Challenges and Strategies to Inform the Development of New Trail and Greenway Design Guidelines

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This project was conducted under the mentorship of **Metro Vancouver** staff. The opinions and recommendations in this report and any errors are those of the author and do not necessarily reflect the views of Metro Vancouver or the University of British Columbia.

Acknowledgements:

Metro Vancouver acknowledges that the region's residents live, work, and learn on the shared territories of many Indigenous peoples, including 10 local First Nations:

- qʼicʼəyʼ (Katzie)
- qʷɑ:nƛ̓ənʼ (Kwantlen)
- kʷikʷəƛ̓əm (Kwikwetlem)
- máthxwi (Matsqui)
- xʷməθkʷəyʼəm (Musqueam)
- qiqéyt (Qayqayt)
- Semiahmoo
- Sḵwx̱wú7mesh Úxwumixw (Squamish)
- scəwʼaθən məsteyəxʷ (Tsawwassen)
- səlilwətaɬ (Tsleil-Waututh)

Metro Vancouver respects the diverse and distinct histories, languages, and cultures of First Nations, Métis, and Inuit, which collectively enrich our lives and the region.

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Executive Summary

Context and Purpose

Metro Vancouver Regional Parks (MVRP) manages approximately 290 kilometers of trails across 23 regional parks, serving over 2.5 million residents and millions of annual visitors.

As the region faces unprecedented environmental and social changes, MVRP's trail infrastructure must evolve to remain accessible, sustainable, and resilient. This report examined current practices and innovative approaches to inform updates to MVRP's 2016 Design Standards and Guidelines, ensuring trail infrastructure meets evolving environmental conditions and diverse community needs.

Research Approach

A multi-method approach combined document analysis of four key MVRP policy documents, interviews with MVRP staff across multiple departments, and a comprehensive scan of best practices from comparable jurisdictions across Canada and the United States.

This study was guided by three interconnected themes:

- **Accessibility** (removing barriers for people of all abilities)
- **Sustainability** (minimizing ecological impact while ensuring long-term viability)
- **Climate resilience** (adapting to extreme weather and environmental changes)

Key Findings

The research identified four critical challenges facing MVRP's trail system

→ **Inflexible design standards** create pressure to upgrade functional trails that may not require modification, while failing to provide guidance for site-specific conditions

→ **Accelerating climate impacts** including flooding, drought, extreme heat, and wildfire risk are overwhelming infrastructure designed for historical weather patterns

→ **Intensifying multi-use conflicts** on shared trails create safety concerns as user quantity and diversity increase

→ **Information and communication gaps** leave both staff and visitors without essential data about trail conditions, accessibility features, and climate vulnerabilities

These challenges reflect broader trends affecting park systems across North America, validating the need to update MVRP's trail and greenway design approach.

Strategic Recommendations

This report presents four transformative recommendations to address identified challenges:

1) **Create flexible accessibility standards** that move beyond binary accessible/inaccessible classifications by applying an "**Accessibility Spectrum**" approach, providing detailed trail characteristics that empower users to make informed decisions while acknowledging that meaningful access can take different forms in diverse environments.
2) **Develop adaptive design frameworks** for **climate-resilient infrastructure** that treats trails as green infrastructure capable of managing stormwater, creating habitat corridors, and supporting emergency response, while establishing performance monitoring systems for materials under extreme weather conditions
3) **Implement design-based solutions for multi-use conflicts** through strategic trail geometry, sight lines, and surface treatments that naturally moderate speeds and behaviors, rather than relying solely on enforcement or user segregation
4) **Build comprehensive information systems** that provide real-time trail conditions through multiple accessible formats, integrate crowd-sourced feedback, connect to emergency management systems, and support adaptive management through data-driven decision-making.

Implementation Pathway

This report recommends a phased approach, beginning with **quick start** initiatives:

Phase 1: Share report findings across departments; establish a collaborative working group to develop a new trail and greenway design framework; arrange accessibility and climate impact audits of 2-3 parks

Phase 2: Explore life cycle costing tools; integrate material performance data into procurement decisions; expand audits based on preliminary findings; pilot new trail features

Phase 3: Revise trail and greenway design standards based on audits and collaborative decision-making; develop MVRP staff training; establish monitoring systems for ongoing development

Moving Forward

This report reveals that the challenges facing Metro Vancouver Regional Parks reflect a fundamental shift occurring across North American park systems: from rigid, prescriptive standards towards an adaptive framework that embraces site diversity while maintaining core commitments to ***accessibility***, ***sustainability***, and ***resilience***. By implementing the recommended strategies and beginning with achievable quick starts, MVRP can demonstrate leadership in developing trail systems that thrive amid rapid environmental and social change.

Introduction

Urban greenways and trails serve as critical infrastructure for community health, ecological connectivity, and climate adaptation in metropolitan regions. However, the rapid growth of cities, along with increased extreme weather impacts, have created unprecedented challenges for trail system management. Trail networks designed using conventional standards often struggle to accommodate diverse user needs, withstand extreme weather events, and maintain ecological integrity under intensifying climate pressures. These converging challenges demand a fundamental re-examination of how regional park systems approach trail planning, design, and maintenance to ensure these vital community assets remain functional, inclusive, and resilient for future generations.

Malcolm Knapp Research Forest, Maple Ridge | K. Pike, 2025

Project Purpose and Scope

Metro Vancouver Regional Parks (MVRP) manages approximately 290 kilometers of trails across the region and is actively planning additional trail networks and recreational greenways. As the region continues to grow and face unprecedented environmental and social challenges, MVRP's trail and greenway infrastructure plays an increasingly vital role in connecting people to nature while protecting sensitive ecosystems. To support ongoing maintenance and expansion efforts, **this report examines current practices and innovative approaches for accessible, sustainable, and resilient greenway and trail design**.

MVRP's current approach to trail and greenway development is guided by multiple strategic documents, including the **Design Standards and Guidelines** (2016), which provide technical specifications for trail construction and universal design implementation. However, as climate change accelerates, accessibility expectations evolve, and sustainability practices advance, these standards require updating to reflect contemporary best practices and emerging challenges. This research examines how MVRP can enhance its design standards to better integrate accessibility, sustainability, and climate resilience considerations across all trail and greenway development.

