FALLS

by Heide Aungst

The Hyatt Regency Ravinia in Atlanta gets its name from the steep ravine located in the 42-acre wooded site. Landscape architects Roy Ashley & Associates and Clark-Morrell landscape contractors, both of Atlanta, worked with the natural surroundings in designing the property, which opened in 1986. The central design element is a three-story greenhouse atrium lobby which looks out over a 10-acre forest. A cascading waterall orginates in the atrium lobby and continues through the greenhouse to the outdoor garden, where it culminates into two waterfalls. The falls drop approximately eight feet at the highest point. More than 2,000 gpm are pumped through the water feature. The water feature connects with Ravinia Creek and meanders through the deciduous forest. Cost of Wisconsin set the steel reinforcement for the stone walls along the sides of the water feature. Sullivan Stone of Lithonia, Ga. supplied the Tennesee Mountain stone used in the feature. The large boulders create water variety through bounce and movement. Surrounding the water feature is a variety of trees including dogwood, crape myrtle, weeping cherry and red maple and a juniper groundcover. Summer plantings of annuals add color to the area.

Cost of Wisconsin: Circle No. 203 on Reader Inquiry Card
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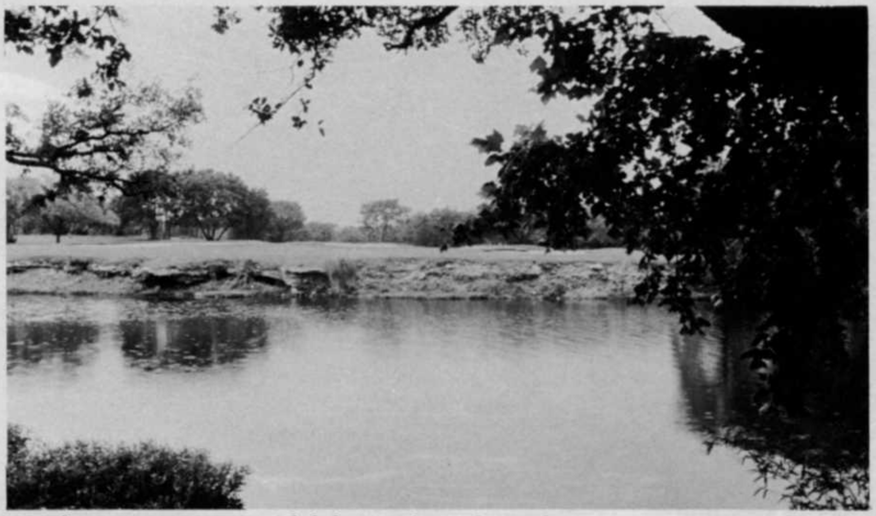
Hyatt Regency Ravinia: Circle No. 207 on Reader Inquiry Card

Insurance problems concerning the design of lakes, ponds and water retention areas

by Jim Leatzow



Landscape managers with lakes and ponds on the property must take extra precautions when designing and maintaining water areas.

If you are responsible for designing public areas that contain lakes, ponds or water run-off retention areas, keep certain important insurance considerations in mind.

First, understand that water-filled areas are always viewed as an "attractive nuisance." That is—especially in the case of children—people will have a hard time avoiding such areas, even if they are trespassing.

Merely putting up a "No Trespassing" sign and assuming your job is done is not enough. Instead, you need to examine multiple design factors.

First, you need to consider the ultimate use for the specific water-filled area you are designing. If, in fact, people are encouraged to swim or boat, then you must proceed with caution to identify those areas where activities will take place. Facilities like docks, piers and location of emergency and lifesaving equipment must also be considered.

More commonly, though, is the design of lakes, ponds and retention areas for aesthetic purposes—areas not intended for public use. One of the biggest concerns with such a project is to make sure that the grade or shoreline slope precludes people—more importantly, children—from losing their footing. This is a consideration especially on wet grass or other surfaces so they do not tumble into the water.

Furthermore, you will want to consider using an expert in storm water drainage, when necessary, to assist you on such a project. Nothing will get you in trouble faster than overselling your capabilities and not using experts when you get into specific areas for which you have not had ample training.

It is better to make less profit on a project, but to have a plan that is safe and workable. Such an approach will not come back to haunt you in the form of a lawsuit from an injured person.

Along with the proper design of such areas comes the need to include some maintenance factors in your plan. You should make the owner of any facility you design provide periodic safety inspections so the facility continues to be safe.

