

**Preliminary Evaluation of the
Beneficial Value of Waters
Diverted in the Clear Creek
Whitewater Park
in the City of Golden**

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Introduction and Summary

The Golden Whitewater Course for kayaking and canoeing is located at the Clear Creek Whitewater Park (CCWWP), in the City of Golden. Construction of the course was completed in 1998. It provides valuable recreational opportunities. The course is currently 1/4 mile long, with rip-rap along the banks with trails and stair-step rock above that provide seating for viewing. It is a complete, world-class course. This report provides a cursory investigation into the order of magnitude of the economic benefits associated with the water rights used to supply the kayak course. The findings reported here are based on a review of available information on kayaking and other activities associated with the park, economic valuation literature on kayaking, and user data.

Our results demonstrate that water diverted in the CCWWP generates considerable economic benefit to the kayakers using the course, other interested parties, and the community as a whole. As summarized in Table 1, the total annual beneficial value generated by the waters diverted within the CCWWP amounts to between \$1.4 and \$2.0 million, not inclusive of several benefits that could not be quantified or valued within the present study's constraints. Over a 20 year period, the present value of all current and anticipated future benefits provided by the waters diverted within the kayak course would be over \$15.4 million to \$23.0 million.

1. Estimation of Total Recreational Value

The total value of kayaking at the course in Golden 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 deserves 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).

Section 1 is divided into three subsections. In Section 1.1, an estimate of kayaking expenditures is developed. Our figures account for kayak equipment and other costs. In Section 1.2, we show WTP "unit values" obtained from the peer reviewed economics literature. In Section 1.3 we discuss the use of the kayak course, while in Section 1.4 we calculate the value of this use. In

Table 1. Estimated value of beneficial uses of waters diverted in City of Golden's kayak course (in 1999 dollars per year).

Beneficial use category	Level of use range	Monetary unit value	Beneficial value range
Kayakers in nonevent uses			
Expenditures	13,170	\$33.00	\$434,610.00
Consumer surplus	13,170	\$33.79	\$445,014.30
Kayakers in special events			
Expenditures ^a	465	\$33.00	\$15,345.00
Consumer surplus ^b	465	\$33.79	\$15,712.35
Economic stimulus for community			
2.0 to 2.88 times out-of-pocket kayaker expenditures ^c			\$449,955.00
Increase in property values			+ ^d
Spectators and near-stream recreators			
Nonevents	>0	>\$0	+>\$0
Special events	1,820	>\$0	+>\$0
Benefits to event sponsors and vendors			
Beneficial use of water downstream of kayak course (heavy use corridor)			+>\$0
Community identity, quality of life			+>\$0
Total beneficial use values per year			\$1,360,636.65
			\$2,031,895.10

a. Expenditures for event participants are probably much higher, including travel and lodging expenses, registration fees, etc.

b. Consumer surplus for elite, competition kayakers probably higher than average literature-based values.

c. Values shown are net of the expenditures shown above for kayakers.

d. "+" indicates positive benefits that could not be quantified or monetized using readily available data.

Section 2 we discuss additional values of the course stemming from the competitive events. Section 3 discusses the economic stimulus and other benefits to the local community because of the whitewater course.

1.1 Kayaking Expenditures

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

Table 2 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. 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. The 1-day rental cost at Alpenglow for a whitewater kayak is \$20. Hence, we believe the \$20 per use day is a reasonable estimate.

Table 2. Cost of kayaking equipment.

Kayak gear 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

The other two cost components we consider relate to travel costs. Table 3 shows automobile costs for roundtrip distances of 30, 40, and 50 miles using the federal reimbursement rate of \$0.325 per mile. Antidotal evidence suggests that kayak users come from many different places; on any given summer day it is common to see kayakers from out of state, the Colorado mountain regions, Boulder, Denver, and Golden. Because we do not have empirical data on kayaker travel distances, in this preliminary assessment we conclude that the 40 mile roundtrip estimate is reasonable, about the distance between the Clear Creek Whitewater Park and Boulder or Denver. A 40 mile roundtrip translates into \$13.00 per trip.

Table 3. Automobile costs to travel to kayak course.

