



CITY OF KIRKLAND

Pet Waste

Bacteria Monitoring, Outreach and Education

Funded By



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*Report Prepared by City of Kirkland Public Works
Storm & Surface Water Division
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Acknowledgements

The City of Kirkland Storm & Surface Water Division wishes to thank the King Conservation District, the Kirkland Parks Department, the Kirkland Communications Program team, Kirkland Animal Services, and the King County Environmental Lab for their support of this campaign.



ABSTRACT

Uncollected dog waste on sidewalks, parks, and public places is unsightly, poses a health threat to people, pets, and wildlife, and pollutes local waters. With jurisdictional funding from the King Conservation District, the City of Kirkland ran an 11-week campaign from September through November 2019 to:

- evaluate the impacts of pet waste bacteria on water quality
- conduct a targeted education and outreach campaign to change scooping behavior
- evaluate whether education and outreach efforts led to measurable changes in bacteria levels in a local creek.

Using brightly colored survey flags and signage, City staff marked all locations of un-scooped dog waste in two City parks over the course of three weeks. This visible display paired with targeted outreach efforts and regional media coverage led to an 80% reduction in un-scooped dog waste lasting at least two months after outreach efforts had ceased. No relationship was found between education and outreach efforts and fecal indicator bacteria collected from stream samples (fecal coliform and *E. coli*). However, fecal coliform and *E. coli* results were both strongly associated with measurable precipitation. In addition, detectable quantities of the canine genetic marker were only observed on sample days with measurable precipitation. These results support the notion that rain washes bacteria from dog waste into local waters and helps provide a data-driven basis for lasting and effective changes in scooping behavior.

Background

The Problem with Dog Waste

Kirkland's Juanita Creek watershed drains a 3,623-acre area¹ and contains approximately 15,209 households. There are 2,663 licensed dogs within the Juanita Creek watershed, but the actual number of dogs may be closer to 9,300 based on per-household dog ownership estimates². Research suggests that between 17% and 40% of dog owners do not pick up after their dogs on every walk^{3,4,5}. In the Juanita Creek watershed, this results in an estimated 1,186 to 2,790 pounds of uncollected dog waste daily in the Juanita Creek watershed.

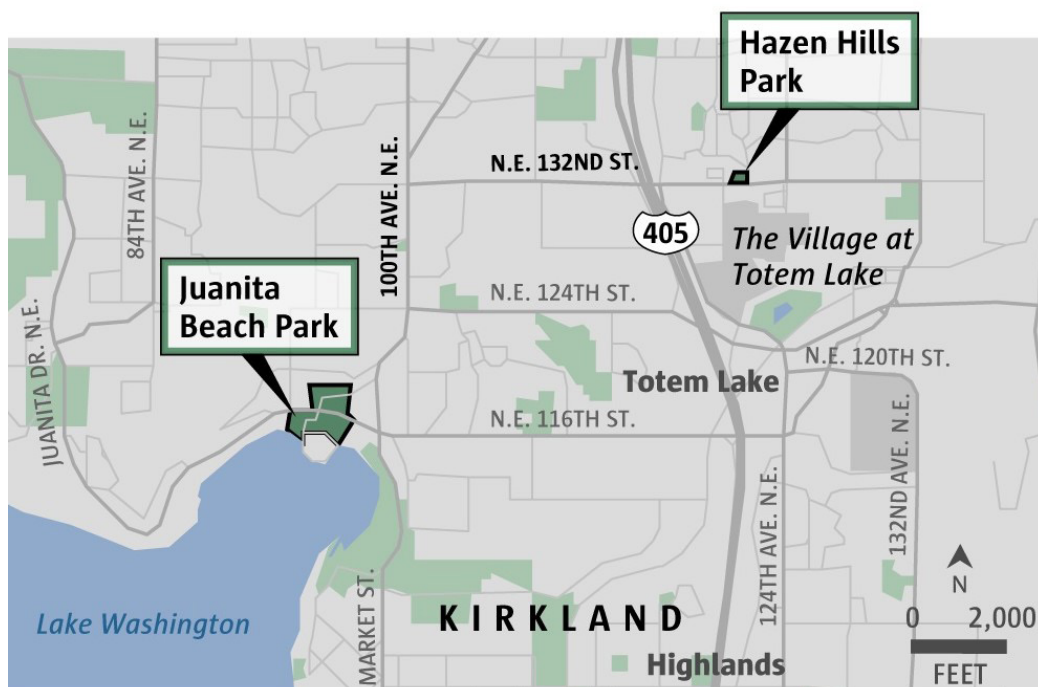
Dog waste contains harmful organisms like *E.coli*, *Giardia*, and worms, that can be transmitted to people and pets if not cleaned up^{6,7}. The average dog waste deposit contains 50 million Colony Forming Units (CFUs) of bacteria per gram⁸ which may survive in dog waste for weeks⁹.

Dog waste also contains elevated levels of nitrogen and phosphorus¹⁰. These nutrients act like fertilizer in our waterways and feed the growth of aquatic plants, including algae. As these plants decay, they use up oxygen in the water that fish and other aquatic life need to survive¹¹.

