



WESTMINSTER

Rocky Mountain Greenway Trail

July 15, 2024

Agenda

Introduction

Rocky Mountain Greenway Federal Lands Access Program (FLAP) Trail Crossings Update

Rachel Brenna, PLA, Strategy and Planning Director, Jefferson County Open Space

City of Westminster Project Involvement to Date

Rocky Mountain Peace and Justice Center Speakers:

Jon Lipsky, MAS, FBI Retired

Dr. Michael Ketterer, Professor Emeritus at Northern Arizona University

Dr. Deborah Segaloff, Physicians for Social Responsibility

Dr. Sasha Stiles, MD, MPH

Diane D'Arrigo, Radioactive Waste Project Director at NIRS

Randy Stafford, Rocky Flats Public Health Advocates

Community Speaker:

D. M. Wood, Emeritus Associate Professor Department of Physics, Colorado School of Mines

Presentation of Soil Analysis Plan Sampling Results

Jason Andrews, P.E. Engineering Analytics, Inc.

Agency Partners

David Lucas, Project Leader/Refuge Manager US Fish and Wildlife

Tom Hoby, Director Jefferson County Open Space

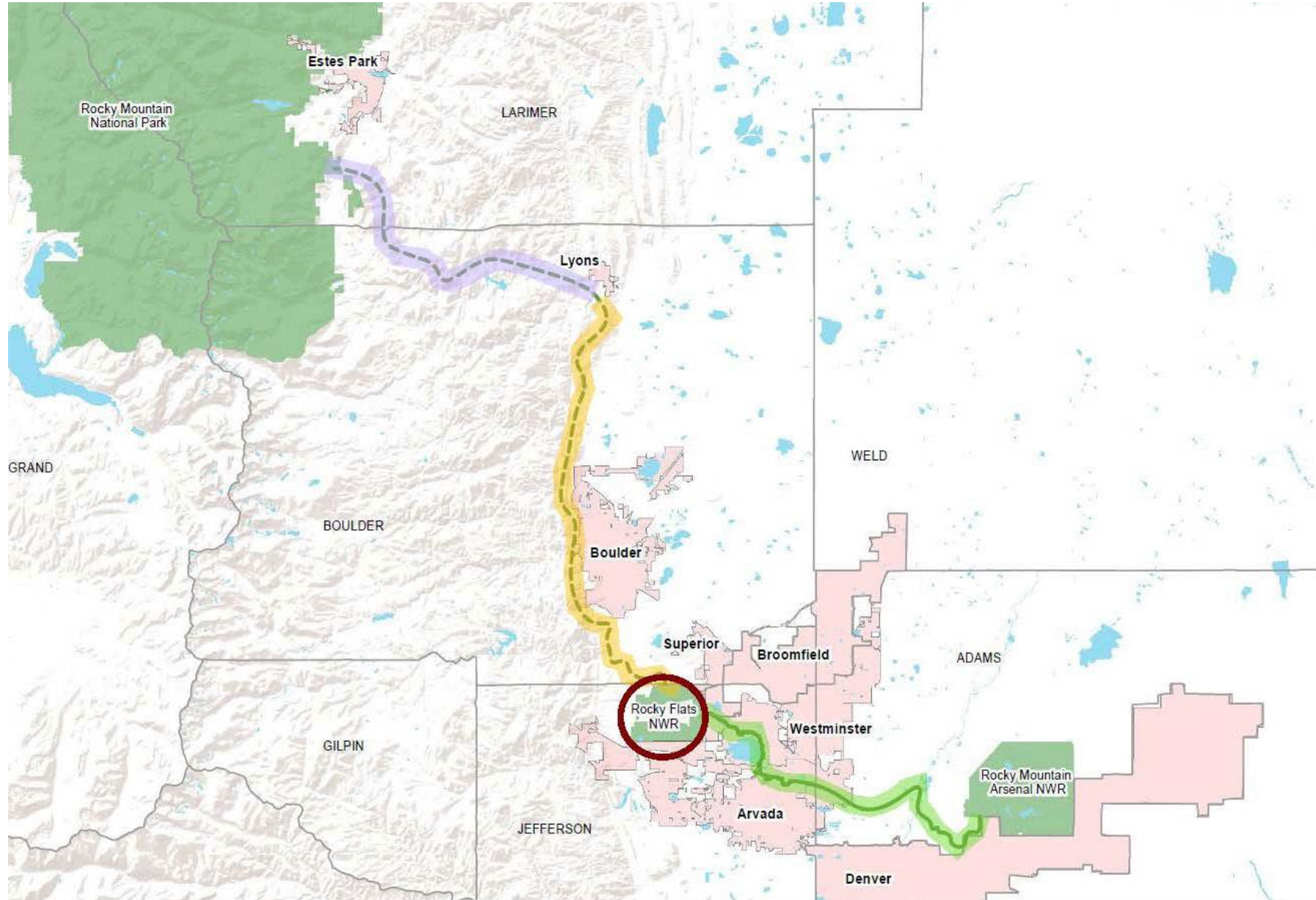
Questions and Discussion

**Rocky Mountain Greenway (RMG) – Rocky Flats National Wildlife Refuge (RFNWR)
Federal Lands Access Program (FLAP) Trail Crossings Update**

July 15, 2024



Rocky Mountain Greenway (RMG)



Rocky Mountain Greenway Alignment

80-mile regional trail that will provide equitable access to federal and local public lands.

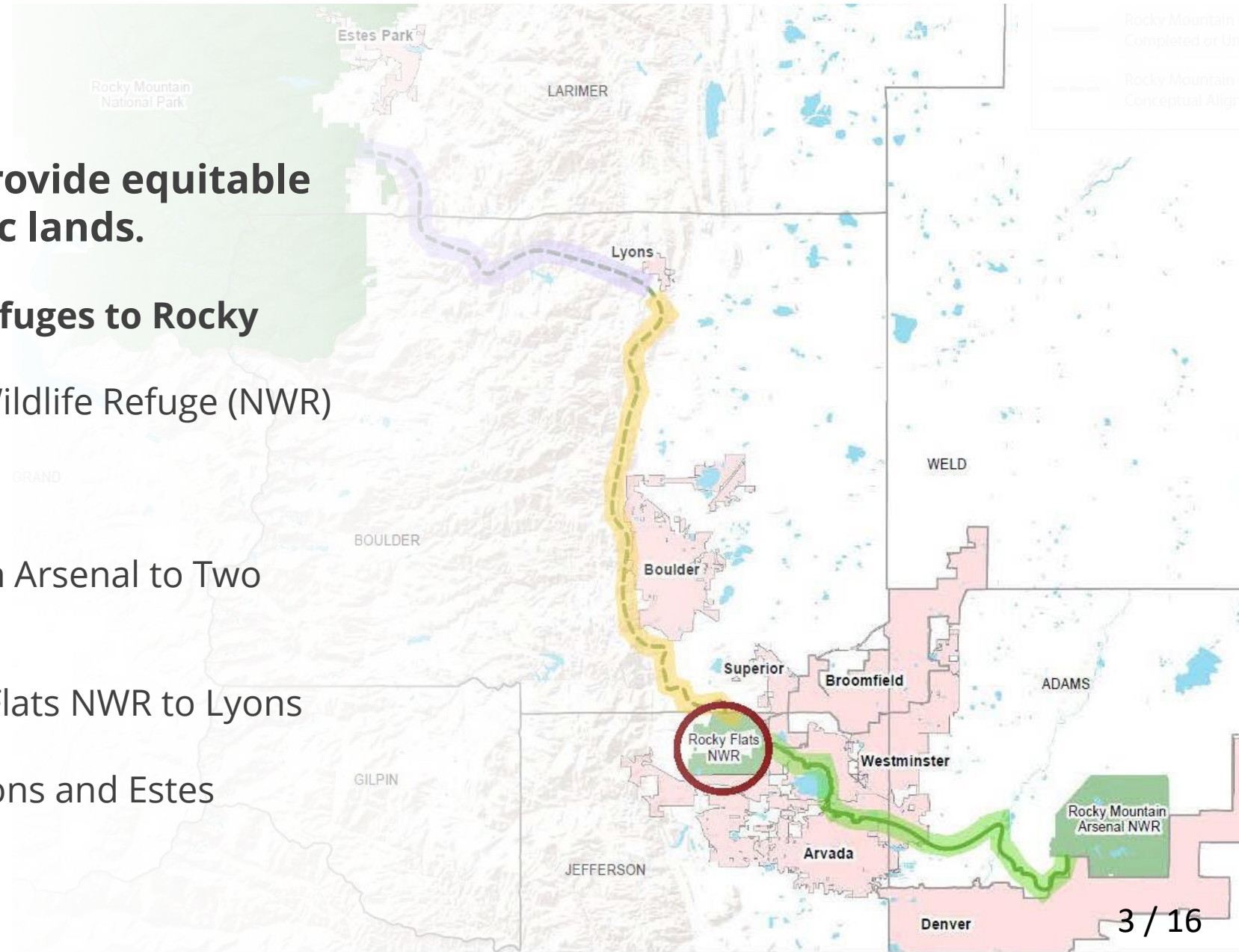
Connects three National Wildlife Refuges to Rocky Mountain National Park

- Rocky Mountain Arsenal National Wildlife Refuge (NWR)
- Two Ponds NWR
- Rocky Flats NWR

Phase One, *Complete*, Rocky Mountain Arsenal to Two Ponds NWR

Phase Two, *Partially Complete*, Rocky Flats NWR to Lyons

Phase Three, *Conceptual*, between Lyons and Estes Park/Rocky Mountain National Park



Rocky Flats National Wildlife Refuge (RFNWR)

- Formerly served as buffer zone for Rocky Flats Plant
- Clean up completed in 2005 and approved by EPA and CDPHE in 2006
- Transferred to the U.S. Department of the Interior in July 2007, to be managed by the U.S. Fish and Wildlife Service as the RFNWR
- Opened in 2018, this 5,237-acre area is a refuge for wildlife and people

The Central Operating Unit (COU) is a **separate 1,300-acre parcel** which is **fenced and permanently closed** to the public. This area is owned and monitored by the Department of Energy as a Legacy Site. Reports from on-going monitoring and testing are reported to the Rocky Flats Stewardship Council which is comprised of elected officials and staff of neighboring local agencies.

