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COMMUNITY FORESTRY AND URBAN GROWTH

A Toolbox for Incorporating Urban Forestry elements Into Community Plans

Washington Community Forestry Council

WASHINGTON STATE DEPARTMENT OF
Natural Resources
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Kaleen Cottingham - Supervisor

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A Toolbox for Incorporating Urban Forestry Elements Into Community Plans

December 1994

by Kevin McFarland
Community Forestry Program

WASHINGTON STATE DEPARTMENT OF
Natural Resources
Jennifer M. Belcher - Commissioner of Public Lands
Kaleen Cottingham - Supervisor

Resource Protection Division

December, 1994

Dear Colleague:

With the Washington Community Forestry Council, the Department of Natural Resources has been working to promote community trees and forests in cities throughout the Evergreen State. We are pleased to present you our newest product: "Community Forestry and Urban Growth: A toolbox for incorporating urban forestry elements into community plans."

Washington is growing. In 1993 our population was 5.2 million—up nearly 37% from only 15 years ago. This growth has placed tremendous demand on the state's land and natural resources including air quality, water, soils, and associated plants and animals. Nowhere is this impact more visible than right inside our own cities and towns.

With a vision and a plan, our natural resources in urban areas can be protected in the process of growing vibrant communities. This toolbox is designed to fold nicely into a community's growth management plan as defined by Washington's Growth Management Act (GMA) of 1990. It focuses on the elements defined in the GMA as essential to community planning—Land Use, Transportation, Housing, Capital Facilities, Utilities and optional elements of urban design and energy conservation.

Planting, planning and caring for trees and other vegetation has a rightful place in each element of a community-wide plan. This toolbox takes each growth management element and discusses its relationship to urban forestry concepts and practices. By taking a look at community-wide assets, setting goals, and devising a plan for achieving a holistic vision, community residents can act together to achieve a livable future.

We hope you find this toolbox to be a treasure chest of ideas and assistance for any kind of community planning activity.

Sincerely,

Jennifer M. Belcher
Commissioner of Public Lands

Rogor Hoesterey
Chair, Washington Community Forestry Council

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Introduction

More than 80 percent of the United States population lives in cities and communities, and this percentage continues to rise. The 1990 Census showed Washington State as a top ten growth state with a 17.8 percent increase in population over the last decade. Of the 4.9 million state residents in that year, 3.7 million lived within urban areas. Looking back 100 years, Washington had only 357,000 residents.

This tremendous growth has presented some critical threats to our forest and agricultural lands and has affected the quality of our air and water resources. Because of this and several other issues, the Washington state legislature passed the Growth Management Act of 1990 (GMA). The intent of GMA is to guide and encourage local governments in assessing their goals, evaluating their community assets, writing comprehensive plans, and implementing those plans through regulations and innovative techniques that encompass their vision for the future.

The GMA requires all cities and counties in the state to plan with the following state goals in mind:

- Conservation of important timber, agricultural and mineral resources lands;
- Protection of critical areas;
- Planning coordination among neighboring jurisdictions;
- Consistency of capital and transportation plans with land use plans; and
- Early and continuous public participation in the land use planning process.

Coincident with Washington state's surge in preparing and planning for growth, was a national surge in awareness of the value of trees, forests and natural areas in our cities and towns, whatever the population. In 1990, Congress passed a Farm Bill that for the first time included the establishment of state programs that provide technical assistance for urban communities in planning, planting and caring for trees. The Washington State Department of Natural Resources administers this program in our state.

An advisory group was formed in 1991 to help guide this new effort—The Washington Community Forestry Advisory Council. Included in the early work of the Council was a vision focused on incorporating community and urban forests in local comprehensive growth management plans for the year 2020. This toolbox will help the Council's vision become reality.

The toolbox starts with the Washington Community Forestry Council's Vision. The "Why Trees?" section details many of the benefits of trees, often taken for granted or forgotten when budgeting for roads, buildings and related infrastructure. The toolbox addresses each important element of the GMA—Land Use, Transportation, Housing, Capital Facilities, Utilities, and Energy Conservation—by providing residents and planners with suggested wording that will help them incorporate urban forestry elements into their comprehensive plans. Each goal and policy is backed with "Facts and Benefits," a section quantifying how trees can help achieve a community's goals and objectives. The "Resources and References" section located after each element helps readers further pursue their areas of interest.

Finally, a glossary of terms is included so that we might all begin to speak the same language when discussing trees and their relationship to urban life. If you find language or concepts that appeal to you in this document, we hope that you will share it with your community and join with fellow residents in shaping a greener future.

Washington Community Forestry Council

■ VISION ■

The Washington Community Forestry Council, is a statewide network of planners, parks managers, citizen volunteers, extension agents, educators and horticultural professionals. The group advises the State Forester, Kaleen Cottingham. In 1991 the Council envisioned this future for Washington state:

In the year 2020, Washington, the Evergreen State, will celebrate the diversity of its people, their communities and the economies they create in a unique setting surrounded by urban and community forests. Our vegetation will be a part of the whole system of support services nurtured by our communities. Our vegetation is treasured for its aesthetic value as well as for the positive influence it provides the residents of our communities. Trees and vegetation grace our city streets, provide habitat for wildlife, soften our city structures, clean our air, protect our water resources and ensure that every resident experiences daily close contact with nature. In Washington threads of diverse vegetation weave from shorelines through our snowcapped mountains and interlace the expanses of our eastern landscapes providing color, cooling oases, wildlife habitat and natural beauty.

Our community and urban forests are planted and maintained by youth, volunteers and community values, creating a patchwork of nature and people in harmony. People of all ages and backgrounds, both in the public and private sectors, have formed partnerships to participate actively in the stewardship and caretaking of our precious natural resources. Residents and guests appreciate the links between the state's large tracts of forested land systems and community forests. Our commitment to our urban forests ensures that all residents have access to nature where we live, work and recreate.

Why Trees?

Our urban forests are surprisingly versatile. In addition to their impact on atmospheric carbon levels, they can significantly affect temperature, humidity, air quality, stormwater control, erosion protection, wildlife habitat, community noise levels and human health. Trees are major capital assets in our cities. Like streets, sidewalks, sewers, and buildings, the urban forest is a critical and valuable component of the urban infrastructure.

