CHERRY CREEK BASIN WATER QUALITY AUTHORITY

WATER QUALITY PERCEPTION SURVEY

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SUMMARY

The Cherry Creek Basin Water Quality Authority (CCBWQA) engaged The Howell Research Group to conduct a survey to determine the awareness and attitudes of Cherry Creek State Park users regarding the water quality of the reservoir and the efforts of the CCBWQA to improve water quality. An intercept survey was conducted among 420 park users between June 6 and July 8, 1997. The survey sample was representative of all Cherry Creek State Park users by day of week and their primary activity while in the park. The key findings and conclusions from this survey are presented below.

USE AND PERCEPTIONS ABOUT CHERRY CREEK STATE PARK

Representative of all Cherry Creek State Park users, boating (29%), swimming (23%) and shore fishing (22%) were the three prevalent activities among the survey respondents. Other primary activities included picnicking (8%), hiking/walking (6%), biking (5%) and camping (5%).

Overall, the survey respondents were experienced, frequent visitors to Cherry Creek State Park. They had been visiting the park, on average, 11.7 years and their median number of visits per year was 12.

Consistent with their activities, most visitors (60%) mentioned something directly related to the reservoir when asked what they found most ***attractive*** about Cherry Creek State Park. They mentioned "reservoir/water" (29%), "nice swim beach" (22%) and "good place to fish" (15%). Although not classified as reservoir directly related, "scenery/natural environment" (25%) was also mentioned frequently.

When asked what they found ***unattractive*** about Cherry Creek State Park, four out of ten visitors (43%) mentioned something directly related to the reservoir such as "jet skis" (14%), "reservoir dirty/polluted" (12%), "too many boats" (8%), "boats interfere with fishing" (6%) and "dirty beach" (5%). Non-reservoir related items frequently mentioned were "park too crowded" (14%) and "not clean/litter" (8%).

PERCEPTIONS ABOUT WATER QUALITY

Perceptions about what is considered ***good water quality*** are primarily based on visual attributes. When asked to define good water quality (unaided), the majority of all survey respondents (60%) used the term "clear," while three out of ten respondents (29%) mentioned "no trash/debris." Other definitions of good water quality included "clean" (20%), "no odor" (13%), "no algae/plants" (12%), "no oil/gas" (8%) and "no bacteria" (8%).

Park users had mixed perceptions about the water quality in Cherry Creek Reservoir. When asked to describe the water quality (unaided), about one-half (53%) said something positive, while one-half said something negative (55%). Respondents were allowed to provide multiple responses, thus some respondents described the water quality in both positive and negative terms.

"Clean" (32%) was the most frequently mentioned positive term used to describe the water quality in Cherry Creek Reservoir. "Clear," the term used to describe good water quality in general, was used infrequently (8%) as a descriptor for Cherry Creek Reservoir.

There was no single negative descriptor used to describe the water quality in Cherry Creek Reservoir. Those used most frequently were "dirty/polluted" (15%), "muddy/murky" (15%), "too much algae/plants" (11%), "gasoline/oil" (9%), and "trash/debris" (6%).

The water quality in Cherry Creek Reservoir is primarily viewed as being either **fair** (39%) or **good** (40%). Few survey respondents rated the water quality at either extreme: **excellent** (8%) or **poor/unacceptable** (10%). Ratings of the water quality did not vary significantly by different characteristics of the respondents (such as their primary activity or their experience with the park).

Park users were more likely to perceive the color of the reservoir to be *green* (38%) or *brown* (24%) instead of either *blue* (20%), *gray* (10%) or *clear* (8%).

A slight majority of park visitors (53%) believe there is a problem with plants/algae being in the

reservoir, while smaller segments believe that oil/gas (41%) and/or trash/garbage (36%) are problems.

Park visitors were most likely to attribute reservoir pollution to motor powered boats. Seven out of ten respondents (71%) thought that motor powered boats contribute either significantly (40%) or moderately (31%) to pollution in the reservoir.

Sizeable numbers of visitors (but not the majority) believed that water runoff from development and the water entering the reservoirs from Cherry Creek contributed to pollution. They were less likely to believe that pollution was caused by chemical changes as a result of sunlight, air temperature and plants, or the people who swim in the reservoir.

Three-fourths of the survey respondents (76%) had used at least one of seven other reservoirs located in the Denver metropolitan area within the past three years. Visitors who had used other reservoirs were more likely to perceive that the water quality in the Cherry Creek Reservoir was **better** instead of **worse** for six of the seven: Aurora Reservoir, Quincy Reservoir, Boulder Reservoir, Barr Lake, Stanley Lake and Bear Creek Reservoir. Chatfield, the most familiar reservoir among the respondents, was the only one for which respondents were more likely to perceive its water quality to be **better** than Cherry Creek (32% vs. 27%). However, the difference was minimal and the largest segment of respondents (36%) perceived the water quality to be the **same** in both reservoirs.

The vast majority of park visitors (69%) perceive that the water quality of Cherry Creek Reservoir has either remained the **same** (46%) or **improved** (23%) over the past few years.

AWARENESS AND KNOWLEDGE OF THE CHERRY CREEK BASIN WATER QUALITY AUTHORITY

Top-of-mind (unaided) awareness of the CCBWQA as an agency that works to maintain or improve water quality in Cherry Creek Reservoir is very low (4%). However, one out of four park visitors (25%) had an awareness of the agency's name.

Awareness of the CCBWQA was most likely a result of the extra fees charged to enter the park. No one mentioned that CCBWQA assessed a property tax.

CONCLUSIONS

Although they often have divergent opinions, Cherry Creek State Park users have fairly enlightened perceptions regarding the reservoir's water quality.

The concept of "good" water quality is best conveyed through messages that focus on the visual aspects of water quality such as clarity, color and lack of debris floating in the reservoir.

Negative news stories regarding bacteria problems in Denver metropolitan area reservoirs have had minimal impact on user perceptions about Cherry Creek Reservoir.

Park users are far more likely to attribute water quality problems to the motored power boats on the reservoir than the major contributors which include water runoff from nearby developments, water entering directly from Cherry Creek, and chemical changes occurring in the reservoir.

User perceptions about the water quality in Cherry Creek Reservoir are consistent with the mission of the Cherry Creek Basin Water Quality Authority. Seven out of ten survey respondents thought that the reservoir's water quality had either improved or remained the same over the past few years.

Cherry Creek Reservoir is perceived to have better or comparable water quality to other major reservoirs located in the Denver metropolitan area.

Perceptions about the water quality in Cherry Creek Reservoir are more positive today than those identified in a study conducted in 1982 for the Colorado Department of Health.

As expected, awareness and knowledge of the Cherry Creek Basin Water Quality Authority is low among park users. Continued education and public information will improve awareness and knowledge, but dramatic changes should not be anticipated.

I. INTRODUCTION

The Cherry Creek Basin Water Quality Authority (CCBWQA) was created by the Colorado Legislature in 1988 to develop and implement plans for maintaining acceptable levels of water quality in the Cherry Creek Reservoir and preserving the reservoir as an outdoor recreational and natural amenity. The CCBWQA is a statutory authority whose membership includes the general purpose local governments (cities and counties) and special water and sanitation districts within the Upper Cherry Creek Drainage Basin.

RESEARCH OBJECTIVES

The CCBWQA is in the process of revising its master plan which will detail future plans for water quality improvements at the Cherry Creek Reservoir and the upstream watershed. As part of its planning process, the CCBWQA desires to determine the awareness and attitudes of Cherry Creek State Park users regarding water quality and the efforts of the CCBWQA to improve water quality. The CCBWQA engaged The Howell Research Group to conduct a survey of Cherry Creek State Park users for these purposes. The survey addressed several specific issues:

1. How do Cherry Creek Reservoir users define "good" vs. "poor" water quality?
2. What is their perception about the current water quality in Cherry Creek Reservoir?
3. Do users perceive that the water quality has improved over the past several years?
4. How does the water quality of Cherry Creek Reservoir compare to that of other metropolitan area lakes or reservoirs with which they are familiar?
5. Do users have awareness or knowledge of the Cherry Creek Basin Water Quality Authority and its efforts to improve water quality?
6. What are the perceptions of Cherry Creek Reservoir users regarding other aspects of their recreation experience at Cherry Creek State Park?
7. Are there specific messages that may be more effective in communicating water quality issues

to the users?

8. Are there differences in awareness, attitudes and perceptions among the different user groups (boaters, swimmers, fishermen, etc.)?

9. How do the results of the 1997 survey compare to those of a user attitude survey conducted by Colorado State University in 1982?

METHODOLOGY

The Water Quality Perception Survey was conducted with an intercept survey of randomly selected Cherry Creek State Park users. A total of 420 users were interviewed in the park between June 6 and July 8, 1997. Each interview was approximately 15 minutes in length.

In order to mitigate the intrusion of the survey on park users and to increase survey participation, those participating in the survey were entered into a drawing for one of ten annual State Park passes. Nearly all people who were approached for this survey were cooperative and willing to answer all the questions.

A detailed sampling plan was designed to include users by different types of activities, days of the week and times of day. Park users were interviewed between the hours of 8:00 a.m. and 7:00 p.m. The surveys were conducted by day of week to closely reflect the proportion of park users by day of week.

