CITY OF ASHLAND

Council Communication
October 21, 2014, Business Meeting

Plaza Replacement Tree Recommendation

FROM:
Michael Piña, assistant planner, michael.pina@ashland.or.us

SUMMARY:
The City of Ashland Tree Commission provided recommendations for replacing a recently deceased Maple tree located in the downtown plaza. Together with Ashland Parks Department, the City Council will select a suitable replacement tree. The commission recommends either a Red Oak or a Bur Oak.

BACKGROUND:
At the August 7, 2014, regular meeting (minutes), the Tree Commission made recommendations for replacement of the dead tree on the Plaza. The Commission recommended the replacement tree be a minimum four- to six-inch caliper, and be planted in the fall in accordance with City tree planting specifications including an appropriate amended soil mixture. The Commission also noted that preferably either a Bur Oak or Red Oak be chosen as the replacement tree.

At the October 9, 2014, regular meeting (minutes not yet available), the Commission took public comment on the choice of the replacement tree, in which two citizens responded via email. One citizen requested that the replacement tree be an "equally brilliantly colorful tree in the Autumn" as was the Maple, while the other citizen supported the selection of a Ginko tree , but provided the following information in support of selecting an Oak tree:

- In 2004, the United States Congress, sponsored by The Arbor Day Foundation, passed legislation declaring The Oak as our National Tree.
- As primary source of sustenance for Native Americans, planting an Oak could pay tribute to our Native American fore bearers.

Staff has put together the following summary based upon information from the City of Ashland Recommended Street Tree Guide, US Dept. of Agriculture, Virginia Tech Dept. of Forest Resources, and Wikipedia.

Red Oak (*Quercus rubra*)

- Native to the northeastern United States and southeast Canada
- Grows straight and tall, from 50-80 feet in height, with a trunk of up to 20 to 40 inches diameter. Open-grown trees do not get as tall, but can develop a stouter trunk, up to 6 feet in diameter. It has stout branches growing at right angles to the stem, forming a narrow round-topped head.
- Grows rapidly and is tolerant of many soils and varied situations. A 10-year-old tree can be 15–20 feet tall. Trees may live up to 500 years according to the USDA.

- Easily recognized by its relatively thin bark, which feature ridges that appear to have shiny stripes down the center, is more susceptible to fire.
- Gypsy moth and numerous other insects can attack the Red Oak. Also susceptible to Oak Wilt.
- Leaves when full grown are dark green and smooth, sometimes shining above. In autumn leaves turn a stunning red color in the fall.
- Local specimen location: Two mature Red Oaks are located on the lawn between the rose garden and Perozzi fountain in Lithia Park.

Bur Oak (*Quercus macrocarpa*)

- Native to East and Midwestern US.
- Typically grows from 70 to 80 feet in height, but can be up to 100 feet. Also one of the most massive oaks with a trunk diameter between 24 and 48 inches in diameter, but can be up to 10 feet.
- One of the slowest-growing oaks with a growth rate of one foot per year when young. A 20-year-old tree will be about 20 feet tall. Commonly lives to be 200 to 300 years old.
- Cultivated by plant nurseries for use in gardens, parks, and as a street tree. Tolerant of air pollutants and compacted soils, and is one of the most tolerant trees in urban conditions. Grows well in full to partial sun.
- Few insects or diseases cause serious damage.
- A fire-resistant tree, and possesses significant drought resistance by virtue of a long taproot.
- Bark is a medium gray and somewhat rugged. The leaves are 3–6 inches long and 2–5 inches broad, variable in shape, with a lobed margin.
- Flowers are greenish-yellow catkins, produced in the spring. Acorns are very large, 0.8–2 inches long and 0.8-1.5 in broad, having a large cup that wraps much of the way around the nut.
- Typically grows in the open, away from forest canopy.
- Is a known butterfly attractor.

FISCAL IMPLICATIONS:

N/A

STAFF RECOMMENDATION AND REQUESTED ACTION:

Staff recommends the Council choose either of the two recommended trees as the replacement tree within the Plaza.

SUGGESTED MOTION:

I move selection of a (Red Oak or Bur Oak) to replace the recently deceased tree on the downtown plaza.

ATTACHMENTS:

Red Oak factsheet including photos (Atch1)
Bur Oak factsheet including photos (Atch2)
Public comment letters (Atch3)

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

NORTHERN RED OAK

Quercus rubra L.

Plant Symbol = QURU

Contributed by: USDA NRCS National Plant Data Center and the Biota of North America Program

© Mike Hogan
Trees of Alabama and the Southeast
Auburn University

Alternate Names

Red oak, common red oak, eastern red oak, mountain red oak, gray oak

Uses

Industry: Northern red oak is an important source of hardwood lumber. The wood is close-grained, heavy, and hard; it machines well and accepts a variety of finishes. It is used for furniture, veneer, interior finishing, cabinets, paneling, and flooring as well as for agricultural implements, posts, and railway ties.

Wildlife: Northern red oak provides good cover and nesting sites (including cavities) for a wide variety of birds and mammals. Deer, elk, moose, and rabbits commonly browse leaves and young seedlings and the acorns are eaten by a wide variety of large and small mammals and birds.

Ethnobotanic: The acorns of red oak (and other oak species) were an important food source for Native Americans. To remove bitter tannins, they were boiled, leached with ashes, soaked for days in water, or buried over winter. Some tribes used red oak bark as a medicine for heart troubles and bronchial infections or as an astringent, disinfectant, and cleanser.

Conservation: Northern red oak is commonly planted as a landscape tree in eastern North America and Europe -- used as a shade tree on lawns, parks, campuses, golf courses, etc, where space is sufficient. It is fast growing, easy to transplant, tolerant of urban conditions (including dry and acidic soil and air pollution), the abundant nuts attract wildlife, and the leaves develop a brick-red fall color. It has been used in various rehabilitation projects, including revegetation of coal mine spoils in states of the east central United States (Ohio, Indiana, Illinois, Kentucky, and Pennsylvania).

