

Making your mower pay off

Strategies to make your big-ticket landscape equipment like commercial mowers finally start contributing to your company's bottom line instead of pulling down your profits.

By J. PAUL LAMARCHE



Let's make a deal. You lend me \$10,000 for one year and at the end of the year, I will give you back exactly \$10,000. Better still, I'll give you back \$7,000. Is that a deal? Of course not! Obviously, you want and expect a return on your money. But if you don't think it's a good deal, why are you doing just this when it comes to your equipment and vehicles?

That's right. Every time you purchase a piece of capital equipment, you seem to be perfectly content to see it "depreciate" in value by 30% each year. An accepted cost of business, you might say. Or is it? Not getting a return on your investment has become acceptable.

This is an investment?

What happens when you buy a mower? Let's suppose you pay \$4,500 for it in 1996 and one year later it is worth \$3,150 (i.e. depreciation expense of 30% or \$1,350).

After 6 years, your total depreciation is \$3,970.57 and the residual value is \$529.43 (and if you think you will actually get that amount, good luck!). In other words, after 6 years, your investment of \$4,500 is returned to you as an expense of \$3,970.57 and \$529.43 in residual value. There is no return on investment. Some investment!

The problem with depreciation is that in following the income tax regulations and using depreciation as an expense in your budget (to determine your cost of doing

DEPRECIATION TABLE

\$4,500 Mower at 30% rate — 6-year lifespan for mower

| Year | Balance | Rate | Depreciation |
|------------------------------|------------|------|-------------------|
| 1 | \$4,500.00 | 30% | \$1,350.00 |
| 2 | \$3,150.00 | 30% | \$945.00 |
| 3 | \$2,205.00 | 30% | \$661.50 |
| 4 | \$1,543.50 | 30% | \$463.05 |
| 5 | \$1,080.45 | 30% | \$324.13 |
| 6 | \$756.32 | 30% | \$226.89 |
| Depreciation Subtotal | | | \$3,970.57 |
| Residual Value | | | \$529.43 |
| Total | | | \$4,500.00 |

business), you are only accounting for the cost of the equipment or vehicle and therefore, shortchanging yourself when it comes to getting a return on investment for the equipment or vehicle.

Look at the following tables to see how depreciation and return on investment (ROI) affect your budget for pricing purposes.

What's wrong with this picture?

There is no return on investment! Let's go back to the offer I made. Didn't you expect something in return for the \$10,000 I borrowed from you?

You claim that your ROI is the profit that you made last year. Unfortunately, it's a sad fact that many entrepreneurs or owner/operators would make more money working for someone else. Not only do you pay yourself less than you pay

INTEREST TABLE

\$4,500 at 8% interest rate

| Year | Balance | Rate | Interest |
|-----------------------|------------|------|-------------------|
| 1 | \$4,500.00 | 8% | \$360.00 |
| 2 | \$4,860.00 | 8% | \$388.80 |
| 3 | \$5,248.80 | 8% | \$419.90 |
| 4 | \$5,668.70 | 8% | \$453.50 |
| 5 | \$6,122.20 | 8% | \$489.77 |
| 6 | \$6,611.97 | 8% | \$528.96 |
| Total Interest | | | \$2,640.93 |
| Investment | | | \$4,500.00 |
| Total | | | \$7,140.93 |

your workers, but you are actually "eating your equity." Each year that you manage to stay in business, your net worth diminishes. If you are over-equipped and unable to charge your customers for this equipment, the problem is magnified.

Each year, the total value of all your equipment and vehicles diminishes in value. Ask yourself: What do you have to show for it?

What's a good return?

A good return on investment means that when your \$4,500 mower goes to the scrap yard, you have enough money (i.e. real cash, not just the ability to borrow more cash) to buy new or replacement equipment. If this isn't making sense to you so far, ask your father (those of you who inherited your business from your father) why he always paid *cash* for his equipment. He never had a charge card or a line of credit at the bank, did he?

You must charge your customers for your vehicles and equipment on every job so that you can get back every penny you paid over the 6-year life span of the mower, as well as your return on investment. Keep in mind that some equipment

will not last 6 years and others may last longer.

