

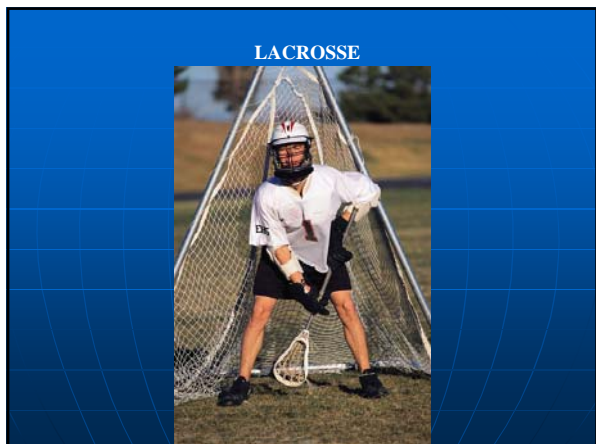
Soccer has changed everything over the past 15 years!

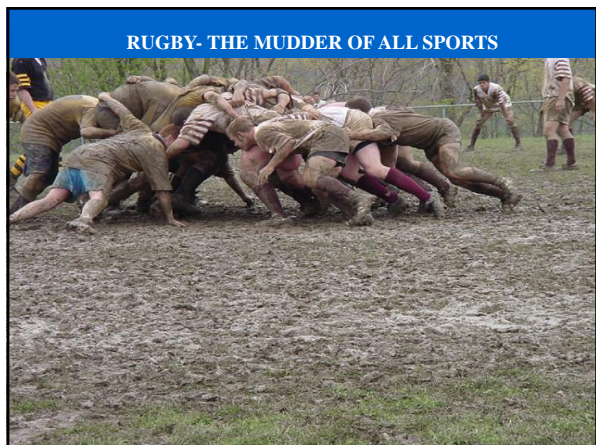


- The popularity of soccer has increased 60% faster than the population growth.
- Every baseball outfield and park in town has become a soccer field.
- Budget constraints over the same period have caused turf maintenance to be cut dramatically.
- Your current sports fields were never designed to handle the wear they are receiving today.

Wait It Gets Worse!

Lacrosse And Rugby Damage
The Fields Worse Than Soccer
Lacrosse Is Growing Today At
A Rate Close To What Soccer
Did In The Past 15 Years.





MAINTENANCE OF HIGH WEAR FIELDS

- YOU MUST GROW THE GRASS AS FAST AS YOU ARE WEARING IT DOWN
- YOU MUST HAVE A RELIABLE SOURCE OF IRRIGATION WATER
- YOU MUST TOP DRESS WITH ORGANICS & SAND ANNUALLY!
- YOU MUST AERATE AT LEAST MONTHLY DURING THE PLAYING SEASON!
- EACH HIGH WEAR FIELD MUST HAVE SOME SET ASIDE TIME EACH YEAR DURING ITS GROWING SEASON FOR HEALING!
- YOU SHOULD OVER-SEED IN DAMAGED AREAS AT LEAST YEARLY!
- YOU MUST AMEND ALL NEW FIELDS PROPERLY AND PROPERLY AMEND ANY AREAS WHERE YOU RESOD OR RESEED!
- YOU MUST PHYSICALLY MOVE THE GOALS AND FORCE COACHES TO PRACTICE IN DIFFERENT AREAS!
- YOU SHOULD IMPLIMENT A PERMITTING SYSTEM TO CONTROL ACCESS TO THE SITE!
- YOU SHOULD FENCE ALL NEW FACILITIES WITH LOCKED 8' HIGH FENCING!
- MULTI-PURPOSE FIELDS SHOULD NOT BE LIGHTED!

MAINTENANCE TRIFECTA OF HIGH WEAR FIELDS

■ YOU MUST GROW THE GRASS AS FAST AS THEY WEAR IT DOWN! A THREE LEGGED STOOL THAT DOES NOT WORK WITHOUT ALL THREE OF THESE:

- ❑ INCREASED FERTILIZATION
- ❑ INCREASED MOWING
- ❑ INCREASED AERATION

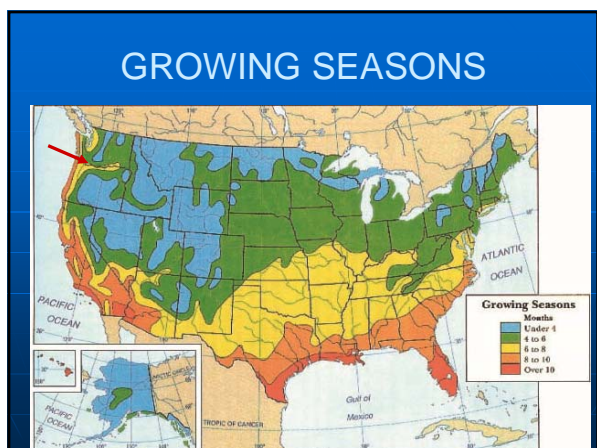
FERTILIZATION: If you are fertilizing, it is better to fertilize too often than not. Fertilizing too often will not hurt the grass, but it will cost more money. Fertilizing too little will result in a weak, thin lawn that is more susceptible to disease and drought.

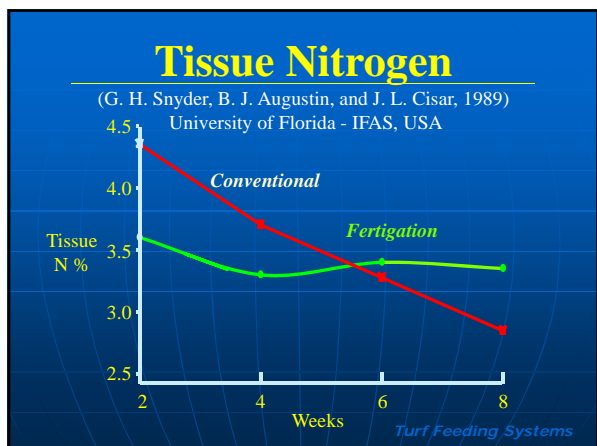
MOWING: If you are mowing, it is better to mow too often than not. Mowing too often will not hurt the grass, but it will cost more money. Mowing too little will result in a thick, uneven lawn that is more susceptible to disease and drought.

AERATION: Aeration is the process of creating holes in the soil to allow air, water, and nutrients to reach the roots of the grass. It is a necessary part of any lawn maintenance program, especially in high wear areas.

You Must Grow the Grass as Fast as you are Wearing it Down!

- You May Need To Increase Fertilization
- 8-12 month growing season with 2 fertilizations per year means:
 - 6-10 months of the year, no nitrogen in the plant leaf
 - You have a plant that can't defend itself
 - You may be playing on dirt





Increased Fertilization Must Equal Increased Mowing

- Increased fertilization without increased mowing creates:
 - Lazy Plants-growing longer leaves which is the easiest thing for the plant to do
 - Extra long clippings that need to be disposed of or shading can occur
 - Very shallow roots
 - Weak sod or seeded new turf



Increased Aeration Must Follow the First Two

- Without increased aeration, properly fertilized and mowed turf will:
 - Be more susceptible to disease and pests
 - Create excessive thatch
 - Maintain shallow roots
 - Not be able to tolerate wear
 - Not allow soil microbiology to aid the growing plants

MAINTENANCE OF HIGH WEAR FIELDS

- YOU MUST AERATE AT LEAST MONTHLY DURING THE PLAYING SEASON!



MAINTENANCE OF HIGH WEAR FIELDS

- YOU MUST HAVE A RELIABLE SOURCE OF IRRIGATION WATER



MAINTENANCE OF HIGH WEAR FIELDS

- YOU MUST TOP DRESS WITH ORGANICS & SAND YEARLY ON DAMAGED FIELDS!



Toro 6' and 16' Mowers





16 foot Productivity
This agile performer mows up to 14-17 acres per hour. It handles tough, tall or wet grass and lets you adjust its cutting width from 8-1/2' to 16 feet on the fly.
The 580-D has seven independent, interchangeable cutting blades and spindles with each installed in its own rear discharge "Wind Tunnel" housing. Add its 50 horses of power and you've got unparalleled mowing capacity with an unsurpassed quality of cut.



Aerway 6' and 12' & 15' Batwing Models

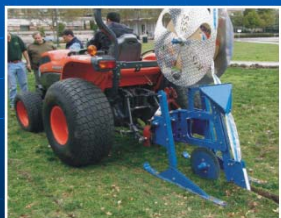




CUTTING EDGE BREAK-THROUGHS IN TURF MANAGEMENT

- Irrigation Water Savings of from 40%-50% Through Improved Technology
- A Fertilization System That Has Been Used Successfully on Golf Courses for Over 20 Years.
- There Is a Direct Correlation Between Sports Field Wear And Sports Field Maintenance
- Designing Sports Fields from a Maintenance Point of View
- Major Discoveries and Improvements in Organics
- No Till Renovation of Sportsfields

Non Drip Subsurface Irrigation



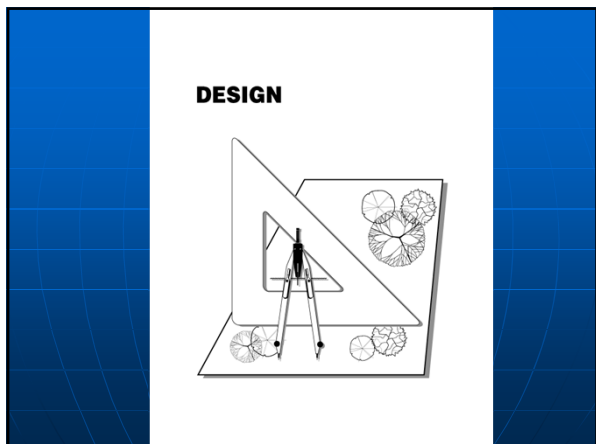
Cottonwood Sports Complex – 24 Acres Colorado Springs, Colorado



Turf Feeding Systems



A 300 gallon tank is installed below ground with the locked cover.



