Green Space Evaluation

A Science-Informed Framework for Evaluating Community and Ecological Value in Opportunity and Expansion Areas

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Prepared by **Save Bend Green Space**, a 501(c)(3) nonprofit organization

Save Bend Green Space



Table of Contents:

1 – Executive Summary 4
1.1 – Scored results 4
1.2 – Key findings 4
1.3 – Planning implications and recommendations 5
2 – Green Space Evaluation Framework 6
2.1 – Project Overview 6
2.2 – Introduction 6
2.3 – Definitions 9
2.4 – Assessment Methodology 10
2.5 – Guiding Principles 11
2.6 – Evaluation Categories 11
2.7 – Green Space Evaluation Framework 11
3 – Green Space Evaluation: Deschutes South Canyon (OA 9) 13
3.1 – Site Overview 13
3.1 – Site Specific Evaluation Methods 16
3.2 – Community Value 17
A. Public Access 17
B. Recreational Use 18
C. Equitable Access 19
D. Natural Open Space Function 19
E. Adjacent Land Use Compatibility 20
F. Scenic Resources 20
G. Historic Features 21
3.3 – Environmental and Ecological Value 22
A. Habitat Value 22
B. Wildlife Corridor Function 23
C. Vegetation Diversity 24
D. Tree Inventory and Canopy 25
E. Hydrologic Features 29
F. Geologic Features 30
4 – Concluding Summary: Overall Green Space Value Assessment 32

4.1 – Overview 32
4.2 – Specific Recommendations 33
A. Develop only in low-priority upland areas 33
B. Preserve the highest-value green spaces from development 33
C. Exclude preserved areas from required density calculations 35
D. Establish ongoing management for these areas 35
4.3 – Infographic 37
5 – Appendices 38
5.1 – Section-by-Section Evaluation Scores 38
5.2 – Maps and GIS Data 38
5.3 – Plant Species List 39
5.4 – Bird List 40
5.5 – Green Space Field Survey form 41
5.6 – Automated Tree Crown Inventory Methodology 44

1 – Executive Summary

Purpose and scope: The Green Space Evaluation framework is intended as a comparative planning tool to place **community and ecological value** alongside **housing, transportation, and economic objectives** before land-use decisions are made. This report applies the framework to the Deschutes South Canyon Opportunity Area (OA) 9, the first of five Opportunity and Expansion Areas (with The Thumb, Juniper Ridge, Bend Central District, and OB Riley) scheduled for assessment. Based on the findings of this report, Save Bend Green Space makes specific recommendations for development of this site.

Site profile: Deschutes South Canyon comprises **130.74 acres** (140.56 acres including all conveyed tracts) owned by COID and PH20-34 Holdings LLC. The boundaries are the Deschutes River (~5,621' frontage), Brookswood Blvd and surrounding neighborhoods. Zoning is **RS** (Standard Density Residential). Development is constrained by the Mt. Bachelor Village scenic view easement through 2034, with master plan approval required. Sensitive lands including steep slopes, and the Waterway Overlay Zone with River and Upland ASI and Riparian Corridor designations further limit the net developable area. COID will retain ~34 acres for irrigation conveyance and hydro-syphon operations; that infrastructure occupies a narrow linear footprint.

Assessment Methodology: The property was evaluated by volunteer teams using eight criteria in Community and Ecological Value categories. Non-quantitative resources were described. On-the-ground GPS data were combined with city mapping records, detailed elevation and slope data, trail usage counts, USGS geologic maps, state wildlife habitat maps, and aerial photography. Tree canopy coverage was estimated using automated image analysis of aerial photos. Where applicable, this methodology will apply to future site evaluations.

1.1 – Scored results

Criterion	Score	Basis
Public Access	10 (Site-wide)	Nine formal/informal trailheads
Recreational Use	10 (Site-wide)	Nine+ miles of trails (Deschutes River Trail + CO Historic Canal Trail, 50+ informal paths),
Natural Open Space Function	8 (Site-wide)	Property functions as natural open space; COID infrastructure is confined to linear footprint
Adjacent Land Use Compatibility	8 (Site-wide)	Minimal impact from surrounding residential neighborhoods
Scenic Resources	8.3	River, rimrock, canal corridor, Cascade views
Habitat Value	8.4	Riparian, upland shrub-steppe, ponderosa mosaic; 130+ bird species
Wildlife Corridor Function	10 (Site-wide)	River corridor + canal; migratory and resident birds; mule deer use of Brookswood undercrossing
Vegetation Diversity	8.6	110+ species documented, over 70 native species

Table 1 – Overall Scored Results

1.2 – Key findings

The site gives people fair and equitable access to the outdoors. Nearly one in three residents in the surrounding neighborhoods are 65 or older, and some nearby neighborhoods have more

than 60% of households with children. In nearby census tract 20.02, one in six households do not have a car. This site is the only walking-accessible natural green space many residents have.

The site meets a real need for recreation. Three well-used trails — the Deschutes River Trail, the Central Oregon Historic Canal Trail, and the Canopy Trail — already make this property function like a city park, drawing visitors from across the region. Bend's population growth since 2016 and increased outdoor use since the pandemic suggest that actual use today is significantly higher than official counts capture.

The site connects wildlife, just as it connects people. The property is an important piece of the Deschutes River's natural corridor, linking neighborhoods to the south with U.S. Forest Service land beyond the city. It overlaps with mapped winter habitat for mule deer and with streamside habitat used by many other species. The historic Pilot Butte Canal, which provides seasonal water access, offers important wildlife connectivity.

The site's trees store a substantial amount of carbon. Tree canopy covers over 23% of the site overall and as much as 39% in some areas. Many surveyed ponderosa pines are very large, exceeding 30" diameter. This is important; in similar forests, the largest 3% of trees store about 42% of the carbon.

The site tells the story of Bend's natural and cultural history. The site has over a mile of natural frontage on the Deschutes River, the defining characteristic of Bend. The exposed rock outcrops tell the story of the region's volcanic past and include several ancient lava flows and volcanic ash rock. The Tumalo fault line runs through the site. The property also includes a section of the Old Pilot Butte Canal, built in 1905 and recognized as a nationally significant historic engineering site.

1.3 – Planning implications and recommendations

The Deschutes South Canyon (OA 9) contains multiple areas of **high-value green space and is a significant conservation opportunity. Key recommendations for development**:

- Develop only in lower-priority upland areas;
- Preserve the highest-value green spaces from development (see Figure 11);
- Exclude these areas from required minimum density calculations; and
- Ongoing management of these areas must be established.

These uniquely valuable community and ecological assets, once removed, can never be replaced.

2 – Green Space Evaluation Framework

2.1 – Project Overview

This chapter introduces the Green Space Evaluation Framework developed to assess the community and ecological value of Opportunity Areas and Expansion Areas identified for future development in Bend, Oregon. It describes the purpose of the evaluation, defines key terminology, outlines the assessment methodology, and explains the rating system used later in this report. Together, these elements establish a consistent framework for evaluating the natural, recreational, scenic, and community resources present in each study area.

2.2 – Introduction

The City of Bend has identified nine Opportunity Areas (OAs) and thirteen Expansion Areas (EAs) as part of its plan for future growth. These areas represent some of the largest remaining underdeveloped properties within or adjacent to the urban growth boundary and are expected to accommodate future residential, commercial, and mixed-use development. Many also contain valuable natural resources, recreational opportunities, scenic landscapes, and ecological functions that contribute significantly to the health and quality of life enjoyed by Bend residents.

Decisions about these lands will shape the community for generations. Once a natural landscape is developed, it rarely returns to functional green space, and many of the ecological functions associated with mature landscapes are difficult or impossible to fully restore afterward. For this reason, evaluating these resources before land-use decisions are made is an important part of long-term community planning, allowing ecological, recreational, scenic, and community benefits to be weighed alongside housing, transportation, and economic development objectives.

This Green Space Evaluation Framework was developed to provide a consistent, science-informed method for assessing green space value within Opportunity Areas and Expansion Areas prior to development. It captures both community and environmental values across a range of property types and landscape conditions, including recreation, public access, scenic resources, and equity, as well as wildlife habitat, ecological connectivity, vegetation, tree canopy, hydrologic resources, and geologic features. By documenting these characteristics consistently across properties, the framework provides a common basis for understanding each site's resources and benefits, helping to inform future land-use planning and conservation decisions.

This evaluation also recognizes that green spaces provide value beyond their ecological functions. According to the Trust for Public Land, "parks and green spaces improve water quality, naturally manage stormwater, reduce air pollution, enhance community health, provide recreational opportunities, attract and retain businesses, and support economic development in their region. People who are physically active in parks have reduced healthcare costs. In turn, all of this generates local tax revenue both from increased property values and from tourist spending"[1]. As Bend continues to grow, understanding the quality, distribution, and function of existing green spaces in areas planned for development becomes increasingly important, and the framework considers these multiple benefits to provide a balanced assessment of each property's overall value.

[1] Dollars and Sense: Economic Benefits of Community Green Spaces - Trust for Public Land

The original conception for this evaluation framework came from internal discussions within Save Bend Green Space. In February 2024, Save Bend Green Space met informally with City planners to discuss this topic. The approach resulting from these discussions was to apply this framework to prioritized areas of interest within the City's Opportunity Areas and Expansion Areas (see highlighted tracts in Figure 1):

- Deschutes South Canyon (Central Oregon Irrigation District Property, OA 9)
- The Thumb Expansion Area
- Juniper Ridge (OA 6)
- Bend Central District (OA 1)
- OB Riley Expansion Area

Each property will be evaluated using the Green Space Evaluation Framework, which combines field observations, geo-located inventories of site features, aerial imagery analysis, and review of existing environmental data to assess both community and ecological value. Together, these evaluations are intended to provide a comprehensive understanding of the natural assets within Bend's future growth areas and to support informed, balanced planning decisions.

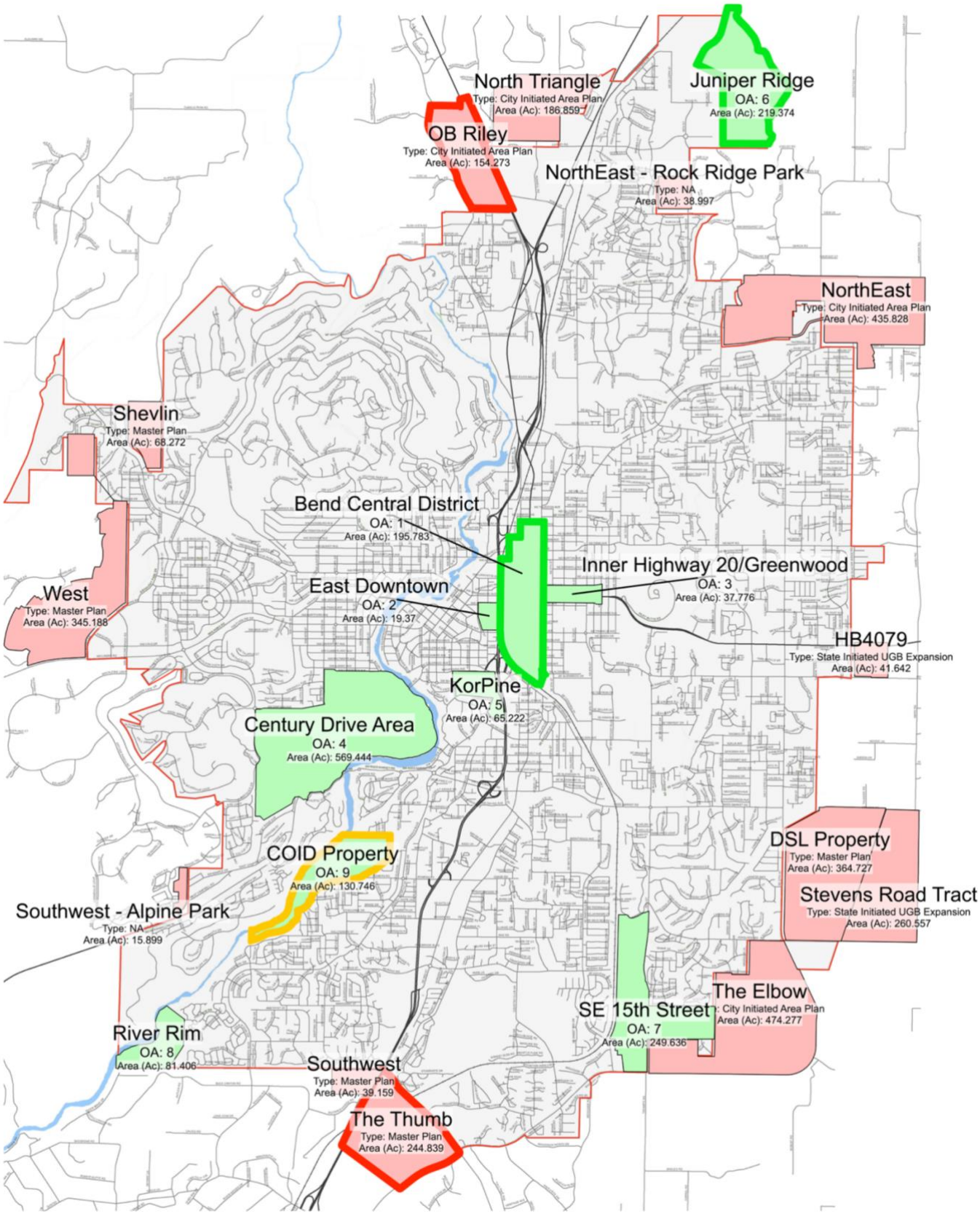


Figure 1 – City of Bend Opportunity and Expansion Areas (bold outlines indicate study areas)

2.3 – Definitions

Expansion Area (EA), City of Bend: areas within the Urban Growth Boundary (UGB), but outside of City limits, designated as expansion areas in the Bend Comprehensive Plan. https://bend.municipal.codes/CompPlan/11_Policies

Green space: Open natural areas within an urban environment that may be covered with grasses, trees, plants, other vegetation, or rock outcrops. These spaces provide important ecological functions, health and recreational benefits for residents and visitors.

