

# Ponderosa Pine, Sustainability, and Public Welfare

Provided by Spokane Ponderosa

Kevin K. Cash, LA  
Executive Director





Spokane Ponderosa is a non-profit organization dedicated to the preservation and revitalization of our native Ponderosa Pine urban forest throughout Spokane County.

### **MISSION STATEMENT**

We are a catalyst for urban Ponderosa Pine reforestation efforts in Spokane County. We work to educate and inform the public, developers, and design professionals on the benefits of Ponderosa Pine. We assist in the efforts of local municipalities to establish best practice policies for the care of our urban forest.

### **GOALS AND OBJECTIVES**

Increase public awareness of value, benefits, and needs of Ponderosa Pine.

Increase public involvement in tree planting.

Increase number of trees planted.

Inspire, train, and mobilize a dedicated volunteer network.

Protect and enhance Spokane County's urban forest.

Provide a high survival rate of planted Ponderosa through community involvement.

# **Spokane Ponderosa**

[SpokanePonderosa.com](http://SpokanePonderosa.com)





Photo: Kevin Cash

## **PART ONE**

- Public Welfare Defined
- Ponderosa Pine & Public Welfare
- Municipal Guidelines
- Design Uses of Ponderosa Pine
- Planting Considerations

## **PART TWO**

- Issues with the Species
- Ponderosa Pine and the Warranty
- Growers and Stock
- Specifications
- Q&A

# **Discussion Topics**



## **PUBLIC WELFARE, A WORKING HOLISTIC DEFINITION**

“Public welfare in the context of Landscape Architecture means the stewardship of natural environments and of human communities in order to enhance social, economic, psychological, cultural and physical functioning, now and in the future.”

## **LANDSCAPE ARCHITECTURE PROJECT IMPACTS ON PUBLIC WELFARE:**

- Enhances environmental sustainability.
- Contributes to economic sustainability and benefits.
- Promotes public health and well-being.
- Builds community.
- Encourages landscape awareness/stewardship.
- Offers aesthetic and creative experiences.
- Enables people and communities to function more effectively.

-ERIN Research Inc., Landscape Architecture and Public Welfare

# **Public Welfare Defined**

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## PONDEROSA PINE AND ENVIRONMENTAL SUSTAINABILITY

- Spokane County's primary native tree.
- Thrives in our environment.
- A large tree species without supplemental watering, fertilizer, or insecticides once established.
- City of Spokane storm pond and swale planting tree.
- City of Spokane street tree.
- Drought resistant.
- No irrigation after two years.
- Provide food and habitat for wildlife.
- Provides erosion control.
- Improves water quality.
- Fire resistant.
- Few Pests.



Photo: National Park Service

## Ponderosa Pine & Public Welfare

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## PONDEROSA PINE AND ECONOMIC SUSTAINABILITY

- Reduced long term landscape maintenance = increased long term project profitability.
- Trees boost sales and add value. Large trees = 3% to 15% increase to home value.
- Commercial areas with trees have higher occupancy & rental/lease rates.
- Increased consumer patronage and spending.
- Ponderosa Pine save the City of Spokane \$210,149 per year in storm mitigation through rain interception and storage.
- Trees provide reductions in building heating and cooling costs.



Photo: Open Source

## Ponderosa Pine & Public Welfare

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## PONDEROSA PINE AND PUBLIC HEALTH AND WELL-BEING

- A mature tree canopy reduces our urban heat island.
- Health benefits include a faster recovery time from illness and surgery when viewing trees.
- Ponderosa Pine stabilize soil, protecting our rivers & streams.
- Ponderosa Pine absorb air and soil pollution.
- Our urban forest helps our air quality by absorbing CO2.



Photo: Hank Greer



Photo: Miguel Vieira

## Ponderosa Pine & Public Welfare

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## **BUILDING COMMUNITY**

- Ponderosa Pine contribute to the unique look of Spokane County.
- Incorporating existing trees into site plans provides a feeling of establishment.
- Many of Spokane County's most popular residential areas retained Ponderosa Pine.
- Retaining and planting Ponderosa Pine in development projects ties the project to the area's unique look and local feel.
- Local projects without Ponderosa look like they could be from any city in the country.



