PORTLAND OFF-ROAD CYCLING MASTER PLAN

Project Advisory Committee Meeting #5

Meeting Summary

MEETING DATE: THURSDAY, MAY 26, 2016
LOCATION: BUREAU OF PLANNING AND SUSTAINABILITY, 1900 SW 4TH AVENUE, PORTLAND
TIME: 4:00 PM – 6:30 PM

In Attendance

CAC Members Present
Punneh Abdolhossieni
Matthew Erdman
Mike Houck
Adnan Kadir
Kelly McBride
Renee Meyers
Evan Smith
Michael Whitesel

CAC Members Absent
Kelsey Cardwell
Erin Chipps
Jocelyn Gaudi
Carrie Leonard
Torrey Lindbo
Jim Owens
Nastassja Pace
Bob Salinger

Agency Representatives and Resource Members
Astrid Dragoy, *Portland Parks & Recreation*
Shannah Anderson, *Bureau of Environmental Services*
Lucy Cohen, *Portland Parks & Recreation*
Robert Spurlock, *Metro*
Michelle Barker, *International Mountain Bike Association*
Maya Agarwal, *Portland Parks & Recreation*
Abra McNair, *Portland Bureau of Transportation*
Jennifer Devlin, *Bureau of Environmental Services*

Staff and Consultants
Michelle Kunec-North*, *Project Manager, BPS*
Tom Armstrong, *Interim Project Manager, BPS*
Lori Grant, *Associate Planner, BPS*
Kristen Lohse, *Consultant Project Manager, Toole Design Group*
Rob Burchfield, *Tool Design Group*
Nat Lopes, *Technical Consultant, Hilride*
Tim Brooks, *Winterbrook Planning*
Adrienne DeDona, *Facilitator, JLA Public Involvement*
Jamie Harvie, *JLA Public Involvement*

Audience / Members of the Public
Andy Jansky
Bob Lessard
B. McGillacuddy
John Miller
Catherine Thompson

*Attended by phone

Overview

The committee:

- Received an overview of system-level planning, design and management best practices and environmental inventories.
- Reviewed the environmental portions of the Impacts and Benefits report and Best Practices research.
- Worked in small groups to identify additional impacts or best practices that should be considered; whether any criteria should preclude a site from consideration; and how best practices could balance recreational and environmental needs.

Welcome, Agenda Review & General Announcements

Adrienne DeDona, JLA Public Involvement, welcomed everyone to the meeting and reviewed the agenda. She explained the meeting would focus on the Impacts Assessment and Best Practices research, with a primary focus on environmental impacts. Staff, committee members and agency representatives introduced themselves.

- A committee member asked the protocol for providing comments on the documents in the meeting packet. Adrienne replied that comments could either be shared during the small group discussion, during the time for clarifying questions, or be sent directly to the project team.

Overview of System Level Planning

Kristen Lohse, Toole Design Group, provided an overview of system-level planning and how best practices shape the approach. She said that the Off-Road Cycling Master Plan is intended to take a comprehensive approach to system-level planning, supported by a broad range of research. She noted that drafts of the Impacts and Benefits Assessment and Best Practices reports were included in the meeting packets. She said the Impacts and Benefits Assessment was divided into three categories: Environment, Human Health and Safety, and Economics. She said the conversation tonight would focus on the environmental section in order to allow time for in-depth discussion of this important topic. She said the Best Practices report focuses on planning, design and management of off-road cycling resources. She said the best practices would also inform the Site Suitability Criteria, which would help vet potential sites based on well-informed criteria that meet the project goals. She said that the impacts assessment and best practices research may not be all the information available, but the team has done their best to be comprehensive and to identify what they know and what they don't know.

Kristen explained that candidate sites would be reviewed using the Site Suitability Criteria and that this process would be the topic of the next meeting. She said candidate sites would be considered against three broad categories: Ownership and Regulatory Framework, Physical Framework, and System Planning. She noted that some of aspects of the categories were straightforward while some included many complicated factors; the shades of gray were where the Best Management Practices will be most helpful and also where the project team would like input. Kristen explained that the screening process would start very broad and then begin to whittle sites down. It would include a fatal flaw analysis, then a high-medium-low suitability analysis, and finally a benefits-tradeoffs discussion, in which committee members would play an important role.

Kristen provided the example of Metro's North Tualatin Mountains off-road cycling planning process, which followed a similar process to the current project. She said that process began with four potential sites and then used the same

three categories (ownership, physical characteristics and system needs) to screen sites and arrive at one proposed site. She noted that, though a site has been identified, Metro is not finished with the planning process.

Kristen said the process of developing the Off-Road Cycling Master Plan would be iterative. The team would initially use modelling and then continue to refine based on the process she had described. She said transparency was important and the team would "show their work" about how certain sites are identified.

- A committee member said that the current land base of city-owned properties would not support the type of system that the mountain biking community would like to see. He said that over the past 20 years, environmental advocates had created bond measures to fund the purchase of properties for habitat and wetland protection. He said that an outcome of the Off-Road Cycling Master Plan process should be identifying the needs and desires for parks, trails and natural areas and how to fund them.
    - *This committee member later clarified his remarks, saying that a larger land base would be needed to create a truly satisfactory off-road cycling system. He said that the next time the city or environmental advocates go after a bond measure, off-road cycling advocates should join forces with them to get additional land and operations and maintenance funds. He said the goal should be to work together to increase the resources available for an integrated parks system.*
- Another committee member said the "type of system" had not yet been defined. Kristen Lohse, Toole Design Group, added that facilities may include a mix of trails and other facilities such as bike parks and pump tracks.
- A committee member asked whether the process could expand their analysis to non-city-owned properties that may be able to be developed. Kristen replied that the purview of the project was limited to city-owned land; however, the project team would not ignore opportunities on other properties that may be uncovered during the process.

Robert Spurlock, Metro, provided a clarification regarding a point in his presentation from meeting 2. He told the committee in meeting 2 that "Metro had promised that there would be mountain biking in the North Tualatin mountains," whereas the resolution actually stated that "Mountain biking would be considered in the North Tualatin Mountains."

Impact Assessment & Best Practices: Focus on the Environment

Overview of Ecological Resources

Lori Grant, BPS Associate Planner, presented an overview of ecological conditions in Portland (presentation attached). She said Portland had been inventorying and mapping natural resource features in the City for about 30 years. She said that state planning laws required an inventory of environmental features and programs to protect them. There are a variety of regulations and management plans currently in place to do so. She said the inventory maps and regulatory documents would help guide the project team and committee as they considered site locations and suitability for off-road cycling. She provided an overview of the natural resources inventory, including examples of inventory maps. She explained that this inventory and computer modeling was also used to rank the value of the functions of identified natural features, and environmental regulations are typically applied accordingly. She noted some inventories and subsequent protection methods had not been recently updated, but that a lot of data about environmental resources existed that could inform the site suitability considerations and later, site-specific planning.

Ecological Impacts and Best Practices

Nat Lopes, Hilride Progression Development Group, and Tim Brooks, Winterbrook Planning, presented their research and findings on ecological impacts of off-road cycling and best practices to avoid and mitigate for impacts (presentation attached).

Tim provided an overview of the scientific research related to the ecological impacts of off-road cycling facilities. He explained the limitations and gaps of the research, which is primarily focused on cross-country trails. He said the report would inform development of Best Management Practices (BMPs) for Portland and explained what BMPs are, how they would be used and how they relate to an adaptive management approach. He said the report had been provided to the committee for review.

Tim and Nat presented the ecological impacts and corresponding best management research. The majority of ecological research has focused on impacts to soil, vegetation, wildlife and waterways. Tim described the potential impacts on each feature based on case studies in the literature, and Nat presented best practices for facility siting, trail design, construction and management to avoid, minimize or mitigate impacts to each feature. It was noted that many more examples were provided in the full report.

Small Group Discussion

Committee members were divided into three groups for discussion. Agency representatives were also included in the group discussions. Groups were facilitated by members of the project team and asked to discuss the following questions:

- Are there other impacts or best practices that should be considered that are not addressed?
- Thinking about the overarching mitigation hierarchy (avoid, minimize, then mitigate ecological impacts), are there potential negative impacts that you believe would preclude consideration of a site for off-road cycling? Why?
- How might we use the best practices to balance the need to preserve natural resources while at the same time providing for increased recreational opportunities?

Adrienne explained the goal of the exercise was to hear and collect ideas from committee members. She said it was not expected that groups come to consensus on the feedback or address all issues in this meeting. She noted that any questions or concerns raised during the discussion could be addressed during the report out or during the following meeting.

Report Out and Larger Group Discussion

Group 1 report out (Nat Lopes, Hilride)

- Impacts and best practices that should be considered:
    - Impacts of dog walkers and dog usage of the parks.
    - Are there City standards regarding trail density within parks? Would trail density recommendations be part of the plan?
    - Indirect environmental impacts, such as the carbon footprint of driving to trailhead.
        - Nat noted that this is sometimes considered during NEPA processes.

        - An agency representative said there had been studies regarding urban cycling and correlations with public health / carbon emissions, but was unsure whether this would be relevant to off-road cycling.
    - Best practices for reducing invasive species distribution, such as bike washes.
    - Need to consider existing regulations during vetting of potential sites.
    - Prioritize low-hanging fruit, such as surplus properties and inventories.
    - Consider the benefits of replacing nuisance uses with sanctioned uses.
    - Is there an inventory of current trails and whether they meet trail building standards?

Group 2 report out (Tim Brooks, Winterbrook)

- Impacts and best practices that should be considered:
    - Core habitat is a fundamental consideration, which should be strongly recognized in the best practices.
        - The City's natural resource inventory maps core habitat, so this should be included in the reports.
    - Narrower trail widths may not be appropriate for users who need more width, which could lead to those users going off-trail and result in more impacts.
    - Education and signage; Powell Butte could use more signage indicated where mountain bikers should be.
    - How are rules going to be enforced? People are still riding at Riverview.
    - Include more case studies on pocket parks and smaller parcels; several examples were given.
        - A committee member noted that Pleasanton Ridge Regional Park, East Bay, CA was included in the report; however, the scale of the land mass was much larger than what is available in Portland. Need to consider differences in scale.
    - Consider invasive species impacts.
        - Consider bike wash stations.
        - Open access trails could cause problems.
- Reasons to preclude sites from consideration:
    - There are key habitats that we want to protect, such as wetlands. Also, some areas are not appropriate for any human use or access. These should be called out specifically.
- Answer to question 3: Apply best practices.

Group 3 report out (Kristen Lohse, Toole)

- Impacts and best practices that should be considered:
    - Trail density/carrying capacity
    - Studies about wildlife in urban settings
- How best practices may help:
    - Displacement of nuisance activity, including homeless camps.
    - How to consider the potential for environmentally degraded sites. For example, they might be appropriate for development because they don't currently have environmental value or alternatively it might be better to consider their potential environmental value if they were restored.
    - Consider "leftover landscapes" as possibilities for trails, such as dead-end roads that aren't maintained or edges of parks.
- Need to consider off-road cycling opportunities that aren't just single-track on a mountain to other opportunities, such as placing gravel next to Springwater Trail.

