

Soil Management for Healthy Lawns and Environments



Jason Lilley

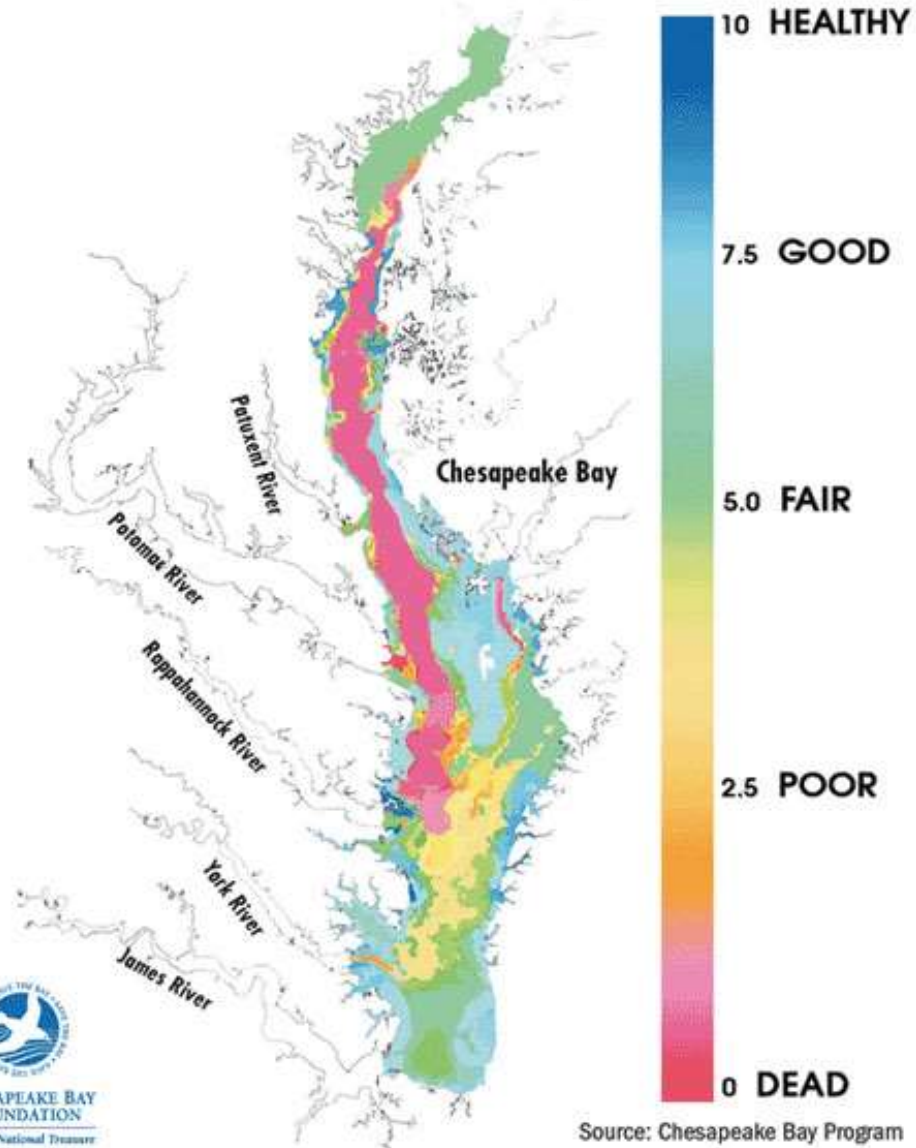
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CHESAPEAKE BAY RECORD DEAD ZONE

AUGUST 2005

Milligrams of Oxygen
per liter of water:



When there are excessive loads of nitrogen and phosphorus in the water, algae can "bloom" to harmful levels, changing water color, and eventually stripping dissolved oxygen from the water when they die, fall to the bottom, and decay. This dissolved oxygen is critical to the health of Chesapeake critters and waters.

Where do excessive nutrients come from?

