Effectiveness of Trailhead Education on Cleaning Up Dog Litter

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Keywords: outdoor education, litter, dogs, leave no trace, behavior change

International Symposium on Society and Natural Resources
Keystone, Colorado
June 5, 2004

Abstract

Dog walkers not cleaning up after their pet is a common problem around the globe. Many people advocate education as a solution, yet little research has been conducted on how effective this approach is at reducing dog waste. The city of Boulder Open Space and Mountain Parks has an estimated one million dog visits per year with an estimated 30 tons of dog waste left behind. A partnership was formed in 2003 between OSMP and Friends Interested in Dogs and Open Space (FIDOS), a local advocacy group, to assess the effectiveness of education at reducing waste. The study consisted of counting and mapping with a GPS unit the dog deposits before, during, immediately after and several months after the education treatment. Previous research at OSMP revealed that some dog walkers said they would not clean up after their pet. FIDOS members promoted the "1 + 1, Pick up an Extra" program at the trailhead for forty hours over a three week period. Brochures were distributed and signs posted to support the personal contact. Dog litter levels were significantly reduced during, immediately after and six months after the educational treatment.

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Introduction

Dog guardians not picking up after their pet is a major issue on City of Boulder Open Space and Mountain Parks lands. Open Space and Mountain Parks has an estimated one million dog visits per year with an estimated 30 tons of dog waste left behind. Dog litter along trails can:

- Diminish other visitor's experiences because of the unpleasant sight and odor
- Create social conflict
- Spread bacterial, protozoal, viral and parasitic diseases such as hookworm to other dogs and humans
- Alter or possibly harm the environment via nutrients such as increasing nitrogen in soils that may favor weeds

Reducing the level of dog litter left on the ground is a major management goal of the Open Space and Mountain Parks Department (OSMP) and Friends Interested in Dogs and Open Space (FIDOS).

Using education to reduce the amount of dog litter left behind is often cited as a solution to the problem, but little is known about the effectiveness of these efforts. This case study quantifies the effectiveness of trailhead education at reducing dog litter by measuring the leavings during, three weeks after, and six months after the educational intervention on OSMP. It is recognized that the study area is limited and that caution should be used when generalizing results to other areas.

Background

Limited research has been done on the effectiveness of education at improving dog litter pick-up. Berry tested dog walker's intention to pick-up their pet's leavings in natural areas through moral appeals, fear appeals, and identity appeals. (Barry, 2000; Barry, Ellis, & Ruddell, E. J., 2001) Fear and moral "awareness of consequences" appeals were most effective. People's intention to clean-up was high and was greater on-trail than off-trail.

Sensory cues at an area may be associated with littering levels. Cues include prompts, such as signs or personal contacts, prior litter, and environmental design such as trash cans. (Huffman & Grosnickle, 1995) For dog litter, anti littering cues including signs, trash cans, plastic bag dispensers, few droppings and no odor may be related to positive clean-up intentions. (Barry, 2002)

Dog litter interventions in an urban environment have been successful, but their effectiveness diminished after a one day intervention. (Jason, McCoy, Blanco, & Zolik, 1980) Interventions with duration of two weeks and one month were more effective. When a sign was placed with no human intervention, pick up levels did not improve.

Using two conceptual frameworks helps with the diagnosis of the dog litter problem on Open Space and Mountain parks lands and the ability to prescribe a solution. The first is the Elaboration Likelihood Model. Land managers hope that through communication, reasoning and internalization people will change their belief structure--their ethic--to "do the right thing" when out on the land. The Elaboration Likelihood Model describes this form of communication as the central route of persuasion (Petty, McMicheal, & Brannon, 1992; Roggunbuck, 1992). The alternative, the peripheral route, relies heavily on the source of the message and behavior change is short term. The effectiveness of central route processing at promoting an enhanced environmental ethic is measured using questions about how much someone thinks about an issue or how much knowledge they have.

A study established that Open Space and Mountain Parks visitors have a high level of understanding about the reasons for "frontcountry leave no trace" practices such as picking up dog litter. (Jones & Breyaure, 2004) Familiarity with regulations was more predictive of whether or not an individual actually practiced Leave No Trace behaviors than was one's Leave No Trace knowledge or time spent thinking about specific Leave No Trace behaviors. Familiarity with regulations indicates that Leave No Trace educational or central route efforts, may not be as effective as other strategies in changing behavior when visitors are already highly knowledgeable of Leave No Trace principles. The study concludes that more effective strategies likely include raising awareness of consequences of non-compliance, social desirability of compliance and heuristic approaches that trigger individual reaction.

