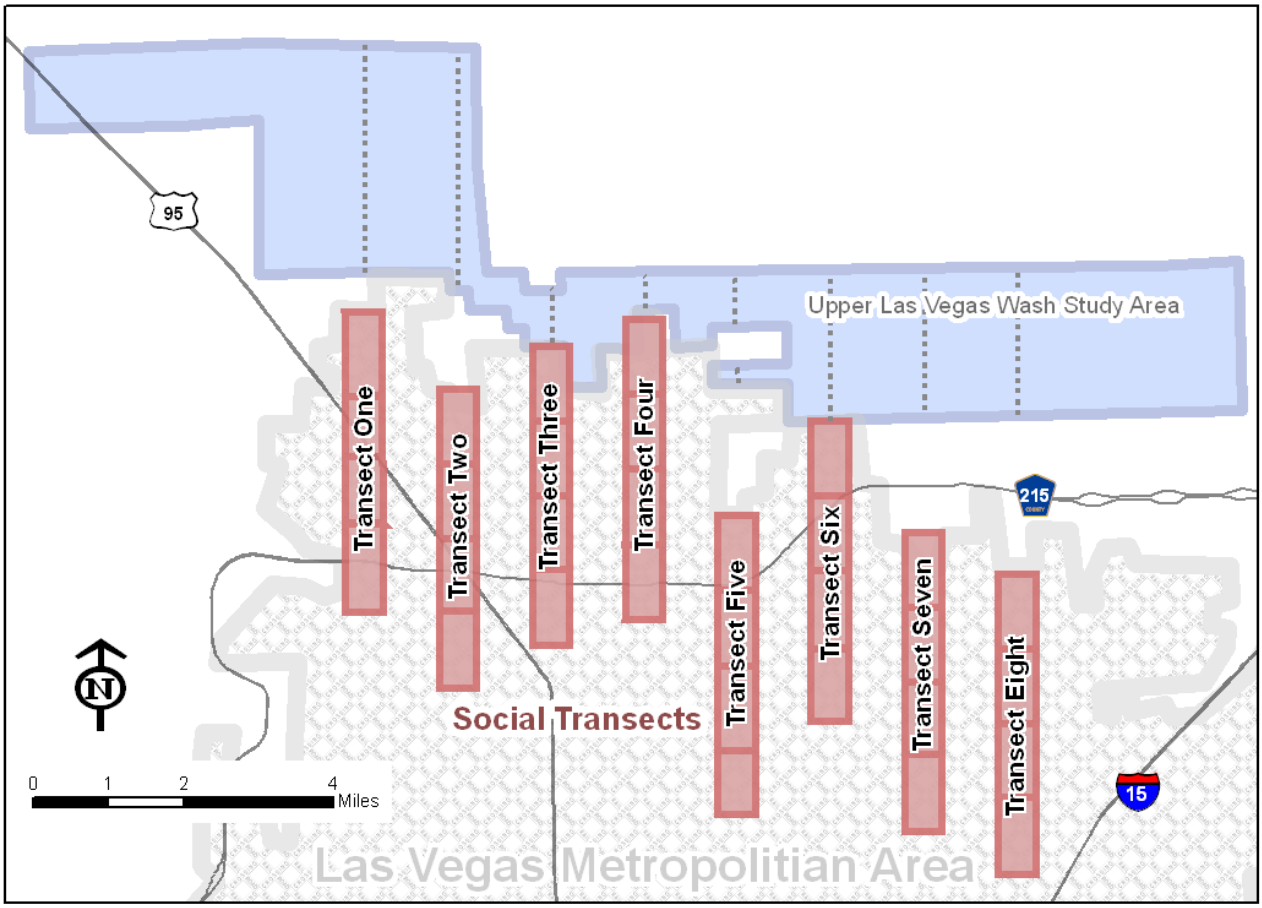
B. Collections of Information Employing Statistical Methods

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method to be used. Data on the number of entities (e.g., establishments, State and local government units, households, or persons) in the universe covered by the collection and in the corresponding sample are to be provided in tabular form for the universe as a whole and for each of the strata in the proposed sample. Indicate expected response rates for the collection as a whole. If the collection had been conducted previously, include the actual response rate achieved during the last collection.

