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Analyzing the Effects of Various sign types used by the Bureau of Land Management for Desert Cleanup and Restoration Projects

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What is the effectiveness of attempts to curb illegal dumping with prompts on signs posted in the area? Do positive friendly language prompts such as "Restoration in Progress Please Do Not Disturb" generate more positive attitudes and intentions towards illegal dumping problems, than less friendly prompts such as "No Dumping Allowed"?
Results, although inconclusive, did however show a slight trend towards the negative language signs.

I Introduction

The Mojave Desert is a product of natural process and man's intervention through urban interface. Both the natural ecosystem and man's intervention involve a "littering" stage. Nature's degradable deposit of material, such as deceased plant and animal debris, falls to the surface and decays. Man's litter, illegally dumped, is not as degradable, and decays more slowly. If the littered material is organic it is usually a non native species that can introduce a new competitor into the ecosystem and possibly drive out and make extinct a native species. Even though humans are not essential to both systems their solid waste littering has become a hazard and an environmental issue (Bennett 1971). The illegal dumping also causes an increased number of ravens, and other predators on the desert tortoise. There is also habitat loss as more illegal "social" trails are formed as dumpers travel off road.

Not everything placed on the land is litter. Geller (1973) writes that litter is "just misplaced solid waste," of any size outside of its proper environmental setting. Perceived litter discolors the natural environment's aesthetic quality, in addition to being a potential hazard to safety and health (McCool and Merriam 1970). Some of this misplaced solid waste is hazardous materials such as oil, and paint, which cause an even greater environmental concern than "ordinary" solid waste.

In the 1950s we began to see national and local initiatives to reduce littering. Programs for picking up litter were instituted in National Parks, and on other public land. Not until the late 1960s and early 1970s did legal, attitudinal, and behavioral programs begin to appear. The local governments throughout the country intensified programs for solid waste removal, litter can pickup, and roadside cleanup (Public Opinion Survey 1968, 1969). In 19 71, $500 million was

spent nationally to clean up litter; $22 million alone was spent to clean up the national forests (Clark, Burgess, and Hendee 1972a)

Studies by government agencies and university research teams provided useful answers about littering problems. Several public opinion polls have been taken to determine why, when, and where people littered. Carelessness, laziness, indifference, and the lack of receptacles have been identified as factors in the littering problem (Bennett 1971). Heberlein (1971) concluded that subjects would litter less in clean areas than they would in littered areas. McCool and Merriam (1970) learned that local residents were less concerned with the problem of littering than visitors were.   Finnie (1973) concluded that certain socioeconomic groups litter differently, younger people more than elderly, blacks more than whites, poor people more than rich people, rural residents more than urban residents, blue color workers more than white color workers, although these differences were not statistically significant. Finnie also concluded that litter receptacles reduced litter by 30 percent on a selected highway, but that anti-littering signs had no effect at all. Kohlenberg and Phillips (1973) concluded that positive reinforcement could increase litter disposal, but methodological problems limit the significance of their results. Several researchers (Bacon-Pure et Al., 1980) have attempted to reduce litter with special trash receptacles, by paying workers, or by making rewards available. "Although some litter may be collected in the absence of scheduled consequences, something additional (rewards or prompts) must be done to retard the gradual accumulation of litter" (Geller, Farris, and Post 1973)

Even though the research on human behavior and attitudes towards littering has not been extensive and some research has not yielded consistent results on the success of the signs and prompts for reducing litter (Cialdini and Baumann 1981; Groves 1974; Tuan 1978), the goals of anti littering programs in the 1980s remain intact, although there has been a consistent reduction

in natural programs since the 1970s. Apparently littering is still a major problem in the United States; public and private agencies continue to combat littering with various anti-littering campaigns and prompts, including Woodsy the Owl, Ricky Raccoon, anti-littering advertising (Dodge 1979; Schnelle et al. 1980), prompts (cues with a message), litter receptacles, and by decreasing the use of non-biodegradable, disposable packaging (Geller, Farris, and Post 1973; Geller, Brasted, and Mann 1980; Geller, Winett, and Everett 1982). These strategies cost millions of dollars, and while some succeed, others fail. One popular anti-litter procedure is to use signs as prompts to discourage littering or to encourage behavior change (Marler 1971). Hayes, Johnson, and Cone (1975) successfully used signs to discourage the trampling of lawns. Anderson (1981) compared the effects of specific and nonspecific messages in leaflets and concluded that specific messages were more successful in reducing littering. Geller, Farris, and Post (1973) found significant behavior change in litter disposal in response to posted signs in dormitories and supermarkets. Heberlein (1971) found only 54 percent of his subjects remembered reading a posted sign on littering, and Marler (1971) found that only 33 percent of her sample red signs.

II Research Question and Method

What is the effectiveness of attempts to curb illegal dumping with prompts on signs posted in the area? Do positive friendly language prompts such as "Restoration in Progress Please Do Not Disturb" generate more positive attitudes and intentions towards illegal dumping problems, than less friendly prompts such as "No Dumping Allowed"?

