



# THE CULMINATION OF ELEMENTS:



## URBAN FOREST SUSTAINABILITY AND MANAGEMENT AUDIT



### PURPOSE

To apply the findings from the planning elements to identify strengths and opportunities relating to Tacoma's sustainable urban forest management.



Source: Hannah Letinich, on behalf of  
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# THE CULMINATION OF ELEMENTS: THE URBAN FOREST AUDIT SYSTEM

## PURPOSE

The findings from the five planning elements are evaluated to identify strengths and opportunities relating to Tacoma's sustainable urban forest management. The research conducted for Phase 1 provides the information needed to complete a comprehensive evaluation of Tacoma's urban forest resource and management procedures. The outcomes of this evaluation, herein referred to as the Urban Forest Audit, is a culmination of all planning elements to define the framework of the Phase 2 plan.

The Urban Forest Audit system identifies the strengths and vulnerabilities in urban forest management to accurately and effectively define Phase 2's strategies, targets, actions, and future evaluations. This system documents the City's level of urban forest sustainability and management as defined by the U.S. Forest Service, industry professionals and researchers, and local parameters from which progress can be measured.

## PROCESS

Developing this Plan was a systematic process where the results of each step inform the next, leading to development of the goals, objectives, strategies, actions and adaptive management measures. Careful evaluation of Tacoma's urban forest was conducted by using a combination of information obtained through the five planning elements evaluated in this Phase 1 Plan:



**#1: EXISTING  
POLICIES  
& PLANS**



**#2: CITY STAFF  
INTERVIEWS**



**#3: URBAN FOREST  
BENCHMARKS**



**#4: IN-DEPTH &  
HIGH-LEVEL DATA  
ANALYSIS**



**#5: COMMUNITY  
INTERESTS  
& INPUT**

Information from these elements such as—existing legislation and planning documents (Element #1); current operations and workflows (Element #2); levels of service (Element #3); urban forest conditions and trends (Element #4); and community viewpoints (Element #5)—was documented and then systematically evaluated following the U.S. Forest Service's Urban Forest Sustainability and Management Audit (UFSMA) system<sup>4</sup>. The following provides an overview of the approach. For a comprehensive summary of the process, see Appendix I.

### Information Discovery

The first step in the planning process involved an extensive review of existing plans, policies, ordinances, practices, data, and initiatives to establish a baseline using the UFSMA (see Appendix I). This audit is an industry-accepted process and region-specific evaluation of 11 categories of urban forest sustainability and management as they relate to the City of Tacoma. 154 documents and resources were identified, reviewed, and indexed as part of the information discovery process.

<sup>4</sup> The Urban Forest Sustainability and Management Audit, developed by the USDA Forest Service Urban Forestry South, is based on the urban forest sustainability and management review checklist developed in cooperation with Agnes Scott College Office of Sustainability and the ASC Arboretum Advisory Council and the City of Austin, TX. J. Abbot, et al., 2015. [www.urbanforestrysouth.org](http://www.urbanforestrysouth.org)

## Urban Forest Sustainability and Management Audit

This auditing system is designed to provide a framework for comprehensively evaluating urban forest management programs. The primary objectives of the audit are defined by the UFSMA authors and adapted by the UF Team:

- Engage the full spectrum of the organizations' management team.
- Provide program direction that increases the level of professionalism in management.
- Conduct a gap analysis of management practices and the health of urban forests.
- Provide strategic direction to improve the health of the urban forest.
- Optimize management for environmental justice and equitable distribution of resources.

The process of analyzing the urban forest involved extensive information and document gathering and research to identify policies, practices, programs, and standards pertaining to 11 categories of urban forest sustainability and management as defined by Clark et al. (1997), Kenney et al. (2011), and the Forest Service. The 11 categories are listed in the following table.

