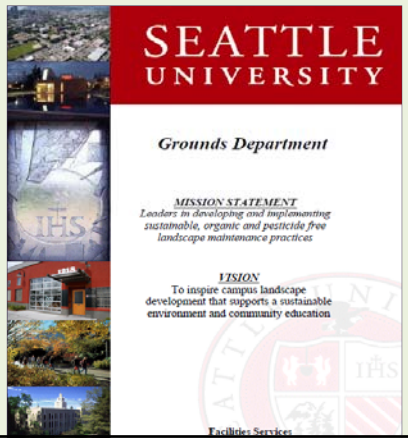



## GARDENING FOR THE FUTURE

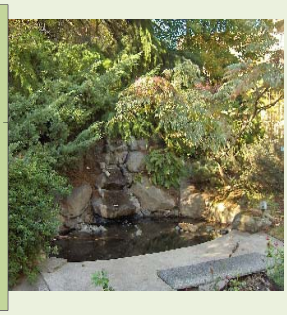
- 48 acres of intensely urbanized landscape
- Organic and sustainable methods *ONLY* for our unique and cherished gardens
- Many themed and historical gardens

## GARDENING FOR THE FUTURE

- Ten Gardeners
  - Expertise in many areas including;
    - irrigation, IPM, athletic field maintenance, arboriculture, sustainable landscape design, compost tea operations, recycling, soil blending and much more.
- Additionally we maintain a base of 20+ part time student employees throughout the year

## SU Gardens

- **Wildlife Habitat**
- **Bio-Diversity**
- **Ethnobotanical**
- **Xeriscaping**
- **Japanese Garden**
- **Rain Gardens**
- **Roof gardens**
- **SU Community P-Patch**



## Gardener Emphasis

- Pollinator Pathway creating habitat
- Soil Building using natural processes and compost solids and liquids
- Native plantings
- Food production for all life now and in the future
- Grounds as a teaching resource
- CPTED & ADA

## Maintenance Philosophy

- Only use organic and sustainable methods
- Pesticide free environment
- First do no harm
- Provide healthy, safe, lush and well groomed landscape
- Development:
  - lowest environmental impact
  - maximum environmental benefit
  - maximum educational benefit

## *Pesticide Free Since 2001*

- Last time pesticides were used on campus was 2001
- Round-Up was applied for weed control

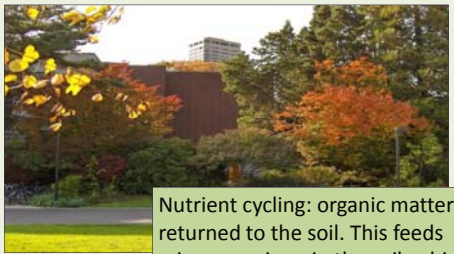
## *Leadership Support*

- Seattle University leadership and surrounding community expect and support:
  - Sustainable and organic methods
  - Natural care of habitat
  - Development for current and future needs.

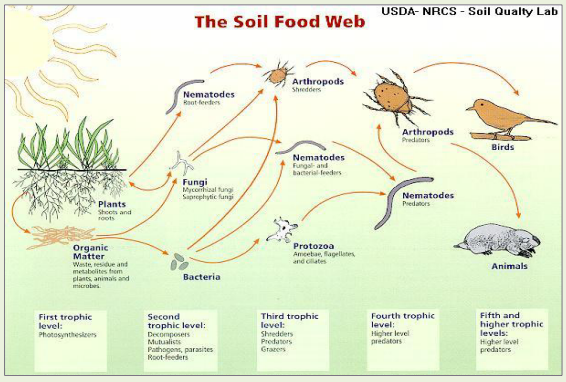
## *Organic Amendments For Healthy Turf*

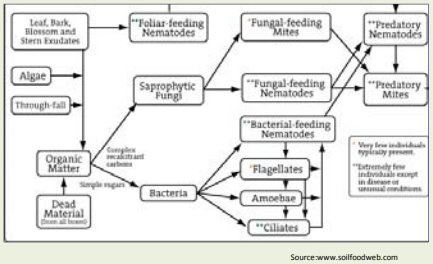
Janice Murphy
janicem@seattleu.edu

## Sustainable landscape management mimics natural processes



Nutrient cycling: organic matter is returned to the soil. This feeds microorganisms in the soil, which make nutrients available to plants, improves soil structure.