This focus sheet lists both direct and indirect benefits that trees can provide your community. This information offers examples of why trees are critical threads that tie all the elements together in your growth management plan.

Trees increase property values

- Real estate with trees can command up to 20% higher values than real estate without trees.
- Office and industrial sites that include mature trees are in greater demand and earn higher sales and rental values.
- Houses on tree-lined streets can command higher prices than houses in more barren areas.

Trees increase economic development

- Trees contribute to a community's image of being livable.
- Trees are increasingly recognized as important elements in building a positive image, which increasingly is being recognized by business and industry as a major factor in locational decisions.
- People linger and shop longer along tree-lined streets.
- Planting and caring for trees provides jobs.

Trees reduce surface water runoff rates and volume

- Trees intercept rainfall and reduce runoff, thereby supplementing retention/detention basins essential to many communities.
- Runoff from forested areas is 17% less than that from developed areas according to a study by the U.S. Forest Service.
- Trees reduce soil erosion and sedimentation of streams.

Trees increase energy-conservation benefits

- Proper tree plantings around buildings can slow winter winds and reduce annual energy use for home heating by 4 to 22%.
- Tree shading can reduce summer cooling energy use and lower cooling costs by up to 20%.
- Trees help cool down the overall environment by shading asphalt, concrete and metal surfaces.

Trees are oxygen producers and clean the air

- Trees remove impurities from the air, such as airborne dirt, sand, dust, pollen, smoke, odors, and fumes.
- Trees absorb CO_2 and other "greenhouse gases" and, in turn, replenish the atmosphere with oxygen.

Trees reduce noise pollution

- Trees absorb sound and modify humidity resulting in lower transmission of sound.
- The vibrations of sound waves are absorbed by leaves, branches, and twigs of trees.
- Trees mask noise with their rustling leaves and associated bird song.

Trees are good for our health

- Views of trees and landscape plantings can reduce hospital convalescent stays up to 8 percent.
- Trees give a sense of being at home, in place.
- Trees create feelings of relaxation and well-being.
- Trees absorb and soften irritating (stress-building) noise from the urban environment.

Trees provide wildlife habitat

- Trees are a critical part of the urban ecosystem that provides habitat and food for birds and animals.
- Trees create special conditions and protection for plant life that otherwise would not exist in an urban setting.

Trees maintain and improve surface water quality

- Trees reduce and/or slow urban runoff, reducing the required size of engineering structures, including waste water treatment plants.
- Trees increase recharge of groundwater (significantly reduced by development).
- Trees reduce the amount of grease and oil transported to streams, a major source of ocean pollution.

Trees provide a buffer between different land uses

- Trees can define and screen different land use areas within the urban growth area.
- Trees buffer parks and residential uses from high traffic areas.

Trees aid in traffic control

- Trees can be planted for traffic indication- i.e., bridge approaches, entrance and exit areas.
- Trees in medians assist in controlling vehicular traffic while adding to the visual quality of the environment.
- Trees separate pedestrians and vehicles, providing safer walking conditions.

Trees provide aesthetic screening

- Trees provide screens to reduce noise, glare, and reflection of harsh urban traffic and design.
- Trees provide visual control in the landscape through view direction and by hiding undesirable views.

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Land Use/Urban Design Element

Trees invite pedestrians, shoppers and new residents to a city and its businesses. The natural landscape can and should influence the decisions to designate appropriate areas for residential and public facility land use. In addition to their reduction of atmospheric carbon levels, they can significantly affect temperature, humidity, air quality, stormwater control, erosion reduction, wildlife habitat, community noise levels and human health.

The Land Use Element is identified by the Growth Management Act as the foundation of the comprehensive plan. This element sets forth the policy direction for the cities and counties planning under the GMA.

"Trees are a critical thread that ties all the elements together."

Sherry Appleton,
Vice Chair,
Washington Community Forestry Council

Sample goals and policies:

Community Design

Goal - To support the design of new development that creates a safe, nonthreatening environment sensitive to pedestrians and the community's image.

Policy - Incorporate the natural environment when making decisions affecting the use of land and related improvements.

Policy - Encourage the green and wooded character of existing neighborhoods.

Policy - Require landscaping to screen unattractive site features and help provide continuity.

Policy - Promote the planting of significant trees where space and other conditions permit.

Policy - Develop district design regulations to soften the edge between high and low intensity uses. Design street trees, landscaping, parking and access features to help integrate land uses and achieve an effective transition.

Policy - Prepare and implement a streetscape plan for each commercial and residential area. This should include, as appropriate, the installation of street trees.

Policy -
Ensure that development codes require commercial development to make adequate provision for landscaping to soften the effects of large building facades and intensive site development.

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Policy -
Promote a pedestrian-friendly environment in commercial areas through the use of landscaping.

Policy - Plant trees in locations that maximize their ability to grow normally while minimizing damage to the gray infrastructure of the city.

Urban/Rural Land Use

Goal - Preserve, protect and enhance significant open space.

Policy - Encourage consideration of open space, landscaping and site amenities in industrial areas that improve the appearance, create a more pleasant working environment, and reduce conflicts with adjacent land uses.

Policy - Protect lands bordering the City and adjacent communities which are in a natural state through the use of cooperative agreements.

Policy - Preserve the natural features of the town by encouraging dedication of open space and preservation of significant trees and vegetation.

Policy - In the short term, assure no net loss of forest canopy cover on publicly owned lands; in the long term, assure measurable gain.

Goal - To designate open space for protection of natural resources, environmental processes, and natural amenities.

Policy - Retain publicly owned lands, including excess rights-of-way for open space purposes.

DNR Photo and

Policy - Protect agricultural activity and long-term commercially viable agricultural land.

Policy - Adopt an urban forestry program to encourage the preservation and planting of trees on public and private property.

Policy - Retain lands which can provide for a separation between communities, prevent sprawl, or provide a buffer between urban and rural areas or other land uses benefiting from separation.

Street Design

Goal - To adopt new arterial rights-of-way standards that will establish, preserve, and maintain new and existing community street trees.

Policy - Provide for a more interesting downtown appearance through landscaped ground, street trees, and planters and baskets.

Policy - Promote pedestrian-friendly streets with trees and other vegetation.