- It was noted that making use of smaller sites was also brought up in Group 2.
- An agency representative gave the example of decommissioning streets to use them as trails.
- A committee member said discussions should be based on the experience being sought – defining a site by size (medium, small) is not necessarily appropriate.
- Nat Lopes agreed, that their recommendations refer to sites as natural areas, open spaces, developed parks, linear park spaces, right of ways, etc.

Adrienne asked the group to identify any common themes from the small group discussion. One theme identified was the best practices research should consider trail densities and sizes of core habitats.

Nat Lopes made a comment about trail width and density in relation to the Pleasanton Ridge Regional Park. He said Pleasanton Ridge had similar characteristics to a lot of the properties in the Portland region, including wide fire trails. He said they were able to increase trail density while reducing the square mileage of the overall, existing trail system. A committee member asked whether the ideal trail width would depend on intended use. Nat agreed but noted that all research shows that narrower trail width have fewer environmental impacts.

Community Engagement Update

Adrienne explained that the project team is working on developing a multicultural outreach approach based on feedback from the committee at the previous meeting. She said they are collaborating with the Community Cycling Center.

Lori said that current outreach activities are focused on input to the Needs Assessment, but that the project would continue to do community engagement throughout the summer, including getting input on potential sites when we reached that point in the process. She noted that the questionnaire responses are being sorted to separate self-selecting respondents from those approached at events. It was noted that the differences in responses may provide some insight into different community desires.

- A committee member said it could be valuable to also separate questionnaire responses by event.
- A committee member asked how many people had replied to the survey. Lori replied they had received 230 responses so far.

Public Comment

Catherine Thompson commented on the Survey of Design, Planning and Management Best Practices for Off-Road Cycling Facilities document, Appendix A. She said that she felt that pedestrians who use Forest Park were not being talked to. She said she was concerned that summaries of Portland documents were not representative of actual results. She specifically called out the summary for the Forest Park 2012 Recreation Survey, saying she felt that it misrepresented the respondent population, the age of park users, the number of people entering the park on foot, and the number of people that supported additional bike trails by not including enough detail from the original report. She also spoke about the Forest Park Resources Management Plan, saying that the summary did not include trail requirements. She suggested that the summaries be reviewed for accuracy and that links to the full studies should be provided for those that want more information. She provided in writing references to sections of the survey that should be incorporated into Appendix A. She said that the committee and documents had not included a discussion about the laws governing Forest Park and she felt this was an oversight.

Robert Lessard submitted a written comment:
1 – With respect to both biodiversity and “ecological function” indices, there needs to be more quantification of the relative contributions of trail development versus urban development, to the loss of biodiversity or “ecological

function," that is, how much was lost from 1900 to present from urban development and what additional fraction will be lost to trail development?
2 – In any discussion about environmental impacts, there needs to be an analysis of wildlife population trends, what are the abundance trends of wildlife populations? Are they declining, what caused declines. Surely trail development can't be the cause.
3 – In the Taylor & Knight 2003 study, the study found no difference between hikers and bikers in the response of the three species studied. The authors note that as bikers travel faster and may cover more ground in a given period of time, then bikers may disturb more wildlife per unit time. The authors make this speculation but did not study it; therefore, it should not be treated as a finding.

Next Steps

Adrienne said the next meeting would be June 23 from 4:00 – 6:00 p.m. The focus would be Site Suitability Screening Process, following up on questions and comments from today's meeting, and providing an update on the community outreach process.

Adrienne thanked everyone for coming and adjourned the meeting.

City of Portland
Natural Resources

PORTLAND OFF-ROAD CYCLING MASTER PLAN

Project Advisory Committee

May 26, 2016

Today's Presentation

1. Description of Portland Natural Resources

2. Examples of mapping resources city-wide

3. Examples of mapping resources in Johnson Creek Watershed

Portland has been inventorying and mapping natural resources for over 30 years. The Natural Resources Inventory is required under the state's planning law, and it has been developed and updated subarea by subarea since the 1980's. The state planning law also requires programs to protect significant resources. In Portland, some are subject to regulations that limit or set criteria for development, while other areas, especially publically owned lands, are subject to Council-adopted management plans.

Today we'll take a very broad look at the ecological conditions in the City, and show some of the ways we map natural resources. We will focus on data at a large scale that is primarily used for planning across a large geography – this will inform our system planning, helping screen for potentially suitable sites for off-road facilities. There is additional data that we won't look at today that is useful and necessary when planning for a single site.

Some of Portland's primary ecological features are:

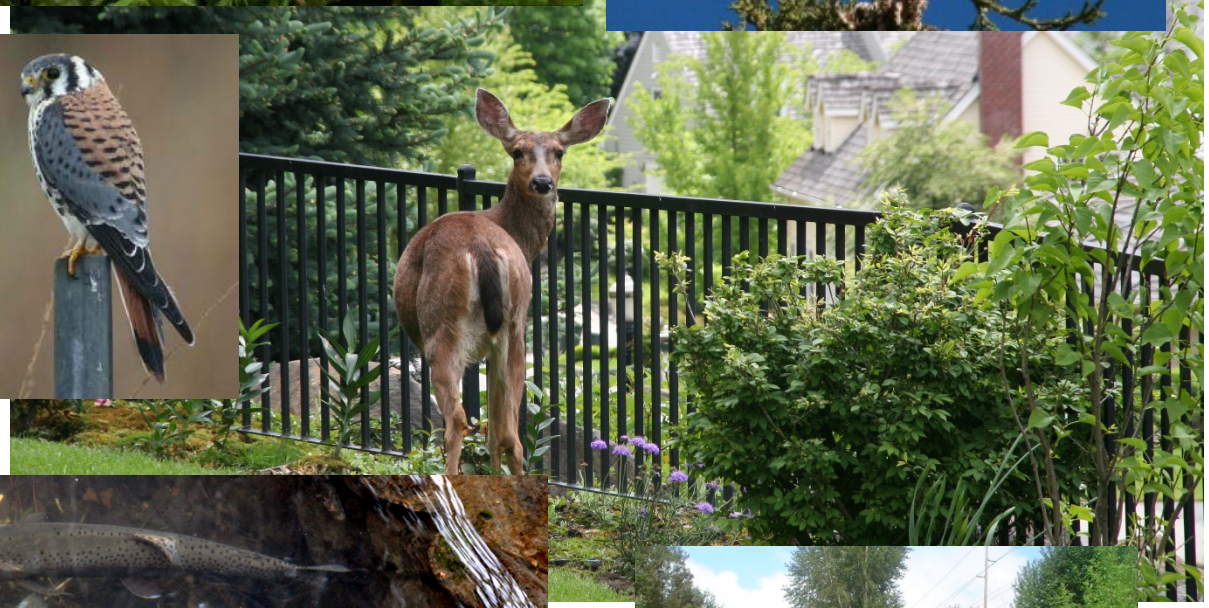
- Forests
- Meadows and grasslands - near the Portland Airport
- Streams and rivers - the Columbia Slough
- And wetlands like Smith and Bybee Wetland

As for wildlife that use these resources:
Yes, deer that you see in your back yard, but also more reclusive and sensitive species like:

- Pacific tree frogs that need both forests and ponds
- Western Meadow lark that nest on the ground
- American Kestrel that hunt in grasslands
- And, of course, salmon – we have 17 threatened endangered fish species in Portland



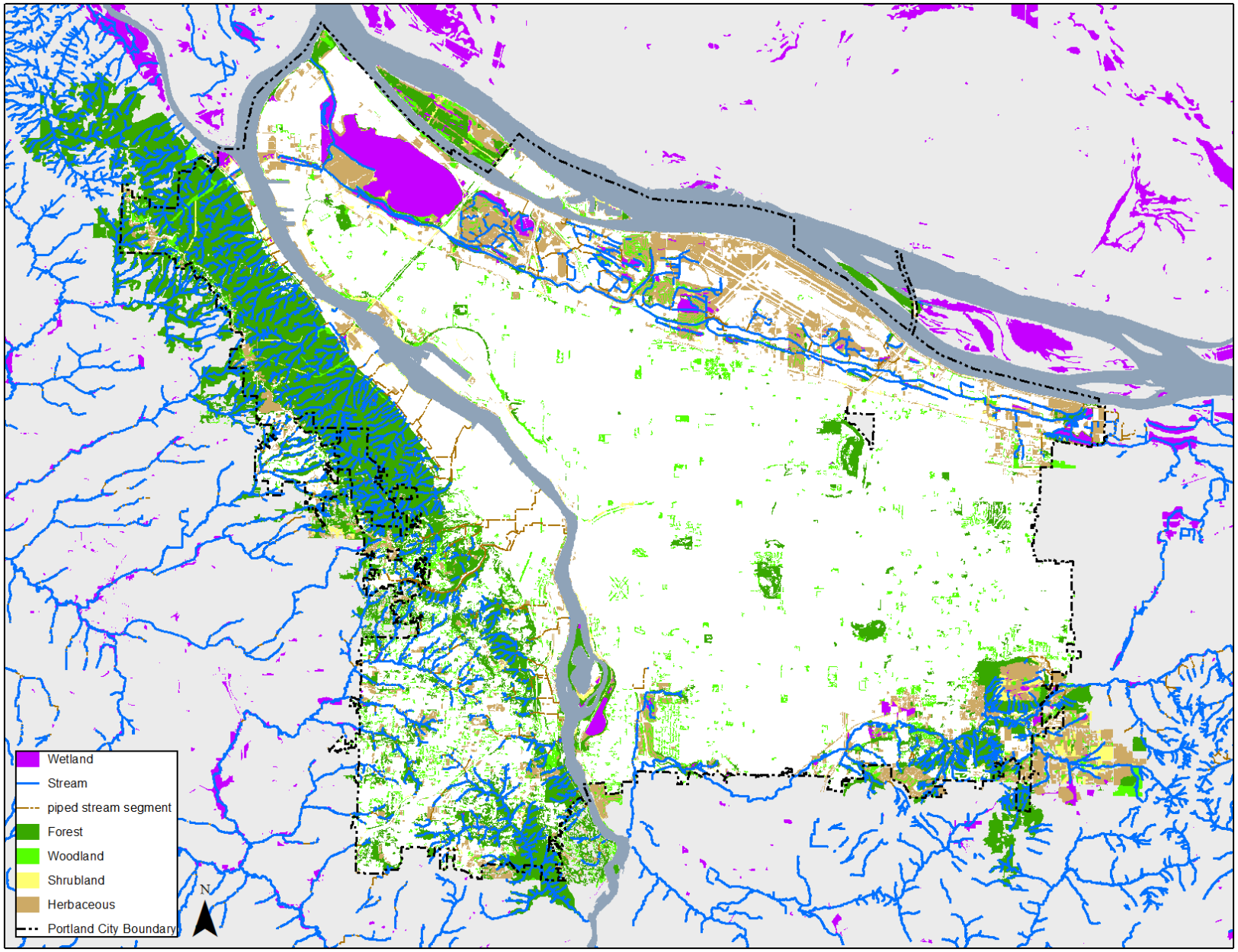



This map shows some of the primary natural resource features in Portland: rivers, streams, wetlands, forests, woodland, shrubland and grassland (herbaceous)

You'll notice some things right away:

- There are big areas of streams and vegetation where you expect them – Forest Park, Powel Butte
- There are smaller areas of natural resources that may surprise you. In a city places like golf courses, airports, cemeteries, school yards are all part of the landscape that wildlife depend on to navigate the urban area

