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MANAGING FOR WILDLIFE VIEWING RECREATION EXPERIENCES: AN APPLICATION IN COLORADO

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Since the early 1980's, wildlife agencies have increased efforts to provide wildlife viewing recreation. In accomplishing this task, the diverse wildlife viewing interests of the public must be recognized. Several nonconsumptive wildlife use classifications have been helpful in guiding policy decisions that affect the provision of wildlife viewing recreation (Applegate et al. 1982, Lyons 1982, Hooper and Fletcher 1988). However, classifications that could guide development, management, and planning of wildlife viewing recreation at a site or for an area generally have been unavailable.

We assumed that, just as managers allocate sites or areas among diverse hunting (e.g., archery, muzzleloader, rifle) and fishing (e.g., fly, lake, stream, catch and release) experiences, they also can allocate among a diversity of wildlife viewing experiences. In this case study, we report a classification of wildlife viewing experiences that was developed to assist the management activities of the Colorado Division of Wildlife's Central Region (Denver metro area). The focus was on wildlife viewing that occurs on public lands. We assessed public preferences for recreation that occurred on trips where wildlife viewing was the primary purpose.

Our research was conducted within an experience-based management framework. Introduced in the early 1980's, the experience-based recreation management model was derived from an expectancy valence model of human motivation (Haas et al. 1981, Driver and Rosenthal 1982, Manfredo et al. 1983). This model proposes that recreation motivation is a function of 2 expectancies: (1) that effort (e.g., driving to a site, purchasing equipment) will lead to performances (viewing wildlife, seeing pristine scenery), and (2) that performances will lead to positive psychological outcomes (e.g., achievement, competence, stress release). One conclusion drawn from this approach is that traditional activity classifications (e.g., hiking, fishing, hunting) are inadequate in guiding management because they do not reflect what people seek (what motivates behavior) and receive (the satisfactions or benefits) from a recreation engagement (Driver and Brown 1975).

A more accurate representation of recreation preference is obtained by identifying preferred recreation opportunities according to the mix of (1) valued psychological outcomes derived from the recreation engagement (preferred experience outcomes), (2) the activity or activities that occur while on a recreation outing, and (3) the types of settings (including physical resources, social conditions, and management activities) that are necessary for achievement of the activity and experience. This approach has been termed "experience-based" to emphasize that experience outcomes are the ultimate goal and motivation of the recreationist, whereas settings and activities are instrumental to that goal. The Recreation Opportunity Spectrum (ROS), the planning system used by the U.S. Forest Service and Bureau of Land Management, offers the most widely applied example of experience-based management (Brown 1982, Buist and Hoots 1982).

Previous research within the experience-based management tradition has been directed

toward identifying recreation opportunity typologies that managers could use in the planning and management process (Hautaluoma and Brown 1979; Brown and Haas 1980; Manfredo et al. 1980, 1983; Ballman et al. 1981). These typologies provide a parsimonious classification of the diversity of public recreational preferences. Each type within a typology describes a distinct recreation opportunity for consideration in the management and planning process. A recreation opportunity is comprised of a set or "bundle" of desired experience outcomes, a set of preferred activities, and a preferred setting.

Given the need for and the general unavailability of information to facilitate an experience-based approach to management of wildlife viewing, our study was directed toward developing a typology of wildlife-viewing experiences.

METHODS

Data were collected in 2 phases. First, through a telephone interview, we collected general recreation participation information and screened subjects to be included in the second phase of the project. In the second phase, in-depth information about wildlife viewing was collected using a mail questionnaire.

Telephone Interview

A telephone interview of Denver metropolitan residents ≥18 years old was conducted in July 1990. Sampling was a 2-stage process. First, a systematic sample of telephone numbers was drawn from the 1989–1990 telephone directory of the Denver metropolitan region. Secondly, the last 2 digits of each number in the systematic sample were replaced with a randomly selected 2-digit number. This procedure was used to ensure that both listed and unlisted numbers were included in the sample frame.

The desired sample size of 400 mail survey respondents was set following a formula available from Mendenhall et al. (1971:46). This estimate resulted from computations in which (1) the population parameter of interest was a proportion of subjects within an experience type, (2) the population proportion was assumed to be 0.5 (which produces a conservative estimate because it assumes the highest possible variability in the population), and (3) the desired bound on error of estimation was 0.05 with a 95% confidence interval. Furthermore, we assumed that 35% of the numbers sampled during the telephone survey would produce usable contacts, that 70% of those contacted would meet the criterion "interested in wildlife" and would be willing to receive a questionnaire, and that there would be an 80% response rate to the mailed survey. Therefore, we drew a sample of 2,000 numbers from the telephone directory.