- **Wastewater treatment plants** release treated water—often still containing large amounts of nutrients—into streams and rivers, which eventually flow into the Chesapeake Bay.
- • **Runoff** from farmland, urban and suburban areas empty into our streams and rivers carry nutrients from fertilizers, septic systems, boat discharges, and animal manure.
- **Air pollution** from our cars, factories, gas-powered tools, etc. contribute nearly 30 percent of the total nitrogen load to the Bay's waterways.

What can we do about them?

- Drive less, walk/bike more!
- • Don't over-fertilize your lawn (or don't fertilize at all!).
- Grow oysters.
- Buy local food.
- Turn off the water when you brush your teeth!
- [Get more ideas here.](#)

Creating Healthy Lawns and Ecosystems by;

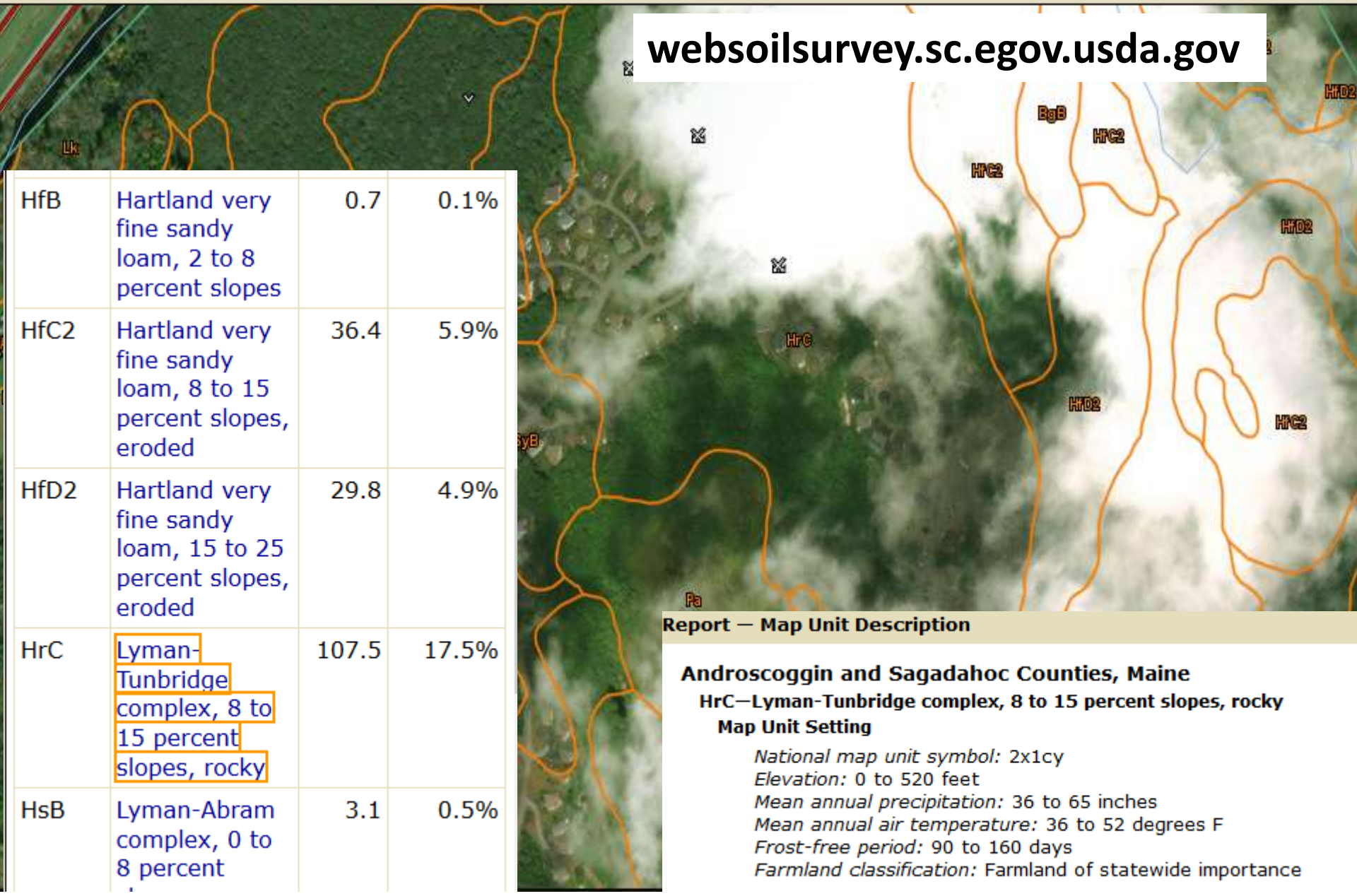
- Applying less pesticides and nutrients
- Build healthier soils
- Select the right grass species mixes
- Create optimal growing conditions for grass growth. Avoid plant stress
 - Appropriate fertility and moisture
 - Mowing at correct height