	Completed Surveys		Actual Percent
Day of Week	Number	Percent	of Users*
Monday	43	10%	9%
Tuesday	38	9	10
Wednesday	42	10	11
Thursday	39	9	10
Friday	65	16	16
Saturday	98	23	22
Sunday	95	23	22
Total	420	100%	100%

* 1996 visitor data provided by Cherry Creek State Park

The intercept interviews were conducted at eight different park locations adjoining the reservoir. These park locations were chosen to intercept different types of users. Outlying locations serving non-reservoir users such as the rifle range, model airplane area and horse stables were not included in the survey. The park locations where surveys were conducted included:

Marina Area
West Shade Shelters
Sailboard Beach
East Boat Ramp
East Shade Shelters
Swim Beach/Picnic Area
Campgrounds
Tower Loop

With a few exceptions, the distribution of survey respondents by their primary activity in the park was very similar to actual visitation data compiled by the Cherry Creek State Park staff in June and July, 1996. The exceptions included park visitors whose primary activities were sightseeing, bicycling and other. Sightseers who typically drive through the park without stopping were not surveyed. The percentage of respondents who were bicyclists was less than the percentage of actual visitors because most of the bicyclists ride through the park without stopping. Very few respondents were in the "other" category which includes horseback riding, rifle range, model airplaning and dog training, whose areas were not survey locations.

	Survey Respondents		Percent of Actual
Primary Activity	Number	Percent	Visitors*
Boating	122	29%	27%
Swimming	97	23	23
Shore Fishing	92	22	21
Picnicking	34	8	8
Walking/Hiking/Jogging	24	6	3
Bicycling	23	5	12
Camping	20	5	6
Other	8	2	-
TOTAL	420	100%	100%

* June-July, 1996 visitation data excluding "sightseeing" and "other" provided by Cherry Creek

State Park.

The total sample of 420 is statistically reliable within ±4.8% at the 95 percent confidence level. In other words, 19 out of 20 times (95%) the survey results will be within ±4.8% of how all visitors would have responded if they had been surveyed.

The questionnaire used for the CCBWQA Water Quality Perception Survey is presented in Appendix A.

II. SURVEY FINDINGS

USE AND PERCEPTIONS ABOUT CHERRY CREEK STATE PARK

In order to assist in evaluating the survey perceptions about water quality, information was obtained regarding the respondents' use and perceptions about Cherry Creek State Park.

Activities

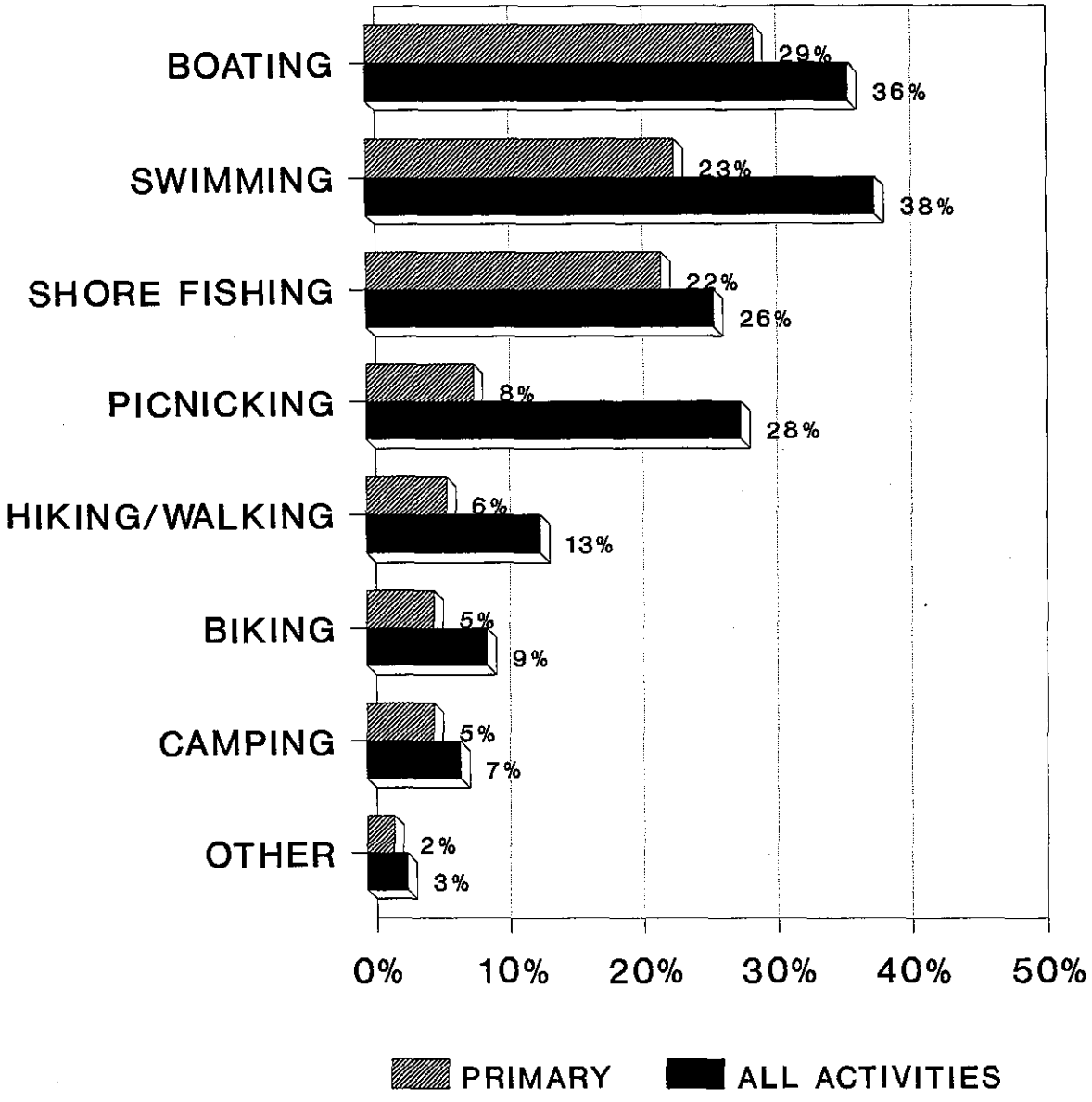
Survey respondents were asked what was the one primary recreation activity, as well as what other activities they were participating in at Cherry Creek State Park on the day of the survey. As discussed in the Introduction (Section I), the distribution of survey respondents by primary activity was very similar to actual visitation data compiled by the Cherry Creek State Park staff in June and July, 1996.

Boating (29%), swimming (23%) and shore fishing (22%) were the three most prevalent primary activities. Boating includes motor boating, sail boating, jet skiing, windsurfing and boat fishing. Other primary activities included picnicking (8%), hiking/walking (6%), biking (5%) and camping (5%). (Refer to Figure 1.)

Most visitors participate in more than one activity when visiting the park. In total, the largest segments of visitors participate in swimming (38%) and boating (36%), followed by picnicking (28%) and shore fishing (26%). While picnicking isn't the primary activity for a large percentage of visitors, it is a secondary activity for a large percentage.

FIGURE 1

RECREATION ACTIVITIES OF CHERRY CREEK STATE PARK VISITORS



Visits Per Year to Cherry Creek State Park

On the whole, the survey respondents are frequent visitors to Cherry Creek State Park. They reported that they made, on average, 31.7 visits to the park in a typical year. However, the average is inflated by a small percentage of visitors who make an exceptionally large number of visits. The median number of visits was 12.0 for all respondents. The median represents the midpoint at which 50% of the responses fall below and 50% fall above. The median is a better representation of visits per year for this survey. (Refer to Table 1.)

Visits per year vary significantly by the primary activity of the survey respondents. The median visits per year vary from a low of 4.0 for camping and 6.0 for swimming, to a high of 20.0 for shore fishing and 25.0 for biking.

Years Visiting Cherry Creek State Park

On the whole, the survey respondents had been visiting Cherry Creek State Park for a long time. These visitors had been visiting the park, on average, 11.7 years. Only 11% of the visitors had visited Cherry Creek State Park for the first time this year. (Refer to Figure 2.)

TABLE 1 VISITS PER YEAR TO CHERRY CREEK STATE PARK BY PRIMARY ACTIVITY

Visits Per Year	All Respondents	Primary Activity: Boating	Swimming	Shore Fishing	Picnicking	Hiking/ Walking	Biking	Camping
1	10%	5%	18%	8%	12%	8%	4%	25%
2 - 5	19	14	30	10	18	13	17	30
6 - 10	17	22	18	13	29	13	9	10
11 - 25	28	34	24	25	26	38	22	25
26 or more	26	25	11	44	15	29	48	10
TOTAL*	100%	100%	101%	100%	100%	101%	100%	100%
AVERAGE	31.7	28.3	15.2	62.4	16.9	36.6	37.8	9.4
MEDIAN**	12.0	12.0	6.0	20.0	10.0	25.0	4.0	15.0

