

**Illegal Dumping in Northern Nevada:
Resident Perceptions and Willingness to Pay for
Expanded Cleanup and Enforcement**

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Introduction

During the fall of 2009, students from the University of Nevada, Reno's Resource Economics Department 100-level course, "Society and the Economic Value of Nature," conducted a survey of Reno and Sparks, Nevada residents to assess Northern Nevada resident attitudes regarding illegal dumping and willingness to pay to alleviate illegal dumping on public lands. The course project served as a service-learning project conducted for the Illegal Dumping Task Force and Keep Truckee Meadows Beautiful¹. The project was intended to teach students the externality issues that result from common resources, illegal dumping in this case, and the options society has to alleviate or correct externalities. Students worked in ten separate groups and each group was assigned a zip code or group of zip codes in the Reno/Sparks area in which to conduct their surveys. The surveys were conducted in-person in public areas such as parks and shopping centers. A total of 452 usable surveys were completed across 18 separate zip codes. This report outlines the results of the survey.

The Externalities of Illegal Dumping

Common resources are resources that may be used by all residents, including regional and city parks, wilderness areas, and Forest Service and Bureau of Land Management public lands. A plight of common resources is that they can be subject to overuse or inappropriate use, which has the effect of reducing the enjoyment or ability to use the resource by other parties, thus creating a negative externality. Illegal dumping, i.e. the disposal of trash and other consumer goods on private or public lands, is a negative externality because its effects are not compensated by or paid for by the illegal dumping offender and therefore generate a cost to society.

Illegal dumping poses risks to human, animal, and environmental health and safety on public lands. Dumpsites on public lands, considered a form of vandalism, are unattractive and negatively affect the outdoor experience of public land users, while dumpsites near residential neighborhoods may reduce home values. Dumped items can lead to water and air pollution or contamination, and create brush fire hazards. Illegally dumped vehicles, fencing, and electronic equipment can cause harm to both domestic and wild animals that may be cut, become entwined, or be exposed to chemicals. Additionally, lost revenue in the form of foregone dumping fees and vehicle scrapping (metal and parts) may result.

According to the EPA Illegal Dumping Prevention Guidebook², illegal dumping typically occurs in areas with limited access to convenient, affordable waste disposal and recycling facilities and in areas with a high population of renters, who don't have a stake in the community as property owners do. The EPA

¹ Keep Truckee Meadows Beautiful (KTMB) is a small local nonprofit focused on beautification of the Truckee Meadows and education of community members since its inception in 1989. The Illegal Dumping Task Force was created through KTMB in 2006 and is made up of government agencies, nonprofit groups and private citizens concerned with the blight of illegal dumping in the community. The Task Force has successfully mapped known areas of illegal dumping in the community, rallied hundreds of volunteers to clean up over 300 tons of trash and debris and has embarked on a campaign to raise awareness about alternatives to illegal dumping and the legal consequences of dumping.

² United States Environmental Protection Agency (2008). "Region 5 Illegal Dumping Prevention Guidebook." Publication Number EPA905-B-97-001.

report also states that illegal dumping is common on unsecured properties, undeveloped lots, unused facilities, abandoned structures, remote spaces, poorly lit roads, highways, alleys, construction sites, public areas, border areas, and rural areas. In rural areas, the incidence of dumping may be attributed to long-standing common practice, or might be a result of a lack of routine or affordable waste pick up service. Landfills and transfer stations with minimum tipping fees or minimum load sizes, or which are perceived to have an inconvenient location or exorbitant disposal fees, may also increase the incidence of illegal dumping. Additionally, materials that are prohibited from landfills are often dumped illegally.

Like other common resource externalities, government policy options may serve to alleviate the incidence of illegal dumping. Essentially, these options internalize the externality by passing the cost to society as taxes, fees, and permits. Taxes may be instated to pay for dump site cleanup or regulate the common resource through law enforcement and prosecution of dumping offenders. Fees or permits may be also levied on the use of a common resource; U.S. National parks and monuments provide an example. The most drastic option is to subdivide public lands and convert them to private property. This study examined resident willingness to pay for taxation and permit fee alternatives.



Demographics

Demographic information was collected from survey respondents to better understand how these demographics affect perceptions of illegal dumping, and to compare the survey population with that of the population of Nevada. The more similar a survey sample is to the general population, the more likely it is that the survey responses are representative of the population.

Comparison of Demographics from Survey Sample and Nevada Census		
Demographic	Survey Sample	Nevada
Median Age (in years)	27.0	35.8 ^a
Female (percent of total)	50.0%	49.1% ^b
Children in household (percent of total)	34.7%	25.7% ^b
Seniors over age 65 in household (percent of total)	10.0%	11.4% ^b
Median household income (range)	\$37,000-\$50,000	\$56,348 ^a
Home ownership (percent of total)	58.0%	60.9% ^c
High School diploma or higher (percent of total)	97.1%	83.7% ^a
Bachelor's degree or higher (percent of total)	34.5%	21.4% ^a
Caucasian (percent of total)	74.3%	74.9% ^a

^a Data from U.S. Census American Community Survey 2006-2008; ^b Data from U.S. Census Bureau, 2008; ^c Data from U.S. Census Bureau, 2000

