# Stratus Consulting

## The Beneficial Value of Waters Diverted in the Blue River for the Breckenridge Whitewater Park and in Gore Creek for the Vail Whitewater Park

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# Introduction and Summary

This report describes our investigation of the economic benefits associated with waters diverted in two Colorado rivers, the Blue River and Gore Creek (a tributary to the Eagle River), to support kayaking and related whitewater activities in the mountain resort communities of Breckenridge and Vail, respectively. Order of magnitude estimates of the economic benefits of water rights used to supply the Breckenridge and Vail kayak courses are derived.

While the benefits estimates derived here are preliminary (e.g., because of the limited time the whitewater parks have been in operation), our results are reliably indicative of the types and levels of economic values that are derived by kayakers who use the waters directly, and also the economic values realized by the communities that host the courses. These findings are based on a review of available information on kayaking and other activities associated with the two parks, published economic literature on the value of kayaking to participants, data assembled on levels of use for the two courses, and information on the importance of kayaking and related recreational activities to the local economies of the two resort communities that built them.

This report is organized as follows:

- Chapter 1 provides an overview of the two kayak courses, including brief summaries of the course locations and descriptions of key course features and uses. Also reported are data that indicate the levels of use for 2001 of each course by kayakers, other whitewater enthusiasts, and spectators.

- Chapter 2 describes the value of the course to those engaged in kayaking and related whitewater activities. Estimates of the user value (consumer surplus) of a kayak-related recreational outing are summarized. These consumer surplus results — derived from the published economics literature — are applied in a "benefits transfer" to the use level estimates from Chapter 1 to develop estimates of direct use values for each whitewater course. Kayaker expenditures are also estimated.

- Chapter 3 examines the value of kayaking and related recreation and tourism and their impacts on the economic well-being of the state and, more specifically, on Breckenridge and Vail.

- Chapter 4 provides estimates for the economic value of the two whitewater courses in the future (i.e., after 2001).

Our results demonstrate that waters diverted in the Breckenridge and Vail courses generate considerable economic benefit. We estimate that the future monetary benefits derived from the whitewater parks at Breckenridge and Vail will be up to $1.4 and $1.8 million per year, respectively. These estimates do not include several benefits that could not be quantified or valued within the present study's constraints.

Over a 20 year period, the present values of anticipated future benefits provided by the waters diverted within the whitewater parks are estimated to be $16.1 and $20.6 million for the Breckenridge and Vail parks, respectively. Several benefits are not quantified or included in the calculations, leading to an underestimation of total benefits. Details are shown in Tables 1 and 2.

**Table 1. Estimated value of future beneficial uses of waters diverted in the Town of Breckenridge's Whitewater Park (in 2001 dollars).**

| Beneficial use category | Level of use | Monetary unit value | | Beneficial value |
|---|---|---|---|---|
| Boaters per year[a] | 2,884 | | | |
| Expenditures | | $48.85 | | $140,878 |
| Expenditures nonlocals[b] | | $195 | | $281,179 |
| Consumer surplus | | $37.77 | | $108,925 |
| Spectators and near-stream recreators | 500 | | | |
| Expenditures | | $133.00 | $133.00 | $66,500 |
| Consumer surplus | | >$0 | >$0 | +[c] |
| Economic stimulus for community | | | | |
| 1.88 times out-of-pocket expenditures[d] | | | | $885,958 |
| Increase in property values | | | | + |
| Benefits to event sponsors and vendors | | | | + |
| Beneficial use of water downstream of kayak course (heavy use corridor) | | | | + |
| Community identity, quality of life | | | | + |
| Option value | | | | + |
| **Total beneficial use values per year** | | | | **>$1,416,925** |
| **Capitalized value[e]** | | | | **$16.1 million** |

a. Based on Earl Richmond's estimate of future use with completion of Phase II and typical river flows. Use expressed as number of outings (user days).
b. Nonlocal boaters equal 25% of total boaters and include one companion.
c. "+" indicates positive benefits that could not be quantified or monetized using readily available data
d. Values shown are net of the expenditures shown above for boaters, and exclude the value of travel time.
e. Over a time horizon of 20 years, discounted at 7%.

**Table 2. Estimated value of future beneficial uses of waters diverted in the Town of Vail's Whitewater Park (in 2001 dollars).**

| Beneficial use category | Level of use | Monetary unit value | | Beneficial value |
|---|---|---|---|---|
| Boaters per year[a] | 2,345 | | | |
| Expenditures | | $48.85 | | $114,553 |
| Expenditures nonlocals[b] | | $162.00 | | $189,945 |
| Consumer surplus | | $37.77 | | $88,559 |
| Spectators (TEVA Whitewater Festival) | 2,300 | | | |
| Expenditures | | $133.00 | $133.00 | $305,900 |
| Consumer surplus | | >$0 | >$0 | +[c] |
| Economic stimulus for community | | | | |
| 1.88 times out-of-pocket expenditures[d] | | | | $1,121,097 |
| Increase in property values | | | | + |
| Spectators and near-stream recreators (non-TEVA) | >0 | >$0 | >$0 | + |
| Benefits to event sponsors and vendors | | | | + |
| Beneficial use of water downstream of kayak course (heavy use corridor) | | | | + |
| Community identity, quality of life | | | | + |
| Option value | | | | + |
| **Total beneficial use values per year** | | | | **>$1,820,054** |
| **Capitalized value[e]** | | | | **>$20.6 million** |

a. Based on Mike Duffy's estimate of 2001 use. Use expressed as number of outings (user days).
b. Nonlocal boaters equal 25% of total boaters and include one companion.
c. Values shown are net of the expenditures shown above for boaters, and exclude the value of travel time.
d. "+" indicates positive benefits that could not be quantified or monetized using readily available data.
e. Over a time horizon of 20 years, discounted at 7%.

# 1. The Kayak Courses and Levels of Use

## 1.1 Background Description of the Breckenridge Course

The Breckenridge Whitewater Park is located on the Blue River in the Town of Breckenridge near the Recreation Center and Kingdom Park. The park consists of modifications to approximately 1,800 feet of the existing river channel with a number of different dam and deflector structures. The modifications were made in two phases. Phase I was completed in May 2001, at an approximate cost of $150,000. Phase II was completed in October 2001, at an approximate cost of $350,000. Improvements to Phase I also have been made since the end of the 2001 season.

Boaters began using Phase I of the park in the spring and summer of 2001. Boaters will start using both Phase I and II elements of the park in the spring and summer of 2002.

## 1.2 Types and Levels of Use at the Breckenridge Whitewater Park

We interviewed several people knowledgeable about the Whitewater Park to obtain preliminary estimates of the types and levels of use during the 2001 season. The 2001 season consisted only of the Phase I modifications and was the first season the park was open.

The persons interviewed are listed in Table 1.1. The interviews were conducted between December 21, 2001, and January 7, 2002.

