

MAXIMUM AND APPROPRIATE PRICE FOR DAY USE IN THE DESOLATION WILDERNESS

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STATEMENT OF PURPOSE

Visitors to a wilderness area may be willing to pay a considerable amount for the experience. That is, if wilderness use is highly valued, and financial resources are available to them, then visitors' maximum willingness to pay (MWTP) can be substantial. However, the mean MWTP alone may not be the appropriate criteria to establish fee levels.

A wilderness visitor survey examines MWTP for day use permits along with the perceived appropriate price (AP). Price sensitivity of wilderness day use predicts the percentage of users who would pay the fee and continue to visit the area at each price level. Price sensitivity is incorporated into a framework to estimate the amount of revenue a wilderness management agency might generate as a function of price. This method demonstrates interpretation of MWTP and AP results with consideration of implications to management decisions.

METHODS

Data are from the Desolation Wilderness Fee Day-Use Visitor Survey (see Watson and others, also on this site). Visitors were asked, in an open-ended format, to indicate their MWTP and what they felt was the AP for three different types of day-use permits, including:

1. A per person, per day fee,
2. A per group (permit), per day fee, and
3. A pass, per person, per year.

RESULTS

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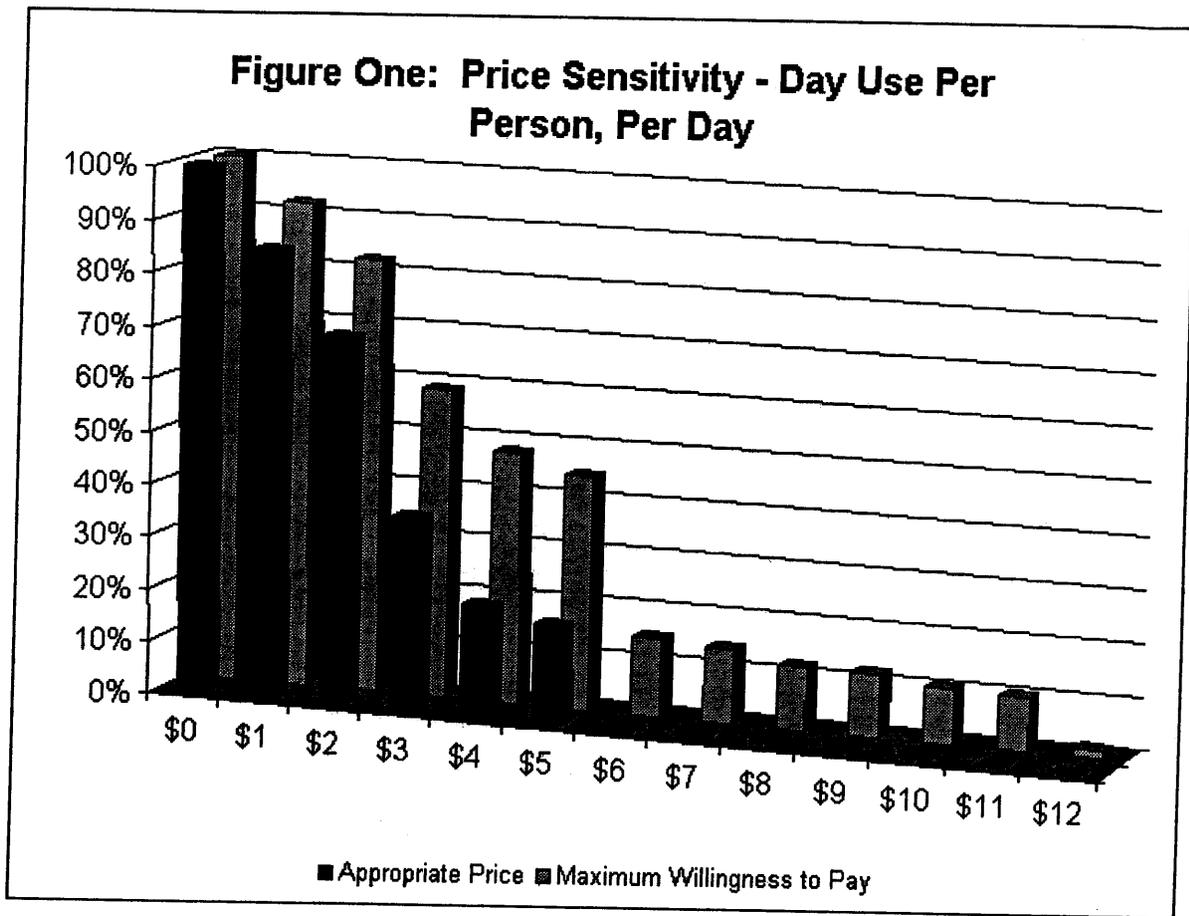
CITATION: Christensen, Neal; Richer, Jerrell Ross. 1998. Maximum and appropriate price for day use in the Desolation Wilderness. [On line]. In: Societal response to recreation fees on public lands; 1998 May 27-31; Columbia, MO. Posted at:
http://www.fs.fed.us/research/rvur/wilderness/recreation_fees.htm.