Table 21. Urban Forest Sustainability and Management Audit summary for the City program

### Categories of the Urban Forest Sustainability and Management Audit

Management Policy and Ordinances

Professional Capacity and Training

Funding and Accounting

Decision and Management Authority

Inventories

Urban Forest Management Plans

Risk Management

Disaster Planning

Policies, Standards, and BMPs (Best Management Practices)

Community

Green Asset Evaluation

Each category has a series of subcategories pertaining to the specific category. As an example, the following subcategories are in the Management Policy and Ordinances category:

- |  |  |
|--|--|
| 1.01 Climate Change (Sustainability)       | 1.08 Wildlife Diversity / Habitat / Protection |
| 1.02 No Net Loss                           | 1.09 Performance Monitoring                    |
| 1.03 Risk Management                       | 1.10 Private Tree Ordinances                   |
| 1.04 Tree Canopy Goals                     | 1.11 Public Tree Ordinances                    |
| 1.05 Tree Protection                       | 1.12 Development Standards                     |
| 1.06 Utility                               | 1.13 High-Conservation Value Forests           |
| 1.07 Human Health (Physical/Psychological) | 1.14 Urban Interface (WUI)                     |

All available documents and plans were reviewed and tallied in the audit worksheet as part of the information discovery phase. Based on the evaluation of the documents and outcomes of all five planning elements (i.e., Policies and Plans, City Staff Interviews, Urban Forest Benchmarks, High-Level and In-Depth Data Analysis, and Community Interests and Input) each subcategory within the 11 categories was "ranked" using the following system:

- 0) Not Practiced = component doesn't exist or is not practiced; 0 points
- 1) In Development = component is in development as part of or aside from this Plan; 1 point
- 2) Adopted Practice = component is routinely practiced; 2 points
- 3) Exceeds Adopted Practice = the component is exceeded; 3 points

The points were then totaled for an overall rating to provide a summary of Tacoma's level of achieving each category of urban forest management and sustainability.





## RESULTS

### Information Discovery

Table 22. Summary of documents and resources pertaining to Tacoma's urban forest

Category	Count
Management Policy and Ordinances	105
Professional Capacity and Training	9
Funding and Accounting	3
Decision and Management Authority	8
Inventories	35
Urban Forest Management Plans	15
Risk Management	15
Disaster Planning	1
Policies, Standards, and BMPs*	98
Community	77
Green Asset Evaluation	NA
<b>Count Total</b>	<b>366</b>

BMP = Best Management Practices, NA = not applicable

To develop this Plan, over 150 documents, plans, and resources were gathered and reviewed by applying the U.S. Forest Service's Urban Forest Sustainability and Management Audit's Discovery Matrix. This matrix includes a total of ten urban forest categories, each containing a multitude of supporting elements. All resources were reviewed to identify references regarding each of the categories and supporting elements. Examples of the elements supporting the Management Policy and Ordinances category include (but not limited to) climate change, no net loss, risk management, canopy goals, tree protection, and human health. Based on the review of resources, a total of 105 resources mention one or more elements within this category. As seen in the table, the Management Policy and Ordinances category has the highest count of existing resources followed by the Policies, Standards, and BMPs (Best Management Practices) with a total of 98 resources. There are a total 366 instances where the 150+ resources reference the ten categories and supporting elements. The number of resources referencing elements of urban forest sustainability and management demonstrate Tacoma's readiness for this Plan. Strategies and recommendations in this Plan align and/or complement components of these supporting resources. For a complete list of categories, elements, and supporting resources, see Appendix J.



366 instances where 150+ existing City planning documents reference the categories of urban forest sustainability and management.

105 instances for the Management Policy & Ordinances category.

### Results of the Urban Forest Sustainability and Management Audit

Based on the Urban Forest Sustainability and Management Audit of Tacoma's urban forest completed in 2019, the City is at a management and sustainability level of 71%. The relatively high score is primarily due to the City's effective Urban Forest Manual, One Tacoma, and efforts in place surrounding the Urban Forest Management Plan project. Significant improvements could be made in the professional capacity and training, funding and accounting, inventories, risk management, disaster planning, and green asset evaluations.