Designing Fields from a Maintenance Point of View!

- Most common specification still used on 90% of new natural turf fields being built today:
- has been the same for 50+ years
- **Will guarantee failure on a multipurpose field within 2 years or less!**

- 3-5 cubic yards per 1,000 sq. ft. of compost incorporated 6" deep
- triple super-phosphate incorporated for the roots
- seed, hydro-seed, stolonize or sod and grow in

This Common Specification Which Hasn't Changed In 50 Years Does Not Consider These Facts:

- Soccer has grown 60% faster than the population over the past 12-15 years.
- During this same 12-15 years, many cities and schools have experienced budget cuts, manpower cuts and some have seen a large increase in sports field acreage.
- Most contractors use a 20-30 hp roto-tiller which doesn't have the power to thoroughly mix compost in heavy clay so most frequently the amendments get incorporated 3-3.5" deep.
- The net result of all the above is that this specification guarantees shallow roots.
- What you will hear over and over today is that to have turf that will tolerate today's wear, you must have deep roots (10"+).

Cookie Cutter Approach Does Not Consider These Differences

- Soils
- Changes in Grading 2% to 1% or less
- Climate
- Type of turf
- Wear
- Maintenance Capabilities

What does designing from a maintenance point of view mean?

- We must gather a great deal of information about the field before design.
- We use all the above information to first determine what the soil percolation rate will need to be and how deep the root zone must be.
- We must write a very tight specification to insure that we get the field constructed based on the criteria mentioned above.
- A field Designed from a Maintenance Point of View means that all aspects from the design through grow-in are customized exactly for that site and all its unique features.
- This will guarantee that if the field is maintained properly, it can sustain the wear that the owner has said will take place on it.



LASER GRADING



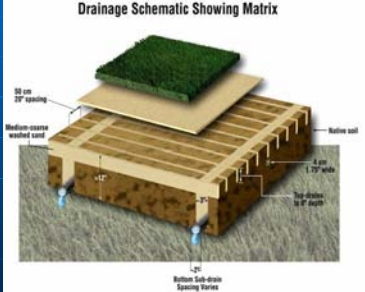
* REGULAR GRADING= + OR - .1 OF A FOOT
* LASER GRADING= + OR - .1 OF AN INCH!

KWIK Drain System



QwikDRAIN System

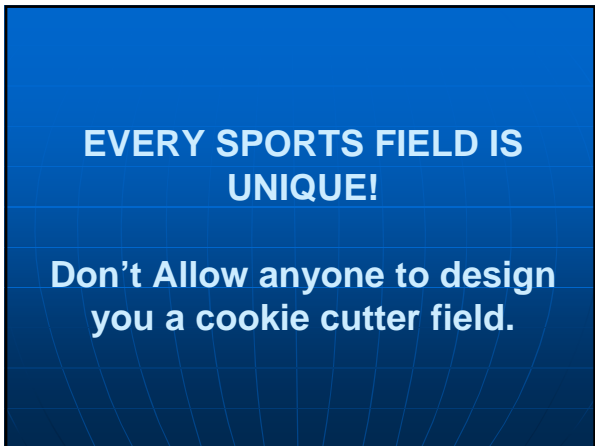
Drainage Schematic Showing Matrix



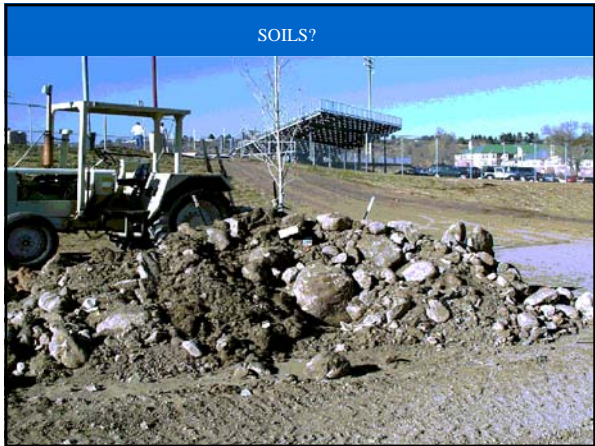






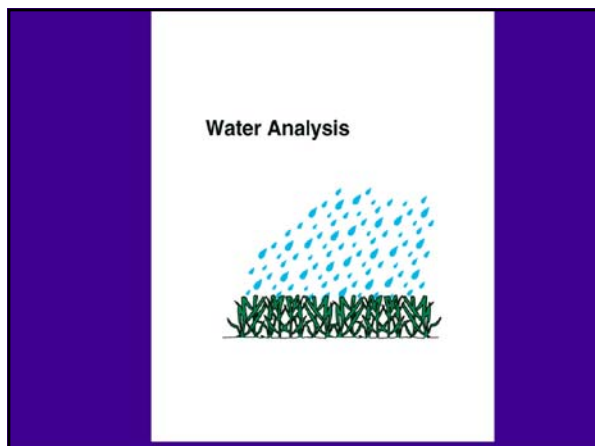




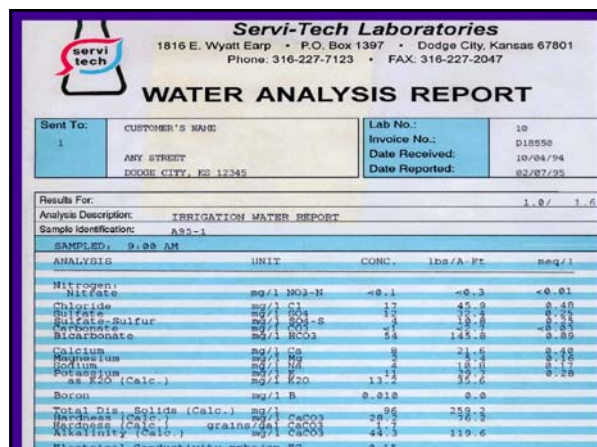


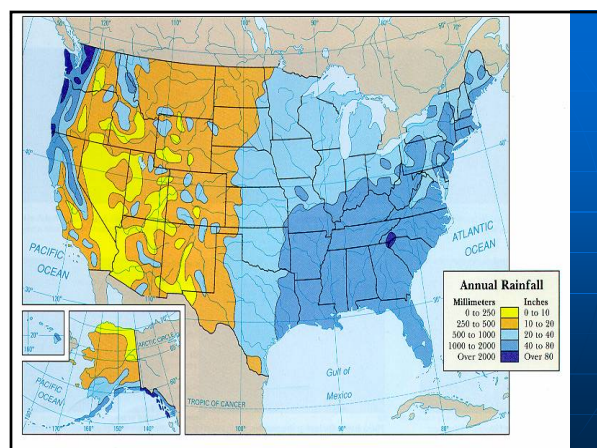


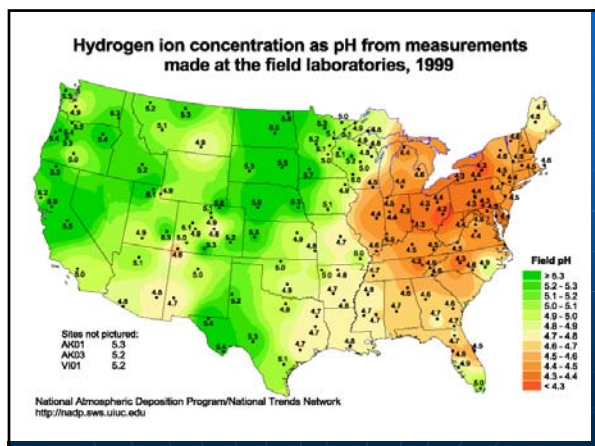


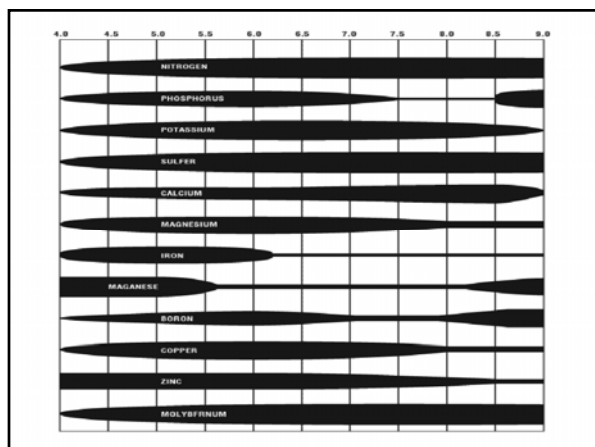


- Test Any Water Wells That Will Be Used For Irrigation Before The Fields Are Built
- Clay Has A Negative (anionic Charge)
- Sodium, Potassium, Calcium And Magnesium Have A Positive (cationic Charge)
- Cations Are Attracted To And Held By Clay
- Bluegrass Is Very Salt Intolerant And Will Eventually Die When Salt Levels Rise
- Reclaimed Water Is Normally High In Sodium And Therefore Accumulates In Clay Soils Affecting Permeability
- We Can Amend The Soil Differently If We Discover This Problem Early On Or If We Must Deal With Reclaimed Water





