

WASHINGTON COUNTY JOINT CPO TREE GROUP - RESEARCH COMMITTEE REPORT

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Introduction

The purpose of this document is to summarize and detail the Joint CPO Tree Code Group Research Committee's findings. We will provide a summary of the tree ordinances and policies of the jurisdictions we have studied along with our group's analysis and recommendations for Washington County. It is intended that this proposal shall be considered by county elected officials and staff who are involved in writing a comprehensive tree ordinance and policy for Washington County.

We found that there is consistency among our local neighbor cities of valuing the urban canopy. The majority of cities within or bordering Washington County already have significant tree protections in place:

- Banks, Beaverton, Durham, Forest Grove, Hillsboro, Sherwood, Tigard, Tualatin, Lake Oswego, Wilsonville, Portland and North Plains

For detailed research, we selected a number of jurisdictions:

- We focused on several cities within Washington County because these communities have needs and issues similar to ours: *Beaverton, Hillsboro, Tigard, Tualatin, and Sherwood*.
- For comparison we included neighboring cities of *Portland* (Multnomah County) and *Lake Oswego* (Clackamas County). Both have extensive tree protections in place.

We specifically selected Lake Oswego for its aesthetic natural beauty due in a large part to a significant older tree canopy. We would like to note that Lake Oswego possesses an average home sale price 73% - higher than the Portland Metropolitan average¹ which is arguably due to in part to its impressive tree canopy.

- We found that while it is not common for counties to adopt comprehensive tree ordinances, it is not unheard of in *urban* counties². To cover county-specific issues with tree protections we sought out and included two urban counties with tree protections in our research: *Fulton County, GA and Monterey County, CA*.

Our research is summarized in this document. In addition, we have provided a matrix detailing the findings broken down by these jurisdictions. (See appendix A)

Scope

For the purposes of our Washington County study and recommendations we will be focusing on the Urban Forest in the unincorporated areas within the UGB (Urban Growth Boundary) of Washington County. While it is conceivable that the Urban Forestry Management Plan could include areas outside of the UGB, our research did not include significant research into state laws regarding trees and Forestry Management (Oregon

¹ Portland State University Center for Real Estate
Quarterly Real Estate Report August 2007 -
http://www.pdx.edu/media/r/e/RE_2007oar3qreport.pdf

² Other counties with tree ordinances: Monterey, Sacramento, San Mateo, Alameda and Los Angeles Counties, CA; Chatham County, GA; Leon County, FL;

Forest Practices Act).

We would also like to further limit the scope to include areas within the UGB that are currently developed to an urban standard or are slated for urban development, thus excluding commercial agriculture and forest lands that are within the UGB but still used commercially

There has been discussion and concern among the Joint CPO Tree Code Group about how to protect trees in “reserve lands,” specifically those lands that are designated to be brought in to the UGB at a later date. As they will become urban communities in the future, some consideration should be given to how these lands might be protected so that residents of these future urban areas are able to retain some mature woodland.

Precedence

Although somewhat unusual, there is a precedent for counties to adopt comprehensive urban forest management plans and tree codes. The current circumstances in Washington County lend themselves to adoption of a plan. Even if future annexation brings unincorporated urban areas into cities, it is important not to have a disparate level of tree canopy. We should strive to have a standardized approach for municipal services.

Counties with successful tree codes include Fulton, Monterey, and Sacramento counties. Monterey County has a tiered ecoregional approach with complex protection programs. Sacramento is in the process of expanding their tree code, in existence since 1981, to be more comprehensive and to incorporate important elements of the Sacramento Tree Foundation’s model ordinance program.

The Sacramento Tree Foundation is an organization leading efforts to build an urban forest in the Sacramento region. The foundation is implementing an initiative, with the support of 22 cities and four counties, to expand urban forests and optimize the benefits of tree canopies. This framework includes comprehensive, scalable model ordinances creating an excellent resource for any other jurisdiction seeking to embark on urban forest planning. We strongly recommend that Washington County utilize the excellent materials and training offered by the foundation as guidance in implementing a plan.

Research Findings

For this report we divided our research findings into six components:

1. *Urban Forest Management Plan* – lays out the guiding policy document and tree board governance;
2. *Preservation* - addresses the tools that communities employ to prevent trees from being removed in the first place;
3. *Mitigation* – outlines rules for replacement and maintenance of trees after development;
4. *Protection* - specifies how trees that are being retained must be protected during development activities;
5. *Public Street Trees/Tree Maintenance* - discusses topics for street trees and other public trees including maintenance responsibilities: and
6. *Administration* - deals with a number of issues we believe are important but which

do not fall into one of the other sections.

Urban Forestry Management Plan

The Urban Forestry Management Plan (UFMP) is the "living" policy document that guides planners and policy makers about how to manage the "urban forest."

The Tree Ordinance is not an end in itself. It does not address all the goals. The Forestry Plan supplements ordinances/code and should be revised regularly.

The majority of UFMP documents we reviewed included the following elements.

Analysis

Most of the jurisdictions we studied had some sort of stand-alone Urban Forestry Management plan. The exceptions are Fulton County, GA and the City of Beaverton, which have a "Tree Maintenance and Planting" policy document (but it does not appear to be a comprehensive management policy document.)

Lake Oswego provides an excellent example of a "Comprehensive Tree Management Plan," which is effectively its Urban Forestry Management Plan. Portland also had a comprehensive set of policy documents. Our analysis of the UFMP topic focuses primarily on Lake Oswego's document, as it is very clear and easy to follow. Most of these same components of Lake Oswego's policy would be applicable for Washington County's policy.

The stated goal of the Lake Oswego plan is to create a comprehensive, sustainable, and integrated approach to tree management on both public and private property. The Lake Oswego plan includes governance of both private and public property. The following italicized sections are the key components of the Lake Oswego plan. We recommend these components be included in the Washington County plan. As the Lake Oswego policy is copied below the word "City" could be replaced with "County".

1. Stewardship and Education: Educate the public about the importance and value of trees.

- *Promote an urban forestry stewardship ethic in the community through general education.*
- *Foster community support for the local urban forestry program and encourage good tree management on privately-owned properties.*
- *Develop a NeighborWoods Program* ³
- *Annually, hold a targeted education event for builders and landscapers.*
- *Expand and foster Arbor Week events as an education and outreach opportunity - This is a requirement to reach Tree City USA status.*

³ NeighborWoods is a program administered by Alliance for Community Trees (ACT) to fund, train and promote local citizen groups who are dedicated to restoring community trees. Portland's "Friends of Trees" is a member. USDA Forest Service is a sponsor and the National Arbor Day Foundation is a leader of this effort.
[<http://actrees.org/site/whatwedo/index.php>]

- *Celebrate Heritage Trees*
- *Increase information available on stewardship events and general tree care and maintenance through print publications and City [County] webpage.*
- *Produce an annual State of the Forest report.*
- *Identify additional incentives for homeowners and builders to preserve trees.*

2. Forest Size

- *Promote a diversity of large canopy street trees*
- *Set and implement goals for increasing tree canopy in open spaces.*
- *Adopt standard for approval in the development code and administrative policies to foster increased canopy growth*
- *Identify opportunities to increase canopy cover on public property.*
- *Identify opportunities to increase canopy cover on private property.*

Remarks:

The Washington County policy should direct the county planning departments and Tree Program Manager to work with developers to suggest alternative placement of structures, roads, and utilities in order to accommodate existing trees.

A high level goal of the Joint CPO Tree Code Group's efforts is to restore the urban forest, whether by a certain percent or by planting a net number of trees by a future date. The Forest Size component of the UFMP should state this goal and list measurable actions to be implemented in order to track progress toward that goal.

American Forests tree canopy studies sponsored by the USDA Forest Service were cited in a number of the policy documents we reviewed. American Forests recommends an urban tree cover goal of 50% for suburban residential areas in the Northwest⁴.

Preliminary data from Metro's Nature In Neighborhoods biennial study of tree canopy coverage for the metro region shows that unincorporated Washington County was at 31.5% canopy coverage at the end of 2007. The full report was due at the end of 2008, but not ready at the time of this document revision, however Metro provided the raw canopy coverage data for the Metro area, as we have shown in *Figure 1*. Note that highlighted Washington County jurisdictions are at the lower end of the 3-county metro region.

⁴ American Forests. "Setting Urban Tree Canopy Goals". Available online <http://www.americanforests.org/resources/urbanforests/treedeficit.php>

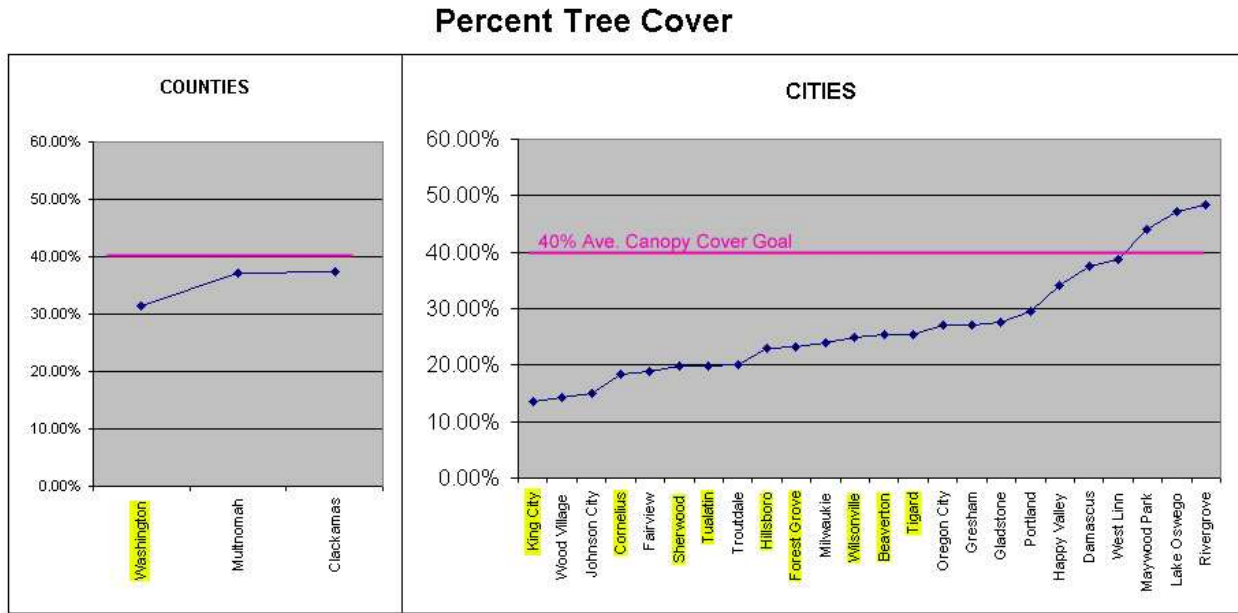


Figure 1: 2007 tree canopy cover by jurisdiction (source Metro)

Metro is mandated to collect this data again at the end of 2009 (reported in 2010) and every 2 years thereafter¹⁷.

One of the previously mentioned American Forests studies was conducted in the Willamette/Lower Columbia Region⁵ and found that the average tree canopy cover in this study’s scope has been reduced nearly in half, from 46% in 1972 to 24% in 2000. The canopy in this same area’s “urban areas” was down from 21% to only 12% canopy coverage respectively.

This indicates a loss of nearly half of the tree canopy in a 28-year period.

A recent and more detailed study conducted by Portland's Urban Forestry Commission⁶ has shown urban forest canopy *growth, not loss*, in existing East side neighborhoods in the low single digits. They attributed this growth at least in part to the "Friends of Trees Effect." Friends of Trees is a non-profit that assists neighborhoods in planning for and planting street trees. This group is active in Beaverton as well, and we expect to engage them in future Washington County restoration efforts.

This data shows that significant canopy loss has occurred, but that also restoration can

⁵ American Forests. "Regional Ecosystem Analysis for the Willamette/Lower Columbia Region of Northwest Oregon and Southwest Washington State-Calculating the Value of Nature." October 2001. Available online http://www.americanforests.org/downloads/rea/AF_Portland.pdf

⁶ Poracsky, Joseph; Lackner, Michael. "Urban Forest Canopy Cover In Portland, Oregon, 1972-2002: Final Report". April 2004. Available Online: <http://web.pdx.edu/~poracskj/Cart%20Center/psucc200404-047.pdf>. (Downloaded: July 27, 2008).

be achieved, even in dense urban settings. Thus **we are recommending adoption of a goal of 40% average canopy tree coverage for unincorporated Washington County.** This target would be broken out by type of land use: residential areas = 50% canopy coverage; transit-oriented = 30%; central business districts =15%; industrial = 10% (with percentages to be calculated based on actual zoning breakdown with a 40% average overall).

We recommend using the percent of tree cover benchmark because 1) it is measurable; 2) it is a standard often used by other jurisdictions for measuring progress to their urban forest management plans; and 3) as previously noted, Metro will be conducting a tree canopy survey every two years at no direct cost to the County.

Here are a few summary examples of how other jurisdictions have stated their high level tree canopy goals:

- Fairfax Co. Virginia: currently at 41% canopy coverage - goal: 45% in 30 years.
- Portland canopy coverage goals: residential: 47%, commercial/industrial 12%
- Annapolis, MD: currently at 41% canopy coverage - goal 50% in 30 years
- Las Vegas: double the canopy to 20% in 20 years

A different type of goal may specify a number of trees planted in a number of year(s). For example: The Sacramento Tree Foundation plans to plant 5 million trees by 2025 in the greater Sacramento region in an effort to double the region's urban canopy. This effort is supported by official resolutions from 22 cities and 4 counties.