The Campaign

To address these concerns with un-scooped dog waste, the City of Kirkland applied for and was awarded funding through the King Conservation District Member Jurisdiction Grant program. The focus of this project was to conduct a public outreach campaign paired with an investigation of the impacts of dog waste on water quality.

Two parks in the Juanita Creek watershed were chosen as the primary focus of this campaign: Hazen Hills Park and Juanita Beach Park (north and south of Juanita Drive). Hazen Hills Park experiences heavy use by neighborhood dog owners, and a reach of Juanita Creek bisects the park with unrestricted access to the water by dogs and humans. Juanita Beach Park is one of Kirkland's most heavily used parks. The park experiences seasonal beach closures due to high bacteria levels and the north side of the park is used frequently as an unofficial off-leash dog area.



Source: Esri

JAMES ABUNDIS / THE SEATTLE TIMES

Background

Campaign Goals

The goals of the campaign were to evaluate the impacts of pet waste bacteria on water quality, conduct a targeted education and outreach campaign to change scooping behavior, and evaluate whether education and outreach efforts led to measurable changes in bacteria levels in a local creek. Few studies have explored the relationship between education efforts and physical environmental conditions, but there is evidence that educational campaigns can be effective means of reducing bacterial inputs to water sources¹².

This project was divided into four objectives:

Objective 1



Bacteria Sampling and Microbial Source Tracing (MST)

Environmental water samples from the section of Juanita Creek that runs through Hazen Hills Park were collected and analyzed for fecal coliform, *E. coli*, and the EPA canine qPCR genetic markers. Samples were collected pre- and post-outreach to determine whether a measurable difference in bacteria levels could be observed as a result of education and outreach efforts. EPA canine qPCR genetic marker samples were analyzed to determine the presence or absence of fecal bacteria from dogs in stream samples.



Objective 2



Un-scooped Dog Waste Frequency Monitoring

The frequency of uncollected dog waste was counted and mapped on a weekly basis before, during, and after outreach efforts to determine whether education and outreach efforts led to a reduction in uncollected dog waste.

Objective 3



Pet Waste Removal Infrastructure

Improved signage, new pet waste stations, and pet waste bags were installed in the study areas to facilitate proper disposal and removal of dog waste by park visitors.

Objective 4



Education and Outreach

A targeted education and outreach campaign was conducted over a three-week period. Outreach efforts included marking all documented un-scooped dog waste occurrences with brightly colored flags and accompanying signage, direct mail newsletters, direct mail postcards, community outreach booths, social media engagement, and press/media engagement.

Methods

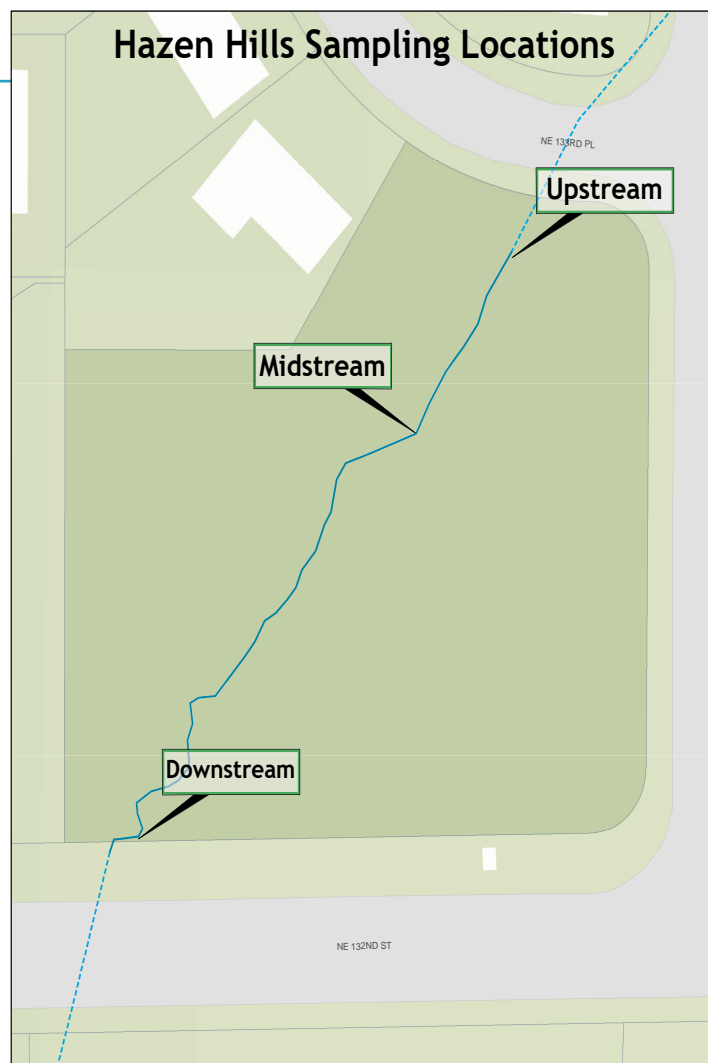
Objective 1



Bacteria Sampling and Microbial Source Tracing (MST)

Water samples for fecal coliform and *E. coli* were collected in Hazen Hills Park from three locations, three times per week, for three weeks prior to outreach and three weeks after outreach. Sampling locations included an upstream location where the creek enters the park, a midstream location where another inlet from adjacent roof drains enters the stream, and a downstream location where the stream exits the park. Samples were promptly delivered to and analyzed by AmTest in Kirkland, WA.