### Summary of types of boater use

The park is used by a variety of beginner, intermediate, and advanced boaters in kayaks and canoes. The intermediate and advanced boaters focus on doing "rodeo" moves created by several of the structures. This is typically called "playboating," a very popular and fast growing element of whitewater kayaking. The park attracts a mix of local and out-of-area boaters. Regarding time-of-day use, most use occurs during the afternoons/evenings of weekdays and all day on weekends. Regarding flow, use generally increases as flow increases. The park attracts boaters of all skill levels, including beginners that see this course as a relatively safe and convenient place to learn. This course is unique in this respect in Summit County. In 2001 there were no organized kayaking events at the park. In 2002, there are plans for a weekly rodeo series and use of the park as part of the Ten Mile One Mile event during the second week of June.

**Table 1.1. Interviewees for Breckenridge Whitewater Park.**

| Person | Comment |
|---|---|
| Bob Pfeifer<br>Town of Breckenridge Parks Department<br>Tele: (970) 453-2251 | Provided park user survey information. |
| Earl Richmond<br>Owner of Summit Kayak (also known as CKS, Colorado Kayak Supply)<br>Tele: (970) 513-9104 | Uses course to demo kayak products and hold kayak classes. Plans on establishing regular rodeo series in 2002 and including park in Ten Mile One Mile event in 2nd week of June. Great place for beginners. Predicts use of park will increase dramatically with completion of Phase II and with higher river flows. He sees that boater use clearly increases with river flow. Unique kayak experience for Summit County. Used park about 20 times in 2001 from May to July. Estimates about 50% of boaters using park are local to Summit County, 25% are from the central Rockies, and 25% from other parts of CO and beyond. |
| Brian Pappas, local kayaker<br>Years kayaking: 6<br>Skill level: Advanced<br>Home: Dillon<br>Miles to park: 10<br>Tele: (970) 262-1628 | Used park about 30 times in 2001 from April to July. Typically uses park for 3 to 4 hours after work on weekdays and during the day on weekends. Prefers to have flows over 100 cfs and the higher the flows the better. Believes park is great and unique resource for Breckenridge and Summit County. |
| Mike Zobbe, local kayaker<br>Years kayaking: 12<br>Skill level: Advanced<br>Home: Breckenridge<br>Miles to park: 2<br>Tele: (970) 453-5548 | Used park about 20 times in 2001 from May to July. Typically uses park for 1.5 hours after work on weekdays. Prefers to have flows over 200 cfs and the higher the flows the better. Phase I provides only one good feature for advanced boaters; looks forward to Phase II features and higher water. Notes geographic diversity of boaters and estimates 70% are local and 30% from outside. Lots of beginners. Lots of nonboaters watch from bike path. |

### 2001 boater user days

Boater use varies with flow, day of week, and time of day, among other factors. The Town of Breckenridge staff maintained a log of users at the Whitewater Park from which we derived estimates of daily boater days. The log was kept between Memorial Day and Labor Day in 2001. The log consisted of hourly counts of users between 9:30 a.m. and 6:30 p.m. up to July 13, 2001, and between 9 a.m. and 7 p.m. after that.

The daily logs had gaps with about 25% of the hourly observations missing over the three months. We replaced missing hourly observations with the monthly average for that time slot. We also removed user observations where the comment field suggested the user was not on the course or that they were counting the same boaters over more than one time slot. The recorded user days are summarized by month in Table 1.2.

**Table 1.2. Documented users per month and average daily flow at Breckenridge Whitewater Park.**

| Month | Boaters per month[a] | Average daily flow (cfs)[b] |
|---|---|---|
| April 2001 | Park not completed | 26 |
| May 2001 | Not collected | 149 |
| June 2001 | 472 | 231 |
| July 2001 | 395 | 145 |
| August 2001 | 47 | 50 |
| September 2001 | Not collected | 35 |
| October 2001 | Not collected | 23 |
| Total Days | 914 | |

a. Total boaters derived from Town of Breckenridge Parks Department user logs.
b. Flows calculated by Tom Williamsen.

Figure 1.1 shows a 7-day moving average of flow versus boaters per day. Boater use clearly is correlated with flow. We estimated the following regression model to quantify the relationship between use and flow over the months June through August 2001.

$$\text{Boaters Per Day} = -0.279 + 0.073 * \text{cfs} \qquad (1.1)$$

Flow explained 86% of the total variance ($R^2$) exhibited in boater use. The model estimates boater use increased by 7.3 boaters per day for every 100 cfs increase in flow.

The estimate of 914 total boater days is not precise. First, this total reflects only documented use during the log-keeping period. As such, it tends to underestimate the true total user count because it only includes boaters between Memorial Day and Labor Day. In addition, it does not count boaters arriving at the Whitewater Park after the last reported observation is made (e.g., 6:30 p.m.). During the long daylight hours at this time of year, boating at the park often goes on until dark, according to Earl Richmond, Brian Pappas, and Mike Zobbe. The Breckenridge user logs also show that the most popular time to use the park is after 5 p.m. Because of these limitations, we sought and obtained boater user estimates via the interviews (see Table 1.3) for the following question:

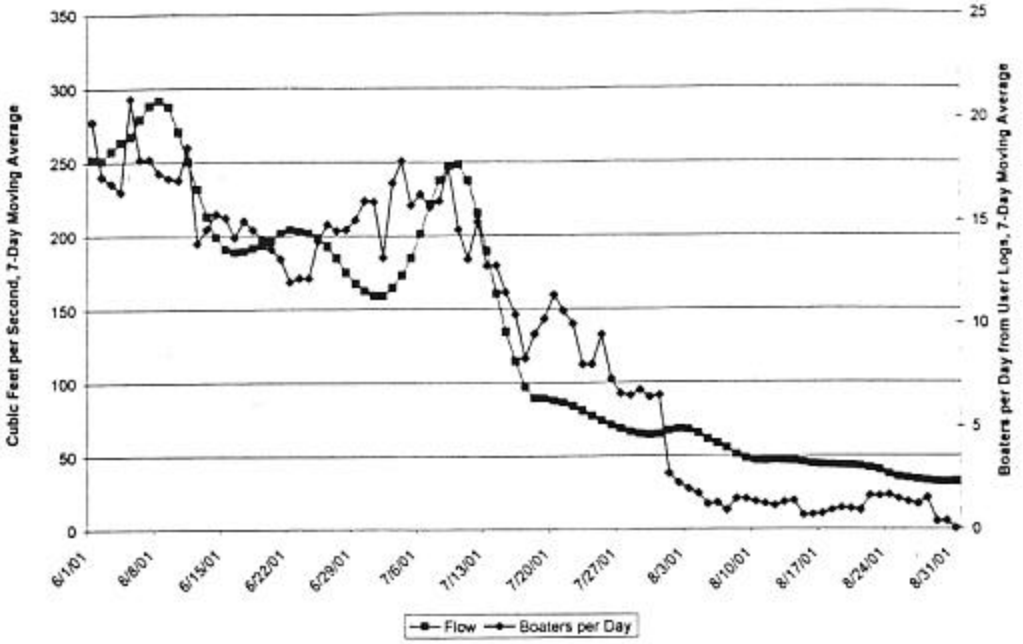


**Figure 1.1. User days and flows at Breckenridge for 2001.**

*When you are at the park boating, what is the average and maximum number of boaters that are at the park with you?*

**Table 1.3. Other boaters in the Breckenridge Park during interviewee outing.**

| Interviewee | Average | Max |
|---|---|---|
| Earl Richmond | 15 | 30 |
| Brian Pappas | 15 | 30 |
| Mike Zobbe | 7.5 | 12 |

These estimates cover only the limited time that the boater was at the park (e.g., several hours). The daily totals would be larger since they would include boaters from other hours of the day.