Federal Lands Access Program (FLAP) Grant

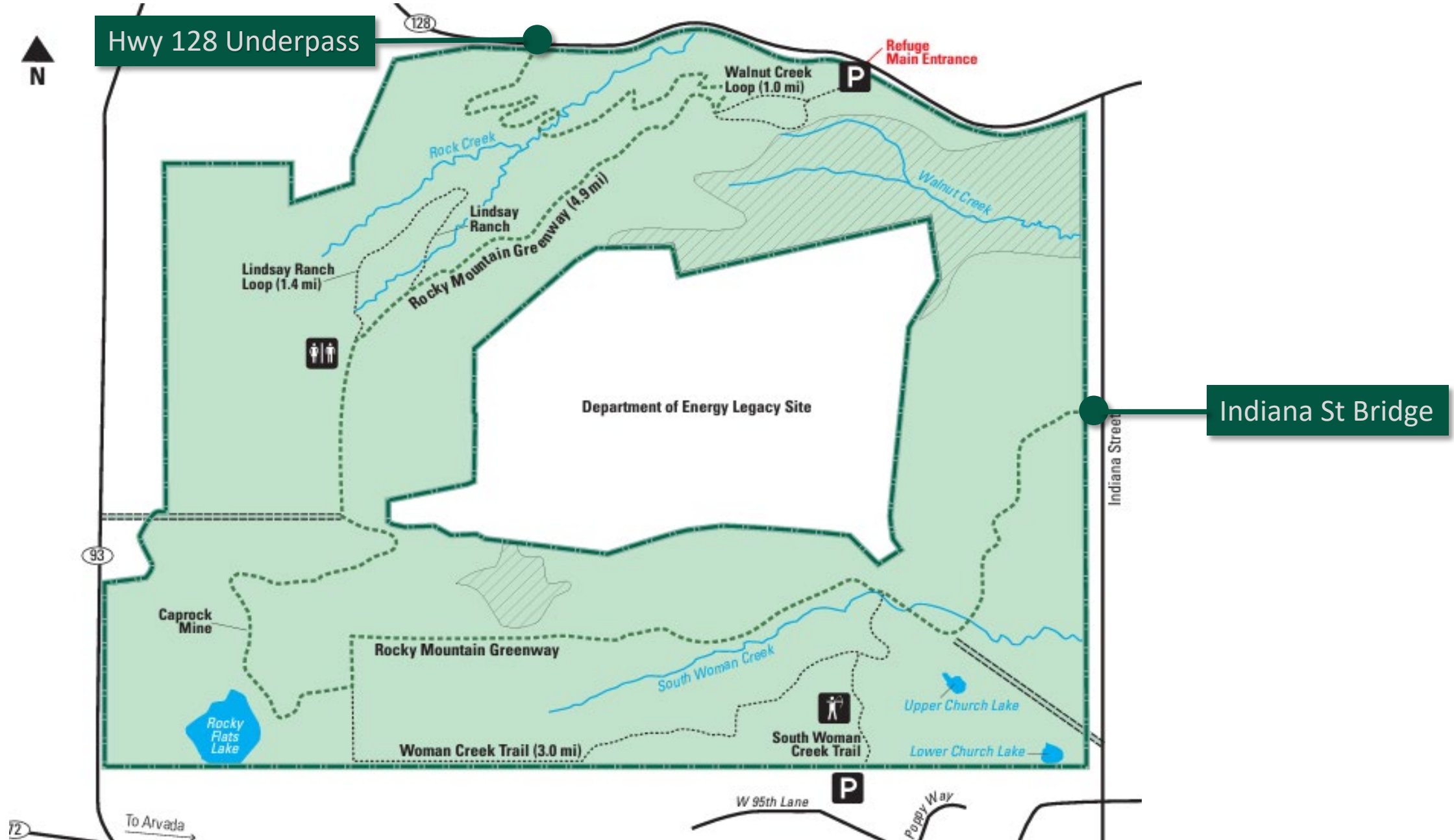
FLAP Grant provides funding for equitable access to Federal Lands.

There is currently no *safe* pedestrian access into RFNWR

The Partner Group comprised of Boulder County, City of Boulder, City of Westminster, City of Arvada and Jefferson County completed a successful application for FLAP grant funding.

The FLAP grant provides 82.79% percent of project costs, and the Partner Group provides a 17.21% match.

FLAP Crossings Locations



FLAP Partner Matching Funds

	Grant Scoping, Application, and SAP		Design and Construction <i>Obligated</i>		Total
City of Boulder	10%	\$14,994	11.04%	\$93,844.63	\$108,838.63
Boulder County	10%	\$14,994	11.04%	\$93,844.63	\$108,838.63
City of Westminster	22.5%	\$33,735	25.97%	\$220,764.13	\$254,499.13
City of Arvada	22.5%	\$33,735	25.97%	\$220,764.13	\$254,499.13
Jefferson County	22.5%	\$33,735	25.98%	\$220,782.49	\$254,499.13
Broomfield	12.5%	\$18,742	-	-	

FLAP Grant Timeline

2016

- Identification of funds Federal Lands Access Program (FLAP) Grant
- First IGA – FLAP Grant Application

2016-2019

- Independent Confirmatory Analysis performed as required in first IGA to pursue FLAP Grant
- Public Engagement
- Jefferson County and City of Westminster purchased Woman Creek Property for the completion of the Rocky Mountain Greenway

2021

- Second IGA with Jefferson County, City of Boulder, Boulder County, City of Westminster, and the City of Arvada obligates funding for design, construction, and air quality monitoring during construction

2022-2024

- IAA (Interagency Agreement) – with FHWA initiation of design and obligation of Federal funds
- Design and Construction

Soil Sampling and Analysis 2017-2020

Public Engagement for Sampling and Analysis Plan (SAP)

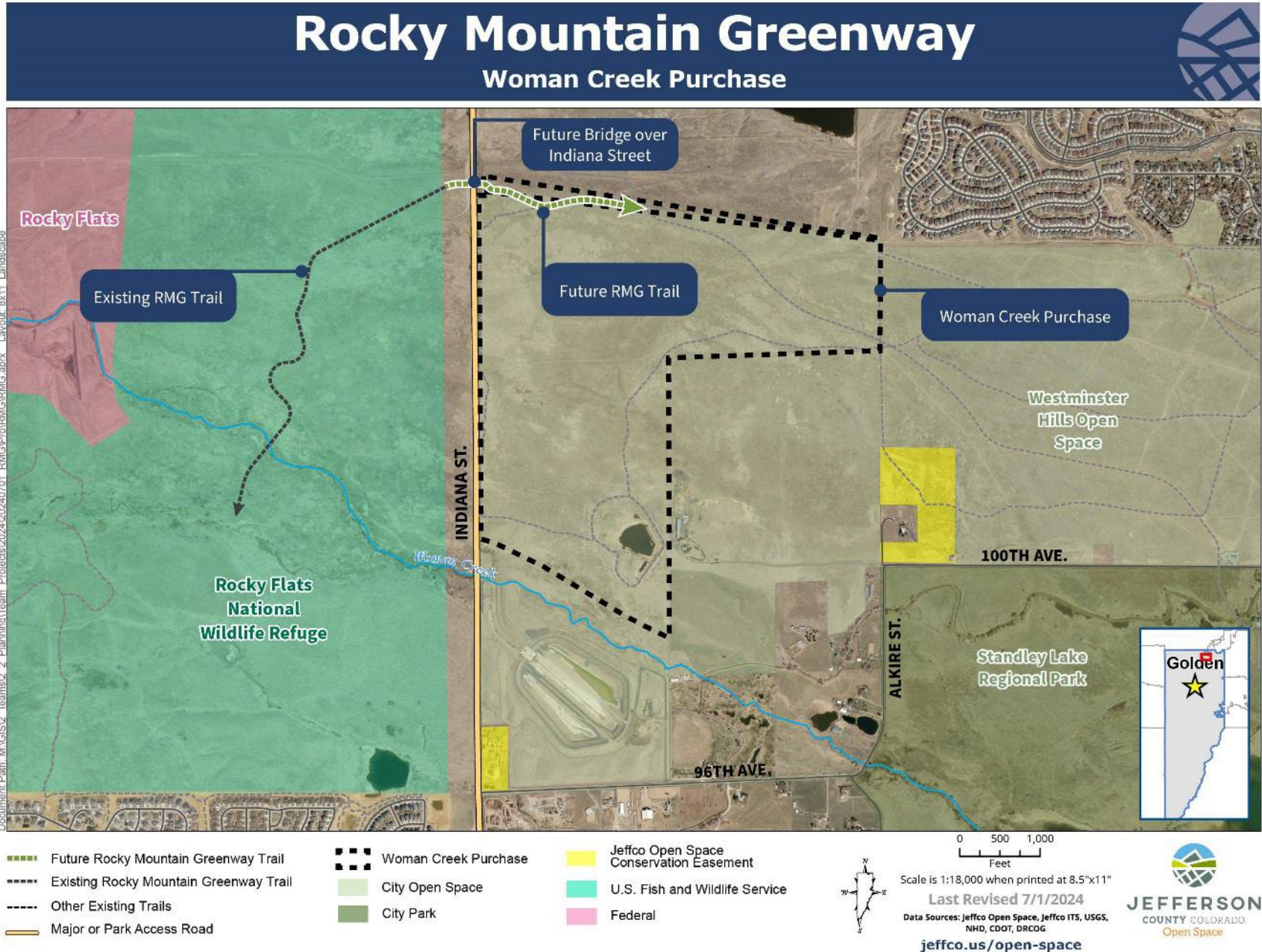
- 60 Day Comment Period (Jun-Aug 2018)
- 2 Open Houses (Boulder and Westminster) 90 community members
- 369 Online comments, 33% technical comment
- Revision of SAP and Final SAP (2018-2019)

Sampling and Analysis

- Feb 2020: Soil Sampling Report
- November 2020: Publication of Final Report

Engineering Analytics did not obtain any results from the soil samples collected and analyzed that indicate a higher risk level than presented in the 2006 Kaiser-Hill Company report and the DOE (2017) report, which allowed for public access to the Project area.