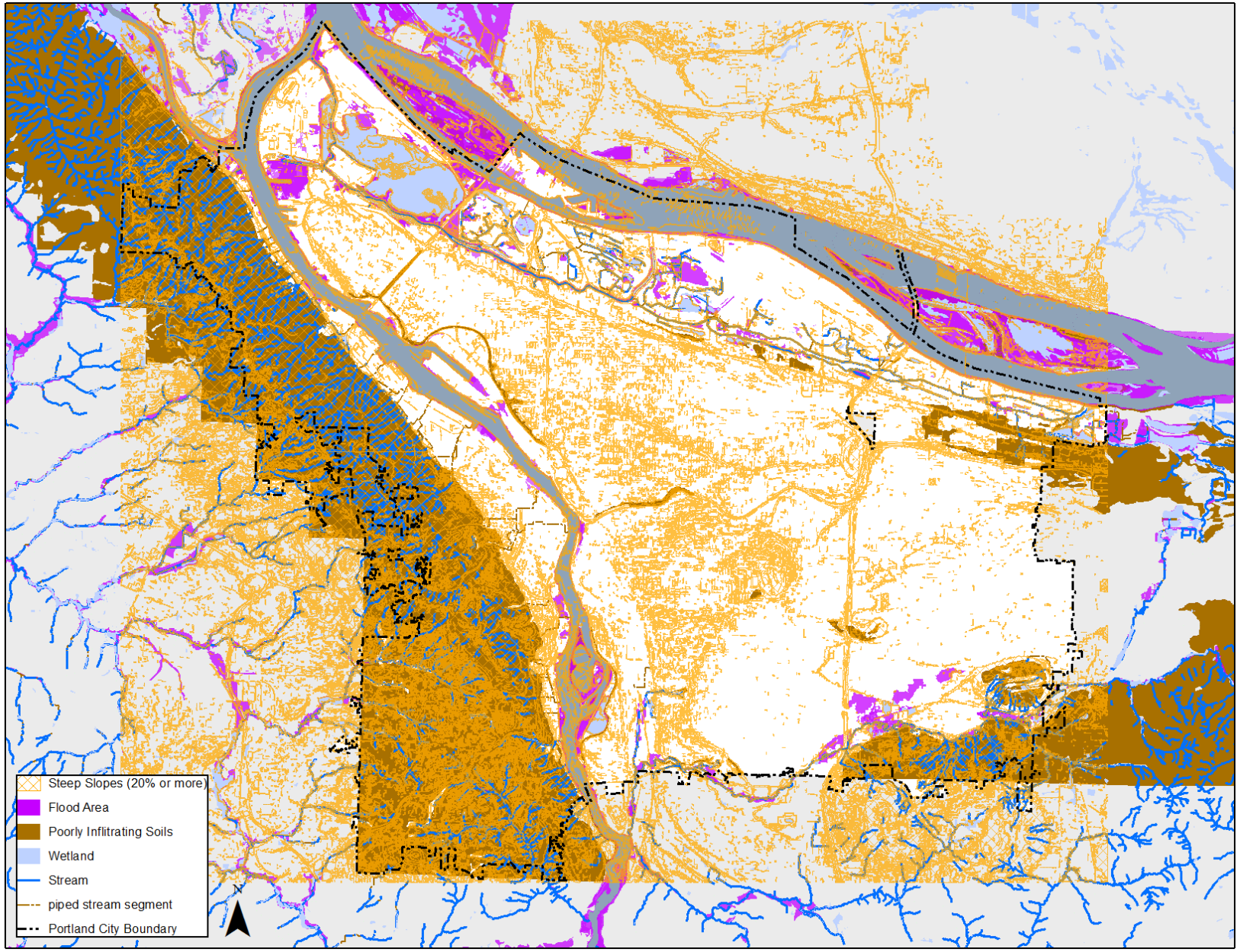


Part of mapping natural resources is based on the risk to property or people such as landslide hazards and flooding.

This map shows:

- Flood area – which is the 100-year floodplain plus the lands that were flooded in 1996
- Steep slopes – thanks to new technology we are able to very accurately map the earth's topography. These areas are all 20% slope or steeper
- Poorly infiltrating soils – these soils don't let water seep in very well. That poses a landslide risk on steep slopes and is a problem for localized flooding and stormwater management in flatter areas

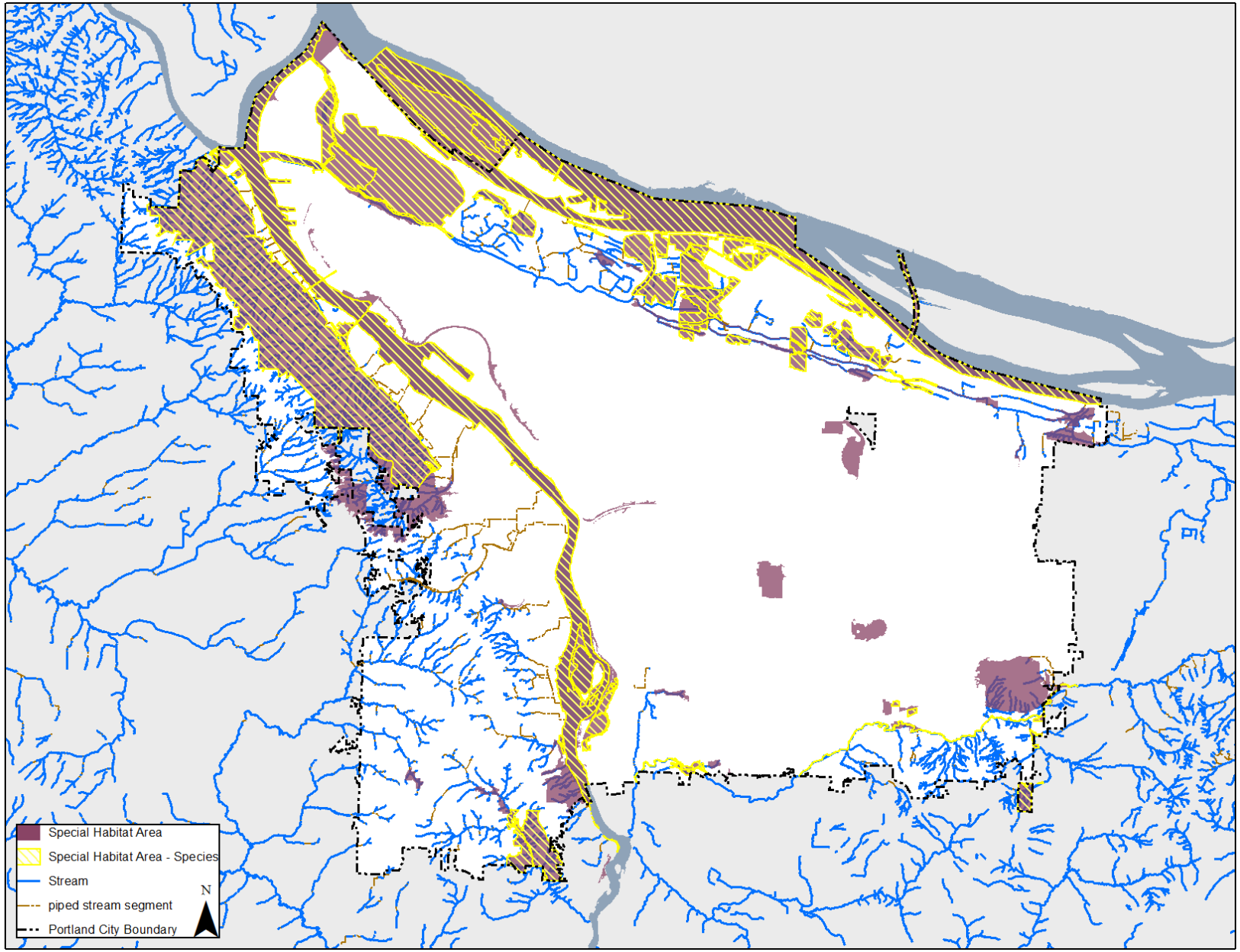
The last is an especially important factor for siting trails – poorly infiltrating soils may be more likely to slide in steep areas of have standing water in flatter areas



Another piece of information that we map is related to Special Habitat Areas. These locations have a unique habitat type or support species (plant or wildlife) that is particular sensitive.

The maroon areas are Special Habitat Area because they meet one of 12 criteria, adopted by the Council, such as native oak habitat or corridor between habitat patches or stopover habitat for migratory birds.

The yellow areas are Special Habitat Area because an at risk wildlife species uses the area to complete their life cycles. That means a species that is in decline uses the space for something like nesting and rearing young or to overwinter. Examples – American Kestrel is dependent on oak habitat, and Western Meadowlark relies on upland prairie

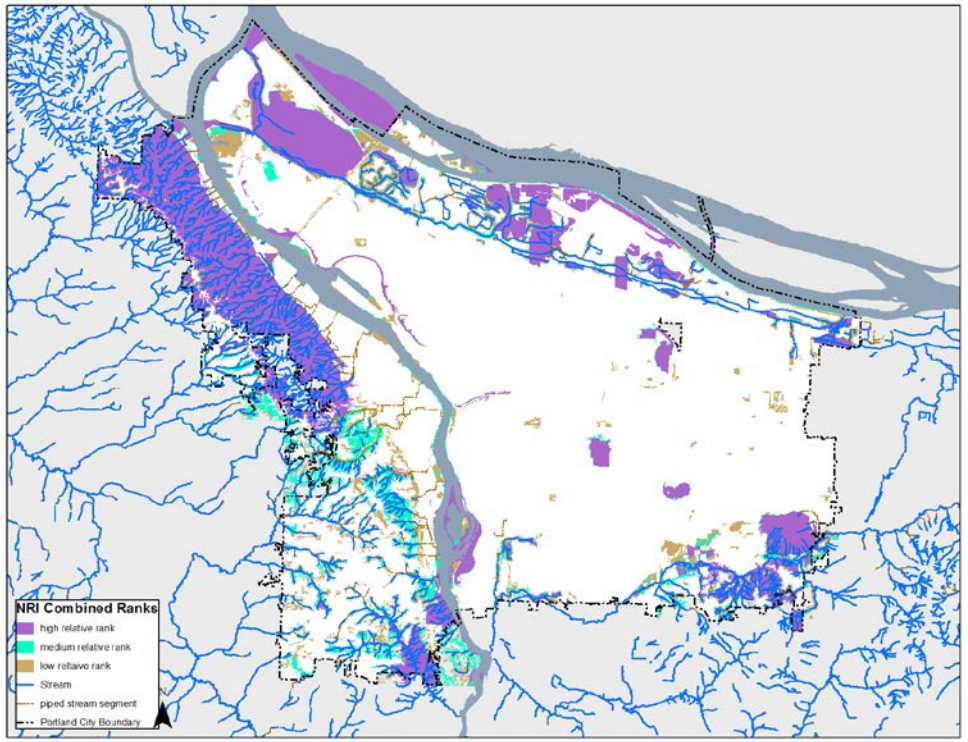


Using the mapped features we just saw, the City uses computer models to rank natural resources by the value of their functions.

