Soil- The living skin of the earth Is the key to any successful eco-restoration effort



Natural soil formation

- Thousands and thousands of years
- Five factors of soil formation-
 - Parent material
 - Topography
 - Climate
 - Organisms
 - Time

 Natural soil formation results in soil horizons



You mostly care about that top horizon 'A'

1. Zone of greatest biological activity

Highest organic matter Highest concentration of plant roots

This soil was built in a couple of weeks





• Soil fertility (N,P, K, S, Ca, Mg, Fe, Mn, Cu, Zn,

Mo, B, Co, Se)

GENERAL PURPOSE

(For Continuous Liquid Feed Programs)

DILUTION RATIO	PER GALLON OF CONCENTRATE		
	50 PPM NITROGI	EN 100 PPM NITROGEN	200 PPM NITROGEN
	(EC=.33)	(EC = .65)	(EC = 1.30)
1:16 (HOZON)	.5 Ounces	1.0 Ounces	2.0 Ounces
1:100 INJECTOR	3.38 Ounces	6.75 Ounces	13.5 Ounces
1:200 INJECTOR	6.75 Ounces	13.5 Ounces	27.0 Ounces
TO COM	WERT OUNCES/GA	ALLON TO GRAMS/LITER, MUL	TIPLY BY 7.5
DISSOLVES	QUICKLY IN HOT V	WATER, LIMIT OF SOLUBILITY	4.0 LBS./GALLON
Commercial Use Su	Iggestions	Suggested Concentratio	on in ppm Nitrogen
Crop Type Con		Continuous Feeding	Periodic Feeding
Beddary Plants (Cons		Constant Liquid Feeding)	(Pulse Feeding)
Containerized Woody Plants		100-150	200-250







Soil physical properties

 Bulk density
 Bulk density





2.65 g cm³

Soil pH





• Soil electrical conductivity



Measured in units dS m Values of concern are > 2decisiemen

Soil Carbon

- Is the pretty much easy answer for many of these things
- Start with physical properties
 - Reason so important is for root penetration, water infiltration, water holding capacity, and air flow

How fast water goes into the soil



How well soil holds onto water



Early grown of corn on control (left) and compost amended (right) Plots on Woodstown silt loam soil (Epstein and Chaney, 1974).



Strongly wilted corn on control plot in experiment with biosolids Compost application to Woodstown silt loam (Epstein and Chaney)



Corn on biosolids compost treated soil on same day as control plot corn was strongly wilted (Epstein and Chaney).



Carbon and plant nutrients

- Organic matter will have all essential nutrients
- C:N ratio key factor



Adding carbon also increases plant growth Which in turn provides more food



You can build soil quickly- generally by adding organic matter





Tar Creek, OK



Biosolids sugar beet lime, CaO

Biosolids and lime, incorporated

Surface application of compost and wood ash

Lime stabilized biosolids +



Joplin-12 years+1 drought in





When you build a soil Realize that we make soil building basics every day





http://www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx

And that the people that manage these resources are not used to being sought after

What are biosolids?



(Compost is about the same-less water, less N and P)

K, Ca, Mg, Mn, Cu, Fe, Zn < 1%

Carbon 4-10%

(20-50%)







http://www.casaweb.org/biosolids

Biosolids are available where there are people





When you built a soil

- - Realize that there are guidelines but not precise formulas
 - Want to add enough amendment to keep it self sufficient in organic matter cycling
 - Don't go make hay-let the site reestablish
 - Don't give up if you need to re-apply- remember we make more every day

Also realize that a healthy soil is a building block for a native ecosystem- other ingredients are required