This project focused on three interconnected areas in trail and greenway design:

Accessibility encompasses the design of environments, products, and services that can be used by people with the widest range of abilities and characteristics, removing barriers and offering opportunities for equitable participation. In urban planning, accessibility involves creating inclusive public spaces and transportation networks that accommodate diverse physical, cognitive, and sensory needs while addressing systemic barriers to participation.

Sustainability refers to development approaches that meet present needs without compromising the ability of future generations to meet their own needs, encompassing both environmental and social dimensions. In urban planning, sustainability involves creating infrastructure and spaces that minimize resource consumption, reduce environmental impacts, and foster long-term community well-being through integrated design strategies.

Climate Resilience describes the capacity of systems to anticipate, prepare for, respond to, and recover from climate-related hazards while maintaining essential functions and adapting to changing conditions. In urban planning contexts, climate resilience involves designing infrastructure and landscapes that can withstand and adapt to evolving climate impacts while supporting community preparedness and recovery.

Research Approach

This research employs a sequential, multi-method approach designed to build knowledge progressively through six interconnected phases (**Figure 1**):

- The process began with a comprehensive literature review of four key MVRP documents (**Table 1**), analyzing content through the lens of *accessibility*, *sustainability*, and *climate resilience*. These findings inform targeted interviews with MVRP staff in relevant positions to validate document analysis and identify practical implementation challenges.
- The combined insights from literature review and interviews then guide the identification of specific challenges and strategies, which in turn inform the curation of five relevant case studies that demonstrate innovative approaches to the identified challenges.
- Finally, all research phases converge to develop evidence-based recommendations and next steps for updating MVRP's design guidelines.

Figure 1. *The major phases of the research process.*

Policy Context

Four foundational documents were reviewed to understand how three main themes (i.e., accessibility, sustainability, and climate resilience) were currently being understood and addressed by Metro Vancouver Regional Parks (see **Table 1**). These documents span from 2016 to 2023 and represent key policy instruments guiding MVRP's current operational framework, including strategic planning, design implementation, resource management, and accessibility compliance. Together, these documents create a comprehensive policy landscape that shapes how MVRP approaches trail and greenway development, though gaps in climate resilience planning and integration across sustainability, accessibility, and environmental considerations became apparent through this analysis and informed subsequent research phases.

Table 1. *Description of four Metro Vancouver official documents used as baseline for this study.*

Document	Acronym	Year Published	Purpose
Accessibility Plan	**AP**	2023	To outline Metro Vancouver's commitment to creating an inclusive and barrier-free environment for all individuals, identifying, removing, and preventing barriers that hinder participation of persons with disabilities
Design Standards and Guidelines	**DSG**	2016	Provide clear direction for park development and establish minimum acceptable standards for trails in a clear and concise format
Natural Resource Management Framework	**NRMF**	2020	Provide strategic direction for managing natural resources within regional parks and ensure system-wide consistency in resource management efforts.
Regional Parks Plan	**RRP**	2022	To guide Metro Vancouver's regional parks system management and development over the next 30 years, focusing on protecting natural areas and connecting people to nature

Expert Interviews

This review informed interviews with several MVRP employees ranging from broader urban planning to operations-level positions to explore their experiences, challenges, and possible strategies for addressing the three main topic areas. Interview responses were coded to identify main themes across accessibility, sustainability, and climate resilience in relation to current experiences, implementation challenges, and potential strategies (see Appendix for interview questions).

Policy Scan and Case Studies

Main themes and the challenges and strategies identified by expert interviews were then used to guide a policy and case study review of other agencies and regions. The policy scan and case study identification process began with web searches using terms related to initial findings from the literature review and interviews.

Recommendations and Next Steps

The final phase synthesizes findings from a literature and policy review, interviews with MVRP staff, and an exploration of case studies to develop comprehensive recommendations for updating MVRP's design standards and guidelines (Anthropic, 2025). These recommendations address identified gaps and opportunities across the three core themes, providing actionable guidance for implementing more accessible, sustainable, and resilient trail and greenway infrastructure. The report concludes with considerations for future work, including areas requiring additional research, potential pilot projects, and long-term implementation strategies that could further advance MVRP's capacity to develop climate-adapted and inclusive recreational infrastructure.

An example of natural shade cover on a warm day in Surrey Bend Regional Park | K. Pike, 2025

Section 1: Accessible, Sustainable, and Resilient Trail Design

This section:

→ Introduces the four foundational documents that guide this report (**Table 1**)
→ Describes each document in terms of the three core research areas (accessibility, sustainability, and climate resilience)
→ Informs the rest of the report by identifying **strengths** and potential **challenges** associated with each document

Natural seating in Surrey Bend Regional Park | K. Pike, 2025

Accessibility and Green Spaces

Accessibility in trail and greenway design encompasses the removal of physical, organizational, informational, and technological barriers that prevent equitable participation in outdoor recreational experiences. In the context of MVRP, accessibility means designing and managing trails and greenways in a way that supports diverse uses and abilities, while maintaining the natural character and ecological integrity of regional parks.

Metro Vancouver's Accessibility Plan (**2023**) establishes a comprehensive framework for barrier removal across all organizational facilities and services, explicitly recognizing regional parks as requiring accessibility improvements. Alongside Statistics Canada, the accessibility plan identifies several types of disabilities that must be considered in design decisions, from mobility and sensory impairments to cognitive and mental health conditions, affecting nearly half of seniors over 75 and representing both permanent and temporary accessibility needs throughout the population.

