MINNESOTA
Shade Tree Advocate
Speaking Out For Community Forests

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Inside This Issue

Winter 2001

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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.

Community Forestry Speaks for Smart Growth

By Janette Monear

MINNESOTA TREE TRUST

Actively engaging young citizens in Community Forestry broadens its base of support.

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Communities are growing rapidly and we must listen to the whispers in the wind, for the voices seem to say "remember as you grow, please speak for us, the trees." There are ripples in the water and the voices seem to say, "remember as you grow, please speak for us, the fishes." There are whispers beneath our feet and the voices seem to say, "remember as you grow, please speak for us, the soil." As we move ahead into the 21st Century, it is a time for us to step forward and speak for all of those things that cannot speak for themselves: the trees, wetlands, prairies, woodlands, rivers and our future generations. But, how do we speak for all the voiceless and keep a balance? How do we grow smart, and what is the role of Community Forestry in Smart Growth?

Community Forestry now is much more integrated than in previous times. In the old days City Foresters just had to deal with tree planting and maintenance. That is no longer true. Mark Schnobrich, Forester for the City of Hutchinson, says, "Community Forestry is the integration of people, trees, environment and the continual change of how they interact with one another. It used to be about planting trees, removing dead ones and pruning existing ones. It is now a multi-disciplinary connection of communities and how they perceive their physical surroundings: development/greenspace/conservation/infrastructure. Community Forestry has evolved to a point of necessity. It has moved

Smart Growth to p. 2

Urban Forest Health Survey

page 7

PRESIDENT'S CORNER

A New Beginning

When we start a new calendar we look back at the "old" pages, but we also look ahead-to see where the holidays fall and what day of the week our birthdays falls upon. MnSTAC is 26+ years old and has had a wonderful life. I am thankful to have had a part in that history. Many have stepped forward to lead and work for the common goal of improving Community Forestry; quite a few for most of the quarter century, some from the beginning.

MnSTAC has been recognized for meeting challenges. Community Forestry continues to offer additional provocations to our mettle. Natural enemies of the forest—DED, OW, Two-Lined Chestnut Borer, ALB, Buckthorn—are familiar and we can respond with scientific vigor.

It is the political arena that causes us the greatest difficulties. Here we see funding for MnReleaf dropped. The DNR Community Forestry program is proposed to be cut 50%. Forest Service funding allocation is reduced so that our own needs are shorted.

What are we doing to meet challenges? We are seeking Legislative assistance, working toward funding MnReleaf. A Task Force is looking at whether it may be advisable to seek 501 (c) (3) status as an aid in funding our own needs. We are keeping up on the Farm Bill process—a "bill" that provides funding for the Forest Service; i.e. Community Forestry.

What's the "New Beginning"? For me it's getting ready for retirement—cleanup the office, study the finances, think about after-career activities, etc. For you, if you are not active in MnSTAC, step up and volunteer your efforts to the cause. Those of you who have been carrying the load need to pull in interested/committed individuals that can release you from duty when the time comes. For your commitment and effort, I THANK YOU !

Note: Glen Shirley stepped down from his position as MnSTAC President at the end of 2000. On behalf of everyone in the organization, thank you, Glen. Your leadership and your many hours of "speaking for the trees" over the years have done much to promote community forestry. We wish you a happy and healthy retirement whenever that time comes, and want you to know you're always welcome anytime the "STACers" get together!

COURTESY MN DNR

Smart Growth is an integrated approach to growth.

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If we are to "speak for the trees," then protection and planning must include the trees as well as all our natural resources.

Growing greener is growing smarter!

MELVIN BAUGHMAN

Community involvement and planning are keys to Smart Growth.

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Smart Growth, from p. 1

beyond the preconceived notion of being a luxury in communities. More is still needed, however, if we are to make Community Forestry a part of every community's budget and comprehensive plan."

It has taken many years for most people to understand the role of Community Forestry. Community Forestry is taking care of the green infrastructure and helping to incorporate the gray infrastructure in a way that protects, preserves and enhances our natural environment. The challenge in doing this must and can be met in many ways. The most important are through education and policy. There is wetland protection policy in place, but then construction moves to the woodlands and this makes the woodlands "at risk." Many communities still do not have tree protection ordinances in their comprehensive plans. Since most developers and builders use the comprehensive plan[1] as their development guidelines, it is necessary to clearly state what can and cannot be done in terms of protection, restoration and replanting. If we are to "speak for the trees," then protection and planning must include the trees as well as all our natural resources.

So, how do we reach a balance in Community Forestry? And how do we help with Smart Growth?

- ✔ ***Put tree protection and preservation in local plans and ordinances*** that set standards for more creative development design.
- ✔ ***Implement Best Management Practices***[2] in woodland areas. The BMP guidebook provides communities with a better understanding and appreciation of the economic, social and environmental benefits of wooded areas and individual trees.
- ✔ ***Integrate thinking*** to include all areas of concern. This means that a natural resource inventory must be done in every community as well as at the county and/or watershed levels.
- ✔ ***Integrate different groups, agencies and organizations*** at the beginning of the planning process so a broad focus is attained and greater resources are available.
- ✔ ***Engage citizens*** in the planning process and project implementation. This broadens the base of support and empowers the public for long-term community sustainability.
- ✔ ***Provide education*** that integrates thinking and identifies options for better choices to link the gray and the green infrastructures that make communities desirable places to live.
- ✔ ***Speak out!*** Speak for the trees, for the trees have no tongues; speak for the waters even though they have a mouth; speak for the soil even though it's older than dirt; and most importantly speak for our future generations!