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description

General: Beech Family (Fagaceae). Native trees often reaching 20–30 m tall, less commonly up to 50 m; bark dark gray or black, shallowly furrowed into broad hard scaly ridges, inner bark reddish to pink; generally developing a strong taproot and network of deep, spreading laterals. Leaves are deciduous, alternate, elliptic, 10–25 cm long and 8–15 cm wide, divided less than halfway to midvein into 7–11 shallow wavy lobes with a few irregular bristle-tipped teeth, sinuses usually extending less than 1/2 distance to midrib, glabrous and dull green above, light dull green below with tufts of hairs in vein angles. Male and female flowers are borne in separate catkins on the same tree (the species monoecious), the staminate catkins in leaf axils of the previous year's growth, the pistillate in 2–many-flowered spikes in the leaf axils. Acorns maturing in the second year, about 15–30 cm long, with a broad usually shallow cup, borne singly or in clusters of 2–5. The common name is in reference to the red fall foliage color, red petioles, and reddish interior wood. This is a different species from "southern red oak" (*Q. falcata*).

Northern red oak is a member of the red oak subgroup (subg. *Erythrobalanus* = sect. *Lobatae*). It hybridizes with related species, including scarlet oak (*Q. coccinea*), northern pin oak (*Q. ellipsoidalis*), shingle oak (*Q. imbricata*), scrub oak (*Q. ilicifolia*), blackjack oak (*Q. marilandica*), swamp oak (*Q. palustris*), willow oak (*Q. phellos*), Shumard oak (*Q. shumardii*), and black oak (*Q. velutina*).

Variation within the species: There are different interpretations of variation patterns among trees of northern red oak. A single species without formally variants is sometimes recognized, or two varieties may be recognized.

Quercus rubra var. *ambigua* (A. Gray) Fernald
SY= *Q. borealis* Michx. f.
SY= *Q. rubra* var. *borealis* (Michx. f.) Farw.

Quercus rubra var. *rubra*
SY= *Q. maxima* (Marsh.) Ashe
SY= *Q. borealis* var. *maxima* (Marsh.) Ashe

Var. *rubra* has a shallow cup, to 3 cm wide, enclosing 1/4–1/5 of the nut. Var. *ambigua* has a deeper cup, to 2 cm wide, enclosing 1/3 of the nut. McDougal and Parks (1984, 1986) found evidence of correspondence between morphological types and flavonoid chemotypes but the evolutionary status and geographic distribution of these have not been worked out in detail.

Distribution
Northern red oak is widely distributed throughout much of the eastern United States and southeastern Canada. It grows from Quebec, Ontario, Nova Scotia, and New Brunswick southward to southwestern Georgia, Alabama, northern Mississippi, northern Arkansas, and eastern Oklahoma. Northern red oak extends westward through Minnesota and Iowa, south through eastern Nebraska and Kansas to eastern Oklahoma. It occurs locally in eastern and southwestern Louisiana and western Mississippi. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
Adaptation: Northern red oak commonly grows on mesic slopes and well-drained uplands, less commonly on dry slopes or poorly drained uplands, at (0-) 150–1800 meters in elevation. It typically grows on lower and middle slopes, in coves, ravines, and on valley floors, most commonly on N- and E-facing slopes and on clay, loam, and sandy or gravelly soils. Best growth is in full sun and well drained, slightly acidic, sandy loam. It occurs as a dominant in many natural communities, including mixed mesophytic and pine-oak.

Northern red oak is intermediate in shade tolerance but generally unable to establish beneath its own canopy. Seedlings usually do not reach sapling or pole size unless gaps are created in the canopy. Northern red oak is often replaced by more shade-tolerant species such as sugar maple and American basswood.

Flowering occurs in April–May, during or before leaf development, while fruiting (August–) September–October.

General: Northern red oak generally first bears fruit at about 20–25 years, although most trees do not produce acorns in abundance until 40–50 years. Good crops are produced every 2–5 years. In most years, birds, mammals, and insects commonly destroy up to 80% of the crop and nearly the entire crop can be eliminated in poor years. Seeds on the soil surface are particularly vulnerable to rodent predation, and germination frequencies are much higher when a layer of leaf litter covers acorns. Under natural conditions, acorns generally germinate in the spring after over-wintering breaks dormancy.

Germination and seedling establishment may be successful in full and partial shade, but early growth is reduced by shade, poor soil, and competing herbaceous vegetation. Seedlings in mature stands may be present in large number, but few survive more than a few years or grow to more than 15–20 cm in height. Under optimal conditions, northern red oak is fast growing and trees may live up to 500 years.

Seedlings, saplings, and small poles of northern red oak can sprout if cut or burned. Although young oaks typically stump sprout readily, older and larger individuals also may sprout.

Management
The tight, relatively thin bark of northern red oak makes the trees more susceptible to fire damage than in species of oak with rougher, corkier bark. Apart from immediate mortality, damaged basal cambial tissue permits the entry of insects and heart-rot decay that may ultimately kill the tree. Even so, northern red oak is adapted to periodic fire, which is integrally associated with oak forests. Older, larger individuals often survive fire and seedlings, saplings, and pole-sized individuals commonly sprout vigorously from the stumps or root collar after being top-killed by fire. Increased fire suppression has favored more shade-tolerant hardwoods and resulted in a decrease in oaks.

Acorns can maintain viability in controlled storage for up to 2–3 years. They should be stratified at 1-3° C for several months; those from northern populations require the longer period. Growth is best

when sown as soon as ripe into permanent position or in an outdoor seedbed protected from predation. Cuttings obtained from young trees can be rooted if treated with hormones. Transplants of bare root stock are best done in spring. Because of its usefulness and popularity, northern red oak is commonly available in ball-and-burlap and in containers.

The gypsy moth and numerous other insects can attack northern red oak, occasionally causing serious damage. Numerous caterpillars enjoy oak foliage, but feeding damage is usually not severe. Oak decline is a serious disease of northern red oak and has affected the species throughout much of the central Appalachian region.