Calls were made Mondays through Thursdays from 6:00 p.m.–9:00 p.m. Businesses were excluded from the sample. We called those residences not producing a contact up to 5 times before discarding the number.

In 1 set of questions, the telephone survey determined outdoor recreation participation. Sixteen activities were listed and respondents indicated (yes or no) whether or not they participated in the activity on a "regular basis." Subjects were asked the number of trips taken in the past year primarily for viewing wildlife. Subjects were instructed not to include trips to museums or zoos or for trapping, hunting, or fishing. Responses were categorized as 0, 1–5, 6–10, 11–20, 21–30, or >30 trips. Subjects also were asked their interest in taking a trip to view wildlife. The response scale was "not at all," "slightly," "moderately," and "extremely" interested.

We established 2 screening criteria in selecting the sample for the mail survey. First, subjects had to have some interest in taking a trip to view wildlife. These included subjects with "slight," "moderate," or "extreme" interest in taking a trip. Secondly, subjects were asked if they would be willing to fill out a questionnaire about their wildlife viewing preferences. Those indicating unwillingness were not included in the mail survey sample.

Mail Survey

Subjects agreeing to answer a survey were sent a questionnaire and a self-addressed, postage-paid return envelope. Reminder postcards were sent 2 weeks after the initial questionnaire mailing and nonrespondents were sent a second questionnaire after 1 month. Approximately 1 month after sending the second questionnaire, we sent a third questionnaire to remaining nonrespondents. As an incentive, the fourth mailing included $1 with an explanation that the money was a token of the importance of the study results.

Experience preferences were measured from the mail survey using 12 items available from Driver (1983). Subjects were asked to indicate how important each of 12 listed "reasons" was for engaging in the type of wildlife viewing experience they preferred most. Possible responses were "not at all," "slightly," "moderately," "very," and "extremely" important.

To learn about the activity preferences associated with wildlife viewing, subjects also were presented with a list of 18 outdoor recreation activities and asked to indicate (yes or no) those activities they would combine with wildlife viewing. To learn about the attributes of preferred settings, a list of 18 types of wildlife or wildlife-viewing situations was presented. Subjects were asked to indicate how important the listed wildlife

was in their decision to take a trip to view wildlife. Possible responses were "not at all," "slightly," "moderately," "very," and "extremely" important.

To learn how management could enhance recreation experiences, we asked subjects how useful 7 types of information were to their wildlife viewing experience. Possible responses were the same as above. Next, subjects were asked to indicate the likelihood, on a 7-point scale ranging from "extremely unlikely" to "extremely likely," that they would use different sources to obtain such information. Fourteen items were listed for responses in this section.

Constraints on participating in wildlife viewing were measured using 12 items taken from previous studies of nonparticipation in recreation (Jackson 1988). Subjects were asked what restricted them from taking trips to view wildlife and possible responses to the 12 items were "not at all," "slightly," "moderately," "very," and "extremely" restrictive. In addition, 5 questions were included to measure subjects' likelihood of involvement in management activities. These items asked the likelihood of attending public meetings, expressing opinions to managers, signing petitions, writing to politicians, and writing editorials. Responses were obtained on a 7-point scale ranging from "highly likely" (+3) to "highly unlikely" (−3). In the final section of the survey, subjects were presented with items measuring sociodemographic characteristics.

Wildlife-setting preference items, activity preference items, and informational preference items were developed through discussions with managers. We pretested 10 Colorado State University students to check the clarity of the survey and telephone instruments.

Analyses

In the first step of our analyses we tested for effects caused by nonresponse (those sent a survey but who did not respond) and by nonparticipation (those who requested a survey not be sent), using responses to the telephone interview.

Object cluster analysis was used to determine a typology of wildlife viewing experiences. Object cluster analysis is useful for reducing a heterogeneous sample into homogeneous subsets based on subjects' patterns of responses across a set of criterion variables. It allowed us to segment our total sample into smaller groups, with each group having different preferences for wildlife-viewing experience.

Three critical decisions must be made by researchers using cluster analysis. One decision involves the selection of variables that serve as criteria for clustering. We used 5 of the 19 experience outcome items (Table 1). Fewer items were used because within-activity subsets (e.g., groups of wildlife viewers) would not be expected to differ on all experience preferences. We selected the 5 items with the highest variances based on the assumption that items with the highest dispersion are those where we would be most likely to detect distinct experience types.