Scale (not to scale)



websoilsurvey.sc.egov.usda.gov



HfB	Hartland very fine sandy loam, 2 to 8 percent slopes	0.7	0.1%
HfC2	Hartland very fine sandy loam, 8 to 15 percent slopes, eroded	36.4	5.9%
HfD2	Hartland very fine sandy loam, 15 to 25 percent slopes, eroded	29.8	4.9%
HrC	Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky	107.5	17.5%
HsB	Lyman-Abram complex, 0 to 8 percent	3.1	0.5%

Report — Map Unit Description

Androscoggin and Sagadahoc Counties, Maine
HrC—Lyman-Tunbridge complex, 8 to 15 percent slopes, rocky
Map Unit Setting

National map unit symbol: 2x1cy
Elevation: 0 to 520 feet
Mean annual precipitation: 36 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Farmland of statewide importance

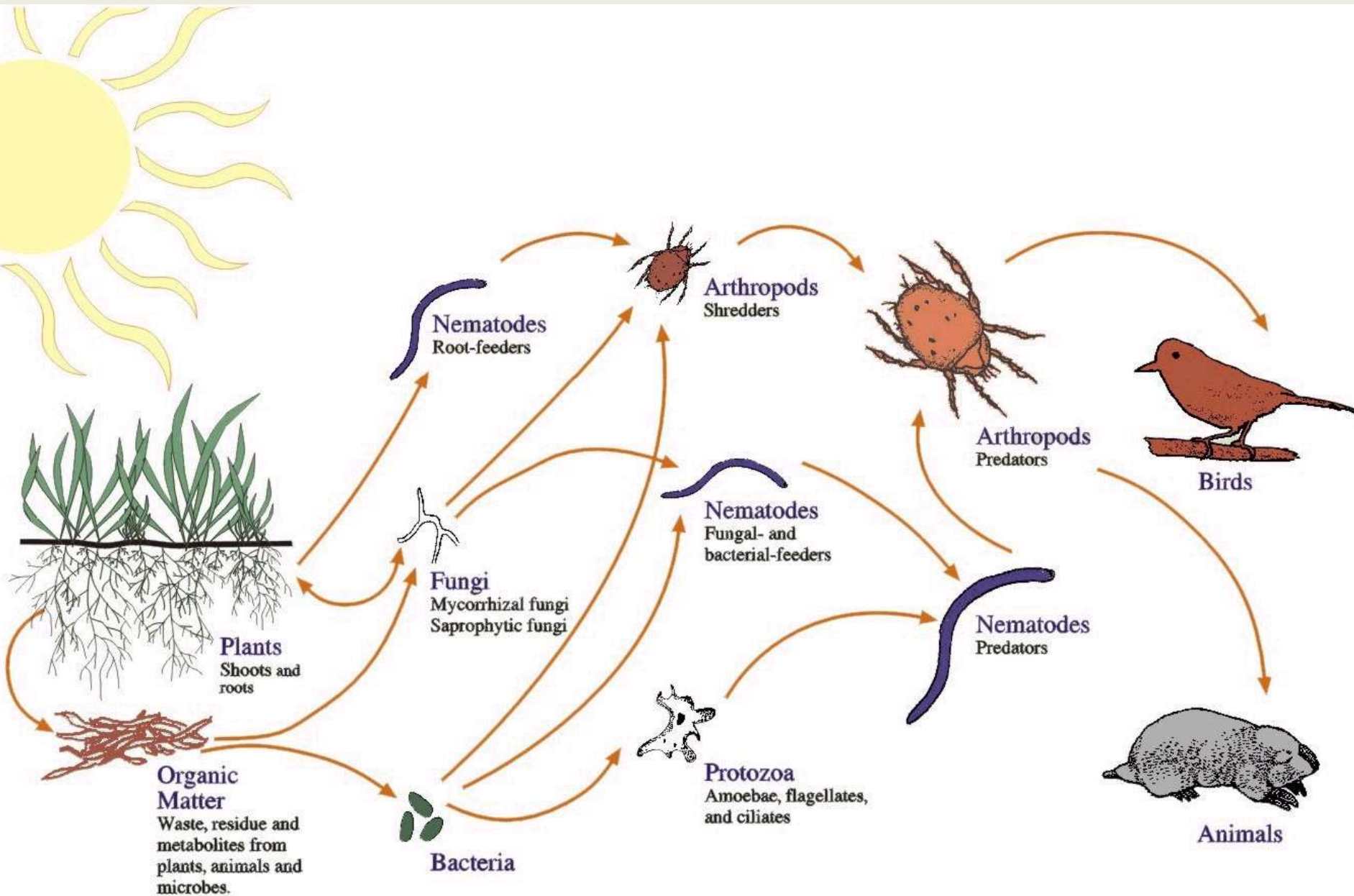
Clay

- Poor drainage
- High water holding capacity
- Nutrients can bind to soil
- Hard to till
- Organic Matter Helps!

Sand

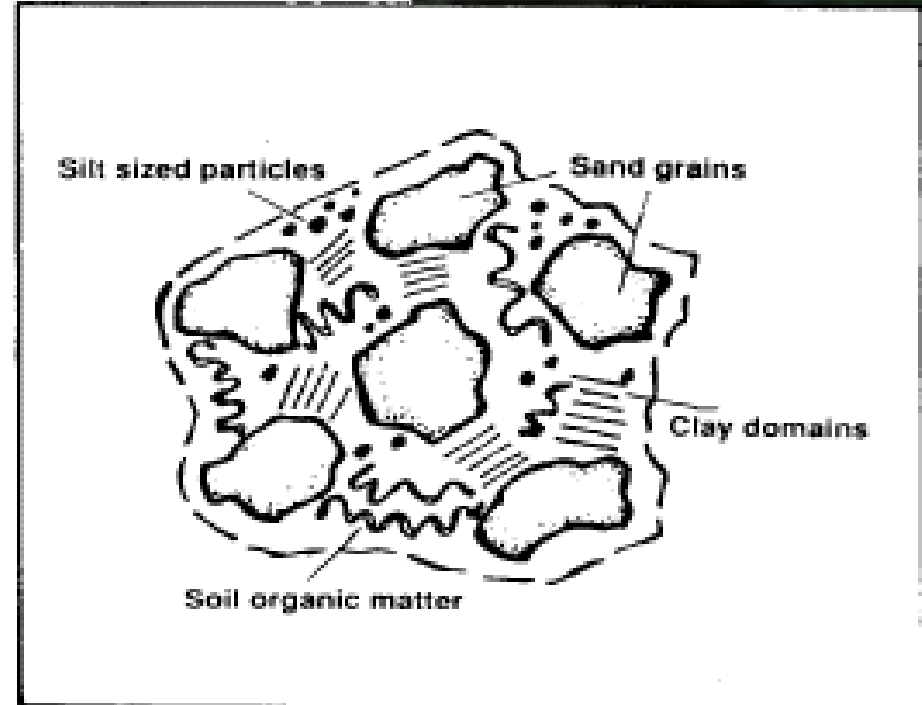
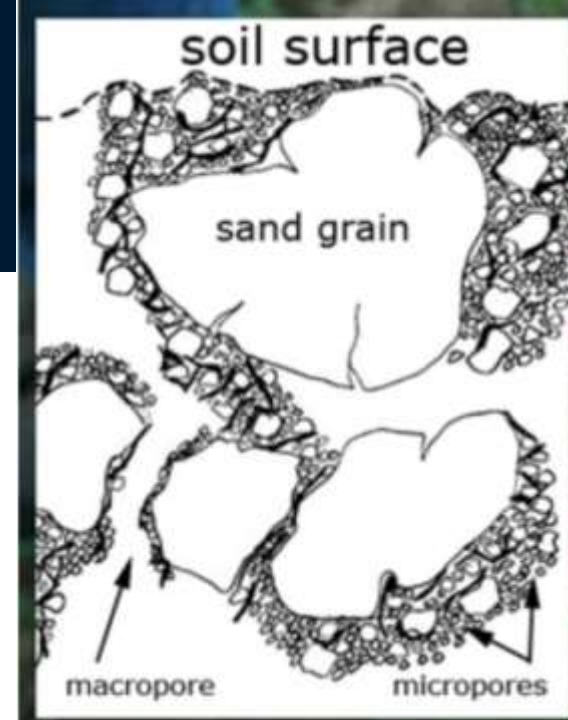
- Good drainage
- Low water holding capacity
- Nutrients leach easily
- Easy to till
- OM Helps!

