Assessment of Recreation for Hydropower Licensing using Place Dependence as a Basis for Determining Proportional Share of Responsibility for Project 184 on the Eldorado National Forest

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Problem Statement

The challenge for hydropower licensing is to understand the relationship between water and recreation use. Specifically, there is an interest in the nexus between the human and aquatic environment along with any infrastructure needed to gain access to water for the purpose of recreation. It is important to characterize this relationship in an effort to address the responsibility assigned to the utility based on FERC regulations authorizing the USDA Forest Service to prepare 4(e) conditions that describe **Protection, Mitigation, and Enhancement** (PM&E) measures.

Knowing about this relationship will allow utilities, agency personnel, and private entities to discuss **responsibility for sustaining resources over time**. This discussion is confined to uses for recreation related to obtaining some benefit to society for the health and welfare of individuals who are actual users of the resource and not those potentially benefiting as non-users nor does it address potential users who may elect to visit project resources in the future.

Prior to this effort, descriptive accounts of complex relationships were forwarded as a basis for negotiated settlements (Northrop, Devine & Tarbell, Inc., 1995). While descriptive information is useful for establishing PM&E measures, it may fail to address project-related influences. Lacking has been a logical process to directly relate recreation use with responsibility. Furthermore, social analysis should attempt to provide the basis to partition the importance of major reservoirs and streams so as to support actual responsibility for specific project resources. In addition, this **Proportional Share of Responsibility** (PSR) should be supported by an ***evidentiary record of empirical evidence*** that clearly links recreation use to the water resource as supported by the Administrative Procedures Act.

While sound science will never resolve all issues related to how people use water as a basis for addressing responsibility, much of the discussion can be better informed with time saved in negotiating only those locations or user groups where the science is less certain on the relationships between users and the water resource.

Defining Project-Related Recreation

Part of the problem in addressing this relationship has been the lack of guidance on defining the relationship between recreation and water or what has been termed: project-induced recreation. While it is difficult to explain what is actually meant by "induced" it is generally accepted that interest is in addressing ***recreation that is project-related***. And since water is central to the project, scientists sought to devise a model and variables that would allow the measurement of this concept called project-related recreation. This starts with a conventional or dictionary definition:

Project-related recreation is defined as participating on or near a water body for the purpose of experiencing a recreational a benefit to fulfill some unmet need; whereby if the water body were not present the benefit could not be obtained.

An Operational Definition of the Importance and Attachment to Places

However, the above definition does not provide a direction for measurement. Such measurement begins with a conceptual model as shown in Figure 1. Four variables are suggested to measure place: 1) place attachment, 2) the importance of location, 3) the importance of facilities services, access, and information, and 4) the importance of option and existence values. Only two of the four are operationally defined and used in this analysis. However, information was gathered on three of the four constructs. Data were not gathered on option and existence values since this type of data collection is often conducted off-site. Although information was gathered on construct three, it was omitted from the analysis and only included in Appendix B for Echo Lake to document the importance of this category. It was decided that a more restrictive and conservative model would adequately account for the relationship under investigation. Dependence on infrastructure provisions such as boat launching ramps are likely to increase proportional share where present.

The variables used to address project-related recreation were ***place attachment,*** where people are attached to a place at a functional and/or identity level, and ***the importance of reservoir and lakes***. The rationale for taking this approach is discussed under the section on place theory. With a model and a set of variables defined, we are able to prepare operational definitions for measurement purposes. Such a definition "specifies the operations, or procedures, by which the construct will be recognized and measured (Smith and Glass, 1987, p 11).

Place attachment is defined with responses to the question, "On a scale of 1 to 5 with 1 being strongly agree, 3 neutral, and 5 strongly disagree, please tell me how strongly you agree or disagree with the following statements." Four dimensions or variables of place, with three statements per dimension for a total of twelve items, were used to measure this construct. These were selected from a larger pool of statements for each dimension to establish reliability values of .85 or better for acceptance during a pilot test conducted within the Crystal Basin Recreation Area that serves a similar recreation clientele. (Titre and Brooks, 2002). A fifth variable dealing with the importance of a specific location required respondents to reply to the question, "How important were the following locations in your decision to visit Lake Aloha/Caples/Silver/Echo Lake?" A scale was used beginning with "Not at all important and proceeding to Extremely Important." These five variables were used to conduct the analysis in this study and group respondents into resource dependents, generalists, or explorers using cluster analysis explained later[2].

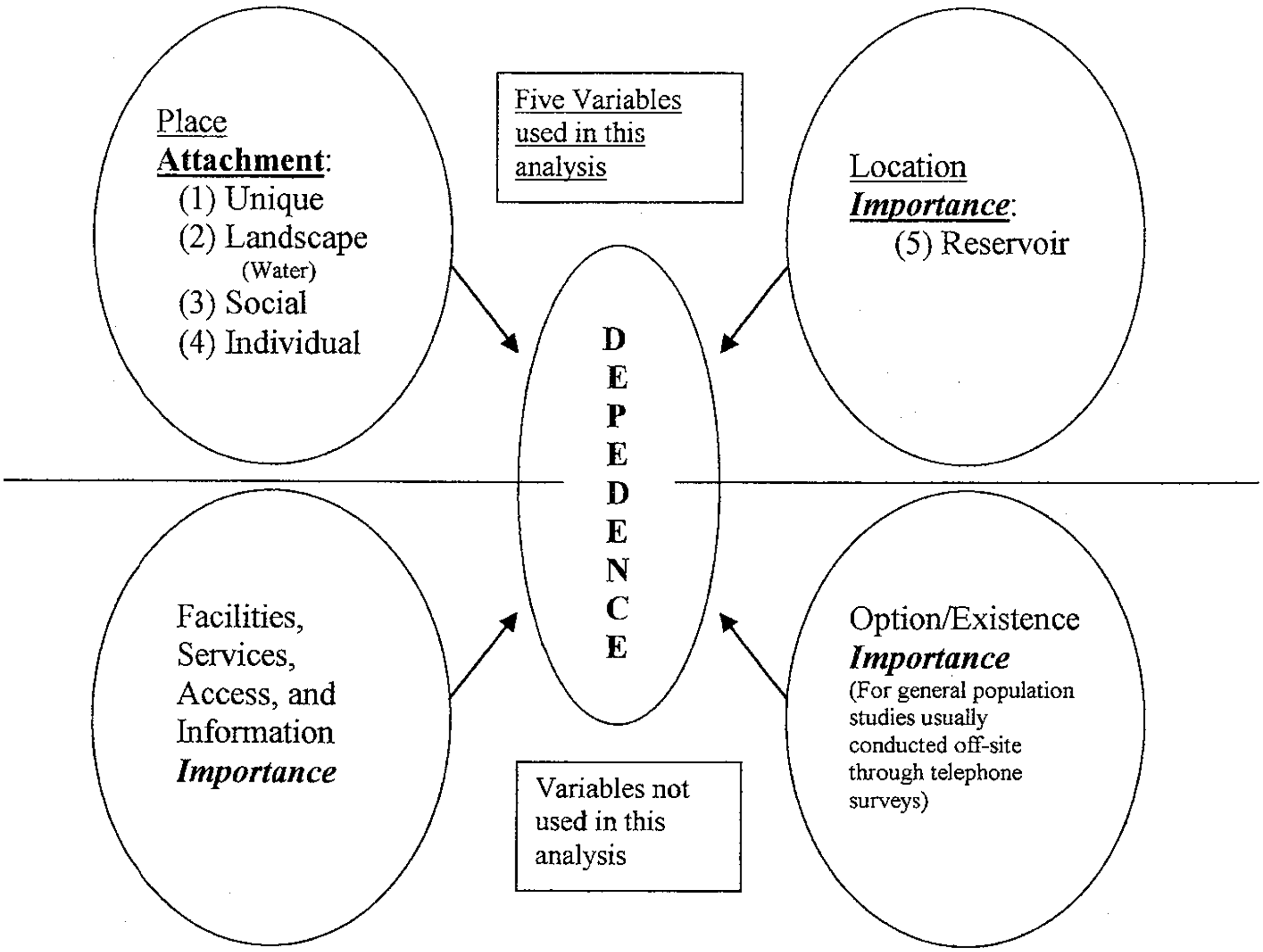

Figure 1: Measurement of Place Dependence for Hydropower Licensing

[2] Resource is used interchangeably with landscape or place. Landscape or place is the preferred term since it avoids the implied economic connotation that a resource is something to be used.

Technical Approach

Based on visits to nearly a dozen hydropower projects and the discussions with both utility and agency personnel (Snyder, et. al. 2001) we have selected a conceptual framework and methods to provide critical information and lead to agreement on the link between users and water resources for the purpose of addressing the issue of PSR to direct PM&E. Understanding how specific places are important to people is central to the place-informed process model (Figure 2). Essentially, by going through the steps, managers gain more information at each stage and this provides an evidentiary record and logic train that can be verified and debated if necessary.

Place-Informed Management is an adaptive strategy beginning with a scoping exercise called Rapid appraisal (RA) and ending with PM&E measures. It utilizes both coarse and fine-filter information at different stages in the process. A coarse-filter is based on rapid appraisal procedures that include observation, semi-structured, key informant, and, focus group interviews (Beebe, J. 1995). Rapid appraisal is aimed at reaching a diversity of respondents using an interdisciplinary team. Sample sizes can be less than 25 and remain useful for understanding context and "jump-starting" the learning process. Rapid appraisal was not used for Project 184 because a 1999 data set had already revealed much descriptive information about the visitors to the fours lakes. In contrast, the fine-filter utilizes a standard place attachment survey to achieve a higher sample size that is randomly drawn and demonstrates representativeness. This report focuses on the findings from that effort.

Sense of Place/Place Dependency (SOP)

SOP was selected to conceptually orient the collection of information for these reasons:

- SOP directly addresses the interrelationship between people and water to provide a holistic accounting of how users experience outdoor settings. It recognizes that dimensions of place are important to understand how people interpret places at various levels that can be functional and/or emotional.
- SOP provides a problem-solving approach such that it segments participants based on their relation to the water resource as a basis for action, i.e., addressing PM&E.

This technical approach is based on a user's relation to the landscape. The elaborated conceptual model (Figure 3) is intended to portray those variables that operationally define place dependency. From the perspective of experience, a relation to the landscape approach begins with some stimuli that are afforded a person from a natural setting followed by some interaction with a place culminating in feelings of attachment at some level. This orientation toward an experience/resource relationship is associated with emotional bonds and meanings that places have for people (Williams and Stewart, 1998). Furthermore, it is assumed that users decide to visit a resource setting based on involvement in some type of activity that may require some level of facilities, services, information, or access provisions.

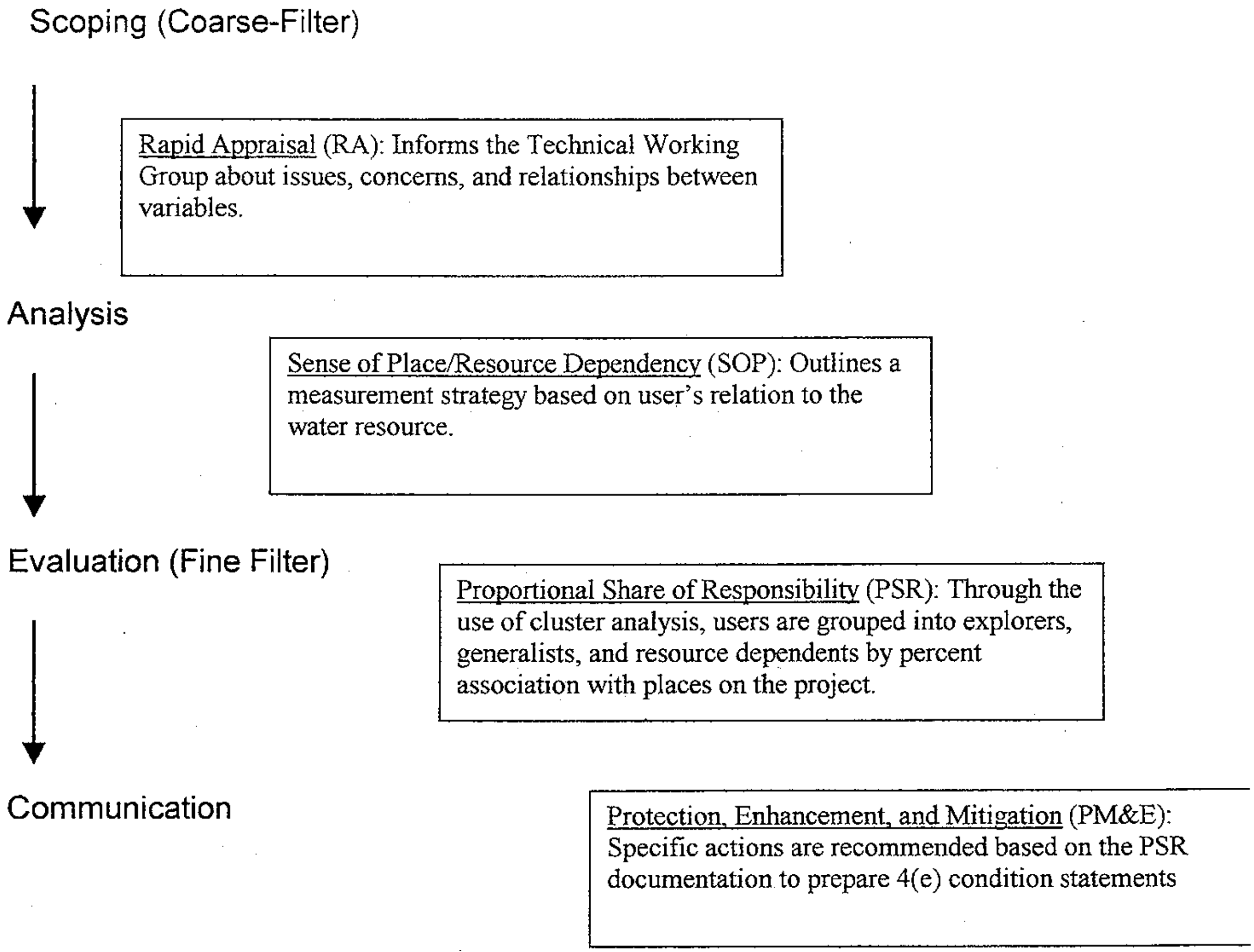

Figure 2: Place-Informed Management for Addressing Hydropower Licensing

Traditional approaches have assumed that similar settings can provide similar experiences (Driver and Brown, 1975). While this paved the way for the recreation opportunity spectrum (Clark and Stankey, 1979) and has lead to sound allocation decisions, it has its limitations as a problem-solving paradigm. It is suggested that these shortcomings are overcome using a relation to the resource or sense of place perspective. Sense of place approaches to complex planning contexts is gaining support by field personnel (Galliano and Loeffler, 1993). The foundations of this approach build on ecological perception theory (Gibson, 1966, 1979) as applied to recreation settings by Pierskalla and Lee (1998). This is in contrast to the experienced-based measurement strategies founded on expectancy value theory, which is said to occur in the mind as a psychological event and may be devoid of a direct connection to the resource Pierskalla and Lee (1998). Ecological perception theory overcomes this weakness by accounting for information perceived by the senses and transformed through cognition resulting in emotional feelings about specific places. It is suggested that this provides a better foundation for discussing how people are related to resources in contrast to merely understanding something about their motives to participate somewhere on the forest.

Users may be related to environmental settings at various *functional levels*, and/or related on *personal or social levels* such that they identify with locations at some level of bonding from casual to serious. This understanding creates a typology of users. The categories of dependent, generalized, and exploratory user (Mitchell, et. al., 1993) are associated with the respective categories of attached, neutral, and unattached. By documenting the percent of users who are water resource dependent a clear rationale for responsibility can be established.

The logic for a resource dependency model presented in this document demonstrates an understanding of the dynamics of resource use and directs measurement toward those variables that contribute toward assigning responsibility for PM&E. This begins with a theoretical discussion about people and places. Selecting a setting for recreation is a conscious decision for the purpose of addressing some unmet need (Schreyer, 1985). The fulfillment of this need can take on various dimensions that are both internal (social-psychological) and external (functional). Furthermore, this ***relation to the resource perspective*** can result in identifying bonds to the setting at various levels of intensity (Williams and Stewart, 1998). It is suggested that participants become attached to natural places for the purpose of recreation on two levels (Figure 3). The first level deals with the person in the environment and their identification with a particular location. This *identity level* can be personal, social, spiritual, or cultural. The second determinant of place attachment is related to what people seek from the landscape on a *functional level.* The resource may hold for them unique or special values, it may contain a set of attributes that they desire, or the resource as a whole may provide opportunities to experience nature on a grand scale as they seek the macro environments of water, wilderness, deserts, canyons, and rock faces. Place attachment is viewed as a holistic concept such that both identity and functional determinants of place are subsumed in the outdoor recreation experience of place attachment.

A theoretical model has been developed that includes the key variables that are hypothesized to be associated with place attachment by group association according to their level of attachment/unattachment (Figure 3). By focusing on a small set of underlying factors that determine place better support is provided for its theoretical development. While the model includes six mutually exclusive and internally homogeneous empirical indictors of place, only four were measured in the data set for this study (The fours lakes within the Eldorado Irrigation District). The other two are recommended for further research.

The locomotive train that drives attachment begins with resource stimuli that flow from settings that span the spectrum from natural to the developed (Hiss 1991). Five senses allow humans to perceive natural settings: 1) sight, 2) sound, 3) smell, 4) touch, and 5) taste. Informational images from the butterfly to the mountain are organized cognitively based on previous experience or some frame of reference with similar objects. From here, images reveal various meanings on a very personal level. "Spaces on a map become places when they are endowed with meaning" (Tuan 1974). That is, individualized symbolism for a particular place or collection of places experienced is catalogued in long-term memory whether visited for the first-time or the twentieth time. As stated earlier, it is hypothesized that this can be captured as various dimensions of place attachment and used to group users according to the strength of their attachment. Finally, it is important to recognize that place should be understood as a whole and not reduced to only that part that deals with water. That is, just as researchers evaluate customer service from multiple perspectives and not just the price of food, participants relate to places at various levels and removing parts from the whole would artificially misrepresent their relationship to the landscape.

Functional attachment

a. unique dependence (*measured*)
b. resource (water) dependence (*measured*)
c. attribute dependence

Identity attachment

a. individual identity (*measured*)
b. social identity (*measured*)
c. spiritual and cultural identity

The terms *attachment* and *dependence* are used interchangeably to depict the emotional bond that people have for places. While it may appear that resource dependence has a greater logical connection to why people bond with places, i.e., I depend on the attribute of steep mountain trails to enjoy mountain biking, it is believed that this is no different for social/ psychological attachment. That is, going to places with family and friends can also be thought of as a form of dependence. Without the social connections, the physical space where recreation occurs may be viewed as a mere backdrop allowing people to engage with each other in a dependent circle of interconnections. For example, recreational boating is seldom done alone and users depend on significant others to make the experience enjoyable.

<u>Place attachment</u> – the affective bond that people have for places as measured using a five-point Likert scale for functional and identity attachment items.

Determinants of Place Attachment

Functional Attachment is comprised of three empirical indicators

<u>Unique dependence</u> – the importance of special aspects of place that make it a poor substitute with other places

<u>Resource dependence</u> – the importance of macro features of the setting such as water, wilderness, rock faces, oceans that draw people to a place within that feature

<u>Attribute dependence</u> – the importance of a feature or features of a setting that draw people to a place such as shade for camping, rapids for running rivers, water clarity for diving.

Social Psychological Attachment is comprised of three empirical indicators

<u>Personal Identity</u> – the importance of self in describing the type of bond that a place holds for an individual

Social Identity – the importance of significant others in describing the type of bond that a place holds for an individual

Spiritual or Cultural Identity – the importance of historical roots or metaphysical interpretations of place bonding for the individual

Exogenous Determinants of Place Attachment

While there are a host of factors such as use history and specialization with a particular activity that contribute in varying degrees to the concept of place attachment, these are deemed minor and may impede the understanding of people's relation to place. They were excluded from the analysis of place to describe group association. Future development of the model should include these determinants.

Coordination with Utility Consultants

The initial element that the Forest Service requested of Park Studies was the analysis of the existing survey data collected by El Dorado Irrigation District (EID) during the 1999 field season. Park Studies analysis confirmed what the Forest Service had suspected about the inability of the data to completely characterize the relationship between the visitors to the Project area and the resources provided by the licensee. Park Studies did however recognize that the 1999 data had been collected in a scientifically rigorous manner and held important information to characterize the user profile.

Park Studies proposed to the Forest Service the use of Place-Informed Management (PIM) as a tool for adequately characterizing the relationship between the visitation of the project to the resources provided by the project. Park Studies continued to provide input into the analysis of the data, and was then asked to meet with the licensee's sub-consultant (Dr. Jim Fletcher of Regional Economic Sciences, Chico California). This meeting occurred on June 10th, 2002 at the Eldorado National Forest Supervisors Office. The primary topic discussed was the use of the Place-Informed Management methodology and standard survey questions during the 2002 Intercept Survey that EID had hired Dr. Fletcher to conduct during the summer.

Park Studies provided to Dr. Fletcher the survey questions and other requested information. We continued to consult with Regional Economic Sciences and the Forest Service in the development of the PIM elements of the survey. Regional Economic Sciences accepted the rational for the PIM approach and included appropriate questions in their 2002 Intercept Survey at the four reservoirs associated with the El Dorado Project.

During the fall of 2002, Park Studies was requested to consult with the staff of Regional Economic Sciences on the analysis of the data relating to the PIM questions used in the 2002 Intercept Survey. The primary goal of this effort was to provide scientific evidence that allowed for determining the "dependency" of the survey respondents to the resources provided by the licensee. The Forest Service staff, Regional Economic Sciences staff, and the staff from Park Studies conducted numerous conference calls. In addition, several e-mail messages also circulated between the same parties, specifically responding to questions about the data analysis protocols.

Regional Economic Sciences were then to begin the analysis of the data results, and Park Studies agreed to participate in the interpretation of the results. After some time, Jeff Marsolais of the Forest Service contracted Park Studies to assist with the completion of data analysis by participating at an information-sharing meeting in Chico, California on October 18th 2002. Park Studies provided a statistician and Social Research Scientist at this meeting to discuss results and finalize data analysis.

