FINAL REPORT

CACHE COUNTY COMMUNITY SURVEY OF FUTURE LANDFILL ALTERNATIVES

A Study Conducted for
The City of Logan, Utah
The County Service Area Number 1
And HDR Engineering

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Executive Summary

Overview

This report summarizes the results of a survey of Cache County residents conducted by scientists at Utah State University in the spring of 2003.

The purpose of this survey was to gather scientific information regarding the concerns, perceptions, and preferences of Cache County adults related to various future landfill siting options. The survey was conducted at the request of local officials, the Countywide Service District, and various advisory committees established to make recommendations on a future Cache County landfill site.

The specific objectives that guided the design of the survey project included the following:

- To clarify the relative importance of various decision-making criteria to a representative sample of County adults.
- To determine the major concerns of Cache County adults related to a future landfill site.
- To identify which specific landfill sites are favored by Cache County adults.
- To solicit citizen reactions to various options that could be taken to mitigate negative impacts associated with a landfill, and possible compensation programs for residents of communities near a future landfill site.
- To assign economic values to the perceived costs and benefits of various landfill options, including an analysis of whether sufficient revenues can be generated from the broader county population to help compensate residents in affected communities.

Throughout the study, a major emphasis was placed on comparing the values, priorities, and concerns of three major groups of county residents. These groups were:

- Residents in the communities of Clarkston, Newton and Cache Junction (CNCJ).
- Residents in the city of Logan.
- Residents in the remaining areas of Cache County.

The CNCJ group was singled out for extensive sampling because all three of the proposed in-county landfill sites are located within a few miles of those communities in Northwestern Cache County.

Methods

Using extensive input from county residents, local government officials, and other interested parties, a mail survey instrument was developed in the fall of 2003. This instrument was then sent to 960 households that were randomly selected from a list of all residential addresses that currently pay for waste disposal in Cache County. The sample was stratified to include equal numbers of households in each of the three groups listed above.

The first surveys were mailed out in mid-January, 2003. Followup mailings were made through March, 2003. To ensure high response rates, a "drop-off, pick-up" technique involving personal visits to nonrespondent households was also employed in Logan and Cache County during March.

The research team received useable responses from over 66 percent of eligible respondent households. This response rate is at or above generally accepted standards for scientific survey research of this type. The results presented below are statistically reliable within +/- 3 percentage points.

Because the survey project was designed to oversample residents in the CNCJ and Logan City areas, numeric weights were assigned to each case that allows us to statistically estimate the characteristics and views of the overall population of adults living in Cache County. In the summary tables, we report separate results for each of the three study areas, and then report a weighted total for the combined sample of Cache County adults.

An analysis of demographic characteristics of the respondents in each of the samples (and in the combined, weighted sample) indicates that the sample is generally representative of the Cache County adult population in terms of gender, homeownership, and other characteristics. The sample does slightly over-represent older adults and those with higher levels of formal education.

In addition to the Community Survey, the researchers administered a brief version of the questionnaire to a sample of 14 local officials (these included members of the County Council, Logan City Council, and Mayors from 8 area municipalities).

Results

Most People are Aware of the Landfill Debate

The survey found that over two-thirds of Cache County adults have heard about the issues surrounding the future Cache County landfill options. Most of these adults get their information from newspapers. While many have heard about the landfill debate, only 31 percent of adults report feeling they are somewhat or very familiar with these issues.

Not surprisingly, adults in the Clarkston, Newton and Cache Junction communities are much more aware of and familiar with the future county landfill debate.

Protecting the Environment and Minimizing Costs are Top Priorities

The survey presented respondents with a set of 7 potential issues or criteria that might be considered when making a landfill siting decision. They were then asked to allocate $100 among these issues, with a reminder that "the amount you allocate reflects the relative weight you think decision-makers should place on each issue."

The results are summarized in Figure 1. While all of the issues received some priority from most adults, there is a clear ranking of the top three issues. On average, Cache County adults allocated $26 to Environmental Protection. They then allocated $18 to the issue of minimizing costs to households. The third most important issue (which received $14) was selecting a site that was isolated (with the fewest people living nearby).

Figure 1: Importance of Various Issues To Landfill Siting Decision

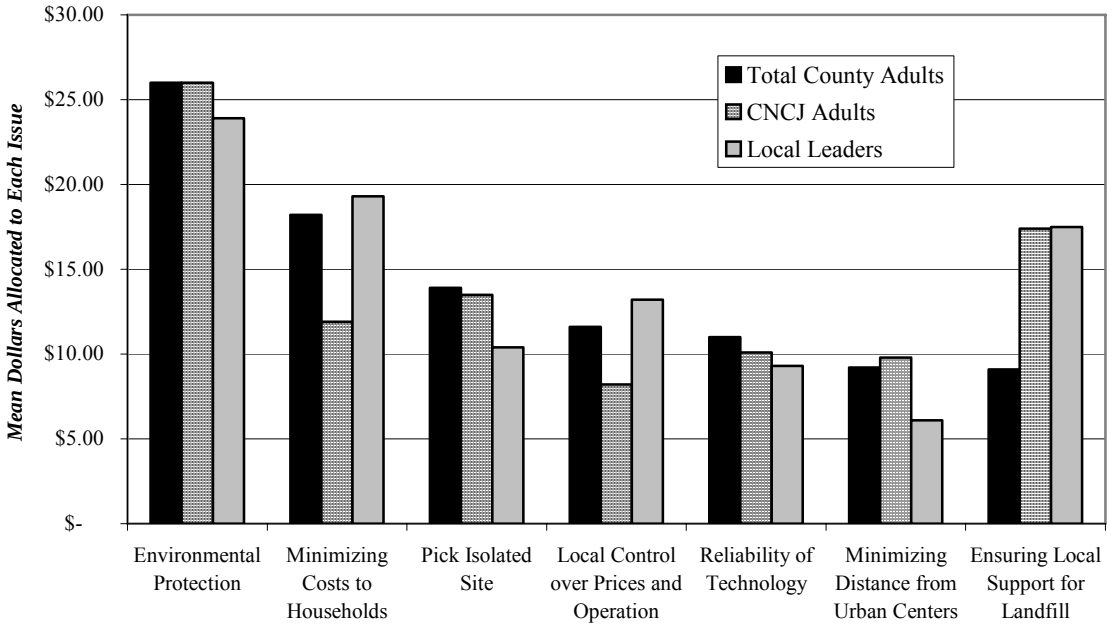


Figure 1 also presents the mean allocations from the subsample of CNCJ adults (who are a very small proportion of the overall county adult sample) and for the local government leaders who participated in a supplemental survey. Overall, the priority placed on most issues is similar across all three samples. The main differences relate to the increased importance placed by CNCJ adults and local leaders on ensuring local support from residents near any future facility. CNCJ adults are also less likely to prioritize costs to households than the other samples.

Residents are Most Concerned about Water Quality, Nuisances, and Loss of Habitat

The survey asked respondents to indicate how concerned they were about 12 different potential impacts that a future landfill might have on the area. Figure 2 illustrates the proportion of respondents who listed each concern as (a) their most important concern; and (b) as a serious concern.

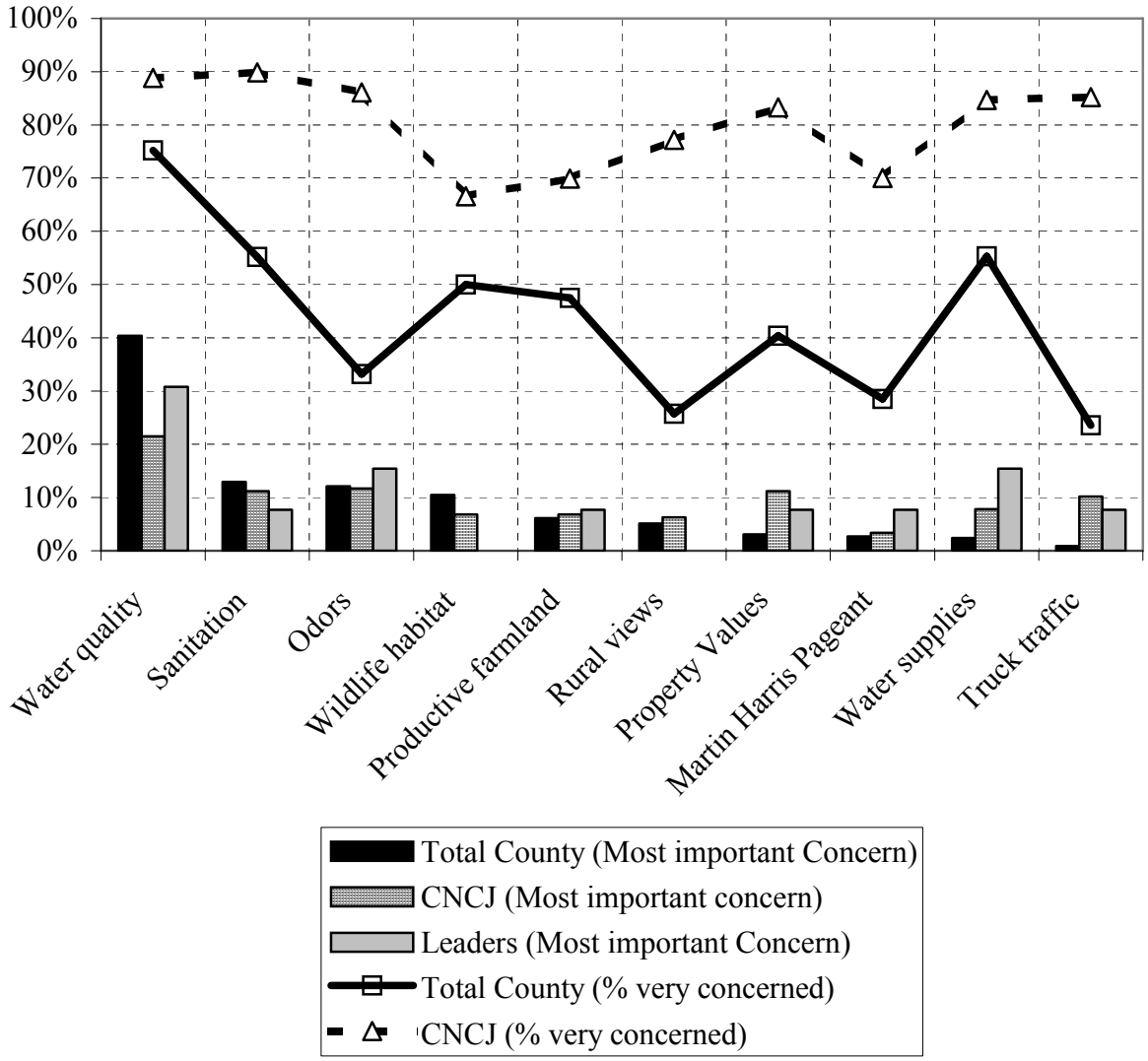
The results suggest that water quality impacts are clearly the most notable concern among most Cache County adults, with over 40 percent reporting this as their most important concern and over 75 percent listing it as a serious concern. Worries about unsanitary conditions, unpleasant odors, and the loss of wildlife habitat were each listed by over 10 percent of respondents as their most important concern. More than half had serious concerns about impacts of a landfill on local water supplies.

In general, the CNCJ adults had much higher levels of concern for all the potential types of impacts a landfill might generate. However, their top concern was also water quality, with

sanitation, odors, property values and truck traffic being listed as top concerns by over 10 percent of CNCJ adults.

Local leaders had many of the same concerns, though they placed slightly less emphasis on water quality, and more emphasis on odors, water supplies, truck traffic, and protecting property values and the Martin Harris pageant in Clarkston.

Figure 2: Levels of Concern about Potential Impacts of a Future Landfill



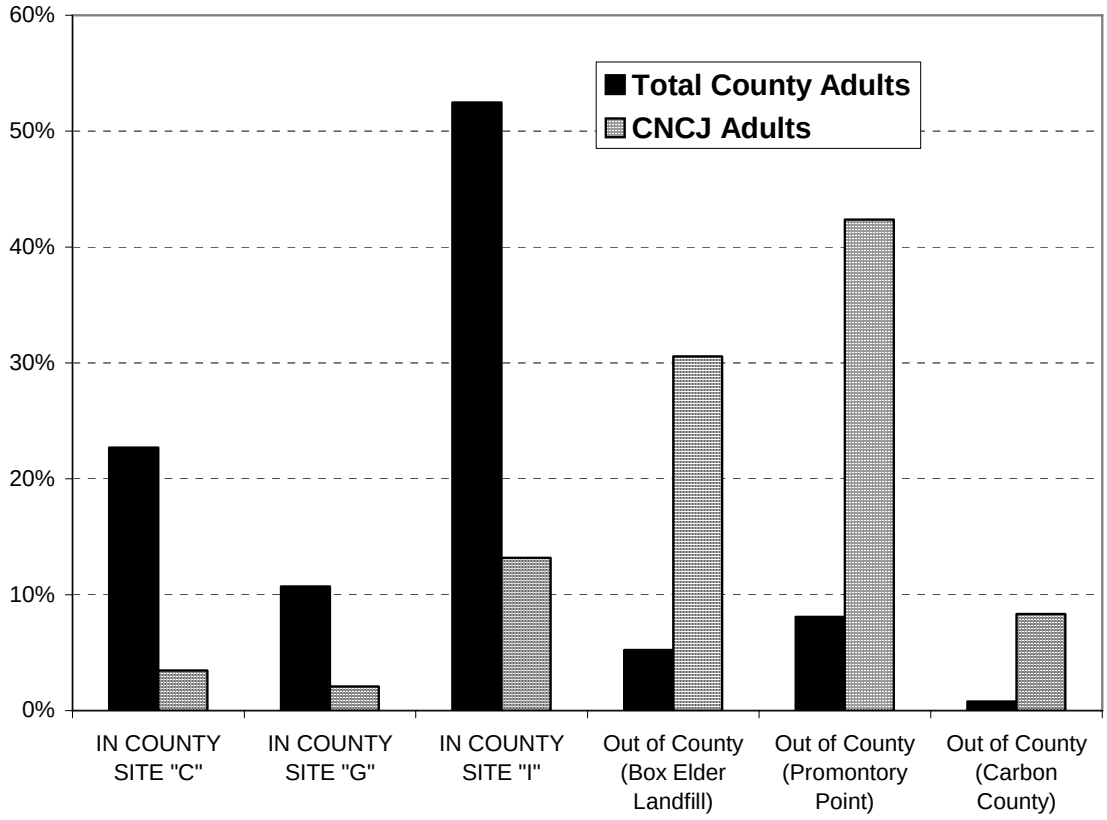
Most County Adults Prefer In-County Options, CNCJ Adults Prefer Out-of-County

The survey presented respondents with a description of the 6 major options for future county waste disposal. Three of these sites were "in-county" locations (all within a few miles of the CNCJ area). Two other options were in Box Elder County, and a final option was a private landfill in Carbon County.

The proportions of county adults (and of the CNCJ adult subsample) who favor each option are illustrated in Figure 3. The overwhelming preferences of most county adults is to place the future landfill at Site "I" (South of Newton and Cache Junction), with a significant minority in favor of Site "C". The favored out-of-county option for the general adult sample is the proposed Promontory Point landfill, closely followed by the Box Elder County Municipal Landfill.

Among the CNCJ subsample, there is a clear preference for the out-of-county options (either of the two Box Elder county alternatives). Among the 15 percent of CNCJ respondents that preferred the in-county option, Site "I" also emerged as their first choice.

Figure 3. Percent of Respondents Favoring Various Specific Landfill Site Options.

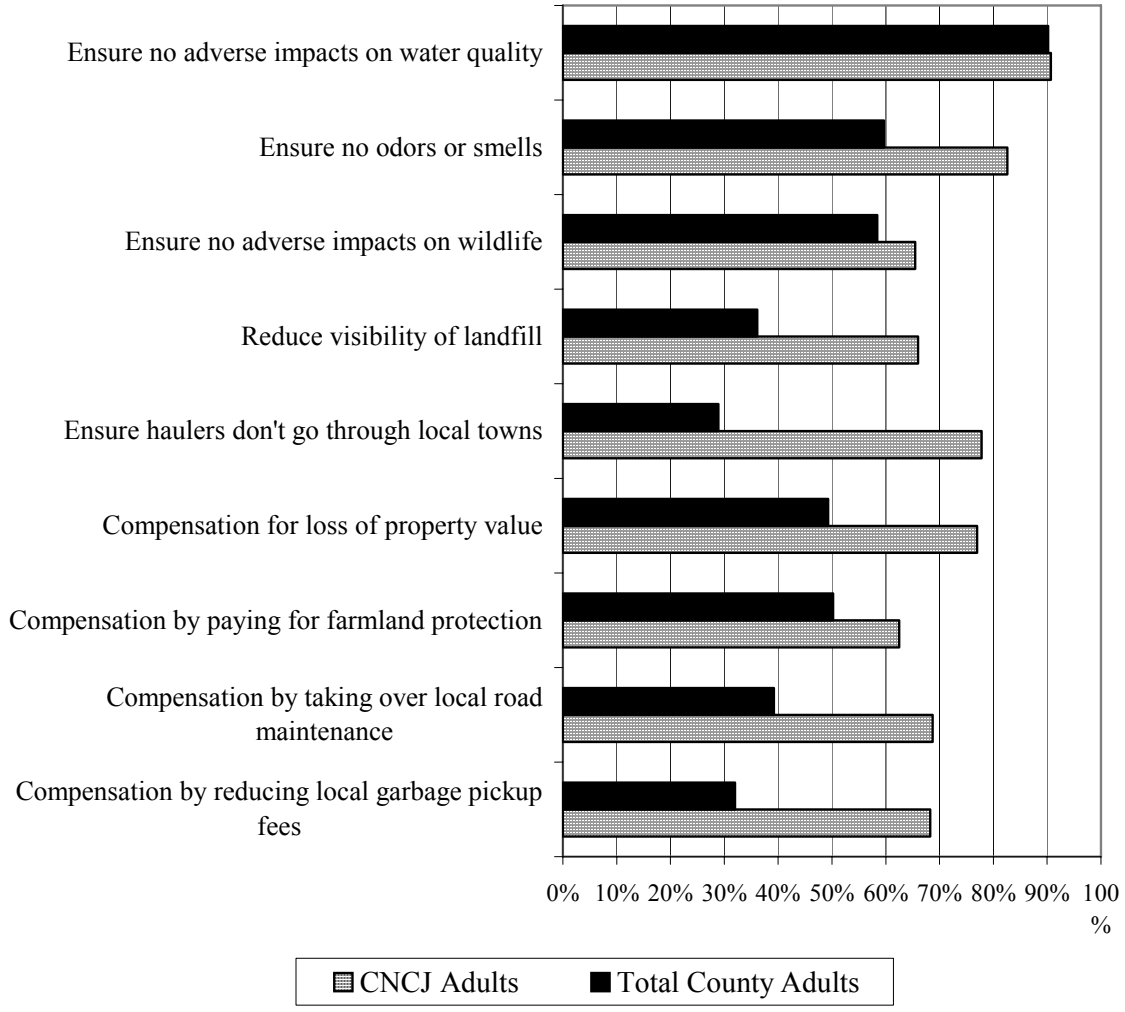


Most Residents Support Mitigation of Impacts and Compensation for Local Residents

The survey asked respondents to consider whether or not the county should pay extra to mitigate potential negative impacts associated with a landfill by improving the design and operation of the facility. It also asked whether they would support various types of possible compensation for residents living near a future landfill site. The proportion of respondents who ranked particular mitigation or compensation options as a high priority is illustrated in Figure 4.

The results indicate that nearly all county adults would support spending additional funds (beyond what is required by state and federal regulation) to protect water quality. A clear majority also supports efforts to design the facility in a way to minimize noxious odors and adverse impacts on wildlife. Roughly half of county adults agreed that local residents should be compensated for having to live near a landfill, with the highest levels of support for compensation programs that would pay landowners to protect farmland and wildlife habitat, and those that would compensate local property owners for documented losses in property value.

Figure 4. Percent of Respondents Supporting Each Mitigation or Compensation Option.



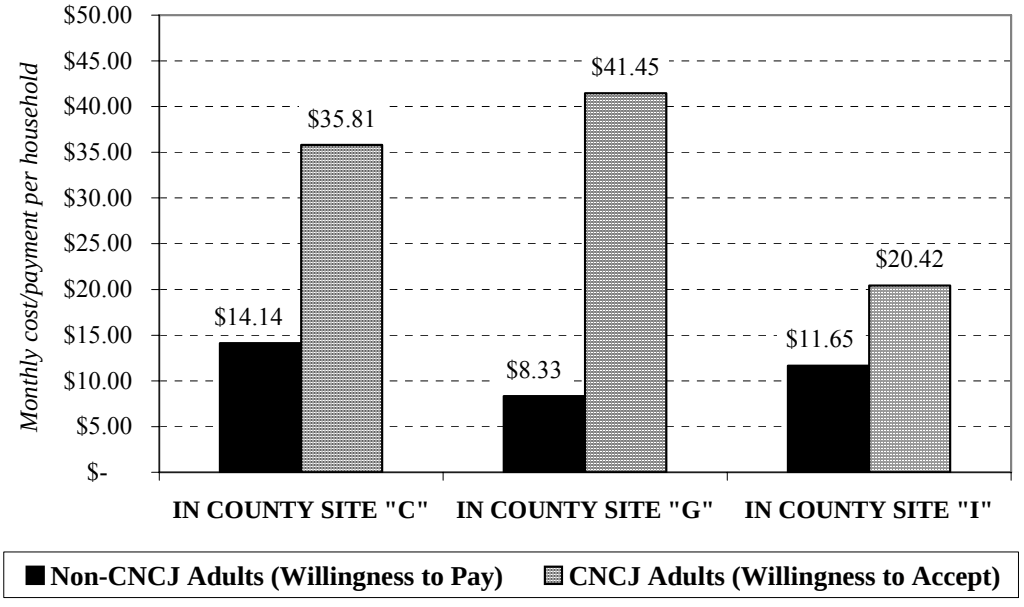
In the CNCJ area (where most of the affected landowners will live), there was consistently higher levels of support for all of the mitigation and compensation options. However, CNCJ adults were most supportive of spending money to design the landfill to protect water quality, to minimize odors, and to ensure that truck traffic does not go through towns. When presented with several potential compensation options, the CNCJ respondents appear to favor compensation for local property owners for loss of property value.