Photo: Kevin Cash

# **Ponderosa Pine & Public Welfare**

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## ENCOURAGES LANDSCAPE AWARENESS / STEWARDSHIP

- Ponderosa Pine are well loved in, and around, public parks and open spaces in Spokane County.
- Area community groups take personal ownership in their neighborhood parks Ponderosa Pine.



Photo: Lands Council



Photo: Lands Council



Photo: Lands Council

# Ponderosa Pine & Public Welfare

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## OFFERS AESTHETIC AND CREATIVE EXPERIENCES

- Spokane County has recreation opportunities in its pine forests and open spaces.
- The Ponderosa Pine is synonymous with the region and its natural beauty.
- Ponderosa Pine provide year round aesthetic quality.

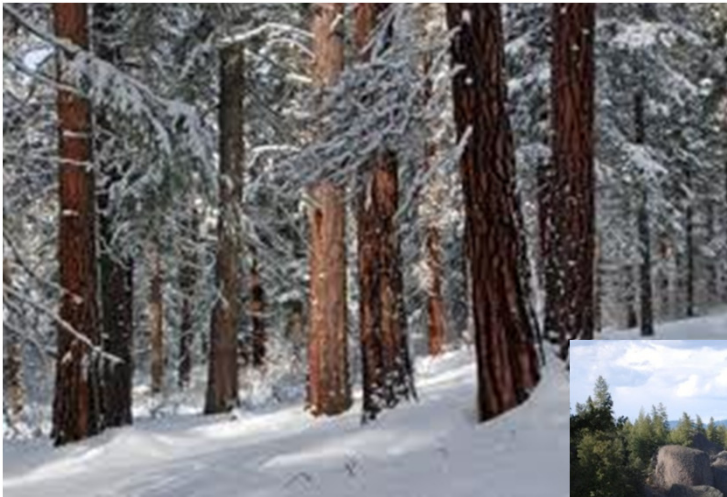


Photo: Washington Trails Assoc.



Photo: Kevin Cash



Photo: Open Source

# Ponderosa Pine & Public Welfare

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## ENABLES PEOPLE AND COMMUNITIES TO FUNCTION MORE EFFECTIVELY

- Ponderosa Pine require less water than non-native tree species.
- Research shows a 10 year increase in asphalt pavement when shaded.
- Storm water absorption of Ponderosa Pine alone saves the City of Spokane \$210,149 per year in mitigation through rain interception and storage.
- Our Ponderosa Pine urban forest provides environmental, economic, and health benefits that improve productivity.



Photo: Gonzaga University



Photo: Spokesman-Review

# Ponderosa Pine & Public Welfare

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## LOCAL COMMUNITIES

- City of Airway Heights
- City of Cheney
- Fairchild AFB
- Town of Fairfield
- City of Millwood
- City of Spokane
- City of Spokane Valley
- Spokane County
- Eastern Washington University
- Washington State University
- Gonzaga
- Whitworth