For all three types of permits, respondents' MWTP was significantly higher than their AP (Table 1). The differences ranged from appropriate per-person, per-day at only 57% of mean MWTP (\$2.41 to \$4.21) to the appropriate per-person, per-year price at 76% of mean MWTP (\$22.41 to \$29.66).

Table One: Responses to Maximum Willingness to Pay and Appropriate Price by Type of Fee

	Mean		Significance (2-tailed t- test)	Appropriate % of Max WTP	Median		Std Dev.		n
	Appropriate Price	Max WTP			Appropriate Price	Max WTP	Appropriate Price	Max WTP	
Per Person Per Day	\$2.41	\$4.21	≤ .0001	57%	\$2.00	\$4.00	1.78	3.26	260
Per Group Per Day	\$7.51	\$10.46	≤ .0001	72%	\$5.00	\$10.00	8.90	10.35	196
Per Person Per Year	\$22.41	\$29.66	≤ .0001	76%	\$20.00	\$25.00	19.74	23.90	190

Next, in an illustration of *price sensitivity*, Figure 1 indicates that a majority of respondents would pay a maximum per-person, per-day fee of \$3 or less. The largest drop in MWTP occurs as the price is increased above \$5, with purchase rates falling from over 40% to about 15% of the sample. On the other hand, any price above \$2 exceeds the appropriate price for the majority of respondents.



Figures 2 and 3 depict price sensitivity per-group, per-day and per-person, per-year, respectively.

Figure Two: Price Sensitivity - Day Use Per Group, Per Day

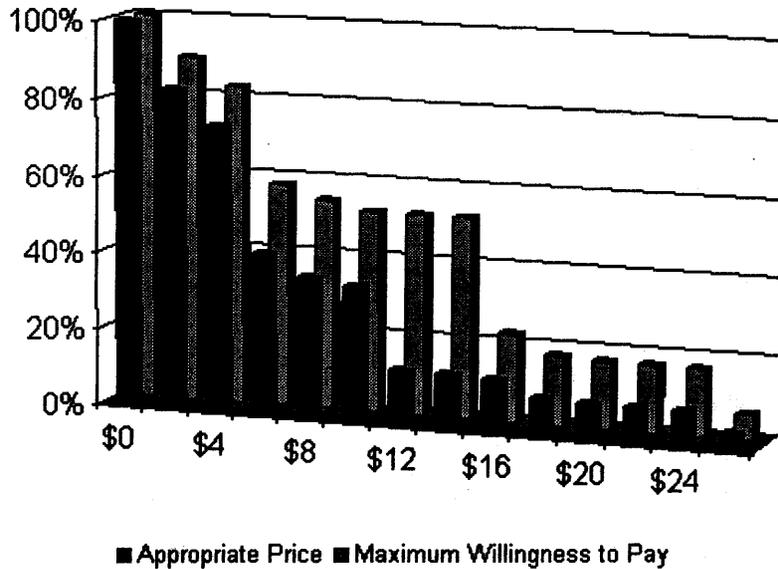
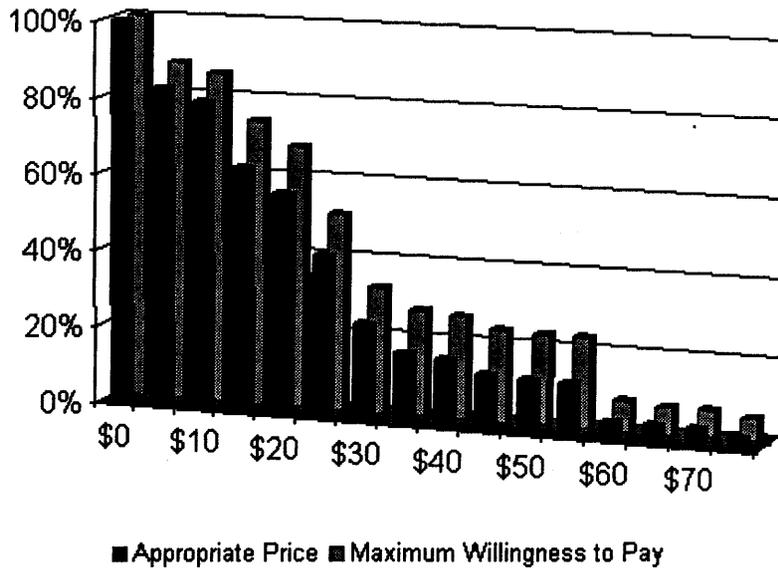