Cache County Households Appear Capable of Generating Revenue for Compensation

The economic valuation exercise was designed to determine how much individuals might be willing to pay (on a monthly basis) to ensure that their preferred landfill site option is selected. In the case of the CNCJ subsample, the analysis also addresses how much individuals might need to be paid as compensation for siting a landfill in their community (to return them to the same level of utility as before).

The economic team included four blocks of questions in the survey instrument that help uncover the implicit economic values associated with landfill siting preferences. These blocks of questions presented respondents with pairs of alternative scenarios for a future landfill, and asked them to state their preferences by choosing one of the two alternatives. Each alternative included a landfill site location, an estimated additional monthly cost to a typical household, and various levels of additional "compensation" for residents living near the landfill. Eight different versions of these questions were randomly included in questionnaires to allow sufficient variation for the econometric analysis.

Analysis of the results confirm that most Cache County adults prefer an in-county site, while adults in the CNCJ area have a strong preference for an out-of-county site. The economic modeling also allowed the estimation of the approximate monthly costs that non-CNCJ households are "willing to pay" to ensure that a particular in-county site is selected. The results are shown in Figure 3. Among the in-county sites, there appears to be a higher willingness of non-CNCJ adults to pay for siting the landfill in sites C or I.

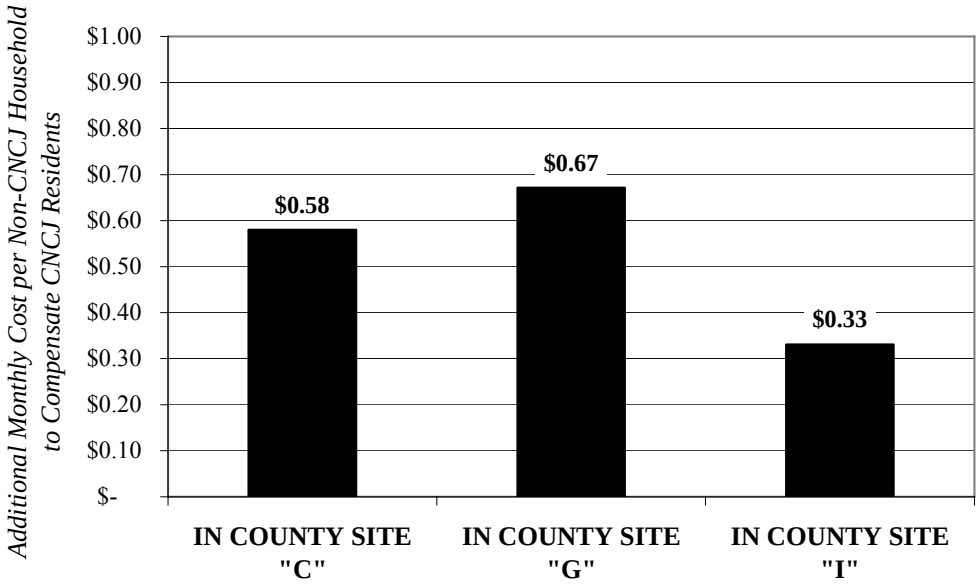


The results also allow the calculation of the monthly level of compensation (or "willingness to accept payment" that CNCJ adults would require before they would be at the same level of utility as they would be given an out-of-county site location. The lower level of payment that would be required for Site I in Figure 4 is a strong indicator that this is the least offensive in-county site for the CNCJ respondents.

Because there are only 439 households in the CNCJ area (and 27,104 households in the rest of the county), it appears possible for non-CNCJ households to potentially compensate the CNCJ communities at a level that would make the typical CNCJ household whole. This compensation could either take the form of strictly a monetary payment, or a combination of monetary payment and the provision of new public services.

The amount of additional monthly cost per non-CNCJ household that would raise enough revenue to compensate CNCJ households is listed for each of the three in-county sites in Figure 5. Due to the large difference in number of households across the two communities, the cost of compensation to the typical non-CNCJ household would likely equal something less than $1.00 per month. The lowest estimated monthly cost is associated with site I.

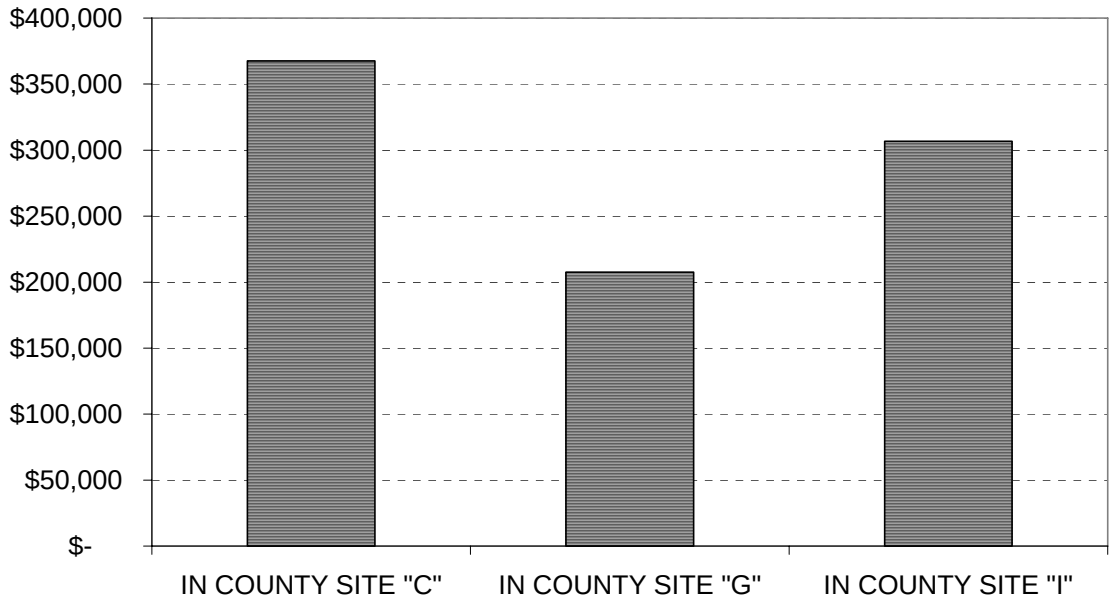
Figure 5. Additional Monthly Cost to Non-CNCJ Households to Compensate CNCJ households.



By virtue of passing a simple compensation test, the siting of an in-county landfill may result in positive net benefits for Cache County residents in the aggregate relative to the selection of either of the two out-of-county sites presently under consideration. We say "may" because a necessary condition for positive net benefits associated with the selection of an in-county site is that the actual cost of building a new in-county landfill be lower than the corresponding cost of shipping the county's waste to the least-costly of the two out-of-county sites presently under consideration.

If this necessary condition is met, then our results suggest that positive net benefits would indeed result in aggregate for Cache County residents by selecting one of three potential in-county landfill sites. An estimate of the value of the net benefits (the difference between what people outside the CNCJ area are willing to pay, minus the cost of compensation for CNCJ residents) is illustrated in Figure 6 below. It is apparent that Site C has the highest estimated net economic benefit to the county (roughly $370,000), with Site I ranked second (roughly $300,000).

Estimated Net Economic Benefit (After Compensation)
Associated with In-County Sites



Section 1:
Introduction and Background

1.a) Origins of the Project

This report summarizes the results of a survey of Cache County residents conducted by Utah State University in the spring of 2003. The purpose of this survey was to gather scientific information regarding the concerns, perceptions, and preferences of Cache County adults related to various future landfill siting options.

The survey was conducted at the request of the Cache Countywide Service District, though their principal contractor (HDR Engineering) which was retained to assist the community as it evaluates future landfill options. The survey was designed to help answer questions from members of two Advisory Committees that have been working with the local officials to develop a recommendation for future municipal waste disposal in the county. One of these committees (the Citizens Advisory Committee, or CAC) has members appointed by the Cache County Council and the City of Logan to represent the interests of the various municipalities in the Cache Valley. The other (the Technical Committee, or TC) consists of engineers, planners, and health department professionals with various types of expertise related to municipal waste disposal issues.

In the spring of 2002, these committees identified several possible future landfill sites located in Cache County that meet basic technical and environmental criteria for landfills. All three of these sites are in the Clarkston, Newton, and Cache Junction area in Northwestern Cache County. At the same time, the committees asked that options for shipping waste to 3 possible out-of-county landfills in Box Elder and Carbon counties also be evaluated. A technical and economic evaluation of all six possible sites have been conducted by HDR Associates and are expected to be released in the early summer, 2003.

This past fall, the CAC and TC requested that an independent team of Utah State University researchers collect information about the views and perspectives of Clarkston, Newton, Cache Junction, and other Cache County residents towards the various future landfill options. They want to use this citizen input as they weigh their various alternatives.

People who completed the survey questionnaire were told that their opinions were very important to the people who are going to be responsible for recommending the site of the future county landfill.

1.b) Objectives of the Project

The contract to conduct the community survey included six key objectives that guided the development of the survey instrument and the presentation of the results. These objectives were the result of extensive conversations between the principal investigators, the HDR Engineering staff, the Citizens Advisory and Technical Committees, and representatives from the City of Logan, Cache County, and other local municipalities. The objectives were as follows:

1. To assess how residents feel about the different options for future disposal of solid wastes generated in Cache County.

2. To clarify the relative importance assigned by county residents to the fiscal cost, local control, environmental protection, aesthetics, and other impacts associated with the various landfill options.

3. To assign economic values to the perceived benefits and costs of the various waste disposal options. This includes an assessment of the "willingness to pay" to ensure wastes are disposed of outside of local communities.
    a. A final analysis will assess whether sufficient revenues could be generated from residents in the non-siting area to potentially compensate residents in the affected communities.
    b. In addition, an assessment will be made to compare the preferences of all county residents between in- and out-of-county waste storage options.

4. To compare and contrast the values and priorities of county residents living in each of three areas:
    a. Logan City residents
    b. Residents of the Clarkston, Newton, and Cache Junction area (defined by zip codes)
    c. Residents of other county municipalities and residents of the remaining unincorporated areas of the county.

5. With regard to the views of the study area encompassing Cache Junction, Newton and Clarkston areas, the project would clarify the nature, intensity, and relative importance of local concerns regarding all three proposed landfill sites in this area, and would identify possible strategies to mitigate the most serious potential impacts.

6. To evaluate whether the values and priorities of local city and county officials regarding landfill siting have changed since the site selection process was begun in 1997.

1.c) Overview of Report

The remainder of this report describes the methodology used to collect the data, and presents the results of the study. The results are disaggregated to reflect responses from each of the three main target samples (the Clarkston/Newton area, Logan City, and the rest of Cache County). In addition, the estimated characteristics and views of the adult population in the entire county are presented.

Section 2:
Methodology

2.a) Developing the Survey Instrument

A fair amount of preliminary work was done prior to drafting a survey instrument. The research team browsed the landfill project website and read through recent newspaper articles regarding the proposed landfill in order to become familiar with the issue. They also reviewed recent social scientific literature regarding citizen concerns about and perceptions of landfills, and collected examples of previous survey instruments that have been used to collect similar data.

In addition, they held meetings with various individuals involved with the project in order to clarify objectives and receive feedback about what should be included in our survey. In September of 2002, the research team met with Mayor Doug Thompson and County Executive Lynn Lemon in order to review the objectives of our proposed research project. In October they toured the three in-county sites with Mayor Merv Thompson and Bill Olsen of Clarkston and discussed with them specific concerns that have been expressed by citizens of Clarkston and Newton. During this same period, research staff contacted community leaders in Logan, Clarkston, and Newton to obtain feedback about what they felt citizens' primary concerns were regarding the proposed landfill as well as to get ideas about what might be feasible compensation options to include in the "willingness to pay" portion of the questionnaire. In late October, team members accompanied the CAC and TC members on a bus tour of the three in-county sites and the Box Elder County landfill. During this trip, the team received input regarding the issues they felt should be addressed by our survey. Also in October, Taunya Jones

A first draft of the survey instrument was created and pre-tested in November of 2002. The research team met with 10 or so residents from Clarkston and Newton at the Clarkston City Hall and asked them to fill out the draft questionnaire. The participants were asked to identify questions that were particularly difficult to understand or answer, and were encouraged to provide suggestions regarding question wording, survey format, and survey length. A similarly pre-test was done with five Logan residents. The pre-test results provided important feedback about new issues to be included in the survey and helped clarify specific questions or wording that pre-test respondents found confusing. The final draft of the questionnaire was completed in December of 2002 and was presented to the CAC and TAC at public meetings for final review and approval.

2.b) Implementing the Survey

The research team implemented the mail survey in mid-January, 2003.

Initially, 960 total names were randomly sampled from lists of households provided by the Countywide Service District staff. The list reported included all residential addresses that currently pay for waste disposal in Cache County. The initial sample of 960 names represented three distinct subsamples of 320 each. The subsamples included:

1. Households in the Cache Junction, Clarkston, and Newton zipcode areas (84304, 84305, 84327)
2. Households in the Logan City zipcode (84321)
3. Households in the remaining areas of Cache County (all other zipcodes)

The survey design and mailing process followed the Tailored Design Method established by Dillman (2000). The first mailing was sent with a cover letter and prepaid business reply envelope to all 960 sampled households on January 10, 2003 and a reminder postcard was sent one week later. A second mailing including a cover letter, a business reply envelope, and another copy of the questionnaire was sent to 553 nonrespondents on January 31st and a second reminder postcard was sent one week after that. The two mailings produced just under 500 useable responses, or roughly a 55% response rate (67% in the Clarkston/Newton area; and 50% in Logan and the rest of Cache County).

The cover letter used in the mail survey instructed the recipients to have the adult who had the most recent birthday fill out the survey. This is done to ensure that the final sample retains the appropriate distribution of gender, age, and other characteristics relative to the underlying population.

To increase response rates and the representativeness of the samples, the research team initiated a drop-off/pick-up (DOPU) data collection effort in the Logan and Cache County sample areas on March 10th. The DOPU methodology involves an unannounced visit to the sampled nonrespondent household. During this visit an attempt is made to make personal contact with the adult that has had the most recent birthday. If no adult is home at the time of the first visit, up to two additional attempts are made at different times of day and days of the week. Once contact is made, the survey is left with this adult, and a time is scheduled for the research team to return to pick up the survey (usually within 24-48 hours). A bag is also provided to allow the respondent to leave the survey on their doorknob for easy pickup.

A total of 204 households who had not responded to the mail survey were randomly sampled from the list of all nonrespondents for the DOPU effort. This included 114 households in the Logan City zipcode area (84321). It also included 90 households in the broader Cache County area, 29 of which only had Post Office Box addresses (which precluded a personal visit to those homes).

During a 3 week period in March, DOPU field workers visited 176 households, and were successful in making personal contact with adult residents in 137 households (87 houses in Logan and 52 in the rest of Cache County). Of these, completed surveys were obtained from 98 households, and 39 refused to participate. Among the remaining homes, 1 could not be found from the mailing address, 6 were disqualified when it was determined that the residence was vacant, and 32 did not have an adult at home during three consecutive visits, 16 of whom were left surveys with a postage paid envelope to return.

Finally, a third mailing of the survey instrument was sent on March 3rd to the 46 of the sampled DOPU households. This included 30 that had either PO Box addresses or an address that could not be located, 16 that otherwise did not receive a survey. This third mailing included a cover letter, a final copy of the survey instrument, and a $2.00 bill to entice people to respond.

In addition to the 3 mailings, we returned surveys that were incomplete or had blank pages to respondents who appeared to have inadvertently skipped parts of the questionnaire. A total of 43 partial surveys were mailed back to respondents, and of those, 31 were completed and returned. In all of the remaining cases, the information we had from their first response was nearly complete and these are retained in the sample used in analysis.

2.c) Response Rates and Reliability

The response rates for the Community Survey project are summarized in Table 1 below. Of the 960 households included in our initial sample, 59 were disqualified (mainly when residential addresses were found to be vacant or unoccupied). This left an adjusted sample size of 901. Of those, 596 returned useable surveys, for an overall response rate of 66.1%. Breaking this percentage down by sample area, useable responses were obtained from 211 households in the Clarkston/Newton area, 198 surveys in Logan City, and 187 surveys in the remainder of Cache County. The response rates for these three areas are 67%, 69%, and 63% respectively.

Table 1. Summary of response rates, by community and overall.

Community	Initial Sample Size	Total Responses	Refusal	Disqualified	Adjusted Sample Size	Response Rate
Clarkston, Newton, and Cache Junction	320	211	3	5	315	67.0%
Logan City (84321 zipcode)	320	198	22	31	289	68.5%
Remainder of Cache County	320	187	15	23	297	63.0%
COMBINED	960	596	40	59	901	66.1%

The relatively high response rates reported above meet generally accepted standards for scientific survey research of this type. This is particularly true given the fact that the landfill siting issue has relatively low public visibility, salience or immediacy for many Cache County residents (outside of the Clarkston and Newton area).

Given the underlying size of the population and samples in each of the three study areas, we can compute an estimated sampling error that provides a range within which the descriptive statistics are reliable at the 95% confidence level (see Levy and Lemeshow, 1991). The results are shown in Table 2 below. In other words, if 50 percent of Logan residents in the sample agree with a statement, we are 95% confident that the true percentage of the entire Logan population is within plus or minus 3.5% of that total (or between 46.5% and 53.5%).

Table 2: Reliability of survey results as estimates of population characteristics.

	95% Confidence Interval if sample proportion is:		
Study area	50% of respondents	66% of respondents	80% of respondents
Clarkston, Newton and Cache Junction	+/- 3.1%	+/- 3.0%	+/- 2.5%
Logan City (84321 zipcode)	+/- 3.5%	+/- 3.3%	+/- 2.8%
Rest of Cache County	+/- 3.6%	+/- 3.4%	+/- 2.9%
Weighted combined sample	+/- 2.5%	+/- 2.3%	+/- 2.0%

2.d) Weighting the Combined Sample

Because we sampled households at different rates in each of the three study areas, we need to use sample weights to allow us to make authoritative estimates of the total county adult population. These weights reflect the influence of three main sources of bias:

(a) sampling density (or the proportion of households in the underlying population that were included in the sample).
(b) response rate differences across the samples, and
(c) the different numbers of adults included in each of the sampled households.

Weights are assigned to each individual case in the dataset. The weights depend on the sample area that the individual was originally selected to represent, and the total number of adults that live in that household. In the latter case, households with more adults present need to be inflated relative to smaller households since the probability of selection in the original sample is lower per adult. The resulting sampling weights are included in Table 3 below.

Table 3: Sample weights used to estimate total county adult population characteristics.

	Number of adults in the household							
Sample:	**1**	**2**	**missing**	**3**	**4**	**5**	**6**	**8**
CNCJ	0.020	0.040	0.046	0.060	0.079	0.099		
Logan City	0.618	1.236	1.385	1.854	2.472	3.091	3.709	4.945
Remaining Cache	0.771	1.542	1.668	2.313	3.084	3.854		

2.e) Representativeness of Samples

To confirm our sample is representative of the County adult population, we compared summary statistics from our survey results with published population characteristics from the 2000 U.S. Census of Population. Some of the comparisons are included on Table 4 below.

The results suggest that our samples from each of the three study areas generally has a gender balance and proportion of adults living in owner-occupied housing that is quite close to the census population. The main exception reflects an over-representation of males in the Clarkston and Newton samples. Across all three study areas, there tended to be proportionately fewer young adults (aged 18-39) and more older adults (age 60 and over) than is present in the population. The weighted combined samples are generally representative of the adult population for the entire county, with a slight overrepresentation of men and home-owners. There is a notable over-representation of older adults and those with bachelors' or graduate degrees. The overall results of this study should be interpreted with this sample bias in mind.

Table 4. Comparison of Survey Sample and Census 2000 population characteristics.