Note that this goal is measured by a number of trees planted, which is easier for people to understand, but the ultimate goal is still to increase the canopy coverage to a specific value long term. It may perhaps be easier for the public to rally around shorter term goals that specify a number of trees to plant ("I can do my part by planting 5 trees") vs. a citizen trying to understand what role they have in helping the county reach some long range goal based on a measurement like 40% canopy coverage.

3. Forest Health

- *Clarify responsibilities for street tree maintenance; identify areas where the City [County] will take responsibility.*
- *Conduct a field inventory of City [County] maintained tree resources (street and park trees)*
- *Conduct a hazardous tree survey to identify hazardous, dead, or otherwise undesirable street trees along public trails and in public rights-of-way schedule removal and replacement.*
- *Develop a tree replacement program for targeted rights-of-way.*

Remarks:

The UFMP should provide guidance for selecting, situating and maintaining street trees appropriately to maximize benefits and minimize hazard, nuisance, hardscape⁷ damage and maintenance costs.

⁷ Hardscape: Sidewalks, streets, sewer/storm fixtures and pipes, etc.

Representatives at the Oregon State Department of Forestry⁸ have offered to provide professional resources for collecting a street tree inventory (discussed later in this document) and for assessing and measuring forest health.

This section of the UFMP should address establishing and maintaining an optimal level of age and species diversity (biodiversity), which is a well-established requirement for forest health.

This section should also call for an emphasis on preservation of trees in clusters as a matter of tree health. Retaining trees in cluster as opposed to individually, allows the trees to protect each other during strong winds (public safety issue). It is also beneficial to wildlife. Encouraging clustered development (homes in clusters) can provide the desired result.

We suggest that the policy recommend, where possible and appropriate, leaving the fallen trees to provide natural habitat for wildlife and returning nutrients to the soils. It may be appropriate to place removed trees along waterways to help mitigate increased water flows due to nearby development. Clean Water Services would likely provide these recommendations on a case-by-case basis based on scientific studies of the site.

4. Tree Maintenance

- *Develop, adopt, and institutionalize maintenance standards and practices.*
- *Create a list of approved [native] street trees of different planting environments.*
- *Establish and fund cost effective preventative maintenance programs to improve the health and safety of City [County] owned or maintained trees.*
- *Utilize appropriate technologies, such as structural soil, to improve growing conditions for trees in urban environments.*

Remarks: The International Society of Arboriculture recommends that the forest policy attempt to solve conflicts between trees and street improvements by setting priorities. While trees are often to blame for bulging sidewalks and invading sewer lines (hardscape), it is also valid to point out that these structures haven't been engineered to function in an environment where trees are so prevalent. ISA recommends that policy establish a priority of trees over hardscape, acknowledging that individual property owners typically don't have the expertise or resources to develop satisfactory solutions to tree-hardscape conflicts on their own and that the responsibility for correcting these conflicts should not be assigned to the property owners.

5. Invasive Species

⁸ Oregon Department of Forestry – Community Assistant Forester – Kristin Ramstad – Phone : 503-945-7390 – FAX: 503-945-7416 – E-mail: Kristin.Ramstad@state.or.us

- *Make invasive plant removal a part of all community outreach efforts.*
- *Integrate invasive plant removal in park management.*

Remarks: Clean Water Services is involved in efforts to remove invasive species in vegetative corridors (VC). Development plans that involve VCs are often required to remove invasive species from those sites.

As Washington County's park system is small (only Hagg and Metzger Parks) we think this second bullet could be expanded to include *facilities* in addition to park management.

6. Integration: *Bring urban forestry concepts/references into all of the various policy/plans documents, outreach, livability indicators, etc.*

- *Integrate urban and community forestry into the Comprehensive Plan during the next periodic review process.*
- *Incorporate Park Master Plans and Management Plans into the Urban and Community Forestry Program as they are developed.*
- *Include tree conservation and planting in capital improvement projects and redevelopment plans.*
- *Include tree canopy measure in the quality of life indicators.*
- *Link community forestry with the storm water management plan.*
- *Consistently include Community Forestry in City [County] sustainability efforts*
- *Provide information on quantifiable benefits of trees to staff*

Remarks: The UFMP should direct the different agencies to work together and any policy and ordinances should be drafted such that there are no conflicts between different policies or agencies.

The UFMP should address the concerns we have heard from the community:

"My worst fear is if we do nothing..."

"Loss of property values when trees are cut or lost"

"Loss of integrity and the look and feel of established neighborhoods"

"Disconnect from nature; living in an all man-made environment can lead in part, to social degradation"

"Loss of Oregon's reputation for its natural beauty and large trees"

The UFMP adopted by Washington County should recognize that the community has a right to maintain/increase their urban canopy alongside the rights of landowners to their property.

For the Quality of Life indicators bullet, we are not aware of any such indicators being tracked in Washington County. This might be something the county considers implementing, perhaps in the context of the ongoing Urbanization Forum.

Tree Program Manager

The Tree Program Manager would be a position on the County staff responsible for:

- o Developing and updating the Urban Forest Management Plan;
- o Heading the Tree Board or Commission;
- o Implementing a monitoring program to evaluate if goals are being met;
- o Directing county tree care operations, including planting, maintenance, permits, removal, etc.;
- o Evaluating and approving permits for activities that may affect trees;
- o Seeking funding from State, Federal or other granting agencies;
- o Conducting community outreach and education programs;
- o Enforcing Ordinance provisions;
- o Authorizing stop work orders and assessing penalties.

Qualifications: The International Society of Arboriculture defines ⁹ Certified Arborists and Foresters as:

- o Certified Arborist - An arborist works with *individual trees* and knows the essentials for their surviving and thriving in different environments. The arborist has extensive knowledge on an individual tree level and is a micro-manipulator of single trees in a forest or landscape. The arborist practices the science of arboriculture.
- o Forester - sees trees as a *group* and manages from that perspective. Foresters practice the art and science of silviculture.

Due to the specialized knowledge required for this position, the Tree Program Manager should be a Certified Arborist or more preferably a Certified Forester. A Forester will have the specialized expertise to consider the impacts of the county's decisions on a wider basis.

Tree Board or Commission

Another key component of an UFMP is a Tree Board. The Tree Board is responsible for maintaining and updating the policy, advising the Board of Commissioners on changes that need to be made, and producing an annual Urban Forestry Status Report and Budget request. The Tree Board is also charged with educating the public on tree care, the value of trees, and how they can participate in enforcement. The Tree board should establish and administer the Heritage Tree program as well as the "Tree Fund".

In Tigard and Lake Oswego, this board is appointed by the commissioners/mayor. The board is made up of arborists, citizens, developers, and/or green industry professionals on a rotating appointment schedule.

The Tigard Tree Board's mission is "to develop and administer a comprehensive tree management program for the maintenance, removal, replacement and protection of trees on public property." The mission of the board was subsequently expanded to develop a comprehensive tree protection and *urban forest enhancement* program throughout the

⁹ http://forestry.about.com/cs/urbanforestry/a/arbor_vs_for.htm

city.

Lake Oswego has at least 2 different groups to help administer tree protections: They are the:

- o Tree Code Task Force, which evaluates the Lake Oswego Tree Code and “provides recommendations for potential amendments. It is the intent of this effort to assess how the current Code is being interpreted, how the public perceives the Code, and what measures can be taken to improve the Code.”
- o Natural Resources Advisory Board (NRAB). Their mission is to “review trends in air, water, and land quality within the Urban Service Boundary of the Comprehensive Plan, and to assist in the development and implementation of plans and policies to protect, restore and enhance the environmental quality within the Urban Service Boundary of the Comprehensive Plan. The NRAB shall encourage conservation of natural resources and preservation and enhancement of the ecosystems, open space, and natural corridors. Administer the Heritage Tree program.”

Tualatin has a seven-member board and is directed by the Urban Forestry Manager (who is a Parks and Recreation staff person and is not an arborist or forester).

Monterey County does not currently have a Tree Board but they are in the process of establishing one as well as a Tree Fund for Oak woodlands protection. They do not have an arborist position on staff, however the planning personnel we worked with was a certified arborist.

We highly recommend that Washington County establish a Tree Board which includes key stakeholders (industry, community, and builders) who establish future policy and provide the flexibility to keep the UFMP up to date with the latest scientific research, policy directions, and national trends.

Tree Fund

The Tree Board also administers the Tree Fund. The Tree Fund receives fee-in-lieu payments from tree mitigation requirements. The Tree Fund may be used to finance Tree Board activities related to tree canopy increases. When someone opts to pay into the tree fund in-lieu-of performing mitigation/replanting, this money may then be used to fund:

- o planting of trees on public property: parks, schools, street trees, libraries, etc.
- o new/replacement or maintenance of existing street trees for property owners who meet certain financial needs tests.
- o stewardship: education programs for the public on the importance of trees.
- o other Tree Board programs needing funding

If the board is established as a non-profit organization the tree fund could also potentially accept contributions from the public. The board may solicit tax-deductible contributions from individuals, or partner with businesses who could make a contribution as a marketing strategy (i.e. a car dealership might contribute a fixed dollar amount for each car sold, marketed as a carbon-offset for the vehicle.)

We recommend that Washington County adopt the following:

- **Create an initial Urban Forestry Management Plan.**
- **Measure progress towards the UFMP goals by setting measurable and actionable targets.**
- **Establish a Tree Board or Commission which owns maintenance of the Urban Forestry Management Plan. The Tree Board or Commission also has responsibility for tree education and stewardship for the public.**
- **Establish a Tree Fund administered by Tree Board.**
- **Establish a County Forester/Arborist position on County staff. This role will lead the Tree Board, have enforcement authority, and have final say in tree-related disputes.**
- **Establish a Historic Tree program.**

Preservation

A key goal that we are recommending is to establish the Washington County Urban/Community Forest management priorities as follows:

1. Preservation first,
2. Increase and Enhance second,
3. Mitigation last.

Preserving the urban forest resources that we currently have to the maximum extent possible is necessary in order to be able to achieve our goal of restoring the urban forest canopy.

Our region's grand scenery is world-renowned and is a major tourist draw. People associate Oregon with trees; examples of which are our license plate, state quarter and state seal. The state's forests are a key street component of that scenery and we need to do our part to preserve it. This includes our urban areas, where visitors typically begin exploration of our grand state.

In addition to trees providing aesthetic beauty, mature trees play a significant and quantifiable role in reducing storm water runoff, reducing heating and cooling costs, improving air quality, and increasing property values (which translates to increased tax revenue). See Appendix B on Economic and Infrastructure Benefits of Trees.

We recognize that as our county continues to grow and housing and economic requirements increase, some trees will be lost during development. Most of our neighboring communities, including most of the cities *within* Washington County, are already acting to slow and reverse the impact of growth to their urban forests. It is time for Washington County to take action, to learn from successes and failures of our neighbors, and to keep from falling behind.

Without changes to slow and reverse tree loss, future generations will not benefit from this incredible asset, and “progress” will continue to result in decline in the urban forest canopy. More can certainly be done to encourage smart planning to retain individual or groves of trees during development.

Preservation is generally achieved through two methods: required preservation (permitting) and voluntary preservation through incentives.

This next section will detail tools that may be used to assist the county with tree preservation.

Permits

Our research has shown that currently Washington County has virtually no regulations regarding tree removal¹⁰. Washington County has an existing section on tree preservation and removal permits in its development code (section 407-3) however it is not clear how or if this section actually applies to non-development tree removals. We have heard concerns about implementation and enforcement of this code expressed by county staff.

Most jurisdictions we reviewed dealt with tree preservation, removal and mitigation in their development application process. In these cases a "tree plan" is required to be submitted along with the development application. The Tree Plan specifies the trees to be preserved (and protected during development) and trees that are proposed for removal.

With every development application including the removal of more than three trees, Monterey County requires submittal of a "Forest Management Plan." Each area differs slightly in the exact requirements; this discussion will focus on the Del Monte Forest region¹¹.

The plan is developed with the consultation of a certified forester, not an arborist (county maintains list, applicant's expense). The plan is submitted on a per-parcel basis. It shows proposed and existing roads and structures, grading plans, and contains a list of all existing trees on a parcel above a specified size (varies by species.) It also shows the trees to be removed as well as the details (type and location) of the mitigation trees. They require a narrative describing the reason for each tree removal. The plan also requires long-term and short-term impacts of development of the forest resource, alternatives to minimize development impacts on the resource, and alternatives to tree removal.

The planning personnel that we spoke with¹² indicated that the plans are scrutinized and frequently rejected requiring the applicant to resubmit with changes to minimize the impact or loss of trees further.

All jurisdictions studied require that permits are issued before tree cutting (except for emergency situations where personal safety/property is in danger.)

We are providing a summary of the Lake Oswego tree permits, as they are clear and easy to follow. They are similar in many ways to other jurisdictions studied but probably the most restrictive. We will discuss jurisdictional differences after presenting the Lake Oswego plan:

Summary of Lake Oswego's Protections/Permitting

There are seven types of tree removal permits:

¹⁰ Relevant Washington County codes relating to trees: Section 430-72.3 provides for a buffer and is used for privacy considerations where an additional set-back may be allowed. Section 407-3 addresses exemptions and submission requirements for applications to remove trees. Sections 407-7 and 407-8 address the requirements for trees to be put in by developments.

