

NORTH BEND PARKS COMMISSION MEETING

January 24, 2024, 6:30pm

North Bend City Hall

920 SE Cedar Falls Way, North Bend, WA

PLEASE NOTE: This meeting will be held in-person at City Hall.

A Zoom meeting link may be set up, upon request, should a member of the public or Parks Commission wish to attend remotely. Contact Principal Planner Mike McCarty at mmccarty@northbendwa.gov to request a Zoom link to attend the meeting remotely.

AGENDA:

1. Call to order, opportunity for public comments
2. Minutes of November 29, 2023 Parks Commission meeting
3. Recognition of 2023 American Concrete Institute Excellence Award to North Bend and Si View MPD for the Torguson Park Skate Park: 1st Place in the Decorative Concrete Category – Bruce Chapman, American Concrete Institute
4. Dahlgren Family Park Canoe Play Structure – proposal for canoe painting by Snoqualmie Tribe artist and developing and installing associated interpretive signs.
 - a. See memo describing purpose.
 - b. Seeking Parks Commission recommendation for expenditure of approximately \$15,000 of Park Impact Fee Revenue.
5. Dog Park Planning
 - a. See Memo describing opportunity sites to consider.
 - b. Seeking Parks Commission recommendation on which site to further pursue.
6. Informational - Dahlgren Family Park Pickleball Court Addition
 - a. See attached plans.
 - b. Court will be constructed at Dahlgren Family Park as a part of a Binding Site Plan (BSP) revision to the Dahlgren BSP for the adjacent multifamily site. As the developer of the stacked flats condo buildings (New Home Co.) no longer proposes to construct the leasing office/clubhouse building originally shown on the BSP, they have proposed a pickleball court at the adjacent Dahlgren Family Park to make up for recreation space/amenity requirements for the development. City staff suggested that the court be in the Dahlgren Family Park, so that the amenity would be available to the general public rather than just residents of the condominiums.
 - c. Court is to be funded and constructed by the developer, no expense to City.

Agenda sent to: Parks Commissioners, Mayor, City Administrator, City Clerk, CED Director, Senior Planner, Public Works Parks Lead

7. Urban Forest Canopy Assessment and Policies

- a. See Canopy Assessment Report prepared by PlanIT Geo. Any Parks Commission feedback?
- b. Consider draft Urban Forestry Policies for inclusion in amendments to Energy and Sustainability Element to Comprehensive Plan (see page 14-15 of the Element).

8. Next Meeting March 27.

Agenda sent to: Parks Commissioners, Mayor, City Administrator, City Clerk, CED Director, Senior Planner, Public Works Parks Lead

Minutes of the North Bend Parks Commission Meeting of Nov. 29, 2023

Minutes are draft until approved at the following Parks Commission Meeting

The meeting, held in person at North Bend City Hall, was called to order at 6:34 p.m.

Attendance:

- Parks Commissioners in attendance: Minna Rudd, Tim Talevich, Kyle Braun, Eric Thompson, Brian Duncan and Kaylie McGhee. Nominated Commissioner Matt Miller attended via Zoom (not yet formally a member, pending his appointment by City Council).
- Staff in attendance: Senior Planner Mike McCarty

Minutes of the Sept. 27, 2023 Parks Commission Meeting

Commissioner Braun made a motion to approve the minutes. Commissioner Duncan seconded. The motion passed unanimously.

Public Input

Ward Bettes, a resident who lives near Riverfront Park, spoke to oppose any consideration of naming something after the late Gardner Vinnedge in the park. Saying he was speaking for the Vinnedge family, Mr. Bettes explained that Mr. Vinnedge was opposed any development of the land. Instead, he suggested a bench, picnic table or similar tribute at the nearby Snoqualmie Valley Historical Museum as more appropriate. The Commission thanked Mr. Bettes for his input. There are no plans under consideration on this matter.

Annual Elections for Chair and Vice Chair for 2024 Calendar Year

Current Chair Rudd noted she would be glad and honored to continue serving as Commission chair; likewise, Vice Chair Thompson would retain his position. Commissioner Talevich nominated Rudd as chair, seconded by Braun. The motion was approved unanimously. Braun nominated Thompson as co-chair, seconded by McGhee. The motion was approved unanimously.

Small Park Improvement Project

Senior Planner McCarty explained a new city policy to use a biennial budget, with the 2024 Small Park Improvement fund amount increased to \$10,500, resulting in a total balance of \$15,050 available in the fund by the end of 2024. Commission members suggested a wide range of possible projects for this fund, including picnic tables at the Senior Center and at Torguson/pump track; signs related to tribal canoe journeys at the new Dahlgren Park related to the canoe play structure there, possibly tying into similar signage at other local parks; a treatment to stabilize the pump track during rain; and much more. Commission members will compile a list of projects for this budget.

2023 Annual Report and 2024 Work Plan

Senior Planner McCarty presented the annual report of projects and activities involving the Parks Commission in 2023, and presented the list of 2024 tentative projects. Discussion ensued about other projects beyond those listed in the plan, including replanting of medians in our area, lighting the skate park, developing the Adopt a Park program, and more. Commission Braun motioned to approve the Work Plan as amended; Commissioner Thompson seconded. The motion passed unanimously. Chair Rudd will present the 2023 Annual Report and 2024 Work Plan at the January 16, 2024 City Council meeting.

Lighting at Skate Park

Commissioner McGee inquired about potential for lighting at the Torguson Park Skate Park. Commissioner Rudd reported that lighting was originally planned together with a shelter cover, but was too costly. Si View is continuing to look into costs for this.

Next Meeting

The Commission will meet next on Jan. 24, 2024. Commissioner Rudd noted she wouldn't be available to attend that meeting.

Adjournment

The meeting was adjourned at 8:05 p.m.

Minutes prepared by Tim Talevich



DATE: January 17, 2024

TO: Parks Commission – For January 24, 2024 Parks Commission Meeting

FROM: Mike McCarty, Principal Planner

SUBJECT: Use of Park Impact Fee Revenue for Dahlgren Family Park – Canoe Painting and Interpretive Signs

Parks Commission,

Staff are seeking your recommendation for use of approximately \$15,000 of Park Impact Fee Revenue to commission a Snoqualmie Tribe artist to paint the canoe play structure at the Dahlgren Family Park, and to develop and install some interpretive signs in consultation with the Tribe. Per NBMC 2.24.100(B), as a part of its duties, the Parks Commission provides recommendations regarding use and allocation of park impact fee revenues.

As you are aware, the City has contracted with the Department of Natural Resources for the design and construction of the Dahlgren Family Park. The original conceptual park plans included a general birch-bark style canoe (a style available from suppliers) as a part of the river theme for the park. However, as that canoe was not ADA-accessible (an important consideration for the park), the City and DNR later selected an alternative canoe structure available from the supplier that was ADA accessible for the final park construction plans.

City staff later realized that this canoe structure resembles a tribal canoe, and not wishing to create possible, although inadvertent, cultural appropriation situation, we contacted Jaime Martin (Executive Director of Government Affairs and Special Projects with the Snoqualmie Tribe) on how best to proceed.

Jaime, in consulting with other Snoqualmie Tribal staff, suggested that to properly acknowledge and honor the tribal connection, the City should (1) commission a Snoqualmie Tribe artist to paint the canoe in a design that reflects the Tribe's culture, and (2) provide some interpretive signs at the park. These signs would describe the Snoqualmie Tribe's canoe history (both ocean canoes such as the form of this play structure, and smaller river canoes), and possible other associated site interpretation (such as interpretation of native plants, Mt. Si, or the like).

\$15,000 is estimated for the project, including an estimate of \$5,000 for the cost of commissioning a Tribal artist to paint the canoe, and an additional \$10,000 for the interpretive signs including graphic design, development of messaging in consultation with the Snoqualmie Tribe, construction, and installation.

Staff recommend the project and Park Impact Fee expenditure to properly acknowledge the tribal form of the canoe and as a way to connect the community with the rich history and culture of the Snoqualmie Tribe.

Canoe Play Structure installed at the Dahlgren Family Park, under construction.





DATE: January 17, 2024

TO: Parks Commission – For January 24, 2024 Parks Commission Meeting

FROM: Mike McCarty, Principal Planner

SUBJECT: Planning Considerations for Dog Park

Parks Commission,

One of the high-priority improvements we heard from many residents in our 2022 Parks Survey was the need for a dog park within North Bend. This was therefore added to the Parks Capital Facilities Plan in the 2024 Parks Element, but without a specific location determined. This memo is to consider alternative locations and parameters for planning a potential dog park, ultimately for recommendation to the North Bend City Council to fund construction of. Funding for a dog park could come through Park Impact Fee Revenue.

The following options are presented for discussion, with some pros and cons listed for each.

Some primary factors and facilities that should be considered include:

- ADA accessible route of travel to and into the dog park area.
- Separate fenced area for small dogs (typically under 35 pounds).
- 5' height minimum fencing, with double-enclosure gate entry to prevent dogs from escaping when others open a gate. Rough estimate of \$30 per lineal foot, installed, for black chain-link.
- Signage displaying rules for the dog park.
- Dog waste bag stations and trash receptacles.
- Smaller dog parks require surfacing other than grass, due to heavy wear.

1. Tollgate Farm Park – Triangle corner of park west of the parking lot



- a. Advantages:
 - i. Vacant corner of the park not being used for other purposes.
 - ii. Already smooth grass field, ready to go site just needs fencing.
- b. Disadvantages:
 - i. Distant from most neighborhoods, requiring driving to get there.

- ii. May be insufficient parking, especially when other uses such as soccer practices are occurring at the park.

2. King County Snoqualmie Valley Trail Corridor in the vicinity of 4th Street – under powerlines



- a. Advantages:
 - i. Close proximity to several neighborhoods.
 - ii. Easy access and on-street parking along 4th Street.
 - iii. Directly adjacent to Snoqualmie Valley Trail.
 - iv. Underutilized space not otherwise used for other park purposes.
- b. Disadvantages
 - i. Adjacent homes across the street may be opposed to potential noise and activity from barking dogs and increased parking from users.
 - ii. Owned by King County Parks – Would need some sort of use and maintenance agreement with King County (could be complicated).
 - iii. Narrow space would likely necessitate surfacing alternative to grass, due to wear.

3. King County Tanner Landing Park – Several potential locations (best area may be west of parking lot)



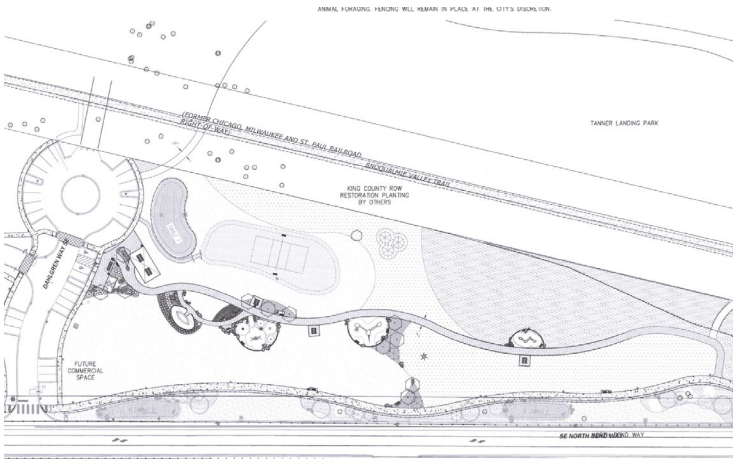
a. Advantages:

- i. Directly adjacent to Snoqualmie Valley Trail.
- ii. Open, unprogrammed open-space nature of the park well-suited to a dog park.
- iii. Regional nature of park.
- iv. Distant from homes, which would minimize potential disturbance from noise and activity.
- v. Lots of space within the park to accommodate a dog park area without dominating the remaining uses of the park.

b. Disadvantages:

- i. Owned and operated by King County Parks – Development of a dog park there may take a very long time and would require use and maintenance agreement if operated by the City of North Bend.
- ii. Outside of City Limits, North Bend couldn't apply Park Impact Fee revenue toward project.
- iii. Since it is a large, regional park, if operated by North Bend, City would be subsidizing

4. Dahlgren Family Park – Lower Area East of the Volleyball Court



- a. Advantages:
 - i. Directly adjacent to Snoqualmie Valley Trail.
 - ii. Distant from homes, which would minimize potential disturbance from noise and activity.
 - iii. Potential to utilize lower floodplain area of the park east of the volleyball court, which is otherwise not used for other active park purposes.
 - b. Disadvantages:
 - i. Limited parking at the park.
 - ii. Somewhat limited size.
 - iii. Site may have wet soils during the winter months due to being the lowest point of the site. May require a surface other than grass given likely heavy use by dogs.
 - iv. Would likely require further park improvements such as ADA accessible trail down to the fenced area.
5. Other Parks were considered inappropriate for a dog park for the following reasons:
- a. Torguson Park, EJ Roberts Park, and other such urban active parks within the City: Incompatibility with too many higher-intensity active uses within the park, and close proximity to residences.
 - b. Meadowbrook Farm Park: Insufficient parking, disturbance to elk, insufficient parking (except at the interpretive center, which is not an appropriate dog park area), and close proximity to the already-existing Snoqualmie dog park.

URBAN TREE CANOPY ASSESSMENT

NORTH BEND, WASHINGTON

JULY | 2023





AN ASSESSMENT OF URBAN TREE CANOPY IN **NORTH BEND, WASHINGTON**



**The true meaning
of life is to plant
trees, under
whose shade you
do not expect to
sit.**



-Nelson Henderson

PREPARED BY

PlanIT Geo, Inc., Arvada, Colorado

PREPARED FOR

City of North Bend

COMPLETED

July 2023

TABLE OF

CONTENTS

01 EXECUTIVE SUMMARY

1..... PROJECT METHODOLOGY
1..... CITY OF NORTH BEND'S URBAN FOREST
2..... RECOMMENDATIONS

03 PROJECT METHODOLOGY

3..... DATA SOURCES
3..... MAPPING LAND COVER
4..... IDENTIFYING POSSIBLE PLANTING AREAS AND UNSUITABLE AREAS FOR PLANTING
4..... DEFINING ASSESSMENT LEVELS

06 STATE OF THE CANOPY AND KEY FINDINGS

6..... CITYWIDE LAND COVER
8..... CITYWIDE URBAN TREE CANOPY
10..... URBAN TREE CANOPY BY WATERSHED
11..... URBAN TREE CANOPY BY LAND OWNERSHIP
12..... URBAN TREE CANOPY BY CENSUS BLOCK GROUPS
13..... URBAN TREE CANOPY BY ZONING
14..... URBAN TREE CANOPY BY PARCELS

14 TREE PLANTING PRIORITIZATION

18 CONCLUSIONS AND RECOMMENDATIONS

19 REPORT APPENDIX

20..... ACCURACY ASSESSMENT
20..... GLOSSARY/KEY TERMS



1,108
ACRES OF CANOPY

39%
TREE CANOPY COVER
IN 2021

EXECUTIVE SUMMARY

PURPOSE OF THIS ANALYSIS

Located in western Washington and within the King County Conservation District, the City of North Bend is approximately 4.4 square miles, or 2,831 acres, in size. North Bend's urban forest is a valuable asset providing residents, businesses, and visitors with many environmental, social, and economic benefits. This assessment mapped urban tree canopy (UTC), possible planting area (PPA), and analyzed how they are distributed throughout North Bend and its watersheds, land ownership, zoning, census block groups, and parcels. **For the purpose of this report, tree canopy refers to percentage of tree canopy coverage for the city's total land excluding water bodies.**

PROJECT METHODOLOGY

The results, based on 2021 imagery from the USDA's National Agriculture Imagery Program (NAIP), provide a near-current look at land cover in North Bend and will allow the City to revise and develop existing and new strategies to protect and expand the urban forest throughout both public and private lands. This study utilized modern machine learning techniques to create land cover data that are more reproducible and will allow for a more uniform comparison in future tree canopy and land cover assessments.