Tree Trust is one resource for promoting Smart Growth. A private non-profit organization focused on Community Forestry, it provides educational and hands-on opportunities that foster individual responsibility. Programs like Ecosystem Based Management, Best Management Practices, Environmental Planning and Zoning and the School Environmental Program provide information and technical resources to change paradigms that change actions about how to grow smart. Integrating curriculum into school and community education brings a better understanding about how everything is interrelated and how one action affects another. We are but one voice, an integrated green voice, and a Community Forestry voice. Together, with your voice and expertise, we can help Minnesota grow smarter. Growing greener is smarter!

Community Forestry is taking care of the green infrastructure and helping to incorporate the gray infrastructure in a way that protects, preserves and enhances our natural environment.

Janette Monear is Director of Outreach at Tree Trust.

[1] Results from open forums for smart growth—Creative Development Through Communication, Tree Trust, Minnesota Land Trust and MN Dept. of Natural Resources. Supported by American Planners Assn., Builders Assn. of Minnesota, Minnesota Dept. of Agriculture and the Minnesota Design Team.

[2] *Conserving Wooded Areas in Developing Communities—Best Management Practices in Minnesota* was produced by the Minnesota Depart-ment of Natural Resources in cooperation with many organizations. For a copy, call Jean Mouelle at DNR: 651/772-7567.

Salt, Sand and Vegetation: Striving for Best Practices

COURTESY MNDOT

MnDOT is constantly exploring alternatives for creating safer winter road conditions. Shown in MnDOT District 1B on Highway 53 is a tandem-axle standard sanding truck.

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As we moved through the second coldest and snowiest December on record, snowplows and sanding units were a welcome sight throughout the state. No one questions that public safety must be the priority on icy and snow-packed highways, but "green" advocates often wonder what the deicing materials are doing to the vegetation.

Salt and sand are important tools in creating safer winter road conditions, but runoff or spray can affect nearby soil, groundwater and vegetation. Knowledge of which materials to use, how and where to apply them, and matching proper materials to the road surface temperatures and weather conditions helps minimize environmental impact.

Three deicing materials are commonly used in Minnesota: Sodium chloride (salt), magnesium chloride and calcium chloride. They are effective at different temperatures and different road conditions. Ideal management would involve using two or three different de-icing materials matched to the conditions. In the real world, however, decisions are often based on cost. Because it's relatively inexpensive (5 cents a gallon for salt brine and $25 per ton for rock salt) and readily available, sodium chloride is most widely used. Calcium chloride, available as granules or flakes, is easier on plants and the environment, but it is also most expensive of the three and consequently used less. A biodegradable de-icer, potassium acetate, is highly effective to –50°F, but at $5.00 a gallon, few use it. It is used at MSP airport.

MnDOT and many local communities follow industry recommendations in storage and field use of road salt. But since local supervisors generally make de-icing decisions, many communities (and their vegetation) would benefit from further education.

To limit use of road salt, MnDOT prewets the sand/salt mix to help it stick to the road and stay in place. A salt brine solution is sprayed on roads before snow and ice arrive to prevent ice buildup on road surfaces. Many sanding trucks are equipped with electronic road sensors to monitor the precise temperature of the road surface, indicating the optimal sand/salt mix to meet the conditions. An on-going "Salt Solutions" program trains supervisors and snowplow operators in the most effective and efficient use of salt. MnDOT also continues to experiment with various de-icing methods and alternative chemicals in its commitment to gain best public safety with minimal environmental impact.

How can we tell if our plants are being injured by de-icers? Most salt injury patterns follow what we might logically expect:

- Damage increases as traffic increases.
- Damage decreases with distance from the road (most injury occurs within 60 feet of the road).

New Technology

Fascinating technology is being applied to solving ice problems on the I-35 bridge over the Mississippi. A high traffic area susceptible to black ice, the bridge is equipped with recessed nozzle heads in the deck and a 3,000 gallon storage tank. Potassium acetate is currently being tested in this system. When icy conditions develop, the bridge is de-iced with its own built-in system!

- Injury is more severe on the side facing the road, so plants are often one-sided due to branch dieback.
- Branches covered by snow or above the spray-drift zone are less likely to suffer damage.
- Salt spray penetrates only a short distance into dense plants.
- Plants in sheltered locations generally avoid injury.
- Plants that are less winter-hardy may be injured more severely.
- Plants damaged over several years can lose vitality and decline, becoming more vulnerable to secondary diseases and insect damage.
- Spray injury to conifers can be seen in late winter, but injury to deciduous plants isn't evident until leaves emerge.

