MINNESOTA
Shade Tree Advocate
Speaking Out For Community Forests

VOL. 7, NO. 3

Summer 2005

COMMUNITY FOREST PROFILE

Global Climate Change: It's All About the Trees?

By Chad P. Giblin

Just bring up the issue of global warming and you're bound to get a "heated" response. This issue is so economically/politically charged that it's really quite difficult to figure out exactly what's going on. Much scientific concern currently lies in the gases that can cause widespread change in plant and animal life, specifically increasing levels of carbon dioxide (CO2) and methane gas. So, a good starting point would be to replace "global warming" with "global climate change." This helps us to think about other issues that are involved in changing climates, not just temperature.

A key concept in understanding global climate change is that very small shifts in the Earth's rotational axis result in changes in the amount of sunlight that reaches us, especially in the Northern Hemisphere. Solar energy peaks about every 22,000 years. These peaks correspond to natural warming trends and peaks in both CO2 and methane concentrations. This warming trend ends 11,000 years later when the rotational axis shifts to minimize solar warming; this results in lower levels of CO2 and methane. This all seems quite predictable. In fact, this could explain what's happening right now. We're just currently in a warming phase, and eventually the rotational axis will shift and we'll have another Ice Age. Unfortunately, that's not the case. According to 400,000 years of data, from a 3 kilometer (1.86 mile) long ice core extracted from the Vostok station in Antarctica, we should be in an Ice Age right now.

Dr. William F. Ruddiman, professor of Environmental Sciences at the University of Virginia, has developed an insightful new hypothesis: climate change actually began about 8,000 years ago. Based on gas measurement from air bubbles trapped in the Vostok ice cores, Dr. Ruddiman suggests that the advent of organized agriculture in Europe and Asia actually stopped an Ice Age from happening. After the last ice age, some 20,000 years ago, when most of the northern hemisphere was covered in ice, massive tracts of forests began to develop. These forests eventually covered massive tracts of land throughout Asia, Europe,

Global Climate Change continued on p. 3

Inside THIS ISSUE

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The Minnesota Shade Tree Advisory Committee's mission is to advance Minnesota's commitment to the health, care and future of all community forests.

Dear Dad: I Don't Deliver Computers.

by Jill Johnson

DISMAY. That was the look on my father's face when I announced that I had accepted a job as a Technology Transfer Specialist. He wondered why, after being so devoted to urban forestry, I would switch careers–to deliver computers or provide computer phone support or some other technology transfer job.

I assured him that I was still in urban forestry and tried to explain the responsibilities of my new position. I must have done a poor job because, to this day, when engaged in small talk about where his kids live and what they do for a living, he finds it easier to skip over me than try to explain it.

So, in an effort to get back into the family tree and answer the question that I see on so many people's faces when I tell them what I do…I take this opportunity to give my interpretation of "technology transfer" and explain how it is the core of the Forest Service's Midwest Center for Urban & Community Forestry.

Although the word "technology" conjures up images of hardware and software (and laser beams for some reason), technology transfer really has little to do with computers. It is only since the recent surge in computer use that the word "technology" has come to denote computer-related technology instead of its original meaning of "applied science"–any science.

Technology transfer is enabling people to use research findings and innovations. In urban forestry, that means getting people to adopt tree planting and care practices that research proves are the most successful. It means helping urban forest managers and arborists learn about innovative tools that can improve efficiencies and accuracies in their jobs (like handheld computers and the AIR-SPADE®). And it means helping instructors use new ways of teaching and reaching (like web courses).

With so much research and innovation being developed by sources all over the country, how is it possible to stay in touch with the "latest and greatest"?

One way is to devise a system of collecting and then distributing information across political boundaries, geographic areas, and private/public sectors. And that is what the Forest Service has done by creating the Midwest Center for Urban & Community Forestry. Utilizing a network of researchers, educators, private industry professionals, non-profit organizations, and government agencies, the Center serves as a gathering place for new informational resources, research, and innovation.

The Center is much like a bottling and distribution plant (pardon my beer analogy, but I lived in Wisconsin for eight years). We need to get the beer (information) into a format that can and will be consumed by those we are targeting. By bottling and labeling the information in a way that will appeal to the consumer, we have a better chance of it being used. The "bottles," in our case, include fact sheets, posters, websites, newsletter articles, CD-ROM's, workshops, and presentations.

The next step is to determine the best way to distribute the bottled information. As the Center Coordinator, I work through a network of information brokers. Although still being developed, the network includes state urban forestry coordinators, teachers, librarians, extension agents, professional organizations (like the International Society of Arboriculture and the Minnesota Nursery and Landscape Association), and non-profit organizations. I also strive to improve avenues for getting information out in a timely manner, via research summaries, resource alerts, and online, searchable databases of existing resources.

As a Technology Transfer Specialist and Coordinator of the Midwest Center for Urban & Community Forestry, I try to stay abreast of the latest research and new innovations that can improve the planting, care, and management of trees in developed areas. Sometimes the information needs to be rewritten or repackaged for the intended audience. Through a small grants program, the Forest Service provides funding to organizations interested in developing those translations. Or, in some cases, we contract for the service to be completed or work internally with our own staff. Once completed, the resources are distributed through information brokers who then, in turn, distribute through their networks. Much like a beer distributor, for most people, the information and resources then come to them through their local network.

In order to prioritize Center initiatives and gauge informational needs, I rely on a committee of researchers, practitioners, and educators from each of the seven Midwest states. Minnesota committee members are Janette Monear of the Tree Trust and Patrick Weicherding of the University of Minnesota Extension Service. If you have ideas, please feel free to contact me, so that we can continue to get you the information and tools necessary to improve our tree resource. Until then, stay tuned for my next article: Dear Dad: I'm not a beer distributor.

