

Memo

To: City Council of the City of Westminster, CO
City Manager Mark Freitag
Director of Parks, Recreation, and Libraries Tomás Herrera-Mishler
Presented at the City Council Meeting on March 11, 2024
From: Westy Dog Park Guardians - Website: [Westy Dog Park Guardians](#)
Re: Westminster Hills Open Space and Dog Park
Date: March 11, 2024

Introduction

The purpose of this Memo is to request that the City Council of Westminster:

1. Retain the current 420 acre off-leash dog park that has existed for dog owners and their dogs at Westminster Hills Open Space since 2000, and at its current size since 2009;¹
2. Officially redesignate the Westminster Hills Dog Park as a City of Westminster Dog Park to comply with the Municipal Code, and to acknowledge the area is intended for active use by dog owners and cyclists; and
3. Consider a collaboration with the Westy Dog Park Guardians to improve conditions at Westminster Hills and to address the concerns of Westminster Parks, Recreation & Libraries (PRL) that Westminster Hills is being “negatively impacted by overuse.”²

According to the Westminster PRL Mission Statement:

Together we create exceptional opportunities for a vibrant community with a commitment to nature, wellness, and literacy. (Emphasis added).

Westminster Parks, Recreation & Libraries manages more than 6,600 acres of parks and open space; 125 miles of trails; seven recreation facilities; two championship golf courses; two libraries; numerous community events; and a multitude of programs for individuals of all ages, abilities, and interests.³

The Westy Hills Dog Park Guardians offer a summary of research that demonstrates:

- Substantial public support to retain the off-leash dog park at its current size;
- Residents of the Denver Metro Area love their dogs, and recreation with their dogs is of utmost importance to them;
- The Westminster Hills Dog Park amounts to approximately 6.4% of the 6,600 acres of parks and open space enjoyed by the dog lovers of Westminster and surrounding communities, and it has been marketed, developed, managed, and used for at least two recreational activities that are not listed as passive activities, off-leash dog use and cycling use, for at least 23 years;
- Some of our questions and concerns about the data provided in the ERO Westminster Hills Open Space Conditions Report⁴;

- The unique restorative contributions of dogs to people;
- The importance of exercise to brain health and mental health;
- The value of a space dedicated to people and dogs recreating together naturally; and
- A list of potential solutions to the concerns raised by PRL.

We are asking to work **together** with the City Council and PRL on the care and stewardship of the Westminster Hills Open Space Dog Park because:

- **89.8% of the respondents to the Community Feedback survey want to retain the 420 acres at Westminister Hills as an off-leash dog park;**
- Coloradans love their dogs, dog parks are a very small portion of PRL resources, and dog owners are likely underserved by PRL resources;
- Dogs are likely not the exclusive cause of the PRL issues of concern;
- Dogs serve people in unique and important ways, and they also deserve to exercise;
- Exercise is important to people’s physical and mental health;
- This is an opportunity for the City of Westminister to provide and enjoy the recreational and economic benefits of serving dog lovers; and
- Dog owners who exercise with their dogs at Westy Hills also love nature, the environment, and our experiences in them, and we want to collaborate on solutions and continued stewardship of the park.

Results of Community Feedback

PRL has conducted two public surveys: the Visitor Survey in summer 2023 (Survey 1), and the Community Feedback Survey that was open to the public through February 15, 2024 (Survey 2).

During the March 6, 2024 Public Meeting, PRL referred to the data from Survey 2. PRL provided inaccurate and incomplete numbers to citizens in attendance at the meeting. PRL used said information to develop a new survey, the WHOS Area Management Options survey (Survey 3) posted to the PRL website on March 6, 2024. Our analysis of Survey 2, as categorized by the four options presented on the new Survey 3, shows that out of **883 responses**, the public supports:

- **Option 1 - No change to the size of the off-leash area – 89.8% (793)**
- Option 2 - Off-leash area larger than 33 acres but smaller than 400 acres - **2.7% (24)**
- Option 3 - Conditions assessment recommendation of reducing off leash area to 33 acres - **2.8% (25)**
- Option 4 - Eliminate off-leash at WHOS and create more off-leash dog parks throughout the city - **2.5% (22)**
- Comments recorded but n/a to any category - **2.2% (19)**⁵

The Survey 2 data is very similar to data collected from Survey 1, which, although no numbers are provided by the PRL graph (slide 34 of Visitor Survey results on PRL website), appear to show that some **75-80% of respondents would be extremely dissatisfied or dissatisfied with any reduction to the off-leash dog area.**⁶

Coloradoans Love Their Dogs

In Denver, there are more dogs than children,⁷ and 27.1% of Colorado households have a dog.⁸ Coloradoans love their dogs so much, they ranked 4th in a study examining which dog owners spoil their dogs the most.⁹ Coloradoans value their relationships with their dogs so much that 46% report hosting a celebration for and with their dogs; 43.2% report taking their dog to dog-friendly activities; and 41.3% take their dog on vacation with them.¹⁰

A recent survey by Rover and Zillow showed that Denver tops the list for dog-friendly cities because dog owners put their dog's well-being at or near the top of their criteria for deciding where to relocate.¹¹ Being home with our dogs during the pandemic strengthened our already considerable bonds with our dogs. Among dog owners who were surveyed, 86% reported that dog-friendly amenities were a factor in determining where to move.¹²

Westminster Dog Parks

In addition to Westminster Hills, there are only two other dog parks in Westminster, The Big Dry Creek Dog Park (no acreage listed) and The Little Dry Creek Dog Park (1.75 acres).¹³ The difference between Westminster Hills and the Big Dry Creek Dog Park and The Little Dry Creek Dog Park is that dog owners can exercise alongside their dogs, and their dogs can exercise at their own pace, at Westminster Hills.

The Westminster Hills Dog Park is approximately 6.4% of the 6,600 acres of parks and open space enjoyed by the dog lovers of Westminster and surrounding communities. Westminster Hills is also enjoyed by folks who walk, run, and cycle without dogs.

Although the Westminster Hills Open Space area may have been purchased with a specific use in mind, the 420 acre East side has been devoted to off-leash dog use for at least 23 years, beginning in 2000, and at its current size since 2009.¹⁴ By comparison, there are over 150 miles of multi-use trails in Westminster, which are enjoyed by cyclists, runners, and walkers, often with their dogs.¹⁵

The results of two public surveys, and the considerable support demonstrated at the March 6, 2024 Public Meeting, suggest that dog owners who wish to exercise with their off-leash dogs may be an underserved population. The City of Westminster can seize this opportunity to improve our crown jewel Westy Hills Dog Park. Engaging the public has revealed a considerable desire for this population to recreate in spaces like Westy Hills Dog Park. Westminster should consider the creation of another similar dog park, in order to serve this part of the community, and expand the economic rewards that would come with an expansion of off-leash dog parks for dog lovers who spend time and money in Westminster.

Use of Westminster Hills Open Space

“Westminster Hills Open Space was acquired through twelve different open space purchases beginning in 1988 with the purchase of the 400 acre Colorado Hills Property, followed by the purchase of 125 acres in 1995 from the Brauch Family. More land was purchased over several years including the addition of Woman Creek Reservoir Property in 2017, which is 345 acres. Westminster Hills Open Space is now roughly 1,000 acres. This open space was acquired using over \$4.5 million from the Westminster Parks Open Space and Trails’ (POST) funds and more than

\$4.7 million from Natural Resources Damages and Department of Energy Funds and grants from Jefferson County and Great Outdoors Colorado (GOCO).”¹⁶

For approximately 23 years, the City of Westminster has advertised and marketed the off-leash Dog Park to dog owners in the Denver Metro Area, via park signage (that has been replaced over the last year - See Attachment D) and via the current PRL website.¹⁷ It is also enjoyed by folks who walk, run, and cycle without dogs, from the city of Westminster and from surrounding communities.