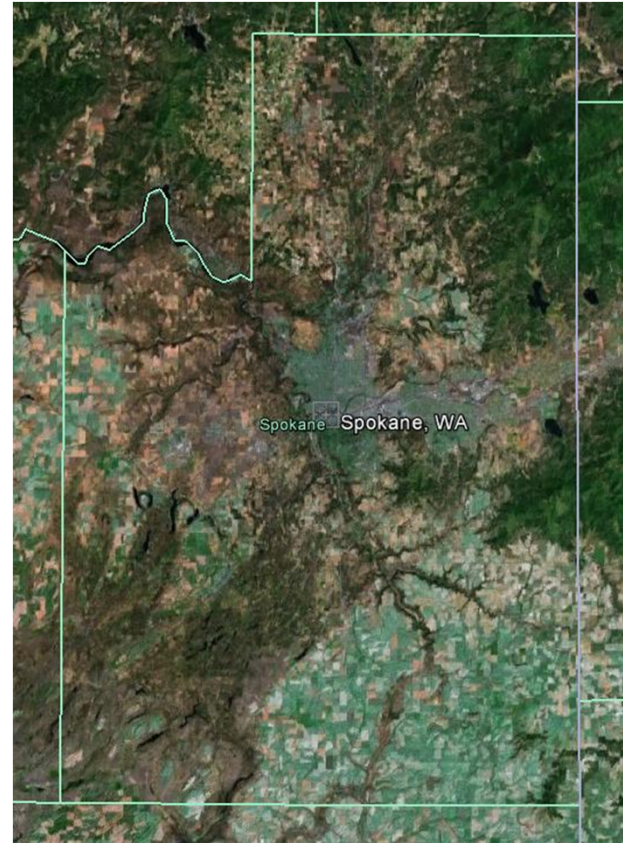


Photo: Google Earth

# Municipal Guidelines

[SpokanePonderosa.com](http://SpokanePonderosa.com)





## CITY OF AIRWAY HEIGHTS

- Tree City USA
- Landscape required per development standards outlined in Municipal Codes.
- Urban Forestry chapter included in Municipal Code.
- Tree Department (Urban Forestry) part of Public Works.
- City approved street tree list.
- “Landscape plans using native plant materials or xeriscaping will not require a landscape architect’s seal irrelevant of size of project.”  
(AHMC17.22.040)



## CITY OF CHENEY

- Tree City USA
- Landscape required per development standards outlined in Municipal Codes.
- Potential landscape requirement reductions for preservation of existing trees.



# Municipal Guidelines



### **FAIRCHILD AFB**

- Tree City USA
- Landscape required per Fairchild Base Development Standards.
- Approved plant list materials include Ponderosa Pine for open space and buffer plantings.



**U.S. AIR FORCE**

### **TOWN OF FAIRFIELD**

- Tree City USA
- Landscape required per development standards outlined in Municipal Codes.

### **CITY OF MILLWOOD**

- Tree City USA.
- City Arboretum.
- City Tree Board.
- Active in the Avista Shade Tree Program.
- Landscape required per development standards outlined in Municipal Codes.



## **Municipal Guidelines**

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## CITY OF SPOKANE

- Tree City USA
- City Arboretum.
- City Urban Forestry Department part of Parks and Recreation.
- Landscape required per development standards outlined in Municipal Codes.
- City approved street tree list includes Ponderosa Pine.
- Ponderosa Pine is an approved tree for use in storm water facilities.
- Potential landscape requirement reductions when xeriscaping is used in storm water facilities.
- Potential landscape requirement reductions for preservation of existing trees.
- Ponderosa pine is the official City tree.



# Municipal Guidelines

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## CITY OF SPOKANE VALLEY

- Landscape required per development standards outlined in Municipal Codes.
- Currently deciduous street trees only. Approved tree list for under overhead utilities outlined in Municipal Codes.
- Potential landscape requirement reductions when xeriscaping is used.



## SPOKANE COUNTY

- Landscape required per development standards outlined in Municipal Codes.
- Potential landscape requirement reductions when xeriscaping is used.
- Potential landscape requirement reductions for preservation of existing trees.



# Municipal Guidelines



## EASTERN WASHINGTON UNIVERSITY

- Campus trees maintained by the Facilities Services Department.
- Landscape requirements outlined in Design Guidelines and Construction Standards.
- University preferred landscape plant list.
- Substantial specifications for existing tree protection during construction projects.



## WASHINGTON STATE UNIVERSITY

- Campus trees maintained by the Facilities Operations Department.
- Landscape requirements outlined in Uniform Design Standards. Extensive section on trees, Section 02960. Includes a Tree Removal and Replacement Policy.
- LA required to document condition of existing trees prior to construction.



# Municipal Guidelines

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## GONZAGA UNIVERSITY

- Campus trees maintained by the Plant and Construction Services Department, Grounds Division.
- Campus street trees must meet City of Spokane guidelines.
- Landscape requirements outlined in the campus Landscape Master Plan Narrative (currently being updated).
- Recommended campus tree list includes Ponderosa Pine.