CITY OF NORTH BEND'S URBAN FOREST

In 2021, North Bend overall had 39% urban tree canopy cover and 30% possible planting area, not including surface water bodies which do not support trees without significant modification. The City's total land cover, including water bodies, contained 39% tree canopy, 3% shrubs, 28% other vegetation; 3% soil/dry vegetation; 26% impervious surfaces, and 1% water.

Of the three ownership types in North Bend, city-owned land had the highest canopy cover at 51% (see Figure 12 on page 11). City-owned land contained over 400 acres of canopy making up 35% of the City's total canopy cover. Although privately-owned land had a lower canopy cover (37%), this ownership type occupied a larger percent of North Bend's total land area (59%) and contained a majority (56%) of the citywide distribution of canopy. Privately-owned land contained the greatest potential for canopy expansion, offering 584 acres (32% PPA by area and 58% of the City's total plantable space).

Across North Bend's 12 zoning types, the Low Density Residential 4 Units/Acre (LDR) type made up 31% of City's land area and contributed the second greatest amount of UTC (26%) towards the citywide canopy total. This type had the largest contribution towards the citywide PPA distribution at 31%. Constrained Low Density Residential (CLDR) had the highest percent tree canopy cover (71%) within its boundary. PPA percent was highest within the Employment Park - 2 (EP-2) zoned areas with 47% of its land area available for tree planting.

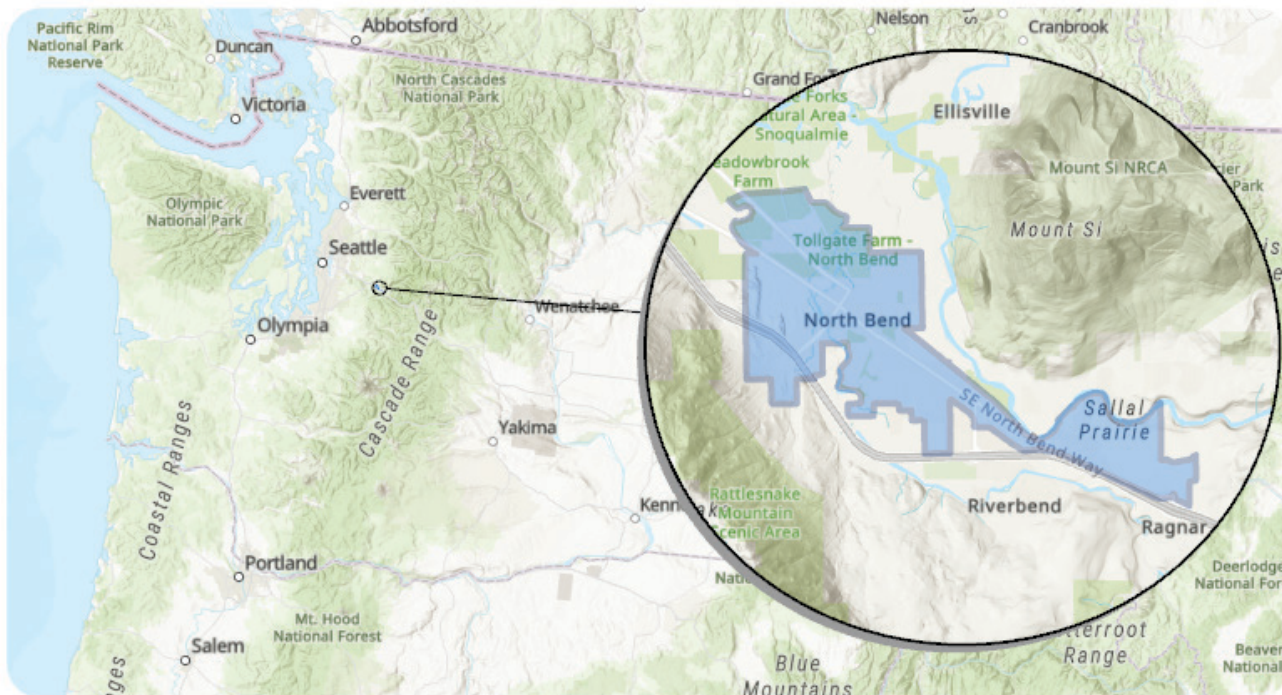


Figure 1. The City of North Bend is in King County Conservation District and occupies approximately 4.4 square miles of western Washington.

RECOMMENDATIONS

The results of this analysis can be used to develop a continued strategy to protect and expand North Bend's urban forest. This study revealed that the City of North Bend has a healthy amount of tree canopy coverage overall (1,108 acres), highlighting the need for protection and preservation. However, with 855 acres of possible planting area, North Bend has the opportunity to continue to increase urban tree canopy coverage on both public and private property. The study found that there are over 720 acres of plantable space along North Bend's Lower South Fork Snoqualmie River and an additional 135 acres of PPA throughout the rest of the city.

With partnerships, education, and outreach programs to private landowners, the City of North Bend can aim to plant additional trees to absorb stormwater, address tree inequity, and set actionable goals. It is important for the City to use this assessment to inform future investments in the urban forest so that all those who live, work, and play in North Bend can benefit from the urban forest. The City should proactively work to protect the existing urban forest and replenish the canopy with additional trees and native shrubs. Through management actions, strategic plantings, and protections for existing canopy informed by the UTC and PPA metrics included in this report, the City of North Bend has an opportunity to expand its current urban tree canopy to its fullest potential.



Figure 2. Based on an analysis of 2021 high-resolution imagery, the City of North Bend contains 39% tree canopy, 30% areas that could support canopy in the future, and 26% total impervious areas.

PROJECT

METHODOLOGY

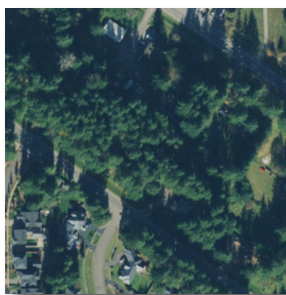
Land cover, urban tree canopy, and possible planting areas were mapped using the sources and methods described below. These data sets provide the foundation for the metrics reported at the selected geographic assessment scales.

DATA SOURCES

This assessment utilized high-resolution (60-centimeter) multispectral imagery from the U.S. Department of Agriculture's National Agriculture Imagery Program (NAIP) collected in July of 2021 to derive the land cover data set. The NAIP imagery was used to classify all types of land cover.

MAPPING LAND COVER

The land cover data set is the most fundamental component of an urban tree canopy assessment. Tree canopy and land cover data from the EarthDefine US Tree Map (<https://www.earthdefine.com/treemap/>) provided a six class land cover data set. The US Tree Map is produced using a modern machine learning technique to extract tree canopy cover and other land cover types from the latest available 2021 NAIP imagery. These six classes are shown in Figure 3 and described in the Glossary found in the Appendix.



**URBAN TREE
CANOPY**



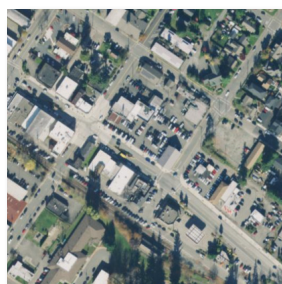
**OTHER
VEGETATION**



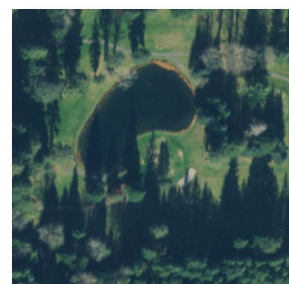
**SHRUB OR
SCRUB**



**SOIL AND DRY
VEGETATION**



**IMPERVIOUS
SURFACES**



**SURFACE
WATER**

Figure 3. Six (6) distinct land cover classes were identified in the 2021 tree canopy assessment: urban tree canopy, shrubs, other vegetation, bare soil and dry vegetation, impervious surfaces, and water.

IDENTIFYING POSSIBLE PLANTING AREAS AND UNSUITABLE AREAS FOR PLANTING

In addition to quantifying the City of North Bend's existing tree canopy cover, another metric of interest in this assessment was the area where tree canopy could be expanded. To assess this, all land area in the City of North Bend that was not existing tree canopy coverage was classified as either possible planting area (PPA) or unsuitable for planting.

Possible planting areas were derived from the vegetation and shrubs layer. Unsuitable areas, or areas where it was not feasible to plant trees due to biophysical or land use restraints (e.g. golf course playing areas, recreation fields, utility corridors, airports, etc.) were manually delineated and overlaid with the existing land cover data set (Figure 4). The final results were reported as PPA Vegetation, Unsuitable Impervious, Unsuitable Vegetation, Unsuitable Soil, and Water.

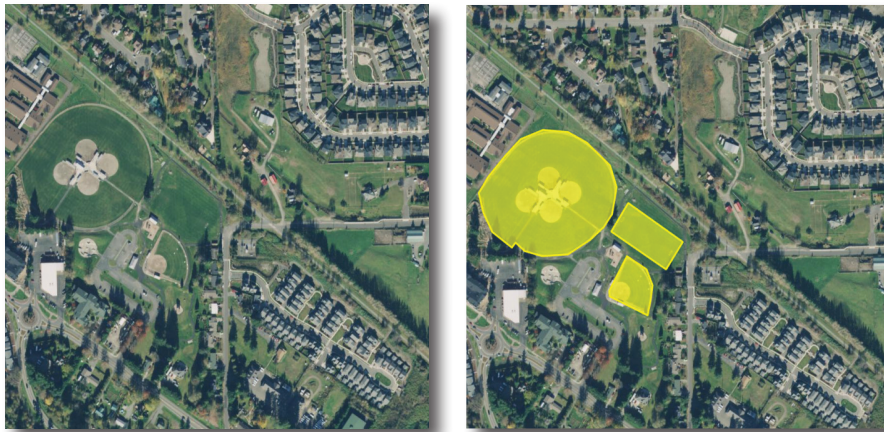
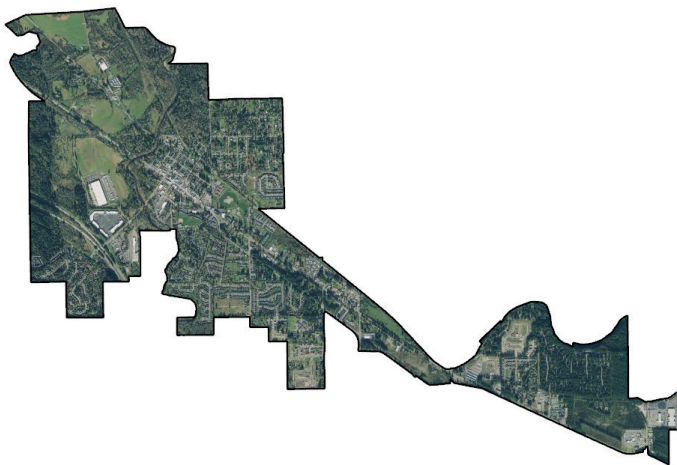


Figure 4.

Vegetated areas where it would be biophysically feasible for tree plantings but undesirable based on their current usage (left) were delineated in the data as “Unsuitable” (right). These areas included recreational sports fields, golf courses, and other open space.

DEFINING ASSESSMENT LEVELS

In order to best inform North Bend's various stakeholders, urban tree canopy and other associated metrics were tabulated across a variety of geographic boundaries. These boundaries include the city boundary, watersheds, land ownership, zoning, census block groups, and parcels.



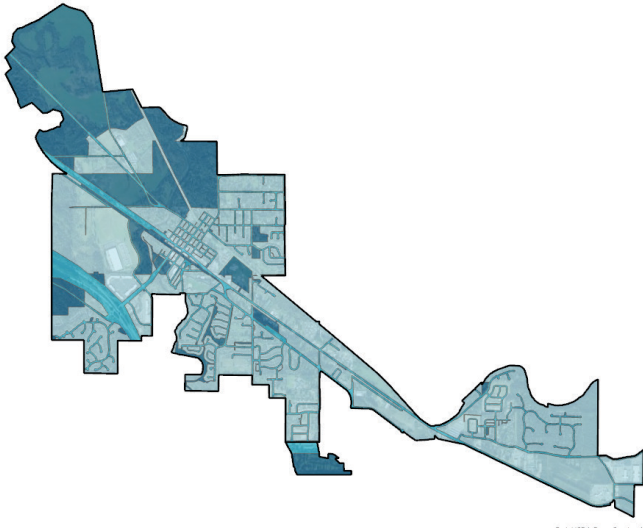
CITY OF NORTH BEND

The **City boundary** is the one (1) main area of interest over which all metrics were summarized.



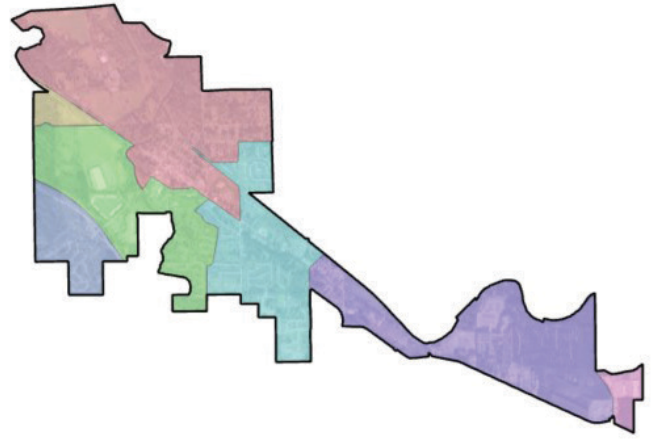
WATERSHEDS

Since trees play an important role in stormwater management, three (3) **watersheds** were assessed.



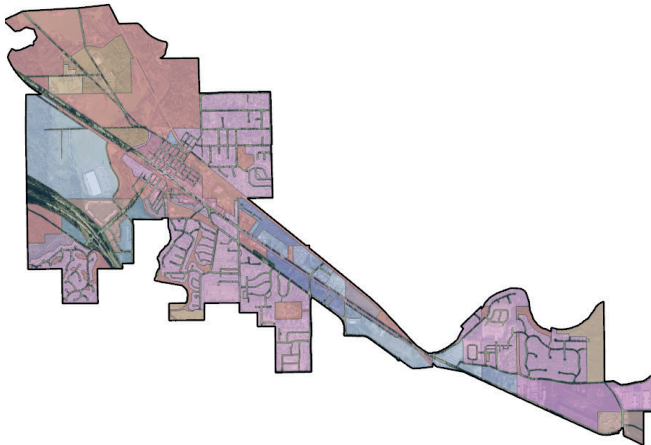
LAND OWNERSHIP

Parcels were summarized by three (3) **land ownership** types: private, public, and right-of-way. Ownership types were analyzed to determine how tree canopy differs on land owned by different stakeholders. **Note that the parcels used for this assessment boundary extend past the northern city limits.*



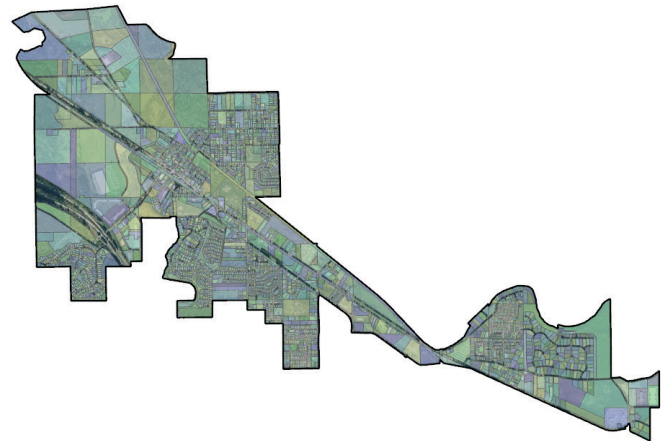
CENSUS BLOCK GROUPS

Seven (7) **census block groups** were assessed to show the relationship between tree canopy and socio-demographics and highlight potential environmental justice issues.