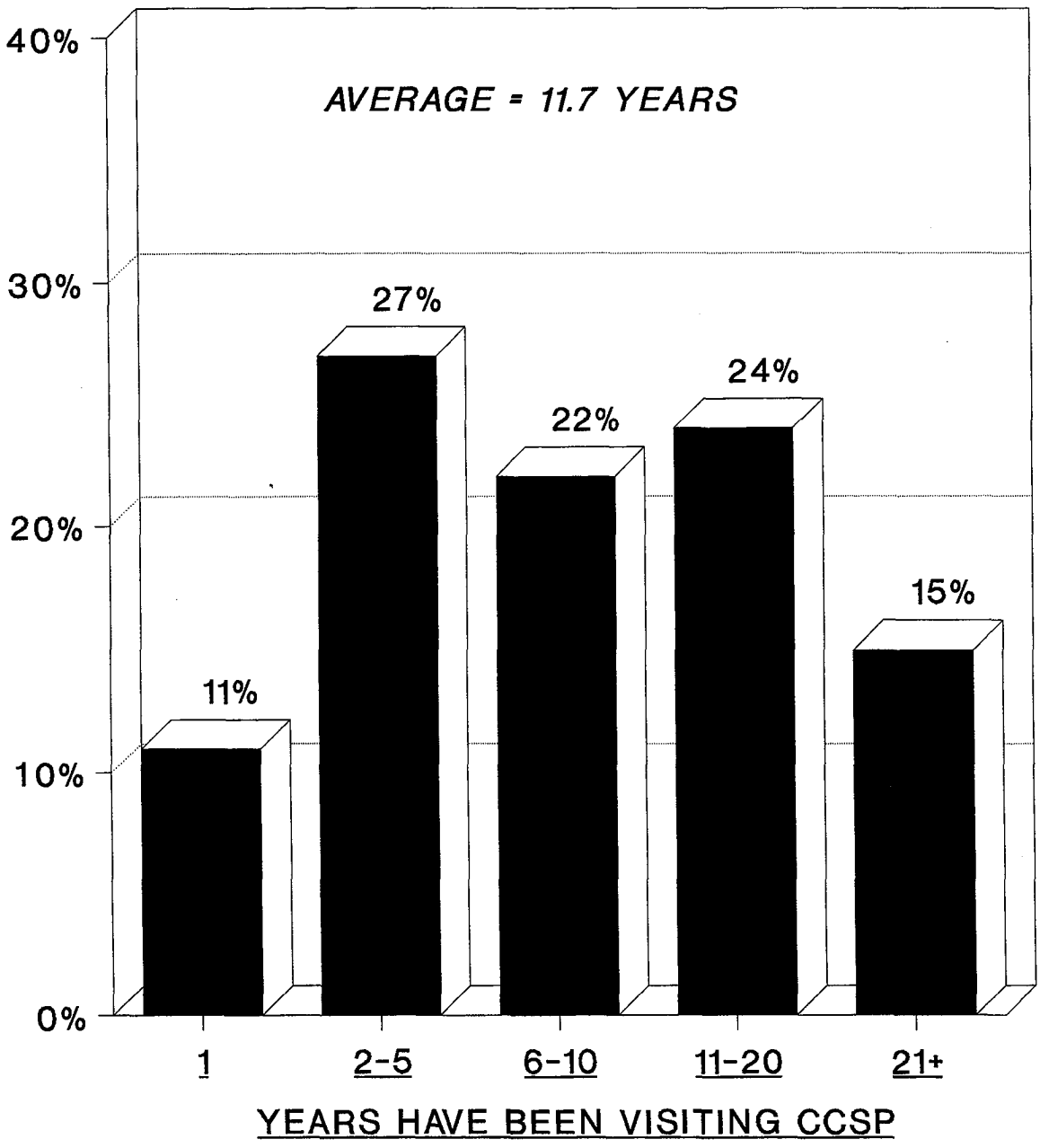
* May add to more than 100% due to rounding.

** Median is midpoint at which 50% of the responses fall below and 50% fall above.

Source: THE HOWELL RESEARCH GROUP

FIGURE 2

YEARS VISITING CHERRY CREEK STATE PARK



What Visitors Considered Attractive About Cherry Creek State Park

Survey respondents were asked (unaided) what they found most attractive about Cherry Creek State Park. They were allowed to provide more than one response. (Refer to Table 2.)

In total, six out of ten visitors (60%) mentioned something that was directly related to the reservoir. The most frequently mentioned item was the "reservoir/water" (29%). "Nice beach" (22%) and "good place to fish" (15%) were other frequently mentioned items directly related to the reservoir. Only 5% of the visitors mentioned "reservoir clean" as what they found attractive.

Overall, the second most frequently mentioned item was "scenery/natural environment" (25%). Although this response was not classified as reservoir directly related, it is closely associated with the reservoir. Other frequently mentioned things found attractive were "clean/well-maintained' (16%), "bike paths" (11%), "wildlife" (8%) and "picnic area" (8%).

The responses to this question were examined by visitors who did or did not participate in a reservoir contact activity on the day of the survey. Those participating in a reservoir contact activity were defined as those whose primary or other activities included either boating, swimming or shore fishing. Those with a reservoir contact activity represented 85% of all survey respondents.

In general, there were few differences in what visitors found attractive about Cherry Creek State Park between those who did or did not participate in a reservoir contact activity. The only significant difference was that non-contact visitors (32%) mentioned bike paths more frequently than those with reservoir contact (7%).

TABLE 2 WHAT VISITORS CONSIDERED ATTRACTIVE ABOUT CHERRY CREEK STATE PARK (UNAIDED)

Attractive*	All Respondents	Any Reservoir Contact Activity: Yes	Any Reservoir Contact Activity: No
Reservoir Directly Related (Net)	60%	61%	54%
Reservoir/Water	29	28	35
Nice beach	22	23	22
Good place to fish	15	18	0
Reservoir clean	5	5	5
Boat ramps	2	2	0
Scenery/natural environment	25	24	32
Clean/well-maintained	16	16	17
Bike paths	11	7	32
Wildlife	8	8	9
Picnic area	8	8	8
People at park	7	8	5
Trails	5	5	9
Views	4	4	3
Camping area	4	3	5
Layout/organization of park	4	4	3
Rangers/patrolled well	2	3	2
Not crowded	1	1	3
Playground	1	2	0
Other	12	12	11
Nothing	1	2	0
BASE	(420)	(355)	(65)

* Survey respondents were allowed to provide multiple responses.

Source: THE HOWELL RESEARCH GROUP

What Visitors Considered Unattractive About Cherry Creek State Park

Survey respondents were also asked (unaided) what they found unattractive about Cherry Creek State Park. Again, they were allowed to provide multiple responses. (Refer to Table 3.)

More than four out of ten visitors (43%) mentioned something that was directly related to the reservoir. "Jet skis" (14%) was most frequently mentioned, while "reservoir dirty/polluted" (12%) was the second most frequently mentioned reservoir related item. Other reservoir related things found unattractive included "too many boats" (8%), "boats interfere with fishing" (6%) and "dirty beach" (5%).

A non-reservoir related item, "park too crowded" (14%) was mentioned with the same frequency as "jet skiis." "Not clean/litter" (8%) was the second most frequently mentioned item not reservoir directly related.

One out of five visitors (21%) said there was "nothing" they found unattractive about Cherry Creek State Park.

There were a couple of significant differences in what visitors considered unattractive between those who did or did not participate in a reservoir contact activity. Those participating in a reservoir contact activity were more likely than non-reservoir contact visitors to mention something reservoir directly related (46% vs. 29%). Non-reservoir contact visitors were far more likely (12%) than reservoir contact visitors (1%) to mention "need more/improved bike paths."

TABLE 3 WHAT VISITORS CONSIDERED UNATTRACTIVE ABOUT CHERRY CREEK STATE PARK (UNAIDED)

Unattractive*	All Respondents	Any Reservoir Contact Activity: Yes	Any Reservoir Contact Activity: No
Reservoir Directly Related (Net)	43%	46%	29%
Jet skis	14	14	9
Reservoir dirty/polluted	12	12	11
Too many boats	8	9	6
Boats interfere with fishing	6	7	0
Dirty beach	5	6	3
Small swim beach	4	4	5
Quality/lack of sand on beach	3	3	2
Needs more/improved boat ramps	2	3	0
Park too crowded	14	15	11
Not clean/litter	8	8	8
Entry fee/pass price	4	5	2
Restrooms	4	3	6
Conduct of other visitors	3	3	5
Not enough trees/shade	3	3	3
Insects/mosquitos	3	3	3
Need more/improved bike paths	3	1	12
Lack of parking	2	2	2
Rangers/staff	2	1	3
Other	15	15	15
Nothing	21	20	25
BASE	(419)	(354)	(65)

* Survey respondents were allowed to provide multiple responses.

Source: THE HOWELL RESEARCH GROUP

PERCEPTIONS ABOUT WATER QUALITY

How Visitors Defined "Good" Water Quality in a Lake or Reservoir

When visitors were asked (unaided) how they would generally define "good" water quality in a lake or reservoir, they provided a variety of definitions. Only 3% of the respondents could not provide a definition of "good" water quality. The majority of all respondents (60%) used the term "clear" in their definition. (Refer to Table 4.)

The next most frequently used terms in defining "good" water quality were "no trash/debris" (29%) and "clean" (20%), followed by "no odor" (13%) and "no algae/plants" (12%). Descriptors such as "no bacteria" (8%) and "safe to swim" (4%), which could be related to the recent news stories regarding area reservoirs, were mentioned with low frequency.

TABLE 4 HOW VISITORS DEFINED "GOOD" WATER QUALITY IN A LAKE OR RESERVOIR (UNAIDED)

What Defines Good Water Quality*	All Respondents
Clear	60%
No trash/debris	29
Clean	20
No odor	13
No algae/plants	12
No oil/gas	8
No bacteria	8
Blue color	6
Safe to swim	4
Safe to drink	4
No dead fish	4
No bad taste	2
Wildlife on/around lake	2
Good fishing	2
Good color	1
Safe to eat fish	1
Cold	1
Other	10
Don't know	3
BASE	(420)

* Survey respondents were allowed to provide multiple responses.