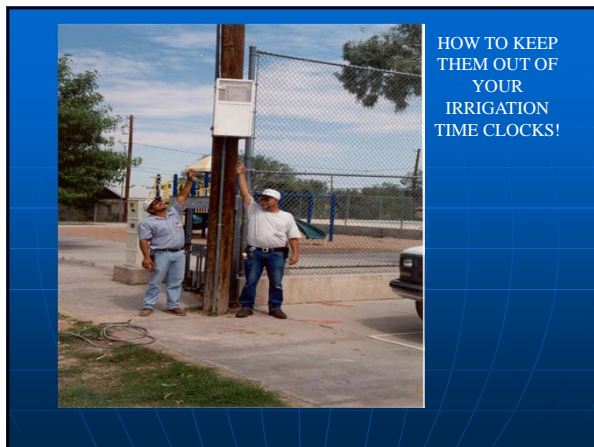


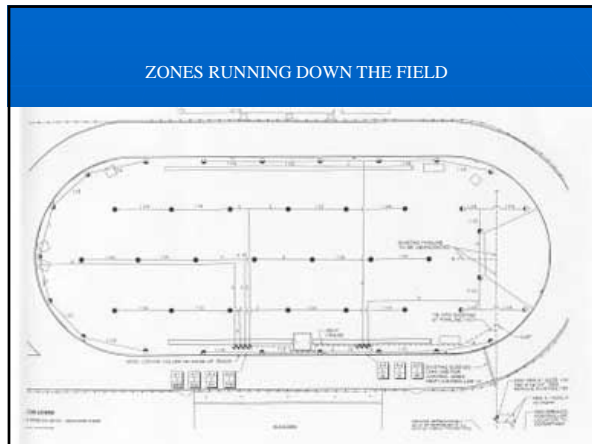




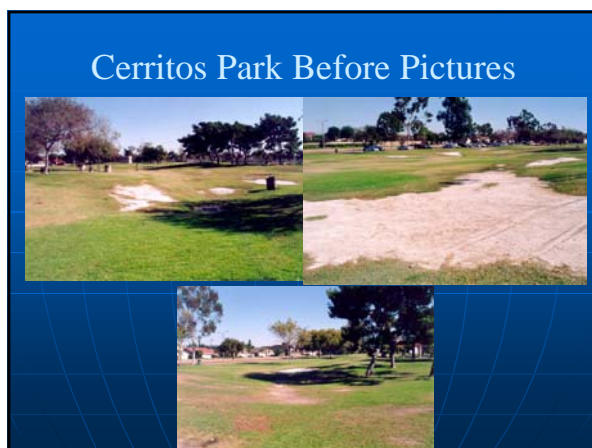








11-12-0000		PRZ SPORTS TURF CONSULTING		WATER QUALITY RATING- VERY POOR QUALITY IRRIGATION WATER	
Customer		Cerritos Regional Park		SALINITY HAZARD: HIGH. May affect growth of moderately tolerant crops (Kentucky bluegrass) Leaching will be necessary to prevent salt accumulation. Annually monitor soil and water for soluble salts.	
Location		Cerritos Regional Park		PERMEABILITY HAZARD: EXTREMELY HIGH. Specialized soil and water management practices are needed to maintain soil permeability. Annually monitor soil and water for sodium content.	
Reclaimed Water		Irrigation Water Analysis		CHLORIDE HAZARD FROM SPRINKLER IRRIGATION- VERY HIGH: Chloride may cause leaf burn to moderately tolerant plants, especially during high temperatures and low humidities. Foliar damage can occur with sensitive plant types (Kentucky bluegrass & certain trees). Irrigate at night or during cool weather conditions if possible.	
Total Nitrogen		mg/l	100	100	
Sulfate		mg/l	210	210	
Sulfate-Sulfide		mg/l	80	80	
Chloride		mg/l	100	100	
Carbonate		mg/l	<10	<10	
Hydroxide		mg/l	<10	<10	
Total Alkalinity		mg/l	100	100	
Hardness		mg/l	110	110	
Total Calcium		mg/l	100	100	
Total Magnesium		mg/l	20	20	
Total Potassium		mg/l	10	10	
Adjusted SAR			11.4	11.4	
SAR			39.2	39.2	
Total Iron		mg/l	0.1	0.1	
Total Manganese		mg/l	0.001	0.001	
Phosphorus		mg/l	0.001	0.001	
Orthophosphate		mg/l	0.001	0.001	
Total Dissolved Solids		mg/l	4	4	
Water pH			7.3	7.3	
Amphibian Index			1.0	1.0	



PRZ Consulting Before and After Pictures-Reclaimed Water




The County regional park on the left had very heavy & plastic clay soil, very poor quality reclaimed water and heavy usage. The soil was properly amended and the proper turf prescribed and the picture on the right was the result. The fields on the right side of the park are owned by a city and were not a part of the PRZ specification or renovation

Recycled Water Sprayed into Trees

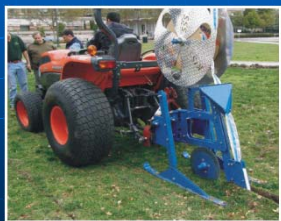


Declines of conifer trees have been observed under prolonged use of RWW

Sulfur Burner



Non Drip Subsurface Irrigation



Sub Surface Irrigation

- Reduce water consumption by up to 50%
 - Minimize evaporation
 - Reduce runoff
 - Minimize percolation
 - Eliminate drift
- Reduce head replacement from failure & vandalism
- Deliver matched precipitation and nutrients to the root-zone
- Eliminate overspray, staining and waste
- Increased playability of sports fields
- Highly durable system components
- Eliminate scheduling conflicts

**MAINTAIN MATCHED PRECIPITATION
ANY ARC, ANY RADIUS**

**THE IDEAL
8-30' (2.4 - 9 M)
SOLUTION**

<p>MP1000 & MP2000 ADVANTAGES VS. CONVENTIONAL SPRAYS</p> <ul style="list-style-type: none"> • Higher uniformity — even after radius reduction • Superior wind resistance • Reduced misting at higher pressure • Outstanding close-in water • Lower application rate — less runoff • Wider operating pressure range • Lower system cost — ability to put more heads per zone or use smaller pipe sizes 	<p>MP3000 ADVANTAGES VS. CONVENTIONAL ROTORS</p> <ul style="list-style-type: none"> • Better performance in wind with tight, high energy 30° or 45° streams • Faster installation because nozzle trees are eliminated • Matched precipitation between arc settings and after radius reduction • Better uniformity after radius reduction — no diffuse screw to cause stream distortion • Lower cost — especially for shrubs, 6" (15 cm) and 12" (30 cm) pop-up models
--	---



THE IDEAL 8' - 30' SOLUTION

MP1000



MP2000 Series



MP3000 Series



For Rain Bird & Hunter Type Heads W/Male-Threaded Pop-Up Stems **Spray**



High Application Rate Sprays On Golf Bunkers







Water Purveyor Response

107 Water Purveyors, Municipalities & Regions

The collage features several logos and maps. At the top left is the 'Saving Water Partnership' logo with the tagline 'A nation of great local water assets'. Below it is a map of the United States with a purple box highlighting the 'Central Utah Water Conservancy District'. To the right of the map is the 'Aurora' logo, which features a sunburst design. Below the map is the 'Smart Approved WaterMark' logo. To the right of the map is a map of the 'Metropolitan Water District of Southern California'. Below that is the 'Los Angeles' logo. To the right of the map is the 'San Diego County Water Authority' logo. Below that is the 'Colorado Springs Utilities' logo with the tagline 'It's how we're all connected'. At the bottom left is a 'BYE BUCKS' logo for 'WATER 2020'.

Fertigation for Sports Field Management



The bottom section of the slide features three rectangular images arranged horizontally. From left to right: a soccer player in a yellow and black striped jersey kicking a white ball on a green field; a football player in a red jersey with the number 40 running with the ball while being tackled by a player in a white jersey; and a baseball player in an orange jersey sliding into a base while a player in a white jersey attempts to tag him out.

Turf Feeding Systems

Fertigation has been used
in golf for over 20 years.


It is the fastest way to
grow-in a new golf course.