Reducing Damage

For local decision-makers and city foresters, the following guidelines can help reduce salt damage to trees and shrubs in urban areas:

- Avoid de-icing salts as much as possible, or reduce quantities by pre-wetting the salt with a liquid such as salt brine, or by mixing the salt with abrasives such as sand, cinders and ash.
- Improve the structure and drainage of poorly drained soils. Reduce sodium. Add organic matter, activated charcoal or gypsum and thoroughly leach the soil.
- Protect susceptible plants. Place physical barriers made of plastic, burlap or snowfencing between the pavement and the plants.
- Avoid planting trees and shrubs in high salt sites, or use only plants sufficiently tolerant of exposure to salt.
- Keep plants healthy. Appropriate water, mulch, pruning, soil amendment to correct nutrient deficiencies and control of disease and pests help roadside trees and shrubs maintain the vibrancy they need to resist weakening due to salt injury.

Salt-Tolerant Species

Although salt-tolerant species are available, there are relatively few of them. If only tolerant species are planted, however, there are few

Salt, Sand to p.6

Salt Tolerance of Some Common Street and Landscape Trees

Tolerant of both spray and soil salt

- ✔ horse chestnut
- ✔ Russian olive
- ✔ white ash
- ✔ ginkgo
- ✔ honey locust
- ✔ Black Hills spruce
- ✔ jack pine
- ✔ white poplar
- ✔ black locust
- ✔ mountain ash
- ✔ Norway maple*
- ✔ Ohio buckeye*

*(*Evaluations are based on a single parameter and more data is needed.)*

Sensitive to salt

- ✗ sugar maple
- ✗ hawthorne
- ✗ Norway spruce
- ✗ Norway pine
- ✗ white pine
- ✗ eastern pin oak
- ✗ yew
- ✗ American linden
- ✗ Canada hemlock

Sensitive to spray salt, but tolerant of soil salt

- ~ black walnut
- ~ black cherry
- ~ white oak
- ~ northern red oak

COURTESY MNDOT

A MnDOT Metro Division plowtruck with inbox pre-wetting tank rests between tasks.

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COURTESY MNDOT

On Highway 169 near Virginia, MN, a MnDOT sanding truck battles winter road conditions. This truck has an integrated pre-wetting tailgate tank.

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Salt, Sand, from p.. 5

opportunities to match tree species with soil characteristics, and the risks increase for a single disease or tree pest destroying large numbers of trees. No species is completely tolerant of salt injury; even salt tolerant species have limits on the amount of salt they can accept before they weaken and become vulnerable to other problems. Some species can tolerate spray salt, but will not necessarily tolerate soil salt.

Common street and landscape trees tolerant to both spray and soil salt include horse chestnut, Russian olive, white ash, ginkgo, honey locust, Black Hills spruce, jack pine, white poplar, black locust and mountain ash. Norway maple and Ohio buckeye are also possibilities, but evaluations of these two species are based on a single parameter and more data is needed.

What are some of the most salt-sensitive species to both spray and soil salt? You'll find many of them lining boulevards and roadways in the state: sugar maple, hawthorne, Norway spruce, Norway pine, white pine, eastern pin oak, yew, American linden and Canada hemlock. While sensitive to spray salt, black walnut, black cherry, white oak and northern red oak can tolerate soil salt relatively well.

Information for this article was provided by Paul Walvatne, Minnesota Department of Transportation Office of Environmental Services, St. Paul; by Edward Fleege, Road Weather Information System Project Advisor, located in Duluth; and through excerpts from MnDOT printed material and Minnesota Extension Service publication FO-1413-S, ***Minimizing De-Icing Salt Injury to Trees*** *by Gary R. Johnson and Ed Sucoff.*

Spring Celebrations and Green Economics: Natural Partners

Many communities are well into planning spring planting and Arbor Day celebrations. Most will involve civic leaders and school children, park or city staff and local media.

Bruce Bacon, City of Ramsey Forester and a lead organizer of Ramsey's Green Environmental Expo (See City of Ramsey, page 10 *Minnesota Shade Tree Advocate* Vol. 2, No. 1, Winter '99), urges communities to go a step farther and create specific opportunities to involve local green businesses and promote their economic development.

These local venders are key players in green infrastructure development throughout the community all year long. Creating partnerships with them in spring celebrations builds their visibility, enhances their role as environmental and information resources and generates income opportunities.

Ramsey's Green Environmental Expo, held the Saturday following Arbor Day each year, includes tree and plant sales. Local vendors set up booths, determine the mix of products, provide planting and care information and offer special discount prices on selected items. It's a winning situation for everyone. Stock often sells out, buyers go on their way newly enthused about planting and all those trees, bushes and plants become part of Ramsey's green infrastructure.

Bruce believes economic elements are too often omitted from environmental education and community programs. He is excited about a proposed real-life demonstration project that would help professionals and the public learn to apply ecological and green economic stewardship.

The Kunde Company, the Minnesota Historical Society and its Oliver H. Kelley farm near Elk River are in the planning and proposal stages of creating a Certified Stewardship Forest at the Kelley farm. This sustainable woods management plan would educate visitors about site planning, planting trees, native vegetation, management for multiple goals including supplemental income, and sustainable practices with growing examples. Watch for more information in future *Advocate* issues.