If this sounds outrageous or impossible, have a look at the table at left. If you invest your \$4,500 and earn 8% interest, you will earn \$2,640.93 in interest. This is "return on investment."

It's interesting that people who tell me it's difficult to get return on investment on vehicles and equipment are the same people who do not mind paying for their equipment over a 36-month bank term.

If they would continue to allocate those monthly payments (which were successfully made in the past) to a separate bank account for the three-year balance of the vehicle's lifespan, they would have ROI and have the cash to pay for a new vehicle.

Both examples at right show how to get a decent return on investment from your mowers, either those that are financed or those that are purchased with cash.

Cover your costs

The key is to charge adequately to cover your costs. How do you charge for equipment? There are three ways: 1. Guess; 2. Charge by the hour; 3. Include the cost of your equipment in your overhead cost.

More than 80% of all service companies use method number 1. Chances are, you may be in this category. The majority isn't always wrong, but here is a case where the other 20% have the advantage. Is it any wonder that we have so many bankruptcies? □

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RETURN ON INVESTMENT TABLE

Return on Investment (ROI) \$4,500 Mower

| | |
|---|-------------------|
| Mower Cost | \$4,500.00 |
| Sales Tax (7%) | \$ 315.00 |
| Finance Cost * | <u>\$1,593.76</u> |
| Total | \$6,408.76 |
| *3 years at 10% (monthly payment \$178.02) | |

Return on Investment Calculation (Total cost of mower) divided by (lifespan of mower x 2)

$$\begin{aligned}
 & \$6,408.76 \\
 & \quad 6 \text{ years} \\
 & = \$1,068.13 \\
 & \\
 & \$1,068.13 \\
 & \quad \times 2 \\
 & = \$2,136.25 \text{ per year} \\
 & \\
 & \$2,136.25 \text{ per year} \\
 & \quad \times 6 \text{ years} \\
 & = \$12,817.52^*
 \end{aligned}$$

*\$6,408.76 cost of mower & \$6,408.76 return on investment

\$6,408.76 return on investment + residual value of mower (\$529.43) should be adequate funds to purchase a new replacement mower.

If you paid cash, it would be:

$$\begin{aligned}
 & \$4,815 \\
 & \quad 6 \text{ years} \\
 & = \$802.5 \\
 & \\
 & \$802.5 \\
 & \quad \times 2 \\
 & = \$1,605 \text{ per year} \\
 & \\
 & \$1,605 \text{ per year} \\
 & \quad \times 6 \text{ years} \\
 & = \$9,630^*
 \end{aligned}$$

\$4,815 cost of mower & \$4,815 return on investment.

\$4,815 ROI & residual value of mower (\$529.43) should be adequate funds to purchase a new replacement mower with cash.

One Big Mean Yellow Machine

Blazer 360Z

- Floating Deck
- Deck Offset
- Floating Front Deck
- Zero Turn Radius



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MOWING guide

**Eastman Industries
Portland, Maine
800/760-1680**

The HM19S2 HoverMower from Eastman Industries is powered by a Suzuki 3.8-hp two-stroke engine and has a cutting width of 19 inches. The mower features a durable aluminum cutting disc with three Zytel composite metal-edged blades, a space-age plastic alloy deck for strength and durability and a 15-inch impeller that produces optimum air volume for hoverability and performance. With a cushion of air beneath the deck, the HoverMower can mow in any direction and in hard-to-reach areas without scalping. The model comes with 18-gauge steel handles and a vibration-reducing engine mount. Cutting height is adjustable from 1 to 3 inches.

Circle No. 258

**Encore Manufacturing Co.
Beatrice, NE
402/228-4255**

Encore's Prowler Front Cut has a dual path hydrostatic drive for more overall drive power, control and stability on slopes and around tight turns. Available in single or dual-tail wheels, the mower has a zero turning radius in both 52- and 61-inch cutting widths. A 20-hp liquid-cooled Kawasaki or 22-hp air-cooled Kohler engine is available. Also included is a flip-up deck.