Turf Feeding Systems

**Fertigation is the best way to
recover a damaged
sports field.**

Turf Feeding Systems

***Fertigation
for
Sports Field
Management***



Turf Feeding Systems

**Fertigation has been used
in golf for over 20 years.**

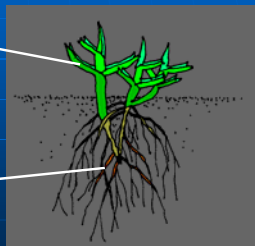
**It is the fastest way to
grow-in a new golf course.**

Turf Feeding Systems









SOIL ANALYSIS REPORT

[illegible]

Sand Based Field																					
SOIL ANALYSIS																					
FOR:	City of Santa Monica																				
ACRES:	0.33																				
FIELD:	Douglas-Bowling Green																				
SOIL ANALYSIS																					
pH	SALT	LIME	TEXTURE	ORGAN.	NIT.	PHOS.	POTAS.	SULF	CALC.	MAGN.	SOD.	ZINC	IRON	MANG.	BORON						
MMMS	%			%	N PPM	P PPM	K PPM	S PPM	Ca PPM	Mg PPM	Na PPM	Zn PPM	Fe PPM	Mn PPM	B PPM						
5.90	0.27	80	sand	1.70	2.00	1.00	54	37	429	98	93	5.70	47.80	1.10	0.30	0.10					
RECOMMENDED L.E. LOW	%LOAME	3.5%			50 PPM	112.00	11 PPM	13,000 PPM	118 PPM	37 PPM	1 PPM	1 PPM	15 PPM	2 PPM	4 PPM	10					
LB/ 1000 SQ FT. NEEDED					6.50	0.33	4.20	0.00	4.00	0.00		0.00	0.00	0.00	0.00						
CATION EXCHANGE CAPACITY																					
%CEC	%H	%K	%Ca	%Mg	%Na	Chlor					LOESS	CLAY	CLAY								
4	0%	4%	61%	23%	12%	0.00					100%	0%	0%								
RECOMMENDED L.E.	12-14										100%	0%	0%								

Organics

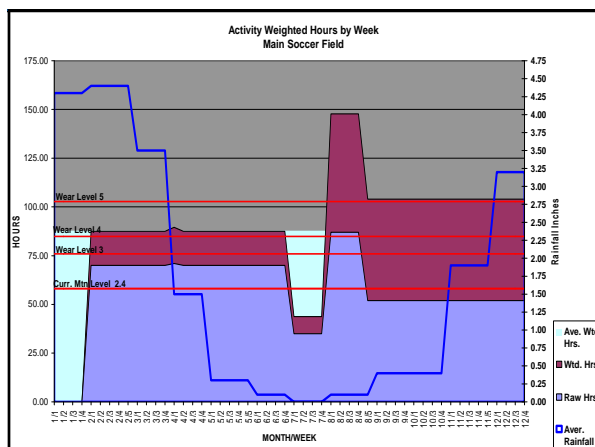
- Help Prevent Compaction
- Add Billions Of Microbes, Bacteria That Break Down Fertilizer
- Cause Turf To Go Dormant Later & Green Up Quicker In The Spring
- Help To Control Diseases
- Provide Dark Green Color

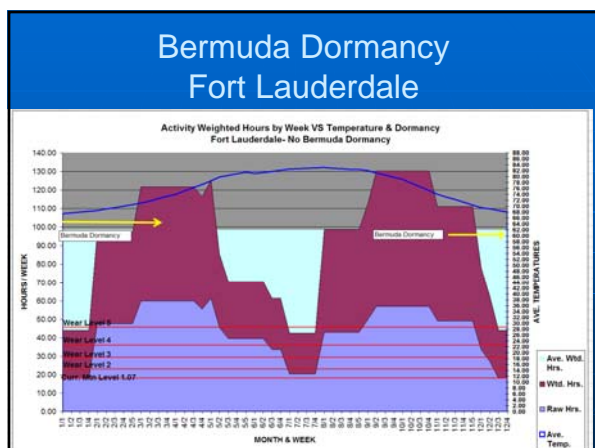
Composted Amendments

Dramatically Affect Turf Diseases

- They Bio-stimulate Native Populations of Soil Organisms to Prevent Diseases
- Contain Suppressive Micro-organisms
- Suppress Root Infecting Pathogens-Dollar Spot, Brown Patch, Pythium Blight, Necrotic Ringspot, Red Thread, Typula Blight
- Control Through Top-dressing Would Require Monthly Applications Of ½ Cu. Yd.
- Root-zone Incorporation Can Provide Up to 4 years of Disease Suppression

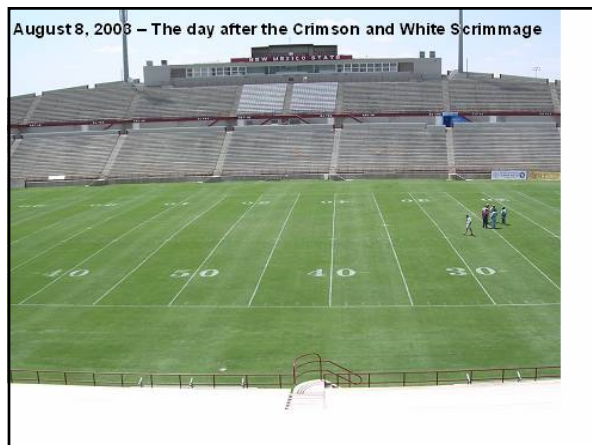
ACTIVITY WEIGHTING		
■ Walking		1.00
■ Baseball		1.25
■ Band		1.50
■ Physical Education		1.50
■ Soccer		2.00
■ Football		2.00
■ Lacrosse		2.25
■ Field Hockey		2.25
■ Rugby		2.50
■ Sports Clinic		2.50

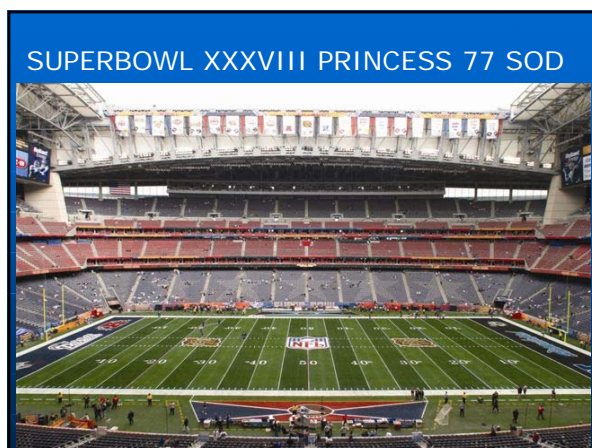












SEED RESEARCH for nurseries			
Regional agents' Classification			
Note: Nurseries are grouped by geographical region and by the type of seedlings they produce. The list is not exhaustive and is subject to change. Nurseries are listed in alphabetical order by region and by the type of seedlings they produce.			
State	Company	Address	Telephone
Alabama	Alabama Nurseries	1000 1st St. N. N. 36101	205/261-1111
Alaska	Alaska Nurseries	1000 1st St. N. N. 99501	907/261-1111
Arizona	Arizona Nurseries	1000 1st St. N. N. 85001	602/261-1111
Arkansas	Arkansas Nurseries	1000 1st St. N. N. 72701	501/261-1111
California	California Nurseries	1000 1st St. N. N. 90001	916/261-1111
Colorado	Colorado Nurseries	1000 1st St. N. N. 80001	303/261-1111
Connecticut	Connecticut Nurseries	1000 1st St. N. N. 06101	203/261-1111
Delaware	Delaware Nurseries	1000 1st St. N. N. 19701	302/261-1111
Florida	Florida Nurseries	1000 1st St. N. N. 32101	407/261-1111
Georgia	Georgia Nurseries	1000 1st St. N. N. 30301	404/261-1111
Hawaii	Hawaii Nurseries	1000 1st St. N. N. 96801	808/261-1111
Idaho	Idaho Nurseries	1000 1st St. N. N. 83401	208/261-1111
Illinois	Illinois Nurseries	1000 1st St. N. N. 60601	312/261-1111
Indiana	Indiana Nurseries	1000 1st St. N. N. 46101	317/261-1111
Iowa	Iowa Nurseries	1000 1st St. N. N. 52201	319/261-1111
Kansas	Kansas Nurseries	1000 1st St. N. N. 66101	316/261-1111
Kentucky	Kentucky Nurseries	1000 1st St. N. N. 40301	502/261-1111
Louisiana	Louisiana Nurseries	1000 1st St. N. N. 70001	504/261-1111
Maine	Maine Nurseries	1000 1st St. N. N. 04101	207/261-1111
Maryland	Maryland Nurseries	1000 1st St. N. N. 21201	410/261-1111
Massachusetts	Massachusetts Nurseries	1000 1st St. N. N. 02101	617/261-1111
Michigan	Michigan Nurseries	1000 1st St. N. N. 48101	313/261-1111
Minnesota	Minnesota Nurseries	1000 1st St. N. N. 55401	612/261-1111
Mississippi	Mississippi Nurseries	1000 1st St. N. N. 39201	601/261-1111
Missouri	Missouri Nurseries	1000 1st St. N. N. 64101	314/261-1111
Montana	Montana Nurseries	1000 1st St. N. N. 59101	406/261-1111
Nebraska	Nebraska Nurseries	1000 1st St. N. N. 68101	402/261-1111
Nevada	Nevada Nurseries	1000 1st St. N. N. 89101	702/261-1111
New Hampshire	New Hampshire Nurseries	1000 1st St. N. N. 03001	603/261-1111
New Jersey	New Jersey Nurseries	1000 1st St. N. N. 07001	908/261-1111
New Mexico	New Mexico Nurseries	1000 1st St. N. N. 87101	505/261-1111
New York	New York Nurseries	1000 1st St. N. N. 10001	212/261-1111
North Carolina	North Carolina Nurseries	1000 1st St. N. N. 27601	919/261-1111
North Dakota	North Dakota Nurseries	1000 1st St. N. N. 58101	701/261-1111
Ohio	Ohio Nurseries	1000 1st St. N. N. 43001	614/261-1111
Oklahoma	Oklahoma Nurseries	1000 1st St. N. N. 73101	405/261-1111
Oregon	Oregon Nurseries	1000 1st St. N. N. 97101	503/261-1111
Pennsylvania	Pennsylvania Nurseries	1000 1st St. N. N. 19101	610/261-1111
Rhode Island	Rhode Island Nurseries	1000 1st St. N. N. 02901	401/261-1111
South Carolina	South Carolina Nurseries	1000 1st St. N. N. 29101	803/261-1111
South Dakota	South Dakota Nurseries	1000 1st St. N. N. 57101	605/261-1111
Tennessee	Tennessee Nurseries	1000 1st St. N. N. 37101	615/261-1111
Texas	Texas Nurseries	1000 1st St. N. N. 75101	214/261-1111
Utah	Utah Nurseries	1000 1st St. N. N. 84101	801/261-1111
Vermont	Vermont Nurseries	1000 1st St. N. N. 05401	802/261-1111
Virginia	Virginia Nurseries	1000 1st St. N. N. 22101	703/261-1111
Washington	Washington Nurseries	1000 1st St. N. N. 98101	206/261-1111
West Virginia	West Virginia Nurseries	1000 1st St. N. N. 26001	304/261-1111
Wisconsin	Wisconsin Nurseries	1000 1st St. N. N. 53101	608/261-1111
Wyoming	Wyoming Nurseries	1000 1st St. N. N. 82101	307/261-1111