ZONING

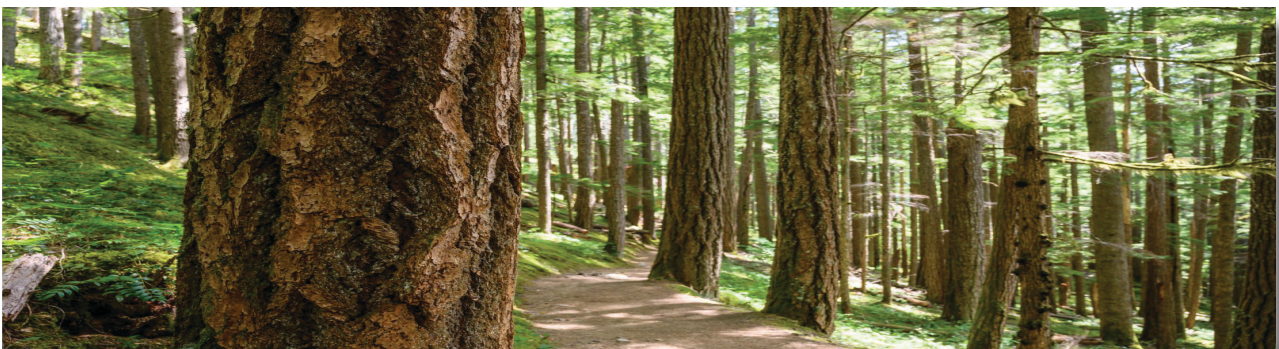
Twelve (12) **zoning** classes were assessed to further dissect tree canopy cover on different types of permitted and zoned areas, from commercial to residential.



PARCELS

The smallest unit of analysis was **parcels**, of which there were over three thousand (3,080) total.

Figure 5. Six (6) distinct geographic boundaries were explored in this analysis: North Bend City boundary, watersheds, land ownership, zoning, census block groups, and parcels.



STATE OF THE CANOPY AND KEY FINDINGS



The results and key findings of this study, including the land cover map and canopy analysis results, are presented below. These results can be used to design a strategic approach to identifying existing canopy and future planting areas. Land cover percentages are based on the City Boundary as of 2021. The City boundary includes six land cover classes including tree canopy (over impervious surfaces and over pervious surfaces), shrub/scrub, soil and dry vegetation, other vegetation, impervious surfaces, and water, see Table 1 and Figure 6 for the breakdown of percentages. While citywide urban tree canopy includes urban tree canopy, PPA vegetation, unsuitable impervious, unsuitable soil, see Table 2 for the breakdown of percentages.

In 2021, the City land cover consisted of 39% tree canopy, 28% other vegetation, 26% impervious surface, 1% water, 3% shrub, and 3% soil & dry vegetation.

Table 1. Land cover classes in acres and percent in City of North Bend.

North Bend, WA	Acres	% of Total
City of North Bend	2,831	100%
Tree Canopy	1,108	39%
Shrubs	92	3%
Other Vegetation	779	28%
Impervious Surfaces	746	26%
Soil & Dry Vegetation	85	3%
Water	21	1%

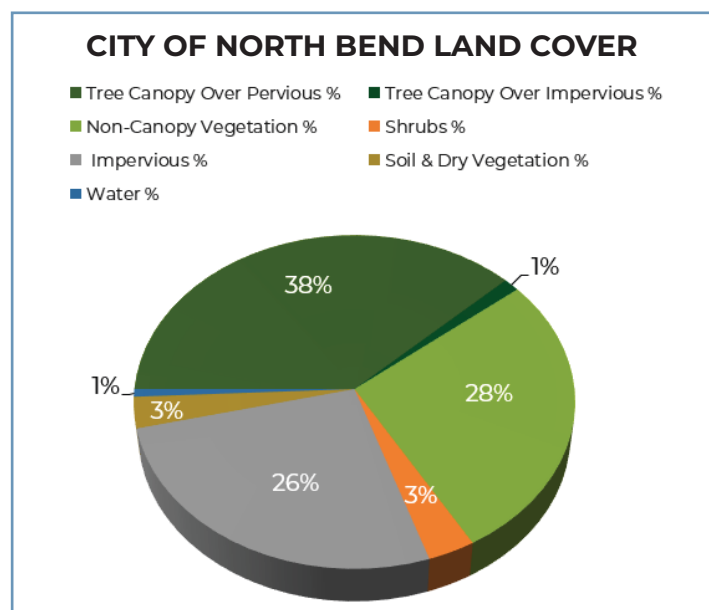


Figure 6. Land cover classification results (percentages based on total area of North Bend including water bodies).

CITYWIDE URBAN TREE CANOPY

This urban tree canopy assessment utilized the land cover data as a foundation to determine tree canopy cover and possible planting areas (PPA) throughout the City of North Bend. Results of this study indicate that within the city boundary, 1,108 acres are covered with urban tree canopy, making up 39% of the city's 2,810 land acres; 855 acres are covered with other vegetation where it would be possible to plant trees, making up 30% of the city; and the other 847 acres were considered unsuitable for tree planting, making up 30% of the city. The unsuitable areas include recreational sports fields, golf course playing areas, airports, utility corridors, areas of bare soil and dry vegetation, and impervious surfaces. Impervious surfaces made up 88% (or 746 acres) of total unsuitable areas. Total unsuitable percentages were broken down by land cover type in Figure 10. Note that these results are based on land area, which excludes water bodies, and should be used to describe the City's current tree canopy cover.



Figure 7. Distribution of land cover throughout North Bend.

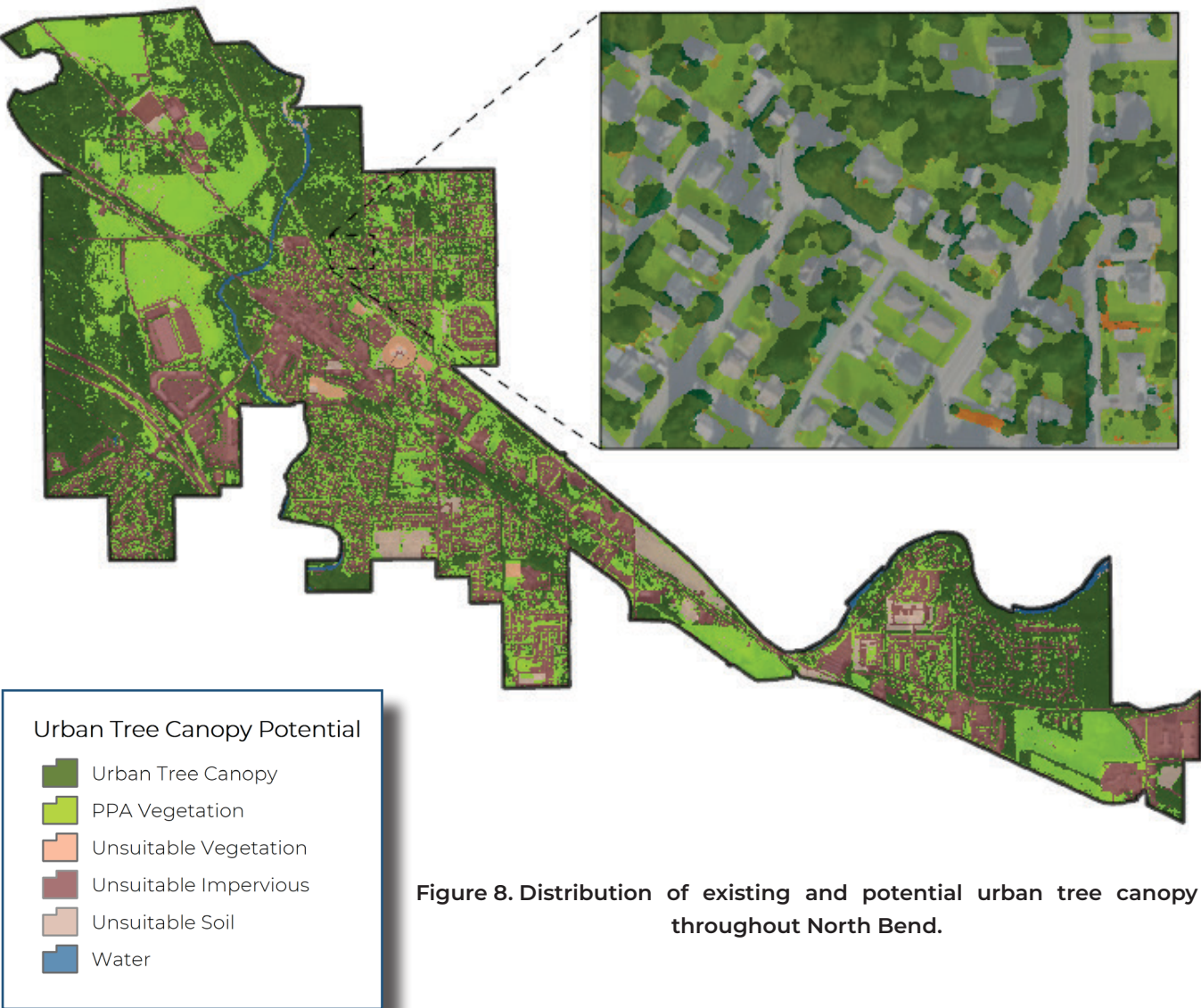


Figure 8. Distribution of existing and potential urban tree canopy throughout North Bend.



Table 2. Urban tree canopy assessment results by acres and percent (percentages based on land acres).

City of North Bend	Acres	%
Total Area	2,831	100%
Land Area	2,810	99%
Urban Tree Canopy	1,108	39%
Total Possible Planting Area	855	30%
Total Unsuitable Area	847	30%



The city's 1,108 acres of urban tree canopy were further divided into subcategories based on whether the canopy was overhanging pervious or impervious surfaces. Tree canopy overhanging an impervious surface can provide many benefits through ecosystem services such as localized cooling provided by shading and increased stormwater absorption. Results indicated that the City of North Bend's UTC was predominantly overhanging pervious surfaces at 97%, while 3% was overhanging impervious surfaces.

Urban Tree Canopy Potential

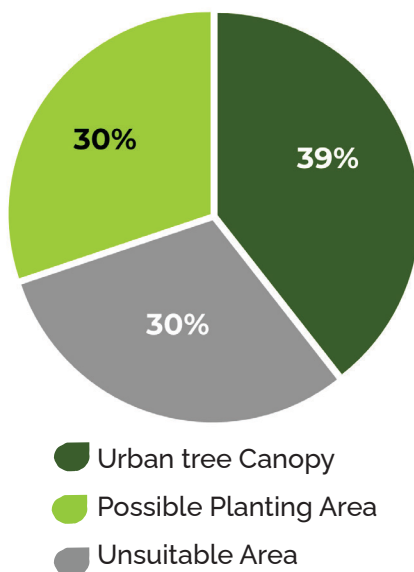


Figure 9. Urban tree canopy, possible planting area, and area unsuitable for UTC in City of North Bend. Percentages based on total land area, not including water bodies.

Unsuitable for Planting

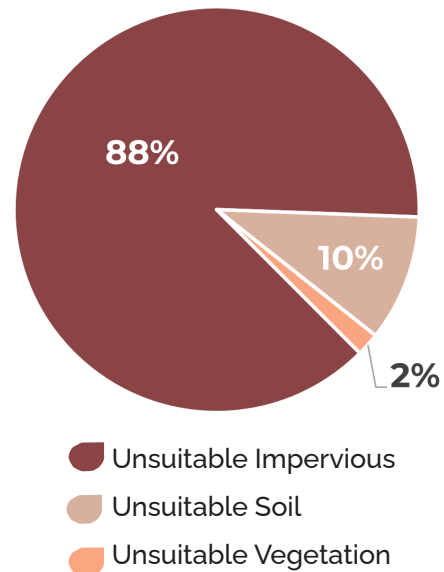


Figure 10. Total unsuitable area broken down by unsuitable soil, unsuitable impervious, and unsuitable vegetation percentages.

URBAN TREE CANOPY BY WATERSHEDS

Due to their benefits for regulating stormwater runoff, reducing flooding, and maintaining a healthy water cycle, urban tree canopy metrics were also assessed by watersheds. Trees planted within these areas can help to intercept and absorb stormwater runoff that may otherwise carry unhealthy pollutants into surface water bodies. UTC and PPA were assessed across North Bend's three watersheds. The Lower South Fork Snoqualmie River watershed, occupies 82% of City's land area and contributed the greatest amounts of UTC (80%) and PPA (84%) towards the citywide totals. Although the Lower South Fork watershed contributed the largest amount to citywide total, it had the lowest UTC cover of all the watersheds at 38%. The Patterson Creek-Snoqualmie River watershed contained the greatest proportion of UTC and PPA within its boundary at 56% and 41% respectively. Utilizing the plantable space in riparian areas will increase shade of water bodies therefore keeping rivers at optimal temperatures for Chinook salmon and other threatened native fish species.

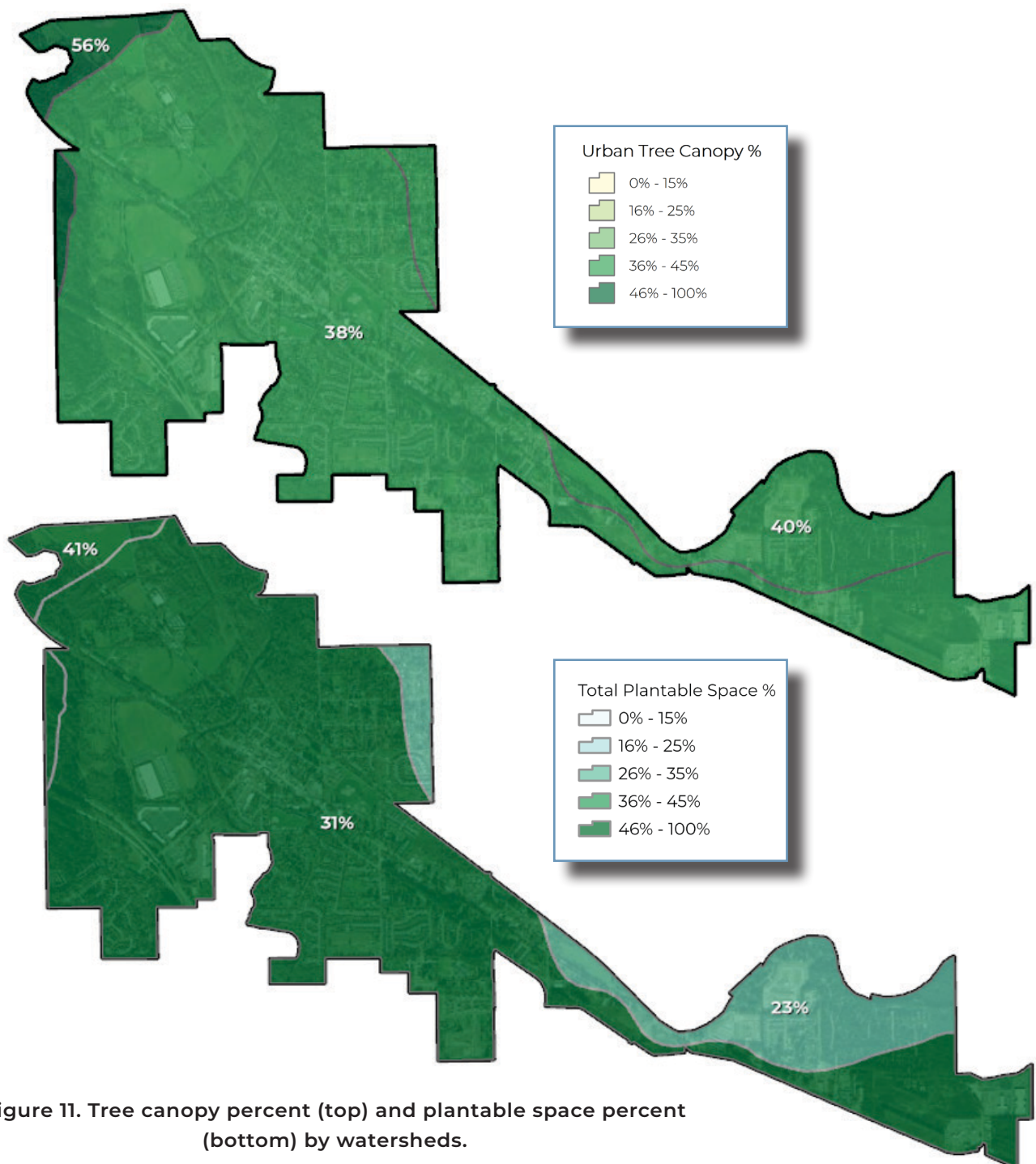


Figure 11. Tree canopy percent (top) and plantable space percent (bottom) by watersheds.