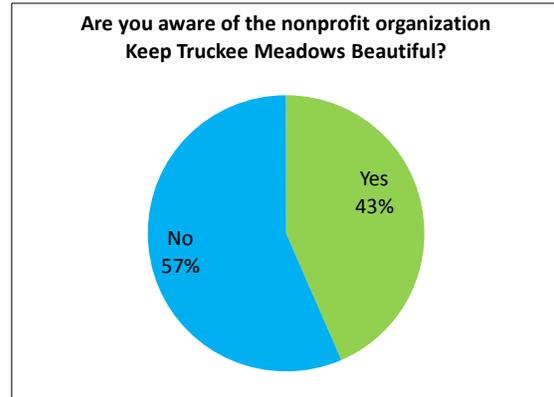
The median age of the survey sample was substantially lower than the state Census estimate. This is to be expected, as 18% of the population identified themselves as students. With regards to gender, the survey sample was representative of Nevada. A much greater proportion of the survey sample had children 18 and younger in their household, which may be attributed to the higher number of students in the sample. It is also possible that the students who conducted the survey were more comfortable approaching younger people to complete the survey. The sample was representative, however, with regards to the number of seniors in the household. The median income range for the sample was lower than the median income for the state, which may also be attributed to the high proportion of students in the sample. Home ownership was also representative of state levels. With regards to race, specifically Caucasian, the survey sample was representative of Nevada. The survey sample boasted a higher proportion of high school graduates and persons with a four-year degree than the state. This may again be attributed to the number of students in the sample.

Resident Perceptions and Awareness of Illegal Dumping

The following questions were asked to create a better understanding of resident perceptions of illegal dumping, awareness of efforts made to reduce illegal dumping, and willingness to take action to reduce illegal dumping.

Question: “Are you aware of the nonprofit organization Keep Truckee Meadows Beautiful?”

Survey respondents were asked whether they were familiar with the nonprofit organization Keep Truckee Meadows Beautiful (KTMB). Less than half of respondents, 43% (196 respondents), said they were aware of KTMB while the other 57% (255 respondents) were not aware of KTMB.

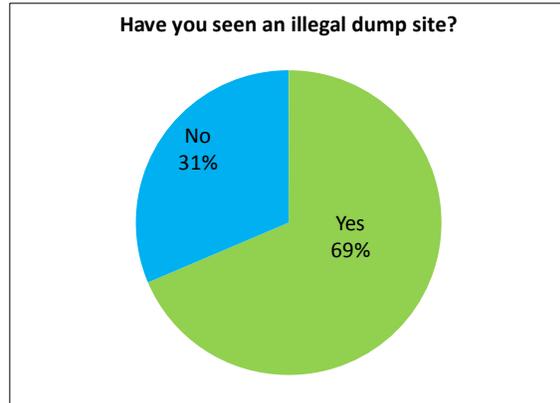


The table below analyzes responses to this question by participation in recreational activity which can be used by KTMB to target future educational campaigns. Respondents were asked whether they participate in a variety of recreational activities on public lands and if so, how frequently. The table below shows the number of respondents who participated in each activity on at least a monthly basis, and those who participated in the activity on at least a monthly basis and were aware of KTMB. Respondents who bike and run and/or hike on public lands at least once per month had the greatest likelihood of being aware of KTMB with more than one-third of respondents indicating their awareness. More than one quarter of respondents who participate in ATV sports, hunting, and horseback riding at least once per month were aware of KTMB. KTMB can use this information to target educational campaigns among recreationalists by attempting to increase awareness among the groups with lower percentages and by recruiting recreationalists from the more aware groups for volunteer opportunities geared toward their specific outdoors interest.

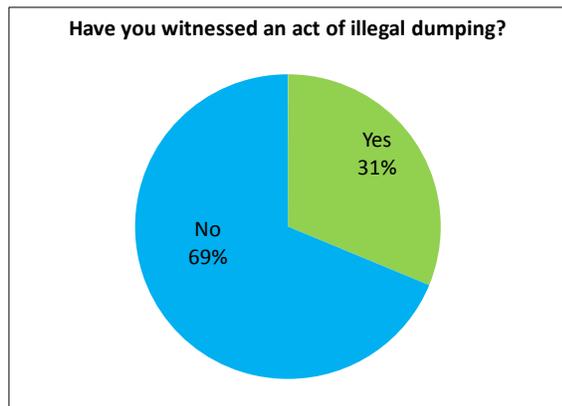
Activity	Number of Respondents Who Participate in Activity	Number of Respondents Aware of KTMB	Percentage of Respondents Aware of KTMB
Hiking/Running	293	99	34%
Biking	207	75	36%
Fishing	182	41	23%
Camping	269	53	20%
Hunting	113	31	27%
ATV sports	118	33	28%
Horseback riding	67	18	27%
River sports	196	28	14%

Question: “Have you previously seen an illegal dumping site?”

Survey respondents were asked whether they had seen an illegal dump site in the past. Over two-thirds of respondents had seen a dump site, with 69% (310 respondents) confirming that they had, while the remaining 31% (142 respondents) had not.



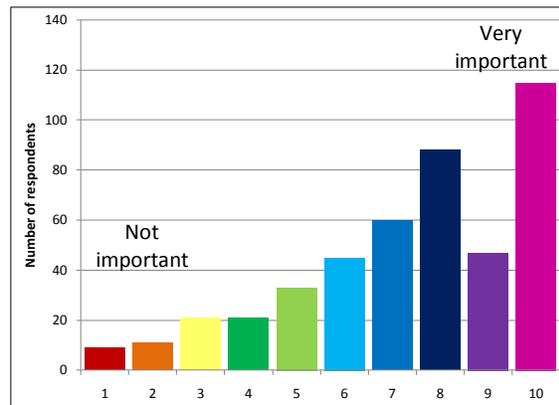
Question: “Have you previously witnessed an act of illegal dumping?”