The second decision involves the measure of similarity and method of clustering that will be used. The resemblance matrix for our cluster analysis was comprised of squared Euclidian distances and the method of clustering was average linkage between groups. Analysis was performed using SPSS–PC (Norusis 1988: B90–B101).

The third decision is to determine the number of object clusters to accept. We increased the number of requested clusters over successive analyses. We accepted the number of clusters after which the next highest number of clusters produced a group of <3% of the respondents.

In subsequent analyses, we attempted to describe the differences among the groups identified in cluster analysis (i.e., experience types). Where the scales for the descriptive variables were nominal or ordinal, we tested hypotheses that there were relationships between experience types and the descriptive variable using chi-square. The variables used in these tests included all items that assessed wildlife preference, activity preferences, informational preferences, constraints to participation, race, membership in conservation organizations, education, marital status, and gender. On variables with interval level measures, which included only the index for involvement with management and age, we tested for differences among group means with analysis of variance. The Student-Newman-Keuls post hoc test for mean differences also was used to determine which group means differed.

RESULTS AND DISCUSSION

Six-hundred and seventy Denver metro area residents were interviewed by telephone. Of that group, 71 were uninterested in wildlife viewing and were not sent a questionnaire, and 107 were interested in wildlife viewing but did not want to fill out the questionnaire. The remaining 492 subjects were sent questionnaires, of which 16 were nondeliverable. We received 385 usable responses, 81% of those who received the survey. A higher percentage of the respondents, compared to the other 3 groups, participated in wildlife viewing, photography, and auto sightseeing (Table 2). More of those who agreed to fill out the survey (both respondents and nonrespondents) participated in overnight backpacking, day hiking, and fishing than those who did not fill out the survey. Those not interested in wildlife viewing, when compared to the other 3 groups, had the lowest participation rates for all activities where differences were detected (e.g., 17% day hiked vs. 55, 49, and 39% for the other groups).

Table 1. Preferred experience outcomes by wildlife viewing experience types for the Denver metropolitan region, 1990.

Experience outcome	Percentage of respondents indicating "very" or "extremely" important[a]					
	Type 1 $n = 83$	Type 2 $n = 55$	Type 3 $n = 117$	Type 4 $n = 115$	χ^2	P
To view scenery.	96	88	80	63	40.0	0.000
To experience tranquility.	95	79	71	52	52.2	0.000
To get away from the usual demands of life.	94	74	75	55	42.2	0.000
To bring back pleasant memories.	91	74	50	35	79.9	0.000
To experience new and different things.	91	83	66	52	47.3	0.000
To be on your own.[b]	88	10	56	3	213.2	0.000
To study nature.	85	78	51	34	70.4	0.000
To relax physically.	85	66	63	42	41.5	0.000
To experience excitement.	84	55	43	21	86.1	0.000
To do something with your family.	84	74	69	51	27.7	0.000
To be with friends.	83	57	51	37	27.7	0.000
To get exercise.	78	68	56	36	37.1	0.000
To develop your skills and abilities.[b]	75	40	12	4	147.0	0.000
To be near considerate people.[b]	71	43	4	14	127.8	0.000
To teach your outdoor skills to others.[b]	66	16	1	1	174.2	0.000
To develop personal spiritual values.	65	38	23	18	56.4	0.000
To do something creative, such as sketch, paint, or take photographs.[b]	52	72	35	9	88.2	0.000
To gain a sense of self confidence.	26	2	3	1	42.4	0.000
To have others think highly of you.	10	0	0	1	17.7	0.000

[a] Subjects were asked how important each item was as a reason for engaging in wildlife viewing activities. Possible responses were "not at all," "slightly," "moderately," "very," and "extremely" important.
[b] Items used in the cluster analyses.

There was little difference among mailback respondents, mailback nonrespondents, and interested nonrecipients in the number of trips taken to view wildlife. Nonrecipients who had no interest in wildlife viewing had the lowest participation rates (Table 2). Participation in outdoor recreation and wildlife viewing did not differ between mail survey respondents and nonrespondents.

We concluded that the findings based on mailback survey respondents (57% of those contacted by telephone) were representative of a similar proportion of Denver metro area residents who were interested in wildlife viewing. Using data available from the 1990 U.S. Census (U.S. Dep. Commer. 1992), comparisons were made between our mail survey respondents and the population of the Denver metro area. The groups did not differ in age structure or racial composition, but our survey sample had a slightly greater percentage of women (60 vs. 50%).

Population Characteristics

Telephone interview results indicated that 60% of people in Denver had taken trips primarily for wildlife viewing in the past year. Based on the proportion of participants, this makes wildlife viewing the third most popular outdoor recreation activity of Denver residents, behind picnicking (78%) and auto sightseeing (64%). Furthermore, 90% of people responded that they were interested (slightly, moderately, or extremely) in taking future trips for wildlife viewing.