The PRL, on the Westminster Hills Open Space Area Management Plan website, acknowledges that:

“The land was acquired to protect the environment and offer passive recreation as designated open space. The off-leash dog area was initially a small pilot project added in 2000 that expanded to its current size of over 400 acres due to its popularity. Per the Westminster Municipal Code, lands acquired with open space funds shall be preserved and managed in a natural condition (W.M.C. 13-5-3(A)).”¹⁸

Multiple sections of the Westminster Municipal Code are relevant to this situation:

Section 13-5-3(A) of the Westminster Municipal Code states “**Generally**, lands acquired with open space funds shall be preserved and managed in a natural condition.” It also states that: “Open spaces will generally be open for passive public use and enjoyment, and trails will be developed where possible to provide access. Examples of compatible passive recreation include hiking, nature study and photography.” (Emphasis added).¹⁹

Section 13-5-3(B) states: “Additional activities that may be allowed on certain open space property, or portions thereof, after the City Manager determines such activities will not have a detrimental effect on the natural qualities for which the open space was originally acquired, include fishing, biking, horseback riding, boating, and the development of off-leash dog exercise areas, restrooms, trailhead parking lots, and limited structures that enhance the passive recreational experience.”²⁰

Section 13-5-7 states: “The Department of Parks, Recreation and Libraries shall be responsible for the regular maintenance and operation of the open space properties, with funds made available in the City's general operating budget and funds derived from the open space portion of the parks, open space and trails sales tax.”

Section 13-5-4(A) states that “In certain cases, it may be determined by the City Council that a property originally acquired for open space purposes may be better utilized for another public purpose, including, but not limited to, **an active park.**” (Emphasis added).²¹

The PRL has **not** managed the Westminster Hills Open Space and Dog Park as purely open space that is used for only passive recreation activities since 2000. It has marketed and provided dog owners and their dogs with an active recreation space for at least 23 years. It has also marketed, developed, and provided the Rocky Mountain Greenway Bike Trail, a dirt road that can support vehicle traffic, for bike use. **For over two decades, the PRL has promoted, marketed, developed, and managed the use of at least two recreational activities that are not listed as**

passive activities, off-leash dog use and cycling use, at the Westminster Hills Dog Park. (See Attachment D and current PRL website).²²

This is the opportunity for the City of Westminster to officially redesignate the 420 acre Westminster Hills Dog Park as an off-leash dog park; collaborate with the Westy Dog Park Guardians to promote, model, and collaborate on dog-park support, citizenship, and stewardship; and to consider a plan to develop a second large off-leash dog park to capitalize on this Colorado-style recreation activity.

Questions and Concerns about the ERO Data and Impact on the PRL Recommendations

The PRL argues that Westminster Hills Open Space “is being loved to death,”²³ and “the current management strategy for Westminster Hills is unable to sustain resource demands from high visitation to the Property.”²⁴

Westminster Hills Open Space consists of 1,027 acres of prairie that includes The Rocky Mountain Greenway Trail that “crosses through the Property from the southeast to northwest, while multiple other roads, trails, and social trails provide visitor and dog access through the prairie.”²⁵

Of the 1,027 acres, the 420 acre off-leash Dog Park has existed since 2000.²⁶ “The off-leash dog area is a regional attraction, providing a unique opportunity for dog owners to walk, hike, or run with their dog through an open prairie setting. This use, however, has resulted in a proliferation of social trails, vegetation trampling, native plant degradation, and concerns about contamination from dog waste (E. coli).”²⁷

The PRL heard from long-time citizens at the March 6, 2024 public meeting that the Westminster Hills Open Space has been transformed from a cow pasture to the current open prairie, and some users report that the current conditions are healthier than when the land was purchased. The public also questioned blaming off-leash dogs for conditions that may be caused by, or exacerbated by, climate change.

We have reviewed the ERO Westminster Hills Open Space Conditions Report, dated January 10, 2024,²⁸ and we have some initial questions and concerns. Briefly:

- E. coli data levels are extremely similar in the 420 acre off-leash dog park and the Mower Reservoir, which implies that dog waste is not exclusively, or even largely, responsible for E. coli levels in the Westminster Hills Open Space (see Attachment A).
- Our analysis leads us to believe that E. coli is entering the park from water sources that contain E. coli. If that is the case, this has been true since 2000, when the area was designated a dog park. There is no reported data on dog or human illnesses that could be attributed to E. coli from the dog park. There are methods for remediating E. coli that may be considered by the City of Westminster to reduce this risk.²⁹
- The existence of social trails, vegetation trampling, and native plant degradation may be exacerbated by users other than dog owners and their dogs. Unofficial trails likely expanded during the pandemic, and they could be attributed to bikers or walkers without dogs. At the March 6, 2024 meeting, the PRL suggested it would be comfortable with the time, resources, and environmental impact of totally redesigning the trail system at Westminster

Hills, cited by PRL as 10 miles of official designated trails and 12 miles of unofficial trails. The position that the trail system could be totally redesigned seems counter to the PRL argument that overuse by off-leash dogs must be curtailed.

- The existence of the Concrete Bike Trail, and the Rocky Mountain Greenway Bike Trail, a dirt road that was constructed through the Westminster Hills Open Space, and running almost through the middle of the historically sensitive wildlife area, seems to run counter to the PRL position that the 420 acre off-leash dog park must be greatly reduced due to overuse. The PRL is comfortable with the impact of its 150 miles of multi-use trails that run through wildlife corridors, including significant use by cyclists, while arguing that off-leash dogs are creating the environmental impacts that require eliminating most of the off-leash dog use within the 420 acres.

Soil and Water Testing (see Attachments A and B)

1. The report shows that the consultant tested soil in 4 locations and water in 3 locations.

2. Soil testing observations and comments:

- A comment is made on page 5 of the report on soil testing - *"There are no regulatory standards for E. coli in soils and E. coli concentrations were determined to be less than the laboratory method detection/reporting limit"*
- A comment on page 34 - "E. coli concentrations in surface soil on the Property were determined to be less than the laboratory method detection/reporting limit in the composite soil samples from four high traffic areas of the property"

While these comments don't necessarily mean that there are no E. coli problems with the soil, one could take from the comments that there was minimal E. coli presence (or at very low levels) in the soil samples. If that's the case, one can imply that the E. coli presence in the water of the Church Ditch is not coming from dog excrement in the soil.

3. Water testing observations and comments:

- We have included a map showing Church Ditch along with a comment from the City of Arvada (arvadaco.gov site on irrigation canals). From the City of Arvada information, Church Ditch delivers water seasonally from Clear Creek to Standley Lake, and continues past Standley Lake. If you follow the path of Church Ditch that is shown on the map to determine the flow path, Church Ditch enters the Dog Park at test point WH-SW-2 and exits the Dog Park at test point WH-SW-3.
- According to E. coli test results on pages 6 and 7 of the ERO Report, the highest levels were found at Mower Reservoir on 5/23/2023 and 8/28/2023, and the inlet and outlet points at Church Ditch on 8/28/2023. It would appear that dogs accessing the Church Ditch in the Dog Park have no impact on the E. coli levels, when comparing water within the Open Space from two different sources. Other environmental factors need to be investigated.