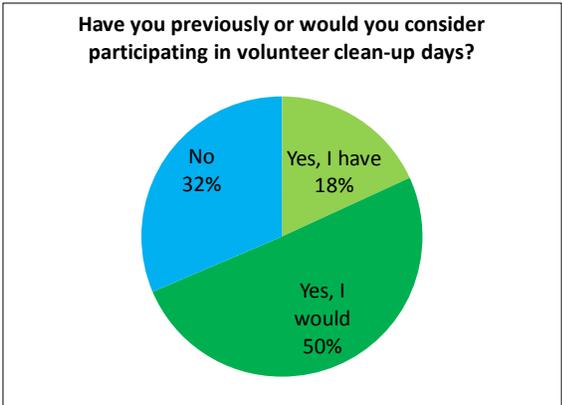
Survey respondents were asked whether or not they had witnessed an act of illegal dumping. About one-third of respondents, 31% (141 respondents) had witnessed an act of illegal dumping, while the other 69% (310 respondents) had not.

Question: “On a scale of 1-10, where 1 is *not important* and 10 is *very important*, how would you rate the importance of eliminating illegal dumping in Northern Nevada?”

Respondents were asked to rate the importance of eliminating illegal dumping in Northern Nevada on a scale of 1 to 10, where 1 indicates it is not important, and 10 indicates it is very important. The average rating for the entire survey population was 7.36, indicating that on average, respondents found the issue to be important. Additionally, 56% (250 respondents) of respondents rated eliminating illegal dumping as very important (8-10), while only 9% (41 respondents) rated it as not important (1-3). This shows an interest on the part of Northern Nevada’s residents to eliminate illegal dumping.



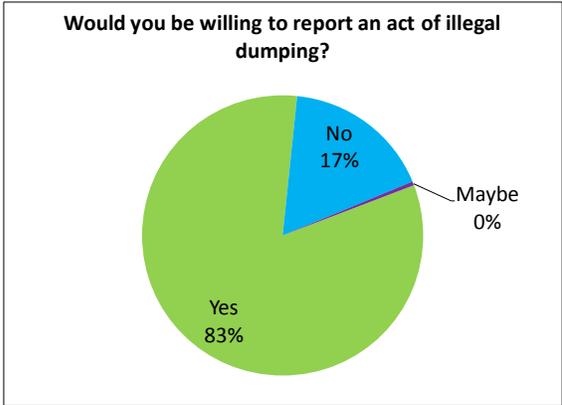
Question: “Have you ever participated or would you consider participating in a volunteer clean-up day?”



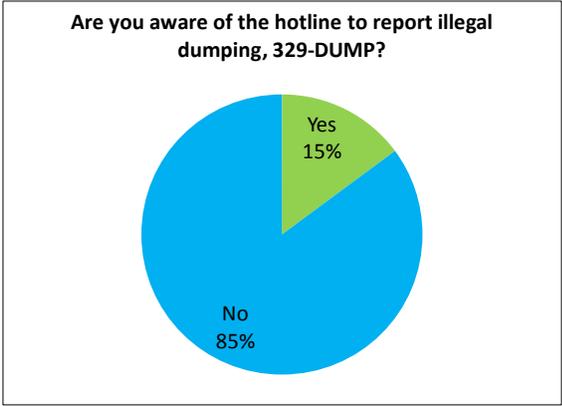
Respondents were asked whether they had ever participated in a volunteer community cleanup effort and whether they would be interested in doing so in the future. While 50% (231 respondents) said they would be willing to participate in a future cleanup, only 18% (83 respondents) had done so in the past, and 32% (144 respondents) said they would not be interested. Although it is possible that a portion of the respondents who said they would be willing in the future would not actually follow through on that claim, this still indicates that a substantial portion of respondents are interested in community trash cleanups.

Question: “Would you be willing to report an act of illegal dumping?”

Survey respondents were asked whether they would be willing to report an act of illegal dumping. The majority of respondents, 83% (372 respondents), said they would be willing to report an act of illegal dumping, while 17% (77 respondents) said they would not be willing, and less than 1% (2 respondents) said they would consider it.



Question: “Are you aware of the hotline to report illegal dumping, 329-DUMP?”



Respondents were asked whether or not they were aware of the Illegal Dumping Hotline, 329-DUMP. Only 15% (56 respondents) of respondents were familiar with the hotline, while the other 85% (383 respondents) were not.

This is an educational area KTMB is already seeking to address, and may be assisted in this goal through more targeted educational campaigns. The table on the next page shows the results of this question analyzed by recreational activity. As before, the table shows the

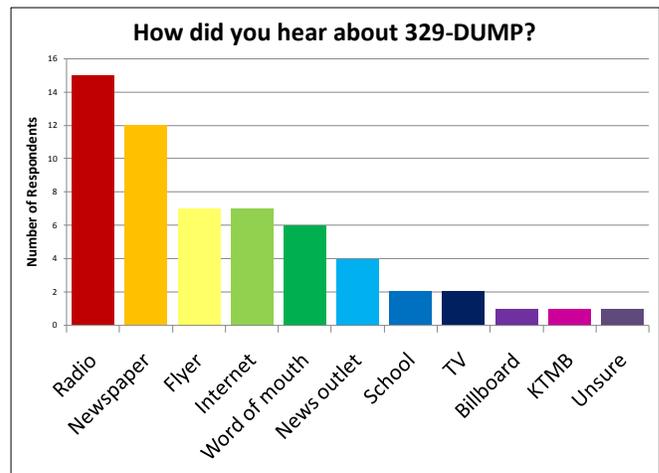
percentage of respondents who participate in each activity at least once per month and were aware of the Illegal Dumping Hotline.

Horseback riders were the most likely to be aware of the Hotline, followed by respondents who hike and run, respondents who participate in ATV sports, respondents who bike, and those who hunt on at least a monthly basis. KTMB can use this information for future campaigns in terms of both targeting underrepresented groups, and through recruitment of respondents in the more aware groups to educate their fellow recreationalists.