Open space (common, active or passive), City of Bend: any property or area of land or water set aside, designed or reserved for the public or private use specifically for the purpose of providing places for recreation, conservation or other open space uses. https://bend.municipal.codes/BDC/O

Opportunity Area (OA), City of Bend: locations within the city, as shown in the Bend Comprehensive Plan, that are appropriate to focus new growth due to their location, zoning (existing or planned), amount of vacant or underdeveloped land, and/or proximity to urban services. https://bend.municipal.codes/CompPlan/11_Opportunity_Areas

Plant community: an assemblage of plants that co-exists in a similar environment. https://usnvc.org/mission/plant-communities-and-vegetation-classification/

Priority tree, City of Bend: an individual tree with a trunk diameter of 20" DBH[2] or larger. See BDC 3.2.200, Tree Preservation. https://bend.municipal.codes/BDC/P

Regulated tree, City of Bend: an individual tree with a trunk diameter of six inches DBH or larger. Regulated trees include Priority Trees. See BDC 3.2.200, Tree Preservation. https://bend.municipal.codes/BDC/R

Sensitive lands, City of Bend: wetlands, areas within a site with one or more regulated trees, steep slopes, floodplains and other natural resource areas designated for protection or conservation by the Bend Comprehensive Plan or the State of Oregon. https://bend.municipal.codes/BDC/S

Shrub-steppe: a type of low-rainfall natural grassland which has sufficient moisture to support a cover of perennial grasses or shrubs, which distinguishes it from deserts. https://swap.oregon.gov/key-habitat/sagebrush-habitats/

Steep slope, City of Bend: any slope equal to or greater than 12 percent as measured over any minimum run of 10 feet, perpendicular to the contour of the slope, based on contour intervals of two feet or less. https://bend.municipal.codes/BDC/S

Trailhead, Formal: a trailhead equipped with signage and/or Bend Park and Recreation District facilities.

Upland Areas of Special Interest Overlay Zone, City of Bend: These areas represent potential private and public open space. The upland features consist of scattered rock outcrops, stands of trees, and dominant ridges and faults that are typical of the Central Oregon landscape. https://bend.municipal.codes/BDC/2.7_ArtVI

[2] "DBH" is an acronym for "Diameter at breast height."

Urban Growth Boundary (UGB): the urban growth boundary as adopted by the City and County and acknowledged by the State, as set forth in the Bend Comprehensive Plan and as shown on the Bend Comprehensive Plan map. https://bend.municipal.codes/BDC/U

Wildlife corridor: an area of connected habitat that allows wildlife to move across the landscape to fulfill their daily, seasonal, and life cycle needs. https://www.dfw.state.or.us/wildlife/management_plans/docs/WCAP Final January 2024.pdf

2.4 – Assessment Methodology

Eight criteria are evaluated for each property using a combination of field investigation, aerial imagery, Geographic Information System (GIS) analysis, and publicly available environmental and planning data. This multi-method approach integrates direct observation of site conditions with existing resource information to characterize each property's natural, cultural, recreational, and community resources.

Field assessments are conducted on foot, bicycle, or by vehicle, depending on site conditions and accessibility. Larger properties are divided into multiple evaluation sections to ensure representative coverage of varying habitats, land uses, and ecological conditions.

During field investigations, significant natural and cultural resources are documented and, when appropriate, geolocated using Gaia GPS for incorporation into site mapping. Recorded features may include:

- Recreational facilities and user-created features
- Formal and informal trails
- Scenic viewpoints
- Historic resources
- Habitat boundaries
- Wildlife observations
- Plant communities
- Priority and regulated trees
- Hydrologic features
- Geologic features

Field observations are supplemented by publicly available GIS datasets, aerial photography, drone videography, LIDAR, hydrologic mapping, soil surveys, City of Bend planning documents, Oregon Department of Fish and Wildlife mapping, and other relevant environmental data sources. These sources may provide information on tree canopy, vegetation, topography, habitat features, drainage patterns, land use, and other characteristics that may be difficult to observe directly from the ground. Together, field observations and supplemental data provide a more complete basis for evaluating each property's existing resources and conditions.

2.5 – Guiding Principles

The Green Space Evaluation Framework is guided by five fundamental principles:

Consistency - Each property is evaluated using the same methodology and rating criteria.

Field Verification - Whenever practical, observations are verified through on-site investigation rather than relying solely on aerial imagery or existing datasets.

Multiple Lines of Evidence - Evaluations integrate field observations, GIS analysis, scientific literature, planning documents, and publicly available environmental datasets.

Landscape Context - Properties are evaluated within the broader ecological and community landscape, recognizing that habitat connectivity, watershed function, and surrounding land use influence green space value.

Transparency - Evaluation findings are supported by written observations, maps, photographs, and documented field data to provide a clear rationale for scoring decisions.

2.6 – Evaluation Categories

The evaluation framework consists of thirteen components in three primary categories: **Community Value**, **Environmental and Ecological Value**, and **Descriptive Resources**. Community Value evaluates the ways in which a property contributes to recreation, public access, neighborhood livability, scenic quality, and overall quality of life. Environmental and Ecological Value evaluates the natural resources, ecological processes, and environmental functions present on each property. These criteria assess the property's contribution to biodiversity, habitat connectivity, ecosystem health, water resources, and long-term environmental resilience. Descriptive Resources provide additional cultural and scientific context for less-quantifiable factors. Together, these components recognize that the value of green space is determined by both its ecological functions and the benefits it provides to the surrounding community.

Community Value	Environmental and Ecological Value	Descriptive Resources
Public Access	Habitat Value	Hydrologic Features
Recreational Use	Wildlife Corridor	Geologic Features
Natural Open Space Function	Vegetation Diversity	Historic Features
Adjacent Land Use Compatibility	Tree Assessment and Canopy	Equitable Access
Scenic Resources		

Table 2 – Evaluation Categories

2.7 – Green Space Evaluation Framework

To provide a consistent summary of property characteristics, selected evaluation criteria are assigned scores using a standardized rating system. Scores are informed by field observations, GIS analysis, aerial imagery, and supporting environmental data.

Each scored criterion receives a score from **1 to 10**, with higher scores representing greater green space value (see Table 3). Individual criterion scores are combined to produce an overall Green

Space Score that summarizes the property's community and ecological value. Because each criterion evaluates a different aspect of green space, the overall score should be interpreted as a comparative planning tool. The rating system is intended to facilitate consistent comparison among evaluated properties and should not be interpreted as an absolute measure of environmental quality.

For larger properties containing substantial variation in habitat, land use, or ecological conditions, separate sections may be evaluated independently. Section scores are then combined to produce an overall property score that reflects conditions across the site.

Score	Rating	Description
1–2	Very Low	Criterion is absent, highly degraded, or provides little measurable green space value.
3–4	Low	Criterion is present but limited in extent, quality, or function.
5–6	Moderate	Criterion provides meaningful value and contributes to the property's overall function but lacks exceptional characteristics.
7–8	High	Criterion is well developed, functions effectively, and represents a significant community or ecological asset.
9–10	Exceptional	Criterion is outstanding, regionally significant, unusually intact, or provides exceptional ecological, recreational, scenic, or cultural value.

Table 3 – Rating Scale

3 – Green Space Evaluation: Deschutes South Canyon (OA 9)

Deschutes South Canyon Property Summary	
City of Bend Designation	Opportunity Area 9
Acreage	130.74 acres [3]
Ownership	COID / PH20-34 Holdings LLC
Zoning	Residential Standard Density (RS)
River Frontage	Approximately 5621 linear ft.
Major Trails	Deschutes River Trail, CO Historic Canal Trail, Canopy Trail
Primary Habitats	Riparian, Ponderosa Pine, Shrub-Steppe
Historic Resources	Old Pilot Butte Canal, Tuff quarry
Primary Geology	Basalt Outcrops and Rimrock, Volcanic Tuff

Table 4 – Summary of Opportunity Area 9, Deschutes South Canyon

3.1 – Site Overview

The Deschutes South Canyon Opportunity Area 9 encompasses approximately 130.74 acres owned by the Central Oregon Irrigation District (COID) and PH20-34 Holdings LLC (see Figure 2). The property is located along the Deschutes River corridor in southwest Bend and is bounded by the Deschutes River to the west and Brookswood Boulevard to the east, with established residential neighborhoods bordering portions of the site. It lies within the Southwest Bend and Southern Crossing Neighborhood Districts, while the Century West Neighborhood District is located on the west side across the river. **As the largest remaining undeveloped open space adjacent to the Deschutes River within Bend's city limits, the property provides important ecological, recreational, and scenic functions while serving as a de facto park for surrounding neighborhoods and the broader community.**

[3] The acreage of the entire tract, including COID property, and all conveyed tracts, is 140.56 acres. The official designation of the "Opportunity Area" does not include the portion of the site nearest Brookswood Boulevard. See Figure 2.

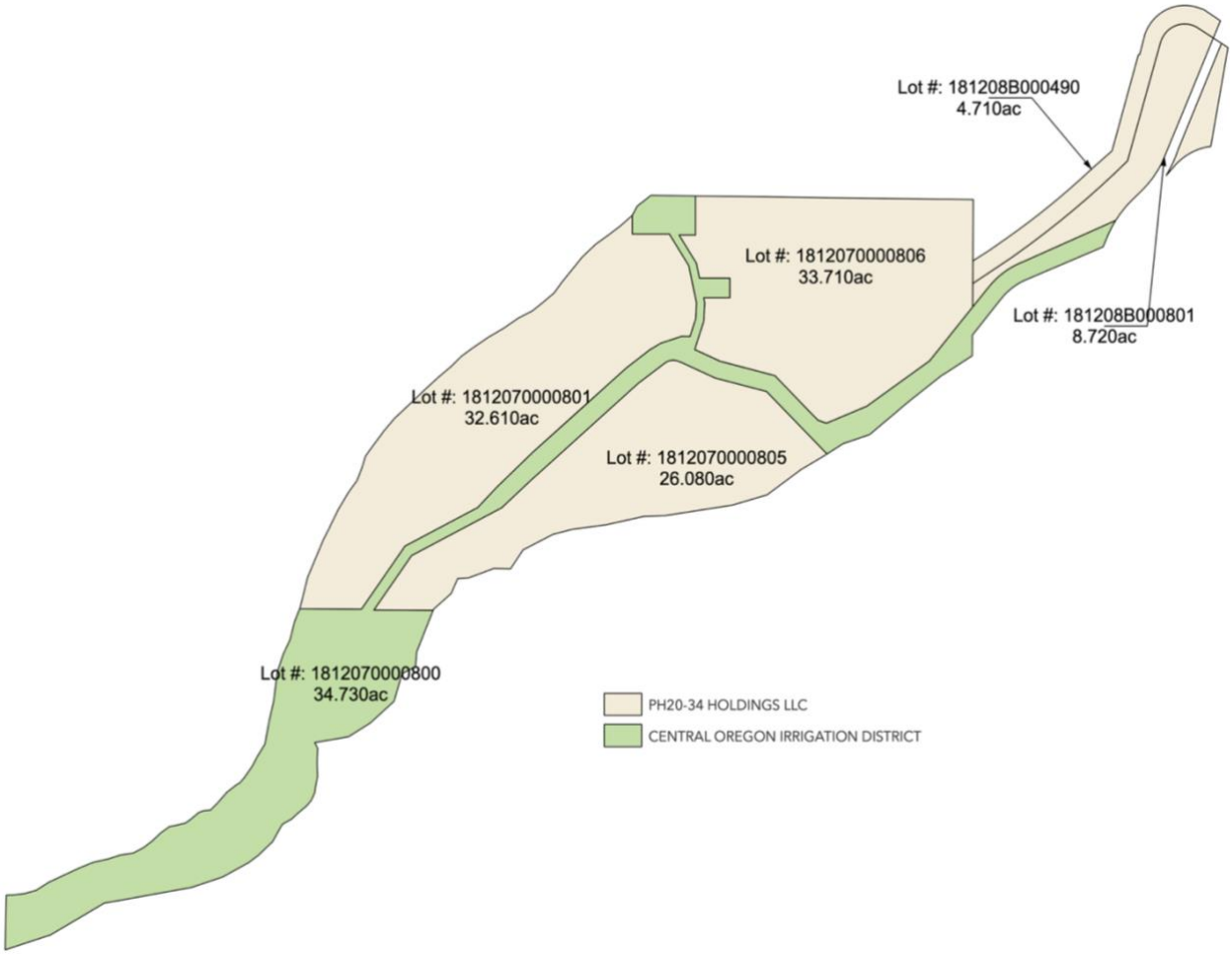


Figure 2 – Ownership of Opportunity Area 9

Despite its location within the urban growth boundary and proximity to residential development, the property remains largely undeveloped reflecting its decades long ownership by the COID. Existing development is limited primarily to infrastructure associated with irrigation-water diversion, conveyance, and hydropower generation. The irrigation diversion structure is located at the south end of the property with ownership held by the COID, a hydro-syphon power generation facility is situated near the northern end of the property, and the above-ground piped, open, and underground piped canal traverses the property from its southern to its eastern extremities. Aside from the actual infrastructure, the entirety of the site functions as a natural open space supporting diverse vegetation, wildlife habitat, recreational opportunities, and scenic resources.

The property is currently zoned Residential Standard Density (RS), which allows residential development at approximately 4.0 to 7.3 dwelling units per gross acre. However, development potential is constrained by several factors. Mt. Bachelor Village holds a scenic view easement over much of the property through 2034, preventing development within the easement area until the easement expires and a master plan has been completed and approved. In addition, substantial portions of the site consist of sensitive lands[4] that are subject to development limitations under the Bend Development Code (see BDC 3.5.100, 2.1.600, and 4.4.400). As a

[4] The "Sensitive Land" category is based on natural ground slope. The slope analysis was derived from a digital terrain model (DTM) based on the City of Bend's public 1-foot topographic maps.

result, significant portions of the property present regulatory or practical development restrictions. In addition, the Bend pumice deposit and overlying Tumalo tuff layer may pose additional development challenges owing to the uncertain structural characteristics of this geology[5]. The extent and thickness of these formations will require careful geotechnical investigation. See Figure 3 and section 3.3 – F.