This line is reasoning is reinforced by using Hendee's persuasion potential typology that segments an audience into five groups. (Hendee, 1990) Using this framework, education works best with uninformed (not knowing how much dog waste spreads disease) and unskilled (not knowing how to pick up droppings) actions, but less so with careless (not paying attention to the dog) and illegal activity (knowingly walking away from a deposit). The fifth segment is unavoidable (diarrhea) actions. It is estimated that about 60% of the dog leavings are picked up on OSMP. (Mertz, 1999) This follows significant trailhead education efforts to reduce the level of dog leavings and to manage dogs under Voice and Sight Control. (Jones, 1999). Using Hendee's typology, dog guardians not picking up after their pet are likely to fall into the uncaring and illegal categories in which more education would have minimal effect.

It will be difficult to increase dog litter pick up compliance for the people who do not currently pick up, given the results of the OSMP educational effectiveness study and the reasoning of Hendee's typology. Unlike other low impact practices such as managing your dog or staying on trail, having other dog walkers compensate for other's shortcomings can help address the problem. The "1 + 1, pick up an extra" program acknowledges that a segment of the public is not likely to pick-up after their pet and encourages other dog walkers to compensate for uncaring and illegal categories of people.

Goal, Objectives and Hypotheses

Goal: Measure the effectiveness of trailhead education at reducing the amount of dog litter left by dog guardians.

Objectives and hypotheses:

- Measure the change in dog litter before, after, three weeks after and six months after trailhead education activities. We hypothesize that litter levels will decrease during the intervention, but will gradually return to previous levels over time.
- Determine the number of contacts, second contact and refusals there are per hour for a dog guardian education program. We believe that almost all visitors will be receptive to the information and there will be a significant number of second or third contacts.
- Determine which of three signs was thought to be the most effective at changing behavior.

Methods

Study Area

The study area was a 15 feet by 150 feet (2,250 square feet) transect paralleling the left side of a multi-use trail about 60 feet from a busy trailhead (Figure 1). The transect size was a balance between a large area with enough dog leavings, yet small enough to manage with limited staff/volunteer time. The trail was one edge of the transect, which helped determine which leavings were in the transect. "Voice and sight" dog management, which is the standard in this part of Open Space and Mountain Parks, enables dogs to range off the trail. Before the study began, the grass was mowed to about six inches to make the site accessible to dogs and to make it easier to see and clean up the dog litter. Unobtrusive markers were placed after mowing to delineate the transect. Litter pick up cues were present. A trash can was at the trailhead entrance and another trash can was about 60 feet beyond the end of the transect. A dog litter pick-up bag dispenser was stocked weekly. A "1 + 1" sign was placed just before the transect on the other side of the trail and near where the education table was placed.

Monitoring

All four phases of the study sampling period were three weeks in duration following a clean-up. Three weeks was chosen to better ensure similar numbers of dog visits (similar length of day, weather, and temperature) through a 12 week period.

Sampling consisted of delineating locations of dog piles using a global positioning system unit. This provides the number of piles left and their geographic location within about two feet. Piles were differentiated by distance from other piles, shade of color and age. When not sure if the leavings were from one litter event, each discreet pile was counted. To count and remove the leavings, a grid pattern along the width of the transect was used, followed by an up and back the length of the transect for a final check. There were four phases to the study.

Phase 1 – Establish baseline : September 11- Clean area, October 2 - GPS and clean

Phase 2 – Education treatment: October 3 to 22- Trailhead contact and signs, October 23 – GPS and clean

Phase 3 – Carry over: October 23 - Leave sign/no trailhead contacts, November 13 – GPS, clean and remove sign

Phase 4 – Longer term effect: April 19 – Clean area, May 10 – GPS and clean

Educational Treatment

The core of the education treatment was personalized contacts at the trailhead. A volunteer, who is a member of the local advocacy group FIDOS, contacted visitors with dogs to encourage them to pick-up after their pet and to pick up an extra—"1 + 1." Moral appeals, fear appeals (want to keep privileges) and identity appeals were used. Brochures were given listing the rules and reasons to pick-up after their pet. The volunteer was field trained to ensure consistency of message and to provide for their safety. Three signs were placed for a one week each at the same location to encourage pick-up and to pick-up an extra. A total of 38 trailhead contact hours were made, in 19 two-hour increments. Time periods were selected based on when the most visitors were likely to be out and volunteer availability.