Activity	Number of Respondents Who Participate in Activity	Number of Respondents Aware of Hotline	Percentage of Respondents Aware of Hotline
Hiking/Running	293	40	14%
Biking	207	26	13%
Fishing	182	15	8%
Camping	269	25	9%
Hunting	113	13	12%
ATV sports	118	17	14%
Horseback riding	67	12	18%
River sports	196	11	6%

Question: “If you are aware of the Illegal Dumping Hotline, how did you hear of it?”

The 65 respondents who were aware of the Illegal Dumping Hotline were asked to describe how they learned of its existence. As shown to the left, radio and newspaper were the primary means, with 26% (15 respondents) and 21% (12 respondents), respectively. Flyers and the Internet were the next most common, with 12% (7 respondents) each, followed by word of mouth with 10% (6 respondents), and a TV news outlet with 7% (4 respondents). Smaller percentages had heard of the Hotline at school or through a TV advertisement (3% and 2 respondents each), and on a billboard or through KTMB (2% and 1 respondent each). One respondent (2% of subsample) was unsure of how he/she had heard of the Hotline.



Question: “Why do you think people choose to dump illegally?”

Why do you think people choose to dump illegally?	Percent of Total Sample	Number of Respondents
Fees associated with legal disposal at landfill/transfer station too high	69%	312
Distance to landfill/transfer station too far	51%	232
Lack of proper transportation (truck/trailer) to landfill/transfer station	40%	180
Unaware of illegal dumping fine(s) and/or penalties	38%	174
Unaware of landfill/transfer station location	34%	155
Unaware of landfill/transfer station policies towards bulky, construction or yard waste	34%	155
Hours of operation at landfill/transfer station inconvenient	30%	137
Laziness	14%	63
Apathy	4%	19
Ignorance	2%	7
Don't think it's bad	<1%	3

Respondents were provided with a list of possible explanations for why people choose to dump illegally and were asked to select as many as they felt were relevant. The percentages for each response in this table are out of the total sample of 452, and therefore do not sum to 100% overall. These responses indicate that at least one-third of respondents believed illegal dumping could be attributed to unawareness on the part of the dumping offenders. This is an area that might be addressed by KTMB educational programming in the future.

Question: “Rate each of the following impacts of illegal dumping on a scale of 1-5, where 1 indicates low impact and 5 indicates high impact.”

Rate each of the following impacts of illegal dumping on a scale of 1-5, where 1 indicates low impact and 5 indicates high impact	Average Impact	Percent Rated High (5)	Percent Rated Low (1)
Animal health/safety	4.08	50%	3%
Water/air contamination	3.97	42%	3%
Eyesore	3.89	42%	6%
Lower property values	3.68	31%	5%
Human health/safety	3.63	32%	7%
Vandalism	3.60	32%	7%
Fire	3.61	30%	5%

Respondents were provided with a list of potential negative impacts of illegal dumping and were asked to rate the magnitude of these impacts on a scale of 1 point (low impact) to 5 points (high impact). The above table lists the average rating of each impact, the percentage of the survey sample who assigned each impact the highest rating, and the percentage of the survey sample who assigned each impact the lowest rating.

It is worth noting that animal health and safety, water and air contamination, eyesore, and lower property values were all rated higher than human health and safety, which had one of the lowest percentages of 5-point ratings and one of the highest 1-point ratings. This might be attributed to an assumption on the part of respondents that humans will see illegally dumped items and avoid them (compared to animals, who might injure themselves on wires or cut glass, or through ingestion of toxic chemicals), however, this might serve as evidence that residents in the area are not necessarily considering the secondary impacts of illegal dumping. Future educational campaigns could focus on the primary and secondary negative health impacts to humans, such as injuries (primary) and illness (secondary due to water or air contamination from chemicals). It might also be beneficial to consider highlighting the link between illegally dumped items, especially green waste (biodegradable waste such as lawn clippings) and fire danger, as dumped items can provide fuel for wildfires, a large concern in Northern Nevada's arid, windy climate.



Waste Management Services

Two survey questions were designed to better understand survey respondents' knowledge of currently available legal waste disposal options and their interest in potential legal waste disposal options. The first question was a true/false quiz about available Waste Management services in which the correct response to each question was true (i.e. each of the services is currently available in the area). The second question offered respondents four potential waste disposal options (several of which are currently available) and asked them to indicate in which they would be interested in participating.

Question: "For each of the following statements regarding Waste Management services, please specify if the statement is *true* or *false*."

For each of the following statements regarding Waste Management services, please indicate whether the statement is <i>true</i> or <i>false</i> .	Percent Correct
The Lockwood Landfill will take recyclable items free of charge	61%
The Lockwood Landfill holds free dump days	60%
Residential customers who have a WM green plastic 96 gallon container are allowed to put seven extra 32 gallon bags of trash out on a normal service day	57%
Water-based house paint can be put into a normal garbage container if dried out	48%
The transfer stations will take 2 automotive batteries, 5 quarts of used uncontaminated motor oil and 2 gallons of anti freeze for free per residential customer	47%
The Lockwood Landfill will take one residential refrigerator for free	47%
The Lockwood Landfill/transfer stations will take only one computer monitor or television per residential customer at normal trash rates	45%
The Lockwood Landfill will take one bulky item (such as a mattress or sofa) for free	45%

This table shows the percentage of respondents who answered each question correctly. Correct responses ranged from 45% to 61% of the population, indicating that on average, about half of the survey respondents were unaware of the Waste Management services in their area. One of the questions answered correctly most often was in reference to free dump days at the local landfill, a program that KTMB has made an effort to advertise. The high correct response might be an indication that this effort is working.

Question: "If available, in which of the following opportunities would you take advantage?"