Average round trip miles to Clear Creek Whitewater Course	Auto cost per mile ^a	Auto cost ^b
30	\$0.325	\$9.75
40	\$0.325	\$13.00
50	\$0.325	\$16.25

a. Equals the federal reimbursement rate as of January 1, 2000.
b. Equals round trip miles multiplied by the cost per mile.

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 40 miles per hour travel rate (including stop signs, etc.), the average travel time given a 40 mile round trip is one hour. We use a typical \$10 per hour value to reflect this travel time cost. This translates into a \$10 travel time cost per visit.

The total cost from the kayak equipment, automobile, and travel time cost components ranges between \$37.25 and \$73.19 per visit using the range of assumptions shown in Tables 1 and 2. We conclude a conservative point estimate of the cost is \$43 (based on a \$20 equipment cost, \$13 automobile cost, and \$10 travel time cost), of which \$33 is directly out-of-pocket.

1.2 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 that have already been 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 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) demonstrate 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 \$37.86, in 1999 dollars. For comparison, Loomis found the national average to be \$31.36, in 1999 dollars.

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 \$33.79 in 1999 dollars per person per day. In the same study, rafting on these same rivers was valued at \$29.23 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 will be 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 \$63.80, in 1999 dollars (Bishop et al., 1989). However, we do not apply this value to the City of Golden kayak course 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 will use a range of \$33.79 to \$37.86 per person, per activity day, as the value of kayaking (in 1999 dollars).

1.3 Levels of Use

Use of the kayak and canoe course at Clear Creek Whitewater Park (CCWWP) can be separated into two categories: event use and nonevent use. Nonevent use includes regular weekend and weekday daily use not organized as specific events. Nonevent use occurs throughout the entire year, with the heaviest use occurring from mid-April to early October (with more modest levels of use continuing through the fall and winter months). Event use consists of boating competitions organized in advance and usually conducted on weekends. The course is one of about 20 man-made top quality whitewater courses in the world. The course attracts competition events for

elite as well as nonelite athletes. There are usually at least three to four events held at the CCWWP in the summer.

1.3.1 Nonevent Use

To our knowledge, no formal census has been conducted as to the number of nonevent users of the Clear Creek Whitewater Park. Therefore, we interviewed key users and knowledgeable observers of the park in developing an approximation of user days.

Two estimates of nonevent use of the whitewater course were collected. The first estimate relies on daily direct observation of use at the park by Dan Hartman, director of Public Works for the City of Golden. Mr. Hartman's office overlooks the CCWWP, providing him with daily opportunities to observe visitation to the course. Mr. Hartman divided the boating season into three parts: (1) a high-peak season, which is generally mid-May to mid-July, (2) a moderate-peak season, which is generally mid-April to mid-May and mid-July to early October, and (3) a nonpeak period, which runs from early October through mid-April.

Mr. Hartman gave minimum and maximum estimates of boater use of the course for a typical weekday and a typical weekend day for high-peak and moderate-peak parts of the boating season. Mr. Hartman's estimates are summarized in Table 4. The midpoint of each range was used to calculate number of users. Those midpoints are: 50 users for moderate-peak weekdays, 100 users for moderate-peak weekends, 115 users for high-peak weekdays, and 175 users for high-peak weekends. Mr. Hartman also estimated an average of 10 users per week during the nonpeak period.

Benefits from use of recreational facilities are expressed in user days, which is the number of days of facility use multiplied by the number of users. Excluding number of days on which there were special events in the 2000 season, there are 103 moderate-peak days and 50 high-peak days. Estimates of the number of users were multiplied by the number of days to get the number of user days: 6,550 moderate-peak user days, 6,350 high-peak user days, and 270 nonpeak user days. This yields a total of 13,170 user days.¹

1. It should be noted that the patterns of regular daily use visitation to the course during weekdays differ from those of visitation on weekends. Many weekend visitors remain at the park for at least several hours. However, weekday users can be divided into three groups. The first group boats before going to work, usually from sunrise until 8 to 9 a.m. The second group arrives at the park during the day and stays for several hours. The third and largest group arrives at the course around 4 p.m. and stays until dusk or later.