For comparison, a second trailhead had only the signs posted, but no personalized contact. Unfortunately, it was obvious that someone had removed the dog litter during the "carry over" period and the results were not used.

Weighting

A significant weakness of this study is that the number of dog visits was not tracked. We assumed that the level of dog visits remained roughly constant because of the large number of repeat visitors. Dog walkers tend to visit more consistently and frequently than other visitors, because of the guardians interest in walking their pet regularly at a convenient location. (Zeller, Zinn, & Manfredo, 1994, R. Lowery , personal communication, May 19, 2004.) We also shortened each replicate period to three weeks from four weeks and expanded the transect to better ensure similar weather conditions. But as the adage goes: "if you don't like the weather in Colorado, just wait a few hours." November 2 through 8 in Phase 3 was 12 degrees cooler than Boulder's normal temperatures with five days with high temperatures in the 30s and it snowed on five of seven days, for a total of 1.1 inches. April (in Phase 4) was the seventh wettest since records started, and had several cold spells. (Callahan, 2004). On cold or rainy/snowy days few people were observed at the trailhead. To control for these variables, temperature and precipitation records were used to weight the data in an attempt to make the time periods compatible. (NOAA, 2004) Days that the high of 50 degrees or below and/or more than a trace of precipitation were factored into the results.

Results

Study Objective1: Measure the change in dog litter before, after, three weeks after and six months after trailhead education activities.

Table 1: Dog litter pick-up results

	Dog litter	Change	Bad weather days	Conversion factor	Dog litter - weighted	Percent change
October 2, 2003	59		2	1.10	65	
October 23, 2003	22	-63%	0	1.00	22	-66%
November 13, 2003	19	-68%	8	1.38	26	-59%
May 10, 2004	10	-83%	6	1.29	13	-80%

There was about a two-thirds drop in dog litter piles during the three week educational treatment, carry over, and the long term effect period. Weighting the data did not make much difference in the results. It appears that frequent and intensive trailhead education promoting the "1 + 1" concept was successful at reducing dog litter. The reduced level of dog litter is likely the result of dog walkers picking up after other dog walkers. If 22, 19 or 10 dog litters along one side of 150 feet of trail is acceptable to visitors has not been determined.

The eight inch high, thick vegetation growing in April/May may have also had the effect lessoning the number of dogs traveling and defecating in the area and as a result the amount of dog litter. Even with this potentially confounding variable, the size of the reduction makes it likely that a significant reduction in litter continued. No conclusions can be made about the patterns of dog litter left based on a visual review of the dog litter location maps (Figure 2).

Our hypothesis that litter levels will decrease during the intervention was correct. Litter levels gradually returning to previous levels did not prove true over a six month time frame. Litter levels remained at reduced levels.

Study Objective 2: Determine the number of contacts, second contact and refusals there are per hour to a dog guardian education program.

Most dog walkers were receptive to listening about the program. During the 38 hours 441 contacts of dog walkers were made for an average of 12 dog walker contacts an hour. Almost 20% of those contacted had been previously contacted during the three week period. Of the 441 people contacted with the "1 + 1" pitch, 91% were supportive, with the remaining 9% either being unresponsive or unsupportive. Of the 9%, about x % were confrontational or rude. Of the 441 dog walker contacts, 75 or 17% did not have a dog litter pick-up bag with them, but 83% did have a bag.

A total of 899 people passed by the educator. There were 443 dogs and 442 people in parties with at least one dog. Visitors included 49% dog walkers, 24% hikers, 18% bike riders, and 8% runners. While not counted, it appeared about one quarter of the visitors at Marshall Mesa Trailhead were from Boulder, with the majority being from the nearby towns of Superior, Louisville, Lafayette and Broomfield.

Our hypothesis that almost all visitors will be receptive to the information proved to be true and there were a significant number of re-contacts.

Study objective3: Determine which of three signs was thought to be the most effective at changing behavior

Three "1 + 1" signs were used for one week each. Visitors were then asked which they preferred. The sign with a smiling dog putting a bag in a barrel was the clear favorite. Other signs included the Leave No Trace on Open Space dog looking at the viewer and pointing at their dog litter and FIDOS sign of the "arty" looking person with a bag by a dog (Figure 3).