ATHLETIC FIELD SODDING SPECIFICATION

- No Bugs, Grubs
- Grown on Sandy Loam Soil With Sand Content Slightly Higher than the soil it is being Layed on
- Big Roll Sod-42-48" wide-67% Fewer Seams-Much Faster Installation
- Plastic Netting Must be removed
- Thin Cut Sod-1 1/2"-3/4" Soil, 1"-1.5" Turf, Thick Cut Sod (2" soil) is Lazy
- Specify Newer Varieties (improving every year)
- Only Sod Cut The Night Before

BIG ROLL SOD-67% FEWER SEAMS





FIELD TOPMAKER-MILE HIGH STADIUM







Sports Field Drainage

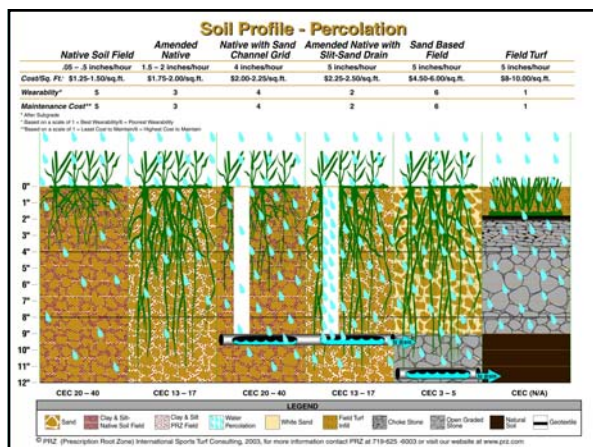
- 18" Crown of Football Field= 2% Grade- Left sideline Soccer Player Can't See Ball on right sideline
- 2% Slope From Home Plate = Center Fielder is at eye Level with Home Plate-Doesn't Work
- We Must Design Percolation Rate Into Root zone- can reduce grade to 1-1.25%
- High Wear During Rainfall= Under-drain system to quickly dry out top 3" of Root Zone
- Best Drain System Address Surface Drainage and Root Zone Drainage

Sports Field Drainage



KWIK Drain System





INFILL ARTIFICIAL TURF

- Not The Old Astro Turf-Career Ending Injuries
- Infill Turf Has Much Longer Fibers Which Are Then Filled With sand and Rubber
- Feels Just Like Natural Turf And Is Actually Softer to Land On
- Sewn In Seams Are Best
- Can Sew In Soccer & Football Lines In Different Colors To Save Painting
- Never Consider Unless You Can Light The Field To Maximize Use And Take Wear off of The Natural Turf Fields

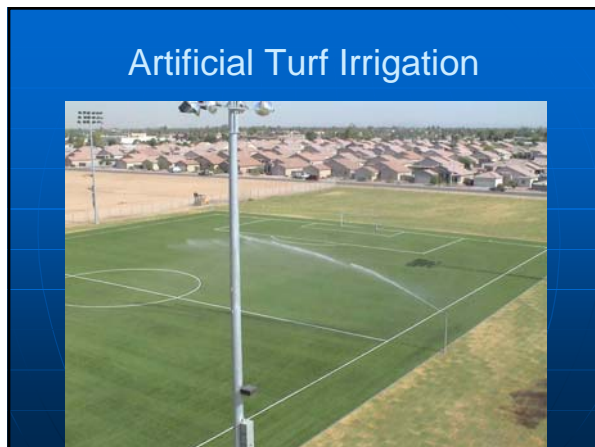
Artificial Turf With Soccer and Football Permanent Lines

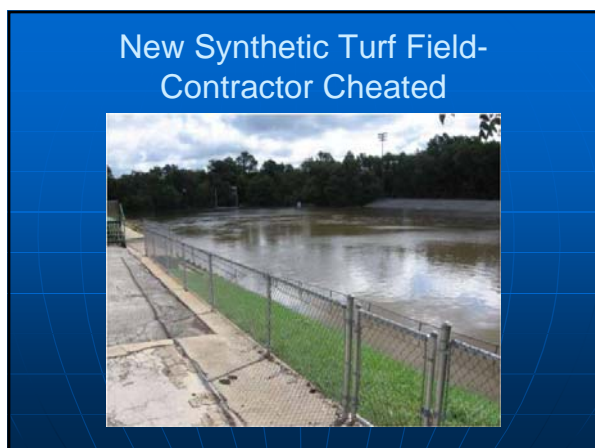


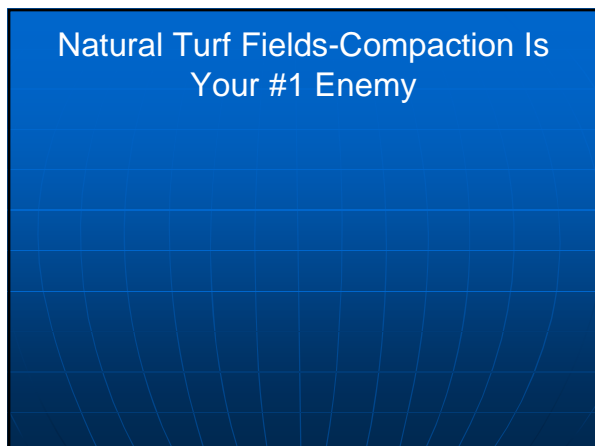
MULTI PURPOSE ARTIFICIAL TURF











Natural Turf Fields-Compaction Is Your #1 Enemy

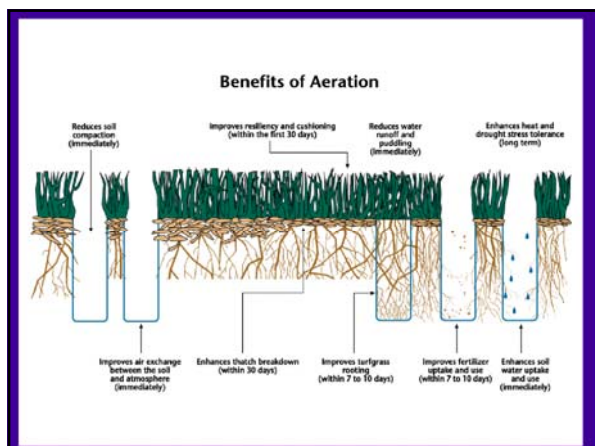
- Influences water uptake
- Decreases Turf density
- Increases Canopy temperatures
- Less Carbohydrate storage
- Less shoot growth
- Slower leaf extension
- Decreased clippings
- Prevents Rhizomes from spreading
- Dramatically reduces wear tolerance

Determining Maximum Hours/Week/Field-Phoenix

[illegible]

AERATION IS GOOD?





AERATION

- **Annual Renovation Aeration**
 - Normally Done In Spring & Includes Deep Tine Aeration & Plug Pulling
- **Regular Maintenance Aeration**
 - Plug Pulling Best But Leaves Cores At The Surface To Deflect The Ball
 - Knife Aeration Allows Field To Be Played On Immediately



- Advantages

- Does Not Leave Plugs At The Surface
- Has 7" Long Shatter Tines That Fracture The Soil 7" Deep
- Has A Roller On The Ground To Smooth Out Any Rough Spots
- Has A 100 Gallon Ballast Tank Mounted On Top
- Also Has 7" Slicing Tines For Regular Usage
- Also Has Plug Pulling Tines
- Leaves Hole Big Enough To Allow Topdressing
- Can Aerate 3+ Acres Per Hour

AerWay simplifies deep-tine aeration

At first glance, AerWay 200 Series subsothers may look like older Models, but that's where the similarity ends. AerWay 200 Series subsothers simplify deep-tine aeration with a unique rotating action deep in the soil for fast and effective compaction relief. No cones, no PTO, no complex machinery. Aerate and clear that area with AerWay 200 Series subsothers.