Water samples for the EPA canine qPCR genetic marker were collected from the downstream location once per week for three weeks prior to outreach and three weeks following outreach. Samples were stored on ice and delivered to the King County Environmental Lab within 24 hours of collection for analysis.



Objective 2



Un-scooped Dog Waste Frequency Monitoring

Frequency monitoring of un-scooped dog waste was conducted at each park location once per week, on the first day of each week. Monitoring began five weeks prior to education and outreach, continued through the campaign period, and concluded three weeks after the campaign. Total duration of frequency monitoring was 11 weeks. Frequency monitoring is also planned for one-month, three-month, and six-month follow up periods.

Each park was canvassed using a grid search and each instance of un-scooped dog waste was counted and mapped. Dog waste was not picked up or disposed of in order to avoid influencing bacteria results or scooping behavior (for example, visitors are less likely to litter when less litter is present in an area¹³).

In Hazen Hills Park, the entire park area was monitored. Due to the large size of Juanita Beach Park, a 0.85-acre area on the north side of the park (Juanita North) and a 1.02-acre area along the waterfront (Juanita South) were selected for monitoring. All other areas of Juanita Beach Park were excluded from monitoring (Appendix A).

Methods

Objective 3



Pet Waste Removal Infrastructure

A total of six new pet waste bag dispensers and ten new signs were installed across the study areas. One station and three signs were installed at Hazen Hills Park, two stations and three signs were installed at Juanita

North, and three stations and four signs were installed in the waterfront portion of Juanita South. A total of 52,000 dog waste bags were ordered to ensure long-term stocking of the stations. Dog bag dispensers were co-located with existing trashcans already in service by the Parks Department to minimize impact on staff resources.



Objective 4



Education and Outreach

Flagging

The central component of the education and outreach phase consisted of placing bright yellow survey flags at each mapped location of un-scooped dog waste along with signage in each park explaining the presence of the flags. This method of dog waste flagging has been conducted in many jurisdictions across the country including in Aspen (CO)¹⁴, Bellingham (WA)¹⁵, and Springfield (MO)¹⁶. The primary purpose of this flagging is to raise awareness about the cumulative impact of un-scooped dog waste. Flags were left in place for three weeks to allow for maximum visibility in the community. Frequency monitoring continued throughout the flagging period and new flags were added when necessary.

Direct Mail and Email

Educational direct mail postcards were sent to all residents who lived within one-quarter mile of each park. A new dog-focused newsletter titled “The Scoop” was sent to all licensed dog owners in Kirkland in partnership with the City’s Animal Services Program (Appendix B). Information about the campaign was also sent through the City’s weekly email newsletter as well as the Kirkland Conserves monthly email newsletter.

Social Media and Press

Social media posts were published through the City of Kirkland Facebook and Twitter accounts throughout the outreach period. Press releases were sent to regional media outlets detailing the flagging efforts and highlighting proper scooping behavior.

Booth Outreach

An education booth with the “poop toss” bean bag game for youth was conducted at City of Kirkland’s *City Hall for All* event during the outreach phase.

Super Scooper Pledge

Research shows that those who sign a pledge to perform a specific behavior are more likely to perform that behavior compared to those who do not sign a pledge¹⁷. All direct mail, social media, booth outreach, and press releases directed audiences to an online Super Scooper pledge where participants pledged to always pick up after their pets. Those who completed the pledge were mailed a free on-leash dog bag dispenser and roll of refill bags.

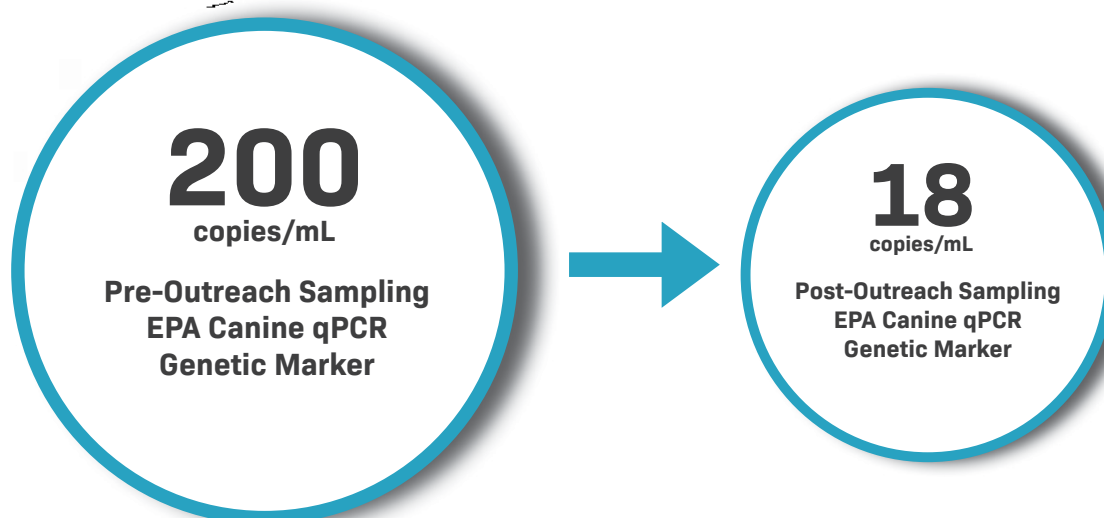
Results



Bacteria Sampling and Microbial Source Tracing (MST)