The meeting lasted approximately ½ day, and ended with all parties agreeing to the data analysis methods. The Forest Service then contracted with Park Studies to actually complete the data analysis, as Regional Economic Sciences had elected not to conduct the analysis. The Forest Service provided to Park Studies copies of the raw data set that they received from EID, and Park Studies completed the data analysis. The results are found in Appendices A, B, and C.

The following photo was taken from the meeting between Park Studies and Regional Economic Sciences. Pictured from left to right are James Fletcher, Rick Gumina (statistician, PSI), John Titre (social scientist, PSI), and Jon Ebling.

Cluster Analysis

Clustering procedures are a subset of a large body of preliminary exploratory techniques designed to elicit an underlying structure to multivariate responses. They differ from classification techniques in that clustering procedures seek to identify "natural" groupings within a data set. The goal of classification procedures is, generally, to categorize a response into one of a known number of classes (Johnson and Wichern 1992). Like many exploratory techniques, the investigator's expertise is used in conjunction with the output to decide, albeit subjectively, the ultimate number of "natural" groups present in the data set under study.

Algorithms used to arrive at clusters fall into one of two broad categories. The agglomerative techniques begin with "n" distinct groups – a separate group for each individual observation – and populate classes by computing a distance metric (for numeric data) or a similarity measure (for categorical data). Observations in close proximity based on the distance metric are placed into the same class. Eventually all "n" objects are grouped together into 1 large class.

Divisive clustering techniques begin with 1 large group containing "n" observations and successively divide the cluster into smaller groups. The process stops when there are as many clusters as observations. That is, these divisive procedures ultimately result in "n" distinct clusters each containing only 1 observation. In either case the number of "natural" groupings for a data set will lie somewhere between "n" and 1.

If the analysis is truly exploratory then hierarchical clustering methods are used. These methods force no *a priori* assumptions on the number of groupings and let the results tell the story. The output of a hierarchical cluster analysis is a graphical tool called a denograms. Based on this graphic and professional expertise, the investigator makes a decision about the number of clusters present in the data set. Non-hierarchical methods rely on previous knowledge regarding the total number of classes and the process iterates through each of the observations in the data set until they have all been placed into one of the specified classes.

The pilot test conducted at Crystal Basin Recreation Area (CBRA) was intended to evaluate the usefulness of the model for application to other locations. Survey results were collected (n = 65) and composite scores were computed for:

1) Importance of reservoirs and lakes
2) Social Identity
3) Attribute Dependence
4) Place Dependence
5) Place Identity

Although there was some literature citing the existence of three distinct classes of recreational area users (Mitchell, et. al., 1993) we decided to allow the algorithm to iterate through all of the observations and classify them without forcing a 3-group outcome. Hence, hierarchical clustering techniques were used with a standardized Euclidean distance being the metric. (In fact, we looked at results from both standardized and non-standardized distance metrics. These results were virtually identical.) Since all items on the survey were not scaled alike we felt that distances based on the non-standardized responses would be biased. There is, however, some controversy regarding the routine use of standardized results (Aldenderfer and, Blashfields 1984).

Several different criteria have been used for cluster formation (Tatham and MacMillan 1987). These include – but are not limited to – the minimum distance method. This method is also known as the single linkage or nearest neighbor algorithm. The maximum distance method or complete linkage cluster rule uses the farthest "neighbor" to form clusters; and the average linkage rule computes cluster centroids and uses the distance from this location to a prospective point as the criterion for inclusion in the cluster. The S-plus and SPSS statistical packages were both used for the cluster analysis of the CBRA survey data and for the Project 184 data. Although several distance metrics and clustering decision rules were investigated, we ultimately settled on using the standardized Euclidean distance in a nearest neighbor clustering routine. The strongest contributing factor for this decision was the fact that it made the most sense intuitively.

Figures 4 and 5 are the dendograms that was produced from the cluster procedure based on the distance and algorithm choices discussed above. The vertical axis represents the standardized distance and it's easy to see the agglomerative nature of the method as the routine classifies each point. The cut point is the maximum distance for inclusion. Based on professional expertise a cut point of 2.75 was selected yielding 4 groups populated with between 12 and 24 elements and 2 singleton clusters.

It is important to note that these results were not forced to a specified number of groups. Although there was some subjectivity in selecting the cut point, the routine generated clusters on a purely objective metric. Once the cluster elements had been uniquely identified and tracked back to the original survey responses, it turns out that the "natural" groupings for this data set have similar characteristics to those in the three groups of users referenced above. In addition, there appears to be a cluster here that can be viewed as a subcategory of one of the classifications described.

These results were sufficiently conclusive to suggest that scientists pursue further model testing using larger sample sizes in different locations.

Data analysis for Project 184

Based on the preceding discussion of cluster analysis, tables 1-12 of Appendix A provide the findings to support the theoretical model for segmenting participants. Analysis of variance tables are provided for each lake. P values were all significant except for the following: table 5, attribute dependence, p=. 059 and for table 8, attribute dependence, p=. 055. While this does not weaken the model, it does suggest that the attribute dimension, of the four dimensions, may not contribute as significantly to the overall findings.

Note on tables 3, 6, 9, and 12 that the importance of reservoirs and lakes (Lake Dependence) was uniformly quite high and contributed to the naming of segments. In nearly all tables, place attachment means supported the lake dependence classification.

Appendix B provides the actual SPSS output to include the facilities, services, access, and information variable for Echo Lake. Appendix C provides the actual survey.

Figure 4: Resulting Denogram for n= 65 responses from the CBRA survey

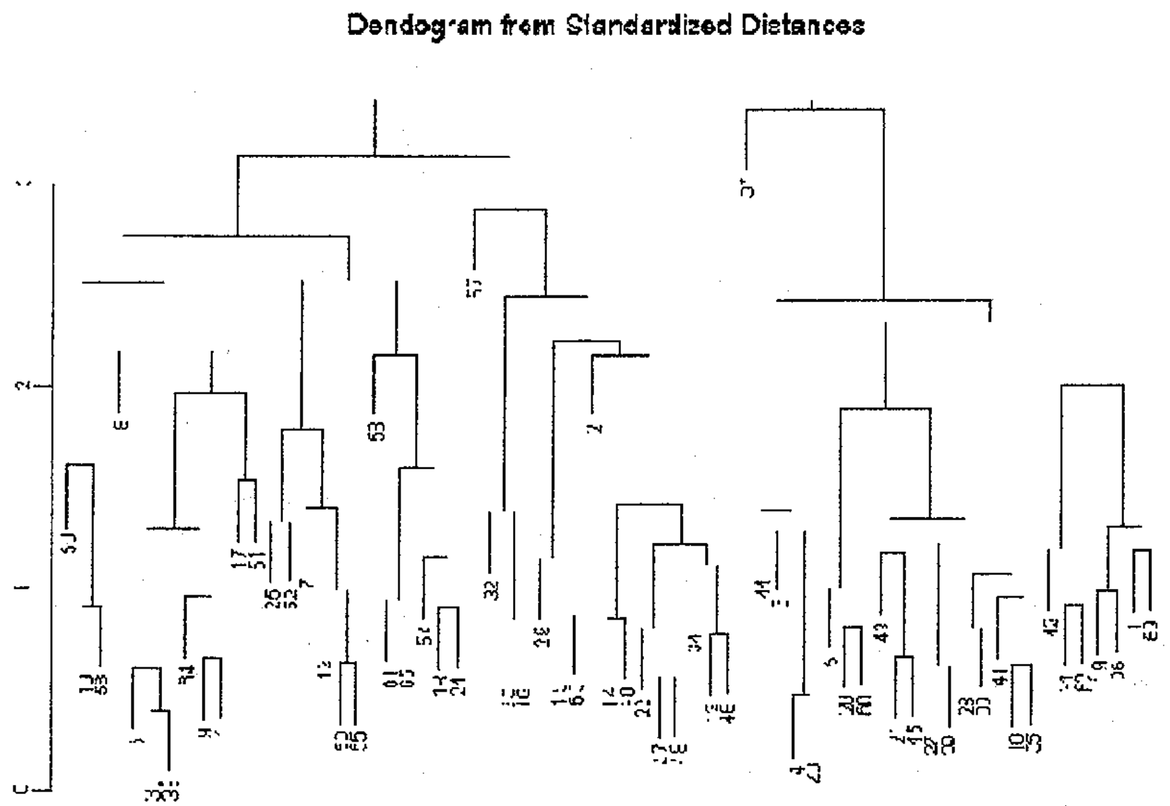

Figure 5: Denograms for CBRA data with clusters

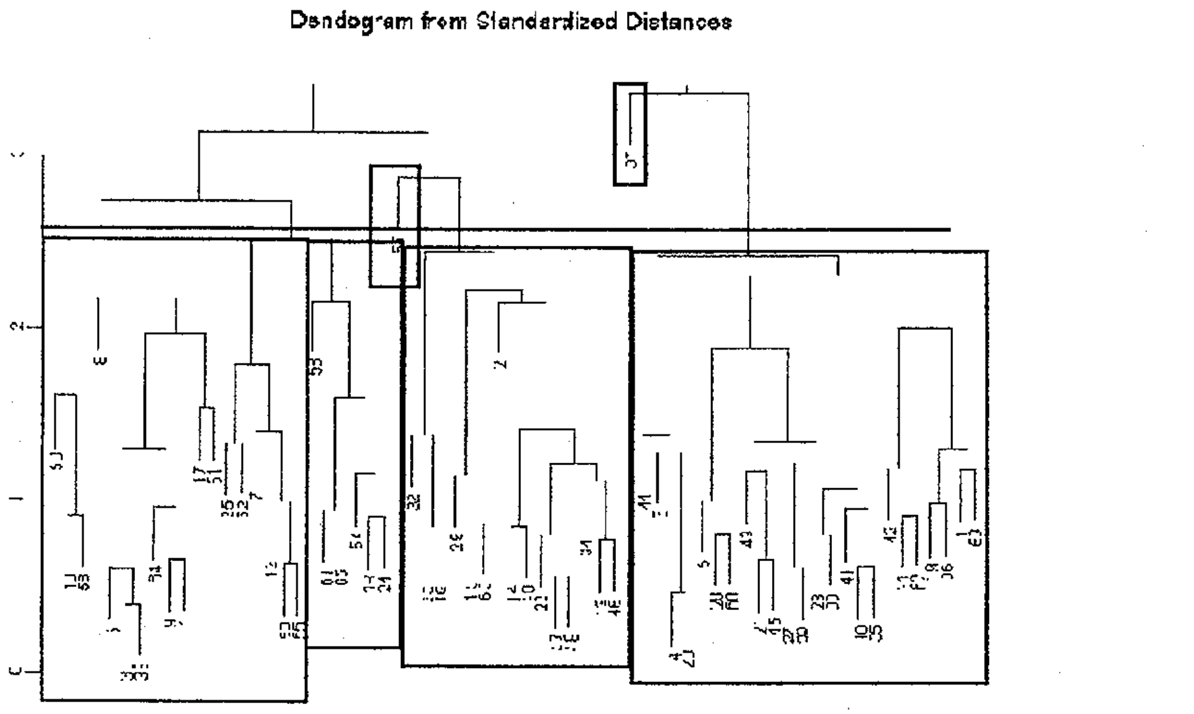

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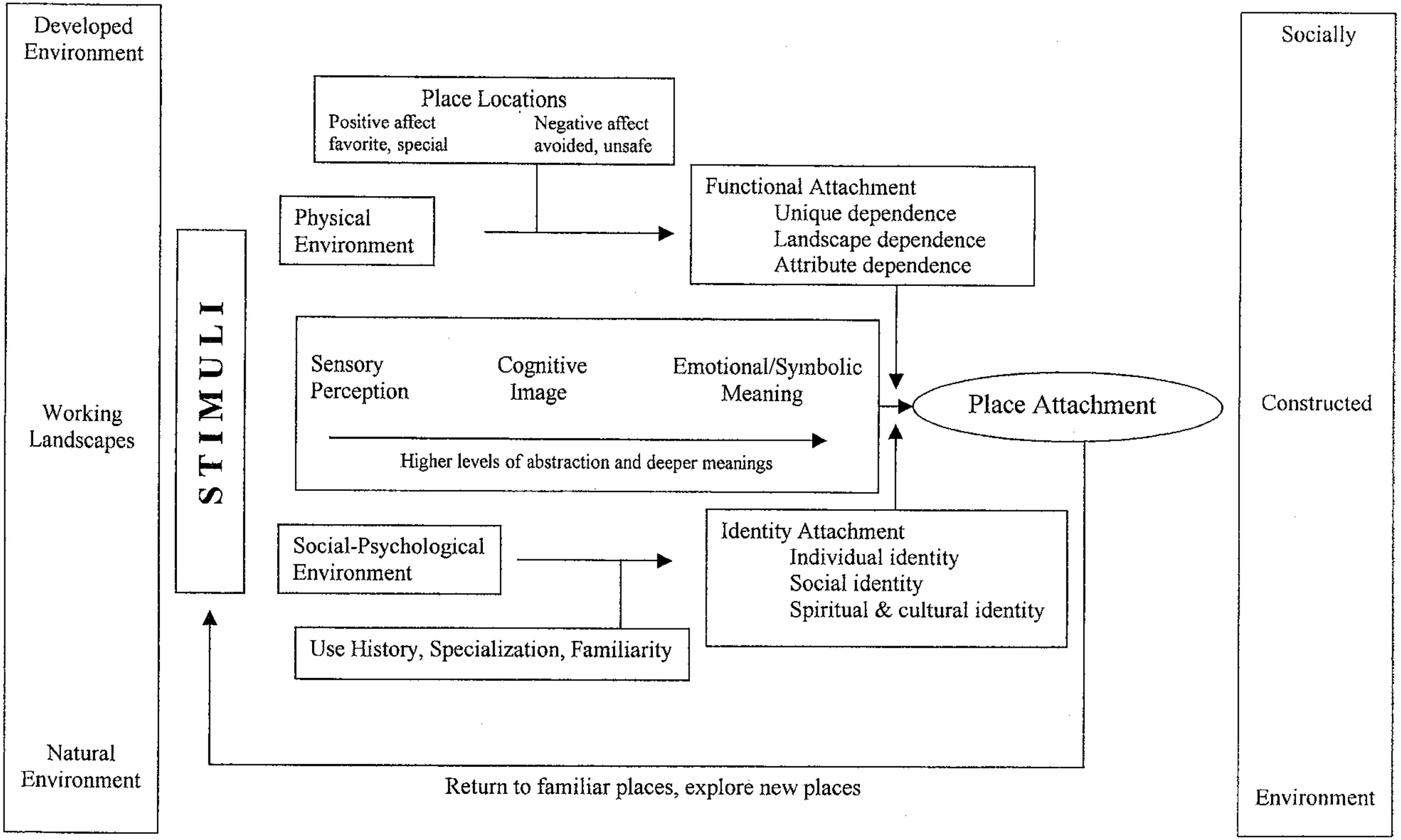
Figure 3: Place Attachment in Outdoor Recreation



Appendix A

Cluster Analysis Results for Project 184

Table 1. Echo Lake Dendogram

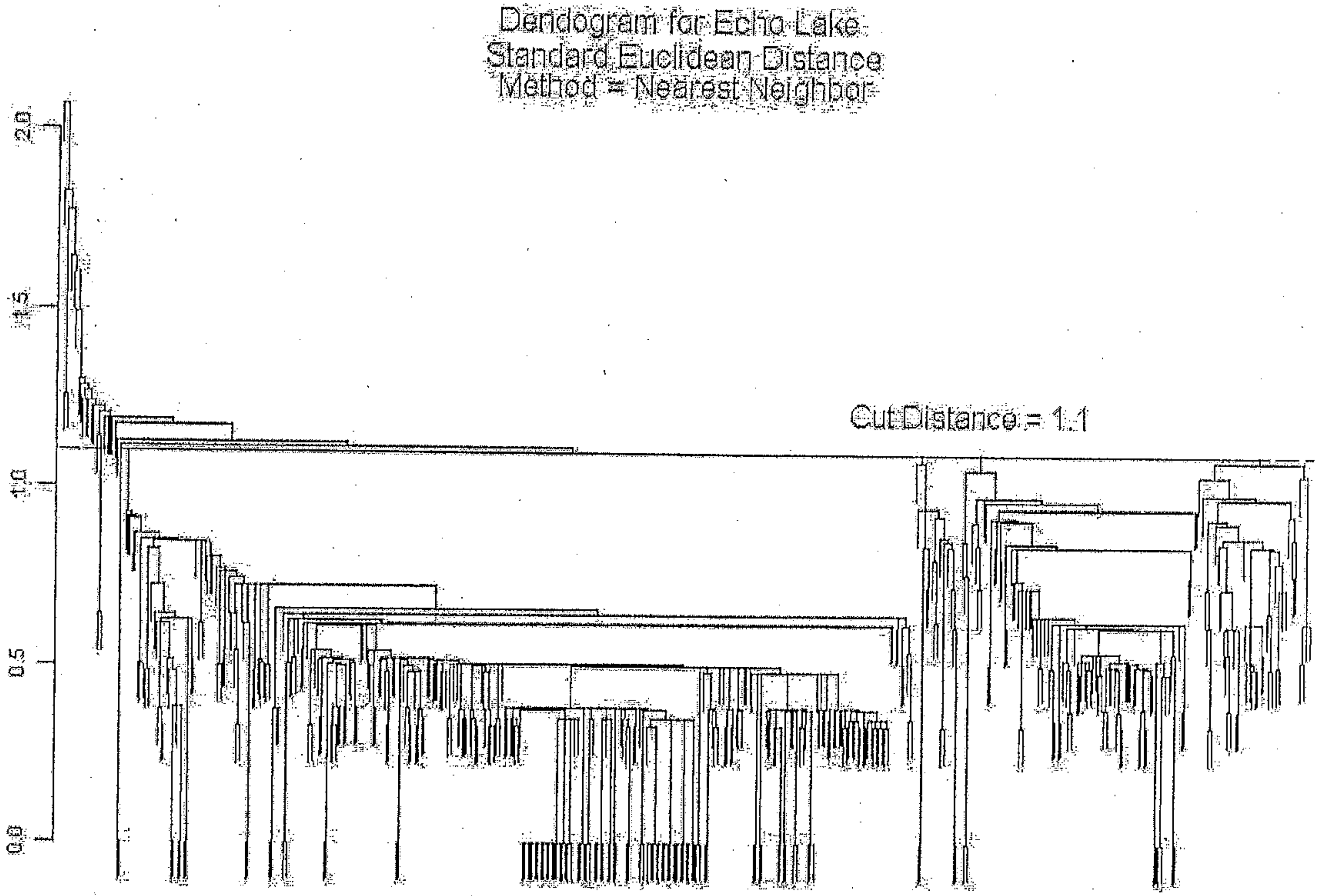


Table 2. Analysis of variance for Echo Lake

Analysis of variance with four clusters of visitors at Echo Lake Summer 2002.

	Cluster1 (n=42)		Cluster 2 (n=17)		Cluster 3 (n=88)		Cluster 4 (n=294)				
Dependent Variables	Mean	S.D.	Mean	S.D.	Mean	S.D	Mean	S.D	F	p	Eta^2
Importance of lakes	2.00	.00	1.00	.00	3.00	.00	4.00	.00	—	—	1.0
Social identity	3.40	.89	2.35	.74	3.58	.80	4.00	.95	23.57	<.001	.14
Attribute dependence	2.97	.73	2.49	.47	3.54	.77	3.93	.77	37.65	<.001	.20
Place dependence	2.75	.62	1.98	.53	2.97	.67	3.41	.94	23.67	<.001	.14
Place identity	3.51	.80	2.69	.48	3.81	.73	4.16	.80	27.39	<.001	.16

Table 3. Echo Lake Findings

Echo Lake Findings (N=466), Cut Line=1.1

	n=294(63%) Mean (SD)	n=88 (19%) Mean (SD)	n=42 (9%) Mean (SD)	n=17 (4%) Mean (SD)
Resource Dependence	3.93 (.6)	3.54 (.6)	2.97 (.54)	2.49 (.22)
Unique Dependence	3.42 (.89)	2.97 (.46)	2.75 (.38)	1.98 (.28)
Personal Dependence	4.14 (.64)	3.81 (.54)	3.52 (.64)	2.69 (.23)
Social Dependence	4.01 (.91)	3.58 (.64)	3.4 (.8)	2.35 (.55)
Lake Dependence	4.0 (0)	3.0 (0)	2.0 (0)	1.0 (0)

Table 4. Caples Lake Dendogram

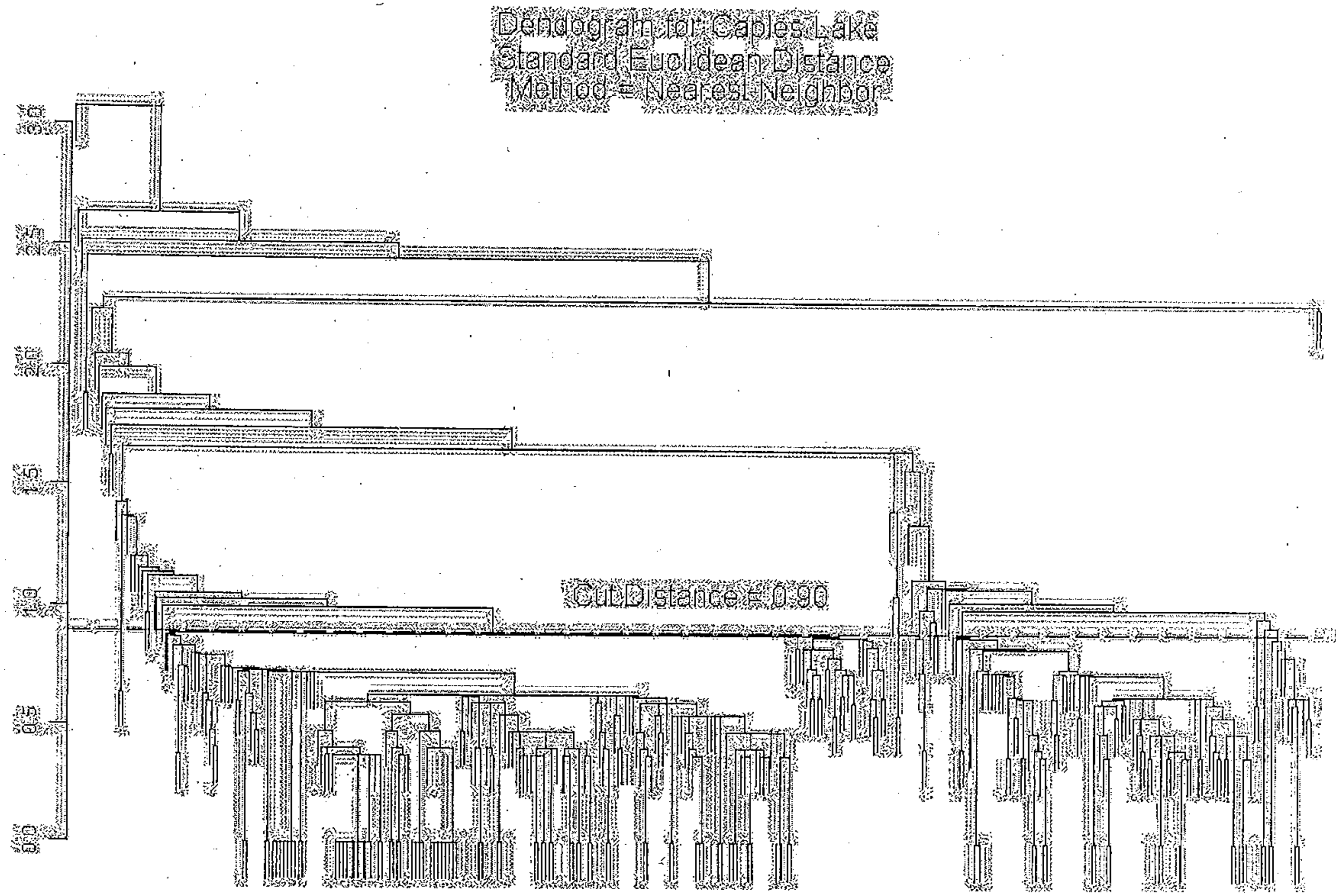


Table 5. Analysis of variance for Caples Lake

Analysis of variance with three clusters of visitors at Caples Lake Summer 2002.