AerWay 100 Series tines penetrate 6" deep to break through deep layering, enhance rooting, and aid infiltration

Effective operation

JetWing is a rugged ground drive unit built to work hard for a long time. No more. No PMS. No complex maintenance.

Patented

are the key
like a crucial line
series to guide
from the road.
for Way 1 uniquely
right lines their
through the soil

...surrounds
...surge than both
...side and
...toward

Aerobic and anaerobic

right answer

7. *Journal of the American Medical Association*, 277, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674,

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Building 1000, Ruston with Rye

Aerate greens and tees anytime with



Have you tried the new *Proton* yet? It's the most powerful, most reliable, most economical car in the world.

The apartment is just a few minutes' effort
from the train station. It is a very nice place to live.

For many applications, sorting 100 bytes (floats) are the smallest solution you've been looking for. Specimen 4: efficient, fast, and easy with virtually no buffer disruption. You'll see the difference in the

and, as a result, the soil is not compacted. The resulting improvement in soil conditions, SoilWise 100 Series footings are ideal for most commercial use where glaze is involved. Plus, the optional built-in collar can be added to smooth the phasing surface.



Close-up, surface

without disrupting play

Not only does herring let you avoid ground whenever you want, you'll see Vancouver too. But you could use a more complex machine. The built-in color monitor

AcrylicWay 100 Series Green Express

- Built-in measuring wheel
- Instant ground stability with one or two runners
- Control position depth to 12" increments up to 6' or use the roller alone
- Power-pinch hitch models available
- Pneumatic, hot tire or hot-grip wheels

A yellow AerWay roller attachment is shown mounted on the rear of a tractor. The roller has a large yellow cylindrical tank on top with the 'AerWay' logo. Below the tank is a series of black rollers and a metal frame. The tractor is on a green lawn.



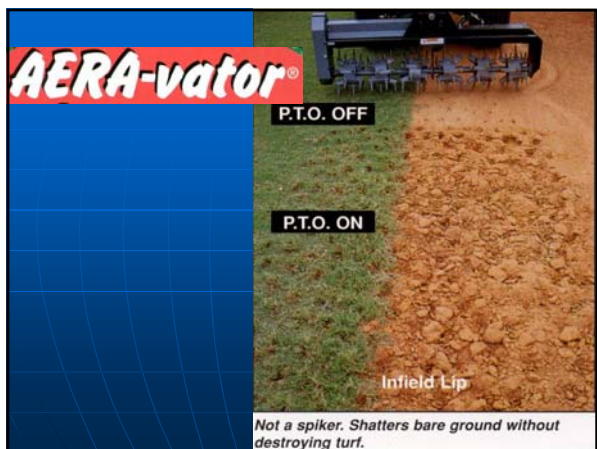












Agrivator



TOP DRESSING

- The Only Way To Change A Soil Profile Without Total Renovation
- Fills In Low Spots Thus Re-leveling The Field Each Year
- Best Way To Replenish Compact Fighting Organics That Are Used Up Each Year
- When Followed By Frequent Knife Aeration, Adds Sand & Organics To Root-zone, 7" Deep
- Helps Break Down Thatch
- Should Be Done Annually On High Wear Fields
- Top Dressing Mix Should Be At Least 20% Compost & 80% Sand & 1/4" In Depth
- Requires At Least A 4 Yard Machine



TOP DRESSERS
TURFCO 1 YARD- UPPER
RIGHT
TYCO 5-7 YARD- BOTTOM

TY-CROP TD-460 TOP DRESSER



No Till Renovation

- Developed and Used in Europe for 15 years
- Called Greenway System in the US
- Aerates and breaks up compaction 8" deep
- Utilizes sand and top dressing to re-level the field and re-establish the grades
- Cost 33%-50% of normal renovation (roto tilling, amending soil, seeding or sodding)
- Ready to play in 4-5 weeks vs 12-16 weeks normally

Before Renovation

- 1.5 Year old Field unplayable
- Compacted to 98-100%
- Many Low spots collecting water
- New sod dying-creating bare spots
- Very shallow root system
- Needed to play on in 6 weeks







Top Dress with Sand



Agrivator 6"Deep



Agrivator 5 Holes /Sq. Ft.



Agrivating Through the Top
Dressed Sand



Recycling Dresser



Recycle Dress Through the Top
Dressed and Agrivated Sand



LEVELING HARROW

- Works topdressing into turf
- Moves soil into the low spots
- Shaves the soil off the high spots
- Creates level, smooth playing surface



Re-leveling & Re-establishing Grade 3-5' Sections Wide



Over-seeding



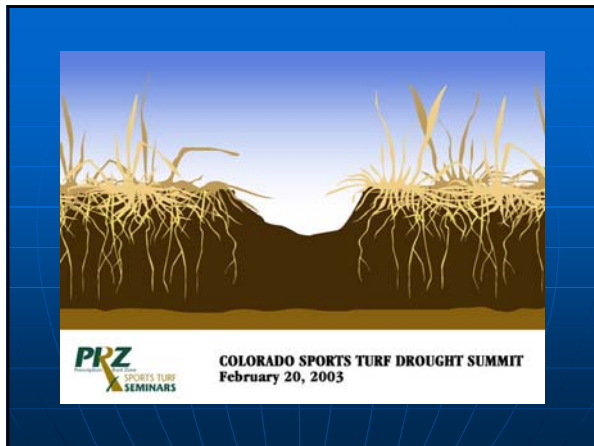


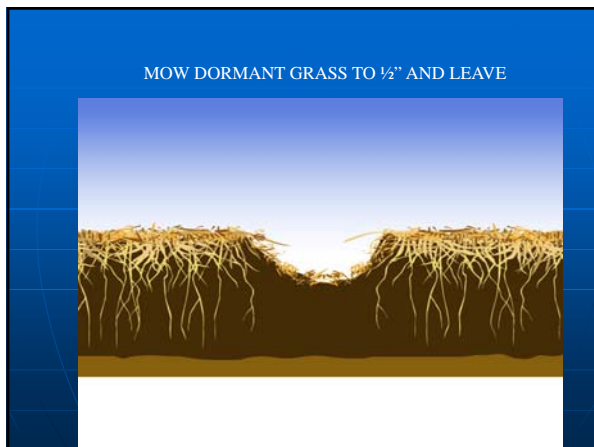
ANNUAL RENOVATION OF SPORTS FIELDS

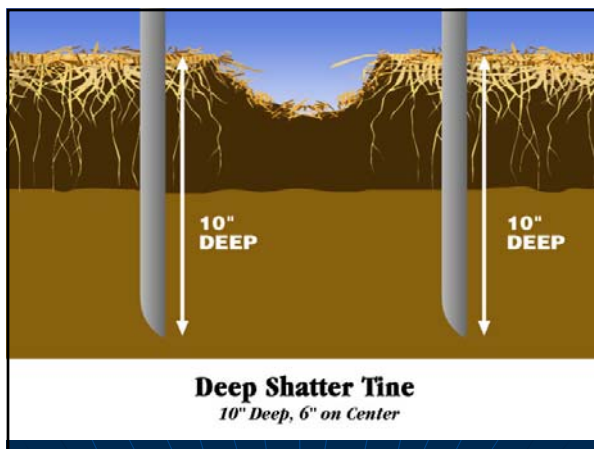
- Must Use This Language Or It Is Considered Routine Maintenance That Can Be Pushed Aside For A Soccer Tournament Or Even Practice
- You Should Schedule This A Year In Advance To Insure That All Involved Have It On Their Calendars
- Set Aside 8 Weeks For Full Recovery Before Play Resumes
 - This Is Essential To Allow The New Seed And Newly Stimulated Grass To Grow Over Any Bare Spots Before Play Resumes

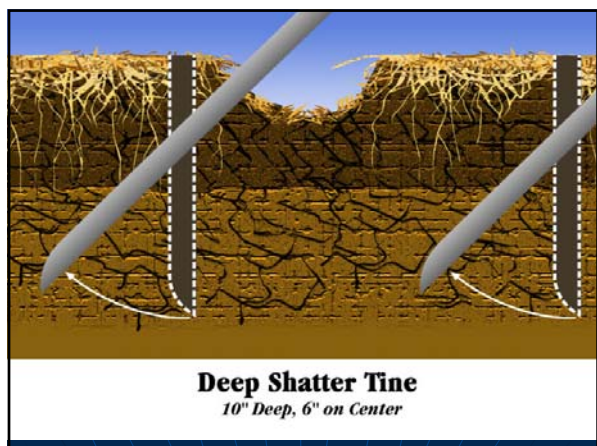
STEPS FOR ANNUAL RENOVATION

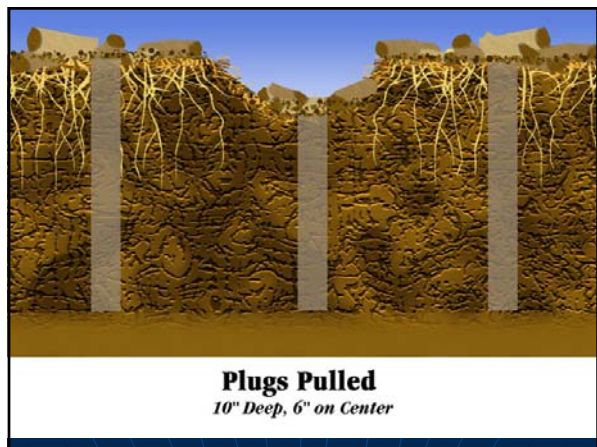
- Mow The Dormant Grass Close (1/2") And Leave It
- Deep Tine In Two Directions (Solid Tine Then Plug Pulling) Or Shatter Tine In Two Directions
- Plug Pull In At Least 4 Directions
- If This Is Tight Clay, Vacuum Plugs & Thatch
- Top Dress With 80/20 Mix
- Drag The Top Dressing Into The Holes (Deep-tine-6-8 Passes, Shatter-tine Or Normal Plug Pulling-4 Passes)
- Over-seed In Two Directions
- Fertilize With A Quick Release Fertilizer To Stimulate The Plants To Grow In The Bare Or Worn Spots Quickly
- Grow & Mow! Should Mow At Least Three Times A Week To Cause Plants To Mend Quickly