The rankings give a quick snap shot of the types of functions the resources are providing. Functions are things like:

- Food web – providing food options for wildlife
- Attenuating water – slowing down rain water from just running quickly off the land
- Flood control – areas where flood water can go safely during big storm events
- Size of habitat – big habitat areas provide more space for wildlife

In total the computer models look at 11 functions that could be provided by the features. The result is this map.



High ranked resources, shown in purple, are areas providing either many of the functions or a Special Habitat Area.

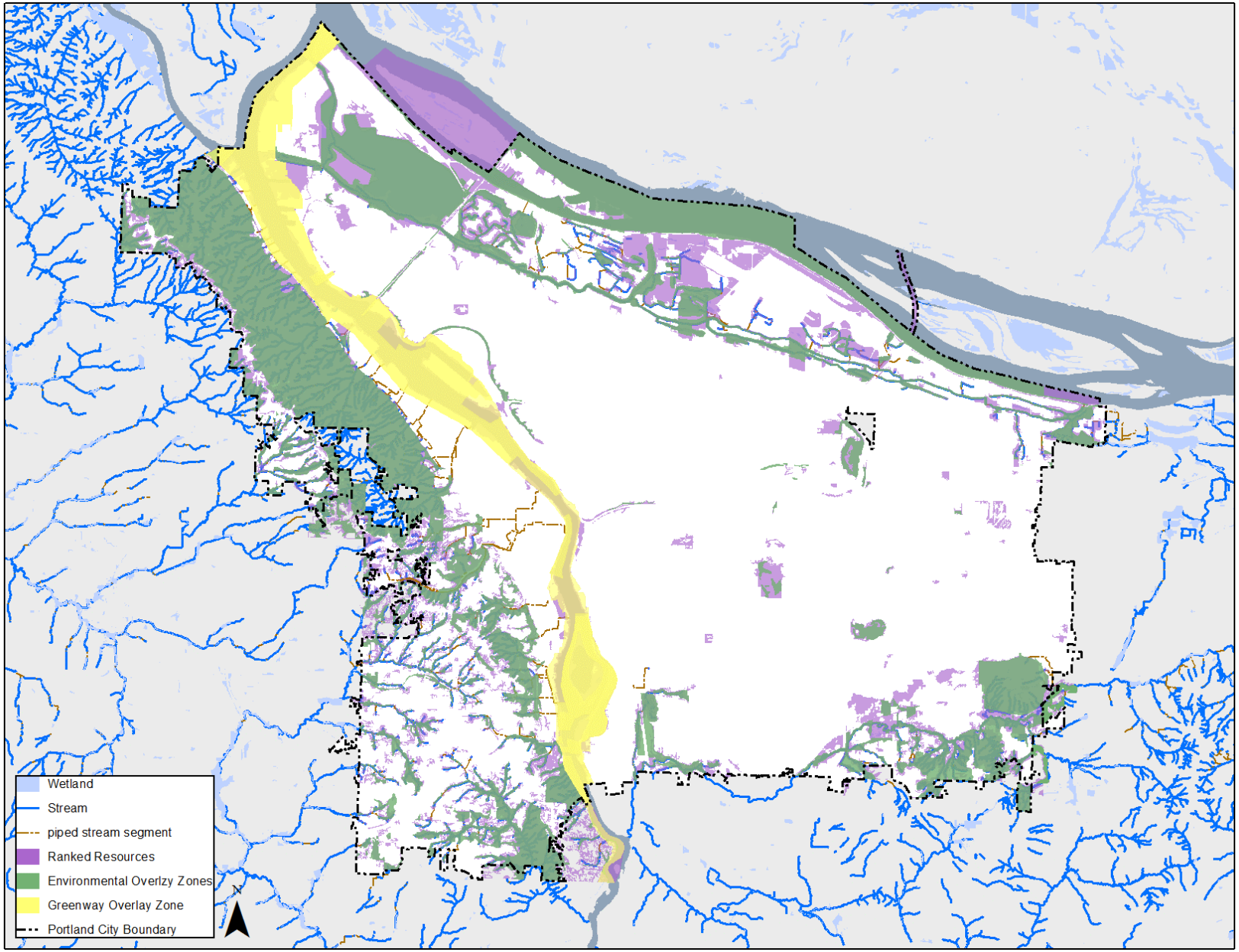
Medium ranked recourses are providing many, but not as many, of the functions has high ranked resources. Medium ranked resources may have more impacts from development or human use, but are still functioning pretty well.

Low ranked resources are providing one or two functions. They aren't to be discounted completely because even low ranked resources are important in an urban area. But they are compromised resources. An example of a low ranked resources is a developed floodplain. Most of the time the area is not providing natural resource functions because it is a building and parking lot, but during a flood it does provide some capacity for the waters (and fish in the water).

This map shows all of the ranked resources (combined in purple) and the environmental overlay zones.

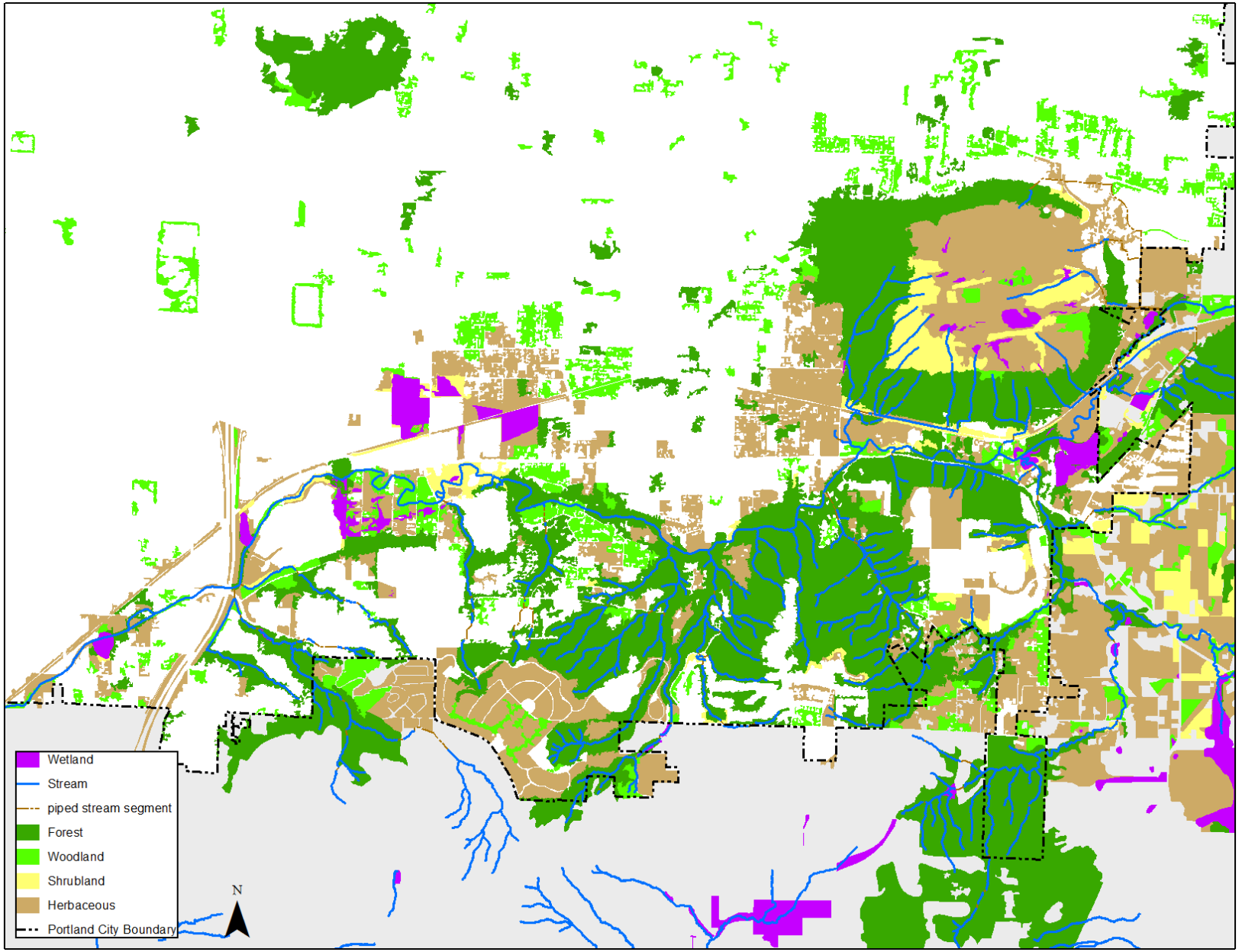
The City applies special regulations governing development in some resource areas. The yellow area is the Greenway Overlay zone, predominantly requiring development setbacks from the Willamette River. The green area includes a couple of different environmental overlay zones that provide different levels of protection.

The overlays zones do not prohibit development – they allow development consistent with the underlying zone, for example, single family residential, but apply special review criteria and restrictions.



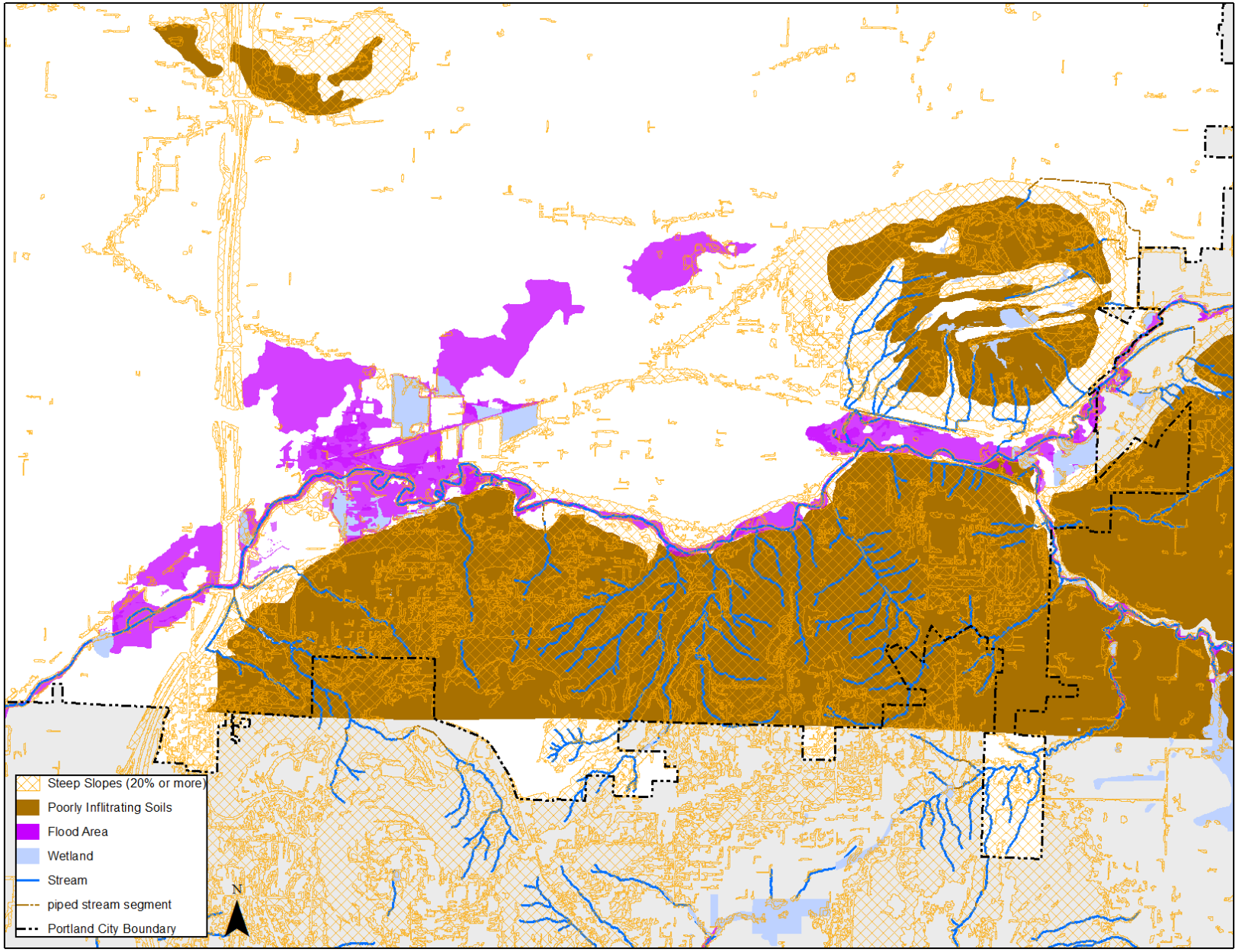
Now we'll look at the same set of maps, but zoomed into eastern Johnson Creek/Powell Butte.