Think Spring!

Mark your calendar now and look forward to a fun-filled open house at the Minnesota Historical Society's Oliver H. Kelley Farm this year! The date is Sunday, April 29 from noon to 5 PM. Call 763-441-6896 for more information.

Urban Forest Health and Condition Needs Assessment Survey

The University of Minnesota, Forest Resources Extension Department has been contracted by the U.S.D.A. Forest Service, Midwestern Center for Urban and Community Forestry, to conduct a research and education needs assessment. This survey will aid in the allocation of technology transfer funds as well as define major areas of research and education for several years. Your input is critical. You have the option of accessing and submitting the form on line by visiting: http://www.cnr.umn.edu/FR/extension/survey/survey.htm. If you have any questions concerning the survey please e-mail extfor@forestry.umn.edu or call 612-624-3020. To return the survey please fold into thirds, staple, place a stamp on the outside, and return to the address on the last page.

1. You are:

❑ Private urban forestry professional ❑ Volunteer

❑ University/agency urban forestry professional ❑ Advocate of urban forestry issues

2. What is your assessment of the general health and condition of the urban forests in your state or city? (Health can be defined as the general state of vitality, free of insect and disease. Condition can be defined as structural integrity as in lack of decay and pruned regularly. Please rate on a scale of 1-5 with 5 being excellent and 1 being poor.

_____ Health _____ Condition

3. Do you need assistance in the survey, detection, or evaluation of urban forest health and condition problems or pests within your state or city? If so, please check all that apply:

❑ Consultants ❑ Training Workshops

❑ Fact Sheets ❑ Color "How To" Publications

❑ Don't Know ❑ Other (please specify)

4. Is preserving the health and condition of urban forests currently an integral component of the Urban and Community Forestry programs in your city or state?

❑ Very Integral ❑ Somewhat Integral ❑ Minimally Integral ❑ Don't Know

5. I interact with the following Urban Forestry clients or partners (O) often, (S) sometimes, (R) rarely, (N) never. Please place a letter designator before each client category.

_____ State Department of Natural Resources

_____ State University Staff and Programs

_____ USDA Forest Service

_____ International Society of Arboriculture

_____ Nursery/Garden Centers

_____ Homeowners

_____ City Planners

_____ Builders/Developers

_____ Other – Who?

_____ USDA Cooperative Extension Service

_____ Community Groups

_____ State and Regional Tree Advisory Councils

_____ State Department of Agriculture

_____ Private Tree Care Companies

_____ City Foresters/Parks Personnel

_____ Landscape Architects

_____ Emergency Management Contacts

6a. How would you rate the following urban forest management practices for preserving the health and condition of your urban forest/s? Please rate on a scale of 0-5 with 5 being very critical, 1 being rarely critical, and 0 being no opinion.

Tree Health Monitoring:	0	1	2	3	4	5
Disease Management and Control:	0	1	2	3	4	5
Insect Management and Control:	0	1	2	3	4	5
Non-infectious Disorders: (e.g. drought, deicing salt damage, flooding)	0	1	2	3	4	5
Tree Risk Evaluation and Management: (i.e. likelihood of failure)	0	1	2	3	4	5
Proper Tree Pruning Techniques:	0	1	2	3	4	5
Fertilization Needs:	0	1	2	3	4	5
Watering Needs:	0	1	2	3	4	5
Minimizing Construction Damage:	0	1	2	3	4	5
Site Analysis and Tree Selection:	0	1	2	3	4	5
Natural Disaster Planning and Mitigation:	0	1	2	3	4	5
Identification and Collaboration with Local Groups Concerned with Community Forestry Issues: (e.g. non-governmental organizations)	0	1	2	3	4	5
Funding: Where to get it, How to apply, Tips:	0	1	2	3	4	5

6b. When managing your urban forest, what other factors do you consider besides tree health and condition?

7a. Please indicate if it would be useful to you to receive printed information and/or training in the following long-term tree care/maintenance subject areas. Please rate on a scale of 0-5 with 5 being very useful, 1 being rarely useful, and 0 being no opinion. Also please indicate whether you would prefer printed information or training.

Tree Health Monitoring:	0	1	2	3	4	5	❑ Printed information ❑ Training
Disease Management and Control:	0	1	2	3	4	5	❑ Printed information ❑ Training
Insect Management and Control:	0	1	2	3	4	5	❑ Printed information ❑ Training
Non-infectious Disorders: (e.g. drought, deicing salt damage, flooding)	0	1	2	3	4	5	❑ Printed information ❑ Training
Tree Risk Evaluation: (i.e. likelihood of failure)	0	1	2	3	4	5	❑ Printed information ❑ Training
Proper Tree Pruning Techniques:	0	1	2	3	4	5	❑ Printed information ❑ Training
Proper Fertilization Techniques:	0	1	2	3	4	5	❑ Printed information ❑ Training
Proper Watering Techniques:	0	1	2	3	4	5	❑ Printed information ❑ Training
Minimizing Construction Injury:	0	1	2	3	4	5	❑ Printed information ❑ Training
Site Analysis and Tree Selection:	0	1	2	3	4	5	❑ Printed information ❑ Training
Natural Disaster Planning and Mitigation:	0	1	2	3	4	5	❑ Printed information ❑ Training

7b. If you indicated in question 7a that you would like to receive printed information and/or training within a particular subject area, please list specific topics (e.g. Sycamore anthracnose, cold-hardy trees, Asian long-horned beetle).