Experience Types

Cluster analysis resulted in the identification of 4 experience types. Differences among these groups on the 19 experience preference items are highly pronounced and generally follow a pattern where Type 1 respondents placed greater importance on all experience preferences than did Type 2 respondents, Type 2

Table 2. Comparisons of recreation participation of Denver metropolitan respondent types contacted by the wildlife viewing telephone interview and the follow-up mail survey, 1990.

	Percentage participating in activity					
	Recipients[a]		Nonrecipients[a]			
Activities[b]	Respondents[c] $n = 385$	Non-respondents[c] $n = 123$	Interested[d] $n = 107$	Not interested[d] $n = 71$	χ^{2e}	P
Auto sightseeing	69	58	59	54	11.1	0.011
Wildlife viewing	67	55	53	28	39.0	0.000
Camping	57	59	49	32	16.7	0.001
Day hiking	55	49	39	17	38.3	0.000
Bicycling	55	63	52	34	15.5	0.001
Photography	47	36	31	21	23.4	0.000
Fishing	50	56	39	32	13.7	0.006
Off-road vehicle use	23	29	18	13	8.7	0.034
Cross-country skiing	23	19	15	4	14.7	0.002
Mountain climbing	18	30	16	9	15.6	0.001
Overnight backpacking	17	21	10	4	13.2	0.007
Number of trips primarily to view wildlife						
0	34	39	42	80	103.3	0.000
1–5	46	40	46	16		
6–10	8	11	6	1		
>10	12	10	7	3		

[a] "Recipients" were those contacted in the telephone interview who agreed to participate in the mail survey and were sent the mail survey instrument. "Nonrecipients" were those contacted in the telephone interview who did not agree to participate in the mail survey and were not sent the instrument.
[b] Picnicking, swimming, downhill skiing, boating, horseback riding, birdwatching, and hunting activities did not differ among types ($\chi^2 > 7.3$, 3 df, $P > 0.06$).
[c] "Respondents" were those who received a mail survey and responded. "Nonrespondents" were those who received the survey and did not respond.
[d] "Interested" includes those who indicated an interest in viewing wildlife but declined to participate in the mail survey. "Not interested" included those who had no interest in viewing wildlife and declined participation in the mail survey.
[e] 3 df except 9 df for "number of trips primarily to view wildlife."

placed greater importance than Type 3, and Type 3 placed greater importance than Type 4 (Table 1). The experience outcomes that were "very" or "extremely" important to Type 4 respondents included "viewing scenery," "getting away from the usual demands of life," "experiencing new and different things," "experiencing tranquility," and "doing something with your family." Type 3 respondents placed high importance on these same types of experiences, but 13–20% more of this group than Type 4 cited these outcomes as "very" or "extremely" important. Additionally, Type 3 respondents placed importance on "being on your own," "relaxing physically," and "studying nature."

Type 2 respondents ranked as "very" or "extremely" important the same items as Types 3 and 4, but they were rated important by more Type 2 respondents. For example, "experiencing new and different things" was important to 52% of those in Type 4, 66% of Type 3, and 83% of Type 2.

More items were important to Type 2 respondents. These items included "bringing back pleasant memories," "getting exercise," and "doing something creative such as sketching, painting, or taking photographs." The latter experience outcome revealed a distinguishing feature of this group: they placed the highest importance of all groups on creativity (Table 1). Another distinguishing feature was the low importance this group placed on being alone (10%) compared to Types 1 (88%) and 3 (56%).

Compared to the other 3 types, Type 1 had the highest importance scores on all experiences except those related to creativity. Approximately 90% of the respondents in this

group indicated that "very" or "extremely" important experiences included "being on your own," "experiencing new and different things," "viewing scenery," "getting away from the usual demands," "bringing back pleasant memories," and "experiencing tranquility," About 80% cited "experiencing excitement," "doing something with your family," "being with friends," "studying nature," "getting exercise," and "relaxing physically." Type 1 respondents contained the highest percentage of people interested in teaching their outdoor skills to others.

Items revealing achievement motivation, "to gain a sense of self confidence" and "to have others think highly of you," were generally unimportant to all groups.