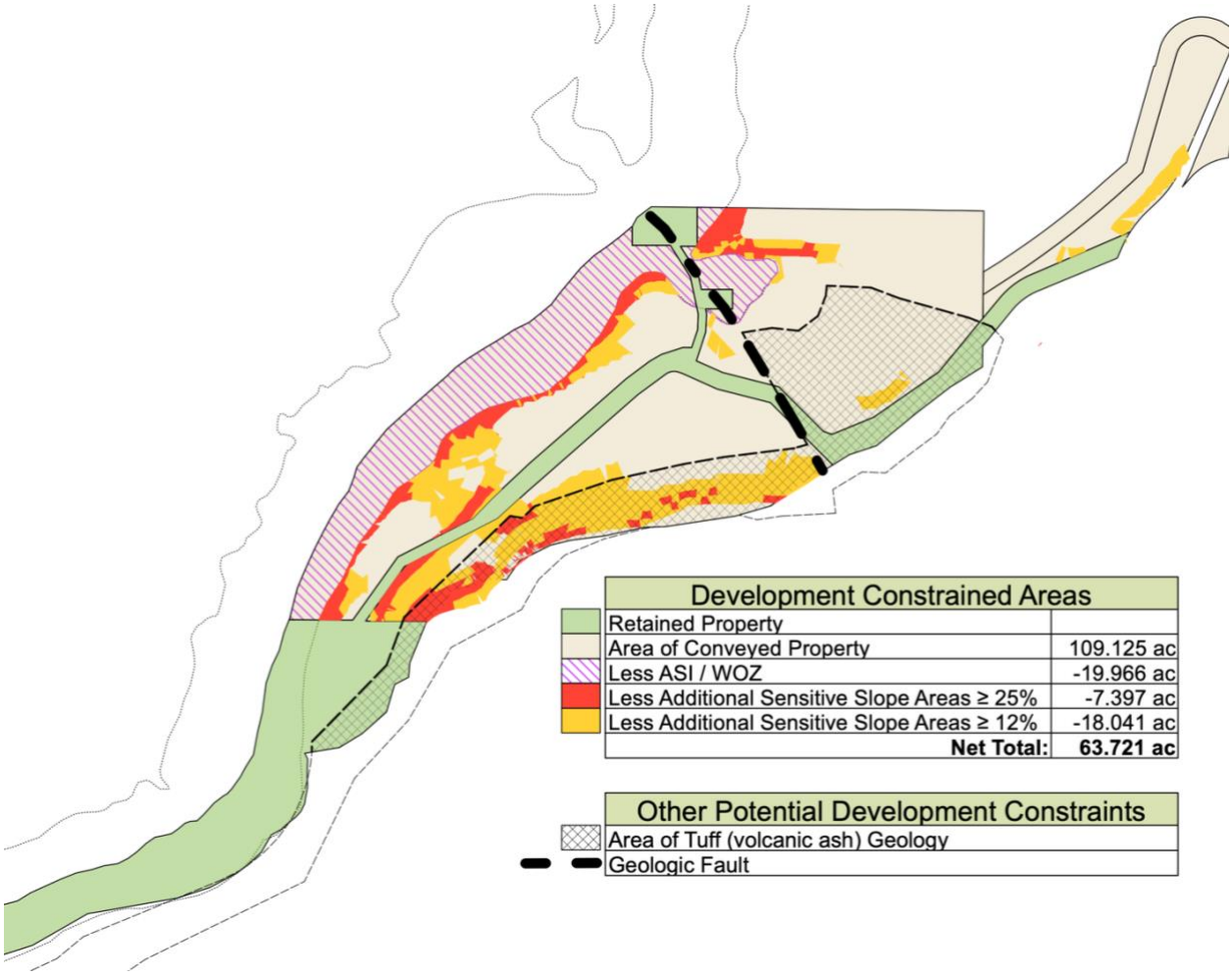


Figure 3 – Site Development Constraints

The Deschutes River is the defining natural feature of the property. As a perennial river in the High Desert, it supports one of Bend's most productive riparian ecosystems and provides essential habitat, wildlife corridors, scenic character, and recreational opportunities. The river corridor is protected through the City of Bend's Waterway Overlay Zone (WOZ) and includes designated River Areas of Special Interest (ASI) (BDC Art V, 2.7.600 and 2.7.620) that recognize the ecological and scenic importance of river-adjacent landscapes. Upstream the river is protected by the Upper Deschutes Wild and Scenic River[6] and Oregon Scenic Waterway[7] management plans. Because intact riparian environments are relatively uncommon within Bend, this corridor represents an extremely valuable natural resource.

[5] https://www.mdpi.com/2673-7094/4/4/61

[6] https://www.fws.gov/rivers/river/deschutes

[7] https://www.oregonwaterdata.org/maps/geo::oregon-state-scenic-waterways/about

Geology provides the foundation for the property's natural character. The landscape was built from layers of lava flows and volcanic ash, carved by the river, bisected by a major fault, and contains remnants of a historic tuff quarry and stone cutting operation. Few places in Bend offer such a visible record of the forces that shaped Central Oregon. The property's geologic setting is described in detail in section 3.3 – F.

The site also preserves an important piece of Central Oregon's irrigation history. What is possibly the best-preserved section of the historic Pilot Butte Canal, completed in 1905, remains visible along the trail commonly known as the Canopy Trail. The corridor is lined with mature ponderosa pine trees, many estimated to be more than a century old, whose impressive growth is likely attributable to the proximity of this historic water source. Today, the Canopy Trail follows this historic canal alignment beneath a shaded forest canopy, offering one of the few extensively wooded trail experiences within Bend. Public access along the corridor has been preserved through provisions associated with the Federal Energy Regulatory Commission (FERC) licensing of the adjacent hydro-syphon facility, allowing the historic landscape and recreational trail to remain accessible while protecting significant irrigation infrastructure.

The property supports an extensive network of informal and developed recreational opportunities. The Deschutes River Trail provides a path along the river and connects to the Central Oregon Historic Canal Trail within the property, while the Canopy Trail follows the historic canal corridor through mature forest. Together, these trails receive substantial year-round use for walking, running, hiking, skiing, sledding, mountain biking, wildlife observation, dog walking, fishing, and nature appreciation. In addition to the formal trail system, the property contains numerous informal paths, rock climbing areas, natural viewpoints, and community-created recreation features that reflect its long-standing use as a public natural open space. BPRD trail counters recorded more than 166,000 users on the Deschutes River Trail and Central Oregon Historic Canal Trail over a single six-month period in 2016, a figure that has certainly increased with Bend's growth over the last decade (see Section 3.2 – B.

The site's ecological value extends well beyond recreation. The Deschutes River functions as an important wildlife corridor supporting mule deer, river otters, raptors, songbirds, waterfowl, and a diversity of other native species. Riparian vegetation, mature ponderosa pine forests, rock outcrops, and shrub-steppe plant communities provide a variety of habitat types that contribute to biodiversity and ecological resilience within the urban landscape. Habitat, corridor function, vegetation, and tree canopy are evaluated in Section 3.3 – B.

The property's scenic quality is among its most distinctive attributes. Informal trails and overlooks along more than a mile of the Deschutes River corridor offer direct views of the river, riparian vegetation, and rimrock canyon walls, while the Canopy Trail follows the historic canal beneath mature ponderosa pines. From the uplands near the water tower and the eastern property edge, panoramic vistas open to the Cascade Range. Four of the ten study sections rated Exceptional for scenic resources, and the property averaged 8.3 (see Section 3.2 – F.)

Based on its size, location, ecological resources, historic character, and established public use, the Deschutes South Canyon Opportunity Area represents one of the most significant remaining green spaces within the City of Bend.

3.1 – Site Specific Evaluation Methods

For the purposes of this evaluation, the property was divided into ten assessment sections, bordered by existing well-established trails (see Figure 4). Each section was independently evaluated and scored by a team of volunteers using the Green Space Evaluation Framework.

Individual section scores were then averaged to generate an overall property score for rated criteria. Additional property-wide evaluations were completed for public access and recreational use. Hydrologic and geologic features were observed and recorded.

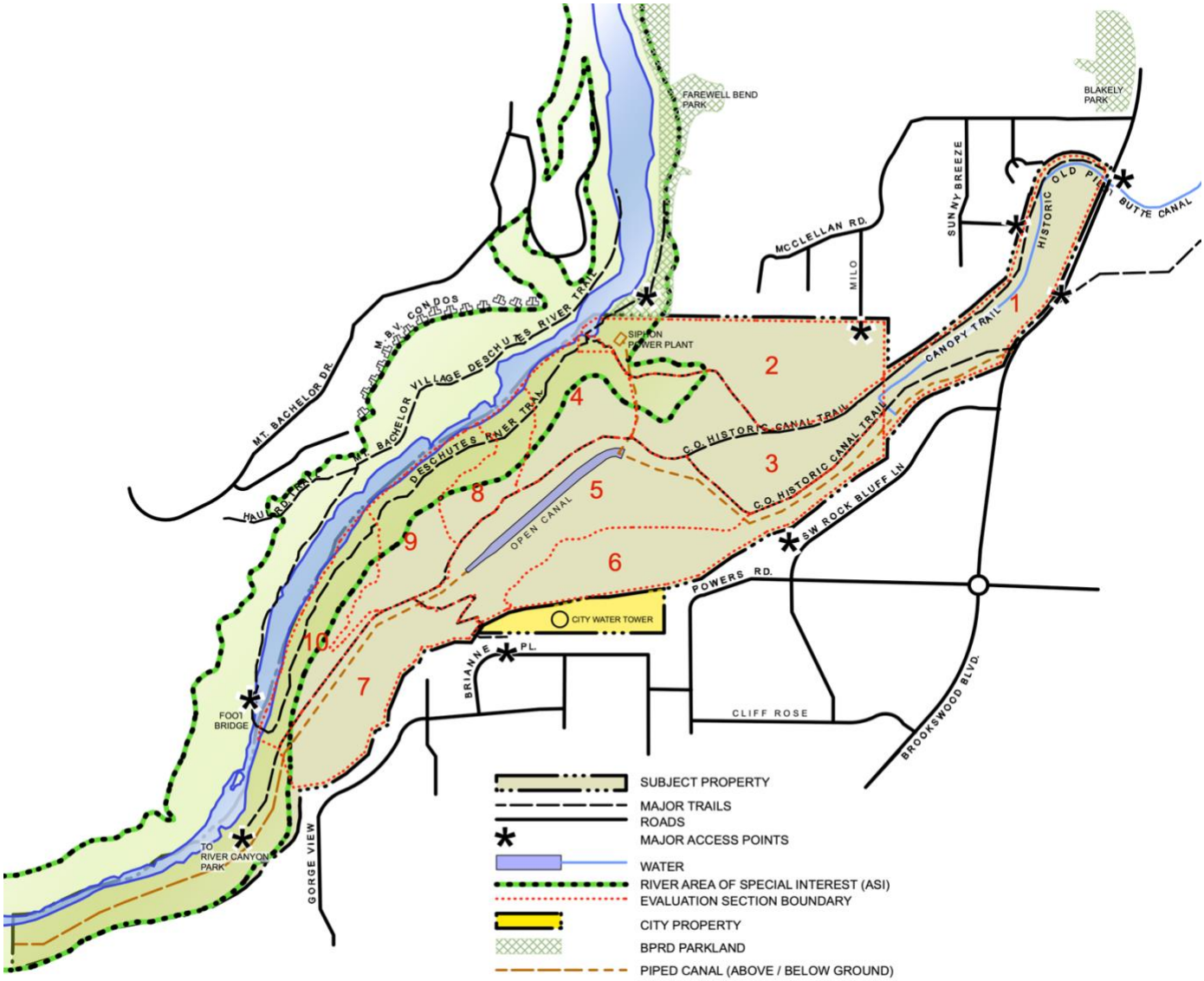


Figure 4 – Context Map of Opportunity Area 9 (COID – Deschutes South Canyon)

3.2 – Community Value

A. Public Access

Score: 10/10

Extensive public access is provided through a combination of formal and informal trail systems. Formal trailheads are located at Brianne Place, Brookswood Boulevard, and Pine Drive, and the Central Oregon Historic Canal Trail underpass at Brookswood Boulevard, while additional

informal access points connect the property to surrounding neighborhoods at Rock Bluff Lane, Mill Terrace Place, Sunny Way, and Milo Avenue (see Figure 4).

The Deschutes River Trail connects to several marked trails to the interior of the property. A pedestrian bridge maintained by Bend Park and Recreation District (BPRD) provides access to the midpoint of the property from the west side of the Deschutes River.

These access points connect to an extensive network of trails throughout the property, including more than 50 informal user-created paths that link formal trails and provide access to scenic viewpoints, river overlooks, and other notable features. While the property is highly accessible, there are no designated parking areas associated with the trailheads, encouraging travel to the property on foot or bicycle. Cascades East Transit is the public bus line that has stops near Blakely Park and along Brookswood Boulevard, and the proximity of these stops to the property improve overall accessibility.

BPRD holds a permanent easement for the Deschutes River Trail. The Central Oregon Historic Canal Trail (COHCT) is the subject of a license agreement between BPRD and COID. These two recreational trails that pass through the property have regional significance. In addition, the trail extending from Brookswood Boulevard to the COID hydro-syphon facility, commonly known as the "Canopy Trail," has been maintained under a Federal Energy Regulatory Commission (FERC) agreement since 1987, and now has a permanent, if relocatable, recorded easement. The COHCT passes beneath Brookswood Boulevard and through the BPRD trail system connects to Larkspur Park, contributing to broader citywide trail connectivity. A COID-maintained access road, which overlaps a portion of the COHCT, extends the length of the property and is frequently used for walking, running, and bicycling.

Few natural areas in Bend can be reached on foot or by bicycle from so many neighborhoods. For residents who walk to the trailhead rather than drive to it, this site is part of everyday life, and that kind of access will be difficult to recreate elsewhere.

B. Recreational Use

Score: 10/10

With more than 9 miles of formal and informal trails, the Deschutes South Canyon is one of southwest Bend's most heavily used natural open space areas. Existing uses include walking, running, hiking, bicycling, dog walking, wildlife viewing, fishing, birding, cross-country skiing, sledding, and informal rock climbing. Additionally, users have created a variety of informal recreation features throughout the site, including a community-built outdoor exercise area known as "The Ruins" and multiple mountain bike trails and jump features.

Trail use data collected by BPRD demonstrates the property's significant recreational value. Between July 2014 and April 2015, fixed trail counters recorded 15,120 monthly trail users on the east bank of the Deschutes River Trail adjacent to this property[8]. And this usage has only grown; between March and August 2016, trail counters recorded 131,955 users on the Deschutes River Trail South Canyon segment and 34,304 users on the Central Oregon Historic Canal Trail[9]. Since that time, continued population growth in Bend and increased demand for outdoor recreation, particularly following the COVID-19 pandemic, have likely contributed to substantially higher levels of use. The high usage demonstrates that the property already

[8] https://bendoregon.gov/wp-content/uploads/2025/12/Tech-Memo-5.1-Current-Practices_Final.pdf

[9] Bend Bulletin articles dated 11/7/2016 and 2/10/2023

functions as an established community recreation resource despite the absence of formal park designation. Its continued availability as open space will help meet growing demand for outdoor recreation opportunities in southwest Bend.