Characteristic	Clarkston, Newton, & Cache Jctn	Logan City	Rest of Cache County	Total County Adult Population Estimate
Percent male respondents				
Census 2000	51.0	47.2	49.4	48.4
Survey Sample	59.8	49.5	48.9	50.0
Percent owner-occupied housing units				
Census 2000	89.6	48.2	77.2	64.6
Survey Sample	91.0	54.6	81.7	68.1
Percent of adults 18-39 years old				
Census 2000	45.7	70.6	54.5	61.8
Survey Sample	25.0	56.1	42.6	49.3
Percent of adults 40-59 years old				
Census 2000	35.1	17.0	30.7	24.5
Survey Sample	43.3	20.1	37.2	30.7
Percent of adults 60 and over				
Census 2000	19.2	12.4	14.8	13.7
Survey Sample	31.7	23.8	20.2	20.1
Percent of adults (25 and over) with 4-year college degree or higher				
Census 2000	22.4	33.0	31.3	31.9
Survey Sample	26.2	43.5	46.0	45.2

2.f) Profile of respondents

Some descriptive characteristics of respondents in each of our three study areas (and a weighted estimate of the characteristics of all adults in our combined sample) are presented in Table 5.

Overall, the average respondent in our study was 42 years old. Respondents in the Clarkston, Newton and Cache Junction (CNCJ) area were notably older. Roughly a quarter of respondents had lived in Cache County all their life, though this ranged from 20 percent of Logan city residents to almost half of the CNCJ respondents. Most respondents had some post-high school education. Almost 40 percent reported completing a bachelors or graduate degree. Formal education levels were highest in the greater Cache County study area, and lowest among the CNCJ respondents.

Meanwhile, over 70 percent of respondents were employed (most full-time), 10 percent were retired, and just under 20 percent were keeping house, in school, or unemployed. Logan residents had lower levels of employment, reflecting the higher proportion of active students working on degrees at Utah State University.

Table 5: Profile of respondents, by study community.

Characteristic	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
Age of Respondent (mean)	52.9	42.3	44.1	42.1
		Percent of total respondents		
Male	59.8	49.5	48.9	50.0
Has lived in Cache County all their life	47.1	20.7	27.3	24.3
Highest level of formal education				
High School Diploma	25.3	14.8	17.2	15.6
Some College, 2-year degree, or Trade School	49.0	50.3	46.3	46.2
4 year college Degree	15.5	19.0	26.5	23.0
Graduate Degree	10.2	15.9	17.1	15.3
Employment status				
Employed full time	46.9	35.8	46.5	40.6
Employed part-time	9.2	22.3	13.5	19.2
Self-employed	18.4	7.8	15.1	11.8
Retired	17.9	15.0	9.7	10.3
Other (Keeping house, Student, Unemployed)	7.7	19.2	14.2	18.2
Owns their own home	91.0	54.6	81.7	68.1
Has children under 18 living at home	44.0	32.6	55.7	44.8
Household income class				
Under $15,000	3.5	22.2	6.8	14.8
$15,000 to $24,999	9.1	15.9	6.3	9.7
$25,000 to $34,999	22.2	19.6	18.2	17.0
35,000 to 49,999	24.2	18.0	23.3	20.8
$50,000 to $74,999	26.8	13.2	23.9	19.9
$75,000 and over	14.1	11.1	21.6	17.7
Over the last 12 months, how much of the paper, cardboard, glass, plastic and aluminum products that you used did you recycle?				
Almost all	14.3	17.1	16.2	16.7
Most	21.0	18.7	23.8	15.0
Some	41.4	23.8	34.1	28.5
Very little	17.6	20.7	23.8	22.9
None	5.7	19.7	13.5	17.0

Countywide, over two-thirds of our respondents reported owning their own home. This ranged from 55 percent in Logan to over 90 percent in the CNCJ area. Meanwhile, 45 percent of respondents had children under 18 living in their home. Again, Logan residents were least likely to have children at home, while more than half of respondents living in the rest of Cache County had children.

Respondents reported a wide range of household income. Most respondents earned between $25,000 and $75,000 a year, though 15 percent earned under $15,000 and 18 percent earned over $75,000 in 2002. The lowest levels of household income were reported by Logan city residents, while the highest incomes were found among respondents from the remaining parts of Cache County.

Finally, the survey asked respondents how about their household's recycling behavior. The results suggest that most Cache County households make some effort to recycle their paper, cardboard, glass, plastic and aluminum. Almost a third of the respondents reported recycling most or all of these products. Roughly 40 percent of indicated that they recycle very little or none.

RESULTS

3.a) Awareness of landfill issue

The survey instrument began with a series of questions designed to capture how aware respondents were of the current landfill (located on the western edge of the city of Logan). The distribution of responses to these questions are disaggregated by study area in Table 6 below.

The results suggest that almost all county residents are aware of where the current landfill is located, and almost three-fourths of the respondents have personally taken household wastes to that location. Very few respondents report negative impacts from the current landfill on their day-to-day quality of life. In fact, over two-thirds of county adults report that the current landfill has a positive impact on their quality of life. Interestingly, respondents in the Clarkston, Newton and Cache Junction (CNCJ) study area were most likely to report awareness and use of the current landfill. Meanwhile, Logan residents (who live closest) were least likely to know about the location of the current landfill or to report negative impacts on their daily lives.

Most Cache County adults appear to be satisfied with their current garbage service, and levels of satisfaction do not differ significantly across the three samples. Roughly 20 percent of households agreed with the statement that their "monthly garbage pickup costs are too high," while 23-30 percent of households disagreed with this statement in each of the study areas.

The survey results suggest that relatively few Cache County adults have been following the public debate over the future county landfill issue. Over half have heard very little or nothing about future landfill options in the last few years, and only 6 percent report being 'very familiar' with these issues. However, in the communities likely to be most affected by a future county landfill (those in the CNCJ area), almost 70 percent of respondents have heard a 'fair amount' or 'great deal' about the landfill siting issue, and over 80 percent report being somewhat or very familiar with these issues.

Interestingly, although the towns of Clarkston and Newton are located in a fairly rural area of Cache County, almost all of the respondents in Logan and the rest of Cache County report that they have personally visited the CNCJ area.

The survey also asked about where people are obtaining information about the future Cache County landfill issue. One set of questions was directly only to those respondents who reported having heard about the future Cache County landfill issue (65 percent of Logan residents, 75 percent of the greater Cache County respondents, and 99 percent of the CNCJ sample). The importance of various sources of information for these respondents are presented in Table 7.

For respondents outside of the CNCJ area, newspapers have clearly been the most important source of information about landfill issues. They are used by roughly 80 percent of those aware of the issue, and are the most important source for over 70 percent of these adults. Other important sources of information are friends and neighbors, family members, and local community leaders.

For respondents in the CNCJ area, newspapers remain the most common source of information, and are the principal source of information for roughly 30 percent of respondents. Public meetings have been the most important place for learning about the issue for 29 percent of CNCJ respondents, and local community leaders are the most important information source for another 14 percent of these people. In general, a majority of CNCJ respondents have obtained information from almost all of the sources listed in the survey instrument. The least important sources have been television coverage or the landfill project website or hotline.

Table 6. Awareness of current and future landfill issues, by community.

Characteristic	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
	Percent of respondents in sample			
Knows where the current landfill is.	98.6	84.8	89.3	83.7
Household member has taken trash, recyclables, or waste to current landfill.	81.5	74.6	74.3	73.4
On balance the current landfill has affected my day-to-day quality of life:				
Negatively	7.2	3.5	1.1	2.4
No real impact (or not sure)	60.6	69.1	68.3	67.6
Positively	32.2	27.5	30.6	29.9
Percent indicating they agreed or strongly agreed with statement that…				
"I am satisfied with my current garbage service."	73.1	68.0	69.6	68.1
"My monthly garbage pickup costs are too high."	19.3	26.2	18.5	21.6
In the last few years, how much have you heard or read about the issues surrounding the future Cache County landfill options?				
Nothing at all	1.4	35.4	24.5	30.1
A little	8.1	24.1	31.5	27.0
Some	21.5	24.1	29.3	26.8
A fair amount	44.0	13.3	12.5	12.6
A great deal	24.9	3.1	2.2	3.4
How familiar are you with these issues?				
Heard nothing	1.4	37.3	25.3	31.6
Heard something, but not familiar	2.9	10.8	11.8	11.2
Slightly familiar	14.9	28.1	29.2	26.7
Somewhat familiar	50.0	20.5	31.5	26.5
Very familiar	30.8	3.2	2.2	4.0
Reports they have been to Clarkston or Newton (in northwestern Cache County).	*n.a.*	84.1	93.5	85.4

Table 7. Sources of information about landfill siting issue.

Source of Information	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
	Percent listing the source as where they get "most of their information" (Percent getting any information from source)			
Newspapers	**29.6** (78.7)	**72.4** (78.4)	**73.0** (80.4)	**72.5** (79.1)
Friends and neighbors	7.9 (72.0)	8.6 (29.6)	7.4 (28.3)	3.6 (29.2)
Family members	6.3 (43.5)	3.8 (15.2)	3.3 (18.2)	3.6 (18.0)
Public meetings	**28.6** (59.4)	1.0 (9.6)	.8 (5.1)	2.0 (9.4)
Mailed newsletters and cards	8.5 (55.1)	1.0 (14.4)	1.6 (11.6)	1.9 (13.4)
Television	1.1 (8.2)	3.8 (11.2)	1.6 (5.8)	1.9 (7.6)
Local community leaders	**13.8** (69.1)	0 (11.2)	0 (19.6)	.3 (18.3)
Website or Hotline	1.6 (7.2)	1.0 (1.6)	1.6 0	1.4 (1.5)
	Percent of respondents (on a 0 to 5 scale)			
How confident are you the above sources of information have provided a complete and accurate picture of the various landfill options?				
Not at all confident (0 or 1)	6.8	n.a.	n.a.	n.a.
Somewhat confident (2 or 3)	44.0	n.a.	n.a.	n.a.
Very confident (4 or 5)	49.3	n.a.	n.a.	n.a.

The bottom of Table 7 presents results of a question that was only asked of the CNCJ sample. This question asked how confident respondents that the sources of information listed in the questionnaire were providing them with a complete and accurate picture of the landfill issue. The results suggest that almost half of the respondent feel very confident in the information they are receiving. Less than 10 percent indicated feeling a lack of confidence in their information sources.

3.b) Landfill Siting Priorities

3.b.i) Ranking Decision Criteria

The mail survey presented respondents with a set of 7 potential issues or criteria that might be considered when making a landfill siting decision. They were then asked to allocate $100 among these issues, with a reminder that "the amount you allocate reflects the relative weight you think decision-makers should place on each issue." The list of criteria and the amounts allocated to each issue are presented in Table 8.

On Table 8, the seven issues are ranked in decending order of importance (based on the mean allocations among the estimated combined county adult population). The most important issue among all the study areas is picking an option that best protects the environment (water quality, productive farmland and wildlife habitat). On average, respondents allocated over 25 percent of their money to that issue, with a median value of $20.

The second most important issue was to minimize the garbage pickup fees charged to households. The mean value allocated to this issue ranged from $12 in the CNCJ sample to $20 in the greater Cache County area. Overall, Cache County adults would allocate $18 to this issue, with a median value of $15.

The third major issue raised by most respondents is picking a site that is isolated, where there are the least number of people living within a 1 to 2-mile radius of the facility. On average, the respondents allocated $14 to this issue, with a median value of $10.

The remaining issues all receive allocations of between $9 and $12 (and median values of $9 to $10). These issues include picking sites that: (a) enhance control by local officials over future price increases, (b) rely on technology that is reliable, well established and minimizes liability risks; (c) are located closest to where most of the trash is generated; and (d) have the least opposition from nearby residents.

While the overall rankings for decision-criteria are relatively similar across the three samples, there were two issues where residents of the Clarkston, Newton and Cache Junction area differed from respondents in Logan city and the greater Cache County area. Most notably, the CNCJ respondents placed much greater weight on the importance of local support, and noticeably lower priority on the impacts of a landfill siting decision on the costs incurred by households.

Table 8. Importance of various issues to landfill siting decision, by community.

Imagine you have $100 to allocate among the following issues. How much would you spend on each issue?	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
Environmental Protection (water quality, farmland, and wildlife habitat)				
Mean $ allocated	26.0	28.2	25.1	26.0
Median $ allocated	20	20	20	20
Range	*0-100*	*0-94*	*0-100*	*0-100*
Minimize Cost (to households)				
Mean $ allocated	11.9	16.5	20.1	18.2
Median $ allocated	10	15	20	15
Range	*0-100*	*0-60*	*0-100*	*0-100*
Isolation (site with fewest people nearby)				
Mean $ allocated	13.5	14.1	13.3	13.9
Median $ allocated	10	10	10	10
Range	*0-100*	*0-94*	*0-100*	*1-100*
Local Control (over price increases, operation)				
Mean $ allocated	8.2	10.6	12.4	11.6
Median $ allocated	9	10	10	10
Range	*0-30*	*0-35*	*0-70*	*0-70*
Reliability (use established technology)				
Mean $ allocated	10.1	10.9	11.2	11.0
Median $ allocated	9	10	10	10
Range	*0-50*	*0-50*	*0-75*	*0-75*
Distance (site close to where trash generated)				
Mean $ allocated	9.8	9.4	8.6	9.2
Median $ allocated	7	10	10	9
Range	*0-75*	*0-50*	*0-50*	*0-75*
Local Support (site with least opposition from nearby residents)				
Mean $ allocated	17.4	8.6	8.9	9.1
Median $ allocated	10	10	10	10
Range	*0-100*	*0-35*	*0-50*	*0-100*

3.b.ii) Concerns about future landfill impacts

During the public debates over potential landfill sites in Cache County, a diverse number of concerns have been raised by citizens that might end up living close to the future landfill. The survey instrument asked respondents to indicate how much they were concerned about 12 of these issues, and then asked them to identify the issue that is their "most important concern." Their responses are presented in Table 9 below. The various types of concerns are listed in descending order based on the proportion of Cache County adults that are likely to list this concern as most important.

The results suggest that the most important concern among Cache County adults is the potential negative impact of a landfill on water quality in the valley. This concern was listed as the top issue by over 40 percent of the adults in the weighted respondent sample. In addition, over three-fourths of the respondents were very concerned about this issue.

The next three concerns (unsanitary conditions, unpleasant odors, and loss of wildlife habitat) were listed as the 'most important' concern for between 10 and 13 percent of respondents. In two cases – sanitation and wildlife habitat -- over half of the adults in the weighted sample indicated that they were 'very concerned' about the issue.

Several other issues were considered serious concerns by large fractions of the respondents. For example, a majority of respondents felt that competition for local water supplies is a key issue, and over 40 percent indicated that loss of productive farmland and declining local property values were concerns.

In general, the levels of concern (and priority concerns) indicated by respondents from Logan City were very similar to those reported by the greater Cache County subsample. However, there were important differences between these two samples and the CNCJ subgroup. Overall, the CNCJ respondents expressed much higher levels of concern about *all 12 types of impacts* listed in the survey. On six issues (water quality, sanitation, odors, property values, water supply, and truck traffic), over 80 percent of CNCN respondents indicated they were "very concerned". Moreover, the CNCJ residents were less likely to pick water quality, sanitation, or odors as their top issue than the rest of the county. Instead, they were more likely to cite declining property values, traffic from trucks hauling trash, and competition for local water supplies as their most important concerns.

Table 9. Levels of concern about potential impacts of a future landfill.

Assuming one of the three potential Cache County sites is chosen for a future landfill, how concerned would you be about the following impacts?	**Clarkston, Newton, and Cache Junction**	**Logan City**	**Rest of Cache County**	**Total County Adult Population Estimate**
	Percent listing the issue as their *"most important concern"* *(Percent 'very concerned' about the issue)*			
Negative impacts on water quality	**21.5** (88.8)	**38.7** (75.5)	**42.8** (75.2)	**40.4** (75.2)
Unsanitary conditions	**11.2** (89.9)	**13.4** (54.3)	**12.8** (54.0)	**12.9** (55.2)
Unpleasant odors	**11.7** (86.1)	**14.5** (49.0)	**17.0** (33.2)	**12.1** (33.2)
Loss of wildlife habitat	6.8 (66.6)	**11.8** (54.4)	8.9 (48.4)	**10.5** (50.0)
Loss of productive farmland	6.8 (69.9)	6.5 (47.7)	6.1 (48.4)	6.1 (47.5)
Impacts on rural views	6.3 (77.2)	4.8 (23.0)	6.1 (26.5)	5.1 (25.7)
Declining property values	**11.2** (83.3)	3.8 (40.1)	2.2 (40.1)	3.1 (40.4)
Negative impacts on Martin Harris Pageant in Clarkston.	3.4 (70.0)	1.6 (28.4)	3.9 (28.8)	2.7 (28.5)
Competition for local water supplies	7.8 (84.7)	2.2 (53.6)	2.8 (59.0)	2.4 (55.3)
Unpleasant noise	0.5 (75.5)	0.0 (23.8)	3.0 (25.0)	1.0 (25.1)
Decreased ability to enjoy outdoor activities	0.5 (69.6)	1.6 (40.1)	0.6 (35.5)	0.9 (37.3)
Traffic from trucks hauling trash	**10.2** (85.2)	0.0 (25.3)	1.1 (21.1)	0.9 (23.6)

3.b.iii) Preferences for specific future landfill sites

One of the central objectives of the Community Survey project was to ascertain which of the various landfill site options is preferred by residents of the county. Initially, the survey instrument asked respondents to first indicate if they preferred a site that was in-county, an out-of-county location, or if they had no clear preference (or didn't know enough to express one). After answering this question, people were asked to indicate which of the various in- (or out-of-) county alternatives would be their first choice. Shortly before these questions were asked, the survey included a map of the in-county sites and a brief description of the out-of-county alternatives. The responses to these questions are outlined in Table 10 below.

It is clear that a majority (56%) of Cache County adults who participated in the survey prefer an option that keeps the landfill in the county. Another 10 percent preferred an out-of-county location. A sizeable minority (34%) expressed no clear preference, or indicated preferences from both the in- and out-of-county lists.

Among the respondents who expressed a preference for in-county sites, over 60 percent felt that site "I" (located south of Newton and Cache Junction) was the best alternative. Roughly 26 percent preferred site "C" (located north of Clarkston).

Among the respondents who expressed a preference for an out-of-county site, there was a clear preference for the two Box Elder County locations (over the Carbon County site), and over half of the respondents preferred the proposed Promontory Point facility.

There were significant differences between the site preferences of respondents from the CNCJ area and the rest of the county residents. In particular, over two-thirds of the CNCJ respondents clearly prefer an out-of-county landfill solution. Only 15 percent indicated a preference for one of the in-county sites, and 18 percent were undecided. Interestingly, among the group of CNCJ respondents who preferred in- (or out-of-) county sites, the rank order of the specific sites within the category is always the same as in the other samples (with site "I" and the Promontory Point facility receiving the most votes).

The survey indicated that roughly two-thirds of Cache County adults would agree with the statement that they "need more information about landfills before I make up my mind about which option I prefer." This drops to 45 percent of respondents in the CNCJ area.

All respondents outside of the CNCJ area were asked how willing they would be to consider siting a new landfill within three miles of their home. Only 12 percent of the population indicated they would be willing to have a facility near them. Another 46 percent were somewhat willing, and 43 percent indicated they would not be willing to allow this.

Finally, the survey asked respondents to indicate how happy they are currently with their lives, and then how happy they think they would be if a landfill was constructed within 3 miles of their home. Not surprisingly, the average "happiness" score dropped by roughly 1 point given the siting of a new landfill. This drop was much more dramatic among the CNCJ residents (who started out as the most happy respondents currently, but the least happy given a future landfill site near them).

Table 10. Preferences for specific future landfill sites, by community.

Given what you know right now, which option would you select for disposing future municipal wastes generated in Cache County?	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
	Percent of respondents in sample			
Overall preferences				
Use in-county landfill	14.8	55.3	61.9	56.4
Use out-of-county landfill	67.2	7.4	13.1	9.8
Listed both in- and out-of-county choices	15.9	18.1	14.2	19.2
Don't know, Not sure, No preference	2.1	19.1	10.8	14.6
Specific site preferences				
In-County Sites	*Percent of respondents who prefer in-county site*			
Site #C (north of Clarkston)	18.5	31.4	24.1	26.4
Site #G (between Clarkston and Newton)	11.1	14.7	13.0	12.5
Site #I (south of Newton & Cache Jnctn)	70.4	53.9	63.0	61.1
Out-of-County Sites	*Percent of respondents who prefer out-of-county site*			
Box Elder Co. Municipal Landfill	37.6	42.9	33.3	37.0
Promontory Point Landfill (Box Elder Co.)	52.1	57.1	57.1	57.4
Carbon County Landfill	10.3	0.0	9.5	5.6
Percent indicating they agreed or strongly agreed with statement that…				
"I need more information before I make up my mind about which option I prefer."	45.2	64.9	65.0	66.1
If the three sites near Clarkston and Newton were not selected, how willing would you be to consider siting the new county landfill within 3 miles of your home? (on a scale of 0 to 5)				
Percent not willing (0 or 1)	*n.a.*	43.6	41.5	42.5
Percent somewhat willing (2 or 3)	*n.a.*	44.1	48.1	45.7
Percent very willing (4 or 5)	*n.a.*	12.2	10.4	11.9
	mean score on a scale of –2 to +2			
How happy are you currently with your life	1.56	1.30	1.44	1.38
How happy do you think you would be if a new landfill was constructed within 3 miles of your home?	-0.89	0.33	0.40	0.35

3.b.iv) Landfill design and mitigation options

The Citizens Advisory Committee and Technical Committee have been charged with making recommendations for the future location of a county landfill. In the research team's interviews with local citizens, officials, and members of these committees, however, there was significant interest exploring ways that a local landfill might be designed to minimize or mitigate its negative impacts on the surrounding community. Similarly, people were interested in measuring levels of support for various policy alternatives that potentially could be used to compensate local residents or communities that might host a future landfill.