Analysis of the four documents reveals several accessibility strengths, opportunities, and challenges that impact trail and greenway design:

Highlights

- ★ **DSG**: Solid universal design principles with specific requirements for trail widths (minimum 1500mm for universal access), grades (maximum 8.3% for accessible trails), and surface specifications
- ★ **RPP**: Emphasizes universal design implementation in all new construction while acknowledging the need to address existing infrastructure that may not meet current accessibility standards. Expands on the idea of accessibility to include "financial, transportation, physical accessibility, communication, or feelings of exclusion."
- ★ **All documents:** Opportunities for enhanced wayfinding systems, improved information accessibility across multiple formats and languages, and stronger connections between accessibility improvements and broader community engagement strategies

Implementation Gaps

- × **DSG**: Lacks integration with broader accessibility frameworks and emerging inclusive design practices.
- × **All documents:** Limited technical specifications for diverse outdoor recreational environments, minimal integration between accessibility requirements and environmental protection measures, and insufficient consideration of how climate change impacts may affect accessible route maintenance and reliability

A survey of nearly 1,500 Metro Vancouver residents found that:

- 22% believed public toilet facilities should be more prioritized (p. 60)
- 20% believed more light fixtures should be added along trailways (p. 60)
- 17% believed more benches and seating should be added along trailways (p. 60)
- 10% believed their mobility limited their use of some trails (p. 45)

Sustainability and Green Spaces

In the scope of this project, sustainability refers to the material selection and approach used in the design, creation, and maintenance of trails and greenways. In line with a broader concept of sustainability, these practices should aim to minimize ecological impact while ensuring the long-term viability of Metro Vancouver's regional parks system. For MVRP, sustainability could mean developing trails and greenways that protect biodiversity, conserve natural resources, support ecosystem services, and provide lasting community benefits through cost-effective, durable design solutions that require minimal maintenance and environmental intervention. Further, trail networks can provide an opportunity for people to connect with nature and, through this, encourage stewardship.

The **Natural Resource Management Framework** (**NRMF**) establishes ecosystem-based management as a core sustainability approach, emphasizing that biological diversity and structural complexity strengthen ecosystem function over time. This framework recognizes that effective sustainability requires managing regional parks as connected components of the broader landscape rather than isolated ecological islands, with infrastructure decisions guided by ecosystem integrity and connectivity considerations.

Across the four strategic documents, sustainability challenges emerge in several key areas affecting trail and greenway development:

Highlights

- ★ **DSG:** prioritizes cost-effective, durable solutions using native soils and recycled materials where appropriate. Environmental protection measures include 30-meter riparian setbacks and minimal vegetation clearing requirements.
- ★ **NRMF:** highlights challenges in balancing increased public access with ecosystem protection goals, noting that infrastructure siting decisions must consider cumulative environmental stresses from climate change, fragmentation, and visitor impacts while maintaining the dual mandate to both protect natural areas and connect people to nature.
- ★ **RPP:** identifies sustainability gaps including the need for stronger integration between built and natural asset management approaches, enhanced consideration of life-cycle environmental impacts, improved coordination between trail development and broader climate action strategies, and the use of sustainable materials in the construction and upgrade of facilities and infrastructure.

Implementation Gaps

- × **DSG:** provide limited guidance on the use or selection of sustainable materials or advanced environmental integration techniques, while opportunities exist for enhanced ecosystem connectivity and habitat restoration integration within trail planning processes. For example, some of these approaches are being done through partnerships with ecological restoration students at the British Columbian Institute of Technology (See Appendix for Additional Resources).

Climate Resilience and Green Spaces

Climate resilience in trail and greenway design refers to infrastructure's capacity to withstand, adapt to, and recover from climate change impacts while maintaining functionality and supporting broader ecosystem and community resilience. For MVRP, climate resilience means developing trails and greenways that can handle increased precipitation intensity, temperature extremes, sea level rise, wildfire risk, and invasive species spread while continuing to provide safe, accessible recreational opportunities and supporting ecosystem adaptation processes.

The **Regional Parks Plan** (**RPP**) identifies climate change as a central consideration for all infrastructure development, establishing a goal to help "regional parks adapt to change and contribute to regional resilience." This goal recognizes that climate impacts will affect both built infrastructure and natural ecosystems, requiring proactive adaptation strategies that integrate infrastructure resilience with ecosystem-based adaptation approaches such as maintaining diverse, connected habitats that provide natural climate services including flood control, urban cooling, and carbon sequestration.

Across the four strategic documents, climate resilience challenges emerge in several key areas affecting trail and greenway development:

Highlights

- ★ **DSG:** include comprehensive drainage and erosion control measures with requirements for cross-slope design and positive water management
- ★ **NRMF:** identifies climate change as creating cumulative stress on ecosystems alongside land use changes and visitor impacts
- ★ **All Docs:** reveal opportunities for incorporating nature-based solutions that simultaneously support infrastructure resilience, ecosystem adaptation, and recreational access goals.

Implementation Gaps

- × **DSG:** lack explicit consideration for how changing precipitation patterns, extreme weather events, or temperature fluctuations may affect infrastructure performance over time. Current drainage specifications focus on typical conditions rather than the increased intensity and frequency of extreme weather events projected for the region.
- × **NRFM:** provides limited specific guidance on how infrastructure design can support ecosystem adaptation
- × **All Docs:** insufficient integration of climate projections into design specifications, limited consideration of how extreme weather events may affect accessibility and emergency response capabilities, and minimal guidance on material selection for enhanced durability under changing environmental conditions.

Section 2: Major Challenges and Emerging Strategies

This section:

→ Describes major themes of MVRP staff interviews in relation to accessibility, sustainability, and climate resilience.

→ Informs the following sections (case studies, recommendations, and next steps)

Interviews with Metro Vancouver Regional Parks staff

Semi-structured interviews with MVRP staff (including those from planning and management roles) provided critical operational insights into the practical realities of implementing accessible, sustainable, and resilient trail infrastructure. Drawing from diverse professional perspectives, these interviews revealed several interconnected themes that illustrate the gap between policy aspirations and on-the-ground implementation.

The challenges identified by staff span social and environmental dimensions, reflecting the complexity of managing parks and trails with varying user demands, site conditions, and ecological sensitives. These findings not only validate the gaps identified in Section 1 but also highlight urgent operational challenges that existing guidelines inadequately address, particularly regarding **climate adaptation, user safety, and the need for flexible standards that can respond to diverse park contexts**.

Lynn Headwaters Regional Park | K. Pike, 2025

Challenge #1: Current design standards are difficult to implement

For trail design standards to be effective in diverse regional park contexts, *flexible approaches are essential* to accommodate varying site contexts and user needs.