The property's recreational importance is enhanced by its accessibility from surrounding neighborhoods and its connection to the broader regional trail network.

C. Equitable Access

(Unscored Descriptive Resource)

This large property provides important access to nature, recreation, and open space for a diverse population of southwest Bend residents. The surrounding neighborhoods include both a substantial population of older adults and a high concentration of families with children, creating broad community demand for nearby outdoor recreation opportunities.

Nearly one-third of residents within the surrounding census tracts are over the age of 65. For older adults, access to nearby trails and natural areas can support physical activity, mental well-being, social connections, and healthy aging. At the same time, the area has a significant number of families with children. In some adjacent neighborhoods, more than 60 percent of households include children, highlighting the importance of nearby open space for outdoor play, exploration, environmental learning, and family recreation.

The property also serves residents for whom access to green space must be available within walking or bicycling distance. The proximity to neighborhoods reduces the necessity for driving to access green space. In one adjacent census tract, 16.5 percent of households do not have access to a vehicle. Nearby apartment complexes and multifamily housing developments provide homes for lower-income residents who may face additional barriers to accessing parks and recreation opportunities elsewhere in the city. Multiple neighborhood access points, regional trail connections, and proximity to established residential areas allow the site to function as an accessible community resource for a broad range of users.

Access to nature has been shown to support physical health, mental well-being, social cohesion, and overall quality of life. As Bend continues to grow, preserving publicly accessible natural areas within walking and bicycling distance of established neighborhoods will become increasingly important for advancing community health, promoting equitable access to recreation, and maintaining the livability of the city.[10] Natural areas that older adults, families, and households without cars can all reach on their own are rare, and this site is one of them.

D. Natural Open Space Function

Score: 8/10

Although COID's irrigation and hydropower infrastructure is present, it occupies a limited, linear footprint relative to the property as a whole. (See Figure 2.) For much of its length, the canal follows existing maintenance roads and shifts between buried pipe, above-ground pipe, and a concrete-lined open channel, with a portion of the flow routed to the hydro-syphon facility. Because this development is confined to a narrow corridor, the remainder of the property continues to function as natural open space.

[10] https://bendoregon.gov/departments/community-development/bend-metro-planning-organization/transportation-data/demographic-data/

COID will retain ownership of approximately 35 acres to support ongoing operation, maintenance access, and management of water delivery and hydropower infrastructure. Developed features associated with these operations include a storage and maintenance area adjacent to the canal, gravel service roads, utility corridors, and localized power infrastructure. These features are concentrated primarily within the southern and eastern portions of the site and occupy a relatively small percentage of the overall property.

Outside of these operational areas, most of the property remains in a predominantly natural condition. Extensive upland High Desert habitat, riparian areas along the Deschutes River, and canal-adjacent open space continue to provide significant ecological, scenic, and recreational value. Overall, the existing natural landscape value is characterized by limited and concentrated infrastructure development within a predominantly natural setting. That a working irrigation and hydropower system and a largely natural landscape have coexisted here for decades is part of what makes the site remarkable. It shows that open space and essential infrastructure can share the same ground.

E. Adjacent Land Use Compatibility

Score: 8/10

The open space is bordered by established residential neighborhoods and Brookswood Boulevard, a heavily traveled arterial roadway that forms the eastern edge of the site. These adjacent land uses introduce minimal impacts, including traffic noise, visual intrusion from nearby development, artificial lighting, and increased human activity along portions of the site perimeter. Brookswood Boulevard also functions as a partial barrier to wildlife movement, although an existing crossing beneath the road helps some wildlife move safely. Homes along portions of the property lines also introduce fences, pets, noise, and inhibit the movement of wildlife. Future residential development on the property would increase these impacts if not carefully planned.

Despite these adjacent land use pressures, the property's size, trail network, topographic variation, river setting, and mature trees allow visitors to feel removed from the city while remaining minutes from home.

F. Scenic Resources

Score: 8.3/10, (See Figure 5 for individual section scores.)

Within the surrounding Bend development, this canyon contains a diverse and visually distinctive landscape that provides scenic resources uncommon within an urban setting. The site overlooks a little more than one mile of the Deschutes River corridor, where informal trails and overlooks provide direct views of the river, riparian vegetation, canyon walls, and exposed rock outcrops. These river-facing viewpoints offer a sense of enclosure, natural character, and visual separation from surrounding development that is rare within city limits.

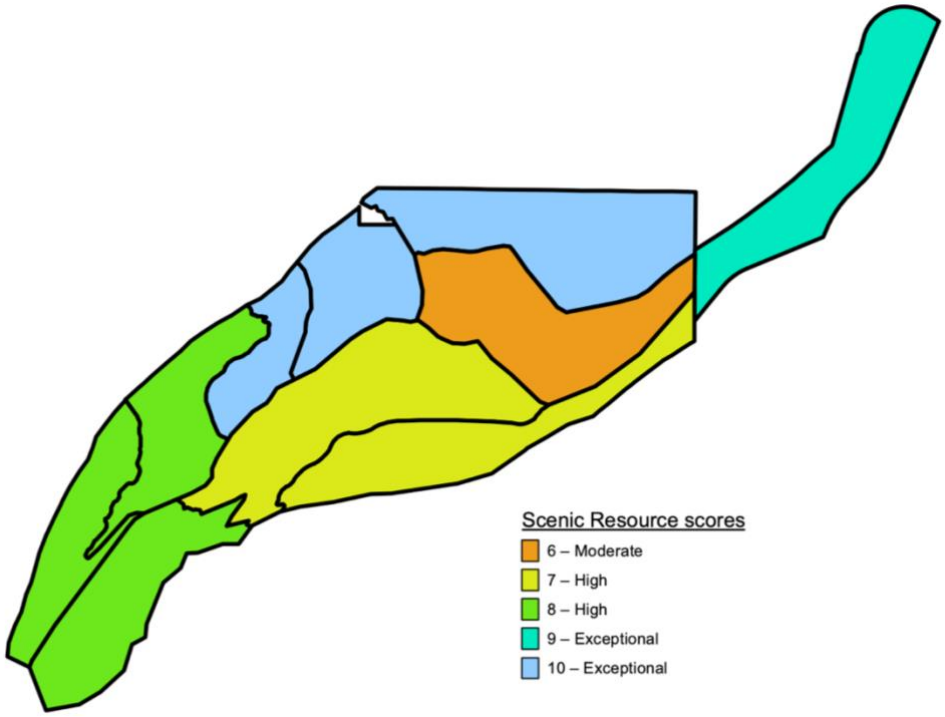


Figure 5 – Scenic Resource scores by Study Area

Topographic variation throughout the property enhances scenic quality by creating a range of visual experiences, from intimate riparian and canal-side corridors to elevated upland viewpoints. The historic Pilot Butte Canal corridor and Canopy Trail are particularly notable scenic features, characterized by mature ponderosa pines, seasonal water, dense vegetation, and a shaded trail environment distinct from the surrounding High Desert landscape.

In upland areas near the City of Bend water tower and eastern property edge, higher elevations provide expansive views and panoramic vistas of the Cascade Range, including prominent mountain peaks visible from multiple locations. These long-range views complement the more enclosed scenic character of the river corridor and contribute to the site's overall visual diversity.

These views of river, rimrock, forest, and Cascade peaks are open to everyone, and for many visitors they are part of an ordinary walk. Scenery of this quality is a rare find within city limits.

G. Historic Features

(Unscored Descriptive Resource)

Several historic features associated with the early irrigation and industrial development of Bend are found on the property. Most notably, the site includes a remnant segment of the historic Pilot Butte Canal system, one of the earliest and most significant pieces of water infrastructure in Central Oregon.

Alexander M. Drake, Bend's founder, created the "Old Pilot Butte Canal" in 1904. It was the first irrigation canal in Bend and is described in the Historic American Engineering Record filing OR-62[11] (HAER) in the Library of Congress as "the most historically significant canal connected with the founding of Bend." Completed in 1905, the canal provided water to support agriculture,

[11] This HAER filing may be found at https://www.loc.gov/pictures/collection/hh/item/or0342/

settlement, and economic development throughout the region. The canal was a critical factor in the establishment and growth of Bend, Redmond, and other Central Oregon communities.

Remnants of a historic tuff quarry and stone-cutting operation are present on the property, suggesting the area may have served as a source of local building material during Bend's early development.

The Pilot Butte Canal remnant and the tuff quarry and stonecutting remains preserve physical evidence of the irrigation and industrial activity that enabled Bend's early growth. Continued public access along the 1905 canal alignment allows this history to be interpreted in its original setting, which adds to the site's cultural and educational value.

3.3 – Environmental and Ecological Value

A. Habitat Value

Score: 8.4/10 (See Figure 6 for individual section scores.)

Habitat value is high, driven by a diverse and ecologically productive mosaic of upland, riparian, and canal-associated habitats. More than 110 native and non-native plant species have been documented on the property. Wildlife observations include mule deer, red fox, coyotes, bobcats, river otters, waterfowl, raptors, songbirds, squirrels, chipmunks, reptiles, and numerous pollinating insects. Seasonal changes in plant communities are marked by blooming wildflowers, native grasses, forbs, fungi, and riparian vegetation, providing habitat resources throughout the year.

The property's habitat value is enhanced by its location along the Deschutes River corridor, one of the most significant ecological features in Central Oregon. The river supports riparian habitat that is uncommon within the surrounding High Desert landscape and provides essential food, water, cover, and breeding habitat for a wide variety of species. Structural diversity created by mature trees, shrubs, herbaceous vegetation, rock outcrops, and aquatic features contributes to overall habitat quality and ecological resilience.

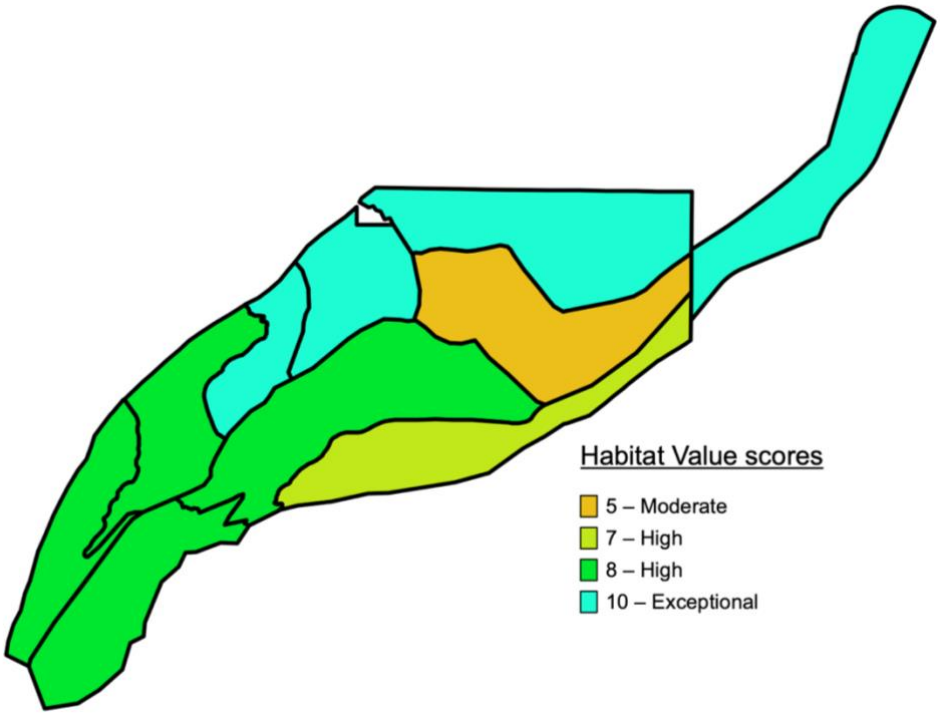


Figure 6 – Habitat Value score by Study Area

Habitat quality varies across the property, with the highest variety of species occurring along the historic Pilot Butte Canal corridor. Elevated soil moisture along this linear feature creates microclimates and riparian conditions that support biodiversity well beyond what the surrounding High Desert would otherwise sustain.

The site also contains mature ponderosa pine stands, including several exceptionally large trees that likely predate much of the surrounding urban development. These trees provide important nesting, roosting, and foraging habitat for birds and other wildlife while contributing to the scenic and ecological character of the property.

Habitat of this diversity and quality is increasingly uncommon in an urban setting. The concentration of species along the canal corridor, the mature ponderosa stands, and the direct connection to the Deschutes River support more than 130 recorded bird species and a broad range of mammals, reptiles, and pollinators, establishing the property as a significant wildlife resource within Bend.

B. Wildlife Corridor Function

Score: 10/10

The Deschutes South Canyon is a critical component of the larger Deschutes River wildlife corridor and is one of the most important habitat connectivity areas within the City of Bend. Its location along the river provides a continuous movement corridor that supports wildlife travel, foraging, breeding, and seasonal migration across the urban landscape.

The Deschutes River is particularly significant in the High Desert environment of Central Oregon because it provides a reliable water source and supports dense riparian vegetation that offers food, shelter, and cover for a wide range of species. The corridor supports mammals, birds, reptiles, amphibians, fish, and pollinating insects while also providing critical winter

habitat and movement pathways for mule deer. The area additionally supports nesting, roosting, and hunting habitat for bald eagles, ospreys, hawks, and other raptors. See Table 9.

The historic Pilot Butte Canal corridor provides a secondary wildlife movement pathway across the property. Seasonal water availability supports plant communities that are denser and more diverse than adjacent upland habitats, creating additional cover, forage, and travel routes for wildlife. Together, the river corridor and canal corridor create a network of interconnected habitats that increase ecological function across the site.

Wildlife movement persists despite nearby transportation infrastructure. Mule deer have been observed using the under crossings beneath Brookswood Boulevard, demonstrating that the landscape remains permeable. The Bend Park and Recreation District pedestrian bridge provides an additional crossing between habitats on both sides of the river. South of the property, larger residential parcels and open lands continue the connection to extensive U.S. Forest Service lands west and south of Bend.

At both the local and regional scale, the property plays an essential role in maintaining habitat connectivity within the Deschutes Basin. Because it sits within this continuous corridor, its value extends well beyond the property boundary, supporting wildlife movement throughout the river corridor.

C. Vegetation Diversity

Score: 8.6/10 (See Figure 7 for individual section scores.)