Oak wilt

Northern red oak is susceptible to oak wilt, a fungal disease that invades the water-conducting vessels and plugs them. As water movement is slowed, the leaves wilt and rapidly drop off the tree. The disease begins with a crinkling and paling of the leaves, followed by wilting and browning from the margins inward. Necrosis may be strongest along the veins or between them. The symptoms move down branches toward the center of the tree and the tree may die within 1–3 months, although some diseased trees may survive up to a year. The disease may be spread by insects (primarily beetles) or pruning tools, but most of the tree loss in oak wilt centers results from transmission through root spread between adjoining trees. A trench (dug and then immediately filled) between neighboring trees severs the roots and prevents fungus spread. Dead and infected trees must be destroyed – once a tree has become infected, there is little chance to save it. The wood may be used for firewood provided it is debarked or covered and sealed during the spring and summer (Johnson and Appel 2000; Roberts 2000; Wisconsin Dept. of Natural Resources 2000; City of Austin 2000).

This disease most seriously infects species of the red oak group (including black and live oaks). Overcup oak, bur oak, white oak, and other members of the white oak group are not as susceptible and can be planted in oak wilt centers. Oak wilt has reached epidemic proportions in Texas and in the mid-West from Iowa and Minnesota through Michigan and Wisconsin into Ohio, West Virginia, and Pennsylvania.

Cultivars, Improved and Selected Materials (and area of origin)

These plant materials are somewhat available from commercial sources. Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

References

Auburn University 1999. *Trees of Alabama and the southeast web site*. 001207. School of Forestry and Wildlife Science, Auburn, Alabama. <http://www.forestry.auburn.edu/samuelson/dendrology/>

City of Austin 2000. *The oak wilt suppression program*. Austin Parks and Recreation, Austin, Texas. <http://www.ci.austin.tx.us/oakwilt/> Accessed September 2000.

Johnson, J. & D. Appel 2000. *Eight step program to oak wilt management*. Department of Plant Pathology & Microbiology, Texas A&M University, College Station, Texas. <http://cygnus.tamu.edu/Texlab/oakwilt.html> Accessed September 2000.

McDougal, K.M. & C.R. Parks 1986. *Environmental and genetic components of flavonoid variation in red oak, Quercus rubra*. Biochem. Syst. Ecol. 14:291–298.

McDougal, K.M. & C.R. Parks 1984. *Elevational variation in foliar flavonoids of Quercus rubra L. (Fagaceae)*. Amer. J. Bot. 71:301–308.

Nixon, K.C. and others 1993. *Quercus*. Pp. 445-506, IN: *Flora of North America, North of Mexico. Vol. 3*. Oxford Univ. Press, New York. <http://hua.huh.harvard.edu/cgi-bin/Flora/flora.pl?FLORA_ID=12395> Accessed September 2000.

Roberts, D.L. 2000. *Oak wilt: A threat to red oaks*. Michigan State University Extension Website. <http://www.msue.msu.edu/reg_se/oakwilt/> Accessed September 2000.

Sander, I.L. 1990. *Quercus rubra L. Overcup Oak*. Pp. 727-733, IN: R.M. Burns and B.H. Honkala. *Silvics of North America. Volume 2. Hardwoods*. USDA Forest Service Agric. Handbook 654, Washington, D.C. <http://willow.ncfes.umn.edu/silvics_manual/Volume_2/quercus/rubra.htm> Accessed September 2000.

Tirmenstein, D.A. 1991. *Quercus rubra*. IN: W.C. Fischer (compiler). *The fire effects information system [database]*. USDA Forest Service, Intermountain Research Station, Intermountain Fire Sciences Laboratory. Missoula, Montana. <http://www.fs.fed.us/database/feis/plants/tree/querub/> Accessed September 2000.

Wisconsin Dept. of Natural Resources 2000. *Oak wilt in Wisconsin: Biology and management*. Wisconsin DNR Website. <http://www.dnr.state.wi.us/org/land/forestry/fh/diseases/oakwilt.htm> Accessed September 2000.

Prepared By
Guy Nesom
Formerly BONAP, North Carolina Botanical Garden, University of North Carolina, Chapel Hill, North Carolina

Species Coordinator
M. Kat Anderson
USDA, NRCS, National Plant Data Center, c/o Plant Sciences Dept., Davis, California

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For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

VirginiaTech Invent the Future | Department of Forest Resources and Environmental Conservation

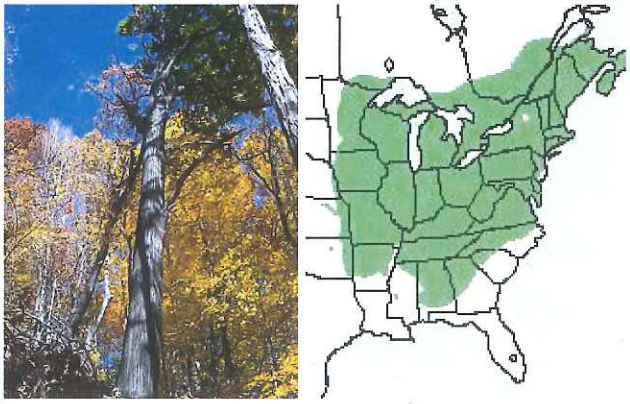
northern red oak Fagaceae *Quercus rubra* L.

symbol: QURU

vTree

Leaf: Alternate, simple, 5 to 8 inches long, oblong in shape with 7 to 11 bristle-tipped lobes, sinuses extend 1/3 to 1/2 of the way to midvein, generally very uniform in shape, dull green to blue-green above and paler below.
Flower: Species is monoecious; males in yellow-green slender, hanging catkins, 2 to 4 inches long; females are borne on short axiliary spikes, appearing with the leaves in spring.
Fruit: Acorns are 3/4 to 1 inch long and nearly round; cap is flat and thick, covering about 1/4 or less of the acorn, resembling a beret; matures in 2 growing seasons, in late summer and fall.
Twig: Quite stout, red-brown and glabrous; terminal buds multiple, quite large, conical, and covered with red-brown, mostly hairless scales but terminal scales may bear some frosty pubescence.
Bark: On young stems, smooth; older bark develops wide, flat-topped ridges and shallow furrows. The shallow furrows form a pattern resembling ski tracts.
Form: A medium sized to large tree that reaches up to 90 feet tall, develops a short trunk and round crown when open grown, straight with a clear, long bole when grown with competition.