Figure Three: Price Sensitivity - Day-Use Per Person, Per Year



The amount of revenue an agency can earn by charging for day use depends on (1) the

price that is chosen and (2) the number of visitors that are willing to pay that price. A sensible method of estimating the number of visitors that would pay at each price involves multiplying the percentages from our price-sensitivity analysis by some estimate of the number that would visit if the price were zero. We can then multiply the number who would pay a particular price by the price itself to estimate revenues.

In the Desolation, the five-year average number of permits issued for day use is 19,033. Permits are issued per group so visitation is estimated by multiplying permits by the average group size of 3.1. To estimate revenues for a particular fee level, we multiply the total number of visitors by that price and the purchase rate associated with it.

The calculations and method for estimating the per-person, per-day fee are presented in Table 2 with results displayed in Figure 4. Note that revenues are highest when a price of \$5 is chosen. If the price is \$6 instead, the drop in the purchase rate (from 45% to 15%) leads to a dramatic decline in revenue. Results for the other two types of fees are shown in Figures 5 and 6.

Table Two: Method for Calculating Revenue Generation Displayed in Figure Four

Price	Total Permits	Group Size	Purchase Rate	Revenue
\$0	19,033	3.1	100%	\$0
\$1	19,033	3.1	92%	\$54,516
\$2	19,033	3.1	82%	\$97,431
\$3	19,033	3.1	59%	\$104,416
\$4	19,033	3.1	48%	\$113,413
\$5	19,033	3.1	45%	\$131,704
\$6	19,033	3.1	15%	\$52,918
\$7	19,033	3.1	14%	\$58,009
\$8	19,033	3.1	12%	\$56,351
\$9	19,033	3.1	12%	\$63,395
\$10	19,033	3.1	10%	\$61,560
\$11	19,033	3.1	10%	\$65,112
\$12	19,033	3.1	2%	\$10,655

* Assumes 19,033 day-use permits per year at Price = \$0 (5 year average in 1995)