Mature ponderosa pine and a mosaic of native shrubs characterize the vegetation on site, which represents both upland shrub-steppe and riparian plant communities. More than 110 plant species, including 70+ natives, have been documented on the property, reflecting a high degree of ecological diversity for an urban-adjacent landscape. The dominant upland community consists of ponderosa pine, bitterbrush, sagebrush, native bunchgrasses, and a variety of flowering forbs adapted to the region's dry climate. Along the Deschutes River and the historic Pilot Butte Canal corridor, greater moisture availability supports a distinct riparian community of willow, alder, dogwood, sedges, rushes, and other water-associated species.

The canal's seasonal water is a particularly notable contributor, sustaining greater species richness and structural complexity than would otherwise occur in this High Desert setting. Together, the contrast between dry upland and moist riparian zones provides wildlife habitat, soil stabilization, erosion control, carbon sequestration, nutrient cycling, and climate resilience, while adding to the site's scenic character. Trees and canopy are addressed in Section 3.3 – D. , and the canal's influence on riparian vegetation in Section 3.3 – E.

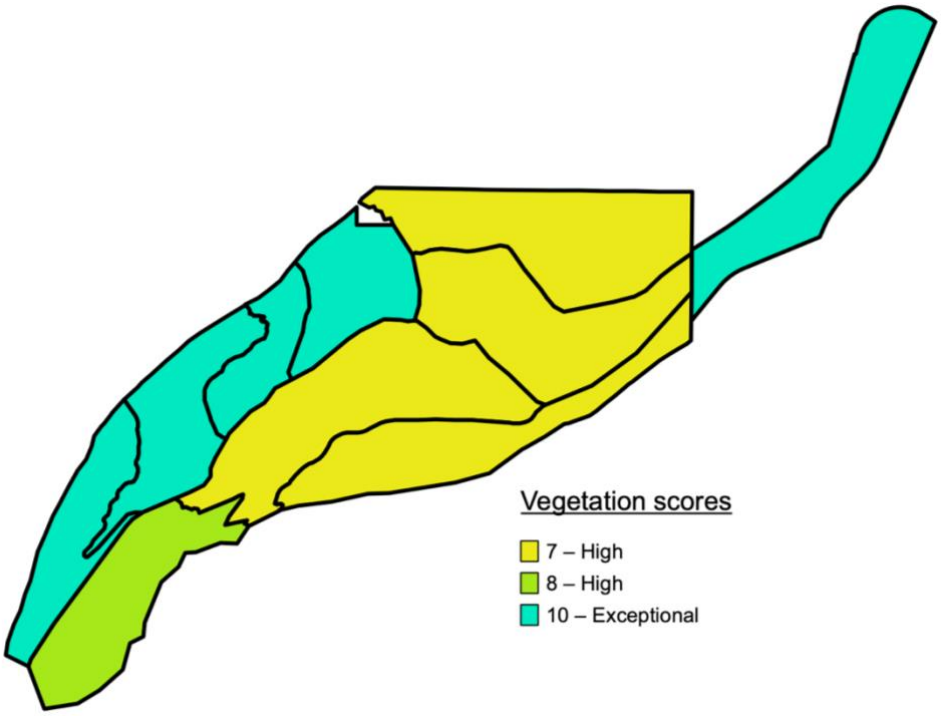


Figure 7 – Vegetation Diversity score by Study Area

D. Tree Inventory and Canopy

i. Automated Tree Assessment from Aerial Photography

For a site as large, as topographically challenging, and as heavily wooded as the COID site, an on-the-ground survey (even utilizing modern survey-grade GPS technology) is not economically practicable. Tree surveys, using consumer-grade handheld devices are not sufficiently accurate for positional information[12].

Sophisticated automated tree count (even including projections of tree diameters, species, and health) are possible using a combination of aerial imagery and LIDAR detection, but such sophisticated data sets for this tract do not exist, and the budgetary requirements for obtaining such data and developing such analysis greatly exceeds that available for a report of this type.

[12] Consumer-grade GPS devices, including those built into smartphones and basic handheld units, typically deliver positional accuracy in the range of 3 to 10 meters under open sky conditions. For navigation or casual outdoor use, this level of precision is entirely adequate. However, surveying tasks require accuracy measured in centimeters rather than meters. (Source)

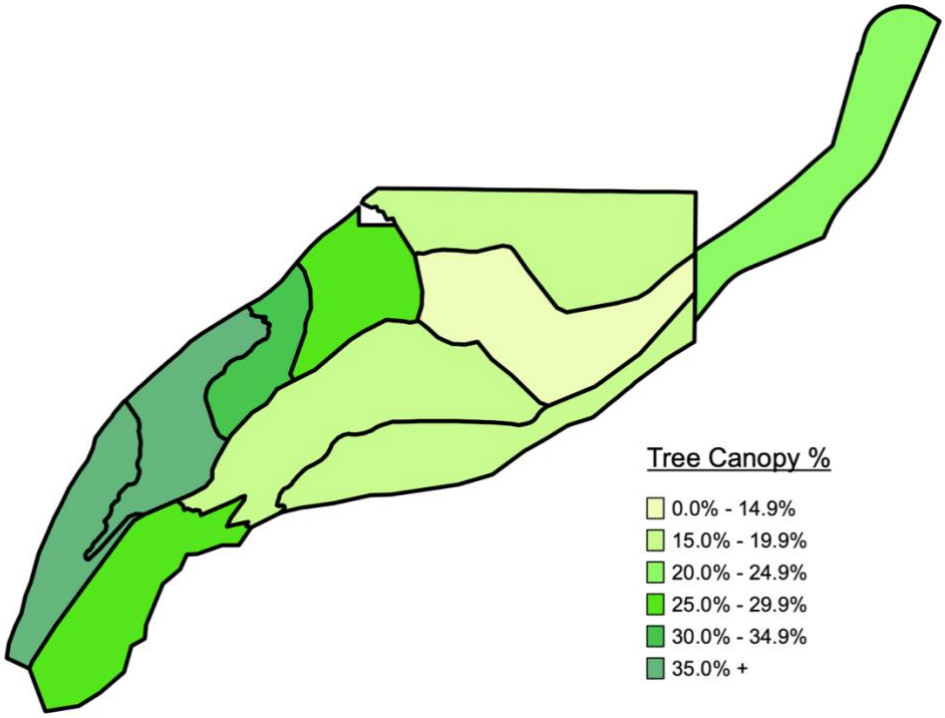
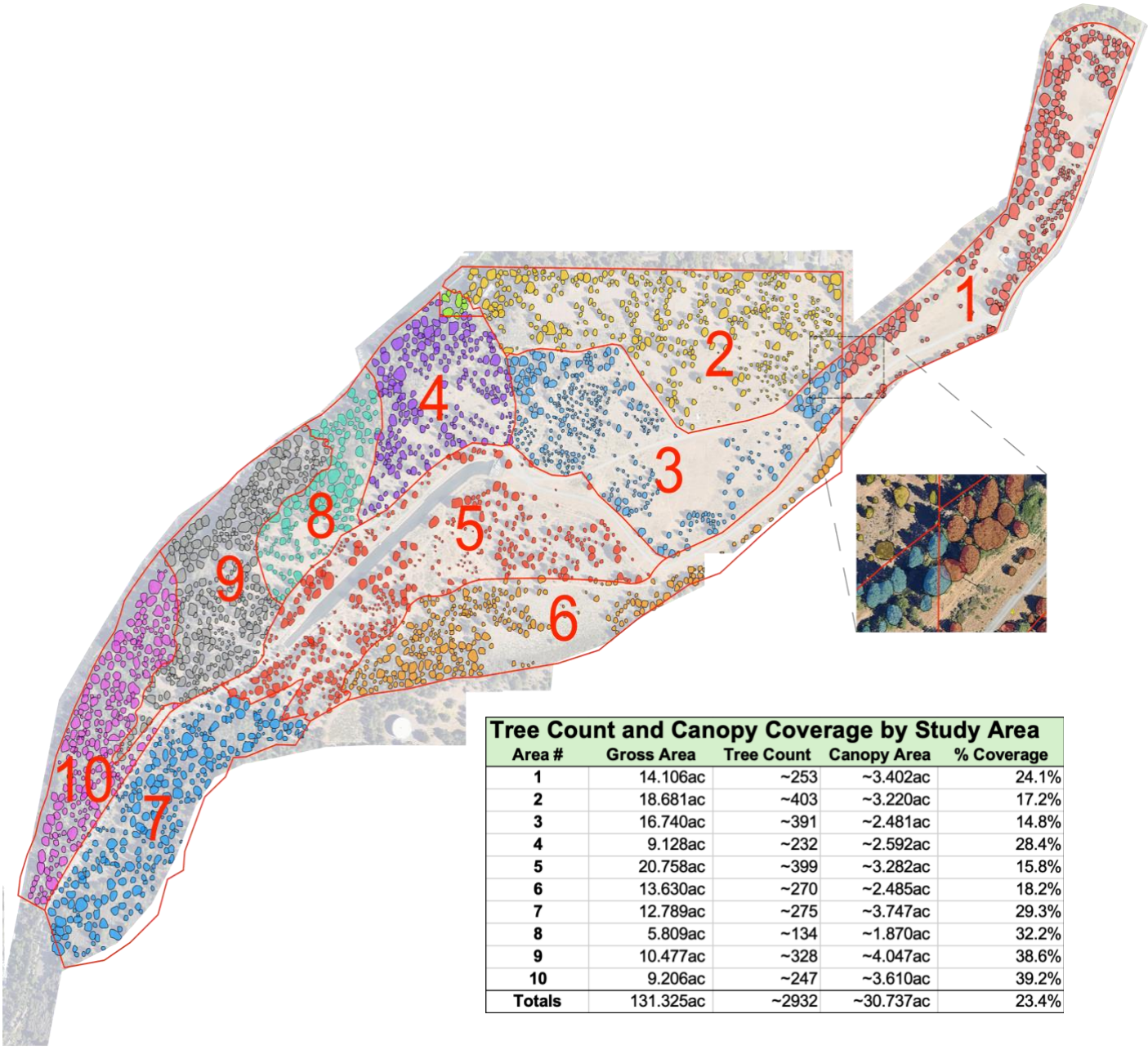


Figure 8 – Tree Canopy by Percentage (overview)

A reasonably meaningful assessment of tree count and canopy cover has been developed using generally available aerial imagery from Google Maps combined with a machine-learning algorithm called "Detectree" [13]. Detectree uses A.I.-based image analysis to detect tree crown extents from aerial imagery and returns geo-located polygons of the crowns, which can then be visually analyzed (for accuracy) and quantified in a GIS system.

Data developed from processes like this can be improved using additional training on context-specific imagery. For the purposes of this study, "false positives" (polygons that the algorithm returned as likely trees but are not) have been manually removed from the data set. A few obvious "false negatives" (trees observable in the photos but missed in the count) have also been corrected, but the numbers developed most likely represent a mild undercount.

[13] https://acocac.github.io/environmental-ai-book/forest/modelling/forest-modelling-treecrown_detectree.html



Tree Count and Canopy Coverage by Study Area

Area #	Gross Area	Tree Count	Canopy Area	% Coverage
1	14.106ac	~253	~3.402ac	24.1%
2	18.681ac	~403	~3.220ac	17.2%
3	16.740ac	~391	~2.481ac	14.8%
4	9.128ac	~232	~2.592ac	28.4%
5	20.758ac	~399	~3.282ac	15.8%
6	13.630ac	~270	~2.485ac	18.2%
7	12.789ac	~275	~3.747ac	29.3%
8	5.809ac	~134	~1.870ac	32.2%
9	10.477ac	~328	~4.047ac	38.6%
10	9.206ac	~247	~3.610ac	39.2%
Totals	131.325ac	~2932	~30.737ac	23.4%

Figure 9 – Computer-generated Tree Canopy Inventory overlaid on aerial imagery

ii. GPS-assisted Tree Survey

As part of the Green Space Evaluation, a pilot tree survey was conducted to test whether standard mobile phones could be used to document tree locations and characteristics in the field. Volunteers recorded the species, size, and approximate location of trees in Study Area 1 using smartphone GPS. Trees less than 6 inches in diameter at breast height (dbh) were not included.

The pilot demonstrated that smartphones can be useful for documenting trees in the field, but their GPS accuracy is not sufficient for precise mapping of tree locations. The survey was limited to Study Area 1.

Outside of the riparian area along the canal, ponderosa pine and western juniper accounted for nearly all of the trees recorded in the survey (see Table 5), representing approximately 54

percent and 46 percent, respectively, of the regulated and priority trees. The survey team observed that juniper appears to be more abundant in this portion of the property than in other areas of the site.

Just over 30 percent of the recorded trees were classified as Priority trees, representing the largest trees in the survey. Most of the largest trees were concentrated near the historic canal, where additional water availability may have supported greater growth than would typically occur in the surrounding dry landscape. As a result, the proportion of Priority trees recorded in this study area may be somewhat higher than would be expected in other portions of the property.

Although the survey covered only a portion of the site, it provides a useful indication of general tree patterns across the property. Based on the survey:

- Approximately one-third of regulated-size trees are likely to be large enough to qualify as Priority trees; and
- Ponderosa pine likely makes up the majority of Priority trees.

Summary of Trees by Status		
Species	**Count**	**% Total**
Regulated Small (6"—10" dbh)		**38.1%**
Juniper	47	21.6%
Ponderosa	36	16.5%
Regulated Medium (10"—19.9" dbh)		**31.7%**
Juniper	49	22.5%
Ponderosa	20	9.2%
Priority Trees (> 20" dbh)		**30.3%**
Juniper	4	1.8%
Ponderosa	62	28.4%

Table 5 – Tree Species and Size Categories

The size of mature trees is an important consideration when evaluating their green space value. The City of Bend Development Code, Section 3.2.200, establishes requirements for tree preservation and replacement. While the code emphasizes preserving existing mature trees, removal may be mitigated through replacement based on tree diameter. This approach substantially underestimates the ecological value of mature trees, because a tree's biomass, and therefore its ability to store carbon, increases in proportion to roughly the 2.4 power of its diameter.[14]

Research on ponderosa pine-dominated forests east of the Cascades illustrates this difference. One study found that trees 21 inches dbh and larger made up only about 3 percent of the trees sampled but contained approximately 42 percent of the aboveground carbon.[15] In other words, a

[14] https://research.fs.usda.gov/treesearch/6996 and https://research.fs.usda.gov/treesearch/18815

[15] https://www.frontiersin.org/journals/forests-and-global-change/articles/10.3389/ffgc.2020.594274/full

relatively small number of large trees can represent a substantial share of the carbon stored in a forest.