In a lake or pond setting, this may include inspecting drains which are often installed for overflows. Such drains should include covers secure enough that kids cannot remove them.

Once a storm occurs, overflow drains become important factors in keeping the rising waters from overflowing the banks. If the overflow pipe is blocked with debris, and not checked periodically, one could allege improper design.

Conversely, overflow pipes become uncovered because grates were removed, storm drains can become life-threatening whirlpools that can drown even a strong person, given the right circumstances.

As mentioned before, maintenance applies to other areas such as fencing and signage. Although you may not have any direct responsibility for the project once it is constructed, you go a long way in adding meaningful safety provisions. You should stress the owner's obligation to consider the maintenance needs once the project is built.

Depending on the type of project, erosion of the banking material is a potential source of design error claims. If water undercuts the banks, over time the ground will become considerably less stable. Thus, the chances of injury increase dramatically.

It is imperative to make on-sight observations while construction work is in progress, whether or not such is called for in your work agreement. I would even encourage liberally using a camera to make a periodic record of the construction phase.

That kind of documentation would be of utmost importance if a claim were to arise. Such measures, along with written confirmation of any changes to the plan, should be considered normal, customary documentation included in every job file.

When it comes down to "your word against theirs" in court, the design professional often comes up on the short end of the stick.

In short:

- Estimate the purpose of the water-filled area.
- Analyze who, if anyone, will be using the facility.
- Put in the necessary safety considerations. (Too much margin of safety is always preferable.)
- Employ other design professionals if you get into areas beyond your expertise.
- Stress the maintenance factors to the owner of the project.
- Visit and record the actual construction while in progress.
- Document, document, document your file as though you expect a claim. Because of some frightening recent interpretations of the Statute of Limitations, plan on being held responsible for your design for the rest of your life. **LM**

Jim Leatzow is president of Leatzow & Associates, Glen Ellyn, Ill. He specializes in green industry matters.

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Late fall fertilizing and groundwater quality

by A. Martin Petrovic, Ph.D., Cornell University

The late fall period is becoming both an extremely popular and important time to apply a nitrogen fertilizer to cool-season turfgrass. Considerable research has been done at Ohio State University (see Feb. 1988 LANDSCAPE MANAGEMENT) on the response of turfgrass to late fall-applied N.

In general, it has been shown that there is improved late fall, winter and spring color over spring and summer N application. Also, spring root growth is enhanced by late fall N applications.

To date, the only negative aspect is a slightly higher potential for thatch development. This is thought to be a result of the increased rooting associated with late fall N application.

When one considers the environmental impact of late fall-applied N, there is one major point to consider. Potentially, this could be the worst time of the year to fertilize in terms of having a negative impact on groundwater quality. That is, if the following factors are true.

1. For your location, does the greatest amount of water reaching groundwater (referred to as recharge) occur from precipitation in late fall, winter or early spring?

2. Cool and cold temperatures of this period related to limited plant uptake of N.

3. With cool soil temperatures, there is little chance of gaseous N loss by either ammonium volatilization or denitrification.

When all three conditions are found, nitrate leaching potential is very high. There are areas of the country where these conditions naturally occur, such as the cool-season zone of the Atlantic Coastal Plains.

Also, any inland site on sandy soils could potentially be considered part of the problem areas. A perfect example of a location with these conditions is Long Island, N.Y.

Research continues

A research project was initiated in the fall of 1985 to study the impact of late fall-applied N on groundwater quality. Two sites on Long Island, N.Y., were chosen for this experiment.

The first site was St. Charles Cemetery in Pinelawn, which was established in 1982 as a mixture of Kentucky bluegrass (Adelphi and Glade) and perennial ryegrass (Citation, Manhattan and Derby).

The second site was at the Long Island Horticultural Research Laboratory in Riverhead, which contained three cultivars of Kentucky bluegrass seeded in 1980. After establishment, little or no N was applied to either site. The surface soils at each site were sandy loams; however, the subsoil at the St. Charles site was considerably more gravelly.

In November of 1985 and 1986, ion exchange resin bags were buried about 12 inches below the surface or below the depth of rooting.

Generally, it is believed that once nitrogen has gone deeper than the root zone, it will eventually end up in groundwater. This is especially true for the fall, winter and spring period because little or no water will move up from below the root zone.