¹¹ Del Monte Forest Coastal Implementation Plan.
http://www.co.monterey.ca.us/planning/docs/plans/Del_Monte_Forest_CIP.pdf.
Forest Management Plan Requirements on pg 63.

¹² Erin Knickerson, Land Use Technician, Building Division – Monterey County, 831-883-7578

Joint CPO Tree Code Group – Research Committee Report

- o Dead Tree Removal Permit
 - Applicant is required to demonstrate the tree is dead and warrants removal
 - City may require the tree retained for wildlife habitat in certain circumstances
- o Hazard Tree Removal Permit
 - Clear danger to personal safety and property
 - Public tree causing damage to existing public or private facilities or services.
- o Emergency Permit
 - Immediate danger of collapse
 - Payment of fee may be waived
 - May be issued retroactively.
- o Topping Permit
 - Only issued where other pruning practices are impractical
 - Exception for trees in an open space or undeveloped area to provide a "snag" for wildlife habitat.
 - A separate approved tree removal permit does not authorize topping.
- o Type I¹³
 - Residential single family only
 - Removal of up to two trees per year, 10" caliper (DBH) or less
 - Not a Heritage Tree or in some specific areas.
 - These permits are issued with no further review.
- o Type II
 - All other removals that are not covered in prior types.
 - Trees to be removed must be marked in the field and permit application notice posted in the field (viewable by public)
 - 14-day public comment period
 - Mitigation will be required
- o Verification Permit
 - Required for trees that have been approved for removal through a separate development application
 - Trees for removal/protection and proposed buildings identified in the field
 - Verification that trees in the field match the approved site plan.

Approvals of above Type II and Verification permits are based on consideration of the following criteria [Lake Oswego code section 55.02.080]

- Removal will not have significant negative impact on erosion, soil stability, flow of surface waters, and protection of adjacent trees or existing windbreaks.
- Removal of the tree will not have a significant negative impact on the character, aesthetics, or property values of the neighborhood.
- Removal is not for the sole purpose of providing or enhancing views.

Several jurisdictions require permits to remove trees even without a development application (Beaverton, Lake Oswego, Sherwood, Tualatin, Portland, Monterey County).

¹³ Type I and II is not related to the Washington County's Type I, II and III development applications.

We expect this to raise concerns from homeowners who would like unlimited control over the trees on their property (i.e. weekend landscaping activities may prevent a homeowner from cutting a tree without planning ahead and first obtaining a permit during business hours.)

The main concern is that without limits for non-development situations, there exists a major loophole allowing a landowner the ability to cut trees prior to submitting a development application (which requires a tree survey). This is the impetus for the Clackamas County Urban Green advocacy group's current push in Clackamas County for expanded tree protections.

Some jurisdictions get around this concern by allowing a number of trees (per year) to be cut by a homeowner (excludes specially designated trees). In many jurisdictions, this can be done without any permit. It is unclear in these cases how tracking and enforcement is performed.

Beaverton allows removal of up to 4 "Community" trees per year without a permit (community trees are essentially any trees that are not otherwise specially designated.) There is no limit if the property is less than 1/2 acre. Beaverton has a list of exceptions for situations that don't require a permit (i.e. minor pruning, nonnative removal, emergency situations, vision clearance, etc). Beaverton's permit section (Section 40.90.15) provides three tree plan permit levels, with increasing mitigation requirements as increasing percentages of existing trees are removed.

The Type I permit in Lake Oswego allows for the freedom of a homeowner to remove 2 trees a year without review, but an administrative permit is still required. This is presumably for tracking and enforcement.

The Type I permit in Lake Oswego applies to trees from 0" up to 10". The Tree Code Group has discussed this particular point and feels that the 0" minimum would probably not be acceptable with Washington County residents. We have discussed a range of potential options, but we feel that more research needs to be done to find an appropriate set of limits that will be generally accepted by Washington County citizens. The final decision needs to take into consideration *best practices* and be aligned with the goal of increasing forest canopy.

Most jurisdictions established a minimum trunk diameter (DBH- Diameter Breast Height, trunk diameter measured at 4 and 1/2 feet from the ground), under which permits are not required to remove a tree. There is a wide-variation in the minimums: Tigard 12", Beaverton 10" (6" for specific designated species), Tualatin 8", Sherwood 5". All trees in Lake Oswego are subject to permit requirements.

While we like the Lake Oswego plan for its overall clarity and coverage, some surveys with a wider audience of citizens should be conducted to adjust the numbers and tree sizes to make it acceptable for the county. The Beaverton plan is quite difficult to understand. It also seems to allow for a significant degradation of tree canopy over time (discussed further in the later *Mitigation* section.)

We would like to see adoption by Washington County of a framework for permitting similar to the Lake Oswego plan.

We also request that removed/preserved trees are shown on *all* plan overlays so that they can be seen on all the different parts of development (grading, streets, landscaping, etc).

Our study found some extra protections of specific types of trees in different jurisdictions. Trees with these classifications should have a higher bar for removal and mitigation:

Street Trees: Trees in the right-of-way. They are public property and nearly always called out as having special protections. (city/county expects homeowner to maintain, permit needed to remove). These trees are usually excluded from preservation/replacement calculations

Further discussion in *Public Street Trees* section (page 28)

Heritage Tree Programs -A heritage tree program generally identifies trees (public and private) that are of special significance to the community. Trees are nominated for Heritage Tree status designation by citizens and reviewed by the Tree Board based on some criteria. Trees on private land may be designated as Historic Trees with the consent of the property owner. These trees possess special restrictions for removal and sometimes maintenance (a Heritage Tree Removal permit) and these trees maintain this designation for life (deed restriction).

Tigard, Tualatin, Lake Oswego, and Fulton County all have Heritage Tree programs. These programs are independent of the State of Oregon's Heritage Tree program (which provides no legal protection of designated trees).

Monterey County does not have a "Heritage" tree program per se, rather a Landmark Tree program. Landmark trees are trees greater than 24" diameter, visually significant, historically significant, and exemplary of its species or more than 1000 years old. These trees enjoy more stringent protections.

We recommend that Washington County implement its own Heritage tree program. Washington County should also consider options for merging with cities within the county that already have adopted a program and open up the County-wide program to other cities that don't currently have one.

"Significant Trees/Groves": Trees in city tree inventory that "have been determined to possess distinctive or exceptional characteristics, such as beauty, size, shape, location, natural resource value, etc." (Beaverton Board of Design Review¹⁴). This classification allows for a further delineation from Heritage tree which we believe is important, especially for the option to be able to declare a "grove" of trees as significant. However a Heritage tree definition could potentially be expanded to include this definition.

¹⁴In 1991 the Beaverton Board of Design Review defined

1. *An individual tree shall be considered significant if the Board finds:*

(a) *The tree has a distinctive size, shape, or location that warrants a significant status; or*
(b) *The tree possesses exceptional beauty which warrants a significant status; or*
(c) *The tree is significant due to a functional or aesthetic relationship to a natural resource.*

2. *A grove as defined in Section 90 shall be considered significant if the Board finds that:*

(a) *The grove is relatively mature and evenly aged; and*
(b) *The grove has a purity of species composition or is of a rare or unusual nature; and*
(c) *The grove is in a healthy growing condition; or*
(d) *The grove has a crucial functional and/or aesthetic relationship to a natural resource.*

Hazardous/dying/dead trees - Most jurisdictions allow removal without permit or free permit. One issue with this type of removal is who/how to make the determination of the status of a particular tree.

- o Beaverton requires City arborist approval for the permit
- o These trees are often excluded from preservation/replacement calculations

Trees Within a Significant Natural Resource Area (Goal 5): It is our understanding that Washington County currently does not have protection for trees that exist in a Significant Natural Resource area, unless they are situated in a Vegetative Corridor (as defined by Clean Water Services). We request that Washington County establish a higher bar for removal of trees that are within a defined Significant Natural Resource Area.

In Tigard, there is a deed restriction for future homeowners on all trees preserved through development process.

Incentives for Tree Preservation

In addition to recommending changes to a development plan, the development code may offer incentives to preserve trees that otherwise would not be preserved.

Some options to be considered:

- o **Significant and Historic Resources:** Allow for relaxation of development standards to protect significant natural and historic resources. Such standards may include but are not limited to minimum setbacks, maximum building height, minimum street width, location of bicycle, pedestrian and multi-use paths, etc.
- o **Landscaping Requirements:** Tigard, Tualatin, Beaverton give landscaping credits in some circumstances for voluntary tree preservation. [Tigard] "For each 2% of canopy cover provided by existing trees over 12 inches in caliper that are preserved and incorporated into a development plan, a 1% reduction in the required amount of landscaping may be granted. No more than 20% of the required amount of landscaping may be reduced for any one development."
- o **Density bonuses:** Portland and Tigard [Tigard] "For each 2% of canopy cover provided by existing trees over 12 inches in caliper that are preserved and incorporated into a development plan, a 1% bonus may be applied to density computations...No more than a 20% bonus may be granted for any one development" (not applicable to trees preserved in areas that would otherwise be precluded from development).
- o **Lot Size Averaging:** [Tigard] "To retain existing trees over 12 inches in caliper in the development plan for any land division under Chapter 18.400, lot size may be averaged to allow lots less than the minimum lot size allowed by the underlying zone as long as the average lot area for all lots and private open space is not less than that allowed by the underlying zone. No lot area shall be less than 80% of the minimum lot size allowed in the zone."

- **Commercial/Industrial/Civic Use Parking:** [Tigard] "For each 2% of canopy cover provided by existing trees over 12 inches in caliper that are preserved and incorporated into a development plan for commercial, industrial or civic uses listed in Section 18.765.080, Minimum and Maximum Off-Street Parking Requirements, a 1% reduction in the amount of required parking may be granted. No more than a 20% reduction in the required amount of parking may be granted for any one development"

- Relaxation of:
 - **Minimum setbacks**
 - **Maximum building height**
 - **Minimum street width**

- **Lot Width and Depth:** [Tigard] "To retain existing trees over 12 inches in caliper in the development plan for any land division under Chapter 18.400, lot width and lot depth may be reduced up to 20% of that required by the underlying zone."

- **Location of Bicycle, Pedestrian and Multi-use Paths:** Allow and suggest paths to meander among existing trees. Allow some tree preservation requirements exemption for building these paths under dripline.

- **Bond:** Builders should have a bond to protect the trees during development that could be reduced or waived if the developer leaves over X% (i.e. 50%) of the existing trees on the proposed development site.

- **Sliding Scale Permit Fee:** Lower permit cost based on percentage of existing trees preserved.

- **Green Builder:** Publicly recognize and acknowledge developers as a "green builders."

Tree Inventory

Most of the jurisdictions studied maintained a tree inventory of some sort. The tree inventory is usually limited to public and street trees.

Tree inventories may be used to manage forest health, diversity and size, determine a dollar value of the urban forest, identify potential planting locations, and baseline and track progress in tree preservation or canopy restoration efforts.

The Tree Inventory can be used to manage forest health by identifying patterns in tree deaths or diseases. If problems can be identified early enough, preventative measures can be instituted to limit the extent of future problems (e.g. expenses).

The non-profit Casey Trees of Washington D.C. provides public access to their tree

inventory database¹⁵ where people can identify on an interactive map of their inventory individual trees, their species, size and condition, calculations of the amount and value of air pollutants the tree removes and the value of the tree to a tree appraiser. This inventory of Washington D.C. was catalogued by a team of roughly 500 trained volunteers over the course of a summer.

We recommend that a tree inventory in Washington County also identify possible locations for future tree plantings (street trees, parking lot trees, public services building property, highway medians and cloverleaves, etc). These locations could be used as off-site mitigation planting sites. It would also address a possible developer concern about lack of off-site mitigation options.

A healthy forest requires species and age diversity which minimizes the risk of a disease or infestation devastating the forest (a community asset¹⁶). If the tree inventory contains information about area tree species and age, it can provide diverse species recommendations for future plantings.

The tree inventory can also be used to identify significant individual trees or groves of trees (e.g. Beaverton). This can include public and private trees. These trees are generally considered separately in the tree removal permitting process.

We recognize collecting and maintaining a tree inventory would likely be a laborious process, especially for an area the size of our county (as compared to a city), however representatives at the Oregon State Department of Forestry have offered to provide professional resources for assessing/measuring forest size and health. They suggested volunteer groups to be trained to perform the legwork (e.g. 4-H GIS-GPS TechWizards collecting street tree inventory in Hillsboro).

In addition, updates to the inventory could be done as part of the development/planning process. When development plans are submitted they include existing trees, planned removed trees, mitigation trees and street trees. An emphasis should be placed on native trees. This submitted information can be standardized so as to easily be incorporated into the tree inventory database.

Monterey County administers this type of tree inventory as every development application involving more than three protected trees is submitted with a Forest Management Plan. Those plans remain on file, and are reviewed when later development applications are filed.

However, a street tree-only inventory would not help much in assessing overall forest size increase goals or identify trees to be protected during private development. To monitor the canopy increase goal, aerial photograph analysis of the forest canopy should be used.

Metro Nature In Neighborhood's Lori Hennings indicated that starting in 2008, Metro will be reporting detailed canopy coverage measurements broken down by cities/counties, including unincorporated Washington County (within UGB, excluding incorporated areas). They are required to measure and report canopy measurements every 2 years (Title 13,

¹⁵ Casey Trees Tree Map; <http://www.caseytrees.org/treemap/index.html>

¹⁶ There has been discussion by federal agencies about reporting public trees as assets in public budgets. Center For Urban Forest Research – Pacific Southwest Research Station. News Brief. May 2004. "Can Community Trees be Capital Assets?"

renewal of OR SB100)¹⁷. We would expect Washington County to take advantage of these reports to assess the canopy increase goals.

