What's a River Worth?

By Bryson Tillinghast, John Gangemi, Ken Ransford, and Don English

The high cost of research makes it infeasible to hire a professional economist to study each river. American Whitewater is fostering a grassroots approach so that a major expense of recreation economic studies—surveying river users—can be borne by volunteers who are not economists by trade. The primary purpose of conducting an economic impact analysis is quantifying a recreation user's contribution to a local economy. A key aspect of this method involves surveying users to determine expenditure profiles. Local paddlers volunteering to restore whitewater to their river can undertake this.

Over the summer of 1998, American Whitewater intern Bryson Tillinghast researched various methodologies for calculating the economic value of natural resources and in particular whitewater. This article compiles Bryson's research in the following topics: (1) How to perform a Trip Expenditure Survey to determine how much money boaters contribute to a local economy; (2) How to perform a random sample; (3) A thumbnail description of economic valuation models used to estimate the value of recreation.

How to Conduct a River Trip Expenditure Survey

A trip expenditure survey is designed to estimate how much money boaters in the specific community spend where the river is located. This is the most basic level of economic analysis. Surveying spending habits of recreational users is a fundamental component of the method. The survey is reprinted below.

Checklist for collecting the data:
1. Before starting, check the AW website, www.awa.org, for updated information. Determine if local paddling clubs, outfitters, or government officials has already collected any data on user numbers and expenditure profiles. The local chamber of commerce may have supplemental data on visitor spending or the average cost of lodging, meals, etc.

2. Use the random sampling techniques described below to choose survey schedule and target audience.

3. Organize a group of 4-5 boating friends to help conduct the survey.

4. It is essential to clarify the geographic region in which visitor spending is counted. Delineate a map of the targeted economy and measure spending only in that mapped area.

5. With completed surveys in hand, average the cumulative expenditures per category. Be sure to note the range of answers as well (i.e. the highest and lowest figures). This can be done on an Excel spreadsheet. American Whitewater plans to have a data input layer in the future website for this spreadsheet. In the meantime, contact John Gangemi for a spreadsheet template (jgangemi@digisys.net).

6. Approximate the number of boaters per year based on the surveys. You must keep track of the number of boaters you see at the access points, not just those agreeing to be surveyed. Contact local outfitters and various organizations, clubs, and government officials to see if the information already exists.

7. After determining the dates and who will conduct the surveys, print out 200 surveys and head to the pre-determined access points. A sample survey is printed below—it's designed for you to copy it!

Trip Expenditure Survey Form. Part One: Demographic information:

1) Age: ____ 2) Sex:_____ 3) Occupation: _____ 4) Zip code _____
5) Education level completed: ___High school ___College ___Graduate School
6) Annual household income: ___$0-20,000 __$20-40,000 __$40-60,000 __$60-80,000 __$80-100,000
__$100,000 and over

General Boating Questions:

7) How many years have you been boating: ____
8) Circle your level of expertise: Beginner intermediate advanced expert
9) On average, how many days do you boat per year: ____
10) How many boats do you own: ____kayaks ____canoes ____rafts
11) When did you last buy a kayak/canoe/raft (circle one): _____ Cost: $_____
12) What did you spend on additional gear for paddle sports in the last twelve months? $_____

Specific to this Visit:

13) What section of the river did you boat today? Name_____ class____ miles____ flow_____
14) How long did you spend in the _____ River* region for this trip: Days ____ Nights ____
(*Supply the name of your river here and in the blanks below.)
15) Was your main reason for this recreation trip to float the _____ River? Yes ____ No____
16) If this river lacked boatable flows, would you still have come to this region? Yes ____ No____
17) How many times have you boated the _____ River in the past twelve months? ____
18) How far is your home from the _____ River? _____miles
19) How was your experience on the _____ River? _____ (1-bad 10-excellent),
20) What is the minimum flow you recommend to boat this river? _____ cfs or gage height____
21) What specific improvements could be made for the boating community for this river?

_____
_____.
22) What additional facilities/services would you like to see offered for the boating community on this river?

_____

Part Two: Trip Expense Survey

1) Report the total expenses made in each of the following categories during your visit to this river. Estimate to the nearest whole dollar. Do not double count: Only report expenses once.
2) Record the total amount of expenses you paid personally. If you are paying for more than one person (i.e., you are part of a family or couple) record the total amount spent by every member of the family or couple. If you are paying expenses for more than one person:
   Including yourself, how many people boat in your family? ____
   Including yourself, how many people are you paying expenses for on this trip? ____
   Including yourself, how many people boated in your party on this river today? ____

LODGING

$ _____ Hotel/motels/bed & breakfast/cabin, etc.
$ _____ Public (government) camping site: (RV/tent/camper)
$ _____ Private (non-government) camping site: (RV/tent/camper)
$ _____ Rental home, cottage, or cabin

FOOD AND BEVERAGES:

$ _____ Food and drinks consumed at restaurants and bars
$ _____ Food and drinks purchased at a store for carry-out
$ _____ Liquor/beer purchased at retail

TRANSPORTATION:

$ _____ Rental fees for vehicle
$ _____ Gasoline and oil
$ _____ Repair and Service
$ _____ Parking fees & tolls
$ _____ Taxi, bus, airline, rail, or shuttle fees

RIVER RAFTING AND KAYAKING:

$ _____ Guide/outfitter fees (including tips)
$ _____ Instruction
$ _____ Rental fees
$ _____ Repair fees
$ _____ Equipment/gear purchases
$ _____ Books, maps
$ _____ Put in/take-out fees

OTHER ACTIVITIES:

$ _____ Fishing (permits, guides, flies, bait, tackle)
$ _____ Biking (rentals, guides, repairs, equipment purchase, trail use)
$ _____ Horseback riding (outfitter/guide, trail fees, equipment)
$ _____ Sightseeing (admission into tourist attractions)
$ _____ Other activities- please specify _____

MISCELLANEOUS EXPENDITURES:

$ _____ Film purchase or developing
$ _____ Clothing and footwear
$ _____ Souvenirs and gifts (not clothing)
$ _____ Personal services: laundry, barber, other
$ _____ Business services: telephone, xerox, fax, other
$ _____ Medical services: physician, dentist, other
$ _____ Others, please specify _____

Developing a Sampling Plan for Obtaining Boater Data

Any effort to collect economic information from visitors to a recreation site must have a defined sampling plan. The plan assures that the data collected will adequately describe the 'typical' boater. The sampling plan provides explicit documentation for how information was obtained, and provides the information necessary to make any statistical corrections that may be needed. Not having a sampling plan provides an easy way for opponents to discredit or question the results.

Usually, there are two parts to the sampling strategy: (1) determine how many and which days to survey boaters at the river; (2) determine which boaters to survey.

PART 1. Determining the days to do surveying

STEP 1: With a calendar in hand, estimate the amount of boating use that occurs on the river by day of the week and by season. For example, if you assume that over the whole year, 75 percent of all paddling use occurs on weekends and holidays, and that 70% of overall use occurs when the water is high, you might construct the following table. Note that the sum of the numbers must equal 100%. Factor in special events such as festivals, releases, and El Nino.

	Weekdays	Weekends/holidays	Total
High use season	20%	50%	70%
Low use season	5%	25%	30%
Total	25%	75%	100%

STEP 2: Decide how many days of data collection will occur.

Based on the number of volunteers, determine how many days of surveying at the river that you can feasibly accomplish. At least 10 or 12 days are needed to give enough coverage across the types of days, and at least 200 surveys should be completed. If the volunteer interviewers can complete 3 surveys per hour (given a 10 to 15 minute survey, and a few minutes between groups), and are there for a full 8 hour day, that's about 25 completed surveys per day. To get 200 surveys would require 8 days of intense work. On many days, it may not be possible to get 3 surveys completed per hour, due to refusals, time between available people, weather, and so on. It may be better to schedule a few extra days of surveying.

STEP 3: Allocate the days of data collection in proportion to the expected use.

Take the number of days of data collection from STEP 2, and multiply by the percentages in the Table in STEP 1. That will give the number of days of surveying that should occur in each type of day. Note that it is important to have at least 1 survey day in each category. In our example, assume that the river group has decided to survey on 20 different days. This would result in 4 survey days on weekdays during the high use season (20% of 20 days is 4 days). The table of sample days could appear as follows:

	Weekdays	Weekends/holidays	Total
High use season	4	10	14
Low use season	1	5	6
Total	5	15	20

STEP 4: Select the days to sample.

It is best to randomly select the days in each season that surveying will occur. There is a multitude of ways to randomly select sampling days. One method is to simply assign numbers incrementally on individual pieces of paper corresponding to boatable days. Put the days into a hat and draw out the required number of days. Of course, volunteer availability may effect sampling days. If surveyors are not going to be available on certain days, remove those days from the set of possible survey days prior to random selection. The important point in this step is to avoid introducing bias into the set of days chosen.

PART 2: Selecting individuals to survey

A good time to survey people is after they have completed their trip on the river. Often there is some down time as they wait for their shuttle. Take out points frequently have space for the survey crew to set up. Parking areas can also be good locations

There are a number of ways to select which individual paddlers to survey. Don't survey anyone under age 16, as they may not be able to appropriately answer the economic questions. No single method is best for every situation. Choose a method that will work for the targeted river, given the use patterns, physical constraints, and size of the survey crew. The point to this process is to avoid a systematic bias in who gets selected to complete the surveys. For example, you can choose every fifth person getting off the river, or a person from every fifth group getting off the river. The interval you select depends in part on how long it takes to do the survey, number of surveyors available, and number of boaters. Or, you can choose people getting off the river at random. For this method, you must select a number from a table of random numbers or roll dice and use that number to determine the number of intervening people between surveys. The simplest method is to take the next available person after completing an interview. This may be the most time efficient way to survey users. Since there is no predefined interval or method, it sacrifices some statistical reliability.