Activity Participation

More Type 1 and Type 2 respondents participated in wildlife viewing (81% Type 1 and 72% Type 2 vs. 68% Type 3 and 53% Type 4, $\chi^2 = 17.8$, 3 df, $P = 0.000$) and mountain climbing (29% Type 1 and 26% Type 2 vs. 15% Type 3 and 10% Type 4, $\chi^2 = 14.3$, 3 df, $P = 0.002$). Also, compared to the other 3 groups, more Type 1 respondents participated in camping (79% Type 1, 56% Type 2, 57% Type 3, and 40% Type 4, $\chi^2 = 30.1$, 3 df, $P = 0.000$), backpacking (42% Type 1, 5% Type 2, 16% Type 3, and 7% Type 4, $\chi^2 = 48.0$, 3 df, $P = 0.000$), day hiking (72% Type 1, 60% Type 2, 56% Type 3, and 40% Type 4, $\chi^2 = 20.5$, 3 df, $P = 0.000$), fishing (66% Type 1, 49% Type 2, 46% Type 3, and 42% Type 4, $\chi^2 = 12.1$, 3 df, $P = 0.007$), and hunting (35% Type 1, 13% Type 2, 15% Type 3, and 4% Type 4, $\chi^2 = 34.2$, 3 df, $P = 0.000$). Type 2 respondents were the most involved in photography (63% Type 2, 57% Type 1, 50% Type 3, and 31% Type 4, $\chi^2 = 20.2$, 3 df, $P = 0.000$).

Type 1 respondents participated most in wildlife viewing in the past year (35% made ≥6 trips) followed by Type 2 (22%), Type 3 (16%), and Type 4 (10%). Half of Type 4 respondents took no trips to view wildlife in the past year, compared to 25% Type 1, 28% Type 2, and 28% Type 3 ($\chi^2 = 41.3$, 3 df, $P = 0.000$).

Activities Combined with Wildlife Viewing

The preferred activities that all groups would combine with wildlife viewing were camping, auto sightseeing, and picnicking (Table 3). We found that more Type 1 respondents combined wildlife viewing with backpacking, hunting, mountain climbing, cross-country skiing, and wild food gathering compared to the other 3 types. Other differences among groups were (1) more Type 2 respondents compared to the other 3 types combined photography with wildlife viewing, (2) more Type 1 and 3 respondents combined viewing with fishing, (3) more Type 1 and 3 respondents combined viewing with boating, (4) nature study was more important to Type 1 and 2 respondents compared to the other 2 groups, and (5) Type 4 respondents were less likely to combine viewing with hiking than the other 3 groups.

Types of Wildlife

The types of wildlife that were rated most important for viewing by all groups were "eagles" and "rare and endangered species." More Type 1 respondents (59%, 59%) rated these extremely important, compared to Type 2 (35%, 41%), Type 3 (38%, 31%), and Type 4 (25%, 26%), ($\chi^2 = 41.3$, 3 df, $P = 0.000$; $\chi^2 = 30.8$, 3 df, $P = 0.002$).

Other types of wildlife rated extremely important for viewing by about 40% of Type 1 respondents, but by fewer of Types 2, 3, and 4 were "mountain goats" (46% Type 1 vs. 28% Type 2, 22% Type 3, and 13% Type 4, $\chi^2 = 48.7$, 3 df, $P = 0.010$), "bighorn sheep" (43% Type 1 vs. 26% Type 2, 22% Type 3, and 14% Type 4, $\chi^2 = 39.8$, 3 df, $P = 0.000$), and "elk" (40% Type 1 vs. 19% Type 2, 13% Type 3, and 14% Type 4, $\chi^2 = 46.2$, 3 df, $P = 0.000$).

Table 3. Participation in outdoor recreation activities combined with wildlife viewing by wildlife experience types for the Denver metropolitan region, 1990.

Activities combined with wildlife viewing[a]	Percentage of respondents participating				χ^{2b}	P
	Type 1	Type 2	Type 3	Type 4		
Camping	95	75	79	64	26.4	0.000
Hiking	84	80	81	57	25.5	0.000
Picnicking	81	87	82	69	10.1	0.017
Fishing	71	44	56	44	17.3	0.001
Photography	64	75	68	48	15.0	0.002
Boating	60	36	55	41	12.3	0.006
Backpacking	58	29	40	21	30.4	0.000
Nature study	51	62	34	24	28.3	0.000
Off-road vehicle travel	48	46	37	30	7.7	0.052
Mountain climbing	48	27	33	17	22.0	0.000
Bicycling	46	47	39	30	7.5	0.057
Cross-country skiing	41	22	28	24	8.9	0.030
Downhill skiing	31	18	36	21	9.7	0.022
Hunting	29	13	17	8	16.4	0.001
Wild food gathering	23	11	7	7	15.9	0.001

[a] Auto sightseeing, horseback riding, and trapping activities did not differ among types ($\chi^2 \geq 5.0$, 3 df, $P \geq 0.170$).
[b] 3 df.