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Global Climate Change from p. 1

and North America. It was in those trees that much of the slowly rising levels of carbon dioxide found their home. Then, about 8,000 years ago, these forests were cleared on tremendous levels for agriculture. This resulted in significant increases in both CO_2 and methane in the atmosphere.

Dr Ruddiman finds additional support in the deforestation claim from disease epidemics that resulted in massive loss of human life. The two most significant events are the "Black Death" or bubonic plague of Europe in the 1300s, which killed up to 40% of Europeans, and smallpox, which killed 90% of Native Americans in the 15th century. These tremendous losses in human life correspond with deep drops in global carbon dioxide and methane levels. He suggests that the loss of human lives, on such a large scale, caused a dramatic fall in overall agricultural production and thus allowed much of the land to return to a more "natural" state, one with more trees, that is more able to capture carbon from the atmosphere.

> Forests worldwide currently absorb about one-third of total carbon emissions from human activity.

So, our farming ancestors actually may have averted an ice age. It seems like that might have been a good thing, right? There's much less cave-dwelling, no problems with having to go spear wooly mammoths or keeping the kids safe from saber-toothed tigers.

The Tree Connection

Most of us are already aware of the many benefits of trees, especially in urban areas. As mentioned above, one benefit, still being heavily debated, is the concept of trees acting as "carbon sinks" or areas of long term carbon storage. Forests worldwide currently absorb about $\frac{1}{3}$ of total carbon emissions from human activity. The idea here is that having more trees around will help offset any potential increases in CO_2.

This seems like a good idea, so good that the United States and other governments around the world were planning to plant trees to offset potential contributions to elevated CO_2 levels. Additionally, many people, in both the political and scientific communities, suggest that plants will actually grow better under elevated carbon dioxide levels. Dr. Patrick J. Michaels, a professor of Environmental Science at the University of Virginia, supports this theory by stating that CO_2 is "being increasingly captured by growing vegetation." It's like a two-for-one deal, we're going to have more trees and they're going to grow faster!

Unfortunately, it might not work. There are countless researchers looking into climate change and elevated CO_2 levels on plant, ecosystem, and global scales. A popular method to examine the effects of elevated CO_2 on plants utilizes Free Air CO_2 Enrichment (FACE) technology. This basically involves pumping extra CO_2 into the air around plants and seeing what happens. A large FACE experiment, currently underway at Duke University in North Carolina, is examining the effects of elevated CO_2 on a loblolly pine plantation. Other researchers have examined white poplars and various food crops. Here in our own state, the University of Minnesota is examining how changes in atmospheric conditions will affect plant biodiversity. At the Cedar Creek Natural History Area, just north of the Twin Cities, the BioCON (Biodiversity, CO_2, and Nitrogen) research site is examining how local grassland species biodiversity is affected by the addition of CO_2 and nitrogen. Many scientists are hesitant or lack enough data to draw concrete conclusions, but have developed many theories as to how plants (mostly food crops) respond to elevated atmospheric CO_2 levels.

One recurring idea is that of CO_2 acclimation. This happens when plants "get used" to having elevated levels of CO_2 around. Initially, we see increases in photosynthesis, especially in cool-season or C3 plants, but after a while, photosynthesis levels off. There are various reasons for this, but the bottom line is that the massive increases in growth usually don't last. Another problem could arise if temperatures also increase with CO_2 levels. According to research from the International Geosphere-Biosphere Programme, we will see an initial increase in forest growth due to elevated CO_2 levels and increased photosynthesis. Unfortunately, higher temperatures usually result in higher rates of respiration and more release of CO_2 from plants. Trees only work as carbon sinks when photosynthesis (carbon absorption) exceeds respiration (carbon release).

Even more interesting is that the amount and types of nitrogen taken up by the plants can also be affected by increases in CO_2. In a study that examined nitrate (NO_3^-) uptake in wheat, barley, and tomatoes, researchers found that increased atmospheric CO_2 levels caused the plant to favor nitrogen in the ammonium (NH_4^+) form over the NO_3^- form. In general, some plants favor NO_3^- and others favor NH_4^+, but they all rely on a delicate balance that may be in jeopardy. If these results are accurate, we could expect changes in biodiversity as some plants are favored over others. The practical application here requires some serious rethinking of how and when we apply fertilizer to our food crops and other plants.

We also need to think about the reality of planting more trees. This is actually quite a daunting task, and I think most of us can agree that we can't possibly plant enough trees to even get close to our pre-agricultural conditions. Based on my personal opinion alone, I thought we were doing pretty well on the planting end, but according to some surveys, tree numbers are actually down nationwide. Using satellite imagery, the tree conservation group, American Forests, estimates that 634,407,719 trees are currently "missing" from urban areas in the United States. By missing, they imply that the trees were, for the most part, removed due to development – urban sprawl. Similar studies focused on the Baltimore-Washington metropolitan area, including the Chesapeake Bay watershed, found that from 1973 to 1997, overall tree cover decreased from 51% to 39%. If the tree loss alone isn't bad enough, there was also an increase in impervious surface area, again due to development, which increased stormwater runoff by 19%. The American Forests group predicts building infrastructure to handle this additional water, which was before handled by trees, to cost about $1.08 billion dollars. This is all in addition to the loss of air quality benefits, cooling and heating advantages, and loss of overall aesthetics of having fewer trees around.

As foresters, arborists, growers, and all-around tree huggers, we know that trees do good things for us and the planet. We know that keeping them healthy and strong will maximize contributions to us and the environment. The big hurdle now is to plant as many trees as possible and remove as few as possible.

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New Book Features Trees
on the Winona State University Campus

By Bill Meyer

Most of my life has been spent planting, growing, nurturing, enjoying, and talking about trees. In the past year, I added a new dimension to my work with trees. I wrote a book about trees.

