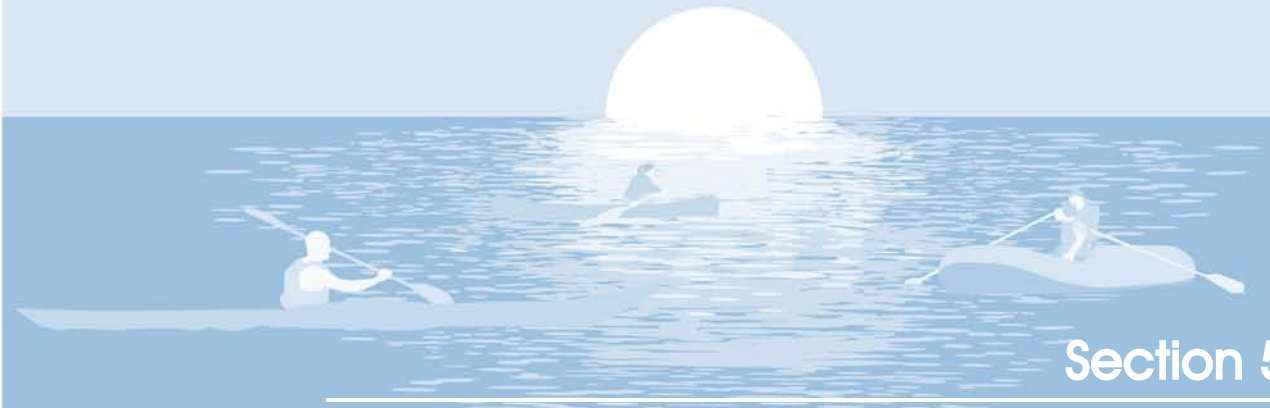
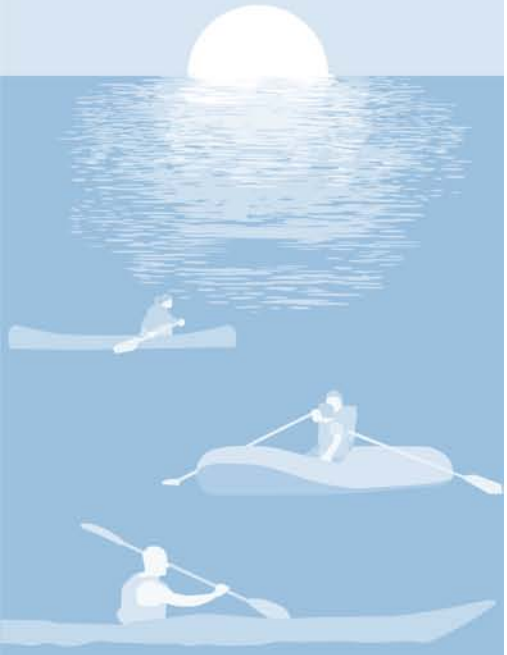


Section 5

# Recreational User Values of Non-Motorized Boating



# 5. Recreational User Values of Non-Motorized Boating

This section of the report examines the recreational user values of non-motorized boating. Recreational user values represent the non-market, or intangible, value of an activity. This background discussion of non-market goods and methods for determining recreational user values is based on Volume V, of the *California Boating Facilities Needs Assessment (BNA), Boating Economic Assessment and Demand Projections*.[1]

This section is organized as follows:

*A. Economic Concepts: Non-market Goods, Supply, Demand, and Consumer Surplus*
*B. Travel Cost Method*
*C. Benefit Transfer Method*
*D. Summary of Recreational User Values of Non-Motorized Boating in California.*

## A. Economic Concepts: Non-market Goods, Supply, Demand, and Consumer Surplus

In order to determine the recreational value of non-motorized boating in California, it was useful to define concepts of non-market goods, supply, demand, consumer surplus, and other principles of economic theory. Attempting to assign a monetary value to recreational non-motorized boating presents several challenges.

One significant obstacle is that different types of value associated with recreation (e.g., health benefits of physical exercise, enjoyment of scenic beauty, rewards from perfecting a skill, etc.) are measured using different methodologies and are expressed in different units. Employing dollars as a standard unit of recreational value requires some subjective judgment and is frequently difficult to defend. In addition, at least one school of thought proposes that recreation is, by definition, a non-market good with intangible values, and therefore it is not justifiable to attempt to attach a monetary value to it.

On the other hand, economists frequently arrive at a meaningful estimate for the value of many non-market resources through the concept of consumer surplus. The conceptual basis for providing an understanding of consumer surplus is the simple supply and demand models shown in **Exhibit 5.1** and **Exhibit 5.2,** both on the next page. The supply curve indicates the quantity of a good or service supplied at varying prices, and it shows the marginal cost of producing more of the good or service. Generally, the higher the price, the more a good or service will be supplied by the market. Because producers wish to sell more of a good or service at higher prices, the supply curve slopes upward.