8. The following are effective information transfer tools. Please circle the appropriate response on a scale of 0-5 with 5 being strongly agree, 1 being strongly disagree and 0 being no opinion.

"How To" Informational Brochures:	0	1	2	3	4	5
Fact Sheets:	0	1	2	3	4	5
Pest Alerts:	0	1	2	3	4	5
Press Releases:	0	1	2	3	4	5
Posters:	0	1	2	3	4	5
Popular Magazine Articles:	0	1	2	3	4	5
Slide Sets:	0	1	2	3	4	5
Reference Handbooks:	0	1	2	3	4	5
Videos:	0	1	2	3	4	5
Internet (computer on-line networks):	0	1	2	3	4	5
Workshops (hands on):	0	1	2	3	4	5
State Conferences:	0	1	2	3	4	5
Regional Conferences:	0	1	2	3	4	5
Other Methods (please specify)						
_____	0	1	2	3	4	5
_____	0	1	2	3	4	5
_____	0	1	2	3	4	5
_____	0	1	2	3	4	5

9. For information pieces, it is often most effective to produce two versions, one tailored for homeowners and another more technically oriented for professionals. Please check the appropriate response.

❑ strongly agree ❑ agree ❑ no opinion ❑ disagree ❑ strongly disagree

10. When seeking information where do you search? Please rank responses with 1 being the most important and 5 being the least important.

_____ Websites

_____ Professional Associations (ISA, NAA, others)

_____ Other—Who?

_____ Local Extension Office

_____ Local Forest Service Personnel

11. There seems to be a growing dependence on the internet for information transfer. If you use the internet regularly please list specific websites you visit to get information or where you refer others to.

12a. Do you feel you are aware of all the places to access information?

❑ Yes ❑ No

12b. If you answered No, what is the most beneficial way for the information to get to you?

13. The last survey of this kind was sent out in 1995. Do you think the quantity and quality of information available has improved and adjusted to changing needs?

❑ Yes ❑ No

Place Stamp Here

Forest Resources Extension Office
115 Green Hall
1530 Cleveland Ave. North
St. Paul, MN 55108

Living Snow Fences: The Natural Solution

Living snow fences are plantings of trees, shrubs, native grasses and sometimes standing rows of corn that trap blowing and drifting snow. Strategically placed, these barriers help keep roadways clear and prevent big drifts that lead to stranded motorists. But that's not all they do.

DAN GULLICKSON

This snow-swept aerial photo shows a honeysuckle shrub living snow fence protecting a road and farm (prevailing winds from lower left).

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■ Living snow fences save lives.

According to the Federal Emergency Management Administration, the number one natural disaster that claims the most lives in Minnesota is winter weather. From 1984 through the spring of 2000, 265 motorists were killed on Minnesota roads as a result of snow and blowing snow. During the decade of 1990 to 2000, in the Mankato-Windom area alone, there were 1,411 vehicle crashes due to snow, 917 crashes due to blowing snow, and 86 crashes resulting from cross winds. With living snow fences, driver visibility is improved and vehicle accidents are reduced.

■ Living snow fences save money.

According to Standard and Poor's financial information services, economic disruption of having to shut down the highways for one day in Minnesota would cost $66 million in lost wages and $27 million in lost sales. Living snow fences help keep roads open and reduce shipping delays for goods and services. They are cost-effective to create, and help make better use of public money by reducing the need for plowing.

■ Living snow fences look good.

These natural, live-material barriers are aesthetically pleasing year round. They provide

Living Snow Fence to p. 12

DAN GULLICKSON

RON TABLER

Above: An accident caused by snow.

Left: Mechanical snow removal can be difficult and costly.

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Windbreaks and Shelterbelts

With the rising energy costs we are experiencing this winter, many communities and homesites across the state would benefit from having shelterbelts. In her *Energy Saving Landscapes* publication dated April 1993, DNR's Peggy Sand states well-placed windbreaks could reduce annual fuel bills by up to 10-20%.

Farmers with livestock can tell you that a farmstead shelterbelt helps reduce winter feed costs. That's because animals do not have to eat as much food to maintain their body heat. The shelterbelts stop the fierce winter winds and create a more liveable environment for both humans and animals.

Living Snow Fences, from p. 11

DAN GULLICKSON

Above: A farmstead shelterbelt protecting livestock.

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Below: A new generation shrub living snow fence with native grasses.

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DAN GULLICKSON

visual cues, or land marks, to help drivers find their way.

■ Living snow fences are an environmentally sound solution to improve snow management.