This is the natural resources features map – streams, wetlands, forests, etc.



These are some of the hazards.

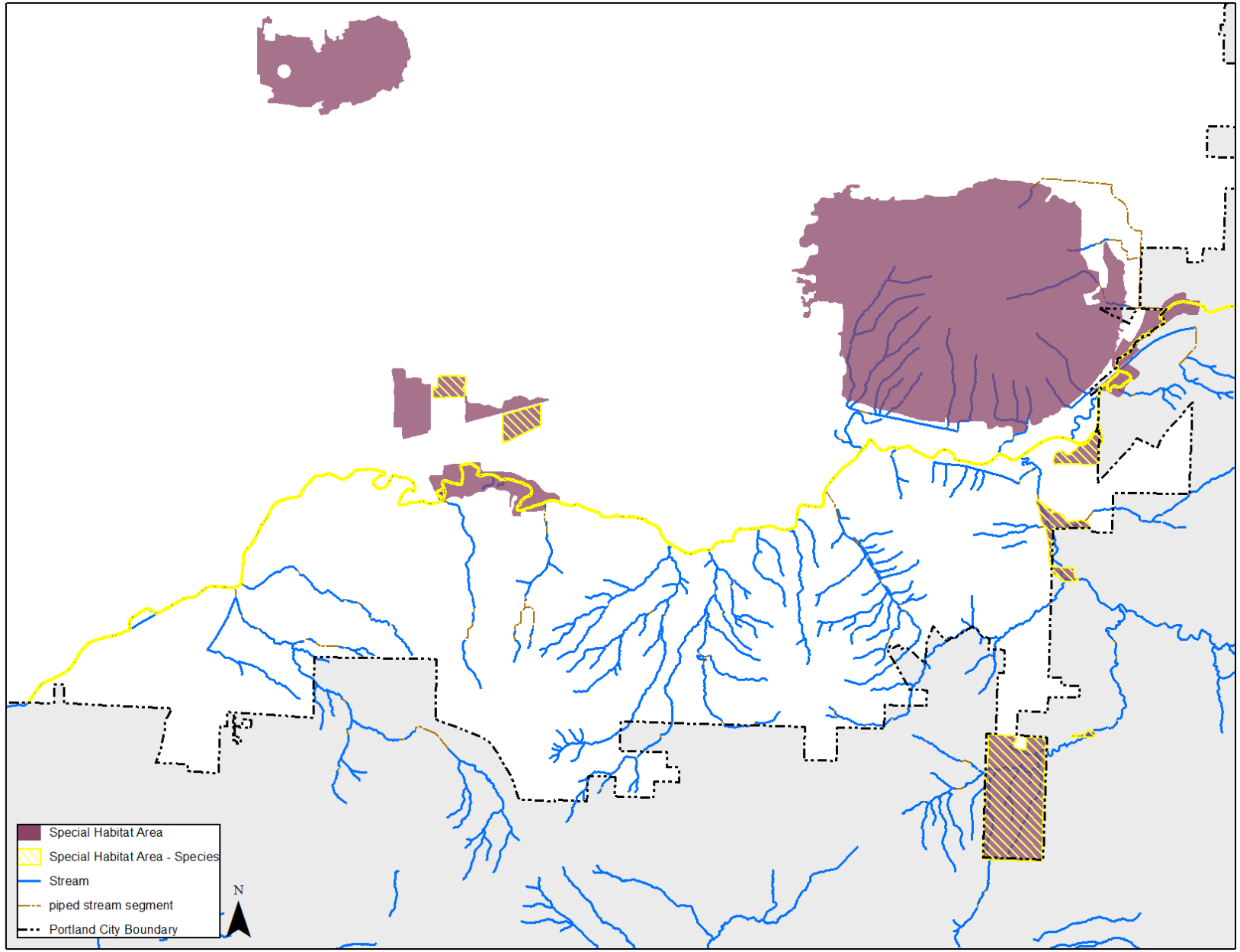
- Flood area
- Steep slopes
- Poorly infiltrating soils



These are the Special Habitat Areas.

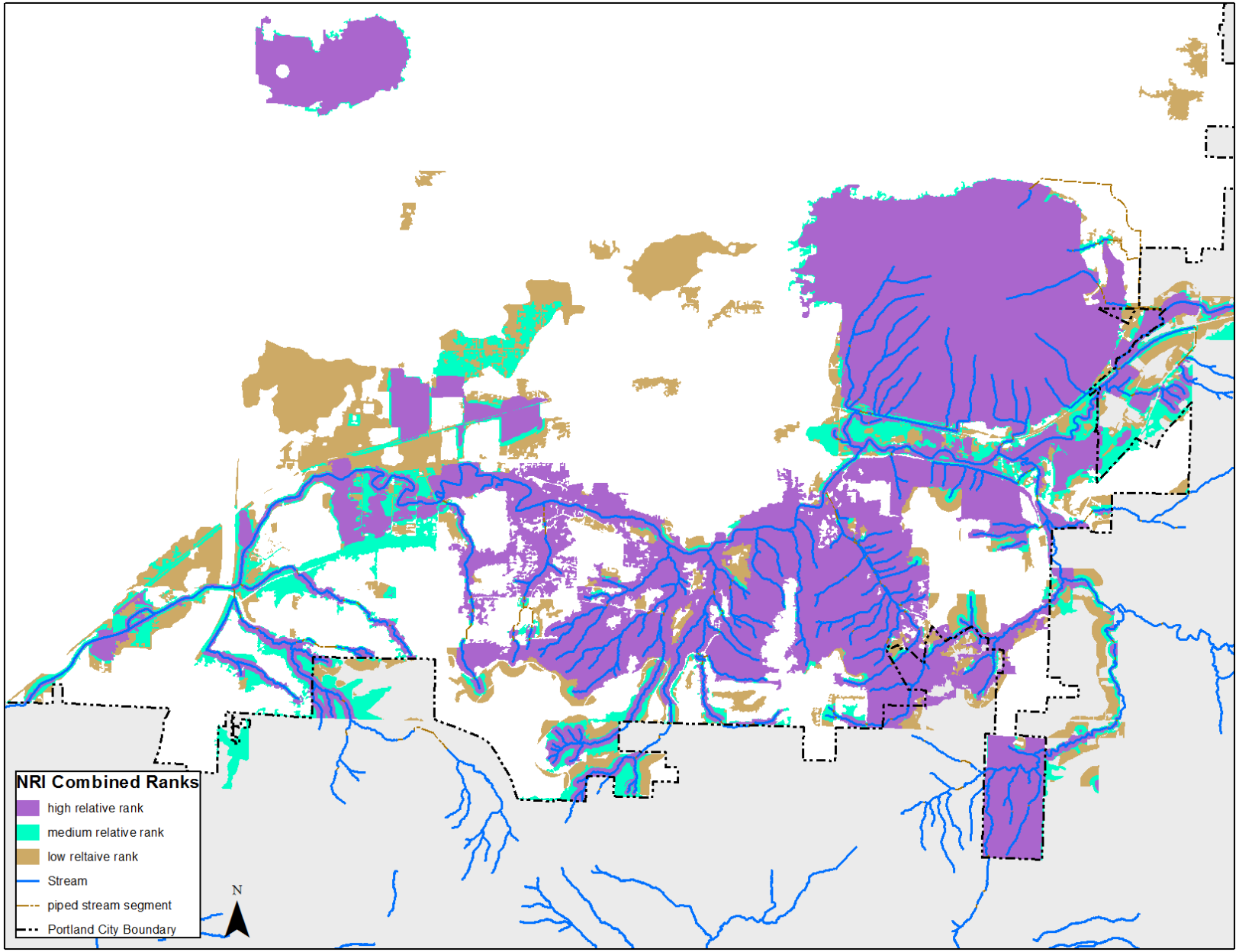
Powell Butte meets many criteria including: upland grassland habitat, migratory stopover habitat and wildlife connectivity corridor.

Johnson Creek is used by the threatened and endangered fish species. Please note that this geography of Portland has not been updated to reflect the tributary streams that also support threatened and endangered fish species.