Figure Four: Revenue Generation from Maximum WTP - Day Use Per Person, Per Day

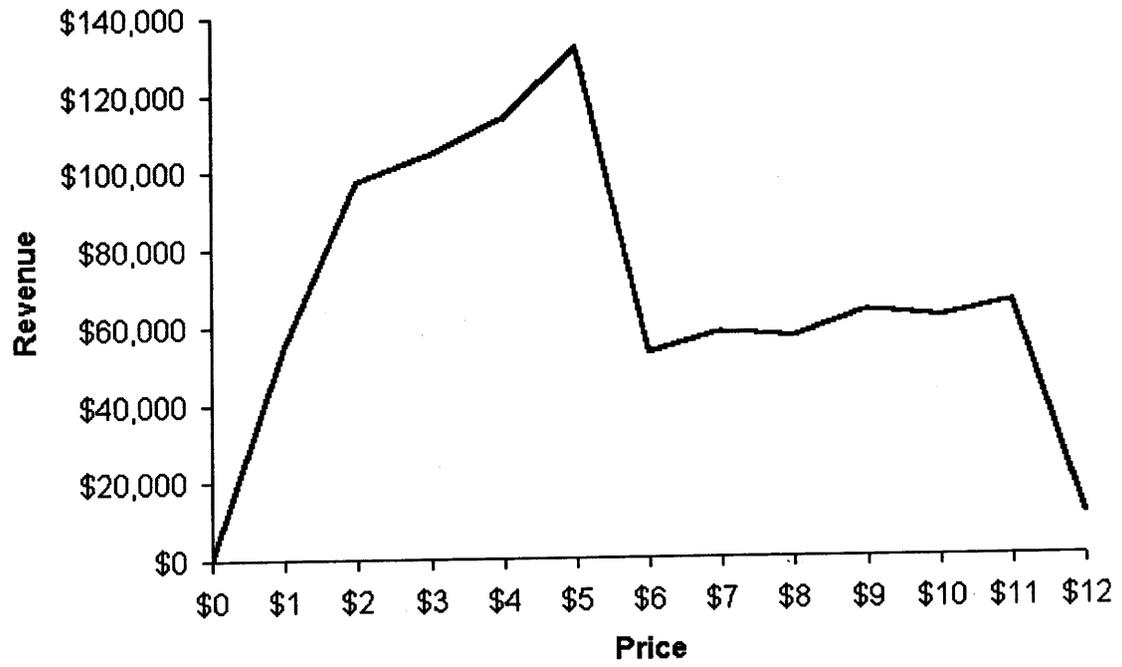


Figure Five: Revenue Generation from Maximum WTP - Day Use Per Group, Per Day

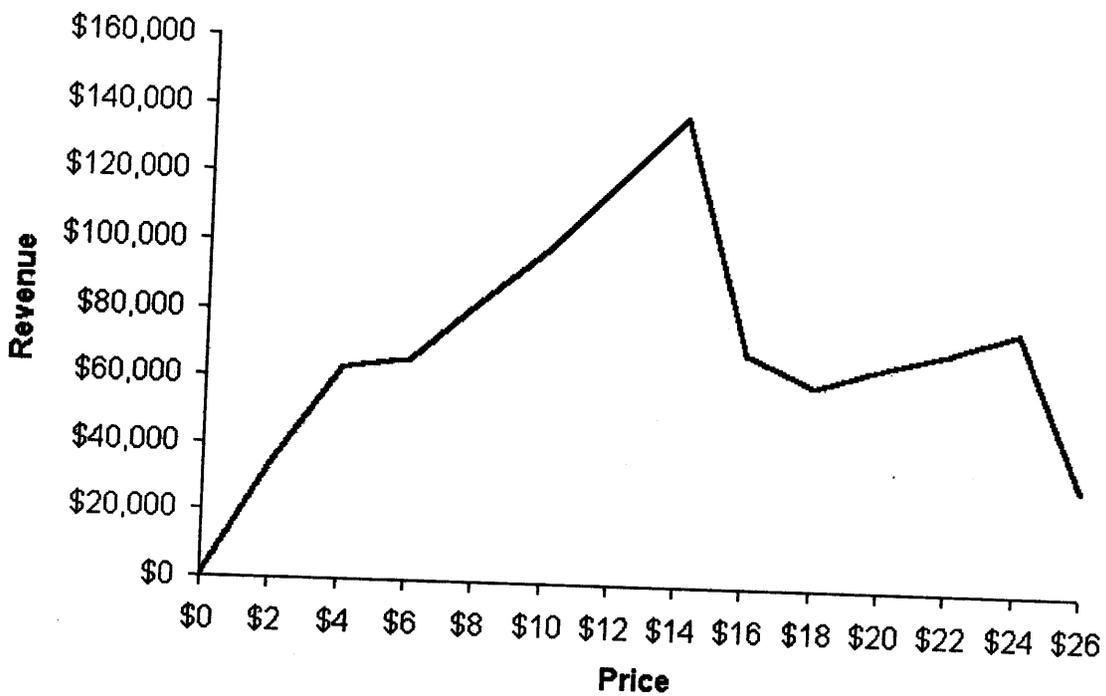
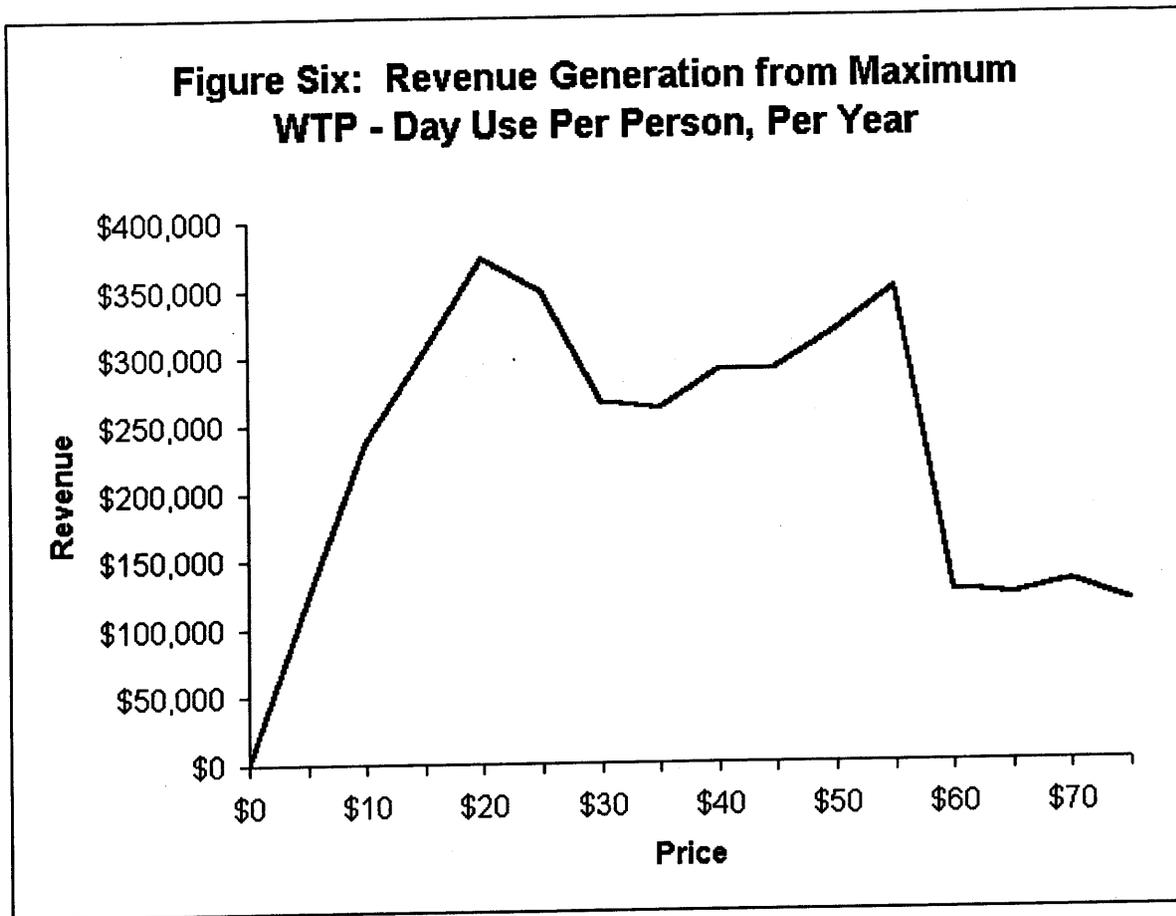