## WHITWORTH UNIVERSITY

- Campus trees maintained by the Facilities Services Department.
- Plant material approval by Staff.
- Landscape requirements outlined in campus construction specifications.
- Campus has designated tree walk (“Campus Arboretum”).



# Municipal Guidelines

[SpokanePonderosa.com](http://SpokanePonderosa.com)







## SPOKANE'S UNIQUE LOOK

- Ponderosa Pine are the most prevalent native tree in Spokane County.
- First described by historic botanist David Douglas in 1826 while exploring near present day Spokane.
- Garrison Keillor referred to Spokane as “The City of tall Pines” during his 2010 performance in Spokane.



Exhibit: Kevin Cash



Photo: Bing Maps

## Design Uses of Ponderosa Pine

[SpokanePonderosa.com](http://SpokanePonderosa.com)





## STREET TREE

- Ponderosa Pine are a City of Spokane approved street tree.
- Use in other municipalities is currently based on design review.



Photo: Kevin Cash



Photo: Kevin Cash



Photo: Kevin Cash

# Design Uses of Ponderosa Pine

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## NATIVE PLANTING

- Ponderosa Pine are Spokane County's primary native tree.
- The cities of Spokane County cover what was once a forest of Ponderosa provide the region with it's unique look.
- Ponderosa Pine provide food and habitat for native wildlife.
- Few Pest.
- Thriving native in our environment.
- Fire resistant.

## LOW WATER USE LANDSCAPES

- No irrigation required after two years.
- Drought resistant species.



Photo: Spokesman-Review

# Design Uses of Ponderosa Pine

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## **LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)**

- Stormwater Management: Rate and Quantity (1 Point, Credit SS 6.1)
- Stormwater Management: Treatment (1 Point, Credit SS 6.2)
- Heat Island Effect 30% Shade Non-Roof (1 Point, Credit SS 7.1)
- Water Efficiency, Water Efficient Landscape Reduce by 50% (1 Point, Credit WE 1.1)
- Water Efficiency, No Potable Use or No Irrigation (1 Point, Credit WE 1.2)



Exhibit: Ashkin Group, LLC

## **Design Uses of Ponderosa Pine**

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

- Stormwater Management: Rate and Quantity (1 Point, Credit SS 6.1)
- Stormwater Management: Treatment (1 Point, Credit SS 6.2)

Landscape plant material and features are not directly reviewed for these LEED rating points, however, Ponderosa Pine aid in the absorption of stormwater and can be incorporated into stormwater system design.



## Design Uses of Ponderosa Pine

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

- Heat Island Effect 30% Shade Non-Roof (1 Point, Credit SS 7.1)

Provide shade (within 5 years) and/or use light-colored/high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for at least 30% of the site's non-roof impervious surfaces, including parking lots, walkways, plazas, etc.; OR place a minimum of 50% of parking spaces underground or covered by structured parking; OR use an open-grid pavement system (less than 50% impervious) for a minimum of 50% of the parking lot area.

### Potential Technologies & Strategies

Shade constructed surfaces on the site with landscape features and minimize the overall building footprint. Consider replacing constructed surfaces (i.e. roof, roads, sidewalks, etc.) with vegetated surfaces such as garden roofs and open grid paving or specify high-albedo materials to reduce the heat absorption.

Out of the options available for this credit, the use of evergreen trees as a shading landscape feature is the most cost effective. Couple this with a need for native species and Ponderosa Pine fit the bill.

## Design Uses of Ponderosa Pine

[SpokanePonderosa.com](http://SpokanePonderosa.com)





## LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

- Water Efficiency, Water Efficient Landscape Reduce by 50% (1 Point, Credit WE 1.1)  
Use high-efficiency irrigation technology OR use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.

### Potential Technologies & Strategies

Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements. Use high-efficiency irrigation systems and consider using stormwater and/or greywater for irrigation.

Ponderosa Pine require no supplemental water once established, greatly reducing the long term irrigation on a site.