Each November, six different N sources were applied at a rate of 2 lbs. N/1000 sq.ft. The following April, the ion exchange bags were removed and the amount of nitrate collected was determined. With collecting nitrate on an area basis, the information presented can be related to the percent of N applied.

The percent of fertilizer N applied that leached as nitrates passed the root zone.

Nitrogen Source	Manufacturer	Long Island, NY Location: Pinelawn	Riverhead
		% fertilizer	N that leached
Sulfur-coated urea	Scotts	21	14
Ureaformaldehyde	Noram	1	3
Plastic-coated urea (150D)	Estech	0	0
Activated sewage sludge	Milorganite	2	2
Flowable ureaformaldehyde	Cleary	9	5
Urea		42	27

The results

In the table with this update are the results averaged over the two years of the study. These results revealed that the highly water soluble N source urea was suspect to considerable leaching, especially at the Pinelawn location. However, slowly available N sources of ureaformaldehyde, plastic-coated ureas and activated sewage sludge had little or no potential for nitrate leaching. The other N sources—sulfur-coated ureas and flowable ureaformaldehyde—were intermediate in nitrate leaching potential.

Conclusions

From these results, several conclusions can be drawn.

- Applying a highly water soluble N source at a high rate in late fall can result in considerable nitrate leaching. As pointed out before, this could be a "worst case scenario."
- The degree of leaching is very manageable based on the source of N used (i.e. less leaching with slow release sources).
- Factors found at each site affect the degree of leaching. The factors that were different between Pinelawn and Riverhead were grass species used, soil type of the subsoil and possibly climatic factors, like the amount of precipitation. At this point, which one(s) responsible can only be speculated on.

The general concern over the protection of groundwater quality is important to all turfgrass managers. The results of this project show that there is potential for groundwater contamination. However, as managers, you have options available to reduce or eliminate any nitrate leaching from late fall applied N. **LM**

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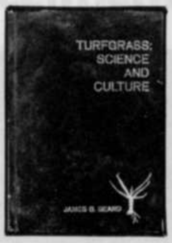

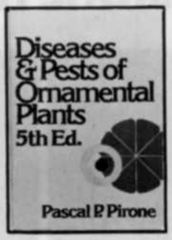

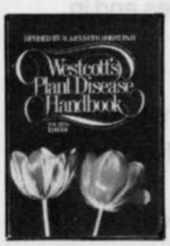

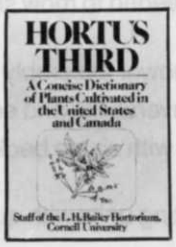

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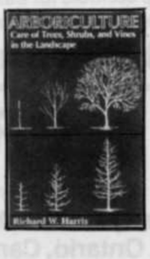

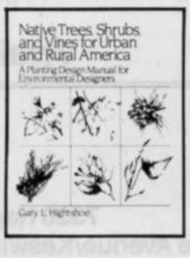

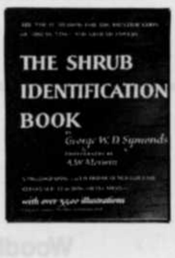

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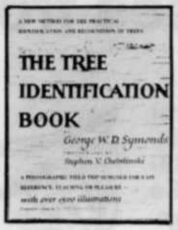

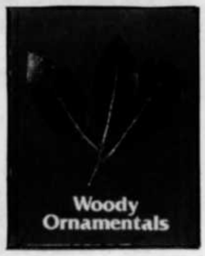

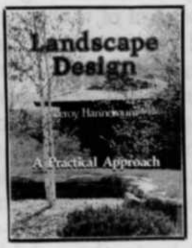

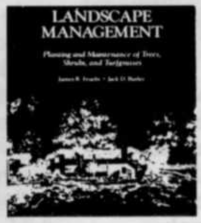

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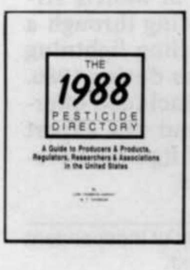

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Protecting trees from lightning shock

by Robert E. Cripe

Bill Graham Jr., chief horticulturist with the Morris Arboretum in Philadelphia, decided to include tree lightning protection in one of the arboretum's workshops two years ago.

He wished to include classroom instruction and an actual installation of lightning protection in several trees. I became interested and decided to help with the workshop.