The target population for the social survey is all adult residents living in households located within an area extending four miles south of the portion of the Upper Las Vegas Wash that is the focus of this project. Estimates based on aerial photoimagery of the project area indicate that in May 2005 approximately 20,000 residential households were located within the areas of residential development encompassed by this area. Rapid residential growth during the time since those images were produced suggests that the number of households in the areas defined by those transects is now likely in excess of 25,000 – 30,000. The precise number of households comprising the target population will not be known until approximately December 2007 when residential property records maintained by the Clark County Assessor's Office will be accessed. Those comprehensive, up-to-date lists of residential properties will include information on the spatial coordinates of each residential property, along with physical addresses and mailing addresses (if different from physical address) for each household within the sampling frame. A stratified probability sample of 1,000 households will be drawn from this universe, as outlined below.

An understanding of the socio-economic characteristics of residents in conjunction with their spatial proximity to the wash will aid in our understanding of the ecological disturbance impacts, and will assist the BLM in implementing protective actions in the future. In order to obtain the required information from appropriate residents, a sampling design that will capture variation in spatial proximity to the wash is needed. For the purposes of consistency, continuity, and accuracy across multiple components of this research the same linear transects established to determine the spatial attributes of environmental disturbance fronts will be used to define the residential areas from which we will draw representative samples of local residents. The line transects, which have a north/south orientation, will be extended further south to incorporate areas where urban development is present and occurring in both the Las Vegas and North Las Vegas municipalities. Due to the relatively large size of the study area, thirteen transects were created to examine the spatial attributes of disturbance fronts. However, at present virtually all of the residential development occurring in this area is located south of the central part of the study area, which is covered by eight of the thirteen original transects. Therefore, the two transects located furthest to the east and the three transects located furthest to the west will not be used when identifying residential areas for inclusion in the social survey, given that the residential development in these areas is sparse at best. This enables the sampling frame (e.g. list of residential households eligible for inclusion in the sample) to be created from areas that are defined by the remaining eight transects

The sample will focus on residents of households located within one quarter mile to either side (east or west) of each of eight designated transect lines. For the purpose of the social survey, the beginning of each transect will occur congruent with the closest developed area to the Upper Las Vegas Wash itself. Each of the transect corridors will have a fixed length extending four miles south, since to date no urban development has occurred in areas located north of the wash. Therefore, each of the eight transects will encompass a two square mile area (4 miles long by 0.5 miles wide), with the total sampled area encompassing 16 square miles. The configuration of these sampling transects is depicted below.



The total sample size will be 1000, with 125 residents sampled from each of the 8 transects using a stratified random sampling procedure. Each of the eight transects will be divided into four onemile long segments. Fifty households will be randomly sampled for participation in the survey from the eight transect segments located within one mile of the wash; 25 households will be selected from each of the other transect segments. This approach will produce a sample that exhibits the following spatial distribution within the overall analysis area:

	Transect One	Transect Two	Transect Three	Transect Four	Transect Five	Transect Six	Transect Seven	Transect Eight	
Strata 1 (< 1 mile south of Wash)	50	50	50	50	50	50	50	50	S1 = 400
Strata 2 (1-2 miles south of Wash)	25	25	25	25	25	25	25	25	S2 = 200
Strata 3 (2-3 miles south of Wash)	25	25	25	25	25	25	25	25	S3 = 200
Strata 4 (3-4 miles South of Wash)	25	25	25	25	25	25	25	25	S4 = 200
TOTAL BY TRANSECT	125	125	125	125	125	125	125	125	TOTAL N = 1000

This sampling strategy will enable the recording of four different spatial gradients extending south from the wash, totaling 400 possible responses from the segments located nearest to the wash and 200 possible respondents from each of the other three gradient categories located farther from the Wash. In addition to this categorical breakdown of the residential location of each of the survey respondents, a more precise measure of linear distance to the wash will be calculated using the exact spatial location of each household sampled.

Survey administration procedures outlined below are expected to produce an overall response rate of no less than 50%-60%.

2. Describe the procedures for the collection of information including:

***Statistical methodology for stratification and sample selection,**
***Estimation procedure,**
***Degree of accuracy needed for the purpose described in the justification,**

***Unusual problems requiring specialized sampling procedures, and**
***Any use of periodic (less frequent than annual) data collection cycles to reduce burden.**

The procedures for sample selection are discussed above in item B-1. The data collection process will consist of a multi-wave mail survey process following the principles outlined by Dillman (Dillman, D.A., 2007. *Mail and Internet Surveys: The Tailored Design Method*). . The procedural protocol for this mail survey methodology includes the following: (1) a prenotification letter sent approximately two weeks in advance of survey mailing; (2) an initial mailing of the survey packet including an explanatory cover letter, booklet-format questionnaire and postage-paid return envelope; (3) a post-card reminder sent one week after the survey packet mailing that thanks those who have responded and reminds those who have not yet responded to do so; (4) a second mailing of a survey packet (cover letter, questionnaire and return envelope) to non-respondents, sent 3 weeks after the first packet was mailed; and (5) a final contact and survey packet mailing to all remaining non-respondents, sent 4 weeks after the second packet was mailed.