## Design Uses of Ponderosa Pine

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## LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

- Water Efficiency, No Potable Use or No Irrigation (1 Point, Credit WE 1.2)  
Use only captured rain or recycled site water to eliminate all potable water use for site irrigation (except for initial watering to establish plants), OR do not install permanent landscape irrigation systems.

### Potential Technologies & Strategies

Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements.

Consider using stormwater and/or greywater for irrigation.

Ponderosa Pine are our main native tree species in Spokane County. Ponderosa need supplemental watering during the establishment period that can be supplied by a temporary irrigation system. A temporary irrigation system is allowed when going for this LEED credit.

## Design Uses of Ponderosa Pine

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## LOW IMPACT DEVELOPMENT (LID)

- The State is increasing requirements for low impact development.
- Ponderosa Pine is approved by the City of Spokane for rain gardens, swales, and retention facilities.
- LID methods conducive to Ponderosa Pine use include open conveyance systems, native area site conservation, reduced lawn native plantings, storm gardens, and street design.

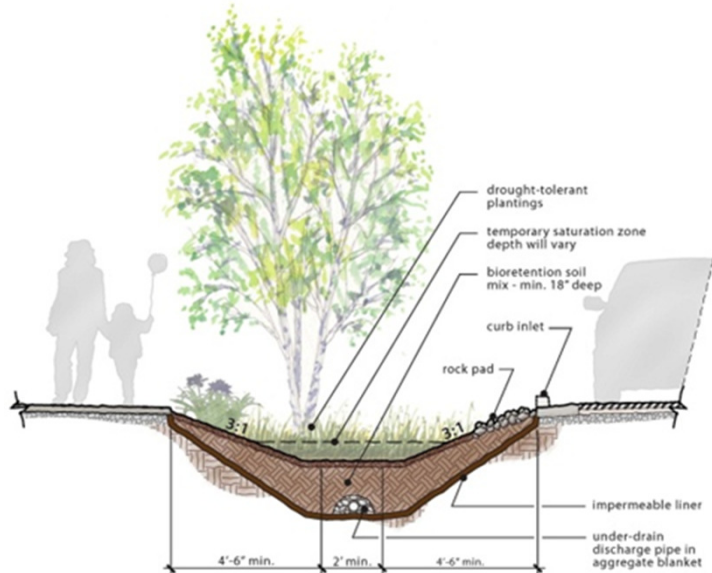


Exhibit: City of Spokane



Photo: City of Spokane



Exhibit: City of Spokane

# Design Uses of Ponderosa Pine

[SpokanePonderosa.com](http://SpokanePonderosa.com)





## STORMWATER DETENTION FACILITIES

- Ponderosa Pine is approved by the City of Spokane for use in retention basins.
- Ponderosa Pine is our regional champion tree for storm water runoff reduction.



Photo: Kevin Cash



Photo: Kevin Cash

## Design Uses of Ponderosa Pine

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## THINGS TO CONSIDER

- Ponderosa Pine and Pavement
- Planter Size
- Supplemental Watering
- Staking



Photo: Kevin Cash

# Planting Considerations

[SpokanePonderosa.com](http://SpokanePonderosa.com)





## PONDEROSA PINE AND PAVEMENT

- Excellent tree for adjacent sidewalks and drives.
- Root heave is rarely an issue.
- Root system consists of a large tap root with major laterals at roughly 20" below grade.



Photo: Kevin Cash



Photo: Kevin Cash

## Planting Considerations

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## PLANTER SIZE

- An eight foot minimum planter width is advised (required by City of Spokane for street trees).
- Consider cone drop in sizing planters for parking lots.



Photo: Kevin Cash

# Planting Considerations



## SUPPLEMENTAL WATERING

- Ponderosa Pine are extremely sensitive to their root ball drying out during their establishment period.
- Supplemental watering is a must for Ponderosa larger than seedling plug size. Supplemental watering should be for at least two years. Professional arborists suggest a minimum of three years and an additional year for every two inches of caliper.
- Irrigation Systems
  - Separate Bubbler Zones
  - Temporary Irrigation
- Water truck or hand watering.