There are several different methods that I considered when planning this research. A public opinion survey was one of the first methods that I considered. After reviewing several

other Surveys (Public Opinion Survey 1968, 1969), I found that although they provided a lot of good information, a survey is not appropriate nor is it practical in this instance.

After further review of other literature sources I considered other types of research methods such as an exploratory study similar to the one done by (Dodge 1979). Or a case study similar to the one done by Groves (1974). I found that although these are all great papers with a lot of good information they were not using any methods relevant to my research.

I decided to use field experiments much like Finnie (1973). Finnie posted signs in national parks on select routs asking people to stay on the trail while leaving other trails with no signs. Finnie than sat back and observed peoples reactions to the signs, and weather or not the followed the directions on them. To accomplish my field experiments this first step was to write an Environmental Assessment (BLM EA # NV-052-04-366), as required by the National Environmental Policy Act of 1969, (Appendix A) for the cleanup phase of the project. After The EA was signed in late August, 2004, I was then able to pick the locations for the selected project sites. I chose twelve sites in Clark and Southern Nye counties (Appendix B). These twelve sites were chosen based on the disturbance level, and where they are in relation to the cities they are near. This criterion was used to ensure similar visitation to all of the sites. The sites have been grouped geographically with four areas of three sites each. The reason for the grouping of the sites into four similar groups of three was so that each of the four main locations could have one site with the signs reading "Restoration in Progress Please Do Not Disturb", one site with the signs reading "No Dumping Allowed", and the final site as the control site with no signs at all. After completing the EA, and picking the sites, I spent the latter part of September and all of October cleaning the selected sites, and placing the signs (Appendix C). All signs were in place

by October 30th. Returning twice a month to each location I have obtained ten observations at each of the twelve sites.

III Data

Once all of the sites were cleaned and signs posted, I started the actual data collection. To accomplish this I returned to the sites twice a month on the same day and time. When returning to the sites I used photo documentation, and Global Positioning Systems (GPS) and ArcMap® Global Imaging System (GIS) to show which of the signs if any are working, and to map any new disturbance. In addition to collecting this data myself I also enlisted the help of volunteers that are members of the groups, Partners in Conservation (PIC) and the Public Lands Alliance of Southern Nevada (PLASN). These volunteers helped me by checking on the sites on a more regular basis than I was able to.

These volunteers checked on the sites and informed me via telephone or E-Mail if they encountered any new disturbance. They have also been advised not to approach the site if there is anyone there; they are to leave it for the time being and return later. The reason for this is twofold. First it is for the safety of the volunteers, so they did not find themselves in a dangerous situation. In addition, it is so that again I can try and prevent biased results. If I can keep the people that are contributing to the litter problem from being observed, they will continue with their habits and not alter there pattern, thus keeping the results as accurate as possible.

I ran into a major setback; during the month of January I was not able to collect data at any of the sites. This was due to all of the rain, and flooding that it caused, I had eight of my twelve sites destroyed. Then as the Rains and flooding continued through February, my timeline got pushed farther back. Unfortunately because of weather I was not able to re-post all of the signs at those eight sites, until early March. I had hoped that after reviewing all of the photos, the

GIS maps and the rest of the data, I would be able to show that the positive language signs "Restoration in Progress Please Do Not Disturb" have a greater effect on public perception than do the negative language signs "No Dumping Allowed" signs, and I also had expected to find that the sites with no signs at all had the least effect.

IV Results:

The results of my research are inconclusive, due to several factors the biggest of which being the inclement weather we have had in the last few months.

TABLE 1

Results By Site										
	Visit # 1	Visit # 2	Visit # 3	Visit # 4	Visit # 5	Visit # 6	Visit # 7	Visit # 8	Visit # 9	Visit # 10
Mesquite Positive	no	no	no	Flood	Flood	Flood	Flood	Flood	Flood	Flood
North LV Positive	no	no	no	no	no	no	Flood	Flood	Flood	Flood
Pahrump Positive	no	no	no	no	no	no	yes	yes	yes	yes
Laughlin Positive	no	no	no	no	no	no	no	yes	yes	yes
Mesquite Negative	no	no	no	Flood	Flood	Flood	Flood	Flood	Flood	Flood
North LV Negative	no	no	no	no	no	no	no	Flood	Flood	Flood
Pahrump Negative	no	no	no	no	no	Flood	Flood	Flood	Flood	Flood
Laughlin Negative	no	no	no	no	no	no	no	no	no	no
Mesquite Control	no	no	no	Flood	Flood	Flood	Flood	Flood	Flood	Flood
North LV Control	no	no	no	no	no	no	no	Flood	Flood	Flood
Pahrump Control	no	no	no	no	no	Flood	Flood	Flood	Flood	Flood
Laughlin Control	no	yes	yes	yes	yes	yes	yes	yes	yes	yes

Although it is impossible to tell exactly how much the flooding that occurred on eight of my twelve sites affected my results, it is obvious that the flooding has caused errors in my data. I do not have enough information to determine if the debris that is on the sites now was washed in by the flood waters, weather the flood waters washed debris out, or if it had little to no effect.