Policy - Give identity and continuity to street corridors by using a comprehensive street tree plan and other landscaping to enhance circulation routes, soften the appearance of pavement and separate pedestrians from traffic.

Policy - Maximize biodiversity by planting a variety of tree species.

Cultural Resources

Goal - To promote the preservation of significant lands, sites and structures, and historic trees through a combination of techniques.

Policy - Cooperate with and assist owners of historic landmarks to plan for the use of property in a manner compatible with preservation objectives, and provide special incentives and recognition to those owners who have undertaken the rehabilitation or restoration of their historic properties.

Policy - Promote and provide for the early identification and resolution of conflicts between the preservation of historic resources and competing land uses.

Construction and Design Efficiencies

Goal - To encourage the development of new housing, office, commercial and other development that is healthful and aesthetically pleasing. Factors to be considered include the development pattern, the type of structure, as well as environmental concerns such as noise, privacy, safety, and security.

Policy - Promote the development of housing which is designed, sited, constructed and landscaped to facilitate conservation of water and energy. In high risk fire areas consider access and building protection measures

Goal - To incorporate energy conservation into the construction, rehabilitation, and maintenance of structures. Factors that influence energy efficiency include landscaping.

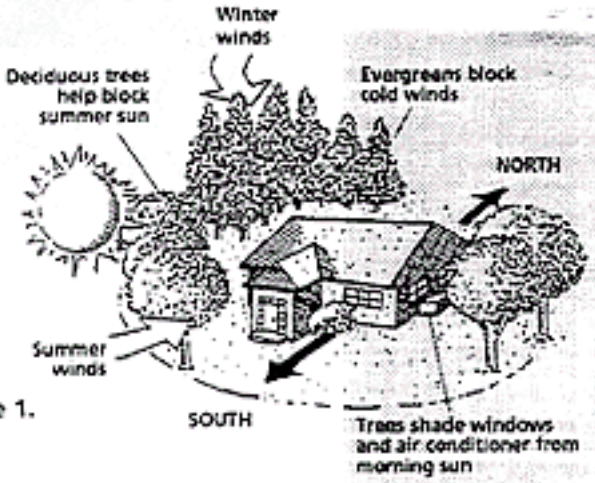

Figure 1.

To reduce energy consumption fire-resistant trees and shrubs are chosen and planted to shield a house from both the hot summer sun and the cold winter winds. Source: American Forests

Policy - Promote the development of housing which is designed, sited, constructed and landscaped to facilitate conservation of water and energy.

Facts and Benefits

The way in which different land uses interact can affect our quality of life, trees can offer a positive link among those uses by:

■ Increasing property values and local tax base—Trees increase the value of property. Surveys show that residential real estate surrounded by trees sells for prices as much as 20% higher than real estate with no trees.

■ Increasing economic development—Trees are increasingly recognized as important elements in building a positive overall community image, a factor often recognized by business and industry in locational decisions.

■ Providing aesthetic screening—Trees can be a significant factor in reducing unwanted sound levels, providing visual control in the landscape through view direction and by hiding unsightly views.

■ Reducing soil erosion—Runoff from forested areas is 17% less than that from developed areas according to a study by the U.S. Forest Service.

■ Providing wildlife habitat—Considering wildlife in cities and communities can produce sound ecological, economic, aesthetic, and education benefits. Some 135 million Americans told Census workers that viewing wildlife is an important part of their lives.

A poll of retail customers in the great plain states found that with a renovated or beautified business area

- 62% would shop more often
- 57% would stay longer
- 42% would purchase more goods
- 86% felt that to some extent vegetation enhanced the downtown main street area.

■ Helping create a healthy environment—Views of trees and landscape planting can reduce hospital convalescent stays up to 8%.

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Consider the impact of construction activities on what is hidden underground.

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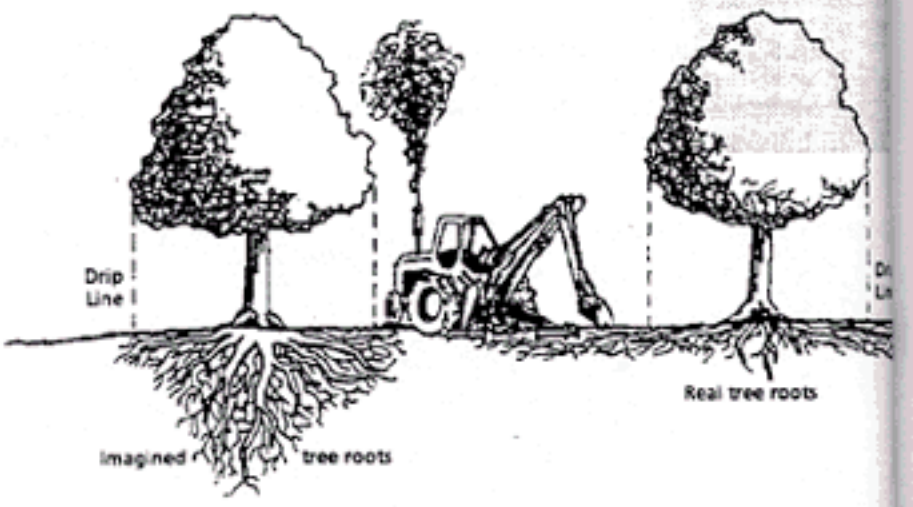
Figure 2.
Tree roots extend well beyond the drip line and are found mostly in the top 18 inches of soil.



Source: *The Complete Guide to Landscape Design, Renovation and Maintenance*. Cass Turnbull. Betterway Publications, Inc. 1991

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Transportation Element

The transportation element will address varied issues concerning existing and future transportation needs. The urban forest can be an integral part of transportation facilities.

"No town can fail of beauty, though its walks were gutters and its houses hovels, if venerable trees make magnificent colonnades along its streets."

Henry Ward Beecher

Sample goals and policies:

Transportation Alternatives

Goal - To promote the development of alternative transportation corridors.

Policy - Provide guidelines and specific criteria that encourage the establishment of street trees as buffers to outline boundaries between pedestrians and roadway.

Transportation Development

Goal - To enhance the liveability of the community by designing and constructing roadways that include landscaping, parkway trees, compatible architecture and view corridors.