Discussion

Conclusions from the study include:

1. Intensive trailhead education using the "1 + 1" program likely caused a meaningful short term and longer term (six months) reduction in the amount of dog litter along the trail.
2. Trailhead education is a necessary and important part of the solution to dog litter not being picked up, but it is not the total solution and other management tools need to be applied.
3. The result of 22, 19 or 11 dog litter piles along 150 feet of trail, while an improvement, is not likely an acceptable level of dog litter for the general public.

The "1 + 1" program appears to have reduced dog litter significantly. The visual cues of a cleaner area may have reinforced the education efforts and the already visual cues of the trash cans and plastic bag dispenser.

Future studies should control for the number of dog walkers, which was a major weakness of this study. One approach is to randomly count dog walkers. A second approach is to use active infrared monitors to count the number of visitors. Random calibrations of the monitors to ensure their accuracy should include the number of dog walkers and dogs in the area, which would result in a more reliable dog visitation estimate.

Recommendations

1. Continue and expand 1 + 1 program throughout Open Space and Mountain parks, focusing on high volume trailheads. Because the positive results were based on an intensive education effort, the program will be expensive and requires focused attention (doing the same amount of education at the eight busiest trailheads would cost $250,000 annually). More outreach can be achieved through using more interest groups volunteers to reinforce the education and ranger staff. Fostering interest group involvement in trailhead education is important. Other outreach components to explore include literature, sign, news media and public education.
2. Conduct a similar behavioral study for voice and sight behaviors.

3. Consider doing a similar study to assess the effectiveness of education at less intensive levels.
4. Explore how the Stewardship (“adopt an area”) Program can encompass dog walkers.
5. Share results and recommendations with other citizens and organizations.
6. Continue providing bag dispensers and trash cans.
7. Devise a management program to improve voice and sight compliance. This is an unresolved issue and needs more attention. Design the outreach program to address both dog litter and voice and sight issues.