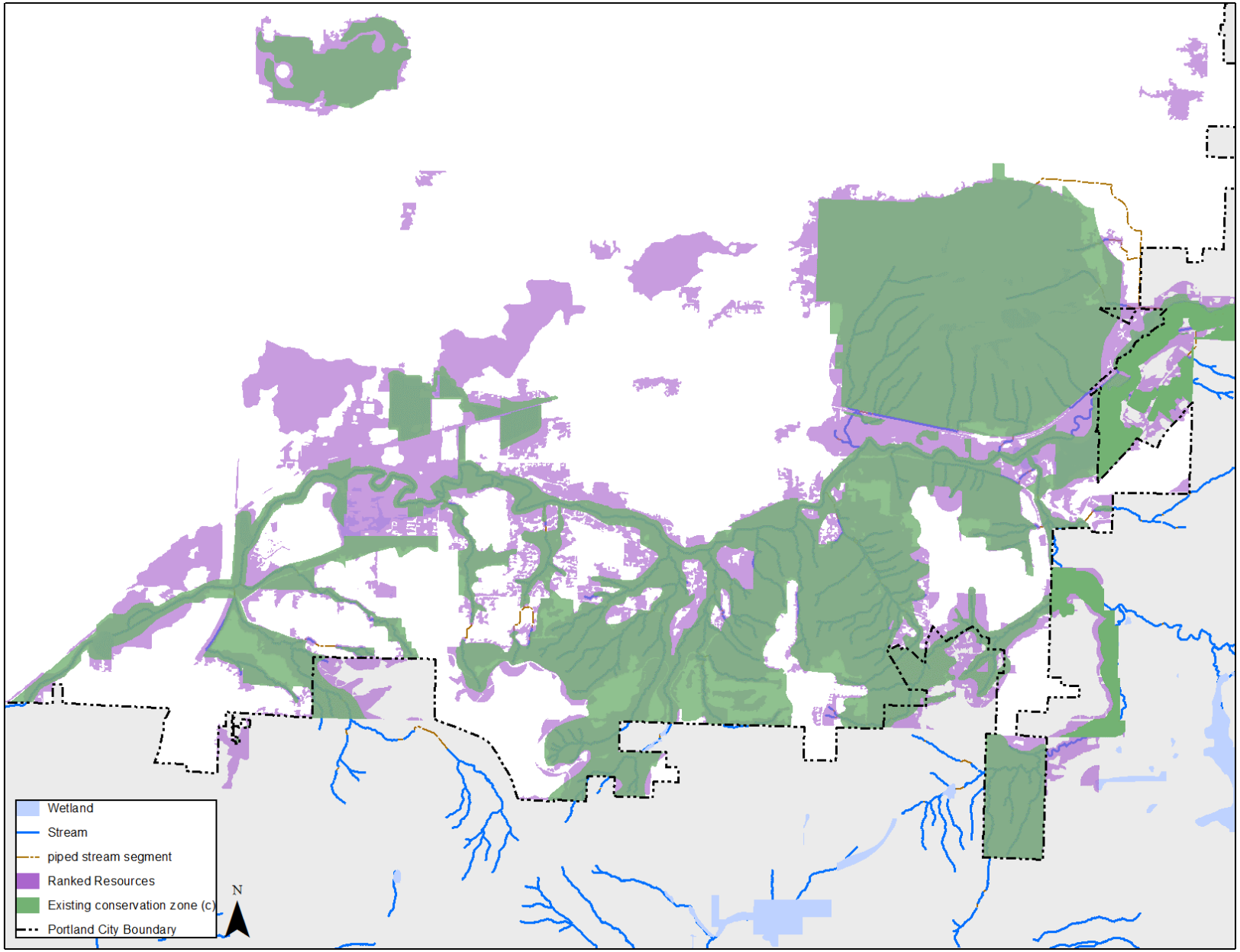
Again, all the features are combined and evaluated using computer models to determine how much function they provide. Note that even though the tributaries are not mapped as Special Habitat Areas, other features such as the quality of the streams and riparian areas result in a high ranking.

- High ranked resources include those Special Habitat Areas as well as stream and wetlands and non-developed land between 50-100ft from the waterbody.
- Medium ranked resources are vegetated land further than 100ft from water bodies or within the floodplain.
- Low ranked resources are the developed floodplain.



And finally, these are the ranked resources combined in purple and the environmental overlay zones that are used to help manage the resources.

You'll see that the overlay boundaries don't always match the high ranked resource areas, leaving them without regulatory protections. One reason is that most of the overlay zones were applied before GIS technology. We also know much more about the resources today than we did then. Because mapping natural resources can lead to new regulations, the process of updating maps requires a deliberative planning process and adoption by the City Council. Now that the City is nearing the end of its Comprehensive Plan process, we can turn attention to updating zoning.



Key Takeaways:

- For an urban area, Portland has a wealth of natural resources
- Portland also has gathered and continues to update a vast amount of data about our natural resources
- It has also adopted a range of regulations and management plans to guide land use decisions in resource areas
- This mapped data along with adoped resource plans and regulations will inform the next phase of our system planning process, screening for potential off-road facility sites, as well as site-specific planning down the road

PORTLAND OFF-ROAD CYCLING MASTER PLAN

Science Review and Best Practices: Focus on Environment

Presented by:
Tim Brooks, Principal
Winterbrook Planning

Nat Lopes, Principal Designer
Hilride Progression Development Group, LLC

5/26/2016

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Outline

1. Speaker Introductions
(5 minutes)

2. Overview of the Scientific Review Process and Best Practices
(5 minutes)

3. Presentation of Environmental Research, Findings and Best Management Practices
(30 minutes)

4. Summary of General Environmental Best Management Practices
(5 minutes)

5. Questions, Comments, Feedback
(5 minutes)

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Speaker Introductions

(5 Minutes)

1

PORTLAND OFF-ROAD
CYCLING MASTER PLAN

Tim Brooks, Principal
Winterbrook Planning

Land Use Planner specializing in environmental assessment, planning and design in the Portland area

Prior work as a Portland City Planner, preparing natural resource inventories and developing city environmental policy and regulations for West Hills, East Buttes, Johnson Creek

Recent trails-related projects:
Powell Butte Reservoir and Trail Master Plan
Smith & Bybee Wetlands CNRP
Blue Lake Park & Chinook Landing
Killin Wetlands Trail Master Plan

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Nat Lopes, Principal
Hilride Progression Development Group

Specialize in the Planning, Design, Construction and Development of Bike Parks, Trails, and Destination Riding Areas

Contributor to IMBA's Managing Mountain Biking Book

Certified Parks and Recreation Professional
Member Professional Trail Builders Association
Member National Recreation and Parks Association

Consultant to the National Interscholastic Cycling Association
Consultant to the National Trips For Kids Organization
Consultant to the Outdoor Alliance

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Overview of the Scientific Literature Review Process and Best Practices

(5 Minutes)

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Background

Development of the Portland Off-Road Cycling Master Plan requires understanding the impacts and benefits of off-road cycling related to:

The Environment

Wildlife, vegetation, soil, and water resources, including streams and wetlands.

The health and safety of park and trail users

User conflicts, accidents and incidents and perceived nuisance activity.

The City's economic activity and tourism.

Jobs, revenues and taxes.

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Scientific Review

- A survey of the most **current research studies** and their findings for each subject area was performed by the project team and city staff.

- The survey included **57 peer reviewed studies** that were identified for analysis by the project team, city staff, and members of the Parks Advisory Committee.

- **Limitations and gaps** in the studies that were surveyed have been identified and outlined in the summary of findings for each subject area.

- The ***Assessment of Off-Road Cycling Impacts and Benefits*** report presents the summary of findings, references and citations of the studies that were surveyed.

- The report has been provided, in draft form on 5/19/16, to the members of the **PAC to review**.

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Analysis of Findings

The findings from the scientific survey will inform the development of the Master Plan and the specific tools and resources used to develop the plan itself including:

- **Site Suitability Criteria**
- **Site Feasibility Assessment Process**
- **Best Management Practices**
- **Policy Recommendations**

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Best Practices

- Best practices address **known and potential impacts** related to siting, design, construction, and management.

- Best practices are **informed by published sources, professional experts, case studies and scientific research.**

- **Research pertaining to the impacts of off-road cycling is not comprehensive** and there are limitations and gaps.

- **Best practices continue to be refined** as riding styles and trends change over time, building techniques progress, and additional facilities are built.

- **Adaptive management responds to any unintended** consequences of trail development or management based on best practices **and to new research that arises over time**.

NL

PORTLAND OFF-ROAD CYCLING MASTER PLAN

Presentation of Environmental Research, Findings and Best Management Practices

(30 Minutes)

3

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Environmental Research Context

- Recreation Ecology Framework

- Study of the environmental effects of recreational activity in natural areas

- Themes include use-impact relationships, environmental resistance and resilience, management effectiveness, monitoring techniques

- Research can inform recreational planners and managers

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Primary Research Areas

- Soil
- Vegetation
- Wildlife
- Water

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Summary of Study Limitations and Gaps

- Research on the environmental impacts of off-road cycling is limited compared to the research on other outdoor recreational activities such as hiking.

- Research has focused on soil erosion and related impacts, with a secondary focus on vegetation impacts such as trampling.

- Wildlife studies focus on specific bird and mammal species. Researchers have noted a range of gaps – for example, information on wildlife habitat impacts, impacts to ecosystems at larger spatial scales, cumulative impacts of recreational activities.

- Very little research exists on the specific impacts of off-road cycling on water resources.

- Most research on the environmental impacts of off-road cycling focuses on cross-country cycling, with limited study of other off-road cycling disciplines.

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Case Studies

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Soil Studies

Study: Wilson and Seney (1994)

Overview:

- Studied water runoff and sediment yield
- 4 user types: bikers, hikers, equestrians, and motorcyclists
- Conducted on existing multi-use trail

Findings:

- No significant differences between hiking and biking
- Horses caused the most erosion and motorcycles climbing on wet trails created a mess
- Soil more susceptible to erosion when wet

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Soil Studies

Study: Marion and Olive (2006)

Overview:

- Big South Fork National River and Recreational Area
- 5 user types: biker, hikers, equestrians, ATV and mixed use
- Measured soil loss along 47 existing trail segments, 500’ intervals

Findings:

- Mountain bike trail impacts are comparable to hiking and multi-use trail impacts
- ATV and horse trails substantially more impacted than hiking and biking trails
- Trails with slopes >15% had significantly higher erosion rates
- Contour trails showed much less erosion than fall line or valley bottom trails

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Soil Management - Recommendations

- Avoid steep (12% to 15% threshold)
- Cross slope trails have lower erosion and water runoff potential than fall line trails
- Close trails during wet season in areas with poorly draining or compacted soils
- Close informal trails and relocate and/or reconstruct trails located on fall line trails
- Trail design, construction and maintenance are important factors in controlling erosion

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Soil Best Practices - Design

- Avoid Fall Line Trail Alignments
- Design Contour Trail Alignments
- Minimize Trail Width
- Minimize Drainage Crossings
- Design Trails That Flow and Control User Speeds
- Max. Trail Grade: (15%)
- Limit maximum grades and sustained grades
- Average Trail Grade: (5-7%)
- Comply with Half Rule
- Frequent Grade Reversals

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Soil Best Practices - Construction

- Construct full bench cut trails
- Frequent grade reversals
- Outslope trail tread: (5%)
- Compact the trail tread and outslope
- Blend the backslope
- Trail hardening: armor and/or amend poorly draining or loose soils
- Construct bridges over drainage crossings

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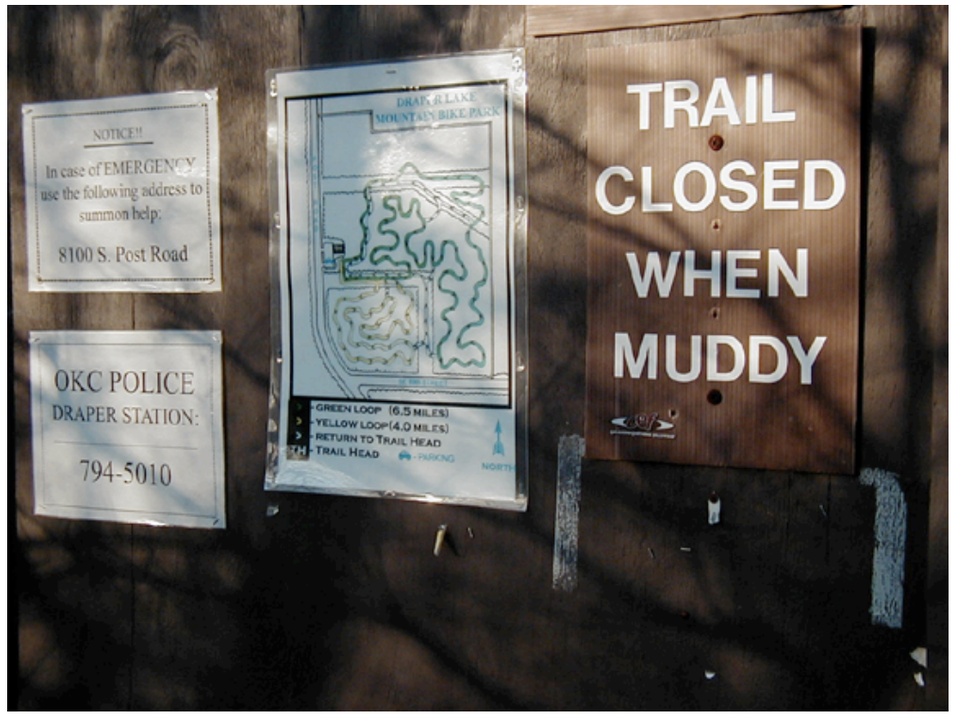
Soil Best Practices - Management