→ Interviewed staff consistently emphasized that many existing trails serve their recreational purposes well but making them **completely accessible or climate resilient may be unrealistic**.

→ **Current standards are inflexible**, creating pressure to upgrade trails that function appropriately for their intended use, ecological context, and climate exposure, without considering site-specific factors.

Suggested approaches by MVRP staff:

★ **Conduct an audit of trails and greenways** to understand existing infrastructure (e.g., trail width / slope and public amenities such as bathrooms, parking, and seating)
★ **Re-evaluate difference between *standards* and *guidelines*** (i.e., mandatory vs. voluntary)
★ **Accept that not all trails may be able to be accessible** to all visitors

Challenge #2: Adapting to extreme weather and climate change

Environmental pressures from climate change are creating urgent infrastructure challenges that current design standards inadequately address.

→ Interviewed staff reported **increased flooding events** that required **emergency trail relocations and extended closures**

→ **Drought conditions** were described as having an impact on the performance and erosion of trail materials. For example, the gravel used on some of the trails was described as drought insensitive, requiring a substantial amount of water to be maintained (See Appendix for photos).

→ **Extreme heat** led to the discussion of new ways to protect visitors – particularly those most vulnerable to sun exposure

→ The **risk of wildfire** has influenced discussion of emergency evacuation planning

→ Staff expressed **uncertainty about which building materials balance accessibility, sustainability, and climate resilience**, particularly when considering full life-cycle environmental impacts, maintenance requirements under extreme weather, and performance for diverse mobility needs.

Suggested approaches by MVRP staff:

★ **Proactively consider evolving climate and extreme weather** when constructing new (or managing existing) trails
★ **Accept that trails may need to be closed for extended periods of time** or may not be accessible during certain seasons

Challenge #3: Conflict and safety concerns on multi-use trails

User conflicts on shared trails emerged as a critical challenge affecting the safety and accessibility of trail systems under increasing and diversifying use pressures.

→ Interviewed staff shared that **multi-use trails can be a challenge due to the diverse ways visitors enjoy these spaces**, including visitors with dogs who are on vs. off leash; those that require mobility assistance devices; cyclists and other modes of active transportation other than walking and running; equestrians; and more recently, electric cyclists.

→ While the existing design standards offer some multi-use guidelines, interviewed staff desired more guidance on navigating planning and managing multi-use trails for diverse user types.

Suggested approaches by MVRP staff:

★ **Introduce more nuance into existing DSG guideline's** multi-use trail categories and situations
★ Accept that **not all conflict can be mitigated**

Challenge #4: Information and communication gaps

There are significant data gaps surrounding trail conditions, climate vulnerabilities, and accessibility information that affect both planning and management.

→ Staff expressed **concerns about visitors' inability to determine trail accessibility, current conditions, or climate-related hazards** before arriving at parks, creating safety risks, accessibility barriers, and potential exposure to weather-related dangers.

→ Without systematic trail audits documenting accessibility features, erosion risks, drainage performance, and ecological impacts, **both staff and visitors lack essential information** for appropriate trail selection, maintenance prioritization, and climate adaptation planning.

Suggested approaches by MVRP staff:

★ **Include more information in person and online regarding accessibility** features and amenities of trails and greenways
★ **Improve communication about extreme weather** events and trail closures

Section 3: Transformative Trail Design in Practice

This section:

→ Introduces five case studies based on the findings in previous sections
→ Highlights key approaches and considerations relevant to MVRP staff concerns

The challenges and potential strategies identified by Metro Vancouver Regional Parks staff reflect broader trends affecting park and trail management agencies across North America. A policy scan revealed that many other agencies are grappling with similar tensions between rigid standards and site-specific needs, struggling to integrate climate adaptation with accessibility goals, and seeking sustainable solutions for material performance under environmental stress. These parallel experiences, drawn primarily from Canada with supporting examples from the United States, demonstrate both the universality of these challenges and emerging pathways for transformation.

The following case studies directly respond to the challenges and potential strategies identified through MVRP staff interviews and document analysis, demonstrating how comparable organisations have transformed similar constraints into opportunities for innovation.

An increasingly flood-prone area in Campbell Valley Regional Park | K. Pike, 2025

Case Study #1: From rigid standards to flexible frameworks

The tension between prescriptive standards and site-specific flexibility identified by MVRP staff represents a growing concern and fundamental shift occurring across North American park systems.

Programs/Policies of Interest

Accessibility Standards Canada's Outdoor Spaces Standard "envisions accessible, barrier-free, and inclusive outdoor spaces. The standard explicitly recognizes that "one-size-fits-all" approaches cannot address the complexity of outdoor recreational spaces – *directly validating MVRP staff concerns about unnecessary upgrade pressures on functional trails*.

Trans Canada Trail's All Persons Trails approach goes beyond traditional accessibility standards to provide visitors with a wide range of needs access to a variety of trail experiences. Rather than forcing all trails to meet identical specifications, this framework creates diverse trail categories that serve different user needs while maintaining clear communication about trail characteristics. *This addresses the "fringe situations" MVRP staff identified, legitimizing bare earth trails and seasonal routes as valuable recreational resources rather than substandard infrastructure.*

Toronto & Region Conservation Assoc.

- TRCA's ***Trail Strategy*** (2019) guides the planning, development, and management of Toronto's regional trails
  - Categorizes **trail typologies** based on site context and user type
  - Provides a definition for **exceptions to accessibility** (p. 79):
  - Bolstered by **diverse partnerships**, including community stewards, universities, municipalities, and the federal government

Considerations for MVRP

★ Previous approaches are often too rigid and **lack the nuance necessary to address complex challenges**

★ Multi-phase implementation allows for **adaptive learning**

Case Study #2: Accessible trails and greenways: an evolving concept

Definitions and understandings of accessibility are evolving. MVRP staff desired more nuance in how accessibility factors are considered and addressed, suggesting the need for an accessibility audit and a re-evaluation of what accessibility looks like in trails and greenways. See Additional Resources for more examples of accessibility and green spaces.