Among all groups, Type 2 respondents most often indicated it was extremely important to see animals in the wild (37 vs. 26% Type 1, 26% Type 3, 17% Type 4, $\chi^2 = 61.1$, 3 df, $P = 0.000$). Also, more Type 2 (35%) and Type 1 respondents (39%), compared to Type 3 (22%) and Type 4 (14%), rated the opportunity to see many animals at 1 time as extremely important ($\chi^2 = 30.7$, 3 df, $P = 0.002$).

Opportunities to see fish, feed birds, see "prairie dogs," feed "chipmunks or squirrels," see animals at zoos, and to learn about animals in museums were rated as extremely important by ≤28% of all types.

Informational Preferences

Compared to the other 3 types, more Type 1 respondents rated several kinds of information about wildlife viewing "very" or "extremely" useful. This was the case regarding information about threatened and endangered species (53% Type 1 vs. 30% Type 2, 20% Type 3, and 14% Type 4, $\chi^2 = 69.3$, 12 df, $P = 0.000$), how to be successful in viewing (52% Type 1 vs. 36% Type 2, 27% Type 3, and 21% Type 4, $\chi^2 = 32.7$, 12 df, $P = 0.000$), the habits of wildlife (49% Type 1 vs. 35% Type 2, 25% Type 3, and 15% Type 4, $\chi^2 = 37.4$, 12 df, $P = 0.000$), the natural history of wildlife species (40% Type 1 vs. 28% Type 2, 13% Type 3, and 15% Type 4, $\chi^2 = 48.5$, 12 df, $P = 0.002$), and Colorado's wildlife management activities (33% Type 1 vs. 16% Type 2, 8% Type 3, and 7% Type 4, $\chi^2 = 55.6$, 12 df, $P = 0.000$).

More Type 1 and 2 respondents rated information about the best times to view wildlife (48% Type 1 and 51% Type 2 vs. 32% Type 3 and 22% Type 4, $\chi^2 = 39.1$, 12 df, $P = 0.000$) and the best locations to view wildlife (53% Type 1 and 46% Type 2 vs. 29% Type 3 and 24% Type 4, $\chi^2 = 42.2$, 12 df, $P = 0.000$) as "very" or "extremely" important.

Large percentages of all types indicated it was "slightly," "quite," or "extremely" likely they would pick up brochures at visitor centers (96% Type 1, 89% Type 2, 90% Type 3, and 89% Type 4, $\chi^2 = 6.6$, 3 df, $P = 0.361$), visit designated wildlife viewing areas (96% Type 1, 94% Type 2, 90% Type 3, and 86% Type 4, $\chi^2 = 9.1$, 3 df, $P = 0.166$), stop to read signs placed along trails (96% Type 1, 91% Type 2, 95% Type 3, and 90% Type 4, $\chi^2 = 5.6$, 3 df, $P = 0.464$), and stop at visitor centers (94% Type 1, 89% Type 2, 90% Type 3, and 88% Type 4, $\chi^2 = 4.3$, 3 df, $P = 0.642$).

Overall, more Type 1 and 2 respondents would be likely to seek information than Types 3 and 4. They would be more likely to obtain wildlife-watching field guides (84% Type 1 and 83% Type 2 vs. 67% Type 3 and 61% Type 4, $\chi^2 = 19.1$, 3 df, $P = 0.004$), take personal guided tours (77% Type 1 and 83% Type 2 vs. 63% Type 3 and 70% Type 4, $\chi^2 = 13.3$, 3 df, $P = 0.039$), tune the radio to local wildlife information broadcasts (74% Type 1 and 67% Type 2 vs. 45% Type 3 and 30% Type 4, $\chi^2 = 49.8$, 3 df, $P = 0.000$), get videotapes from a local supermarket (65% Type 1 and 55% Type 2 vs. 43% Type 3 and 32% Type 4, $\chi^2 = 23.7$, 3 df, $P = 0.000$), and check out audio tapes to take on a car tour (54% Type 1 and 60% Type 2 vs. 44% Type 3 and 33% Type 4, $\chi^2 = 14.7$, 3 df, $P = 0.022$). In addition, more Type 1 respondents would send away for maps about places to view wildlife (83% Type 1 vs. 71% Type 2, 65% Type 3, and 61% Type 4, $\chi^2 = 19.9$, 3 df, $P = 0.003$).