Woman Creek Property Acquisition 2019



Woman Creek Property Acquisition

Purchased from Woman Creek Reservoir Authority (WCRA) property

368 acres adjoining Westminster Hills Open Space and RFNWR

Purchased jointly by City of Westminster and Jeffco Open Space for RMG Trail corridor

Purchase Price - \$1,631,635.20 / City of Westminster and Jefferson County Open Space each contributed \$815,817.60

Woman Creek Property Purchase

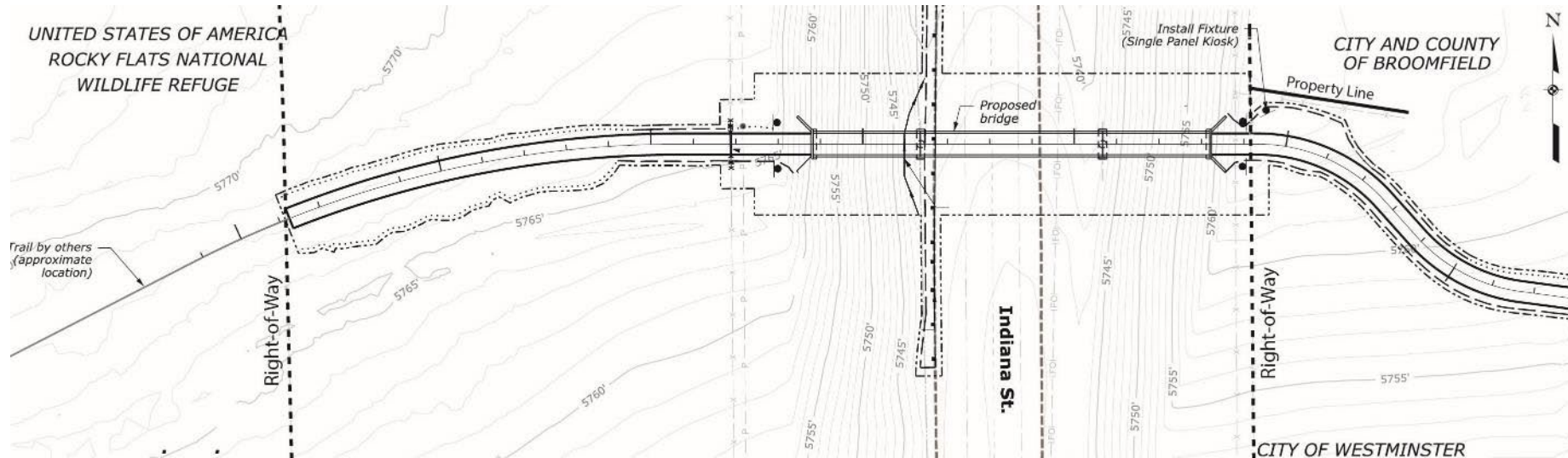
City of Westminster City Council Resolution 7, Series 2019:

*WHEREAS, purchasing the Property furthers the City's Strategic Plan goals of proactive regional collaboration and enhancing our natural resources and environmental assets by preserving land identified as critical wildlife habitat by the United States Fish and Wildlife Service and as a Conservation Study Area in the Jefferson County Master Plan; allowing the City to address public access control; **allowing soil testing to proceed on the Property so that construction of the Rocky Mountain Greenway Trail may progress**; and, allowing the City to continue to protect the Standley Lake watershed;*

Jefferson County Board of County Commissioners Resolution CC19-064:

***Purchase of the Property will enable a critical extension of the Rocky Mountain Greenway Trail** and expansion of Westminster Hills Open Space.*

Indiana Street Crossing



Construction Schedule

Final Design

- December 2021–March 2023

Bidding and Contracting

- November 2023 – Bid Opening
- March 2024 – Pre-Construction Meeting

Construction

- January–May 2024 – RMG trails through RFNWR are completed
- March 2024–September 2024 – Submittals, sub-contractor engagement, materials procurement
- September 2024 (estimated) – On-the-ground activities begin
- Additional air-quality monitoring will be conducted during construction ground disturbance

Partner Obligations



- Intergovernmental Agreement (IGA) and Interagency Agreement (IAA) are binding agreements
- Funds have been committed to provide local match for FLAP grant
- *If* the failure to fulfill IGA and IAA commitments result in contract changes, additional costs will be incurred
- These additional costs may be passed on to the partner agencies



Westminster Project Involvement to Date

- The Rocky Mountain Greenway Trail currently connects Rocky Mountain Arsenal through Standley Lake to its terminus in Westminster Hills Open Space
- This section of trail including the crossing at 100th Street, the South Westminster Hills Open Space Parking Area and trail through Standley Lake were funded by the Federal Transportation Authority and the US Fish and Wildlife Service



Westminster Project Involvement to Date *(Continued)*

2016 City Council adopts Resolution 24 approving conditionally supporting the FLAP grant partnership

2019 Jefferson County and Westminster purchase the Woman Creek Open Space to facilitate SAP testing and the completion of the Greenway Trail

2021 City Council were presented with the findings of the SAP Analysis and approved the revised IGA for construction of the Greenway Crossings

2022 City Council received Greenway Trail update (30% design) and restated their support for the project





Rocky Mountain Peace & Justice Center Speakers

Presentation Slides Unavailable at time of Packet Publication

Speakers Scheduled to Present include the following:

- Jon Lipsky, MAS and FBI Retired
- Dr. Michael Ketterer, Professor Emeritus at Northern Arizona University
- Dr. Deborah Segaloff, Physicians for Social Responsibility
- Dr. Sasha Stiles, MD, MPH
- Diane D'Arrigo, Radioactive Waste Project Director at NIRS
- Randy Stafford, Rocky Flats Public Health Advocates



Community Speaker:

D.M. Wood

Emeritus Associate
Professor, Department of
Physics, Colorado School of
Mines

A physicist looks at Rocky Flats

Overview

- Plutonium in context
- What recent measurements say
- Radiation doses and health risks

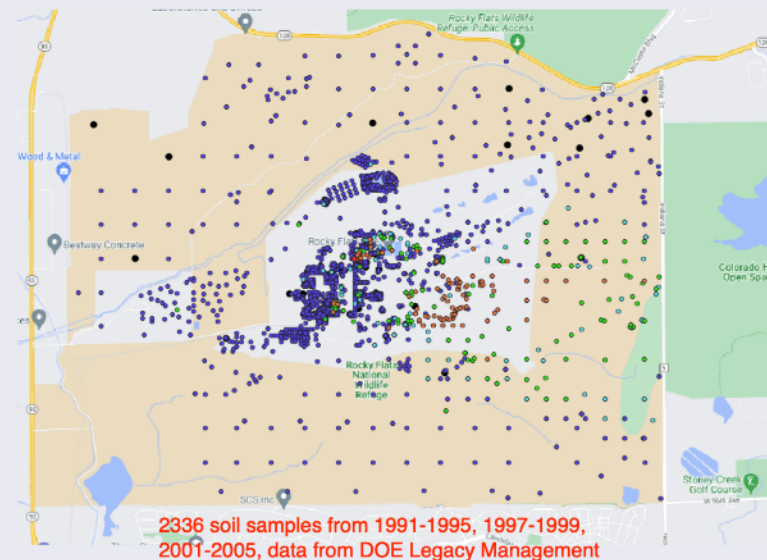
D. M. Wood

- Lives in Candelas, gamma spectrometer, following radiation and health data for 11 years
- B.A., honors in physics, Princeton 1974; M.S., Ph.D physics, Cornell 1981, 2-year postdoc Ohio State
- Senior Scientist, Solar Energy Research Institute (now NREL), Golden 1982-1989 + 1 year visiting scientist
- Colorado School of Mines 1989-2017; retired physics professor

The Refuge

Claim: 'Not enough is known about Rocky Flats'

Example: where was pre-2019 soil radioisotope data available?
(Where Superfund cleanup done, post-scrape but pre-topsoil)



Health impacts

International Commission on Radiological Protection. Regulations in all countries stem ultimately from ICRP findings, updated frequently. EPA, DOE, other agencies use ICRP 'dose coefficients' relating measured **radioactivity** to radiation **dose**.

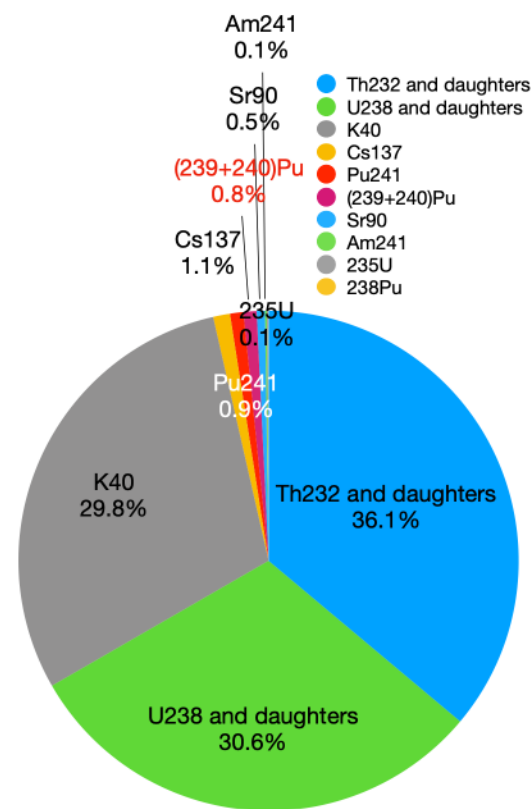


Figure: NIST 'soil standard' data augmented with non-measured radioisotopes.