For several years, an idea hung around in the back of my mind that I should make a record of the trees on the Winona State University (WSU) campus, where I am the senior groundskeeper. I realized that my memory isn't what it used to be, and it probably wasn't likely to get any better as I age. I thought that some of the interesting and valuable information about when and where trees were planted might be lost forever if I didn't write it down.

With the encouragement of the university president Darrell Krueger, the assistance of Tom Grier, WSU's Director of University Communication, and the expertise of the WSU Publications Office staff, the book, *The Trees of Winona State University,* was published in December 2004. This book represents a tour–or perhaps more correctly, a journey–of the evolution of the trees at Winona State University.

I started working at Winona State University in the mid 1980s, following years as a horticulturist and armed with a degree from the University of Minnesota, where I worked at the Landscape Arboretum as a student. I realized that the WSU campus grounds had a limited number of tree species. Many flowerbeds that displayed a dazzling array of flower types were planted throughout the campus, but WSU only hosted 15-20 different tree species. I became concerned about potential harm to the campus environment that could be caused by this lack of diversification combined with possible disease, insect infestation or severe weather.

Diversification and expansion of the types of trees growing on campus became a personal and professional goal. In 1994, I planted the first of our Kentucky Coffeetrees and the journey officially began. Throughout the next 10 years, the WSU campus grounds witnessed incredible change. With WSU President Darrell Krueger's vision, the streets that crisscrossed the inner core of the campus were eliminated and returned to green space, providing more opportunity for the introduction of new and varied plant materials.

In 2003, Winona State University was able to boast, that it had growing on campus. all the tree species that are native to Minnesota that were included in a publication of the University of Minnesota Extension Service. Each year, we added several more trees, moved a few to make room for expansion or renovation projects, and replaced specimens that may not have taken well to harsh winter weather or particularly dry summer periods.

The Trees of Winona State University serves several distinct purposes. On the one hand, it may be viewed as a field guide of sorts with tree information, maps and identifying photographs. It may be helpful as a companion to a walking tour of the campus grounds. In addition, it is a volume that attests to Winona State University's dedication to providing a beautiful campus environment that supports learning.

The book has also served as a springboard for many local and regional groups to visit campus and request guided tours of the trees. School groups, gardening clubs and even alumni have requested campus tree tours, which I am happy to lead, as time permits.

The first section of the book includes photographs and feature descriptions of several campus trees. The second section features campus maps which represent the placement of each tree on campus. Trees included in the feature section were chosen because of the potential interest for the reader. In each case, the feature tree has a unique story related to its inherent features (leaves, blooms, fruit, bark, etc.); the history of the species; or how the tree came to be placed at Winona State University. Several trees are the result of donations of faculty, staff or friends of the institution, and others have been placed as living memorials to loved ones with a connection to the university.

The section that includes the maps is broken out geographically in a grid pattern that covers the entire main Winona State University campus. Readers can use the maps to help locate a tree they wish to view, or use the grid map system to help identify a tree they are viewing while holding the book. The maps include the common name of each tree, as well as the official species name.

The journey is not over. A constant evolution will continue to take place here at Winona State University. This book is a brief but current glimpse in time of the trees on campus. It can serve as a foundation for even better record-keeping in the future. I hope the guide adds to the appreciation of the beauty of Winona State University grounds.

Bill Meyer is the senior groundskeeper at Winona State University in Winona, Minnesota.

The Trees of Winona State University *is available through the Winona State University Bookstore (phone: 507-457-5319). All proceeds from the sale of the book will be used for maintenance and diversification of trees on campus.*

DISPEL-A-MYTH

Don't bother planting trees in the fall!

By Emily Barbeau

Minnesota's growing season may be less than desirable for horticultural enthusiasts, but for arboricultural enthusiasts, there is hope! When summer wanes and crisp northern air sets in, don't put those tools away, plant some trees! It is time to overcome that intuitive and nagging question: How can a tree possibly establish a decent root system before winter weather descends on Minnesota?

To overcome our doubts, we must look to tree biology and the amazing interaction between trees and soil. Springtime is associated with the emergence of new shoot growth, so it is the most common time people chose to plant trees. We can see buds and green growth, so now the tree is ready to grow!! Too many of us tend to forget the fact that unlike shoot growth, tree root growth actually has two peak times: spring and fall. Roots show reduced growth during the summer due to reduced rainfall. In the fall, however, when shoot growth has plummeted, root growth continues until soil temperature and water conditions permit. Additionally, soil temperatures are usually warmer in the early fall than they are in the early spring, especially after a long, cold winter.

If we really want to delve into tree biology, consider the shorter days and cooler temperatures of fall. These variables can lead to less transpiration (water loss from the tree) and allow the tree roots more time to grow before the big water demand of spring sets in. This means you won't have to contend with transplant shock associated with summer heat. According to many sources, root growth continues until the soil temperature falls below 45 degrees F. Although every year is a little different, the fall planting season in Minnesota is generally from September to late October.

But wait, aren't there certain trees that won't do well when planted in the fall? Indeed, when planting trees in the fall, there are a few limitations to keep in mind, and maybe that is why we avoid fall planting. There are three main types of planting "stock" to choose from when buying a tree: Balled and burlap, container, and bare root. Of these three, don't plant bare root trees in the fall, plant them in early spring. It is also worth mentioning that there is a difference between planting a tree and transplanting a tree. Planting a tree requires digging a hole, putting the root system in the hole, covering it with soil, watering and mulching the tree. Conversely, transplanting entails first uprooting a tree and then planting it. While planting can be done anytime the ground is workable, transplanting cannot be done with a high degree of success in the fall for some species. If a tree is dug in springtime, it will be kept in a warm, moist medium such as sawdust, bark, or sand which promotes root growth and establishment. If a tree is dug in mid to late fall and then planted (this is transplanting), there may or may not be a window of opportunity for the root system to re-establish before soil temperatures drop, and that can yield a root system that never recovers in time for the next spring when it's responsible for supporting the crown with moisture.