Circle No. 259

**Exmark Manufacturing Co.
Beatrice, NE
402/223-6300**

Exmark has incorporated a 22-hp Kawasaki, liquid-cooled engine into its Lazer Z. Features include 52- or 60-inch full-floating decks, zero-turn maneuverability and a radiator positioned up-top to draw clean and



Exmark Lazer Z Liquid-Cooled

cool air. Instant-Adjust allows cutting height adjustments in 0.25-inch increments from a seated position. The mower also includes a wavy radiator screen to increase air flow and prevent complete blockage.

Circle No. 260

**John Deere
Research Triangle Park, NC
800/537-8233**

John Deere has the HD45 and the HD75 walk-behind hydrostatic mowers. The HD45 has a 14-hp overhead valve engine while the HD75 has 17 hp. They both are available with an oscillating 48- or 54-inch deck, but the HD45 also has a 36-inch deck available. The models have unitized hydrostatic transmissions with on-the-go tracking; speed and direction control; and parking brakes. A speed control lock lets you return every time to your preset speed and adjusts without tools. The HD75 also has a standard electric start.

Circle No. 261

**Ferris Industries
Munnsville, NY
800/933-6175**

Ferris Industries presents the ProCut Z Mid-mount zero-turn rider. The mower features a foot-operated deck lift and jumbo 23-inch tires, 25-hp Kohler engine, twin four-gallon fuel tanks, variable displacement hydro-drive system with Hydro Gear pumps and Ross wheel motors. Also featured is a 54- or 61-inch cutting width and a cutting height of 1.5 to 5 inches in 0.25-inch increments.

The mower has the Independent Drive Systems (IDS), which uses two separate reservoirs and hydraulic drives to prevent cross contamination of oil, as well as the IS independent suspension system which allows each wheel to move up and down independently, smoothing out the roughest turf.

Circle No. 262

**Gravely
Brillion, WI
800-GRAVELY**

The Gravely 260Z zero-turn machine features maintenance-free

Gravely XL Spindles and Gravely's Stay-sharp tungsten carbide coated blades. A five-inch-high deck, a redesigned cutting chamber and a 21-inch-wide discharge tunnel provides maximum air flow to expel clippings faster. The mower also includes a hydraulic deck height control and self-adjusting belts, a nine-gallon fuel capacity and 360-degree swivel antiscalp rollers. The



Lesco "Float Deck" rotary mower with hydro drive



The Gravely 260Z

model is available with a 25-hp Kohler Command CV255 or a 22-hp Robin EH65V engine.

Circle No. 263

**Great Dane
Sellersburg, IN
812/246-8770**

Great Dane's walk-behind Zero Turn Surfer includes a stand-on platform nearly at the center of zero turn radius. The mower features a 48-, 52- and 61-inch cutter decks, 16-hp to 23 hp Kawasaki, Vanguard-B&S and Kohler engines and a hydrostatic drive system. Also included is a six-gallon fuel tank with extra wide mouth fill and a 2- to 6-inch cutting height.

Circle No. 264

**Lesco
Rocky River, OH
440/333-9250**

Lesco's 48- and 54-inch float deck rotary mowers were designed to promote maximum air flow for even dispersion of clippings while providing ease in height adjustment by a four-pin system for raising and lowering the cutting deck.

These hydro drive mowers with dual hydro pumps and drive mowers

allow true zero turning radius while allowing for positive reverse and eliminating belt slippage in wet conditions. The twin ground-speed control levers allow for on-the-go adjustment to ensure straight-line tracking and hillside control.

Both models have five-gallon capacity fuel tanks.

Lesco offers the 48-inch cutting deck model powered by a 17-hp electric start Kawasaki engine and the 54-inch cutting deck model with a 20-hp electric start Kohler engine.

Circle No. 265

**MTD
Cleveland, OH
330/225-2600**

MTD introduces the 2260 Wide Track Mower in its new line of "MTD Pro" series. The mower features a 22-hp Kohler Command V-Twin OHV Engine and floating stamped decks with pivoting axles available in 48-, 54- or 60-inch sizes. Its dual hydrostatic control lets the operator perform true zero turns with pistol grip operation and allows for easy adjustment with no down time.

The mower also includes two ground-speed dash lever controls, 1.25-inch tubing handle bars and a five-gallon plastic fuel tank. The flat-resistant, extra wide 9 x 3.5-inch front caster wheels provide reduced compacting and easier maneuvering and create the better curb appeal of a finished cut.