Looks like: pin oak - black oak - scarlet oak - Shumard oak



Additional Range Information:
Quercus rubra is native to North America. Range may be expanded by planting. See states reporting northern red oak.
More: Fall Color Wood

External Links:
USDAFS Silvics of North America
USDAFS Additional Silvics
Landowner Factsheet
USDA Plants Database
Horticulture

Photos and text by: John Seiler, Edward Jensen, Alex Niemiera, and John Peterson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USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

BUR OAK
Quercus macrocarpa
Michx.

Plant Symbol = QUMA2

Contributed by: USDA NRCS Plant Materials Center, Manhattan, Kansas, Kansas State University, Manhattan, Kansas, and USDA NRCS National Plant Data Center & the Biota of North America Program

Figure 1. Bur oak planted as a yard tree.
John M. Row, USDA NRCS, Manhattan, KS

Alternate Names
Blue oak, mossycup oak, mossy-overcup oak, scrub oak

Uses
Industry: Bur oak wood is used for railroad ties, cabinetry, and tight cooperage --barrels, hardwood flooring, and fence posts. Main sources of trees for timber are Iowa and Illinois bottomlands. The wood is sometimes marketed as 'white oak' (Panshin and deZeeuw 1980).

Wood characteristics: The wood of bur oak is heavy to very heavy, hard to very hard (specific gravity 0.55-0.64 green and 0.66-0.79 ovendry), without odor or taste, and straight grained; tight cooperage (good for barrels). Sapwood is whitish and heartwood light reddish (Panshin and deZeeuw 1980). It is susceptible to breakage at the crotch due to poor collar formation (Gilman and Watson 1994).

Ornamental: Probably too large for the average home landscape; however bur oak makes for an excellent park or large area tree (Dirr 1998).

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Description
General: A member of the Beech Family (Fagaceae), bur oak is a medium-sized to large tree, typically grows from 70 to 80 feet in height but can grow to 100 feet or more on better sites, with a massive trunk 2 to 3 feet in diameter and a broad, rounded crown of stout branches (Dirr 1998; Fowles 1965). The national Registry of Big Trees reports a specimen in Kentucky that is 99 feet tall and has a circumference of 295 inches and a crown spread of 127.5 inches (American Forests 2012). Shrubbier forms are found on bluffs and hillsides in the northwest part of the tree's range (Nixon 1993); branches and branchlets with corky-winged projections.

The leaves are variable on the plant, alternate, deciduous, 2 to 6 inches wide and 4 to 10 inches long; shape is ovate to oblong; mostly obovate, shaped like a fiddle, tapering to a wedge-shaped base, widest above the middle, with 2–3 rounded lobes on upper half of leaf and 5–7 deeper lobes on lower half of leaf, dark green above, gray-green below, turning yellow or brown in fall (Barkley 1986; Harlow *et al*. 1979; Stephens 1969).

Figures 2 and 3. Leaves deciduous, alternate, obovate, and shaped like a fiddle, tapering to a wedge-shaped base; branches and branchlets with corky-winged projections.
Ohio Division of Natural Resources, Division of Forestry

The stout twigs, yellowish brown, usually pubescent after the second year with conspicuous, corky branches after the first year on some trees. Bark light gray-brown, thick, rough, low ridges separated by shallow furrows into scaly plates, and vertical flattened ridges (Dirr 1998; Stephens 1969).

The inconspicuous flowers emerge shortly after the leaves appear, late April to mid-June. Male and female flowers are borne in separate catkins on the same tree on the current year's branchlets. Male catkins have greenish-brown flowers; female are with green scales and tinged with red. Even though bur oak is monoecious, pollen from one tree appears to germinate better on the stigmas of another favoring cross pollination (Fowells 1969; Johnson 1990).

Fruit is solitary and variable in size. The acorn matures in the first year and is ¾ to 1 ½ inch long and ½ is enclosed with a deep cup which is conspicuously fringed on the margin (Dirr 1998). The common name (bur) is in reference to the cap-covered acorn. It has the largest acorns of all native oaks. Acorns mature in one growing season and drop from the tree August through November. Acorns germinate shortly after seedfall and require no cold stratification. Acorns on more northern trees may remain dormant and germinate the following spring (Johnson 1990).

Figure 4. The acorn enclosed in a deep cup conspicuously fringed on the margin.

John M. Row, USDA NRCS

Variation within the species: Two varieties are commonly recognized within the species.

Var. *depressa* (Nutt.) Engelm. (*Q. mandanensis* Rydb.) – mostly along the western margin of the Great Plains; small trees or shrubs with smaller and less fringed cups and corky twigs.

Var. *macrocarpa* – over most of the species range; trees with large thick cups.

Bur oak is a member of the white oak subgroup (subgenus *Lepidobalanus*) and hybridizes with various related species, including white oak (*Q. alba*), swamp white oak (*Q. bicolor*), overcup oak (*Q. lyrata*), swamp chestnut oak (*Q. michauxii*), chinkapin oak (*Q. muehlenbergii*), post oak (*Q. stellata*), live oak (*Q. virginiana*), and Gambel's oak (*Q. gambelii*) (Johnson 1990).

Ethnobotany

Native Americans used the inner bark to make decoctions with astringent properties to treat various maladies such as cramps, diarrhea, wounds and sores, hemorrhoids, heart and lung trouble, suppress menses caused by a cold, poison oak, and insect bites. A compound containing wood and inner bark was used to expel pinworms. The large acorns were often roasted in ashes or boiled to remove the bitter taste and prepared in various ways for human consumption. Young growths were used by a number of tribes to make popgun pistons (Moerman 1998).

Wildlife: The acorns are eaten by many birds and mammals, including squirrels, rabbits, ground squirrels, mice, deer, black bear, wild turkey, wood ducks, flickers, woodpeckers, and blue jays. They are dispersed by rodents and blue jays, which frequently cache the acorns for later use. Bur oak is browsed by deer, elk, moose, and cattle. Red-tailed hawks, screech owls, fox squirrels, and flying squirrels nest in large trees of bur oak (Fowells 1965; Johnson 1990; Gucker 2011).