In nature, look to the prairie/meadow ecology for a comparison to turf

## Adding The Human Factor

- Constant use = compaction
- Removal of organic matter = no nutrient cycling
- Single grass species = disease susceptibility
- Sand based fields = low nutrient holding capacity, low microbial populations

## Organic Amendments: What are their functions?

- To make conditions in the soil more favorable for microorganisms
- To provide food for microorganisms
- Add trace minerals and specialized microbes

## Organic amendments:

- Clippings
- Compost top dressing
- Compost tea
- Humic acid
- Mycorrhizal fungi
- Kelp
- Corn gluten
- Other Biostimulants

## Mulching Mowers

- Clippings can return up to 30- 40 % of Nitrogen needed for the growing season
- Clippings are 90% water with 4-1-3 NPK ratio
- Don't cause thatch

Research from Ohio State University

## Compost Top Dressing

- Adds organic matter to the soil
- ¼" to ½" thick layer in Spring
- 1-1 ½ cubic yard per 1,000s.f.

## Options for Spreading Compost


## Compost Tea

Many different types:

- Actively Aerated Compost Tea (AACT)
- Fermentative Compost Tea
- Compost Extract
- Compost Leachate
- Manure tea

## Actively Aerated Compost Tea

## Humic Acids

"Humates are prehistoric compost"

- The most stable form of organic matter
- Hold micronutrients in the soil
- Improve soil structure
- Open up clay soils
- Enhance photosynthesis

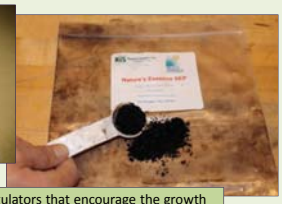

**in soluble powder form**


**in liquid form**

## Mycorrhizal Fungi

- Form a symbiotic relationship with the plant roots
- Mostly Endo – mycorrhizae for turf grasses
- Must have contact with the root surface to be activated
- Increases drought tolerance, disease resistance of turf

## Kelp



•Contains plant growth regulators that encourage the growth of foliage, rooting, and seedling establishment
• Contains trace elements that are easily absorbed by plants and broken down by soil microbes
•Granular , liquid or soluble powder forms.

## Corn gluten

- By-product of corn milling
- 3 to 4 lbs N per 40lb bag
- Acts as pre-emergent

## Biostimulants

•Various other products that augment and stimulate microbiological activity in the soil:
•BioChar
•*Rhizobia* species
•*Azotobacter species*
•*Trichoderma species*


**Azotobacter** Free Nitrogen Fixing Bacteria , don't need a legume to fix nitrogen in the soil

## Organically Managed Turf

- Tufts University Medford, MA
- Battery Park, NYC
- Blackburn Meadows Golf Course, Salt Spring Island, BC
- Moscholu Golf Course, Bronx, NY
- Bandon Dunes Golf Course, OR
- Presidio Golf Course, San Francisco, CA
- Harvard Yard, Harvard University, Cambridge, MA