Constraints on Participation

Constraints on participating in wildlife viewing for all 4 experience types (indicated "very" or "extremely" restrictive) included lack of knowledge about the activity (11% Type 1 respondents, 4% Type 2, 4% Type 3, and 20% Type 4) and where to go (22% Type 1, 24% Type 2, 23% Type 3, and 37% Type 4), the time (16% Type 1, 9% Type 2, 8% Type 3, and 17% Type 4) and money (26% Type 1, 19% Type 2, 15% Type 3, and 12% Type 4) required to participate in the activity, and wildlife viewing areas being "too far away" (10% Type 1, 15% Type 2, 3% Type 3, and 12% Type 4). The 4 experience types differed on factors constraining participation in wildlife viewing. Type 1 respondents were more constrained by onsite crowding than the other groups (22% Type 1 vs. 15% Type 2, 9% Type 3, and 11% Type 4 indicated it was "very" or "extremely" restrictive, $\chi^2 = 8.6$, 3 df, $P = 0.021$). More Type 4 respondents were constrained by not knowing enough about the activity compared to the other 3 groups (20% Type 4 vs. 11% Type 1, 4% Type 2, and 4% Type 3, $\chi^2 = 20.2$, 3 df, $P = 0.000$) and not knowing where to go to view wildlife (37% Type 4 vs. 22% Type 1, 24% Type 2, and 23% Type 3, $\chi^2 = 7.5$, 3 df, $P = 0.033$).

Involvement with Management

Type 1 and 2 respondents seemed more likely to become actively involved in the nonconsumptive recreation management and planning process ($F = 5.86$, 3 df, $P = 0.001$). On a scale from +3 (highly likely) to −3 (highly unlikely), these 2 groups had positive mean scores ($\bar{x} = 0.60$, SE = 0.16; $\bar{x} = 0.50$, SE = 0.12), whereas Type 3 and 4 respondents had neutral scores ($\bar{x} = 0.00$, SE = 0.11; $\bar{x} = 0.00$, SE = 0.13).

General Descriptive Characteristics

We found that the 4 groups did not differ in membership in conservation organizations, gender, or education. They did, however, differ in age and race. Types 1 and 3 were, on the average, about 6 years younger ($F = 6.85$, 3 df, $P = 0.000$, $\bar{x} = 36.2$ yr, SE = 1.10, $\bar{x} = 36.2$, SE = 1.32) than Types 2 and 4 ($\bar{x} = 43$ yr, SE = 1.30, SE = 2.13). Additionally, there was greater ethnic diversity within Types 1 and 2 (21 and 20% Hispanics) compared to Types 3 and 4 (12 and 11% Hispanics, $\chi^2 = 19.6$, 3 df, $P = 0.000$). Interestingly, national statistics indicated that there were not wide differences in wildlife viewing between Hispanics (18%) and whites (24%) (Hartmann and Overdevest 1990). Our results, which require further testing, suggest that the style of wildlife viewing participation may be different between these 2 groups in Denver.

Generalizing Results

Our results indicated that 60% of Denver metro area residents took trips away from home primarily to view wildlife in 1990. This finding is similar to the results of the 1985 National

Survey of Fishing, Hunting, and Wildlife-Associated Recreation for Colorado, which reported that 73% of Coloradans >16 years of age engaged in "primary nonconsumptive wildlife activities" (U.S. Fish and Wildl. Serv. 1989:45). Differences between the results may be caused by the regional focus of our study, because we included subjects only ≥18 years of age, and because the U.S. Fish and Wildlife Service study included nonconsumptive activities that we did not define as recreation (e.g., backyard feeding of birds or other wildlife, or plantings for wildlife).

We suggest that there may be a high latent demand for wildlife viewing because 90% of our respondents indicated interest in taking a trip to view wildlife, but only 60% currently participate. The challenge for wildlife managers lies in deciding how to best accommodate this interest. Our study provides guidance to assist managers in meeting that challenge.

Marketing has been successful in applying research similar to ours. In a procedure known as benefit segmentation, "consumer types" are identified and targeted in marketing and product development. Haley (1987) indicated that this research stimulates the creative processes of marketing managers. Wildlife managers will find our results most useful if they integrate them with their own knowledge and perceptions in searching for new approaches to management.

We illustrated an application of our study results to the management of wildlife viewing recreation in Colorado's Central Region. Applications were facilitated by discussions with researchers and managers in an attempt to identify how study findings can be used to manage for wildlife viewing recreation.