The tree species you should avoid transplanting in the fall are oaks, most fruit trees (plum, crabapple, and cherry), mountain ash, honey locust, poplars, ironwood, birch, and hawthorn because they may be more sensitive to winter damage if they don't establish in time. Damage may include frost damage to shoots and flowers, winterkill of buds, soil heaving, and sunscald. You could, however, certainly choose to plant these trees in the fall.

Moving swiftly from tree biology to tree finance, another reason to plant in the fall are the discounts that you can usually get at retail nurseries. Most stores do not want to pay for the care of trees over the winter, so the trees go on sale! Make sure you buy only healthy planting stock, though, because a stressed tree in poor health and condition is about as useful as the ugly orange sweater you bought last year on clearance. Examine each tree to be sure they are wound and canker-free, have good branching structure, have roots within the first 4 inches of the soil line in the container or root ball, and that the roots are not encircling.

Just like spring planting, it is important to mulch the area around the tree and continue to water until the ground freezes. Make sure not to fertilize the tree since vigorous growth right before frost makes the plant tissues more susceptible to damage and dieback.

Emily Barbeau is an Assistant Forester with the City of Minnetonka.

FOREST HEALTH

Sudden Oak Death

By Patrick Weicherding

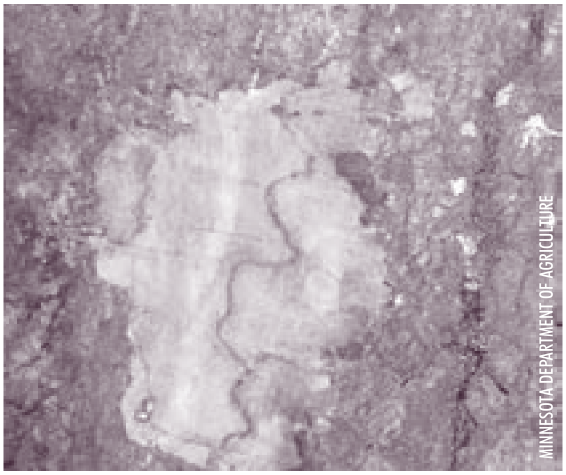
Remember the days when the only one who worried about diseases in the yard and landscape was the gardening guru next door? Unfortunately, today, with so many new and devastating exotic insects and diseases, knowledge and action to prevent them is imperative. The latest, a deadly tree disease that everyone hoped would remain confined to California, was potentially shipped (last year) to every state in the US through the shipment of infected nursery stock. The pathogen, *Phytophthora ramorum,* causes at least two types of disease. Ramorum leaf blight infects over 40 genera of herbaceous and perennial hosts, and sudden oak death (SOD) attacks oak and other tree species.

First appearing along the coast of California in 1995, the pathogen has caused the death of thousands of tan oaks, *Lithocarpus densiflorus,* and other oak species including California live oak, Shreve's oak and California black oak (all *Quercus* species). In 2000, researchers at the University of California identified the organism as a fungal-like organism in the same genus *(Phytophthora)* as the organism that caused the horrific blighting of potatoes in Ireland, resulting in the well-known Irish potato famine. It is no longer classified as a fungus but is still referred to as a water-mold, since it has a spore stage that produces flagella capable of propelling the spores short distances in water. *Phytophthora ramorum* was first reported in Germany in 1993 and today we know that the "strain" in Europe is slightly different and of a different mating type than the one in the US. The origin of this new pathogen in the US and Europe remains a mystery.

Phytophthora ramorum causes ramorum leaf blight on many different host plants, referred to as foliar hosts, and sudden oak death on several tree species (Tables 1 and 2; visit www.usda.aphis.usda.gov/ppq/ispm/sod for updates to these lists). By the end of 2004, the number of plant species

Table 1. Proven Hosts for Phytophthora ramorum

Acer macrophyllum	Bigleaf maple
Aesculus californica	California buckeye
Arbutus menziesii	Madrone
Arctostaphylos manzanita	Manzanita
Calluna vulgaris	Scotch heather
Camellia spp.	Camellia - all species, hybrids and cultivars
Hamamelis virginiana	Witch hazel
Heteromeles arbutifolia	Toyon
Lithocarpus densiflorus	Tanoak
Lonicera hispidula	California honeysuckle
Maianthemum racemosa (Smilacina racemosum)	False Solomon's seal
Photinia fraseri	Red tip photinia
Pieris formosa	Himalaya Pieris
Pieris formosa x japonica	Pieris 'Forest Flame', forest flame andromeda
Pieris floribunda x japonica	Pieris 'Brouwer's Beauty', Brouwer's beauty andromeda
Pieris japonica	Japanese Pieris
Pseudotsuga menziesii var. menziesii	Douglas-fir
Quercus agrifolia	Coast live oak
Quercus chrysolepis	Canyon live oak
Quercus kelloggii	California black oak
Quercus parvula var. shrevei	Shreve's oak
Rhamnus californica	California coffee-berry
Rhododendron spp.	Rhododendron (including azalea) – includes all species, hybrids and cultivars
Rosa gymnocarpa	Wood rose
Sequoia sempervirens	Coast redwood
Trientalis latifolia	Western starflower
Umbellularia californica	California bay laurel, pepper-wood, Oregon myrtle
Vaccinium ovatum	Evergreen huckle-berry
Viburnum x bodnantense	Bodnant Viburnum
Viburnum plicatum var. tomentosum	Doublefile Viburnum
Viburnum tinus	Laurustinus



Damage to a Tan oak.

known to be susceptible to *P. ramorum* reached 68 and these represent over 40 genera. Host plants are plants found naturally infected with P. ramorum. Those which have been through a rigorous scientific confirmation protocol called Koch's postulates are considered "proven hosts". Plants which are naturally infected but have not yet been confirmed by Koch's postulates are called "associated hosts". New regulations recently enacted by USDA-APHIS-PPQ–United States Department of Agriculture, Animal Plant Health Inspection Service, Plant Protection and Quarantine–require inspection and certification of freedom from *P. ramorum* of all nurseries in California, Oregon and Washington that ship plants interstate, and implementation of restrictions on the interstate movement of nursery stock from all nurseries in regulated areas.