Conservation: Bur oak is tolerant of city smoke and other air pollutants and of soils that are compacted, sandy, and/or of high pH – it is commonly planted as a shade tree in many urban areas of the United States. The trees become large and are suited for lawns and other open areas, including golf courses, parks, large islands, and fields. They also are useful in rehabilitation of degraded strip-mine sites and have been widely planted in windbreak and shelterbelt systems because of their drought tolerance. A deep tap root system penetrates to lowered water tables during the dry periods. They are used in riparian forest plantings (Johnson 1990).

According the National Register of Big Trees, removal of a bur oak tree 60 feet tall and 105 feet wide with a circumference of 322 inches would cost $3456.39 to replace the storm water control service it provides. This same tree removes 19.56 lbs. of nitrogen, sulfur, ozone and particulate matter every year (American Forests 2007).

Distribution: Bur oak grows naturally throughout much of the north-central United States and the eastern Great Plains. It occurs from extreme southeastern Saskatchewan, southern Manitoba, southwestern and southeastern parts of Ontario, to New York's Finger Lakes Region and southwestern Quebec, to central Maine and New Brunswick, scattered regions in New England, most of Ohio, southern half of Michigan westward to the Dakotas and extreme northeastern Wyoming, central Nebraska and Kansas, south to Tennessee, Arkansas, and the central prairies of Texas – with rare outliers in Louisiana, Mississippi, and Alabama (Fowells 1965). For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Bur oak grows in a range of habitats and moisture regimes – from prairies to valley floors and upland woods. It is a pioneer or early seral species at prairie margins, and savannas.

Figure 5. The light gray-brown bark is thick and rough.
John M. Row, USDA NRCS, Manhattan, KS

Adaptation
The trees are slow-growing but long-lived and may reach ages of 300 to 400 years old with some trees to 450. It is classified as intermediate in tolerance to shade (Fowells 1965).

Bur oak has declined on savannas and prairies due to grazing and fire suppression. It is not resistant to flooding (Johnson 1990), although mature bur oak in the Missouri and Mississippi flood plains withstood up to 8 weeks inundation during the Great Flood of 1993. Young trees planted in the Missouri River Flood Plain in 2000-2001, were approximately 9 feet tall when inundated by up to 8 feet of water during the 2008 Flood (Cordsiemon 2012).

It grows quickly on moist, rich bottomlands, but is relatively intolerant of flooding during the growing season; bur oak can only survive flooding or saturated soils 30 consecutive days (Tang and Kozlowski 1982). At the north and west ends of its range, where bur oak occurs on rocky bluffs with thin soil and where repeated fire also may be common, it commonly grows as small trees or thickets of low shrubs. Young plants grow well in full sun to partial sun. It is one of the most drought resistant of the North American oaks (Johnson 1990). It is often associated with calcareous soils. It has high aerosol salt tolerance and good soil salt tolerance (Gilman and Watson 1994).

Bur oak is hardy in USDA Winter Hardiness Zones 4 to 8.

Establishment
Most natural seed germination occurs during the fall (directly after maturation) and unless germination is rapid, few seeds survive predation by insects, small birds, and mammals. Litter-covered acorns appear to be more vulnerable to rodents, insects, and fungus.

One-year old, bare root seedlings, 12 to 18 inches tall are used in plantings. Survival is generally good. Initial growth is centered on root development. Two to three years after planting, top growth should average 8 to 12 inches annually with good weed control. Planting in windbreak rows should be spaced 10 to 18 feet apart and 20 to 24 feet between adjacent rows (Kansas Forest Service 2010).

Although strong and rapid development of the taproot contribute to difficulty in transplanting, bur oak saplings can be obtained in ball-and-burlap and they may be transplanted as young plants from containers. Transplants are best made in spring.

The taproot of young bur oaks rapidly penetrates into the soil, sometimes growing more than 4 ½ feet deep in the first growing season. This early root development, along with high water-use efficiency, may explain why bur oak can pioneer on droughty sites and can successfully establish itself in competition with prairie shrubs and grasses (Fowells 1965).

Management
Bur oak bark is thick and fire-resistant and larger trees often survive fire. Grass fires often kill only seedlings and young trees, but even seedlings may survive unless fires occur at short intervals or with enough intensity of heat. Top-killed smaller trees (or those mechanically damaged) sprout vigorously from the stump or root crown after fire. In areas of frequent fire and strong herbivore browsing, the underground portions may be much older and more extensive than the continually resprouting aerial portions. Where fire suppression is prevalent, bur oak communities may be replaced by more shade-tolerant maple-basswood forests (Gucker 2012).

Pests and Potential Problems
Few insects or diseases cause serious damage to bur oak. Reported insect problems include oak webworm (*Archips fervidana*), oak skeletonizer (*Bucculatrix ainsliella*), solitary oak leafminer (*Cameraria hamadryadella*) and gregarious oak leafminer (*C. Cincinnatiella*), variable oakleaf caterpillar (*Heterocampa manteo*), and June beetles (Johnson 1990). Oak lacebug (*Corythucha arcuata*) may heavily defoliate bur oaks in shelterbelt plantings, especially during dry weather.

Acorn-inhabiting curculionid weevils of the genera *Conotrachelus* and *Curculio* cause the most damage to

acorns. Two species of *Conotrachelus, C. naso* and *C. posticatus* infest bur oak acorns (Gibson 1971).

Oak wilt (*Ceratocystis fagacearum*) is a less serious problem in bur oak than in species of red oak, but the disease sometimes spreads through root grafts of adjacent trees, and entire groves have been killed by the gradual expansion of the disease from one center of infection. Bur oak is susceptible to attack by the cotton root rot (*Phymatotrichum omnivorum*) *and* Strumella canker (*Strumella coryneoidea*). Other pathogenic fungi have been recognized (Johnson 1990).

Environmental Concerns
None known

Seeds and Plant Production
Trees as young as 5 years of age began producing acorns in a spaced plant nursery where 20% of the trees from 20 different sources. Acorn production ranged from heavy to light in the provenance test at Manhattan, Kansas (USDA NRCS, Unpublished Data). For forest trees the minimum seed-bearing age is 35, with optimum seed production occurring between 75–150 years, and trees are known to produce seed up to 400 years. Abundant acorns are produced every 2–3 years, with light crops in the intervals (Fowells 1965).