We further asked Earl Richmond, owner of Summit Kayak, to provide additional estimates of average user days by month and weekend/weekday. We perceived Earl to be well informed about the park from his direct experiences as a user and from his discussions with his staff and patrons that frequent the park. His boater user day estimates are shown in Table 1.4.

**Table 1.4. Average boater day estimates from Earl Richmond.**

| Month | Weekday | Weekend |
|---|---|---|
| April 2001 | Park not completed | Park not completed |
| May 2001 | 20 | 30 |
| June 2001 | 25 | 35 |
| July 2001 | 20 | 30 |

Earl Richmond reports that boater use dropped significantly after July 2001, although some boaters still used the park. He declined to provide numerical estimate of boaters.

Based on these sources of data, we estimate the number of boater days in 2001 ranged between 1,309 and 2,307. The 1,309 estimate is based on analysis of the Breckenridge user logs and the assumption that the number of May 2001 boaters equaled the number of July 2001 boaters. This assumption is supported by our observation that average flow levels during these months are nearly equal (as shown in Table 1.2) and from the Earl Richmond's observation that use in May equaled that in July. The 2,307 estimate is based on Earl Richmond's estimates for May, June, and July plus the 47 boater day estimate reported in the Breckenridge logs for August; Earl did not use the course after July. We did not add any boater days for September or October, although there was probably some use of the park in those months.

In addition, we developed a prediction of boater use based on the flows claimed by Breckenridge their application of water rights and the regression model we developed linking boater use and flow (Equation 1.1). The results are summarized by month in Table 1.5. The total number of boaters for the season equals 3,218. Because the claimed flows are higher than those observed in 2001, the total boater use estimate is higher than the 2001 use estimates. The 3,218 boater use total is not used in our economic calculations, but illustrates the relative increase in use that could occur under the claimed flows.

**Table 1.5. Breckenridge flow and boater use scenario.**

| Month | Claimed flow (cfs) | Boaters per day predicted by model | Days in month | Predicted boaters per month |
|---|---|---|---|---|
| April | 39 | 2.6 | 30 | 77 |
| May | 281 | 20.1 | 31 | 623 |
| June | 524 | 37.7 | 30 | 1,132 |
| July | 343 | 24.6 | 31 | 763 |
| August | 205 | 14.6 | 31 | 452 |
| September | 82 | 5.7 | 30 | 170 |
| October | 51 | 3.4 | 31 | 106 |
| Total | | | | 3,218 |

### Future boater user days

It is reasonable to believe that the number of boater days at the park will increase in future years for the following reasons:

1. **Whitewater Events**. According to Earl Richmond (owner of Summit Kayak), there are plans to hold weekly whitewater rodeos at the park starting in 2002. The park has also been proposed for some of the events for the Ten Mile One Mile whitewater event traditionally held on the second weekend of June. These events will most likely increase the interest and use of the park by boaters.

2. **Higher Stream Flows**. Stream flows in 2001 tended to be below typical values. Higher flows will most likely increase interest and use of the park by boaters.

3. **Phase II Completion**. The modifications included in Phase II (plus improvements made to Phase I) will most likely increase interest and use of the park by boaters. The park will be able to accommodate more boaters at one time and provide a greater diversity of boating activity. In particular, more advanced structures are likely to make the park even more attractive to intermediate and advanced boaters.

4. **Maturity**. The park opened in 2001 with only Phase I attributes. It is likely that over time more boaters, especially destination boaters from out of the immediate area, will hear about the park and its features. Over time, the base of boaters knowledgeable about the park will grow.

5. **Growing Popularity of Kayaking**. Outdoor recreation — particularly whitewater sports — are growing industries (see Chapter 3). It is likely that more interest will evolve in whitewater kayaking and the park.

For these reasons, we believe our 2001 boater user day estimates underestimate future use. It is plausible that the number of boater user days could be much higher than the 2001 reported estimates when all of the above factors are considered. Earl Richmond estimates a 25% increase in use after completion of the Phase II structures.

### Spectator use and values

The park provides benefits beyond the direct benefits to boaters. The park is located along the River Walk and is highly visible to spectators. In fact, the boaters interviewed all commented that many spectators stop and watch them perform on the course. This type of entertainment adds to the ambiance of Breckenridge as a premium outdoor recreation area. Tourism is an important element to the Breckenridge economy. It is estimated that the average guest staying in Breckenridge spends $195 per day in the summer (Breckenridge Resort Chamber, 2001). The

Whitewater Park and the improved amenities of Kingdom Park and the nearby Recreation Center add significantly to the draw of Breckenridge as a summer destination for visitors. This study does not estimate the economic value of the Breckenridge course for nonboaters.

## 1.3 Background Description of the Vail Course

The Town of Vail Whitewater Park is located on Gore Creek in the Town of Vail. The park consists of three control structures along approximately 300 feet of the existing channel. The structures were constructed in October and November 2000.

## 1.4 Types and Levels of Use at the Vail Course

We interviewed several people knowledgeable about the Town of Vail Whitewater Park to obtain preliminary estimates of the types and levels of use during the 2001 season.

The persons interviewed are listed in Table 1.6.

### 2001 boater user days

Boater use varies with flow, day of week, and time of day, among other factors. An attempt was made in 2001 to maintain user logs of the kayak course by Mountain Quest Sports. However, the logs were not maintained regularly by Mountain Quest Sports staff, according to Craig Russom. Craig was able to provide us with only four sheets of logs covering the period May 22, 2001, to June 7, 2001, as best we can tell (a number of entries did not have dates). We observed that 14 out of the total 54 entries were from out-of-town boaters, but we cannot draw additional conclusions from these data.

Without user logs, we obtained estimates of average and the maximum number of boaters from the interviewees listed in Table 1.6 using the following question:

*When you are at the park boating, what is the average and maximum number of boaters that are at the park with you?*

The results are shown in Table 1.7. Note these are not daily averages, but estimates of the number of boaters as directly experienced by the interviewees during their visits to the Vail Whitewater Park.