Infected foliar hosts have been found in wildland settings in the US, and in plant nurseries. According to the California Oak Wilt Mortality Taskforce 2004 Report, P. ramorum has been found in more than 400 European nurseries in at least 13 countries, in the United States in 171 nurseries in 20 states, and in Canada in more than 20 nurseries. In Europe, *P. ramorum* is also found in landscape plantings. The *P. ramorum* caused canker disease of tree species (including SOD) is very limited in European natural environments, not at all like the SOD epidemic occurring in California. At the end of 2004, the canker disease had been found only on 9 trees in 3 sites in Cornwall, England, and on 2 trees in the Netherlands.

Symptoms on foliar hosts include leaf spots and blights, shoot blight, and stem dieback and are very difficult to tell from the diseases these hosts routinely have, even by the experts! Bleeding cankers caused by *P. ramorum* on tree

Table 2. Associated Hosts for Phytophthora ramorum

Abies grandis	Grand fir
Aesculus hippocastanum	Horse-chestnut
Arbutus unedo	Strawberry tree
Clintonia andrewsiana	Andrew's clintonia bead lily
Castanea sativa	Sweet chestnut
Corylus cornuta	California hazelnut
Drimys winteri	Winter's bark
Dryopteris arguta	California wood fern
Fagus sylvatica	European beech
Fraxinus excelsior	European ash
Kalmia latifolia	Mountain laurel
Laurus nobilis	Bay laurel
Leucothoe fontanesiana	Drooping leucothoe
Nothofagus obliqua	Roble beech
Pieris formosa var. forrestii	Chinese Pieris
Pieris formosa var. forrestii x Pieris	Japonica Pieris
Pittosporum undulatum	Victorian box
Pyracantha koidzumii	Formosa firethorn
Quercus cerris	European turkey oak
Quercus falcata	Southern red oak
Quercus ilex	Holm oak
Quercus rubra	Northern red oak
Rhamnus purshiana	Cascara
Rubus spectabilis	Salmonberry
Salix caprea	Goat willow
Syringa vulgaris	Lilac
Taxus baccata	European yew
Taxus brevifolia	Pacific yew
Toxicodendron diversilobum	Poison oak
Viburnum davidii	David Viburnum
Viburnum farreri (=V. fragrans)	Fragrant Viburnum
Viburnum lantana	Wayfaringtree Viburnum
Viburnum opulus	European cranberrybush Viburnum
Viburnum x burkwoodii	Burkwood Viburnum
Viburnum x carlcephalum x V. utile	Viburnum
Viburnum x pragense	Prague Viburnum
Viburnum x rhytidophylloides	Alleghany or Willowood Viburnum

hosts are difficult to discern from cankers caused by insect damage and other canker causing organisms including other species of *Phytophthora*. A number of Phytophthora species have been causing cankers on trees in urban and wildland settings in the US for sometime, but are not as aggressive as *P. ramorum*. As a result, laboratory testing is necessary for all samples suspected of having P. ramorum.

Although infections on foliar hosts seldom kill the host, they are very important because they produce the spores (inoculum) that infect the trees. These spores are known to be disseminated by rain-splash and water movement in the forest, but may also be moved around on plant material, or by human activity including hiking and biking in forests where the disease occurs. Currently in the US, the disease is only found in wildlands in California and one site in Curry County, Oregon which is under eradication, and in nurseries.

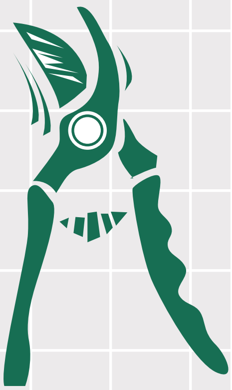
In response to the 2004 shipments of infected nursery stock from the West Coast to all states in the US, the US Forest Service expanded their forest (wildland) survey for *P. ramorum* in 2004 and initiated a survey of forested areas adjacent to nurseries while USDA–APHIS coordinated nursery surveys. No new sites with *P. ramorum* were found in forested areas outside California in the 2003 or 2004 Forest Service surveys. Survey plans have increased for forested lands and nursery perimeters in 2005 aided by new and ongoing research recently presented at the second Sudden Oak Death Science Symposium in Monterey, California.

USDA-APHIS-PPQ scientists continue to develop more effective and economic methods for mapping climate host factors used in survey maps by the US Forest Service and other regulatory agencies. The maps identify sites that are at highest risk for infection based on the presence of an environment that is highly conducive for disease development and the presence of susceptible tree hosts. The presence of the pathogen is the third factor necessary for disease development and unfortunately, it made its way around the country in nursery stock last year, or possibly even earlier. These surveys will be crucial for the early identification of the disease at new locations to allow successful eradication.

Patrick Weicherding is a Regional Extension Educator with the University of Minnesota Extension Service.