URBAN TREE CANOPY BY LAND OWNERSHIP

Urban tree canopy metrics were also assessed for North Bend's three property ownership types to inform the City's management strategies. In 2021, 56% of North Bend's tree canopy was located on private property, and 35% was on city-owned land. However, city-owned land contained more canopy within its boundaries at 51% tree canopy cover. Privately-owned land had 37% canopy cover and ROW had 27%. Due to the large total area of private land, this ownership type also contributed the largest percent of citywide PPA distribution at 58% of the citywide total. City-owned property provided 345 acres of plantable space, or 41% of city-owned land area. Over a quarter (34%) of the City's total PPA is found on city-owned parcels. The ROW had 77 acres of PPA.

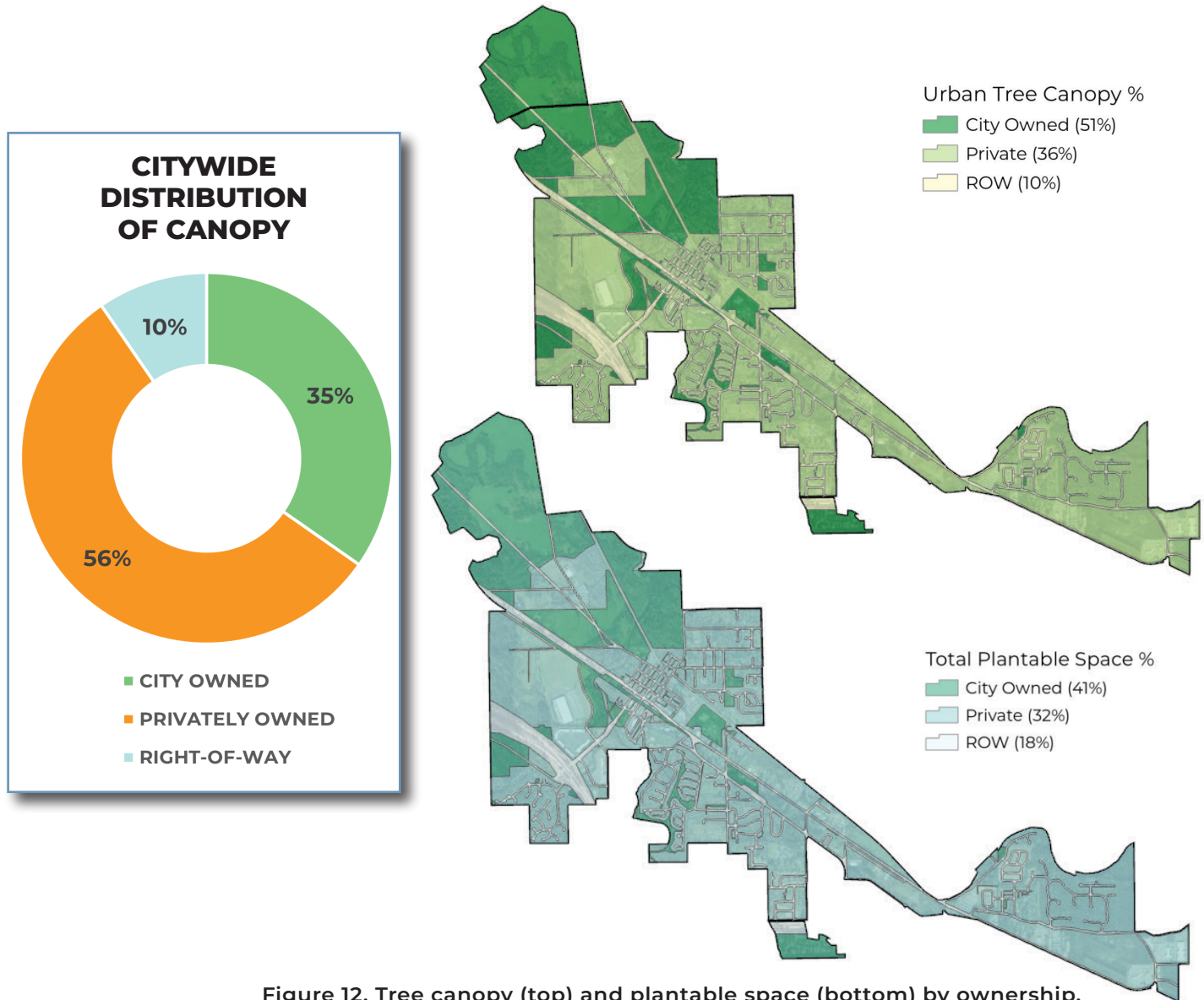


Figure 12. Tree canopy (top) and plantable space (bottom) by ownership.

41%
of city-owned land is available for planting

18%
of the right-of-way is available for planting

URBAN TREE CANOPY BY CENSUS BLOCK GROUPS

UTC and PPA were also assessed at the census block group level. Census block groups contain clusters of census block boundaries. This is the second smallest geographic unit of measure at which the U.S. Census publishes statistical data within a state and represents between 600 and 3,000 people. Census block groups are particularly valuable for assessing the equitable distribution of tree canopy throughout the city, as the block groups are linked to readily available demographic and socio-economic data. Results indicated that canopy cover varied substantially throughout North Bend's census block groups, as seen in Figure 12. Out of North Bend's seven census block groups, over half (five) contained between 20-50% canopy cover, and the other two contained greater than 50%. Three census block groups exceeded the citywide canopy cover (39% UTC). Plantable space was not distributed as evenly across census block groups, with 71% of all block groups containing 20-40% PPA. No census block groups exceeded 40% PPA.

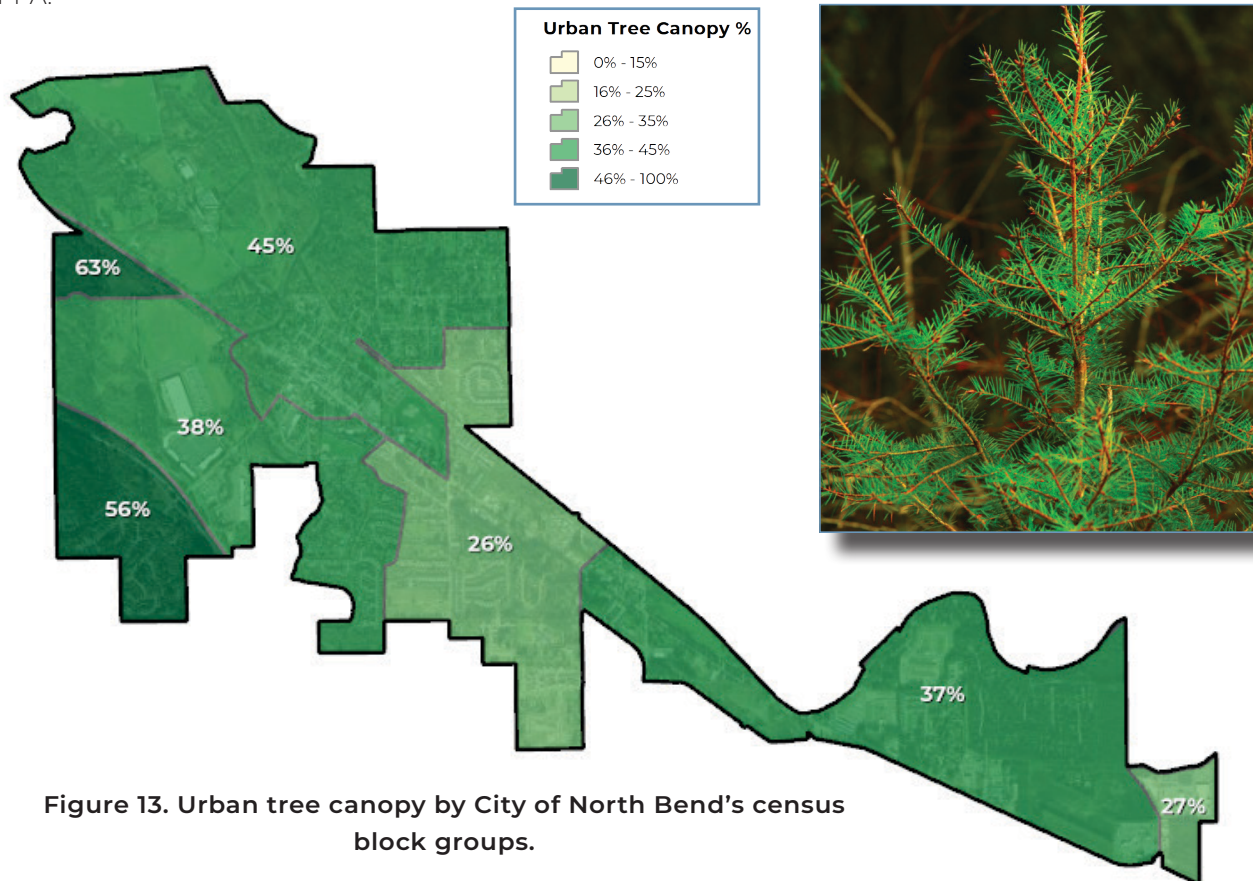


Figure 13. Urban tree canopy by City of North Bend's census block groups.

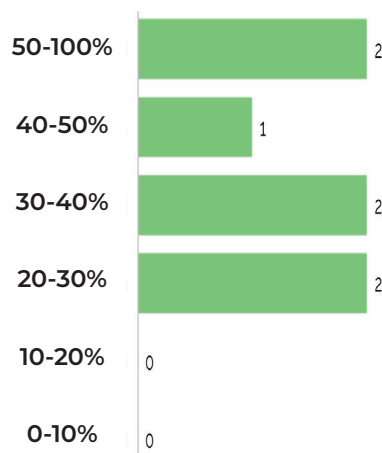


Figure 14. Number of census block groups with percent canopy cover ranges.

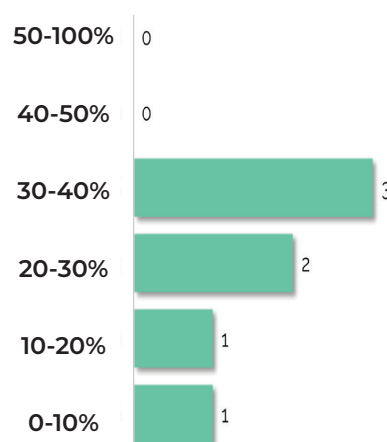


Figure 15. Number of census block groups with percent possible planting area ranges.

URBAN TREE CANOPY BY ZONING

Urban tree canopy metrics were also assessed for North Bend's 12 zoning types. In 2021, Constrained Low-Density Residential (CLDR) zones had the highest percentage of urban tree canopy with 78% or 65 acres. Parks/Open Space or Public Facilities (POSPF) contained 28% of North Bend's land area, had 53% UTC coverage within its boundary, but represented 37% to North Bend's entire canopy cover. Low Density Residential 4 Units/Acre (LDR) contained 263 acres of canopy, accounting for 26% of the city's total tree canopy. Downtown Commercial (DC) had the lowest canopy cover at 18%. The zoning types had a wide range of PPA. Employment Park - 2 (EP-2) contained the highest percentage of PPA at 47% PPA (9% of total PPA within North Bend). LDR and POSPF zones contributed the highest amount of citywide PPA at 31% and 30% respectively.

Table 3. Urban tree canopy, citywide canopy distribution, and possible planting percent by zoning.

Study Area Zones	UTC %	Distribution of Citywide Canopy %	PPA %
Constrained Low Density Residential (CLDR)	78%	7%	18%
Parks/Open Space or Public Facilities (POSPF)	53%	37%	34%
Neighborhood Business - 2 (NB-2)	48%	5%	31%
Interchange Mixed Use (IMU)	47%	2%	20%
Cottage Residential (CR)	45%	3%	34%
Employment Park - 1 (EP-1)	39%	11%	41%
Low Density Residential 4 Units/Acre (LDR)	36%	26%	33%
High Density Residential (HDR)	29%	2%	9%
Interchange Commercial (IC)	28%	2%	12%
Neighborhood Business - 1 (NB)	24%	2%	30%
Employment Park - 2 (EP-2)	23%	3%	47%
Downtown Commercial (DC)	18%	1%	17%

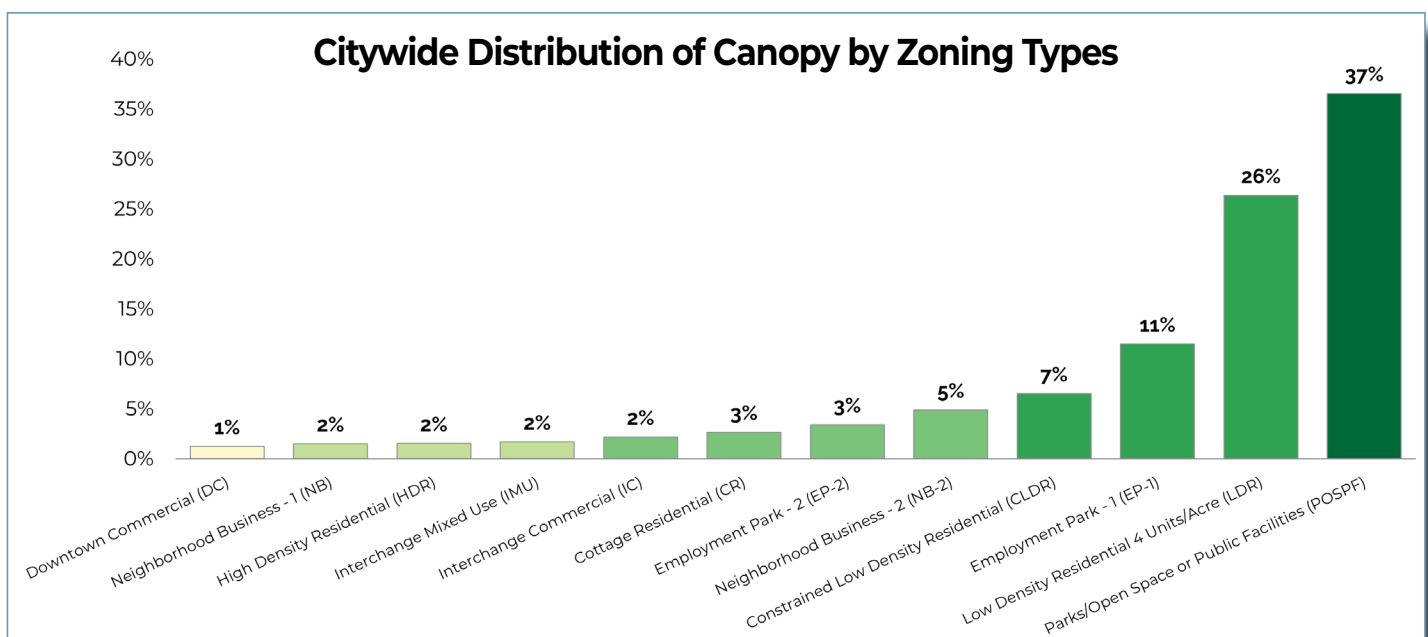


Figure 16. Citywide distribution of urban tree canopy by zoning.