**Table 1.6. Interviewees for Vail Whitewater Park.**

| Person | Comment |
|---|---|
| Mike Duffy — Alpine Kayak and Canoe<br>Years kayaking: 14<br>Skill level: Advanced<br>Home city: Avon<br>Miles to course: 10<br>Tele: (970) 949-3350 | Used park about 10 to 15 times in 2001 from May to July. Typically uses park for 1.5 hours after work on weekdays and during day on weekends. Also, he believes that the river run from the Vail Golf Course to confluence with Eagle River has become much more popular because of the park. The park adds a dimension to the run and he estimates the number of boaters doing this run increased by at least 25% in 2001. He also notes that the Gore Creek stretch is great recreational opportunity for beginners because structures break up continuous flow. The Teva Whitewater event introduces many people to the sport and brings in many destination boaters. The park increases the demand for kayak lessons at his business, Alpine Kayak and Canoe. |
| Craig Russom — Mountain Quest Sports<br>Years kayaking: 7<br>Skill level: Advanced instructor<br>Home city: Edwards<br>Miles to course: 10<br>Tele: (970) 926-3867 | Used park about 24 times in 2001 from April to June. Typically uses park for 2 hours, between 4 and 6 p.m., on weekdays and weekends. Does not focus on cfs, but gauges flows by a mark on a rock at the park. He prefers the higher flows. He views park as a beginner/intermediate course, although he notes a significant increase in advanced boaters. The Whitewater Park was the reason that Mountain Quest Sports opened up a kayaking store in 2001 in the Vail Village (Adventure Center). They have a significant business providing kayaking lessons and rentals to visitors staying in Vail. |
| Ian Anderson, local kayaker<br>Vail Valley Tourism and Convention Bureau<br>Years kayaking: 6<br>Skill level: Advanced<br>Home: Avon<br>Miles to park: 5<br>Tele: (970) 477-4015 | Used park about 15 times in 2001 from mid-May to early July. Typically uses park for 2 hours after work on weekdays. He prefers the higher flows, and would like to see more advanced control features for more advanced kayak techniques. |
| Joel Heath, local kayaker<br>Vail Valley Tourism and Convention Bureau<br>Years kayaking: 2<br>Skill level: Intermediate<br>Home: Vail<br>Miles to park: 2<br>Tele: (970) 390-8106 | Used park about 5 times in 2001 from May to June. Typically uses park for 1.5 hours after work on weekdays. He was not sure about flows. Notes that accessibility to the course makes it easier for beginners to get into the sport. |

Table 1.7. Other boaters in the Vail Park during interviewee outing.

| Interviewee | Average | Max |
|---|---|---|
| Mike Duffy | 10 | 15 |
| Craig Russom | 10 | 30 |
| Ian Anderson | 3.5 | 15 |
| Joel Heath | 10 | 20 |

We subsequently called back the two local boating shop owners — Mike Duffy and Craig Russom and got their user estimates of the total number of boaters per day. Their estimates are shown in Table 1.8. Figure 1.3 compares average river flows with average boater days for April through July.

Table 1.8. Average per day boater use estimates for Vail Whitewater Park.

| | Mike Duffy | | Craig Russom | |
|---|---|---|---|---|
| Month | Weekday | Weekend | Weekday | Weekend |
| April 2001 | 1 | 1 | 2 | 6 |
| May 2001 | 30 | 40 | 12 | 24 |
| June 2001 | 35 | 45 | 12 | 24 |
| July 2001 | 5 | 5 | 0 | 0 |

Mike Duffy and Craig Russom reported that some boaters used the park during other months of 2001, but the use was not significant.

Multiplying the number of estimated user days by the number of days each month provides us with boater day totals ranging between 1,044 and 2,345, based on data from Craig Russom and Mike Duffy, respectively.

The linear regression model correlating the average boater days with flow is as follows:

$$\text{Boaters Per Day} = -2.97 + 0.076 * \text{cfs} \qquad (1.2)$$

Flow explained 98% of the total variance ($R^2$) exhibited in boater use. The model estimates boater use increased by 7.6 boaters per day for every 100 cfs increase in flow.

We developed a prediction of boater use based on the flows claimed by Vail in their application of water rights and the regression model developed in Equation 1.2. The results are summarized by month in Table 1.9. The total number of boaters for the season equals 3,474. Because the claimed flows are higher than those observed in 2001, the total boater use estimate is higher than the 2001 use estimates.

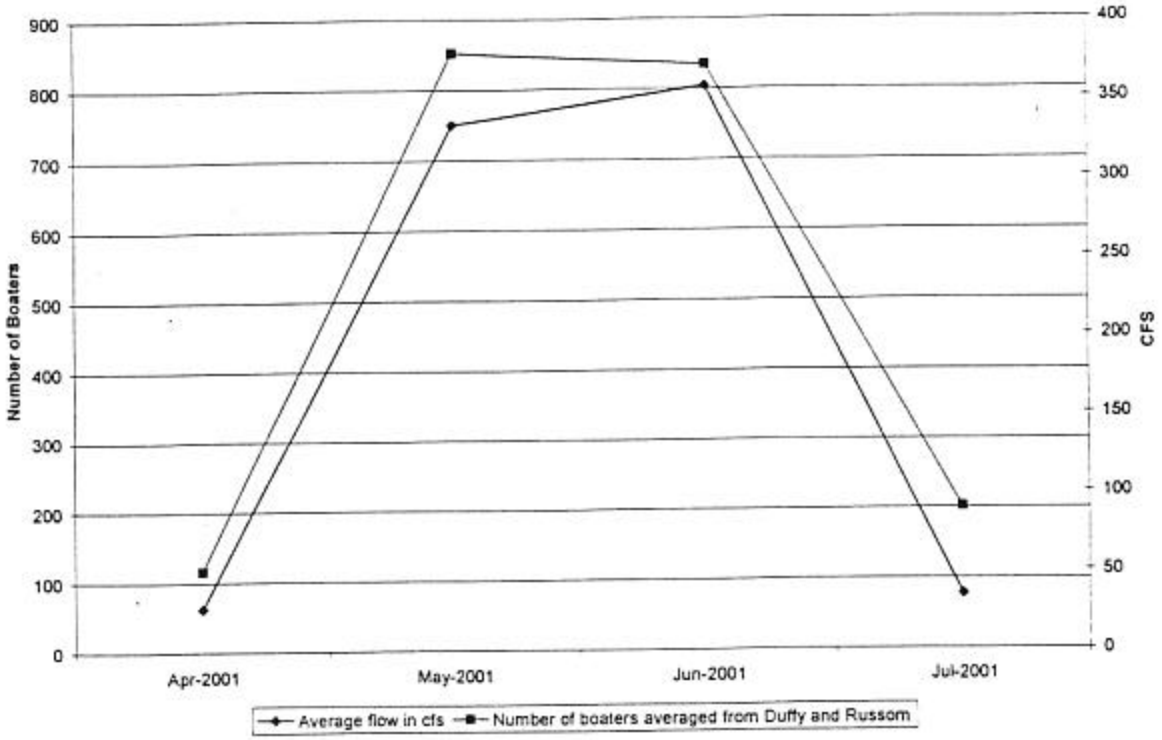


**Figure 1.3. Boater days and flows at Vail for 2001.**

**Table 1.9. Vail flow and boater use scenario.**

| Month | Claimed flow (cfs) | Boaters per day predicted by model | Days in month | Predicted boaters per month |
|---|---|---|---|---|
| March | 54 | 1.1 | 31 | 34 |
| April | 227 | 14.2 | 30 | 426 |
| May | 400 | 27.3 | 31 | 846 |
| June | 400 | 27.3 | 30 | 819 |
| July | 400 | 27.3 | 31 | 846 |
| August | 218 | 13.5 | 31 | 419 |
| September | 67 | 2.1 | 30 | 63 |
| October | 48 | 0.7 | 31 | 20 |
| Total | | | | 3,474 |

### 2001 Teva Whitewater Festival

Vail has hosted a Memorial Day Weekend Whitewater Festival for the past 7 years. Since the kayak park opened, the event has become a major summertime attraction. The 2001 Teva Whitewater Festival enjoyed tremendous success in Vail, attracting some of the world's best kayakers, huge crowds, and great media coverage. Twenty of the world's best kayakers competed in a unique, spectator-friendly rodeo invitational at the festival; the athletes included the world freestyle champion and the waterfall descent world record holder.