Soil Food Web



The arrangement of soil separates into soil aggregates

- **Aggregates**
 - Particles of soil stuck together with humic acid
- **Sizes**
 - From size of pea down to a few grains of sand



Soil Structure is affected by:

- Compaction
- Moisture Content
- Organic Matter



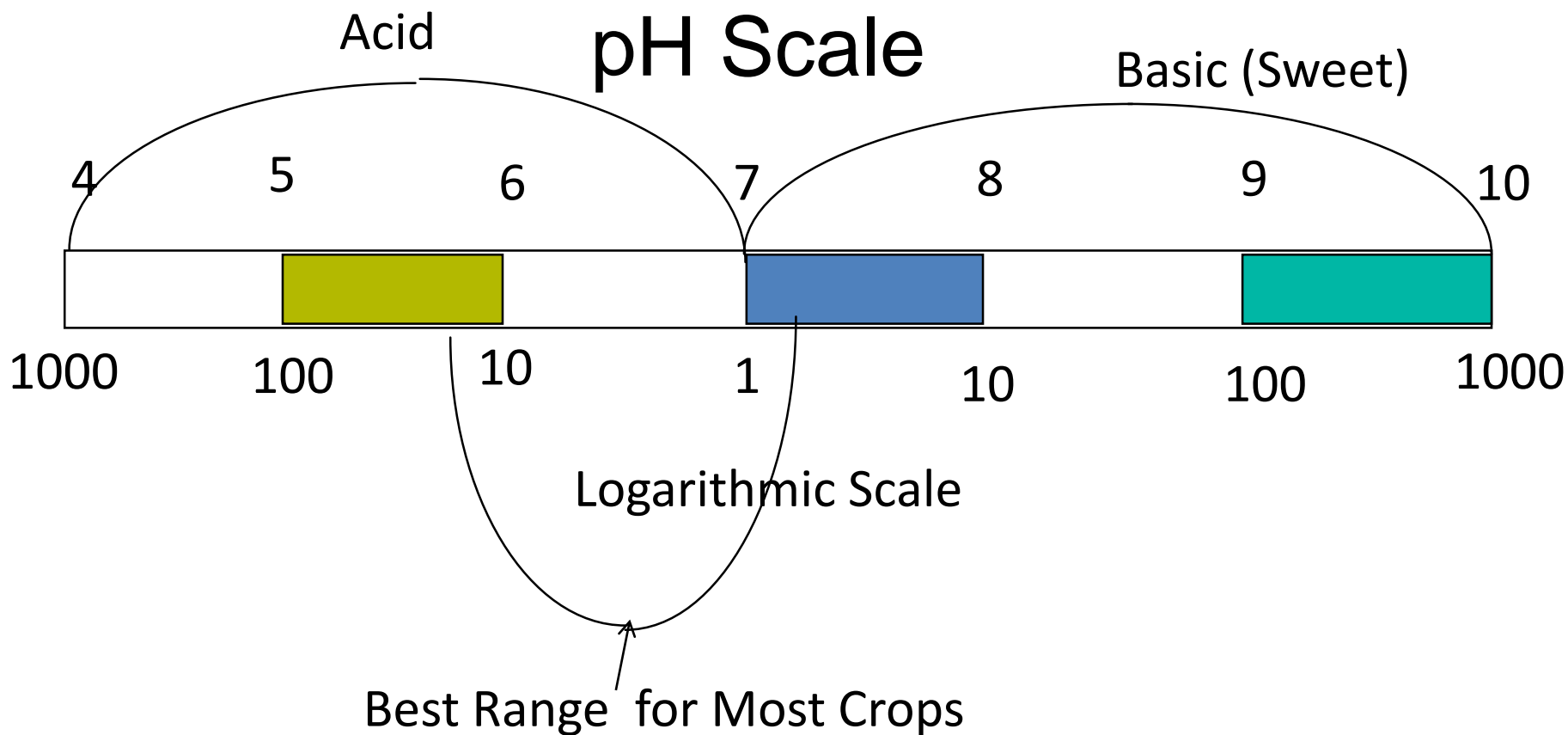
Which influence the
Arrangement, Shape, and Size of aggregates.

