunction with Colorado State University, is conducting this study to understand visitor use and spending related to Ruedi Reservoir. This survey will only take 10 minutes and all of your answers will be anonymous. Please answer all questions to the best of your ability.

If you need to go to a previous page please use the back button on the BOTTOM of the page, do NOT use the browser back button.

Section A: Please tell us about this trip to Ruedi Reservoir.

On this trip to Ruedi Reservoir what activities did you participate in? (check all that apply)

- ❑ Motorized boating
- ❑ Non-motorized boating
- ❑ Water sports (such as water skiing and jet skiing
- ❑ Fishing from shore
- ❑ Fishing from boat
- ❑ Picnicking
- ❑ Swimming
- ❑ Camping (Tent or RV)
- ❑ Other _____

Which of these activities was your primary purpose for this trip? (check only one)

** List of selected responses from previous question**

What was the total amount of time spent on this trip away from home?

_____# of days

How much of this time did you spend recreating on the Ruedi Reservoir?

_____# of days (fractions ok)

Was your current trip to the Ruedi Reservoir? (Check only one)

- ❍ The primary purpose or sole destination of your trip from home

- ❍ One of many equally important reasons or destinations for your trip from home
- ❍ Just an incidental stop on a trip taken for other purposes or to other destinations

What were your primary methods of travel from home to Ruedi Reservoir? (Check all that apply)

- ❑ Car/Truck
- ❑ RV
- ❑ Airplane
- ❑ Other _____

Approximately, what was your one-way travel time from your home to the Ruedi Reservoir?

_____# of hours

_____# of minutes

Approximately, what was your one way travel distance from your home to the Ruedi Reservoir?

_____# of one way miles

Including yourself, what is the number of people in your group that are traveling with you on this trip?

_____# of people in your group

During which of the following months do you visit the Ruedi Reservoir in a typical year? (check all that apply)

- ❑ Jan
- ❑ Feb
- ❑ Mar
- ❑ Apr
- ❑ May
- ❑ Jun
- ❑ Jul
- ❑ Aug
- ❑ Sep
- ❑ Oct
- ❑ Nov
- ❑ Dec

Including this trip how many trips have you taken to Ruedi Reservoir in the last 12 months?

_____# of annual trips to Ruedi Reservoir

Do you also recreate on the Lower Fryingpan River?

❍ No
❍ Yes

Answer If Do you also recreate on the Lower Fryingpan River? Yes Is Selected

You indicated that you also recreate on the Lower Fryingpan River. How many fishing trips in the last 12 months have you taken to the Lower Fryingpan River?

_____# of trips

Section B: Trip Expenditures

Before answering the questions below please refer to the REGION MAP handout from your interviewer. Please indicate the amount you and members of your group with whom you shared expenses (e.g., other family members, traveling companions) spent in the region (Pitkin, Eagle and Garfield counties) on each category during your trip to the Ruedi Reservoir. An estimate is fine.

Water Recreation: What amount did you spend in the region on the following:

Equipment/boat rental: _____

Boat repairs: _____

Boat repairs: _____

Fishing tackle and gear: _____

Fishing license (specifically for this trip): _____

Water Recreation Expenses in Pitkin county: Of all your water recreation expenditures what percent was spent in Pitkin county? (enter a number between 0 and 100) _____%

Water Recreation Expenses in Downtown Basalt: Of all your water recreation expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Water Recreation Expenses in West Basalt: Of all your water recreation expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Food Expenditures: What amount did you spend in the region on the following:

Food and drink from grocery stores _____

Food and drink from restaurants _____

Food Expenditures in Pitkin County: Of all your food expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Food Expenditures in Downtown Basalt: Of all your food expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Food Expenditures in West Basalt: Of all your food expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Other Retail Expenditures: What amount did you spend in the region on the following:

Other (non-boating related) retail _____

Other Retail Expenditures in Pitkin County: Of all your other retail expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Other Retail Expenditures in Downtown Basalt: Of all your other retail expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Other Retail Expenditures in West Basalt: Of all your other retail expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Travel Expenditures: What amount did you spend in the region on the following:

Gasoline for auto/boat _____

Rental Car _____

Other _____

Travel Expenditures in Pitkin County: Of all your travel expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Travel Expenditures in Downtown Basalt: Of all your travel expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Travel Expenditures in West Basalt: Of all your travel expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Accommodation Expenditures: What amount did you spend in the region on the following:

Camping (Tent/RV) _____

Hotel/Motel _____

Other _____

Accommodation Expenditures in Pitkin County: Of all your accommodation expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Accommodation Expenditures in Downtown Basalt: Of all your accommodation expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Accommodation Expenditures in West Basalt: Of all your accommodation expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Including yourself how many people in your group shared the majority of expenses?