Programs/Policies of Interest

Trans Canada Trail

- In partnership with **Access Now**, TCT's **All Persons Trail** uses accessibility mapping to bridge critical information gaps and elevate the lived experience of trail users with disabilities
- Considers neuro-inclusive trail design that increase predictability and reduces stimulation
- Provides a variety of seating styles (with and without armrests and backrests) and accessible washrooms (with multiple grab bars and wheelchair space)
- Piloted **BlindSquare** in Victoria to support safer, more inclusive outdoor experiences for people who are blind or partially sighted.

East Bay Regional Park District (USA)

- A partnership with **Access Northern California** provides accessibility details based on access needs rather than simple accessible/inaccessible labels
- Provides descriptions of over 25 accessible trails from the perspective of someone in a motorized wheelchair
- A variety of information available through websites, apps, and printed guides
- Offer low-cost transportation for low-income schools and groups serving children, seniors, and people with disabilities
- Follow this link for more information and resources.

Considerations for MVRP

★ Accessibility is **an evolving concept**
★ Partnering with community-centered organizations **shapes what accessibility looks like** based on the needs, preferences, and lived experiences of park users
★ **Meaningful engagement** is important for understanding community needs and preferences

Case Study #3: Climate resilient, sustainable trail design

The flooding, drought, and extreme weather impacts described by MVRP staff are driving fundamental changes in trail infrastructure planning across Canada. Likewise, the challenges with effective and sustainable trail materials and maintenance reported by MVRP staff represent a widespread issue, with several organisations reporting similar challenges.

Programs/Policies of Interest

Trans Canada Trail

- Practices ecological restoration through strategic tree planting, restoration of trails damaged by severe weather, ongoing trail maintenance, and pioneering research to build climate-smart trails.
- Designed a Trail Development & Life Cycle Costing tool "to provide comprehensive insights into the financial implications of trail development over its entire life cycle" and "make informed decisions that optimize resource allocation and ensure the long-term viability of trail infrastructure."

Rouge National Urban Park

- A three-phased climate adaptation strategy that outlines proactive infrastructure, including:
  - Advanced drainage systems designed for extreme precipitation events
  - Restoring flood-prone areas to natural states that can absorb climate impacts
  - Extensive public consultation with detailed response to concerns

Alberta Parks

- Trail Development Guidelines (2019) acknowledge that traditional materials and construction methods require updating for current environmental conditions
- Use classification-based flexibility and explicit climate considerations in guidelines

Toronto & Region Conservation Assoc.

- Notes that "rising temperatures and changing precipitation patterns have already reduced river flows, warmed surface waters and dried out wetlands" (Conservation Ontario, 2025).
- Their response includes relocating vulnerable trail segments, implementing nature-based solutions for erosion control, and developing emergency response protocols that account for rapid weather changes.

Considerations for MVRP

★ Apply **anticipatory design** by moving infrastructure away from worsening flood zones and creating new trails with changing weather patterns in mind

★ Use a **multi-phase** approach to allows for adaptive learning

★ **Meaningful collaboration** strengthens both design and implementation.

Case Study #4: Multi-use trail design and conflict mitigation

Conflict among visitors on multi-use trails was a significant challenge identified by MVRP staff. This concern aligns with other cities and park districts that have released strategies that to mitigate conflict while meeting diverse visitor needs and preferences. See Additional Resources for more examples.

Programs/Policies of Interest

Alberta Parks

- Trail Development Guidelines take a strategic classification approach, designating some trails for higher-speed travel while preserving others for slower, more contemplative experiences (2019, p. 89-95).

City of Toronto

- Multi-Use Trail Design Guidelines suggested wider trails for high-use areas and specific design interventions including separated lanes, speed management features, and strategic sight line improvements.
- Design guidelines also include principles for accessibility, sustainability, and environmental protection (p. 7)

MVRP

- Completed a community survey for multi-use trails in Metro Vancouver
  - Found that most visitors are most likely to use trails within 3km of their home
  - The majority of surveyed community members use multi-use trails and believe they are important to the community, *yet 18% state that they are unable to use them due to mobility or health issues*
  - Walking is the most common activity (86%), followed by cycling (32%), dog walking(26%), and jogging/running (24%)

Trans Canada Trail

- **National Guidelines for Classifying Multi-Use Trails in Canada** are "available to all of Canada's trail ecosystem to help trail operators and partners classify trails, define their trail experiences and evaluate their trail's tourism readiness."

Considerations for MVRP

★ **Create neighborhood-specific trail strategies** - Since most users stay within 3km of home and 86% walk, develop localized management approaches rather than uniform standards across the system.

★ **Manage mixed speeds through adaptive design** - Use time-based management, directional flow, or environmental cues to naturally moderate speeds rather than strict separation, addressing the walking/cycling/running mix.

★ **Prioritize non-user voices in planning** - Specifically engage mobility-limited residents and disability advocates to understand barriers beyond physical access, including safety concerns and information gaps.

Case Study #5: Collaborative information systems, communication and engagement

Current methods for communicating with park visitors was another challenge identified by MVRP Staff. To improve both data collection and community education, many organizations are addressing both simultaneous through creative engagement methods, often via a partnership with an advocacy group.

Programs/Policies of Interest

Toronto & Region Conservation Authority

- Watershed and Ecosystems Reporting Hub demonstrates the power of integrated data systems and climate science application, *directly addressing the "big picture perspective" gap identified by MVRP staff*
- Takes an innovative approach to reporting on watershed and ecosystem conditions through interactive community science and education
- Identifies current conditions by theme and explains the importance of different environmental indicators
- Shows how conditions are changing over time and provides insights into TRCA's progress

Trans Canada Trail

- Partnered with **AccessNow** to design engagement that is supported through the lived experiences of people with disabilities.
  - By using a mobile app, detailed user accessibility data can provide nuanced information that informs more inclusive trail and greenway design.

East Bay Area Ridge Trail Council (USA)

- Uses comprehensive trail assessment protocols that document gradient variations, surface conditions, and seasonal accessibility changes.
  - Approach acknowledges that trail conditions vary significantly with weather and maintenance cycles – *addressing MVRP's concern about visitors arriving unprepared for actual trail conditions.*
  - See Appendix for examples of what this currently looks like in Lynn Headwaters Regional Park.