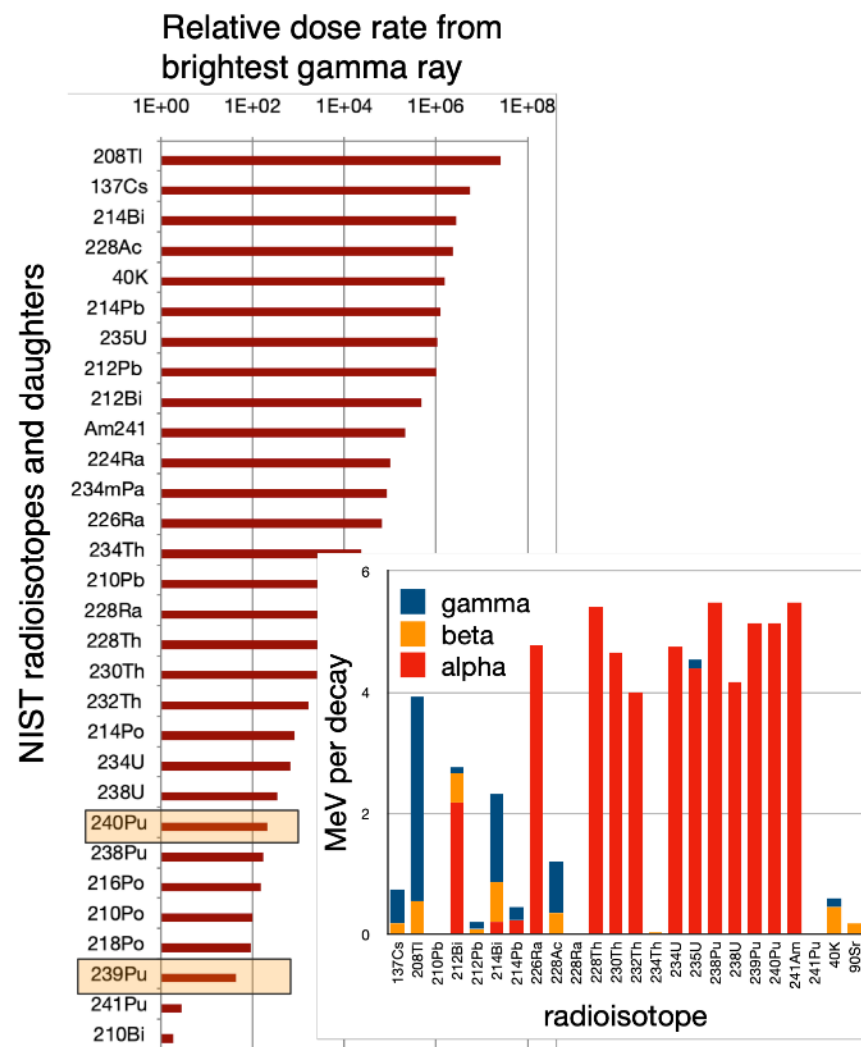
Note

- Two very different measurements (one non-DOE) agree to within 4% that Pu contributes less than 1% of total soil radioactivity.
- Risk from plutonium is due to the alpha particles it emits—very ionizing, very short range. BUT: 99.4% of alpha particle radiation comes from **natural** radioisotopes. **Show stopper if you blame Pu for health problems.**

NIST soil standards provide complete view

- NIST 'soil standards' used internationally to calibrate radiation measurement labs: must be **accurate** and **precise**; 14 labs, 4 different countries participated.
- $^{239+240}\text{Pu}$ contributes about 0.8% of total soil radioactivity
- NIST: 98% of alpha radioactivity [DOE: 99.4%] comes from **natural** isotopes.
- Unless Pu is **exotic**, **physically impossible it can contribute much radiation dose**

Is plutonium unusual? No



Pu appears very similar to natural alpha-particle emitters!

But *Pu* is unusual: much less whole-body dose

- Emits 15,000× less very penetrating gamma radiation (whole body dose) than most other radioisotopes
- Alpha particles it emits can't penetrate skin. Only exposure is thus via inhalation, swallowing dirt.
- Can now *expect* dose from Pu (no whole-body!) <0.8% of natural ('terrestrial' background from soil) dose.
- **Could stop now—we know answer about dose.**

'Recent' measurements

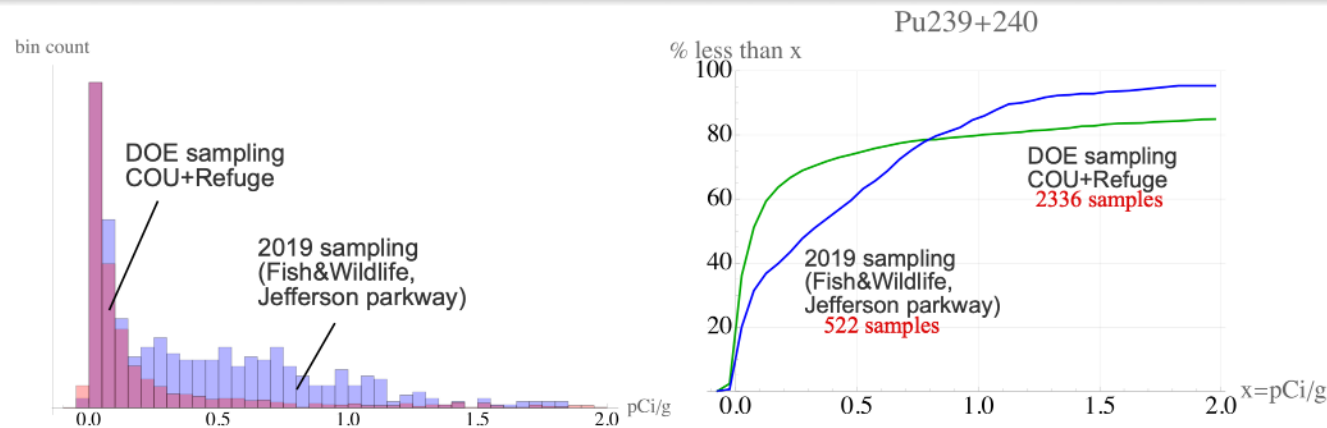


Figure: Histograms of DOE data vs. 2019 data for $^{239+240}\text{Pu}$

Figure: Distributions for these datasets. Answer to question: **What fraction of samples have $\text{Pu} > x \text{ pCi/g}$.**

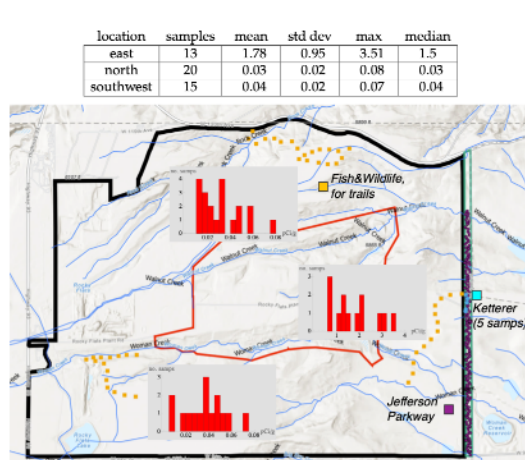


Figure: Histograms, locations of Fish&Wildlife sampling. Purple on right edge: Parkway sampling.

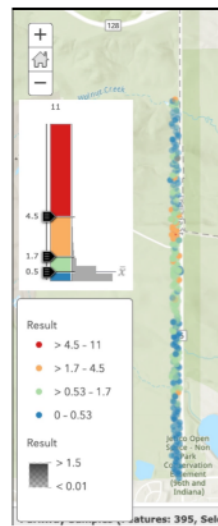


Figure: Eastern edge

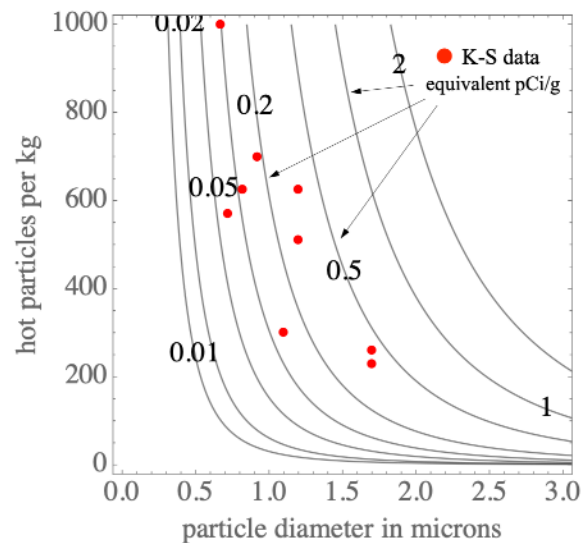


Figure: Ketterer & Szechenyi hot particles contribute $< 0.5 \text{ pCi/g}$

Reasons

- 2019: Jefferson Parkway right-of-way along Indiana
- 2019: Fish&Wildlife: confirm levels previously measured where Rocky Mountain Greenway trails, structures planned
- 2019: Suspicion by anti-nuclear groups. Dr. Michael Ketterer (work for hire for Rocky Mountain Peace& Justice), in hunt for 'hot particles'

Note: **>80% of all samples have values below about 0.7 pCi/g, about 70 times less than 'cleanup value' 50 pCi/g.**

'Hot particles'

Flecks of very insoluble PuO_2 big enough to be quite radioactive, small enough to be inhaled. Believed especially dangerous until mid-1970s. Knowing mean diameter and number per kg of soil, can combine with uniform contamination in pCi/g.

quantity	Pu only	natural	Pu smaller by ×
soil pCi/g	0.454	53.0	117
soil alpha pCi/g	0.45	19.24	42.8
gamma dose $\mu\text{Sv/y}$	0.00463	565.621	122,200
inhal total $\mu\text{Sv/y}$	0.833	17.3	20.8
ingest total $\mu\text{Sv/y}$	0.567	7.75	13.7
lifetime excess cancer risk	5.7E-8	4.6e-5	807
rad dose ($\mu\text{Sv/year}$)	1.405	591.	420.5

pCi/g from NIST soil standard, soil alpha from DOE measured mean, risk from RESRAD, doses using ICRP dose coefficients.

Table: Comparing Pu contributions to total quantities

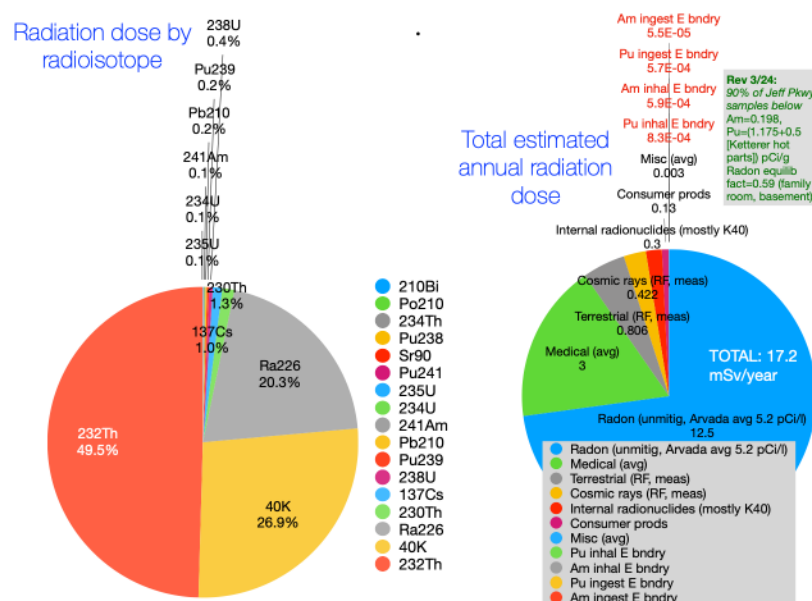


Figure: Radiation dose by soil radioisotope (left) and estimated annual total dose. (Pu pCi/g value > 90% of all Jefferson Parkway samples.)