Policy - Prepare and implement a comprehensive plan for design and construction of roadways and other facilities that addresses the protection of sensitive environmental resources. (eg. steep hillsides, wetlands, stream corridors, and vegetative cover).

Policy - Encourage the establishment of planting strips with adequate width for street trees (5-feet or more) as an integral part of roadway construction and reconstruction projects.

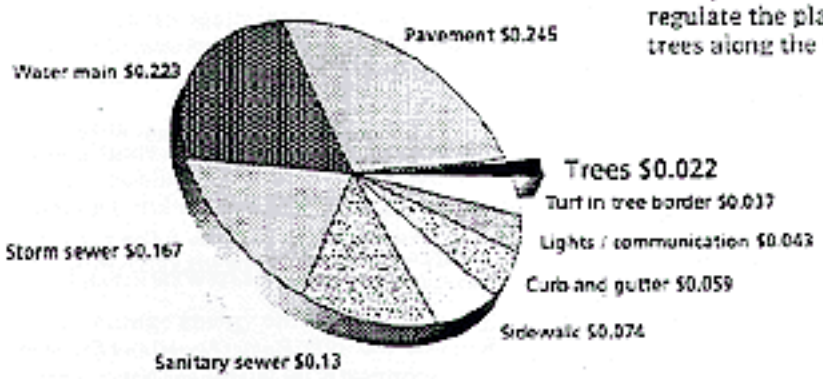
Tree Selection Guidelines

Goal - To develop transportation corridors according to a master plan, with special attention given to the location and design of streets or roadways, and selection of tree types.

Policy - Establish a street tree ordinance to regulate the planting, pruning and removal of trees along the public streets.

Policy - Provide a city-wide arterial/street design plan which defines gateway arterials, ultimate intersections, street trees and other design features.

Figure 3.
Street Construction Dollar



Milwaukee has successfully integrated tree planting in the road-building budget.

Source: American Forests. 1989. The Street Construction Dollar. Urban Forest Forum, 3 (3): 3

Financial Mechanisms

Goal - To provide adequate funding for transportation facilities in the city/county and ensure the comprehensive plan vision and goals are implemented.

Policy - Develop and implement other appropriate funding mechanisms to ensure new development's fair share contribution to other public facilities such as recreation, drainage, solid waste, and congestion management services and facilities (car/van pool matching, transit shelters, bike racks, street trees, and sidewalks).

Policy - Include tree planting as a capital expenditure. In this way the city is able to ensure that trees will be planted in new construction or reconstruction areas in a timely, coordinated manner.

Policy - Ensure that new development takes responsibility for maintenance of the trees along the right-of-way in front of the project.

Facts and Benefits

Trees are part of the community infrastructure, a "green infrastructure," and they can help by:

- Aiding in traffic control—Trees can indicate bridge approaches, entrances and exit areas. Trees may be used to assist in controlling traffic, while adding to the visual quality of the environment. Plants can be used to control bicycles, automobiles, motorcycles, pedestrians, and animals.
- Providing aesthetic screening—Trees screen out noise, glare, and reflection, as well as busy streets and community eyesores, etc.
- Creating an enjoyable environment—Urban greenery relieves the monotony of pavement and masonry. Trees offer shade, pleasant fragrances, and help to create serene settings. Trees soften and complement architectural lines and building detail.
- Reducing noise pollution—Trees and associated soil berms absorb sound and modify humidity resulting in lower transmission of sound. The vibrations of sound waves are absorbed by leaves, branches, and twigs.
- Consuming atmospheric carbon dioxide—a "greenhouse gas"—An acre of trees inhales the amount of carbon dioxide emitted by a single automobile in one year.

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Housing Element

The housing element of a city's comprehensive plan recognizes the vitality and character of established residential neighborhoods and includes a statement of goals, policies, and objectives for the preservation, improvement, and development of housing. A community can be proud of being known for the desirability of its neighborhoods. The urban forest contributes greatly to a healthy neighborhood.

"As we try to create livable residential areas, trees can give coherent form to neighborhoods, provide human scale, reflect and moderate the seasons, and establish a link with nature."

Stephen Metzler, ASLA
Landscape Architecture/Urban Design
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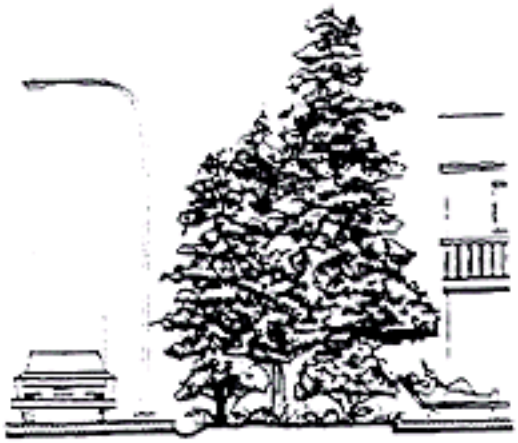
Figure 4.



Trees buffer noise and block views of traffic.

Source: *Saving Native Trees in the Pacific Northwest*. British Columbia Recreation and Parks Association — prepared by J.S. Peters and Associates

Sample goals and policies:

Neighborhood Quality

Goal - To ensure the establishment and preservation of neighborhood character based on natural features which include vegetative transitions or buffers between different land uses.

Policy - Provide vegetative buffers for transition between different residential land use densities and intensities.

Policy - Establish an educational program to inform the public about the importance of the urban forest and the policies in place to protect it.

Energy Conservation

Goal - To encourage energy efficiency in housing developments.

Policy - Promote the development of housing which is designed, sited, constructed and landscaped to facilitate conservation of water and energy. In high risk fire areas consider access and building-protection measures.

Policy - Adopt a solar access protection ordinance for new developments that ensures land is divided in such a way that houses can be sited for optimum solar access while minimizing shade to adjoining properties.

Development Planning

Goal - To offer design standards for development that consider and incorporate natural factors.

Policy - Emphasize and preserve the site's characteristics such as remnant woodlands and natural areas to create community character and increase the value of the project.

Policy - Encourage cities and counties to adopt ordinances that promote the clustering of residential units by granting density bonuses that will help preserve, enhance, or rehabilitate natural features of the property such as significant woodlands, wildlife habitats, or streams.