## Resources

**THINK GLOBALLY, ACT LOCALLY: Sustainable Practices at BPC Parks**
http://www.bpcparks.org/bpcp/news/BPCPC%20THINKS%20GLOBALLY.pdf
**Organic Turf Management at Tufts University**
http://sustainability.tufts.edu/?pid=14&c=22
**Basics for the control of soil-borne plant pathogens with composts**.
Hoitink, H.A.J., and P.C. Fahy. 1986. *Annual Review of Phytopathology 24: 93-114.*
**Metro King County**
www.metrokc.gov/soils
**Organic Lawn Care Manual**
Paul Tukey, Storey Publishing, 2007
**Organic Lawn Care Program**
www.ictorganics.com
**Mycorrhizae and Turfgrass**
Dr Mike Amaranthus, http://www.mycorrhizae.com/
**BioChar**
www.biochar.info


Using synthetic and organic fertilizer on fields- always growing, always mowing


Green spec 10-2-4- all natural organic

- Excellent dissolving & spreading characteristics
- Sustained feeding 10-12 weeks
- Controlled growth w/ less mowing and fewer clippings

Grigg Bros.

Tuff Turf for cool season grasses


Tuff Turf 1-0-14+ micros+Si

- Liquid proven foliar qualities- no burn, low leaching risk improved uptake & trans location
- Supplies potassium[ K] to tolerance to High and Low temps & moisture stress

  High K levels enhance resistance to a biotic stress.
- Rate of 6oz per 1000sq.ft.

Grigg Bros


## Ultraplex 5-0-3-2%Fe& micros

- Liquid combination of macro & micronutrients
- Plant and root stimulators
- Plant and soil wetting agents
- Provides healthy color and combats stress
- Buffering agent resist large changes in tank PH

Grigg Bros

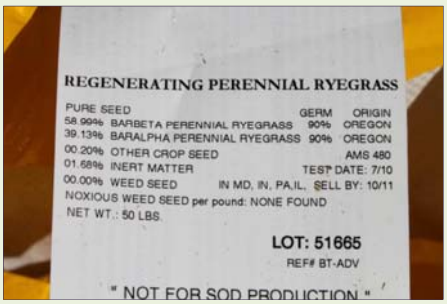
## Logan field
multi use area –flag football, LaCrosse, track and field & fast pitch softball

## Championship field
Using RPR regenerating ryegrass

## RPR seed


BARENBURG

## RPR seed




BARENBURG

## Both field seed mixes

- Using RPR regenerating p. ryegrass
- Germination slightly yellow green color
- Can be slow to get established
- Using the pseudo stolon comes out of crown should come in about 1 year -2 season growth
- I think it can be a tough grass
- Used for only 1 year to early to tell

BARENBURG

## Turf Blue


BARENBURG

## Turf Blue


TURF BLUE SPORT BLEND

| PURE SEED | GERM | ORIGIN |
|---|---|---|
| 29.81% BARRISTER KENTUCKY BLUEGRASS | 85% | ID |
| 29.73% BARIRIS KENTUCKY BLUEGRASS | 85% | WA |
| 29.40% BARRARI KENTUCKY BLUEGRASS | 85% | WA |
| 09.64% BARNIQUE KENTUCKY BLUEGRASS | 85% | OR |

00.00% OTHER CROP SEED
AMS 480
01.40% INERT MATTER
TEST DATE: 4/10
00.02% WEED SEED
NOXIOUS WEED SEED PER POUND: NONE FOUND
NET WT.: 50 LBS.

LOT: 50267
REF# BT-ADV

0 53909 14088 9

BARENBURG

## Verticut

Then.....

## Seeder

## Overseeding

- Rates for Turf Blue
- 1-2# per 100 sq .ft.
- Rates for RPR
- 5-10 # per 1000 sq. ft.
- Transitional Rye grass
- 5-15# per 100 sq. ft.