The urban forest sustainability and management objective for Tacoma is to achieve a level of Adopted Practice for all subcategories. This means that the Total Possible equates to the count of subcategories for a given category multiplied by the Adopted Practice multiplier of “2”. For example, there are 14 subcategories in Management Policy and Ordinances, therefore, a the Total Possible is 28. Long-term goals in this Plan may acquire the level of Exceeding Adopted Practice for multiple subcategories but this audit focuses on the attainable and measurable level of Adopted Practice.

Table 23. Results of the evaluations of subcategories in the UFSMA system

UFSMA Category	Not Practiced (x0)	In Development (x1)	Adopted Practice (x2)	Exceeds Adopted Practice (x3)	Overall Rating (count x multiplier)	Total Possible
1) Management Policy & Ordinances	0	4	<b>10</b>	0	24	28
2) Professional Capacity & Training	0	3	5	0	13	16
3) Funding & Accounting	0	4	2	0	8	12
4) Decision & Management Authority	0	1	<b>3</b>	0	7	8
5) Inventories	1	3	9	0	21	26
6) Urban Forest Management Plans	1	3	8	0	19	24
7) Risk Management	1	7	1	0	9	18
8) Disaster Planning	1	4	2	0	8	14
9) Policies, Standards, & BMPs	0	9	<b>20</b>	0	49	58
10) Community	0	4	<b>10</b>	0	24	28
11) Green Asset Evaluation	0	8	2	0	12	20
<b>TOTAL (count)</b>	<b>4</b>	<b>50</b>	<b>72</b>	<b>0</b>	<b>194</b>	<b>252</b>

\*BMP = Best Management Practices

Based on the audit of 126 subcategories (11 primary categories) to urban forest sustainability and management, Tacoma is achieving “Adopted Practice” for 72 (29%) of these. 50 subcategories (20%) are “In Development”. Applying the multipliers of 2 for Adopted Practice and 1 for In Development results in a total score of 194 out of 252 possible points, or 77% (detailed in the following table). Cells in bold font indicate a high level of Adopted Practice subcategories for the given category. “Exceeds Adopted Practice” was not considered for any category because the Urban Forest Management Plan was in development during the time of this evaluation.

The Overall Rating for each category in the table above is detailed in the following table that summarizes the overall percent achieved for each category. A complete breakdown of rankings by subcategory/category is available in Appendix K.

Table 24. Outcomes of the urban forest auditing process for Tacoma, WA

Category	Description	SOC* (% Achieved)	Base** (% Achieved)	Overall Rating	Overall (% Achieved)
1	Management Policy & Ordinances	75%	83%	24	<b>86%</b>
2	Professional Capacity & Training	100%	NA	13	<b>81%</b>
3	Funding & Accounting	75%	NA	8	<b>67%</b>
4	Decision & Management Authority	100%	100%	7	<b>88%</b>
5	Inventories	NA	75%	21	<b>81%</b>
6	Urban Forest Management Plans	NA	67%	19	<b>79%</b>
7	Risk Management	58%	50%	9	<b>50%</b>
8	Disaster Planning	NA	67%	8	<b>57%</b>
9	Policies, Standards, & BMPs***	75%	88%	49	<b>84%</b>
10	Community	100%	NA	24	<b>86%</b>
11	Green Asset Evaluation	NA	NA	12	<b>60%</b>
<b>Total</b>		<b>77%</b>	<b>76%</b>	<b>194</b>	<b>77%</b>

\*Standard of Care (SOC) elements represent the minimum group of urban forestry management “best practices” that a municipality should consider for implementation. SOC refers to the degree of prudence and caution required of an individual who is under a duty of care (i.e. legal obligation of the controlling authority, owner, or manager) to minimize risk. Neither state, regional, nor national minimum management components have been established for SOC but these are interim recommendations for consideration.

\*\*Base Practices (BP) elements represent additional urban forest management activities or components that may effectively expand a program beyond the SOC group (see footnote above). These elements are typically precursors to other “non-core” elements in the category.

\*\*\*BMPs = Best Management Practices



The Audit places Tacoma at an overall score of 77% in terms of urban forest sustainability and management.

Tacoma’s Decision & Management Authority scored the highest with 88%.