The mower also features a 1- to 4.5-inch easy adjustment cutting height in 0.25-inch increments, re-

MOWING guide

quiring no tools to change the height.

Circle No. 266

**Howard Price Turf
 Chesterfield, MO
 314/532-7000**

Howard Price Turf introduces a new vacuum attachment for its 360Z. The collection container has a capacity of 10 bushels and may be dumped from the operator's seat. The turbine operates off the cutting unit, eliminating the need for an auxiliary engine. The vacuum can be installed or removed with three pull pins.

Circle No. 267

**Scag Power Equipment
 Mayville, WI
 920/387-0100**

The heavy-duty hydro drive system on the SCAG STHM provides smooth, even power to both wheels, controlled by a single foot-pedal control. A 13-quart nylon reservoir and heavy duty cooling radiator ensure longer drive system component life by preventing contamination and lowering temperatures.

The STHM Hydro Rider is available with 52-, 61- or 72-inch cutter deck and 20- or 22-hp Kohler Command engine. Optional accessories include a 44-gallon capacity grass catcher with auxiliary engine, a mulching plate and electric deck lift.

Circle No. 268

**Steiner
 Dalton, OH
 330/828-0200**

The model ZTM 325 Steiner tractor is packaged with a Kohler Command engine with 25 hp at 3600 rpm. The 2-wheel drive tractor features zero turning, dual fuel tanks and foot-operated electric deck height adjustment. Included is a single park level, antiscalp rollers, twin hydrostatic controls with flip handles and a 61-inch deck cutting height of 1 to 5 inches.

Circle No. 269

**Textron TurfCare & Specialty
 Products
 Racine, WI
 414/637-6711**

Jacobsen's Turfcats 500 Series

features the power of a liquid-cooled Kubota diesel engine with 22.5-, 28- and 33-hp engines. Mowers include a 12-gallon fuel tank and an accelerator with an adjustable pedal stop for setting a consistent transport/mowing speed.



Jacobsen Turfcats 500

Four heavy-gauge steel cutting decks are available and a new deck mounting delivers consistent cutting heights from one to four inches, in half-inch increments.

The 500 series has a new all-hydraulic traction drive and self-adjusting turn-assist brakes on the wheels to help ensure sure-footed stability. The hydraulic system oil capacity has been increased to eight gallons, which helps the system run cooler and last longer.

Circle No. 270

**Toro
 Bloomington, MN
 612/888-8801**

The Toro Groundsmaster 3000 has a variety of choices. Available with either a 33-hp liquid-cooled Peu-

geot diesel, in two- or four-wheel drive, or a 45-hp gasoline-fueled Ford engine, the 3000 has low noise levels, being the lowest decibel rotary mower of its type. An Integrated Hydrostatic Transmission (IHT) combines transmission, axle

and PTO in a single housing. The fewer parts and the direct transfer of power will make for years of durable performance. The Groundsmaster 3000 also has a variety of decks available: 84" Guardian Recycler®, 84" Rear Discharge, 72" Guardian Recycler®, 72" Rear Discharge

and the new Contour 82. Additional attachments include: rotary broom, snow-thrower, debris blower and enclosed cab.

Circle No. 271

**Walker Manufacturing Co.
 Fort Collins, CO
 970/221-5614**

A new sprayer attachment for the front of the Walker mower is easily mounted to all 42-, 48- and 54-inch Walker decks and offers a 96-inch spray pattern. The SP6640 Boom Sprayer features a 20-foot hose and adjustable spray tip that allows the operator to adjust the spray pattern from a 35-foot stream to a mist pattern.

Walker also has a "No-Catch" Deflector for a quick conversion of



Walker "No-Catch" Deflector

the Walker Grass handling System mower to a rear discharge mower. The conversion can be made in seconds by installing the deflector in the back of the GHS catcher box door.

Circle No. 272

**Woods Equipment Co.
 Rockford, Ill
 414-255-0100**

Woods Equipment Co. has added the model 6225 Mow'n Machine to its line of zero turn radius mowers and offers a 25-hp Kohler engine with a 48-, 52-, 61- or 72-inch deck.