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Figure 1

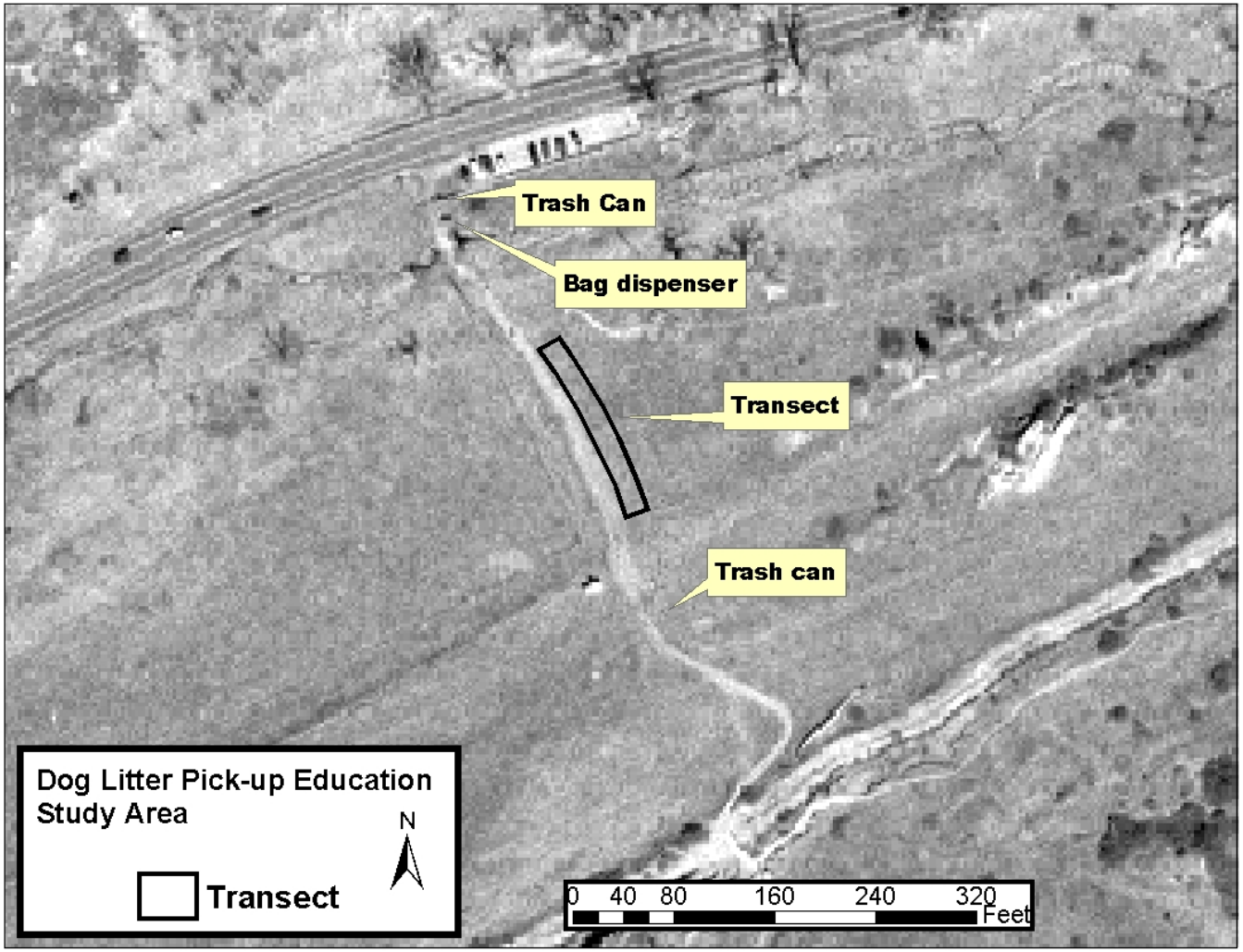

Trash Can
Bag dispenser
Transect
Trash can
Dog Litter Pick-up Education
Study Area
N
Transect
0 40 80 160 240 320
Feet