Facts and Benefits

If done effectively, mixing housing styles and compatible uses in neighborhoods can increase community livability. Modifying the traditional grid pattern for tree-lined streets can facilitate walking, bicycling, and travel by transit.

Trees can help the preservation, improvement and development of housing by:

- Increasing property values—The amount of taxes contributed to community coffers throughout the U.S. due to the value added by privately-owned trees on residential property is conservatively estimated at over $1.5 billion per year. The contribution of street and nearby park trees to property values would probably double or triple this figure. A U.S. Forest Service Study showed that real estate values increase as much as 20 percent with the addition of trees to a property.
- Providing a buffer between intensity uses—Trees can offer visual blocking, privacy control, acoustical control, and traffic control.

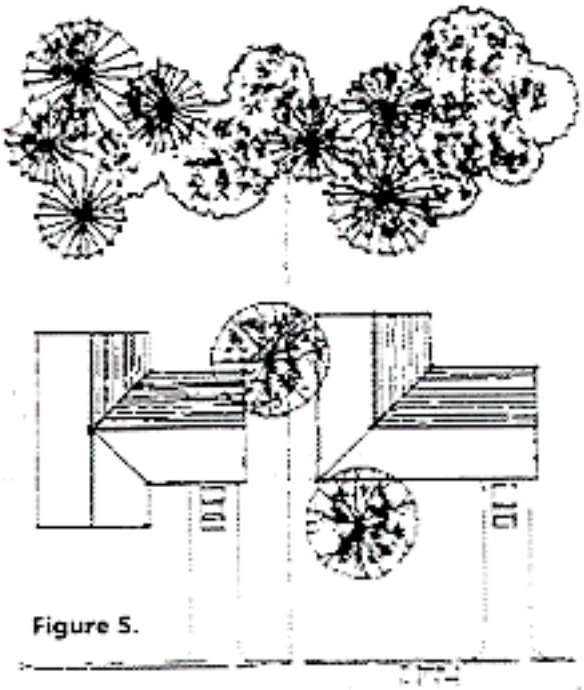


Figure 5.

A vegetative buffer can conserve energy, add privacy and enhance the property. In high risk fire areas consider access and building-protection measures.

Source: British Columbia Recreation and Parks Association. Written by J.S. Peterka and Associates

- Increasing energy conservation—100 million mature trees in U.S. Cities (about 1.5 trees per single family home) can reduce annual energy use by 30 billion kwh, saving consumers $2 billion plus avoided investment in new power plants.
- Providing a neighborhood a sense of shelter—People long for security, and associate trees with that sense of being at home, in place. Trees provide gentle protection for the boundaries of our home-space, and they help heal the loss of deep roots associated with our transient society.
- Helping create an enjoyable environment—A Weyerhaeuser publication refers to a 1986 survey conducted in all 50 states by the Gallup Organization on the value of landscaping. Overall, buyers of new and previously owned homes estimated that landscaping added nearly 15 percent to the value or selling price of their homes.

Resources and References

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Capital Facilities Element

The capital facilities plan is the mechanism by which the city can schedule the timing, location, projected cost, and revenue sources for the capital improvements. Trees and associated vegetation are part of a long-term investment in most capital facilities: highway building and rebuilding, public housing, community improvement, and private development. Trees last longer than the average road or sidewalk surface.

"Trees are the only part of the municipal infrastructure that actually increase in value."

Preston Cole,
Urban Forester, City of Milwaukee, WI

Sample goals and policies:

Livable Environment

Goal - To develop a program assuring the city's ability to protect and maintain a streetside planting of trees such that public property has a suitable planting space to allow for one or more trees per property.

Policy - Encourage the green and wooded character of existing neighborhoods.

Policy - Implement the use of landscaping or greenspace to mitigate the potential impacts on surrounding neighborhoods. In high risk fire areas consider access and building-protection measures.

Water Quality

Goal - To develop storm drainage collection and discharge systems that protect public and private property and the natural environment.

Policy - Promote soil stability and the use of natural drainage-ways by encouraging the retention of existing vegetation near streams, springs and slopes.

Financial Mechanisms

Goal - To provide adequate funding for capital facilities in the city to ensure that the comprehensive plan vision and goals are implemented.

Policy - Include tree planting as a capital expenditure. In this way the city is able to ensure that trees will be planted in new construction or reconstruction areas in a timely, coordinated manner.

Policy - Develop and implement other appropriate funding mechanisms to ensure new development's fair share contribution to other public facilities such as recreation, drainage, solid waste, and congestion management services and facilities (car/van pool matching, transit shelters, bike racks, street trees, and sidewalks).

Development Standards

Goal - To recognize the special needs necessary to preserve and enhance the urban forest so that the human environment can exist in harmony with nature.

Policy - Design the placement of overhead wires, sidewalks and underground utilities to minimize the impact on existing or proposed trees, within public rights-of-way and on private property.

Policy - Include trees and other vegetation as a direct part of the capital facility construction and reconstruction processes.

Policy - Encourage design and installation using tree species appropriate to an urban setting.

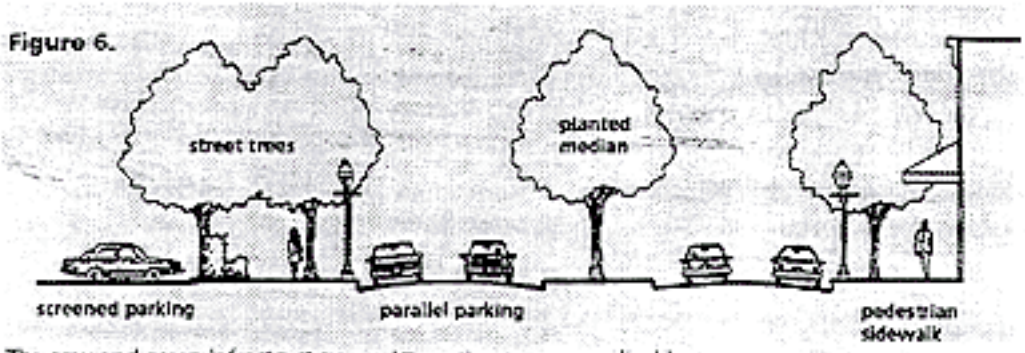
Policy - Establish a high level of maintenance of the green infrastructure through adopted standards and adequate funding. The planting of each tree should include a commitment to pay for long term care.