The goal of the analytical and estimation procedures is not to describe the characteristics of existing residential populations located within residential areas proximate to the Upper Las Vegas Wash analysis area. Rather, the goal is to produce statistical estimates of the relationships between social and demographic characteristics of residents in those proximate neighborhoods, levels of awareness and patterns of use related to the Wash analysis area, levels of concern about and attachment to the Wash environment, residents' attitudes and preferences regarding future use and development of the analysis area, and measures of environmental disturbance within the analysis area. The accuracy of sample-based estimates is influenced both by sample size and by the variance that exists within the target population for specific variables of interest. Because the variance of key variables is unknown in advance of data collection, it is not possible to determine with precision the degree of accuracy that will be produced for each individual variable measured by questions included in the survey. However, an approximation of the amount of sampling error that would be associated with a variable exhibiting a binomial distribution can be ascertained for various sample sizes using readily available statistical tables. For example, assuming 600 responses (e.g., an original sample size of 1,000, with a 60% survey response rate) and a 50/50 response distribution to a binomial, the estimated sampling error at the 95% confidence interval would be +/- 4.1%. Sampling error would decline as response distributions become more skewed. Given this, the expected number of cases available for analysis (500-600 responses) is sufficiently large to produce highly precise estimates of the associations between variables that will be generated through bivariate and multivariate statistical procedures. Also, because the primary analytic goal related to the social survey data will be to test the nature and strength of relationships between variables rather than to provide an accurate description of overall population characteristics, the precision of sample-based estimates is less critical than might otherwise be the case.

The examination of relationships between the social and demographic attributes of humans living in adjoining residential areas and indicators of environmental disturbance is to a large degree exploratory, since such analyses have not been addressed either theoretically or empirically in previous research. As a result, the analysis will examine a host of potential relationships between measures of sociodemographic characteristics of survey respondents, measures of attitudes and behaviors related to the Wash environment, and biophysical indicators of environmental disturbance. Bivariate analyses will be conducted using statistical procedures appropriate to the level of measurement for specific variables of interest. For example, a relationship between two categorical variables involving measurement at the nominal or ordinal levels (e.g., #18, length of residence in the neighborhood; and question #2, degree of familiarity with the Upper Las Vegas Wash area) would be assessed using simple crosstabulation techniques. In this instance, the presence or absence of a systematic association between the two variables would be assessed using the Pearson's Chi-Square statistic, while the strength of any observed association would be assessed using a statistic appropriate for comparison of two ordinal variables, such as Tau *c* or *gamma*. Pearson's correlation coefficient (*r*) will be used to assess the magnitude and statistical significance of bivariate correlations when both variables are measured on a metric (interval or ratio scale). For example, Pearson's correlation would be an appropriate statistical measure when examining the relationship between respondent age (question #15) and a composite, additive index measuring level of attachment to the Upper Las Vegas Wash environment that might be created by summing responses to questions 13a through 13g. In all cases, the presence of a statistically significant association will be determined using conventional ($p \leq .05$) probability criteria for assessing the potential for Type I error, involving inappropriate rejection of the null hypothesis that no relationship exists between variables.

Multivariate analyses designed to assess the joint association of multiple independent or predictor variables with a dependent variable will utilize ordinary least-squares (OLS) multiple regression analysis when the dependent variable is measured quantitatively (e.g., in a manner that corresponds to an interval or ratio scale). Logistic regression and logit analysis will be used when the dependent variable is measured as a binomial.