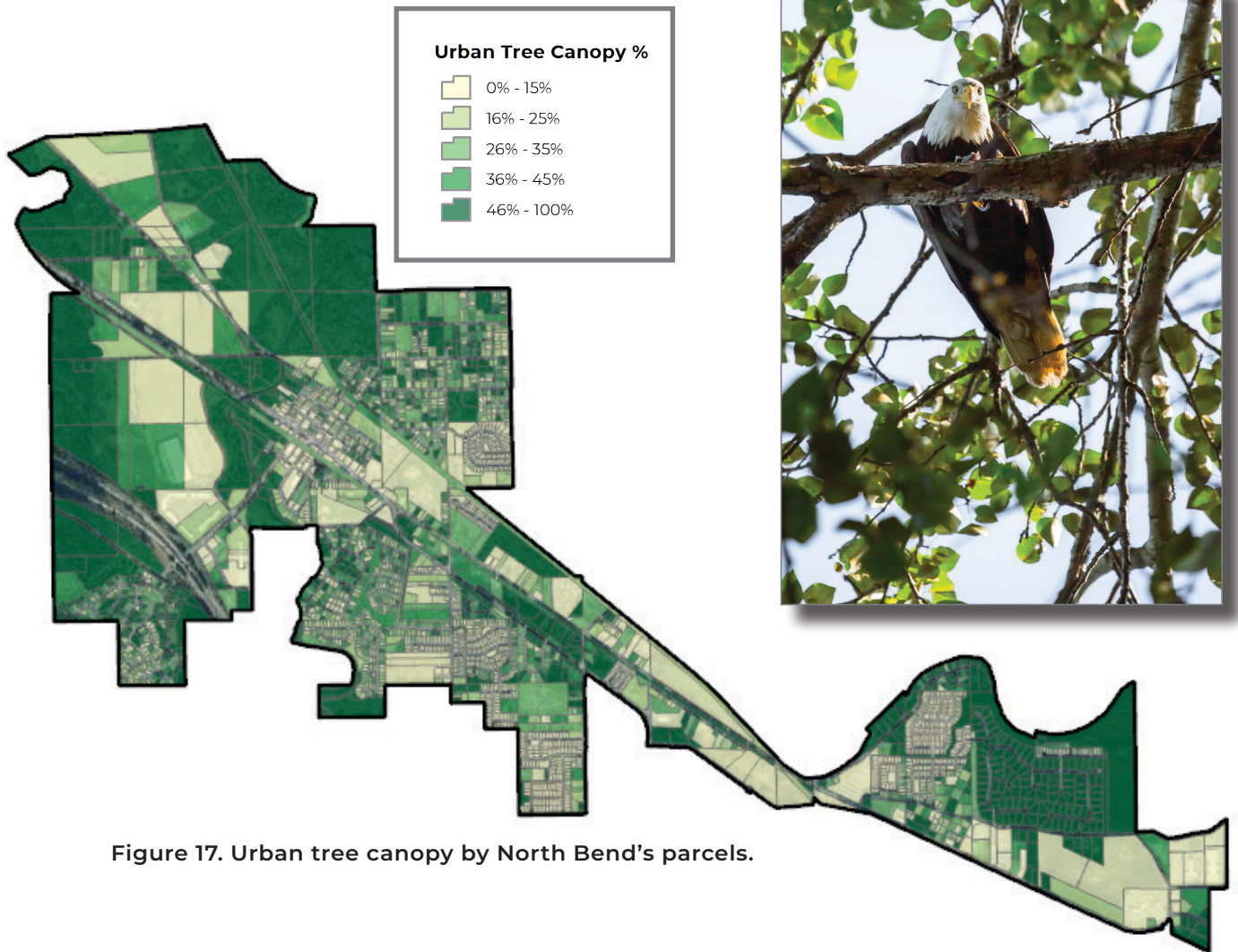


Figure 17. Urban tree canopy by North Bend's parcels.

URBAN TREE CANOPY BY PARCELS

Tree canopy cover and PPA were assessed for the city's 3,080 individual parcels. Short of quantifying every individual tree, this unit of measure provides the finest possible scale at which to interpret the results, defining UTC and PPA metrics for every parcel within the city boundary. 35% of the City's parcels had a tree canopy cover of 10% or lower. However, 25% of parcels met or exceeded the citywide average of 39%, and 18% had a canopy cover of 50% or greater. 29 parcels were entirely covered by canopy while 736 had no canopy at all. At 42%, the average canopy cover of all parcels exceeded the citywide average of 39%.

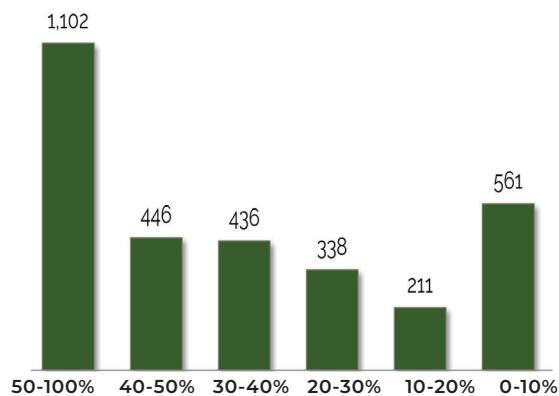


Figure 18. Number of parcels with percent canopy cover ranges.

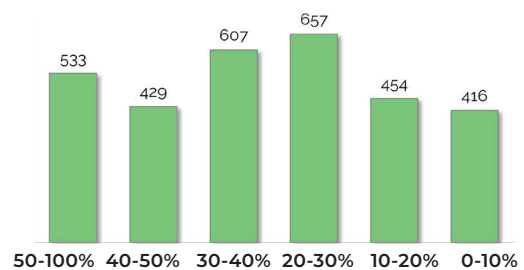


Figure 19. Number of parcels with percent possible planting area ranges.

TREE PLANTING

PRIORITIZATION

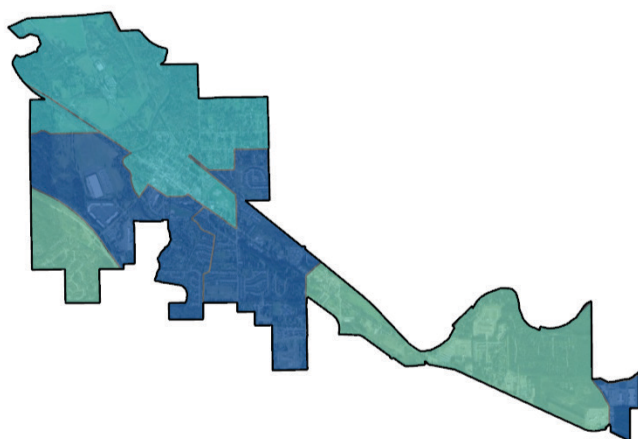
PRIORITIZATION CRITERIA DESCRIPTIONS

Urban tree canopy provides a multitude of direct and indirect benefits. To provide the most complete understanding of where those benefits are lacking, tree planting priorities were identified based on environmental, socio-demographic, and public health data sets.

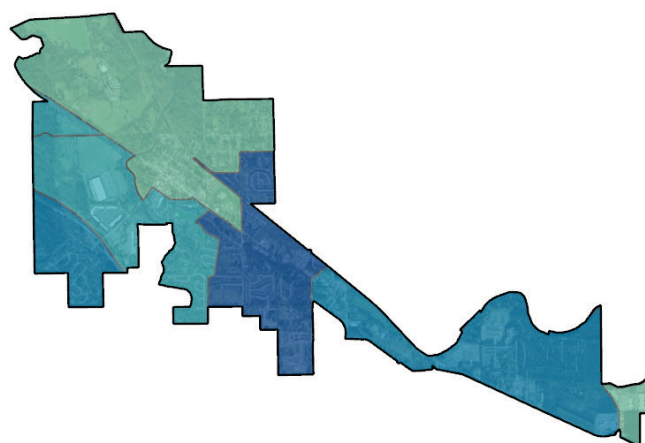
Tree planting prioritization ranking is needs-based and designed to rank census block groups on each area's need for a particular benefit that trees can provide. Rankings are sorted from highest priority (dark blue) to lowest priority (light yellow) and were calculated for each individual criteria as well as overall to show where multiple needs overlap. Viewing combined ranks show where tree canopy benefits can have the greatest impact by addressing multiple needs.

SOCIO-DEMOGRAPHIC

- **Underserved Populations:** Income inequality often occurs with environmental inequality where lower-income residents live in highly impervious areas with limited numbers of trees, parks, and other greenspaces. This criterion shows the percentage of residents living below the poverty level, as reported by the U.S. Census American Community Survey 5-year estimates.
- **People of Color Populations:** Tree canopy is often negatively correlated with the percentage of residents of color. Planting trees in communities with higher percentages of people of color can support environmental equity. The greater percent of people of color within a census block group, the higher the planting priority.



Underserved Populations



People of Color Populations

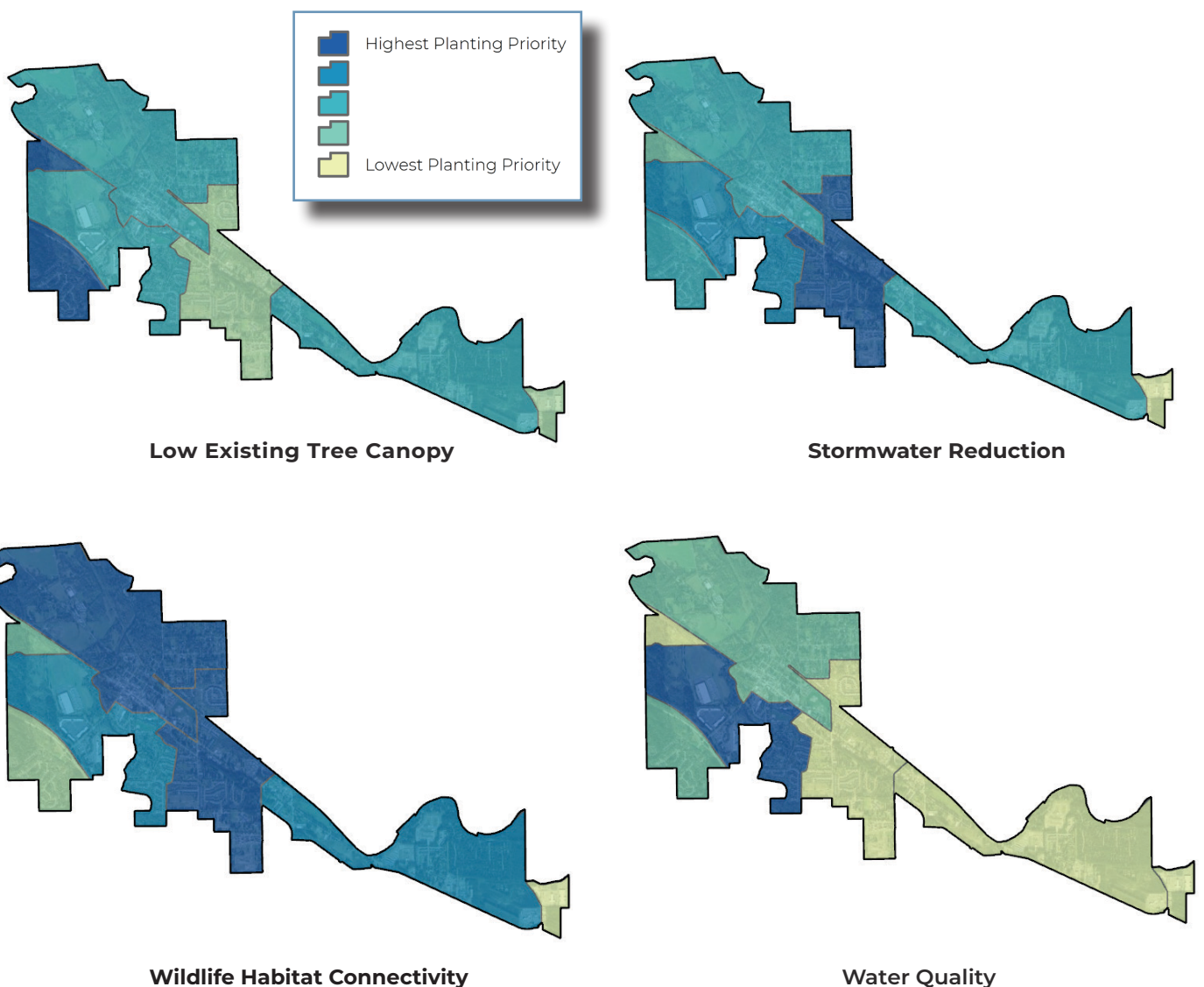


LAND COVER

- **Areas with Low Existing Tree Canopy:** This indicator highlights census block groups with low percentages of existing canopy cover. This criterion prioritizes areas with higher percentages of area that are not covered by tree canopy.

ENVIRONMENTAL

- **Stormwater Reduction:** This indicator uses available planting area within 100 feet of all surface water bodies and impervious surfaces to identify areas with plantable space that will reduce stormwater runoff. Areas close to water bodies and impervious surfaces were considered high priority planting areas.
- **Wildlife Habitat Connectivity:** Large block groups of connected canopy cover can improve habitat for local wildlife. This indicator identifies available planting areas within 10 feet of large canopy block groups (equal to or greater than 5 acres). Areas where opportunities to expand connectivity are high were considered higher priority for planting.
- **Water Quality:** Trees are integral in reducing impact of erosion while roots stabilize soil and promote infiltration of water and nutrients, reducing the volume and rate of sediment, water, and pollutant loads downstream. This indicator identifies available planting areas within 100' of all surface water bodies.



- **Overall:** The overall suitability for tree planting score is based on an equally weighted formula that includes all planting prioritization categories. The weights of priority criteria can be adjusted and customized with the TreePlotter™ CANOPY application.