Source: THE HOWELL RESEARCH GROUP

How Visitors Described the Water Quality in Cherry Creek Reservoir

Visitors were asked (unaided) to describe the water quality in the Cherry Creek Reservoir. This question was asked prior to any other questions regarding water quality in order to solicit unbiased responses. The responses varied widely and about one-half of the respondents (53%) mentioned something positive, while about one-half (55%) mentioned something negative. Multiple responses were allowed, thus, some respondents used both positive and negative descriptors for the water quality in Cherry Creek Reservoir. Only 3% of all respondents could not provide a description. (Refer to Table 5.)

The most frequently mentioned response in total, as well as the most frequently mentioned positive comment was "clean" (32%). This response was mentioned twice as frequently as the second most frequently mentioned comment, "dirty/polluted" (16%). Other positive comments mentioned with some frequency were "no problems/OK," (9%), "no trash/debris" (9%) and "clear" (8%). It should be noted that "clear" was by far the most frequently used term used to describe "good" water quality in general. (Refer back to Table 4.) Thus, there is minimal association with Cherry Creek Reservoir and how people define "good" water quality.

In addition to "dirty/polluted," respondents mentioned other negative comments with some frequency: "muddy/murky" (15%), "too much algae/plants" (11%), "gasoline/oil" (9%) and "trash/debris" (6%). Comments that could have been related to recent news stories such as "not safe to swim" (2%), "human/animal waste" (2%) and "bacteria" (1%) were mentioned infrequently.

TABLE 5 HOW VISITORS DESCRIBED THE WATER IN CHERRY CREEK RESERVOIR

What Describes Water in Cherry Creek Reservoir*	All Respondents
Positive Comments (Net)	53
Clean	32
No problems/OK	9
No trash/debris	9
Clear	8
Safe to swim	3
Does not smell	3
Good fishing	2
No dead fish	2
Has improved	1
Better than other reservoirs	1
Lack of algae	1
Other - positive	2
Negative Comments (Net)	55%
Dirty/polluted	16
Muddy/murky	15
Too much algae/plants	11
Gasoline/oil	9
Trash/debris	6
Cold	5
Smells	5
Marginal/varies/needs improvement	4
Not safe to swim	2
Human/animal waste	2
Bacteria	1
Not as clean as other reservoirs	1
Other - negative	5
Don't know	3
BASE	(416)

* Survey respondents were allowed to provide multiple responses.
Source: THE HOWELL RESEARCH GROUP

Rating of Water Quality in Cherry Creek Reservoir

The vast majority of park visitors rated the water quality in Cherry Creek Reservoir as either **good** (40%) or **fair** (39%). A small percentage (8%) rated the water quality **excellent**, while only one out of ten respondents rated it either **poor** (9%) or **unacceptable** (1%). (Refer to Figure 3.)

There were only slight variations in the ratings by different characteristics of the respondents such as their primary activity or whether they were first-year visitors to the park. Visitors whose primary activities were either biking or camping, on the whole, gave slightly higher ratings to the water quality than other visitors. However, these results must be viewed with caution since the sample sizes for those biking and camping were small. (Refer to Table 6.)

Respondents who had been visiting Cherry Creek State Park for only this year also rated the water quality slightly higher than those who had been visiting for two years or more. First year users were more likely (58%) to rate the water quality **good** or **excellent** than longer-term users (46%) and less likely to rate it **poor** or **unacceptable** (2% vs. 12%).

The reasons (unaided) given for their ratings of the water quality are profiled in Table 7. Those rating the water quality in Cherry Creek Reservoir as **excellent** or **good** were most likely to mention "clean," "no trash/debris" or "clear" as their reasons. Those rating it **excellent** were more likely to mention both "clean" and "clear" than those rating it **good**. One out of five of those rating it **good** (22%) mentioned something negative in their reasons.

Respondents who rated the water quality **fair** were far more likely to provide negative reasons (85%) than positive reasons (23%). There was no single negative reasons stated with more frequency than the others. They mentioned several negative reasons with similar frequency: "muddy/murky," "gasoline/oil," "dirty/polluted," "too much algae/plants," and "marginal/ varies/needs improvement."

Those who rated the water quality **poor** or **unacceptable** also mentioned several different reasons. "Gasoline/oil," "dirty/polluted" and "trash/debris" were mentioned most frequently, followed by "muddy/murky," and "too much algae/plants."

FIGURE 3

RATING OF WATER QUALITY IN CHERRY CREEK RESERVOIR

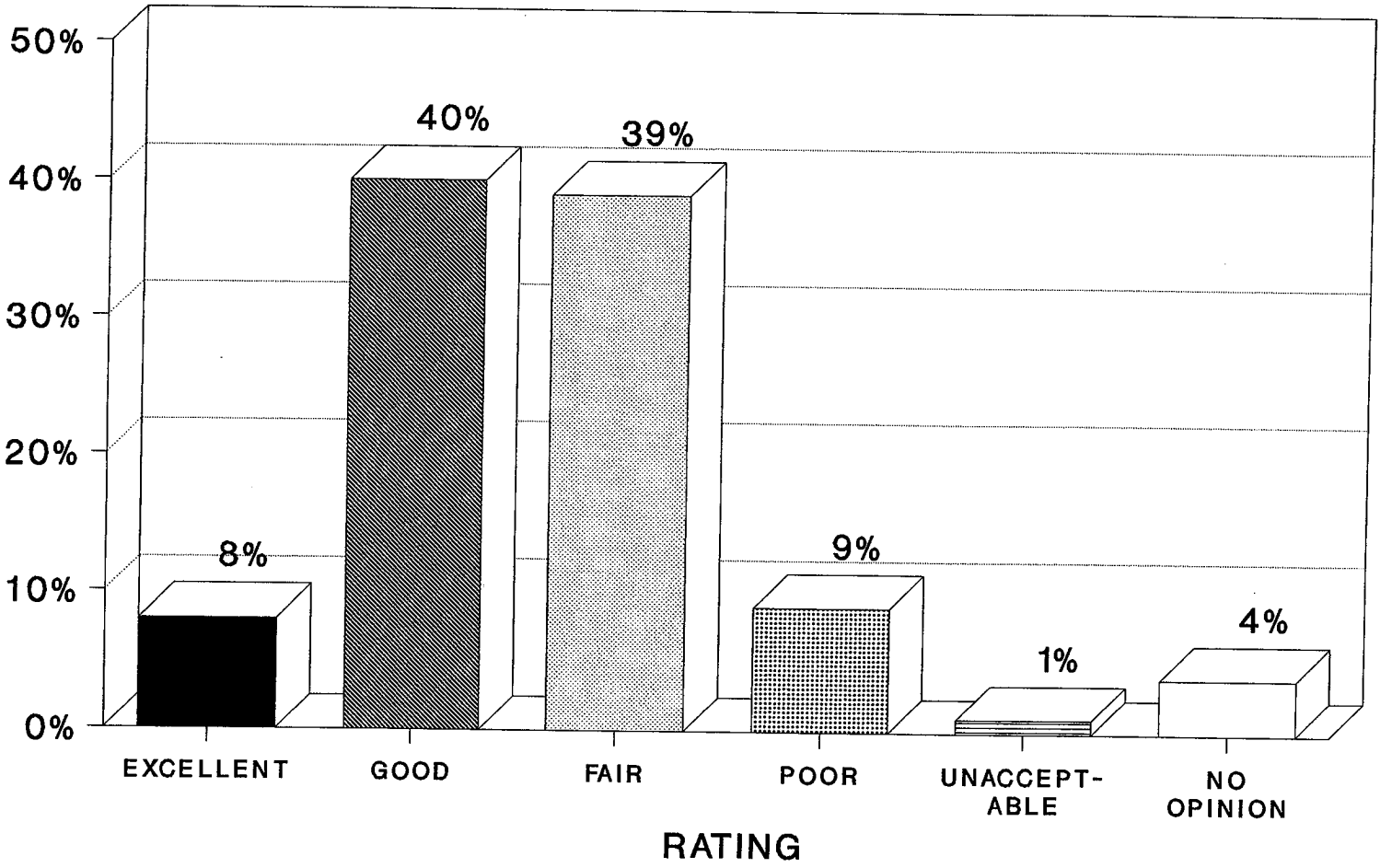


TABLE 6 RATING OF WATER QUALITY IN CHERRY CREEK RESERVOIR BY SELECTED CHARACTERISTICS

		Primary Activity							First Year Visitors	
Rating	All Respondents	Boating	Swimming	Shore Fishing	Picnicking	Hiking/ Walking	Biking	Camping	Yes	No
Excellent	8%	7%	3%	9%	12%	21%	4%	5%	7%	8%
Good	40	41	39	43	29	21	39	55	51	38
Fair	39	37	43	42	41	50	30	30	30	40
Poor	9	12	10	4	12	4	9	0	2	10
Unacceptable	1	2	0	1	3	4	4	0	0	2
No Opinion	4	2	4	1	3	0	13	10	9	3
TOTAL*	101%	101%	99%	100%	100%	100%	100%	100%	99%	101%
MEAN SCORE**	3.5	3.4	3.4	3.5	3.4	3.5	3.7	3.7	3.7	3.4
BASE	(420)	(123)	(97)	(91)	(34)	(24)	(23)	(20)	(43)	(377)

* May add to more or less than 100% due to rounding.

** Mean score is calculated by assigning integer values of “5" to **excellent**, “4" to **good**, “3" to **fair**, “2" to **poor**, “1" to **unacceptable** and disregarding the **no opinions**.