Organic Matter Sources

- Compost
- Chop and drop grass clipping
- Mulched leaves

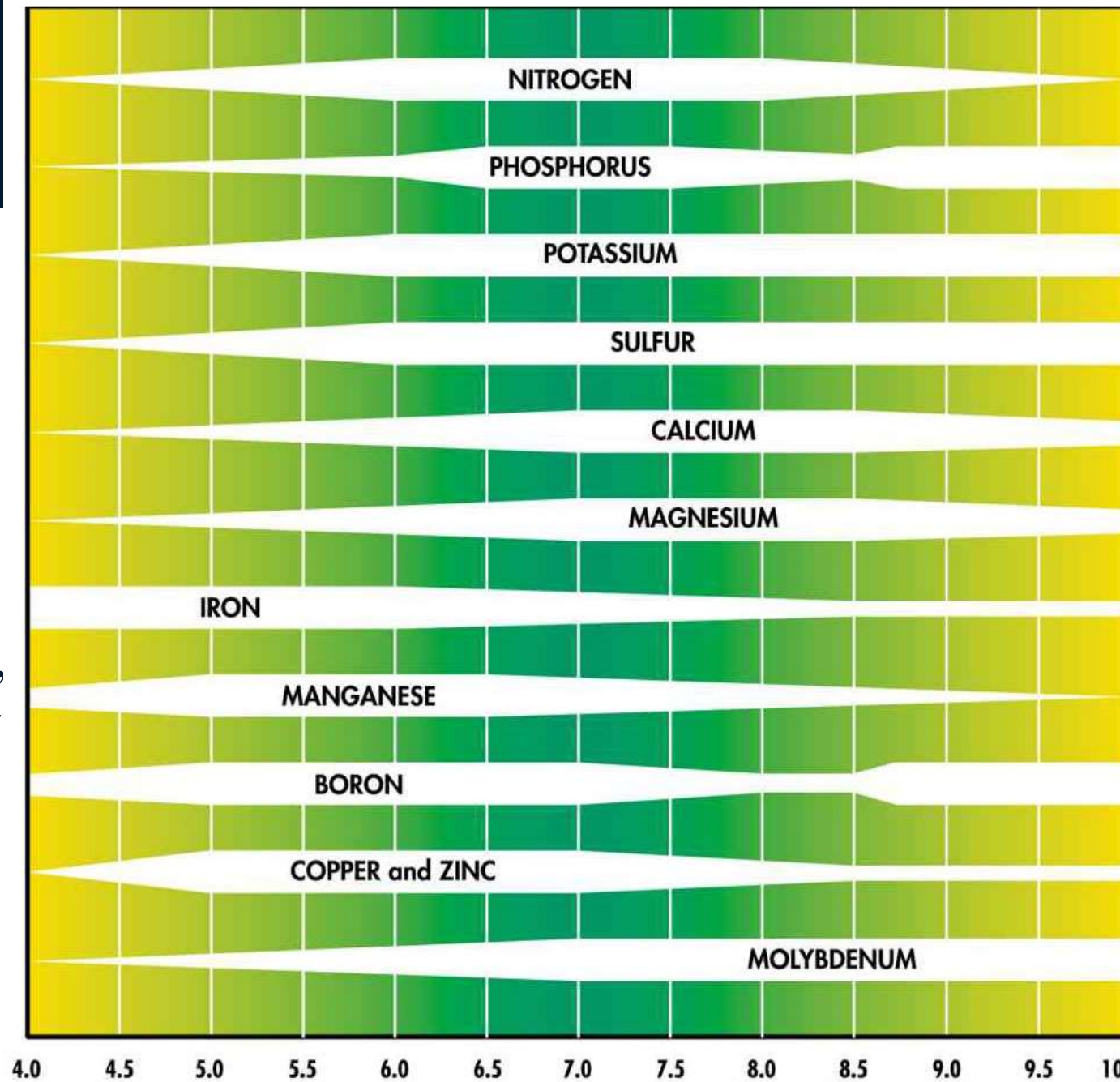
**Remember that all of these will add nutrients.