The 175-acre Morris Arboretum at the University of Pennsylvania, consists of rolling hills, rose gardens, greenhouses, statues, ponds, step waterfalls where trees, shrubs and other plants are grown and preserved for scientific and/or educational purposes.

Installing a tree system

The tree we chose for the installation was a stately Bender Oak approximately 80 feet high with a 75-foot spread.

To design this system in accordance with codes, the tree needed two standard downlead cables and two separate grounds, since the tree trunk was more than three feet in diameter.

Three climbers ascended to the uppermost branches of the three main trunk extensions to install three main or standard air terminals and downlead conductors. They were to terminate at the base with two grounds leading from the trunk below grade 180 degrees apart out some 40 feet beyond the tree's drip line.

To provide the tree with umbrella protection, four miniature air terminals and miniature cables were installed on four of the main branch extensions.

Air terminals were fastened to the ends of the standard conductors. They were then pulled up into the main trunk extensions by the three workmen. The air terminals were fastened to main trunk extensions as close to the upper ends as safety would permit, to provide secure fastening.

Drive-type cable fasteners were used to fasten these standard cables to the main trunk extensions every three feet. Cables were not pulled tight but allowed to flow in a gradual downward course following the contour of the trunk extension branches. After the standard cables were brought down to the main crotch of the tree, the climbers ascended to the main branch areas and started installing the miniature air terminals on the uppermost parts of the branches. They then secured the miniature cables down to the branches where they interconnected with the main standard conductors.

With ropes and copper lightning conductor cable in place, the workmen are ready to climb the tree, drop a rope and pull the standard copper cable with point attached to one of the top main trunk branch extensions.

Copper vs. aluminum

Copper air terminals and cables are always used in tree systems. Aluminum conductors or cables are not used for several reasons, the first being that codes and specifications recommend copper cables because of their tensile strength. Aluminum conductors become brittle from the bending and swaying motion of trees.

Another factor is corrosion. Aluminum cables and accessories, when in contact for extended periods with moisture from decaying leaves, moss or just from the moisture absorbed by tree bark, could eventually cause corrosion and deterioration of the system.

Aesthetics are another factor. Copper materials tend to discolor with age and eventually blend in with the bark of the tree, whereas aluminum materials are always bright and shiny and tend to draw attention to the aluminum system rather than the aesthetic beauty of the tree itself.

Grounding

While the climbers were installing the air terminals and tree conductors, workers on the ground were installing the grounding system. Each ground terminal consists of a minimum ½-inch diameter by 10-foot length copperweld ground rod driven 10½ to 11 feet into the ground out beyond the main root area and beyond the drip line. The ground cable is laid in either a trench six to 12 inches below grade. Or in the case of sodded areas, a spade may be inserted into the ground and a small slit or envelope-type insertion made, allowing the cable to be slipped into the pie-shaped insertion and the sod tamped back in place.

For driving the 10-foot length ground rods, we used a special ground rod driver consisting of a three-foot length of a ½-inch steel pipe open on one end. A heavy steel weight is welded onto the other end, similar to a fence post driver used by farmers.

As we drove the ground rod, we periodically measured the ground resistance, since several of those assisting with the ground aspect of the system were not familiar with measuring resistance. This resistance was measured by an ohm meter, providing a direct calibrated reading which eliminated further calculations or interpolation. Code requirements and standards in the lightning protection field state that a newly-driven ground should be in the neighborhood of 50 ohms or less—the lower the ohms resistance reading, the better the ground.

At three feet deep, we took a reading of 450 ohms resistance. At six feet, the resistance was 375 ohms. At eight feet we hit rock or shale and could not drive the ground rod deeper. This gave us an opportunity to use an alternate grounding method—multiple grounds, as provided for in the code.

At a distance of six to 10 feet from the eight-foot-deep ground rod, we drove another ground rod interconnecting the two in parallel fashion. The reading was 50 ohms ground resistance at that point. The 10-foot grounding electrode on the opposite side of the tree was driven to its full depth without difficulty. The ground resistance reading on this ground was 25 ohms. Both standard downlead conductors were tied to their respective grounding electrodes and the three standard main downlead conductors interconnected at the base of the tree. Then, the ground resistance on the entire tree lightning protection system was less than 15 ohms. Additional grounding virtue was obtained by interconnecting the system with an underground abandoned irrigation pipe located near the base of the tree about four feet from one of our ground cables. By 4:30 p.m., the installation was completed.