Microbial Source Tracing

Detectable quantities of the EPA canine qPCR marker, Dog-1-Bacteroidales, were reported in one of three pre-outreach samples (200 gene copies per mL of water) and one of three post-outreach samples (18 copies/mL). While copies/mL don't necessarily equal a colony forming unit of bacteria, the pre-outreach result of 200 copies/mL was noted as a substantial presence by King County Environmental Lab staff. All other samples were below the minimum detectable level. Notably, the only samples that yielded detectable results were on sample days with measurable precipitation. Samples that were below the minimum detectable level were collected on days with no measurable precipitation.



Bacteria Monitoring

Geometric means were calculated for pre- and post-outreach fecal coliform and *E. coli* results at upstream, midstream, and downstream sampling locations. Results are reported below in Colony Forming Units (CFU) per 100mL of water. For reference, King County closes the Juanita Beach swim area when geometric means exceed 200 CFU/100mL. While the geometric mean of CFU/mL did decrease between the pre- and post-outreach conditions, this decrease was not statistically significant* and could be due to decreased precipitation during the post-outreach condition. Overall, no statistically significant differences were observed between sampling location or between the pre- and post-outreach condition on either fecal coliform or *E. coli* indicators. However, both fecal coliform and *E. coli* were positively significantly correlated with measured precipitation ($p < .01$).

Fecal coliform Geometric Mean (CFU/100ml)	Hazen Hills Upstream	Hazen Hills Midstream	Hazen Hills Downstream
Pre-Outreach	68.2	58.3	64.9
Post-Outreach	17.1	14.3	21.3
<i>E. coli</i> Geometric Mean (CFU/100ml)	Hazen Hills Upstream	Hazen Hills Midstream	Hazen Hills Downstream
Pre-Outreach	42.3	33.4	23.0
Post-Outreach	11.2	10.4	17.0

*Statistical significance is the probability that the observed result would have occurred due to sampling error alone. A p-value lower than 0.05 indicates statistical significance.