Compute your own dose

- ICRP dose coefficients are used around the world, are updated frequently, and used by DOE, EPA, foreign countries.
- International Commission on Radiological Protection provides direct estimates of doses from inhaled or swallowed insoluble plutonium. Calculate your own!

$$\begin{aligned}
 &\text{Pu } (16.0 \times 0.840 + 0.251 \times 36.5) \times (\lambda_{un} + \lambda_{hp}) \times 0.037 \\
 &\text{Am } (96.4 \times 0.840 + 0.204 \times 36.5) \times (\lambda_{un} + \lambda_{hp}) \times 0.037
 \end{aligned}$$

Annotations:
 - 0.840 : dose coefficients
 - 0.251 : mass of dirt (g) inhaled/y
 - 36.5 : mass of dirt (g) ingested/y
 - λ_{un} : pCi/g (uniform)
 - λ_{hp} : pCi/g (hot particles)
 - 0.037 : dose/year in μSv

Note: Airborne plutonium in dust has **always** been included in dose and risk estimates. Ketterer air filter results confirm Pu levels on eastern side of Refuge.

Discussion of plutonium, 'hot particles', Pu in filtered air samples is all *meaningless* without dose estimates and risk estimates [not covered here]. No anti-Refuge groups have ever presented estimates of dose or risk, or indicate awareness of Rocky Flats data and the peer-reviewed literature.

Note: Many anti-Refuge claims could be refuted easily; **not** the purpose of this presentation.

Big picture on Refuge and Rocky Mountain Greenway safety

- Context of natural radioisotopes *completely missed* by many (including DOE).
- Superfund cleanup **very successful**, considered exemplary around the world, source of new technologies, focus on how its incentives worked. **Median (half samples above, half below) Pu levels around the Refuge (0.096 pCi/g) are 520 times lower than the (negotiated) standard of 50 pCi/g. Measured natural soil levels are about 53 pCi/g.**
- Early claims of elevated cancer risk downwind of Rocky Flats discredited by 1983 (no support after then). Careful epidemiology since 1982 (>7 papers) shows neither elevated rates nor any correlation with distance from the plant.
- **Pu radiation doses via inhalation and swallowing of contaminated dirt/dust (using overestimated Pu soil levels) are 420 times lower than background (natural) doses. Thus very unlikely additional epidemiology will be carried out.**

Very low doses and corresponding lifetime excess cancer risks are due to (i) very low concentrations of Pu in soil and (ii) fact that Pu emits very few gamma rays (normally dominant source of radiation). These findings reflect reliability of NIST data for soil standards collected in 1978, first published in 1998.



Sampling Results from Engineering Analytics, Inc.

Selected by Partnership to conduct SAP Analysis

Summary of Rocky Mountain Greenway Trail Crossings Sampling

■ Mining ■ Water Resources ■ Geo-Civil ■ Oil & Gas ■ Industrial



July 2024

Rocky Mountain Greenway Trail Crossings

FLAP Sample Locations

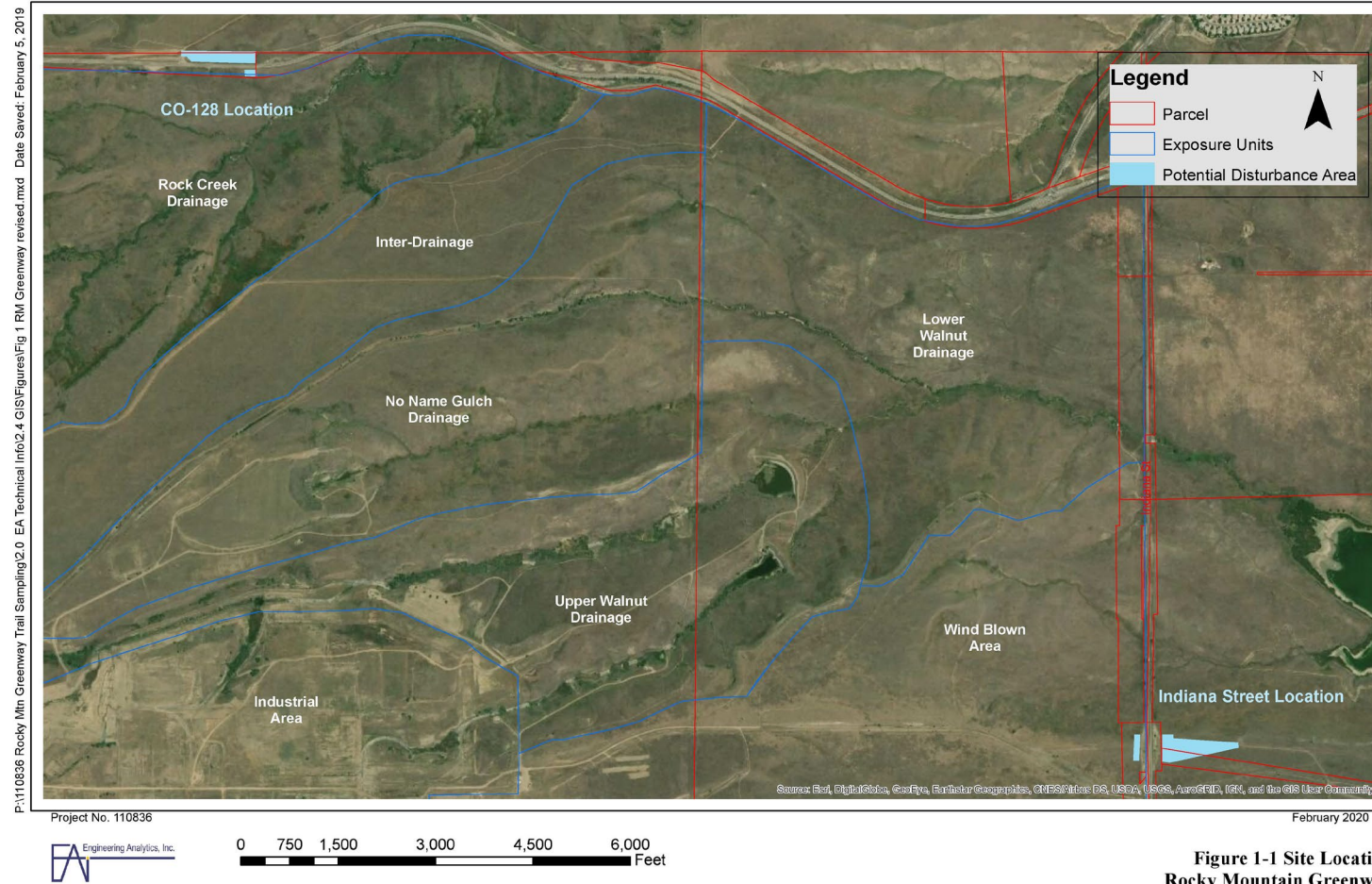


Figure 1-1 Site Location
Rocky Mountain Greenway

- The FLAP partnership sampled in the two areas where the crossing structures are planned.
- Underpass at Colorado Highway 128 connecting to Boulder County.
- Overpass (pedestrian bridge) at Indiana Street
- EA collected 25 (plus 2 duplicate) surface soil samples on July 1-3, 2019