Bill Graham, Harold Rosner, Lewis Randall and the staff of Morris Arboretum received funding through a federal grant for installing lightning protection on four trees during 1986. The grant application included offering to train arborists and tree expert firms on how to install lightning protection systems in trees.

Robert E. Cripe is president of Independent Protection Co., Goshen, Ind.

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PROBLEM MANAGEMENT

by Balakrishna Rao, Ph.D.

For early green-up...

Problem: *At our University in New York State, we have two problems with the spring fertilizer application for athletic fields. One problem is that our groundcrew's workload in April and May is extremely heavy with preparations for Commencement and other spring activities. The second problem is one of wet conditions in certain areas of our athletic fields which we cannot, at this time, afford to drain. As a result, I would like to apply our spring granular fertilization while the ground is still frozen. We use a granular blend with a 50 percent slow-release nitrogen. What is the earliest date of application that could still be effective?*

Solution: One solution to your problem is to consider applying fertilizers in the fall. If your late fall fertilization coincides with the last mowing, which is ideal timing, we have seen response from that application the following spring until the first of June. Similar observations have been reported from several universities and several other green industry personnel.

For early green-up, enhanced root development and density in the spring, it would be necessary to apply at least 1¼ lbs. of nitrogen per 1000 sq. ft. during the late fall fertilization. Since late fall fertilization may hold color response through the month of May, ideally it would be necessary to treat again in late May to maintain turf quality. Reports also indicate that a light application of fertilizer in very early spring would help recuperation from winter injury and/or injury from low-temperature diseases.

From your comment, I understand that it would be difficult to fertilize in early spring due to spring school activities. Therefore, your planned approach of applying fertilizers in early spring with a slow-release fertilizer would be an alternative choice. Assuming that you will continue to get green-up response from your late fall fertilization, an application of slow-release fertilizer in early spring (February/March) should help maintain turf quality.

In my opinion, since you would be applying in early spring, it would be necessary to apply at least 50 percent or higher of slow-release nitrogen to obtain sufficient residual. If late fall fertilization was made last year, consider using 50 percent slow-release nitrogen with 50 percent or less of quick-release in February/March to get some immediate green-up response.

Remember that soil type and exposure to extremes in moisture and temperature can also partially contribute to turf color, density and overall quality.

Concerning your wet areas, installing drainage tiles is the most effective remedy, although the system is time-consuming and expensive. If this is too expensive or impractical, consider installing vertical drainage systems. Drill vertical holes two to three ft. deep with a post-hole digger or an augur, and fill them with pea gravel, covering the top with soil and turf. It would be necessary to drill holes beyond hard pan in order to drain the excess moisture out of the surface area.

Pruning elm trees

Problem: *We have an American elm in need of pruning. When is the best time of year to do this? Are disease-carrying elm bark beetles attracted to pruning wounds? When is the best time to spray for these pests?*

Solution: The best time for pruning elms would be in the late fall or winter. Reports indicate that elms pruned during July, August or September are more apt to get Dutch elm disease which is spread by elm bark beetles. Beetle emergence and number of brood per year may vary from one geographic location to another.

In general, adults emerge in late spring and may have two to three broods. Therefore, it is best not to prune during beetle activity period which may be from May to September, depending upon the region.

The answer to your second question is yes: the beetles are attracted to pruning wounds. As far as the timing for managing these pests, an understanding of beetle life history and their activity would be helpful. The European elm bark beetle and the native bark beetle are the two most important vectors in transmitting Dutch elm disease through their feeding activity. European elm bark beetles feed primarily on smaller branches on the upper crown. They overwinter as larvae in dead or dying trees and stumps, pupate in the spring and emerge as adults in late spring. Native bark beetles primarily feed on larger branch crotches, overwinter as an adult in dead or dying plants or stumps and emerge in spring.

It is important to provide target sprays where these beetles are feeding on the tree. A good coverage is very important.

Reports suggest that severely infected trees should be removed by May 1 and the remaining healthy trees should be protected by spraying for bark beetles and providing fungicide injections. Insecticide sprays should be applied prior to beetle emergence in spring. This would be before May 15 in most places. In addition, repeat applications may be necessary to manage the future broods (generally around July). Read and follow label specifications for best results.

Balakrishna Rao is Manager of Technical Resources for the Davey Tree Co., Kent, Ohio.

Questions should be mailed to Problem Management, LANDSCAPE MANAGEMENT, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.