Source: THE HOWELL RESEARCH GROUP

TABLE 7 REASONS FOR THE RATINGS GIVEN TO THE WATER QUALITY OF CHERRY CREEK RESERVOIR (UNAIDED)

	Rating			
Reasons*	Excellent	Good	Fair	Poor/ Unacceptable
Positive Reasons (Net)	91%	81%	23%	-%
Clean	41	26	1	-
No trash/debris	28	25	2	-
Clear	19	13	2	-
Safe to swim	9	5	6	-
Better than other reservoirs	9	6	2	-
No problem/OK	6	6	2	-
Does not smell	6	7	1	-
Good fishing	3	4	2	-
Lack of oil/gas	-	4	1	-
Lack of algae/plants	3	2	1	-
No dead fish	3	3	-	-
Has improved	3	2	1	-
Low bacteria	3	2	-	-
Other - positive	13	11	1	-
Negative Reasons (Net)	3	22	85	100
Muddy/murky	-	6	13	16
Gasoline/oil	-	2	13	28
Dirty/polluted	-	1	12	28
Too much algae/plants	-	2	14	14
Marginal/varies/ needs improvement	-	2	15	2
Trash/debris	-	2	8	21
Smells	-	1	6	7
Not as clean as other reservoirs	-	1	6	2
Bacteria	-	1	2	7
Human/animal waste	-	1	3	7
Read/heard reports	-	-	3	5
Not safe to swim	-	1	1	5
Other - negative	3	6	10	23
Don't Know	3	3	2	-
BASE	(32)	(166)	(164)	(43)

* Survey respondents were allowed to provide multiple responses.
Source: THE HOWELL RESEARCH GROUP

Perceptions About Color of Cherry Creek Reservoir

When asked which one of five different colors described the water in Cherry Creek Reservoir, the largest percentage selected *green* (38%), followed by *brown* (24%). One out of five respondents (20%) said the color was *blue*, while small percentages selected *gray* (10%) or *clear* (8%). (Refer to Figure 4.)

Perceptions About Specific Problems With Reservoir

Survey respondents were asked if they thought there is a problem with trash/garbage, oil/gas or plants/algae being in the reservoir. A slight majority of park visitors (53%) believed there was a problem with plants/algae. Four out of ten visitors (41%) perceive a problem with oil/gas and 36% perceive a problem with trash/garbage. (Refer ot Figure 5.)

Those visitors who had participated in any reservoir contact activities were more likely than those not participating in any reservoir contact activities to believe that each of the three pollutants was a problem. The largest variation between these two segments of respondents existed for plants/algae -- 55% of those with reservoir contact perceived it to be a problem compared to 38% of those with no direct contact.

FIGURE 4

PERCEPTIONS ABOUT COLOR OF CHERRY CREEK RESERVOIR

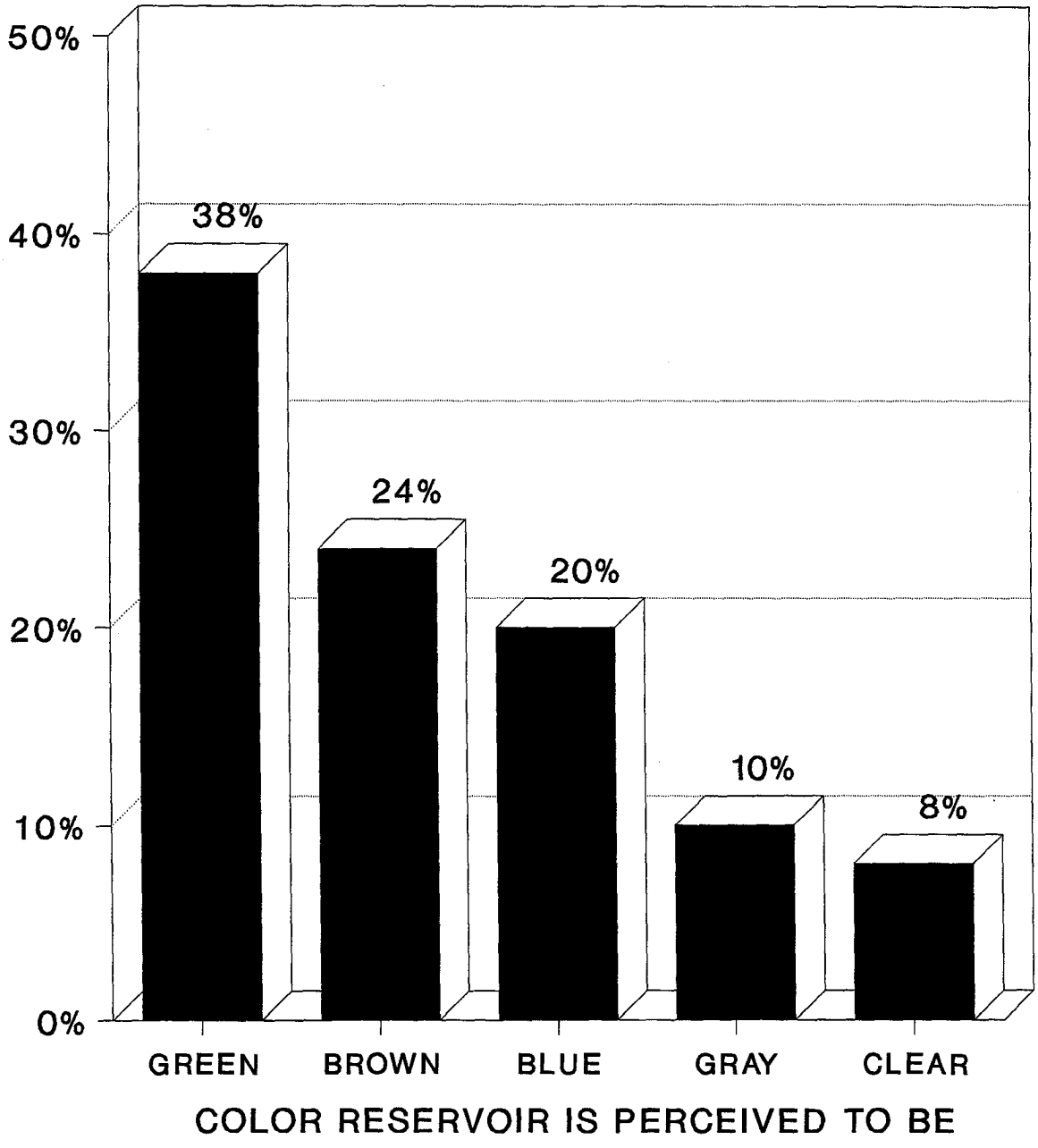
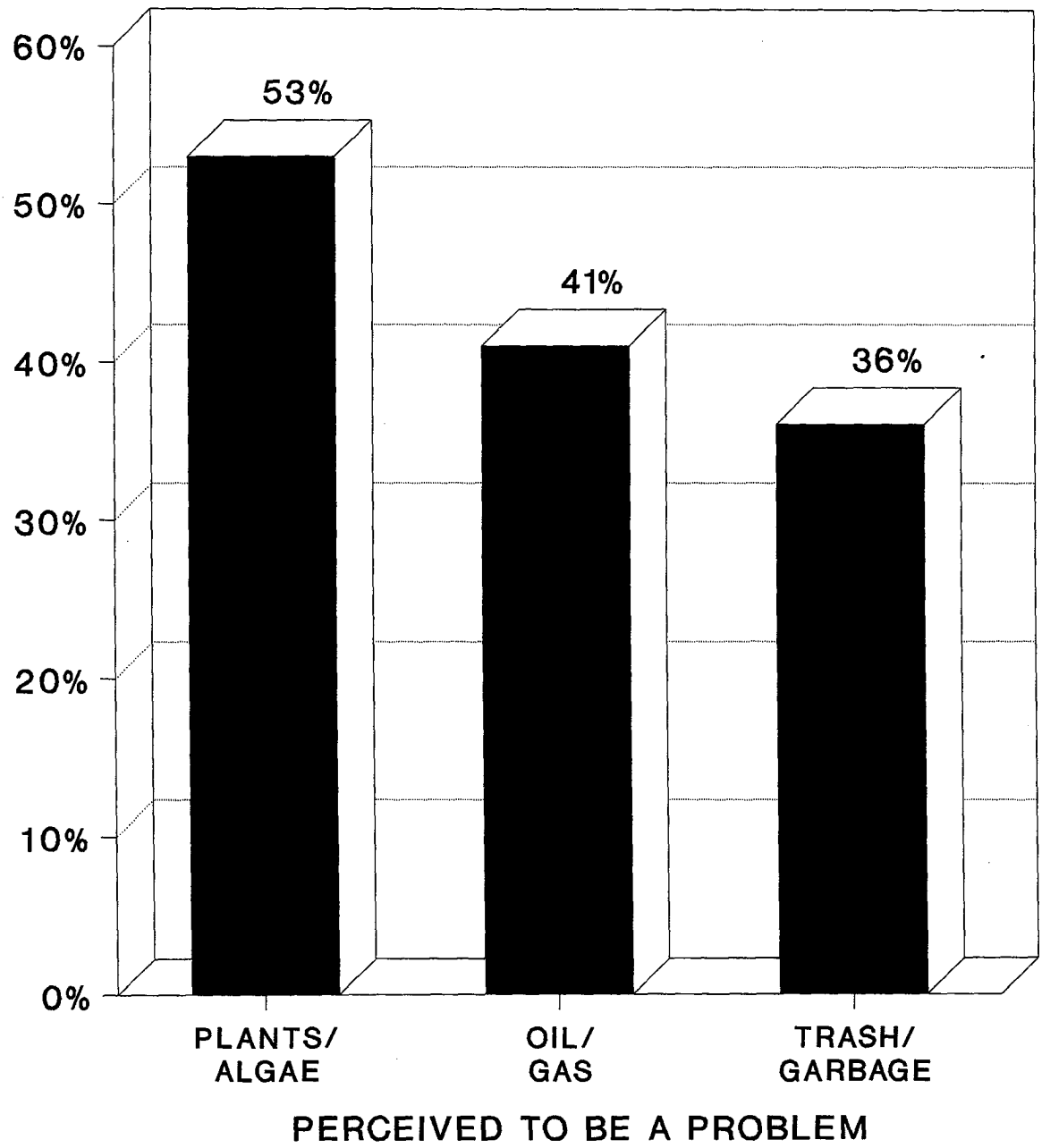


FIGURE 5

PERCEPTIONS ABOUT SPECIFIC PROBLEMS WITH RESERVOIR



NOTE: MULTIPLE RESPONSES

Perceptions About Contributors to Pollution in Cherry Creek Reservoir

Park visitors were most likely to believe that motor powered boats contribute to pollution in Cherry Creek Reservoir. Seven out of ten respondents (71%) thought that motor powered boats contribute either **significantly** (40%) or **moderately** (31%) to pollution in the reservoir. Those whose primary activity was boating were only slightly less likely than non-boaters to have this perception. (Refer to Table 8.)