_____# sharing expenses

Fishing tackle and gear: _____

Fishing license (specifically for this trip): _____

Water Recreation Expenses in Pitkin county: Of all your water recreation expenditures what percent was spent in Pitkin county? (enter a number between 0 and 100) _____%

Water Recreation Expenses in Downtown Basalt: Of all your water recreation expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Water Recreation Expenses in West Basalt: Of all your water recreation expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Food Expenditures: What amount did you spend in the region on the following:

Food and drink from grocery stores _____

Food and drink from restaurants _____

Food Expenditures in Pitkin County: Of all your food expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Food Expenditures in Downtown Basalt: Of all your food expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Food Expenditures in West Basalt: Of all your food expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Other Retail Expenditures: What amount did you spend in the region on the following:

Other (non-boating related) retail _____

Other Retail Expenditures in Pitkin County: Of all your other retail expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Other Retail Expenditures in Downtown Basalt: Of all your other retail expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Other Retail Expenditures in West Basalt: Of all your other retail expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Travel Expenditures: What amount did you spend in the region on the following:

Gasoline for auto/boat _____

Rental Car _____

Other _____

Travel Expenditures in Pitkin County: Of all your travel expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Travel Expenditures in Downtown Basalt: Of all your travel expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Travel Expenditures in West Basalt: Of all your travel expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Accommodation Expenditures: What amount did you spend in the region on the following:

Camping (Tent/RV) _____

Hotel/Motel _____

Other _____

Accommodation Expenditures in Pitkin County: Of all your accommodation expenditures what percent was spent in Pitkin County? (enter a number between 0 and 100) _____%

Accommodation Expenditures in Downtown Basalt: Of all your accommodation expenditures what percent was spent in Downtown Basalt? (enter a number between 0 and 100) _____%

Accommodation Expenditures in West Basalt: Of all your accommodation expenditures what percent was spent in West Basalt? (enter a number between 0 and 100) _____%

Including yourself how many people in your group shared the majority of expenses?

_____# sharing expenses

Section C: Important features in your decision to visit the Ruedi Reservoir today:

How important were each of the following characteristics of Ruedi Reservoir in your decision to visit today?

Please check one box for each item

	Not Important	Somewhat Important	Important	Very Important
Reservoir water levels	❍	❍	❍	❍
Main marina boat ramp open	❍	❍	❍	❍
Being close to where I live	❍	❍	❍	❍
Number of fish caught	❍	❍	❍	❍
Size of fish caught	❍	❍	❍	❍
Weather	❍	❍	❍	❍
Other	❍	❍	❍	❍

Section E: Please tell us something about yourself:

These last few questions will help us in evaluating how well our sample represents visitors to the area. Your answers will be kept strictly confidential and will only be used for the analysis of this study. Statistics will only be reported in average form, and you will not be identified in any way.

Are you?

❍ Male
❍ Female

What year were you born? _____

How many members are in your household?

_____# of persons

What is the status of your employment?