BARENBURG

## Other Areas of turf usage

- Union green grass field in main campus
- Using perennial ryegrass blend RPR
- Using new Zealand clover
- Transitional intermediate ryegrass over seeding early spring and late fall with early

BARENBURG

## Union Green
## high use area has many events

## Union green multi-use, tents, concerts, frisbee & grounds staff

## Union green use of perennial rye grass

## Union green
## has New Zealand Clover in the mix

## Eco-turf at Student Center

High mowing height 6” or more fewer mowings

Variety of plants
Yarrow

Strawberry Clover – colored blossom

English daisy

Drought tolerant, nitrogen fixing, always green

## Conclusions

- For turf grass in high use areas, seed that is quick to germinate and is resilient to wear and tear is required.
- The correct balance of fertilization and overseeding is necessary to maintaining a healthy high use turf grass area.
- Maintenance will be higher in these areas because of greater usage.
- Turf grass maintenance is always continuing advances of turfgrass products to bring the optimum results.

## Thanks for joining us


- David "D.C." Clausen
- clausend@seattleu.edu


## Three M's of Turf Irrigation

Measure

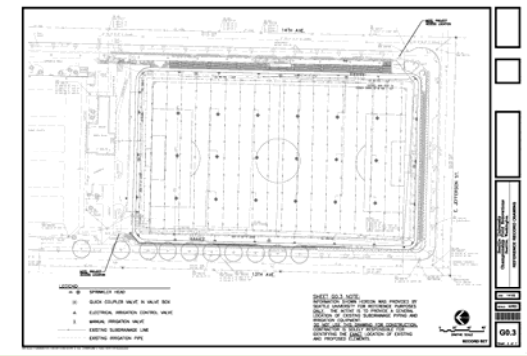
Monitor

Manage

## Measure

- TURF OR AREA SIZE
  - DRAWINGS OR PLANS
  - GPS
  - MANUAL MEASUREMENT

## Drawings or Plans



## GPS or Google Earth

## Manual measurement

## Water measurement

- Irrigation water needed
  - Evapotranspiration (ET)
  - Audit
  - Landscape Water Budget

## ET Evapotranspiration

- ET is the sum of the water lost from the soil surface (evaporation) and water used by plants (transpiration).
- Reference ET ($ET_o$) is defined as the ET rate of healthy grass, completely covering the ground to a uniform height of 3 to 6 inches, and having an adequate supply of water with no microclimate factors influencing it.

## ET Gauge

## ET Sources

- The Irrigation Water Management Society http://www.iwms.org
- IWMS also has:
  Scheduling calculators
  Budget key calculators

## Audits

## Audits

## Pressure at Head

## Landscape Water Budgeting

- Seattle area: 20“ of water (April – September)
- Acre inch of water = 27,154 gallons
- For a 1 acre site you will need 543,080 gallons!

This does not include the adjustments for system inefficiencies, microclimate and species factors.

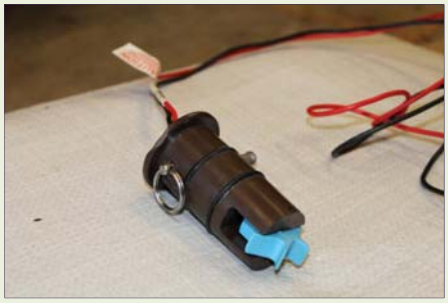
## Monitoring

- Soil Probe
- Flow Sensing
- Meter Reading
- Visual Inspection
- Experience

## Soil Probe

## Soil Probe

## Flow Sensor



## Flow Sensor in Ground

## Water Meter


## Visual Inspection

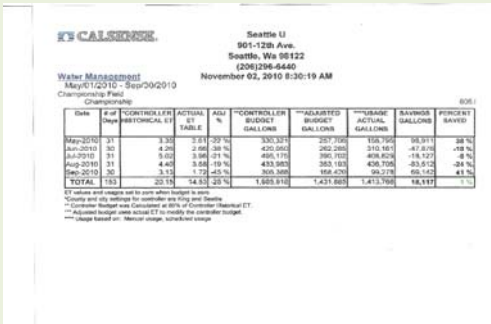
## Management

- Irrigation Maintenance
  - Inspection!
  - Inspection!
  - Inspection!
- Fix broken equipment
- Adjust arcs and cut turf away from heads