Visitors expressed mixed views regarding the contributions of water runoff from development, the water that enters the reservoir from Cherry Creek and chemical changes. Nearly one-half thought that water runoff from development around the reservoir contributed either **significantly** (19%) or **moderately** (27%), while four out of ten respondents thought it contributed only **a little** (20%) or **not at all** (19%). One-third of the respondents thought that the water that enters the reservoir from Cherry Creek contributes **significantly** (12%) or **moderately** (21%), while nearly one-half thought it contributed only a **little** (24%) or **not at all** (25%).

Similarly, about one-third of the respondents (32%) thought that chemical changes as a result of sunlight, air temperature and plants in the reservoir contributed either **significantly** (8%) or **moderately** (24%) to pollution, while one-half thought chemical changes contributed only **a little** (26%) or **not at all** (26%).

Sizeable percentages of the respondents had no opinion regarding the contributions to pollution of water runoff from development (15%), the water that enters from Cherry Creek (18%) or chemical changes as a result of sunlight, air temperature and plants (17%).

Visitors were not likely to attribute pollution to the people who swim in the reservoir. About one-fourth thought that swimmers contributed either **significantly** (8%) or **moderately** (19%), but seven out of ten respondents thought that they contributed only **a little** (32%) or **not at all** (40%).

TABLE 8 PERCEPTIONS ABOUT CONTRIBUTORS TO POLLUTION IN CHERRY CREEK RESERVOIR

	Contributes to Pollution					
Possible Contributor	Significantly	Moderately	A Little	Not At All	Don't Know	Mean Score*
Motor powered boats	40%	31%	20%	8%	2%	3.0
Water runoff from development around the reservoir	19	27	20	19	15	2.5
Water that enters reservoir from Cherry Creek 12	21	24	25	18	2.2	
Chemical changes as a result of the sunlight, air temperature and plants on reservoir	8	24	26	26	17	2.2
People who swim in reservoir	8	19	32	40	2	2.0
BASE	---------- (420) ----------					

* Mean score is calculated by assigning integer values of "4" to **significantly**, "3" to **moderately**, "2" to **a little**, "1" to **not at all** and disregarding the **don't knows**.

Source: THE HOWELL RESEARCH GROUP

Comparison of Water Quality in Cherry Creek Reservoir to Other Reservoirs

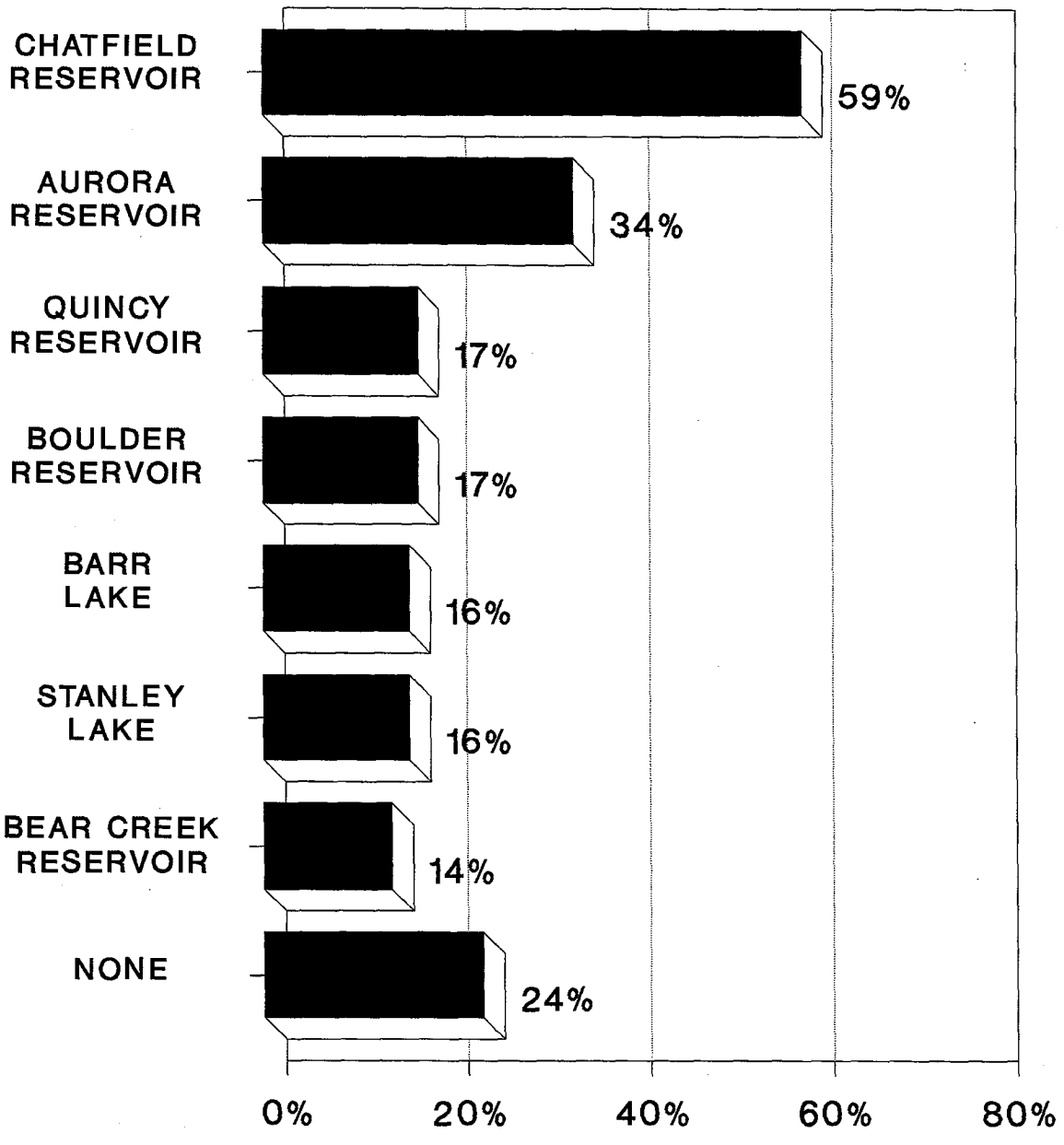
Survey respondents were asked to compare the water quality in Cherry Creek Reservoir to the water quality in other Denver metropolitan area reservoirs that they had used within the past three years. In total, three-fourths of the visitors (76%) had used at least one of these reservoirs within the past three years. The majority of respondents (59%) had used Chatfield Reservoir, while one-third (34%) had used the Aurora Reservoir. The other five reservoirs had each been used by similar percentages of the respondents (14% - 17%). (Refer to Figure 6.)

Visitors who had used other reservoirs expressed mixed views regarding the water quality in Cherry Creek compared to these reservoirs. Chatfield, the most familiar reservoir among the respondents, was the only one for which respondents were more likely to perceive its water quality to be **better** than Cherry Creek (32% vs. 27%). However, the difference was minimal and the largest segment of respondents (36%), perceived the water quality to be the **same** in both reservoirs. (Refer to Table 9.)

Respondents who had used any of the other six reservoirs were more likely to perceive that the water quality in the Cherry Creek Reservoir was **better** instead of **worse**. The most pronounced differences were for Quincy Reservoir (Cherry Creek is 47% **better** vs. 21% **worse**) and Bear Creek Reservoir (Cherry Creek is 37% **better** vs. 12% **worse**).

FIGURE 6

OTHER RESERVOIRS USED IN PAST 3 YEARS



NOTE: MULTIPLE RESPONSES

TABLE 9 WATER QUALITY IN CHERRY CREEK RESERVOIR COMPARED TO OTHER RESERVOIRS THAT HAVE BEEN USED

	Water Quality in Cherry Creek Is				
Compared To	Better	Same	Worse	Don't Know	Base*
Chatfield Reservoir	27%	36%	32%	4%	(249)
Aurora Reservoir	42	26	28	4	(144)
Quincy Reservoir	47	30	21	3	(73)
Boulder Reservoir	27	44	23	6	(70)
Barr Lake	42	23	29	6	(66)
Stanley Lake	39	28	26	8	(65)
Bear Creek Reservoir	37	46	12	5	(57)

* Base represents respondents who had used that reservoir within past three years.