	Cluster 1 (n=193)		Cluster 2 (n=80)		Cluster 3 (n=12)				
Dependent Variables	Mean	S.D.	Mean	S.D.	Mean	S.D	F	P value	Eta^2
Importance of lakes	4.00	.00	3.00	.00	3.00	.00	—	—	1.0
Social identity	4.26	.65	4.45	.48	3.00	.32	30.91	<.001	.18
Attribute dependence	4.52	.41	4.47	.35	4.25	.35	2.85	.059	.02
Place dependence	3.84	.74	4.12	.68	3.05	.44	12.81	<.001	.08
Place identity	4.25	.57	4.30	.42	3:14	.17	27.27	<.001	.16

Table 6. Caples Lake Findings

Caples Lake Findings (N=332), Cut Line=.9

	n=193 (58%) Mean (SD)	n=80 (20%) Mean (SD)	n=12 (3%) Mean (SD)
Resource Dependence	4.53 (.17)	4.47 (.13)	4.25 (.12)
Unique Dependence	3.84 (.55)	4.12 (.46)	3.06 (.2)
Personal Dependence	4.25 (.32)	4.3 (.18)	3.14 (.03)
Social Dependence	4.25 (.42)	4.45 (.23)	3.0 (.1)
Lake Dependence	4.0 (0)	3.0 (0)	3.0 (0)

Table 7. Aloha Lake Dendogram

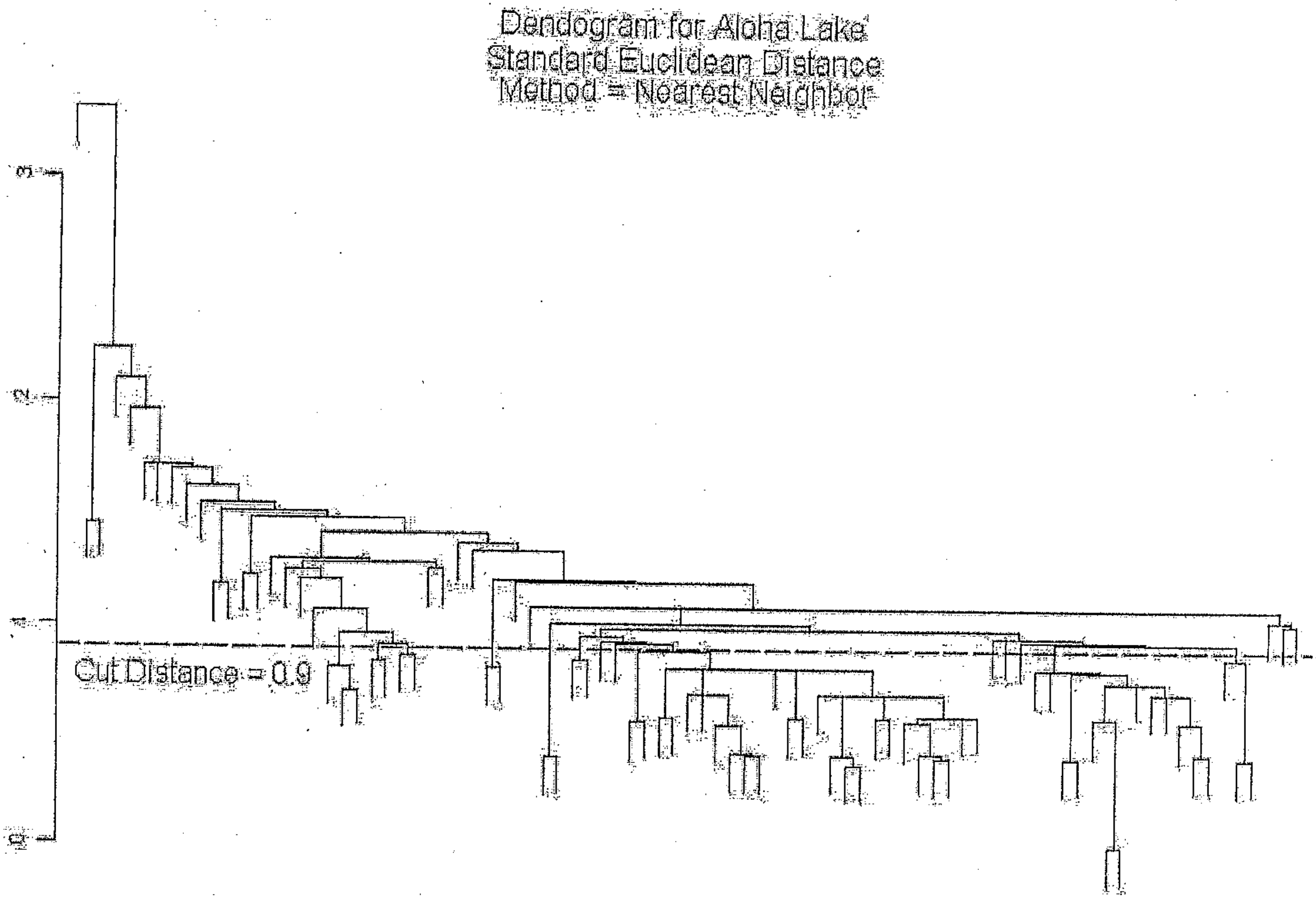


Table 8. Analysis of variance for Aloha Lake

Analysis of variance with two clusters of visitors at Lake Aloha Summer 2002.

	Cluster 1 (n=25)		Cluster 2 (n=13)				
Dependent Variables	Mean	S.D.	Mean	S.D.	F	P value	Eta^2
Importance of lakes	4.00	.00	4.00	.00	—	—	1.0
Social identity	3.17	.56	4.33	.56	36.47	<.001	.50
Attribute dependence	3.67	.50	3.97	.34	3.92	.055	.10
Place dependence	2.57	.37	4.08	.39	138.15	<.001	.79
Place identity	3.88	.51	4.79	.35	33.69	<.001	.48

Table 9. Aloha Lake Findings

Lake Aloha Findings (N=85), Cut Line=.9

	n=25 (29%) Mean (SD)	n=13 (16%) Mean (SD)
Resource Dependence	3.67 (.25)	3.97 (.12)
Unique Dependence	2.57 (.13)	4.08 (.15)
Personal Dependence	3.88 (.26)	4.79 (.12)
Social Dependence	3.17 (.32)	4.33 (.31)
Lake Dependence	4.0 (0)	4.0 (0)

31 single cases or 36%

Table 10. Silver Lake Dendogram

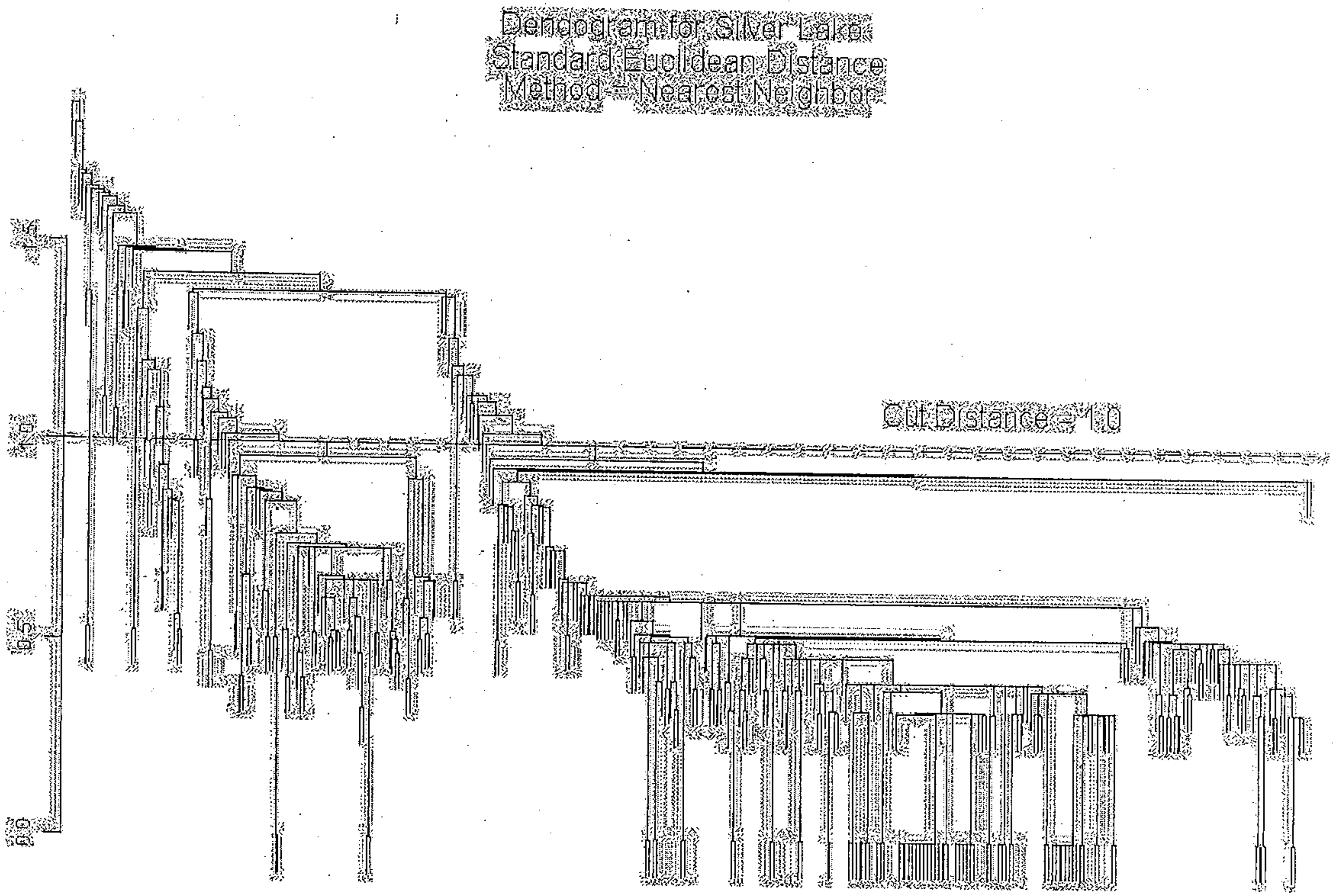


Table 11. Analysis of variance for Silver Lake

Analysis of variance with two clusters of visitors at Silver Lake Summer 2002.

	Cluster 1 (n=233)		Cluster 2 (n=60)				
Dependent Variables	Mean	S.D.	Mean	S.D.	F	P value	Eta^2
Importance of lakes	4.00	.00	3.00	.00	—	—	1.0
Social identity	4.11	.95	3.74	.89	7.38	.007	.02
Attribute dependence	4.28	.66	3.95	.65	11.34	.001	.04
Place dependence	3.66	.96	3.14	.75	15.18	<.001	.05
Place identity	4.27	.76	3.91	.79	10.37	.001	.03

Table 12. Silver Lake Findings

Silver Lake (N=352), Cut Line=1.0

	n=233 (66%) Mean (SD)	n=60 (26%) Mean (SD)
Resource Dependence	4.28 (.44)	3.96 (.43)
Unique Dependence	3.66 (.92)	3.14 (.56)
Personal Dependence	4.27 (.57)	3.91 (.63)
Social Dependence	4.11 (.9)	3.74 (.79)
Lake Dependence	4.0 (0)	3.0 (0)

Appendix B

SPSS™ Output

Oneway Analysis of Variance - Five variables; four lakes

Descriptives

		N	Mean	Std. Deviation	Std. Error
overall attribute dependence dimension	Aloha	89	3.5506	.79946	.08474
	Caples	341	4.4272	.52174	.02825
	Echo	475	3.6898	.86212	.03956
	Silver	357	4.0934	.81343	.04305
	Total	1262	3.9934	.82852	.02332
overall personal identity dimension	Aloha	89	4.1180	.75303	.07982
	Caples	341	4.1002	.70582	.03822
	Echo	475	4.0540	.87102	.03997
	Silver	357	4.1354	.86044	.04554
	Total	1262	4.0940	.81806	.02303
overall place dependence dimension	Aloha	88	3.0606	.82202	.08763
	Caples	340	3.6980	.89784	.04869
	Echo	473	3.1786	.94123	.04328
	Silver	357	3.4304	1.00182	.05302
	Total	1258	3.3822	.96517	.02721
overall social identity dimension	Aloha	88	3.1364	1.04146	.11102
	Caples	340	4.0598	.85724	.04649
	Echo	473	3.6568	1.04079	.04786
	Silver	357	3.8903	1.03189	.05461
	Total	1258	3.7956	1.02013	.02876

Descriptives

		95% Confidence Interval for Mean		Minimum	Maximum
		Lower Bound	Upper Bound		
overall attribute dependence dimension	Aloha	3.3822	3.7190	1.00	5.00
	Caples	4.3716	4.4827	1.67	5.00
	Echo	3.6121	3.7676	1.33	5.00
	Silver	4.0087	4.1780	1.00	5.00
	Total	3.9476	4.0392	1.00	5.00
overall personal identity dimension	Aloha	3.9594	4.2766	2.00	5.00
	Caples	4.0250	4.1754	1.67	5.00
	Echo	3.9755	4.1326	1.00	5.00
	Silver	4.0458	4.2249	1.00	5.00
	Total	4.0489	4.1392	1.00	5.00
overall place dependence dimension	Aloha	2.8864	3.2348	1.00	5.00
	Caples	3.6023	3.7938	1.00	5.00
	Echo	3.0936	3.2637	1.00	5.00
	Silver	3.3262	3.5347	1.00	5.00
	Total	3.3288	3.4356	1.00	5.00
overall social identity dimension	Aloha	2.9157	3.3570	1.00	5.00
	Caples	3.9684	4.1512	1.00	5.00
	Echo	3.5628	3.7508	1.00	5.00
	Silver	3.7829	3.9977	1.00	5.00
	Total	3.7391	3.8520	1.00	5.00

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
overall attribute dependence dimension	35.968	3	1258	.000
overall personal identity dimension	10.638	3	1258	.000
overall place dependence dimension	3.457	3	1254	.016
overall social identity dimension	11.723	3	1254	.000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
overall attribute dependence dimension	Between Groups	128.959	3	42.986	73.409	.000
	Within Groups	736.652	1258	.586		
	Total	865.612	1261			
overall personal identity dimension	Between Groups	1.434	3	.478	.714	.544
	Within Groups	842.463	1258	.670		
	Total	843.897	1261			
overall place dependence dimension	Between Groups	63.447	3	21.149	23.946	.000
	Within Groups	1107.519	1254	.883		
	Total	1170.966	1257			
overall social identity dimension	Between Groups	74.291	3	24.764	25.168	.000
	Within Groups	1233.832	1254	.984		
	Total	1308.123	1257			

Post Hoc Tests

Multiple Comparisons

Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	Mean Difference (I-J)	Std. Error	Sig.
overall attribute dependence dimension	Aloha	Caples	-.8766*	.09109	.000
		Echo	-.1393	.08839	.479
		Silver	-.5428*	.09066	.000
	Caples	Aloha	.8766*	.09109	.000
		Echo	.7374*	.05431	.000
		Silver	.3338*	.05794	.000
	Echo	Aloha	.1393	.08839	.479
		Caples	-.7374*	.05431	.000
		Silver	-.4035*	.05360	.000
	Silver	Aloha	.5428*	.09066	.000
		Caples	-.3338*	.05794	.000
		Echo	.4035*	.05360	.000
overall personal identity dimension	Aloha	Caples	.0178	.09741	.998
		Echo	.0639	.09452	.928
		Silver	-.0174	.09696	.998
	Caples	Aloha	-.0178	.09741	.998
		Echo	.0462	.05808	.889
		Silver	-.0352	.06197	.956
	Echo	Aloha	-.0639	.09452	.928
		Caples	-.0462	.05808	.889
		Silver	-.0814	.05732	.570
	Silver	Aloha	.0174	.09696	.998
		Caples	.0352	.06197	.956
		Echo	.0814	.05732	.570
overall place dependence dimension	Aloha	Caples	-.6374*	.11240	.000
		Echo	-.1180	.10910	.760
		Silver	-.3698*	.11185	.012
	Caples	Aloha	.6374*	.11240	.000
		Echo	.5194*	.06682	.000
		Silver	.2676*	.07121	.003
	Echo	Aloha	.1180	.10910	.760
		Caples	-.5194*	.06682	.000
		Silver	-.2518*	.06589	.002
	Silver	Aloha	.3698*	.11185	.012
		Caples	-.2676*	.07121	.003
		Echo	.2518*	.06589	.002
overall social identity dimension	Aloha	Caples	-.9234*	.11864	.000
		Echo	-.5204*	.11516	.000
		Silver	-.7539*	.11805	.000
	Caples	Aloha	.9234*	.11864	.000
		Echo	.4030*	.07053	.000
		Silver	.1695	.07517	.166

Multiple Comparisons

Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	Mean Difference (I-J)	Std. Error	Sig.
overall social identity dimension	Echo	Aloha	.5204*	.11516	.000
		Caples	-.4030*	.07053	.000
		Silver	-.2335*	.06954	.011
	Silver	Aloha	.7539*	.11805	.000
		Caples	-.1695	.07517	.166
		Echo	.2335*	.06954	.011

Multiple Comparisons

Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	95% Confidence Interval	
			Lower Bound	Upper Bound
overall attribute dependence dimension	Aloha	Caples	-1.1316	-.6216
		Echo	-.3867	.1082
		Silver	-.7966	-.2890
	Caples	Aloha	.6216	1.1316
		Echo	.5853	.8894
		Silver	.1716	.4960
	Echo	Aloha	-.1082	.3867
		Caples	-.8894	-.5853
		Silver	-.5536	-.2535
	Silver	Aloha	.2890	.7966
		Caples	-.4960	-.1716
		Echo	.2535	.5536
overall personal identity dimension	Aloha	Caples	-.2549	.2905
		Echo	-.2007	.3285
		Silver	-.2888	.2540
	Caples	Aloha	-.2905	.2549
		Echo	-.1164	.2088
		Silver	-.2087	.1383
	Echo	Aloha	-.3285	.2007
		Caples	-.2088	.1164
		Silver	-.2418	.0791
	Silver	Aloha	-.2540	.2888
		Caples	-.1383	.2087
		Echo	-.0791	.2418
overall place dependence dimension	Aloha	Caples	-.9521	-.3228
		Echo	-.4235	.1874
		Silver	-.6829	-.0567
	Caples	Aloha	.3228	.9521
		Echo	.3323	.7064
		Silver	.0683	.4670
	Echo	Aloha	-.1874	.4235
		Caples	-.7064	-.3323
		Silver	-.4362	-.0674
	Silver	Aloha	.0567	.6829
		Caples	-.4670	-.0683
		Echo	.0674	.4362
overall social identity dimension	Aloha	Caples	-1.2555	-.5913
		Echo	-.8428	-.1981
		Silver	-1.0844	-.4235
	Caples	Aloha	.5913	1.2555
		Echo	.2056	.6004
		Silver	-.0409	.3799

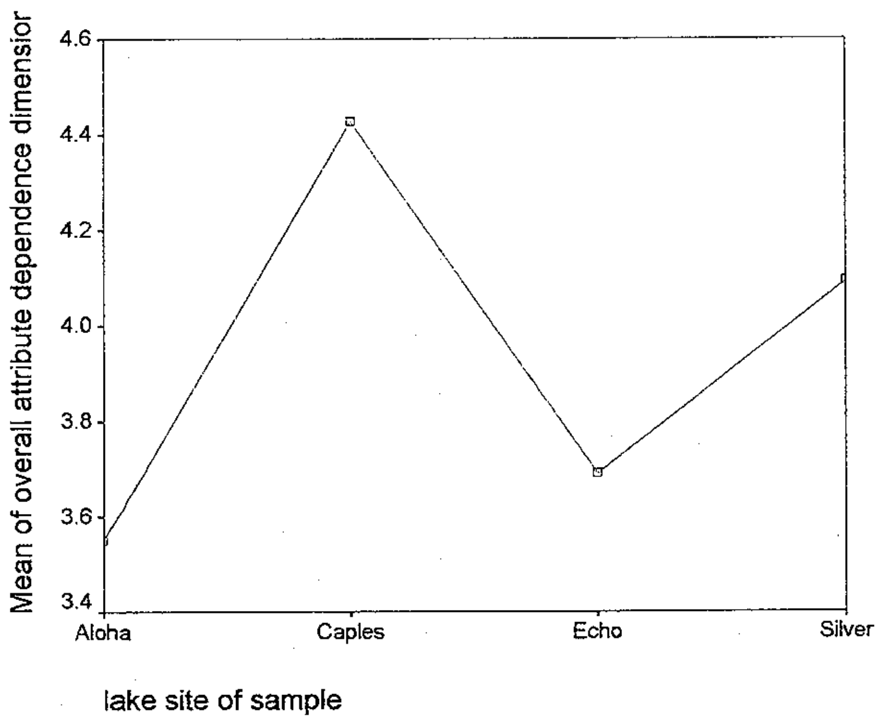
Multiple Comparisons

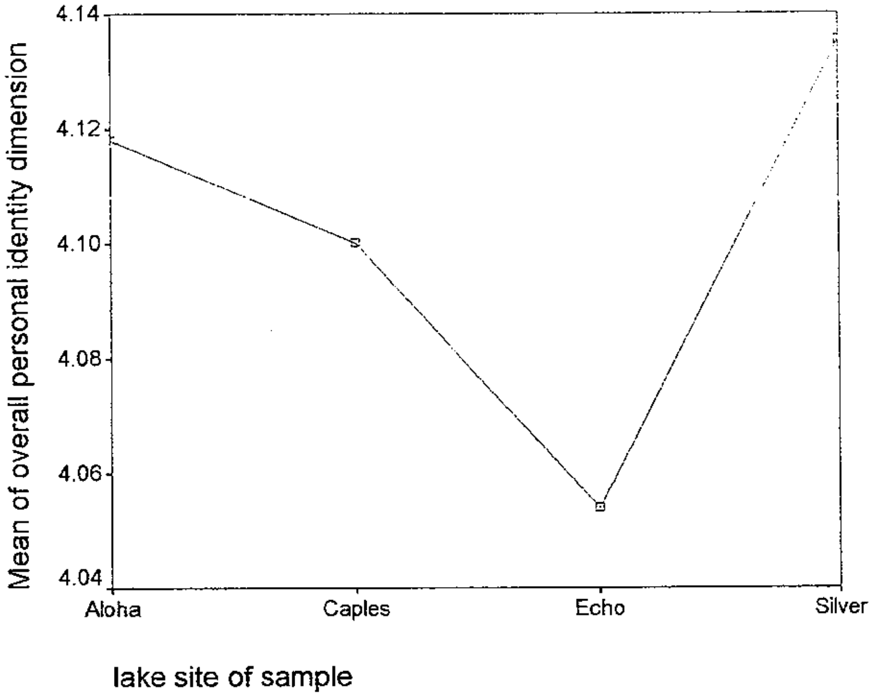
Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	95% Confidence Interval Lower Bound	Upper Bound
overall social identity dimension	Echo	Aloha	.1981	.8428
		Caples	-.6004	-.2056
		Silver	-.4282	-.0388
	Silver	Aloha	.4235	1.0844
		Caples	-.3799	.0409
		Echo	.0388	.4282

*. The mean difference is significant at the .05 level.

