

Healthy Soils from Biosolids

Diane Gilbert Jones
City of Los Angeles, Sanitation

California Bioresources Alliance 11th Annual Symposium
November 1, 2016



Soils



Green Acres Farm

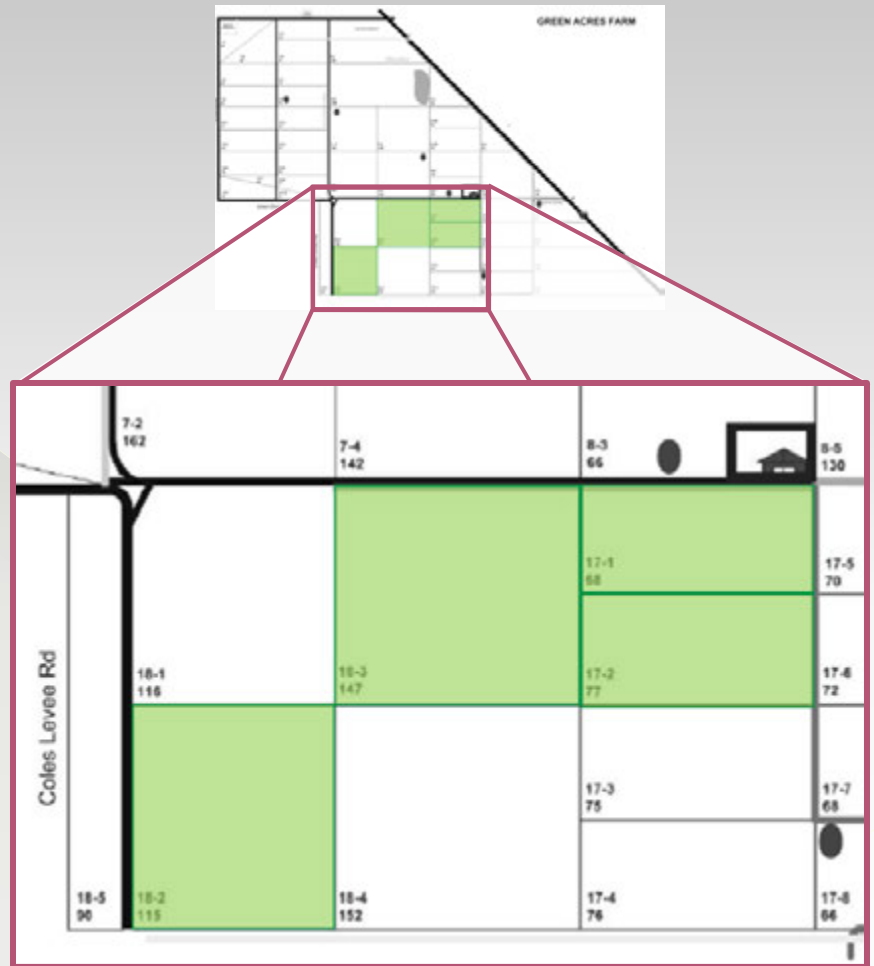


Soil Available & Natural Protections

- ◎ Cajon, Chino, Traver and Pond soil series. These soils are:
 - > loam, fine sandy loam soils
 - > moderately to heavy-textured
 - > generally alkaline
- ◎ Clay content and high pH soil
- ◎ Nitrate transport limited due to hard pan located two to four feet beneath surface

Field Selection Methodology

- Fields selected: 17-1, 17-2, 18-2, 18-3
- Biosolids application started 2004
- Data from field soil analysis for agronomic loading
- Data from soil analysis done every 3 years per Kern Ordinance
- Baseline soil analysis done 1999 when farm was purchased



Field Soil pH

- Baseline pH over 9
- Preferred pH range 6.0 to 8.2
- Maintained for 11 years
- Allow for healthy crop production

Primary Nutrients in Soil

- Phosphorus (PO_4)
- Potassium (K)
- Nitrogen as Nitrate (NO_3N)

Present in Soils

- ⦿ PO_4 - Average 29 ppm
- ⦿ K - Average 91 ppm
- ⦿ NO_3N - Average 23 ppm

Crop Needs

- ⦿ Minimum 15 ppm
- ⦿ 150 - 800 ppm
- ⦿ 4 - 30 ppm

Micronutrients in Soil

- Zinc (Zn)
- Iron (Fe)
- Copper (Cu)