They provide shelter for wildlife, create oxygen, absorb carbon dioxide and help reduce soil erosion from wind and water. Less salt, fewer plow and truck trips and less fuel are required to keep the roadways clear.

Mn/DOT, with a $2.5 million grant from FEMA and the participation of landowners and local governments, is increasing its investment in the living snow fence program. By June 2001. between 50 and 60 new living snow fences will be planted statewide.

The information for this article was provided by Dan Gullickson, Forester, Minnesota Department of Transportation Office of Environmental Services. For more information, you can reach Dan at (651) 284-3763 or dan.gullickson@dot.state.mn.us

DAN GULLICKSON

Wendell community shelterbelt (prevailing winds from upper right of photo).

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Dispel a Myth

Frost Cracks and Sunscald: Bad Weather or Bad Management?

by Dr. Robert W. Miller

We associate frost cracks with cold weather and sunscald with late winter sun damage to the south and southwest side of trees. Frost cracks split open on very cold nights, leading us to conclude that when a warm trunk chills rapidly the outside layers cool and shrink faster than the inside creating physical stresses that result in the tree cracking open. Likewise we speculate that in late winter the sun thaws the cambium on the south side of trees and rapid cooling at night refreezes these tissues resulting in their damage. Sounds logical, but if weather is the sole source of these problems, then all trees would have cracks and sunscald. There is more to it than the weather.

For the past decade I have been teaching a course titled "Tree Structure and Function" where students and I learn about trees through dissection. We dissect small parts of trees and look at them under the microscope, and later in the term we go to the woods and do the same thing to larger parts with a chain saw. We pay particular attention to trees with obvious defects, including cracks, cavities, decay and sunscald.

Frost Cracks

Half of what we say about cracks is true. They do happen when it gets very cold, very fast, late at night. We hear them crack and we see the results. But since most trees do not crack, there must reasons that some do. My students and I have dissected hundreds of trees with frost cracks, and we are ***always*** able to follow the crack into an internal defect where the problem originates. The defects are many, but generally fall into three categories: trunk injuries, broken or torn branches and flush

RICH HAUER

RICH HAUER

Flush-cut pruning (a) sets trees up to develop frost cracks (b). Frost cracks in trees originate through injuries, such as trunk wounds, broken or torn branches and flush-cut pruning, that result in internal structural weakness. Physical stresses such as winter cooling complete the process of splitting wood from the weak area to the surface.

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pruning wounds, all of which have been covered with new wood.

As these kinds of injuries close over with woundwood, the callus tissue making the woundwood fuses together and seals over the injury. However, areas of structural weakness typically form where the woundwood joins together over the injury, and at the edges of the original wound, especially if the woundwood rolls over the edge of the wound. Years may pass until all evidence of the injury is buried under new wood. But as the tree warms by day and cools by night, physical stresses start the process of splitting the wood from weak areas at the original injury towards the surface. Slowly the crack works its way to the surface until finally on a cold night the tree splits open. Sometimes more than one crack will form from the same injury, one from the center and one or more from the edges. Arborists used to bolt cracks closed, but often this would merely transfer the stress from one area of the trunk to another, resulting in a new crack at another location.

What can be done about cracks? They can be prevented by avoiding trunk injuries and by proper pruning. There isn't much that can be done once the problem materializes, but the tree should be evaluated for any risk it might pose. A healthy tree with a trunk crack that has compartmentalized the injury will likely pose little risk, but cracks associated with cavities, decay and/or large branches should be evaluated for potential removal, and monitored on an annual basis if the tree is not removed. There are differences between species relative to their ability to compartmentalize and the strength of their wood. Likewise, healthy trees compartmentalize better than unhealthy trees.

Sunscald

My former graduate student Don Roppolo and I recently completed a research project in an attempt to better understand the source of sunscald injuries. Scientists and practitioners have noted that sunscald may be associated with flush pruning, trunk and/or root injuries, transplanting and deep planting. In a cooperative project with the City of Milwaukee Forestry Division, we did all of these to transplanted Norway maples in the city nursery and on city streets. We also planted some of the trees following commonly accepted procedures. A second phase of this project involved dissecting and microscopically examining trees from the Milwaukee nursery and Johnson's Nursery with apparent sunscald injury to determine the source of that injury. In both phases of the study we were surprised by what we found.

Trees in all of our treatments developed sunscald, but trees planted on city streets and deep-planted trees had significantly fewer sunscald injuries. Of the trees that developed sunscald, 77% had flat-headed borer (*Buprestidae* spp.) damage associated with these injuries. The borers attacked the tree at the graft union on the south side of the tree, and the sunscald spread upward one to three feet from the attack site. These borers are noted for attacking the south side of trees, especially stressed trees. Trees grown in the nursery are deep-planted to avoid staking, but when out-planted the soil is removed from the top of the ball and the root collar set at grade. We speculate that transplanted trees are stressed, and trunk tissue exposed to direct sunlight for the first time in several years may be further stressed, making the graft union an ideal site for borer infestation. Deep-planted trees had no borer damage, and the graft tissue was buried. This is not to suggest deep planting as a way to avoid borer damage and associated sunscald. Long-term problems associated with stem girdling roots make deep planting a poor remedy for managing sunscald.