Means Plots

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Caples
Echo
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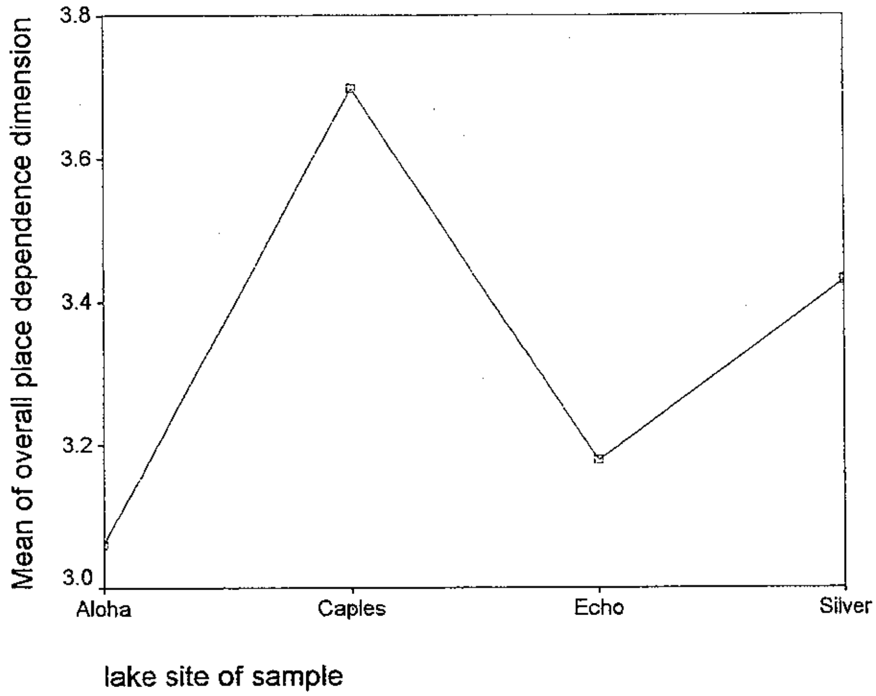
lake site of sample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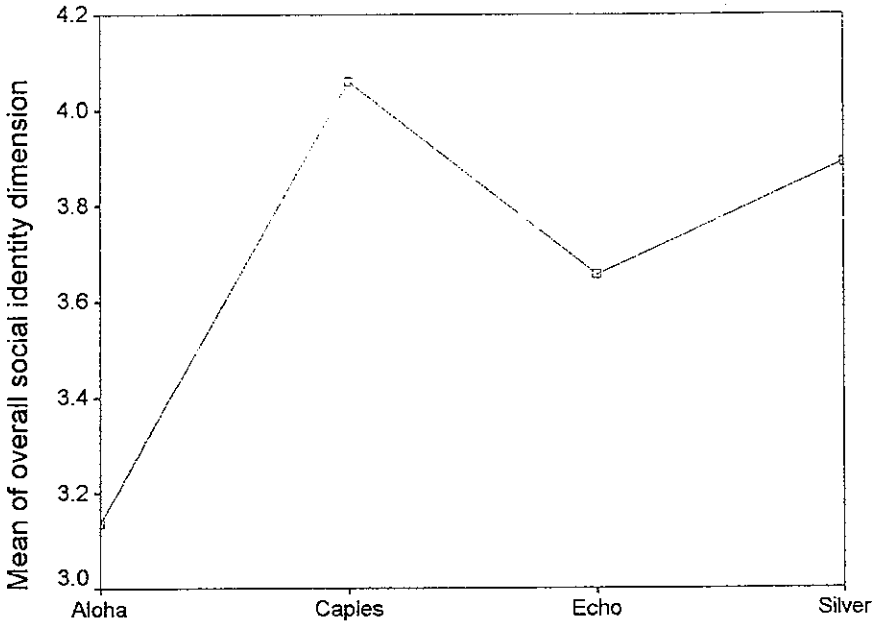
Echo
Silver
lake site of sample



Oneway - Fifth variable - Importance of reservoirs/lakes

Descriptives

reslake

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Aloha	89	3.6404	.69490	.07366	3.4941	3.7868
Caples	338	3.5799	.60252	.03277	3.5154	3.6443
Echo	471	3.4119	.90400	.04165	3.3300	3.4937
Silver	353	3.5921	.72154	.03840	3.5165	3.6676
Total	1251	3.5244	.77046	.02178	3.4816	3.5671

Descriptives

reslake

	Minimum	Maximum
Aloha	1.00	4.00
Caples	1.00	4.00
Echo	1.00	4.00
Silver	1.00	4.00
Total	1.00	4.00

Test of Homogeneity of Variances

reslake

Levene Statistic	df1	df2	Sig.
22.620	3	1247	.000

ANOVA

reslake

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.818	3	3.273	5.573	.001
Within Groups	732.189	1247	.587		
Total	742.006	1250			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: reslake
Scheffe

(I) lake site of sample	(J) lake site of sample	Mean Difference (I-J)	Std. Error	Sig.
Aloha	Caples	.0606	.09129	.932
	Echo	.2286	.08857	.084
	Silver	.0484	.09089	.963
Caples	Aloha	-.0606	.09129	.932
	Echo	.1680*	.05462	.024
	Silver	-.0122	.05831	.998
Echo	Aloha	-.2286	.08857	.084
	Caples	-.1680*	.05462	.024
	Silver	-.1802*	.05394	.011
Silver	Aloha	-.0484	.09089	.963
	Caples	.0122	.05831	.998
	Echo	.1802*	.05394	.011

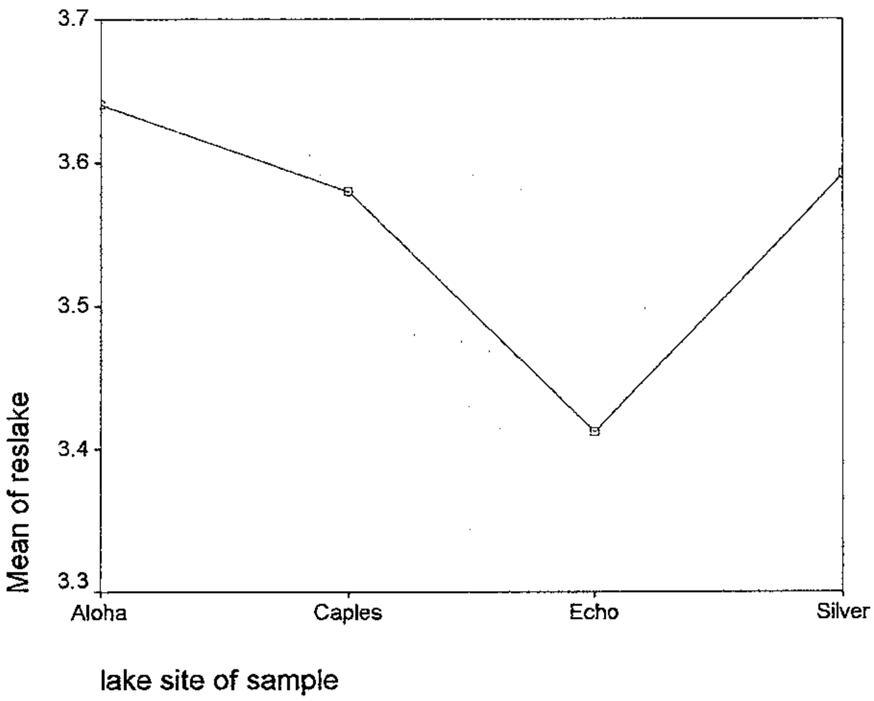
Multiple Comparisons

Dependent Variable: reslake
Scheffe

(I) lake site of sample	(J) lake site of sample	95% Confidence Interval Lower Bound	Upper Bound
Aloha	Caples	-.1950	.3161
	Echo	-.0194	.4765
	Silver	-.2060	.3028
Caples	Aloha	-.3161	.1950
	Echo	.0151	.3209
	Silver	-.1754	.1511
Echo	Aloha	-.4765	.0194
	Caples	-.3209	-.0151
	Silver	-.3312	-.0292
Silver	Aloha	-.3028	.2060
	Caples	-.1511	.1754
	Echo	.0292	.3312

*. The mean difference is significant at the .05 level.