- Monitoring, maintenance and active management
- Maintain outslopes on trail treads
- Maintain trail drainage features, rolling grade dips and grade reversals
- Close trails when they are wet and saturated
- Close unsanctioned trails
- Properly sign sanctioned trails
- Decommission and realign fall line trails onto contour alignments
- Active stewardship, monitoring and adaptive management



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Vegetation Studies

Study: Thurston and Reader (2001)

Overview:

- Looked at previously undisturbed sample plots
- Stem density, species richness, soil exposure
- User types: bikes and hikers
- 5 different intensities (0-500 passes)

Findings:

- Biking and hiking have similar impacts on soil and vegetation
- Impacts of both activities off trail can be immediate and severe
- Most impacts in the first stages of trail development and use

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Use-impact curve

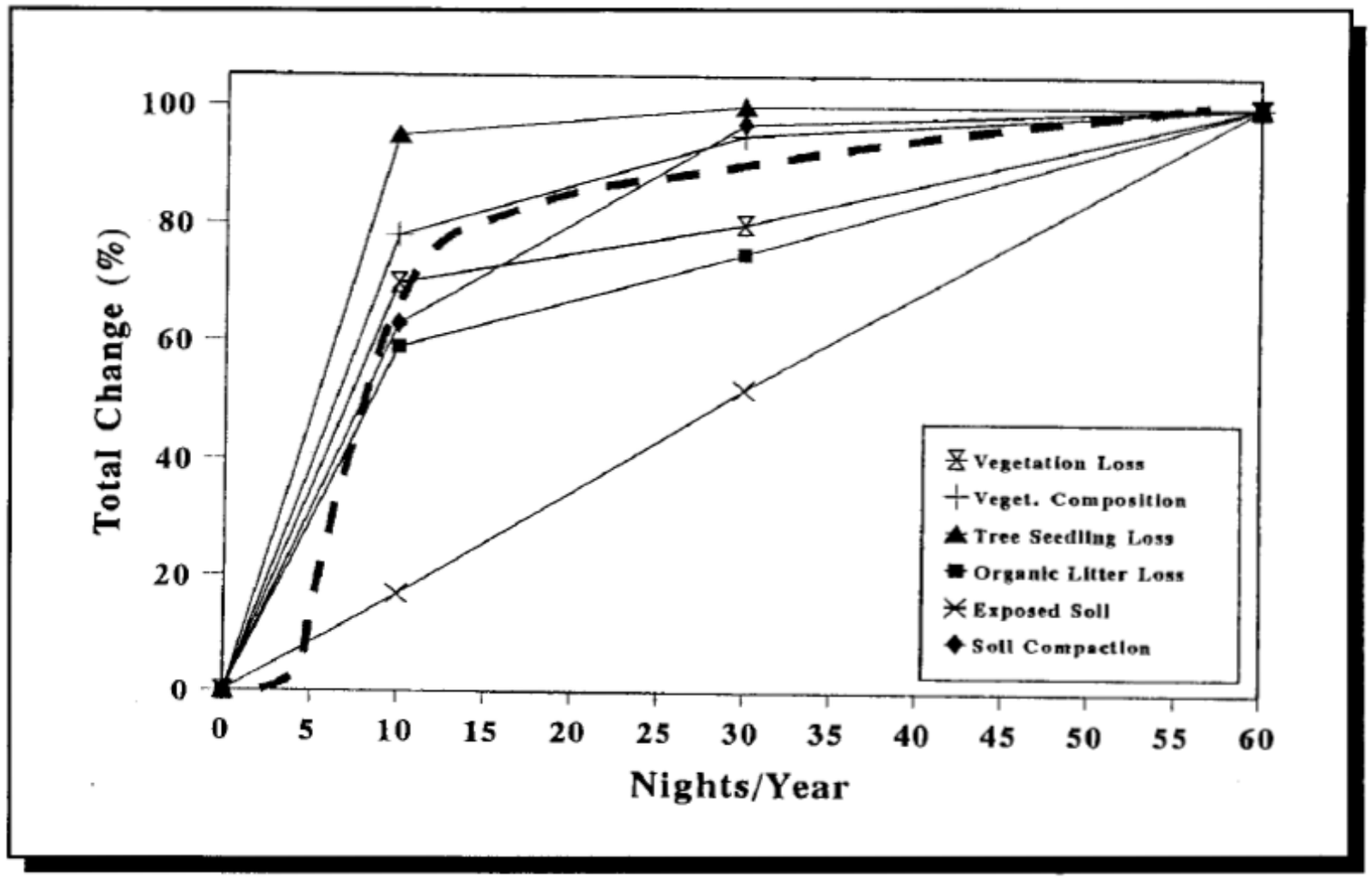

Figure 1. Use/impact relationship for selected impact parameters from a study of campsites in the Boundary Waters Canoe Area Wilderness.

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Vegetation Management - Recommendations

- Keep trails narrow to reduce the total area of intensive tread disturbance, slow trail users, and minimize impacts
- Locate trails on side-hills where possible.
- Locate trails away from rare plants and sensitive habitats.
- Involve resource professionals in designing new trail alignments.
- Limit vegetation disturbance outside the corridor when constructing trails

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Vegetation Best Practices - Design

- Locate trails on side hills
- Design trails with minimum tread widths
- Design trails with habitat buffers
- Locate trails at habitat edges
- Locate trails away from sensitive habitat areas and species
- Involve resource professionals when planning, designing and constructing trail alignments

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Vegetation Best Practices - Construction

- Minimize tree and vegetation removal
- Maintain a minimal construction footprint
- Follow standards for vegetation clearing
- Use proper pruning techniques
- Minimize spread of invasive species: clean tools, boots, equipment prior to entering.
- Work within seasonal work windows (outside of breeding season)
- Time construction activities with invasive species removal and habitat restoration efforts
- In environmentally sensitive areas work closely with environmental professionals during construction to avoid any sensitive species and maintain a habitat buffer.

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Vegetation Best Practices - Management

- Maintain clear trail corridors.
- Close unsanctioned trails immediately.
- Restore unsanctioned trail alignments as quickly as possible.
- In areas with recurring unsanctioned trail use, use natural materials, logs, rock and vegetation to limit access at trail entrances and exits and if Necessary install fencing.
- Educate users- in areas with continued recurring unsanctioned trail post interpretive and educational signage describing habitat conservation and restoration efforts.

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Wildlife Studies

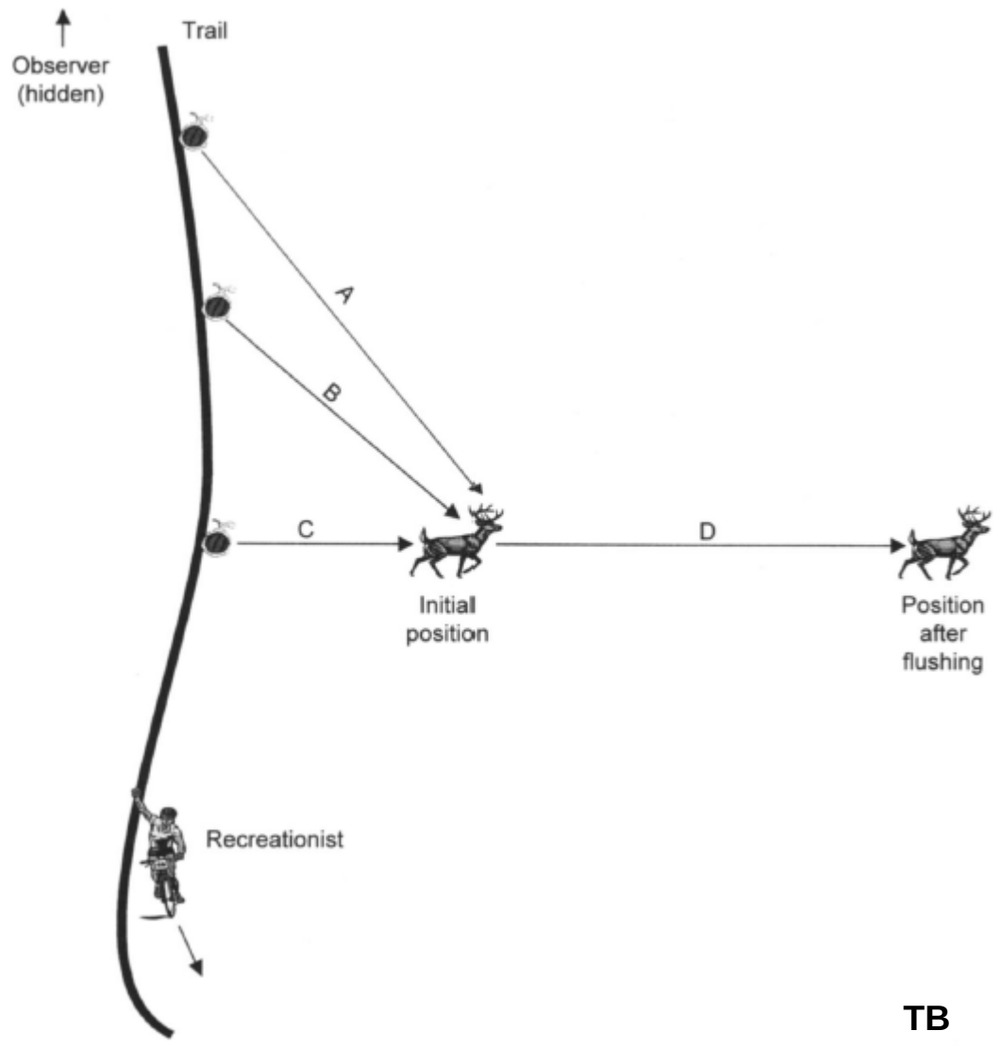
Study: Taylor and Knight (2003)

Overview:

- Response of bison, mule deer, pronghorn sheep to mountain bikers and hikers
- Compared alert distance, flight distance and distance moved

Findings:

- No significant difference between hikers and bikers in responses of three species studied
- Bikers travel faster and may cover more ground in a given time period than hikers, thus may disturb more wildlife per unit time.