- The tests results for E. coli at Mower Reservoir (test point WH-SW-1) show significantly higher E. coli test counts for the 5/23/23, 6/22/23 and 7/27/23 test dates. Because we don't know why those counts are so high, that should be investigated. Mower Reservoir is located in an area of the Dog Park where dogs are supposed to be leashed and is fed by a totally different water source than Church Ditch.
- We theorize that the problem with the E. coli counts in the water are driven by the Church Ditch inflow on the east side of the Open Space. As recommended on page 34 of the ERO Report, Westminster should identify the source of the bacteria, which would require upstream testing.
- The Mower Reservoir is fed by the Mower Ditch. It is possible that the high E. coli counts in the Mower Reservoir are being driven by high counts from flow in the Mower Ditch. As recommended on page 34 of the ERO Report, Westminster should identify the source of the bacteria, which would require upstream testing.

Wildlife, Vegetation, and Recreation Impacts

Vegetation and Noxious Weeds

The distribution of noxious weeds appears to be spread consistently throughout the 1,027 acres according to the visual depictions on pages 16 and 17 of the Report. This seems to indicate that off-leash dogs are not responsible for the spread of noxious weeds.

Burrowing Owl Habitat

Burrowing owl habitat is depicted on page 25 of the Report. It appears to have a significant overlap with the extreme density of noxious weeds represented on page 17 of the Report. The Rocky Mountain Greenway Bike Trail, a dirt road that can support vehicle traffic, runs almost directly through the middle of the owl habitat. This seems to indicate that PRL is comfortable disturbing sensitive wildlife habitat to serve cyclists, but unwilling to serve dog owners who enjoy exercising with their off-leash dogs.

Cyclists and Bike Trails

“With over 150 miles of multi-use trails within Westminster, there's no shortage of outdoor opportunities. There are 50 individual trails within the system, composed of concrete, gravel, natural, and multi-surface materials. There are 5 regional trails, which are great for commuting and recreational use. The regional trails are Big Dry Creek Trail (Westminster's National Recreation Trail), Farmers' High Line Canal Trail, Little Dry Creek Trail, Rocky Mountain Greenway Trail, and the U.S. 36 Bikeway. These trails have been established along ditches and canals that were preserved as wildlife corridors, but they also provide access for trail users to observe a little bit of peace and serenity in an ever-growing metropolitan area.”³⁰

The Westminster Hills Open Space portion of the Rocky Mountain Greenway Bike Trail begins at the Westminster Hills Parking lot on 100th Avenue and dissects both the 420 acre off-leash dog portion, as well as the western remainder of the 1,027 acres of the Open Space. It also nearly subdivides the Historic Burrowing Owl Nest site, depicted on page 25 of the Report.³¹

Bike trail use and cyclist use have an impact on the Westminster Hills Open Space. This impact is not addressed by the ERO Westminster Hills Open Space Conditions Report.

The Unique Contributions of Dogs to People

The benefits of interactions between humans and animals have captured the interest of researchers for years. Animal-assisted interventions involve the use of animals to help people in settings such as schools, libraries, hospitals, assisted living facilities, courts, prisons, offices, and trauma scenes. The most studied species is dogs. Research shows that dogs benefit people by reducing their stress, lowering their blood pressure, reducing their heart rate, and improving their mood, happiness, loneliness, and cognitive capacity.

Below are highlights of key research study results. Please see Attachment C for more detailed explanations of the research.

Dogs make very special, unique, and important contributions to humans. Interacting with dogs:

- Reduces stress hormones;
- Lowers heart rate and blood pressure;
- Increases the bonding and attachment neurotransmitter oxytocin;
- Improves stress, happiness, loneliness, and negative emotions;
- Enhances executive function, responsible for motivation, concentration, planning, prioritizing, emotion regulation, and the capacity to understand different points of view;
- Improves metacognition, the ability to understand your own thinking; and
- Increases brain activation in the prefrontal cortex, dedicated to executive functions, such as attention, working memory, and problem-solving, as well as social and emotional processing.³²

The Importance of Exercise to Well-being

Exercise improves both brain health and mental well-being. All citizens, including dog owners, deserve the means to exercise. Below are highlights of key research study results. Please see Attachment C for more detailed explanations of the research.

Exercise benefits the brain in three ways: it enhances blood and oxygen flow; it elevates the levels of key neurotransmitters (dopamine, serotonin, and norepinephrine); and it stimulates the production of brain cell building blocks, especially Brain Derived Neurotropic Factor (BDNF).

The benefits of exercise to brain health, mood, and stress resilience include:

- Protecting against the negative impacts of aging and stress;
- Increasing brain volume in areas responsible for learning, memory, and cognitive function, via the birth of new brain cells;
- Improving the health and functioning of brain cells, including the capacity for forming neural networks, which likely explains why exercise improves cognitive function;
- Raising antioxidant levels, which helps protect against oxidative stress;
- Increasing neurotropic factors, including BDNF;

- Restoring stress arousal to a resilient level, which improves current mood and brain function, and prepares the brain for processing stressful events;
- Reducing symptoms of anxiety, depression, and stress;
- Regulating the fight-or-flight stress response;
- Reducing inflammation and oxidative stress; and
- Improving self-esteem, self-efficacy, and social support.³³

Enhancing the Health of Humans and Dogs, Together

The Westminster Hills Dog Park, described as the crown jewel of Westminster by people who love to exercise there with their dogs, is strategically important to the City, and of utmost significance to its dog-loving citizens. It provides the exceptional opportunity for people and dogs to exercise in natural ways, together. Traditional dog park models do not offer the same opportunities due to their size and congestion. Westy Dog Park Guardians propose that the City of Westminster could increase its dedication to serving this population, and to reap the economic benefits that would expand as dog lovers spend time and money here, by developing a second large acreage for a second large off-leash dog park.

Potential Solutions

We have brainstormed the following list of ideas that could increase citizenship and stewardship at the Westminster Hills Dog Park:

- Post very clear, large and well-placed signs stating park rules and the fines associated with non-compliance;
- Enforce existing laws: parking, dog waste pick up, unleashed dogs outside of park, number of dogs per person, etc.;
- Increase patrols, especially on weekends;
- Add dog waste bag dispensers and trash cans to encourage visitors to keep the park clean;
- Reinstate and partner with the community for volunteer clean-up days;
- Consider park passes or parking passes, to help decrease congestion and provide income for park management;
- Consider fundraising ideas with interested citizen groups, such as a memorial brick initiative and donation boxes;
- Consider implementing mud day closures;
- Consider scheduled rotation and seasonal closures of parcels of the park for revegetation;
- Install trail edging to gain control of widening trails;
- Revisit trail closures within the 400 acres to allow for visitors not able to walk as far;
- Revisit the wire fencing that is dangerous to both dogs and wildlife. This fencing also funnels all dogs, people and bicyclists into a confined entrance, thereby greatly increasing chances for negative encounters;
- Coordinate with volunteer groups that have shown commitment to this park already; and
- Add additional foot bridges over the canal to decrease congestion.