This distinction is important on this property, where 43 ponderosa pines in Study Area 1 measure 30 inches dbh or larger, many estimated to exceed a century in age. Beyond carbon storage, these trees contribute to urban cooling and provide wildlife habitat, shade, scenic character, and structure to the site's natural landscape, a green space value that is not captured by simply counting trees. Retaining large trees would preserve these benefits for the site and the surrounding community.

The field survey also identified a distinct riparian tree community along the historic canal, where ten survey waypoints documented multi-stemmed willow, alder, and black cottonwood. Although this community represents a relatively small portion of the property's trees, it provides shade, moisture, and dense vegetation that support wildlife habitat conditions not commonly found in the surrounding uplands. Because its persistence may depend on water availability from the canal, maintaining the riparian corridor and the conditions that support it would help preserve an important component of the site's ecological diversity.

E. Hydrologic Features

(Unscored Descriptive Resource)

The Deschutes River forms the western boundary of the Deschutes South Canyon property and is one of the site's defining ecological and hydrologic features. As a perennial river flowing through a High Desert environment, the Deschutes provides a reliable year-round water source that supports riparian habitat, moderates local temperatures, enhances biodiversity, and contributes to the function of the larger river corridor. River-adjacent landscapes are limited within the City of Bend and provide disproportionately high habitat, recreational, scenic, and ecosystem benefits, so the river substantially increases the property's environmental value relative to many other Opportunity Areas.

The river corridor and adjacent uplands are protected through the City of Bend's Waterway Overlay Zone (WOZ) under Bend Development Code 2.7.600. Mapped protected resources on the property include the River Area of Special Interest, Upland Area of Special Interest, Riparian Corridor, and Waterway Overlay Zone. These designations recognize the site's environmental sensitivity and the importance of maintaining water quality, riparian vegetation, habitat connectivity, and scenic character along the Deschutes River.

The property also contains a unique secondary hydrologic feature of significant ecological importance: the historic Pilot Butte Canal corridor. Although portions of the canal system have been modified to accommodate COID infrastructure and the hydro-syphon power generation facility, the canal continues to influence local hydrology. Its seasonal water flow and elevated soil moisture create a linear zone of increased biological productivity across the property. Along the Canopy Trail, the canal supports mature ponderosa pine, willow, alder, dogwood, sedges, rushes, and other moisture-dependent vegetation that would otherwise be uncommon in this upland High Desert setting, producing plant communities substantially more diverse and productive than adjacent uplands. This influence also creates microclimates and provides additional cover and movement corridors for wildlife.

No other undeveloped Opportunity Area in Bend retains both a river and a historic canal corridor. The canal's seasonal flow sustains vegetation and wildlife habitat not found elsewhere in the property's uplands, and it is only as secure as the infrastructure and land use around it.

F. Geologic Features

(Unscored Descriptive Resource)

The Deschutes South Canyon property contains an unusually diverse collection of volcanic rock formations that help tell the story of how the Bend area was shaped over millions of years. Basalt flows, volcanic ash deposits, exposed rock ledges, and fault-related features are visible across the property, creating a landscape where the area's volcanic history can be observed directly. This combination of accessible geology, scenic landforms, and associated habitat contributes to the property's scientific, educational, scenic, and ecological value.

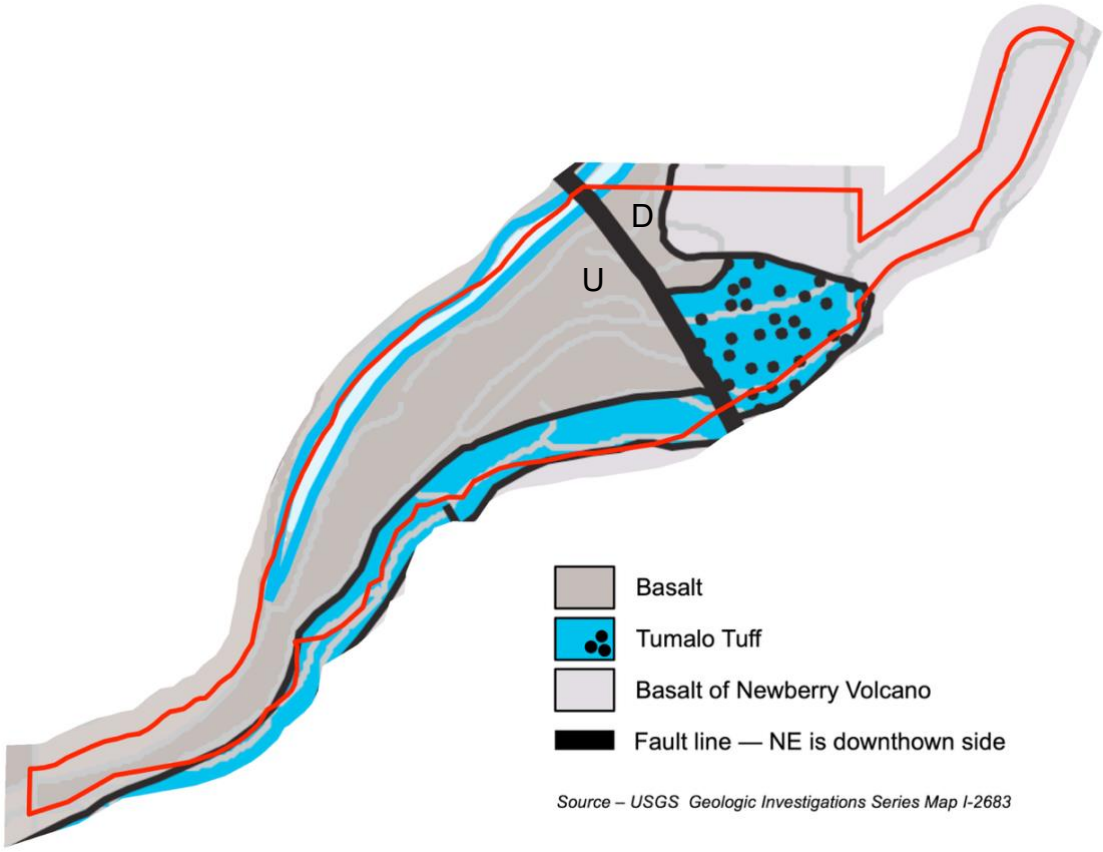


Figure 10 – Geologic features of Site

Basalt outcrops are visible in several areas of the property, including along the Brookswood Boulevard edge and on the rimrock overlooking the Deschutes River corridor. These dark volcanic rocks formed from ancient lava flows that spread across the region and helped create the broad landscape of the Deschutes Basin. The property contains exposures identified as Bend Basalt and the more recently recognized Deschutes River Basalt. Where these rocks form steep rimrock and ledges, they create dramatic changes in elevation and provide scenic views into the river corridor. The rocky terrain also creates sheltered areas and other habitat conditions that are different from those found on the surrounding uplands.

The property is also notable for the presence of several different types of volcanic ash rock, or tuff. These include the Shevlin Park Tuff, Desert Springs Tuff, and Tumalo Tuff (Bend

Pumice).[16] Tuff forms when volcanic ash and other material from explosive eruptions settle and become compacted into rock. Finding several different tuff formations in close proximity provides a visible record of the region's complex volcanic history and makes the property particularly useful for understanding how Central Oregon's landscape developed.

Evidence of past human use of these geologic resources is also present. Remnants of a tuff quarry and rock-cutting operation can be found on the property, along with discarded piles of cut stone containing all three types of tuff. These features provide a connection between the area's geologic resources and its history of human use.

The property also contains evidence of the Tumalo Fault, part of the Sisters Fault Zone. The fault can be seen in the change in elevation on either side of the FERC-designated trail (concurrent with a section of COID service road) as it descends toward the hydro-siphon power plant and the Deschutes River Trail. This visible change in the landscape provides another example of the geologic forces that have shaped the area.

Geology is important not only because of what it tells us about the past, but also because it influences the living landscape today. Different types of rock create differences in soil, drainage, slope, temperature, and moisture. These variations produce a range of small-scale habitats across the property and help support different plant communities. Rock outcrops, rimrock ledges, and areas of loose rock also provide shelter and nesting sites for wildlife and can offer protected areas with different temperature and moisture conditions.

The property's geology also adds to its recreational and educational value. Rimrock, rock outcrops, and changes in elevation create distinctive views and experiences for people using the trails, while the exposed formations provide opportunities to see and interpret the volcanic history of Central Oregon firsthand. Few places within Bend offer such a concentrated and visible record of the geologic processes that shaped the modern landscape and the Deschutes River corridor.

The exposed basalt, multiple tuff formations, and visible trace of the Tumalo Fault provide an accessible record of Central Oregon’s geologic history. Their proximity to residential neighborhoods gives the property considerable educational and scientific value, and few sites within Bend offer comparable opportunities for field-based learning.

[16] https://pubs.usgs.gov/imap/i2683/i2683_bend_pamphlet.pdf

4 – Concluding Summary: Overall Green Space Value Assessment

4.1 – Overview

The Deschutes South Canyon Opportunity Area represents a **high-value green space within the City of Bend**, with a rare combination of ecological, recreational, scenic, geological, and community values. At approximately 140 acres, including more than a mile of Deschutes River frontage, the property encompasses a substantial and largely undeveloped portion of the river corridor within the urban area. Its significance is not based on any single feature, but on the accumulation and interaction of these values within a landscape of this size.

The property provides important habitat and landscape connectivity within the Deschutes River corridor, supporting a diversity of vegetation and wildlife and contributing to a larger network of natural areas within and beyond the site. Field observations have documented more than 130 bird species, in addition to other wildlife observed throughout the property. Its riparian areas, mature ponderosa pine stands, varied terrain, and river-adjacent habitats provide ecological functions that are increasingly limited within an urbanizing landscape. Where the property overlaps mapped priority or sensitive habitats, including riparian areas and mule deer winter range, these resources further reinforce its ecological importance. The site's value is also strengthened by its geographic position: preserving a relatively large, connected area of natural landscape along the river can help maintain ecological functions that become increasingly difficult to sustain as surrounding lands are developed.

The property's recreational value is similarly significant. Existing trails and informal routes provide extensive opportunities for walking, running, bicycling, wildlife viewing, and other outdoor activities, and the area is already heavily used by the surrounding community. During the March – August 2016 monitoring period, BPRD recorded more than 166,000 users on the Deschutes River and Central Oregon Historic Canal trails in the South Canyon area. Its proximity to established residential neighborhoods means that these benefits are available without requiring travel to parks or open spaces farther from the urban core. This accessibility is particularly important in considering green space as a component of community health, quality of life, and equitable access to outdoor recreation.

The site's scenic, geological, and riparian resources further distinguish it within Bend's urban landscape. River views, exposed rimrock, mature trees, varied landforms, and the contrast between dry uplands and lush riparian vegetation create a visually distinctive landscape and provide opportunities to experience the natural features that characterize the Deschutes River corridor. The riparian areas along the Deschutes River and historic canal are particularly important, providing the shade, moisture, vegetation, and structural complexity that support wildlife and ecological functions not found in the surrounding arid uplands. Although relatively limited in extent, these riparian communities contribute disproportionately to the site's habitat value.

The property's geology also provides an accessible record of the processes that shaped the Bend area. Basalt outcrops and tuff formations illustrate the area's volcanic history while contributing to scenic character, habitat diversity, and opportunities for environmental education and interpretation. The mature tree community adds another important dimension to this landscape.

Although the pilot tree survey covered only a portion of the property, more than 30 percent of the recorded regulated-size trees qualified as Priority trees, with mature ponderosa pines making up much of this group. These large trees contribute disproportionately to carbon storage while also providing wildlife habitat, shade, scenic character, and structural complexity. Together, the site's geology, vegetation, landforms, and river setting create a distinctive sense of place that extends beyond the property's individual ecological functions.

Importantly, the conservation value of Deschutes South Canyon is also related to its **rarity**. A largely undeveloped property of this size, situated along the Deschutes River and containing mature vegetation, diverse habitats, recreational access, scenic resources, and connections to surrounding natural areas, represents an increasingly limited type of landscape within Bend's urbanized environment. While adjacent residential development and transportation infrastructure introduce some conflicts and pressures, these impacts do not eliminate the underlying ecological, recreational, and community value of the property.

Taken together, these characteristics support the conclusion that Deschutes South Canyon should be considered a **high-value green space and a significant conservation opportunity within the Opportunity Area framework**. Future planning should prioritize strategies that retain the property's ecological integrity and landscape connectivity while maintaining public access and recreational opportunities. Where development is considered necessary, an integrated approach that concentrates development in less sensitive areas and protects the most valuable habitat, river corridor, scenic, geological, and recreational resources would help retain the functions that make this property distinctive.

The long-term value of Deschutes South Canyon lies not only in what the property provides today, but in what it can continue to provide as Bend grows. **Once the site's connected natural landscape is fragmented or developed, many of its ecological functions, recreational opportunities, and landscape characteristics will be difficult or impossible to fully restore.** Protecting these resources now will preserve a rare component of Bend's natural landscape while providing lasting benefits for wildlife, recreation, community health, and the broader Deschutes River corridor.

4.2 – Specific Recommendations

Because of the breadth of its unique community and ecologic value, Deschutes South Canyon merits significant preservation. Recognizing that the zoning enacted in 2016 makes some development inevitable, Save Bend Green Space has prioritized the value of portions of the site and makes the following specific recommendations:

A. Develop only in low-priority upland areas

Development on this site should occur only on the broad, open areas of the site that are not considered sensitive areas in the Bend Development code. Avoid existing geologic features such as rimrock and exposed tuff.