❍ Employed full-time
❍ Employed part-time
❍ Unemployed
❍ Retired
❍ Other _____

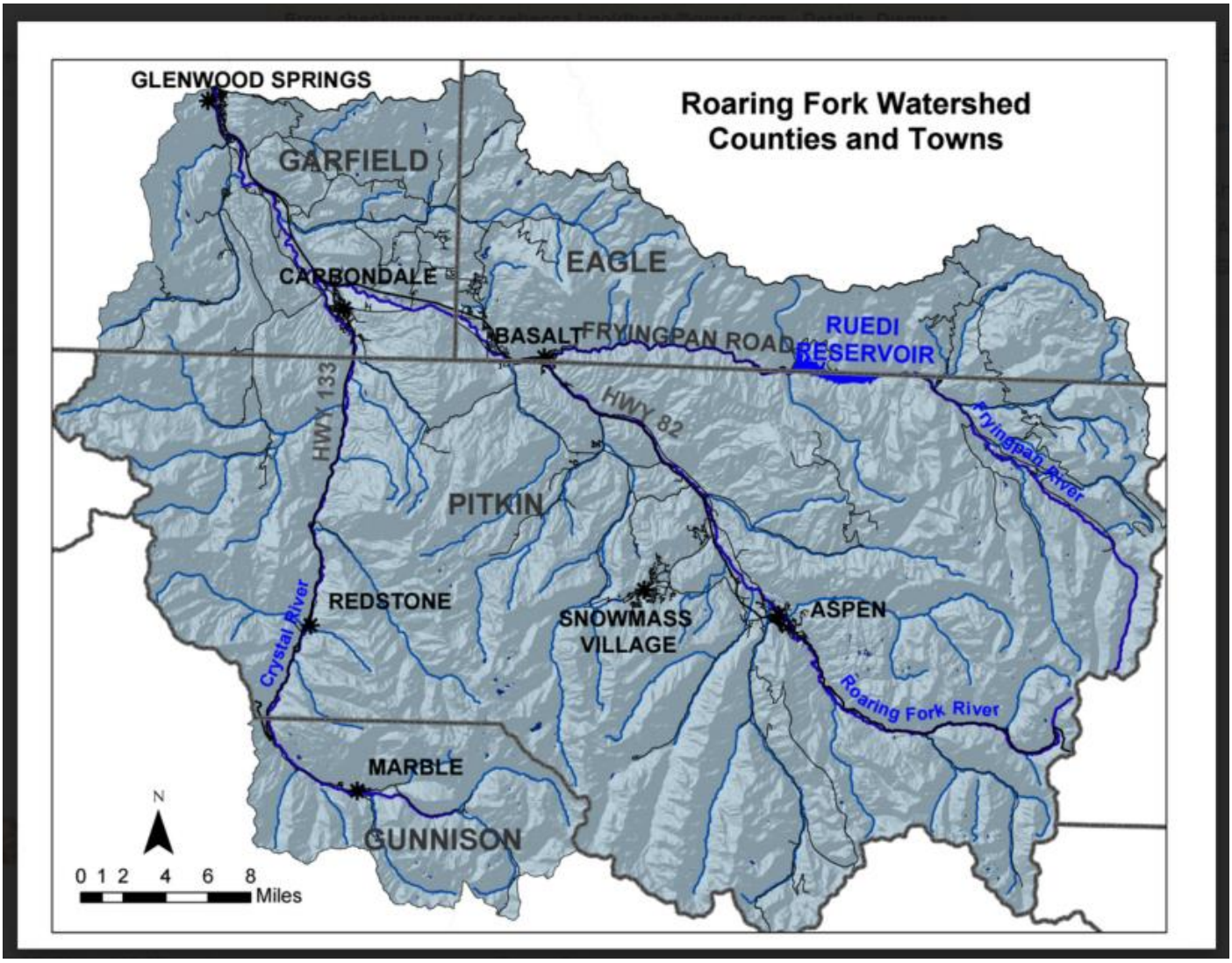
What is your zip code? _____

Thank you taking the time to complete this survey. Please use the space below for any comments or suggestions you have for us:

O

APPENDIX C: REGION MAP HANDOUT

This handout was shown to all survey takers when answering the surveys' expenditure questions.



APPENDIX D: TECHNICAL METHODOLOGY AND DEFINITIONS

In this analysis, we estimate the total economic impact of recreational fishing on the Lower Fryingpan River and Ruedi Reservoir to the regional economy using an economic impact software program known as IMPLAN (Impact Analysis for Planning). Originally developed by the U.S. Forest Service, IMPLAN is an input-output model that is widely-used to quantify how businesses use technology, labor and materials (i.e., inputs) to produce a product (i.e., output). The IMPLAN software and database (www.implan.com) establishes the characteristics of economic activity in terms of 10 broad industrial groups, involving as many as 528 sectors. In practice, the IMPLAN model is used in every state and hundreds of communities across the nation to catalog economic activity and predict the effect of alternative policies and various economic changes. In this analysis, we use IMPLAN to generate information on a number of important economic indicators.

In order to use models such as IMPLAN to examine the role of an industry in a local economy, analysts should have information on the final demand (i.e., expenditures) for any related goods and services. The angler expenditure data we collected in the surveys serve as the basis for our analysis. In this study, final demand is expressed by the total expenditures by category. To determine the direct and secondary effects, we matched the total expenditure data with the IMPLAN sectoring scheme, and entered the appropriate amounts as a final demand "shock" to the model. This generates estimates of both the direct and indirect economic effects. As appropriate, expenditures were entered either on an industry or a commodity basis. For the retail sectors, we applied IMPLAN's default household margins. Secondary effects are based on the IMPLAN Type SAM multipliers, with households endogenous.

Because IMPLAN models are quite stable from year-to-year, we applied the 2013 multipliers (the most recent year available) to the 2014 survey data. In the remainder of this Appendix we define multipliers and other topics related to this analysis. The material is largely drawn from the IMPLAN User's Guide. A detailed description the IMPLAN sectoring scheme is available on the IMPLAN website.