The City of Portland had a study performed¹⁸ to measure their canopy cover at 3 different points in time based on aerial photographs. This showed tree loss and gain in the Portland neighborhoods and was even broken down by zoning. Washington County could conduct a similar study to assess historical loss of canopy to help the tree board establish and track progress towards canopy restoration goals.

Main Recommendations for Washington County:

- **Establish a multi-level Tree Plan/Permit requirement for development applications as well as individual landowners.**
- **Establish Historic and Significant Individual Tree/Grove Inventory**
- **Monitor canopy coverage using Metro's biannual canopy reports.**
- **Enable protections for trees that are in Historic, Significant Individual Trees, Significant Groves, Significant Natural Resource Area (Goal 5).**
- **Create incentives for tree preservation**

Mitigation

According to our high-level policy goal, once "preservation" and "enhance and improve" opportunities have been exhausted, mitigation is the final option.

This section details rules for restoration of trees after development, often called Mitigation. This section includes quantity, sizes and types of trees for replacement, locations for replacement, as well as maintenance requirements after planting. It also includes options for situations where replacement of trees on-site is not feasible.

Along with preserved trees the mitigation plan is usually listed in a Tree Plan submitted with a development application.

The quantity of trees which need to be replaced (mitigated) is often based upon the quantity and size of trees that existed prior to development. As with preservation, most jurisdictions establish a minimum trunk diameter (DBH). If a tree is over this minimum size, it shall be considered in the tree plan. Otherwise it is not a factor in preservation or mitigation. As different trees grow at different rates, a chart could be included that lists the multiple minimum DBHs that could be specified depending on the type/species of tree.

An important point is that most jurisdictions exclude trees from their mitigation calculations that would otherwise be required by other development code, such as landscape trees,

¹⁷ Telephone conversation with Lori Hennings, Metro Senior Natural Resources Specialist, July 10, 2008.

¹⁸ URBAN FOREST CANOPY COVER IN PORTLAND, OREGON, 1972-2002: Final Report; Poracksy, Joseph & Lackner, Michael
<http://web.pdx.edu/~poracskj/Cart%20Center/psucc200404-047.pdf>

street trees, and parking lot trees. So a developer does not get to credit street trees towards their mitigation/replacement tree requirements.

Lake Oswego has the most straightforward mitigation requirements: 1 tree removed = 1 tree replaced. The applicant shall plant either a minimum 2-inch caliper deciduous tree or a 6-8 foot tall evergreen tree for each tree removed.

Other jurisdictions such as Beaverton and Tigard are more complex and mitigation requirements are on a sliding scale based on the size and number of trees that will be preserved (above the minimum diameter threshold).

Using this method, the diameter of all trees on site is measured at a specified height from the ground (DBH - Diameter Breast Height, usually 4.5 feet). If the tree is larger than the thresholds above, that tree is factored into the mitigation calculations.

For Tigard, the calculations are as follows: a) if preserving less than 25% of the existing trees, every removed tree must be replaced for a zero net loss in trees, b) if preserving from 25% to 50% of existing trees, 2/3 of the trees removed must be replaced; c) if preserving 50% - 75% of the existing trees, 50% of the trees removed must be replaced; d) if preserving greater than 75% of the existing trees, no trees need to be replaced.

For Beaverton, the DBH of all* the pre-existing trees on the development lot greater than the above thresholds is summed to get the "Total DBH" for the site. The mitigation requirements are based upon the percentage of that total DBH that is preserved. If greater than 50% of the total DBH is removed, then mitigation is required for the amount beyond 50%, otherwise if less than 50% is removed, then no mitigation is required.

*Note, Beaverton does not require this measurement for all trees. Only trees indicated as Significant Individual Trees/Groves (as indicated in their inventory) or trees within a Significant Natural Resource Area (in Community Plans) need to be mitigated. Beaverton provides *incentives* for mitigating Community, Historic or Street Tree removal with Landscape credits. Double the credits can be achieved if those trees are preserved in the first place.

Remarks: A significant downside of using this method of mitigation is that it does not include all trees (only Significant Individual Trees and Groves), and up to 50% of these "important" trees can be cleared without any mitigation. This seems a very weak requirement, and as a consequence they will always be losing canopy coverage.

Another negative, especially for those jurisdictions with the larger thresholds (i.e. Tigard 12") is that the end result will not likely have a healthy mix of all ages of trees. There will be a gap in ages between the young replacement trees and the large old preserved trees.

A major concern over the pre-existing tree measurement methods is that if protections for removing trees without a development application are not in place, someone could remove trees prior to submitting a development application and not have to mitigate for them. This was a major issue reported by the Clackamas County Urban Green representatives.

A different method for calculating mitigation requirements is not based on pre-existing numbers of trees, but rather a minimum final overall density. This method is employed by Fulton County, GA (Atlanta resides in this county).

This method appears to have a major benefit in that it could be used to much more effectively achieve one of our main goals of restoring canopy coverage to a prior year level.

Fulton County defines a **Tree Unit**. For example, for a single-family residential, after development is complete, must have 20 units per acre (30 units for greater than single-family residential and commercial).

First, the Existing Density Factor (EDF) is calculated by summing the trees which will remain on site to be protected during construction. Based on species and size, tables in the ordinance convert existing tree DBH to tree units. Subtracting this EDF from the 20 units per acre density requirement, one is left with the amount of tree units that need to be replanted/mitigated. Another table in the ordinance provides the replacement tree units to DBH conversion.

Generally a 4" replacement tree equals 0.7 tree units. For example, if a 1 acre site single-family residential lot had been cleared before development, mitigation of a minimum of 28 4" trees would need to occur.

For a site that was initially barren of trees, the definition of a tree unit changes to a 4" replacement tree equals 1.4 units, essentially cutting the mitigation requirements in half.

Remarks: Due to the tables which provide mitigation credit for preserved trees as small as 1-4" in diameter, the method allows for a better mix of differently sized trees (forest health). It also allows for a direct connection of mitigation to our 40% canopy coverage goal.

While Fulton County was the only jurisdiction in our study using this method, the Tree code group recommends Washington County adopt this method. Adjustments to specific measurements and tree types will be needed to adapt this method to our specific conditions.

Replanting Location

Nearly all jurisdictions with tree protections studied allowed mitigation to take place on-site, off-site or assess a fee-in-lieu. One notable exception is Monterey County.

To help achieve the goal of maintaining and restoring the urban forest canopy, replacement trees should be placed **on the same site** from which the associated trees were removed whenever possible.

County Staff or Tree Board should work with the developer to locate replacement trees on-site (parks, greenways, using as a street tree, etc).

The County Staff or Tree Board can also encourage a developer to locate appropriate trees in appropriate buffer locations (adjoining existing development along natural/green spaces).

If all trees cannot be placed on-site due to space constraints and minimum distances between the trees then replacement trees could be planted **on a different site** owned by the party developer. (Note: currently in Beaverton, placing trees off-site increases the developer's mitigation requirements. Also Monterey County requires mitigation be performed on-site.)

Another option is that the developer could offer the trees to be planted on adjoining

properties (with consent of property owner) to provide extra buffering. *There is a question of whether this would be in addition to or credited to the developer's buffering requirements as they are not on the developing property and also if the developer would still be responsible for ongoing maintenance of those mitigated trees.*

One option that we did not find offered in the research conducted is that the tree board could maintain a list of property owners that are interested in trees planted on their private property. Mitigation trees will have special protections so the recipient would have to agree to the long-term protections applied to designated mitigation trees.

Another option would be that the tree inventory would maintain a list of potential locations for future tree plantings (including the desired tree types for each location) and the off-site mitigation trees could be planted there.

If there does not exist enough space on the developing site to locate the trees, the developer may choose to pay a **fee-in-lieu** of planting. This fee-in-lieu will be paid into a newly established "Tree Fund" which would be administered by the newly created Tree Board/Commission. Note: Monterey County also does not allow a fee-in-lieu.

At the discretion of the Tree Board/Commission, these funds may be used for (but not limited to):

- o planting of trees on public property: parks, schools, street trees, libraries, etc.;
- o new/replacement street trees for property owners who meet certain financial needs tests;
- o stewardship: education programs for the public on the importance of trees; and
- o other Tree Board programs needing funding.

This fee should be set as to be sufficient to cover the cost of the tree, cost of planting the tree, maintenance/monitoring of the tree for a specified number of years after planting, as well as the administrative costs involved. For example, Beaverton's Fee-in-lieu charges are: \$90 2" conifer, \$175 2" deciduous, \$200 street tree.

In addition to the site location for replacement trees, the ordinance itself needs to specify requirements on maximum tree planting density to ensure tree health. Beaverton specifies that mitigated trees must be placed at least 10 feet apart.

Tree Selection

All jurisdictions studied maintain an approved tree list. Washington County already has an approved tree list for street trees. Street trees are usually selected for suitability in a location next to impervious surfaces, so they will typically require less water and their root systems will tend not to rise to the surface causing upheaval in sidewalks.

A different tree list will need to be established for general tree replacement. We recommend a certified arborist or Urban Forester familiar with the Pacific Northwest environment be consulted to provide a list of appropriate (non-street tree) replacement trees with a focus on native species. Prohibition of known invasive species is recommended.

The following highlights some specific requirements for tree selection from the jurisdictions studied:

- Deciduous replacement trees must be native trees 2" or greater caliper (Beaverton,

Tigard)

- Coniferous replacement trees must be native trees between 3 and 4 feet in height (Beaverton)
- Fulton County requires that at least 4 different varieties of trees must be selected in the mitigation phase. This requirement provides for a diverse forest (forest health).

We recommend that Washington County adopt the Fulton County requirement of species diversity.

Post-Planting Requirements

Most jurisdictions required that the developer maintain (irrigate, monitor for disease/death) mitigated trees and trees that were potentially impacted by development for a period of 2-5 years after the development had been completed. Monterey County has a 7-year monitoring program. They indicated that trees damaged by development activity will often not provide indication for five years.

In addition to general monitoring, some jurisdictions have additional requirements:

- Beaverton requires that each mitigated tree be insured an appropriate amount.
- Beaverton, Lake Oswego and Portland, require that all mitigated trees be placed in a conservation easement and as a deed restriction.
- Beaverton, Lake Oswego, and Sherwood also establish that each mitigated tree inherit the status and protections of the tree(s) they are replacing.

Main Recommendations for Washington County:

- **Adopt a rigorous mitigation policy. Establish a Tree Unit definition appropriate for our environment.**
- **Allow planting on-site, off-site and a fee-in-lieu.**
- **Establish a replacement tree list with a focus on native species.**
- **Diversity: Require a maximum 25% of one type of trees species.**
- **Establish post-planting maintenance requirements of at least 5 years.**

Tree Protection Standards

Trees to be preserved must be provided significant protections while construction activities occur. The development plan should include protections both above and below ground. A change in grade, drainage or soil conditions (compaction, removal of topsoil) around preserved trees is usually the cause for decline and eventual death of a valuable specimen. Large trees adjacent to streets or sidewalks can become especially hazardous, jeopardizing life and property.

Tree protection standards specified by ISA (International Society of Arboriculture) have been adopted by essentially all the jurisdictions we have studied. The following are ISA recommended tree protections:

1. **Fence/Barrier:** Install a fence or barrier¹⁹ at least at the dripline (edge of canopy) of all trees to be preserved (or twice the dripline for *columnar or fastigate tree*). There are a few different guidelines about measuring the "Critical Root Zone" of a tree²⁰. The root system of a mature tree can be two to three times the width of the canopy and protection of as much of the root system is ideal. Monterey County requires the wrapping of the trunk in some instances.
2. Most jurisdictions restrict all construction activity within the protection zone. No vehicle maneuvering or parking, no construction supplies including topsoil/dirt, no hazardous materials, no topsoil removal, and no new construction of structures or impervious surfaces.
3. Retain grade level around any tree so it will not be lowered within the protection zone/drip line.
4. **Trenching:** Prevent trenching (i.e. for utilities) which could damage protected tree roots. All jurisdictions studied except Tigard and Tualatin specifically prevent utility trenching in a protected tree's dripline. Tigard and Tualatin do not explicitly prevent it but allow it only with a certified arborist's approval. Fulton County prevents trenching but allows/recommends "tunneling" if utilities must be located within a root zone. If trenches must be dug in a root zone, excavate trenches by hand in protection zones.
5. Ensure that preserved trees are not affected by removed trees as they are harvested (directional felling).
6. The builder is responsible for the health of the protected/mitigated trees for 3-5 years after construction:
 - o Bonds issued to protect the health of the trees in the 3-5 year span. Before a Certificate of Permission for Occupancy, the builder shall provide a Guarantee Bond for the sum value of all the trees on the site.
 - o If a protected tree dies or is identified by a certified arborist to have been damaged by the construction within the 5 year span, a replacement tree must be planted within three months, a 1 to 1 ratio.

We believe that perhaps developers should sign a statement indicating acknowledgement of understanding and compliance of rules for themselves as well as their subcontractors.

We also believe that protection rules should be posted on site as well at each protection area as people may not always be educated as to the protection rules.

Summary of Recommendations for Washington County:

- o **We recommend that Washington County enact strict protections for preserving**
-

¹⁹ Several jurisdictions required steel fences.