The trees planted on city streets were watered at planting and watered by most adjacent property owners throughout the first summer, while the trees in the nursery were not ever watered in spite of a prolonged dry period in mid summer. This suggests a relationship between sunscald and stress, as a primary stress following trans-

Frost Cracks and Sunscald, to p. 14

Frost Cracks and Sunscald, from p. 13

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Sunscald often results from improper pruning or establishment-induced stress. Newly transplanted trees require frequent watering during establishment. Water deficits can leave them susceptible to invasion by borer insects [note flatheaded borer exit holes and larval galleries on so-called sunscald-damaged Norway maple trees] or canker-forming pathogens such as coral spot nectria canker.

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planting is the inability of a much-reduced root system to meet water demands of the tree.

Dissection of trees with apparent sunscald yielded unexpected results. Some specimens with what appeared to be sunscald actually had frost cracks with dieback of the cambium at the margins of the crack. Subsequent woundwood growing over the dead cambium had the appearance of sunscald but it was not until these trees were dissected that the source of the injury became apparent. We were able to trace the origin of the stem cracks back to improper pruning of very young trees in the nursery. Other injuries that appeared to be sunscald were actually cankers, likely coral spot nectria canker (*Nectria cinnabarina*). These cankers commonly attack the cambium after it has been injured or stressed by transplanting.

It appears the primary predisposing factor to sunscald is transplanting stress, especially water stress. It is also evident that what is commonly called sunscald is more complex than cambial death related to a single causal agent. Borers and cankers are biotic factors that take advantage of stress, resulting in what appears to be sunscald. Likewise stem cracks and associated cambial dieback on young trees give the appearance of what is called sunscald.

What can the manager do to reduce the incidence of sunscald? It may be as simple as providing adequate water the first growing season after transplanting. Since some of what we call sunscald is really from stem cracks, proper pruning in the nursery and after transplanting can reduce this problem as well.

Dr. Robert W. Miller is Professor of Urban Forestry at the University of Wisconsin—Stevens Point.

STAC INFO & NEWS

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.

Regional MnSTAC Committees

Southeast STAC

Chair: Henry Sorensen
651/388-3625 or 651/385-3674
Sec./Treas.: Katie Himanga, Heartwood Forestry, Lake City
651/345-4976

Headwaters-Agassiz STAC (HASTAC)

Chair: John Johnson
City Forester, City of Thief River Falls 218/681-1835
Sec./Treas.: Jeff Edmonds
DNR Forestry, Bemidji 218/755-2891

West Central STAC

Chair: Bob Fogel
Director of Parks, City of Moorhead 218/299-5340
Sec./Treas.: Dave Johnson
DNR Forestry, Detroit Lakes 218/847-1596

Northeast STAC

Chair: Kelly Morris
City Forester, City of Grand Rapids 218/326-7600
Secretary/Treasurer/Technical Advisor: Dan Jordan
IRRR–Mineland Reclamation 218/254-3369
Coordinator: Kathleen Preece
Minnesota BetterFORESTS magazine 218/326-0403
e-mail kathleen@uslink.net.

Tree Potpourri

URBAN AND COMMUNITY FORESTRY CALENDAR

Events

March 6-8—**Social Issues and the Environment National Conference,** Lied Conference Center, Nebraska City, NE. Contact National Arbor Day Foundation 888/488-7337 or www.arborday.org/socialissues

March 20-21—**Shade Tree Short Course,** Bethel College, St. Paul. Contact Tracey Benson, U of MN, 612/624-3708 or 800/367-5363.

March 26-28—**Building With Trees National Conference,** Lied Conference Center, Nebraska City, NE. Contact National Arbor Day Foundation 888/448-7337.

March 27—**New Tree Inspector Workshop,** Lamberton. Contact Rich Hauer, 651-296-0592.

March 28—**Northwest Urban Forestry Conference,** University of Minnesota–Crookston. Contact Phil Baird, 218/281-8130.

March 31—**New Tree Inspector Workshop,** St. Paul. Contact Rich Hauer, 651/296-0592.

April 4—**New Tree Inspector Workshop,** Rochester. Contact Rich Hauer, 651/296-0592.

April 12—**New Tree Inspector Workshop,** Alexandria. Contact Rich Hauer, 651/-296-0592.

April 27—**Arbor Day in Minnesota.**

May 5-11—**Minnesota Arbor Month Trail of Trees Bicycle Tour.** Kick-off at State Capitol followed by sites around the state. Contact Don Mueller, 651/772-6148.

May 6-8—**Tree Structure and Mechanics: How Trees Hold Together and Fall Apart,** Savannah, GA. Contact Dr. Kim Coder, 4-432 School of Forest Resources, U of GA, Athens, GA, 30602.

July 26 -27—**Vegetation Management Association of Minnesota 5th Annual Conference,** Breezy Point Resort, Brainerd. Contact Jennifer Hildebrand 612/760-4186 or Brad Williams 651/458-4473.

August 5—**Tour des Trees Kick-off,** Minneapolis.

