

APPENDIX 5

A PRELIMINARY ANALYSIS OF
THE SIGNIFICANCE OF WATER TO RECREATIONAL VISITORS
AT ARAVAIPA CANYON WILDERNESS, ARIZONA

A report to the Bureau of Land Management
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PREFACE

This brief paper provides analyses and information to be used in the upcoming adjudication of instream flow rights for Aravaipa Creek, Arizona as it flows through Aravaipa Canyon Wilderness. In May 1988, we were requested by the Safford District Office of the Bureau of Land Management to prepare this information. Because only preliminary analyses are presented, do not quote any portion of this paper without written permission of the authors. Also, this is not intended to be a highly technical document. Consequently, readers requiring more detailed information should contact the authors.

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INTRODUCTION

Research on landscape preferences and use of natural resource areas for recreation has consistently found that people are strongly attracted to water. Pictures of landscapes with streams, lakes, or ponds are consistently preferred over pictures of landscapes without open water. Places with water, particularly in arid regions of the nation, are popular recreation sites. From an aesthetic point of view, water is a focal element in landscapes and is an integral part of the feeling of recreation places. It also is an important medium for many popular recreational activities: swimming, boating, fishing, etc.

Our research has demonstrated that people also highly value water and water related recreational activities in Aravaipa Canyon Wilderness. The results presented in this paper indicate that elimination or even a small diminutions of the flow of Aravaipa Creek could reduce the recreational attractiveness of the wilderness area.

The data base for this paper comes from a mail questionnaire survey of visitors to Aravaipa Canyon Wilderness in Arizona. From April 1987 to March 1988 questionnaires were mailed each month to a random sample of people who had reserved permits to visit Aravaipa Canyon during the previous month. The names and addresses of these individuals were obtained from permit records provided by the Bureau of Land Management (the agency responsible for managing the wilderness area). The sampling process provided

a stratified random sample of an annual cross-section of wilderness visitors. Six hundred and sixty-five responses were received and coded, representing an 83% overall response rate. Except where indicated, results presented in this paper are derived from a weighted data set. We have weighted the data set to correct for minor statistical inequalities in selecting samples from each month of the sample period. The result of our weighting method is that each respondent has an equal probability of being included in our total sample.

The paper proceeds as follows. First, we discuss the importance of water for visitors—at its face value. Second, we look at the significance of water-based recreational activities. Third, a quantitative analysis is described that attempts to quantify visitor's preferences for stream flows in Aravaipa Canyon. Finally, we offer some concluding remarks.

RESULTS

The importance of water to visitors

The best indication of the importance of water to visitors at Aravaipa Canyon Wilderness comes from one question. We asked visitors to rank out of a list of thirteen elements, the five most important elements of Aravaipa Canyon. Approximately 82% of the respondents placed water among the top five elements (table 1). Peace and quiet, solitude, and wildlife were also ranked highly. Water was also ranked most frequently as the most important element of Aravaipa Canyon.

The importance of water-based activities to visitors

Two water-based activities--hiking and swimming in Aravaipa Creek--were highly rated by respondents. Nearly all respondents (94.7%) reported liking or strongly liking hiking in the creek (table 2). This result is important in light of the fact that visitors must repeatedly cross the creek to traverse the wilderness area. If visitors were not pre-disposed to enjoy the water, they might report lower levels of enjoyment for this activity. Some respondents have commented that walking through the creek was difficult at times, but these comments were associated with visits during flood and near-flood stages. We cannot recall any respondents requesting diminution of the flow of Aravaipa Creek to make hiking easier. Some respondents, however, have suggested installation of bridges, etc. to facilitate river crossings. Seventy-eight percent of the respondents reported that they would like or strongly like swimming in Aravaipa Creek if they visited the wilderness in the near future (table 3). Although only 42% of respondents reported actually swimming in the creek during their most recent visit (table 4), a strong preference for contact with water at Aravaipa is apparent from the results.