Source: THE HOWELL RESEARCH GROUP

Perceptions About Improved Water Quality of Cherry Creek

Nearly one-half of all respondents (46%) thought that the water quality of Cherry Creek Reservoir has remained the **same** over the past few years. The remaining respondents were about equally divided in thinking the water quality had **improved** (23%) or had **deteriorated** (25%) with 6% having **no opinion**. (Refer to Figure 7.)

Perceptions about improved water quality somewhat varied by the primary activity of the survey respondents. Those whose primary activity was swimming (15%), hiking/walking (16%), biking (11%) or camping (0%) were less likely to think the water quality had **improved** compared to those whose primary activity was boating (26%), shore fishing (36%) or picnicking (30%). (Refer to Table 10.)

Increased Use of Cherry Creek Reservoir if Water Was Cleaner

Four out of ten respondents (40%) said they would use Cherry Creek Reservoir more often if the water was cleaner. Those whose primary activity was hiking/walking (54%) and swimming (50%) were more likely to say they would use the reservoir more often, while those whose primary activity was boating (31%) were less likely to say they would use the reservoir more often.

Respondents who would use the reservoir more often with cleaner water were asked how many more times per year they would use it. These respondents said they would use the reservoir, on average, 13.2 more times per year. This estimate should be used with caution since survey respondents typically over estimate their actual behavior in such questions.

Among all respondents (including those who would not use the reservoir more often with cleaner water), the average increase in visits per year would be 5.2 with cleaner water. As expected, the average increases are higher for those who currently rated the current water quality as only **fair** (6.2) or **poor/unacceptable** (12.7). The average increases were much lower for those who rated the water quality as **excellent** (3.8) or **good** (2.6). (Refer to Table 11.)

FIGURE 7

PERCEPTIONS ABOUT IMPROVEMENT OF WATER QUALITY IN RESERVOIR

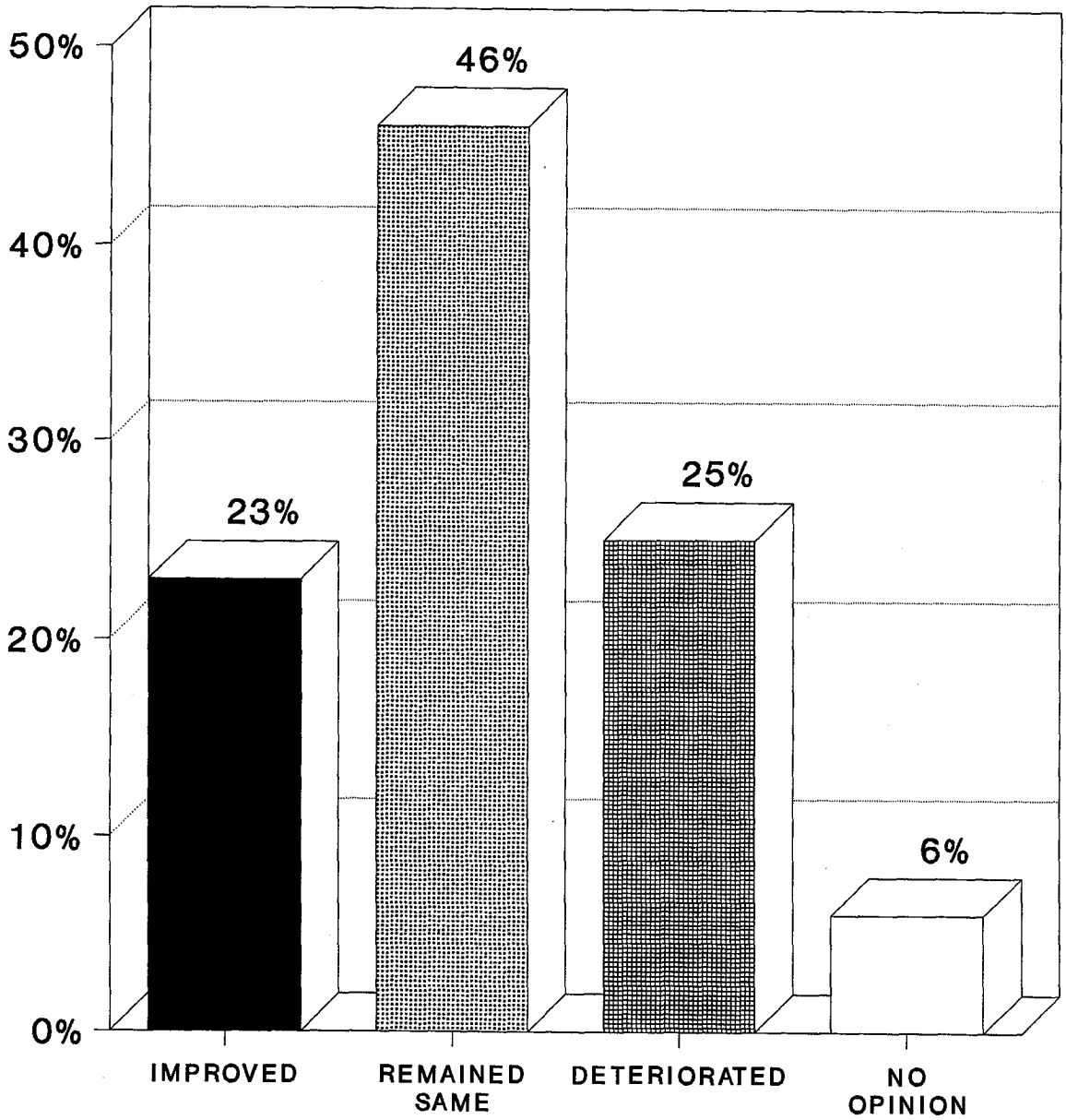


TABLE 10 PERCEPTIONS REGARDING IMPROVED WATER QUALITY OF CHERRY CREEK RESERVOIR OVER PAST FEW YEARS BY PRIMARY ACTIVITY

Water Quality Has	All Respondents	Primary Activity: Boating	Swimming	Shore Fishing	Picnicking	Hiking/ Walking	Biking	Camping
Improved	23%	26%	15%	36%	30%	16%	11%	0%
Remained Same	46	44	51	35	53	58	42	71
Deteriorated	25	25	27	27	17	21	32	18
No Opinion	6	6	7	2	0	5	16	12
TOTAL*	100%	101%	100%	100%	100%	101%	101%	100%
BASE**	(372)	(117)	(81)	(84)	(30)	(19)	(17)	(19)

* May add to more than 100% due to rounding.

** Base represents respondents who had been visiting Cherry Creek State Park for two years or more.

Source: THE HOWELL RESEARCH GROUP

TABLE 11 HOW MANY MORE TIMES PER YEAR WOULD VISITORS USE CHERRY CREEK RESERVOIR IF WATER WAS CLEANER BY HOW VISITORS RATED THE WATER QUALITY

Additional Visits Per Year	All Respondents	How Respondents Rated Water Quality: Excellent	Good	Fair	Poor/ Unacceptable
1 - 5	15%	6%	13%	18%	23%
6 - 10	9	3	6	12	20
11 - 25	12	16	5	14	37
26 or more	4	0	2	5	20
None/Don't Know	60	75	74	51	30
TOTAL	100%	100%	100%	100%	100%
BASE	(415)	(32)	(166)	(159)	(43)
AVERAGE	5.2	3.8	2.6	6.2	12.7

Source: THE HOWELL RESEARCH GROUP

AWARENESS AND KNOWLEDGE OF CHERRY CREEK BASIN WATER QUALITY AUTHORITY

Awareness of CCBWQA

Awareness of the Cherry Creek Basin Water Quality Authority was tested in two ways: unaided and aided. Respondents were first asked (unaided) if they were aware of any agencies that work to maintain or improve the water quality in Cherry Creek Reservoir. Only 14% of the respondents had awareness of any such agencies with only 4% having an unaided awareness of CCBWQA. Respondents were most likely to mention State Parks (6%), with some mentions of EPA (2%), Colorado Health Department (2%), City of Aurora (2%), Arapahoe County (1%) and the City of Denver (1%). Respondents were obviously offering educated, but incorrect, guesses. (Refer to Table 12.)

Survey respondents were then directly asked if they had ever heard of the Cherry Creek Basin Water Quality Authority. Another 21% of the respondents claimed to have an aided awareness of CCBWQA. Thus, in total, one-fourth (25%) of all respondents had an awareness of CCBWQA (4% unaided plus 21% aided). (Refer to Figure 8.)

Awareness of the CCBWQA varies by certain characteristics of the park visitors. Respondents whose primary activity was boating had the highest awareness (33%), while those whose primary activity was biking had the lowest (9%). One plausible reason for the low awareness among bikers is that they typically do not pay an entry fee, and thus, would not be aware of the added fee for CCBWQA. (Refer to Table 13.)

As expected, awareness of the CCBWQA generally increases with the number of park visits per year and the number of years the respondents had been visiting Cherry Creek State Park. For example, only 6% of those who had been visiting the park for one year were aware of CCBWQA compared to 44% of those who had been visiting for 21 or more years.

Awareness of the CCBWQA did not vary significantly by county of residence, except that Jefferson County residents (15%) and residents living outside the Denver Metro area (10%) had lower awareness.

Knowledge About CCBWQA

Respondents were asked (unaided) what they knew about the Cherry Creek Basin Water Quality Authority. As presented above, only 25% of the respondents had any awareness or knowledge of the CCBWQA. The most frequently mentioned thing about the CCBWQA was the "fee/sticker" (13%). About one out of four of those with awareness of the CCBWQA said they "have only heard of the name" and knew nothing specific (7% of all respondents). Other less frequently mentioned perceptions were "trying to clean up reservoir" (4%), "monitor/test for water quality" (1%) and "built some holding ponds" (1%). (Refer to Table 14.)