**Exhibit 5.1**
**The Supply Curve and Producer Surplus**

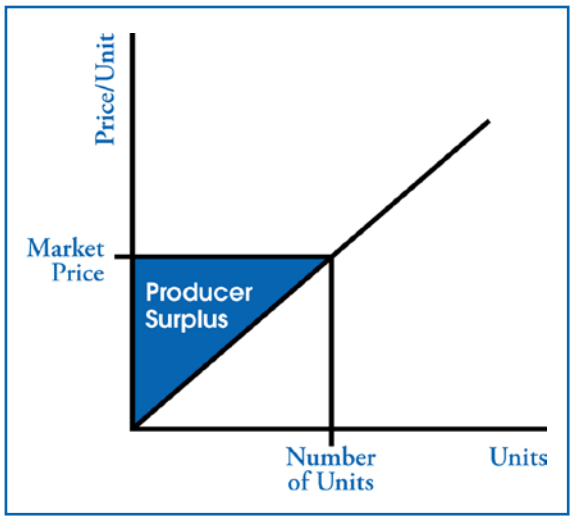
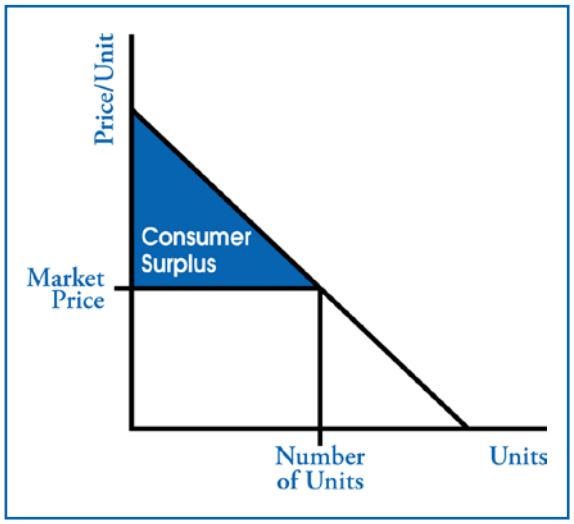



**Exhibit 5.2**
**The Demand Curve and Consumer Surplus**




The demand curve indicates the maximum amount that consumers are willing to pay for incremental increases in the quantity of a good or service. As the price of a good or service increases, the level of consumer demand decreases because consumers only purchase a good or service when the value they receive is greater than the price they pay. This is known as the law of demand and it is reflected in a downward sloping demand curve.

If producers receive a higher price for a good or service than the minimum price for which they would have been willing to sell it, then they receive a benefit from the sale, i.e., the producer surplus (see shaded area in Exhibit 5.1). Likewise, consumer surplus is the difference between the maximum price consumers would be willing to pay for a good or service, and what consumers actually spend (see shaded area in Exhibit 5.2).

For a non-market good, such as non-motorized boating recreation, the concept of a demand curve exists as if it were a market good. Since the demand curve for a non-market good cannot be represented by market transactions, it must be derived from stated or revealed preferences. Economists have developed three main techniques to estimate demand for recreation: the travel cost method (a revealed preference approach), the contingent valuation method (a stated preference approach), and the benefit transfer method (drawing on existing studies). The estimation of the recreational user value of non-motorized boating described in this section utilizes both the travel cost method and the benefit transfer method.

## B. Travel Cost Method (Revealed Preference Approach)

The underlying principle of the travel cost (TC) method is that time and travel costs that consumers incur to enjoy a recreational outing can be used as a proxy to estimate the "price" of recreation. These costs reflect only the recreational value of the outing. Other costs such as equipment expenses, user fees, etc., are specifically excluded from the TC method. The TC method assumes that the consumer's willingness to pay time and travel expenses for a recreational outing can be estimated based on the number of trips that they make at different travel costs. This is comparable to estimating consumer demand for market goods based on the quantity demanded by consumers at different prices.

Application of the travel cost method requires administering a detailed survey to visitors, and conducting a statistical analysis of the survey results. Such a survey asks a variety of questions about each visitor's travel experience including the distance traveled to the site, the length of the trip, amount of travel expenses, the number of trips to the site per year, and income data (to determine the opportunity cost of travel time). Analysts may use a regression analysis of such survey data to estimate the relationship between the number of visits and travel costs, and provide a demand function for the typical visitor.

We used an alternative method of estimating boaters' travel cost value for recreational boating. This method estimated travel costs using average (mean) responses from the statewide random telephone survey of non-motorized boaters. These results were based on 157 random surveys.[a]

We provided three different approaches to estimating recreational user values per person, per day, for non-motorized boating in California: (1) average travel time, (2) average travel cost, and (3) average actual trip expenditures. The resulting three estimates of recreational user value per person, per day, of non-motorized boating are provided in **Table 5.1,** above.

The highest estimate of recreational user value resulted from the average travel time approach. The average travel time approach estimate was $50.01 per person, per day, for non-motorized boating. This value was based on the average travel time per trip (in hours) and the average hourly wage of survey respondents (in dollars).