It should be clearly noted that no decisions have been made about whether to spend extra money (beyond what is required by state and federal regulations) on the design of a landfill. There has also been no serious public discussion about the advisability or feasibility of compensating individuals or local communities for impacts associated with this type of public works project. (Indeed, several officials expressed concerns about the expense and precedents that might be set by such a compensation package). Nevertheless, the survey instrument provided an opportunity to inquire about citizen reactions to several potential design, mitigation, and compensation approaches.

Table 11 provides detailed information about the proportion of study respondents who felt various project design options and compensation policies should be a "high priority." Specifically, the questionnaire asked them "If the county agreed to pay extra to mitigate impacts from a landfill by improving the design and operation of the facility (beyond what state and federal regulations require), or to compensate residents living near a future landfill by making direct monetary payments, in your view how high a priority would be the following types of compensation?" The list of options are presented in descending order of perceived priority in Table 8.

The results suggest widespread support for spending additional monies to ensure no adverse impacts on water quality in the county. There was also support from a majority of respondents for efforts to minimize odors/smells and to protect wildlife habitat. The third most important issue among the CNCJ respondents involved efforts to ensure that waste haulers do not have to pass through towns. In general, nearly all of the project design options received support from two-thirds or more of the adults in the CNCJ sample.

In general, the various design/mitigation options received higher levels of support than the various 'compensation' policies. Among the compensation approaches, the most popular among the Cache County adults in general were payments to protect farmland and wildlife habitat near the landfill and programs to compensate local property owners for documented losses in property value. Each was listed as a high priority by roughly half of all county adults in the weighted sample. In addition, just over half of county adults agreed with a statement that "…residents of communities near the new county landfill should be compensated for having to live near it." (While not shown in Table 8, 32 percent Cache County adults were neutral and just 17 percent disagreed with this statement).

Among the CNCJ respondents, four compensation programs received support from more than 60 percent of adult residents. The most popular program, supported by 77 percent of respondents, involved reimbursement for people with documented property value losses. Assumption assumption of winter road maintenance by the county and reduced local garbage pickup fees were supported by over two-thirds of respondents in these communities. Farmland and habitat protection payments were a high priority for 62 percent of respondents. Roughly a third of CNCJ adults ranked payments to help support the annual Martin Harris Pageant in Clarkston as a high priority compensation program.

While there appears to be widespread support for programs to mitigate impacts, and modest countywide support for compensation, the survey results suggest that these programs may not change the overall landfill siting preferences that were listed above. This is particularly true in the CNCJ area, where almost 80 percent of respondents indicated that their preferences for an out-of-county option were unlikely to be affected by programs to mitigate or compensate local residents for an in-county facility.

Table 11. Evaluation of landfill design, mitigation, and compensation options, by community.

*If the county agreed to pay extra to mitigate impacts from a landfill by improving the design and operation of the facility, or to compensate residents living near a future landfill…in your view **how high a priority would be the following types of compensation?***	**Clarkston, Newton, and Cache Junction**	**Logan City**	**Rest of Cache County**	**Total County Adult Population Estimate**
	Percent of respondents indicating "high priority" (4 or 5 on a 0-5 scale)			
Improved Project Design: *Pay more to…*				
Ensure no adverse impacts on water quality	**90.7**	**92.7**	**89.7**	**90.2**
Ensure no odors or smells from the facility	**82.6**	**59.9**	**60.4**	**59.7**
Ensure no adverse impacts on wildlife	65.5	**66.2**	**55.9**	**58.4**
Reduce visibility of landfill	66.0	36.0	35.7	36.1
Ensure haulers don't go through towns	**77.8**	33.4	23.7	28.9
Additional Compensation *to local residents*				
Protect farmland and habitat near landfill	62.5	**57.7**	47.3	**50.2**
Compensate local property owners for documented losses in property value	**77.0**	49.5	**48.6**	49.3
Have county take over winter road maintenance in areas near new landfill	68.7	34.9	39.8	39.2
Reduce or eliminate local garbage pickup fees to residents near the landfill	68.3	33.9	28.5	32.0
Contributions to support the Martin Harris Pageant in Clarkston	36.9	15.9	15.3	17.4
Assuming that the county paid for all the programs you listed as medium or high priority above, would that change your overall preference where the future landfill should be sited? (% yes or maybe)				
Yes	2.9	6.8	2.8	4.5
Maybe	19.6	40.5	35.9	38.2
Percent indicating they agreed or strongly agreed with statement that…				
"I think residents of communities near the new county landfill should be compensated for having to live near it."	76.9	50.8	47.0	50.6

3.c) Other Results

3.c.i) Evaluation of public involvement process

The community survey project was conducted after several years of active committee meetings and an involved public participation process. As a result, the survey provided an opportunity to ascertain how the public feels about opportunities for public input, dissemination of public information, and the overall fairness of the landfill siting decision-making process. The results are summarized in Table 12 below.

Overall, there are modest levels of satisfaction with the public information and participation processes that have been conducted to date. Remembering that a majority of county adults reported that they had heard little or nothing about the future landfill siting issue (see Table 6), it may not be surprising that between 27 to 34 percent of county adults are satisfied or very satisfied with public information dissemination, opportunities for public input, and the fairness of the process. Generally speaking, there were equal proportions of people dissatisfied as satisfied with the public information efforts. Meanwhile, satisfied county adults appear to outnumber dissatisfied adults by a 3 to 2 margin relative to the public input opportunities, and by a 3 to 1 margin relative to the issue of fairness. Logan city residents appear to be the most satisfied with all three aspects of the public participation process.

Among the audience that has been the target of the most extensive recent public participation efforts (the CNCJ subsample), opinions about the process appear to be stronger. In other words, compared to the average Cache County respondents, slightly higher proportions of adults in the CNCJ area reported being satisfied with the public information and public input efforts. At the same time, notably larger proportions of the CNCJ adults also report being dissatisfied. Meanwhile, CNCJ adults are consistently more skeptical about the overall fairness of the landfill siting decision-making process. Over half of households in the CNCJ area reported participating in the public open house in Clarkston in the spring of 2002. Roughly 17 percent of CNCJ adults feel they have "directly participated" in the siting selection process.

Table 12. Evaluation of public participation process related to landfill siting decision, by community.

Question	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
To date, how satisfied are you with the following aspects of the public participation process related to the future county landfill?				
Getting information out to the public				
Percent satisfied	39.1	29.0	21.7	26.8
Percent dissatisfied	40.1	30.0	26.8	28.9
Soliciting input from the public				
Percent satisfied	34.5	36.9	29.9	34.0
Percent dissatisfied	42.0	22.1	21.7	22.4
Fairness of the process				
Percent satisfied	19.9	34.2	28.4	32.9
Percent dissatisfied	50.3	14.1	9.7	12.4
	Percent indicating they agreed or strongly agreed with statement that…			
"I think the process used to select a future county landfill option has been open and fair."	21.6	36.1	38.8	38.5
"My opinion is likely to influence the final decision about where the future county landfill will go."	13.1	15.7	14.6	16.5
	Percent of households where an adult has…			
Directly participated in the future county landfill siting selection process.	17.1	n.a.	n.a.	n.a.
Attended the public open house held in Clarkston last spring regarding the future county landfill siting decision.	56.1	n.a.	n.a.	n.a.

3.c.ii) Trust in science and leaders

A final section of the mail questionnaire asked county residents about how much they trusted the officials, scientists, and engineers that would be responsible for selecting a site, designing a facility, and operating the future landfill. To a considerable extent, levels of confidence in local leaders and the scientific community reflect the success or failure of the public education efforts associated with the project.

The results in Table 13 suggest that nearly half of county adults are confident that a landfill can be built that meets state and federal regulations. However, less than 40 percent of county adults express high levels of confidence that these standards are adequate to protect human health and the environment. Looked at from the other side, however, a relatively small proportion of county adults (8 percent) expressed little or no confidence in state and federal landfill regulations.

Generally speaking, county adults express moderate levels of trust in local officials and landfill decision-makers. Between 44 and 46 percent agreed with statements indicating trust that these people will do what is in the best interests of the community (between 21 and 27 percent expressed disagreement with these statements). Roughly two-thirds of county adults think the scientists and engineers involved in the landfill project will build a safe facility and minimize undesirable effects.

In all cases, the adults in the CNCJ area expressed notably higher levels of skepticism about state and federal landfill regulations, landfill siting decision-makers, and the abilities of scientists and engineers to protect the local community. A majority of CNCJ respondents *disagreed* with statements that they "trust Cache County officials to do what is the county's best interests" and "the officials who make the final decisions…can be trusted to make good decisions." Nevertheless, nearly half of the CNCJ sample felt that the scientists and engineers involved in the landfill project can be trusted to build a facility that is safe.

The survey results suggest there is very little support for the use of the county's condemnation powers to acquire land necessary for a future landfill. Roughly 40 percent of county adults oppose the use of condemnation, with 23 percent in favor. This rises to nearly 80 percent opposed (and 8 percent in favor) among the CNCJ residents.

Table 13. Trust in regulations, decision-makers, and scientists, by community.

Question	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
There are many state and federal regulations that govern the construction and operation of a modern landfill. These are designed to protect human health and environmental quality. **How confident are you that:**	*Percent indicating they were' confident' or 'very confident' (percent with little or no confidence)*			
A future Cache County landfill will be able to meet these regulatory standards.	19.6 (23.0)	46.0 (3.7)	50.5 (3.8)	48.8 (4.0)
These standards are adequate to protect human health and the environment.	18.6 (31.1)	39.3 (6.3)	35.5 (7.7)	37.7 (7.7)
Trust in Decision-Makers	*Percent indicating they agreed or strongly agreed (percent who disagreed or strongly disagreed)*			
"I trust my local officials to do what is in the best interests of my community."	45.9 (36.8)	42.5 (30.1)	47.8 (28.2)	46.1 (27.4)
"I trust Cache County officials to do what is in the county's best interests."	22.1 (56.2)	45.5 (27.2)	47.8 (33.3)	46.3 (24.1)
"The officials who make the final decisions on the future county landfill can be trusted to make good decisions."	17.4 (52.7)	43.0 (22.5)	42.4 (19.6)	44.0 (20.5)
"I would support the county's use of condemnation powers to acquire land necessary for a future landfill."	7.7 (79.7)	22.7 (42.1)	21.2 (39.7)	22.6 (39.5)
Trust in Project Scientists and Engineers				
"The scientists and engineers involved in siting and constructing a future county landfill can be trusted to build a facility that is safe."	49.7 (23.0)	69.8 (4.2)	71.2 (4.3)	69.0 (4.5)
"The scientists and engineers involved in designing a future county landfill can be trusted to minimize undesirable effects on the quality of life in the surrounding community."	35.3 (38.8)	61.0 (7.9)	64.1 (6.5)	62.1 (7.7)

3.d) Leadership Survey Results

One component of this community survey project involved administering a brief 2-page questionnaire to a sample of local elected officials. This instrument was distributed at regular meetings of the Cache County Council, Logan City Council, and a meeting of Cache County mayors hosted by the landfill siting project. A total of 14 completed questionnaires were returned, with 6 from county officials and 8 from city council members or mayors (2 from Logan, 1 from a medium city, and 5 from small cities).

Because of the small sample size, low response rates, and opportunistic sampling design the results should not be viewed as a scientific sample of all Cache County local elected leaders. However, they do provide an interesting basis for comparison with the results of the Community Survey (summarized above) and to a previous inventory of leaders' priorities conducted by the landfill siting committees in 2001. The results of our small survey of local leaders are compared to the community survey findings in Tables 14 and 15 below.

The leadership survey replicated the questions that asked respondents to allocate $100 among 7 landfill siting decision-making criteria, with a reminder that "the amount you allocate reflects the relative weight you think decision-makers should place on each issue. The amounts allocated to each issue by local leaders are presented in Table 14.

In general, the local leaders who responded to our survey placed similar amounts of emphasis on the various landfill siting decision criteria as did the citizens in our community survey. The top two issues for local leaders in our study reflect principle concerns about protecting environmental quality and minimizing costs to households. Local leaders placed slightly more emphasis on the issue of local control (over price increases and day-to-day landfill operations), and slightly less emphasis on picking a site that is either isolated from population or close to where most of the wastes are generated. Local leaders were generally more responsive to the issue of ensuring local support for a future landfill (though the mean value is skewed due to one very high rating on this issue).

The results of the 2003 Leader survey are compared in Table 14 to the Evaluation Criteria Scores that were ascertained from a similar leadership survey of local officials conducted in 2000. These scores represent a similar idea: when making a landfill siting decision, roughly how much emphasis should be placed on each issue (when scored on a 100 point scale). While several categories were not included in both surveys (two appeared in 2000 only, two others in 2003 only), the results provide interesting insights into several potentially notable changes in the perceived importance of several criteria over the last 2-3 years. First, the amount of emphasis placed on environmental protection appears to have increased (from 11 to 24 points), and has become the most important criteria. Second, the amount placed on minimizing costs to households fell by half (from 41 to 19 points). Finally, the amount allocated to local support seems to have increased modestly (from 12 to 18 points).

The leadership survey also replicated the set of questions that asked respondents to indicate how concerned they were about various possible impacts related to a future landfill in the valley. The proportion of leaders who listed each concern as their 'most important concern,' and the percent that were very concerned about the issue are listed in Table 15.

The results suggest that leaders who participated in our survey had similar concerns as the citizens in our community survey. The leaders listed water quality, water quantity, and odor concerns as their 'most serious concerns. The local leaders generally expressed higher levels of serious concern for all the various potential impacts, with the exception of impacts on farmland, wildlife habitat, and the ability to enjoy outdoor activities.

Table 14: Importance of Decision-Criteria, Local Leader and Community Survey Results.

Imagine you have $100 to allocate among the following issues. How much would you spend on each issue?	Local Leader Survey (n=14)	Evaluation Criteria from 2000 Study	Total County Adult Population Estimate
Environmental Protection (water quality, farmland, and wildlife habitat)			
Mean $ allocated	23.9	11.1	26.0
Median $ allocated	20		20
Range	*10-50*		*0-100*
Minimize Cost (to households)			
Mean $ allocated	19.3	41.0	18.2
Median $ allocated	17.5		15
Range	*0-40*		*0-100*
Isolation (site with fewest people nearby)			
Mean $ allocated	10.4	*n.a.*	13.9
Median $ allocated	10		10
Range	*0-30*		*1-100*
Local Control (over price increases, operation)			
Mean $ allocated	13.2	16.0	11.6
Median $ allocated	15		10
Range	*0-20*		*0-70*
Reliability (use established technology)			
Mean $ allocated	9.3	9.1	11.0
Median $ allocated	7.5		10
Range	*0-25*		*0-75*
Distance (site close to where trash generated)			
Mean $ allocated	6.1	*n.a.*	9.2
Median $ allocated	5		9
Range	*0-25*		*0-75*
Local Support (site with least opposition from nearby residents)			
Mean $ allocated	17.5	11.8	9.1
Median $ allocated	12.5		10
Range	*5-60*		*0-100*
Control over Liability	*n.a.*	9.8	*n.a.*
Privatization	*n.a.*	1.3	*n.a.*

Table 15: Concerns about possible landfill impacts, Local Leader and Community Survey Results

Assuming one of the three potential Cache County sites is chosen for a future landfill, how concerned would you be about the following impacts?	**Local Leader Survey (n=14)**	**Total County Adult Population Estimate**
	Percent listing the issue as their "most important concern" *(Percent 'very concerned' about the issue)*	
Negative impacts on water quality	**30.8** (92.9)	**40.4** (75.2)
Unsanitary conditions	7.7 (78.6)	**12.9** (55.2)
Unpleasant odors	**15.4** (57.1)	**12.1** (33.2)
Loss of wildlife habitat	0.0 (42.9)	**10.5** (50.0)
Loss of productive farmland	7.7 (42.9)	6.1 (47.5)
Impacts on rural views	0.0 (50.0)	5.1 (25.7)
Declining property values	7.7 (57.1)	3.1 (40.4)
Negative impacts on Martin Harris Pageant in Clarkston.	7.7 (50.0)	2.7 (28.5)
Competition for local water supplies	**15.4** (78.6)	2.4 (55.3)
Unpleasant noise	0.0 (50.0)	1.0 (25.1)
Decreased ability to enjoy outdoor activities	0.0 (35.7)	.9 (37.3)
Traffic from trucks hauling trash	7.7 (57.1)	.9 (23.6)

3.e) Economic Valuation of Citizen Preferences

3.e.i) Introduction

The economic analysis had three main objectives:

1) To statistically estimate the typical CNCJ household's minimum willingness to accept compensation (WTA) for the potential siting of a landfill in its local community;

2) To similarly estimate the typical non-CNCJ household's maximum willingness to pay (WTP) for the siting of a landfill in the CNCJ community (henceforth "in-county landfill"), as opposed to shipping the county's waste to one of two possible out-of-county landfill sites. The WTA and WTP estimates are measured in both monetary and non-monetary (i.e. in-kind) terms, where the in-kind measure considers the rate at which the typical CNCJ and non-CNCJ households are willing to trade off one resource (e.g. the establishment of an endowment fund or county provision of road, police, fire, etc. services for the CNCJ community) for another (e.g. the siting of an in-county landfill).

3) To aggregate the typical households' WTA and WTP estimates to respective community levels, in order to identify at which levels (monetary and in-kind) the possible siting of an in-county landfill passes a simple compensation test. By "compensation test" we mean at what minimum level the typical non-CNCJ household would have to compensate the CNCJ community so that the latter is "made whole" (i.e. its welfare with the landfill and compensation – the new situation – is equal to its welfare with neither the landfill nor compensation – the reference situation). In meeting this objective, the analysis provides a large-scale perspective of public preferences for the types and mix of compensation alternatives, and also provides value-based methods to scale compensation to provide services of equivalent societal value to the *total* value of annual losses incurred by the CNCJ community.

To accomplish our objectives, we draw heavily on the methodology developed for the recent Green Bay, Wisconsin natural resource damage assessment (Stratus Consulting, Inc., 2000).[1] In that study, monetary WTP estimates were derived for reducing releases of polychlorinated biphenyls (PCBs), as well as in-kind tradeoffs between PCB reductions and a variety of potential resources – wetlands restoration, reduced runoff, and enhanced outdoor recreation opportunities.

By comparison, in this study the CNCJ community's monetary and in-kind WTA estimates are derived for incurring the potential *net* losses associated with the siting of an in-county landfill (i.e. the social costs associated with landfill operations, increased risk of water contamination, and potential reductions in nearby property values minus the social benefits associated with retaining local control over future landfill tipping fees). In addition, the non-CNCJ community's monetary and in-kind WTP estimates are derived for obtaining the gains associated with access to an in-county landfill (i.e. the social benefits of retaining local control over future landfill tipping fees).

The next section provides a brief background on the economic content of the survey instrument and explains how the analysis supports the Citizen Advisory Committee's (CAC's) overall goal of identifying various compensation scenarios and determining the levels of compensation necessary to make the CNCJ community whole. Section 3 provides a summary of the survey design as it relates to the economic

[1] For background on the various federal statutes and regulatory promulgations in support of this methodology see Jones and Pease (1997). For a cautionary assessment of the methodology see Flores and Thacher (2002).

content of the survey instrument. Section 4 presents the economic model. Section 5 provides a summary of results, with a focus on the public's preferences across different types of compensation alternatives and an example of how different compensation packages might be combined to make the CNCJ community whole. Section 6 offers some specific conclusions from the economic analysis.

3.e.ii) Background on the economic content of the survey

The basic design of the survey questions used in the economic analysis were four blocks of questions that presented respondents with pairs of alternative scenarios for a future landfill, and asked them to state their preferences by choosing one of the two alternatives. (See questions 11-14 and questions 12-15 in the CNCJ and CACHE COUNTY versions of the survey, which are reproduced in Appendices I and II). Each alternative included a landfill site location, an estimated additional monthly cost to a typical household, and various levels of additional "compensation" for residents living near the landfill.

Although the CAC acknowledged that there were potential social costs to the CNCJ community associated with siting a landfill in-county, such as increased vehicle traffic and noise, loss of open space, and potential decreases in nearby property values, there was a lack of specific information about the costs and benefits associated with each proposed site when the survey instrument was drafted.

As a result, the team of researchers decided not to explicitly include estimates of these potential costs as part of the information provided to survey respondents prior to the series of questions that elicit the respondents' preferences for different compensation alternatives (see information boxes prior to questions in the survey instruments). The same decision was made with respect to the potential social benefits associated with an in-county landfill, such as retaining local control over future landfill tipping fees and lower cost.

However, a list of the potential benefits and costs were presented in a series of questions prior to the compensation-alternative questions, which asked the respondents to rank the importance of each with respect to how they view the siting of an in-county landfill (see questions 4, 6, and 7 in both the CNCJ and CACHE COUNTY versions of the survey). Thus, respondents were at least implicitly informed of the potential social costs and benefits associated with an in-county landfill prior to answering the compensation-alternative questions.

With respect to the various compensatory resources that they were asked to value, respondents were provided with information both before and as part of the compensation-alternative questions. For example, in question 9 in both versions of the survey, respondents are asked to prioritize a host of potential compensation packages that were identified by both the CAC and various focus groups of local citizens and community leaders. Then, in the information boxes accompanying the compensation-alternative questions, additional information is provided about the two compensation packages considered most feasible (and thus included in the ensuing compensation alternatives) – provision of local community payments and new public services.