Facts and Benefits

The urban forest provides a host of integrated benefits that complement other parts of the urban infrastructure by:

- Reducing stormwater runoff and enhancing ground water recharge—Runoff from forested areas is 17% less than that from developed areas according to a study by the U.S. Forest Service.
- Reducing stormwater treatment costs in many communities by reducing runoff due to rainfall interception.
- Contributing to real estate values—Surveys show that residential real estate surrounded by trees sells for prices as much as 20% higher than real estate with no trees.

Figure 6.



The gray and green infrastructure work together to create a livable environment.

Source–*City of Sumner Community Character Element* — prepared by A. Nelessen Associates, Inc. 1993

- Conserving energy—Trees affect energy use in buildings by directly reducing (1) solar heat gain, (2) radiant heat gain from surroundings by shading and view factor reduction; and (3) infiltration by shielding a particular building from winter winds.
- Creating an enjoyable environment—Urban greenery relieves the monotony of pavement and masonry. Tree offer shade, pleasant fragrances, and help to create serene settings. Trees soften and complement architectural lines and building detail.

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Utilities Element

The State Growth Management Act (GMA) requires all cities and counties to consider the location of existing and proposed utilities and potential utility corridors in land use planning. The urban forest can have a significant influence on the goals and policies that will be developed within the comprehensive plan.

"Cooperation and communication between municipalities and utilities will provide for a safe and livable environment where trees and utilities coexist."

John Goodfellow
Puget Sound Power and Light Co.

Sample goals and policies taken:

Vegetative Guidelines

Goal - To consider utility maintenance and access needs in design of landscape plans.

Policy - Provide appropriate guidelines and standards for utility design that will coexist with established and future tree plantings.

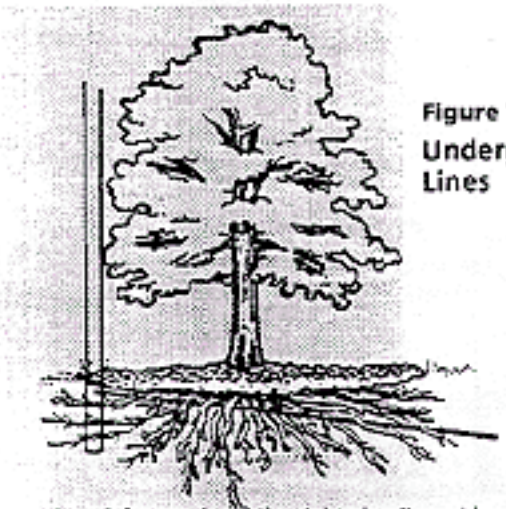

Figure 7.
Underground Lines

The "right tree for the right place" considers overhead as well as underground utilities.

Source: *International Society of Arboriculture*, 1992.

Policy - Provide informational guidelines and evaluation criteria dealing with specific site conditions for vegetative buffers and coordinate with public and private utilities when drafting buffer strip requirements.

Policy - Develop appropriate tree lists, guidelines and standards for tree planting that will coexist with established and future utility infrastructure.

Energy - Conservation

Goal - To promote community coordination with public and private utilities for adopting tree planting programs as part of their overall energy conservation efforts.

Policy - Provide requirements for the use of trees and other forms of landscaping to shade the entrances and pedestrian paths of commercial, office and public buildings so as to reduce ambient temperatures and heat load. In high risk fire areas consider access and building-protection measures.

Development Guidelines

Goal - To assure clear and safe utility easements.

Policy - Establish utility installation guidelines that assure the maximum number of trees with the best potential for healthy survival are retained and protected through the development process.

Policy - Promote utility and local government coordination regarding utility maintenance and installation.

Goal - To maintain and develop an urban forest that is compatible with the urban infrastructure.

Policy - Establish trees that will not conflict with the urban infrastructure.

Policy - Promote steps to reduce pollution associated with stormwater runoff from construction sites, industrial facilities, and parking lots by establishing vegetation buffers.

Facts and Benefits

Trees are a key consideration for utilities and public services because they:

- Maintain and improve surface water quality—Peak storm runoff from undisturbed forests can be 10-20% less than from developed sites. Reducing and/or slowing urban runoff reduces the required size of engineering structures, including treatment plants. Slower moving water also causes less damage to saltwater ecosystems, where organisms depend on specific water-to-salt ratios.
- Reduce surface water runoff rates and volume—The absorbent soil beneath forest canopies soaks up direct rainfall and runoff from adjacent developed areas, reducing stormwater treatment costs for some communities.
- Reduce energy use—Shade trees have been shown to reduce exterior wall temperatures by eight degrees on a hot summer day, and reducing the work load of an air conditioner by as much as half when the house is fully shaded. Established trees can reduce heating energy use when they act as windbreaks. Reduced wind speed around buildings can result in heating energy savings between 4 and 22 %.
- Require proper planning—Communication involving city agencies, public/private utilities and the planning department helps to alleviate potential hazards and problems of inappropriate specification and inappropriate design of overhead and underground utilities.

Note: Public and private utility providers encourage local planners to consider the problems buffer strip requirements can cause for power lines.

Resources and References

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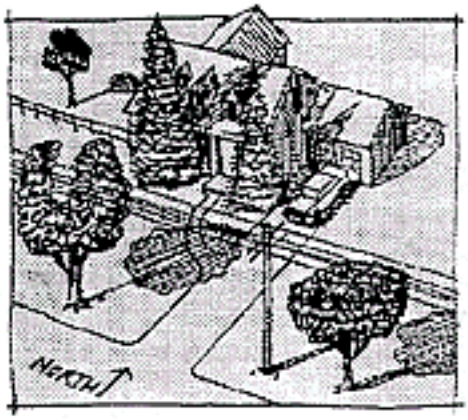
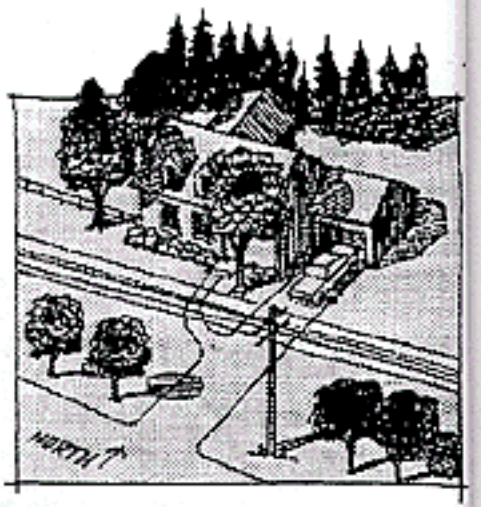
Figure 8.