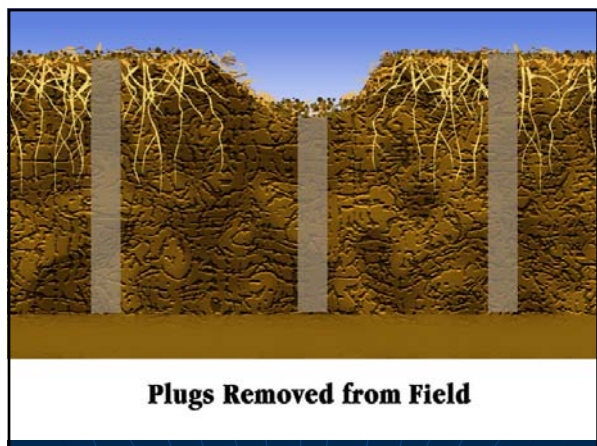


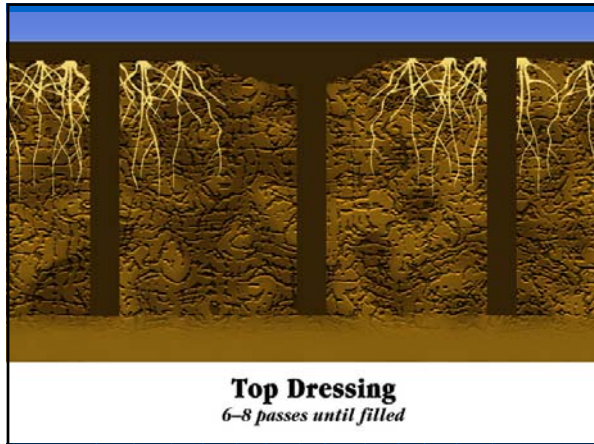




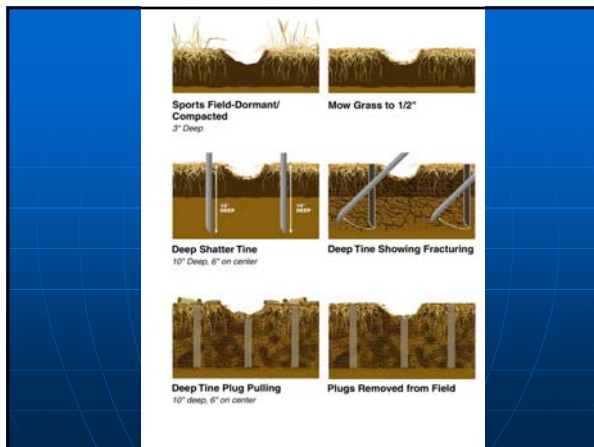


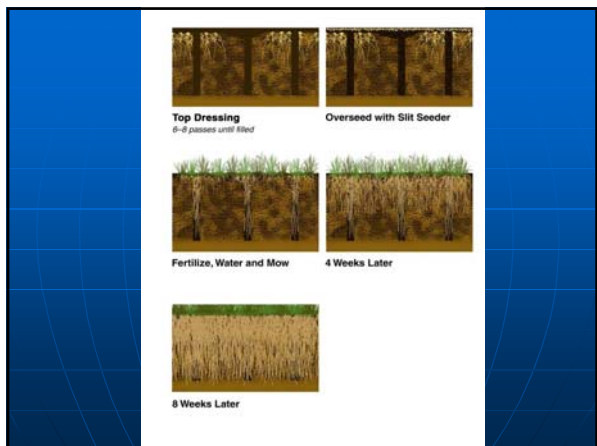






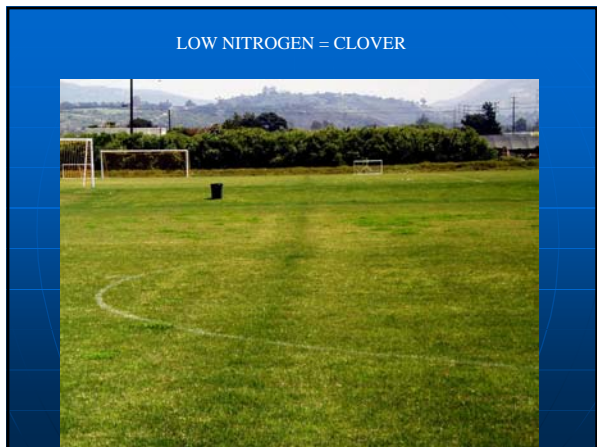


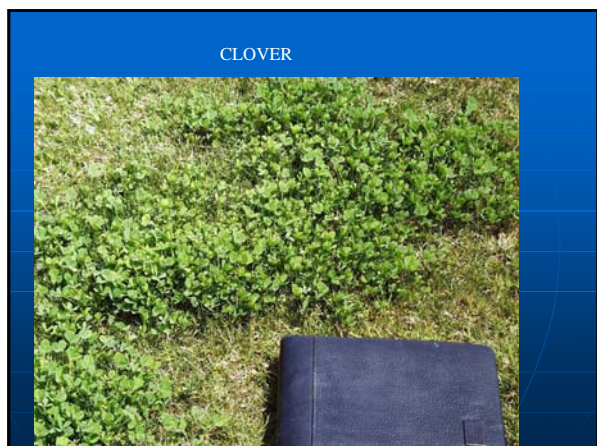




NITROGEN (N)

- Used In Greatest Quantities
 - Most Money Spent On N
- Over Stimulation Is Greatest Cause Of Thatch
- Deficiency Symptoms
 - Yellowing (Chlorosis)
 - Slowing Growth
 - Amount Of Clippings Drop
 - Over Time Clover Appears
- Diseases
 - N Deficient Diseases, Dollar Spot, Red Thread
 - Pythium And Brown Patch Attack Over Stimulated Turf
- Late Fall Fertilizations
 - Soil Temps Still Allow Fertilizer To Be Taken In After Air Temps Drop
 - Carbohydrates Go To Root Development Instead Of Shoots So Spring Response Is Much Better

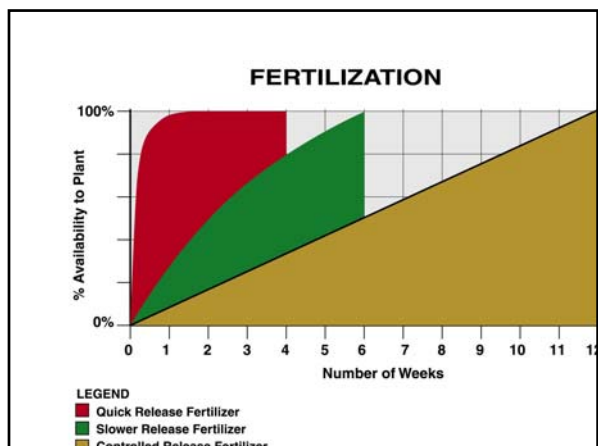




Nitrogen Timing & Rate

- Cool Weather Grasses
 - Light Applications In Spring And Early Summer (March-May .5- .75 Lbs/1,000 Sq. Ft.)
 - As Needed To Prevent Chlorosis In Summer (June & July)
 - Heavier Applications In Fall (August & Sept. 1 Lb/1,000 Sq. Ft.)
 - Late Fall –(Oct.-November-1-1.5 Lbs/1,000K)
- Warm Weather Grasses
 - 1 Lb./1,000 Sq. Ft. Per Month During Growing Season
 - This Varies With Climate And Growing Conditions

COMPARISON OF MAJOR SOURCES OF NITROGEN								
NITROGEN SOURCE	APPLIC. INTERVAL	HYDROLYSIS RELEASE	MICROENC. RELEASE	BURN POTENTIAL	SALT INDEX	LEACHING POTENTIAL	VOLATL. POTENTIAL	COST
QUICK RELEASE								
UREA-49%	2-4 WEEKS	YES	NO	VERY HIGH	MEDIUM	HIGH	HIGH	LOW
AMM. 30% NITRATE	2-4 WEEKS	YES	NO	VERY HIGH	HIGH	HIGH	HIGH	LOW
AMM. 32% SULFATE	2-4 WEEKS	YES	NO	VERY HIGH	HIGH	HIGH	HIGH	LOW
SLOWER RELEASE								
SCI 32-38% (slow and steady)	4-6 WEEKS	YES	NO	LOW	HIGH	HIGH	LOW	HIGH
PLASTICURE-38% COATED-UREA	4-6 WEEKS	YES	NO	LOW	HIGH	HIGH	LOW	HIGH
CONTROLLED RELEASE								
URAP-21% 12-18 WEEKS	12-18 WEEKS	YES	NO	LOW	LOW	LOW	LOW	HIGH
URAP-30% 12-18 WEEKS	12-18 WEEKS	YES	YES	LOW	LOW	LOW	LOW	HIGH
METHYLENE UREA 49%	12-18 WEEKS	YES	YES	LOW	LOW	LOW	LOW	HIGH
CALFEA-22% CHLORIDE & UREA	14 WEEKS	NO	NO	NONE	LOW	NONE	NONE	HIGH
* ISOBUTYLUREA UREA								