Management Policy & Ordinances as well as the Community category are at 86% but Tacoma scored low for Risk Management (50%), Disaster Planning (57%), Green Asset Evaluation (60%), and Funding & Accounting (67%).



The Phase 2 Plan will provide the strategies for advancing all categories.




## CONCLUSION

This systematic approach to evaluating Tacoma’s current levels of urban forest management and sustainability provide the framework and reference point for establishing and implementing strategies. The ranking as determined by the audit justifies the need for appropriate actions to be supported and implemented in order to effectively achieve improved urban forest sustainability and management levels. These levels are balanced with the City’s resource capacity, baseline conditions of the urban forest, and viewpoints gathered from the community.

Table 25. Explanation and implications of the UFSMA results

Category	Implications
<b>1) Management Policy and Ordinances</b>  <b>Rating of 86%</b>  	<p><b>STRENGTHS:</b> Tacoma scored relatively high due to the existing climate change and sustainability efforts (CAP, Tacoma 2025, EAP), tree canopy goals, development standards, and recognition of trees as positive influencers on human health.</p> <p><b>OPPORTUNITIES:</b> Proper tree protection and enforcement in the ROW will support a “no net loss” strategy for retaining the benefits of urban forests. Appropriate levels of public and private tree ordinances as well as a heritage tree program would advance Tacoma in this category.</p>
<b>2) Professional Capacity and Training</b>  <b>Rating of 81%</b>  	<p><b>STRENGTHS:</b> Staff have industry certifications, qualifications, and training.</p> <p><b>OPPORTUNITIES:</b> Additional staffing for internal technical support, community outreach and education support staff, as well as expansion of an in-house arborist crew to support current and future tree maintenance and planting demands would benefit Tacoma in all categories of this audit.</p>
<b>3) Funding and Accounting</b>  <b>Rating of 67%</b>  	<p><b>STRENGTHS:</b> Urban forestry is budgeted annually.</p> <p><b>OPPORTUNITIES:</b> Based on benchmarking research, Tacoma is well below regional averages in terms of budget per capita and per tree even if expenditures from partners are included. A diversified, sustainable, and dedicated funding source is needed. Tacoma has a strong network of engaged community residents who are in support of reallocating resources for urban forestry and provide tree stewardship support (i.e. young tree training).</p>
<b>4) Decision and Management Authority</b>  <b>Rating of 88%</b>  	<p><b>STRENGTHS:</b> Tacoma’s Urban Forestry Program has authority over day-to-day activity and closely engages other City Departments and Work Groups. The City scored high in this category because the audit only contains four subcategories but can be expanded as described in the opportunities below.</p> <p><b>OPPORTUNITIES:</b> If Tacoma were to create, revise, and/or clarify standard operating procedures, refine workflows, clarify policy, bolster staff trainings, and acquire additional internal technical support, the City would see advancement in this category. To lead by example, the City should consider incremental stages of acquiring street tree maintenance responsibility in priority areas.</p>