## $H_20$ for Championship Field

- 7.48 gallons = 1 cubic foot (cf) of $H_20$
- 1.85 acres x 543,080 = 1,004,698 gallons
- 1,004,698 gallons/ 7.48 = 134,318 cf

## Report analysis



Seattle U
901-12th Ave.
Seattle, Wa 98122
(206)296-6440
November 02, 2010 8:30:19 AM

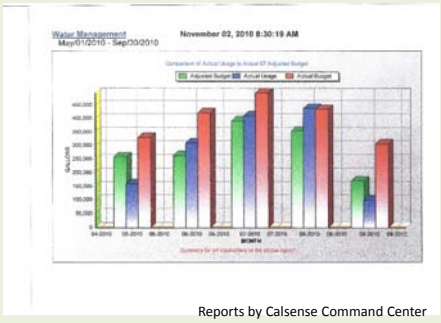
Water Management
May/01/2010 - Sep/30/2010
Championship Field
Championship

| Date | # of Days | *CONTROLLER HISTORICAL ET | ACTUAL ET TABLE | ADJ % | **CONTROLLER BUDGET GALLONS | ***ADJUSTED BUDGET GALLONS | ****USAGE ACTUAL GALLONS | SAVINGS GALLONS | PERCENT SAVED |
|---|---|---|---|---|---|---|---|---|---|
| May-2010 | 31 | 3.30 | 3.61 | -22 % | 330,321 | 257,735 | 159,795 | 98,911 | 38 % |
| Jun-2010 | 30 | 4.26 | 2.66 | -38 % | 420,660 | 262,285 | 310,161 | -47,876 | -18 % |
| Jul-2010 | 31 | 5.62 | 3.96 | -21 % | 495,175 | 390,702 | 409,829 | -19,127 | -5 % |
| Aug-2010 | 31 | 4.40 | 3.68 | -19 % | 453,985 | 383,193 | 436,705 | -53,512 | -24 % |
| Sep-2010 | 30 | 3.13 | 1.72 | -45 % | 305,368 | 158,400 | 99,278 | 59,143 | 41 % |
| TOTAL | 183 | 20.19 | 14.53 | -25 % | 1,605,910 | 1,431,665 | 1,413,766 | 18,117 | 1 % |

ET values and usages set to zero when budget is zero
*County and city settings for controller are King and Seattle
** Controller Budget was Calculated at 80% of Controller Historical ET.
*** Adjusted budget uses actual ET to modify the controller budget.
**** Usage based on Mercuri usage, schedules usage

Reports by Calsense Command Center

## Report Analysis



Water Management
May/01/2010 - Sep/30/2010
November 02, 2010 8:30:19 AM

Reports by Calsense Command Center

## Questions?

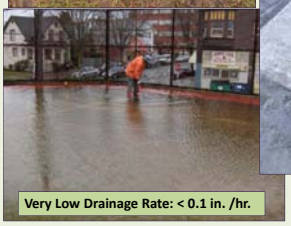
## Thank You!

## New Field Installation 2010

## Issues We Faced Before

- Poor Drainage
- Undesirable Grass
- Uneven Surface

## Poor Drainage

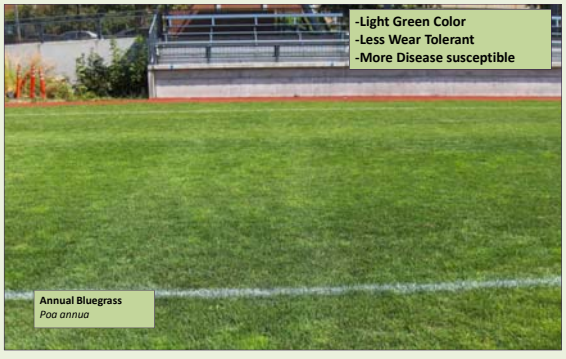





## More Drainage Problems


## Undesirable Grasses


## Undesirable Grasses




## Uneven Surface

## Time For A Facelift!

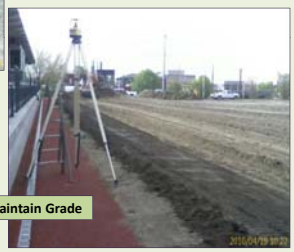
Using An Old Sod Cutter To Remove The Turf