A Method for Determining Unique Local Expenditures

To adequately represent the impacts of recreational fishing on the Lower Fryingpan River and Ruedi Reservoir, it is necessary to only examine the local activity uniquely supported by the industry. Careful economic impact analyses of recreation-related activities distinguish between "new" economic activity and that which would have occurred anyway. For example, if fishing was not available and anglers chose instead to spend their money on other local activities, such as movie tickets, then the economic impacts generated by the fishery are simply substituting for other local economic activity. Conversely, should the Lower Fryingpan River or Ruedi Reservoir be the sole reason that substantial new monies enter (or remain in) the region, then the impact can be attributed to the Lower Fryingpan River or Ruedi Reservoir. Accordingly, to measure the "true" impact of angling on the Lower Fryingpan or Ruedi Reservoir on the local economy we must consider only economic activity in the region that would otherwise not occur. Estimates of the number of trips by angler type were derived from the surveys. A

copy of the Lower Fryingpan River survey is provided in **Appendix A** and a copy of the Ruedi Reservoir survey is provided in **Appendix B**.

Input-Output Definitions

Multipliers

Input-output models are driven by final consumption (or final demand). Industries respond to meet demands directly or indirectly (by supplying goods and services to industries responding directly). Each industry that produces goods and services generates demand for other goods and services and so on, round by round. These so called *ripple effects* are described by **multipliers**. A multiplier examines how much spin-off economic activity is generated by a marginal change in an industry. For example, multipliers can describe how many total jobs (employment) in the economy are created when an industry adds one new job. In general, input-output modelers describe three types of multiplier effects when examining the role of an industry in a county economy.

1. The **direct effect** is the contribution of the industry itself. It may represent the total revenue (output), employment or employee compensation. The value of the direct effect multiplier is always 1.
2. The **indirect effects** are effects of the industry on its suppliers. This multiplier captures the additional activity in businesses that provide inputs to the industry of interest.
3. The **induced effects** capture the impacts of changes in spending from households as income changes due to the direct effect. This effect captures the impact of spending by a) employees of the industry being studied, and b) employees of the input supplying businesses. These effects usually show up in retail and service industries. In the study here, the *secondary effects* are the sum of the indirect and induced effects.

In this study we use the IMPLAN Type SAM multipliers. The Type SAM multiplier is obtained according to the following formula:

Type SAM multiplier = (direct effect + indirect effect + induced effect) ÷ direct effect

Input-output analysis is a means of examining the relationships within an economy both between businesses and between businesses and final consumers. It captures all monetary transactions for consumption in a given time period. The resulting mathematical formulae allow one to examine the effects of change in one or several economic activities on an entire economy.

Industry output is a single number in dollars for each industry. The dollars represent the value of an industry's total production. In IMPLAN, the output data are derived from a number of sources, including U.S. Bureau of Census economic censuses and the U.S. Bureau of Labor Statistics employment projections. Another way to think about industry output is as the total revenue generated by an industry.

Employment is the total number of wage and salaried employee and self-employed jobs in a region. It includes both full-time and part-time workers. The data sets used to derive employment totals in the

IMPLAN model are the ES-202 data, County Business Patterns, and the Regional Economic Information System (REIS) data.

While output captures the total dollar value of economic activity, its use as a measure of economic activity can be over-counted, in that it captures the value of all intermediate stages of the production process as well. For example, the price one pays for a car at the local auto dealership in large part represents economic activity that occurred in the production process. If one were to consider the price one paid for a car as the contribution to the local economy, then one would likely be overstating its impact. This is called double counting. To avoid double counting, economists usually examine economic contributions in terms of **value added**. At the local level, value added is equivalent to the concept of Gross Domestic Product, in that it examines the unique contribution of an industry to the overall economy. In input-output analysis, value added consists of four components.

1. **Employee compensation** is wage and salary payments as well as benefits, including health and life insurance, retirement payments, and any other non-cash compensation. It includes all income to workers paid by employers.
2. **Proprietary income** consists of payments received by self-employed individuals as income. This is income recorded on Federal Tax Form 1040C. Note: labor income is the sum of employee compensation and proprietary income.
3. **Other property type income** consists of payments for interest, rent, royalties, dividends and profits. This includes payments to individuals in the form of rents received on property, royalties from contracts, and dividends paid by corporations. This also includes corporate profits earned by corporations.
4. **Indirect business taxes** consist primarily of excise and sales taxes paid by individual to businesses. These taxes occur during the normal operation of these businesses but do not include taxes on income or profit.