²⁰ One common measure is for every inch in diameter of a tree (at breast height). Another goes a foot out from the trunk for radius of the area

trees during construction activity using standards developed by:

- **International Society of Arboriculture**
- **American National Standards Institute**
- **We recommended that developers sign a statement acknowledging compliance with the tree protection code, including taking responsibility for subcontractors and posting on-site tree protection rules.**
- **Developers are responsible for health of preserved trees 5 years after development completion.**

Tree Maintenance

The community will not realize the benefits of urban forest if the trees are in poor health. Promoting tree health helps communities to protect their investment in urban forest. Public health and safety also depend on healthy trees. Improperly maintained trees have an increased risk of failure, which can result in personal injury and property damage. Good cultural practices will have major impact on success and longevity of the urban trees.

Responsibility of Property Owners

The purpose of this section is to set forth any responsibilities for maintenance of trees in the public right-of-way (“street trees”). This responsibility should be assigned to property owners regardless of whether or not the property is developed (this is the case currently in Washington County).

Maintenance should include watering, pruning to providing correct clearances for trees around streets and sidewalks, and removal of tree debris. The county should provide education materials (on a website) clearly describing the requirements (i.e. clearances) and proper tree maintenance and pruning methods.

As an alternative, the County may simply require property owners/residents to notify the tree program when problems occurs, and have work done by pre-approved contractors. This allows for greater control over the quality of tree maintenance, but at a significantly higher cost.

Example:

This maintenance shall include watering as needed and keeping such strips free from weeds or any obstructions contrary to public safety. Property owners shall be responsible for watering mature city street trees whenever landscaping of the property is changed in such manner as to deprive the tree of its normal source of moisture. Such watering shall be continued during dry weather until the street tree becomes acclimated to the new environment, but need not exceed three years. All watering requirements shall be waived to the extent they are inconsistent with governmental restrictions on water use.

It shall be the duty and responsibility of every person owning or occupying any real property within the City of Sacramento, to keep all trees on property trimmed in such a manner that there is a clearance of at least fourteen feet above any street or alley, and a clearance of at least seven feet over any sidewalk. It shall also be the duty and responsibility of every person owning or

occupying any real state property within the City of Sacramento to keep all trees on the public right-of-way trimmed in such manner that they do not obstruct the view of any traffic sign or device for vehicle traffic in the direction controlled by a traffic sign or device [Sacramento, CA: City Code Section 45.5]

Topping

Some people, even “tree-care professionals”, still advocate topping, but it is now widely accepted by experts as a practice that must be prevented or restricted. Other names of the practice are hat-racking, severely trimming, dehorning, or stubbing. An incorrectly trimmed tree can significantly weaken even mature trees. This creates a potential serious public health hazard (trees falling on pedestrian, private property, in a storm, etc.)

Due to the public health risk, topping restrictions may apply to public as well as private trees.

We have heard a number of complaints about utilities' poor "pruning" standards (topping) specifically in Washington County. Trees are often left with big gaps in the center, weakening the tree which creates a new public health concern.

Portland specifically prevents topping (with utilities exclusion). A "Topping permit" is required in Lake Oswego so that the city arborist/forester can review the situation and suggest alternatives.

Washington County code should establish a clear definition for topping. Example definitions include:

- Beaverton: Except for trees which have been severely damaged by storms or other causes, or where trees are located under utility wires or other obstructions where other pruning practices are impractical as determined by the City, trees in the right-of-way shall not be topped.
- Lake Oswego: severe cutting back of a tree's limbs to stubs 3 inches or larger in diameter within the tree's crown to such a degree so as to remove the natural canopy and disfigure the tree.

The International Society of Arboricultists recommends rather than including detailed specifications in the ordinance itself, that the ordinance authorize the preparation, adoption and enforcement of tree pruning standards by the professional skilled in this area.

The county should help educate the public on the myths and dangers of tree topping. Here are several examples:

- o <http://www.plantamnesty.org/stoptopping/5reasonstostoptopping.htm>
- o Illinois Dept. of Forestry - Urban and Community Forestry Program
<http://dnr.state.il.us/conservation/forestry/Urban/TreeToppingTis.htm>

We recommend the county prohibit topping of trees on public and private property.

- o There needs to be an exception (under arborist supervision) for topping of trees under utility lines for the purpose of public safety
- o Establish requirements for utilities to follow standards established by Arboculturist.
- o A utility shall be required to provide 30-day notice for maintenance of trees in the

right of way. This allows the property owner time to hire their own service.

Help for citizens performing tree maintenance

While it is the property owner's responsibility to maintain trees in the public right-of-way, there may be some need to assist citizens in meeting requirements mandated by the County for street tree maintenance.

The County or the Tree Board could enact a provision that allows the local government to assist citizens with street tree maintenance based on citizen meeting a "needs-test" paid out of the Tree Fund. The provision should be clear on the types of assistance permitted and reviewed and updated regularly.

If the public works department performs work where a needs-test has not been met, reimbursement may be required.

Alternatively or in addition to, a non-profit group may be available to help citizens for a reduced or no fee.

Public Street Trees

In addition to all of the aesthetic and financial benefits of street trees (Appendix B), proper street tree planning and maintenance can reduce the urban heating effect.

Street tree code specifies the species and size of trees permitted and spacing requirements for street trees. It is important to select trees that will thrive in their planting location and minimize damage to hardscape as the trees mature.

Street trees are generally public property. They are usually protected in the tree permitting process (a permit is needed to remove one).

Washington County already has code governing street trees (CDC Section 407-7) and a separate street tree list²¹. This list currently contains "recommended" and "not permitted" street trees. Washington County currently requires that deciduous trees are at least 1½" caliper and 8 feet in height and evergreen trees a minimum of 6 feet in height (CDC Section 407-8).

We have heard a number of specific concerns from Washington County citizens over the selection and quality of trees chosen for street trees as well as the lack of maintenance (watering) after new trees are planted.

Some have noted that it can become very expensive to maintain their sidewalks as the street tree matures and damages the sidewalks multiple times; it then becomes financially more practical to remove the trees. We recommend that the current street tree list be reviewed and updated by certified arborists to ensure that the list contains only trees that are currently accepted by the profession as appropriate for street trees as well as for our particular climate. This list should remain separate from the code so that it can be reviewed and updated more frequently to conform to current arboriculture standards.

When presenting to Washington County CPOs (Citizen Participation Organizations,) a

²¹ Washington County Street Tree List:
<http://washtech.co.washington.or.us/LDS/formDocs/StreetTrees.pdf>

common theme we heard from CPO members was the importance of planting of native trees. There are a number of non-native tree species on Washington County's current recommended tree planting list. We recommend that the current street tree list be reviewed by a certified arborist or Forester and updated to focus on native species.

Another concern we have heard is that as a result of poor nursery stock and/or lack of watering, new street trees are often stunted or die prematurely. We recommend that Washington County require that for a street tree that dies or is significantly non-healthy (as determined by the County Forester or Tree Board) within 5 years, it is the responsibility of the developer/home-owner/Homeowner's Association who planted to tree as a condition of a development application to replace that tree in accordance with current code.

Washington County already has a program whereby occupancy permits can be withheld or security bonds paid if street tree installation is not complete according to plan (CDC Section 407-8). This is similar to other jurisdictions studied but could be expanded such that the security bonds are changed to "performance" bonds such that the bonds are held for 5 years to enforce proper street tree establishment.

Some communities have programs for street tree planting in established areas (without new development). In Tigard for example the City Arborist administers an annual street tree give-away program. Washington County's Tree Board could administer a similar program in its stewardship campaigns funded by the Tree Fund. In Portland and Beaverton, the non-profit, Friends of Trees, assists communities in purchasing and planting trees in areas deficient in street trees. We are planning to engage this group in Washington County.

Some communities have ordinances for **parking lot** trees, which significantly reduce the heat island effect. Davis, CA, Sacramento, CA and Lewisville, TX all have parking lot tree-shading ordinances. Oroville, CA requires a 50% shading cover from tree canopies within 15 years of planting²². We would also like to request that the County consider adding requirements for tree canopy coverage in parking lots.

Main Recommendations for Washington County:

- **Address/Prohibit Tree Topping in county code/policy documents.**
- **Provide public information on proper tree care/maintenance.**
- **Review/update the existing street tree list with certified arborists/foresters.**
- **Add performance requirements to new street tree plantings.**
- **Do not allow attachments to trees (signs, wires, lights).**
- **Add parking lot tree density requirements to the county code.**

Administrative/Other Issues

This section contains a number of subsections that deal with the administrative odds and ends of an ordinance. Significant portions of this section are derived from "Guidelines for Developing and Evaluating Tree Ordinances" (Bernhardt and Swiecki 1991)

²² US Environmental Protection Agency – Heat Island Effect. Available online: <http://www.epa.gov/heatislands/strategies/community.html#6>

Definitions

Purpose: Define key words which will be used in the ordinance

- It will be necessary to define some words/phrases used in the code/policy.
- Establish an authority responsible for interpreting definitions. This provision reduces the chance that the ordinance enforcement could be challenged on the basis of specific definitions
- A useful technique, illustrated in the example text²³, is to include in the definition what is not covered by the term.

Examples from Beaverton Development Code

- **Landscape Tree.** A tree, other than a Significant Tree, Historic Tree, or Tree within a Significant Natural Resource Area, that has been preserved or planted as a component of an approved landscaping plan.
- **Protected Tree.** Includes Significant Individual Trees, Historic Trees, Trees within a Significant Natural Resource Area or Significant Grove, and Mitigation Trees.
- **Pruning, Major.** Removal of greater than 10% of the tree’s canopy or disturbance of over 10% of the root system.
- **Surveyed Tree.** Trees on a proposed development site that are required to be identified in a Tree Plan application. Trees required to be surveyed include all trees greater than or equal to ten (10) inches DBH (including nuisance trees) and the following trees greater than or equal to six (6) inches DBH: western hemlock (*Tsuga heterophylla*) or mountain hemlock (*Tsuga mertensiana*) trees, Pacific madrone (*Arbutus andrachne*) trees, and big-leaf maple (*Acer macrophyllum*) trees.
- **Vegetation.** Any woody, perennial plant, deciduous, evergreen or coniferous which is not defined as a tree.

Jurisdiction

Purpose: To set forth the Washington County jurisdiction over certain groups or classes of street trees, or trees located in public property.

Example:

[The City of Carpinteria shall have control of all street trees, shrubs and other

²³ From Development Code of the City of Beaverton – Chapter 90 Definitions

plantings now or hereafter in any street, park, public right-of-way or easement, or other public place within City limits, and shall have the power to plant, care for maintain, remove, and replace such trees, shrubs and other planting. Carpinteria, CA: City Code Section 12.28.020]

County Disclaims Liability

Purpose: To avoid accepting liability for any personal injury or property damage caused by trees on private property.

Remarks: Legal counsel should be consulted for an expert opinion on the draft and validity of such clauses. A provision of this nature is usually included if the County claims the authority to abate hazardous trees or regulate tree pruning and removal on private property. The note below is typical of a provision used in a street tree ordinance.

[Nothing contained in this section shall be deemed to impose any liability upon the City, its officers or employees, nor to relieve the owner of any private property from the duty to keep any tree, shrub or plant upon any street tree area on his property or under his control in such condition as to prevent it from constituting a hazard or an impediment to travel or vision upon any street, park, pleasure ground, alley or public place within the City. Patterson, CA: City Code Section 12.13.160]

Appeals

Purpose: To establish procedure whereby decisions of the tree program manager can be appealed.

Key elements:

- o Types of decisions to appeal
- o Procedure for filing appeals
- o Time limitations for appeals and responses to appeals
- o Requirement to suspend actions during the appeal process
- o Hierarchical sequence of appeal

Remarks: The appeal process provides a check against the authority of the tree program manager. However, it is important that decisions by appeal bodies be based on the ordinance and established policies.

Lake Oswego has a five-member citizen advisory body appointed by City Council which meets as needed to consider requests for hearings and appeals of tree cutting applications.

Penalty for Violation

Purpose: To establish penalties for violating provisions of ordinance

Key elements:

- o Legal categorization of violations

- o Specific penalties, if not provided for elsewhere
- o Legal means stopping and correcting situations which constitutes violations

Remarks: Depending on the nature and complexity of the tree ordinance, penalties for violations may be listed in a single provision or in several different parts of the ordinance and the penalties may be simple. A comprehensive tree ordinance may address a wide variety of issues including the care of public trees, protection of designated trees, planting requirements for new developments, etc. Different types of penalties may be appropriate for violations of different sections of the ordinance. In such cases, the penalty provision may either list all the penalties that may apply to violations of various provisions or may state the basic penalties and indicate the additional penalties listed under specific provisions.

[PENALTIES: Any Person who neglects or refuses to comply with, or assists in the violation of, any of the provisions of this Chapter, or any order, permit, or notice issued pursuant thereto, shall be fined not more than \$500 for each such violation and shall pay in addition the cost of replacement as provided in this Section. Each day any such violation continues shall constitute a separate offense, and each Tree Removed or Damaged shall also constitute a separate offense.