Means Plots

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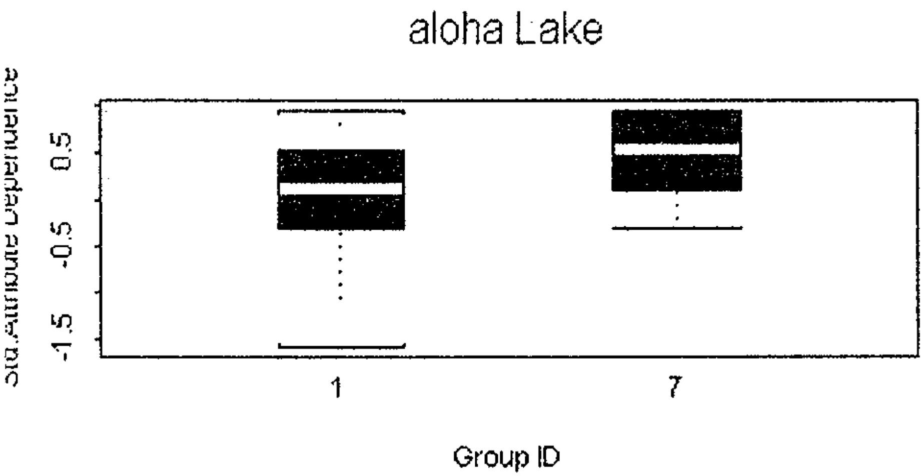
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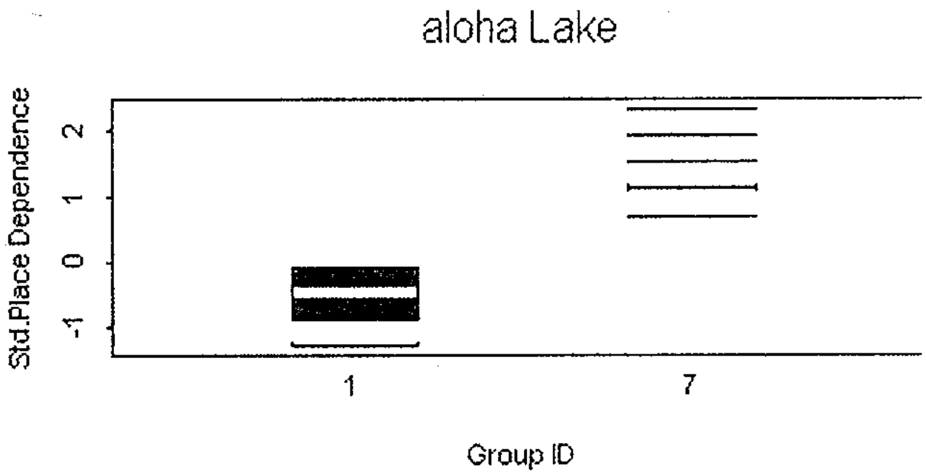
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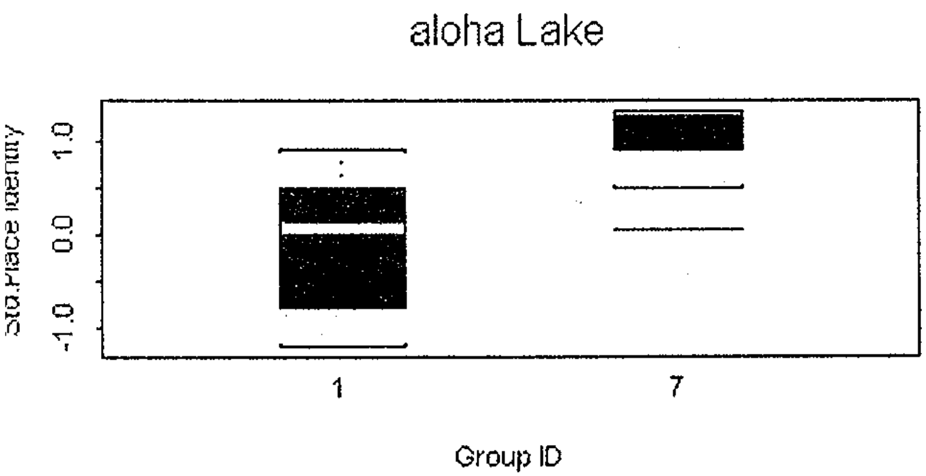
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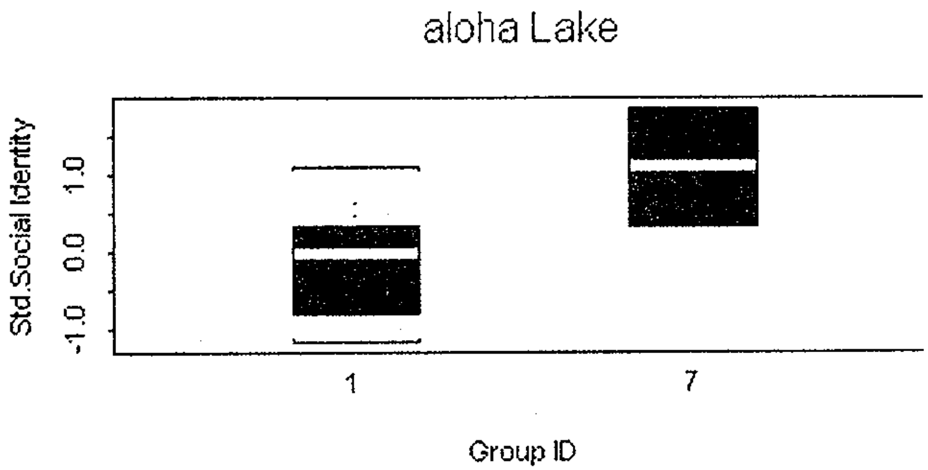
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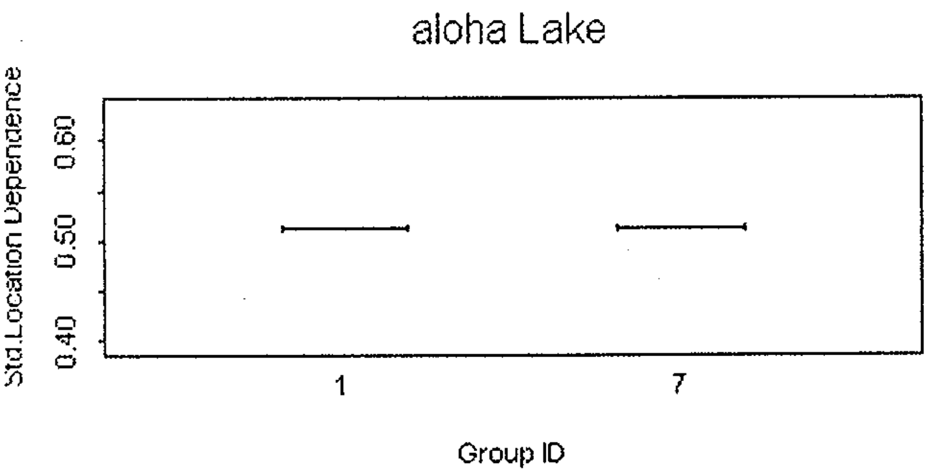
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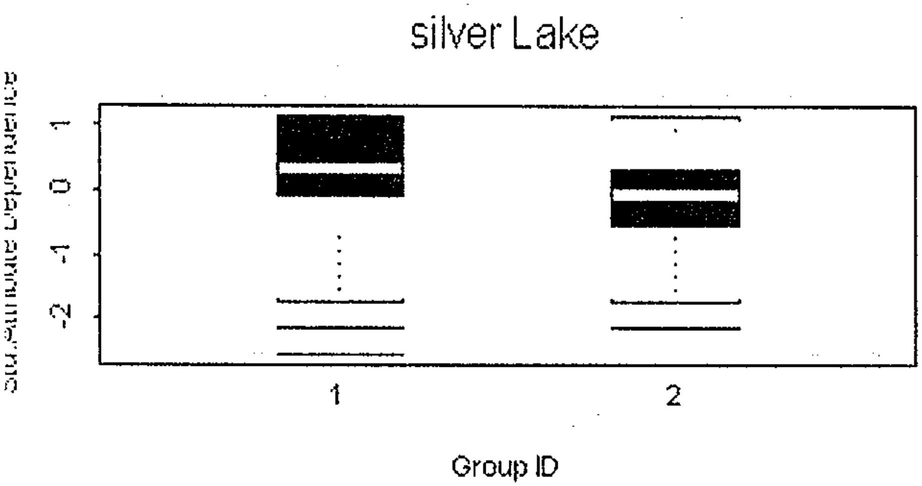
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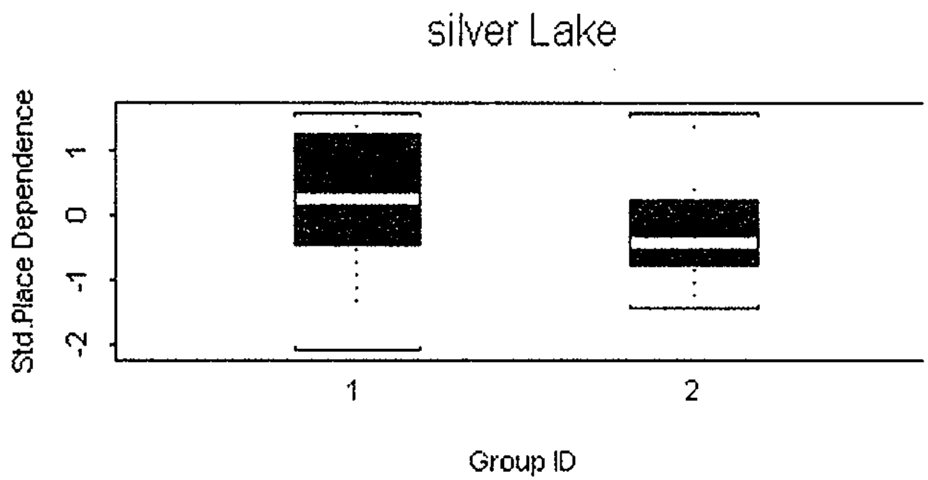
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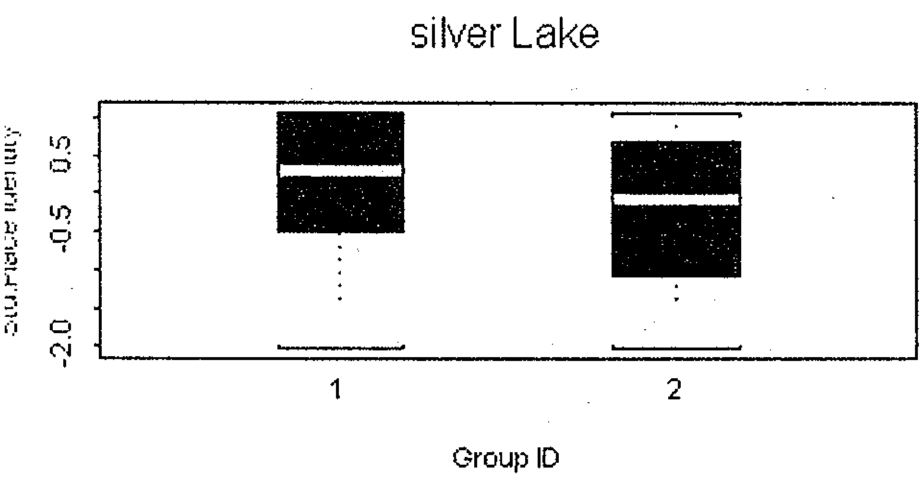
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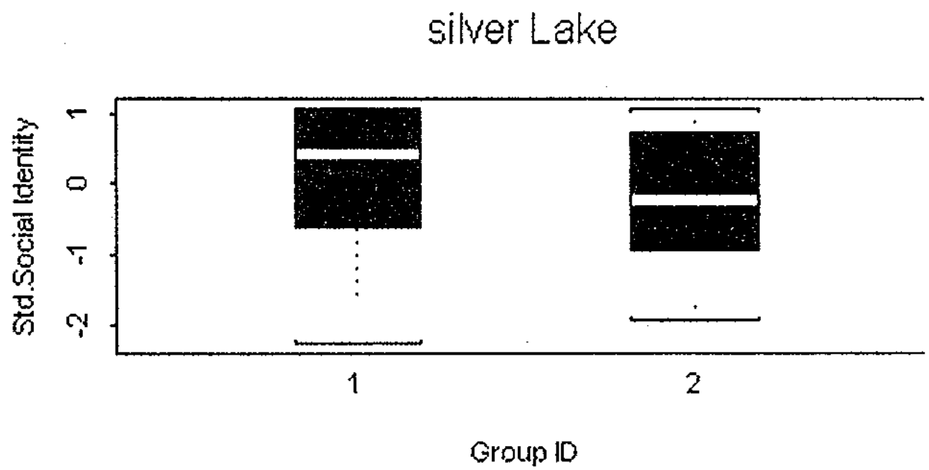
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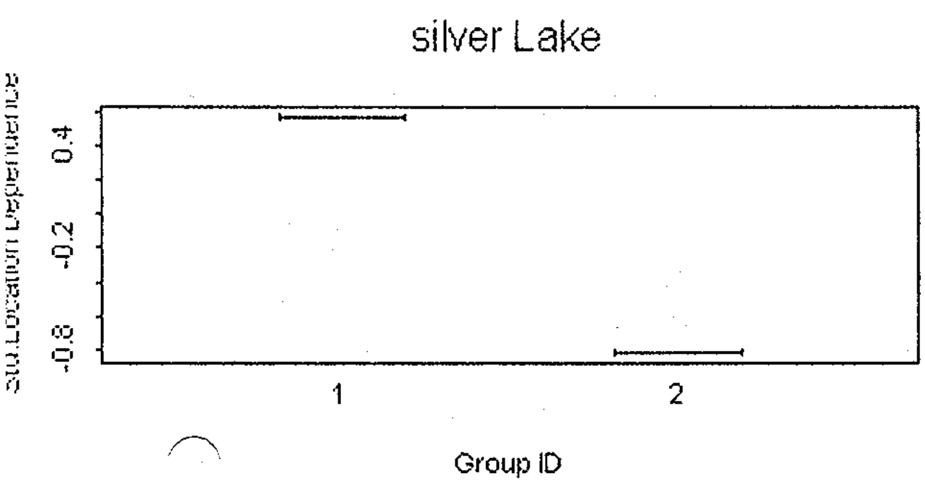
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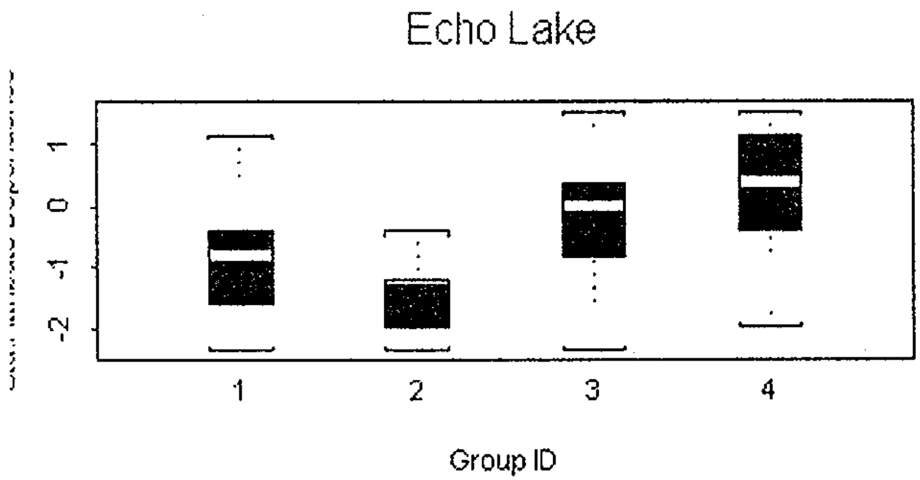
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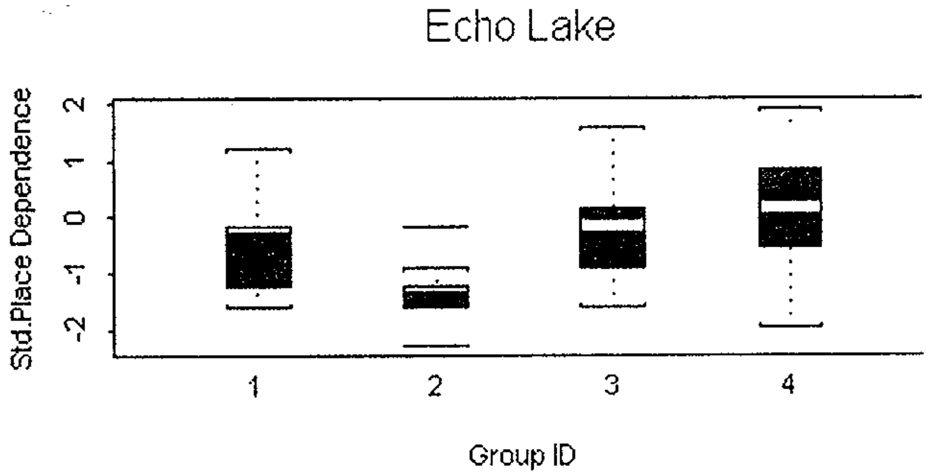
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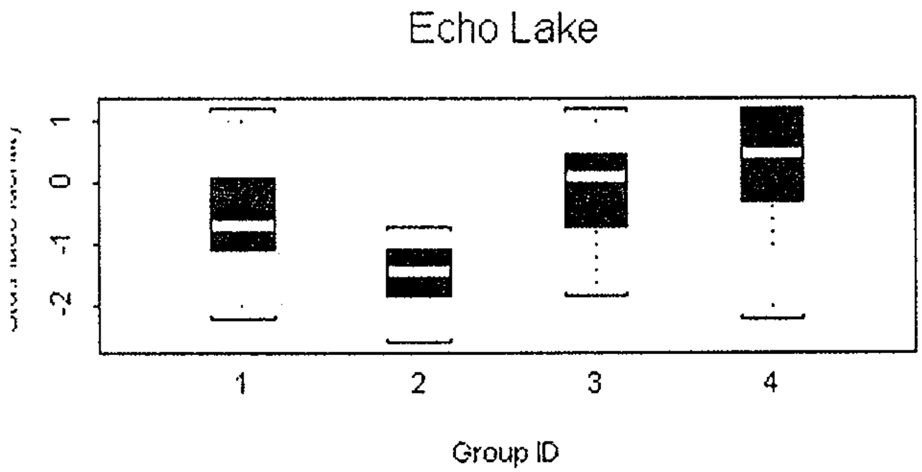
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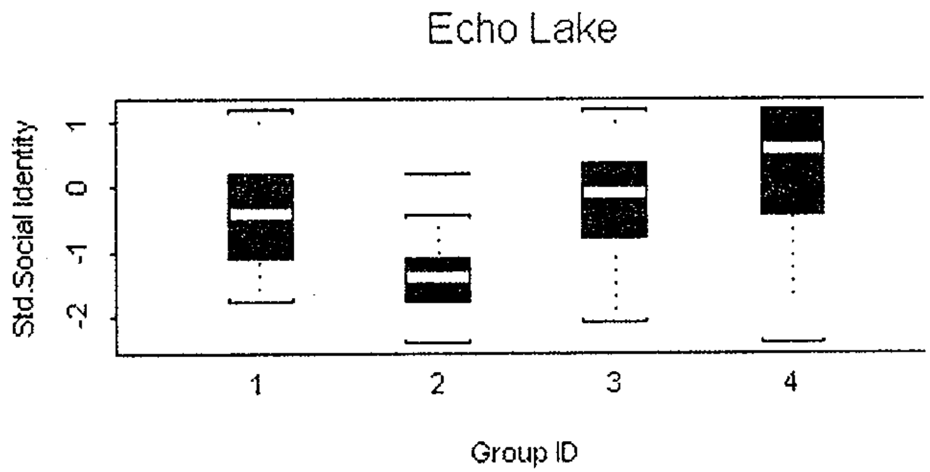
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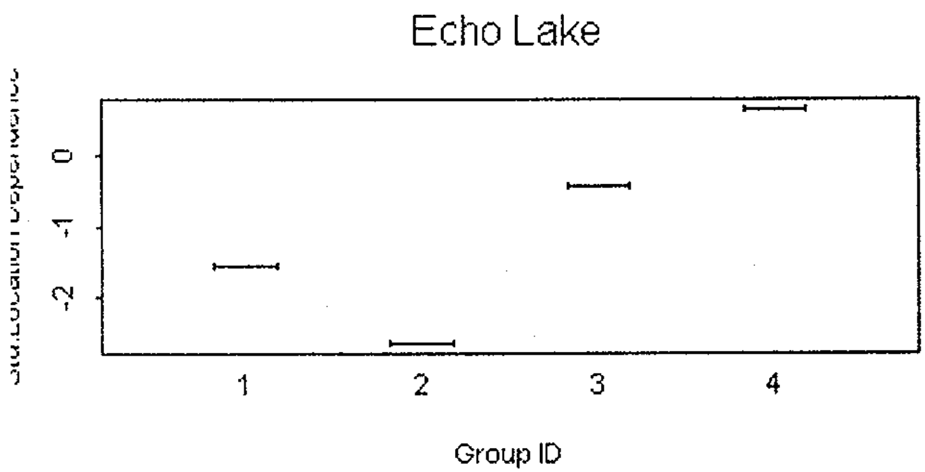
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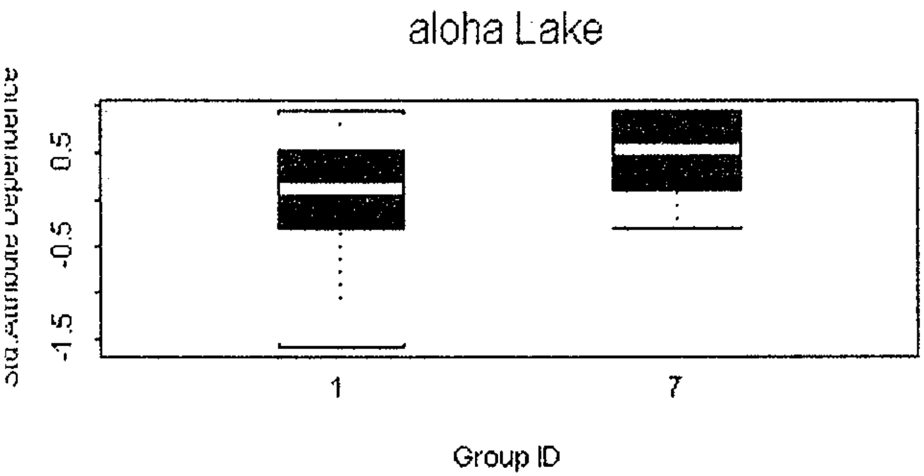
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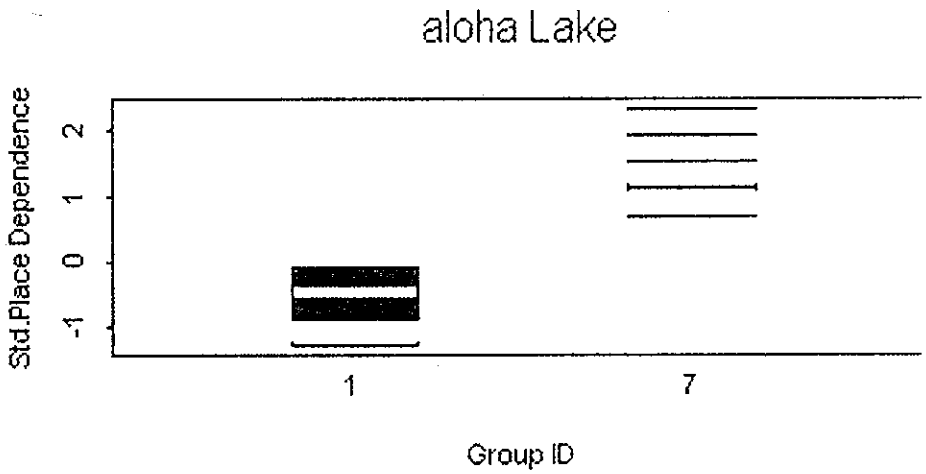
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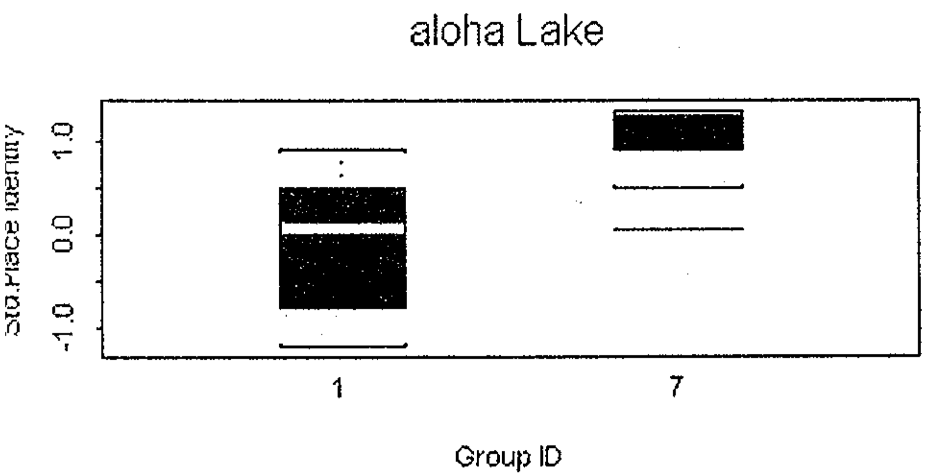
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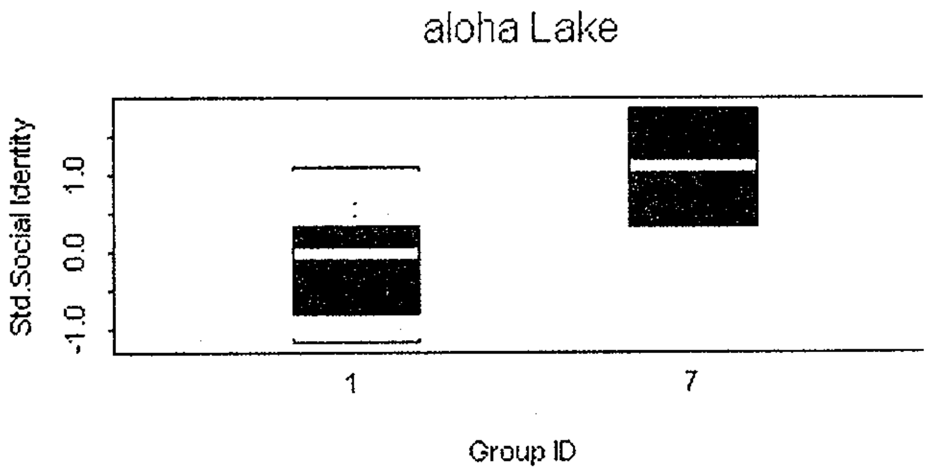
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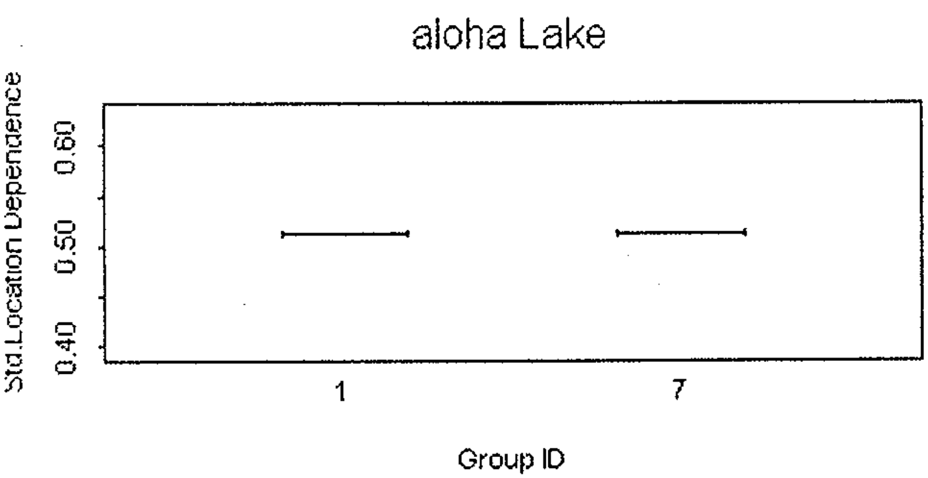
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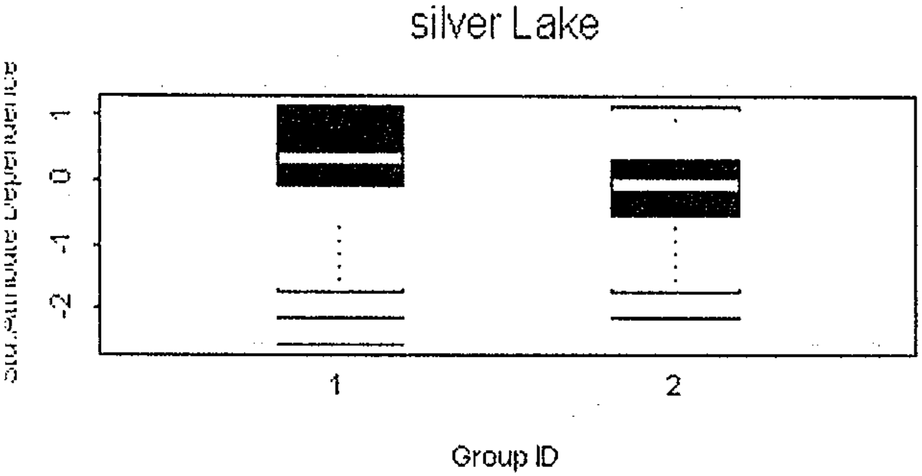
silver Lake
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-2
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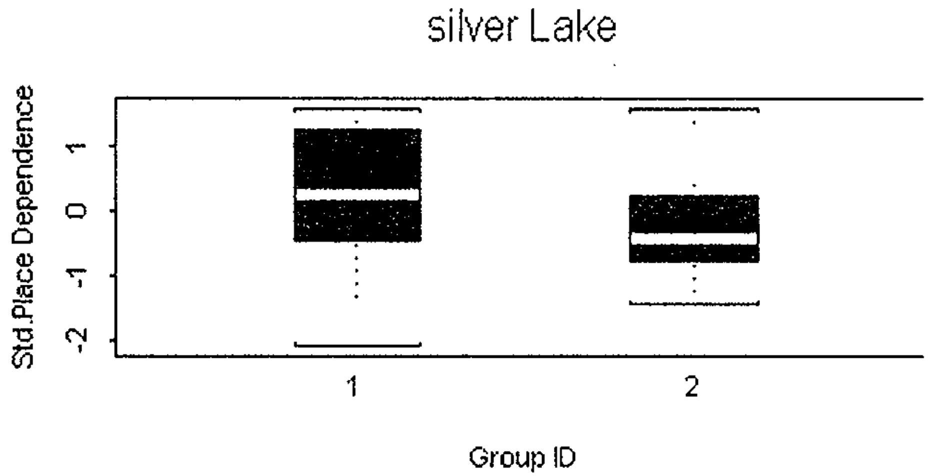
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1
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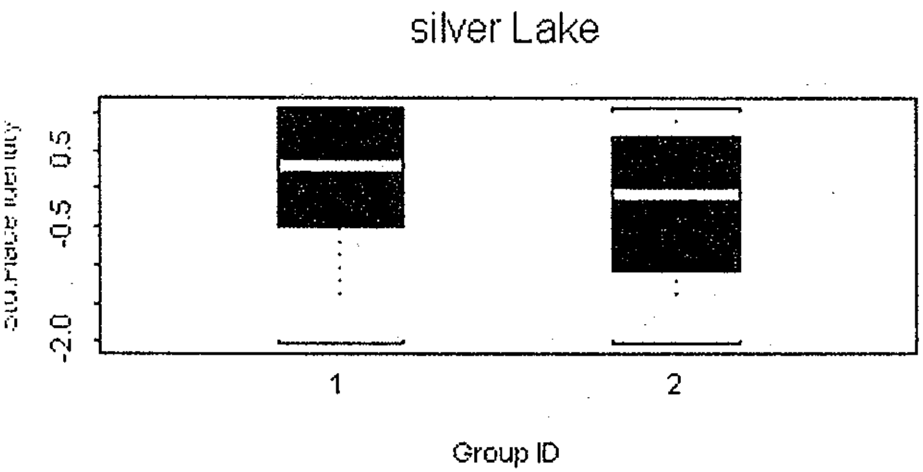
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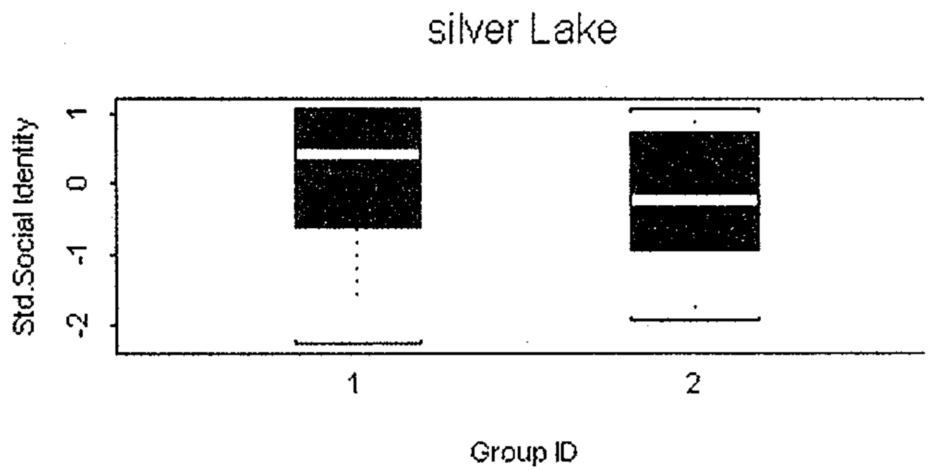
2
Group ID