**Table 5.1**
**Estimated Recreational User Value of Non-Motorized Boating Per Person, Per Day, in California (2006)**

| Estimation Approach | Recreational User Value, Per Person, Per Day |
|---|---|
| 1. Average Travel Time | $50.01 |
| 2. Average Travel Cost | $36.09 |
| 3. Average Actual Trip Expenditures | $13.02 |

The mid-range estimate of recreational user value resulted from the average travel cost approach. The average travel cost approach estimate was $36.09 per person, per day, for non-motorized boating. This value was based on the average miles per trip, and the American Automobile Association (AAA) estimate for costs of operating an automobile at 52.2 cents per mile.[2]

The lowest estimate of recreational user value resulted from the average actual trip expenditures approach. The average actual trip expenditures approach estimate was $13.02 per person, per day, for non-motorized boating. This value was based on average per person daily expenditures for fuel, parking, entrance fees, and lodging.

## C. Benefit Transfer Method

To provide a crosscheck to the recreational user value measures derived from our survey results, we researched other methods to calculate the recreational value of non-motorized boating. The U.S. Forest Service has an interest in estimating the value of outdoor recreation activities for areas under its jurisdiction. As a result, the U.S. Forest Service has conducted numerous recreational user value studies. In 2005, the U.S. Forest Service published *Updated Outdoor Recreation Use Values on National Forests and Other Public Lands (Update)*,[3] an update of a 2001 report, *Benefit Transfer of Outdoor Recreation Use Values*.[4]

[a] A total of 288 of the 351 statewide random survey respondents participated in non-motorized boating in the last five years. These 288 respondents answered survey questions related to their most recent non-motorized boating trip. However, the methodology we used for calculating travel costs assumed that the sole purpose of the trip was for non-motorized boating. Thus, the number of useable surveys was reduced from 288 respondents to 157 respondents.

Benefit transfer refers to the use and adaptation of existing economic data derived from specific sites to other sites with similar conditions. Benefit transfer analysis utilizes information from a large number of studies and provides reliable measures of average values that are sensitive to underlying distributions of the data. The benefit transfer model developed in 2001, and then updated in 2005, was tested for convergent validity and it performed well in providing accurate average values for each activity in all regions where data existed.

The 2005 *Update,* fifth in a series of similar reports, was prepared for the U.S. Forest Service to provide recreation value data in cases where primary research is not justified because of budget constraints, limited time for research, or where resource impacts are expected to be insignificant. The *Update* provides an average recreational user value (consumer surplus or willingness to pay) per day, for thirty (30) different recreational activities. The resulting database provides 1,239 separate estimates of per person, per day, recreational user values, summarizing over thirty (30) years of literature.

The *Update* included twenty (20) studies and eighty (80) separate estimates of recreational user value per person, per day, for the category, "floatboating/rafting/canoeing". This category most closely reflects our study definition of non-motorized. The mean recreational user value per person per day for all eighty (80) floatboating/rafting/canoeing estimates was $100.91. Only one study, and four (4) estimates of recreational user value were specifically for non-motorized boating in California (on the Trinity River). The mean recreational user value per person, per day, for the four (4) Trinity River estimates was $27.84.

## D. Summary of Recreational User Values of Non-Motorized Boating in California

Using the travel cost and benefit transfer approaches, we obtained five separate estimates of the recreational user value of non-motorized boating in California, per person, per day. These values ranged from a low of $13.02 per person, per day, to a high of $100.91 per person, per day.

The mid-range estimate was a recreational value of $36.09 per person, per day, for non-motorized boating. This estimate was based on the average miles per non-motorized boating trip, and the AAA costs per mile of operating an automobile.

The non-motorized boating recreational user value estimates from this study are slightly higher than the motorized boating recreational user value estimates from the BNA. In 2000, the BNA study of motorized boating (including sailboats eight (8) feet and longer in length) identified recreational user values for motorized boating of between $4.14 and $29.36 per person, per day. The mid-range recreational user value for motorized boats in the BNA was $17.89 per person, per day (in year 2000 dollars).

A higher recreational user value for non-motorized boating, as compared to *motorized* boating, is consistent with U.S. Forest Service studies. The average recreational user value for motorized boating in the *Update* was $46.27 per person, per day, compared to $100.91 per person, per day, for float boating/rafting/canoeing.[5]

**Section 5 Endnotes**

[1] NewPoint Group, Sacramento State University Sacramento Foundation, Planning and Applied Economics, Bay Area Economics, Public Research Institute. *California Boating Facilities Needs Assessment, Volume V, Boating Economic Assessment and Demand Projections* (Sacramento, California: California Department of Boating and Waterways, October 15, 2002, Chapter 2).

[2] American Automobile Association. (at http://www.aaa.com).

[3] John Loomis. *Updated Outdoor Recreation Use Values on National Forests and Other Public Lands* (Portland, Oregon: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, October 2005).

[4] Randall S. Rosenberger and John B. Loomis. *Benefit Transfer of Outdoor Recreation Use Values* (Fort Collins, Colorado: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 2001).

[5] Loomis, 2005.