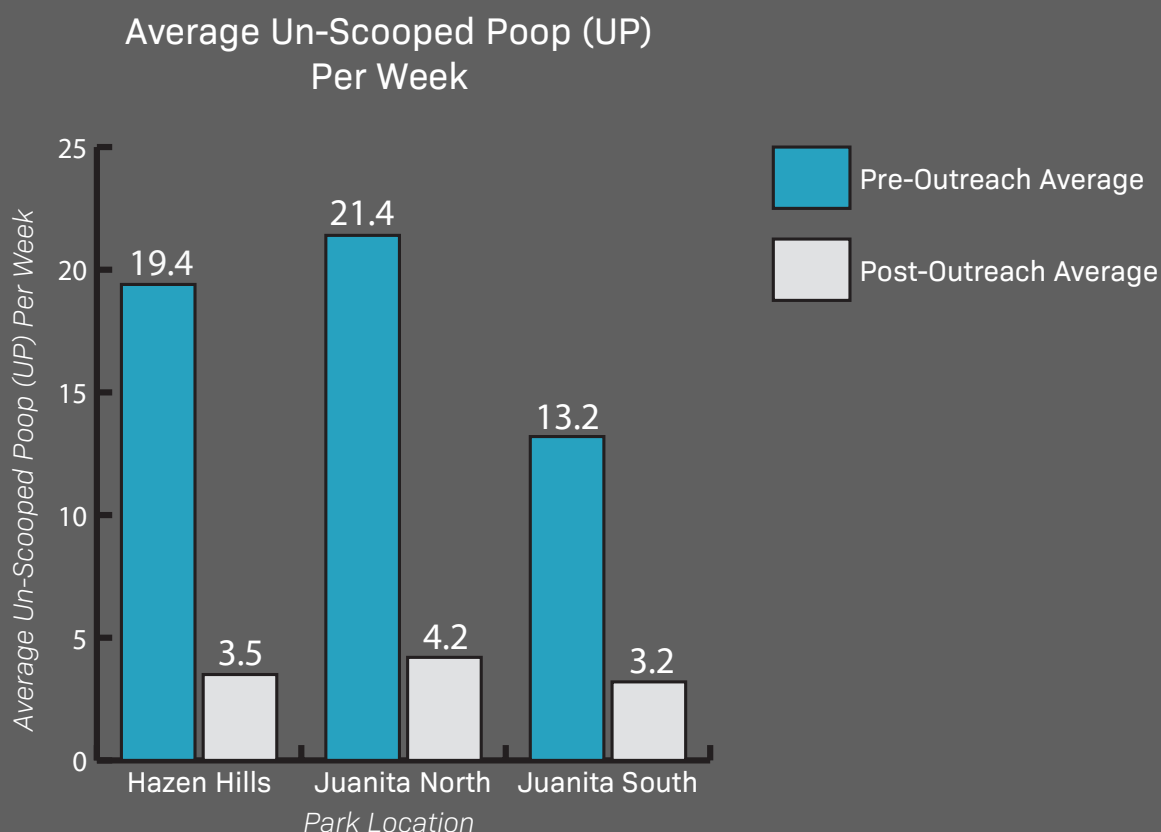
Results



Un-scooped Dog Waste Frequency Monitoring

Pre-outreach frequency of uncollected dog waste averaged 18 un-scooped poops (UP) per week across the three study areas. A total of 97 UP were observed at Hazen Hills Park, 107 UP at Juanita North, and 66 UP at Juanita South during the five-week pre-outreach monitoring period (Appendix C). UP declined significantly during the outreach phase (4.1 UP per week) and post-outreach monitoring (3.2 UP per week). All three study areas demonstrated statistically significant ($p < 0.01$) decreases in UP following the three-week outreach period. Overall, average un-scooped poop per week decreased by 80% as a result of education and outreach efforts.

Average un-scooped dog poop
decreased by 80%
as a result of education and outreach efforts.



Results

Objective 3



Pet Waste Removal Infrastructure

The newly installed pet waste stations have been heavily utilized since installation, particularly at Juanita Beach Park. As of February 2020, approximately 12,000 dog waste bags have been used across the six new stations. This equates to approximately 4,500 pounds of dog waste being removed from the park.

12,000 Bags

=

4,500 Pounds of dog waste.

Objective 4



Education and Outreach

Flagging

More than 300 yellow flags were deployed across the three study areas with almost instant reaction and discussion around the community as noted in the social media and press section below.

Direct Mail and Email

Direct mail postcards were sent to 3,215 households within one-quarter mile of each park area. In addition, 4,369 copies of the inaugural copy of the pet-focused newsletter, "The Scoop," were sent to licensed dog owners across Kirkland. Emails were sent to City distribution lists including *This Week in Kirkland* and *Kirkland Conserves*, reaching approximately 5,700 inboxes.



Results

Social Media and Press

Social media and press were incredibly effective components of this campaign due to the high visibility of the marking flags. Notably, the outreach efforts were printed on the front page of the Seattle Times, with an estimated circulation of 230,000. In addition, outreach efforts were covered on regional media outlets including *King5*, *KOMO*, *KIRO*, *KNKX*, *New Day Northwest*, *The Kirkland Reporter*, *Kirkland Patch*, *Kirkland Weblog*, and *High Country News*.

Social media posts gained significant traction, with City of Kirkland posts reaching more than 22,000 people with 613 likes, 214 comments, 75 shares, and 13,646 video views. In addition, social media posts by news media outlets garnered an additional 664 likes, 488 comments, and 108 shares. Social media may have reached tens of thousands more people through shared posts, but these metrics are not available.

The overall estimated reach between news media and social media outlets for this campaign was more than 340,000 people.



13,284

Direct mail pieces and emails delivered.



305,000+

Circulation reached through news media.



35,000+

Social media interactions and reach.

Booth Outreach

Several hundred Kirkland residents attended the annual City Hall for All and Sustainability Fair on October 12, 2019. Approximately 150 people engaged with the dog waste booth and 60 people signed the Super Scooper pledge to receive a free on-leash dog bag dispenser.