Conclusion

Dog owners are a population that deserve an exercise and recreation space where we can exercise with our dogs. The vast majority of us are responsible dog owners and good citizens. As with any of the parks and recreation spaces, there are some responsible citizens who take care of the resources, and there are some less responsible citizens who fail to manage their impact. The Westy Dog Park Guardians are seeking to increase our stewardship of Westminster Hills through a collaboration with the City of Westminster that includes education, clean-up, and connection, and that makes a positive impact on our community, **together**.

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Four sets of water samples were collected (May 23, 2023, June 22, 2023, July 27, 2023, and August 28, 2023). The water samples were collected using clean laboratory-provided containers, and the water collected was transferred into sterile laboratory-provided 150-milliliter, preserved, poly sample bottles. The sample bottles were labeled, placed on ice, and submitted under strict chain-of-custody to Industrial Laboratory in Wheat Ridge, Colorado for *E. coli* analysis by the appropriate EPA Method.

The highest *E. coli* concentrations were observed in the samples from Mower Reservoir (WH-SW-1) at concentrations ranging from most probable number [of colony forming units], per milliliter (MPN/100ml) concentrations of 1,119.9 to greater than 2,419.6 MPN/100ml (**Table 1**). Samples collected from Church Ditch have increased in concentration since the initial sampling event, from 32.7 MPN/100ml to greater than 2,419.6 MPN/100ml at WH-SW-2 and 35.5 MPN/100ml to greater than 2,419.6 MPN/100ml at WH-SW-3 (**Table 1**).

According to the EPA, individuals who encounter elevated levels of *E. coli* and other fecal indicator organisms increase their risk of getting sick due to potential exposure to fecal pathogens (EPA 2021). *E. coli* concentrations are typically expressed as the number of colony forming units (cfu) per 100 mL (cfu/100mL). The two sets of criteria using different methods for calculating illness rates are shown in **Table 1**. The EPA “Threshold Values” are based on studies that show a link between illness and fecal contamination in recreational waters. Both are considered protective of human health, and either can be used to assess recreational water quality (EPA 2021). It is important to note that the values >2,419.6 MPN/100mL could be any number beyond the EPA’s threshold.

All of the surface water samples collected from the Property contained *E. coli* concentrations that exceed the EPA Threshold Values (**Table 1**). However, the EPA recommends weekly sampling to evaluate the geometric mean (GM) and the statistical threshold value (STV) over a 30-day period (EPA 2021). Additional measures recommended by the EPA are listed in the **Preliminary Management Recommendations** section.

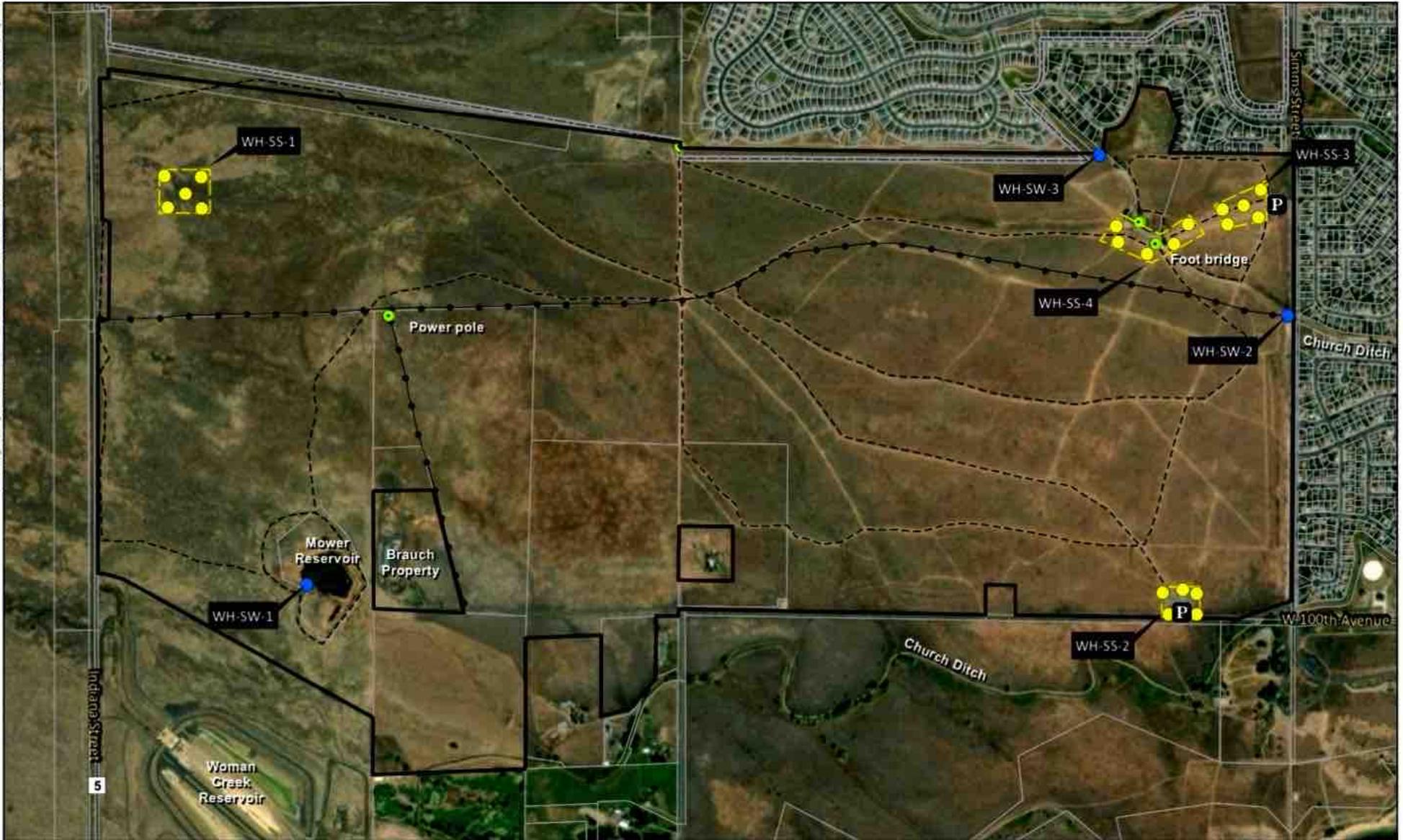
Table 1. Surface water *E. coli* concentrations.

Sample ID	Date	Results (MPN/100mL)	EPA Threshold Value ¹	EPA Threshold Value ²
WH-SW-1 (Mower Reservoir)	5/23/2023	>2,419.6	100	320
WH-SW-1 (Mower Reservoir)	6/22/2023	1,119.9	100	320
WH-SW-1 (Mower Reservoir)	7/27/2023	1,119.9	100	320
WH-SW-1 (Mower Reservoir)	8/28/2023	>2,419.6	100	320

Westminster Hills Open Space
 Conditions Report
 Jefferson County, Colorado

WH-SW-2	5/23/2023	32.7	100	320
WH-SW-2	6/22/2023	261.3	100	320
WH-SW-2	7/27/2023	980.4	100	320
WH-SW-2	8/28/2023	>2,419.6	100	320
WH-SW-3	5/23/2023	35.5	100	320
WH-SW-3	6/22/2023	290.9	100	320
WH-SW-3	7/27/2023	816.4	100	320
WH-SW-3	8/28/2023	>2,419.6	100	320

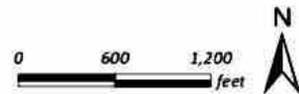
¹ = EPA Estimated illness rate: 32 per 1,000 - Geometric Mean (colony forming units [cfu]/100mL); ² = EPA Estimated illness rate: 32 per 1,000 – statistical threshold value (STV- 90th percentile (cfu/100mL); **Bold** = Concentration exceeds one or both Threshold Values.