Respondents were provided with a list of potential waste disposal options and were asked in which they would participate. Seventy-eight percent of respondents (78%, 352 respondents) said they would participate in large item curbside pick up, 74% (335 respondents) said they would participate in a free dump day at the

If available, in which of the following options would you participate?	Percent of Sample
Free large item curbside pick up	78%
Free dump day at the landfill/transfer station	74%
Free bulky waste disposal at at the landfill/transfer station	54%
Unit-based waste disposal program, or "pay-as-you-throw"	34%

landfill or transfer station (this option is currently available on an annual basis), 54% (243 respondents) said they would be interested in participating in free bulky waste disposal at the landfill or transfer

station (this option is currently provided with paid Waste Management service), and 34% (153 respondents) said they would participate in a unit-based waste disposal program, or “pay as you go,” which is what is currently available at Northern Nevada’s Lockwood Landfill. These results are revisited in the final section of this report, “Survey Data Analysis by Zip Code ‘Zone.’”



Recreational Activities

Respondents were presented with a list of recreational activities and were asked to rate their current usage of public lands (federal, state, and county parks or lands) to engage in each activity. This was done in an effort to determine in which recreational activities survey respondents participate, as well as to understand their level of public lands usage.

Question: “Rate your current usage of federal/state/county parks/lands for recreational usage.”

Please rate your current usage of public lands for recreational activities:	Hiking/Running	Biking	Fishing	Camping	Hunting	ATV sports	Horseback riding	River sports
Never	13%	25%	35%	18%	58%	52%	64%	32%
Seldom	22%	27%	24%	21%	15%	20%	19%	23%
Yearly	20%	17%	22%	38%	11%	12%	7%	29%
Monthly	20%	15%	10%	17%	8%	8%	4%	8%
Weekly	16%	9%	6%	3%	4%	4%	3%	5%
Daily	9%	5%	1%	1%	1%	2%	1%	2%

Hiking and running were the recreational activities that participants engaged in most frequently, with 25% of respondents reporting they use public lands for hiking or running on at least a weekly basis. Biking was the next most common activity, with 14% of respondents using public lands for biking on at least a weekly basis. Camping and river sports, which are more seasonal activities, were not cited as having high frequency, but large proportions of respondents said they engage in these activities on at least an annual basis. Hunting, horseback riding, and ATV sports were the least popular recreational activities.

Additional results regarding recreational activities were mentioned in the analysis of respondent awareness of KTMB and the Illegal Dumping Hotline, and are explored further in the following discussion on survey respondent willingness to pay.



Willingness to Pay

Respondents to the illegal dumping survey were presented with three hypothetical scenarios the local government might undertake in an effort to address the issue of illegal dumping in Northern Nevada: a tax/fee collected with Waste Management charges or property ownership taxes to pay for the cleanup of illegal dumping sites on public lands; a tax/fee collected with Waste Management charges or property ownership taxes to pay for increased law enforcement and prosecution of illegal dumping offenses; and a public lands use permit that would restrict use of public lands to permit holders, with the fees collected from the permit dedicated to the regulation and cleanup of illegal dump sites.

After the respondents were presented with an overview of the three scenarios, they were presented with a dollar amount and were asked to specify whether or not they would be willing to pay said amount. If they were unwilling to pay that amount, they were asked to provide an amount they felt they would be willing to pay. There were six versions of the survey presenting three different levels of payment amounts. On all surveys, the dollar amounts were presented in both monthly and annual contexts to increase the ease of understanding for respondents. A probit analysis was conducted in STATA to estimate willingness to pay among the survey sample.

Willingness to Pay Estimation	Annual Estimate	Monthly Estimate
Willingness to pay for illegal dump site cleanup on public lands	\$3.78	\$0.315
Willingness to pay for increased law enforcement and prosecution of illegal dumping offenders	\$3.89	\$0.324
Willingness to pay for a public lands use permit, with proceeds assigned to illegal dump site regulation and cleanup on public lands	\$23.12	\$1.93

Option 1: Impose a residential tax/fee included with Waste Management services or property ownership taxes to pay for the cleanup of illegal dumping sites on public lands.

Survey respondents' willingness to pay for the cleanup of illegal dumping sites on public lands was estimated as \$3.78/year, or \$0.315/month. A total of 351 respondents (78% of the survey sample) were willing to pay some amount for this option. The highest amount a respondent was willing to pay was \$18.00/year, or \$1.50/month.

Option 2: Impose a residential tax/fee included with Waste Management services or property ownership taxes to pay for increased law enforcement and prosecution of illegal dumping offenders.

Survey respondents' willingness to pay for increased law enforcement and prosecution of illegal dumping offenders was estimated as \$3.89/year, or \$0.324/month. A total of 319 respondents (71% of the survey sample) were willing to pay some amount for this option. The highest amount a respondent was willing to pay was \$25.00/year, or \$2.08/month.

Option 3: Charge a permit fee to public lands users, where use of public lands would be restricted to permit holders only, with permit fees going toward regulation and cleanup of public lands.

Survey respondents' willingness to pay for the hypothetical public lands use permit was estimated as \$23.12/year, or \$1.93/month. A total of 250 respondents (55% of the survey sample) were willing to pay some amount for this option. The highest amount a respondent was willing to pay was \$75.00/year, or \$6.25/month.

In addition to providing information about how residents in Northern Nevada value the elimination and enforcement of illegal dumping, the willingness to pay estimates indicate a level of amenability on the part of residents to contribute toward the cause through either a residential tax increase or a Waste Management fee increase. This information may be used in the future to support a proposal to increase either residential taxes or Waste Management service fees to expand cleanup and/or enforcement of illegal dumping offenses.