We developed names that would convey our overall impression of each experience type, focusing on the distinguishing attributes of each type. Involvement in wildlife viewing recreation decreases from Type 1 to Type 4. This is based on a definition of recreation involvement that suggests those more involved in a particular form of recreation derive more pleasure from it (McIntire 1989). We found that Type 1 respondents had the highest ratings on the greatest number of experience preferences and we inferred that they derived the greatest pleasure from engagement. We labeled the desired experience of Type 1 respondents as the High Involvement Experience. We considered Type 2 respondents as having a moderately high level of involvement, Type 3 respondents as having a moderate level, and Type 4 respondents as having a low level. However, in naming the preferred experience of Type 2 respondents, we noted the high importance of the "creativity" experience outcome and the "photography" activity and named that type the Creativity Experience. The experiences of Type 3 and 4 respondents were labeled based on their participation rates. Results indicated that Type 4 respondents participated less in wildlife viewing than did Type 3 respondents. The Type 4 experience was labeled an Occasionalist Experience, reflecting the intermittent participation of those seeking this experience. Finally, we labeled Type 3 as a Generalist Experience; although Type 3 participation was similar to Type 1 and 2, the experience preferences from wildlife viewing participation seemed, overall, less important to this group.

MANAGEMENT IMPLICATIONS

This typology can facilitate planning by guiding allocation of human and natural resources to provide opportunities for wildlife viewing in Colorado's Central Region. Four basic types of wildlife viewing experiences are being considered by managers in the allocation process. In deciding allocation strategies, questions asked by managers will include "How available are locations where people could engage in each of these types of experiences?" "What actions currently are being taken to

provide for each experience type?"; and "How does the availability of experience opportunities compare to the extent of public preference for each experience?" By comparing what is available and what is preferred, managers can judge if there is a balance (opportunities = preferences), an overabundance (opportunities > preferences), or a lack (opportunities < preferences) of opportunities for desired experiences.

The typology also can assist in selecting types of developments, facilities, interpretation, and education that will increase the probability that opportunities for specific experiences are available. A distinction was made in the management philosophy for the Creativity and High Involvement Experiences as compared to the Generalist and Occasionalist Experiences. For the former, management should enhance the process of a visitor selecting and experiencing wildlife viewing recreation, and for the latter, management should focus on developing the product that will be experienced. For example, Creativity and High Involvement Experiences could be enhanced by providing information on when and how to engage in wildlife viewing, technical information on wildlife, and information on how to engage in activities associated with wildlife viewing such as painting or photography. Preparation of specific sites for visitation would involve only low levels of development (e.g., blinds, trails, signs) that facilitate self-discovery. Experiences for Generalists and Occasionalists would be provided by developing specific destinations (i.e., experience "products") such as visitor centers, roadside exhibits, and interpretive centers. A low degree of self-discovery would be necessary; exhibits would show or describe wildlife, or captive species would be available for viewing. In some cases, the participant may never actually see wildlife in a natural setting.

Distinctions between providing for Creativity versus High Involvement Experiences would be primarily in the information content and density of on-site use; Creativity Experiences would be facilitated by information about activities such as painting or photography. High Involvement Experiences would be facilitated by technical information about wildlife biology or about being involved in amateur wildlife research projects. Because High Involvement Experiences seem to focus on being alone and Creativity Experiences do not, on-site use density should be maintained at low levels for High Involvement Experiences and moderate levels for Creativity Experiences.

Occasionalist Experiences (vs. Generalist Experiences) would demand little effort by the participant. For example, to provide Occasionalist experiences, we proposed that radiotransmitters be placed along heavily used travel routes to deliver messages about wildlife in the area.

Another use of the typology would be to give guidance in establishing cooperative strategies with land management agencies. By agreeing on the type of wildlife viewing experience to be provided, wildlife and land management agencies could establish a common ground for management action. Land managers, for example, might be directed by the types of facilities and developments appropriate for a particular type of experience, whereas wildlife agencies could focus on the types of information that would facilitate the experience and sustain wildlife populations for viewing. It is important that the management activities of the 2 agencies be directed toward a common objective.

SUMMARY

Our study used a telephone survey and a follow-up mail survey to determine wildlife viewing preferences on recreational trips away from home. The analysis was conducted in the context of experience-based recreation management; this suggests that when planning for recreation it is important to look at the expe-

rience outcomes, the activities, and the settings desired by recreationists. Analysis revealed 4 types of wildlife viewing experiences desired by Denver metropolitan residents. Wildlife viewing preferences, activity preferences, and informational preferences differed among the 4 types. Furthermore, those residents who would participate in these experiences differed in their constraints on participation, in how actively involved they might be in the management process, and in sociodemographic characteristics. These findings can serve as a starting point for managers attempting to develop or refine wildlife viewing management programs.

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