The purpose of the CAC's compensation determination is to establish the amount of money to be sought in compensation for any potential social damages resulting from the siting of a new landfill in the CNCJ community. This compensable value includes the value of lost public use of the land designated as the landfill site and lost value of nearby properties plus lost nonuse values such as existence and bequest values. Compensation can be accomplished by providing the equivalent of the lost compensable value, such that the injured community is returned to its baseline condition, or made whole. The cost of the preferred compensation alternative reflects the value of the damage imposed on the CNCJ community.

This study supports CAC planning in two ways. First, it explicitly obtains public input regarding the preferences and values for alternative compensation packages, and it ensures that the public has input on the selection of alternatives (Stratus Consulting, Inc, 2000, henceforth Stratus). Second, the study provides value-based methods to determine the appropriate scale of potential compensation packages (Ibid). Given the nature of the landfill siting process, providing compensation with the same or very similar services as the land actually designated for the site is technically infeasible. Therefore, it may be preferable to select a compensation package that provides resources and services of a different type than that injured. This approach is known as "value-to-value scaling", where the value is measured by both the monetized and non-monetized utility (benefits or satisfaction) that people derive from all active and passive uses of the resources.

3.e.iii) Survey design as it relates to economic content

To obtain public preferences and values, the survey instrument focused on two types of compensation packages for the CNCJ community. The levels of compensation considered for each of the two packages were selected reflecting relevant technical options and responses from respondents in survey focus groups and pretests.[2]

1. *Local community payments* to municipalities in the CNCJ area. These payments would be made annually using revenues generated from waste disposal fees. Local governments could use these payments to mitigate unwanted impacts from the landfill, to reduce local property tax burdens, or for any other public purpose.

2. *New public services* that involve the Countywide Service District paying for staff and equipment to provide new or improved public services in the CNCJ community. As presented in the survey, these services could include either: (a) assuming responsibility for the maintenance and improvement of local roads, particularly in the winter; (b) county provision of local fire and police protection services; or (c) both.

The survey described each of the two compensation packages and asked a variety of questions to elicit preferences about the packages and compensation levels. Table 16 provides a summary of the various levels for each compensation package used in this study.

[2] The study is not intended to provide the selection of a particular compensation package. That task is left to the CAC and regional planners who have a detailed knowledge of needs, technical effectiveness, and cost-effectiveness (Stratus).

Table 16. Summary of the Compensation Packages.

Various Level of Compensation Included in Survey Instrument
1. Local Community Payments ($/year): • None • $ 5,000 • $ 10,000 • $ 50,000
2. New Public Services: • None • County provides roads. • County provides police and fire protection. • County provides roads, police, and fire protection.
3. Future Landfill Location: • In-County Site I • In-County Site G • In-County Site C • Box Elder County Site • East Carbon County Site
4. Added Costs to Household ($/mo.): • $ 0 • $ 5 • $ 10 • $ 15

While each individual survey included 4 distinct pairs of questions (each with a specific compensation package option), there were 8 versions of the survey used in the CNCJ and CACHE COUNTY instruments. The use of multiple versions allows the estimation of thresholds associated with economic willingness to pay (or to accept payment) under various scenarios.

The specific combinations of alternatives per choice pair and characteristics per alternative for each choice pair were selected with the help of the SAS proc Optex procedure. Given the number of characteristics and the levels they can take, there were 132 possible alternatives and therefore an extremely large number of possible choice pairs. The Optex procedure provides an orthogonal experimental design that helps to eliminate certain types of inappropriate pairs.
Figure 1 provides an illustration of the choice questions presented to respondents (See the Appendices for a sample survey version that contains an entire set of four choice pairs).

In this question, respondents are making a choice between a local community payment and whether or not to site an in-county landfill. This particular choice question is "simple" because the only differences between the alternatives pertains to Local Community Payments – which are zero in Alternative A and $50,000 in Alternative B – and Future Landfill Location – which is out-of-county in Alternative A and in-county in Alternative B.[3] Everything else between the alternatives (i.e. New Public Services and Added Cost to Household) is the same. Thus, in this particular question, the respondent is weighing the tradeoff between (1) siting the landfill in the CNCJ community and compensating the CNCJ community with an

[3] A "complex" choice question varies both local community payment levels and new public services along with landfill site across alternatives.

endowment of $50,000 per year, and (2) shipping the county's waste out-of-county and therefore not compensating the CNCJ community.

Figure 1. Example of a Simple Resource-to-Resource Choice Question.

	Alternative A	**Alternative B**
Local Community Payments	No Payments	$50,000 per year
New Public Services	No New Services	No New Services
Future Landfill Location	Ship to Box Elder County	Use Cache County Site "G"
Added Cost to your Household	$10 per month	$10 per month

Check one box: ☐ I prefer Alternative A ☐ I prefer Alternative B

By varying the compensation package mixes and levels across questions and examining the choices made, mathematical methods (described below) are used to determine how much of one kind of restoration has equivalent value to different amounts of another compensation package (Stratus). The alternatives, and the choice between alternatives, are designed to reflect realistic and meaningful compensation alternatives. To present realistic choices, each of the alternatives includes a dollar cost to the household associated with the alternative. The dollar values presented differ across choice pair, and across survey versions, which allows for calculation of the public's WTP and WTA for compensatory values. A complete list of the specific options listed in each version of the survey instruments is included in Appendix III below.

3.e.iv) The Economic Model

In this section, we present the choice-question model used to estimate preferences for compensating the CNCJ community. The model can be used to examine how individuals trade-off different levels of the two compensation packages, and how they value changes in package levels in monetary terms (i.e. traditional WTA and WTP measures). The choice-question model seeks to explain statistically each respondent's four choices from the choice pairs as a function of a number of compensation-package and individual characteristics. The model parameters represent a quantitative measure of the relative importance of the program characteristics in determining benefits individuals receive from their availability (Ibid). For example, the parameter value on the variable for the level of local community payment indicates the increase (or decrease) in the individual's utility level if the payment to the CNCJ community is made at that level.

The Theoretical Model and Associated Likelihood Function

In making their choices, we assume that survey respondents chose the alternative (A or B) in each pair that provides them with the largest net benefit. Following Stratus, let individual i's utility, i = 1,...,I, for the compensation packages be given by:

$$U_{ij}^{k_{ij}} = \beta x_{ij}^{k_{ij}} + \varepsilon_{ij}^{k_{ij}}, \; j = 1,\ldots, J \text{ and } k_{ij} \in [1,2], \qquad (1)$$

where $U_{ij}^{k_{ij}}$ is the utility of the k^{th} alternative of choice pair j to individual i. In our case, J = 4, since each respondent received a total of four choice questions in the survey, and k_{ij} indicates which of the two alternatives within each choice pair is ultimately chosen by the respondent. The vector $x_{ij}^{k_{ij}}$ contains the characteristics of the k_{ij}^{th} alternative as well as a host of demographic, attitudinal, and knowledge-level characteristics that differentiate the households from one another. Thus, the corresponding vector of unknown elements β (which we statistically estimate) can be interpreted as the respective marginal utilities. While $\beta x_{ij}^{k_{ij}}$ represents the nonstochastic part of utility, the term $\varepsilon_{ij}^{k_{ij}}$ represents the stochastic element of utility. This stochastic element accounts for the fact that the respondent's preferences can vary randomly over time and that the researcher likewise has imperfect information about what the respondent's preferences really are. In other words, neither the respondent nor the researcher knows the respondent's preferences with certainty. For estimation purposes, we assume that $\varepsilon_{ij}^{k_{ij}}$ is independently and identically distributed across both i and j, is uncorrelated with $x_{ij}^{k_{ij}}$, is mean-zero type 1 extreme value, and has constant unknown variance σ_ε^2.

Letting $K_{ij} \in [1,2]$ be the Bernoulli random variable that is the choice for individual i when confronted with choice pair j, the individual is assumed to choose the k_{ij}^{th} alternative with probability[4]

$$P\left(K_{ij} = k_{ij}\right) = P_{ij}^{k_{ij}} = P\left(U_{ij}^{k_{ij}} > U_{ij}^{3-k_{ij}}\right), \qquad (2)$$

where k_{ij} is the observed value of K_{ij} as a result of the survey response.

[4] In this notation, if the individual chooses alternative K_{ij} = 1(or 2), then the alternative that is not chosen is $3 - K_{ij}$ = 2(or 1).

From equations (1) and (2) and the assumptions on $\varepsilon_{ij}^{k_{ij}}$, the probability of choosing alternative k_{ij} may be rewritten as

$$P_{ij}^{k_{ij}} = P\left(\beta x_{ij}^{k_{ij}} + \varepsilon_{ij}^{k_{ij}} > \beta x_{ij}^{3-k_{ij}} + \varepsilon_{ij}^{3-k_{ij}}\right) = \Psi\left(-\beta\left(x_{ij}^{3-k_{ij}} - x_{ij}^{3-k_{ij}}\right)\right), \tag{3}$$

where $\Psi(.)$ is the univariate logistic distribution function. This probability enters into the following likelihood function L, which denotes that the empirical approach used to estimate the unknown vector (3) – called maximum likelihood estimation – estimates the unknown vector simultaneously across all i and j,

$$L\left(k_{ij}, i = 1,..., I; j = 1,..., J \mid x_{ij}^{1}, x_{ij}^{2}; \beta, \sigma_{\varepsilon}^{2}\right) = \prod_{i=1}^{I}\prod_{j=1}^{J} P_{ij}^{k_{ij}}, \tag{4}$$

where the 1 and 2 superscripts on x_{ij} denote alternative 1 and 2, respectively, and the operators indicate that the J observations for each respondent are "stacked" to produce a dataset with Jm observations.

Empirical Specification of Utility, WTP, and WTA

The following empirical specification of $U_{ij}^{k_{ij}}$ is used in this study,

$$\begin{aligned}
U_i &= \beta_Y\left(Y_i - C_i\right) + \beta_A D_A \\
&+ \sum_{r=1}^{3}\beta_r^{loc}\left(D_{loc} \bullet roads_r\right) + \beta_p^{loc}\left(D_{loc} \bullet payment\right) + \sum_{w=1}^{4}\beta_w^{loc}\left(D_{loc} \bullet landfill_w\right) \\
&+ \sum_{r=1}^{3}\beta_r^{know}\left(D_{know} \bullet roads_r\right) + \beta_p^{know}\left(D_{know} \bullet payment\right) + \sum_{w=1}^{4}\beta_w^{know}\left(D_{know} \bullet landfill_w\right) \\
&+ \sum_{r=1}^{3}\beta_r^{sconf}\left(D_{sconf} \bullet roads_r\right) + \beta_p^{sconf}\left(D_{sconf} \bullet payment\right) + \sum_{w=1}^{4}\beta_w^{sconf}\left(D_{sconf} \bullet landfill_w\right) \\
&+ \sum_{r=1}^{3}\beta_r^{vconf}\left(D_{vconf} \bullet roads_r\right) + \beta_p^{vconf}\left(D_{vconf} \bullet payment\right) + \sum_{w=1}^{4}\beta_w^{vconf}\left(D_{vconf} \bullet landfill_w\right) \\
&+ \sum_{r=1}^{3}\beta_r^{comp}\left(D_{comp} \bullet roads_r\right) + \beta_p^{comp}\left(D_{comp} \bullet payment\right) + \sum_{w=1}^{4}\beta_w^{comp}\left(D_{comp} \bullet landfill_w\right) \\
&+ \sum_{r=1}^{3}\beta_r^{min\,c}\left(D_{min\,c} \bullet roads_r\right) + \beta_p^{min\,c}\left(D_{min\,c} \bullet payment\right) + \sum_{w=1}^{4}\beta_w^{min\,c}\left(D_{min\,c} \bullet landfill_w\right) \\
&+ \sum_{r=1}^{3}\beta_r^{hinc}\left(D_{know} \bullet roads_r\right) + \beta_p^{hinc}\left(D_{know} \bullet payment\right) + \sum_{w=1}^{4}\beta_w^{hinc}\left(D_{know} \bullet landfill_w\right) + \varepsilon_i,
\end{aligned} \tag{5}$$

where $U_{ij}^{k_{ij}}$ is replaced by U_i to simplify notation. Each of the variables in this function is defined in Table 17 below.

Table 17. Model Variables

Variable	Definition
Compensation Variables	
C_i	Monthly household cost (in dollars).
$roads_r$, $r \in [1,3]$	=1 if New Public Services are provided at level r =0 otherwise services: roads; police/fire protection; roads & police/fire protection
payment*	Level of annual payment to CNCJ community (in dollars) levels: $5,000; $10,000; $50,000
$landfill_w$, $w \in [1,4]$	Future landfill site (in-county sites I (=3), G (=2), and C(=1); East Carbon County site(=4); Box Elder site**
Individual Characteristics	
Y_i	Annual household income (in dollars)
D_{loc}, loc ∈ [CNCJ, non-CNCJ]	=1 if household location is loc =0 otherwise
D_{know}	=1 if somewhat to very informed about landfill issue =0 otherwise
D_{sconf}	=1 if somewhat confident that in-county landfill will meet federal regulations =0 otherwise
D_{vconf}	=1 if very confident that in-county landfill will meet federal regulations =0 otherwise
D_{comp}	=1 if you believe communities located near landfills should be compensated =0 otherwise
D_{minc}	=1 if annual household income is $35,000-$49,999 =0 otherwise
D_{hinc}	=1 if annual household income is greater than $50,000 =0 otherwise
Alternative-Specific Variables	
D_A	=1 if alternative is A =0 otherwise

* Treated as a continuous variable for estimation purposes.

** The Box Elder site is the reference landfill site. For the roads and payment variables, the reference service and level are "none" and 0, respectively.

With the exception of β_A, the various β parameters measure the marginal utilities associated with one unit changes in the corresponding variables.[5] For example, β_Y indicates the increase in utility if the cost of the compensation package decreases by $1, and thus may be interpreted as the (constant) marginal utility of money. It is expected to have a positive sign, implying that the individual prefers to pay a lower cost.

[5] These marginal effects are based on all else remaining equal. β_A controls for the fact that the typical respondent is more likely to choose alternative A.

The remaining individual-characteristic parameters – β^{loc}, β^{know}, β^{sconf}, β^{vconf}, β^{comp}, β^{minc}, and β^{hinc} – represent the change in utility associated with a unit change in each of the respective individual characteristics, all else equal. For example, when loc = CNCJ and r = 1, $\beta_r^{loc} = \beta_1^{CNCJ}$ indicates the change in a CNCJ-individual's utility associated with the county providing road service to the CNCJ community. Similarly, when an individual perceives herself as being somewhat to very informed about the landfill issue and r = 1, β_r^{know} indicates the change in this type of individual's utility associated with the county providing road service to the CNCJ community.

The linearity of the empirical model specified in (5) allows for straightforward computations of WTA and WTP. These WTA and WTP computations are known as "compensating surplus" (CS) measures of welfare, where WTA can be thought of as a negative WTP. CS is computed as the change in utility between the "new" and "reference" situations (e.g. between r=1 and r=0; w=1 and w=0; etc.) divided by the marginal utility of money (i.e. β_Y),

$$CS_i = \frac{\beta^s}{\beta_Y}, \; s \in [\text{set of individual characteristics}] \qquad (6)$$

where β^s represents the β parameter associated with the given individual characteristic. For example, if loc = CNCJ and r = 1, then $\beta^s = \beta_r^{loc}$ and CS_i equals the typical CNCJ household's estimated WTP for county provision of roads in the CNCJ community. Similarly, if loc = CNCJ and w=1, then $\beta^s = \beta_w^{loc}$ and CS_i equals the typical CNCJ household's estimated WTA payment for selecting landfill site C in the CNCJ community. To the contrary, if loc = non-CNCJ, then CS_i equals the typical non-CNCJ household's estimated WTP for selecting landfill site C in the CNCJ community.

3.e.v) Summary of Results

This section is divided into three subsections. The first subsection presents the results from a restricted version of equation (5) and derivations of the corresponding CS measures from this model. This section also includes two examples of how the CS measures can be used to answer the question, at what level would non-CNCJ residents have to compensate CNCJ residents such that they are made whole in the event that a landfill is sited in their community? The second subsection reports results for a more fully specified version of equation (5). The third subsection presents some simple frequency measures that help to answer the question, how reliable are the survey responses?

Results From a Restricted Empirical Model

We turn now to the results associated with the estimation of equations (5) and (6). To begin, we have estimated a restricted version of (5) in order to focus on the most important determinants of our CS measures. To this end, the set of individual-characteristic parameters, excluding β^{loc}, are assumed equal to zero (i.e. $\beta^{know} = \beta^{sconf} = \beta^{vconf} = \beta^{comp} = \beta^{minc} = \beta^{hinc} = 0$). The restricted empirical model is therefore,

$$U_i = \beta_Y (Y_i - C_i) + \beta_A D_A + \sum_{r=1}^{3} \beta_r^{loc} (D_{loc} \bullet roads_r) + \beta_p^{loc} (D_{loc} \bullet payment) + \sum_{w=1}^{4} \beta_w^{loc} (D_{loc} \bullet landfill_w) + \varepsilon_i \; . \qquad (5')$$

The results from for this estimation are presented in Table 18.

Table 18. Estimation Results for Restricted Empirical Model.

Variable	β	$Stderr_{\beta}$	Marginal Utility	P-value	WTP/WTA ($/mo./HH)*
Non-CNCJ Community					
payment	0.000	0.000	0.000	0.000	0.00
East Carbon County Site	-0.107	0.116	-0.107	0.356	---
In-County Site C	0.875	0.122	0.875	0.000	14.14
In-County Site G	0.516	0.132	0.516	0.000	8.33
In-County Site I	0.721	0.111	0.721	0.000	11.65
roads	0.136	0.211	0.136	0.518	---
police/fire protection	-0.046	0.148	-0.046	0.755	---
roads & police/fire protection	0.092	0.150	0.092	0.540	---
CNCJ Community					
payment	0.000	0.000	0.000	0.000	0.00
East Carbon County Site	-0.041	0.176	-0.148	0.816	---
In-County Site C	-3.093	0.216	-2.217	0.000	-35.81
In-County Site G	-3.082	0.242	-2.566	0.000	-41.45
In-County Site I	-1.986	0.179	-1.264	0.000	-20.42
roads	0.806	0.402	0.942	0.045	15.21
police/fire protection	0.481	0.263	0.435	0.068	7.02
roads & police/fire protection	0.349	0.250	0.441	0.162	---
Alternative-Specific					
Alternative A	0.111	0.066	---	0.093	---
Y - cost	0.062	0.006	0.062	0.000	---
n = 2265	---		---	---	---
LL ratio = -1258.1	---		---	---	---
LL ratio (rest.) = -1568.9	---		---	---	---
Chi-Square = 621.5	---		---	0.000	---

*****WTP/WTA values are not provided for those cells demarked by "---" due to the statistical insignificance associated with the corresponding coefficient estimates.

Note that the P-value indicates the level of significance at which the corresponding β coefficient estimate is statistically different from zero. Therefore, (1 – P-value) is the corresponding level of confidence that the β estimate is statistically different from zero. The standard error of each respective β estimate (SE_β) helps define the interval within which the true latent β is expected to lie.

For example, the P-value of 0.045 and corresponding SE_β of 0.402 for the coefficient on the roads variable for CNCJ residents implies an approximately 95% confidence level that the true latent $\beta_{r=1}^{CNCJ}$ lies within an interval of width approximately four SE_β's (or, 4 x 0.402 = 1.61 utils), the center of which is the estimated coefficient value 0.806.[6] Typically, any β coefficient with a P-value of less than 0.1 is considered to be statistically different from zero (i.e. the corresponding variable is presumed to explain the level of variation in the dependent variable (U_i) equal to the value of the coefficient at the level of confidence indicated by the P-value). Referring to Table 7, several of the β coefficients are statistically significant.

To illustrate what the coefficients mean, an examination of Table 7 suggests that locating an in-county landfill at sites C, G, and I, respectively, relative to the "left-out" Box Elder County site, increases the typical non-CNCJ household's utility by 0.875, 0.516, and 0.721 utils, implying that of the three possible in-county landfill sites, the typical household most prefers site C.[7] However, choosing the East Carbon County landfill site over the Box Elder site has no statistical effect on the household's utility level.

Converting these marginal utility estimates to their corresponding CS values via (6) results in monthly household WTP values of $14.14, $8.33, and $11.65 for sites C, G, and I, respectively. These dollar amounts reflect the value non-CNCJ households receive from retaining local control over the county's waste disposal system, and, presumably, from compensating the CNCJ host community *other than* through a community endowment fund or provision of new public services. Given the statistical results for the community endowment fund (i.e. the payments variable) and new public services (i.e. roads, police and fire protection), non-CNCJ households apparently are unwilling to fund these compensation packages through contributions to a CNCJ-community endowment fund.

Not surprisingly, CNCJ households would need to be compensated to willingly accept the siting of a landfill in their community. The typical CNCJ household's utility decreases by 2.217, 2.566, and 1.264 utils, respectively, as in-county sites C, G, and I are chosen, implying that the typical CNCJ household prefers site G the least.[8]

Converting these marginal utility estimates to their corresponding CS values via (6) results in monthly household WTA values of $35.81, $41.45, and $20.42 for sites C, G, and I, respectively. These dollar amounts reflect the perceived social costs that these households will suffer as a result of the siting of a landfill in their community. Also as expected, the typical CNCJ household has no preference for the East Carbon County site over the Box Elder site.