Westminster Hills Open Space Sampling Plan

- Open Space Boundary
- Trail
- Overhead Electrical Line
- Parcel Boundary
- 5-Point Soil Composite Sample Location
- Soil Sample Aliquot Location
- Surface Water Sample Location

Figure 3 Sampling Locations



Prepared for: City of Westminster
 File: 23059 Figure 3 Sampling.mxd (dlH)
 September 14, 2023



Purpose of the Conditions Assessment

The purpose of this conditions assessment is to provide a baseline of existing natural resources from which to guide resource management and public recreation on the Property. More specifically, this conditions assessment is also intended to achieve the following objectives:

1. Document a baseline level of existing conditions and resource management issues on the Property.
2. Identify and recommend strategies to address resource management and public recreation issues in order to maintain the overall integrity of resources on the Property.

Existing conditions of Westminster Hills Open Space and Dog Park are outlined in the sections below.

Existing Conditions

Soil Sampling

ERO collected five-point composite soil samples at four predetermined sites to assess *E. coli* levels in surface soils (WH-SS-1, WH-SS-2, WH-SS-3, and WH-SS-4) on the Property (see **Figure 3**). Soil samples were collected from the top three inches of the soil using a dedicated disposable acetate liner. Organic matter was removed from each sample aliquot as collected. The samples were placed in laboratory-provided, certified clean 4-ounce glass sample jars. The jars were labeled, placed on ice, and submitted under strict chain-of-custody to Industrial Laboratory in Wheat Ridge, Colorado for analysis for *E. coli* by the appropriate Environmental Protection Agency (EPA) Method.

Soil samples were collected on May 23, 2023 and contained most probable number [of colony forming units], per gram (MPN/g) concentrations <1.8 in all four composite samples. There are no regulatory standards for *E. coli* in soils and *E. coli* concentrations were determined to be less than the laboratory method detection/reporting limit.

Surface Water Sampling

ERO is currently collecting monthly surface water samples from Mower Reservoir (WH-SW-1), in the southwest portion of the Property, and two predetermined locations along the Church Ditch (WH-SW-2 and WH-SW-3), along the northeast boundary of the Property, to assess *E. coli* levels (see **Figure 3**). Sampling only occurs when the ditch is running or when surface water is present (typically May through September). According to the Church Ditch Water Authority, the ditch begins at a headgate in Clear Creek, near Golden, Colorado, and runs 26 miles in length through Jefferson County until it ends near the intersection of 100th Avenue and Simms Street at the Wilson Flume (CDWA 2023).

Preliminary Management Recommendations

Resource management issues are specific occurrences or situations that can compromise the natural resource values on the Property. Known or potential resource management issues for the Property are listed below and addressed with management recommendations. Based on information and data gathered during the conditions assessment, ERO proposes the following management concerns and recommendations be considered in the forthcoming management plan.

Soil and Surface Water Quality Management

Environmental Concern – E. coli

Existing Condition:

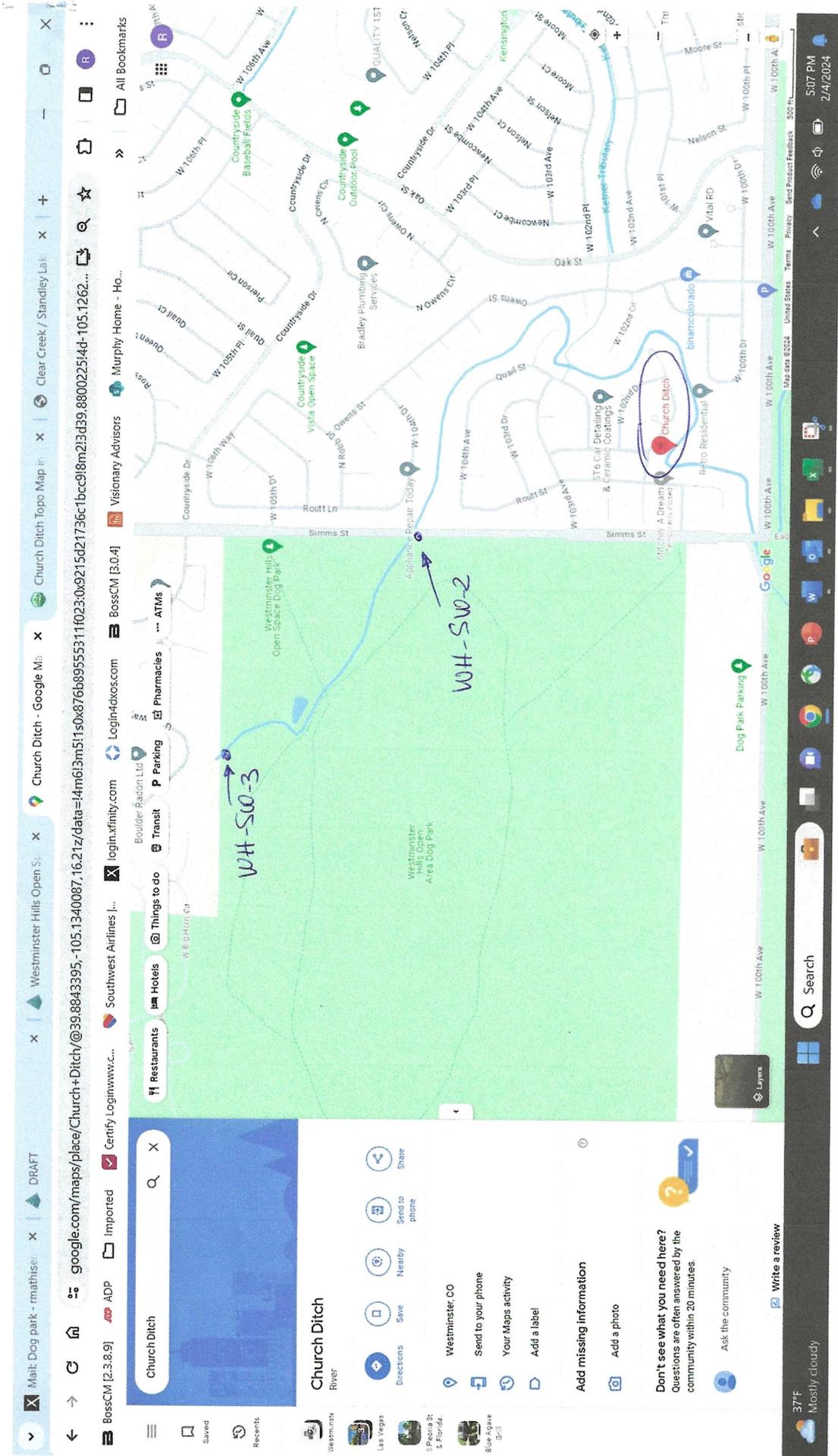
Surface Soil: *E. coli* concentrations in surface soil on the Property were determined to be less than the laboratory method detection/reporting limit in the composite soil samples collected from four high traffic areas of the Property.