Category	Implications
<b>5) Inventories</b>  <b>Rating of 81%</b>  	<p><b>STRENGTHS:</b> Tacoma has multiple datasets describing the broad distribution of urban tree canopy and data-driven indicators to prioritize tree planting and preservation for environmental justice and equity. The City has recently acquired innovative software for managing public trees and has pioneered green stormwater infrastructure (and mapping of) in the region.</p> <p><b>OPPORTUNITIES:</b> A better understanding of the public tree population is needed with a comprehensive inventory focused on street and median trees. Potential threats such as pests and diseases are unbounded by land ownership, therefore, a better understanding of private trees is needed. Inventories should remain current and frequently updated.</p>
<b>6) Urban Forest Management Plans</b>  <b>Rating of 79%</b>  	<p><b>STRENGTHS:</b> Tracking and reporting of urban forest management activities, this Plan, and urban forestry referenced in One Tacoma resulted in a relatively high score for this category. Plans for compartments of the urban forest such as open space, grounds on public facilities, campus/university trees, and green stormwater management, is a strength of Tacoma.</p> <p><b>OPPORTUNITIES:</b> Implementation of this Plan will increase the rating as will plans for private trees and street tree management such as a strategic tree planting plan.</p>
<b>7) Risk Management</b>  <b>Rating of 50%</b>  	<p><b>STRENGTHS:</b> Staff trained in tree risk assessments.</p> <p><b>OPPORTUNITIES:</b> Additional internal technical support for assessing trees questioned for removal would improve the efficiency, effectiveness, resourcefulness, and appeal of City operations. An inventory of trees in public rights-of-way is necessary to identify, monitor, plan, prioritize, and mitigate risk. A comprehensive understanding of the urban forest through inventories would determine in detail Tacoma's vulnerabilities to tree pests and diseases, climate change impacts, storm events, invasive species, and the natural or premature senescence of trees. The City will establish tree risk management procedures in Phase 3 of the Urban Forest Management Plan project which will greatly increase the rating of this category.</p>
<b>8) Disaster Planning</b>  <b>Rating of 57%</b>  	<p><b>STRENGTHS:</b> Debris management following a disaster is outlined in the Pierce County Hazard Mitigation Plan. The City's Grounds Maintenance crew does conduct post-storm cleanup to the extent the resources allow.</p> <p><b>OPPORTUNITIES:</b> Implementation of Phase 3 to this Plan project will increase the rating for this category. Primarily, a multi-faceted disaster plan for public trees is needed.</p>



Category	Implications
<b>9) Policies, Standards, and BMPs</b>  <b>Rating of 84%</b>  	<p><b>STRENGTHS:</b> Tacoma has a high rating for this category due to the Urban Forest Policy Element, the Urban Forest Manual, the ROW Design Manual, and references to urban forest management throughout TMC.</p> <p><b>OPPORTUNITIES:</b> A heritage tree program to protect significant trees is recommended along with improvements to the tree permitting process. Public education regarding proper tree BMPs needs to be conducted and supported with enforcement. There is a growing interest from the community for the acceptance of fruit trees in the ROW. Trees required for development projects should be monitored and their health needs maintained through enforcement and bonds. Proper tree preservation while not inhibiting smart development is needed. The City should explore cost-share options for hazard tree removal in the ROW and the potential acquisition of tree maintenance responsibility, first in priority regions such as underserved priority areas according to the Equity Index. Implementing strategies directed at these objectives would increase the rating of this category and be better suited to achieve a goal of a healthy 30% tree canopy.</p>
<b>10) Community</b>  <b>Rating of 86%</b>  	<p><b>STRENGTHS:</b> Tacoma is a Tree City USA city for 25 years (as of June 2019), demonstrating the value placed on urban forests. This Plan included public surveys with almost 1,500 respondents in the first survey alone and has engaged the public in community meetings and the Plan website. The City has a successful Grit City Trees and Coupon Program, an extensive network of partners, conducts events such as tree walks, engages the public through social media, website, radio, and other platforms, has an extensive email listserv, addresses service requests, presents to City organizations and special interest groups, enables stewardship activities, and works closely with Tacoma Tree Foundation.</p> <p><b>OPPORTUNITIES:</b> Continue to utilize this Plan's website, address the concerns and questions posed in the surveys and meetings, conduct outreach to the public based on survey feedback, establish a heritage tree program and recognition program by sector for exemplary urban forest considerations, address underserved areas as identified in the 2018 tree canopy assessment, the 2018 urban heat island study, the Tacoma Equity Index, and other resources, and facilitate more trainings both internally and for the public. Align efforts with ongoing initiatives such as One Tacoma, Tacoma 2025, the EAP, and the Neighborhood Business District Urban Forest Management Plan.</p>
<b>11) Green Asset Evaluation</b>  <b>Rating of 60%</b>  	<p><b>STRENGTHS:</b> The urban forest is diverse, relatively young, and mostly in good condition.</p> <p><b>OPPORTUNITIES:</b> This category is for documenting observed outcomes and improvements which will occur as this Plan is implemented and a comprehensive public tree inventory is maintained. The development of a new critical area code restricting clearing and development in biodiversity areas will provide a layer of protection for much of the City's large greenbelts in private and public ownership (open space).</p>