Rocky Mountain Greenway Trail Crossings

FLAP Sample Locations

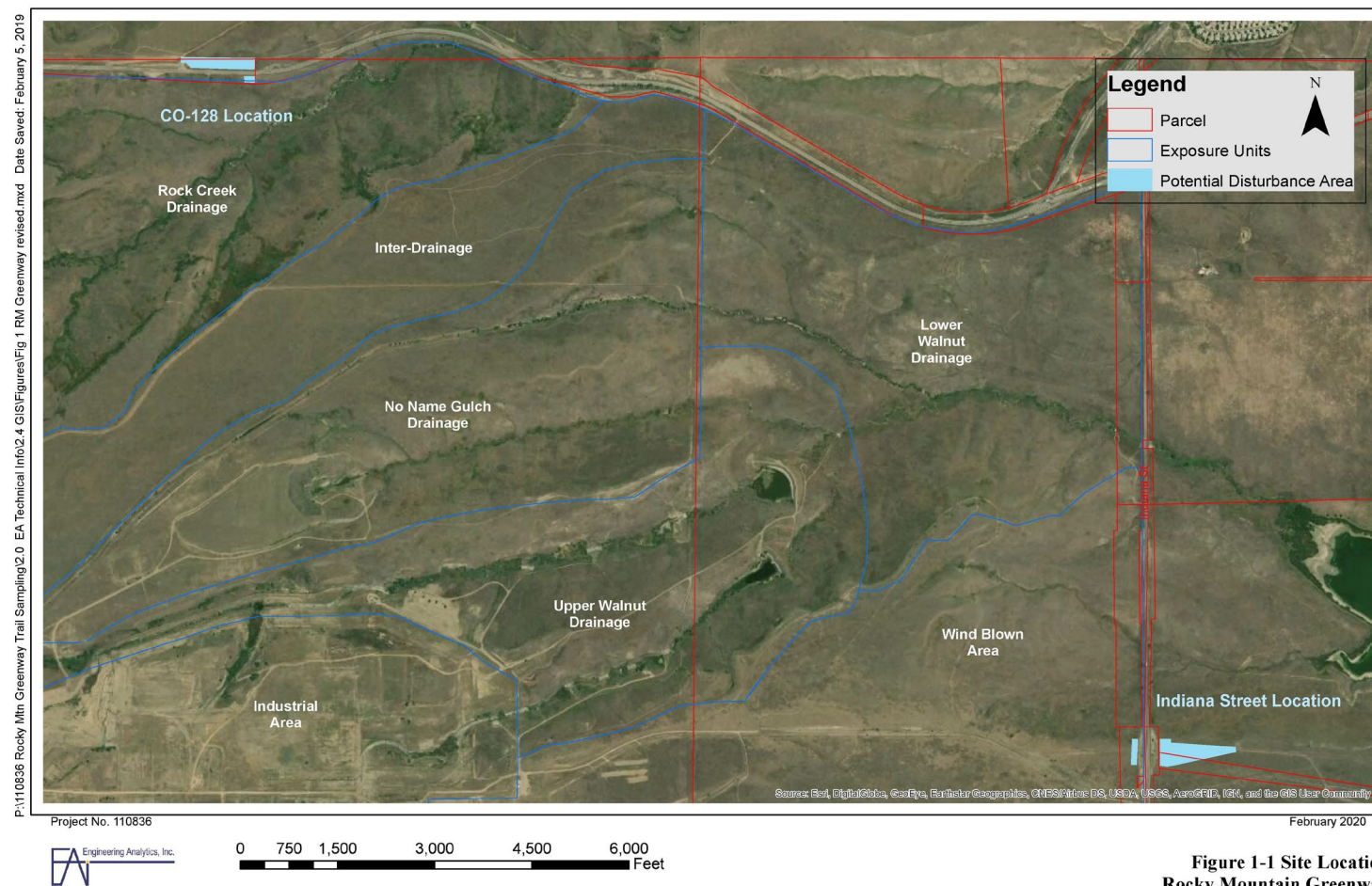


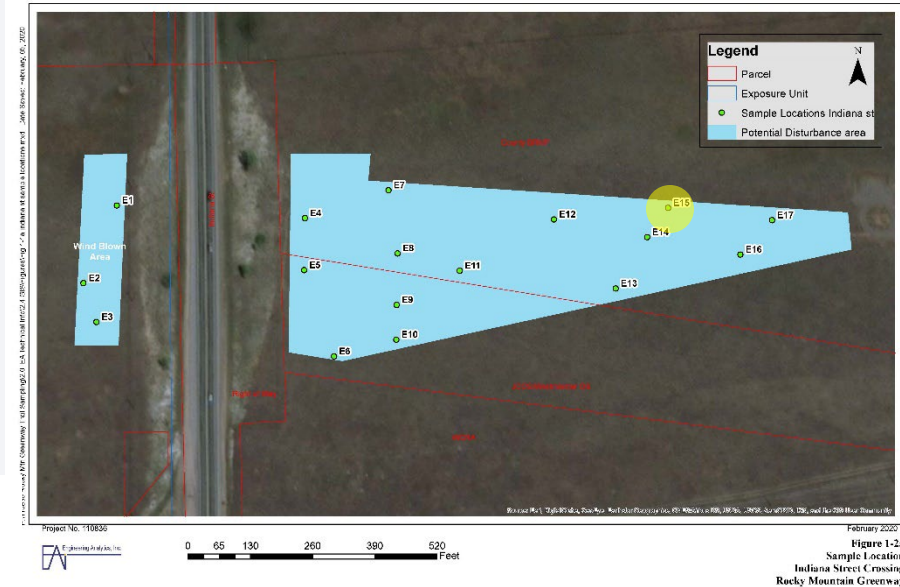
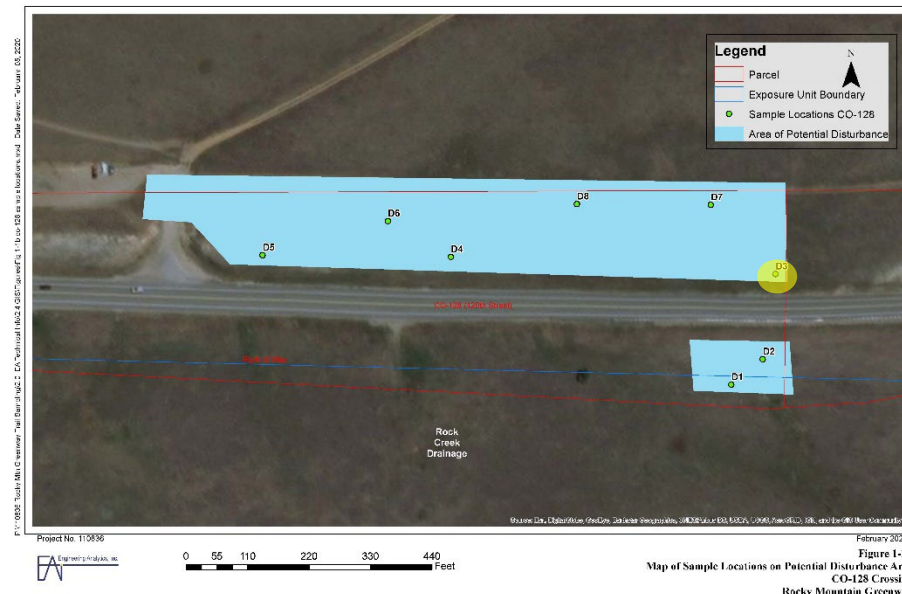
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Rocky Mountain Greenway Trail Crossings

FLAP Sample Locations

- EA collected 25 (plus 2 duplicate) surface soil samples on July 1-3, 2019



* Yellow highlights are the locations of the highest readings.

Rocky Mountain Greenway Trail Crossings

FLAP Sample Results

- Comparison of Pu-239/240 to RI/FS Benchmarks

Sampled Area	Associated Exposure Unit	Project Samples Less Than Background	Project Samples Less Than WRW PRG ⁴	Project Sample Mean Less Than RI/FS Mean	Historic Maximum Results	Cleanup Standard ⁵
CO-128 Crossing	Rock Creek Drainage	✓ 0.045 (pCi/g) ^{1,3}	✓ 0.045 (pCi/g) ^{1,3}	✓	7.25 (pCi/g)	50 (pCi/g)
Indiana Street Crossing	Wind Blown Area	19.4 (pCi/g) ^{1,2}	19.4 (pCi/g) ^{1,2}	✓	49 (pCi/g)	50 (pCi/g)

¹ Maximum Results

² Sample Located at E15

³ Sample Located at D3

⁴ The Wildlife Refuge Worker Preliminary Remediation Goal = 9.3 (pCi/g) (230 day/year exposure)

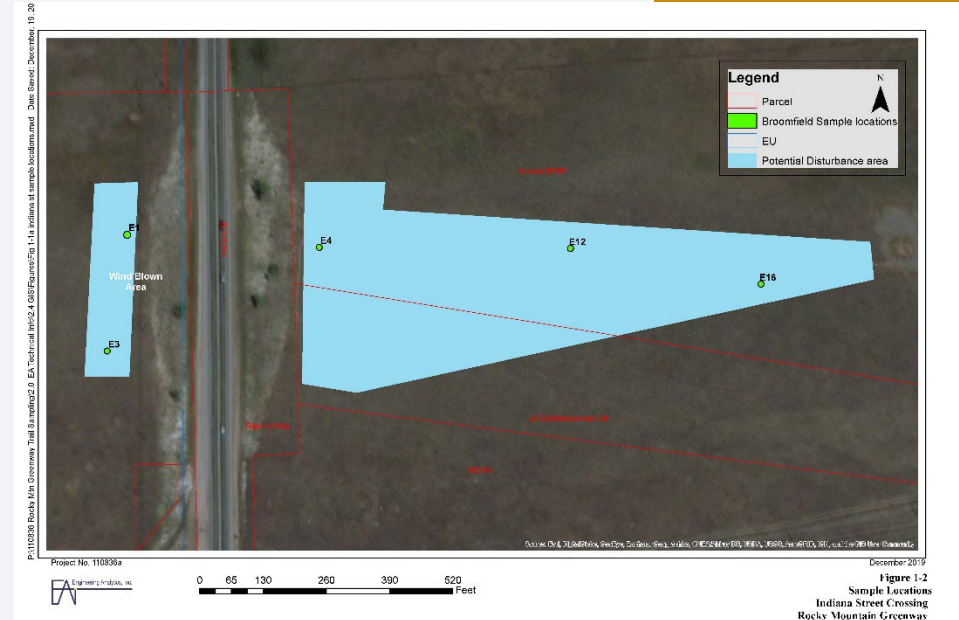
⁵ 5x10⁻⁶ risk for a WRW

Rocky Mountain Greenway Trail Crossings

Broomfield Sampling at Depth

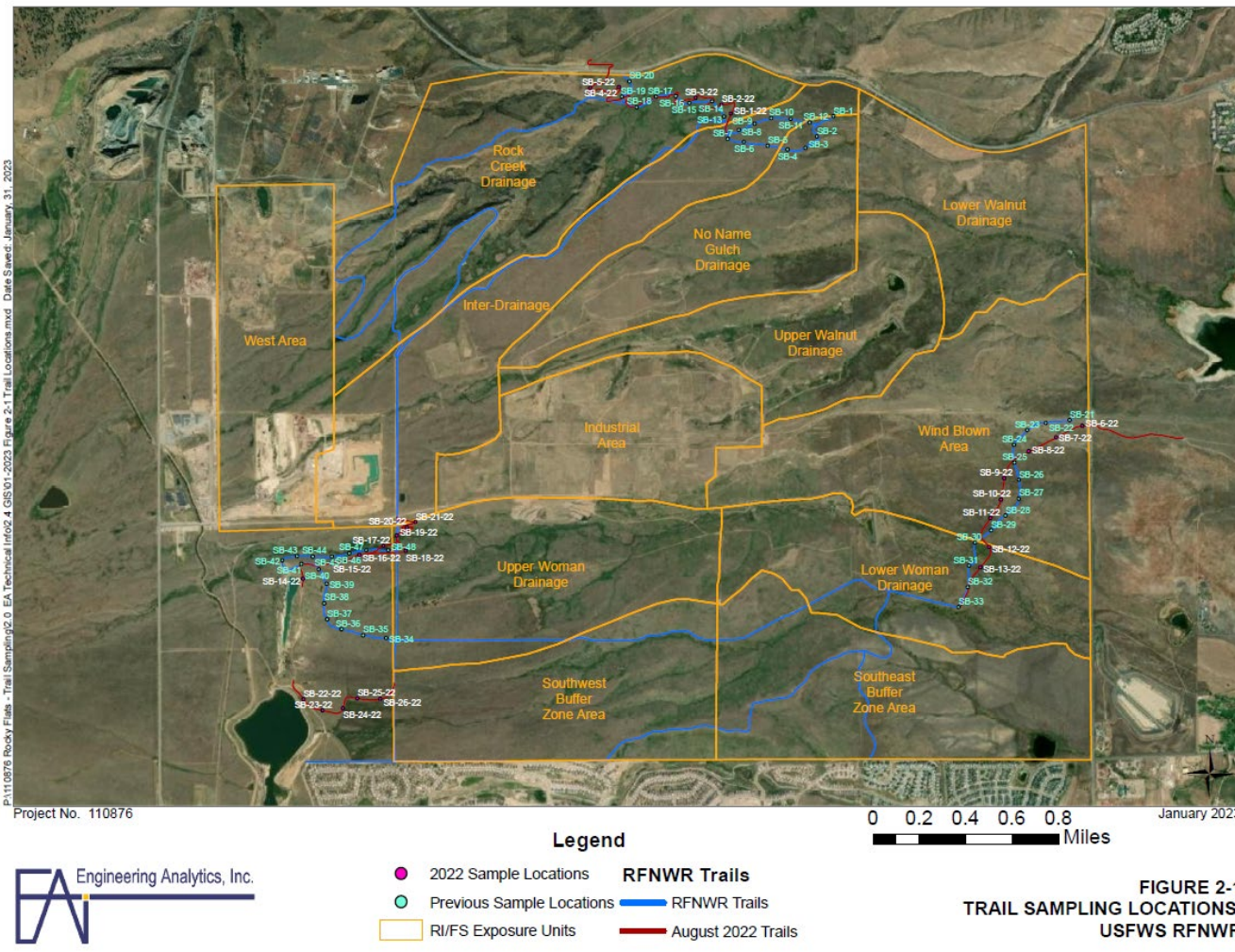
Sampling Rational Indiana St.