Surface Water: The Mower Reservoir was observed to have less human recreational use and off-leash dogs in the water, though ducks, geese, and other aquatic species activity was noted. Off-leash dogs were observed playing in and near the Church Ditch primarily in the east portion of the Property. Due to the type of activity the Property is used for, *E. coli* and other potential harmful pathogens may be present in the soil and surface water, as was shown in the surface water sampling conducted as part of this study. Additionally, the Church Ditch runs through agricultural lands and grazing areas which may affect increased levels of pathogens in the water.

Recommendations:

According to the EPA, when elevated *E. coli* concentrations are observed, it is important to respond in a timely manner by collecting additional data, posting a public notice, and/or closing the waterbody to recreational activities. The EPA provides these general actions to take when responding to elevated *E. coli* concentrations in recreational waters (EPA 2021):

- Take action immediately in the event of an exceedance to prevent human exposure to *E. coli*. Exposure can cause infection, diarrhea, and other illness in humans. Additional data may be needed to understand the cause of the exceedance.
- Issue a public notice and post advisories to notify the public that the waterbody is closed to recreational activities.
- To prevent future *E. coli* exceedances, identify the source of the bacteria. Depending on the source, different steps will be necessary to remediate the problem and reduce the likelihood of future events.



Water flow from inlet at WH-SW-3
to outlet and on to Standley Lake
at WH-SW-2

Browser tabs: Mail: Dog park - rmathisen@cc... | Irrigation Canals | Anvada, CO | Mower Reservoir - Google Map | Mower Feeder Ditch - Google | +

Address bar: google.com/maps/place/Mower+Feeder+Ditch/@39.8796208,-105.1616434,17.79z/data=!4m6!3m5!1s0x876b8c28b5789fd9:0xc02d6a827a74db018m2!3d39.8807314!4d-105.1616434

Navigation icons: Back, Forward, Home, Refresh, Search, Bookmarks, All Bookmarks

Browser extensions: BossCM [2.3.8.9], ADP, imported, Certify Loginwww.c..., Southwest Airlines [...], login.xfinity.com, BossCM [3.0.4], Visionary Advisors, Murphy Home - Ho...

Map interface: Mower Feeder Ditch (circled in red), Mower Reservoir (blue area), Mower Ditch (inked to Mower Reservoir), Mower Reservoir (with arrow pointing to the reservoir)

Map controls: Layers, Street View pegman, Map data © 2024 Google, United States, Terms, Privacy, Send Product Feedback, 200 ft

Bottom panel: Mower Feeder Ditch River, Directions, Save, Nearby, Send to phone, Share, Westminister, CO 80005, Send to your phone, Your Maps activity, Add a label, Add missing information, Add a photo, Don't see what you need here? (with question mark icon), Ask the community, Write a review

System tray: 35°F, Mostly cloudy, Windows taskbar icons (Search, File Explorer, Edge, Word, PowerPoint, Chrome, Mail, Calendar, Photos, Settings), System clock: 6:03 PM, 2/4/2024

Browser tabs: Mail: Dog park - rmathisen@c... | DRAFT | Westminster Hills Open Space | Irrigation Canals | Arvada, CO

Address bar: arvadaco.gov/512/Irrigation-Canals#...:text=The%20FHL%2C%20Croke%20and%20Church.Church%20continue%20past%20Standley%20Lake.

Navigation: Home | Community | Parks, Trails, and Open Space | Park Maintenance | Irrigation Canals

IRRIGATION CANALS

Irrigation canals wind through the Denver metro area, including the City of Arvada. Many of the ditches were constructed in the 1860s, including the Farmers' High Line Canal (FHL), Croke Canal and the Church Ditch. Urban / suburban areas have developed around the ditches. Since the ditch water runs seasonally, not everyone realizes their purpose and importance.

Irrigation Canals FAQs

- What are irrigation ditches? ^
Irrigation ditches own water rights. The FHL, Croke and Church ditches deliver water seasonally from Clear Creek to Standley Lake (in Westminster). In addition, the FHL and Church continue past Standley Lake.
- How can I find out the name of the ditch near me? v
- Who owns irrigation ditches? v

Contact Us

Church Ditch
303-423-6010

Croke Canal
303-659-7373

Farmers' High Line Canal
303-451-7604

Navigation bar: Pay my Water / Trash Bill | Report a Problem | Jobs | Agendas & Minutes | Alerts & Notifications | Engage

System tray: 37°F Mostly cloudy | Search | 5:20 PM 2/4/2024

Memo: Attachment C

To: City Council of the City of Westminster, CO
City Manager Mark Freitag
Director of Parks, Recreation, and Libraries Tomás Herrera-Mishler
Presented at the City Council Meeting on March 11, 2024

From: Westy Dog Park Guardians - Website: [Westy Dog Park Guardians](#)

Re: Westminster Hills Open Space and Dog Park

Date: March 11, 2024

Below please find a detailed description of the research demonstrating that dogs make unique and important contributions to people and communities, and how exercise develops and protects brain health and mental well-being.

The Unique Contributions of Dogs to People

The benefits of interactions between humans and animals have captured the interest of researchers for years. Animal-assisted interventions involve the use of animals to help people in settings such as schools, libraries, hospitals, assisted living facilities, courts, prisons, offices, and trauma scenes. The most studied species is dogs. Research shows that dogs benefit people by reducing their stress, lowering their blood pressure, reducing their heart rate, and improving their mood, happiness, loneliness, and cognitive capacity.

Interaction with dogs can reduce stress.

Research shows that interacting with therapy dogs reduces stress hormones, lowers heart rate and blood pressure, and causes the release of the bonding neurotransmitter oxytocin, assisting in the downregulation of the fight-or-flight stress response system.

The presence of a dog while college students took the Trier Social Stress test reduced heart rate and stress hormone levels. The company of a pet reduced the stress response during mental math testing more effectively than the presence of a spouse or friend.

Interacting with dogs can improve negative mood and enhance happiness.

Although therapy dogs have been coming to college campuses for many years as one way to support student mental health, researchers wanted to explore the impact on student well-being of being able to touch a therapy dog versus only seeing a therapy dog with no contact.

Researchers randomly assigned 284 self-selected Canadian undergraduate students (77% female, 22% male, 2% non-binary) to one of three groups: 1) a touch therapy dog intervention; 2) a no-touch therapy dog intervention; or 3) a handler-only with no therapy dog group. Data was collected on participant perception of well-being (happiness, life satisfaction, and positive affect and ill-being (stress, loneliness, and negative affect).

Participants in all 3 conditions experienced an improvement on some well-being measures, but only those students who experienced direct contact with the therapy dogs reported significant

improvements on all well-being measures. The greatest benefits of direct contact with a therapy dog were improvements in happiness, stress, loneliness, and negative emotions.

Interactions with dogs can enhance cognitive capacity.

A study examined the impact of interacting with therapy dogs on the executive skills of 309 college students. Executive function (EF) describes three brain functions: working memory, mental flexibility, and inhibitory control. EF empowers cognitive skills that are necessary for success in school and work including motivation, concentration, planning, prioritizing, emotion regulation, and the capacity to understand different points of view.

Students were randomly assigned to the therapy dog interaction group or the stress management instruction group. The results showed that at-risk students who interacted with therapy dogs demonstrated greater EF and metacognitive skills (understanding your own thinking) than the stress management content students, and that these dog interaction benefits were still present 6 weeks later.