For more information on SOD contact your local Extension Service office, DNR office or visit:
www.suddenoakdeath.org
www.aphis.usda.gov/ppq/ispm/sod
www.fs.fed.us/na/morgantown/fhp/palerts/sod/sod.pdf (Forest Service Pest Alert)

Minnesota Celebrates Arbor Day 2005



Construction Damage: Is it Going to Get Your Tree?

By Robert Slater

This is not a story about how a tree responds to construction damage or how to protect your tree from construction. I am sure most of you know how to protect trees and reduce damage. This is a story about some of the common misunderstandings between the supposedly opposing sides of construction and tree care. I have learned much of what follows the hard and embarrassing way. To this day, I still cringe at the thought of these mistakes.

In my experience, there are only a few tree problems, but there are a lot of “people” problems. As tree care professionals, once we understand the extent of the construction, we can figure out the technical solution to protect the tree or have it removed. The people problem is much more difficult to solve. It is almost always about a lack of communication, which creates misunderstanding or misplaced expectations. Opposing sides, and the lack of knowledge of the needs on the other side, drive these misplaced expectations.

George Bernard Shaw observed, “England and America are two countries separated by the same language.” In the biological and the engineering arenas, we have the same problem. We use the same language, but we are divided by different understandings of the words. I have been in project meetings where one side of the table says, “it will be a small project with little impact” and I can see that neither side understood the meaning of the words.

Without understanding on both sides, no one will ever be satisfied with the outcome of a construction project. As tree care professionals, we need to be bilingual. To be bilingual, we need to be able to understand a construction plan and translate its meaning to everybody involved. We also need to be able to explain, in a clear and understandable way, what the proposed work means to the tree. Are the trees likely to decline, die, become hazard/risk trees or be standing in an inappropriate place once construction is complete? Can we, the tree care professionals, do the dirty work of recommending that a tree be removed, even when the above ground tree is not going to be physically removed by construction? Can we do this even when everyone else wants to keep the tree (but they are not going to do the necessary work to keep it healthy or safe)? Making these difficult decisions is, sadly, a necessary part of what we need to do–leaving a dangerous or dying tree is a favor to nobody.

When one side or the other says, “what the blankety blank were they thinking?”–*We have failed at our jobs.* Often the designer, engineer or construction company wanted to save the trees, but didn’t know how. Many times, examples of tree abuse are really a story of good intentions gone bad. On the flip side, the tree care professional didn’t know the real extent of the construction work when they said the tree would survive. Rarely does anybody wake up in the morning and say to themselves: “I’m really going to toss the monkey wrench in the works today, just to screw it up.” In general, everyone wants to do a good job. Many times the construction folks want to save more than should be saved given the work that is being done. After all, the trees they didn’t want, were cut down right at the beginning of the work. To us, the results look like tree torture, but it is really a lack of good information. As the old saying goes, the road to Hades is paved with good intentions.

This is the information gap where the tree care professional or urban forester can help. We must learn a new “engineering language” and fit it into our own technical expertise to make biology and engineering work together. We cannot forget the hard work of getting to know the people on the other side of the divide. They know what needs to be done to get the job done from their end. In design, for example, there are many things that constrain projects and need to be taken into account. Historic preservation, wetlands regulations (federal, state, and local), storm water runoff and erosion control laws, safety concerns, park land, municipal consent, threatened and endangered species, traffic projections, building codes, zoning codes, etc. During construction, room is needed for road bypasses, temporary bridges, temporary creeks, dewatering, material storage, equipment storage, temporary storm water ponds, the construction shack, parking for the workers, and lastly, one of the most important issues, room for the work to get done with large modern equipment. The list for design and construction is almost endless and we haven't even talked about the need for maintenance issues such as how to clean out holding ponds, plow snow, store snow, repaint, repair walls, patch pavements, replace lights and fix utilities.

My struggle in a large engineering organization is to save a few trees on the edge of construction that people haven't thought about and to remove a few trees on the edge, again, that people haven't thought about. The questions I ask myself: Does the edge of construction really need to be at that exact spot? Are there interior areas that can be left undisturbed? Are there any trees, just outside of the construction area, that should be removed? Those are the things I think about when I review a project.

Some of the more common misunderstandings I see in my work include:

CUTS–Areas where existing soil is removed. Terms like "shallow cut" or the "edge of cut" must be questioned. These terms can sometimes mean up to a foot of soil removal.

We need to explain how a shallow cut can cause problems for the tree. The extensive and "shallow" nature of the root systems of trees is always one fact that seems to shock non-tree care people (Figure 1).

"...fill placed on a tree root system is a major problem."

FILL–Areas where new soil is placed over the existing ground. "Light fill" can mean anything up to a foot of almost any kind of soil placed over the existing ground line. *Warning:* a fill starts with a cut. We all know that fill placed on a tree root system is a major problem. Be aware that in most cases, the roots are removed before the fill is even placed. In an area where fill is to be placed, the topsoil is usually salvaged (removed) for use elsewhere on the project before excavation is started. This results in a soil cut and the removal of tree roots to the approximate depth of the topsoil. Just like for cuts, we need to explain about the shallowness of the roots and how they are mostly in the topsoil (Figure 1).

Figure 1: Example of Root Spread Two Times the Height of Tree

CONSTRUCTION LIMIT–This is one of the biggest misunderstandings I commonly address. Construction limits are better described as a cut and fill limit, with the added restriction that if an area is returned to the original grade, it is considered to be outside the construction limit. This results in a lot of serious work outside of the so-called construction limits. Be careful about urban road reconstructions when city utilities, usually sewers, are being replaced. When the sewers, and therefore the trench to install them are deep, safety rules require that either a trench box be used or that the trench walls be cut back far enough so that risk of collapse is eliminated. This can require that the trees in the boulevard be removed even though they were outside of the construction limit.