silver Lake
Std.Social Identity
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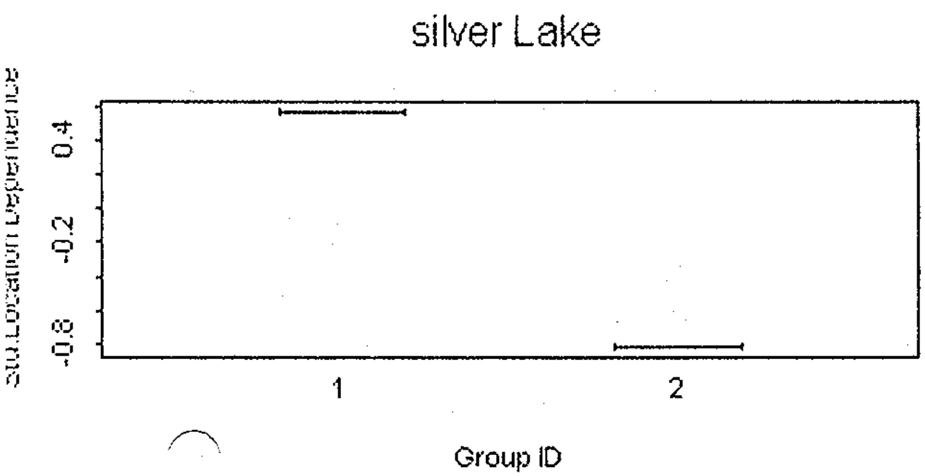
2
Group ID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-0.8
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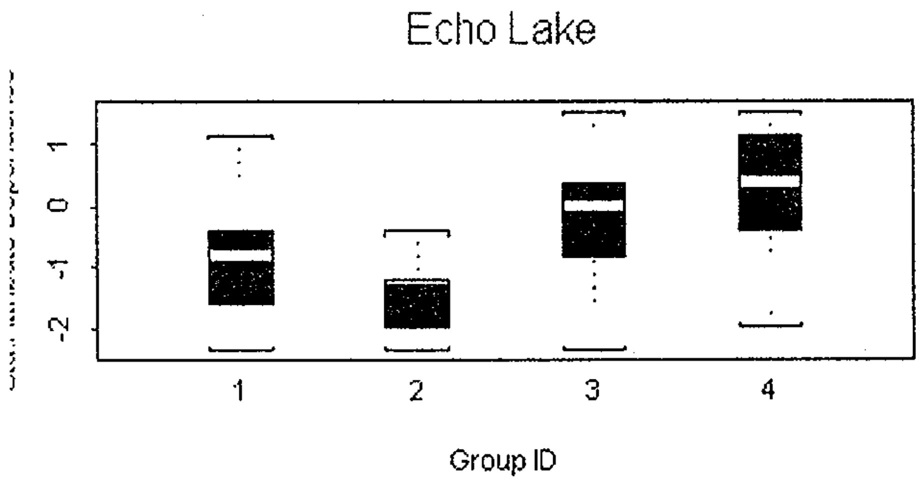
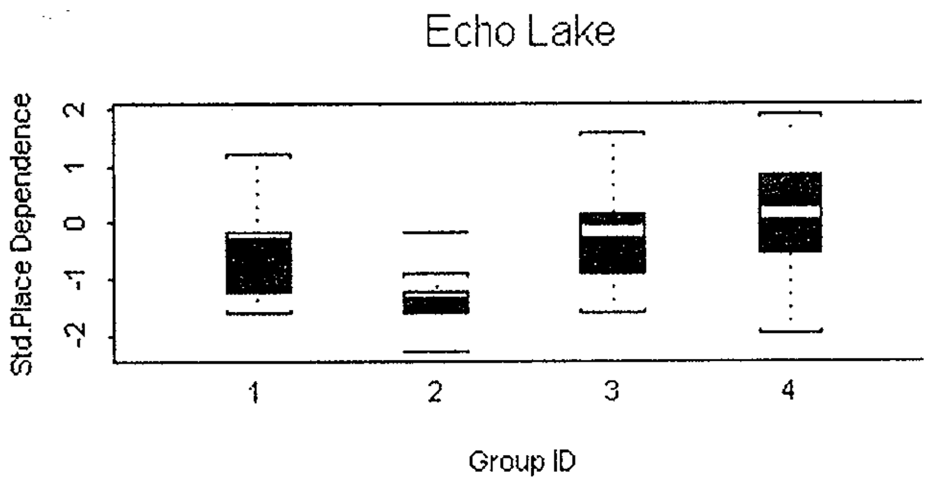
2
Group ID


Echo Lake
1
0
-1
-2
1 2 3 4
Group ID


Echo Lake
Std.Place Dependence
2
1
0
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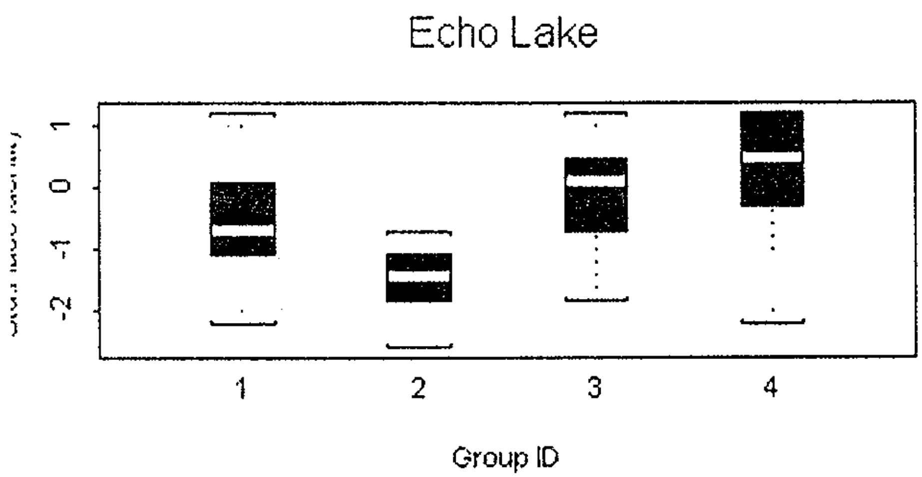
-2
1 2 3 4
Group ID


Echo Lake
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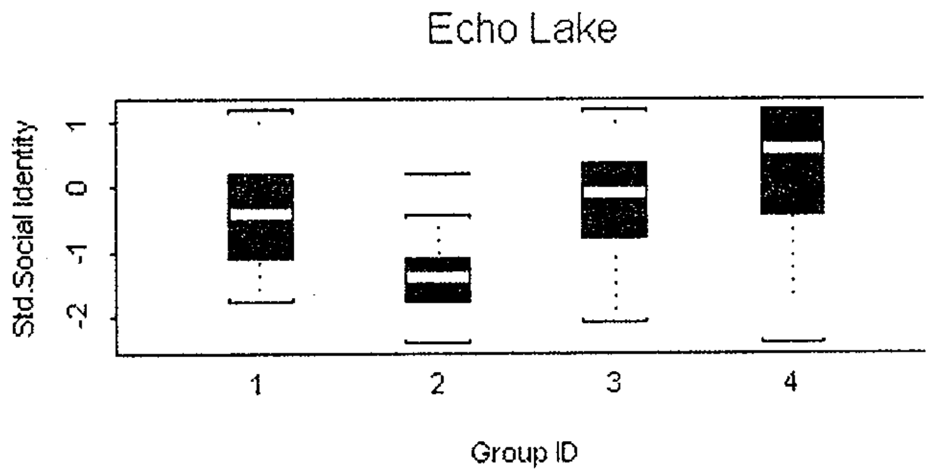
Group ID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Std.Social Identity
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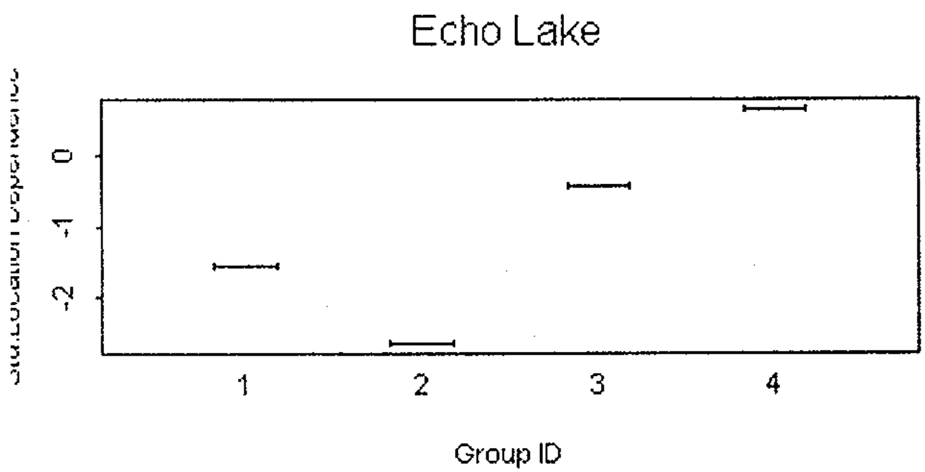
1 2 3 4
Group ID


Echo Lake
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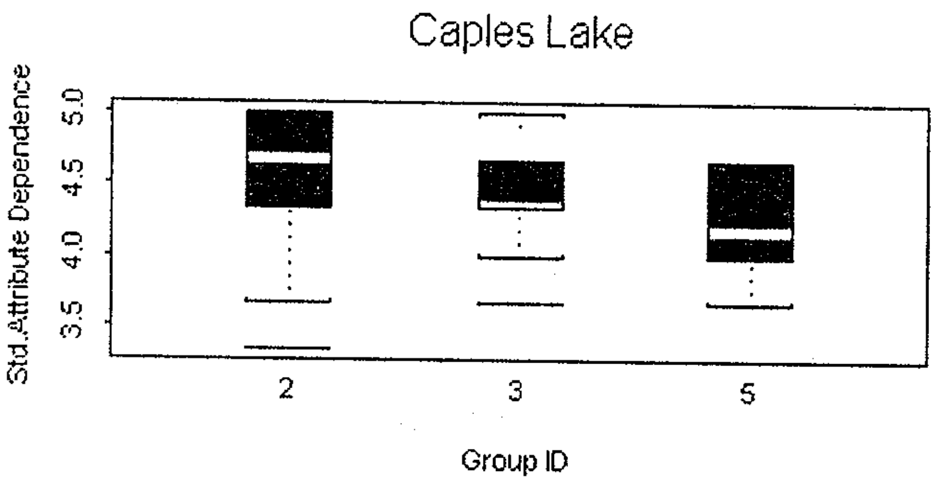
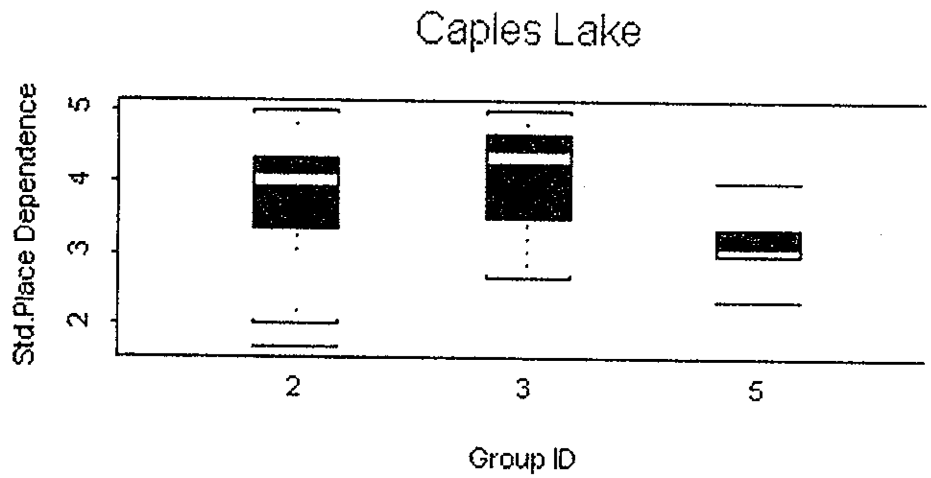
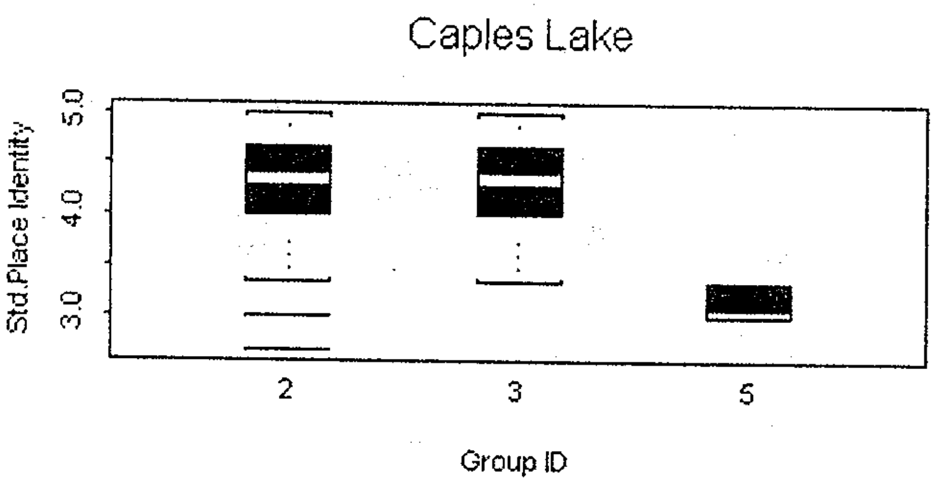
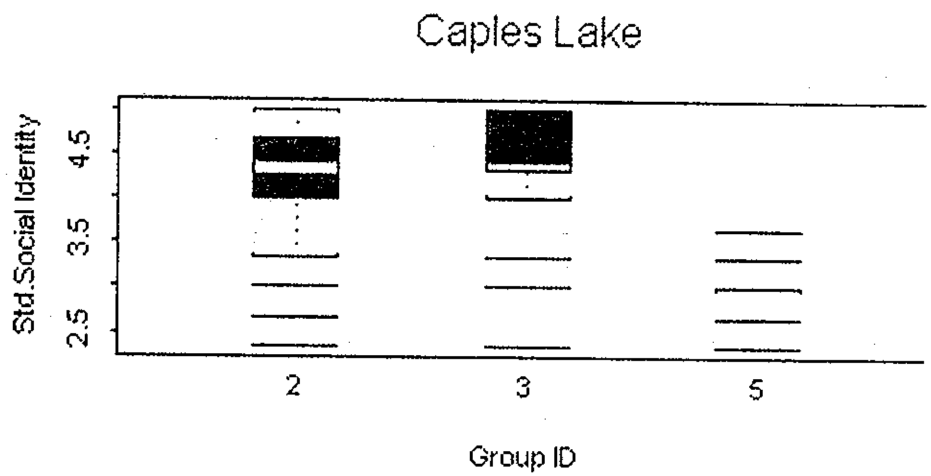
-1
-2
1 2 3 4
Group ID


Caples Lake
Std.Attribute Dependence
3.5
4.0
4.5
5.0
2
3
5
Group ID


Caples Lake
Std.Place Dependence
2
3
4
5
2
3
5
Group ID


Caples Lake
Std.Place Identity
3.0
4.0
5.0
2
3
5
Group ID


Caples Lake
Std.Social Identity
2.5
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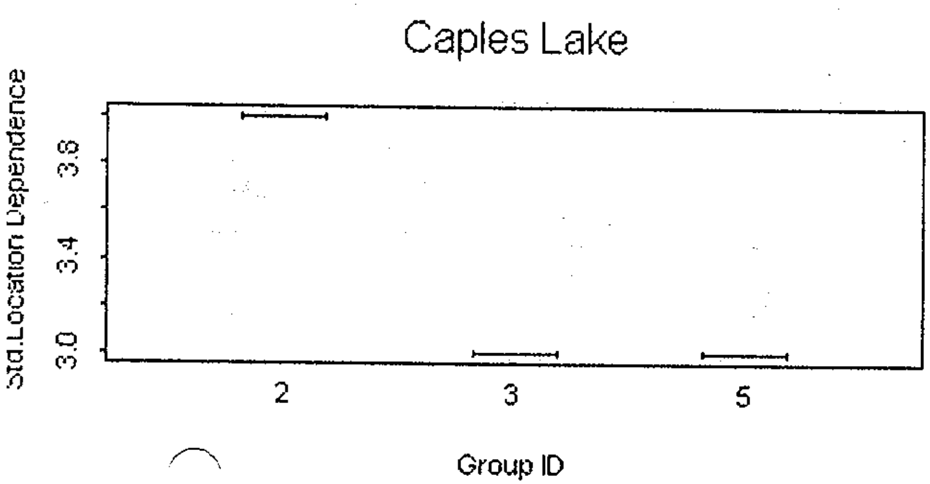
4.5
2
3
5
Group ID


Caples Lake
Std.Location Dependence
3.0
3.4
3.8
2
3
5
Group ID

Frequencies - ECHO LAKE

Statistics

		developed campgrounds	2-wheel drive vehicle access	developed swimming/beach areas	picnic facilities	boat launch ramps
N	Valid	470	473	473	472	471
	Missing	6	3	3	4	5

Statistics

		ohv trails	constant water level in lake
N	Valid	472	468
	Missing	4	8

Frequency Table

developed campgrounds

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	316	66.4	67.2	67.2
	somewhat important	66	13.9	14.0	81.3
	moderately important	56	11.8	11.9	93.2
	extremely important	32	6.7	6.8	100.0
	Total	470	98.7	100.0	
Missing	System	6	1.3		
Total		476	100.0		

2-wheel drive vehicle access

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	202	42.4	42.7	42.7
	somewhat important	80	16.8	16.9	59.6
	moderately important	85	17.9	18.0	77.6
	extremely important	106	22.3	22.4	100.0
	Total	473	99.4	100.0	
Missing	System	3	.6		
Total		476	100.0		

developed swimming/beach areas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	275	57.8	58.1	58.1
	somewhat important	89	18.7	18.8	77.0
	moderately important	77	16.2	16.3	93.2
	extremely important	32	6.7	6.8	100.0
	Total	473	99.4	100.0	
Missing	System	3	.6		
Total		476	100.0		

picnic facilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	228	47.9	48.3	48.3
	somewhat important	103	21.6	21.8	70.1
	moderately important	106	22.3	22.5	92.6
	extremely important	35	7.4	7.4	100.0
	Total	472	99.2	100.0	
Missing	System	4	.8		
Total		476	100.0		

boat launch ramps

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	240	50.4	51.0	51.0
	somewhat important	78	16.4	16.6	67.5
	moderately important	86	18.1	18.3	85.8
	extremely important	67	14.1	14.2	100.0
	Total	471	98.9	100.0	
Missing	System	5	1.1		
Total		476	100.0		

ohv trails

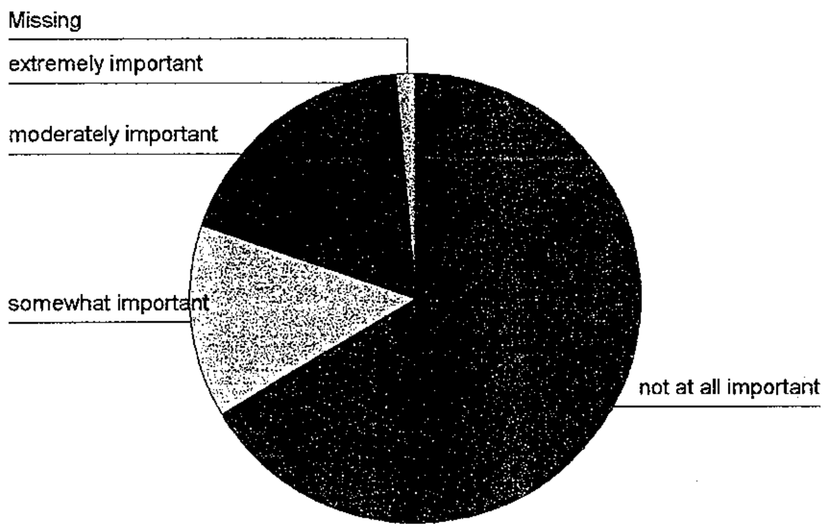
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	417	87.6	88.3	88.3
	somewhat important	19	4.0	4.0	92.4
	moderately important	24	5.0	5.1	97.5
	extremely important	12	2.5	2.5	100.0
	Total	472	99.2	100.0	
Missing	System	4	.8		
Total		476	100.0		

constant water level in lake

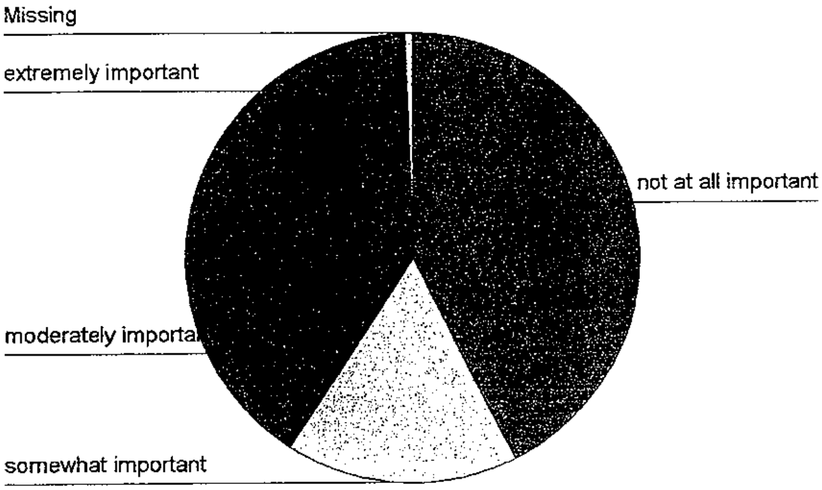
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	69	14.5	14.7	14.7
	somewhat important	91	19.1	19.4	34.2
	moderately important	113	23.7	24.1	58.3
	extremely important	195	41.0	41.7	100.0
	Total	468	98.3	100.0	
Missing	System	8	1.7		
Total		476	100.0		