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Wildlife Studies

Study: Naylor and others (2009)

Overview:

- Response of elk to mountain biking, hiking, horseback riding and ATV riding in NE Oregon
- Resting, feeding, and travel activities were recorded for 13 elk during disturbance and control periods

Findings:

- ATV riding and mountain biking caused the largest reductions in elk feeding time and increases in travel time
- Both mountain biking and hiking reduced resting time for elk
- Horse back riding caused the lowest travel response in elk

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Wildlife Management - Recommendations

- Locate trails away from sensitive habitats
- Involve resource professionals in selection and design of new trail alignments
- In sensitive habitat areas, restrict access during nesting, breeding, calving seasons
- Locate trails at habitat edge or existing disturbance corridors
- Plan new trail construction with habitat restoration efforts

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Wildlife Best Practices - Design

- Apply mitigation hierarchy: avoid, minimize, mitigate negative impacts
- Prioritize sites with existing disturbance and lower value habitat areas
- Maintain habitat connectivity and avoid fragmentation
- Avoid critical nesting, breeding, areas
- Avoid crossing streams, wetlands and floodplains. Use bridges when necessary
- Minimize overall area impacted by increasing trail density in smaller areas
- Route trails around sensitive areas
- Minimize trail widths
- Involve environmental professionals throughout the design process

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Wildlife Best Practices - Construction

- Time construction to avoid critical nesting, calving and breeding seasons
- Work with environmental professionals during the construction phase
- Perform preconstruction survey to clear the construction area of sensitive species
- Minimize noise, air quality and other construction impacts.
- Create wildlife crossings to enhance habitat connectivity.
- Construct bridges over drainage crossings

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Wildlife Best Practices - Management

- Close trails and limit access to areas with sensitive species during critical nesting, breeding and calving seasons.
- Monitor wildlife impacts and maintain mitigation efforts.
- Minimize overall area impacted by managing shared-use trails

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Water Resources

Recreational trails in general can:

- Introduce Soils, Nutrients, and Pathogens
- Increase Water Turbidity and Sedimentation
- Alter Patterns of Surface Water Drainage
- Intercept and Divert Water from Wetlands, Seeps or Springs

Very little research exists on the specific impacts of off-road cycling on water resources. However, several references can provide useful guidelines for planning including:

- Portland Metro's: *Green Trails: Guidelines for Environmentally Friendly Trails*
- Minnesota DNR's: *Trail Planning, Design and Development Guidelines*

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Water Management Recommendations

- Avoid placing trails in close proximity to water resources, including riparian or wetland areas
- Look for restoration opportunities for existing facilities – e.g., relocating existing trails out of wetlands and restoring wetland habitat
- Work with resource professionals to determine the crossing locations that have the least impact and incorporate low impact practices such as bridges and boardwalks, when avoidance is not possible
- Develop design and management strategies to limit soil loss from trails

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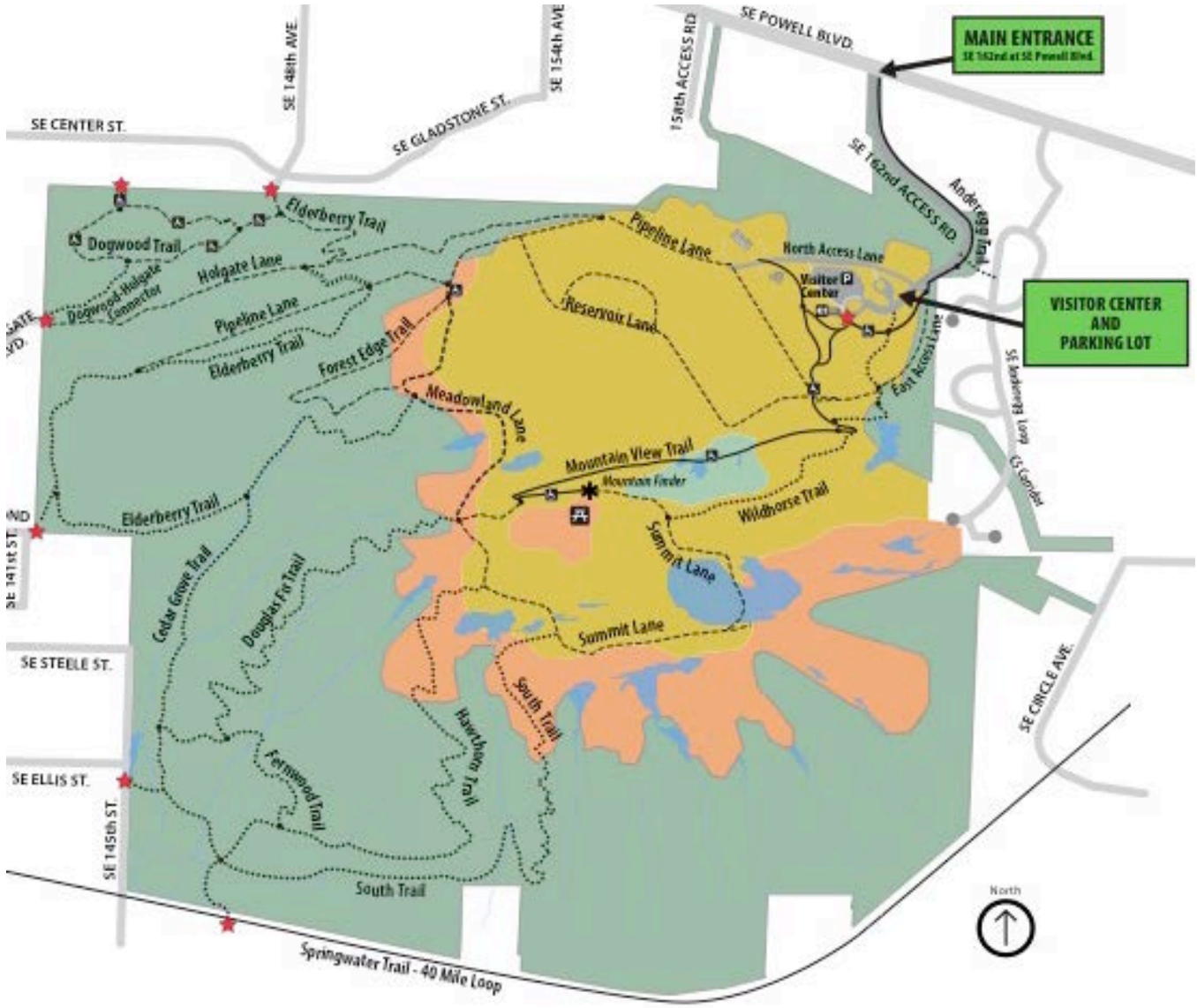
Powell Butte

- Improved access with habitat restoration and impact reduction
- Relocate trails out of sensitive habitats (wetlands, amphibian breeding sites)
- Maintain habitat connectivity (stream & wetland corridors, amphibian corridors)
- Realign fall-line trails, repair eroded trails and close informal trails using BMPs



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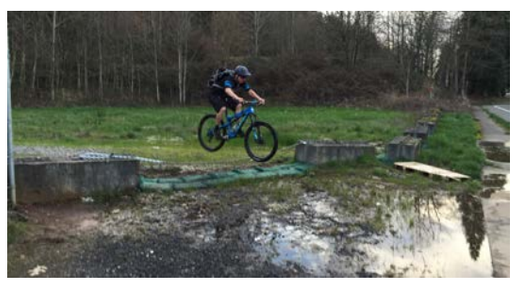
Water Resources Best Practices - Design

- Mitigation hierarchy for water crossings: avoidance, minimization, mitigation.
- Low impact crossing design: bridge, boardwalks, etc.
- Avoid fall line trail alignments
- Design contour trail alignments
- Minimize trail width
- Design trails that flow and control user speeds
- Max. trail grade: (15%)
- Limit maximum grades and sustained grades
- Average trail grade: (5-7%)
- Comply with Half Rule
- Frequent grade reversals



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Water Resources Best Practices - Construction

- Sheet flow of water across trail tread
- Construct full bench cut trails
- Construct frequent grade reversals
- Outslope trail tread: (5%)
- Compact the trail tread and outslope
- Blend the backslope
- Trail hardening: armor and/or amend poorly draining or loose soils
- Construct bridges over drainage crossings
- Dissipate water concentrated from trail drainage features.
- Install brush Boxes To Filter Water Concentrated From Trail Drainage Structures.
- Targeted planting

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Water Resources Best Practices - Management

- Closure and limiting access to trails in inclimate weather.
- Environmental interpretation and education
- Active stewardship, monitoring and adaptive management
- Targeted Planting.

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Summary of Key Research Findings

(5 Minutes)

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Summary of Key Research Findings

Soils

- **The available data indicate that off-road cycling, when limited to established trails, has a similar impact on soils to hiking, and a lower impact than horseback riding.**
- **Frequency of off-trail activity was the greatest cause of adverse soil and vegetation impacts.**
- Trail design and landscape factors may have more potential to affect soils than the nature of the trail activity.
- **Trails with slopes greater than 15% are strongly correlated with significant increase in impacts to soil erosion.**
- Cross-slope trails have lower erosion and runoff potential than fall line trails.

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Summary of Key Research Findings

Vegetation

- **All trail-based recreational activities have the potential to negatively impact vegetation, especially on unsanctioned trails.**
- **Most impacts occur with initial trail construction and use, with a diminishing increase in impact associated with increasing levels of traffic.**
- Vegetation trampling/removal and soil erosion/compaction are closely linked impacts.
- Removal of vegetation is an inherent consequence in trail construction but that accelerated soil erosion becomes the primary impact once vegetation is lost.
- **Frequency of off-trail activity was the greatest cause of adverse soil and vegetation impacts.**

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Summary of Key Research Findings

Wildlife

- **Wildlife disturbance can extend much further into natural landscapes than other forms of trail impacts, which tend to be limited to the narrow trail corridor.**
- People riding bicycles cover more ground in a given time period than hikers and thus can potentially disturb more wildlife per unit time.
- **The research on wildlife impacts focuses on a limited set of bird and mammal species, and the results appear to differ depending on the species studied.**
- **For some bird species, disturbance from mountain biking trail use on foraging and nesting behavior may be minimal, but fragmentation and alteration of habitat by mountain biking trails may reduce quality of nesting habitat.**
- Wildlife impacts can be reduced by ensuring that trails avoid sensitive or critical wildlife habitats, including streams and wetlands.

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Summary of Key Research Findings

Water resources

- **Trails can introduce soils, nutrients, and pathogens, increase water turbidity and sedimentation, and alter patterns of surface water drainage and divert water sources that serve important ecological functions.**
- Avoid locating trails in close proximity to water resources, including riparian or wetland habitats areas.
- **Relocate and restore existing trails that are within riparian and wetland habitat areas.**
- **Trail alignments should not parrellel streambeds or creeks coorrdiors.**
- **Design trails to minimize water crossings.**
- **Relocate and restore existing trails that are within riparian and wetland habitat areas.**

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PORTLAND OFF-ROAD CYCLING MASTER PLAN

Best Practices

- Best practices address **known and potential impacts** related to siting, design, construction, and management.

- Best practices are **informed by published sources, professional experts, case studies and scientific research.**

- **Research pertaining to the impacts of off-road cycling is not comprehensive** and there are limitations and gaps.

- **Best practices continue to be refined** as riding styles and trends change over time, building techniques progress, and additional facilities are built.

- **Adaptive management responds to any unintended** consequences of trail development or management based on best practices **and to new research that arises over time**.

NL

PORTLAND OFF-ROAD CYCLING MASTER PLAN

CLARIFYING QUESTIONS

(3 Minutes)

Nat Lopes, Principal
Hilride Progression Development Group

Tim Brooks, Principal
Winterbrook Planning