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[6] For further information on P-values, standard errors, and confidence intervals see any introductory statistics textbook.

[7] This result differs from the finding discussed above that indicated a majority of respondents in both the CNCJ, Logan, and Cache subsamples expressed a preference for the in-county site I. This difference is partly a result of the fact that in-county site preference is not controlled for in this particular empirical model. Note, however, that the marginal utilities associated with sites C and I are very close, indicating that even when not controlling for in-county site preferences, site I is still a highly preferred site relative to site G.

[8] The aversion of CNCJ households to site G likely reflects its proximity to the towns of Clarkston and Newton. Similarly, the aversion of CNCJ households to site C likely reflects the fact that all of the CNCJ towns are en route to this site.

While CNCJ households would gain utility from the county provision of roads and fire/police protection services, the combination of roads and fire/police protection has no statistical effect on utility. On the surface, this is a curious result. One would think that the more public goods provided, the larger would be the increase in the household's utility level. However, in this case, adding fire and police protection to the provision of roads completely eliminates the utility gain of 0.806 utils that the household obtained solely from the provision of roads.

One explanation for this result is that while the CNCJ may be comfortable with the county assuming responsibility for providing roads services, they are uncomfortable with the county being in a de facto monopoly position of supplying public goods to the community. Another explanation may simply be that while CNCJ households may trust the county to adequately provide roads alone, if the county is also responsible for police and fire protection it may not have the resources to adequately ensure quality road provision in the future.

To show how this information on WTP and WTA can be used to answer the overriding question, "At what level would non-CNCJ residents have to compensate CNCJ residents such that they are made whole in the event that a landfill is sited in their community?," we provide two examples.

The first example explores (1) whether the willingness of non-CNCJ households to compensate CNCJ households in aggregate is larger or smaller than the CNCJ households' willingness to accept compensation, and (2) at what level the typical non-CNCJ household would have to compensate the CNCJ community in order for the typical CNCJ household to be made whole.

The second example looks at whether a combination of compensation packages might be feasible – and at what cost to non-CNCJ households – in order for the typical CNCJ household to be made whole.

Example 1

According to the 2000 U.S. Census of Population, there were 439 and 27,104 households located in the CNCJ and non-CNCJ communities, respectively.[9] Thus, assuming site C is chosen as the preferred in-county landfill site, our empirical results indicate that non-CNCJ households in aggregate would be willing to pay on average approximately $383,250 per month ($14.14 per household per month x 27,104 households) for locating a landfill at that site rather than shipping the county's waste to the Box Elder site. However, CNCJ households would need aggregate compensation of approximately $15,720 per month ($35.81 per household per month x 439 households). The estimated net economic benefit for Site C would be the difference between the amount non-CNCJ households are willing to pay to use this site minus the amount that CNCJ households would require in compenation, or $367,529.97 [= ($14.14*27,104) ($35.81*439).]

Thus, site C passes a simple compensation test, indicating that the aggregate WTP of non-CNCJ households is sufficient to fully compensate CNCJ households for any losses associated with a landfill being sited at site C.[10] This test is "simple" because it only measures the ability of the non-CNCJ community to compensate the CNCJ community in aggregate. It does not ensure that the distribution of this compensation will be sufficient to make every household in the CNCJ community better off.

An alternative way of using this information is to consider the minimum monthly cost to the typical non-CNCJ household that would be necessary to make the CNCJ community whole. To do this, simply divide

[9] These numbers equal the average number of households by municipality and zip code area.
[10] Note that sites G and I also pass this simple type of compensation test. This is due to the fact that the number of non-CNCJ households greatly outweighs that number of CNCJ households.

the aggregate WTA of CNCJ households ($15,720 per month) by the total number of non-CNCJ households (27,104) for a monthly cost of approximately $0.60 per non-CNCJ household. In other words, charging each non-CNCJ household approximately $0.60 per month would raise enough money to fully compensate the CNCJ community.

Using the same calculations, similar estimates of net economic benefits for the other two sites are estimated at:

Site I = $306,797 [= ($11.65 * 27,104) - ($20.42 * 439)]
Site G = $207,580 [= ($8.33 * 27,104) - ($41.45 * 439)]

Example 2

An alternative to strict monetary compensation might be some combination of local community payments, new public services, and monetary compensation. Again, suppose site C is selected. According to our empirical results, if the non-CNCJ community provides road service for the CNCJ community, the typical CNCJ household will obtain the equivalent of $15.21 in value per month, for an aggregate community value of approximately $6,677 per month. Thus, if roads are provided, then only $15,720 - $6,677 = $9,043 per month would need to be provided to the CNCJ community in monthly monetary compensation, or $0.33 ($9,043/27,104) per non-CNCJ household.

In other words, if the non-CNCJ community provides road service and a monthly payment equal to $0.33 per non-CNCJ household, the CNCJ community would be made whole. Note that the only possible combinations include new public services with monetary compensation, as the WTA local community payments is statistically equal to $0.00 per CNCJ household.

Confidence in Specific Values Derived from the Restricted Model

Because the estimates of household willingness to pay (or to accept payment) for each of the various sites are derived from statistical models, it is possible to calculate a confidence interval around the model coefficients. A table of confidence intervals for the estimated model coefficients related to WTP and WTA values is shown in Table 19 below.

Table 19: Confidence Intervals around estimated WTP and WTA coefficients.

SITE	Estimated coefficient ($ per month)	Lower bound	Upper bound
Non CNCJ Respondents: Willingness to pay more to have landfill at:			
SITE I	$11.65	$7.98	$15.32
SITE G	$8.33	$4.09	$12.57
SITE C	$14.14	$9.93	$18.35
CNCJ Respondents: Willingness to accept payment to have landfill at:			
SITE I	$20.42	$13.93	$26.91
SITE G	$41.45	$30.90	$52.00
SITE C	$35.81	$26.67	$44.95

The results show that the relative rank of each site remains the same, though the precise values of the household willingness to pay are accurate to within plus or minus $4. The estimates of willingness to accept payment (for CNCJ respondents) tend to be somewhat less precise. Here the estimated monthly payments required to compensate CNCJ households are accurate within +/- $6 (for site I) to +/- $11 (for Site G).

More Information on the Reliability of the Survey Results

As the authors of the Stratus report point out, "higher awareness [of the issue at hand] can be expected to enhance the reliability of responses and to reduce the burden of communication in survey design." In that study's case, over 80% of the respondents reported that they were somewhat to very aware of the topics addressed in the survey, which Stratus perceives as indicating a high level of reliability in their sample.

As discussed above (see Table 6), roughly 40 percent of the non-CNCJ respondents indicated that they had heard a fair amount about the landfill issue, and 30 percent are somewhat or very familiar with the future landfill options. By contrast, 90 percent of CNCJ respondents have heard a fair amount, and 80 percent are somewhat or very familiar.

To ascertain how reliable responses to the economic analysis "choice" questions, all respondents were asked "how confident are you in the choices you made" immediately following this block of questions. The results are presented in Table 20 below.

Table 20: Confidence in Responses to Economic Valuation Choice Questions

Characteristic	Clarkston, Newton, and Cache Junction	Logan City	Rest of Cache County	Total County Adult Population Estimate
	Percent of respondents in sample			
How certain are you of your choices? (on a 0 to 5 point scale)				
Uncertain (0 or 1)	3.0	12.4	11.4	13.7
Somewhat certain (2 or 3)	20.4	52.3	50.5	48.5
Very Certain (4 or 5)	76.6	35.2	38.0	37.8

Table 20 shows that approximately 77% of the CNCJ respondents and 35 to 38 percent of the Logan and Cache respondents felt very certain about their responses to the choice questions. Over half of the Logan/Cache adults indicated they were somewhat certain. When the results are weighted to represent the entire county adult population, a total of 86 percent of adults participating in the survey were at least somewhat certain of their choices.

Taken together, these results indicate that while many of the survey's non-CNCJ respondents felt they were not well-informed of the issues surrounding the future in-county landfill options, a strong majority

does feel confident enough in their responses to the choice questions to lend credibility to the economic valuation analysis.

3.e.vi) Conclusions of the Economic Valuation Analysis

Results from the economic portion of the landfill survey suggest that (1) a majority of Cache Valley respondents are reasonably confident of their responses to the economic questions in the survey, and (2) there appears to be room for the non-CNCJ community to fully compensate the CNCJ community in the event that a landfill is sited in the latter community. The first result provides some evidence that the survey responses are reliable. The second result has two implications.

First, by virtue of passing a simple compensation test, the siting of an in-county landfill may result in positive net benefits for Cache County residents in the aggregate relative to the selection of either of the two out-of-county sites presently under consideration.[11] We say "may" because a necessary condition for positive net benefits associated with the selection of an in-county site is that the actual cost of building a new in-county landfill be lower than the corresponding cost of shipping the county's waste to the least-costly of the two out-of-county sites presently under consideration. If this necessary condition is met, then our results suggest that positive net benefits would indeed result in aggregate for Cache County residents by selecting one of three potential in-county landfill sites.

Second, we find evidence that non-CNCJ are potentially willing to compensate the CNCJ community at a level that would make the typical CNCJ household whole. This compensation could either take the form of strictly a monetary payment, or a combination of monetary payment and the provision of new public services. Due to the large difference in number of households across the two communities, the cost of compensation to the typical non-CNCJ household would likely equal something less than $1.00 per month.

REFERENCES

Dillman, D.A. 2000. Mail and Internet Surveys: The Tailored Design Method. New York: John Wiley and Sons, Inc.

Flores, Nicholas E. and Jennifer Thacher (2002) "Money, Who Needs It? Natural Resource Damage Assessment," *Contemporary Economic Policy*, 20(2):171-178.

Jones, Carol A. and Katherine A. Pease (1997) "Restoration-Based Compensation Measures in Natural Resource Liability Statutes," *Contemporary Economic Policy*, 15:111-122.

Levy, P.S. and S. Lemeshow. 1991. Sampling of Populations: Methods and Applications. New York: John Wiley and Sons, Inc.

Stratus Consulting, Inc. (2000) "Restoration Scaling Based on Total Value Equivalency: Green Bay Natural Resource Damage Assessment," Final Report.

[11] Because the benefits and costs of an in-county landfill will be incurred over some given time horizon, net benefits really refers to the present value of the stream of net benefits that will be incurred over that time horizon.

APPENDIX I:

Clarkston, Newton, and Cache Junction version of the survey

CLARKSTON, NEWTON, and CACHE JUNCTION AREA

CITIZEN SURVEY:
Views on Future Landfill Options

Institute for Social Science Research on Natural Resources
216 Old Main, UMC 0730
Utah State University, Logan, Utah 84322-0730

Background:

As you may know, the various cities and towns in Cache County that rely on the Logan Landfill to dispose of their trash have realized that the current landfill will likely fill to capacity in another 15-20 years.

Over the last 3 years, a Citizens Advisory Committee (with members appointed by the Cache County Council and the City of Logan) and a technical review committee of engineers, planners, and health department professionals have been evaluating various options for future municipal waste disposal.

In the spring of 2002, these committees identified several possible future landfill sites located in Cache County that meet basic technical and environmental criteria for landfills. All three of these sites are in the Clarkston, Newton, and Cache Junction area.

At the same time, they asked that options for shipping waste to 3 possible landfills in Box Elder and Carbon counties also be evaluated. A technical evaluation of both the in- and out-of-county options will be available for public review in the spring of 2003.

This fall, the Citizens Advisory Committee requested that an independent team of Utah State University researchers collect information about the views and perspectives of Clarkston, Newton, Cache Junction, and other Cache County residents towards the various future landfill options. They are seeking guidance as they weigh their various alternatives.

This questionnaire is critical to the Citizens Advisory Committee's efforts to find out what members of the community like you want to do with our future municipal solid wastes. In other words, **your opinion is very important to the people who are going to be responsible for recommending the site of the future county landfill.**

Since only a small number of households were selected to participate in this study, every response is required to provide a scientific estimate of the views of this community.

We estimate you will spend approximately 20 minutes completing this survey.

➔ **REMEMBER: Please have the adult (18 years old or over) living in your household who has had the most recent birthday complete this questionnaire.**

Before we ask about your views on future landfill alternatives for Cache County, we are interested in your use of the current county landfill.

1. **Do you know where the current county landfill is located?**

   ☐ YES ☐ NO ☐ NOT SURE

2. **Has any member of your household ever personally taken trash, recyclables, or green waste to the current landfill?**

   ☐ YES ☐ NO ☐ NOT SURE

3. **On balance, how has your day-to-day quality of life been affected by the current landfill?**

   ☐ Strong negative impact
   ☐ Weak negative impact
   ☐ No real impact
   ☐ Weak positive impact
   ☐ Strong positive impact
   ☐ Not sure

Ultimately, there are many advantages and disadvantages associated with each of the future county landfill options. To help decision-makers weigh the various issues, we need to know how important each of the following considerations is to you.

4. **Imagine you have $100 to allocate among the following issues. How much would you spend on each issue?** *((In other words, the amount you allocate reflects the relative weight you think decision-makers should place on each issue. Remember, the total has to add up to $100.)*

   $_____ **Cost** (picking an option that minimizes garbage pickup fees charged to households).

   $_____ **Local Control** (picking an option where local officials can control future price increases and day-to-day operation of the landfill)

   $_____ **Reliability** (picking an option where the technology is well established and liability risks to local governments are minimized)

   $_____ **Environmental protection** (picking an option that best protects water quality, productive farmland, and wildlife habitat)

   $_____ **Isolation** (picking an option where there are the least number of people living within a 1 to 2-mile radius of the facility)

   $_____ **Local Support** (picking an option which has the least opposition from nearby residents)

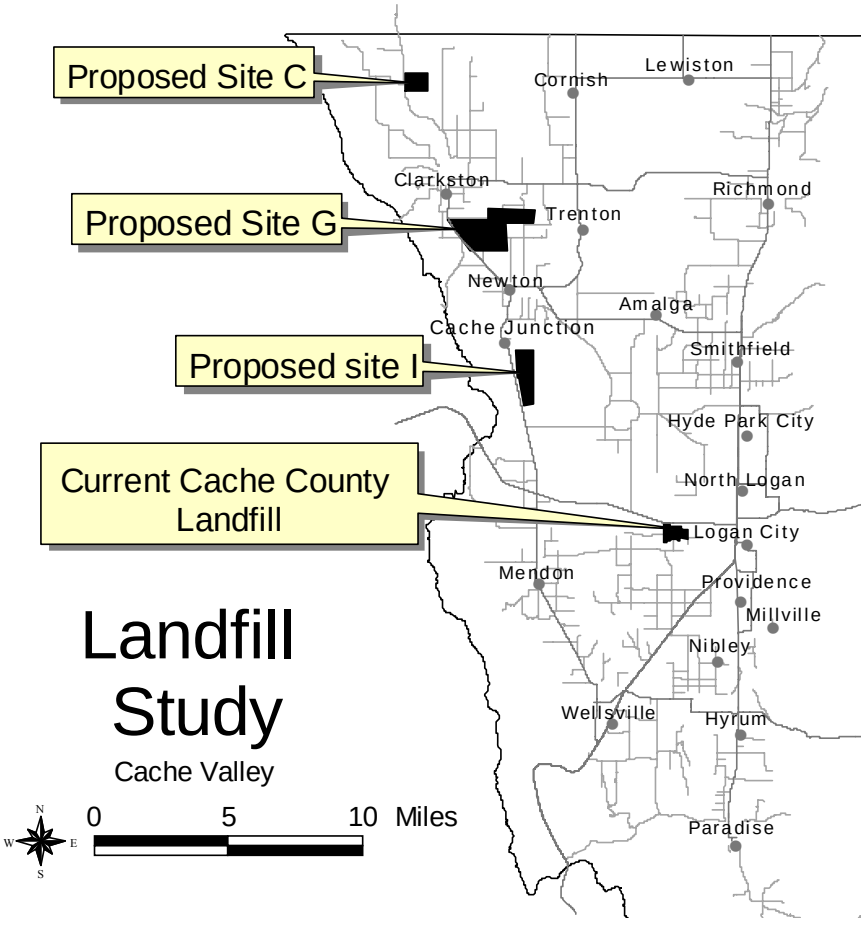
   $_____ **Distance** (picking an option which is closest to where most trash is generated)

   $ 100 TOTAL

BRIEF DESCRIPTION OF POSSIBLE FUTURE LANDFILL LOCATIONS

- **Cache County Sites** (3 options – see map. Each would likely have a projected lifespan of 50-80 years, and would be owned and run by the countywide service district, providing local control over future disposal fee rates).
- **Out-of-County Sites**
  - **Box Elder County Sites** (Either the Box Elder County Municipal landfill or a proposed Promontory Point landfill; both would have a projected lifespan of more than 100 years, and would be owned/run by a non-profit or public agency; uncertain if Cache County could retain control over future disposal fees).
  - **Carbon County Site** (a privately owned landfill that has a projected lifespan of at least 100 years, would require shipping waste 200 miles by rail. Cache County would not likely have control over future disposal fees)

The map below shows the approximate locations of the current county landfill (in Logan) and three proposed Cache County sites that could be used for a future landfill. Actual boundaries of future landfills would be somewhat smaller.



5. Looking at this map, PLEASE PUT AN "X" OVER THE LOCATION OF YOUR HOME.

6. Assuming one of the three potential Cache County sites (see map) is chosen for a future landfill, how concerned would you be about the following impacts:

IMPACTS	Not concerned at all					Somewhat concerned / Very Concerned
A) Impacts on rural views	0	1	2	3	4	5
B) Unpleasant noise	0	1	2	3	4	5
C) Unpleasant odors	0	1	2	3	4	5
D) Traffic from trucks hauling trash to landfill	0	1	2	3	4	5
E) Unsanitary conditions (loose trash, flies, birds, etc.)	0	1	2	3	4	5
F) Declining property values	0	1	2	3	4	5
G) Negative impacts on water quality	0	1	2	3	4	5
H) Competition for local water supplies	0	1	2	3	4	5
I) Loss of wildlife habitat	0	1	2	3	4	5
J) Loss of productive farmland	0	1	2	3	4	5
K) Decreased ability to enjoy outdoor activities	0	1	2	3	4	5
L) Negative impacts on Martin Harris Pageant in Clarkston	0	1	2	3	4	5
M) Other (specify): _____	0	1	2	3	4	5

7. **If you had to select your top three concerns from above that are more important than all the others, what would these concerns be?** *(Write the letters associated with the concern in the blanks below.)*

Most important concern: ____

2nd most important concern: ____

3rd most important concern: ____

8. **Given what you know right now, which option would you select for disposing future municipal wastes generated in Cache County?** *(Check box and follow instructions.)*

☐ Use in-county landfill ➔ *which site?*
- ○ Site #C *(north of Clarkston)*
- ○ Site #G *(between Clarkston & Newton)*
- ○ Site #I *(south of Newton & Cache Junction)*

☐ Use out-of-county landfill ➔ *which site?*
- ○ Box Elder County Municipal Landfill
- ○ Promontory Point Landfill *(Box Elder Co.)*
- ○ Carbon County Landfill

☐ Don't' know / not sure
☐ No real preference

} ➔ *continue to next page*

9. If the county agreed to pay extra to mitigate impacts from a landfill by improving the design and operation of the facility (beyond what state and federal regulations require)**,** or to compensate residents living near a future landfill by making direct monetary payments, **in your view how high a priority would be the following types of compensation?** *(Circle the number for each option that best reflects your views.)*

Type of compensation	*Low* **priority**		**Medium priority**		**High priority**
Improved Project Design:					
• Pay more to reduce visibility of landfill from local roads and homes	0	1	2	3	4
• Pay more to ensure that waste haulers do not have to pass through towns	0	1	2	3	4
• Pay more to ensure that there are no odors or smells from the facility	0	1	2	3	4
• Pay more to ensure that there are no adverse impacts on local water quality	0	1	2	3	4
• Pay more to ensure that there are no adverse impacts on wildlife habitat	0	1	2	3	4
Additional Compensation					
• Compensating local property owners for documented losses in property values.	0	1	2	3	4
• Having county take over winter road maintenance in areas near new landfill.	0	1	2	3	4
• Reducing or eliminating local garbage pickup fees to residents in the communities near the landfill.	0	1	2	3	4
• Contributions to support the Martin Harris Pageant in Clarkston.	0	1	2	3	4
• Payments to protect farmland or wildlife habitat near the landfill.	0	1	2	3	4

10. Assuming the county paid for all the programs you listed as medium or high priority above, would that change your overall preference where the future landfill should be sited (as you noted in question 8 on the last page)?

☐ YES ☐ MAYBE ☐ NO

The next series of four questions asks you to select between different pairs of alternatives. For example, in Question 11, these alternatives are labeled A and B.