WRONG— Planting large trees under utility lines often means future maintenance costs. Large evergreens close to the house on the south, block warming winter sunlight.

Source: *Tree City USA Bulletin* 1992 National Arbor Day Foundation



RIGHT— Short flowering trees don't clash with overhead utility lines. Large deciduous trees on the southeast, southwest and west provide cooling shade in the summer and don't obstruct the low winter sun. An evergreen windbreak on the north blocks cold winter winds.

Energy Element

An energy element will address growth as it affects the cost, availability and reliability of our energy resources. Every essential service local government provides involves energy. Trees and plants play a significant role in climate control: they can influence solar radiation, windflow, and heat absorption which ultimately has an effect on energy consumption.

> ***"Trees can reduce demand for air conditioning to cool buildings by shading residences and lowering summertime air temperatures. During winter, trees can reduce heating needs by lowering wind speeds and thereby reducing infiltration of cold air."***
>
> *U.S. Forest Service*

Sample goals and policies:

Proper Planning

Goal - To manage the urban forest in a way that recognizes its effect on wise energy use.

Policy - Develop guidelines to preserve existing trees or plant new trees that shall allow for appropriate levels of solar access or shade to living spaces within a development and/or on adjacent property.

Development Guidelines

Goal - To design and maintain landscaping that maximizes energy efficiency and minimizes water use at all city/county buildings.

Policy - Adopt an ordinance that requires developers of new buildings to preserve existing healthy trees on building sites and to plant trees and shrubs that improve energy efficiency.

Policy - Amend the zoning code to require street trees in new residential, commercial, and industrial developments.

Policy - Implement natural shading in building codes consistent with needed utility clearances and home safety concerns in high risk fire areas.

Coordination

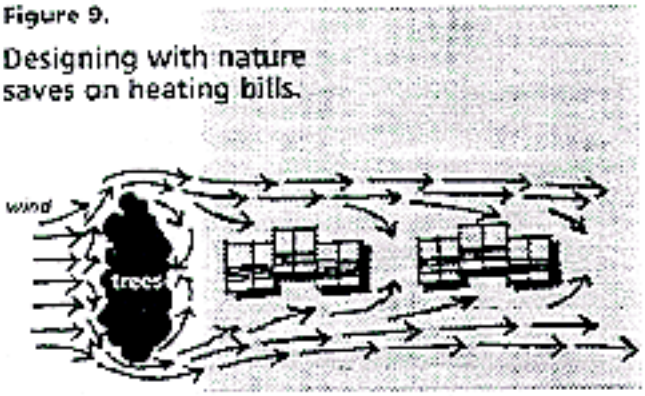
Goal - To develop a tree planting program with municipal or private utilities that establishes a systematic energy conservation initiative.

Policy - Encourage tree planting and preservation designs for public and private development that considers the environmental benefits of trees.

Policy - Coordinate work with local energy utilities and local government to offer education, incentive programs and appropriate landscaping as effective ways to increase energy efficiency in existing homes and commercial buildings.

Figure 9.

Designing with nature saves on heating bills.



By slowing winter winds, trees lower the loss of heat in buildings by reducing cold air infiltration.

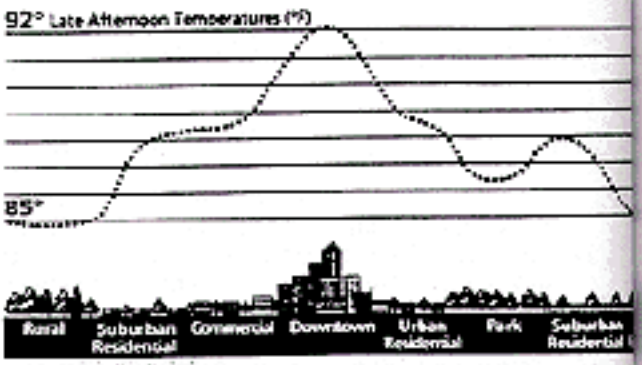
Source: Tree City USA Bulletin, No. 27, National Arbor Day Foundation

Facts and Benefits

Trees can affect energy conservation by:

- Breaking the force of winter winds—Windbreaks can reduce wind velocity by up to 20%. Research on winter energy savings indicates that proper plantings around buildings can reduce annual energy use for home heating by 4 to 22%.
- Reducing solar heat gain—Properly planted trees can reduce energy used for cooling in individual buildings by up to 20%.
- Reducing the radiant heat gain—Shaded neighborhoods are 5 to 10 degrees cooler than areas with few trees. Trees help cool down the overall environment by shading heat-conducting materials such as asphalt, concrete and metal.

Figure 9.
Heat Island



Trees make a big difference in ambient temperatures. Areas with little vegetation become "heat islands"

Source: Andreasko, Huang. 1990. *Cooling Our Communities*. U.S. Environmental Protection Agency.

State Legislation

In 1993 the State of Washington passed a law that addresses the contribution urban forestry makes to energy conservation. The law amends or adds to RCW 35.92.355, 43.19.668, 76.12.160 and 80.28.024, 35.92, 35A.80, 80.28, 43.19 and 76.15.

> The state law encourages municipal utilities, private gas companies and electrical companies to provide landscaping information to their customers on trees and energy conservation and to provide customers a billing "checkoff" for donations to tree planting.
>
> The law also encourages any public or quasi-public entity of the state engaged in the generation, sale or distribution of energy to be granted the authority to carry out programs which will "conserve resources, reduce waste, and encourage more efficient use of energy."

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Glossary/Acronyms

Ambient Temperature: the temperature of the surrounding air at a particular place and time.

CO_2: Carbon Dioxide is one of the "greenhouse gases" that is released into the atmosphere when, for example, fossil fuels such as coal and oil are consumed.