Any Person who causes a Tree to be Removed or Damaged in violation of this Chapter, or any order, permit, or notice issued pursuant thereto, shall repair or replace any such Tree at the violator's sole cost and expense pursuant to the Tree replacement requirements set forth in Subsection 10-11-4E of this Chapter. The cost of replacement shall be \$100 for each DBH inch of the Removed or Damaged Tree. If the precise DBH cannot be determined, the cost of replacement shall be determined by the Village Forester based on the Village Forester's estimate of the DBH of the Removed or Damaged Tree. The replacement cost shall be paid to the Village by the Person responsible for the violation. The location, species, and planting specification for replacement Trees shall be approved prior to replanting by the Village Forester pursuant to the requirements of Subsection 10-11-4E of this Chapter. Lake Bluff, IL: Village Code Section 10-11-16]

Our research revealed a wide variety of penalties for violations:

- o Beaverton: \$250 per day,
- o Tigard: \$500 per day
- o Tualatin: Enforcement fee: \$837 per incident+\$10/tree + Restoration fee: \$2000/tree
- o Lake Oswego: Enforcement fee: \$317 per incident+\$30/tree + Restoration fee: \$51 per caliper inch DBH
- o Fulton County: \$1000 per violation per day (no limit) + double the unit replacement/mitigation requirements.
- o Monterey County: The violator must restore the property to the prior state before the violation then [re]apply for the permit (paying double the permit fee and going to the higher level permit). They will also be assessed a fine based on the retail value of the wood lost and potentially \$1000/day per violation

Recommendation: To address the anecdotal reports of individuals repeatedly violating an ordinance provision as a matter of "just the cost of doing business", our group recommends that the county establish a sliding scale of fines. A record of violations

follows each individual/entity and the penalties increase dramatically for each repeated offense.

Enforcement

Purpose: Designate the position responsible for enforcing the ordinance

Remarks: The authority designated to enforce the ordinance should be always indicated. However, a separate enforcement provision may not be necessary if the responsibility for ordinance enforcement is specified under designated administrative responsibilities.

Methods for Evaluating Tree Ordinances and the Urban Forest Ecosystem

Purpose: Establish measurable

- o Sampling from populations - In many cases, it will be more efficient to evaluate a sample of the population under study (trees, parking lots, homeowners), than evaluate the entire population.
- o Photogrammetry and remote sensing techniques - Using stock aerial photographs or other aerial imagery, photogrammetric techniques can be used to assess tree canopy cover quickly and cost-effectively.
- o Ground Survey - For many applications, the ground survey is still the simplest and most accurate means for collecting detailed data on the Urban Forest.
- o Photo Points - Photographs taken from the ground or air can provide graphic and obvious evidence of changes in tree condition and cover.
- o Record keeping and analysis - Well maintained records and databases can be analyzed to provide a wealth of information on ordinance performance.
- o Public Polling - People are integral part of Urban Forest ecosystem.

Performance evaluation of ordinance

Purpose: evaluate effectiveness of ordinance provisions

Key Elements:

- o Position responsible by evaluation and reporting (unless specified on designated administrative responsibilities)
- o Actions required in case of unsatisfactory performance

Remarks: One way to ensure that evaluation does occur is by including a provision that mandates a periodic performance evaluation of the ordinance. In addition to evaluation, this provision should establish a mechanism for revision of the ordinance if goals are not being achieved.

[The tree program manager and/or tree board shall collect and maintain all records and data necessary to objectively evaluate whether progress has been made toward the stated goals of this ordinance. An annual summary and analysis of the evaluation and recommendations for action shall be prepared at the direction of the tree program manager and presented to the County Planning Department and Board of Commissioners. The County Board of Commissioners shall consider the report and recommendations and take all actions deemed necessary to accomplish the goals of the ordinance. These actions

may include, but are not limited to, revision or amendment of this ordinance or the adoption of other resolutions.]

Severability

Purpose: Prevent the whole ordinance from becoming invalid if any part is declared invalid by the courts.

Remarks: This provision is included in many ordinances as a matter of course.

[Should any part of provision of this ordinance to be declared by a court of competent jurisdiction to be invalid, the same shall not affect the validity of the ordinance as a whole or any part thereof other than the part held to be invalid Atherton, CA: Ordinance 444 - Section: 7]

Situations which are declared to be public nuisances

Purpose: Define unacceptable situations which are subject to abatement by local government.

Remarks: Conditions and situations that jeopardize public health and safety are most commonly declared to be public nuisances. Hazardous trees and tree which obstruct travel or line of sight may fall into this category. Situations that threaten the health of the urban forest or are contrary to the Community Forest Management strategy may also be declared nuisances. This second category includes trees which harbor diseases or insect infestations that may readily spread to adjacent trees and species which are considered undesirable. Improper maintenance practices which can lead to tree death or disfigurement have also been declared to be public nuisances in some communities. Abatement procedures are typically contained in a separate provision.

Exemption from Oregon Solar Energy Easement/Washington County Solar Access Standards

Purpose: To exempt a local jurisdiction from provisions of the Solar Access Standards

- o Washington County Section 427 Solar Access Standards
- o Oregon Solar Energy Easement Law - ORS 105.885 to ORS 105.895

Remarks: Oregon Solar Energy Easements describes that the property where the solar panels are to be installed must be given a solar envelope sufficient to determine the space over the burdened property that must remain unobstructed.

There is a potential conflict between tree preservation and solar access requirements. In California local jurisdictions may exempt themselves from the state's solar access requirements, however it is unclear if this is possible in Washington County since we have our own Solar Access code already in place.

The city of Brier, WA (suburban Seattle) deals with this conflict with the following statement in their municipal code:

[While trees have long been used to complement solar planning and site design such as providing deciduous trees in strategic locations to cool areas in summer and providing solar access in winter, providing of adequate solar access may

sometimes conflict with preservation of existing trees, particularly evergreen trees. When established city goals designed for different purposes conflict, balancing of different community and individual needs must be accomplished. In implementing the goals of this chapter, the Director shall give due consideration to valid solar access needs. Brier, WA]

Tree City USA

Purpose: public/media acknowledgment for tree preservation efforts

Remarks: A program administered by the Arbor Day Foundation. They provide resources to guide communities to creating Tree-friendly communities. Once a jurisdiction meets a set of criteria, it is declared a "Tree City USA" and receives public/media attention.

Criteria

- o A tree board/department
- o community tree ordinance
- o community forestry program with an annual budget of at least \$2 per capita
- o Arbor Day observance and proclamation

"Tree-City USA" cities: Beaverton, Tigard, Tualatin, Forest Grove, Wilsonville, Sherwood, Portland, Lake Oswego.

Counties may be designated "Tree City USA" (Arbor Day foundation confirms there are "dozens" across the country).

Recommendation: Washington County should have a goal of achieving Tree City USA status.

Summary of Recommendations:

- Establish an Urban Forest Management Plan
- Establish a measurable urban forest canopy restoration goal
- Establish a Tree Board/Commission with members from the community including citizens as well as professionals (i.e. developers, arborists, landscaping)
 - Establish a Tree Fund administered by Tree Board
- Create a County Forester position on County Staff
- Establish a Tree Inventory
 - Public trees (street trees)
 - Historic Trees. Establish a Historic Tree Program.
 - Significant Individual Trees/Groves
- Establish a permit process for tree removal
- Codify a Tree Preservation/Protection Plan which must be submitted with any development application that involves removal/preservation of trees
 - Codify tree preservation incentives
- Codify Tree Protection guidelines for trees that are preserved during the development process
- Codify Replacement/Mitigation requirements
- Review/expand street tree requirements and produce public tree maintenance education materials
- Achieve “Tree City USA” status

While we recognize that **funding** for the above recommendations will be a significant concern of County personnel, we can identify a number of potential funding sources:

- o Grants (state, federal, corporation partnerships, foundations)
- o new permit fees
- o mitigation fee-in-lieu/Tree Fund

Additional References

Reis, Paul D. Oregon Department of Forestry. "An Urban and Community Forestry Research and Education Agenda for Oregon." Available online
http://www.oregon.gov/ODF/URBAN_FORESTS/docs/Other_Publications/ucforagenda.pdf

References to the Tree Codes for the Cities/Counties Studied by the Research Committee:

Beaverton

40.90 TREE PLAN
60.12 HABITAT FRIENDLY DEVELOPMENT PRACTICES
60.60 TREES AND VEGETATION

[<http://www.beavertonoregon.gov/departments/CDD/Codes/devCodeChp10.aspx>]

Street tree list –

[<http://www.beavertonoregon.gov/departments/publicworks/opsmaintenance/streettrees.aspx>]

City of Beaverton Tree Planting and Maintenance Policy –

[<http://www.beavertonoregon.gov/departments/publicworks/opsmaintenance/docs/TreePolicy.pdf>]

Tigard

18.790 Tree Removal

[http://www.ci.tigard.or.us/business/municipal_code/title-18.asp]

Hillsboro

Section 136: Station Community Planning Areas (SCPA)

Section 137: Development Regulations For Station Community Planning Areas

XIII. MINIMUM LANDSCAPING, NATURAL RESOURCE AND MATURE TREE PRESERVATION REQUIREMENTS

[<http://www.ci.hillsboro.or.us/Planning%5FDepartment/HTMLzoneVOL1/default.aspx>]

Tualatin

Section 10.050 Tree Preservation and Street Tree Objectives.

Section 34.200 Tree Removal Without Architectural Review, Subdivision or Partition Approval, or Tree Removal Permit Prohibited.

Section 34.210 Application for Architectural Review, Subdivision or Partition Review, or Tree Removal Permit.

Section 34.230 Criteria [for tree removal]

Section 34.270 Tree Protection During Construction Section

Section 73.250 Tree Preservation

Joint CPO Tree Code Group – Research Committee Report

[<http://www.ci.tualatin.or.us/departments/legal/DevelopmentCode.cfm>]

Sherwood

16.142.060 Trees on Property Subject to Certain Land Use Applications

[<http://municipalcodes.lexisnexis.com/codes/sherwood/>]

Portland

Chapter 20.40 Street Tree and Other Public Tree Regulations

Chapter 20.42 Tree Cutting

Chapter 33.630 Tree Preservation (for developments)

Chapter 33.853 Tree Review (Mitigation)

Chapter 17.52 Public Improvements: Trees

[<http://www.portlandonline.com/auditor/index.cfm?c=28148>]

Lake Oswego

Chapter 55 - Trees: Removal, Heritage Trees, Tree Protection

[http://www.ci.oswego.or.us/CITYATTY/City_of_Lake_Oswego_Code/Chapter_55/index.html]

Lake Oswego Urban & Community Forestry Management Plan:

[http://www.ci.oswego.or.us/plan/community_forestry/UCFP-final.pdf]

Fulton County, GA

[<http://www.fultonecd.org/develop/treeord/tree-04.pdf>]

Monterey County, CA

[<http://www.co.monterey.ca.us/planning/docs/plans/landuse.htm>]

Title 20: Coastal Areas

Title 21: Inland Areas

[<http://www.co.monterey.ca.us/building/docs/ordinances/Title21/title21.pdf>]

21.64.260 Preservation of Oak and Other Protected Trees

Sacramento County, CA

Chapter 19.12 Tree Preservation Ordinance

[http://municipalcodes.lexisnexis.com/codes/sacramento_co/]

General Plan Conservation Element (pg 91)

[<http://www.planning.saccounty.net/general-plan/index.html>]

General Plan Update draft

[<http://www.planning.saccounty.net/gpupdate/gpu-index.html>]

Washington County

407-3 Tree Preservation and Removal

407-7 Urban Street Tree Standards

Joint CPO Tree Code Group – Research Committee Report

407-8 Installation and Maintenance

430-72.3 Infill

[<http://washtech.co.washington.or.us/LDS/index.cfm?id=7>]

Appendix A – Tree Protection Research Matrix

Appendix B – Economic and Infrastructure Benefits of Trees

This contains facts and figures that can be used to help educate the public and county staff about the benefits of trees.

The following facts are from the Lake Oswego Community Forestry Plan:
http://www.ci.oswego.or.us/plan/community_forestry/UCFP-final.pdf

Trees:

- Increase property value
- Provide shade and cooling
- Conserve energy
- Provide erosion control
- Reduce storm water run-off
- Release oxygen and filter airborne pollutants
- Reduce noise
- Provide wildlife habitat
- Enhance our connection to the natural world
- Create a sense of historical continuity

ECONOMIC BENEFITS FROM THE URBAN FOREST

Trees not only beautify streets and neighborhoods and provide wildlife habitat, they also function to increase water, air, and soil quality and provide tangible economic benefits to homeowners and commercial districts. A tree that will live 50 years is worth about \$14,000 in today's dollars for the infrastructure services it provides, without considering its effect on adjacent property values or its aesthetic value.¹

Air Quality

Trees in the Portland Metro area remove 178 million pounds of pollutants annually, a savings valued at \$419 million.² Sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, and particulate matter are among the pollutants trees absorb.

Storm Water Management

Leaves and branches intercept and store rainfall, and tree roots increase capacity and rate of soil infiltration by rainfall. Trees also break the force of rain and reduce erosion. Trees thus promote groundwater recharge and improve overall watershed health and aquatic habitat. A study by the non-profit American Forests³ estimates that in the Portland Metropolitan area, a mature tree saves \$10/year in storm water management costs, intercepting an average of 760 gallons of rainfall a year. The same study estimated that tree loss between 1972 and 2000 resulted in an increase of 963 million cubic feet of storm water flow during a peak storm event. Using a local cost estimate of \$6.00/cubic foot to build storm water systems in urban areas, and \$2.00/cubic foot in rural areas, this vegetation loss is equivalent in value to a \$2.4 billion system.