Figure Six: Revenue Generation from Maximum WTP - Day Use Per Person, Per Year



RESEARCH IMPLICATIONS

Visitors believe the "appropriate price" for wilderness day-use is significantly less than the maximum amount they would be willing to pay. However, we cannot identify the reason(s) for this phenomenon - be it social equity concerns, a lack of reference prices, or a desire to simply pay a lower price - and whether the result is unique to wilderness. Further research can help illuminate these issues.

The price sensitivity analysis developed here is a useful, rich alternative to descriptive statistics. Whereas mean MWTP, for example, focuses only on identifying the *center of the distribution*, price sensitivity analysis estimates the *behavioral impact* of a fee. As such, it provides both a logical basis for estimating fee revenues and a way of comparing the differential impacts of various fee levels.

MANAGEMENT IMPLICATIONS

Actual revenues will depend, of course, on many factors. For example, revenues from a

per-person, per-day fee will be reduced if an annual pass is offered at an attractive price (see Richer, "Setting New Fees for Recreation"). The revenue that can be generated by a day-use fee for wilderness depends as much on visitors' *price sensitivity* as it does on the amount of the fee itself. Though higher fees generate more revenue per person (or group), total revenue hinges on the number of people that decide to pay. As fees are increased, purchase rates fall and, beyond some point, revenues are reduced.

Average (mean) MWTP statistics may serve as a poor guide in choosing price levels. In this example, average MWTP for an annual day-use pass is approximately \$30. We estimate that revenue can be increased by about 40% by choosing the \$20 price instead.

Price sensitivity is important not only for its revenue implications, but also because it reveals the effect on visitor behavior. In many cases, large increases in purchase rates can be achieved with relatively small reductions in revenue. For example, a \$5 per-person, per-day fee may generate more revenue than any other price, but only 45% of current visitors are willing to pay this much for day use. We estimate that lowering the price to \$2 would increase the purchase rate dramatically, from 45% to 82%, and reduce revenues by only 26%.

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http://www.fs.fed.us/research/rvur/wilderness/recreation_fees.htm

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