For example, it would be reasonable to analyze the influence of multiple independent variables on residents' propensity to report their observation of environmentally depreciative activities within the Wash area. This dependent variable could be measured by creating a summated rating scale/index involving summed responses to questions #9a through #9g. If statistical item analysis procedures verify that all seven of these items exhibit high inter-item correlations and that the summated index exhibits high reliability (as measured by Cronbach's *alpha* statistic), the resulting dependent variable would be a metric assuming integer values ranging from 7 to 28. An ordinary least-squares multiple regression analysis examining the potential influence of various socio-demographic characteristics on the propensity to report depreciative activity might then be modeled as follows:

$Y' = A + B_1$ (distance of residence from Wash) + B_2 (respondent age) + B_3 (respondent sex) + B_4 (respondent education) + B_5 (race) + B_6 (household income)

where Y' represents propensity to report observation of depreciative behavior; A represents the Y intercept in the linear regression equation, and B_1, B_2, etc. are regression coefficients representing the partial associations of each independent variable with the dependent variable. In this instance the race variable (originally measured as a multinomial nominal variable) would either need to be recoded as a dichotomous variable (e.g., white/other) or broken into a series of dichotomous dummy variables allowing discrete measurement of the partial associations involving affiliation with each of several racial identities, in order to meet the quantitative measurement assumptions associated with ordinary least-squares regression procedures.

Similarly, a logistic regression model would be appropriate when the dependent or response variable is binary. The general form of the logistic regression model is as follows:

$\text{Logit}(\pi) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots. \beta_k X_k$

Where π represents the binary dependent variable and β_1, β_2, β_3, etc. provide estimates of the effect of a unit increase in values of independent variables on the odds that the dependent variable will assume a value of 1 rather than 0. The logistic regression model will be utilized when the dependent variable is binary or can be appropriately collapsed from multiple categories into a dichotomous or binary variable, and when the independent variables are either quantitative or are categorical measures that can be measured as dichotomized dummy variables. Logit modeling, an extension of the logistic regression procedure, will be utilized when the dependent variable is binary and some or all of the independent variables are categorical.

3. Describe methods to maximize response rates and to deal with issues of non-response. The accuracy and reliability of information collected must be shown to be adequate for intended uses. For collections based on sampling, a special justification must be provided for any collection that will not yield "reliable" data that can be generalized to the universe studied.

Non-response problems will be minimized through use of the multiple-wave mail survey methodology described above. In addition, we will establish contact with homeowners associations in advance of survey implementation, and solicit their assistance in publicizing the survey to encourage citizen response. Cover letters and survey instructions will describe the purpose and importance of the study and will clearly state that responses will remain confidential. Questionnaires will be printed in an attractive and easy-to-use pamphlet format to enhance response. In combination, these techniques are expected to produce a survey response rate of approximately 50%-60%.

To assess potential for non-response bias, a brief (approximately 5 minutes) follow-up telephone survey of 100 randomly selected members of the original sample who do not respond to the mail survey will be conducted. Those contacted by telephone will be asked to provide answers to a small subset of the questions included in the mail questionnaire. Specific questions identified for measurement in this process include five measures of socio-demographic characteristics (question 15 – respondent age; question 18 – length of residence in neighborhood; question 21 – household size; question 23 – ethnicity; question 24 – race) and three measures of respondent activity patterns and attitudes (question 3 – engagement in activities within Upper Las Vegas Wash analysis area; question 9b – potential to report dumping of solid waste; question 13a – importance of the natural environment provided by the Upper Las Vegas Wash area). For each of these questions appropriate statistical techniques (analysis of variance; chi-square tests of independence) will be used to determine whether and to what extent there are differences in the response patterns obtained from mail survey respondents and those obtained from non-respondents who are contacted by telephone.

4. Describe any tests of procedures or methods to be undertaken. Testing is encouraged as an effective means of refining collections of information to minimize burden and improve utility. Tests must be approved if they call for answers to identical questions from 10 or more respondents. A proposed test or set of tests may be submitted for approval separately or in combination with the main collection of information.

Earlier drafts of the survey had extensive input from the team of professional peers associated with this project. This project team has expertise in the areas of environmental sociology and survey design. Additional changes were incorporated based on input provided by Department of Interior personnel. Apart from any further revisions required by OMB, the survey is in its final form and will be the one administered.

5. Provide the name and telephone number of individuals consulted on statistical aspects of the design and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

The Utah State University project team members who will have lead responsibility for survey data collection and statistical analysis of those data are Dr. Richard Krannich and Dr. Thomas C. Edwards, Jr. Dr. Krannich, Professor of Sociology and Head of the Department of Sociology, Social Work and Anthropology, can be reached at his office, (435) 797-1241. Dr. Edwards, Research Ecologist, USGS Biological Resources, College of Natural Resources, can be reached at (435) 797-2529.