Results

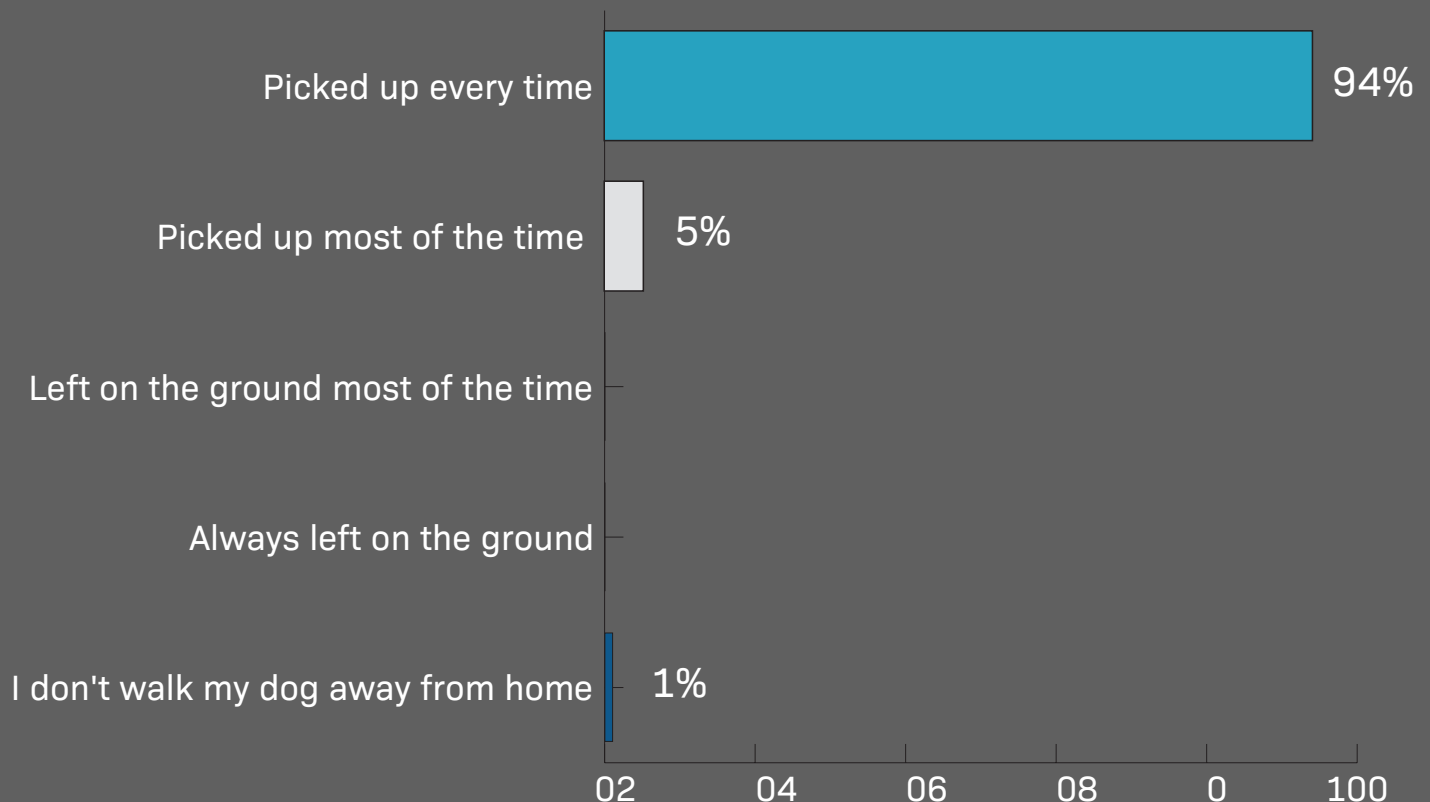
Super Scooper Pledge

The online Super Scooper pledge was an overwhelming success due to the widespread reach of social media and news media coverage. 425 people signed the online pledge in a one-month period. A total of 350 on-leash dog bag dispensers and 240 refill rolls were distributed to pledge participants who requested these items. This response used the entirety of the program supplies and resulted in an additional 11,800 dog waste bags being distributed to the Kirkland community. These bags equal an additional 4,425 pounds of dog waste being scooped, bagged, and thrown away.

In a follow up survey with Super Scooper pledge participants, 94% of respondents reported picking up their dog's waste every time while on walks, and 75% of respondents reported scooping at least a few times per week from dog waste deposited at home or in their yard. In addition, 97% of respondents either somewhat agreed or strongly agreed that bacteria in pet waste can be a health risk and that bacteria in pet waste can pollute our waters.

94% of participants
pick up their dog's waste on every walk.

How often do you pick up your dog's waste while on walks/away from home?



Discussion

Targeted education and outreach efforts resulted in an 80% decrease in un-scooped dog waste across three study parks, demonstrating a clear link between campaign efforts and scooping behavior. This substantial reduction in un-scooped dog waste has held constant for at least two months after the conclusion of all outreach efforts.

No statistically significant links between the education and outreach campaign and fecal indicator bacteria were observed during the study period. However, fecal coliform and *E. coli* were both strongly associated with measurable precipitation. In addition, detectable quantities of the canine genetic marker were only observed on sample days with measurable precipitation. These results support the idea that rain washes bacteria from dog waste into local waters and helps provide a data-driven basis for future education and outreach efforts. More data is needed to fully explore the relationship between education efforts and fecal indicator bacteria.

These results support the idea that rain washes bacteria from dog waste into local waters.

Lessons Learned

Due to the overwhelmingly positive response to the online Super Scooper pledge, more resources and staff time were necessary to deliver pledge items than originally anticipated. Original plans called for hand delivering pledge items as pledge responses trickled in online, but this option was not feasible due to the high volume of responses. Instead, pledge items were mailed to participants, resulting in a substantial postage cost.

While the brightly colored flags were highly visible and sparked positive behavior change, not all residents or dog owners were pleased with their presence. Some concerns were raised by residents that dogs and/or small children would hurt themselves on the flags. On two occasions all flags were removed from the park by anonymous residents and had to be replaced by City staff.

A variety of factors make it difficult to make statistically significant links between fecal indicator bacteria and education efforts, including precipitation, upstream events, distance of waste from the water source, etc. Future explorations of this type should include a control location with no education and outreach efforts. In addition, the sampling schedule may benefit from a focus on sampling days with only measurable precipitation, as dry days provide no mechanism for bacteria transport. The managers of future studies may also wish to expand the timescale over which bacteria data is collected. Previous studies that have demonstrated links between fecal indicator bacteria and outreach efforts have relied on data spanning several years rather than several weeks.



Discussion

Future Direction

The high visibility of the marking flags likely helped dog owners be more attentive to their dog when spending time at the study parks. While positive scooping behavior has held constant for several months, it is reasonable to expect un-scooped dog waste numbers to increase in the spring and summer months. Future iterations of these outreach efforts may solely focus on the monitoring and flagging strategy when new concerns regarding un-scooped waste arise at any of Kirkland's parks. Monitoring and flagging are a relatively low-effort, low-cost response that delivers a high degree of behavior change. Future plans may also include training volunteers to conduct frequency monitoring and flagging to further reduce City staff time and resources.