Present in Soils

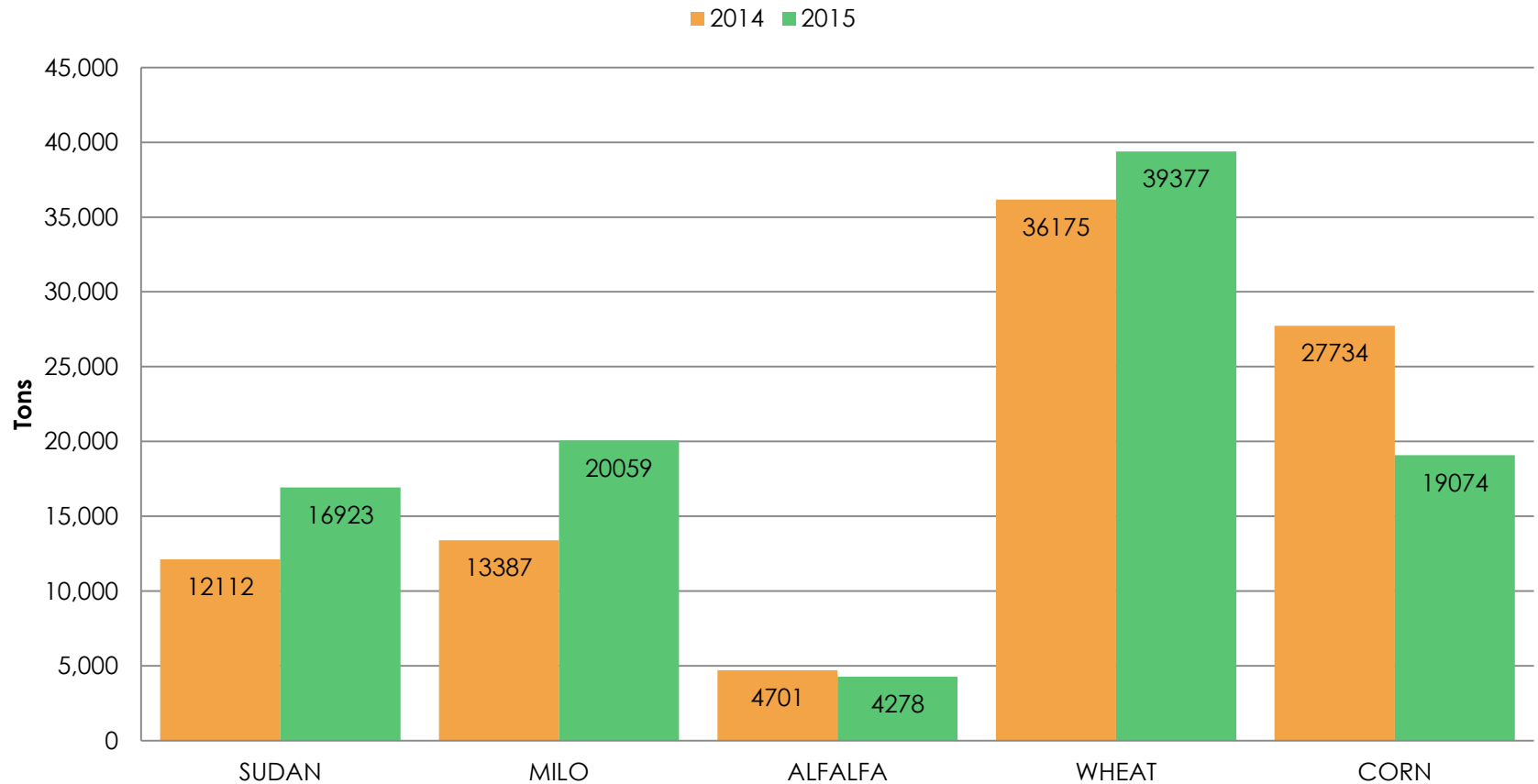
- ⦿ Zn - Average 50 ppm
- ⦿ Fe - Average 70 ppm
- ⦿ Cu- Average 32 ppm

Crop Needs

- ⦿ 1- 200 ppm
- ⦿ Minimum 4 ppm
- ⦿ 0.6 - 70 ppm

Crop Production

Crop Yields at Green Acres Farm



Crops



Corn Crops - Green Acres Farm



Crop Uses

Los Angeles Police Mounted Unit



Los Angeles Zoo



Biosolids vs Fertilizer

Biosolids

- Average application rate: 25-40 tons/acre
- Every 2 years 2 tons of gypsum (\$125/ac) or 1000 lbs of sulfur (\$80/ac)
- Cost: \$0

Fertilizer

- Nitrogen: 300-200 lbs
- Phosphate: 100-50 lbs
- Potassium: 100-50 lbs
- Cost: $150 \frac{\$}{acre} \times 4688 acres = \$703,200$

Fields Soil Samples



- ★ Field 12-8 Setback area along county road
- ★ Field 7-2 Area where biosolids applied
- ★ Field 8-5 Area will biosolids applied and access road

Biosolids or Not?



NO



★ Field 12-8 Setback area along county road



YES



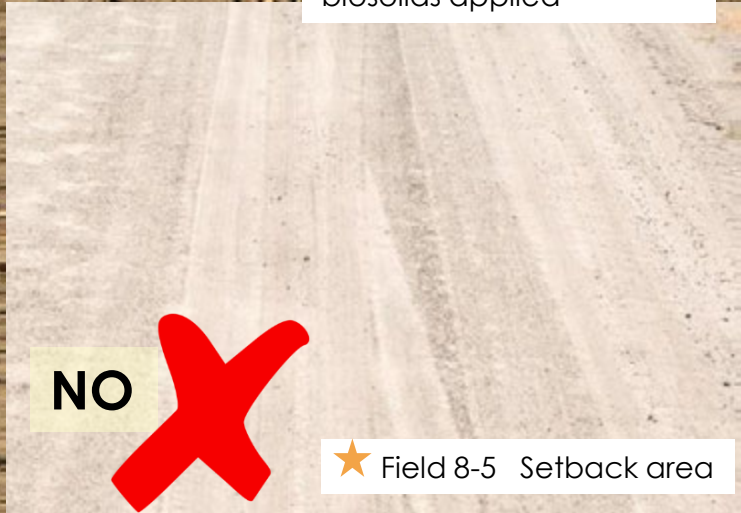
★ Field 7-2 Area where biosolids applied



YES



★ Field 8-5 Area where biosolids applied



NO



★ Field 8-5 Setback area