- Each alternative describes a combination of potential policies and programs that could possibly be adopted (though no decision has been made yet). These include:
  - Possible annual payments to the communities located near a landfill,
  - Possible new public services provided by the county to these communities,
  - Possible landfill sites, and
  - A level of additional cost to your household for garbage pickup service.
- **For each pair, please tell us which of the two choices you prefer** (even if you do not view either alternative as ideal). Indicate your preference by putting a ✓ in the box.
- **Local community payments** could use revenues generated from waste disposal fees to make annual payments to the local communities nearest a future landfill. These payments could be used by the local governments to mitigate unwanted impacts from the landfill, to reduce local property tax burdens, or for any other public purpose.
- **New public services** could involve the County Service Area paying for staff and equipment to provide new or improved public services in the communities near a future landfill. These services could include either: (a) maintenance and improvement of local roads, particularly in the winter; (b) provision of local fire and police protection services; or (c) both.

11. If you had to choose, would you prefer Alternative A or Alternative B? *Check one box.*

	Alternative A	**Alternative B**
Local community payments	No payments	$5,000 per year
New public services	No new services	No new services
Future landfill location	Ship to Box Elder County	Use Cache County Site "I"
Added cost to your household	$5 per month	$5 per month
	☐ **I prefer Alternative A**	☐ **I prefer Alternative B**

12. If you had to choose, would you prefer Alternative C or Alternative D? *Check one box.*

	Alternative C	**Alternative D**
Local community payments	No payments	No payments
New public services	Assume police/fire services	No new services
Future landfill location	Use Cache County Site "G"	Ship to Carbon County
Added cost to your household	$10 per month	$10 per month
	☐ **I prefer Alternative C**	☐ **I prefer Alternative D**

13. If you had to choose, would you prefer Alternative E or Alternative F? *Check one box.*

	Alternative E	Alternative F
Local community payments	$10,000 per year	$50,000 per year
New public services	Assume local road maintenance	No new services
Future landfill location	Use Cache County Site "I"	Use Cache County Site "G"
Added cost to your household	$15 per month	$15 per month
	☐ **I prefer Alternative E**	☐ **I prefer Alternative F**

14. If you had to choose, would you prefer Alternative G or Alternative H? *Check one box.*

	Alternative G	Alternative H
Local community payments	No payments	No payments
New public services	No new services	No new services
Future landfill location	Use Cache County Site "I"	Ship to Box Elder County
Added cost to your household	No change	$15 per month
	☐ **I prefer Alternative G**	☐ **I prefer Alternative H**

15. On a scale of 0 to 5, how certain are you of your choices for the previous series of questions? *(Circle the number that best reflects your views.)*

Completely Uncertain			*Somewhat Certain*		*Completely Certain*
0	**1**	**2**	**3**	**4**	**5**

16. In the last few years, how much have you heard or read about the issues surrounding the <u>future</u> Cache County landfill options?

- ☐ Nothing at all ⇨ ***Skip to question 17 on the next page***
- ☐ A little
- ☐ Some
- ☐ A fair amount
- ☐ A great deal

} Continue ⇩

a. When did you first learn of the possible siting of a future landfill in this <u>area</u>?

- ☐ I hadn't heard about it before now ⇨ ***Skip to question 17 (next page)***
- ☐ In the last few months (since August)
- ☐ Earlier this year (January-July)
- ☐ In 2001
- ☐ In 2000
- ☐ Before 2000

b. How familiar are you with the Cache County landfill siting issue?

- ☐ Very familiar
- ☐ Somewhat familiar
- ☐ Slightly familiar
- ☐ Not familiar

c. From which sources have you received information regarding landfill siting issues? *(Check all that apply)*

- ☐ NONE (I haven't received any information yet)
- ☐ Newspapers
- ☐ Television
- ☐ Public meetings
- ☐ Local community leaders
- ☐ Family members
- ☐ Friends and neighbors
- ☐ Mailed newsletters and cards
- ☐ Website
- ☐ Hotline
- ☐ Other: _____

d. Please circle the one source from (c) where you get most of your information.

e. How confident are you the above sources of information have provided a complete and accurate picture of <u>the</u> <u>various</u> <u>landfill</u> <u>options</u>?

Not at all Confident			*Somewhat Confident*		*Very Confident*
0	**1**	**2**	**3**	**4**	**5**

17. Have you or any member of your household directly participated in the future county landfill siting selection process?

☐ YES ➔ *continue* ☐ NO ➔ *Skip to question 18*

If yes, **please describe the type of involvement**: _____

_____

_____

18. Did you or any member of your household attend the public open house held in Clarkston last spring regarding the future county landfill siting decision?

☐ YES ☐ NO

19. To date, how satisfied are you with the following aspects of the public participation process related to the future county landfill? *(Circle the number that reflects your views).*

ASPECT OF THE PROCESS	*Very Unsatisfied*		*Neither Satisfied or Unsatisfied*		*Very Satisfied*
Getting information <u>out</u> to the public	-2	-1	0	+1	+2
Soliciting input from the public	-2	-1	0	+1	+2
Fairness of the process	-2	-1	0	+1	+2

20. If given a chance, how would you change the public participation process? *(or, what specific steps should be done to improve the public participation process?)*

_____

_____

_____

_____

21. How much would <u>you</u> like to be involved in future public input activities related to the Cache County future landfill decision? *(Circle the number that best reflects your view.)*

Not involved at all		Somewhat involved			Very involved
0	**1**	**2**	**3**	**4**	**5**

22. In your view, how should public opinion and technical recommendations from scientists, planners, and engineers be balanced in making a decision about the future Cache County landfill location. *(Check the one box that best represents your views.)*

- ☐ Public opinion should be the only consideration.
- ☐ Public opinion should be the most important factor.
- ☐ Public opinion should be considered equally with scientific or technical recommendations.
- ☐ Scientific or technical recommendations should be the most important factor.
- ☐ Scientific or technical recommendations should be the only consideration.

Next we have some questions about your feelings toward science and government.

23. On a scale of -2 to +2 (where -2 means strongly disagree and +2 means strongly agree) **how much do you agree or disagree with the following statements?**

Statement	*Strongly Disagree*		*Neutral*		*Strongly Agree*
Scientists generally work for the well-being of the public.	-2	-1	0	+1	+2
In general, scientists cannot be trusted when they claim that a product or procedure is safe.	-2	-1	0	+1	+2
I trust my local officials to do what is in the best interests of my community.	-2	-1	0	+1	+2
I trust Cache County officials to do what is in the county's best interests.	-2	-1	0	+1	+2
The officials who will make the final decisions on the future county landfill can be trusted to make good decisions.	-2	-1	0	+1	+2
The scientists and engineers involved in siting and constructing a future county landfill can be trusted to build a facility that is safe.	-2	-1	0	+1	+2
The scientists and engineers involved in designing a future county landfill can be trusted to minimize undesirable effects on the quality of life in the surrounding community.	-2	-1	0	+1	+2

24. There are many state and federal regulations that govern the construction and operation of a modern landfill. These are designed to protect human health and environmental quality. **How confident are you that:**

	Not at all confident		*Somewhat Confident*			*Very Confident*
A future Cache County landfill will be able to meet these regulatory standards	0	1	2	3	4	5
These standards are adequate to protect human health and the environment	0	1	2	3	4	5

Next, we have a set of questions that ask about your opinions on several related issues.

25. On a scale of -2 to +2, **how much do you agree or disagree with the following statements?**

	Strongly Disagree		**Neutral**		**Strongly Agree**
I need more information about landfills before I make up my mind about which option I prefer.	-2	-1	0	+1	+2
I think the process used to select a future county landfill option has been open and fair.	-2	-1	0	+1	+2
I think residents of communities near the new county landfill should be compensated for having to live near it.	-2	-1	0	+1	+2
My opinion is likely to influence the final decision about where the future county landfill will go.	-2	-1	0	+1	+2
I think there are no real environmental dangers associated with modern landfills.	-2	-1	0	+1	+2
I would pay higher fees to be sure a future landfill is located far away from my home.	-2	-1	0	+1	+2
I would pay higher fees to ensure the future landfill is located out of Cache County.	-2	-1	0	+1	+2
I would support the county's use of condemnation powers to acquire land necessary for a future landfill.	-2	-1	0	+1	+2
Living near a landfill would not likely have much impact on my day-to-day quality of life.	-2	-1	0	+1	+2
Recycling and other programs that reduce the amount of garbage should be used to reduce the amount of trash that needs to be landfilled.	-2	-1	0	+1	+2
My monthly garbage pickup costs are too high.	-2	-1	0	+1	+2
I am satisfied with my current garbage service.	-2	-1	0	+1	+2

INFORMATION ABOUT YOU AND YOUR HOUSEHOLD

To make sense of the different perspectives of Cache County residents, and to ensure our results represent the entire population of the valley, we want to conclude this survey with a few questions about you and your household.

26. Are you male or female?

☐ MALE ☐ FEMALE

27. In what year were you born? **1 9** __ __

28. How many years have you lived in Cache County? _____ **years or** ☐ All my life

29. How many years have you lived in the Clarkston/Newton/Cache Junction area?

_____ **years or** ☐ All my life

30. How many adults 18 or over currently live in your home *(including yourself)***?** _____

31. Do any children under the age of 18 live in your home?

☐ YES → *continue* ☐ NO → *SKIP to question 32*

If yes: How many children in your home are in each of the following age groups**:**

0 to 4 years old ____ children

5 to 11 years old ____ children

12 to 17 years old ____ children

32. What is the highest level of formal education you have completed? *(Check the one box for the highest level you have completed).*

☐ Less than high school diploma
☐ High school diploma
☐ Some college, no degree
☐ Trade school or Associates (2-year) degree
☐ Bachelors degree
☐ Graduate School or Professional Degree

33. How would you describe your current occupation? *(pick the <u>one</u> that best applies)*

☐ **Employed** (*check the subcategory that best applies to you*)
- ☐ Full-time employee (salaried or wage)
- ☐ Part-time employee (salaried or wage)
- ☐ Self-employed (farm or nonfarm business)

☐ **Not Employed** (*check the sub category that best applies to you*)
- ☐ Keeping house
- ☐ Student (taking classes, going to school, on break from school)
- ☐ Unemployed (looking for work)
- ☐ Disabled (unable to work)
- ☐ Retired

☐ **Other** (please specify): _____

34. Over the last 12 months, how much of the paper, cardboard, glass, plastic, and aluminum products that you used did you recycle? *(Recycling might include dropping materials off at a recycling center or paying for a curbside pickup service. It does not include putting them in with the garbage.)*

- ☐ We recycle almost all of our recyclable wastes
- ☐ We recycle most of our recyclable wastes
- ☐ We recycle some of our recyclable wastes
- ☐ We recycle very little of our recyclable wastes
- ☐ We recycle none of our recyclable wastes

35. How many garbage carts does your household currently use? *(Write the number of each size.)*

Smaller 60-gallon size carts _____
Regular 90-gallon size carts _____
Dumpsters _____

36. How important are each of the following reasons to your decision to live in this particular community? *(For each reason, note how important it was to you.)*

REASONS	*Not Important*			*Somewhat important*		*Very Important*
I grew up here.	0	1	2	3	4	5
This community has a lot of rural character.	0	1	2	3	4	5
People in this community are very neighborly.	0	1	2	3	4	5
The area around this community has excellent natural resources.	0	1	2	3	4	5
I like the schools in this community.	0	1	2	3	4	5
The cost of living is low.	0	1	2	3	4	5
I wanted to live close to where I work.	0	1	2	3	4	5
I wanted to live close to retail and entertainment businesses.	0	1	2	3	4	5
I wanted to live in peaceful, quiet area.	0	1	2	3	4	5
This area has good access to public transportation.	0	1	2	3	4	5
This community is beautiful.	0	1	2	3	4	5
Other (specify): _____ _____	0	1	2	3	4	5

37. Over the last 5 years, how involved have you been in the following types of organizations or community activities?

Type of Organization or Activity	*Level of Involvement* *Not* **Involved**	*Somewhat Involved*		*Very* **Involved**
School organizations *(PTA, boosters, parent classroom volunteer, etc.)*	0	1	2	3
Local government *(elected official, volunteer fire dept., member of committee or board, etc.)*	0	1	2	3
Church groups *(boards, relief society, etc.)*	0	1	2	3
Civic or charity groups *(VFW, Kiwanis, Rotary, Elks, United Way, etc.)*	0	1	2	3
Youth groups **(4H, Boy or Girl Scouts, etc.)**	0	1	2	3
Recreational groups **(non-church related, regular athletic or social activities)**	0	1	2	3
Farm, business, or professional organizations	0	1	2	3
Environmental organizations	0	1	2	3

38. On a scale of –2 to +2 (with -2 being "very unhappy" and +2 being "very happy") **how happy are you currently with your life?** *(Circle the number that represents your feelings).*

-2 **-1** **0** **+1** **+2**

39. Using the same scale, **how happy do you think you would be with your life if a new landfill was constructed within 3 miles of your home?**

-2 **-1** **0** **+1** **+2**

40. Do you currently rent or own the home or apartment you are now living in?

☐ RENT ☐ OWN ☐ OTHER (specify: _____)

41. What would you estimate your total household income will be in 2002 (before taxes)?

- ☐ Under $15,000
- ☐ $15,000 to $24,999
- ☐ $25,000 to $34,999
- ☐ $35,000 to $49,999
- ☐ $50,000 to $74,999
- ☐ $75,000 and over

We would appreciate any other comments or suggestions you might have on this issue. Feel free to write them below or include them separately when you return this survey.

Thank you for your help in this important project.

Please return your completed questionnaire in the enclosed envelope to:

Institute for Social Science Research on Natural Resources
216 Old Main, UMC 0730
Utah State University
Logan, Utah 84322-0730

VERSION A

APPENDIX II:

CACHE COUNTY
version of the survey

(used in Logan and "Rest of Cache Count" samples)

CACHE COUNTY CITIZEN SURVEY

Views on Future *County Landfill Options*

Institute for Social Science Research on Natural Resources
216 Old Main, UMC 0730
Utah State University
Logan, Utah 84322-0730

Background:

As you may know, the various cities and towns in Cache County that rely on the Logan Landfill to dispose of their trash have realized that the current landfill will likely fill to capacity in another 15-20 years.

Over the last 3 years, a Citizens Advisory Committee (with members appointed by the Cache County Council and the City of Logan) and a technical review committee of engineers, planners, and health department professionals have been evaluating various options for future municipal waste disposal.

In the spring of 2002, these committees identified several possible future landfill sites located in Cache County that meet basic technical and environmental criteria for landfills. All three of these sites are in the Clarkston, Newton, and Cache Junction area.

At the same time, they asked that options for shipping waste to 3 possible landfills in Box Elder and Carbon counties also be evaluated. A technical evaluation of both the in- and out-of-county options will be available for public review in the spring of 2003.

This fall, the Citizens Advisory Committee requested that an independent team of Utah State University researchers collect information about the views and perspectives of Cache County residents towards the various future landfill options. They are seeking guidance as they weigh their various alternatives.

This questionnaire is critical to the Citizens Advisory Committee's efforts to find out what members of the community like you want to do with our future municipal solid wastes. In other words, **your opinion is very important to the people who are going to be responsible for recommending the site of the future county landfill.**

Since only a small number of households were selected to participate in this study, every response is required to provide a scientific estimate of the views of this community.

We estimate you will spend approximately 20 minutes completing this survey.

➔ **REMEMBER: Please have the adult (18 years old or over) living in your household who has had the most recent birthday complete this questionnaire.**

Before we ask about your views on future landfill alternatives for Cache County, we are interested in your use of the current county landfill.

1. **Do you know where the current county landfill is located?**

   ☐ YES ☐ NO ☐ NOT SURE

2. **Has any member of your household ever personally taken trash, recyclables, or green waste to the current landfill?**

   ☐ YES ☐ NO ☐ NOT SURE

3. **On balance, how has your day-to-day quality of life been affected by the current landfill?**

   ☐ Strong negative impact
   ☐ Weak negative impact
   ☐ No real impact
   ☐ Weak positive impact
   ☐ Strong positive impact
   ☐ Not sure

Ultimately, there are many advantages and disadvantages associated with each of the future county landfill options. To help decision-makers weigh the various issues, we need to know how important each of the following considerations is to you.

4. **Imagine you have $100 to allocate among the following issues. How much would you spend on each issue?** *(In other words, the amount you allocate reflects the relative weight you think decision-makers should place on each issue. Remember, the total has to add up to $100.)*

   $_____ **Cost** (picking an option that minimizes garbage pickup fees charged to households).

   $_____ **Local Control** (picking an option where local officials can control future price increases and day-to-day operation of the landfill)

   $_____ **Reliability** (picking an option where the technology is well established and liability risks to local governments are minimized)

   $_____ **Environmental protection** (picking an option that best protects water quality, productive farmland, and wildlife habitat)

   $_____ **Isolation** (picking an option where there are the least number of people living within a 1 to 2-mile radius of the facility)

   $_____ **Local Support** (picking an option which has the least opposition from nearby residents)

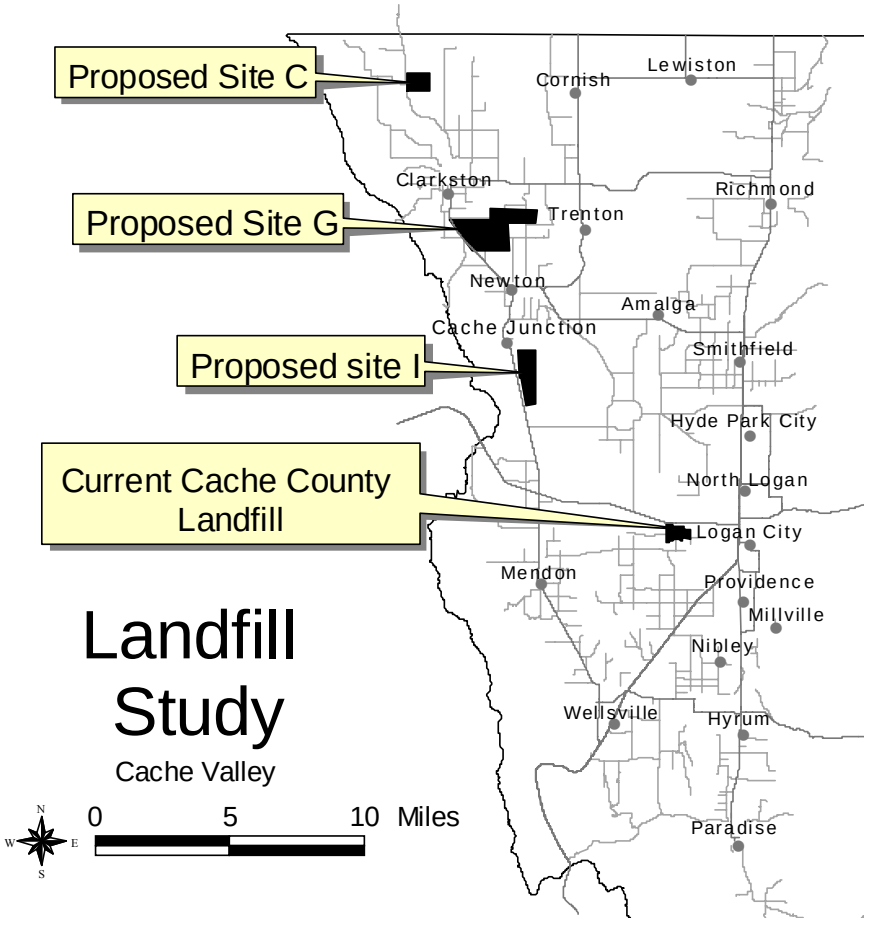
   $_____ **Distance** (picking an option which is closest to where most trash is generated)

   $ 100 TOTAL

BRIEF DESCRIPTION OF POSSIBLE FUTURE LANDFILL LOCATIONS

- **Cache County Sites** (3 options – see map. Each would likely have a projected lifespan of 50-80 years, and would be owned and run by the countywide service district, providing local control over future disposal fee rates).
- **Out-of-County Sites**
  - **Box Elder County Sites** (Either the Box Elder County Municipal landfill or a proposed Promontory Point landfill; both would have a projected lifespan of more than 100 years, and would be owned/run by a non-profit or public agency; uncertain if Cache County could retain control over future disposal fees).
  - **Carbon County Site** (a privately owned landfill that has a projected lifespan of at least 100 years, and would require shipping waste 200 miles by rail. Cache County would not likely have control over future disposal fees)

The map below shows the approximate locations of the current county landfill (in Logan) and three proposed Cache County sites that could be used for a future landfill. Actual boundaries of future landfills would be somewhat smaller.