Preferences for water quantity

A hint at visitors' preferences for water quantity is provided by table 5: approximately 88 percent of the respondents found streamflows at preferable levels. A more in-depth analysis indicates that some streamflows may be more preferable than

others. Using multinomial logit models, we compared actual streamflows¹ to the responses in table 5. In this manner we were able to investigate at what streamflows respondents were more likely to indicate that they saw less water than they prefer, as much water as they prefer, and more water than they prefer.² At present, we do not feel that our models are sensitive enough to make an accurate prediction of the breakpoint between too low and just enough flows.³ We can, however, state that small changes in streamflow may influence respondents' feelings about the amount of water they find in Aravaipa Canyon. Our results indicate that during our study period, single increment declines in streamflow (for example from 25 cubic feet per second [cfs] to 24 cfs) increased the likelihood that respondents would report that they found less water than they preferred. The respondents apparently were sensitive to small changes in streamflow.

CONCLUSIONS

Two conclusions are apparent from our analyses. First, water is a highly valued attribute of the recreational setting at Aravaipa Canyon Wilderness. Respondents ranked water highly compared to other attributes of the setting and demonstrated

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- 1 Streamflow data were provided by the Safford District Office of the Bureau of Land Management.
 - 2 This analysis was conducted with unweighted data.
 - 3 We are continuing to explore the relationship between streamflow and attitudes with more sophisticated statistical models.

strong preferences for water-related activities. These results are not surprising considering the rarity and significance of open water in a desert setting. Based on our results and on personal experience, we could argue that water is the intrinsic attraction of Aravaipa Canyon Wilderness. Second, visitors appear to be sensitive to small changes in streamflow. Our preliminary analyses indicate that declines in streamflow increase the likelihood that respondents will find less water than they prefer. Many factors could explain this relationship, we offer two. At lower flows, the river bed may be less aesthetically pleasing. Stagnant pools and dying vegetation become more prevalent and noticeable. Also at low flows, deep pools and swimming holes may disappear, leading to less availability of sites for water related recreation.

It is important to note that our survey was conducted at a time when streamflows ranged between 17 and 250 cfs (approximately). Accordingly, our respondents were not subjected to the 15 cfs level proposed for the instream flow permit. Because visitors are highly satisfied with current streamflows, a decline to 15 cfs or lower is likely to lead to some dissatisfaction. Repeat visitors (people who are accustomed to higher streamflows) may be more affected than new visitors.⁴ Dissatisfaction should continue for a time until visitors become accustomed to the new stream level. If some features of the

⁴ 51.1% of our survey respondents have visited Aravaipa Canyon Wilderness one or more times during their lifetime.

stream are eliminated by decreased flow (for example, pools for swimming), though, some recreational visitors could be permanently displaced from the area. At some point (which could be above, at, or below 15 cfs, but we cannot judge this from our data), Aravaipa Canyon could become relatively undesirable as a recreation site.

TABLES

Table 1: Percentages of respondents rating elements of Aravaipa Canyon most important and within the five most important elements. N=546.

	Most Important Element	Within the Five Most Important Elements
Water	33.3%	81.8%
Peace and quiet	23.2	73.5
Solitude	16.4	67.1
Wildlife	8.7	65.9
Geology	6.9	47.1
Challenge	3.0	29.4
Vegetation	2.5	51.1
Ease of hiking	2.3	23.0
Good campsites	1.6	28.0
Shade	1.4	24.5
Safety from natural hazards	0.4	6.4
Archeology	0.2	7.0

Table 2: Respondents' attitudes toward walking in Aravaipa Creek. N=665.

Strongly dislike	0.3%
Dislike	1.5
Neutral	3.5
Like	18.1
Strongly Like	<u>76.6</u>
	100.0

Table 3: Respondents' attitudes toward swimming in Aravaipa Creek. N=665.

Strongly dislike	1.2%
Dislike	1.9
Neutral	18.6
Like	31.5
Strongly Like	<u>46.7</u>
	100.0

Table 4: Activities pursued by visitors in Aravaipa Canyon Wilderness. N=575.

Hiking	97.4%
Camping	57.9
Rock climbing	26.5
Hunting	1.0
Swimming	42.0
Backpacking	53.5
Horseback riding	2.1
Birdwatching	55.5
Observing wildlife other than birds	63.2
Relaxing	82.7
Photography	65.0

Table 5: Amount of water in the main canyon of Aravaipa Canyon Wilderness in relation to visitors' preferences. N=483.

Less than preferred	8.4%
At the preferred amount	87.9
More than preferred	3.7