At the 2001 Teva Whitewater Festival, the Vail Valley Tourism and Convention Bureau surveyed 136 spectators (summary results are shown in Appendix A). The average age of spectators was 33; 32% had an average annual income over $75,000; 67% came specifically for the event, and 47% came from out of town. The Whitewater Festival is a big event, with a significant economic impact on the Town of Vail. The editor of *Kayak* magazine calls the event second only to the world championships (VVTCB, 2001), and for the first time in 2001 the competition was nationally televised in a one-hour broadcast by FOX Sports. This type of exposure is quite valuable to Vail in its efforts to boost summer tourism, and the event crowds themselves provide an important economic stimulus.

In 2002, 35 of the world's best male, female, and junior whitewater athletes will be invited to the competition. Vail's Whitewater Park will allow thousands of spectators to enjoy the competition from riverside, while millions of viewers from around the country are expected to see the festival on a one-hour, nationally syndicated television program.

### Spectator use

The park provides benefits beyond the direct benefits to boaters. The park can be viewed from a pedestrian bridge, making boater use highly visible to spectators.

## 1.5 Conclusions

The 2001 number of boater days at the Breckenridge and Vail whitewater parks is approximately the same. Our estimates for Breckenridge range up to 2,307 user days, and our estimates for Vail range up to 2,345 user days for 2001. As found in prior analysis of the kayaking course in Golden, Colorado, kayakers appear to prefer higher flows over low flows (all things equal), and use levels appear to be positively correlated with periods of relatively high flow.

# 2. The Value of Whitewater Use to Kayakers

The total value of kayaking has two components: (1) what people actually pay to kayak (e.g., equipment costs), plus (2) what they would be willing to pay over and above what they currently pay. The first component of value can be represented simply by the expenditures incurred. The second component requires more explanation. Consumers purchase products in the marketplace because they are better off with the products than they were with the money needed to obtain the products (or whatever else they would have purchased with the money). If that were not true, goods and services would not be exchanged through free will in the marketplace. Similarly, recreational site visits cost money and time, and recreationalists would not undertake visits unless the visits yielded net benefits. Those net benefits are referred to by economists as "consumer surplus," and are measured as willingness to pay (WTP).

This chapter is divided into three subsections. In Section 2.1, an estimate of kayaking expenditures is developed. Our figures account for kayak equipment and other costs. In Section 2.2, we show WTP "unit values" obtained from the peer reviewed economics literature. In Section 2.3 we summarize the estimated use of the kayak course (from Chapter 1) and combine this information with the valuation estimates to calculate the value of this use to kayakers and others who use the Breckenridge and Vail courses.

## 2.1 Kayaking Expenditures

We conducted a preliminary assessment of the costs that might be typically incurred by a kayaker visiting the Breckenridge and Vail courses. We considered three cost items: kayak equipment, automobile, and travel time.

Table 2.1 shows our cost calculation for kayak equipment. We estimate the cost of purchasing a typical set of new kayak equipment to be about $2,000. This estimate is based on a review of prices shown at Alpenglow Mountainsport Inc., a retailer of boating gear located in Golden, in 2000. The set of equipment includes a kayak, paddle, helmet, dry top, life jacket, spray skirt, booties, gloves, and throw rope. We amortize the equipment costs over three to five years and assume the equipment is used on average 15 to 20 days per year. This leads to an average equipment cost ranging between $20 and $44 per user day. In Breckenridge, the 1-day rental cost for a whitewater kayak is $45 (Summit Kayak and Canoe). In Vail, the 1-day rental cost for a whitewater kayak is $40 (Mountain Quest Sports). Hence, we believe the range of $20 to $45 is a reasonable estimate of the equipment cost per kayaking outing.

Table 2.1. Cost of kayaking equipment (2000$).[a]

| Kayak gear purchase cost | Useful life (years) | Average user days/year | Gear days over useful life | Kayak gear cost per user day |
|---|---|---|---|---|
| $2,000 | 5 | 20 | 100 | $20 |
| $2,000 | 4 | 20 | 80 | $25 |
| $2,000 | 3 | 20 | 60 | $33 |
| $2,000 | 5 | 15 | 75 | $27 |
| $2,000 | 4 | 15 | 60 | $33 |
| $2,000 | 3 | 15 | 45 | $44 |

a. Using the CPI values for 2001, the cost would be roughly 2% higher.

The other two cost components we considered relate to travel costs. Table 2.2 shows automobile costs for roundtrip distances of 20, 30, and 40 miles using the federal reimbursement rate of $0.345 per mile. From Chapter 1, Earl Richmond of Summit Kayak and Canoe estimated that 50% of boaters at Breckenridge are local to Summit County and 50% are from outside. Mike Zobbe estimated a 70%/30% split between local and nonlocal boaters using the park. To be conservative, we assume a 75%/25% split between local and nonlocal boaters in our calculations. Using an average roundtrip travel distance of 20 miles for locals and 60 miles for nonlocals, the overall average roundtrip distance is estimated to be 30 miles.

Table 2.2. Automobile costs to travel to kayak course (2001$).

| Average round trip miles to whitewater courses | Auto cost per mile[a] | Auto cost[b] |
|---|---|---|
| 20 | $0.345 | $6.90 |
| 30 | $0.345 | $10.35 |
| 40 | $0.345 | $13.80 |

a. Equals the federal reimbursement rate as of January 1, 2001.
b. Equals round trip miles multiplied by the cost per mile.

We also believe an average 30-mile roundtrip distance is reasonable for the Vail Whitewater Park. The Vail user logs available show that 26% of boaters come from outside the area. Hence, assuming a 75%/25% split between local and nonlocal boaters and an average roundtrip travel distance of 20 miles for local boaters and 60 miles for nonlocal boaters, we get 30 miles as a representative roundtrip travel distance.

A 30 mile roundtrip translates into $10.35 per trip for auto-related expenses alone, as shown in Table 2.2.

Studies of recreational expenditures and travel costs also typically include the opportunity cost (value) of travel time in the estimation process (time spent on site also might be included). Assuming an average 50 miles per hour travel rate (including stop signs, etc.), the average travel time given a 30 mile round trip is 0.6 hours. We use a $10 per hour value to reflect this travel time cost, which translates into a $6 travel time cost per visit.

The total cost from the kayak equipment, automobile, and travel time cost components ranges from $36.35 ($20.00 + $10.35 + $6.00) to $61.35 ($45.00 + $10.35 + $6.00) per visit using the range of assumptions regarding kayak equipment cost and assuming an average roundtrip travel distance of 30 miles.