- EA collected 55 (plus one duplicate at E16) soil samples over three consecutive days (July 1-3, 2019) for the sample depths to one foot
- EA drilled and collected samples to a depth of 20 feet in two locations (anticipated pier foundation locations) on July 24, 2019



Sample Locations – On Refuge (USFWS)

- The U.S. Fish and Wildlife Service has sampled in the areas of proposed trail construction.
- A total of 48 locations were sampled in 2019.
- An additional 28 locations were sampled in 2022 for proposed trail alignment changes.



Fish and Wildlife Service Trail Sampling

■ Comparison of Pu-239/240 to RI/FS Benchmarks – 2019 and 2022 Sampling

Sampled Area/Exposure Unit	Project Samples Less Than Background	Project Samples Less Than WRW PRG ²	Project Sample Maximum Less Than RI/FS Mean	Project Sample Mean Less Than RI/FS Mean	Historic Maximum Results	Cleanup Standard ³
Rock Creek Drainage	✓	✓	✓ 0.046 pCi/g ¹	✓	7.25 pCi/g	50 pCi/g
Upper Woman Drainage		✓	✓ 0.315 pCi/g ¹	✓	5.01pCi/g	50 pCi/g
Inter-Drainage		✓	✓ 0.078 pCi/g ¹	✓	2.2 pCi/g	50 pCi/g
Wind Blown Area		✓	✓ 2.43 pCi/g ¹	✓	9.44 pCi/g	50 pCi/g
No-Name Gulch Drainage	✓	✓	✓ 0.048 pCi/g ¹	✓	2.31 pCi/g	50 pCi/g
Wind Blown Area		✓	✓ 3.51 pCi/g ¹	✓	49 pCi/g	50 pCi/g
Lower Women Drainage		✓	✓ 1.20 pCi/g ¹	✓	12.2 pCi/g	50 pCi/g
Southwest Offsite (Upper Women Drainage)		✓	✓ 0.163 pCi/g ¹	✓	5.01 pCi/g	50 pCi/g

¹ Maximum Results

² The Wildlife Refuge Worker Preliminary Remediation Goal = 9.3 (pCi/g) (230 day/year exposure)

⁵ 5x10⁻⁶ risk for a WRW

Conclusion

EA did not obtain any results from the soil samples collected and analyzed that indicate a higher risk level than presented in the 2006 Kaiser-Hill Company report and the DOE (2017) report, which allowed for public access to the Project area.

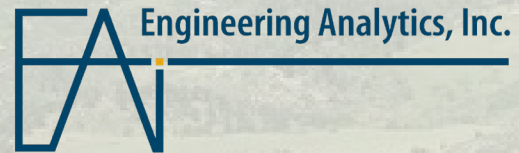
Engineering Analytics, Inc.

1600 Specht Point Road, Suite 209

Fort Collins, Colorado 80525

Phone: 970-488-3111

www.enganalytics.com





Dave Lucas
USFWS Refuge Manager



Rocky Mountain Greenway

CITY OF WESTMINSTER

JULY 15, 2024

Rocky Flats National Wildlife Refuge Act of 2001 (PL 107-107)

Section 3177. ROCKY FLATS NATIONAL WILDLIFE REFUGE.

(e) ADMINISTRATION AND PURPOSES.—

(1) IN GENERAL.—The Secretary of the Interior shall manage the refuge in accordance with applicable law, including this subtitle, the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd et seq.), and the purposes specified in that Act.

(2) REFUGE PURPOSES.—The refuge shall be managed for the purposes of—

(A) restoring and preserving native ecosystems;

(B) providing habitat for, and population management of, native plants and migratory and resident wildlife;

(C) conserving threatened and endangered species (including species that are candidates for listing under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.)); and

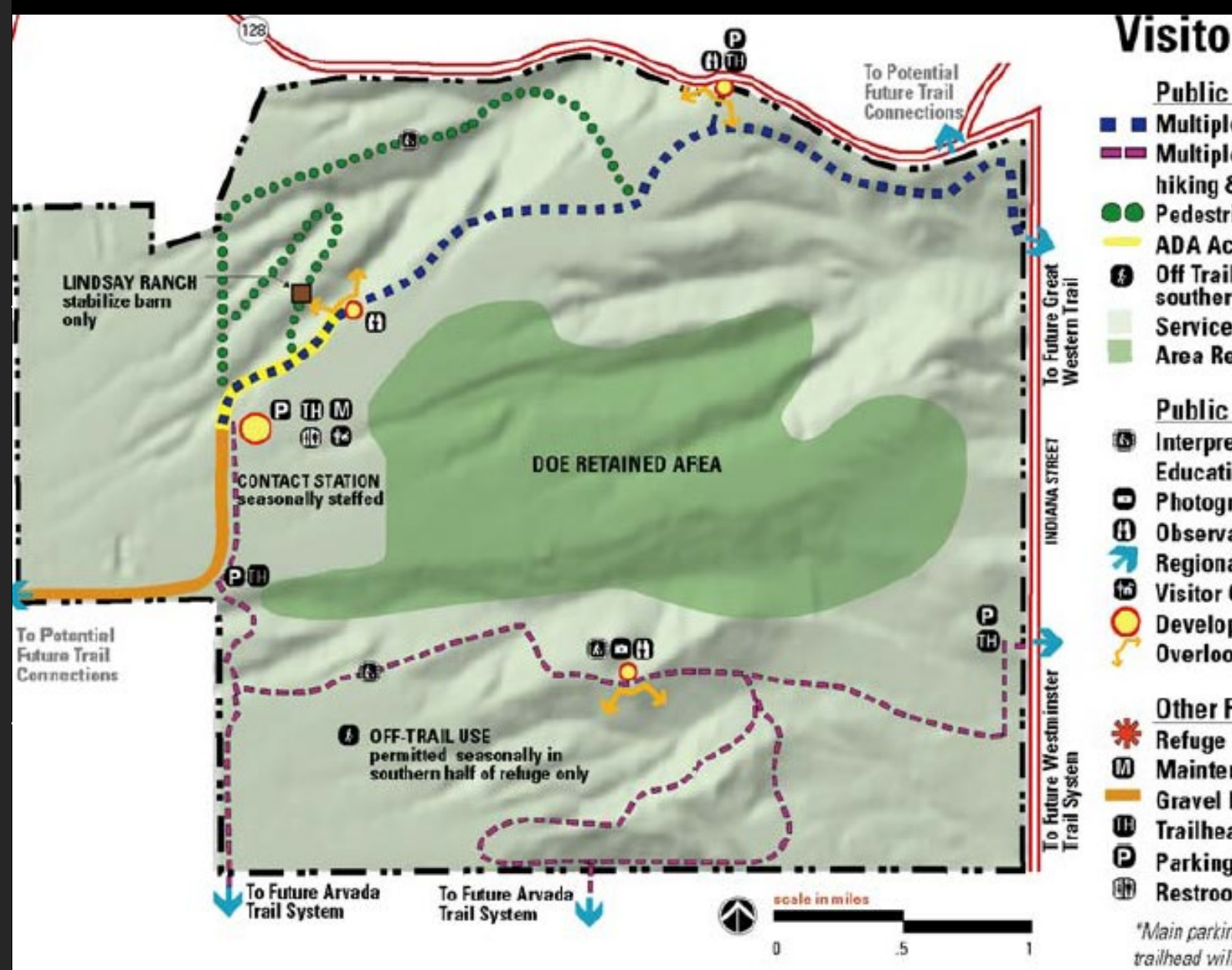
(D) providing opportunities for compatible scientific research.