It should be noted that implementation of the hypothetical public lands use permit would create additional costs for public lands managers, as the permit would only be an effective way of garnering fees if it was strictly enforced, creating additional labor costs. As such, it might not be the most efficient option. However, the table to the

Activity	Number of Respondents Who Participate in Activity	Number of Respondents Willing to Pay for Permit	Percentage of Respondents Willing to Pay for Permit
Hiking/Running	293	84	29%
Biking	207	59	29%
Fishing	182	35	19%
Camping	269	41	15%
Hunting	113	24	21%
ATV sports	118	26	22%
Horseback riding	67	20	30%
River sports	196	30	15%

right outlines the percentage of respondents who said they participate in each of the recreational activities on public lands once per month or more frequently and were willing to pay at least some amount for the hypothetical lands use permit. This information may be used by KTMB in the future to target fundraising and volunteer campaigns among Northern Nevada's outdoor recreationalists.



Survey Data Analysis by Zip Code “Zone”

As part of the demographic information collected on the survey, respondents were asked to provide the zip code of their primary residence. To provide a more comprehensive analysis of the survey data, the data were divided into zip code “zones” based upon the political jurisdiction of the respondents’ residential zip code. Thirteen zones were identified. Below is a listing of the zip codes and their current (as of June 2010) representation by county commissioner and city council member. On the following pages are tables outlining responses to various survey questions.

Zip Code Zone A

Zip Code Zone A comprises the zip codes that fall under County Commissioner Bonnie Weber’s jurisdiction, including 89439, 89515, 89508, 89433, 89523, 89507, 89512, and 89557. There were 96 survey respondents in Zone A.

Zone A		
Zip codes	County Commissioner(s)	Council Member(s)
89439	Bonnie Weber	N/A
89515	Bonnie Weber	N/A
89508	Bonnie Weber	N/A
89433	Bonnie Weber	N/A
89523	Bonnie Weber/Kitty Jung	David Aiazzi
89507	Bonnie Weber	Jessica Sferrazza
89512	Bonnie Weber	Jessica Sferrazza
89557	Bonnie Weber	David Aiazzi

Zip Code Zone B

Zip Code Zone B comprises the zip codes that fall under County Commissioner Robert Larkin’s jurisdiction, including 89441, 89510, 89431, 89432, 89434, and 89436. There were 103 survey respondents in Zone B.

Zone B		
Zip codes	County Commissioner(s)	Council Member(s)
89441	Robert Larkin	N/A
89510	Robert Larkin	N/A
89431	Robert Larkin	Julia Ratti/Phil Salerno
89432	Robert Larkin	Mike Carrigan
89434	Robert Larkin	Mike Carrigan
89436	Robert Larkin	Ron Schmitt

Zip Code Zone C

Zip Code Zone C comprises the zip codes that fall under the jurisdiction of County Commissioner Kitty Jung, including 89501, 89504, 89505, 89520, 89523, 89503, and 89506. There were 110 survey respondents in Zone C.

Zone C		
Zip codes	County Commissioner(s)	Council Member(s)
89501	Kitty Jung	David Aiazzi/Dan Gustin
89504	Kitty Jung	David Aiazzi/Dan Gustin
89505	Kitty Jung	David Aiazzi/Dan Gustin
89520	Kitty Jung	David Aiazzi/Dan Gustin
89523	Bonnie Weber/Kitty Jung	David Aiazzi
89503	Kitty Jung	David Aiazzi
89506	Kitty Jung	Dwight Dortch

Zip Code Zone D

Zip Code Zone D is comprised of the zip codes in County Commissioner David Humke’s jurisdiction, including 89502, 89511, and 89521. There were 63 survey respondents in Zone D.

Zone D		
Zip codes	County Commissioner(s)	Council Member(s)
89502	David Humke	Jessica Sferrazza
89511	David Humke	Sharon Zadra
89521	David Humke	Sharon Zadra

Zip Code Zone E

Zip Code Zone E comprises the zip codes that fall under the jurisdiction of County Commissioner John Breternitz, including 89509 and 89519. There were 15 respondents in Zone E.

Zone E		
Zip codes	County Commissioner(s)	Council Member(s)
89509	John Breternitz	Dan Gustin
89519	John Breternitz	Dan Gustin

Zip Code Zone F

Zip Code Zone F is comprised of the zip codes that fall under the jurisdiction of Sparks City Council members Julia Ratti and Phil Salerno, and is made up of zip code 89431. There were 23 respondents in Zone F.

Zone F		
Zip codes	County Commissioner(s)	Council Member(s)
89431	Robert Larkin	Julia Ratti/Phil Salerno

Zip Code Zone G

Zip Code Zone G is comprised of the zip codes that fall under the jurisdiction of Sparks City Council member Mike Carrigan and is made up of zip codes 89432 and 89434. There were 18 survey respondents in Zone G.

Zone G		
Zip codes	County Commissioner(s)	Council Member(s)
89432	Robert Larkin	Mike Carrigan
89434	Robert Larkin	Mike Carrigan

Zip Code Zone H

Zip Code Zone H is comprised of the zip codes that fall under the jurisdiction of Sparks City Council member Ron Schmitt and is made up of zip code 89436. There were 38 survey respondents in Zone H.

Zone H		
Zip codes	County Commissioner(s)	Council Member(s)
89436	Robert Larkin	Ron Schmitt

Zip Code Zone I

Zip Code Zone I is comprised of the zip codes that fall under the jurisdiction of Reno City Council member Dave Aiazzi and is made up of zip codes 89501, 89504, 89505, 89520, 89523, 89503, and 89557. There were 95 survey respondents in Zone I.

Zone I		
Zip codes	County Commissioner(s)	Council Member(s)
89501	Kitty Jung	David Aiazzi/Dan Gustin
89504	Kitty Jung	David Aiazzi/Dan Gustin
89505	Kitty Jung	David Aiazzi/Dan Gustin
89520	Kitty Jung	David Aiazzi/Dan Gustin
89523	Bonnie Weber/Kitty Jung	David Aiazzi
89503	Kitty Jung	David Aiazzi
89557	Bonnie Weber	David Aiazzi

Zip Code Zone J

Zip Code Zone J is comprised of the zip codes that fall under the jurisdiction of Reno City Council member Jessica Sferrazza and is made up of zip codes 89502, 89507, and 89512. There were 63 survey respondents in Zone J.