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Appendices

Appendix A - Map of Frequency Monitoring Areas. Yellow areas indicate where monitoring occurred.



Juanita North Map



Juanita South Map



Appendices

Appendix B - Outreach Materials

Direct Mail Postcard Sent to Nearby Residents

Be #1 at picking up #2.

Our local creeks need your help to prevent water pollution from un-scooped dog poop.

Sign the **Super Scooper Pledge** online at www.kirklandwa.gov/petwaste and receive a free poop scooping toolkit for your dog!



Good human.

Visit www.kirklandwa.gov/petwaste to learn more.

Front

Back

Bring extra bags.
Scoop every poop.
Carry it to the trash can.

20,000 dogs

in Kirkland



6,000 pounds
of poop
every day




Dog poop spreads disease to people and pets, and pollutes our creeks and lakes.

Healthy families. Clean water. Clean shoes.

“The Scoop” Newsletter Sent to Licensed Dog Owners



City of Kirkland
123 Fifth Avenue
Kirkland, WA 98033-6189

PSRST STD
U.S. Postage
PAID
Kirkland, WA
Permit #268

More than 20,000 dogs of all shapes and sizes live and play in Kirkland. We need you and your dog's help in keeping the trails, parks, and beaches our dogs love clean, safe, and healthy.



"Kirkland's Doggy Newsletter"

Be #1 at picking up #2!!

Sign the **Super Scooper** pledge and receive a **free poop scooping toolkit** that includes a poop bag dispenser, flashlight, and/or collar light for your pet. Sign the pledge at www.kirklandwa.gov/petwaste.

This program is funded by the  King Conservation District

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Education & Outreach Specialist
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Is Your Pet License Up-To-Date?
Renew today at <http://bit.ly/KirklandPetLicense>!
Pet licenses help ensure the safe return of your furry four-legged family members should they ever get lost!



LOVE 'EM, LICENSE 'EM.

Join us in welcoming Kirkland's first ever Park Ranger, Betty Fletcher. Betty came to Kirkland with a wealth of experience in animal control and a background in law enforcement. As a Park Ranger Betty is focused on the safety of our City parks and marina. She also supports Animal Control Officer Jennifer Matison when she needs backup on animal control calls.

Some of the duties of a Kirkland Park Ranger include:

- patrolling all City parks and the marina
- ticketing pet owners that fail to clean up their pet's waste
- responding to animal violations
- enforcing the City's pet licensing requirements
- enforcing leash laws

However, for Park Ranger Betty Fletcher the job is more than just enforcement, it's also about education and building relationships with the community.







The Poop Problem

Kirkland dogs poop an average of 6,000 pounds every day! Dog poop contains harmful bacteria and germs that can spread disease to other dogs and wildlife, and pollutes our streams, creeks, and lakes. Dog poop harbors organisms like E. coli, giardia, parvovirus, worms, and other harmful pathogens that can spread to pets, children, and adults if not cleaned up. When it rains, dog poop washes away to the nearest storm drain, stream, creek, or lake. The bacteria in dog poop can harm water quality and can make our favorite places to swim and play unsafe.

Bring extra bags.
Scoop every poop.
Carry it to the trash can.



The Poop Solution

The easiest and most effective way to prevent the spread of disease and water pollution is to scoop the poop, bag it, and put it in the trash.

At home, dog poop should be scooped every day, but weekly scooping and scooping before it rains can also make a big difference. Some bacteria can survive in your yard for weeks or months, and can be tracked indoors by paws, shoes, or flies.

On walks, bring extra bags, scoop every time, and carry it to the trash. Watch your dog closely when off-leash and be sure to scoop poop even when it is in tall brush or plants.

Dog poop, even in biodegradable bags, should not be thrown in compost or yard waste because the bacteria cannot be safely broken down by composting.

The Scoop - Kirkland's Doggy Newsletter

Appendices

Signage Installed at Parks

Bring extra bags.
Scoop every poop.
Carry it to the trash can.



Healthy families. Clean water. Clean shoes.

IT'S THE LAW.

FINES UP TO \$250.

Dog walkers are required to have poop scooping equipment with them and to remove dog poop from public properties.

KMC 8.09.508

WHY?

Dog poop is raw sewage that can spread disease to people, pets, and wildlife, and pollutes our waters.

Dog poop looks bad and smells bad too.

Funding made possible by



www.kirklandwa.gov/animalservices

Seattle Times Coverage



SHOWERS LIKELY
High: 56, Low: 52, > 83%
seattletimes.com/weather

\$1.50

The Seattle Times

WINNER OF 10 PULITZER PRIZES

INDEPENDENT AND LOCALLY OWNED FOR MORE THAN 123 YEARS

SEATTLETIMES.COM

6,000 pounds a day: Kirkland campaign targets dog poop



After city of Kirkland officials targeted Juanita Beach Park as having a poop problem, city staff put up yellow flags at each spot they found unscooped dog poop. The northeast curve of the park has a large concentration of flags.