## 2.2 User Values for Kayaking (WTP-based estimates of value)

The method of "benefits transfer" is a standard practice used by resource economists to obtain quick approximations of value when there is no opportunity to undertake primary research by administering a new survey or econometric model. Benefits transfer is conducted by obtaining values per unit of use for similar types of activities from studies conducted in similar locations. Then, those unit values are multiplied by the amount of use. A unit value typically might be the consumer surplus value for an activity such as a fishing day or a hiking trip.

We conducted a benefits transfer using recent, peer-reviewed recreational valuation literature. One set of unit values per day of kayaking was obtained from a 1999 database compiled by John Loomis, a professor of economics at Colorado State University and an expert in valuing environmental amenities. This database is a "meta-analysis," which is an amalgamation of many individual studies to develop an estimate of central tendency. Meta-analysis is used to exploit and combine the strengths of multiple studies that use different valuation methods, and to avoid being misled by a single potential outlier study. These user day values reflect the availability of substitute sites for the recreationalists.

Typically, two types of valuation methods are used in the literature, and in the Loomis database: (1) revealed preference (RP) methods such as travel cost models, which use observed recreational behavior to infer values; and (2) stated preference (SP) methods such as contingent valuation, which ask people to state their values or their willingness to trade off different resource commodities. Carson et al. (1996) demonstrated that estimates of use values do not vary substantively whether RP or SP methods are used.

The Loomis database reports values for five regions of the United States. The values used in this report are taken from the values listed for the "Intermountain" region because they apply directly to Colorado. This region had six studies on floatboating, which includes kayaking, rafting, and sailing. The mean value per person per day for the "Intermountain" region is $39.91, in 2001 dollars. For comparison, Loomis found the national average to be $33.06, in 2001 dollars.[1]

The recreation values summarized in the Loomis database are generally consistent with summary values obtained in other analyses, such as Walsh et al. (1980). This study, using the contingent valuation method, found kayaking values on the Crystal, Roaring Fork, and Yampa rivers (all in Colorado) to be $35.62 in 2001 dollars per person per day. In the same study, rafting on these same rivers was valued at $30.81 per person per day. Thus, we may deduce that, in general, kayaking is a more highly valued activity than rafting. Accordingly, the Loomis value for floatboating may be an underestimate, since it includes kayaking and rafting together. Nonetheless, the Loomis estimate is used as an upper bound in our analysis.

Another study focused on kayaking in the West found that the average user day value for kayaking on the Colorado River is $67.25, in 2001 dollars (Bishop et al., 1989). However, we do not apply this value to the Vail or Breckenridge kayak courses because the Colorado River is considered to be a unique resource in the United States and, thus, values for use of this special amenity may be higher than those for similar activities at other sites.

Therefore, for the purposes of this study, we use a range of $35.62 to $39.91 per person, per activity day, as the value of kayaking (in 2001 dollars).

## 2.3 Total Use Value in 2001

As developed in Chapter 1 for the Breckenridge course, the estimate of boater user days for 2001 is between 1,309 and 2,307. We believe visitation will be greater in the future given completion of Phase II modifications, establishment of whitewater events, higher river flows, maturity of the park, and the growing popularity of kayaking as identified in Chapter 1.

For the Vail course, the estimated number of boater user days in 2001 ranges from 1,044 to 2,345. These estimates may also significantly increase in the future if planned park modifications are completed (modifications are likely to be conducted in the fall of 2002, communication with Ian Anderson).

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1. Values updated to 2001 dollars using Consumer Price Index, U.S. Department of Labor, Bureau of Labor Statistics.

To obtain the recreational use value of the whitewater parks, the user days are multiplied by the sum of expenditures and consumer surplus. For daily expenditures, we use the estimate of $36 to $61 per person, which reflects conservative estimates of out-of pocket expenses alone and with travel time included, respectively. Added to this is the consumer surplus realized by each kayaker of $36 to $40 per outing. Thus, our recreational value range per outing is from $72 to $101 (2001 dollars).

Multiplying the estimated number of 2001 user days by the value per outing estimates yields a total recreational beneficial use value of the kayak courses of up to:

- $233,600 per year for the Breckenridge course in 2001
- $237,500 per year for the Vail course in 2001.

## 2.4 Beneficial Value of Special Events

The competitive and other special events held at kayak courses generate other economic benefits besides ones that accrue from the participants.

### 2001 Teva Whitewater Festival (Vail, Colorado)

Each year for the past 7 years, Vail has hosted a whitewater festival that features professional kayaking and rafting competitions. In 2001, Vail's new kayaking park became a major focal point of the event, attracting top kayakers from the United States and around the world. The combination of the high level of competition and the Vail kayak park's convenient location near the center of town attracted the largest crowds in the event's history. Twenty professional kayakers competed in the feature events of the TEVA 2001 Whitewater Festival. Of these 20, five were Colorado residents — one was a Vail resident and four came from other Colorado towns. Ten competitors traveled to Vail from other U.S. states, including California, Montana, New Mexico, North Carolina, Oregon, Utah, and Washington. There were five international competitors — three from Canada, one from England, and one from Costa Rica.

For the Memorial Day weekend event, approximately 2,300 spectators attended the Saturday competition (Ian Anderson, Vail Valley Tourism and Convention Bureau, personal communication, January 2, 2001), while attendance for the remaining portions of the weekend was "several hundred" (VVTCB, 2001). An event this size provides an important economic stimulus for Vail, especially given the timing of the event during the late spring "shoulder" season (the period after the ski season ends and before the summer recreation season begins), when comparatively few visitors travel to Colorado's mountain resort communities. According to a survey of spectators conducted on behalf of the Vail Valley Tourism and Convention Bureau by RRC and Associates (see the appendix):

- 67% came to Vail specifically for the Teva Whitewater Festival.
- 47% came from outside Eagle County, and 26% of these visitors spent at least one night in the area.
- Those staying overnight stayed an average of 3 days, and 30% stayed 4 nights or more.
- The average Saturday spectator spent a total of $133 for food, lodging, and shopping. Therefore, the festival generated over $305,000 in spending by spectators alone at the Saturday competition alone.

The 2001 whitewater festival provided valuable regional and national exposure to Vail. The event was marketed heavily in Colorado's print and electronic media and had several promotional tie-ins with local businesses. In addition, radio station Q106.5 in the Quad Cities (of Iowa and Illinois) highlighted the festival and conducted a contest to win a Vail rafting trip. The biggest exposure, however, was provided by FOX Net Sports, which prepared a one-hour program on the kayaking competition. This program was aired a confirmed 13 times in seven of Fox's major markets across the United States (Detroit, Pittsburgh, Midwest, Los Angeles, San Francisco Bay Area, Rocky Mountain Region, and Florida).

### World kayak championships

The Vail kayak park could also attract larger events in the future. In 2001, representatives from Vail entered a bid to host the 2003 World Freestyle Kayak Championships. Vail was not selected to host the event, in large part because sufficiently high flow levels could not be guaranteed for the course (Ian Anderson, Vail Valley Tourism and Convention Bureau, personal communication, January 2, 2001). Despite losing the 2003 bid, Vail was considered an attractive location and could present a successful bid to host the biannual event in the future, especially if high enough flow levels can be reasonably assured.