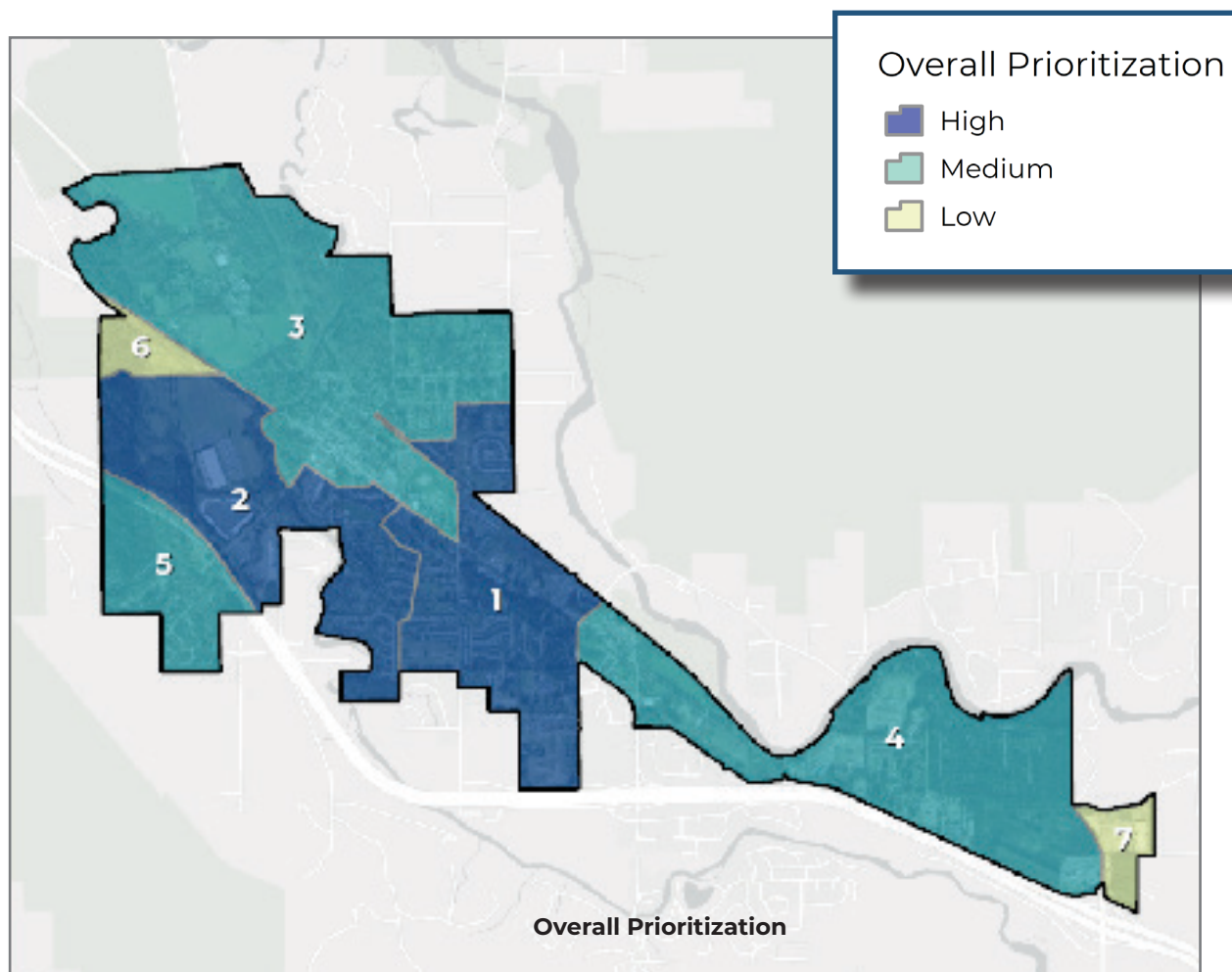


Table 4. Urban tree canopy, possible planting percent, and priority planting score by census block group. The highest priority block groups are highlighted in navy.

Census Block Group	UTC %	PPA %	Priority Score
530330327032	63%	25%	6
530330327041	37%	30%	4
530330327042	26%	34%	1
530330327043	45%	33%	3
530330327044	38%	31%	2
530330327052	56%	18%	5
530330327063	27%	9%	7

CONCLUSIONS AND RECOMMENDATIONS

The City of North Bend has demonstrated that it values its natural resources and wants to maintain a healthy and sustainable urban environment. Recurring assessments of the City's tree canopy represent important steps in ensuring the long-term health of its urban forest. A greater percent of canopy cover can be achieved with proper planning, investment, and care of existing trees. The City should continue to monitor the health of the urban forest and implement the following recommendations to ensure the urban forest is considered during future city planning and development to sustain and enhance the benefits that trees provide to the community. The City of North Bend can utilize these results to protect the habitat that supports the Chinook Salmon, Northern Goshawk, and other threatened or endangered species.

City-owned land encompasses...

27% of North Bend's land area

35% of all canopy

3% of all impervious

To preserve, protect, and maintain North Bend's tree canopy, the City should continue to have a tree canopy assessment performed at regular intervals through a TreePlotter™ CANOPY subscription or continuing regular projects. As the City grows, they will be able to use these data to ensure that their urban forest policies and management practices prioritize its maintenance, health, and growth. The City's urban forest provides North Bend with a wealth of environmental, social, and even economic benefits which relate back to greater community pride and interest in citywide initiatives and priorities. These results can be used to identify where existing tree canopy cover should be preserved, where there are opportunities to continue to expand the City's

canopy cover, and which areas would receive the greatest benefits from the investment of valuable time and resources into North Bend's urban forest.

1. Leverage the results of this assessment to promote the urban forest and set canopy goals

The results of this assessment should be used to encourage investment in urban forest monitoring, maintenance, and management; to prepare supportive information for local budget requests/grant applications; and to develop targeted presentations for city leaders, planners, engineers, resource managers, and the public on the functional benefits of trees in addressing environmental issues. The land cover, tree canopy, and plantable space data should be disseminated to diverse partners for urban forestry and other applications while the data are current and most useful for decision-making and implementation planning. The information from this study can help establish new canopy cover goals for the short- and long-term to continue to expand City of North Bend's urban forest to its known potential.

2. Use the urban tree canopy data to identify areas to prioritize canopy expansion

The City and its various stakeholders can utilize the results of the UTC and PPA analyses to identify the best locations on City-owned and private property to focus future tree planting and canopy expansion efforts. Trees can play a large role in improving public health by improving air quality, reducing temperatures, and addressing climate change. The City can acquire parcels for public use as part of redeveloped neighborhoods to be used as carbon sinks to address community access to nature, climate, human health, and equity. The priority planting analysis should be used to identify census block groups with the greatest need for canopy expansion. The census block groups with the largest concentration of impervious surfaces are: 530330327041, 53033032704, 530330327043. Targeting these block groups for tree plantings can help offset the urban heat island effect, stormwater runoff, and energy consumption.

The right-of-way often contains high concentrations of impervious surfaces. Utilizing the 77 acres of plantable space in the right-of-way could provide significant shading for walkways and roadways. The City can develop a proactive street tree maintenance program to take on the responsibility of planting and managing street trees, ensuring healthy trees are distributed equitably across the city. It is recommended that planting efforts take place near the highest scoring prioritization census block groups (530330327044, 530330327041, 530330327043). The City should evaluate city codes to increase tree preservation, create space for existing trees during the development process, and set aside space for new larger stature trees to be planted both on private property and within the public right-of-way to maximize the benefits of trees.

243 ACRES
OF PLANTABLE SPACE
IS WITHIN LOW DENSITY
RESIDENTIAL 4
UNITS/ACRE (LDR) ZONED
AREAS

3. Develop outreach programs towards private landowners

In City of North Bend, 58% of all citywide PPA is found within privately-owned land. The City should focus on community outreach and education programs to better inform citizens and private landholders of the environmental, health, social, and financial benefits that trees provide and consider other strategies to help preserve existing trees and grow the tree canopy in the 855 acres of plantable space in North Bend. The City should explore options to develop grant programs for tree maintenance or removal of hazard or invasive trees within the city to remove barriers for overburdened communities which lack tree canopy. Native tree giveaways, tree planting programs, and tree maintenance events can help to promote proper pruning techniques for maintaining healthy, resilient trees. To promote new plantings, expand the partnership with local contractors to plant more trees on redeveloped or newly developed property focusing on low-canopy and underserved neighborhoods. The City should also continue to develop partnerships with Community Based Organizations and individual champions throughout neighborhoods to build stewardship at the community level. In addition, the city should continue to conduct volunteer tree planting and tree maintenance events to increase awareness levels in the community.



4. Use TreePlotter to identify areas in need of tree canopy, prioritize planting efforts, and continue to monitor the urban forest

Performing a canopy assessment every five years is recommended. An up-to-date subscription to TreePlotter Canopy will guarantee updated assessments occur once than every 2-3 years. To maximize impact, see greater return on investment, and provide the greatest number of benefits to the community, we recommend that the City focus planting and management efforts in areas with high weighted priority rankings. Planting priority maps and data, displayed in TreePlotter™ CANOPY, show land cover metrics and the areas of highest priority collectively and individually for all planting prioritization criteria. The City should also use the GIS data provided to create unique weighted scenarios to focus efforts in targeted areas that

meet specific criteria. For instance, the City could find areas that have low UTC, high PPA, or would offer the greatest benefits to improving air quality and reducing summertime temperature. Focusing urban forest management resources on expanding and maintaining tree canopy in areas like these will have positive impacts on multiple factors that the City has deemed important. Efforts should focus on outreach to the residents of these neighborhoods, as well as local business and landowners, in order to promote new tree plantings and continued maintenance of existing trees. NAIP imagery was collected in 2021 in Washington and is collected by the USDA every two-three years. The City's CANOPY application can be updated with new UTC and PPA metrics when they become available in mid- to late-2023 if the city chooses to subscribe.



REPORT

APPENDIX

ACCURACY ASSESSMENT

Classification accuracy serves two main purposes. Firstly, accuracy assessments provide information to technicians producing the classification about where processes need to be improved and where they are effective. Secondly, measures of accuracy provide information about how to use the classification and how well land cover classes are expected to estimate actual land cover on the ground. Even with high resolution imagery, very small differences in classification methodology and image quality can have a large impact on overall map area estimations.

The classification accuracy error matrix illustrated in Table A1 contain confidence intervals that report the high and low values that could be expected for any comparison between the classification data and what actual, on the ground land cover was in 2021. This accuracy assessment was completed using high resolution aerial imagery, with computer and manual verification. No field verification was completed.

THE INTERNAL ACCURACY ASSESSMENT WAS COMPLETED IN THESE STEPS:

1. One hundred and one sample points, or approximately 23 points per square mile area in City of North Bend (4.4 sq. miles), were randomly distributed across the study area and assigned a random numeric value.
2. Each sample point was then referenced using the NAIP aerial photo and assigned one of five generalized land cover classes ("Ref_ID") mentioned above by a technician.
3. In the event that the reference value could not be discerned from the imagery, the point was dropped from the accuracy analysis. In this case, no points were dropped.
4. An automated script was then used to assign values from the classification raster to each point ("Eval_ID"). The classification supervisor provides unbiased feedback to quality control technicians regarding the types of corrections required. Misclassified points (where reference ID does not equal evaluation ID) and corresponding land cover are inspected for necessary corrections to the land cover.¹
5. Accuracy is re-evaluated (repeat steps 3 & 4) until an acceptable classification accuracy is achieved.

SAMPLE ERROR MATRIX INTERPRETATION

Statistical relationships between the reference pixels (representing the true conditions on the ground) and the intersecting classified pixels are used to understand how closely the entire classified map represents City of North Bend's landscape. The error matrix shown in Table A1 represent the intersection of reference pixels manually identified by a human observer (columns) and classification category of pixels in the classified image (rows). The blue boxes along the diagonals of the matrix represent agreement between the two-pixel maps. Off-diagonal values represent the number of pixels manually referenced to the column class that were classified as another category in the classification image. Overall accuracy is computed by dividing the total number of correct pixels by the total number of pixels reported in the matrix ($(33 + 42 + 22 + 2 + 1 = 100 / 101 = 99\%)$), and the matrix can be used to calculate per class accuracy percentages. For example, 42 points were manually identified in the reference map as non-canopy vegetation, and 43 of those pixels were classified as non-canopy vegetation in the classification map. This relationship is called the "Producer's Accuracy" and is calculated by dividing the agreement pixel total (diagonal) by the reference pixel total (column total). Therefore, the Producer's Accuracy for non-canopy vegetation is calculated as: $(42/43 = .976)$, meaning that we can expect that ~98% of all 2021 non-canopy vegetation in City of North Bend, WA study area was classified as non-canopy vegetation in the 2021 classification map. This also applies to tree canopy classifications.

Conversely, the "User's Accuracy" is calculated by dividing the total number of agreement pixels by the total number of classified pixels in the row category. For example, 34 classification pixels intersecting reference pixels were classified as Tree Canopy, but 1 pixel was identified as non-canopy vegetation in the reference map. Therefore, the User's Accuracy for Tree Canopy is calculated as: $(33/34 = 0.97)$, meaning that ~97% of the pixels classified as Tree Canopy in the classification were actual tree canopy. It is important to recognize the Producer's and User's accuracy percent values are based on a sample of the true ground cover, represented by the reference pixels at each sample point. Interpretation of the sample error matrix results indicates this land cover, and more importantly, tree canopy, were accurately mapped in City of North Bend in 2021. The largest sources of classification confusion exist between tree canopy and water.

¹ Note that by correcting locations associated with accuracy points, bias is introduced to the error matrix results. This means that matrix results based on a new set of randomly collected accuracy points may result in significantly different accuracy values.

Table A1. | Error matrix for land cover classifications in City of North Bend, WA (2021).

		Reference Data					
		Tree Canopy	Vegetation	Impervious	Soil / Dry Veg.	Water	Total Reference Pixels
Classification Data	Tree Canopy	33	1	0	0	0	34
	Vegetation	0	42	0	0	0	42
	Impervious	0	0	22	0	0	22
	Soil / Dry Veg.	0	0	0	2	0	2
	Water	0	0	0	0	1	1
	Total	33	43	22	2	1	101
Overall Accuracy = 99%							
Producer's Accuracy		User's Accuracy					
Tree Canopy		100%	Tree Canopy				97%
Veg./ Open Space		98%	Veg./ Open Space				100%
Impervious		100%	Impervious				100%
Bare Ground/ Soil		100%	Bare Ground/ Soil				100%
Water		100%	Water				100%

ACCURACY ASSESSMENT RESULTS

Interpretation of the sample error matrix offers some important insights when evaluating City of North Bend's urban tree canopy coverage and how well aligned the derived land cover data are with interpretations by the human eye. The high accuracy of the 2021 data indicates that regardless of how and when it was achieved, City of North Bend's current tree canopy can be safely assumed to match the figures stated in this report (approximately 39%).

GLOSSARY/KEY TERMS

Land Acres: Total land area, in acres, of the assessment boundary (excludes water).

Non-Canopy Vegetation: Areas of grass and open space where tree canopy does not exist.

Possible Planting Area - Vegetation: Areas of grass and open space where tree canopy does not exist, and it is biophysically possible to plant trees.

Shrub: Areas of shrub or other leafy and woody vegetation (smaller than 6ft tall) that are not classified as tree canopy

Soil/Dry Vegetation: Areas of bare soil and/or dried, dead vegetation.

Total Acres: Total area, in acres, of the assessment boundary (includes water).

Unsuitable Impervious: Areas of impervious surfaces that are not suitable for tree planting. These include buildings and roads and all other types of impervious surfaces.

Unsuitable Planting Area: Areas where it is not feasible to plant trees. Airports, ball fields, golf courses, etc. were manually defined as unsuitable planting areas.