Considerations for MVRP

★ Partner with **community-centered** social/environmental justice organizations (instead of reinventing the wheel)
★ Use **different types of platforms** for interactive engagement and education
★ Meaningful collaboration can strengthen both design and implementation.

Section 4: Recommendations

This section:

→ Introduces four recommendations based on previous sections
→ Includes potential starting points for implementation

The convergence of challenges and strategies identified through MVRP staff interviews and policy analysis reveals fundamental limitations in traditional prescriptive design standards. The following recommendations synthesize lessons from comparable jurisdictions while addressing the specific operational realities facing Metro Vancouver Regional Parks.

An engineered shade structure at Surrey Bend Regional Park | K. Pike, 2025

1) Create flexible accessibility standards that acknowledge diversity

The tension between standardized accessibility requirements and diverse park users and environments requires reimagining how cities and agencies approach universal access.

Develop an "Accessibility Spectrum" approach that:

- Provides detailed inventories beyond minimum standards
- Empowers users with comprehensive information for informed decision-making
- Acknowledges "meaningful access" in challenging terrains

Establish site-specific accessibility solutions that:

- Allow flexibility in technical specifications while maintaining core accessibility principles
- Create alternative accessible experiences when full physical access isn't feasible
- Include sensory and cognitive accessibility considerations beyond mobility
- Implement accessible opportunities equitably across the park system

See Additional Resources section for guides on more inclusive park design.

2) Develop an adaptive design framework for nature-based, climate-resilient infrastructure and planning

Create an integrated framework that moves beyond viewing trails as isolated infrastructure to understanding them as components of interconnected natural systems, while addressing both material uncertainty and changing environmental conditions.

Design trails as green infrastructure that:

- Manage stormwater through integrated drainage design
- Create habitat connectivity corridors
- Support wildfire management through strategic fuel breaks
- Provide urban cooling through canopy coverage and permeable surfaces

Establish climate-responsive material selections that:

- Differentiate trail materials based on:
  - Local and global environmental impact
  - Exposure to climate hazards such as flooding and extreme heat
  - Local availability of materials

Monitor material performance, including:

- Degradation under various weather conditions (particularly for accessibility)
- Resiliency to multiple climate hazards (e.g., materials that perform well under drought followed by extreme precipitation)
- Cost (both monetary and ecologically) of sustained management

Develop a 'living' performance database with climate integration:

- Monitor material performance across different microclimates and extreme weather events
- Track maintenance requirements linked to specific climate conditions
- Include regular update mechanisms as climate science and material technology evolve

See Additional Resources section for examples of nature-based park design.

3) Implement design-based solutions for multi-use conflicts

Rather than relying on enforcement or user segregation, embed conflict resolution into the physical design of trails through evidence-based interventions that naturally moderate behavior while maintaining inclusive access.

Develop differentiated trail design typologies that:

- Use trail geometry, sight lines, and surface treatments to naturally moderate speeds
- Create "speed transition zones" at conflict points
- Implement wider trail standards (4+ meters) for high-use multi-modal corridors
- Design dedicated passing zones and rest areas at regular intervals

Create adaptive management protocols for emerging uses:

- Establish e-mobility design parameters based on actual speed data collection
- Develop "pilot trail" designation for testing new design approaches
- Implement user feedback mechanisms integrated with design iterations
- Create seasonal or time-based use strategies for high-conflict areas

See Additional Resources section for example strategies for multi-use trail design.

4) Build comprehensive information systems and organisational capacity

Transform fragmented trail information into integrated systems that serve diverse user needs while supporting adaptive management and emergency response.

Develop data-driven communication and management systems that:

- Report real-time conditions accessible through multiple formats
- Use crowd-sourced user feedback
- Integrate trail counters, weather stations, and user reports
- Connect to regional emergency management systems
- Support research and adaptive management through open data

Establish dedicated roles/assignments that:

- Integrate framework across departments
- Advance inclusive design practices
- Lead cross-functional review teams

Develop continuous improvement mechanisms, such as:

- Annual design standard reviews based on performance monitoring
- Pilot project protocols with structured evaluation
- Regional collaboration frameworks for shared learning

See Additional Resources section for example approaches for innovative data systems.

Final Summary: Charting a Path Forward

Metro Vancouver Regional Parks stands at a critical juncture in reimagining its trail and greenway infrastructure for an era of climate uncertainty and evolving community needs. This research reveals that the challenges facing MVRP reflect broader experiences occurring across North American park systems. The convergence of staff experiences, policy analysis, and case study insights points toward a fundamental shift: moving from prescriptive, one-size-fits-all standards to adaptive, principle-based frameworks that embrace site diversity while maintaining core commitments to accessibility, sustainability, and resilience.

Key Findings and Transformative Opportunities

This report identified four interconnected challenges that demand immediate attention:

1) Inflexible design standards that create unnecessary upgrade pressures
2) Accelerating climate impacts that existing infrastructure cannot withstand
3) Intensifying multi-use conflicts on shared trails
4) Critical information gaps that compromise both planning and visitor safety

These challenges present opportunities for MVRP to become a leader in trail design.

An ecological restoration project done by BCIT students at Mosquito Creek, North Vancouver | S. Henderson, 2025

Implementation Pathway: Quick Starts to System Transformation

Recognizing that transformative change requires both immediate action and long-term commitment, this report offers several "**quick start**" initiatives that MVRP staff can implement with minimal lead time and existing resources. These quick starts serve as critical first steps that maintain momentum while larger systemic changes are planned and resourced.

Phase 1: Immediate Quick Start Initiatives

The following actions can begin immediately to build momentum and organizational capacity:

→ **Share report findings across departments** to build awareness and consensus around the need for updated approaches to trail design

→ **Arrange accessibility audits** of 2-3 trail facilities through partnerships with the Rick Hansen Foundation or similar organizations, providing baseline data on current conditions

→ **Explore life-cycle costs** of trail materials using free tools like Pathfinder, addressing staff concerns about material performance uncertainty

→ **Classify existing trails and greenways** as part of management planning, determining appropriate standards for each based on use patterns and environmental context

→ **Pilot an innovative trail feature** that establishes commitment to inclusive and/or sustainable / climate resilient design. Facilitate on-going communication and engagement with community

Phase 2: Build on Quick Starts

As quick start initiatives yield insights, MVRP could establish a **cross-functional working group** to integrate findings and champion broader transformation. This group could develop the "**Accessibility Spectrum**" framework based on audit results, moving from binary accessible / inaccessible classifications toward detailed characteristic inventories. Material performance data from life-cycle assessments could inform procurement decisions and maintenance planning. Trail classification outcomes could guide where flexible standards can be applied immediately versus where significant upgrades are needed.