Energy Savings

Trees shade and cool residential homes during hot summer months and reduce the amount of electricity needed to run air conditioners. Trees provide an estimated \$1.86 million in

annual energy savings for communities in the Portland area. Reducing energy use also reduces the amount of carbon emissions by utility companies. Direct tree shading prevents approximately 140,000 tons of carbon from being emitted into the atmosphere annually in our region.⁴

Residential Real Estate Value

Conserving and protecting existing trees on a development property also enhances its appeal to potential buyers and increases the property's value. According to Northwest Builder Magazine, one mature tree can add approximately \$6,000 to a property's value. Each large tree increases home value by 1% on average, and a large specimen tree can increase the home value by 10% or more.⁵

Commercial District Appeal

Numerous studies have shown that trees benefit commercial districts. A national study conducted by the University of Washington found that consumers are willing to drive farther to shop in tree-lined shopping districts; they rated "amenity and comfort" levels 80% higher in these areas compared to non-shaded streets. Remarkably, patrons even perceived the quality of goods to be 30% higher in districts lined with trees.⁶

Footnotes:

¹ McPherson et al. 2002.

² Regional Ecosystem Analysis. 2001.

³ *ibid.*

⁴ *ibid.*

⁵ "Blending In." 2000.

⁶ "Grow for the Gold." 1999.

McPherson, E.G., S.E. Maco, J.R. Simpson, P.J. Peper, Q. Xiao, A VanDerZanden, and N. Bell. Western Washington and Oregon Community Tree Guide: Benefits, Costs, and Strategic Planting. Silverton, OR: International Society of Arboriculture, Pacific Northwest Chapter, 2002.

"Blending In Residential Landscape Architecture," Northwest Builder Magazine. May/June 2000.

Wolf, Kathleen L. "Grow for the Gold – Trees in Business Districts". Treelink [newsletter]. No.14. Washington State Department of Natural Resources. Spring 1999: 1-4. 5 Nov 2007.
<http://www.cfr.washington.edu/research.envmind/CityBiz/TreeLink.PDF>

Landscape and Human Health Laboratory <http://www.lhhl.uiuc.edu/>

Regional Ecosystem Analysis for the Willamette/Lower Columbia Region of Northwestern Oregon and Southwestern Washington State
http://www.americanforests.org/downloads/rea/AF_Portland.pdf

Human Benefits of Urban Forestry and Urban Greening

<http://www.cfr.washington.edu/research.envmind/>

Western Washington and Oregon Community Tree Guide: Benefits, Costs, and Strategic Planting http://www.fs.fed.us/psw/programs/cufr/products/5/cufr_164.pdf

The following is from Portland Park and Recreation Urban Forest Website:
<http://www.portlandonline.com/parks/index.cfm?c=38294&a=162610>

- *Trees improve the water quality of our rivers and streams by capturing rainfall and reducing erosion and run-off.*
 - *Trees provide shade and cooling of streams, which is essential to fish and other aquatic life.*
 - *Trees in the combined sewer area prevent millions of gallons of rainwater from entering the Sewage Treatment Plant.*
 - *Trees improve our air by capturing pollution particles in leaves and reducing carbon dioxide.*
 - *Trees provide food and shelter for wildlife that would otherwise be displaced.*
 - *Trees provide shade and can help keep homes and buildings up to 20 degrees cooler in the summer.*
 - *Trees provide privacy and help reduce noise and glare.*
 - *Trees help reduce stress. The sight, sound, smell, and touch of plants can reduce stress levels.*
 - *Crime levels in communities are reduced when there are extensive street tree systems and well-landscaped parks.*
-

The following is from the City of Portland Urban Forest Action Plan:
<http://www.portlandonline.com/parks/index.cfm?c=38294&a=226238>

1. *Environmental Benefits:*
 1. *provide Wildlife habitat*
 2. *decrease erosion*
 3. *decrease flooding*

4. *protect biodiversity*
 5. *recharge groundwater*
 6. *manage stormwater*
 7. *improve air quality*
 8. *reduce greenhouse gasses/combat global warming*
2. *Social benefits:*
1. *provide shade*
 2. *provide wind break*
 3. *improve mental and physical health*
 4. *improve neighborhoods*
 5. *reduce heat islands*
 6. *create visual and sound buffers*
3. *Economic benefits:*
1. *Reduce cooling costs*
 2. *increase property values*
 3. *reduce flood damage*
 4. *reduce engineered infrastructure needed for stormwater management*
 5. *draw business and tourism*

The following is from March 2008 report "**The Value of Street Trees in Portland, Oregon**"

<http://www.friendsoftrees.org/pdfImages/Value%20Street%20Trees.pdf>

- *Benefits of street trees in Portland far outweigh their costs. Estimated benefits are \$45 million annually, compared to annual maintenance costs of \$4.6 million.*
- *Street trees also increase annual property tax revenues for the City of Portland by \$13 million.*
- *Benefits of street trees spill over to neighboring homes. Therefore, if left solely to homeowners, there will be too few trees from a community perspective.*

Although these trees provide benefits to the homeowner, they also provide benefits to neighboring homes. As homeowners bear all the costs of street tree maintenance, but do not receive all the benefits, if the provision and maintenance of street trees is left to individual homeowners, there will be too few street trees in Portland from a community perspective. Therefore, the City of Portland should consider increasing its

urban forestry investment by subsidizing the cost of planting more trees, or perhaps providing homeowners with a property tax break depending on the number and size of trees they maintain.

Study conducted by research forester Geoffrey Donovan of the Forest Service's Pacific Northwest Research Station, and David Butry of the National Institute of Standards and Technology, U.S. Department of Commerce (*March 2008 issue of the Oregon Department of Forestry's Community Tree Connections*).

- *On average, street trees add \$7,020 to the price of a house in Portland, which is equivalent to increasing the size of a house by 106 square feet.*
 - *Street trees provide the City of Portland with an estimated annual benefit of \$45 million.*
 - *The annual maintenance cost of Portland's street trees is \$4.6 million (\$3.3 million of which is borne by property owners).*
 - *Therefore, the benefit-cost ratio of Portland's street trees is almost 10 to 1.*
-

The Oregon Progress Board publishes an annual study which reports on progress indicators to the following 3 goals:

- 1) economic
- 2) social
- 3) environmental

The 2007 report states,

"The state's biggest concern [in the environmental space] is carbon dioxide emissions. At 115 percent of 1990 levels, this benchmark remained nine percentage points above the 2005 target in 2002, the most recent year for which data are available. The weight of scientific evidence suggests that carbon dioxide emissions are a major factor in global warming."

It is well regarded that trees play a significant role in the carbon dioxide (CO₂) equation.

Thinking in terms of the benefits of trees, the following tables illustrates the CO₂ costs of some typical household items. The last table shows the amount of CO₂ sequestered (or consumed) annually by a single tree

Joint CPO Tree Code Group – Research Committee Report

product	CO2 emissions to manufacture (lbs)*1*
gallon of paint	50.7
gallon of gasoline	13.0
air conditioner	19.4
cordless phone	35.3
aluminum can	0.2

	CO2 emissions (lbs per year)
Honda Civic	12,600 lbs *2*
Suburu Forester 4WD	17,400 lbs *2*
improperly inflated tires	250 lbs *3*

Carbon Sequestration of 1 Douglas Fir Tree *2*:

Age of Tree (years)	CO2 sequestration *4* (lbs per year)
1	4.97
10	130.99
20	320.57
mature	552.7

-Erik Mace (Joint CPO Tree Group)

1 source: Learn, Scott. "Climate Change? Blame Your Stuff". The Oregonian. August 1, 2008.

2 source: [U.S. Department of Energy](http://www.fueleconomy.gov/feg/sbs.htm) <http://www.fueleconomy.gov/feg/sbs.htm>

3 source: <http://stopglobalwarming.org/carboncalculator.asp>

4 source: APPA-American Public Power Association, Sacramento Municipal Utility District, Available Online. http://www.appanet.org/treeben/calculate_p.asp

"Marketing with Trees"

http://daily.sightline.org/daily_score/archive/2005/07/27/marketing_with_/?searchterm=urban%2520forest

UW professor Kathleen Wolf showed photos of retail streets with and without trees to inner-city residents across the US and asked how much they would be willing to pay for a variety of items at each location. The study participants perceived shops on treed streets not only as better maintained and having a more pleasant atmosphere but also as likely having higher quality products.

These perceptions may translate into more business, because participants also said they were willing to drive farther to those shops (expanding the customer pool) and to pay more for parking. And most important for the bottom line, trees may lead to higher prices: on average, participants said they were willing to pay nearly 12% more to shop on treed streets than on treeless ones.

Poracksy & Lackner

A Technical Guide to Urban and Community Forestry – Urban and Community Forestry: Improving our Quality of Life - <http://www.na.fs.fed.us/Spfo/pubs/uf/techguide/values.htm>

The basis for the value of an urban tree could be emotional, aesthetic, or it could be strictly utilitarian. However, people seldom perceive value as strictly aesthetic or monetary. There is often substantial overlap that makes "value" difficult to classify. In many communities, public spending on tree care and management reflects an approximate value of trees. Spending patterns that go unchallenged, especially among an informed public, indicate the value people associate with trees.

The following categories describe different values that people place on trees. They are arranged primarily by their measurability. The least measurable values are discussed first.

This document describes in detail:

Psychological and Aesthetic Values

Social Values

Historic Values

Environmental Values

Climate control

Air pollution

Noise pollution

Soil and water quality

Monetary Values

**Appraisal
*Economics and Decision Making***

Appendix C – “Elements of an Urban Forestry Program” – Olympia, WA

The following is from the Olympia WA "Elements of an Urban Forestry Program"
<http://www.olympiawa.gov/cityservices/zoning/LongRangePlanning/CompPlan.htm>

- An **Urban Forestry Management Plan** for Olympia, to include capital improvements, on-going maintenance, programs, and public events coordination, design review, development of design manuals and educational materials, and enforcement. **Public and private utilities should be invited to participate** in the development of the Urban Forestry Management Plan.
- A **Landmark Tree Protection Ordinance** to apply to trees which have been identified by the community as needing protection due to their special value in that they are irreplaceable by any means.
- A **Tree Protection and Replacement Ordinance** to apply to private and public development, restricting land clearing and requiring use of state of the art techniques in site design, grading design, tree protection, and mitigation of construction impacts.
- **Modifications to the existing Landscape Ordinance** to encompass new tree planting and tree replacement requirements which enhance habitat.
- A new **Street Tree Master Plan** for Olympia, to include major arterials, the downtown area and neighborhoods.
- **Funding mechanisms** to ensure full implementation of the Urban Forestry Management Plan.
- **Professional staffing** needed to implement the Management Plan, providing appropriate expertise in the fields of urban forestry, landscape architecture and arboriculture.
- **Training programs for City staff and the development community** to increase their effectiveness in planting and preserving trees in an urban setting.
- A **public involvement program** to encourage volunteer participation in planting and caring for trees.
- An **Interdepartmental Coordination System**, to include Parks, Public Works, Community Development and Planning, as well as all appropriate public and private utilities.
- **Standards and Criteria Manuals** for design, implementation and maintenance, incorporating **best management practices (BMP's)** from the fields of urban forestry, landscape architecture and arboriculture.
- **Educational material for the public and for design professionals**, such as a Citizens Street Tree Guide, a List of Recommended Species, Techniques for Tree Planting and Maintenance, and Plantings which Enhance Wildlife Habitat.

Appendix D – Response to Comments to Draft Report and CPO Presentations.

(December 2008 update)

The following is a response to comments and questions during our presentations to the active urban CPOs as well as feedback from people who have reviewed our report.

Item: Why use percent of tree canopy as a measure?

Response: We recommend using the percent of tree cover benchmark because 1) it is measurable; 2) it is a standard often used by other jurisdictions for measuring progress in achieving their urban forest management plans; and 3) Metro will be conducting a tree canopy survey every two years at no direct cost to the County.

Item: What "counts" in measuring canopy?

Response: Using best-practices GIS software (Feature Analyst), digital aerial photographs and near-infrared data in the 2007 analysis, Metro provided our 31.5% current canopy coverage measurement. This measures forest canopy as well as most individual trees. They had a 3 meter resolution for the 2007 measurements, so some small and newly-planted street trees would NOT be included in the current measurements.

Due to resolution limitation of this year's data, shrubs and small trees were NOT included in the current canopy coverage measurements.

According to Lori Hennings (Metro-Nature In Neighborhoods) they expect to get considerably more detailed analysis adding "Lidar" data to their canopy coverage analysis in future years. This will allow them to distinguish in future reports between small trees, shrubs and grasses, which will likely have the effect of an increase in canopy coverage measurements due to the inclusion of the smaller trees. They will even be able to distinguish some tree species at that point, which helps with assessing species diversity.

Item: Are you making any recommendations to give higher priority to native tree species?

Response: While we do not have specific targets for native trees, we are developing a recommended tree list that includes native species and recommend that any plan adopted by the county should ensure that native species receive priority in which trees should be preserved and planted. Non-natives may be more appropriate for street trees and under power lines, however.

Item: Does tree planting on clay soil can cause soil erosion?

Response: Planting trees on clay or any other type of soil will help *prevent* soil erosion. Trees will grow in about any type of soil. Planting or having existing trees helps control water runoff and are an excellent way to help stabilize soil. The exceptions are when trees fall over on steep hill sides or on stream banks. Trees need to be preserved on steep hill sides. During the summer months the trees dry out the soil around them so that the soil is better suited to absorb moisture during the winter months. Washington County has a good basic soil structure. Clay soil is more prevalent when builders bulldoze the land and strip off the good top soil. Clay is the subsoil that gets exposed during development. The builders

replace the good top soil with a thin layer of inferior top soil. Trees will still grow but will need more care to survive initially. (From a January 2009 conversation with Dean Moberg, District Conservationist, Washington County USDS Natural Resources Conservation Service).