Woods' 6000 Series of Mow'n Machines feature eight engine options ranging from 14 to 25 hp, including diesel. The mowers are designed with a low, out-front, three-spindle deck, allowing easy mowing under shrubs and low hanging branches.

The products include instant forward and reverse action, dual lever controls and special operator comfort features to increase productivity. The spring-loaded attachment pins allow for quick attachment of the decks, snow throwers, sweepers or dozer blades.

Grass collection systems are available in 7.5-, 15- and 25- cubic ft. models. Woods' collection systems are composed of a detachable blower and twin plastic containers or a steel gravity hopper with a lever-controlled gravity dump system.

Circle No. 273



Toro Groundsmaster 3000

Capital crunch: How to find financing

It's not impossible to raise capital for your operations, but it sure isn't easy. Find out how these experts view the process.

By GEORGE WITTERSCHEIN

Besides being an end, money is also a means to growth and success. Yet for many in the green industry, financing is a hassle. It needn't be. Knowing what our experts know can seriously reduce the pain of financing your business.

Get innovative

In Bellevue, WA, Rod Bailey and his partner Tom Graham have owned Evergreen Services Corporation since 1971. "We financed our original acquisition of the business in an innovative fashion," Bailey says.

"When the original owner decided to sell, we were consultants to the company, and we wanted to buy it. We didn't have any money of our own. So we borrowed some of the money from family and the rest of it from a bank," he explains. "The bank insisted we get a guarantor for the loan, so we went to another company and made them a deal: act as our guarantor and we'll give you free consulting services for three years. It worked!"

Their initial expenses were quickly followed by new financing needs. "Over the years, we've probably grown faster than our profitability would support, so we've relied heavily on banking relationships," Bailey says.

Those relationships can be hard to maintain as banks merge and people move on. But Bailey found that the effort of constantly making and remaking friends with a banker is worth it. "We've always believed banking is a partnership relationship and that your banker is one of your key advisors," he suggests. "Tom and I, both being MBAs, have had a good grasp of financial and business techniques. But most people in or industry can't say that. I'd recommend you form an alliance with three people: an accountant, a banker and a financial consultant."

Know your stuff

Another advantage of their MBA degrees was confidence in dealing with banks. "It's never bothered us to go into a bank and ask to borrow money...as long as we knew we could handle it. But there was one critical point in our development where we found it very helpful to get a federal Small Business Administration loan guarantee, and I would recommend people consider that as an avenue, too."

What advice would Bailey give his colleagues in the industry?

"First, I run into a lot of people in the industry who aren't comfortable with borrowing, because they lack the financial management knowledge they need to han-

dle it. I advise them not to go into debt, unless they are willing to gain that knowledge. If you're not familiar with financial management, projections, long range plans and pro formas, you should work with somebody who does."

Second, he believes in having a plan: "A well laid-out plan for how you're doing the financing and how you plan to pay that back over the years."

Third, the financing plan should be part of an overall long-range business plan, so you can put any financing decision in a strategic context. "If you set objectives for your business, they may imply you will need to borrow money. You can get a head start instead of waiting until you need to buy equipment yesterday."

In its own long-range planning, Evergreen tried to reduce leverage and achieve debt-free operation. They've gotten close several times, he says, "But whenever we bring our debt ratios down to the point where we can see paying off our debt, we get gutsy and start to grow again. You've got to be confident in what you're doing — if you're not, don't borrow money to do it!"

Use insider expertise

Joe Williams owns and operates Lawn Master Inc. Pensacola, FL. His wife, Elaine, and sons Scott and Jeff work with him, and Scott provides valuable accounting expertise in-house. "It's a lot better having him in-house because he keeps track of things," Williams reports. "Even though we retain an outside firm that does a lot of our accounting work for us, Scott

can translate what they're doing — and that lets us focus more on lawn care."

Scott's accounting knowledge has also helped Lawn Master obtaining financing.

"We've been able to go with some shorter terms for buying vehicles, and in fact, now we're leasing some vehicles to see if that may help us in the long run," he explains.

They've also built up a good working relationship with the bank. "We've stayed with the same one for almost 20 years now. The bank has been bought a couple of times, but we've been very fortunate in they've kept the local people we've been dealing with."