Appropriate Nutrient Management and Fertilization




pH affects the availability of different nutrients:

The wider the bar, the more readily available that nutrient is to plant uptake.



Soil Testing

•SOIL TEST REPORT FOR:
JASON LILLEY
 75 CLEARWATER DR
 FALMOUTH ME 04105

MAINE SOIL TESTING SERVICE
 UNIVERSITY OF MAINE 
 5722 DEERING HALL
 ORONO,MAINE 04469-5722 

•SOIL TEST SUMMARY & INTERPRETATION
(see Numerical Results section for more information)

	Level Found	LOW	MEDIUM	OPTIMUM	ABOVE OPTIMUM
Soil pH	5.9	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
Organic Matter(%)	3.9	XXXXXXXXXXXXXXXXXXXXXXXXXXXX			
<u>Major nutrients</u>					
Phosphorus(lb/A)	2.1	XXXXXXXXXXXX			
Potassium (% Sat)	1.6	XXXXXXXXXXXXXXXXXXXX			
Calcium (% Sat)	39.5	XXXXXXXXXXXXXXXXXXXX			
Magnesium (% Sat)	15.8	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
Sulfur (ppm)	17	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
<u>MICRONUTRIENTS</u>					
Boron (ppm)	0.1	XXXXXXX			
Copper (ppm)	0.05	XXXXXXX			
Iron (ppm)	5.7	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
Manganese (ppm)	2.0	XXXXXXXXXXXXXXXXXXXX			
Zinc (ppm)	0.7	XXXXXXXXXXXXXXXXXXXX			

•RECOMMENDED ADDITIONS FOR ORGANIC GROWING - Crop Code # 392

To raise soil pH to 6.5, apply 70 pounds of lime per 1000 sq. ft.

Magnesium level is sufficient. Use a calcitic (low magnesium) lime.

To meet major nutrient requirements, apply (on each 1000 sq. ft.):

Nitrogen(2.5 lb) - from 20 lb bloodmeal or 35 lb soybean or 25 lb fishmeal.

Phosphorus(4.5 lb) - from 28 lb bonemeal/bonechar or 150 lb rock phosphate.

Potassium(4.7 lb) - from 94 lb dry wood ash or 9 lb potassium sulfate.

**Note: not all sources of potassium sulfate approved for organic certification.

Wood ash acts as a liming material. Reduce lime amount by 1.5 lb for each 1 lb used.