Interacting with therapy dogs outperformed stress management instruction. The researchers believe that one explanation for the strong and enduring impact on cognitive skills is due to the downregulation of the stress response in these students after therapy dog interactions.

Interacting with dogs can increase human brain activation.

Researchers investigated the impact of different forms of interaction with a dog on the prefrontal cortex of healthy study participants. The prefrontal cortex is involved in social cognitive processing and understanding yourself and others.

The study was conducted at the University of Basel in Switzerland. The researchers used functional near-infrared spectroscopy (fNIRS) to measure brain activity of 19 adults (9 women, average age 32 years) with no dog phobias or allergies, during 3 interactions with a dog and 3 interactions with a plush lion stuffed with a hot water bottle. The therapy dogs, who all worked in hospital settings and were with their handlers, were a female Jack Russel (6 years), a female Golden Retriever (4 years), and a female Goldendoodle (4 years). The fNIRS technology uses 2 sensors placed on the participant's forehead, which allows researchers to mimic a clinic setting.

Researchers measured oxygen saturation in the prefrontal cortex of participants during five 2-minute phases, with short breaks in between phases, while they sat on a couch and:

1. Looked at a white wall and relaxed (Neutral phase 1)
2. Watched a dog or a plush from a distance (Watching)
3. Had a dog lying next to them or the plush placed on their thigh (Feeling)
4. Pet the dog or the plush (Petting)
5. Looked at a white wall and relaxed (Neutral phase 2).

Researchers analyzed data from 53 dog conditions and 55 plush animal conditions. They found:

- Prefrontal activity in the brain increased with greater intensity of contact with both the dog and the plush.

- Interaction with the dog resulted in significantly greater brain activation than interaction with the plush.
- Each phase of interaction with the dog, which increasingly engaged more senses from Watching to Feeling to Petting, led to an increase in brain activation.
- The Petting condition resulted in the highest level of brain activation.
- During the Neutral phase 2, after the dog interaction phases, the brain activation did not calm to the level of the Neutral phase 1.

The prefrontal cortex is involved in executive functions, such as attention, working memory, and problem-solving, as well as social and emotional processing. Prior research has shown that interactions with animals are highly emotionally relevant for a majority of people. Emotional salience, coupled with the gradual developing of a relationship with the therapy dog, may help to explain the greater brain activation with dog contact in this study. This research indicates that interacting with therapy dogs may promote social attention, motivation, and emotional arousal in people, which could improve performance on learning and therapeutic goals.

Dogs make very special, unique, and important contributions to humans. Interacting with dogs:

- Reduces stress hormones;
- Lowers heart rate and blood pressure;
- Increases the bonding and attachment neurotransmitter oxytocin;
- Improves stress, happiness, loneliness, and negative emotions;
- Enhances executive function, responsible for motivation, concentration, planning, prioritizing, emotion regulation, and the capacity to understand different points of view;
- Improves metacognition, the ability to understand your own thinking; and

Increases brain activation in the prefrontal cortex, dedicated to executive functions, such as attention, working memory, and problem-solving, as well as social and emotional processing.ⁱ

The Importance of Exercise to Well-being

Exercise improves both brain health and mental health. All citizens, including dog owners, deserve the means to exercise. Below is a summary of key research studies.

Protecting Brain Health

Exercise benefits the brain in three ways: it enhances blood and oxygen flow; it elevates the levels of key neurotransmitters; and it stimulates the production of brain cell building blocks, especially Brain Derived Neurotropic Factor (BDNF).

Exercise prompts blood flow deeper into body tissues. The more exercise, the greater the benefits provided by the bloodstream, which includes distribution of food and elimination of waste. While the entire body benefits from the improved functioning that increased blood flow renders, in the brain, increased blood volume helps to maintain the health and functioning of the memory-processing hippocampus.

Three powerful neurotransmitters are increased and rebalanced by exercise: dopamine, serotonin, and norepinephrine. In addition, exercise boosts endorphins. Dopamine influences learning, it

and inspires motivation because its role is to increase behaviors that help us survive including eating and maintaining fitness. Serotonin influences mood, sleep, impulsivity, and anger. While elevated levels of serotonin are associated with well-being and controlling impulsiveness, low levels of serotonin are associated with anxiety, depression, and impulsivity. Norepinephrine amplifies brain signals that activate attention, motivation, and perception. Endorphins are the body's natural opioids that increase pleasure and reduce pain, helping us tolerate the exertion of physical activity.

Another brain benefit of exercise is its unique capacity to increase the production of BDNF. Aging occurs when the brain loses more brain cells than it creates. BDNF is a protein that acts like a fertilizer for hippocampal brain cells (neurons). BDNF helps create new neurons, protect existing neurons, and encourage synapse formation, which is the connection between neurons vital for thinking and learning. The presence of BDNF at the synapse enhances long-term potentiation, the process that is required to consolidate memories and build expertise. Aging, stress, and depression cause a drop in BDNF, but activity increases it. A lifestyle that includes regular exercise will encourage production of BDNF, increase the birth of new neurons, and provide a powerful brain boost.

- A large study of elderly women demonstrated exercise lowered the risk of cognitive impairment by about 20%.
- In 2007, German researchers discovered that people learned vocabulary words 20% faster after exercise than before and that the rate of learning correlated directly with BDNF levels in the brains of the participants.ⁱⁱ

Exercise has been shown to protect against cognitive decline, dementia, and Alzheimer's disease.

A 2011 meta-analysis of 1,603 research studies on the relationship between cognition and exercise found that exercise can prevent cognitive decline and heal cognitive impairment. Exercisers had larger hippocampus volumes, the structure where memories are processed and stored, and greater synaptic connections, the links between brain cells that are vital for thinking and memory.

A new study adds to that data by demonstrating that active older adults have bigger brains than inactive folks, helping to explain how it defends against cognitive deterioration. Researchers divided 1,557 multi-ethnic participants, with an average age of 75, into three groups. They collected information on leisure time physical activity and conducted MRI scans on the participants. When they compared the brain volume of the most active third to that of the least active third of participants, they found that the active group had larger brains, and that was equivalent to a reduction in between 3 and 4 years of aging. Active participants enjoyed walking, gardening, swimming, and dancing.

Telomeres are nucleoprotein caps at the ends of chromosomes. Aging causes gradual cell degradation and the shortening of telomeres. Chronic stress can prematurely shorten our telomeres. When telomeres get too short, cells can no longer divide leaving us vulnerable to disease. Telomere length is also regarded as a marker for biological age.

Researchers examined the relationship between physical activity and telomere length. DNA data from 5,823 American adult participants in the National Health and Nutrition Examination Survey were compared across four groups: High Activity, Moderate Activity, Low Activity, and Sedentary. The telomeres were measured in all four groups. The longer telomeres discovered in active adults revealed reduced cell aging. The High Activity Group had a biological aging advantage, showing their cells were:

- 9 years younger than the Sedentary Group;
- 8.8 years younger than the Low Activity Group; and
- 7.1 years younger than the Moderate Activity Group.ⁱⁱⁱ

Improving Mental Health

Mental health disorders have a significant impact on individuals, society, and global health burdens. The pandemic significantly increased the number of people experiencing mental health issues.

Exercise works on both body and brain to:

- Reduce muscle tension;
- Build brain resources by increasing BDNF, serotonin, and norepinephrine; and
- Improve resilience through self-mastery by preventing anxiety, panic attacks, and depression.