August 12-15 **International Society of Arboriculture National Conference,** Milwaukee, WI. Contact http://www.isa-arbor.com

Sept. 5-8—**National Urban Forestry Conference: Investing Natural Capitol in Urban Spaces,** Washington DC. Contact Cheryl Kollin, American Forests; www.americanforests.org

New Publications

Conserving Wooded Areas in Developing Communities: Best Management Practices in Minnesota. Contact MN DNR Forestry at 651/772-7925.

Storm Damage to Landscape Trees: Prediction, Prevention, Treatment. Gary R. Johnson and Ben Johnson, 1999. FO-7415. University of Minnesota Extension Service Distribution Center, 20 Coffey Hall, 1420 Eckles Ave., St. Paul, MN 55108-6069; 800/865-8636. Refer to publication number when ordering.

The Big Woods Heritage Forest pamphlet. Contact Minnesota DNR-Forestry at 651/772-7925.

Tree and Shrub Handbook: Selection, Care, Pests, Diseases. This handbook from the Morton Arboretum provides a wide range of information on tree selection, planting and care in a three-ring notebook format. Purchase by calling 630/ 719-2465. (Caution: Some plants recommended in the manual are not considered hardy in Zone 4, and some of the insect and disease problems listed are not found at significant levels, if at all, in Minnesota.)

Tree Pests of the Midwest poster. Produced by Morton Arboretum and Ohio State University Extension. Contact DNR Urban and Community Forest Office at 651/772-6148.

Woody Plants in North America. The two-CD set contains information on 470 native and introduced woody species commonly found in North America. There are leaf and twig keys to help identify plants and printable fact sheets for each species. The CDs include nearly 10,000 color photos and interactive quizzes to test how much you've learned. Contact DNR Urban and Community Forestry Office at 651/772-6148.

GARY JOHNSON

Internet

- Center for Urban Horticulture, University of Washington (research of human dimensions of urban forestry): www.cfr.washington.edu/enviro-mind
- Hazard Tree Web Page, USDA Forest Service, State and Private Forestry St. Paul Field Office: willow.ncfes.umn.edu/Hazard/hazard.htm
- International Society of Arboriculture: www.ag.uiuc.edu/~isa
- Livable Communities: www.livablecommunities.gov
- Minnesota Department of Natural Resources: www.dnr.state.mn.us
- ***NEW!*** MnSTAC: www.mnstac.org
- ***NEW!*** Minnesota Society of Arboriculture: www.isa-msa.org
- National Arbor Day Foundation: www.arborday.org
- National Tree Trust: www. nationaltreetrust.org
- National Urban and Community Forest Advisory Council: www.treelink.org/connect/orgs/nufac/index.htm
- The Simple Act of Planting a Tree: www.treelink.org/simpleact/index.htm
- Traffic Calming: www.grounds-mag.com/planting.htm
- Tree Climbing: www.treeclimbing.com
- Tree Climbers Discussion Group: spectre.ag.uiuc.edu/archives/isa/treeclimbers
- Tree Link: www.treelink.org
- University of Minnesota Forest Resources Extension: www.cnr.umn.edu/FR/extension/pages

Minnesota Shade Tree Advocate

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

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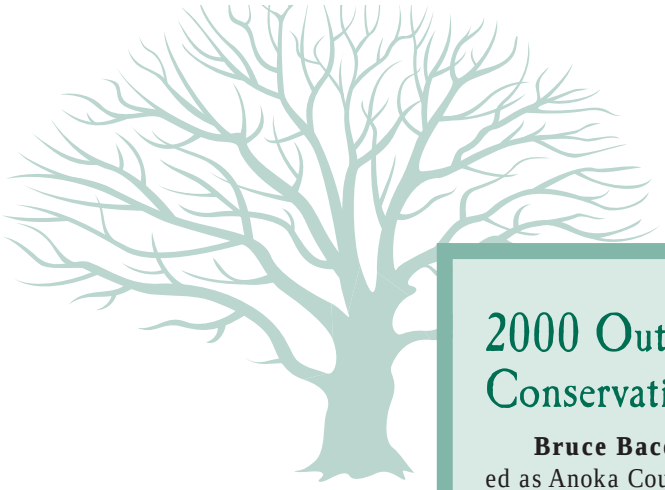

2000 Outstanding Conservationist: Bruce Bacon

Bruce Bacon of Ramsey has been selected as Anoka County's ***2000 Outstanding Conservationist!*** With this honor Bruce has also been nominated for Minnesota's Outstanding Conservationist Award. His efforts to develop farming methods that are environmentally sound and economically viable for urban fringe farms are the embodiment of land stewardship. Through his efforts, there is real hope that farming efforts can be identified that will allow the preservation of the family farm within a rapidly urbanizing environment. Bruce's approach provides a comprehensive set of landscape design principles for integrating energetics, biology and organic cycling into a meaningful local economic framework.

Bruce's colleagues in MnSTAC have long recognized him as one of the leading and creative thinkers of our region as he integrates principles of conservation, ecology and eco-nomic viability. Congratulations, Bruce, on this honor!

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