15 bushel cow or horse manure or 7-8 bushel poultry, sheep, goat, or rabbit manure/1000 sq. ft. can substitute for 1/4-1/3 recommended nutrients (apply in fall). Broadcast lime uniformly, in spring or fall, and till in 6-7 in.

Fertilizer may be broadcast in spring, but is best banded 2-3 in. below & beside rows.

Till in manure, compost, or leaves each year to build and maintain soil organic matter. This will improve the nutrient and water holding capacity of your soil.

For information on micronutrient management and recommendations, see enclosed form.

•NUMERICAL RESULTS

(Test methodology: pH in water and Mehlich buffer, available nutrients by modified Morgan extract) (Organic matter measured by LOI, P determined colorimetrically, all others measured by ICP-OES)

CEC and nutrient balance calculations assume the pH will be raised to 6.5

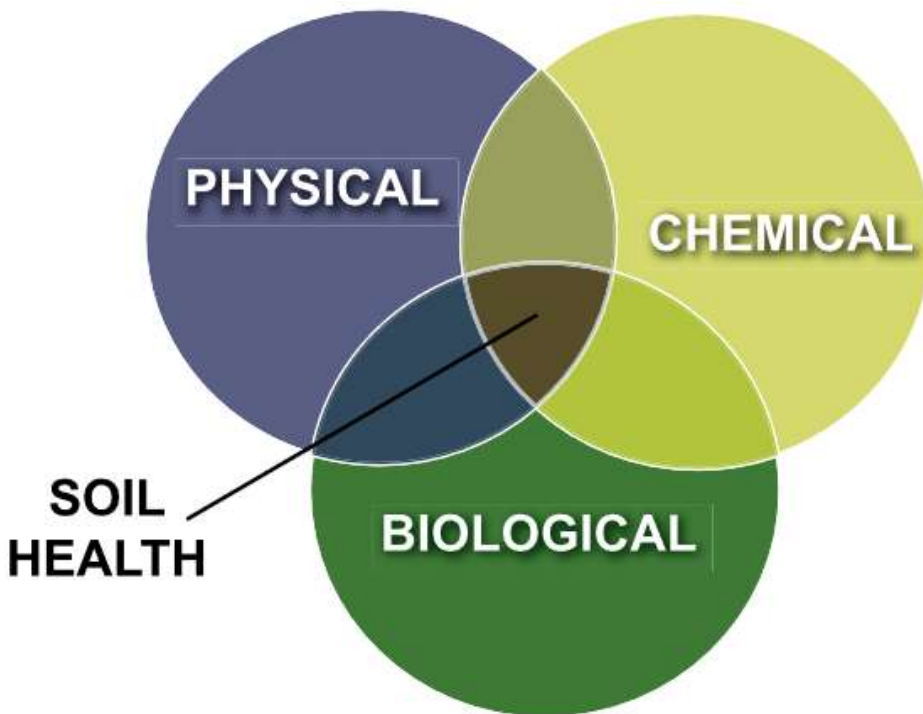
Level Found	5.9	5.99	2.1	97	290	1190	7.5	1.6	15.8	39.5	43.0
	Soil pH	Lime Index 2	Phosphorus (lb/A)	Potassium (lb/A)	Magnesium (lb/A)	Calcium (lb/A)	CEC (me/100 g)	K	Mg	Ca	Acidity
Optimum Range	6.0-7.0	N/A	20-40	see % Saturation levels	> 5	3.5-5.0	10-20	60-80	< 10		

Level Found	3.9	17	0.05	5.7	2.0	0.7
	Organic Matter(%)	Sulfur (ppm)	Copper (ppm)	Iron (ppm)	Manganese (ppm)	Zinc (ppm)

Additional Results or Comments:

Lead scan: NORMAL. BACKGROUND LEVEL.

- To sustain productivity,
Maintain environmental quality,
& Promote lawn health



- Keep the soil uncompacted and porous
- Work to increase OM levels and encourage soil life
- Maintain optimal moisture and fertility for grass growth
- Plant grass species for specific soil and site types

Natural Lawn Care Requires a Holistic Approach

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Questions?



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