Zone J		
Zip codes	County Commissioner(s)	Council Member(s)
89502	David Humke	Jessica Sferrazza
89507	Bonnie Weber	Jessica Sferrazza
89512	Bonnie Weber	Jessica Sferrazza

Zip Code Zone K

Zip Code Zone K is comprised of the zip codes that fall under the jurisdiction of Reno City Council member Sharon Zadra and is made up of zip codes 89511 and 89521. There were 34 survey respondents in Zone K.

Zone K		
Zip codes	County Commissioner(s)	Council Member(s)
89511	David Humke	Sharon Zadra
89521	David Humke	Sharon Zadra

Zip Code Zone L

Zip Code Zone L is comprised of the zip codes that fall under the jurisdiction of Reno City Council member Dwight Dortch and is made up of zip code 89506. There were 18 survey respondents in Zone L.

Zone L		
Zip codes	County Commissioner(s)	Council Member(s)
89506	Kitty Jung	Dwight Dortch

Zip Code Zone M

Zip Code Zone M is comprised of the zip codes that fall under the jurisdiction of Reno City Council member Dan Gustin and is made up of zip codes 89501, 89504, 89505, 89520, 89509, and 89519. There were 23 survey respondents in Zone M.

Zone M		
Zip codes	County Commissioner(s)	Council Member(s)
89501	Kitty Jung	David Aiazzi/Dan Gustin
89504	Kitty Jung	David Aiazzi/Dan Gustin
89505	Kitty Jung	David Aiazzi/Dan Gustin
89520	Kitty Jung	David Aiazzi/Dan Gustin
89509	John Breternitz	Dan Gustin
89519	John Breternitz	Dan Gustin

The tables on the following pages provide an overview of selected survey responses by zip code zone. Table 1 gives an overview of demographics for each zone, including the number of respondents in each zone. It is important to note that in zones where the population was extremely small, such as Zone E (15 respondents), Zone F (23 respondents), Zone G (18 respondents), Zone L (18 respondents) and Zone M (23 respondents) the information presented in these tables may not be representative of residents living in that zone.

Table 2 revisits the survey item, “Rate each of the following impacts of illegal dumping on a scale of 1-5, where 1 indicates *low impact* and 5 indicates *high impact*.” For each zone, the average impact rating was calculated and the highest rating for the zone is indicated by (h) while the lowest is indicated by (l). This information may be used by KTMB to structure future educational campaigns about the hazards of illegal dumping. For example, for the full sample and several of the zones, animal health and safety was given the highest rating, even higher than human health and safety. These respondents might believe that illegal dumping doesn’t pose as much of a risk to humans as to animals because they assume humans can avoid illegal dumping when they see it. However, they may be unaware of the human health and safety risks that can arise from illegally dumped items that contain hazardous chemicals, such as Freon from illegally dumped refrigerators. Fire hazards were assigned average ratings on the lower end of the scale as well, for many of the zones and for the full sample. As fire in the Truckee Meadows and surrounding area poses significant risks for humans, animals, and the habitat, KTMB may consider emphasizing these risks in future educational campaigns, or partnering with fire safety organizations to ensure that residents are fully aware of these risks.

Table 3 outlines resident perceptions of illegal dumping by zip code zone, including average ratings for the importance of eliminating illegal dumping in Northern Nevada, the percentage of respondents who have seen, witnessed, and would be willing to report illegal dumping and are aware of the Illegal Dumping Hotline, the percentage of respondents who are aware of KTMB, and the percentage of respondents who have participated in volunteer cleanups in the past and those who would not be interested in participating in volunteer cleanups in the future. This information can also be used by KTMB to target future educational campaigns. For example, although 69% of Zone A respondents had seen an illegal dump site and 85% said they would be willing to report illegal dumping, only 12% had participated in a volunteer cleanup and 42% said they would not be interested in participating in a volunteer cleanup. Zone A respondents also assigned the lowest average impact rating to human health and safety; perhaps it would be beneficial to focus an educational campaign to these residents instructing them as to how illegal dumping can hurt them and their families and how that potential harm can be minimized through volunteer cleanup efforts.

Table 4 illustrates respondents’ preferences for proposed legal dumping services by zip code zone. For most zones, the proposed free dump day at the landfill or transfer station or the proposed free large item curbside pickup were the most popular legal dumping services. The high popularity of the free dump day at the landfill or transfer station could be used as justification by KTMB for keeping this option available to residents in the Truckee Meadows if it is ever threatened in the future, particularly when taken in conjunction with the result that 69% of the full sample believed that people choose to dump illegally because the fees associated with legal dumping are too high. Free large item curbside pick up

was as or more popular than free dump days in some zones, which is supported by the results that 51% of the sample felt people dump illegally due to prohibitive distance to the landfill or transfer station and 40% of the sample believed illegal dumping could be attributed to a lack of proper transportation. Respondent willingness to participate in a free bulky waste day at the landfill or transfer station was 54% for the full sample, and varied between 44-66% for the individual zones. The fact that this option was less popular than a general free dump day and free large item curbside pick up may be related to some of the reasons respondents gave for believing people choose to dump illegally, including the 40% who felt it was due to a lack of proper transportation, as well as the 34% who believed people are unaware of policies towards bulky waste and the 51% who felt the distance to the landfill or transfer station was prohibitive.

The proposed unit-based waste disposal program was the least popular proposed option, which makes sense given that it was the only option that did not overcome either a price or convenience barrier; additionally, it reflects the current waste disposal structure at Northern Nevada's Lockwood Landfill and associated transfer stations. KTMB may use this information, taken in conjunction with the willingness to pay estimates, to demonstrate the popularity of expanded free services, as well as to show that residents in the community are willing to use alternative payment options to reduce the incidence of illegal dumping.