He too is a big believer in having advisers. "Get a good banker, a good attorney and a good CPA before you even think about buying equipment or hiring personnel." And before you start borrowing, make sure you can maintain a good cash flow.

"I can't overemphasize it. I don't care what kind of dollars you're making; if the cash flow doesn't go through, it can catch you in a bind real quick," he says.

Avoid these mistakes

Cash flow is not your only potential trouble spot — consultant Ed Wandtke of Wandtke & Associates in Lewis Center, OH, has his own list of them. Based on his experience in the green industry, he warns about the following:

1. *Using personal credit cards.* "Not only is this expensive, but it buries the debt where you can't see it," he says. "You're better off knowing what your debt is and where you stand with paying it off." And, when you can't get bank financing, there may very well be no need to resort to your credit card. "Right now, equipment vendors are far more willing to do financing than ever before. I bet that 90% of the time, you could open up a business in our industry with almost no line of credit, using vendor leasing financing for the equipment."

2. *Overbuying equipment.* "A common problem we have is that there's far too much used equipment sitting in the back facility spaces of most of the owners in the industry," Wandtke notes.

"And if you're getting into the business, start small. Don't believe you've got to have everything on Day 1, because in fact, you don't."

3. *Owning vs. leasing.*

"The technology of equipment is advancing so rapidly that you may not want to own it — as is the case with computers. Today, vendors may give you a two-year lease. All you'll have done is

pay the rental premium. It costs you, but it may be a lot cheaper than owning something outright that you want to replace with advanced technology."

Find lenders who understand

As vice president of Sheffield Financial Corp. in Clemmons, NC, Brian Burley is an expert on finding financing. His firm writes loans — \$150 million worth each year — for the green industry. (Sheffield is one of the several major players — such as Transamerica, Nations Credit and, for its own equipment, John Deere Credit.) Not only does Sheffield write that \$150 million, but it also has an astonishingly low delinquency and write-off rate of less than 1%.

Burley attributes that rate to knowing the industry. Sheffield offers loans directly to landscape contractors, or indirectly through dealers, so they see both sides of the equipment transaction. And they understand what he calls the industry's "unique cash flow problems."

"This is a seasonal industry," he says. "We know we have to show flexibility. A landscape contractor's ability to pay back a

loan can dry up in the winter, especially if it's mild and they don't have any snow to push. A bank may not understand that. The 12 months of the year all look the same to them."

Burley's advice is to find the right creditor — and then work with that creditor. "A lot of people start out in business and in two or three years, they're growing phenomenally. But they don't have the history that a bank wants. That's where companies like ours fit in. We know the difference a \$10,000 riding mower can make to someone who doesn't have a deep credit history but who is otherwise stable and a good risk.

"If a contractor is delinquent with a bank, it may not be as willing to work with him on making his payments as we are. Often, a customer who has paid well with us for a year and a half will call and say,

'I've just lost some accounts. I'm going to be short for the next two months. Can you work with me until spring?' We're going to be a little more understanding."

3 steps to financing

How would we sum up our experts' advice?

1. Gain financial know-how — or get access to someone who has it.

2. Use good judgment — buy only what you need. Also, consider leasing instead of owning.

3. Build and maintain the relationships. The creditor — someone who understands your industry and your company — is worth the effort it takes to build a friendship. Should that person move on, as so often happens in today's marketplace, dig in and make the effort all over again! **LM**

—The author, a freelance writer based in Mendham, NJ, is a new contributor to *Landscape Management* magazine.



Joe Williams



Ed Wandtke

How to minimize nitrate movement from turfgrass

By DOUGLAS T. LINDE, Ph.D.

Various researchers have determined that nutrient transport (including nitrate) in surface runoff from turfgrasses is minimal. In addition, researchers found that nitrate in leachate water from a moderately fertilized turf, even grown in sand, was minimal.

Despite the evidence that little nitrate moves offsite in surface runoff or leachate from turfgrasses, you still have to manage nitrate and other forms of nitrogen to reduce the risk of pollution. Also, careless ni-

trogen management can waste money and decrease turf quality.