(3) MANAGEMENT.—In managing the refuge, the Secretary of the Interior shall—

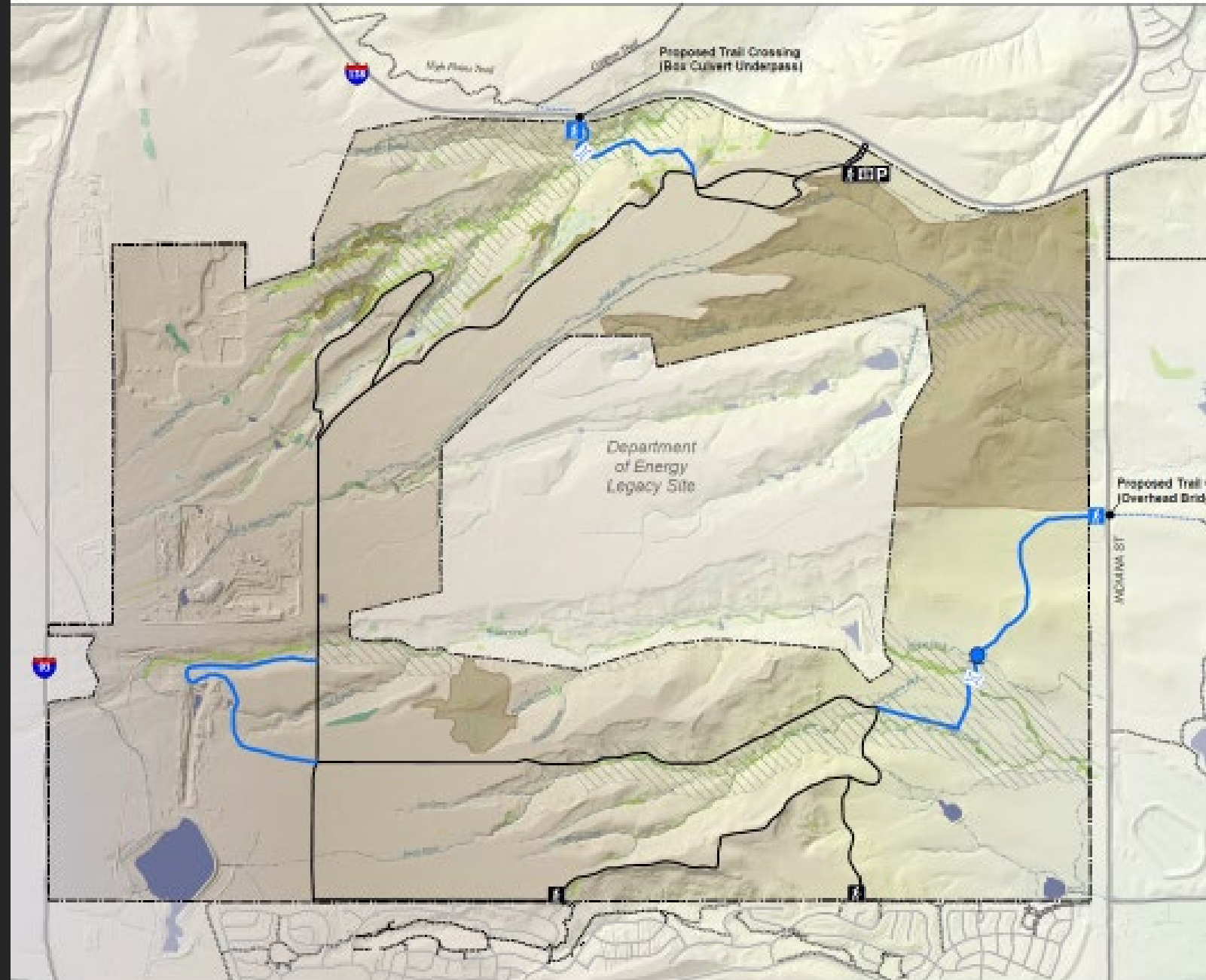
(A) ensure that wildlife-dependent recreation and environmental education and interpretation are the priority public uses of the refuge; and

(B) comply with all response actions.

Comprehensive Conservation Plan (2005)



2020 Environmental Assessment & FONSI

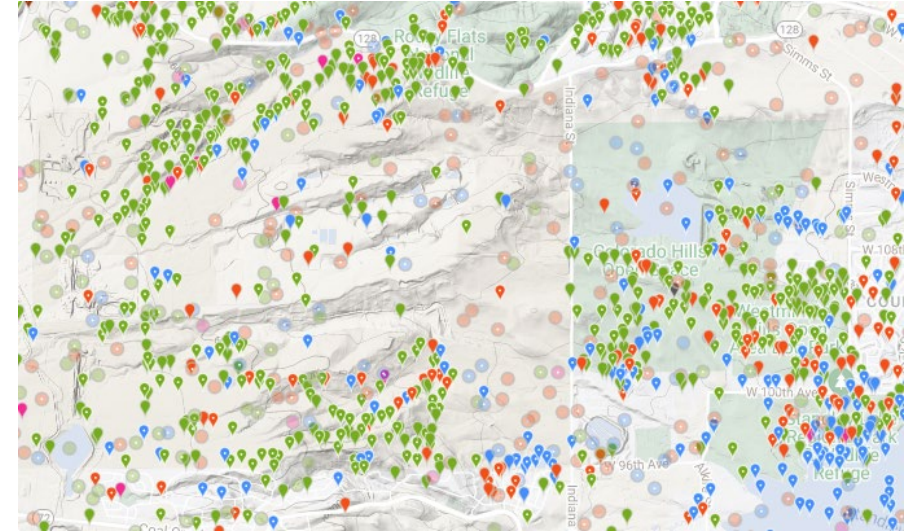


Wildlife & Habitat

The Refuge was established to protect xeric tallgrass prairie, a globally rare ecosystem, and habitat for threatened and endangered species.

The Refuge has more than 630 species of plants and provides habitat for more than 239 wildlife species, including the prairie falcon, deer, elk, coyotes, songbirds, and the Preble's meadow jumping mouse.

The Refuge is an anchor on a much larger landscape (almost 100,000 acres of protected open space).



Federal Lands Access Program

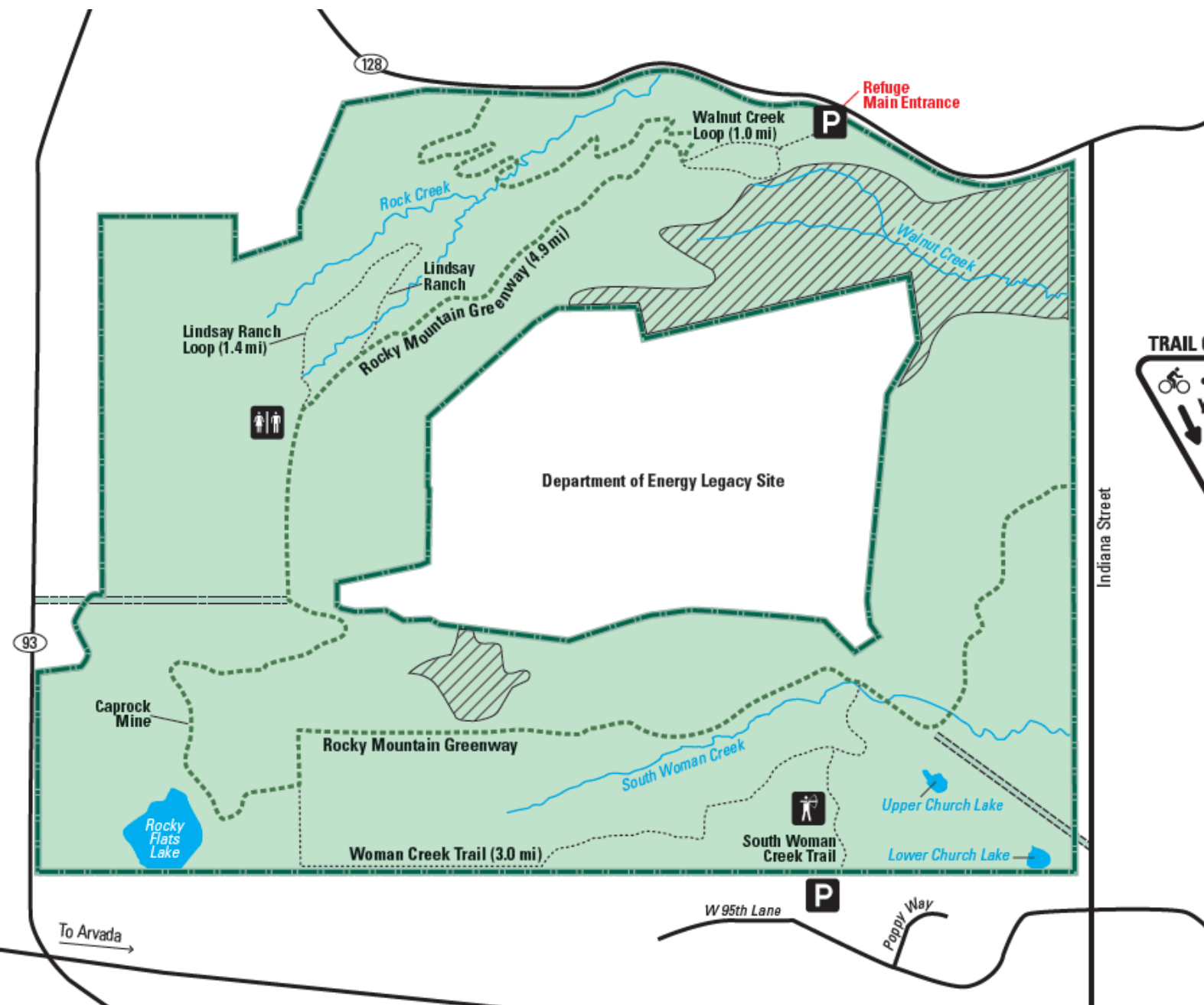
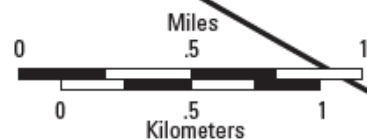
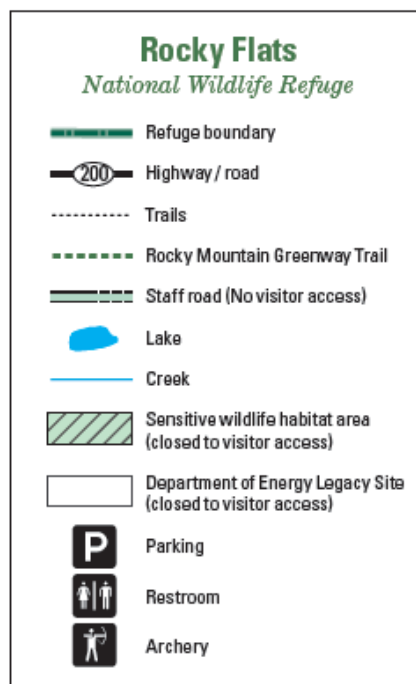
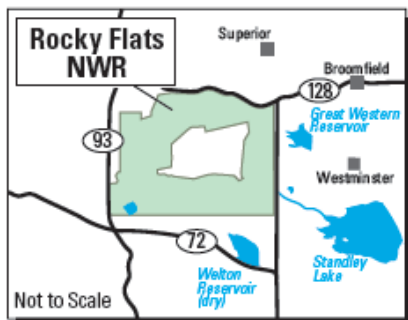
The Federal Lands Access Program (Access Program) was established in 23 U.S.C. 204 to improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands. The Access Program supplements State and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators.



Rocky Mountain Greenway

In 2016 Westminster joined with five neighboring open space partners (Jefferson County, City of Boulder, City and County of Broomfield, City of Westminster and City of Arvada – collectively referred to as the Partner Group) to submit a grant to extend the Rocky Mountain Greenway regional trails project through Rocky Flats National Wildlife Refuge, and into Boulder County. The grant specifically sought funding for trail crossings of Indiana Street and Colorado Highway 128.







Tom Hoby

Director

Jefferson County Open Space and Parks



Questions & Discussion