Researchers wanted to synthesize the evidence on the impact of exercise on anxiety, depression, and psychological distress in adults. They reviewed 97 studies with 128,119 participants experiencing good health, chronic diseases, and mental health conditions. They found that physical activity improved symptoms of anxiety, depression, and distress in all populations.

To better understand *why* exercise improves depression symptoms, a different group of researchers reviewed studies that examined different impacts of exercise on depression. Studies involved moderate to vigorous aerobic exercise for 30-60 minutes one-to-three times per week. They discovered impacts on:

- **Neuroplasticity (growth of brain cell networks):** Depression is associated with reductions in brain volume of areas in the cerebrum (thinking brain) and the hippocampus (associated with memory, emotion processing, and stress regulation); decreases in blood flow throughout the brain; and low levels of BDNF. Exercise can increase cerebrum and hippocampus volumes, improve blood flow throughout the brain, and increase BDNF levels.
- **Stress Hormones:** Prolonged exposure to stress hormones can reduce the birth of new brain cells, decrease BDNF circulation, and increase cell death in the hippocampus. Exercise reduces the stress hormone cortisol and increases BDNF levels, which is likely

to reduce brain cell death and improve brain cell birth.

- **Inflammation:** Depression is associated with chronic increased low-level inflammation. Exercise can reduce numerous inflammatory factors, creating a lasting anti-inflammatory environment.
- **Oxidative Stress:** When oxidative stress outweighs antioxidants, it can damage DNA, proteins, lipids, and cause cell death. The brain is particularly vulnerable to oxidative stress because it has a high metabolic rate and low antioxidant levels. Exercise reduces oxidative stress indicators and increases antioxidants.
- **Psychological Factors:** Exercise can improve self-esteem, enhance socialization and social support, and increase self-efficacy.^{iv}

Exercise improves resilience from trauma. Traumatic experiences (such as the pandemic) can keep the brain on high alert. Chronic activation of the fight-or-flight stress response forms pathways of brain cells that promote hypervigilance. Unresolved trauma can keep stress arousal stuck in high gear. Exercise can help rewire trauma-induced neural pathways. Neurochemicals, such as BDNF and irisin, decrease with aging and exposure to stress. Exercise increases BDNF and irisin levels, which helps heal the damage from stress and trauma by:

- Increasing brain volume in areas responsible for learning, memory, and cognitive function, via the birth of new brain cells;
- Improving the health and functioning of brain cells, including the capacity for forming neural networks, which likely explains why exercise improves cognitive function;
- Raising antioxidant levels, which helps protect against oxidative stress; and
- Restoring stress arousal to a resilient level, which improves current mood and brain function, and prepares the brain for processing traumatic events and healing neural networks.^v

Physical activity improves mood, stress resilience, and brain health by:

- Reducing symptoms of anxiety, depression, and stress;
- Increasing neurotropic factors, including BDNF;
- Regulating the fight-or-flight stress response;
- Reducing inflammation and oxidative stress; and

Improving self-esteem, self-efficacy, and social support.

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ⁱ Changwon Son, et al., Effects of COVID-19 on College Students' Mental Health in the United States: Interview Survey Study, *J. Med. Internet Res.*, Sept. 3, 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7473764/>; NANCY R. GEE, AUBREY H. FINE, AND PEGGY MCCARDLE, HOW ANIMALS HELP STUDENTS LEARN: RESEARCH AND PRACTICE FOR EDUCATORS AND MENTAL-HEALTH PROFESSIONALS 48, 102, and 107 (2017); Patricia Pendry, Alexa M. Carr, Jaymie L. Vandagriff, and Nancy R.j Gee, *Incorporating Human–Animal Interaction Into Academic Stress Management Programs: Effects on Typical and At-Risk College Students' Executive Function*, American Educational

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PRL Signage at Westminster Hills Dog Park

Source: Google Images

Note: PRL Changed the Dog Park Signage in 2023

Signs – Simms Parking lot

- October 2007



- July 2012 - Sign says “Westminster Hills Dog Park”



- November 2018 - Sign Says “Westminster Hills Dog Park”



- February 2022 - Sign says “Westminster Hills Dog Park”



- June 2023 – Current Sign says “Westminster Hills Open Space”



Signs – 100th Ave Parking lot

- This lot was constructed after Rocky Mountain Greenway Trail was built in 2016
- July 2015



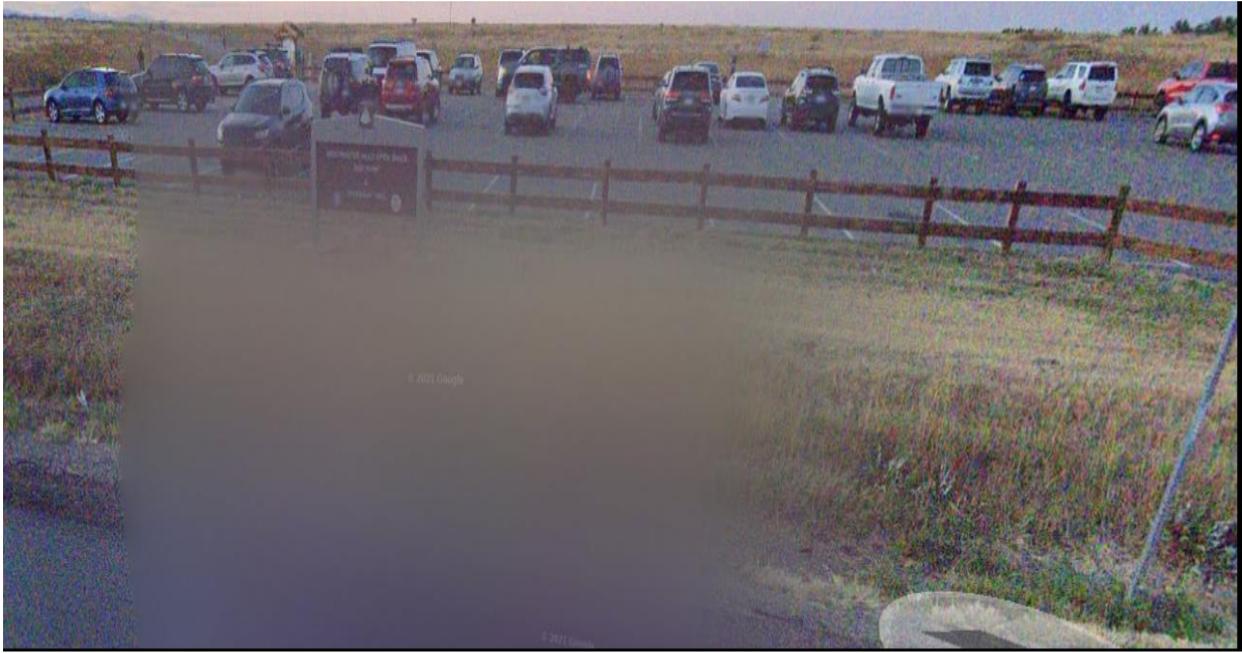
- November 2018 - Sign says “Westminster Hills Open Space Dog Park & Greenway Trail”



- August 2019 - Sign says “Westminster Hills Open Space Dog Park & Greenway Trail”



- September 2021 - Sign says “Westminster Hills Open Space Dog Park & Greenway Trail”



- June 2023 – Current Sign says “Westminster Hills Open Space & Greenway Trail”