Figure 6. Five year old 'Lippert' bur oak produced some 40 acorns. *John M. Row, USDA NRCS, Manhattan, KS*

Bur oak may be transplanted or it is easily propagated from seed. Seed should be stored over winter in a cool, moist place at 1–4°C. Germination frequency may be enhanced by stratifying 30–60 days at 1–5°C but stratification is not required for germination, except for var. *oliviformis*, which typically germinates during the spring. Most natural seed germination occurs during the fall (directly after maturation) but seed may be planted in either the spring or fall. Seeds should be planted ½ to 1 ¼ inches deep, in groups of 2–3, spaced at roughly 6 foot intervals (Kansas Forest Service 2010).

Cultivars, Improved, and Selected Materials (and area of origin)
'Boomer' bur oak was released in 1994 by the James E. "Bud" Smith PMC. Collected from Custer Co., Oklahoma, Boomer was selected for its growth rate and habit under windbreak conditions. It performs well in dry areas.

'Lippert' bur oak, released in 1993 by the Manhattan, Kansas PMC, is a seed propagated cultivar. It is recommended for conservation use in multi-row windbreaks, reforestation for watershed protection, and wildlife habitat plantings. Lippert's deeply furrowed bark and bright green foliage make it an attractive tree for farmsteads.

Ekalaka Germplasm bur oak is a Selected Class pre-varietal selection of bur oak released by the Bridger, Montana PMC in 2009. It was selected for more rapid growth in height, higher percentage seedling survival, and better vigor. It is recommended for various conservation applications such as windbreaks, shelterbelts, riparian forest buffers, Xeriscapes®, woody draw restoration projects, and wildlife plantings.

Bur oak seed is readily available through commercial seed sources in the central and western US. Seedlings can be purchased from both state and commercial nurseries. Foundation seed of Plant Materials program selections is available by contacting the releasing PMC or respective Plant Materials Specialist.

References

American Forests, National Register of Big Trees: bur oak, *Quercus macrocarpa* [online:cited January 2007].

American Forests, National Register of Big Trees: *Quercus macrocarpa* (http://americaforests.org/resources/bigtrees/quercus-macrocarpa-5/). [online:cited April 2012].

Barkley, T. ed. 1986. *Flora of the Great Plains*. 1986. Univ. Press of Kansas. Lawrence. 1392p.

Cordsiemon, R. 2012. Personal Communication. USDA NRCS Elsberry Plant Materials Center.

Dirr, M. A. 1998. *Manual of Woody Plants: Their identification, Ornamental Characteristics, Culture, Propagation and Uses.* 821-822. Stipes Publishing L. L. C. Champaign IL.

Fowells, H. A. 1965. *Silvics of Forest Trees of the United States.* Agriculture Handbook No. 271. USDA Forest Service, Washington, DC.

Gibson, L. P. 1971. Insects of bur oak acorns. Annals of the Entomological Society of America.

Gilman, E. F. and D. G. Watson. 1994. *Quercus macrocarpa.* Fact Sheet ST-551. U.S. Forest Service. Southern Group.

Gucker, Corey L. 2011. *Quercus macrocarpa.* In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [online:cited November 2012].

Harlow , W. H. , E. S. Harrar, and F. M. White. 1979. *Textbook of Dendrology* . Sixth Edition. McGraw-Hill Book Co. 510p.

Johnson, P. S. 1990. *Quercus macrocarpa* Michx. Bur Oak. Pp. 686-692, *IN*: R. M. Burns and B. H. Honkala. *Silvics of North America. Volume 2. Hardwoods*. USDA, Forest Service Agric. Handbook 654, Washington, D.C.

Kansas Forest Service. Bur oak. (http//www.Kansasforests.org/pubs/conservation/index.shtml). [online: cited July 2010].

Moerman, D.E. 1998. Native American Ethnobotany. Timber Press. Portland. London. 927pp.

Nixon, K.C. and others 1993. *Quercus*. Pp. 445-506, IN: *Flora of North America, North of Mexico. Vol. 3*. Oxford Univ. Press, New York, New York.

Ohio Division of Natural Resources, Division of Forestry Bur oak (*Quercus macrocarpa*). http://www.ohiodnr.com/forestry/trees/oak_bur/tabid/5390/Default.aspx [online: cited July 2010].

Panshin, A. J. and C, deZeeu. 1980. *Textbook of wood technology*, 4th Edition. McGraw-Hill Series in Forest Resources. McGraw-hill Book Co., New York. 722p.

Stephens, H.A. 1969. *Trees, shrubs, and woody vines in Kansas*. Univ. of Kansas Press. Lawrence. 250p.

Tang, Z. C. and T. T. Kozlowski 1982. Some physiological and morphological responses of *Quercus macrocarpa* seedlings to flooding. Can. J. For. Res. Vol. 12: 196-202.

USDA NRCS. Unpublished Data. Bur oak (*Quercus macrocarpa* Michx.) seed source study. Manhattan Plant Materials Center, Manhattan, KS.

Prepared By:
John M. Row, Plant Materials Specialist
NRCS Plant Materials Center
Manhattan, KS 66502

Wayne A. Geyer, Professor
Forestry Division, Kansas State University
Manhattan, KS 66506

Guy Nesom, Formerly BONAP, North Carolina Botanical Garden, University of North Carolina, Chapel Hill, NC 27599

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Keywords: bur oak, *Quercus, Quercus macrocarpa*, fire-resistant, large tree, long-lived tree, drought tolerant

VirginiaTech
Invent the Future

Department of
Forest Resources and Environmental Conservation

bur oak Fagaceae *Quercus macrocarpa* Michx.

symbol: QUMA2

vTree

Leaf: Alternate, simple, 6 to 12 inches long, roughly obovate in shape, with many lobes. The two middle sinuses nearly reach the midrib dividing leaf nearly in half. The lobes near the tip resemble a crown, green above and paler, fuzzy below.
Flower: Species is monoecious; male flowers are yellow-green, borne in long, drooping slender catkins, 2 to 4 inches long; female flowers are green tinged in red and appear as single, short spikes, both appear shortly after the leaves.
Fruit: Acorns are quite large (1 1/2 inches long) and 1/2 enclosed in a warty cap that has a long-fringed margin, maturing in one growing season in late summer and fall.
Twig: Quite stout, yellow-brown, often with corky ridges; multiple terminal buds are small, round, and may be somewhat pubescent often surrounded by thread-like stipules; laterals are similar, but smaller.
Bark: Ashy gray to brown in color and quite scaly, but noticeably ridged vertically on large trees.
Form: A large tree that often reaches over 100 feet tall with a long clear bole. In the open it becomes a very wide, spreading tree.