By PAIGE CORNWELL
Seattle Times staff reporter
KIRKLAND — A French bulldog trots along Kirkland's Juanita Beach Park, followed by his walker who is chatting on her cellphone. The plump dog stops, snorts and gets in position. Snout up, hips back, bear down. Poop.

The dog walker, distracted by her conversation, pulls on the leash, seemingly unaware that the dog just did his business on the grass. The pair exit, leaving another casualty in Kirkland's War on Dog Poop.

The bulldog's feces, along with other unscooped piles, will eventually be cataloged by Kirkland city officials, who have been working since September to monitor how much dog poop



An aerial photo shows the locations of unscooped dog poop in the park last week. The beach area has the fewest flags.

is left at two of the city's parks. Beach Park and Hansen Hills Park, which the poop monitors

— they volunteered for this task — need to mark every pile of dog waste. Over a three-week period, they documented more than 250 "findings" in the two parks.

The flags show that it's not just your dog doing this," said Aaron Husman, Kirkland's environmental education and outreach specialist. "And it shows that someone is watching."

The flags, along with the accompanying yellow signs explaining their purpose, are part of Kirkland's campaign to encourage more residents to scoop their dogs' poop. It's a widespread problem, as the flags show, and city officials warn that the poop can spread disease to people and other animals.

See » POOP WAR, A4

Boeing denies prior knowledge of MAX problems

PILOT TEXTS | Company says comments were about malfunctioning flight simulator, not flight control system.

By DOMINIC GATIS
Seattle Times aerospace reporter
Two days after the publication of a 2016 instant-enclosure chat between two senior pilots on the 737 MAX program drew outraged condemnation from members of Congress, airline pilot unions and outside experts, Boeing said Sunday the pilot text exchange had been widely misinterpreted. In the chat conversation on Nov. 15, 2016, made public Friday by a congressional committee, 737 MAX chief technical pilot Mark Forkester told another pilot that when he'd flown the MAX in a flight simulator that day, the jet's new flight control system behaved very erratically. In a Sunday morning statement, Boeing insisted this doesn't mean it had prior knowledge of the system flaws that two years later would play a major role in the two deadly crashes in Indonesia and Ethiopia. Instead, Boeing said, Forkester's "comments reflected a reaction to a simulator program that was not functioning properly."

Boeing said the erratic behavior in 2016 of the new flight control system in the simulator — Forkester in the chat with another pilot described the flight control system as "not functioning properly."

See » BOEING, A4

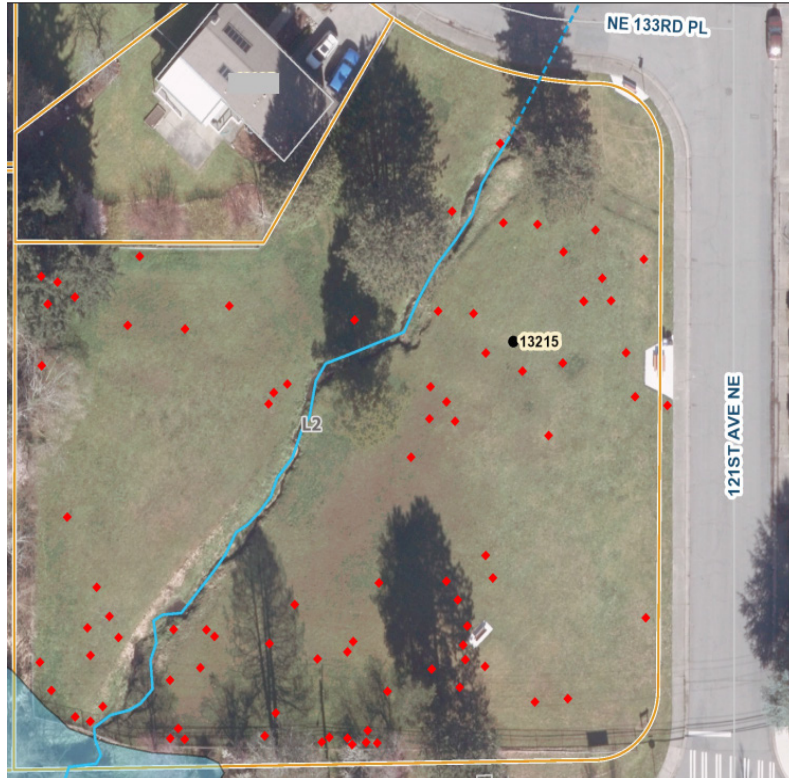
Pelosi leads delegation to Jordan to talk of Syria crisis

By STEVE HENDRICK
The Washington Post

Appendices

Appendix C - Frequency Monitoring Maps

**Hazen Hills Un-Scooped Poop
Pre-Outreach**



**Hazen Hills Un-Scooped Poop
Post-Outreach**



Appendices

**Juanita North Un-Scooped Poop
Pre-Outreach**



**Juanita North Un-Scooped Poop
Post-Outreach**



Appendices

**Juanita South Un-Scooped Poop
Pre-Outreach**



**Juanita South Un-Scooped Poop
Post-Outreach**