Over Stimulation= Thatch

- Mowing Clippings Do Not Cause Thatch
- Thatch Is Breeding Place For Turf Diseases
- Over Time As Thatch Depth Gets Greater, All Roots Come Up To The Thatch Layer
- Kentucky Blue Grass
 - Thatch Caused By Rhizomes
- Hybrid Bermuda Grass
 - Thatch Caused By Stolens

DETHATCHING & VERTICUTTING

- Very Time Consuming
 - Can Be Up To 2" + Thick
- Kentucky Blue Grass
 - Thatch Is Tough & Thick Ryzomes
- Bermuda Grasses
 - Thatch Is Tough & Thick Stolons
- Santa Anita Race Track
 - Takes 14 Days, 11 People For 16 Acres
 - \$13,000 Equipment Rental
 - Field Top Maker To The Rescue!

SANTA ANITA RACE TRACK





KORO FIELD TOPMAKER



GREAT FOR STRIPPING SOD



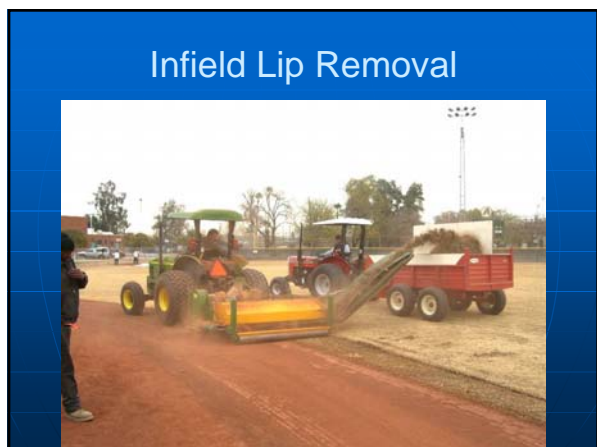


FIELD TOPMAKER-MILE HIGH STADIUM



FIELD TOPMAKER DETHATCHING HYBRID
BERMUDA







WHAT DO YOU MEAN YOU NEED \$60,000 FOR A NEW LAWNMOWER?





16 foot Productivity

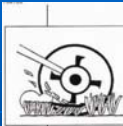
This agile performer mows up to 14-17 acres per hour. It tackles tough, tall or wet grass and lets you adjust its cutting width from 8.5 to 16 feet on the fly.

The 580-D has eleven independent, interchangeable cutting blades and spinners with each installed in its own rear discharge Wind Tunnel® housing. Add its 90 horses of power and you've got unequalled mowing capacity with an unsurpassed quality of cut.






TYPES OF MOWERS



Reel Mowers

These mowers consist of a series of five to eleven blades attached to a cylinder called a reel. The blades on the reel push the grass down against a stationary cutting bar called the bed knife. As the reel rotates, the blades of the reel and the bed knife cut the grass in a scissor-like fashion, with a sharp, clean cut. Reel mowers are commonly used on high-quality turf areas such as golf courses and are best suited for those turf grasses and situations that require close cutting heights. Certain reel mowers are capable of cutting grass to heights of less than 0.25 inch.

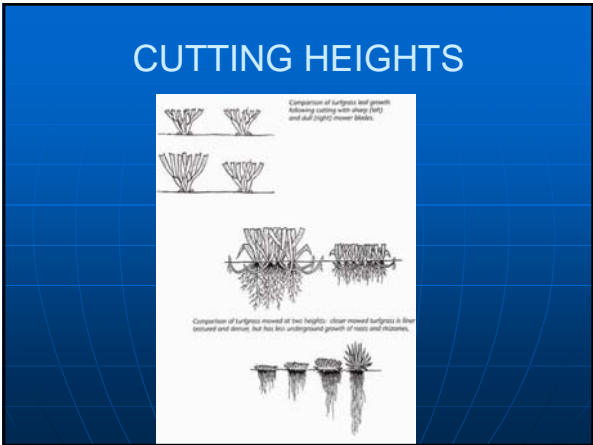
Although reel mowers provide exceptional mowing quality there are several disadvantages to their use. For example, they are best suited to smooth surfaces and will not cut grass that is much taller than the curvature of the height of the reel. They will not mow tall, rough seed head stalks or weeds. In most cases, their initial cost and special maintenance requirements are greater than that of rotary mowers.



Rotary Mowers

These mowers cut turf grass with blades that rotate horizontally at high speeds. The bed knife or set of the blade's leading edge does the cutting. The turf is severed by impact rather than a scissor-like cut; rotary mowers cut because of the sheer speed of the blades. Impact cutting results in a ragged degree of excitation of the leaf tip. Depending on the diameter of the blade and the turf species being cut, the shredding of the tip can vary from very minor to quite severe. The closer the blade, the greater the damage. Turn-of-the-blade tips are more prone to shredding. Continuous mowing with a dull blade will reduce the quality and health of the turf drastically. (Refer to the figure on the following pages.)

Nutrients In A Turf Grass Leaf											
Nitrogen-	Phosphorus-	Potassium-	Calcium-	Magnesium-	Sulfur-	Zinc-	Iron-	Manganese-	Copper-	Boron-	Sodium-
% N	% P	% K	% Ca	% Mg	% S	% Zn	% Fe	% Mn	% Cu	% B	% Na
1.24	0.20	1.86	0.65	0.27	0.79	0.014	0.05	0.0066	0.0144	0.0018	0.46





Your Options

- Increase Maintenance Level
 - Reduce Usage
- Increase Natural Turf Fields
 - Artificial Turf
- Increase Users Fees





INTERNATIONAL
SPORTS TURF CONSULTING

larry@prz.com
Prz.com
Phone- 719-265-6003
Fax-310-626-9657

FIELD USAGE / AVAILABILITY ANALYSIS

Farm Branch Fields		Square Feet	Total														
Field	Weeks	PM	25	Weeks	Aves	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Weeks	Weeks					4	5	4	5	4	5	4	5	4	5	4	5
Subtotal (Numbers represent activity-weighted hours per week)																	
Hours Allowed			921	18	0	0	1	5	26	45	45	45	36	8	0	0	0
Hours Available			496	20	0	0	1	34	4	37	40	10	32	60	29	0	0
Excess hours of usage			716	14	0	0	1	4	20	35	35	35	28	6	0	0	0
Hours Allowed			701	28	0	0	1	35	10	27	30	20	40	62	29	0	0
Hours Available			921	18	0	0	1	5	26	45	45	45	36	8	0	0	0
Excess hours of usage			496	20	0	0	1	34	4	37	40	10	32	60	29	0	0
Hours Allowed			1125	22	0	0	1	7	32	55	55	55	43	10	1	0	0
Hours Available			290	29	0	0	1	7	47	50	50	50	40	24	58	29	0
Excess hours of usage			1432	28	0	0	1	8	41	70	70	70	57	13	0	0	0
Hours Allowed			15														
Hours Available																	
Excess hours of usage																	
						28	31	11	62	65	15	11	56	29			
Active Weighting Scale																	
Walking on field Softball																	
1.00																	
Push-out																	
1.25																	
PF																	
1.50																	
Parked Cars																	
1.50																	
Machining Band																	
1.75																	
Person Grooming																	
1.85																	
Feedback Games																	
1.85																	
Sector & PD Practices																	
2.00																	
Adult Sector & PD Games																	
2.15																	
Adult Sector & PD Prac																	
2.15																	
Lawrence																	
2.25																	
Ragley																	
2.50																	
Sports Clinics																	
2.50																	
Current Water Level																	
4.00																	
Current Maintenance Level																	
3.00																	
Determining Field Availability																	
Use the following steps to evaluate requests for additional field use:																	
1. Determine the actual hours of additional use required.																	
2. Multiply the total hours of prepared use by the appropriate activity weight.																	
3. Locate the column for the month when the prepared additional use will occur.																	
4. Determine if there are available hours at the current maintenance level. If there are:																	
a. You can schedule the activity.																	
5. If not, use of sufficient hours can be made available by increasing the maintenance level.																	
6. If sufficient hours can be made available, and you can afford the additional costs,																	

Frequency	Annual Requirement	Available	Deficit
Level	700	4.5	
Sept	79	95	
Oct	0	7	
Nov	0	1	
Dec	1	1	
Jan	0	1	
Feb	0	1	
Mar	0	1	
Apr	0	1	
May	0	1	
June	0	1	
July	0	1	
Aug	0	1	
Sept	0	1	
Oct	0	1	
Nov	0	1	
Dec	0	1	
Jan	0	1	
Feb	0	1	
Mar	0	1	
Apr	0	1	
May	0	1	
June	0	1	
July	0	1	
Aug	0	1	
Sept	0	1	
Oct	0	1	
Nov	0	1	
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