An event of this size would be a major boost to the Vail economy. As an example, the 2001 championships, held in Sort, Spain, was a weeklong competition that attracted large crowds to watch 400 of the world's top kayakers from 27 countries compete in a variety of events. Attendance at the semifinals was estimated to be well over 3,000 (Buchanan, 2002).

### Other Vail events

In addition to the Teva Whitewater Festival, the Vail kayak park hosts a whitewater rodeo series. In 2001 this series included 11 weekend competitions from May 16 through August 1. Two of these events served as qualifying events for the Teva competition, and the others were series of competitions leading up to a series final held August 1. These events are cosponsored by two

local kayaking shops, Alpine Kayak and Mountain Quest Sports. A similar series is planned for 2002, with event dates to be announced.

**Breckenridge events**

Beginning in 2002, the Breckenridge Whitewater Park plans to host weekly whitewater rodeo events. The park has also proposed to host events as part of the Ten Mile One Mile whitewater event held annually on the second weekend of June. These events are expected to draw increased numbers of participants and spectators to the park, which would provide an important boost to summertime tourism in Breckenridge and Summit County, especially in the late spring/early summer "shoulder" season, when water levels are highest.

In summary, special events are scheduled for the Vail and Breckenridge courses because of the high quality experience provided by the waters diverted within the courses. These special events provide numerous important benefits to the participants, sponsors, spectators, vendors, and the community at large. Events generate benefits above and beyond those included in the monetized estimates discussed for nonevent use periods.

- Expenditure and consumer surplus values assigned to special event participants probably understate the actual values that apply to the participants in the elite events (i.e., they probably spend more than the local, nonevent participants on food, lodging, and other items, and therefore create a larger economic stimulus to the community than has been projected in this report).

- Many event-related benefits are not included in the monetized estimates:

  - The value derived by the spectators who participate in the special events.

  - Revenues received by local vendors, and the associated secondary economic stimulus generated by expenditures made by all spectators (Teva Whitewater Festival spectator-related estimates are estimated for this report, but impacts from other spectators are omitted).

  - Revenues received by the event sponsors and organizers (e.g., registration fees collected), or the economic impact of expenditures made by those parties in hosting the special events.

  - Civic pride and community identity associated with being the host location to elite or other special events.

  - Benefits received by boat and gear manufacturers and vendors, by providing a venue where they can show their wares to kayak enthusiasts. By drawing vendors

and manufacturers to the site, the kayak courses also generate revenues for the local economy (e.g., for food and lodging) that have not been included in the empirical estimates.

# 3. Economic Stimulus to the Local Region

## 3.1 Value of Recreation and Tourism in Colorado

Outdoor recreation is an important activity nationwide. In 2000, more Americans participated in a "human powered" recreation activity (136 million) than voted in the U.S. presidential election (Outdoor Industry Association, 2001). Recreation is particularly popular in Colorado, and as detailed below, plays a key role in the state and local economies.

### 3.1.1 Employment

The importance of recreation-related tourism to employment in Eagle County and Summit County is highlighted in Figures 3.1 and 3.2, respectively. These results are based on a study sponsored by the Colorado Department of Local Affairs (CBEF, 2001). The study estimates that in 1999, tourism-related jobs accounted for 8% of Colorado jobs, 50% of Eagle County jobs, and 57% of Summit County jobs. [1]

These findings of the importance of tourism on employment are corroborated by the results of a Colorado Tourism Office (in the Office of Economic Development and International Trade) study, conducted by Dean Runyan Associates (2001). The Dean Runyan study found that in 2000, jobs generated by visitors traveling to and within Colorado made up 6.6% of all jobs in the

1. CBEF (2001) estimated the number of tourism jobs by applying proportions of employment in 25 industrial categories that were estimated in a 1997 CBEF report to 1999 industry employment estimates for the same categories. "The new estimates of tourism jobs were then reviewed and adjusted for major changes in industrial classification and for the addition or loss of tourism employers. In those counties with significant tourism activity, local experts further reviewed and modified the results. Initial assignments of tourism jobs were prepared for each industry based on detailed databases covering the tourism industry and Colorado's county economies. Then, county or area workshops were conducted to review these initial assignments. Participants in the workshops were asked to identify the specific firms that produced goods or services for visitors to the county. All aspects of the tourism sector were addressed in the workshops, including the effects of second-home owners" (CBEF, 2001).

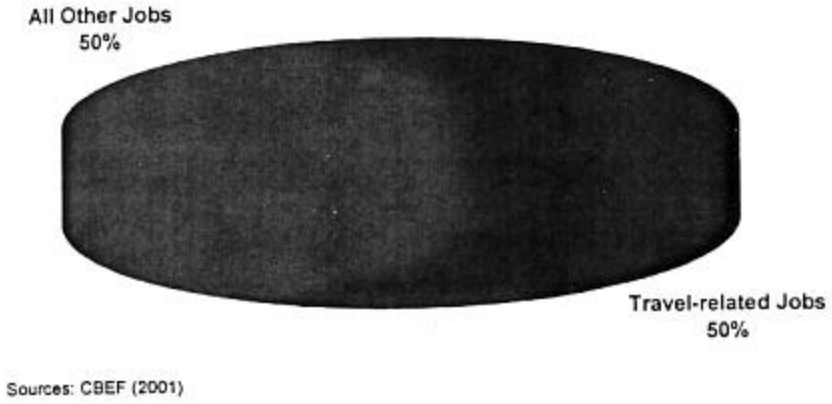


**Figure 3.1. Tourism-related jobs as a percentage of all jobs: Eagle County.**

state of Colorado.[2] These tourism-generated jobs are much more important, however, to Colorado's mountain resort areas. In 2000, travel-generated jobs accounted for one-third of all jobs in Eagle County and one-half of all jobs in Summit County (not including tourism-related jobs generated in the real estate and construction sectors).[3]

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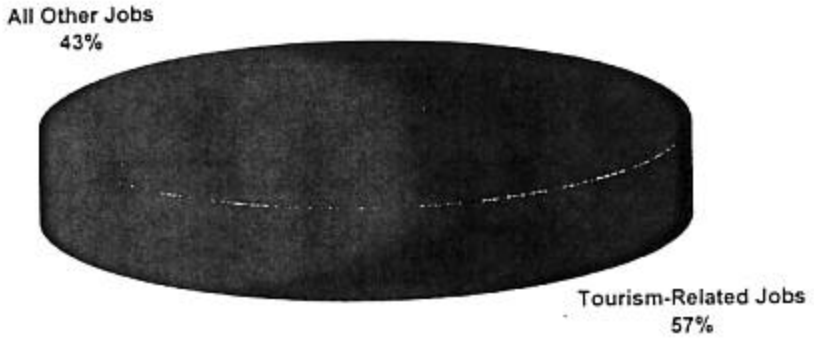
2. Dean Runyan Associates (2001) uses the results of a Colorado visitor survey to estimate spending by travelers. Spending on air travel in Colorado was estimated using payroll and receipts data provided by the Air Transportation Association, the U.S. Department. of Labor, and the Colorado Department of Labor. Spending by visitors staying in hotels, motels, resorts, and private campgrounds was estimated using a ratio of total travel spending to spending on lodging, where total spending on lodging is estimated using applicable state and local tax receipts. Spending by visitors to public campgrounds and private homes is estimated using survey results on daily spending by visitors in each category. Spending by visitors to vacation homes is based on an "inventory of vacation homes (2000 U.S. Census) expenditure survey data of vacation home visitors that made trips of 30 days or less."