V Summary

The purpose for this research was to gain a better understanding of public perception of the littering problem, more specifically illegal dumping, on public land. In addition this project 1) restored tortoise habitat, 2) mitigated surface erosion impacts and, 3) enhanced visual resource values. The primary biological need for restoration action is too partially off-set the spreading loss of tortoise habitat due to regional urbanization and the increasing use demands. The restoration action also satisfied key management provisions of the Clark County Desert Tortoise Conservation Plan (1995), by means approved in the BLM Las Vegas Resource Management Plan and Final EIS (1998), per decisions VG2 & VG2a of the Record of Decision. The action is in conformance with the current Land Use Plan, the Las Vegas Resource Management Plan (RMP) signed 1998. The budget for this project is was funded by a Challenged Cost-share Initiative (CCI) I had a budget of $88,000 for FY05.

TABLE 2

BUDGET	
Plasma Cutting Torch	$2,800
Saw blades	$500
Acetylene cutting torch	$1,500
No Dumping signs	$8,000
Restoration in Progress Signs	$8,000
Safety equipment	$10,000
Dumpster Rental	$40,000
GPS unit	$10,000
Digital Camera	$500
Fuel for the truck	$5,000

Leaving $1,700 for miscellaneous and unforeseen expenses, (i.e. truck and equipment repair)

As for the timeline of this project I explained that in some detail in the method, and data sections. The time line was broken down as follows:

June, through August 2004 – Write the Environmental Assessment, September 2004 – Determine the sites to be used in this research, September, through October 2004 – Clean the twelve sites, post the signs, and take the initial pictures. Monthly October 2004 – March 2005, Take pictures of sites, April 2005, compile and analyze data.

VI Discussion:

The factors contributing to this thesis having inconclusive results are for the most part uncontrolled risks. According to the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service website, 2004 was the fourth wettest year on record for Southern Nevada with 7.76 inches of rain, fourth only to 1965 with 7.96in, 1992with 9.85in, and 1942 with 10.72in.

In addition to this with Southern In addition to this Southern Nevada's average yearly rain fall is 4.49in; currently 2005 is well on its way to another record year. January had 2.45in, and February had to 2.25in bringing our year to date total to 4.7 in. This is already higher than our yearly average being only two full months into the year. There was additional rainfall in March and in April but the data is not available on the NOAA website at this time.

Another inhibiting factor has been people staying home due to the weather. Therefore it prohibited me from obtaining an accurate idea of people's responses due to the low numbers of people actually out on the land. After one of the rain events, I took pictures of the sites near Mesquite. These sites were near a stream approximately 5ft wide in the previous 3 years. At one point during the flooding the stream became a river that measured nearly 1 mile wide.

Figure 1

Before

Figure 2

After

The above photos show the same site on (Oct 2004) taken from under the bridge. The other

photo was taken January 2005 standing on top of the same bridge. More photos are in Appendix

C.

Prior to the flooding, and on the four sites not greatly affected by flood waters there

appeared to be a slight trend towards negative language signs. On the one remaining site with

negative language signs there were no indication of repeat dumping, whereas on the remaining

two control sites and the one remaining site with positive language signage there were

occurrences of repeat dumping. The repeat dumping occurrences were minimal however; all

three consisted of approximately one large (50gal or .30 cubic/yd) trash bag.

TABLE 3

Re Occurrence of Dumping By Site

	Mesquite	N.L.V.	Pahrump	Laughlin
Pos. Language	Flood	Flood	Yes	Yes
Neg. Language	Flood	Flood	Flood	No
No Sign	Flood	Flood	Flood	Yes

I consider this to be not significant enough to get a good idea if either sign was working.

The dumping was landscaping debris, leaving the question is the dumping from professional

companies or from private citizens.   This would make a difference because if it is a professional

company they know that it is illegal and can not use ignorance of the law to justify their actions.

VII Conclusion:

Even though the results were inconclusive a lot of good came out of this thesis. The good

I found is that I discovered in order to truly give a valid answer to the question: What is the

effectiveness of attempts to curb illegal dumping with prompts on signs posted in the area? Do

positive friendly language prompts such as "Restoration in Progress Please Do Not Disturb"

generate more positive attitudes and intentions towards illegal dumping problems, than less

friendly prompts such as "No Dumping Allowed"?, this study would have to be repeated using

more sites at least double the amount so that if there was any unforeseen setbacks such as a large

scale flood event there would be sufficient data not lost to have a valid dataset. In addition I feel

that in order to truly get a valid dataset the study would have to last for a minimum of twelve

months. This would give better data because you would have taken into account all seasons, not just the light use season encompassed in the academic year.