Community and Urban Forest: is that land in and around human settlements ranging from small communities to metropolitan areas, occupied or potentially occupied by trees and associated natural resources. Community and urban forest land may be planted or unplanted, used or unused, and includes public and private lands, lands along transportation and utility corridors, and forested watershed lands within populated areas.

Community and Urban Forestry: is the planning, establishment, protection, care and management of trees and associated plants individually, in small groups, or under forest conditions within municipalities and counties. It is an opportunity to introduce specialized expertise and sensitivity for understanding the interrelatedness (ecology) of people, land, water, forests and wildlife.

Comprehensive Plan: a generalized, coordinated land use policy statement of the governing body of a county or city that is adopted pursuant to the Growth Management Act.

Defensible Space: a buffer of resistance that surrounds a building to reduce the chances of a fire reaching it.

Dripline: the width of a trees crown, as measured by the lateral extent of the foliage.

Greenbelt: an area of wooded land, parks, farmland, open space or riverine corridors bordering, surrounding or linking urban developments or distinct land uses, on which building is generally prohibited.

Groundwater: water within the earth that supplies wells and springs.

Infrastructure: the basic equipment, utilities, productive enterprises, installations and services essential for the development, operation, and growth of an organization, a city, or a nation. Green and gray infrastructure relate to green landscape versus gray hardscape (road, sidewalk, sewer, etc.) installations.

Open Space: parks, squares, yards, courts and other urban spaces not covered by cars or buildings.

Planning: the act of deciding, in advance, what to do. A dynamic effort to use decisions to guide future actions and decisions.

Recharge: addition of water to an aquifer that occurs naturally from infiltration of rainfall and from water flowing over earth materials that allow water to infiltrate below the land surface.

Retention/Detention Basins: water control systems used to catch runoff and hold it or slow it for uniform release.

Tree: a woody perennial plant usually with a single main stem a height greater than fifteen feet and a head of branches and leaves at the top.

Urban Growth Area: (UGA) in the State of Washington this phrase specifically means a designated area that will at a minimum include all cities as well as the areas needed to accommodate a 20-year projected population increase.

Urban: constituting, or comprising a city or town with a characteristic that distinguishes it from the country.

Urban Ecosystem: a city's ecological community to be considered together with the non-living factors of its environment as a unit.

Urban Forest: (See "Community and Urban Forest").

Urban Forestry: (See "Community and Urban Forestry").

Urban Growth: refers to growth that makes intensive use of land for the location of buildings, structures, and impermeable surfaces to such a degree as to be incompatible with the primary use of such land for the production of food, other agricultural products, or fiber, or the extraction of mineral resources.

Urban Heat Island: is a phenomenon of temperature differences between urban and rural areas. Cities absorb, rather than reflect, incoming solar energy which causes temperatures to rise.

Acronyms

GMA	Growth Management Act
AWC	Association of Washington Cities
DNR	Department of Natural Resources
USDA	United States Department of Agriculture
USFS	United States Forest Service

Resources and Funding

Key Resources

American Forests
PO Box 2000
Washington, DC
202-667-3300 FAX 202-667-2407

American Planning Association, Washington Chapter
Roger Wagoner, President
1809 7th Ave.
Seattle, WA 98101
206-467-9417

American Society of Landscape Architects
c/o Portico Group
106 Lenora St.
Seattle, WA 98121
206-448-6506 FAX 206-441-1547

Association of Washington Cities
1076 S. Franklin St.
Olympia, WA 98501
1-800-562-8981 FAX 206-753-4896

Municipal Research & Services Center
10517 NE 38th Place
Kirkland, WA 98033
206-827-4334 FAX 206-827-5002

Planning Association of Washington
c/o McConnell/Burke, Inc.
11000 NE 33rd Place, Suite 101
Bellevue, WA 98004
206-827-6550 FAX 206-889-0730

University of Washington - College of Forest Resources
Mail Stop AR-10
University of Washington
Seattle, WA 98185
206-685-0581 FAX 206-685-0790

Washington Department of Natural Resources
Community Forestry Program
1111 Washington ST SE
PO Box 47046
Olympia, WA 98504-7046
1-800-523-TREE
206-902-1704 FAX 206-902-1788

Washington State Department of Community, Trade and Economic Development
Growth Management Section
906 Columbia St. SW
PO Box 48300
Olympia, WA 98504-8300
206-753-2222

Washington State Energy Office
GMA Assistance
925 Plum St. Building 4
Olympia, WA 98504
206-956-2089

Funding Information

Association of Washington Cities
1076 S. Franklin St.
Olympia, WA 98501
206-753-4137
1-800-562-8981
FAX 206-753-4896

AWC offers the "State Agency Assistance Catalog For Local Governments" that describes grant, loan, and technical assistance programs administered by the state for local agencies. Washington cities, towns, counties, Indian Tribes, service agencies, area-wide planning groups, and special districts would benefit from this information. The catalog provides a tool that enables local officials to identify state administered sources of financial and/or technical assistance.

Washington State Department of Natural Resources
Community Forestry Program
PO Box 47046
Olympia, WA 98504-7046
206-902-1703 or 1-800-523-TREE

The DNR administers financial assistance on a matching basis to local governments and non-profit organizations for education, technical assistance and for the development of local urban forestry boards and community tree programs. Also state and local governments can receive grants to contract with small businesses to provide and plant trees on land owned or controlled by state or local government. These federal programs are funded by U.S. Small Business Administration and the USDA Forest Service.

Infrastructure Assistance Coordinating Council
PO Box 48300
Olympia, WA 98504-8300
206-586-7656

IACC provides a notebook called Matrix. This notebook consolidates information on state and federal programs which provide financing and/or technical assistance for public facility projects in one reference source.

Department of Community, Trade and Economic Development
Growth Management Section
906 Columbia St. SW
PO Box 48300
Olympia, WA 98504-8300
206-753-2222

The Growth Management Section provides the Growth Management Directory Of State-wide Resources. This guide helps to locate financial and technical assistance on many of the issues that local planners are addressing today.

WASHINGTON STATE DEPARTMENT OF
Natural Resources
Jennifer M. Belcher - Commissioner of Public Lands
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