Unsuitable Soil: Areas of soil/dry vegetation considered unsuitable for tree planting. Irrigation and other modifiers may be required to keep a tree alive in these areas.

Unsuitable Vegetation: Areas of non-canopy vegetation that are not suitable for tree planting due to their land use.

Urban Tree Canopy (UTC): The "layer of leaves, branches and stems that cover the ground" (Raciti et al., 2006) when viewed from above; the metric used to quantify the extent, function, and value of the urban forest. Tree canopy was generally taller than 10-15 feet tall.

Water: Areas of open, surface water not including swimming pools.

JULY | 2023

URBAN TREE CANOPY
ASSESSMENT
CITY OF NORTH BEND,
WASHINGTON



CHAPTER 11: ENERGY AND SUSTAINABILITY ELEMENT



Photo by Dave Battey, Snoqualmie Valley Historical Museum

A. INTRODUCTION

The City of North Bend has an incredible setting. The rugged backdrop of Mt. Si, the green forested slopes of Rattlesnake Mountain, the wide open fields of Meadowbrook and Tollgate Farms, and the clear flowing mountain waters of the South Fork and Middle Fork Snoqualmie Rivers form our community's character and unique identity, while enhancing its vitality. The desire to pass these resources to our future generations is at the center of the idea of sustainability.

The North Bend Energy and Sustainability Element provides incentive-based policy direction for municipal operations, new development, and outreach to the community to promote the balance of environmental, community, and economic goals for the long term health and prosperity of the City and its future residents. The policies of this Element are additionally intended to support greenhouse gas emissions reductions which enable the City to compete effectively for important sources of grant and loan funding that favor such factors.

Other Elements of this Comprehensive Plan contain objectives and policies that address additional measures of sustainability. These include:

- ***Critical Areas Element*** – addressing the protection of our physical environment, including wetlands, streams, wildlife habitat, and air and water quality.
- ***Transportation Element*** – addressing impacts of vehicular mobility on multiple social and environmental factors.
- ***Land Use Element*** – addressing creating compact mixed-use, walkable communities with an appropriate jobs/housing balance.

A.1 What is Sustainability?

Sustainability is widely recognized by the following definition:

“Sustainability is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs.”¹

The concept of sustainability describes a condition in which human use of natural resources, required for the continuation of life, is in balance with nature’s ability to replenish them. This concept also extends to economics, as financial decisions must consider balance and the ability to replenish or demonstrate the appropriate payback of expenditures in a timely effective manner. More recently, sustainability has been further expanded to recognize the interdependence of three primary factors or pillars - that of economic vitality, social equity, and environmental quality. A project or action can be considered sustainable when it achieves a balance of these three pillars. When a community maintains a balance of these interdependent pillars, the long-term result is prosperity for the current population and prosperity for its future generations.



A.2 Why is Sustainability Important to North Bend?

Addressing factors of sustainability is necessary for the environmental, economic, and social well-being of North Bend’s current and future generations. By proactively addressing issues of sustainability, the City of North Bend gains the opportunity to:

- i. Resolve issues prior to adverse impacts becoming more costly and difficult;
- ii. Effect positive change through incentive-based policies;
- iii. Compete effectively against other communities for State and Federal grant funds;
- iv. Provide efficient and cost effective government decision making for citizens and tax payers.
- v. Proactively address energy and sustainability-related issues rather than reacting to future legislation, allowing the City to drive its destiny.

¹ Definition created by the Brundtland Commission, established by the UN in 1983 to consider the impacts of environmental degradation on the human environment, natural resources, and economic and social development.

A.3 Proactively Responding to Legislative Requirements

Measures of sustainability are regularly addressed by the Washington State Legislature. The following are some of the more significant sustainability-related state requirements passed in the last few years.

Green Building Requirements for State-Funded Buildings

During the 2005 legislative session, Washington State passed the country's first law requiring that all new buildings and renovation projects of state public agencies and school districts that receive state funding be built to one of three green building standards (Chapter 39.35D RCW). Projects that receive funds from the state capital budget must achieve at least the Leadership in Energy and Environmental Design (LEED) Silver standard.

Electric and Biofuel Vehicle Operations Requirements

In 2009, the legislature enacted RCW 43.19.648, which requires that by June 1, 2018, local governments must satisfy 100% of their fuel usage for operating publicly owned vehicles and construction equipment from electricity or biofuel, to the extent determined practicable by rules to be adopted by the Department of Commerce by June 1, 2015. While these rules have yet to be clarified and there is likely to be a phase-in period, the City should consider this regulation when replacing and acquiring new vehicles.

Statewide Greenhouse Gas Reduction Goals

The Washington State Legislature in 2009 passed statewide greenhouse gas reduction limits, codified as RCW 70.235.020. These goals include reduction of statewide greenhouse gas emissions to 1990 levels and a reduction in vehicle miles traveled by 18% by 2020 (and further reductions by 2035 and 2050), require the Department of Ecology to inventory and track greenhouse gas emissions state-wide, and require industries of a certain size to report greenhouse gasses to the Department of Ecology. While not directed at Cities, municipal operations, land use planning, and local transportation decisions will play a strong role in achieving these limits.

Local Greenhouse Gas Reduction Goals

Starting in 2010, RCW 70.235.070 requires that all state agencies providing competitive grants for economic development and infrastructure must consider whether cities receiving state capital funds have adopted policies to reduce greenhouse gas emissions. This is perhaps the most impactful legislative action for our local government funding as it represents a significant amount of grant and loan funding to the City, including such sources as the Public Works Trust Fund (transportation and infrastructure grants and loans), and competitive grants from the Department of Ecology (environmental policy grants), Department of Commerce (land use policy and economic development grants), and Washington State Recreation and Conservation Office (Park and trail grants), among others. Having goals and policies in place to address greenhouse gas reduction will help ensure that the City is positioned for a primary source of funding opportunities for local projects.

B. SUSTAINABILITY AND PROPERTY RIGHTS

Sustainability involves striking a balance between protecting individual and public interests. In the case of this Energy and Sustainability Element, the focus is on creating incentives rather than regulations, and providing the public with information for wise decision making, rather than mandates for code compliance.

ES Goal 1: In city operations and in the development of policies and regulations, ensure an appropriate balance between individual property rights and the public interest.

- ES 1.1 Wherever possible, foster wise and sustainable land use decisions in the community through incentives rather than regulations.
- ES 1.2 Regularly seek to streamline permit and approval processes and remove regulations that are no longer applicable.

C. EDUCATION AND OUTREACH

Education is a core purpose of this element and a key to achieving sustainability goals. Education should occur through cost effective methods to tax payers, such as the City website, use of existing Boards and Commissions, and partnerships with other governmental agencies, schools and community groups. Education and outreach should include:

- City employees –To reduce municipal operating costs; to utilize economies of scale between city departments with regard to city resources; to learn methods of doing business in ways that are both economically wise and environmentally sound.
- City officials – To develop awareness of strategies for sustainable municipal operations and programs; to gain support and understanding of the latest techniques and methods
- Residents - To raise awareness regarding personal and collective sustainability actions individuals can take on their own; to gain support and understanding of the techniques and methods being proposed and applied

Partnering with other governmental agencies, schools, community groups and utility providers will ultimately conserve money while promoting participation in sustainability throughout the community.

ES Goal 2: Increase individual and public awareness of, and participation in, efforts to foster greater sustainability.

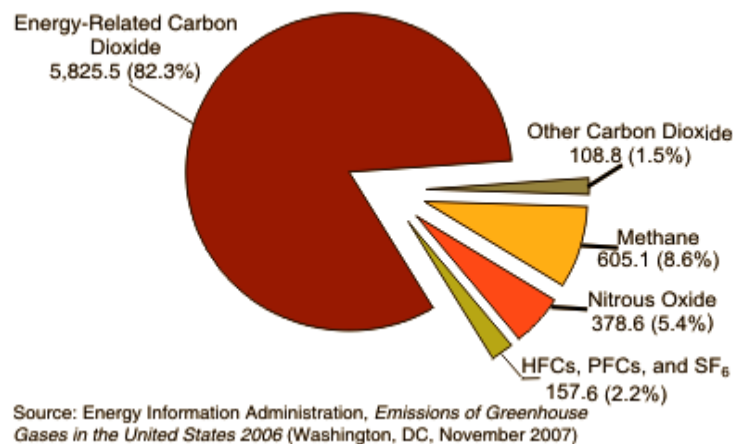
Policies:

- ES 2.1 Help to recognize and make transparent the ecological and economic impacts of City land use, transportation and budget decisions.
- ES 2.2 Help direct people to resources available from other agencies, utility providers and organizations that address issues of sustainability.

- ES 2.3 Maintain a sustainability page on the City’s website identifying measures the City is taking to reduce costs, increase services, reduce greenhouse gas emissions, energy and resource consumption, and other environmental impacts, and ways that residents can further reduce their own impacts.
- ES 2.4 Encourage local organizations, community groups, and businesses to organize events and activities that incorporate sustainable measures.
- ES 2.5 Publicize and recognize the accomplishments of the City’s and community’s sustainability efforts.

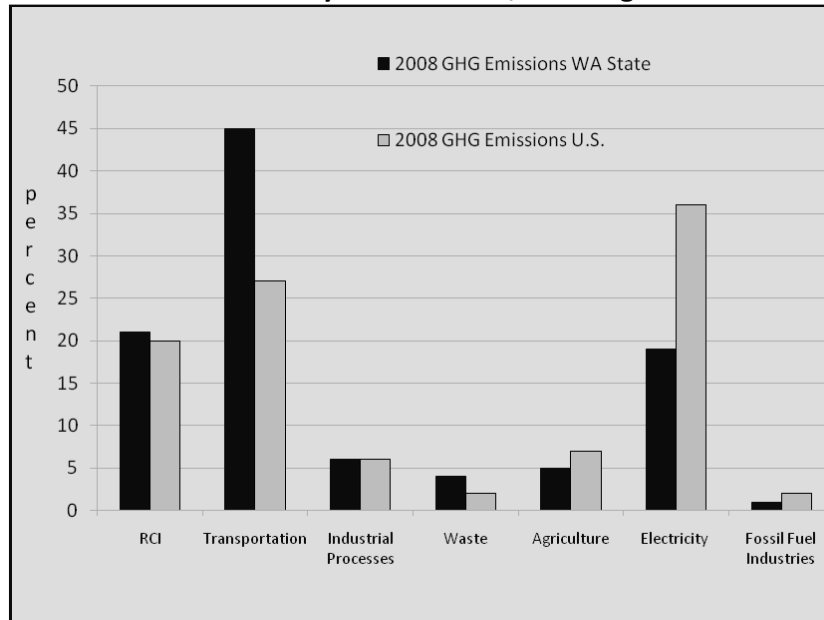
D. GREENHOUSE GAS EMISSIONS REDUCTION

Greenhouse gases are substances that contribute to warming of the climate by trapping heat in the atmosphere. Carbon dioxide is the most dominant greenhouse gas; however a number of other gases also contribute significantly to climate change, including methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrochlorofluorocarbons (HFCs) and perfluorocarbons (PFCs). Greenhouse gasses are emitted from both natural sources and anthropogenic (human activity related) sources, but it is the emissions from anthropogenic sources contributing to global warming which we have the ability to address.



Statewide, transportation is the largest share of greenhouse gas emissions, followed by use of fuels to heat residential, commercial and industrial buildings (RCI), as depicted in the chart below (Washington’s transportation emissions percentage is skewed above the national average due to the generation of most electricity in our state from hydropower sources, which does not contribute to greenhouse gas emissions. Electricity generation is typically the largest source of greenhouse gas emissions.). These percentages are likely to be similar within the City of North Bend.

Percent GHG Emissions by Sector - 2008, Washington State and U.S.



Source: *Washington State Greenhouse Gas Emissions Inventory, 1990-2008*, Department of Ecology Pub. 10-02-046, December 2010

Actions related to the reduction of greenhouse gas emissions are found throughout this ***Energy and Sustainability Element***, as well as in the ***Land Use Element*** and ***Transportation Element*** of the Comprehensive Plan.

E. SUSTAINABLE ECONOMY

E.1 Local Economy and Environmental Quality

With significant natural attractions surrounding the City of North Bend and a local economy supported by tourism, it is particularly important to recognize the interrelationship between a healthy environment and healthy economy. Supporting local economic growth in a manner that complements the natural environment is a key to maintaining sustainability. Likewise, supporting job growth improves overall sustainability by improving the City's jobs/housing balance, which is currently off-balance by way of far more residences than local jobs. Additional policies and direction for supporting economic development are found in the ***Economic Development Element***.

ES Goal 4: Foster a vibrant, balanced, and resilient local economy that supports local production of sustainable goods and services.

Policies:

ES 4.1 Where possible, support local businesses when awarding municipal contracts and in purchasing supplies and equipment for municipal operations, unless the cost of the product or service offered locally outweighs the benefits of buying local.

ES 4.2 Foster local job creation to improve the City's jobs/housing balance.

Chapter 11 – Energy and Sustainability Element

Adopted February 5, 2013 – Ordinance 1479

- ES 4.3 Promote economic development strategies that capitalize on the characteristics of the property, resources, and labor available to the North Bend community, and additional industries compatible with North Bend’s scenic and recreational environment.
- ES 4.4 Support the farmers market as a means to promote local food production and local economic development generation.
- ES 4.5 Support the use of suitable public lands (such as repetitive loss floodplain buyout lots) and underutilized private lands for local food production.
- ES 4.6 Encourage community pea patch gardens and their stewardship and management by local residents and community groups.

E.2 Economic Values of Government Sustainability

Resources and measures to address sustainability need to be practical and achievable.

ES Goal 5: Ensure careful stewardship of the City’s finances and resources in pursuing sustainability in City operations.

Policies:

- ES 5.1 Utilize measures of sustainability that bring the greatest cost benefit ratio, or “bang for the buck.”
- ES 5.2 In choosing materials or equipment for municipal operations, consider long-term operational costs over short term capital expenditures.
- ES 5.3 Maintain existing municipal equipment and facilities in optimal condition to reduce the need for costly repairs or replacement.
- ES 5.4 Consider the purchase of used rather than new vehicles and equipment that otherwise meet energy and resource conservation objectives.

F. ELECTRICAL ENERGY CONSUMPTION, CONSERVATION AND LOCAL GENERATION

The City’s role in electricity conservation comes through monitoring and reducing consumption in its own operations, and in establishing incentives applicable to new development for constructing buildings utilizing energy efficient practices and materials.

ES Goal 6: Reduce energy consumption and encourage energy efficiency and conservation in City operations and in the community.

F.1 Municipal Operations

Municipal buildings, equipment, and infrastructure (including pump stations, street lights, and wastewater operations) collectively use a significant amount of electricity. Because of all the energy uses a City is responsible for, conservation measures can provide substantial cost savings to taxpayers and reduced greenhouse gas emissions and other environmental impacts.

For many cities, street lighting is the largest fixed annual general-fund expense. By replacing 21,000 conventional streetlight bulbs with LEDs, Seattle reduced its streetlight bill by 50%, saving the City more than 1.2 million annually.

Boston Globe, Aug. 2, 2012

Policies:

- ES 6.1 Foster energy conservation practices among City employees.
- ES 6.2 Make energy efficiency a priority in City operations and facilities, retrofitting city facilities with energy efficient lighting and equipment as practical. Participate in rebate and incentive programs from Puget Sound Energy and others to offset the costs of retrofits.
- ES 6.3 Where practical, conduct energy audits of existing municipal buildings to identify high-priority retrofits and repairs for increasing energy efficiency and cost savings.
- ES 6.4 When installing new or retrofitting existing street and public area lighting, select fixtures and bulbs that minimize energy use and prevent over-lighting.
- ES 6.5 Evaluate the selection of US EPA Energy Star certified equipment and appliances when purchased for City use, and make such selection when the business case justifies the cost.