Phase 3: System Integration

Based on quick start findings and expanded pilot projects, MVRP's Design Standards and Guidelines could incorporate principle-based flexibility while maintaining clear performance criteria. The lessons learned from accessibility audits, material assessments, and trail classifications could directly inform these revisions. Developing comprehensive training programs could support staff understanding of both the technical aspects and underlying

Embracing Uncertainty as Opportunity

Perhaps most importantly, MVRP may have to **embrace acceptance** **by acknowledging that not every trail can or should meet identical standards, that climate impacts will continue to surprise us, and that user needs will evolve in unexpected ways**. The quick starts provide safe spaces to test this acceptance, demonstrating that adaptive capacity matters more than perfect standards.

The path forward requires courage to move beyond conventional approaches, wisdom to learn from both successes and failures, and commitment to creating trail systems that serve communities while protecting ecosystems. By beginning with achievable quick starts while planning comprehensive transformation, MVRP can demonstrate leadership in developing trail systems that thrive amid rapid environmental and social change.

Campbell Valley Regional Park | K. Pike, 2025

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Metro Vancouver Regional Parks. (2022). *Metro Vancouver Regional Parks Plan*. *https://www.crd.ca/media/file/crd-regional-parks-and-trails-strategic-plan-2022-2032-reduced*

Metro Vancouver Regional Parks. (2023). *Accessibility Plan*. https://metrovancouver.org/about-us/Documents/metro-vancouvers-accessibility-plan-2023-2026.pdf

Additional Resources

Accessibility / Inclusivity

- CRD Regional Parks | Accessibility in Regional Parks and Trails
- CRD Regional Parks | A Guide to User-Friendly Trails
  - Examples of how to describe trails in a more inclusive, user-friendly way
- CRD Regional Parks | Everyone's Parks and Trails: A Universal Access Plan for CRD Parks
  - See p. 17 for an example of an 'access audit' and p. 21 for an implementation plan
- HCMA Architecture + Design | Designing for Inclusivity Strategies for Universal Washrooms and Change Rooms in Community and Recreation Facilities
- Parametric Architecture | Anti-Anti Hostile Architecture: Simple ways for inclusive design
- Pennsylvania Environmental Council | Inclusionary Trail Building Toolkit
- Rails to Trails | Equitable Practices in Trail Planning
- Rails to Trails | Equitable and Inclusive Trails
- Resources for an Inclusive Trail Sector
- U.S. Forest Service | Accessibility Resources
- U.S. Forest Service | Forest Service Trail Accessibility Guidelines
  - See p. 15 for flow chart of implementation process

Multi-Use Trails

- City of Toronto | Multi-Use Trails Design Guidelines
- MVRP | Multi-Use Pathways Survey
- Rails to Trails | WEBINAR – Accessible and Inclusive Events and Programming on Multiuse Trails
- Trans Canada Trail | National Guidelines for Classifying Multi-Use Trails in Canada

Climate Resilience and Sustainability

- BCIT | Glenrose Tidal Marsh Project Supplemental Planting
- BCIT | Guichon Creek Restoration Project is Awarded Envision Platinum
- BCIT | Students work to reclaim campus meadow from invasives
- BCIT | Excavated project material used to ecologically restore part of Guichon Creek
- Trans Canada Trail | Trail Development & Life Cycle Costing
- U.S. Department of Transportation | Trails as Resilient Infrastructure

Data, Engagement, and Communication

- Rails to Trails | Leveraging Data to Advance Equitable Planning and Development
- TRCA | Watershed & Ecosystems Reporting Hub
- Trans Canada Trail | Accessibility Information for 12 TCT Sections Now Available in AccessNow App

Trail Standards / Guidelines

- Rouge National Urban Park | Trail Guide and Park Map
  - See for examples of how to communicate accessibility features
- Trans Canada Trail | Trail Best Practices & Guidelines

Examples of what MVRP has already been implementing:

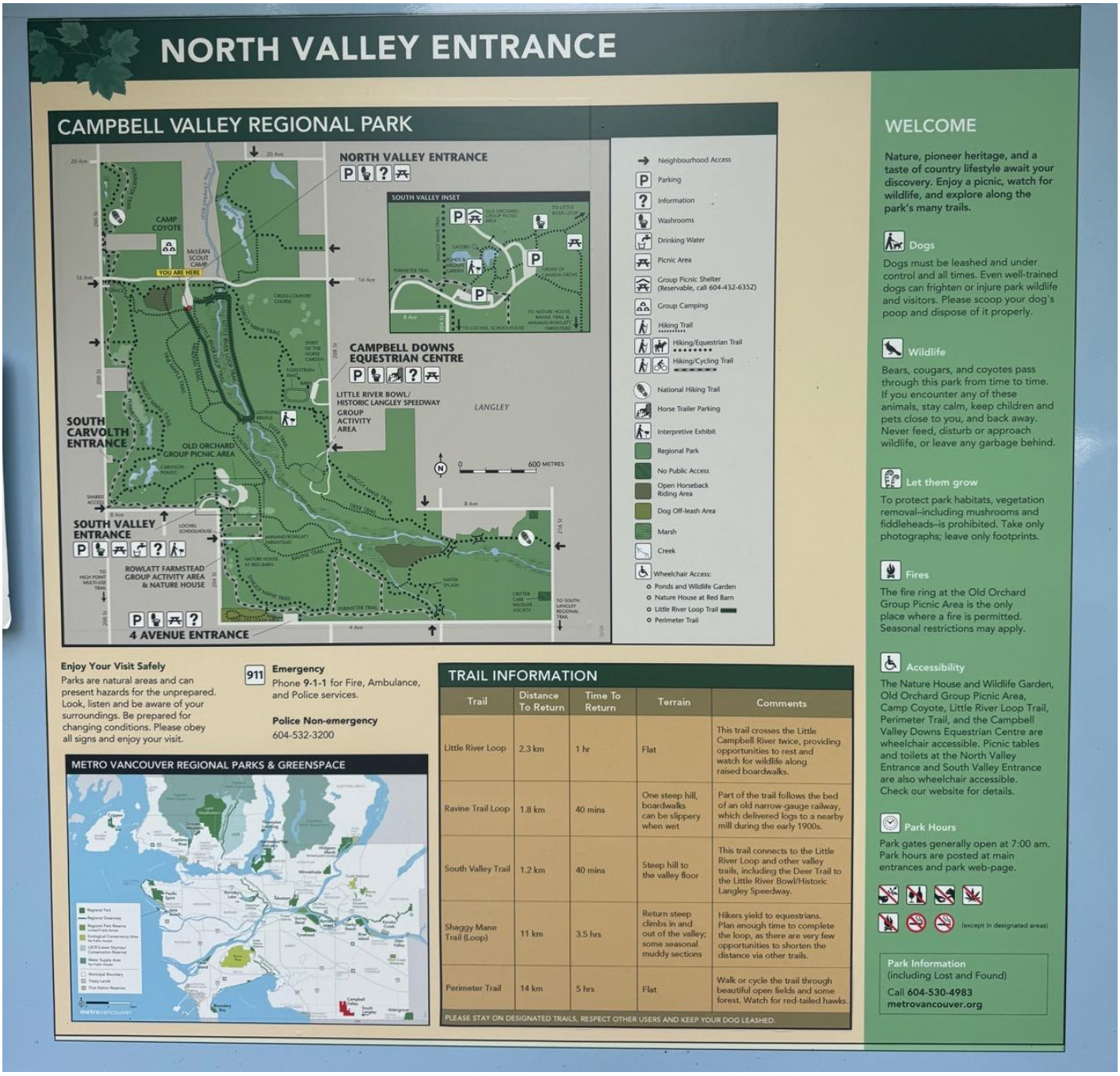
Gender-neutral bathrooms at Lynn Headwaters Regional Park (K. Pike, 2025)

Gender-neutral and handicap accessible bathrooms at Surrey Bend RP (K. Pike, 2025)

‘Non-hostile’ seating at Surrey Bend Regional Park | (K. Pike, 2025)

An engineered shade structure with the option for community/event reservations at Surrey Bend Regional Park | (K. Pike, 2025)

Example trail signage at Campbell Valley Regional Park | (K. Pike, 2025)



Example trail signage (with trail intensity and closure information) at Lynn Headwaters Regional Park | (K. Pike, 2025)

Gravel used in some trail projects that was reportedly becoming loose and creating excess dust. Contractors offered to re- compact it but would needto use a lot of water (also pictured).

Straw wattle with non-biodegradable plastic. MVRP staff mentioned the desire for more sustainable/natural trail materials.

Semi-structured interview questions used to guide expert interviews.

Pre-Interview Setup

- Audio recording permission obtained
- Participant comfortable and settled
- Research context briefly explained

Opening & Context Setting

"Thank you for taking the time to share your expertise with us today. We're conducting research on how Metro Vancouver Regional Parks can update their trail and greenway design standards to better address accessibility, sustainability, and climate resilience. Your insights will help inform recommendations for MVRP's future design approaches."

Warm-up Question

"First, please describe your role and the work that you do."
"What do accessible, resilient, and sustainable trails look like to you?"

Section 1: Stories from the Field

Accessibility Experiences

"What challenges have you seen related to *accessibility* in regional parks?"
"What changes have been made to increase *accessibility*, and do you think those responses have been successful?"

Sustainability Challenges

"Based on your experience, how can regional parks and trails be more *sustainable* in their construction and/or maintenance?"

Climate & Environmental Changes

"How have you seen environmental changes reflected in the parks and trailways?"
"What have you noticed that surprises you or concerns you most?"

Section 2: Reimagining Design Standards

Current Standards Enhancement

"The MV Trail Design Standards currently mainly focus on accessibility in terms of slope, trail width, and limiting obstructions. Based on your experience, are there any additional elements that you would add?"
"Any specific recommendations related to:
- accessibility (equitable access for all visitors)
-climate resilience (extreme/changing weather)
-sustainability (efficient use of materials and resources)"

Universal Design Vision

"Another important aspect of MVRP's trail design standards is the principle of 'Universal Design' (or designing spaces to be usable by all people, to the greatest extent possible, without the need for adaptation)."
"In your experience, what are the biggest challenges in implementing UD in regional parks?"
"How might UD be improved in regional parks?"

Section 3: Innovation & Knowledge Systems

Cross-Sector Learning
"What innovations or approaches from other fields, regions, or traditional practices spark your curiosity for possible application in our trail systems?"

Indigenous Knowledge Integration
“In your experience, what have collaborations and partnerships with Indigenous communities looked like?”
“Are there ways that Indigenous Knowledge can be more meaningfully incorporated into the updated design standards?”
Related to accessibility, climate resilience, and/or sustainability?

Section 4: Systems and Seeds of Change

Enabling Conditions
"What would need to be true - in terms of policies, resources, relationships, or mindsets - for implementing advanced climate resilience, sustainability, and accessibility measures?"

Future Vision
"What would success look like if MVRP became a global model for equitable, climate-resilient trail systems?”

Catalytic Action
"If you could plant one seed of change today that could grow into transformational improvements for our trail systems over the next decade, what would that seed be?"

Closing

Open Reflection
"What question could we have asked you that we didn't think to ask? What's the most important thing we haven't talked about yet?"

Follow-up
"Is there anything else you'd like to add? Are there other people you think we could speak with who might have valuable perspectives on these issues?"

Gratitude & Next Steps
"Thank you so much for sharing your insights. I'll be analyzing all the interviews and will be happy to share a summary of our findings.”

Estimated Total Time: 45-60 minutes