Looks like: white oak - overcup oak - post oak - sand post oak



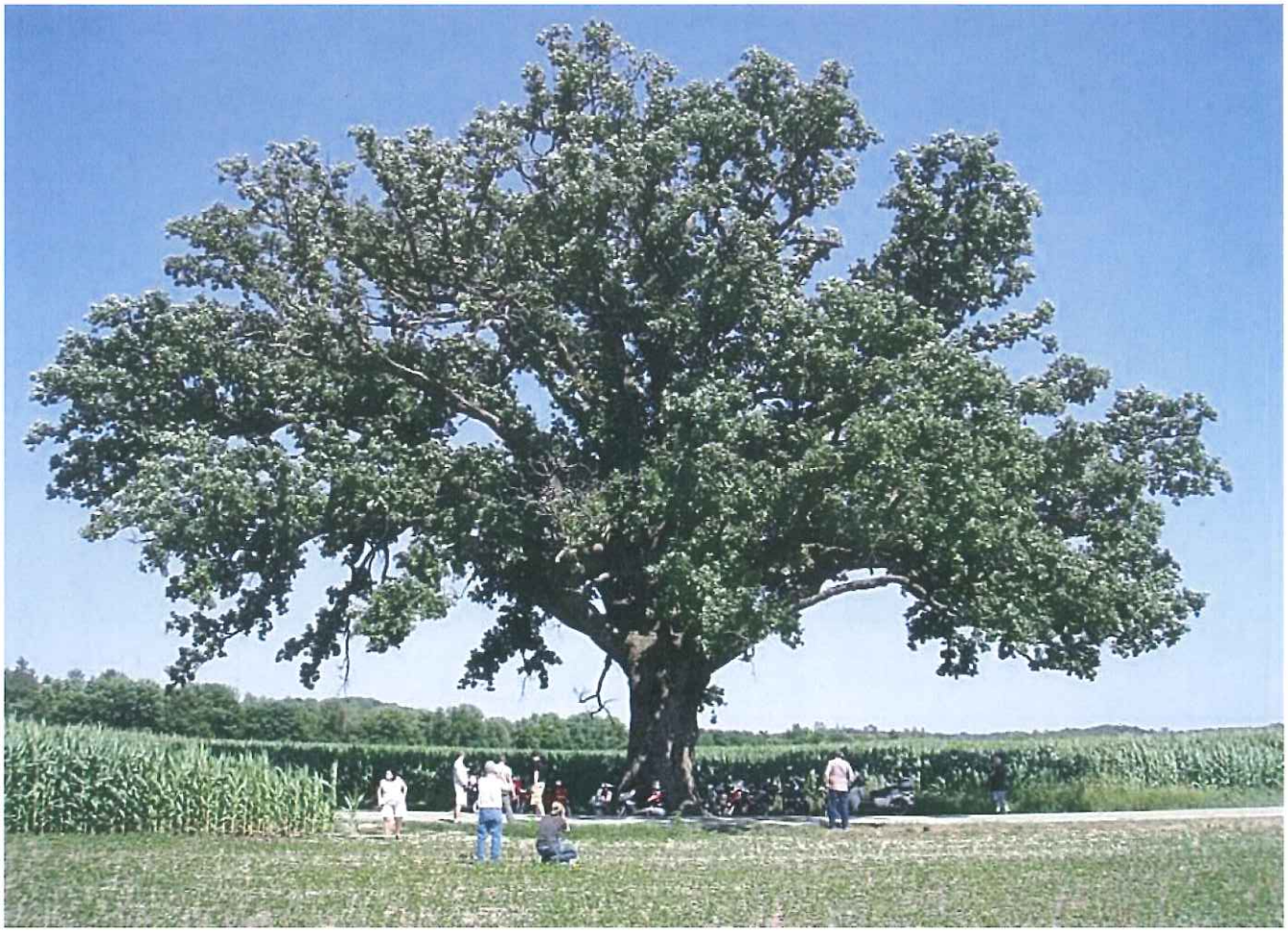


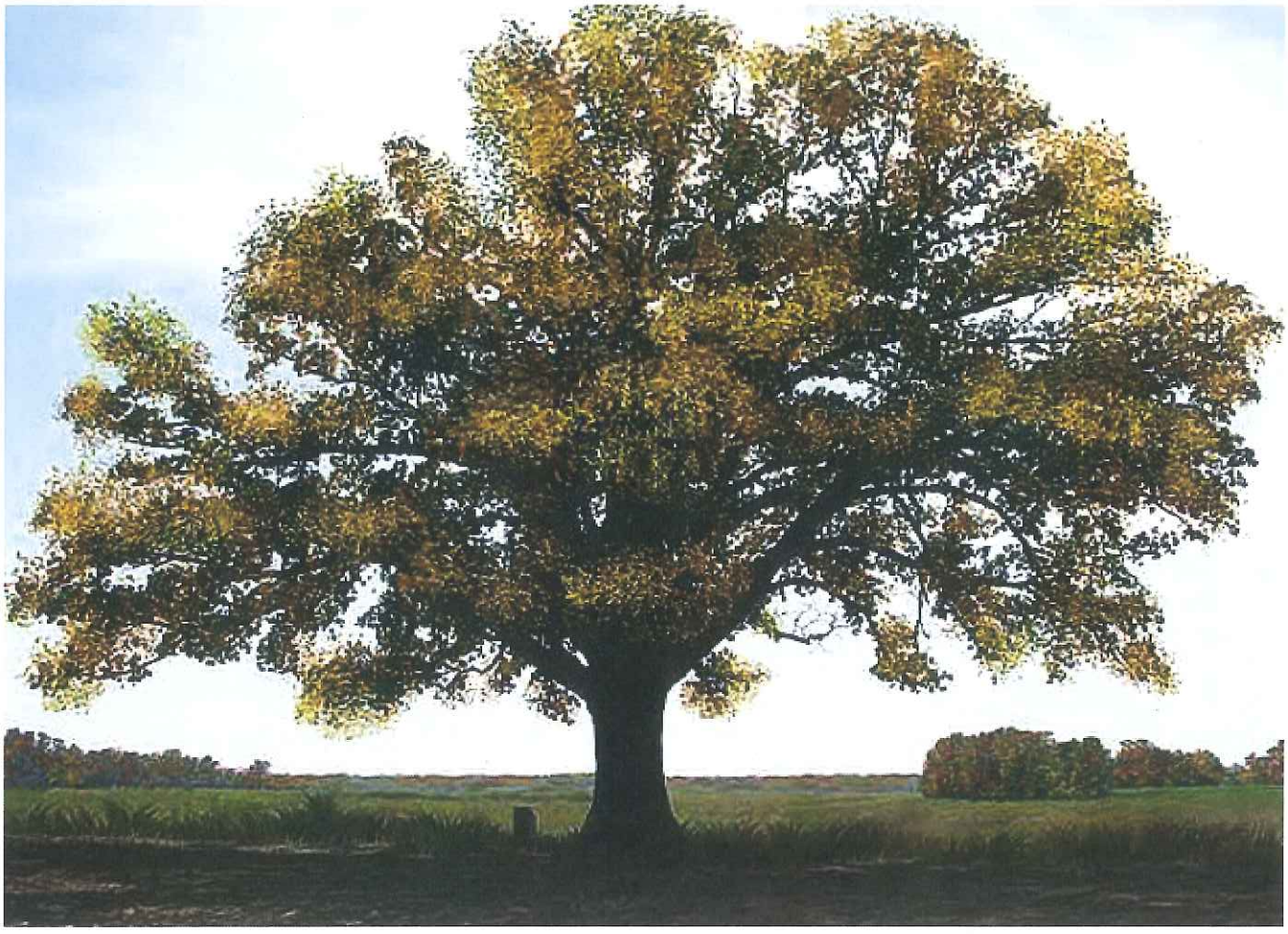


Additional Range Information:
Quercus macrocarpa is native to North America. Range may be expanded by planting. See states reporting bur oak.
More: Fall Color

External Links:
USDAFS Silvics of North America
USDAFS Additional Silvics
Landowner Factsheet
USDA Plants Database
Horticulture

Photos and text by: John Seiler, Edward Jensen, Alex Niemiera, and John Peterson





Zimbra **pinam@ashland.or.us**

Tree replacement in the square

From : Jim Falkenstein <falkenprops@gmail.com> Thu, Oct 09, 2014 09:41 PM

Subject : Tree replacement in the square

To : neffrussell@hotmail.com, pinam@ashland.or.us, caseyprolandtreecare@gmail.com, papkenny66@yahoo.com, gtrunnell@mates.org

I found the tree commission meeting tonight very interesting and intelligently pursued. Thank you for allowing me to attend.

Regarding the choice of a Red or Bur Oak as a replacement for the dead tree in the square, mIght I suggests these supporting facts.

In addition to tolerance for compacted urban soil and rapid yearly growth -

- In 2004 the United States Congress, sponsored by The Arbor Day Foundation, passed legislation declaring The Oak as our National Tree. If it's good enough for America, isn't it good enough for Ashland?
- In Greek mythology, the oak is the tree sacred to Zeus, king of the gods. In Zeus's oracle in Dodona, Epirus, the sacred oak was the centerpiece of the precinct, and the priests would divine the pronouncements of the god by interpreting the rustling of the oak's leaves. Maybe our oak's leaves can be used to interpret the spirits and pronouncements and such!
- The Bur Oak is a know butterfly attractor. Who doesn't want more butterflies?
- The Red Oak is called the "Red" Oak for it's stunning red coloring in the fall. Beats the hell out of the "Dirt Colored" Oak.
- In Norse mythology, the oak was sacred to the thunder god, Thor. Thor's Oak was a sacred tree of the Germanic Chatti tribe. All we need to do is get an Ashland Thunder God and this oak can be his sacred tree!