Photo: Rappoport Consulting



Photo: Hunter Industries



Photo: Open Stock

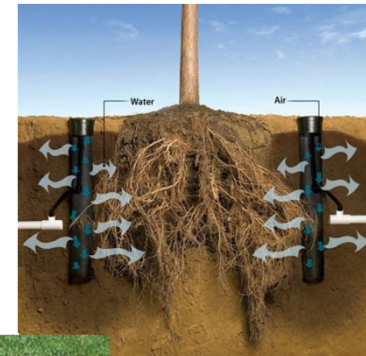


Photo: Rain Bird



Photo: Tree Gator

## Planting Considerations





## STAKING

- Technically unnecessary with adequately sized root ball (“arborist approach”).
- If you’re not 100% certain that wind won’t be an issue, specify staking (“C.Y.A. Design”).
- Typical staking from one to three stakes.
- Alternative subsurface staking through root ball or straps and deadman assembly.

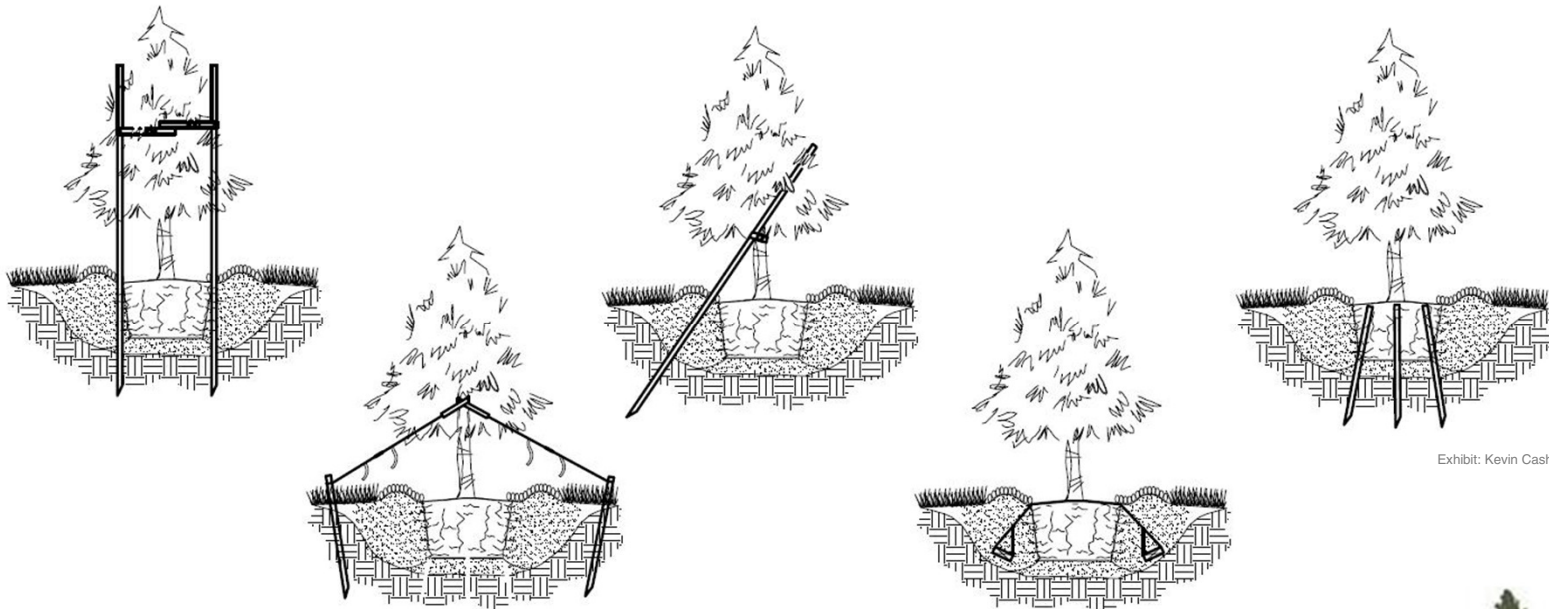


Exhibit: Kevin Cash

# Planting Considerations

SpokanePonderosa.com



try some delicious and healthy snacks  
at our concession stand

# Intermission



## Intermission

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## PART TWO

- Issues with the Species
- Growers and Stock
- Ponderosa Pine and the Warranty
- Specifications