UTILITY WORK–This work is often done by the utility company or contractors to the utility, not necessarily by your contractor. Often the work they must do is done before or after the tree protection areas are placed on the site. On big projects, this might happen a year ahead of the construction timeline. This means an extra level of coordination. The utility may be constrained by laws or regulation on how it does its own work. They may not know that the area where they just used a vibratory plow to put in a new power line was going to be protected during the rest of the work.

STAGING/WORKING AREAS–Every project, depending on size, needs: a place to store materials, room to excavate, room for the construction shack, room to move equipment around the site, access into and out of the area, room for temporary and/or permanent erosion and sediment control, places for the workers to park and a place to wash out the cement truck. Depending on the job the list seems endless.

TEMPORARY WORK–This can be temporary roads, bridges, utilities, holding ponds or erosion control work. If you know that this type of work is likely to happen, it gives you warning that large areas outside of the construction limits might be impacted. This often limits which trees can be saved, even though the area is well outside the "construction limits."

MODERN CONSTRUCTION PRACTICES–On almost all construction sites today, the equipment is large. Even small sites use large equipment because this is what the construction companies own and use on their projects. This large equipment is not always flexible or able to do the fine detailed work necessary to save trees. Large equipment needs a lot of room to work and move, reducing the green areas or number of trees that can realistically be saved without damage. Use of small equipment or handwork is fine, but carries an increased cost. When the use of different techniques is wanted, make sure to follow through and get the details into the contract language. Everyone needs to understand the cost of any extra work, the value of the trees, and the compromises that are made to tree health and the project. Make sure to talk to someone knowledgeable about modern construction practices to be sure that the work you want can be done. In large organizations, even the designer may not be familiar with the ins and outs of a construction site, and therefore, may be willing to do something in the plan that can't be done in the field. When this happens, it is one of the most-heart breaking outcomes and results in everyone being disappointed (Photo 1).

"...large equipment is not always flexible or able to do the fine detailed work necessary to save trees."

ROBERT SLATER

Photo 1 Large crane on crowded church site.

LIFE AFTER CONSTRUCTION (BE CAREFUL WHAT YOU WISH FOR)–Think about the long term. Will the tree you save be an asset or a liability to the site? Check with those who are responsible for the care of the area after construction. Will the owner or maintenance personnel remove the tree in a few years because of foreseeable problems? How long is the tree likely to survive? How much compromise to your project is needed to keep the tree? What is the cost to remove the tree if it dies? Compromise and the resulting problems are in the eye of the beholder. One person's compromised engineering or horrible tree care is another person's wonderful compromise that allows them to have both a tree and a garage. (Photo 2 on next page) As long as all parties know and fully understand what they are getting into, including all the potential problems and costs, almost any solution can work for a time.

In the long run, make sure the tree or area does not make your life more difficult. Is the tree or green space you save going to cause problems with snow drifting, shading, needed open areas or sight lines? Check with the person who is going to take care of the area on a daily basis. What good is it to save a tree just to have it damaged or removed in another project?

In conclusion, think about how a project will be built and all the room that is really needed to complete the work. Projects are not beamed down from the Starship Enterprise, they are built in the real world, with big equipment, on limited sites, by mere mortals.

I believe that our first job as tree care professionals is to make sure that everyone is speaking the same language. If we can't do that, we need to translate the words and make sure that both sides understand what is going to happen and what is the likely outcome and cost. The bigger the organization or project, the harder this job becomes. Only after all sides have had the jargon translated and fully understand the project, can we then go about our jobs of saving, protecting or removing trees using good tree care principles and practices.

ROBERT SLATER

Photo 2 Garage built around tree.

Robert Slater is a forestry and wetland coordinator at the Minnesota Department of Transportation. He can be reached at robert.slater@dot.state.mn.us or 507-529-6145.

Congratulations Mn/STAC Award Winners

Sponsorship Award

The Commercial Arborist "Cartel". The Cartel members are Jim Ostvig of Ostvig Tree Service; Steve Sylvester of S & S Tree and Horticultural Specialists; Steve Thompson, Lori Mordaunt and Greg Krogstad of Rainbow Treecare; Dennis Ullmon of St. Croix Tree Service; Dave Nordgaard of Top Notch Tree; and Jim Walsh of the Vineland Group for using innovation, their own employees, and capital investments to act as stewards of community forestry. The Cartel is also recognized for their contributions in promoting proper arboriculture practices and for education of the public and other tree care professionals. They have partnered with the City of St. Paul to organize and support the Festival of Trees. The Festival of Trees was held on May 7 at Como Park, in conjunction with the Minnesota Tree Climbing Championship.

Distinguished Service Award

Janet Larson, of EcoDesigns and Consulting, for significant contributions to urban and community forestry. Janet Larson puts forth tremendous efforts to foster community support and stewardship. She has been leading the charge for buckthorn removal in the name of saving native plants. She is an active member of the following groups: Minnesota Shade Tree Advisory Committee, Minnesota Society of Arboriculture, Minnesota Native Plant Society, Minnesota Horticultural Society, Tree Care Advisors, Master Gardeners, and the University of Minnesota Forestry and Biological Station at Itasca Park.

Outstanding Community Forestry Maintenance Award

The City of Crystal for preserving trees during the Edgewood Gardens redevelopment project. With thoughtful planning, arboricultural practices and a cooperative spirit between the city and the contractors, John Sutter, city planner, and James Burks, city forester, worked to save as many trees as possible.

Innovation Award

The Rochester Citizen Forester Program. The Citizen Forester Program was set up through a Minnesota ReLeaf grant. Classes were held to educate citizens about trees and then volunteer citizens planted 150 trees in the city.

Stewardship Award

Michael Max, EnvironMentor Systems, and Todd Carroll, Mn/DOT Landscape Partnership Program Coordinator, for development of the new Plant Selector website (http://plantselector.dot.state.mn.us) that allows professionals and novices to become more informed and successful in identifying and selecting the most appropriate woody and herbaceous plants for specific sites throughout Minnesota.