Once total travel spending is estimated, travel earnings are estimated using payroll-to-receipts ratios derived from the 1997 Economic Census and earnings data from the Bureau of Economic Analysis; and travel employment is estimated using wage data from the Colorado Department of Labor and the Bureau of Economic Analysis. Local tax receipts generated by travel are estimated as a percentage of "local lodging taxes, sales taxes, and other local taxes applicable to traveler purchases (e.g., automobile rentals)." State tax receipts generated by travel are estimated as a percentage of "state sales taxes, gasoline taxes, and income taxes on travel-generate earnings and business income."

3. The estimates in the CBEF report are slightly higher than the Dean Runyan Associates (2001) estimates because CBEF defines tourism employment to include a broader range of economic sectors, notably tourism-related real estate and construction.




Sources: CBEF (2001)

**Figure 3.2. Tourism-related jobs as a percentage of all jobs: Summit County.**

### 3.1.2 Impacts on earnings, tax revenues, and employment

Recreation and tourism-related impacts on the state and local economies of Colorado extend beyond direct impacts on employment. Earnings and tax receipts are among the other important economic parameters that are boosted by recreation-related spending in Colorado's resort communities.

Further detail on the economic value of tourism-related spending is provided in Table 3.1, based on data from the Colorado Tourism Office report prepared by Dean Runyan Associates (2001). The spending categories are defined as follows:

- **Travel Spending.** All purchases by travelers during their trip, including lodging taxes and other applicable local and state taxes paid by the traveler at the point of sale.
- **Recreation Spending.** Spending on entertainment and recreation, such as admissions to tourist attractions or artistic events; does not include accommodation, eating and drinking, food, transportation, or retail sales.
- **Earnings.** The wage and salary disbursements, earned benefits, and proprietor income of employees that receive travel expenditures; includes only the earnings that are attributed to travel expenditures.

**Table 3.1. Recreation and tourism-generated impacts on the economies of Colorado, Eagle County, and Summit County: 1996-2000 (spending in current dollars).**

| | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|
| **Colorado** | | | | |
| Employment (jobs)<br>(% of all Colorado jobs) | 144,000<br>(7.4%) | 142,000<br>(7.0%) | 142,000<br>(6.7%) | 145,000<br>(6.6%) |
| Earnings ($M) | 2,577 | 2,702 | 2,794 | 3,033 |
| Spending ($M) | 8,058 | 8,206 | 8,547 | 9,327 |
| Recreation spending ($M)<br>(% of travel spending) | 1,250<br>(15.5%) | 1,298<br>(15.8%) | 1,332<br>(15.6%) | 1,413<br>(15.1%) |
| Local taxes ($M) | 236 | 242 | 249 | 273 |
| State taxes ($M) | 248 | 261 | 263 | 277 |
| **Eagle County** | | | | |
| Employment (jobs)<br>(% of all Eagle County jobs) | 10,000<br>(40.4%) | 10,000<br>(38.0%) | 10,000<br>(36.6%) | 9,400<br>(33.3%) |
| Earnings ($M) | 223.2 | 239.6 | 241.7 | 243.6 |
| Spending ($M) | 623.9 | 654.4 | 663.9 | 670.2 |
| Local taxes ($M) | 24.57 | 25.65 | 26.00 | 26.24 |
| State taxes ($M) | 17.50 | 18.38 | 18.55 | 18.68 |
| **Summit County** | | | | |
| Employment (jobs)<br>(% of all Summit County jobs) | 10,300<br>(59.9%) | 9,100<br>(51.0%) | 9,300<br>(50.4%) | 9,700<br>(50.4%) |
| Earnings ($M) | 183.7 | 175.2 | 182.3 | 200.4 |
| Spending ($M) | 513.4 | 478.7 | 500.7 | 550.4 |
| Local taxes ($M) | 18.52 | 17.44 | 18.26 | 20.18 |
| State taxes ($M) | 14.46 | 13.74 | 14.28 | 15.64 |

Sources: Bureau of Labor Statistics, 2001; Dean Runyan Associates, 2001. Excludes tourism-related jobs created in the real estate and construction sectors.

- **Employment.** All employment associated with the above earnings, including wage and salary workers and proprietors, and full- and part-time positions. The employment estimates are not full time equivalents (FTEs).

- **Recreation Employment.** Employment at entertainment and recreation, such as to tourist attractions; does not include accommodation, eating and drinking, food, transportation, or retail sales.

- **Local Taxes.** Tax receipts collected by counties and municipalities, as levied on applicable travel-related purchases, includes lodging taxes, local sales taxes, and other local use taxes (e.g., auto rental taxes), but not property taxes.

- **State Taxes.** State sales taxes, gasoline taxes, and income taxes on individuals and businesses.

As shown in Table 3.1, in 2000, the tourism-related travel industry statewide provided 145,000 jobs to the Colorado economy. Earnings for these jobs totaled just over $3 billion. Total travel-related spending in Colorado in 2000 was over $9 billion. In addition, travel spending contributed significantly to state and local taxes. Of these travel-generated taxes, a large share of the receipts accrued to local governments. In 2000, 49.5% went to local taxes, 26.7 % went to state sales tax, 12.5% went to the state gas tax, and 11.3% went to state income taxes. (Dean Runyan, 2001).

It is important to note that these results reflect only "direct" spending effects and do not include the multiplier effect of travel spending that occurs when money spent by travelers is recirculated throughout the local economy. As detailed in Section 3.4, these multiplier effects can be significant. For example, in 2000, the greater than $3 billion in recreation-generated income in the state produced, through economic stimulus, up to $9 billion in income.

## 3.2 Kayaking as an Emerging Recreational Asset

The Outdoor Industry Association's (2001) report on participation in outdoor recreation highlights the growing popularity of kayaking. The report presents the results of a 2000 survey of 2,502 people (a representative sample of the U.S. population), in which participants were asked about their participation in 15 "human-powered outdoor recreation" activities, including kayaking.

The survey results show that 3% of the U.S. population, or approximately 6.4 million people, participated in kayaking in 2000. Of the participants, 1.1 million were considered "enthusiasts" — defined as people who participated in kayaking 10 or more times in 2000. These participation rates represent 50% growth in the number of participants and 150% growth in the number of enthusiasts since 1998 (Outdoor Industry Association, 2001).

Kayaking is one of the few outdoor activities that is experiencing growth in participation (Outdoor Industry Association, 2001). Participation in many other activities is leveling off, and declining for a few activities. In fact, kayaking (along with snowshoeing and telemark skiing) is identified in the report as one of only three "emerging" sports, "showing dynamic growth in both new entrants to the sport and growing levels of participation commitment." It appears that this