5. Looking at this map, PLEASE PUT AN "X" OVER THE LOCATION OF YOUR HOME.

6. Assuming one of the three potential Cache County sites (see map) is chosen for a future landfill, how concerned would you be about the following impacts:

IMPACTS	Not concerned at all			Somewhat concerned		Very Concerned
N) Impacts on rural views	0	1	2	3	4	5
O) Unpleasant noise	0	1	2	3	4	5
P) Unpleasant odors	0	1	2	3	4	5
Q) Traffic from trucks hauling trash to landfill	0	1	2	3	4	5
R) Unsanitary conditions (loose trash, flies, birds, etc.)	0	1	2	3	4	5
S) Declining property values	0	1	2	3	4	5
T) Negative impacts on water quality	0	1	2	3	4	5
U) Competition for local water supplies	0	1	2	3	4	5
V) Loss of wildlife habitat	0	1	2	3	4	5
W) Loss of productive farmland	0	1	2	3	4	5
X) Decreased ability to enjoy outdoor activities	0	1	2	3	4	5
Y) Negative impacts on Martin Harris Pageant in Clarkston	0	1	2	3	4	5
Z) Other (specify): _____	0	1	2	3	4	5

7. **If you had to select your top three concerns from above that are more important than all the others, what would these concerns be?** *(Write the letters associated with the concern in the blanks below.)*

Most important concern: ____

2nd most important concern: ____

3rd most important concern: ____

8. Given what you know right now, which option would you select for disposing future municipal wastes generated in Cache County? *(Check box and follow instructions.)*

☐ Use in-county landfill ➔ *which site?*
- ○ Site #C *(north of Clarkston)*
- ○ Site #G *(between Clarkston & Newton)*
- ○ Site #I *(south of Newton & Cache Junction)*

☐ Use out-of-county landfill ➔ *which site?*
- ○ Box Elder County Municipal Landfill
- ○ Promontory Point Landfill *(Box Elder Co.)*
- ○ Carbon County Landfill

☐ Don't' know / not sure
☐ No real preference

} ➔ *continue to next page*

9. If the county agreed to pay extra to mitigate impacts from a landfill by improving the design and operation of the facility (beyond what state and federal regulations require)**,** or to compensate residents living near a future landfill by making direct monetary payments, **in your view how high a priority would be the following types of compensation?** *(Circle the number for each option that best reflects your views.)*

Type of compensation	*Low* **priority**		**Medium priority**		**High priority**
Improved Project Design:					
• Pay more to reduce visibility of landfill from local roads and homes	0	1	2	3	4
• Pay more to ensure that waste haulers do not have to pass through towns	0	1	2	3	4
• Pay more to ensure that there are no odors or smells from the facility	0	1	2	3	4
• Pay more to ensure that there are no adverse impacts on local water quality	0	1	2	3	4
• Pay more to ensure that there are no adverse impacts on wildlife habitat	0	1	2	3	4
Additional Compensation					
• Compensating local property owners for documented losses in property values.	0	1	2	3	4
• Having county take over winter road maintenance in areas near new landfill.	0	1	2	3	4
• Reducing or eliminating local garbage pickup fees to residents in the communities near the landfill.	0	1	2	3	4
• Contributions to support the Martin Harris Pageant in Clarkston.	0	1	2	3	4
• Payments to protect farmland or wildlife habitat near the landfill.	0	1	2	3	4

10. Assuming the county paid for all the programs you listed as medium or high priority above, would that change your overall preference where the future landfill should be sited (as you noted in question 8 on the last page)?

☐ YES ☐ MAYBE ☐ NO

11. If the three sites near Clarkston and Newton were not selected, how willing would you be to consider siting the new county landfill within 3 miles of your home?

Not at all willing			Somewhat willing		Very willing
0	**1**	**2**	**3**	**4**	**5**

The next series of four questions asks you to select between different pairs of alternatives. For example, in Question 12, these alternatives are labeled A and B.

- Each alternative describes a combination of potential policies and programs that could possibly be adopted (though no decision has been made yet). These include:
  - Possible annual payments to the communities located near a landfill,
  - Possible new public services provided by the county to these communities,
  - Possible landfill sites, and
  - A level of additional cost to your household for garbage pickup service.
- **For each pair, please tell us which of the two choices you prefer** (even if you do not view either alternative as ideal). Indicate your preference by putting a ✓ in the box.
- **Local community payments** could use revenues generated from waste disposal fees to make annual payments to the local communities nearest a future landfill. These payments could be used by the local governments to mitigate unwanted impacts from the landfill, to reduce local property tax burdens, or for any other public purpose.
- **New public services** could involve the County Service Area paying for staff and equipment to provide new or improved public services in the communities near a future landfill. These services could include either: (a) maintenance and improvement of local roads, particularly in the winter; (b) provision of local fire and police protection services; or (c) both.

12. If you had to choose, would you prefer Alternative A or Alternative B? *Check one box.*

	Alternative A	**Alternative B**
Local community payments	No payments	$5,000 per year
New public services	No new services	No new services
Future landfill location	Ship to Carbon County	Use Cache County Site "I"
Added cost to your household	$10 per month	$10 per month
	☐ **I prefer Alternative A**	☐ **I prefer Alternative B**

13. If you had to choose, would you prefer Alternative C or Alternative D? *Check one box.*

	Alternative C	**Alternative D**
Local community payments	No payments	No payments
New public services	No new services	Assume police/fire services
Future landfill location	Ship to Box Elder County	Use Cache County Site "G"
Added cost to your household	$15 per month	$15 per month
	☐ **I prefer Alternative C**	☐ **I prefer Alternative D**

14. If you had to choose, would you prefer Alternative E or Alternative F? *Check one box.*

	Alternative E	Alternative F
Local community payments	$50,000 per year	$10,000 per year
New public services	Assume police/fire services	Assume local road maintenance and police/fire services
Future landfill location	Use Cache County Site "C"	Use Cache County Site "C"
Added cost to your household	$5 per month	$5 per month
	☐ **I prefer Alternative E**	☐ **I prefer Alternative F**

15. If you had to choose, would you prefer Alternative G or Alternative H? *Check one box.*

	Alternative G	Alternative H
Local community payments	No payments	No payments
New public services	No new services	No new services
Future landfill location	Ship to Carbon County	Use Cache County site "G"
Added cost to your household	$5 per month	No change
	☐ **I prefer Alternative G**	☐ **I prefer Alternative H**

16. On a scale of 0 to 5, how certain are you of your choices for the previous series of questions? *(Circle the number that best reflects your views.)*

Completely Uncertain			*Somewhat Certain*		*Completely Certain*
0	**1**	**2**	**3**	**4**	**5**

17. Have you ever been to Clarkston or Newton (in northwestern Cache County)?

☐ YES ☐ NO ☐ NOT SURE

18. How familiar are you with the Clarkston and Newton area?

☐ Very familiar ☐ Somewhat familiar ☐ Slightly familiar ☐ Not familiar

19. In the last few years, how much have you heard or read about the issues surrounding the <u>future</u> Cache County landfill options?

- ☐ Nothing at all ⇨ ***Skip to question 21 below***
- ☐ A little
- ☐ Some
- ☐ A fair amount
- ☐ A great deal

} Continue ⇩

a. How familiar are you with these issues?

☐ Very familiar ☐ Somewhat familiar ☐ Slightly familiar ☐ Not familiar

b. From which sources have you received information regarding landfill siting issues? *(Check all that apply)*

- ☐ NONE (I haven't received any information yet)
- ☐ Newspapers
- ☐ Television
- ☐ Public meetings
- ☐ Local community leaders
- ☐ Family members
- ☐ Friends and neighbors
- ☐ Mailed newsletters and cards
- ☐ Website
- ☐ Hotline
- ☐ Other: _____

c. Please circle the one source where you get most of your information.

20. To date, how satisfied are you with the following aspects of the public participation process related to the future county landfill? *(Circle the number that reflects your views).*

ASPECT OF THE PROCESS	*Very Unsatisfied*		*Neither Satisfied or Unsatisfied*		*Very Satisfied*
Getting information <u>out</u> to the public	-2	-1	0	+1	+2
Soliciting input from the public	-2	-1	0	+1	+2
Fairness of the process	-2	-1	0	+1	+2

21. How much would <u>you</u> like to be involved in future public input activities related to the Cache County future landfill decision? *(Circle the number that best reflects your view.)*

<u>Not involved at all</u>		<u>Somewhat involved</u>			<u>Very involved</u>
0	**1**	**2**	**3**	**4**	**5**

22. In your view, how should public opinion and technical recommendations from scientists, planners, and engineers be balanced in making a decision about the future Cache County landfill location. *(Check the one box that best represents your views.)*

- ☐ Public opinion should be the only consideration.
- ☐ Public opinion should be the most important factor.
- ☐ Public opinion should be considered equally with scientific or technical recommendations.
- ☐ Scientific or technical recommendations should be the most important factor.
- ☐ Scientific or technical recommendations should be the only consideration.

23. On a scale of -2 to +2 (where -2 means strongly disagree and +2 means strongly agree) **how much do you agree or disagree with the following statements?**

Statement	*Strongly Disagree*		*Neutral*		*Strongly Agree*
Scientists generally work for the well-being of the public.	-2	-1	0	+1	+2
In general, scientists cannot be trusted when they claim that a product or procedure is safe.	-2	-1	0	+1	+2
I trust my local officials to do what is in the best interests of my community.	-2	-1	0	+1	+2
I trust Cache County officials to do what is in the county's best interests.	-2	-1	0	+1	+2
The officials who will make the final decisions on the future county landfill can be trusted to make good decisions.	-2	-1	0	+1	+2
The scientists and engineers involved in siting and constructing a future county landfill can be trusted to build a facility that is safe.	-2	-1	0	+1	+2
The scientists and engineers involved in designing a future county landfill can be trusted to minimize undesirable effects on the quality of life in the surrounding community.	-2	-1	0	+1	+2

24. There are many state and federal regulations that govern the construction and operation of a modern landfill. These are designed to protect human health and environmental quality. **How confident are you that:**

	Not at all confident		*Somewhat Confident*			*Very Confident*
A future Cache County landfill will be able to meet these regulatory standards	0	1	2	3	4	5
These standards are adequate to protect human health and the environment	0	1	2	3	4	5

Next, we have a set of questions that ask about your opinions on several related issues.

25. On a scale of -2 to +2, **how much do you agree or disagree with the following statements?**

	Strongly Disagree		**Neutral**		**Strongly Agree**
I need more information about landfills before I make up my mind about which option I prefer.	-2	-1	0	+1	+2
I think the process used to select a future county landfill option has been open and fair.	-2	-1	0	+1	+2
I think residents of communities near the new county landfill should be compensated for having to live near it.	-2	-1	0	+1	+2
My opinion is likely to influence the final decision about where the future county landfill will go.	-2	-1	0	+1	+2
I think there are no real environmental dangers associated with modern landfills.	-2	-1	0	+1	+2
I would pay higher fees to be sure a future landfill is located far away from my home.	-2	-1	0	+1	+2
I would pay higher fees to ensure the future landfill is located out of Cache County.	-2	-1	0	+1	+2
I would support the county's use of condemnation powers to acquire land necessary for a future landfill.	-2	-1	0	+1	+2
Living near a landfill would not likely have much impact on my day-to-day quality of life.	-2	-1	0	+1	+2
Recycling and other programs that reduce the amount of garbage should be used to reduce the amount of trash that needs to be landfilled.	-2	-1	0	+1	+2
My monthly garbage pickup costs are too high.	-2	-1	0	+1	+2
I am satisfied with my current garbage service.	-2	-1	0	+1	+2

INFORMATION ABOUT YOU AND YOUR HOUSEHOLD

To make sense of the different perspectives of Cache County residents, and to ensure our results represent the entire population of the valley, we want to conclude this survey with a few questions about you and your household.

26. Are you male or female?

☐ MALE ☐ FEMALE

27. In what year were you born? **1 9** __ __

28. How many years have you lived in Cache County?

_____ **years or** ☐ All my life

29. How many years have you lived in this particular community?

_____ **years or** ☐ All my life

30. How many adults 18 or over currently live in your home *(including yourself)***?** _____

31. Do any children under the age of 18 live in your home?

☐ YES → *continue* ☐ NO → *SKIP to question 32*

If yes: How many children in your home are in each of the following age groups**:**

0 to 4 years old ____ children

5 to 11 years old ____ children

12 to 17 years old ____ children

32. What is the highest level of formal education you have completed? *(Check the one box for the highest level you have completed).*

☐ Less than high school diploma
☐ High school diploma
☐ Some college, no degree
☐ Trade school or Associates (2-year) degree
☐ Bachelors degree
☐ Graduate School or Professional Degree

33. How would you describe your current occupation? *(pick the <u>one</u> that best applies)*

☐ **Employed** (*check the subcategory that best applies to you*)
- ☐ Full-time employee (salaried or wage)
- ☐ Part-time employee (salaried or wage)
- ☐ Self-employed (farm or nonfarm business)

☐ **Not Employed** (*check the sub category that best applies to you*)
- ☐ Keeping house
- ☐ Student (taking classes, going to school, on break from school)
- ☐ Unemployed (looking for work)
- ☐ Disabled (unable to work)
- ☐ Retired

☐ **Other** (please specify): _____

34. Over the last 12 months, how much of the paper, cardboard, glass, plastic, and aluminum products that you used did you recycle? *(Recycling might include dropping materials off at a recycling center or paying for a curbside pickup service. It does not include putting them in with the garbage.)*

- ☐ We recycle almost all of our recyclable wastes
- ☐ We recycle most of our recyclable wastes
- ☐ We recycle some of our recyclable wastes
- ☐ We recycle very little of our recyclable wastes
- ☐ We recycle none of our recyclable wastes

35. How many garbage carts does your household currently use? *(Write the number of each size.)*

Smaller 60-gallon size carts _____
Regular 90-gallon size carts _____
Dumpsters _____

36. How important are each of the following reasons to your decision to live in this particular community? *(For each reason, note how important it was to you.)*

REASONS	*Not Important*			*Somewhat important*		*Very Important*
I grew up here.	0	1	2	3	4	5
This community has a lot of rural character.	0	1	2	3	4	5
People in this community are very neighborly.	0	1	2	3	4	5
The area around this community has excellent natural resources.	0	1	2	3	4	5
I like the schools in this community.	0	1	2	3	4	5
The cost of living is low.	0	1	2	3	4	5
I wanted to live close to where I work.	0	1	2	3	4	5
I wanted to live close to retail and entertainment businesses.	0	1	2	3	4	5
I wanted to live in peaceful, quiet area.	0	1	2	3	4	5
This area has good access to public transportation.	0	1	2	3	4	5
This community is beautiful.	0	1	2	3	4	5
Other (specify): _____ _____	0	1	2	3	4	5

37. Over the last 5 years, how involved have you been in the following types of organizations or community activities?

Type of Organization or Activity	*Level of Involvement* *Not* **Involved**	*Somewhat Involved*		*Very* **Involved**
School organizations *(PTA, boosters, parent classroom volunteer, etc.)*	0	1	2	3
Local government *(elected official, volunteer fire dept., member of committee or board, etc.)*	0	1	2	3
Church groups *(boards, relief society, etc.)*	0	1	2	3
Civic or charity groups *(VFW, Kiwanis, Rotary, Elks, United Way, etc.)*	0	1	2	3
Youth groups **(4H, Boy or Girl Scouts, etc.)**	0	1	2	3
Recreational groups **(non-church related, regular athletic or social activities)**	0	1	2	3
Farm, business, or professional organizations	0	1	2	3
Environmental organizations	0	1	2	3

38. On a scale of –2 to +2 (with -2 being "very unhappy" and +2 being "very happy") **how happy are you currently with your life?** *(Circle the number that represents your feelings).*

-2 **-1** **0** **+1** **+2**

39. Using the same scale, **how happy do you think you would be with your life if a new landfill was constructed within 3 miles of your home?**

-2 **-1** **0** **+1** **+2**

40. Do you currently rent or own the home or apartment you are now living in?

☐ RENT ☐ OWN ☐ OTHER (specify: _____)

41. What would you estimate your total household income will be in 2002 (before taxes)?

- ☐ Under $15,000
- ☐ $15,000 to $24,999
- ☐ $25,000 to $34,999
- ☐ $35,000 to $49,999
- ☐ $50,000 to $74,999
- ☐ $75,000 and over

We would appreciate any other comments or suggestions you might have on this issue. We have provided space below and on the back cover for you to use.

We would appreciate any other comments or suggestions you might have on this issue. Feel free to write them below or include them separately when you return this survey.

Thank you for your help in this important project.

Please return your completed questionnaire in the enclosed envelope to:

Institute for Social Science Research on Natural Resources
216 Old Main, UMC 0730
Utah State University
Logan, Utah 84322-0730

VERSION B

APPENDIX III:

Versions of the Economic Valuation Choice Questions
(All eight versions appear in the CNCJ and CACHE surveys)

Version A

Annual Payments	No payments	$5,000 per year
Future Landfill Location	Ship to Box Elder County	Use Cache County Site "I"
New public services	No new services	No new services
Added cost to your household	$5 per month	$5 per month

Annual Payments	No payments	No payments
Future Landfill Location	Use Cache County Site "G"	Ship to Carbon County
New public services	Assume police/fire services	No new services
Added cost to your household	$10 per month	$10 per month

Annual Payments	$10,000 per year	$50,000 per year
Future Landfill Location	Use Cache County Site "I"	Use Cache County Site "G"
New public services	Assume local road maintenance	No new services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Use Cache County Site "I"	Ship to Box Elder County
New public services	No new services	No new services
Added cost to your household	No change	$15 per month

Version B

Annual Payments	No payments	$5,000 per year
Future Landfill Location	Ship to Carbon County	Use Cache County Site "I"
New public services	No new services	No new services
Added cost to your household	$10 per month	$10 per month

Annual Payments	No payments	No payments
Future Landfill Location	Ship to Box Elder County	Use Cache County Site "G"
New public services	No new services	Assume police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	$50,000 per year	$10,000 per year
Future Landfill Location	Use Cache County Site "C"	Use Cache County Site "C"
New public services	Assume police/fire services	Assume local road maintenance and police/fire services
Added cost to your household	$5 per month	$5 per month

Annual Payments	No payments	No payments
Future Landfill Location	Ship to Carbon County	Use Cache County Site "G"
New public services	No new services	No new services
Added cost to your household	$5 per month	No change

Version C

Annual Payments	No payments	$5,000 per year
Future Landfill Location	Ship to Box Elder County	Use Cache County Site “C”
New public services	No new services	No new services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Ship to Carbon County	Use Cache County Site “C”
New public services	No new services	Assume local road maintenance and police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	$50,000 per year	$10,000 per year
Future Landfill Location	Use Cache County Site “G”	Use Cache County Site “I”
New public services	No new services	Assume police/fire services
Added cost to your household	$5 per month	$5 per month

Annual Payments	No payments	No payments
Future Landfill Location	Ship to Box Elder County	Use Cache County Site “C”
New public services	No new services	No new services
Added cost to your household	$5 per month	No change

Version D

Annual Payments	No payments	$50,000 per year
Future Landfill Location	Ship to Carbon County	Use Cache County Site "C"
New public services	No new services	No new services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Ship to Carbon County	Use Cache County Site "C"
New public services	No new services	Assume local road maintenance
Added cost to your household	$10 per month	$10 per month

Annual Payments	$10,000 per year	$50,000 per year
Future Landfill Location	Use Cache County Site "G"	Use Cache County Site "G"
New public services	Assume local road maintenance and police/fire services	Assume police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Use Cache County Site "C"	Ship to Carbon County
New public services	No new services	No new services
Added cost to your household	$5 per month	$15 per month

Version E

Annual Payments	$50,000 per year	No payments
Future Landfill Location	Use Cache County Site "G"	Ship to Box Elder County
New public services	No new services	No new services
Added cost to your household	$5 per month	$5 per month

Annual Payments	No payments	No payments
Future Landfill Location	Box Elder Country Site	Use Cache County Site "I"
New public services	No new services	Assume local road maintenance and police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	$5,000 per year
Future Landfill Location	Use Cache County Site "G"	Use Cache County Site "I"
New public services	Assume police/fire services	No new services
Added cost to your household	$10 per month	$10 per month

Annual Payments	No payments	No payments
Future Landfill Location	Ship to Carbon County	Use Cache County Site "I"
New public services	No new services	No new services
Added cost to your household	$15 per month	$5 per month

Version F

Annual Payments	$10,000 per year	No payments
Future Landfill Location	Use Cache County Site "G"	Ship to Carbon County
New public services	No new services	No new services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Box Elder Country Site	Use Cache County Site "G"
New public services	No new services	Assume local road maintenance
Added cost to your household	$5 per month	$5 per month

Annual Payments	$50,000 per year	No payments
Future Landfill Location	Use Cache County Site "I"	Use Cache County Site "I"
New public services	No new services	Assume local road maintenance and police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Use Cache County Site "I"	Use Cache County Site "C"
New public services	No new services	No new services
Added cost to your household	$5 per month	No change

Version G

Annual Payments	$5,000 per year	No payments
Future Landfill Location	Use Cache County Site "I"	Ship to Carbon County
New public services	No new services	No new services
Added cost to your household	$5 per month	$5 per month

Annual Payments	No payments	No payments
Future Landfill Location	Ship to Carbon County	Use Cache County Site "I"
New public services	No new services	Assume local road maintenance and police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	$10,000
Future Landfill Location	Ship to Box Elder County	Use Cache County Site "G"
New public services	No new services	Assume local road maintenance and police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Use Cache County Site "C"	Box Elder Country Site
New public services	No new services	No new services
Added cost to your household	$5 per month	$15 per month

Version H

Annual Payments	No payments	$50,000 per year
Future Landfill Location	Ship to Box Elder County	Use Cache County Site "G"
New public services	No new services	No new services
Added cost to your household	$10 per month	$10 per month

Annual Payments	No payments	No payments
Future Landfill Location	Use Cache County Site "C"	Ship to Carbon County
New public services	Assume local road maintenance and police/fire services	No new services
Added cost to your household	$15 per month	$15 per month

Annual Payments	$50,000 per year	$10,000
Future Landfill Location	Use Cache County Site "C"	Use Cache County Site "C"
New public services	No new services	Assume police/fire services
Added cost to your household	$15 per month	$15 per month

Annual Payments	No payments	No payments
Future Landfill Location	Use Cache County Site "G"	Ship to Box Elder County
New public services	No new services	No new services
Added cost to your household	$5 per month	$15 per month