F.2 New Development and Community Energy Use

Electricity in the City of North Bend is provided by Puget Sound Energy and the Tanner Electric Cooperative, both of which have programs to promote energy conservation by their customers. The City can additionally influence energy use in the community by providing incentives for providing energy efficient materials and construction, and by enabling the development of private local generation projects, such as solar arrays and wind turbines on buildings.

Policies:

- ES 6.7 Provide incentives for energy efficiency in new development, including Energy Star certified homes, buildings and plants.
- ES 6.8 Encourage opportunities for local energy generation, including the installation of local solar and wind facilities. Evaluate potential sites and partnerships with other

agencies, such as the school district, parks district, King County and other agencies with land and facilities that could accommodate local energy generation facilities.

- ES 6.9 Review and revise building and development codes, design guidelines, and zoning ordinances to remove barriers to the installation of local-site energy generation facilities.

G. FOSSIL FUEL CONSUMPTION

The global environmental impacts of extracting, processing and burning of fossil fuels are numerous, including significant habitat destruction, air and water pollution, and greenhouse gas emissions. The City can implement strategies designed to reduce the City's fossil fuel consumption, ultimately saving money and improving air quality. One strategy is by addressing RCW 43.19.648, by planning for and transitioning the City's fleet as vehicles reach the end of their practical life.

Burning a gallon of gasoline emits almost 20 pounds of carbon dioxide. A typical late-model, mid-sized sedan produces about 9,500 pounds of carbon dioxide each year, while a hybrid car generates less than half that, about 4,300 pounds.

Environmental Protection Agency

Another strategy is through establishing densities and land use design that supports the use of public transit, encourages walking and bicycling, and other alternatives to single-occupant vehicle trips. This can be done by providing complete streets (interconnected streets with sidewalks and bicycle lanes) and pedestrian pathway networks. These issues are addressed through the ***Land Use Element*** and ***Transportation Element*** of the Comprehensive Plan.

ES Goal 7: Optimize the efficiency of fossil fuel use in City operations and encourage measures in the community which reduce fuel use and emissions.

Policies:

- ES 7.1 Increase the fuel efficiency of the City's vehicle fleet and implement a policy to consider "right-sizing" for the right application in vehicle purchase decisions.
- ES 7.2 Consider alternative work schedules to reduce employee commutes, i.e. telecommuting and flex-time schedule when appropriate.
- ES 7.3 Implement a no-idling policy with all City vehicles.
- ES 7.4 Educate the public about the benefits of not idling vehicles.
- ES 7.5 Limit idling in certain circumstances and locations.
- ES 7.6 Support the installation electric vehicle charging infrastructure by the private market.

H. WATER CONSERVATION

The City of North Bend impacts water use both through its own operations and through public use of water from the City's service area and the Sallal Water Association, which also serves

portions of North Bend. Reducing municipal and public water use not only benefits in-stream flows, it benefits the financial bottom line, as treating and pumping domestic water and wastewater is one of the most energy intensive municipal operations. The less water that residents use, the more energy the City can save. Water consumption and conservation is addressed in Chapter 5 of the City's *2010 Water System Plan*, which provides a Water Use Efficiency Program and includes a section on water conservation measures.

I. GREEN BUILDING

The efficiency and environmental impacts of building materials and practices can have a substantial impact on energy, water and resource consumption, as well as human health. A number of third-party independent certifying organizations have developed standards that measure the efficiency and environmental impacts of building construction, the two most common of which include the US Green Building Council's *Leadership in Energy and Environmental Design* (LEED) program, used for commercial and residential buildings, and the *Built Green* program, which focuses principally on residential construction.

Both LEED and Built Green are point-based ratings systems that address energy, water and resource conservation, indoor air quality, site sustainability, and use of sustainable building materials.

The most efficient way that the City can foster sustainable building practices is by encouraging participation by developers in these existing certification programs, and participating directly in these programs in the construction of public buildings.



ES Goal 8: Encourage the construction of green buildings in the public and private sectors.

Policies:

- ES 8.1 Utilize green building techniques and measures in municipal projects when the economics of a project demonstrate appropriate payback on investment.
- ES 8.2 Provide incentives to the private sector for the development of green and energy efficient buildings, utilizing programs such as Built Green, Leadership in Energy and Environmental Design (LEED), Energy Star, or equivalent. Incentives can include awards or recognition, expedited review, reduced permitting costs or impact fees, density bonuses, or other measures as appropriate.
- ES 8.3 Identify and remove regulatory or procedural barriers to implementing green building practices, such as updating codes, guidelines, and zoning, and ensure that plan review and building inspection staff are trained in green building materials, practices, and techniques as appropriate.

J. RESOURCE CONSUMPTION

The City uses a considerable amount of resources in its day-to-day operations, through the purchase of supplies and equipment, and in cleaning and maintaining its facilities. The City can take a number of simple measures that reduce resource consumption and waste through environmentally preferable purchasing. Environmentally preferable purchasing is the procurement of goods and services that have lower negative impacts on the environment and human health compared with conventional products that serve the same purpose.

ES Goal 9: Reduce unnecessary and/or unwarranted consumption to minimize the cost of City operations, and the environmental and human health impacts of the resources used in City operations.

Policies:

- ES 9.1 Develop an environmentally-preferable purchasing strategy for municipal equipment, vehicles, office supplies, and other products purchased by the City, that considers durability, environmental and carbon footprint, local sourcing, waste reduction, and minimization of toxic and hazardous substances, and weighs the cost benefit in those purchasing decisions. Support environmentally-preferable purchases when the cost is equivalent to the conventional alternative.
- ES 9.2 Purchase recycled, reused or refurbished supplies, equipment and vehicles for City departments where appropriate.
- ES 9.3 Substitute, reduce, and where possible, eliminate the use of toxic materials in municipal operations, such as synthetic fertilizers, pesticides, preservatives, solvents, and other materials that have negative environmental and human health impacts.
- ES 9.4 Whenever possible, extend the useful life of products and buildings through repairs and remodels rather than replacement.
- ES 9.5 Give priority to implementing actions that save both costs and resources. For example, provide pitchers of tap water rather than bottled water for City meetings and functions.
- ES 9.6 Reduce the City's use of paper by using double-sided printing where appropriate.
- ES 9.7 Consider implementing paperless City Council meetings.

K. WASTE REDUCTION AND RECYCLING

In 1985, recycling 25% of overall waste was considered the maximum level feasible. By 2008, Washington State residents recycled or diverted an average of 47.5% of all solid waste (Washington State Department of Ecology), and there is still significant opportunity to increase well beyond this rate. Waste *reduction* is perhaps an even more important goal – reducing the

amount of waste generated in the first place. Both the City and its residents have roles to play in the well-known mantra, “reduce, re-use, recycle.”

ES Goal 10: Reduce waste and increase recycling and waste diversion in City operations and in the community.

K.1 Municipal Operations

City operations involving solid waste collection and recycling includes secure shredding and recycling of office waste paper, regular recycling of other materials and waste disposal from office use, and garbage and recycling collection at parks and during special events. The City does not currently offer recycling at public parks, which represents an opportunity for community participation in recycling, and a focus for future improvement.

Policies:

- ES 10.1 Reduce waste production and increase recycling and waste diversion in City operations, in public parks, and other public places.
- ES 10.2 Place recycling containers adjacent to garbage containers in all areas where public waste receptacles are provided. Ensure that recycling containers are clearly indicated for recycling purposes only, to discourage disposal and mingling of trash with recyclables.
- ES 10.3 Develop operating procedures to ensure that outdoor recycling pickup and management at City parks and other public spaces is time and resource efficient for City personnel.
- ES 10.4 Provide recycling and food waste composting bins at public events and festivals.

K.2 Community Waste Reduction and Recycling

The City of North Bend provides its residents and businesses with solid waste and recycling services through a contract with a waste management service provider. The City can influence resident participation in waste reduction and recycling through outreach and education, and by ensuring that its solid waste contracts include full recycling services, including recycling of yard and food waste.

Recycling just one aluminum can saves enough energy to run a TV for three hours -- or the equivalent of a half a gallon of gasoline.

Recycling-revolution.com

Policies:

- ES 10.5 Reduce waste production and increase recycling rates in the community.
- ES 10.6 Ensure that solid waste contracts provide complete and convenient opportunities for resident participation and education in recycling and waste diversion, including curbside pickup of combined recycling and food and yard waste recycling. Ensure

that these services are available to single and multi-family homeowners, apartment residents, and businesses alike.

- ES 10.7 Provide for hazardous waste collection, to ensure proper recycling or disposal of materials not suitable for curbside pickup.
- ES 10.8 Incentivize building moving and building deconstruction and material re-use rather than building demolition when practical.

L. SUSTAINABLE MOBILITY

In Washington State, transportation accounts for 45% of all greenhouse gas emissions (Greenhouse Gas Emissions Inventory, Department of Ecology, 2010). Municipalities have a strong role to play in reducing transportation-related greenhouse gas emissions and addressing health-related transportation issues, as the built environment influences how far and by what mode people will travel on a daily basis. Goals and policies addressing the relationships between transportation and multiple measures of sustainability are found within the *Transportation Element*. Goals and policies addressing the overall densities and development patterns of the City that foster walking, bicycling and transit use, as well as policies addressing the jobs/housing balance to reduce regional commuting, are found in the *Land Use Element*.

M. EQUITY

Municipal government and land use decisions are made with consideration of input from the public as provided through the public process. It is very important for the overall balance of sustainability to ensure that all voices are heard or represented through local government. Issues of equity that can be addressed by a City include equitable public input and decision making, ensuring community facilities and infrastructure address the needs of all ages and abilities, and geographic and economic equity in locating community facilities. Additional issues of equity involve housing affordability and the provision of affordable housing, which are addressed in the goals and policies of the *Housing Element*.

ES Goal 11: Develop a robust out-reach program to all populations to build trust and strengthen relationships between the City and its residents, and ensure that municipal actions are transparent, equitable, and just.

Policies:

- ES 11.1 In outreach and education activities, and in the public process for land use decision making, strive to reach out to underrepresented populations, including youth, minorities, people with disabilities, and people that are poor, and encourage their participation.
- ES 11.2 In land use decision making, ensure that the City takes into consideration the interests of underrepresented populations, even when their voices are not heard at the table.

- ES 11.3 Partner with the Snoqualmie Valley School District and youth organizations on projects that provide opportunities for youth participation in public decision making and volunteerism, and as a means to provide community outreach and education.
- ES 11.4 Provide opportunities for members of city boards and commissions to share and confer on cross-organizational and inter-organizational matters, to ensure informed decision making and recommendations.
- ES 11.5 Continue to foster youth participation in the public process by providing a youth-position on the Parks Commission, and other boards and commissions as appropriate.
- ES 11.6 Consider economic and geographic equity in locating municipal facilities that can cause negative or positive impacts on the surrounding neighborhood, such as parks, road improvements, wastewater treatment, and utility stations.
- ES 11.7 Partner with educational, governmental and community organizations to encourage community access to information and education. Examples include the Snoqualmie Valley School District, King County Library System, Encompass, the North Bend Food Bank, and the Snoqualmie Valley Chamber of Commerce.
- ES 11.8 Develop and encourage volunteer opportunities, community projects and events that promote community health and interaction. Examples include habitat restoration projects, community races and festivals, and the Adopt-a-Park Program.

N. URBAN FORESTRY

In addition to providing beauty, trees play a role in a number of factors of environmental and economic sustainability, including carbon sequestration, air quality improvement, shading of both buildings and ~~habitat~~ streams, providing wildlife habitat, reducing erosion, uptake of stormwater, and increasing property values. The City of North Bend provides for and enhances its urban forest through the provision of street trees on all public streets, protections of existing ~~significant~~ trees in clearing and land development, and via landscaping requirements applicable to new development. ~~The care and management of public trees is addressed by the City's Urban Forestry Plan.~~

100 mature tree crowns intercept about 100,000 gallons of rainfall per year, reducing runoff and flooding, and providing cleaner water.

US Forest Service, Northeastern Area

ES Goal 12: Enhance the health, viability and beauty of North Bend's Urban Forest Canopy as a resource integral to the character and identity of North Bend.

ES 12.1 Work to maintain and enhance North Bend's urban forest canopy over time by planting trees on public property and requiring the installation of street trees along all public streets in association with new development and public street improvements.

- ES 12.3 Preserve existing native trees whenever possible within rights-of-way, parks and other public properties.
- ES 12.2 Retain existing urban forest canopy when development occurs by establishing and maintaining tree retention and planting requirements appropriate to different land use types.
- ES 12.4 Actively work to protect and restore forest canopy and health along river and stream shorelines.
- ES 12.5 Maintain an inventory of public trees to ensure optimal knowledge of tree conditions, hazards, and maintenance and replacement needs.
- ES 12.6 Replace street trees and other public trees that have died or been removed over time.
- ES 12.7 In support of environmental equity, prioritize urban planting and tree replacement efforts in areas with greater numbers of lower income residents such as the downtown core, and areas that have less access to nearby green spaces.
- ES 12.8 Provide public outreach and education to recognize the values and functions that trees provide in the urban environment and for the character of North Bend.
- ES 12.9 Pursue annual certification as a Tree City USA City through the National Arbor Day Foundation and Washington State Department of Natural Resources.
- ES 12.10 Seek grants and work with partner organizations such as the Mountains to Sound Greenway Trust and the Snoqualmie Tribe on acquisition, restoration and enhancement of key forested areas, including river and stream shorelines and forested areas of Tollgate Farm and Meadowbrook Farm.

O. LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT

Low Impact Development (LID) Stormwater Management refers to the use of techniques that manage stormwater runoff through small-scale, on-site infiltration measures rather than through the construction of traditional drainage facilities such as pipes, stormwater vaults and ponds that are connected to a larger centralized point-discharge stormwater system. LID stormwater management techniques can provide cost savings to developers by reducing or eliminating the need for costly “hard” infrastructure such as pipes, vaults and ponds, which also take up valuable developable area. Using greater LID stormwater management techniques also provides cost savings to the City in minimizing downstream investments for capacity upgrades to the City’s stormwater infrastructure, extending the life and function of the current system and reducing future maintenance burdens.

ES Goal 13: Maintain infiltration to the City’s aquifer and minimize stormwater runoff impacts to surface waters through the use of Low Impact Development stormwater management techniques.

Policies:

- ES 13.1 Incentivize use of LID stormwater management techniques that minimize impervious surfaces and capture, treat, and infiltrate stormwater, including vegetated roofs, cisterns, rain gardens, and biofiltration swales, or such other techniques which may be developed and approved for application.
- ES 13.2 Encourage placement of buildings, roads, sidewalks and other development to minimize the need for clearing and maximize preservation of existing native vegetation.
- ES 13.3 Ensure the proper care and management of LID stormwater techniques by the City for public facilities, and by private property owners or homeowners associations responsible for these features on private property.
- ES 13.4 Develop management protocol to ensure that regular “vacuuming” of pervious paving surfaces is performed to keep them from becoming clogged and losing their infiltration capacity over time.
- ES 13.5 Following completion of a residential LID demonstration project consistent with the City’s LID Demonstration Project Regulations, evaluate the successes and shortcomings of the development’s stormwater management, and consider how the provisions may be applied City-wide.