Table 1: Demographic Information by Zip Code Zone

Demographics/Zip Code Zone	Full Sample	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone H	Zone I	Zone J	Zone K	Zone L	Zone M
Number of respondents	452	96	103	110	63	15	23	18	38	95	63	34	18	23
Demographics														
Age (median in years)	27.0	26.0	30.5	26.0	27.5	32.0	32.0	29.0	31.0	22.0	26.0	27.0	36.5	27.0
Female (percent of population)	50%	40%	52%	44%	49%	47%	74%	33%	58%	44%	41%	53%	50%	39%
Children in household (percent of population)	35%	25%	39%	26%	41%	27%	57%	44%	32%	23%	37%	35%	39%	30%
Income (median)	\$37,001-\$50,000	\$37,001-\$50,000	\$37,001-\$50,000	\$20,001-\$37,000	\$50,001-\$65,000	\$37,001-\$65,000	\$37,001-\$50,000	\$51,001-\$67,000	\$50,001-\$65,000	\$20,001-\$37,000	\$37,001-\$50,000	\$65,001-\$79,000	\$20,001-\$50,000	\$37,001-\$50,000
Bachelor's degree or higher (percent of population)	35%	26%	39%	31%	40%	47%	44%	39%	39%	30%	35%	47%	33%	39%
Labor force participation (percent of population)	66%	59%	71%	66%	76%	80%	78%	67%	68%	63%	68%	77%	78%	78%
Caucasian (percent of population)	74%	72%	77%	78%	78%	46%	57%	79%	88%	77%	61%	81%	82%	62%

Table 2: Average Impact Ratings by Zip Code Zone

Impact Ratings/Zip Code Zone	Full Sample	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone H	Zone I	Zone J	Zone K	Zone L	Zone M
Impact Ratings														
Human health/safety	3.63	3.44 (l)	3.89	3.46 (l)	3.48	3.53	3.52 (l)	4.06	3.89	3.44 (l)	3.49 (l)	3.71	3.56	3.61
Animal health/safety	4.08 (h)	3.88	4.30 (h)	3.96	3.91 (h)	3.87	3.70	4.50 (h)	4.39 (h)	3.97	3.72	4.31 (h)	3.83	3.78
Fire	3.61	3.54	3.81 (l)	3.54	3.39 (l)	3.13 (l)	3.68	3.83	3.84	3.58	3.57	3.41	3.44 (l)	3.13 (l)
Water/air contamination	3.97	3.89 (h)	4.06	4.00 (h)	3.80	3.67	3.91	4.28	3.97	4.00 (h)	3.80 (h)	4.06	4.11	3.87
Lower property values	3.68	3.69	3.81 (l)	3.81	3.46	3.43	3.70	3.61 (l)	3.92	3.86	3.67	3.41	3.61	3.68
Eyesore	3.89	3.70	3.98	3.97	3.87	4.20 (h)	4.04 (h)	3.78	3.87	3.88	3.68	4.06	4.56 (h)	4.04 (h)
Vandalism	3.60 (l)	3.44 (l)	3.82	3.59	3.44	3.73	3.82	3.94	3.71 (l)	3.60	3.53	3.38 (l)	3.56	3.74

Table 3: Perceptions of Illegal Dumping by Zip Code Zone

Perceptions of Illegal Dumping/Zip Code Zone	Full Sample	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone H	Zone I	Zone J	Zone K	Zone L	Zone M
Number of respondents	452	96	103	110	63	15	23	18	38	95	63	34	18	23
Perceptions of Dumping														
Average rating of importance of eliminating illegal dumping in Northern Nevada, on a scale of 1 (low) to 10 (high)	7.36	7.06	7.62	7.03	7.27	7.53	7.13	8.11	7.79	7.06	7.11	7.65	7.00	3.87
Have seen illegal dumping	69%	69%	74%	76%	62%	73%	70%	72%	74%	75%	64%	53%	83%	65%
Have witnessed illegal dumping	31%	34%	26%	36%	35%	40%	35%	33%	8%	40%	32%	35%	11%	39%
Would be willing to report an act of illegal dumping	83%	85%	87%	77%	79%	73%	39%	90%	87%	78%	81%	82%	78%	74%
Are aware of Illegal Dumping Hotline	15%	12%	12%	15%	18%	33%	83%	6%	3%	13%	11%	18%	22%	39%
Are aware of KTMB	43%	41%	50%	39%	51%	60%	17%	50%	58%	38%	51%	41%	44%	52%
Have participated in a volunteer cleanup	18%	12%	18%	23%	10%	33%	22%	28%	11%	21%	13%	6%	28%	39%
Would not be interested in participating in a volunteer cleanup	32%	42%	30%	30%	33%	13%	30%	39%	26%	28%	43%	29%	33%	17%

Table 4: Potential Participation in Proposed Services by Zip Code Zone

Proposed Services/Zip Code Zone	Full Sample	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone H	Zone I	Zone J	Zone K	Zone L	Zone M
Proposed services														
Free dump day at the landfill/transfer station	74%	71%	82%	78%	73%	80%	83%	89%	76%	76%	59%	82%	94%	78%
Free large item curbside pick up	78%	76%	74%	71%	68%	60%	70%	72%	71%	71%	75%	68%	78%	61%
Free bulky waste day at the landfill/transfer station	54%	48%	59%	46%	49%	60%	65%	44%	66%	45%	48%	47%	61%	57%
Unit-based waste disposal program ("Pay as you throw")	34%	33%	37%	28%	19%	60%	39%	33%	34%	28%	25%	26%	28%	61%