Various Economic Valuation Analyses for Recreation Studies

The following is a brief description of various economic methods used by professional economists. American Whitewater is working with other river groups to raise money to hire economists who will perform studies on representative rivers. Ideally, the benchmark values derived from these studies will be applicable to adjacent rivers lacking economic information.

I. Economic Impact Analysis - An economic impact study focuses on tourism's effect on local business sales, income, employment, and tax revenue generation. In short, this analysis attempts to unveil how non-local recreation users contribute to a region's economy.

An economic impact analysis addresses the regional distribution of economic activity. It tracks the flow of money into a region by measuring the gains to those involved in supplying the users with goods and services.

An economic impact analysis measures tourism's direct effects (first round purchases by consumers), indirect effects (second round purchases by local businesses), and induced effects (third round purchases by local employees and households). For instance, if tourists purchase $50,000 of goods and services from a hotel, the hotel owner employs many workers who spend additional money in the region; plus, the owner must also purchase goods and services from other businesses, many of which may be local. This example demonstrates the ripple effect of money flowing through a region's economy. Multipliers are used to gross up the total estimated spending to determine the economic ripple effect of the activity to a community, according to the formula below. Economists choose from various types of multipliers used to examine specific effects on an economy; the three general categories are gross output, income, and employment.

Economic Impact of Tourism = Number of Visitors * Average Spending per Visitor * Multiplier

No "off-the-shelf" multiplier is appropriate for use in all situations. Multipliers depend on the size of the targeted economy (bigger economies generally mean bigger multipliers), the economic structure of the targeted economy (the more self-sustaining the economy the bigger the multipliers, because imports are a smaller portion of production inputs), and what the average expenditure profile of the boaters looks like.

II. Economic Valuation Analysis - An economic *valuation* analysis measures the *non-market* benefits. These benefits represent value to an individual beyond the individual's actual expenditures (hence they are often referred to as *net* economic values). Such value measures are central to benefit-cost analyses, which indicate that a project or change is desirable if the value gained (benefit) exceeds the value given up (cost). In contrast, the economic *impact* analysis discussed immediately above tracks the contribution of recreation to an economy (i.e., the market effects).

There are two primary types of economic values: use values and non-use values. In this case use value is the amount that a river user would have been willing to pay for a recreation trip to the river, beyond what was actually spent, but didn't have to. Non-use values include values for preservation of the river, to have the option to visit in the future (option value), to allow future

generations to use the river (bequest value), or simply to know the river exists in a preserved state (existence value). The two methods commonly used to measure these values are the Travel Cost Method (TCM) and the Contingent Value Method (CVM).

A. Travel Cost Method (TCM) - TCM measures *use* value only. The method is based on the relation between the cost of visiting a recreation site (mostly the expense of traveling there, but also lodging, outfitter fees, and the value of the individual's time) and frequency of use. Unlike economic impact analyses, it makes no difference where the money was spent.

A sample of users provides information about their typical trip cost and the number of trips per year they take, as well as other factors that may influence the level of use, such as income, education, etc. Through a regression analysis, the effects of these other factors are controlled and the demand curve (price-quantity relationship) for a typical user is identified. A little more mathematical fiddling allows calculation of the net economic value for an 'average' trip.

B. Contingent Value Method (CVM) - CVM has been used to measure all sorts of non-market values, both use and non-use, for a wide range of environmental goods and services. Examples have been as broad as estimating the social value of preservation of an entire species, or as specific as maintaining water quality at a specific lake or river.

In essence, CVM determines a resource's value by asking people how much they would be willing to pay to maintain the resource, or how much they would have to be compensated for its loss. CVM is an important tool because it incorporates the full range of non-market values, not just use values (as TCM does). Critics of CVM doubt that people are able to accurately state dollar values for environmental assets. Others are concerned that people may misrepresent their true value to try to influence a study's outcome. Despite these criticisms, CVM has seen increasing use and has recently become accepted in the legal system as a way to determine environmental damages.

About the Authors. Bryson Tillinghast, a senior at Middlebury College in Vermont, did the bulk of the work on this article as an intern with AW Conservation Director John Gangemi in the summer of 1998. For questions on FERC's relicensing process, contact John Gangemi at 406-837-3155, jgangemi@digisys.net. Don English, an economist with the U.S. Forest Service at the Forestry Science Lab in Athens Georgia, is a national expert on recreation economics; 706-559-4268; English_Don/srs_athens@fs.fed.us. Ken Ransford, an AW board member, is an attorney and CPA in Carbondale Colorado; 970-963-6800; ransford@csn.net.