Item: If we're looking for the benefits of stormwater/surface water management, aquifer recharge, carbon sequestration, wouldn't any pervious surface work, even grass?

Response: Indeed, shrubs and even grass do provide these benefits, however the amount of benefit they provide as compared to trees is significantly less.

The Pacific SW Research Station of the US Forest service published a report²⁴ which compared the benefits of large vs small trees and deciduous vs conifer.

The study analyzed stormwater management, energy savings, CO2 sequestration and CO2 emission avoidance (due to less energy production) and property value increase. It assigned dollar values to each of these realized benefits across the different trees/sizes and also factored in the dollar costs/expenditures of maintaining those public street trees.

The results show that larger trees produce markedly greater cost benefits, specifically large and medium sized deciduous trees produced the greatest benefits. The greatest monetary benefit realized was in property values, but air quality and and CO2 benefits also grew significantly along with the tree size. Stormwater benefits also grew with tree size, but to a lesser degree. Interestingly, the study also showed that public street trees (trees in the public right-of-way) were significantly more valuable than private street trees (trees on private property adjoining a street.)

While this report doesn't assess the benefit of grass alongside trees, it does demonstrate that the greater biomass plants are generally markedly of higher value.

One of the benefits a large tree provides is that the trees, specifically the leaves/needles and branches, intercept large amounts of falling rain (*canopy interception*)²⁵. Some of this rain will drip to the ground but a significant amount of it will remain on the leaves and branches and eventually evaporate. Some will also flow its way down into the core of the tree, where less rainfall reaches and thus has more evaporation opportunities. The greater the surface area of the tree, the more rainfall can be intercepted.

Along a riparian corridor or steep slopes, trees and large shrubs significantly contribute to soil stability and reduce erosion by slowing flowing water (*conveyance attenuation*) and holding the terrain in place with root systems that are larger than grass and small plants.

Also along a riparian corridor, trees and large shrubs provide shade to the water, lowering water temperature, a current concern of Clean Water Services. Street trees shade the asphalt, so water that falls on shaded asphalt will tend to be cooler than unshaded asphalt before it flows into the streams. Grass and shrubs would not provide these services.

²⁴ *Maco, Scott E. and McPherson, E. Gergory. "A Practical Approach to Assessing Structure, Function and Value of Street Tree Populations in Small Communities". Report location: http://www.fs.fed.us/psw/programs/cufr/products/cufr_128.pdf

²⁵ Portland Metro. June 2002. "Trees for Green Streets – An Illustrated Guide".

Item: Is there a difference in tree management East and West of the Mississippi?

Response: While the percent tree canopy goals and the recommended species list will be different for East and West of the Mississippi, urban forestry management and watershed protection principles will be similar regardless of tree species, soil type and other eco-jurisdictions. The benefits of trees are generally the same.

Item: Should urban forest management be considered a municipal service for unincorporated urban areas?

Response: While urban forest management usually falls under municipal services, Washington County includes significant unincorporated urban areas that are growing in population. We see an opportunity for the County to develop a comprehensive plan that dovetails with both the cities within its boundaries, which already have tree management plans in place, with an urban forestry management plan for the unincorporated urban areas. There is a gap here that needs to be addressed. The lack of action in other jurisdictions should not allow us to fail to close this gap.

Washington County would not be unique in having an urban forest management plan and supporting code. Four counties in the Sacramento, California region have or are developing tree codes with the assistance of the Sacramento Tree Foundation. Monterey County, California has a tree code in place.

Item: What is the balance between incentives and regulation in terms of tree protection and preservation?

Response: An effective forest management plan should be a balance of incentives and regulation. Although we don't have all the answers now, we can work together with other stakeholders to come up with creative solutions for some of these issues.

Feedback from developers and urban forest management professionals is that consistency in tree code is generally preferred over a patchwork code, jurisdiction by jurisdiction.

Item: "Don't regulate me in my backyard."

Response: We recognize that private interests need to be balanced with public concerns. Recognizing the flexibility that individuals need in managing their own private property, we are recommending that trees can be removed without permitting under certain circumstances. There would be exclusions in the regulations for public safety hazards or emergency situations.

Other questions:

How do we create code that distinguishes between large development and infill development?

Joint CPO Tree Code Group – Research Committee Report

Revision List

Revision	Date	Description
1.0	Oct 2007	Original revision presented to County (Kathy Lehtola and Nadine Smith)
1.1		
1.2	Jan 2008	Responses to specific points/questions Remove Thurston County, WA Add Monterey & Sacramento Counties, CA Change canopy cover recommendation

Report Prepared by Washington County Joint CPO Tree Group Research Committee:

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Detailed Comparison of Key Tree Code Provisions Across Jurisdictions

Prepared by the Joint-CPO Tree Code Group, Washington County, OR
Rev 1.2

= Unknown

Key Categories	Counties		Cities in Greater Portland Area, Oregon						Washington County
	Fulton County, GA	Monterey County, CA	Beaverton	Tigard	Hillsboro	Sherwood	Portland	Lake Oswego	
Protections During Development	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Zone declared around tree(s) at/beyond dripline	Yes - radius 1 foot per 1 inch DBH, or dripline, whichever greater.	Yes - dripline or critical root zone, whichever is greater	Yes	Yes	Yes - dripline + 5 ft	Yes	Yes	Yes	No
Fenced	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Trunk wrapped with protective materials		Yes							No
Prevent any construction/building placement w/in zone	Yes	Yes	Yes	No	Yes	Yes		Yes	No
No new/temporary impervious surfaces	Yes	Yes	Yes	No	Yes			Yes	No
Trenching prohibited	Yes	No (allowed under arborist supervision)	Yes	No (allowed under arborist supervision)	Yes	No (allowed under arborist direction)		Yes	No
Tunnelling okay (no trenching)	Yes	Yes						Yes	
Construction storage prohibited	Yes	Yes	Yes	Yes	Yes			Yes	No
Vehicles prohibited	Yes	Yes	Yes	Yes	Yes			Yes	No
Permitting Required	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
# of tree removal permit categories	3 types: Land disturbance, timber harvest, special use	3 types: for <3 trees Tree Removal Permit, 3+ Use Permit, Coastal Permit. Latter two require Forest Management Plan	4: Types I,II,III, commercial	Yes	0	Yes	Yes	7: Type I, II Dead Tree Removal, Hazard Tree Removal, Emergency Permit, Verification Permit, Topping Permit	Zero
Minimum diameter before tree permit/mitigation calculations (DHB - typ measured 4.5' from surface)	>27" hardwood, 24" softwood, 10" flowering	0", 6" or 8", 12" depending on species/location. (Some DBH, some measured 2 feet from ground.) Removal of 1/3 of foliage or greater	10" most, 8" special varieties	12"	8"	5"	12"	0" & 10"	
Application fees		\$264 / \$2485 / \$2718 + 7 yr mitigation monitoring fees	\$597 / \$978 / \$1356 / \$598				\$35.		
Required for non-development site	No	Yes	Yes	Yes - but only on sensitive lands	No	Yes(after 5 trees or 100' DBH total can be cut per calendar year)	Yes	Yes	No
Permit posted on-site; trees identified/tagged in field		Yes				Yes	Yes	Yes	No
Public appeal/comment period		No					Yes		No
Restrictions differ depending on zoning (res/com/industrial)	Yes	Yes	Yes		Yes			No	No
Nuisance trees exempted	No	Yes	Yes	Yes	No	Yes	No	No	No
Topping prohibited		Not specifically but effectively Yes	No				Yes		No
Topping allowed w/ permit	No	Yes	Yes	No	Yes	No		Yes	No
Use aerial photo for code enforcement (canopy)	No	Yes	No	Yes	No	Yes	Yes	No	No
Penalties for Violations	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Fines	\$1000 per day per violation (No max). Stop Work Order.	Min: complete restoration, retail value of wood removed, \$1000/day	\$250 per day	\$500.			Criminal penalty (\$1k and/or 6 mo prison); civil penalty (\$1k per tree per day)	Enforcement fine \$317 plus \$30 per tree, restoration fine \$51 per caliper inch measured 4.5' from ground	
Replacement/mitigation of tree	No	Yes	Yes	Yes			Yes	Yes	
Fine for value of tree	No	Yes	No	Yes				No	
Illegal to possess or dispose of wood cut or pruned without permit							Yes		
Illegal to attach ropes, wires, chains unless for support of tree itself							Yes		
Tree Inventory Required	No	Yes	Yes	In progress	Yes	Yes	Yes	Yes	No
Designations:		per parcel as part of Tree Management Plans							
- Individual/Significant tree	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
- Tree grove (multiple trees)	Yes	Yes	Yes		No	Yes		Yes	No
- Historic/Heritage/Landmark Tree	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
- Tree w/in SNRA (significant natural resource area)	No	Yes	Yes		Yes	Yes	Yes	Yes	yes
- Mitigation Tree	Yes	Yes	Yes	Yes	No	Yes		Yes	No
- Landscape Tree	Landscape strips	Yes	Yes	Yes	Yes	Yes	Yes	No	No
- Community Tree			Yes	Yes	No	Yes		No	No
Canopy measurements available (Metro-Nature in Neighborhoods)	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	yes
Mitigation Required	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

Detailed Comparison of Key Tree Code Provisions Across Jurisdictions

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Key Categories	Counties		Cities in Greater Portland Area, Oregon						Washington County
	Fulton County, GA	Monterey County, CA	Beaverton	Tigard	Hillsboro	Sherwood	Portland	Lake Oswego	
When mitigation applies	Speciman trees only (>27" hardwood, 24" soft, 10" flowering)	1:1, 3:1 or 5:1. Same species. Protected trees only.	>50% orig DBH removed	<75% existing trees 12" or greater are preserved	any tree > 8" removed w/ development application		1:1 DBH. 10" DBH removed, 10" DBH mitigation	1 tree removed (any size), 1 tree replanted	
Mitigation calculated based on number of removed trees	Yes	Yes	Yes	No	Yes	No	No	Yes	
Mitigation calculated based on sum of removed trees diameter	No	No	Yes	Yes	No	Yes	Yes	No	
"Fee in-lieu" of mitigation		No	Yes	Yes	No	No	Yes	Yes	No
Ongoing (post-development) maintenance/monitoring of mitigation trees required		Yes (7 yrs) cost: \$5k - \$18K	Yes (2yrs)	Yes (3 yrs)	No	No	Yes (3 yrs)	No	No
Minimum mitigation tree diameter size	1"	No	2"	2"	2-1/2"	2-1/2"		2" deciduous. 6-8" tall evergreen	No
Minimum Density Mitigation (instead of replacement based upon #/size pre-existing trees)	Yes	No	No	No	No	Yes		No	
Mitigation trees inherit protections/status of trees replaced			Yes	No	No	Yes		Yes	No
Mitigation trees must be insured			Yes	No	No	No		No	No
Mitigation trees placed in conservation easement or separate tract			Yes		No	No	Yes	Yes	No
Mitigation trees get deed restriction			Yes		No	No		No	No
Provisions for Preservation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Incentives	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes - more planned	No
- Density Bonus/ transfer		Yes	No	Yes	Yes	No	Yes	No	No
- Lot Size Averaging		Yes	No	Yes	Yes	No		No	No
- Lot Width & Depth			No	Yes	No	No		No	No
- Off Street Parking requirement reduction			No	Yes	No	No		No	No
- Open Space Reduction		No	Yes	No	No	No		No	No
- Landscaping Reduction		Yes	Yes	Yes	No	Yes		No	No
- Property Tax incentives							Yes	Yes	No
- Reduced Storm Water Management Fees		No						Yes	No
Preserved trees gain deed restriction		Yes	No	Yes	No	No		Yes	No
Preservation areas in clusters	Yes	Yes	Yes	No	Yes	No		Yes	No
Preservation areas not in linear strips	Yes	Yes	Yes	No		No		No	No
Tree-Friendly Design / Planning Guidelines	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Habitat Friendly/Low Impact Development Policy		Yes		Yes			Yes	Yes	Yes
Connect adjoining SNRA/Groves	No	Yes	Yes	No		No		No	No
Tree density specification along streets	No	No	Yes	Yes		Yes		Yes	yes
Tree density specification in parking lots	No	No	Yes	Yes		Yes		No	
Organizational Support & Outreach	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Tree maintenance policy (public/street trees)	Yes	Yes	Yes	Yes		Yes	Yes		No
Forester/Arborist on staff	Yes	No	Yes	Yes		No	Yes	Yes	No
Heritage Tree Program	Yes	Yes		Yes	No	Yes	Yes	Yes	No
Tree Board/Commission	No	Starting	No	Yes	No	No	Yes	Yes	No
Tree Fund		Starting (oak woodlands protection)	Yes	Yes	No	Yes	Yes	Yes	No
Urban Forest Management Plan, separate from Comprehensive Plan	No	on a per-parcel basis	No	Yes	No	No	Yes	Yes	No
Tree Hotline	No	No	No	Yes	No	No	No	Yes	No
Tree City USA	No	No	Yes	Yes	No	Yes	Yes	Yes	No
NeighborWoods	Yes	No	No	No	Yes	No	Yes	Yes	No
Major capital improvements required to consult with Urban Forestry Commission							Yes		No