B. Preserve the highest-value green spaces from development

Save Bend Green Space has identified, in addition to the established Water Overlay Zone ASI, three areas that represent the **highest value green space**. These all should be protected both

from development and from damage caused by the development process in other areas. These areas, and a brief description of the justification for the "highest value" status, follows:

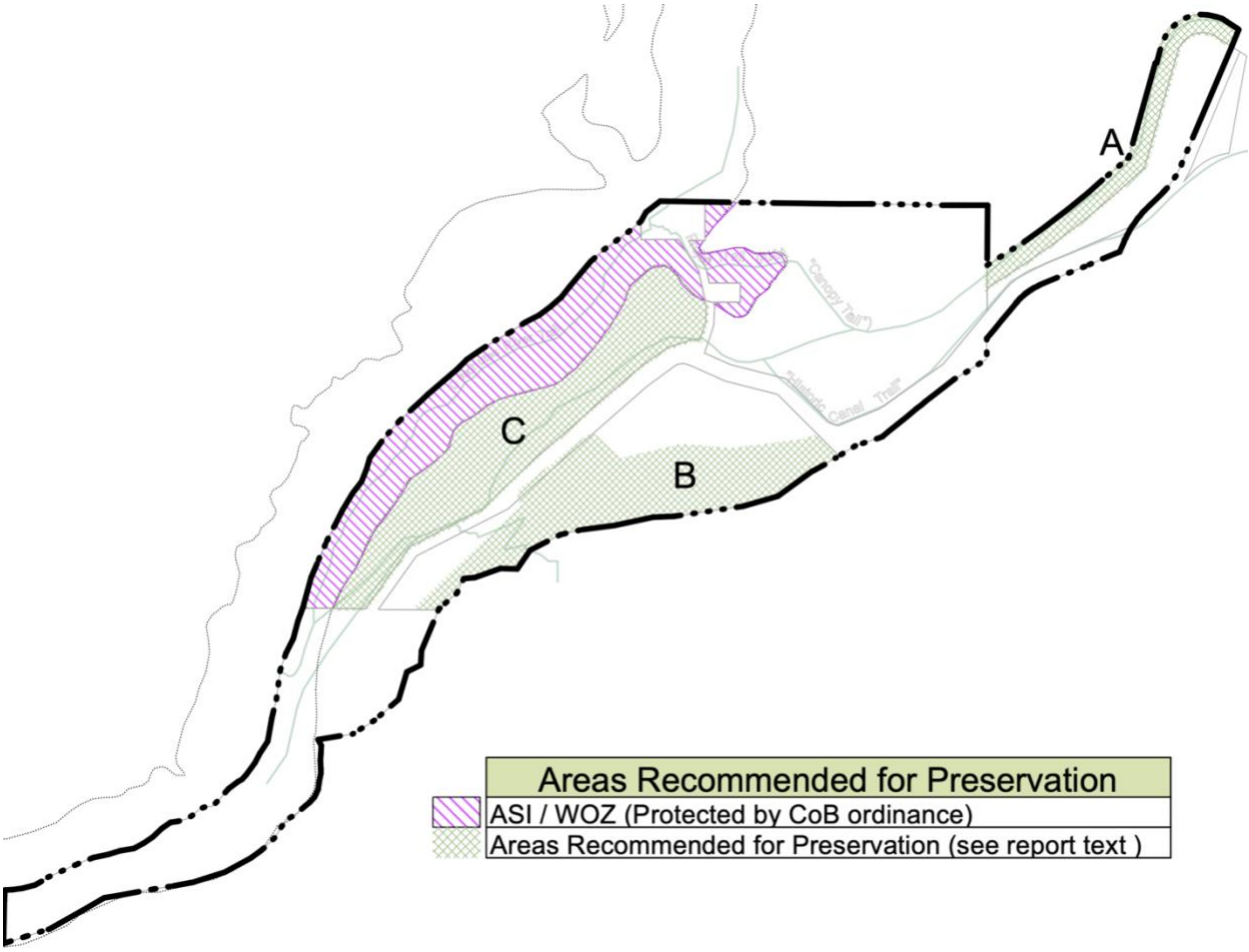


Figure 11 –Preservation of Highest-Value Green Spaces

*i. Area **A**: Canopy Trail and adjacent Old Pilot Butte Canal*

This area, wooded with many specimen ponderosa pines, is a highly used recreation area precious in the minds of Bend residents that use it as a "natural extension" of Blakely Park for exercise and dog-walking. The history of the Old Pilot Butte Canal, while unknown to many of the trail's users, presents an opportunity for an historic and educational park that will greatly enhance the value of any adjacent development.

*ii. Area **B**: Exposed Tuff and Rimrock passage*

This area, traversed by an existing formal trailhead from Brianne Place, presents development difficulty owing to both its topography and geology. It encompasses the "tuff cliffs" composed of Tumalo tuff and Bend pumice. It also provides a sheltered passage for wildlife migrating from the Historic Canal Trail passage to the Deschutes River riparian zone.

*iii. Area **C**: Between the Open Canal and the River*

This area is long and narrow and buffers the upper edge of the Water Overlay Zone ASI, serving to protect the sensitive riparian area below the cliff ledge. It has significant stands of large ponderosa pines and hosts a historic tuff-cutting quarry. Furthermore, it presents significant planning challenges. There is insufficient depth for a right-of-way (that would be necessarily

single loaded), the passage and buffering for the protected Historic Canal Trail, and residential lots. Any construction in this zone would create debris that would be carried into the riparian area by the extensive sloped sensitive areas. Finally, it would be difficult if not impossible to subdivide this area in such a way to provide two means of access for City of Bend fire equipment.

C. Exclude preserved areas from required density calculations

The areas to be preserved represent a significant portion of this unique site. For this reason, allowing these areas to be included in the basis for minimum residential density as prescribed by Bend Development Code 2.1.600 for this site is not reasonable. Therefore, to maintain a reasonable development result, their area (as should the area of the Water Overlay Zone ASI) should be excluded from the basis for minimum and maximum density requirements.

D. Establish ongoing management for these areas

These preserved spaces will greatly enhance any adjacent development but will require ongoing trail and vegetation management. Save Bend Green Space recommends conveying them with appropriate legal instruments to Bend Park and Recreation District for ongoing care and management.

Category	Score	Summary Description
Community Value		
Public Access	**10**	The site has outstanding public access. It is reached by 3 informal neighborhood trail heads, 2 marked trail heads, one adjacent to an existing public park, and is a continuation of 3 major trails with 4 points of access. Moreover, the site serves as a major connectivity point for these trails.
Recreational Use	**10**	The site is a year-round destination for outdoor activities in a natural setting. In warmer months, it is used for hiking, trail-running, casual walks, and daily dog-walking. Its broad trails support off-street recreational cycling in harmony with pedestrian traffic. In the winter, skiing and sledding are added to the mix. Cliffs near the river are well used by rock climbers. The site is effectively an outdoor nature park used hundreds of thousands of times annually by many thousands of residents and visitors.
Equitable Access	**N/S**[17]	The centrally located site provides healthy outdoor activities to elderly and under-served populations in adjacent neighborhoods without requiring access to automobiles.
Natural Open Space Function	**8**	The site is the largest undeveloped natural tract adjacent to the Deschutes River. It exhibits both lush riparian and upland high-desert habitats. Despite its canal infrastructure, it remains largely undisturbed.
Adjacent Land Use Compatibility	**8**	The site is surrounded by low-density and moderate-impact land uses that provide an established buffer.
Scenic Resources	**8.3**	The site has an unusually diverse and high-quality collection of visual outlooks of natural landscape that include rushing river rapids, distant river valley vistas, pine forest, understory, and high-desert steppe. The site includes over one mile of frontage on the Deschutes River. It is a natural refuge from the surrounding city.
Historic Features	**N/S**	The site is home to the best-preserved section of "the most historically significant canal connected with the founding of Bend." It also has remnants of a tuff quarry and stone-cutting operation from Bend's early history.
Environmental and Ecological Value		
Habitat Value	**8.4**	The site supports a wide variety of flora and fauna. More than 100 native and non-native plants have been documented growing at the site, and over 130 species of birds have been documented in its riparian and canal-fed woodlands. In addition to wild fowl, its habitats support diverse wildlife such as mule deer, fox, coyotes, bobcats, wild rodents, and reptiles.
Wildlife Corridor Function	**10**	The site serves a critical role in providing wildlife movement connectivity in the city of Bend. The adjacent river and the canal provide necessary water sources and feed plant cover necessary for movement and protection.
Vegetation	**8.6**	In addition to its significant pine and juniper forest, the site hosts a diverse spectrum of over 100 species, roughly 70% native to the region. The historic Pilot Butte Canal in particular supports a variety of tree species such as dogwood, alder, and willow.
Tree Inventory and Canopy	**N/S**	The site has areas of dense riparian forest and sparser upland high-desert stands. Along the historic Pilot Butte Canal there are specimen trees of great size as well as species other than the predominating ponderosa pine and juniper. A conservative estimate of the average tree canopy coverage of the entire site is greater than 23%, with some sections exceeding 39% coverage, based on an automated tree count derived from aerial photography.
Hydrologic Features	**N/S**	The site's one-mile frontage on the Deschutes River underpins its natural value and ecologic functionality. The riparian river frontage has been recognized by the city of Bend in its Water Overlay Zone designation. The remaining open water in the historic Pilot Butte Canal supports biologically diverse activity along the so-called "Canopy Trail".
Geologic Features	**N/S**	In a relatively small area, the site encompasses an unusually diverse array of volcanic rock formations, including basalt flows, volcanic ash deposits in the form of tuff cliffs and quarries, exposed rock ledges, and fault formations. These features make visible and accessible the geologic history of Bend.

Table 6 – Evaluation Summary Chart

[17] Not scored

4.3 – Infographic

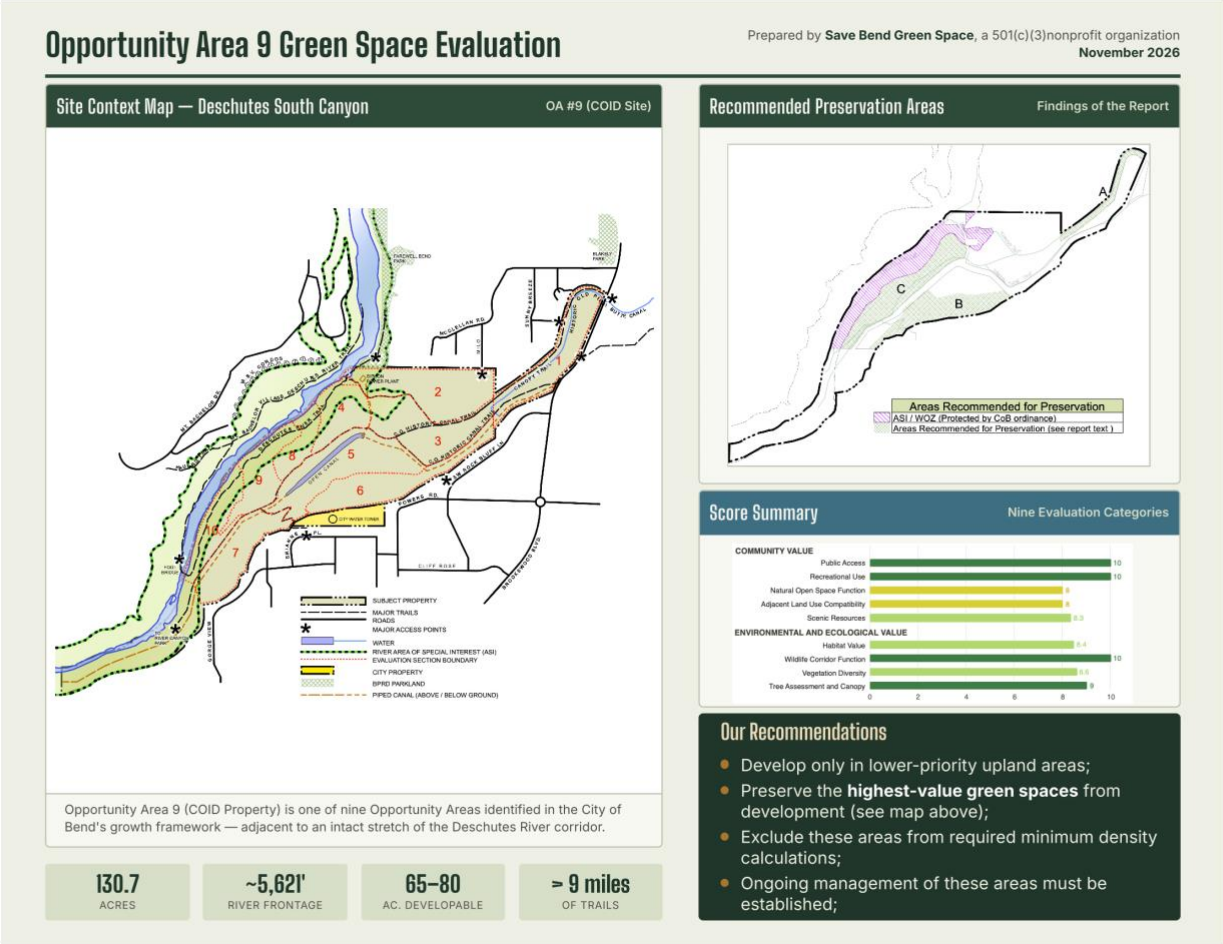


Figure 12 – Infographic (reduced)

5 – Appendices

5.1 – Section-by-Section Evaluation Scores

Evaluation Category	Section										Average Score Entire Property
	1	2	3	4	5	6	7	8	9	10	
Public Access	10										**10**
Recreational Use	10										**10**
Natural Open Space Function	8										**8**
Adjacent Land Use Compatibility	8										**8**
Scenic Resources	9	10	6	10	7	7	8	10	8	8	**8.3**
Habitat Value	10	10	5	10	8	7	8	10	8	8	**8.4**
Wildlife Corridor Function	10										**10**
Vegetation Diversity	10	7	7	10	7	7	8	10	10	10	**8.6**

Table 7 – Section-by-section Evaluation Scores

5.2 – Maps and GIS Data

Multiple data sets from the Bend Data Viewer have been using in compiling the graphics in this report. In general, graphical and map data have been downloaded from the City of Bend website as open-format "shapefiles" and composited in a CAD system (Vectorworks 2026) capable of accurately importing, projecting, layering, compositing and assigning graphical attributes (line and fill color and style) to the city-provided data. Graphic and map data obtained in this manner includes:

- City Boundary;
- Urban Growth Boundary;
- Topography (1 foot elevation contours) [18]
- Parks (BPRD)
- Existing Trails (BPRD)
- Irrigation Canals
- Opportunity Areas
- UGB Expansion Areas
- Special Planned Districts (Waterway Overlay Zone)
- Zoning
- Road Centerlines

[18] Used to build a Digital Terrain Model (DTM) for site slope analysis

5.3 – Plant Species List[19]