Photo: Kevin Cash

# Discussion Topics





## THE GOOD, THE BAD, AND THE UGLY

- Pests
- Diseases
- Nuisance Issues



## Issues with the Species



## PESTS

### Bark Beetles

- Mountain Pine Bark Beetle (*Dendroctonus ponderosae*)
- Western Pine Bark Beetle (*Dendroctonus brevicomis*)
- Pine Engraver Beetle (*Ips spp.*)
- Red Turpentine Beetle (*Dendroctonus valens*)
- Flat and Round Headed Borers (*Buprestidae* and *Cerambycidae*)



Photo: US Forest Service

### Canopy Insects

- Pine Butterfly (*Neophasia menapia*)
- Pandora Moth (*Coloradia pandora*)
- Pine Looper (*Nacophora mexicanaria*)
- Pine Needle Sheathminer (*Zelleria haimbachi*)



Photo: US Forest Service

### Mammals

- Squirrels
- Porcupines
- Deer



Photo: J. O'Brien/USFS,  
www.forestryimages.org



Photo: Laird Robinson, USDA  
Forest Service, Bugwood.org

## Issues with the Species



## DISEASES

- Pine pitch canker: A virulent and incurable fungal disease caused by the fungus *Fusarium circinatum*.

Forest diseases rare in urban settings but still found in Eastern Washington include:

- Western Dwarf Mistletoe (*Arceuthobium campylopodium*)
- Black Stain Root Disease [*Leptographium* (syn. *Verticicladiella) wageneri*]: Major hosts are Douglas-fir and ponderosa pine.
- Annosus root disease (*Heterobasidion* spp.)
- Armillaria root disease (*Armillaria* spp.)
- Laminated root rot (*Phellinus sulphurascens* Pilát and *Phellinus weirii* (Murrill) Gilb.)



Photo: Donald Owen, California Department of Forestry and Fire Protection, Bugwood.org

## Issues with the Species



## NUISANCE ISSUES

- Sap
- Cones
- Needles



Photo: Gardener Steve



Photo: Gardener Steve



Photo: Christian Homekeeper

## Issues with the Species





## THINGS TO LOOK FOR WHEN REVIEWING STOCK

- Species
- Root Conditions
- Field Dug B&B vs. Containers
- Seedlings



Photo: Seven Oaks Native Nursery

# Growers and Stock

[SpokanePonderosa.com](http://SpokanePonderosa.com)





## SPECIES

North Plateau Ponderosa Pine (*Pinus ponderosa* var. *ponderosa*, Douglas ex C. Lawson ).

- Southeast British Columbia, Washington State and Oregon east of the Cascade Range, Arizona, northwestern Nevada, Idaho and western Montana. Cool, relatively moist summers; very cold, snowy winters (except in the hot and dry summers of central Oregon, which also has very cold and generally dry winters).

Rocky Mountain Ponderosa Pine (*Pinus ponderosa* var. *scopulorum*)

- Eastern Montana, North & South Dakota, Wyoming, Nebraska, northern and central Colorado and Utah, and eastern Nevada. Warm, relatively dry summers; very cold, fairly dry winters.

Pacific Ponderosa Pine (*Pinus ponderosa* var. *benthamiana*)

- Washington State, Oregon west of the Cascade Range, California, and just into westernmost Nevada. Hot, dry summers; mild wet winters.

Southwestern Ponderosa Pine (*Pinus ponderosa* var. *brachyptera*)

- Southern Colorado, southern Utah, northern and central New Mexico and Arizona, and westernmost Texas. Hot, relatively moist summers; mild winters.

## Growers and Stock



## ROOT CONDITION

- Water intake during establishment is vital, tree stock must have an adequately developed and prepared root ball.
- Root abnormalities related directly to improper growing and/or digging techniques will cause irreparable harm to tree stock.
- Common root abnormalities include:
  - Root collar set too deep in the ball.
  - J-roots (roots planted with a bend)
  - Girdling roots.
  - Low root fibrosity.