Outstanding Volunteer Project

The City of St. Louis Park for reforesting the Southwest Regional Trail and the Midtown Greenway. Last spring, hundreds of volunteers planted more than one hundred trees in St. Louis Park. The Midtown Community Works Partnership, the City of St. Louis Park, Hennepin County, Hennepin Regional Rail Authority, Tree Trust, and the Three Rivers Park District joined together to complete the projects.

Outstanding Volunteer of the Year

Tim Wallace for many volunteer hours working on Mn/DOT partnership plantings in the Wayzata area. Tim Wallace has been an outstanding volunteer for the community of Wayzata. He has worked on projects with Mn/DOT and the City of Wayzata to plant and maintain thousands of trees.

Outstanding Partnership Award

The Rotary International, Area 8, District 5950, and the City of Buffalo Lake, for initiating, planning, fundraising, and organizing a replanting project after Buffalo Lake was hit by a tornado.

Outstanding Arbor Day Celebration

David Sundmark, City of St. Paul, and Steve Sylvester, S & S Tree and Horticultural Specialists, for organizing the Festival of Trees, a community celebration that best commemorates and furthers the ideals of Arbor Day. The festival is an event to bring together arboriculture professionals, government agencies, and other green industries to join with the community for a day of fun, education, and stewardship. The event was held on May 7 at Como Park.

About MnSTAC

The Minnesota Shade Tree Advisory Committee (MnSTAC) was established in 1974 by a group of concerned citizens to address the health and well being of community forests. MnSTAC is recognized throughout Minnesota and the country for its expertise, advice, coordination and support for community trees. It is an organization of diverse individuals who represent a broad spectrum of tree-related interests. It fosters and supports local community tree programs across the state so healthy community forests are fully integrated into community development, infrastructure, education and management.

MnSTAC Board of Directors

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Northeast STAC

Chair: Kelly Morris, City Forester, City of Grand Rapids—218/326-7481
Secretary/Treasurer/Technical Advisor: Dan Jordan, IRRRA Mineland Reclamation —218/254-7967

Calendar

Events

June 12-15, 2005, **The Association for Temperate Agroforestry, North American Agroforestry Conference,** Rochester, Minnesota. http://cinram.umn.edu/afta2005/

June 14-16, 2005, **Trees, People and Towns–Frontiers in Community Forestry,** Cheyenne, Wyoming. Contact Mark Hughes, 307-777-7586 or mhughe@state.wy.us

July 26-28, 2005, **Reforestation Symposium,** Thunder Bay, Ontario, Canada, www.forestrenewal.ca/thingreenline

August 6-10, 2005, **International Society of Arboriculture's Annual Conference,** Nashville, Tennessee, www.isa-arbor.com

September 19-21, 2005, **Building for Greener Communities,** Nebraska City, Nebraska, www.arborday.org

October 19-23, 2005, **Society of American Foresters National Convention,** Fort Worth, Texas, www.safnet.org

November 7-8, 2005, **The Practice of Restoring Native Ecosystems,** Nebraska City, Nebraska, www.arborday.org

November 17-18, 2005, **National Urban Forest Conference,** Charlotte, North Carolina. Contact: www.americanforests.org/conference

New Publications

Armored Scale Insect Pests of Trees and Shrubs. Douglass R. Miller. 2005. Cornell University Press

Ecology and Management of a Forested Landscape: Fifty Years on the Savannah River Site. John C. Kilgo. 2005. Island Press

Minnesota Sustainable Communities www.nextstep.state.mn.us

Native Trees for North American Landscapes. Guy Sternberg and Jim Wilson. 2004. Timber Press

Oak: The Frame of Civilization. William Bryant Logan. 2005. W.W. Norton and Company

Our Native Trees and How to Identify Them: A Popular Study of Their Habits and their Peculiarities. Harriet L. Keeler. 2005. Kent State University Press

Plants for Stormwater Design. Daniel Shaw and Rusty Schmidt. 2003. Minnesota Pollution Control Agency

Seeing the Forest and the Trees: Human-Environment Interactions in Forest Ecosystems. Emilio F. Moran. 2005. MIT Press

Urban Insects and Arachnids: A Handbook of Urban Entomology. W. H. Robinson. 2005. Cambridge University Press

Variegated Trees and Shrubs: The Illustrated Encyclopedia. Ronald Houtman. 2004. Timber Press

Web Sites

Center for Urban Forest Research **http://wcufre.ucdavis.edu/**

Eastern Native Tree Society **www.uark.edu/misc/ents**

Flowering Plant Family Identification **www.colby.edu/info.tech/BI211/PlantFamilyID.html**

Forest and Shade Tree Pathology **www.forestpathology.org**

Missouri Community Forestry Council **www.mocommunitytrees.com**

Native Plants and Natural Landscapes **www.for-wild.org**

Tree Climbers **www.treeclimbing.com**

Tree Physiology **http://heronpublishing.com/tphome.html**

For handy up-to-date links to web sites of interest, be sure to visit **www.mnstac.org**

Minnesota Shade Tree Advocate

A quarterly newsletter published by the Minnesota Shade Tree Advisory Committee.

Managing Editorial Group: MnSTAC Education Committee (Emily Barbeau, James Burks, Ken Holman, Gary R. Johnson, Lara Newberger, Jeff Rick, Mark Stennes, and Patrick Weicherding)

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Design:
Creative Services Unit, MNDNR

This publication was produced with the support of the U.S.D.A. Forest Service, Northeastern Area; State and Private Forestry.

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Printed on recycled paper using soy-based inks.

Minnesota Celebrates

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