Plant Diversity Survey of COID property (OA #9)		Found in Section								
Plant Common Name or Species	**Status**	**1**	**2**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Alders	Native	✓								
Antelope bitterbrush	Native	✓		✓	✓	✓	✓	✓	✓	✓
Big Sagebrush|Low Sagebrush	Native				✓	✓	✓			
Balkan Toadflax	Non native		✓	✓		✓	✓	✓		
Basalmroot	Native					✓	✓			
Big Sagebrush	Native			✓				✓	✓	✓
Bittersweet Nightshade	Non native	✓								
Black cottonwood	Native		✓							
Bluebunch Wheatgrass	Native	✓		✓	✓			✓		
White bark raspberry	Native		✓							
Broad-leaved sweet pea	Non native			✓				✓		
Bulbous Bluegrass	Non native	✓								
Bush penstemon	Native					✓	✓			
Cheatgrass	Non native	✓	✓	✓	✓			✓	✓	✓
Chokecherry	Native					✓	✓		✓	✓
Collomia genus	Native			✓				✓		
Common Yarrow	Native		✓	✓		✓	✓	✓		
Coyote tabacco	Native				✓					
Creeping Mahonia	Native		✓	✓		✓	✓	✓	✓	✓
Creeping thistle	Non native	✓								
Crested wheatgrass	Non native	✓			✓					
Dandelions	Non native		✓							
Diamond clarkia	Native				✓				✓	✓
Diffuse groundsmoke	Native		✓							
Douglas' Catchfly	Native		✓	✓				✓	✓	✓
Eaton's asters	Native		✓							
Desert yellow fleabane	Native				✓					
Fescue|Idaho Fescue	Native		✓							
Fireweed	Native		✓							
Forget me nots	Non native	✓								
Foxtail	Non native	✓								
Genus melilotus	Non native			✓				✓		
Genus Rumex	Unknown	✓								
Gold-of-pleasure	Non native	✓								
Grand Collomia	Native			✓				✓	✓	✓
Great basin wildrye	Native				✓					
Great mullein	Non native			✓		✓	✓	✓		
Greenleaf manzanita	Native		✓	✓	✓			✓		
Hedgemustard	Unknown	✓								
Hoary pincushion	Native		✓			✓	✓			
Horehounds	Non native	✓								
Horsetails	Native		✓							
Hotrock Penstemon	Native					✓	✓			
Idaho Fescue	Native			✓		✓	✓	✓		
Juniper	Native	✓								
Knotweeds	Unknown	✓								
Lewis Flax	Native	✓	✓			✓	✓			
Leymus Wildrye	Native		✓							
Low beardtongue	Native		✓	✓		✓	✓	✓	✓	✓
Low pussytoes	Native		✓							
Low Sagebrush	Native			✓				✓		
Silvery Lupine	Native		✓	✓	✓	✓	✓	✓		
Dwarf mallow|cheeseweed	Non native	✓								

Plant Diversity Survey of COID property (OA #9)		Found in Section								
Plant Common Name or Species	**Status**	**1**	**2**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Medicks	Non Native			✓				✓		
Milk Kelloggia	Native					✓	✓			
Milkvetch, Idaho	Native					✓	✓			
Milkvetch,curvepod|basalt	Native								✓	✓
Oregon grape	Native					✓	✓		✓	✓
Panicled bulrush	Native	✓								
Panicled willowherb	Native	✓	✓			✓	✓			
Penstemon	Native	✓								
Penstemon humilis	Native				✓					
Pine drops	Native	✓								
Pinewoods pussytoes	Native		✓							
Ponderosa pine	Native	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pussytoes, Rosy or Umber probably	Native			✓				✓		
Red osier dogwood	Native	✓								
Rockcresses, Genus Boechera	Native								✓	✓
Rocky mountain woodsia|common brackenfern	Native		✓	✓		✓	✓	✓		
Rose Spirea	Native		✓							
Rowans and Mountain ashes	Unknown		✓							
Rubber Rabbitbrush	Native		✓		✓	✓	✓			
Needle rush|Baltic rush	Non native	✓								
Sagebrush	Native		✓							
Salsiflies	Non native	✓								
Scarlet gillia	Native				✓					
Silverleaf Phacelia	Native			✓		✓	✓	✓	✓	✓
Smotherweed	Non native	✓								
Snowberries	Native	✓	✓	✓				✓	✓	✓
Snowbrush ceanothus	Native				✓					
Spotted knapweed	Non native		✓	✓		✓	✓	✓	✓	✓
Squirreltail - Elymus elimoides	Native				✓					
Squirreltail	Non native		✓	✓		✓	✓	✓	✓	✓
Storks bills	Non native	✓								
Sulfur Buckwheat	Native			✓				✓		
Tatarian honeysuckle	Non native		✓							
Thread-leaf Fleabane	Native		✓		✓	✓	✓			
Toadflax	Non native	✓								
Vetches	Unknown	✓								
Water forget-me-nots	Non native		✓							
Water hemlock	Native	✓								
Wax Currant	Native	✓	✓	✓		✓	✓	✓		
Western Hawkweed	Native			✓		✓	✓	✓		
Western Ponderosa Pine	Native			✓				✓		
Western Stoneseed	Native			✓				✓		
White clover	Non native		✓							
Sulfur buckwheat|Marumleaf buckwheat	Native								✓	✓
Wild rose	Unknown		✓							
Willows	Native	✓	✓							
Woodland pinedrops	Native		✓		✓					
Woods' Rose	Native								✓	✓
Woolly groundsel	Native		✓	✓				✓		
Woolly mullein	Non native	✓								
Yarrow	Native	✓			✓					
Yellow Rabbitbrush|Rubber Rabbitbrush	Native	✓	✓	✓		✓	✓	✓	✓	✓
Section total occurence (diversity) score:		37	41	33	20	29	29	33	20	20

Table 8 – Plant Species List and Diversity Calculation

[19] A plant survey of section 3 was not completed; a column for section 3 is therefore missing from this table. Section 3 was given same diversity score as its adjacent and generally similar sections. See 0

5.4 – Bird List

Status key:			
	Uncommon		Rare

Bird Species observed at Opportunity Area #9					
Category	Species	Status	Category	Species	Status
CORMORANTS	Double-crested Cormorant		*CORVIDS*	Clark's Nutcracker	
HERONS, EGRETS	Great Blue Heron			American Crow	
	Great Egret**			Common Raven	
WATERFOWL	Canada Goose		*SWALLOWS*	Tree Swallow	
	Snow Goose*			Violet-green Swallow	
	Greater White Fronted Goose*			Northern Rough-winged Swallow	
	Mallard			Cliff Swallow	
	Bufflehead			Barn Swallow	
	Green-winged Teal			Bank Swallow	
	Common Goldeneye		*CHICKADEES, BUSHTITS*	Mountain Chickadee	
	Barrow's Goldeneye			Bushtit	
	Common Merganser		*NUTHATCHES, CREEPERS*	Pygmy Nuthatch	
	Hooded Merganser			Red-breasted Nuthatch	
	American Coot			White-breasted Nuthatch*	
RAPTORS	Turkey Vulture			Brown Creeper	
	Osprey		*WRENS*	Canyon Wren	
	Sharp-shinned Hawk			Pacific Wren	
	Cooper's Hawk			House Wren	
	Red-tailed Hawk		*DIPPERS*	American Dipper (aka Water Ouzel)	
	Red-shouldered Hawk*		*KINGLETS*	Golden-crowned Kinglet	
	Rough-legged Hawk			Ruby-crowned Kinglet	
	Ferruginous Hawk		*WARBLERS, CHATS*	Orange-crowned Warbler	
	American Kestrel			Wilson's Warbler	
	Merlin			Black Throated Gray Warbler*	
	Peregrine Falcon			Nashville Warbler	
	Prairie Falcon			MacGillivray's Warbler	
	Bald Eagle			Yellow Warbler	
	Golden Eagle			Yellow-rumped Warbler	
	Swainson's Hawk			Townsend's Warbler*	
QUAIL	California Quail			Hermit Warbler**	
SHOREBIRDS	Spotted Sandpiper			Common Yellowthroat	
	Killdeer			Yellow-breasted Chat**	
	Wilson's Snipe		*THRUSHES, ROBINS*	Varied Thrush	
GULLS	Ring-billed Gull			Hermit Thrush	
DOVES, PIGEONS	Eurasian Collared Dove			Western Bluebird	
	Mourning Dove			Townsend's Solitaire	
	Rock Pigeon			American Robin	
	Band-tailed Pigeon**			European Starling	
OWLS	Great Horned Owl			American Pipit*	
	Northern Saw-whet Owl*		*WAXWINGS*	Cedar Waxwing	
	Northern Pygmy Owl*			Bohemian Waxwing**	
NIGHTJARS, SWIFTS	Common Nighthawk		*TANAGERS*	Western Tanager	
	Vaux's Swift		*TOWHEES, SPARROWS, BUNTINGS*	Spotted Towhee	
HUMMINGBIRDS	Anna's Hummingbird			Dark-eyed Junco	
	Rufous Hummingbird			Lazuli Bunting*	
	Calliope Hummingbird*			Chipping Sparrow	
	Black-chinned Hummingbird**			Fox Sparrow	
KINGFISHERS	Belted Kingfisher			Song Sparrow	
WOODPECKERS	Downy Woodpecker			Lincoln's Sparrow	
	Hairy Woodpecker			White-Throated Sparrow	
	Lewis's Woodpecker			White-crowned Sparrow	
	Northern Flicker			Golden-crowned Sparrow	
	Red-breasted Sapsucker			Savannah Sparrow	
	Williamson's Sapsucker*			Harris's Sparrow**	
FLYCATCHERS	Olive-sided Flycatcher		*GROSBEAK*	Evening Grosbeak*	
	Hammond's Flycatcher			Black-headed Grosbeak	
	Pacific Slope Flycatcher		*BLACKBIRDS, ORIOLES*	Brewer's Blackbird	
	Dusky Flycatcher			Red-winged Blackbird	
	Gray Flycatcher			Brown-headed Cowbird	
	Willow Flycatcher**		*FINCHES*	Cassin's Finch	
	Western Wood Pewee			Purple Finch*	
	Say's Phoebe			House Finch	
SHRIKES, VIREOS	Northern Shrike			American Goldfinch	
	Cassin's Vireo			Lesser Goldfinch	
	Warbling Vireo			Pine Siskin	
CORVIDS	Steller's Jay			Red Crossbill	
	California Scrub-jay			House Sparrow	
	Piñon Jay*				

Table 9 – Bird list

5.5 – Green Space Field Survey form

Green Space Field Survey form

Evaluator's name _____ **Date** _____

Evaluation Area: _____

Current weather conditions (on day of evaluation): _____

Part 1: Community Value

1 . **Scenic Resources (Interpretation)**

Evaluate views from and within the site including detractions from the natural beauty of the site. If applicable, evaluate views of the site from outside the boundaries of the property.

Rating Scores: **Score:** _____

0 – Views obstructed by development (buildings, power lines, roads)
1 – Falls between 0 - 2
2 – Occasional vistas though development
3 – Falls between 2 – 4
4 – Some unobstructed vistas
5 – Falls between 4 – 6
6 – Multiple vistas available through development
7 – Falls between 6 – 8
8 – Mostly unobstructed vistas
9 – Falls between 8 – 10
10 – Open views of natural areas, unobstructed by development

2 . **Unique Geologic Features (Interpretation)**

Evaluate quality of natural features. Examples include visible rock outcrops or exposures, i.e., lava flows, tuff cliffs, etc.

List of Features:

____ Basalt flows or outcrops

____ Tuff cliffs or outcrops

____ Fault breaks

3 – Falls between 2 – 4
4 – Vegetation of low quality
5 – Falls between 4 – 6
6 – Some trees and/or lower quality riparian vegetation
7 – Falls between 6 – 8
8 – Moderate tree density, diverse vegetation base
9 – Falls between 8 – 10
10 – Exceptional tree coverage and/or riparian vegetation

Comments / Species List:

5 . Hydrologic Resources

Evaluate type and source of water present on site such as river, streams, canal, pond (natural or artificial).

Is water present? Yes No If water is present, what type(s) of water body?

____ River
____ Canal
____ Pond / Lake
____ Wetland

Are there seasonal bodies of water, e.g. canal? Yes No

Provide a description of water bodies.

____ Other features (Include a description within the comment section. Photos may be included.)

Comments (Include descriptions of each feature):

Part 2: Environmental and Ecological Value

3 . Overall Habitat Value

Evaluate habitat including flora (please note, a separate tree inventory will be conducted to measure and record individual trees) and fauna. These criteria will include the variety (diversity), health, and coverage of vegetation. List any animals (insects, fish, amphibians, reptiles, mammals) observed.

Rating Scores: **Score:** _____

0 – No ecological value
1 – Falls between 0 - 2
2 – Minor ecological value
3 – Falls between 2 – 4
4 – Some ecological value
5 – Falls between 4 – 6
6 – Moderate ecological value
7 – Falls between 6 – 8
8 – Quality ecological value
9 – Falls between 8 – 10
10 – Exceptional ecological value

Comments:

4 . Vegetation

Evaluate type, condition, number and variety of plant species. Identify and record plant species. Make note of riparian environments.

Rating Scores: **Score:** _____

0 – Almost no vegetation
1 – Falls between 0 - 2
2 – Little significant vegetation

5.6 – Automated Tree Crown Inventory Methodology

Tools used:

- **Google Maps:** Used to capture high-resolution aerial imagery.
- **Detectree:** A pre-trained model implemented in Python 3.8 that predicts the location and extent of tree crowns from a top-down RGB image. Detectree uses a Mask R-CNN algorithm from the detectron2 library to delineate tree crowns accurately. Further details can be found at: https://acocac.github.io/environmental-ai-book/forest/modelling/forest-modelling-treecrown_detectree.html
- **Claude Code:** Used to manage and deploy the various tools in a high-level code setting;
- **QGIS:** A shareware GIS application, used to accurately geo-reference image data and review various layers of geo-referenced vector data (grids and tree crowns);
- **Vectorworks 2026:** CAD and mapping program used for visualization, analysis, and presentation graphics;

Process:

1. High-resolution aerial photo images of the site were generated from Google Maps using fixed-zoom screenshots and stitching;
2. Shapefiles were downloaded to CAD program from City of Bend Data Viewer of the site boundaries and nearby features and overlay zones;
3. Images and vector shapefiles were overlaid in CAD program and re-exported to GIS app to geo-reference the image;
4. With the georeferenced imagery, Detectree analyzed the image to generate a second shapefile of tree canopies. Various parameters of Detectree were used in an attempt to improve detection, as Detectree is not "tuned" for the highly variable tree coverage of the arid Central Oregon High Desert;
5. The best output shapefile from Detectree was imported back into the CAD application for visual editing, (primarily eliminating false positives) automated processing, (e.g. eliminating anomalous canopies under a small area threshold) and analysis (e.g. tabular reports of crown counts and area coverage by study area.)