Pie Chart

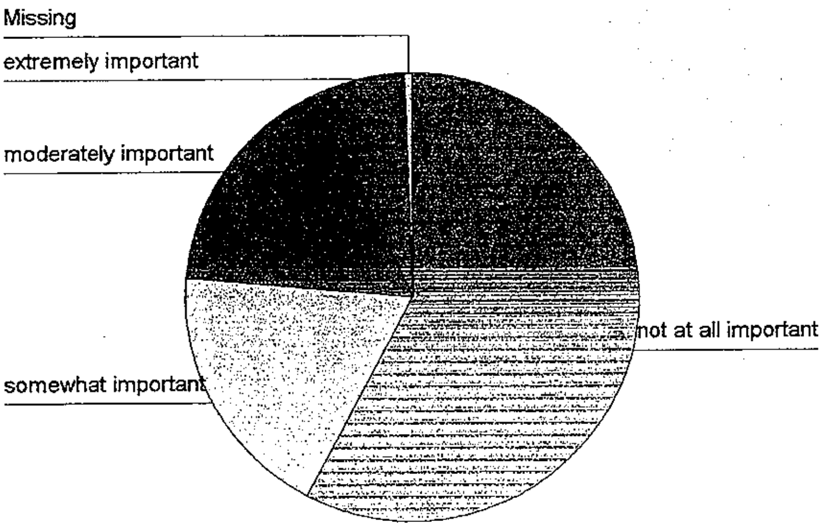
developed campgrounds

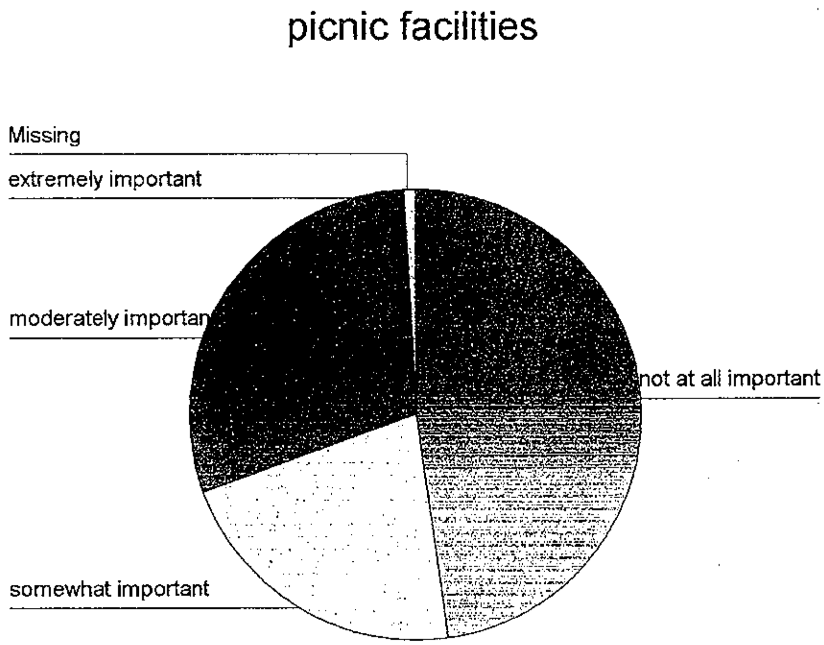


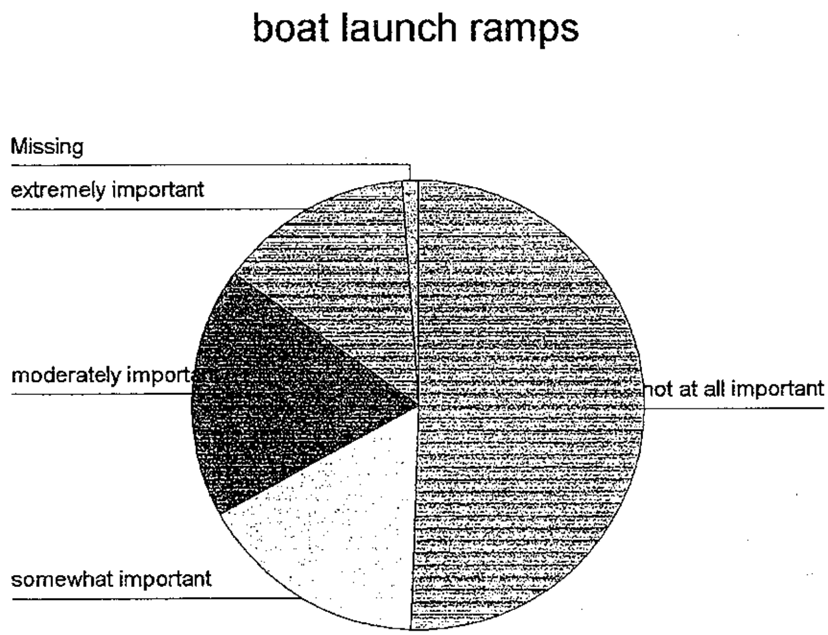
2-wheel drive vehicle access



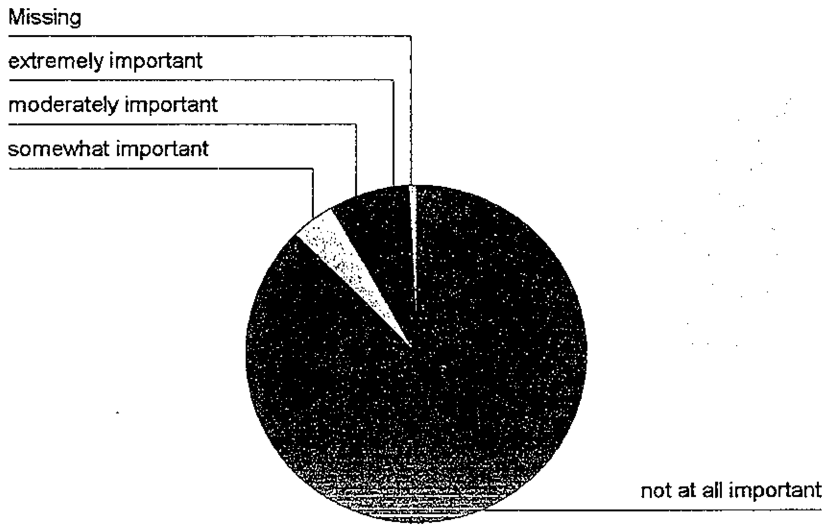
developed swimming/beach areas



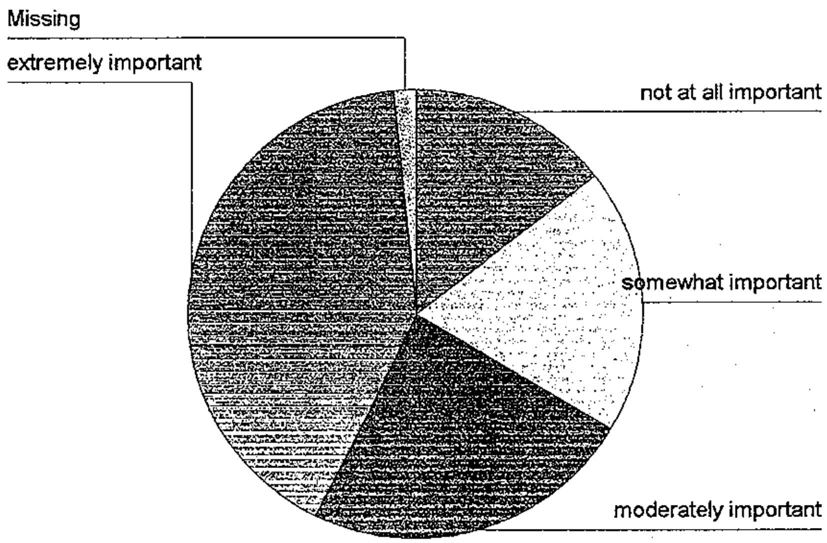

picnic facilities
Missing
extremely important
moderately important
not at all important
somewhat important


boat launch ramps
Missing
extremely important
moderately important
not at all important
somewhat important

ohv trails



constant water level in lake



Oneway

Descriptives

		N	Mean	Std. Deviation	Std. Error
developed campgrounds	Aloha	88	1.2386	.60637	.06464
	Caples	337	2.9050	1.04790	.05708
	Echo	470	1.5830	.94436	.04356
	Silver	355	2.6676	1.18223	.06275
	Total	1250	2.2232	1.20671	.03413
2-wheel drive vehicle access	Aloha	88	1.2500	.68229	.07273
	Caples	337	3.0653	1.04734	.05705
	Echo	473	2.2008	1.21076	.05567
	Silver	354	2.7542	1.20624	.06411
	Total	1252	2.5232	1.24025	.03505
developed swimming/beach areas	Aloha	88	1.1591	.54428	.05802
	Caples	335	2.8269	1.01774	.05561
	Echo	473	1.7167	.96774	.04450
	Silver	355	2.4873	1.18928	.06312
	Total	1251	2.1934	1.15972	.03279
picnic facilities	Aloha	88	1.1818	.59780	.06373
	Caples	335	2.8567	.92717	.05066
	Echo	472	1.8898	.99710	.04590
	Silver	354	2.6554	1.08812	.05783
	Total	1249	2.3163	1.11159	.03145
boat launch ramps	Aloha	88	1.1023	.45586	.04860
	Caples	336	2.7798	1.06743	.05823
	Echo	471	1.9575	1.12340	.05176
	Silver	354	2.2090	1.20025	.06379
	Total	1249	2.1898	1.18350	.03349
ohv trails	Aloha	88	1.0682	.33202	.03539
	Caples	336	2.2411	1.08926	.05942
	Echo	472	1.2182	.65249	.03003
	Silver	354	1.6638	1.03890	.05522
	Total	1250	1.6088	.98901	.02797
constant water level in lake	Aloha	88	3.0000	1.19385	.12727
	Caples	335	3.3373	.83143	.04543
	Echo	468	2.9274	1.09459	.05060
	Silver	352	3.3438	.91739	.04890
	Total	1243	3.1609	1.00715	.02857

Descriptives

		95% Confidence Interval for Mean		Minimum	Maximum
		Lower Bound	Upper Bound		
developed campgrounds	Aloha	1.1102	1.3671	1.00	3.00
	Caples	2.7928	3.0173	1.00	4.00
	Echo	1.4974	1.6686	1.00	4.00
	Silver	2.5442	2.7910	1.00	4.00
	Total	2.1562	2.2902	1.00	4.00
2-wheel drive vehicle access	Aloha	1.1054	1.3946	1.00	4.00
	Caples	2.9531	3.1775	1.00	4.00
	Echo	2.0915	2.3102	1.00	4.00
	Silver	2.6282	2.8803	1.00	4.00
	Total	2.4544	2.5919	1.00	4.00
developed swimming/beach areas	Aloha	1.0438	1.2744	1.00	4.00
	Caples	2.7175	2.9362	1.00	4.00
	Echo	1.6293	1.8041	1.00	4.00
	Silver	2.3632	2.6115	1.00	4.00
	Total	2.1291	2.2578	1.00	4.00
picnic facilities	Aloha	1.0552	1.3085	1.00	4.00
	Caples	2.7571	2.9564	1.00	4.00
	Echo	1.7996	1.9800	1.00	4.00
	Silver	2.5416	2.7691	1.00	4.00
	Total	2.2545	2.3780	1.00	4.00
boat launch ramps	Aloha	1.0057	1.1989	1.00	4.00
	Caples	2.6652	2.8943	1.00	4.00
	Echo	1.8558	2.0593	1.00	4.00
	Silver	2.0836	2.3345	1.00	4.00
	Total	2.1241	2.2555	1.00	4.00
ohv trails	Aloha	.9978	1.1385	1.00	3.00
	Caples	2.1242	2.3580	1.00	4.00
	Echo	1.1592	1.2772	1.00	4.00
	Silver	1.5552	1.7724	1.00	4.00
	Total	1.5539	1.6637	1.00	4.00
constant water level in lake	Aloha	2.7470	3.2530	1.00	4.00
	Caples	3.2480	3.4267	1.00	4.00
	Echo	2.8279	3.0268	1.00	4.00
	Silver	3.2476	3.4399	1.00	4.00
	Total	3.1049	3.2169	1.00	4.00

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
developed campgrounds	35.985	3	1246	.000
2-wheel drive vehicle access	44.731	3	1248	.000
developed swimming/beach areas	57.667	3	1247	.000
picnic facilities	36.468	3	1245	.000
boat launch ramps	67.468	3	1245	.000
ohv trails	137.071	3	1246	.000
constant water level in lake	19.160	3	1239	.000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
developed campgrounds	Between Groups	504.736	3	168.245	159.540	.000
	Within Groups	1313.991	1246	1.055		
	Total	1818.727	1249			
2-wheel drive vehicle access	Between Groups	309.726	3	103.242	79.801	.000
	Within Groups	1614.602	1248	1.294		
	Total	1924.328	1251			
developed swimming/beach areas	Between Groups	366.724	3	122.241	115.968	.000
	Within Groups	1314.462	1247	1.054		
	Total	1681.186	1250			
picnic facilities	Between Groups	337.641	3	112.547	116.337	.000
	Within Groups	1204.439	1245	.967		
	Total	1542.080	1248			
boat launch ramps	Between Groups	246.565	3	82.188	68.150	.000
	Within Groups	1501.464	1245	1.206		
	Total	1748.029	1248			
ohv trails	Between Groups	233.119	3	77.706	97.940	.000
	Within Groups	988.585	1246	.793		
	Total	1221.703	1249			
constant water level in lake	Between Groups	50.000	3	16.667	17.069	.000
	Within Groups	1209.820	1239	.976		
	Total	1259.820	1242			

Post Hoc Tests

Multiple Comparisons

Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	Mean Difference (I-J)	Std. Error	Sig.
developed campgrounds	Aloha	Caples	-1.6664*	.12293	.000
		Echo	-.3443*	.11928	.040
		Silver	-1.4290*	.12229	.000
	Caples	Aloha	1.6664*	.12293	.000
		Echo	1.3221*	.07330	.000
		Silver	.2374*	.07810	.027
	Echo	Aloha	.3443*	.11928	.040
		Caples	-1.3221*	.07330	.000
		Silver	-1.0846*	.07221	.000
	Silver	Aloha	1.4290*	.12229	.000
		Caples	-.2374*	.07810	.027
		Echo	1.0846*	.07221	.000
2-wheel drive vehicle access	Aloha	Caples	-1.8153*	.13616	.000
		Echo	-.9508*	.13205	.000
		Silver	-1.5042*	.13549	.000
	Caples	Aloha	1.8153*	.13616	.000
		Echo	.8644*	.08108	.000
		Silver	.3110*	.08657	.005
	Echo	Aloha	.9508*	.13205	.000
		Caples	-.8644*	.08108	.000
		Silver	-.5534*	.07994	.000
	Silver	Aloha	1.5042*	.13549	.000
		Caples	-.3110*	.08657	.005
		Echo	.5534*	.07994	.000
developed swimming/beach areas	Aloha	Caples	-1.6678*	.12298	.000
		Echo	-.5576*	.11919	.000
		Silver	-1.3282*	.12226	.000
	Caples	Aloha	1.6678*	.12298	.000
		Echo	1.1102*	.07332	.000
		Silver	.3395*	.07820	.000
	Echo	Aloha	.5576*	.11919	.000
		Caples	-1.1102*	.07332	.000
		Silver	-.7706*	.07210	.000
	Silver	Aloha	1.3282*	.12226	.000
		Caples	-.3395*	.07820	.000
		Echo	.7706*	.07210	.000
picnic facilities	Aloha	Caples	-1.6749*	.11782	.000
		Echo	-.7080*	.11421	.000
		Silver	-1.4735*	.11716	.000
	Caples	Aloha	1.6749*	.11782	.000
		Echo	.9669*	.07027	.000
		Silver	.2013	.07497	.066

Multiple Comparisons

Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	Mean Difference (I-J)	Std. Error	Sig.
picnic facilities	Echo	Aloha	.7080*	.11421	.000
		Caples	-.9669*	.07027	.000
		Silver	-.7655*	.06916	.000
	Silver	Aloha	1.4735*	.11716	.000
		Caples	-.2013	.07497	.066
		Echo	.7655*	.06916	.000
boat launch ramps	Aloha	Caples	-1.6775*	.13151	.000
		Echo	-.8553*	.12753	.000
		Silver	-1.1068*	.13081	.000
	Caples	Aloha	1.6775*	.13151	.000
		Echo	.8222*	.07842	.000
		Silver	.5707*	.08364	.000
	Echo	Aloha	.8553*	.12753	.000
		Caples	-.8222*	.07842	.000
		Silver	-.2515*	.07725	.014
	Silver	Aloha	1.1068*	.13081	.000
		Caples	-.5707*	.08364	.000
		Echo	.2515*	.07725	.014
ohv trails	Aloha	Caples	-1.1729*	.10666	.000
		Echo	-.1500	.10343	.551
		Silver	-.5957*	.10610	.000
	Caples	Aloha	1.1729*	.10666	.000
		Echo	1.0229*	.06358	.000
		Silver	.5772*	.06784	.000
	Echo	Aloha	.1500	.10343	.551
		Caples	-1.0229*	.06358	.000
		Silver	-.4456*	.06263	.000
	Silver	Aloha	.5957*	.10610	.000
		Caples	-.5772*	.06784	.000
		Echo	.4456*	.06263	.000
constant water level in lake	Aloha	Caples	-.3373*	.11837	.044
		Echo	.0726	.11481	.940
		Silver	-.3438*	.11777	.037
	Caples	Aloha	.3373*	.11837	.044
		Echo	.4100*	.07072	.000
		Silver	-.0064	.07542	1.000
	Echo	Aloha	-.0726	.11481	.940
		Caples	-.4100*	.07072	.000
		Silver	-.4164*	.06972	.000
	Silver	Aloha	.3438*	.11777	.037
		Caples	.0064	.07542	1.000
		Echo	.4164*	.06972	.000

Multiple Comparisons

Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
developed campgrounds	Aloha	Caples	-2.0105	-1.3223
		Echo	-.6782	-.0104
		Silver	-1.7713	-1.0866
	Caples	Aloha	1.3223	2.0105
		Echo	1.1169	1.5273
		Silver	.0188	.4561
	Echo	Aloha	.0104	.6782
		Caples	-1.5273	-1.1169
		Silver	-1.2868	-.8825
	Silver	Aloha	1.0866	1.7713
		Caples	-.4561	-.0188
		Echo	.8825	1.2868
2-wheel drive vehicle access	Aloha	Caples	-2.1964	-1.4341
		Echo	-1.3205	-.5812
		Silver	-1.8835	-1.1250
	Caples	Aloha	1.4341	2.1964
		Echo	.6375	1.0914
		Silver	.0687	.5534
	Echo	Aloha	.5812	1.3205
		Caples	-1.0914	-.6375
		Silver	-.7772	-.3296
	Silver	Aloha	1.1250	1.8835
		Caples	-.5534	-.0687
		Echo	.3296	.7772
developed swimming/beach areas	Aloha	Caples	-2.0120	-1.3235
		Echo	-.8913	-.2240
		Silver	-1.6705	-.9860
	Caples	Aloha	1.3235	2.0120
		Echo	.9049	1.3154
		Silver	.1206	.5585
	Echo	Aloha	.2240	.8913
		Caples	-1.3154	-.9049
		Silver	-.9724	-.5688
	Silver	Aloha	.9860	1.6705
		Caples	-.5585	-.1206
		Echo	.5688	.9724
picnic facilities	Aloha	Caples	-2.0047	-1.3451
		Echo	-1.0277	-.3883
		Silver	-1.8015	-1.1456
	Caples	Aloha	1.3451	2.0047
		Echo	.7702	1.1636
		Silver	-.0085	.4112

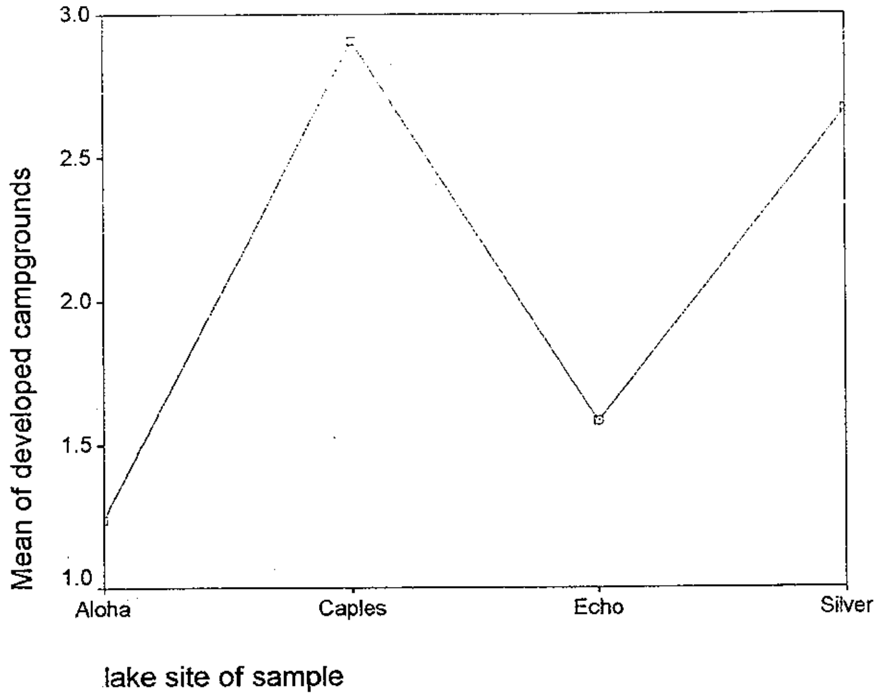
Multiple Comparisons

Scheffe

Dependent Variable	(I) lake site of sample	(J) lake site of sample	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
picnic facilities	Echo	Aloha	.3883	1.0277
		Caples	-1.1636	-.7702
		Silver	-.9591	-.5719
	Silver	Aloha	1.1456	1.8015
		Caples	-.4112	.0085
		Echo	.5719	.9591
boat launch ramps	Aloha	Caples	-2.0456	-1.3094
		Echo	-1.2123	-.4983
		Silver	-1.4729	-.7406
	Caples	Aloha	1.3094	2.0456
		Echo	.6027	1.0417
		Silver	.3366	.8049
	Echo	Aloha	.4983	1.2123
		Caples	-1.0417	-.6027
		Silver	-.4677	-.0353
	Silver	Aloha	.7406	1.4729
		Caples	-.8049	-.3366
		Echo	.0353	.4677
ohv trails	Aloha	Caples	-1.4715	-.8743
		Echo	-.4396	.1395
		Silver	-.8927	-.2987
	Caples	Aloha	.8743	1.4715
		Echo	.8449	1.2008
		Silver	.3873	.7671
	Echo	Aloha	-.1395	.4396
		Caples	-1.2008	-.8449
		Silver	-.6209	-.2703
	Silver	Aloha	.2987	.8927
		Caples	-.7671	-.3873
		Echo	.2703	.6209
constant water level in lake	Aloha	Caples	-.6687	-.0060
		Echo	-.2488	.3941
		Silver	-.6734	-.0141
	Caples	Aloha	.0060	.6687
		Echo	.2120	.6079
		Silver	-.2176	.2047
	Echo	Aloha	-.3941	.2488
		Caples	-.6079	-.2120
		Silver	-.6116	-.2212
	Silver	Aloha	.0141	.6734
		Caples	-.2047	.2176
		Echo	.2212	.6116

*. The mean difference is significant at the .05 level.