Figure 2

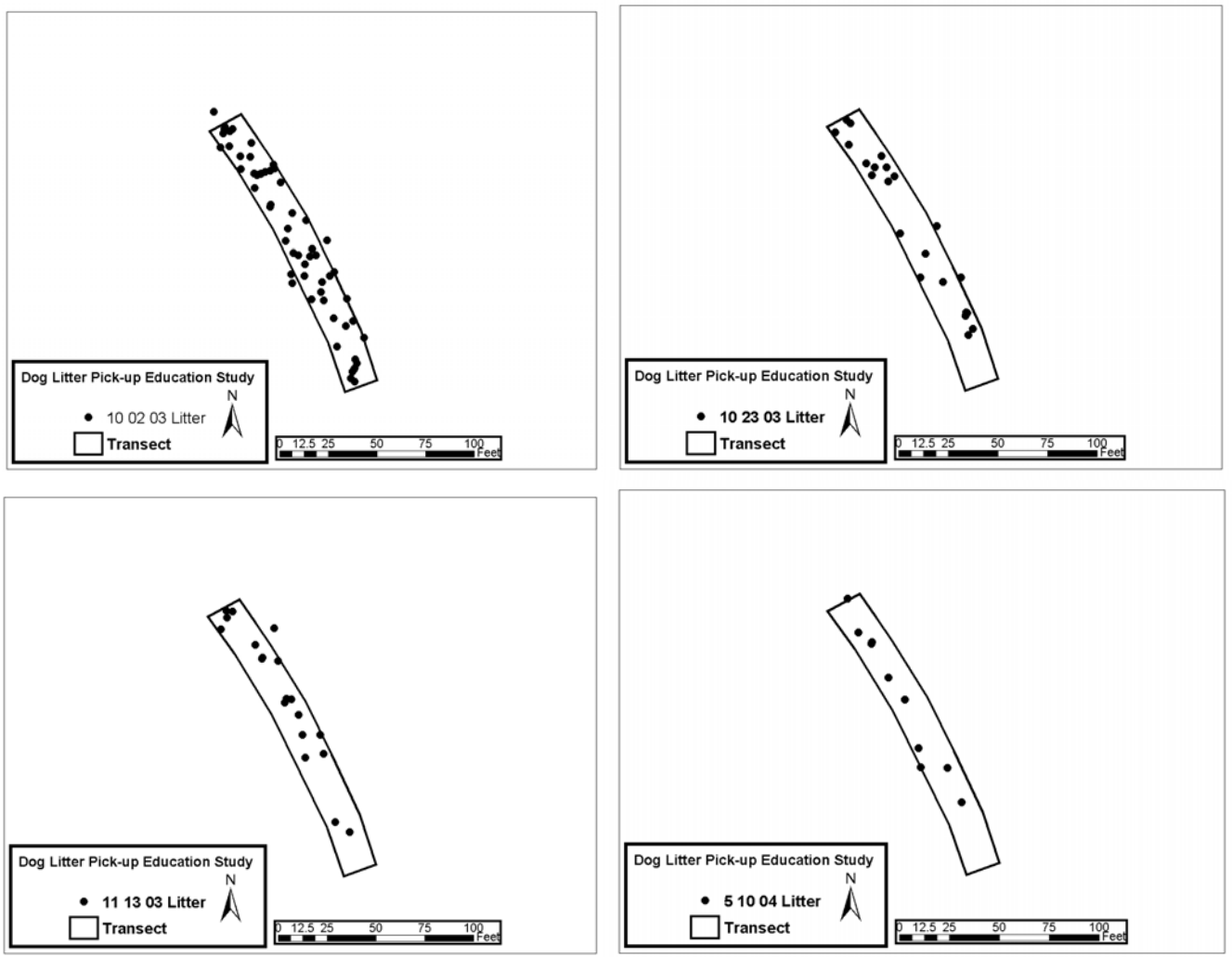
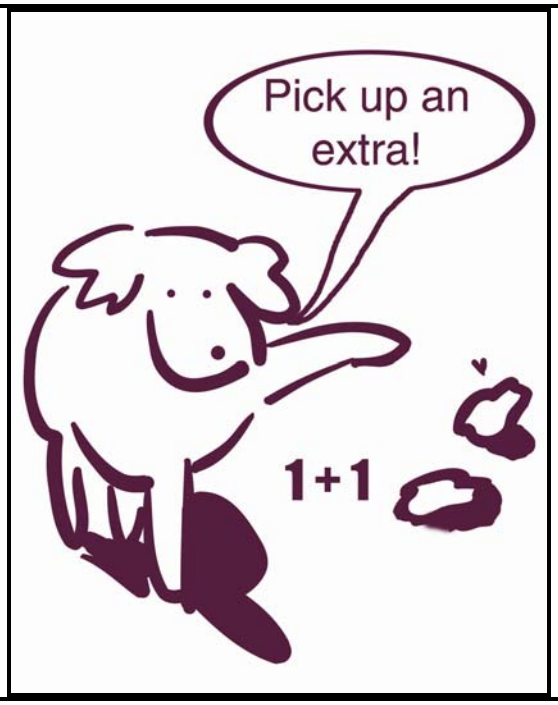
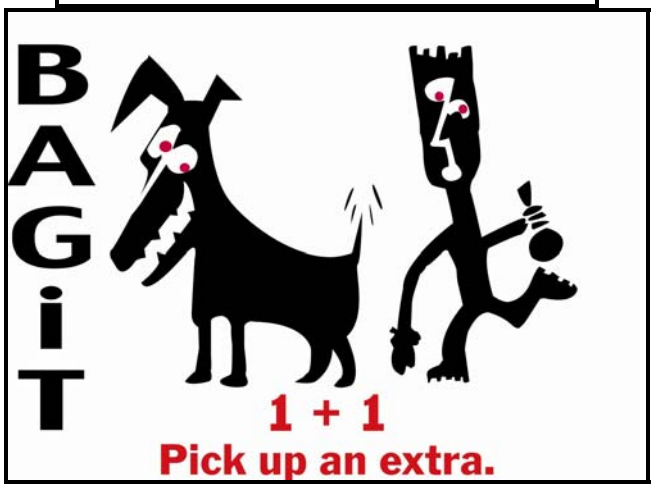

Dog Litter Pick-up Education Study
10 02 03 Litter
Transect
N
0 12.5 25 50 75 100 Feet
Dog Litter Pick-up Education Study
10 23 03 Litter
Transect
N
0 12.5 25 50 75 100 Feet
Dog Litter Pick-up Education Study
11 13 03 Litter
Transect
N
0 12.5 25 50 75 100 Feet
Dog Litter Pick-up Education Study
5 10 04 Litter
Transect
N
0 12.5 25 50 75 100 Feet

Figure 3


SCOOP YOUR POOP!
TRASH
1+1
Pick up an extra.


Pick up an extra!
1+1


BAGiT
1 + 1
Pick up an extra.