- The Oak was a primary source of sustenance for Native Americans on our continent for thousands of years. Don't we want to pay some tribute to our Native American fore bearers?

So I'm just throwing some superficial augmentations to your recommendation of a tree for the square so that when someone down the line claims that "lateral considerations weren't made about the cultural importance and symbolism of the tree", you can claim otherwise.

That said, I'd prefer a Ginko biloba tree. Male. Not sure which cultivar works well in Ashland, but I like the leaves. Half the products at The Ashland Coop already have Ginko in them so it's a fun and easy sell to the locals. And... I like the leaves. It's a living prehistoric fossil. No living relatives! (luckiest organism ever). Disease and insect resistant, and... cool leaves.

Just a few thoughts. keep up the good work

Jim Falkenstein

Zimbra **pinam@ashland.or.us**

Fwd: Tree replacement on plaza

From : Mary Ann & Ken <mkbergman@q.com> Fri, Oct 03, 2014 09:37 PM
Subject : Fwd: Tree replacement on plaza
To : michael pina <michael.pina@ashland.or.us>
Reply To : Mary Ann & Ken <mkbergman@q.com>

Begin forwarded message:

From: Mary Ann & Ken <mkbergman@q.com>
Date: October 3, 2014 8:55:04 PM PDT
To: michael.pina@ashland.or.us
Subject: Tree replacement on plaza
Reply-To: Mary Ann & Ken <mkbergman@q.com>

Dear Michael Pina:

We recommend that a tree with colorful autumn foliage, similar to the deceased maple, be planted in this spot. Another, more durable, maple variety would be the best choice. Maples are far and away the most colorful trees in autumn. We don't know how bur or red oaks stack up for fall color, but most oaks are not all that colorful, being more rust than brilliant red. The dead maple was a brilliant highlight on the plaza in autumn, so lets replace it with an equally colorful tree.

Sincerely,

Mary Ann & Kenneth Bergman
mkbergman@q.com
525 A Street, #5
Ashland, Oregon 97520