Surface runoff is water that flows over the soil surface. It occurs when rainfall exceeds the soil's infiltration rate. Surface runoff may enter streams and lakes or it may infiltrate the soil downslope.

Subsurface runoff is rainfall that infiltrates and moves laterally in soil. It often exits the soil and enters a stream or lake.

Leachate is water that has percolated below the root zone.

Nitrates can move

Nitrogen, like phosphorus, can contribute to eutrophication of water resources; that is both elements promote plant growth in and along the banks of streams, lakes and ponds. The U.S. Environmental Protection Agency considers the nitrate form of nitrogen a drinking water pollutant because of its potential to cause an uncommon condition in human babies and young animals called methemoglobinemia ("blue baby disease").

Nitrate is also highly soluble and can move readily in both surface runoff and leachate. It moves readily through soil because its negative charge prevents it from being held by the soil and it is actually more

prone to leaching into water resources than to moving offsite in surface runoff.

After applying nitrogen fertilizer, it is converted to plant-available nitrate in or on the soil. Any nitrate that has entered the soil cannot move offsite in surface runoff, but it can still enter surface water resources via subsurface runoff. If nitrate happens to be on the soil surface, it will infiltrate the soil as rainfall filters into the soil, until the soil is saturated. By the time runoff begins from turf, most, if not all, nitrate on the soil surface should have entered the soil.

What measures can you take to further minimize the potential of offsite movement of nitrogen and nitrate in surface runoff and leachate? Some of the following suggestions have been proven by research while others are common sense measures.

Promote healthy turf

Use recommended cultural practices that encourage a dense, actively growing turf. This includes proper mowing, irrigation, core cultivation, aeration and fertility. Nitrogen applied to a dense, actively growing turf is rapidly used by the turfgrass plants. The extensive mass of fibrous roots typical of actively growing turfgrasses can absorb available nitrogen at recommended rates. In general, turfgrasses are among the most efficient plants in using applied nutrients.

A dense, actively growing turf also reduces potential nutrient transport (including nitrate) simply because it actually reduces the amount of surface runoff. This was determined in a series of runoff studies



This large turf area shows how surface runoff occurs once the rainfall rate exceeds the soil's infiltration rate.

conducted over the past 10 years at Penn State University.

Water-in the fertilizer

"Watering-in" fertilizer generally refers to applying a light amount of water (0.1 to 0.3 inches) with irrigation soon after applying a granular fertilizer. This practice helps move the granules down into the turf canopy and on to the soil. The fertilizer, especially nitrogen, is then less likely to volatilize into the atmosphere, move offsite in runoff or be removed by mowing equipment. Also, nutrients contained in the fertilizer become available more quickly because water and microbes are more available to break down the nitrogen into the ammonium or nitrate form that plants can use.

Avoid excessive irrigation following fertilization because it can directly cause

runoff or leaching of water-soluble nitrogen fertilizers. Excessive irrigation can leave soils in a near-saturated condition, which increases the potential for surface runoff from additional irrigation or rainfall. Simply put, additional water applied to a water-saturated soil will either run off or pond on the surface.

Offsite movement of nitrogen can be influenced by the nitrogen source. Fertilizers with a higher percentage of water-soluble nitrogen (quick-release sources such as uncoated urea, ammonium nitrate, ammonium sulfate and short-chain methylene ureas) are more prone to offsite movement, compared to fertilizers with a high percentage of water insoluble nitrogen (slow-release sources such as IBDU, natural organics, coated ureas and long-chain methylene ureas).

Right time, right amount, right place

Timing, rate, placement and application method may have an influence on nitrogen movement. Applying soluble nitrogen when soils are nearly saturated, frozen or highly compacted directly increases the chance of nitrogen moving offsite simply because water runoff will be greater under any of those conditions. Apply nitrogen when the turf is actively growing to reduce your risks. Late fall, winter and early spring applications of soluble nitrogen are not recommended. If you want to apply nitrogen during those times, use slow-release sources to reduce potential movement. Also, avoid using fertilizer nitrogen to melt ice on roads, walkways and turf.

Avoid using excessive nitrogen rates per application. The plant can use only so

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S.N.G. EQUIPMENT

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