Means Plots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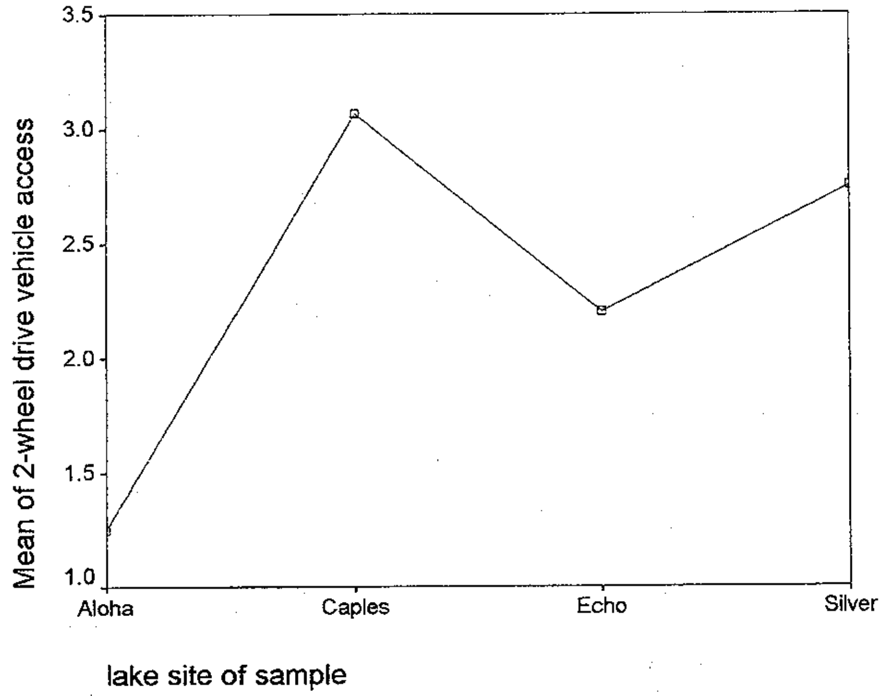
2.0
1.5
1.0
Mean of developed campgrounds
Aloha
Caples
Echo
Silver
lake site of sample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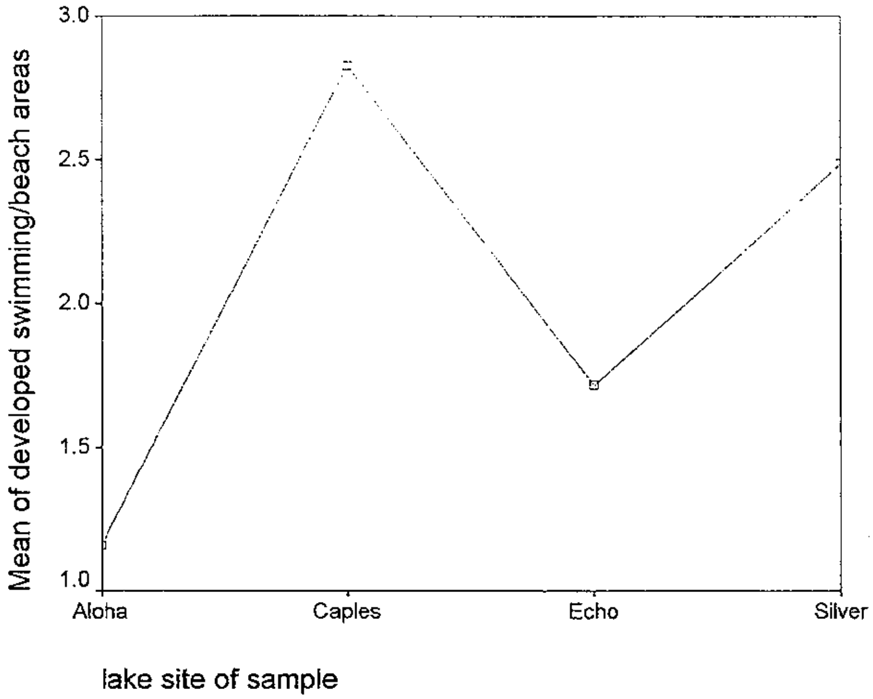
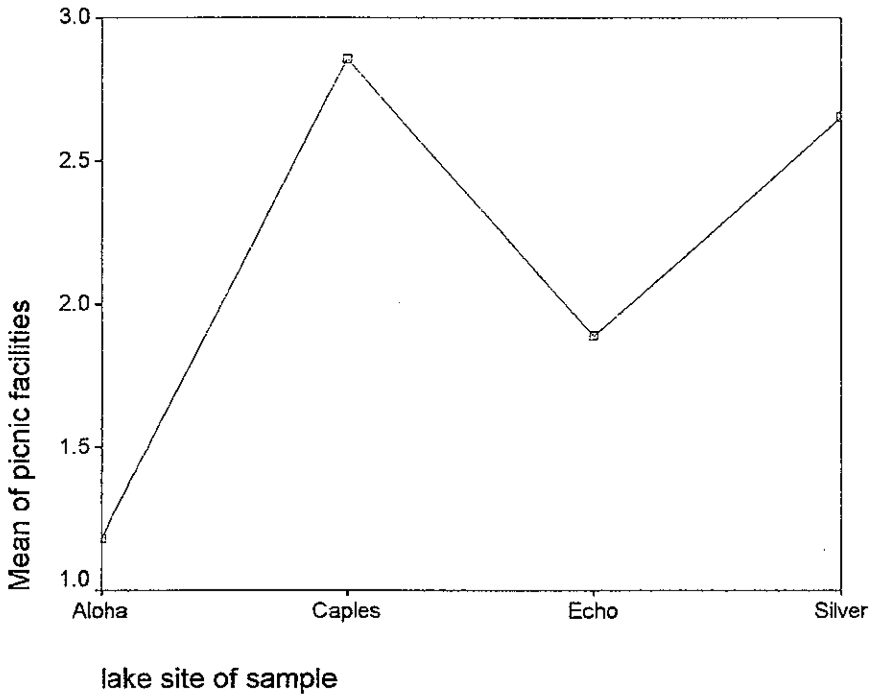
1.0
Mean of 2-wheel drive vehicle access
Aloha
Caples
Echo
Silver
lake site of sample


3.0
2.5
2.0
1.5
1.0
Mean of developed swimming/beach areas
Aloha
Caples
Echo
Silver
lake site of sample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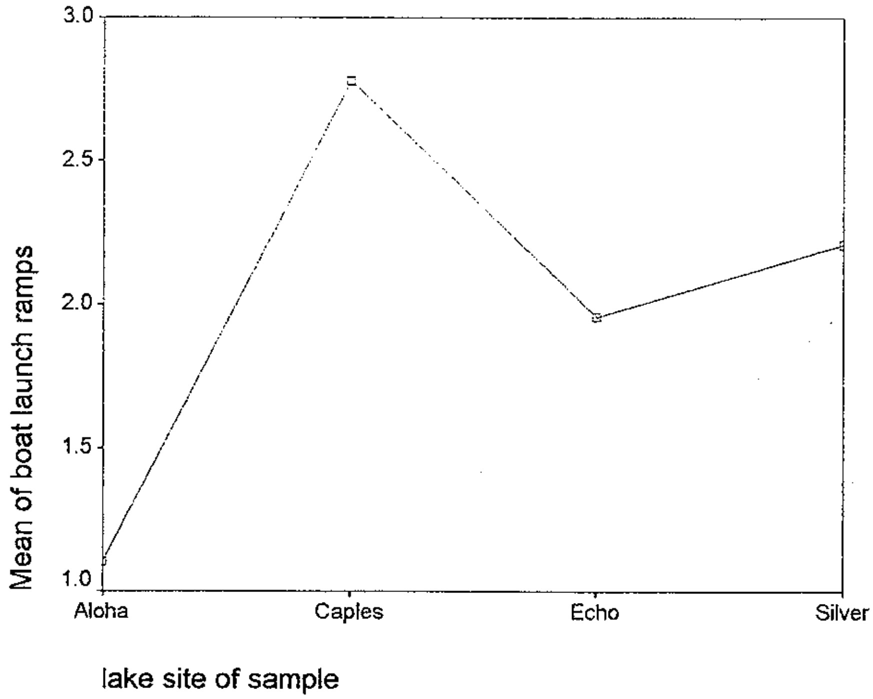
2.5
2.0
1.5
1.0
Mean of picnic facilities
Aloha
Caples
Echo
Silver
lake site of sample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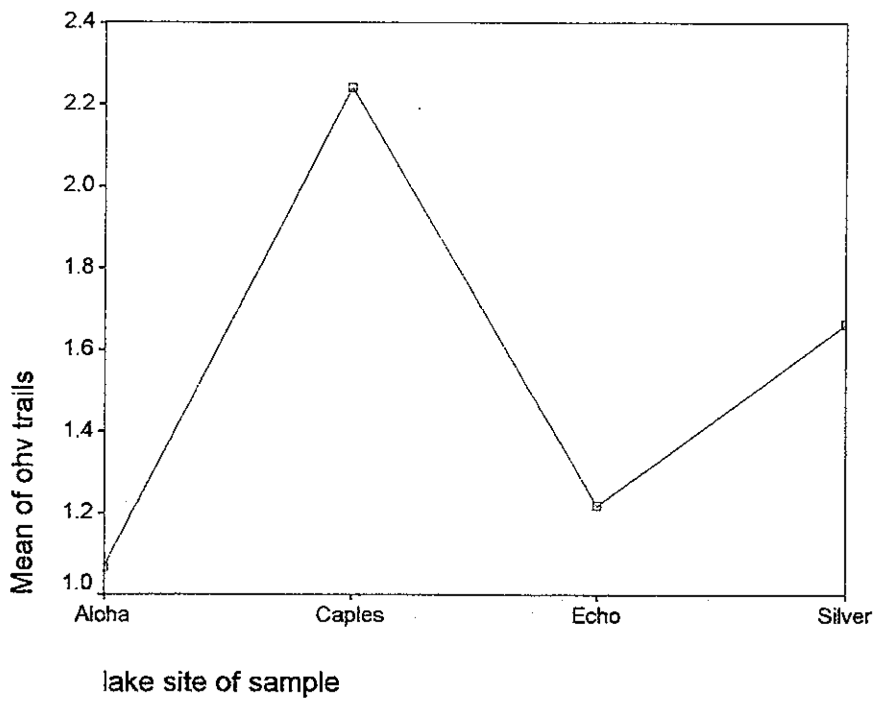
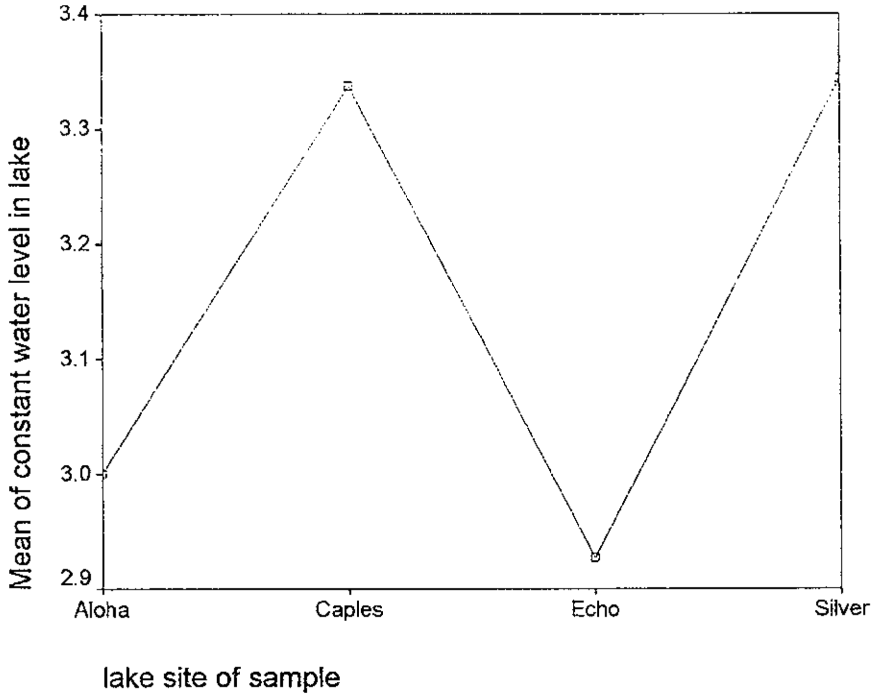
2.5
2.0
1.5
1.0
Mean of boat launch ramps
Aloha
Caples
Echo
Silver
lake site of sample


2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
Mean of ohv trails
Aloha
Caples
Echo
Silver
lake site of sample


3.4
3.3
3.2
3.1
3.0
2.9
Mean of constant water level in lake
Aloha
Caples
Echo
Silver
lake site of sample

Appendix C

Survey Used for Project 184

EID In-Person Recreation Visitor Survey 2002

Date: ______________ Interviewer number: __________________

1. Location of the interview: **[check one]**

1☐ Lake Aloha 2 ☐ Caples Lake 3 ☐ Echo Lake 4 ☐ Silver Lake

INTRODUCTION AND QUALIFYING QUESTIONS
Hello. I'm [name] from Regional & Economic Sciences in Chico. We are conducting a study of recreation users at (location) to find out about the different ways that people use this area. This information will help the Forest Service to better manage recreation areas in the El Dorado National Forest, and will be used as part of the re-licensing for the El Dorado Hydro-electric Project. It only takes about 10 minutes for this interview. After you return home we will mail you a set of photos about the lakes, and ask you to complete a short interview by phone. If we complete the telephone interview with you, we will pay you $10 for your help with the study.

2. Are you age 18 or older?

1☐ NO → **discontinue and say "Thank you for your time, but for statistical purposes, we can only interview a person age 18 or over. We appreciate your cooperation".**

2 ☐ YES → Go to Q.2.

3. Have you participated in this survey at (location) this summer?

1 ☐YES → **discontinue and say "Thank you for your time, but for statistical purposes, we can only interview a person one time. We appreciate your cooperation".**

2 ☐ NO → Start the interview

Enter the 7-digit code number at this time and begin interview ____________________
(Month, Day, Interviewer No., Interview No., Ex. 7031001, July 3, Interviewer 1, interview 1).

Section 1: ABOUT YOUR TRIP

4. How many nights will you stay at Lake Aloha/Caples/Silver/Echo Lake during this trip?
__________ NIGHTS

5. How many persons are in your group on this trip? _______ PERSONS

6. Did you start this trip from your permanent residence?

1 ☐ YES **[Skip to 7]** 2 ☐ NO

6a (If NO) From where did you start your trip?

City/town: _______________ Zip code: ________________
State: __________________ Country: ________________

7. Is Lake Aloha/Caples/Silver/Echo Lake your primary destination for this trip?

1 ☐ YES 2 ☐ NO

8. What is your zip code at your home address? ____________________.

Section 3: These next few questions are ABOUT PREVIOUS TRIPS TO Lake Aloha/Capels/Silver/Echo.

9. Have you visited Lake Aloha/Caples/Silver/Echo Lake before this trip?

1 ☐YES 2 ☐ NO **[SKIP TO QUESTION 11]**

10. Not counting this trip, how many trips have you made to Lake Aloha/Caples/Silver/Echo Lake:

During the past 12 months? ____ Trips Over the past 5 years? ____ Trips

11. On a scale of 1 to 5, with 1 being very dissatisfied and 5 being very satisfied, how satisfied would you say you are with the following conditions at Lake Aloha/Caples/Silver/Echo Lake? **(Circle the number that corresponds to the response of satisfaction with each condition.)**

	Very Dissatisfied	**Dissatisfied**	**Neutral**	**Satisfied**	**Very Satisfied**
a) Water level	1	2	3	4	5
b) Visual quality	1	2	3	4	5
c) Hiking trails	1	2	3	4	5
d) Human impacts on vegetation	1	2	3	4	5
e) Campsite conditions	1	2	3	4	5
f) Amount of litter	1	2	3	4	5

12. On a scale of 1 to 5 with 1 being strongly agree, 3 neutral, and 5 strongly disagree, please tell me how strongly you agree or disagree with the following statements:

[carefully circle the correct response]

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
a) I mainly come to this place to enjoy the water.	1	2	3	4	5
b) Most of the activities I do here are related to the water.	1	2	3	4	5
c) This place is very special to me.	1	2	3	4	5

Question 12 (continued)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
d) This place brings back memories of time spent with friends.	1	2	3	4	5
e) Being near the water is necessary for me to do the things that I enjoy at this place.	1	2	3	4	5
f) I get more satisfaction out of visiting this place than any other.	1	2	3	4	5
g) I associate special people in my life with this place.	1	2	3	4	5
h) I am very attached to this place.	1	2	3	4	5
i) Doing what I do at this place is more important to me than doing it in any other place.	1	2	3	4	5
j) I wouldn't substitute any other area for doing the types of things I do at this place.	1	2	3	4	5
k) This place means a lot to me.	1	2	3	4	5
l) My family regularly visited this place.	1	2	3	4	5

13. Which one of the following three statements best **describes the number of people you <u>expected</u> to see** at Lake Aloha/Caples/Silver/Echo Lake on your most recent trip?

1 □ I saw MORE people than I expected to see.
2 □ I saw ABOUT AS MANY people as I expected to see.
3 □ I saw FEWER people than I expected to see.

14. Which of the following three statements best describes **the number of people that you would have <u>preferred</u> to see** at Lake Aloha/Caples/Silver/Echo Lake during your most recent trip?

1 □ I saw MORE people than I wanted to see.
2 □ I saw ABOUT AS MANY people as I wanted to see.
3 □ I saw FEWER people than I wanted to see.

15. On a scale of 1 to 5 with 1 being very dissatisfied and 5 being very satisfied, how satisfied were you, overall, with your visit to Lake Aloha/Capels/Silver/Echo Lake?

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
1	2	3	4	5

16. Which of the following activities have you participated in while recreating at (location) during your current visit? **[Check all that apply]**

Hiking
Sailing
Motor boating
Water skiing
Other boating
Camping (primitive)
Camping (developed)
Other activities (please write them in)
Swimming
Wildlife observation
Other nature study
Landscape
Photography
Fishing
Horseback riding
Bicycling
Sunbathing
Picnicking
Running/jogging
Backpacking
Kayaking/canoeing
Driving vehicles/ motorcycles off-highway
Just relaxing
Tubing
Winter play

____

17. Of the activities you indicated, which ones would you consider to be your primary and secondary activities while recreating at (location) this past summer? In other words, what is your most important activity and your second most important activity? **[Use the same wording as above.]**

Primary Activity: ______________________

Secondary Activity: ______________________

18. Let me read to you some types of facilities and services. Please tell me how important each of them was to your decision to visit Lake Aloha/Capels/Silver/Echo Lake**? [Read the choices first then the facility or service.]**

Facility or Service	Not at All Important	Somewhat Important	Moderately Important	Extremely Important
Developed Campgrounds	1	2	3	4
2-Wheel Drive Vehicle Access	1	2	3	4
Developed Swimming/Beach Areas	1	2	3	4
Picnic Facilities	1	2	3	4
Boat Launch Ramps	1	2	3	4
Off Highway Vehicle (OHV) Trails	1	2	3	4
Constant Water Level in Lakes	1	2	3	4
Other Facility or Service (Specify) ______	1	2	3	4

19. How important were the following locations in your decision to visit Lake Aloha/Capels/Silver/Echo Lake? **[Read the choices first then the location.]**

Location	Not at All Important	Somewhat Important	Moderately Important	Extremely Important
Reservoirs, Lakes, and Ponds	1	2	3	4
Non-wilderness Forested Area	1	2	3	4
Rivers or Streams	1	2	3	4
Desolation Wilderness Area	1	2	3	4
Other Areas: Specify________________________	1	2	3	4

Section 4: ABOUT YOU AND YOUR HOUSEHOLD

These last few questions are for statistical purposes only. All of your answers will be kept strictly confidential. They will be combined with responses of other people who complete the survey and only reported as averages.

20. How many people live in your household? _______ PERSONS **[IF ONLY THIS PERSON IN THE HOUSEHOLD MARK 1] [IF MORE THAN ONE ASK:]**

20a. Of these household members, how many are under the age of 18 years old? _______PERSONS

21, Do you have a disability? 1 YES 2 NO

22. In what year were you born? ______

23. With which cultural or ethnic group do you most closely identify?

1 Asian or Pacific Islander
2 Black/African American
3 Hispanic
4 Native American or Alaskan Native
5 White, not of Hispanic origin
6 Other ____________________________

24. Which category best describes the highest education level that you have completed?

1 High school not completed
2 High school graduate
3 Some college
4 College graduate
5 Graduate school or professional degree

25. Which category best describes your annual household income? That is the combined income of all persons living in your household.

1 Under $10,000
2 $10,000-$19,999
3 $20,000-$29,999
4 $30,000-$39,999
5 $40,000-$49,999
6 $50,000-$59,999
7 $60,000-$79,999
8 $80,000-$99,999
9 $100,000-$200,000
10 More than $200,000

26. We will provide you with a $10 payment if you complete the telephone survey after you return home. The payment will be mailed to your address after we have sent you photos of the lakes so we can ask you about the lakes at different lake levels. Can we count on your participation in this survey?

1 ☐ Yes
2 ☐ No [attempt to get their permission with a second try, then say thanks]

(If **YES**, ask :)

What is your home phone number and area code?______________________________

What days of the week are best for us to reach you?
__________;____________;________________________
[Ask for 3 different days]

What times of the day are best for us to reach you? **[Ask for 3 different times]**
__________; __________;______________

Or range of time? From ________________ to ________________________

We will mail you a brochure that shows pictures of the 4 lakes at different water levels. To what address should we send the brochure?

Name ____

Street Address or P.O. Box? ____

City ____

State ____

Zip ____

Thanks for helping us with this important study. We will be mailing you the color brochure and contacting you to get your impressions of the lake levels after your return to your home. Please take a few minutes to read the brochure when you receive it, and have it near the phone when we call. It will be helpful to you in answering the questions. Enjoy your visit.