TABLE 12 AWARENESS OF AGENCIES/ORGANIZATIONS THAT WORK TO MAINTAIN OR IMPROVE WATER QUALITY IN CHERRY CREEK RESERVOIR (UNAIDED)

Agencies/Organizations	All Respondents
Have An Awareness	**14%**
State Parks	6
CCBWQA	4
EPA	2
Colorado Health Department	2
City of Aurora	2
Arapahoe County	1
City of Denver	1
Other	3
Not Aware of Any	**86**
TOTAL	100%
BASE	(420)

Source: THE HOWELL RESEARCH GROUP

FIGURE 8

AWARENESS OF CHERRY CREEK BASIN WATER QUALITY AUTHORITY

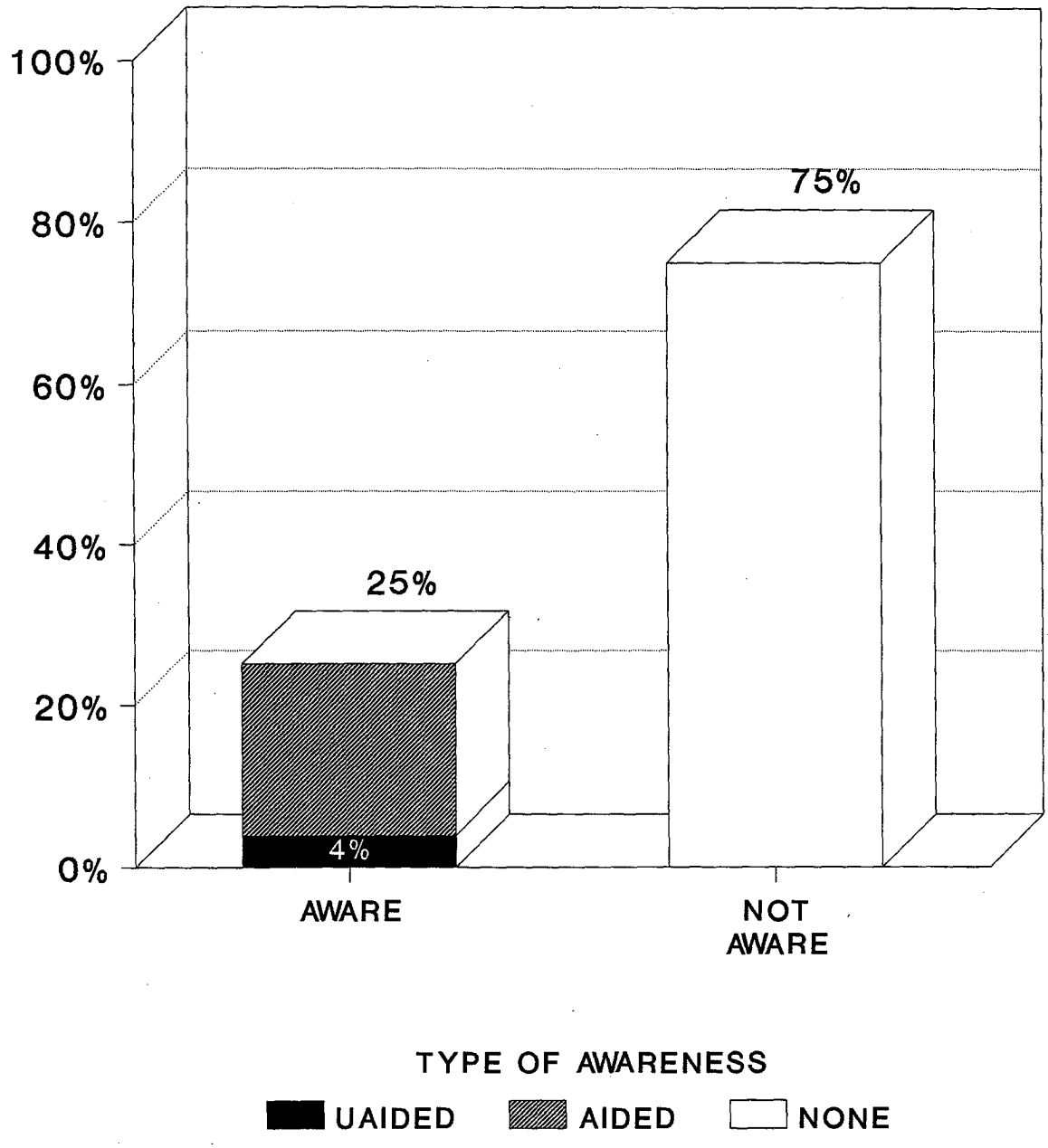


TABLE 13 AWARENESS OF CCBWQA BY SELECTED CHARACTERISTICS

	Percent Aware of CCBWQA
TOTAL (AIDED & UNAIDED)	25%
Primary Activity	
Boating	33
Swimming	21
Shore Fishing	26
Picnicking	18
Biking	9
Camping	20
Hiking/Walking	29
Park Visits Per Year	
1	12
2 - 5	18
6 - 10	11
11 - 25	33
26+	39
Years Visiting Cherry Creek State Park	
1	6
2 - 5	13
6 - 10	32
11 - 20	32
21+	44
County of Residence	
Adams	33
Arapahoe	26
Boulder	20
Denver	27
Douglas	28
Jefferson	15
Other	16

Source: THE HOWELL RESEARCH GROUP

TABLE 14 WHAT PARK VISITORS KNOW ABOUT CCBWQA (UNAIDED)

What They Know*	All Respondents
Fee/sticker	13%
Trying to clean up reservoir	4
Monitor/test for water quality	1
Built some holding ponds	1
Other	2
Have only heard name	7
Not aware of CCBWQA	75
BASE	(420)

* Survey respondents were allowed to provide multiple responses.

Source: THE HOWELL RESEARCH GROUP

COMPARISON OF 1997 SURVEY RESULTS TO 1982 SURVEY RESULTS

In 1982, Colorado State University conducted a survey among visitors at Chatfield and Cherry Creek Reservoirs for the Colorado Department of Health - Water Quality Control Division. The purpose of this survey was to determine "perceptions and attitudes, beliefs, and behavior with regard to various aesthetic characteristics of the water" in the reservoirs.

The 1982 survey results for Cherry Creek visitors are not directly comparable to those from the 1997 survey because the survey questions and the sampling procedures were different. The 1982 survey did not include all types of park users such as campers, bikers, walkers, hikers and picnickers, which were included in the 1997 survey.

Although direct data comparisons cannot be made, some general observations regarding similarities and differences in the results are apparent.

In both surveys, visitors expressed mixed opinions regarding the quality of water in Cherry Creek Reservoir. On the positive side, large percentages of visitors in both surveys described the water as being "clean" while on the negative side, "dirty/polluted" and "muddy/murky" were frequently mentioned in describing the water.

Cherry Creek State Park visitors expressed more concern about the reservoir's water quality in 1982 than in 1997.

In 1982, visitors were most concerned about sewage and chemicals polluting the water, while in 1997, visitors were most concerned with oil and gas from motor powered boats.

The 1982 survey showed that Chatfield visitors were far more positive about its water quality than Cherry Creek visitors were about its water quality. However, the 1997 survey showed that visitors who had used both Chatfield and Cherry Creek Reservoirs were about equally split in thinking the water quality at Cherry Creek was either better, worse or the same as in Chatfield.

DEMOGRAPHIC CHARACTERISTICS OF SURVEY RESPONDENTS

The survey obtained a limited number of demographic characteristics on the survey respondents including gender, age, county of residence and length of residence in Colorado. Although there is no park visitation data directly comparable to these survey results, it appears that the survey respondents are very representative of all park visitors. (Refer to Table 15.)

The survey respondents included a somewhat larger proportion of men (57%) than women (43%). The majority of respondents (52%) were between the ages of 25 and 44.

As expected, the largest segment of respondents (48%) lived in Arapahoe County, where the park is located, with the second largest percentage (25%) coming from Denver County. In total, 95% of the survey respondents lived within the six county Denver Metro area.

The average length of residence in Colorado was 20.9 years among all respondents. Seven out of ten respondents (70%) had lived in Colorado for more than 10 years, while nearly one-half (45%) have lived in the state for more than 20 years.

TABLE 15 DEMOGRAPHIC CHARACTERISTICS OF SURVEY RESPONDENTS

		All Respondents
Gender		
Male		57%
Female		43
	TOTAL	100%
	BASE	(420)
Age		
18 - 24		16%
25 - 34		25
35 - 44		27
45 - 54		18
55 - 64		7
65 and older		6
	TOTAL*	99%
	BASE	(420)
County of Residence		
Adams		9%
Arapahoe		48
Boulder		1
Denver		25
Douglas		4
Jefferson		8
Other Colorado		2
Outside Colorado		2
	TOTAL*	99%
	BASE	(420)

TABLE 15 DEMOGRAPHIC CHARACTERISTICS OF SURVEY RESPONDENTS (Continued)

	All Respondents
Length of Residence in Colorado (Years)	
1 - 5	18%
6 - 10	12
11 - 20	25
21 or more	45
TOTAL	100%
AVERAGE (YEARS)	20.9
BASE	(410)

* May add to less than 100% due to rounding.

Source: THE HOWELL RESEARCH GROUP

APPENDIX A

QUESTIONNAIRE USED FOR CCBWQA WATER QUALITY PERCEPTION SURVEY