## Out With The Old…

Pushing It Into A Pile

Hauling It Away

Removing The Organic Layer



Using Laser Level To Maintain Grade

Digging Out 8" Of Root Zone

Making Drainage Repairs

## New Drainage

-**All existing Drain Lines Repaired** (15' On Center)
-**New Lines Installed Between Original**
-**Giving Us A Drainage Pipe every 7-8'**

## Adding The New Sand



Finish Grade Established & Dragged Smooth


Water Settled & Ready For Sod

## …In With The New!


Big Roll Sod From Country Green Staged And Ready To Be Installed

## Three Days Of Laying Sod…


## Trimming & Patching


## Cutting Around Valve Boxes & Irrigation Heads


## Watering To Establish

All In Preparation For …

## Game Day!


## What We Do To Take Care Of The Field

SU Sport Field Monthly Work Record 2010

| Task | Jan | Feb. | March | April | May | June | July | August | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Champ Field** | | | | | | | | | | | | |
| Mowing | 1-2x/mo. | 1-2x/mo. | 3x/wk. | 3x/wk. | 5x/wk. | 5x/wk. | 5x/wk. | 5-7x/wk. | 5-7x/wk. | 4x/wk. | 3-4x/wk. | 2-3x/mo. |
| Sweeping | | | weekly | weekly | weekly | weekly | weekly | weekly | weekly | weekly | weekly | |
| Rolling | | | | | | As needed | | | | | | |
| Trimming/Edging | | 1x | | 2x/mo | weekly | weekly | weekly | weekly | weekly | weekly | 1x | |
| Fert. Granular NPK | | | 1x | 1x | 1x | 1x | 1x | 1x | 1x | 1x* | | |
| Fert. Foliar NPK | | | | 1x | 2x | 2x | 2x | 2x | 2x | 2x | 1x? | |
| Fert. Minors | | | | | 1x | | | | | 1x | | |
| pH Adjustment | | | | | | As needed | | | | | | |
| Aerification: Core | | | 1x | 1x | | 1x | | 1x | | 1x | 1x? | |
| Aerification: Solid | | | | | | | 1x | | 1x | | 1x | |
| Slicing | | | 2x | 2x | 2x | 2x | 1x | 1x | 1x | 1x | 1x | |
| Topdressing | | | 1x | 1x | | 1x | 1x | 1x | 1x | 1x | 1x? | |
| Seeding | | | 1x | 1x | | 1x | 1x | 1x | 1x | 1x | | |
| Thatching | | | | ? | | | | | | ? | | |
| Divot Filling^ | | | | | | daily | daily | daily | daily | daily | daily | |
| Poa Removal | weekly | weekly | weekly | weekly | weekly | weekly | weekly | weekly | weekly | weekly | weekly | weekly |
| Hand Watering | | | | | | As needed | | | | | | |
| Field Scouting | daily | daily | daily | daily | daily | daily | daily | daily | daily | daily | daily | daily |

## What Does That Mean?

- Mow Daily
- Sweep Before Every Game
- Roll Before Every Game
- Apply Granular Fertilizer Monthly
- Foliar Fertilize Bi-weekly During Growing Season
- Core Aerify 6 Times Per Year
- Solid-tine Aerify 3-4 Times Per Year
- Slice Monthly
- Topdress Monthly
- Overseed Constantly
- Fix/fill Divots Daily
- Plug Out *Poa annua* By Hand Weekly

## And Why Do We Do It?