Exhibit: Illinois Nurseryman's Assoc.



Photo: Mary Ann Hansen, Virginia Polytechnic Institute and State University, Bugwood.org

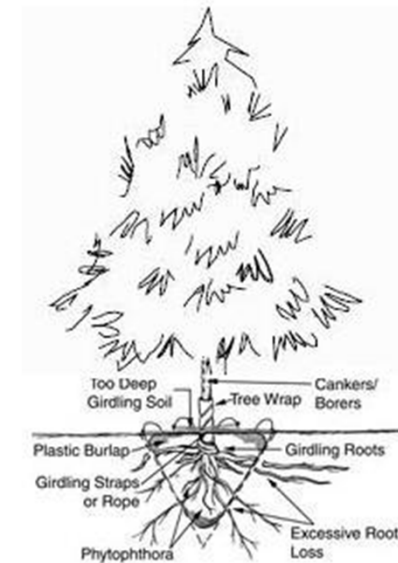


Exhibit: Marshall Tree Farm

## Growers and Stock



## FIELD DUG B&B VS. CONTAINERS

- Ponderosa Pine tree stock is typically field grown then balled and burlapped.
- The typical Ponderosa Pine root structure consists of a tap root and lateral roots.
- Digging is done with a hydraulic tree spade.
- Field digging removes the majority of the tap root and much of the root structure.
- The City of Spokane Urban Forestry Department containerizes their B&B Ponderosa.



Photo: Fastline Equipment



Photo: Air Pot

# Growers and Stock

[SpokanePonderosa.com](http://SpokanePonderosa.com)



## SEEDLINGS

- Tree size with the lowest amount of effort to survive transplanting.
- Planted in mass over an extensive area.
- Typically installed without fertilizer or supplemental watering.
- New planting may be treated with herbicide.
- Seasoned planting crews can install thousands of trees per day.
- Can suffer from same grower mistakes as larger stock (j-roots, girdling roots, etc.)



Photo: Barb and Fred Bentler



Photo: Kevin Cash



Photo: U of Idaho

## Growers and Stock





## WARRANTY

- Ponderosa Pine is the number one issue tree for contractor warranties.
- Tree mortality is preventable.
- Designers and contractors must demand trees with good quality root balls from the growers.
- Designers and contractors should always review tree stock prior to acceptance.
- The root ball must not be allowed to dry out.
- Design for supplemental watering.
- Large plant stock should be planted in the spring for best survivability.



Photo: Best Buy

# Ponderosa Pine and the Warranty

[SpokanePonderosa.com](http://SpokanePonderosa.com)





## SPECIFICATION SUGGESTIONS

- Specify *Pinus ponderosa* var. *ponderosa*
- Specify plant stock grown in the Inland Northwest from local seed.
- Specify and verify that the root ball diameter and root structure quality meet American Standards for Nursery Stock.
- Specify that at no time will the root ball be allowed to dry out after digging by the grower. Require a written watering schedule for stockpiled trees be included as part of the submittal package from the Contractor (already required for projects at WSU).
- If you're not 100% certain that wind won't be an issue, specify staking.
- Soil amendments and general use fertilizer can be specified for Ponderosa.
- Supplemental watering is a must for Ponderosa larger than seedling plug size. Supplemental watering should be for at least two years. Professional arborists suggest a minimum of three years and an additional year for every two inches of caliper.

# Specifications



## QUESTIONS?



Photo: Kolby Kirk

Uhh???????

## Q&A

[SpokanePonderosa.com](http://SpokanePonderosa.com)





# Ponderosa Pine, Sustainability and, Public Welfare

Spokane Ponderosa is a non-profit organization dedicated to the revitalization of our Ponderosa Pine urban forest throughout Spokane County.

If you have any questions about the use of Ponderosa Pine or would like to contact us about having Ponderosa Pine seedlings planted as part of your projects, please feel free to give us a call at (509) 343-9087 or visit us on the web at [www.SpokanePonderosa.com](http://www.SpokanePonderosa.com).

**Thank You**