

Netting Success and Anchoring Alliances

10th Annual
LEA/CIWMB
Conference



Biosolids Program SOLANO COUNTY

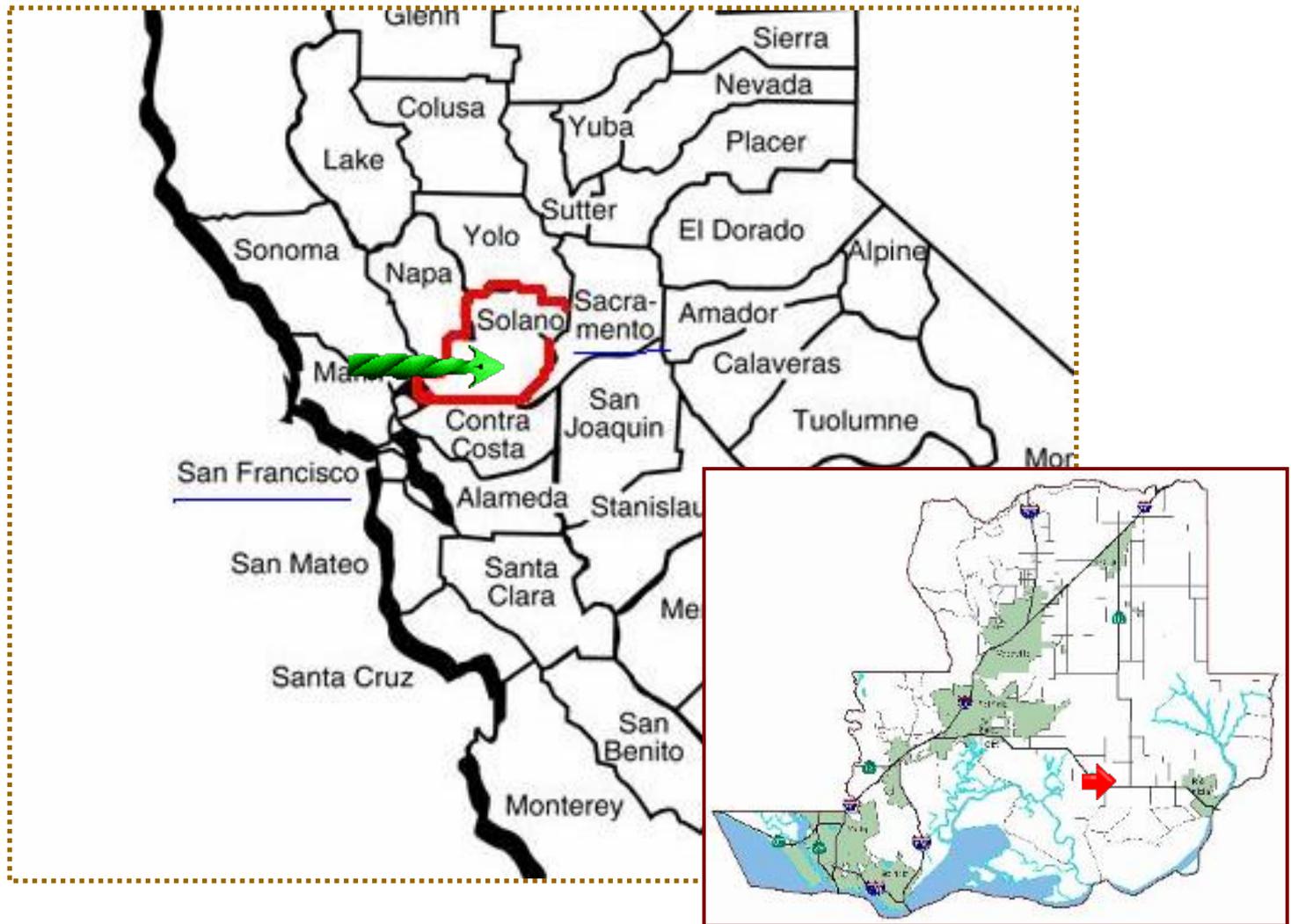
Department of Resource Management
Environmental Health Services Division

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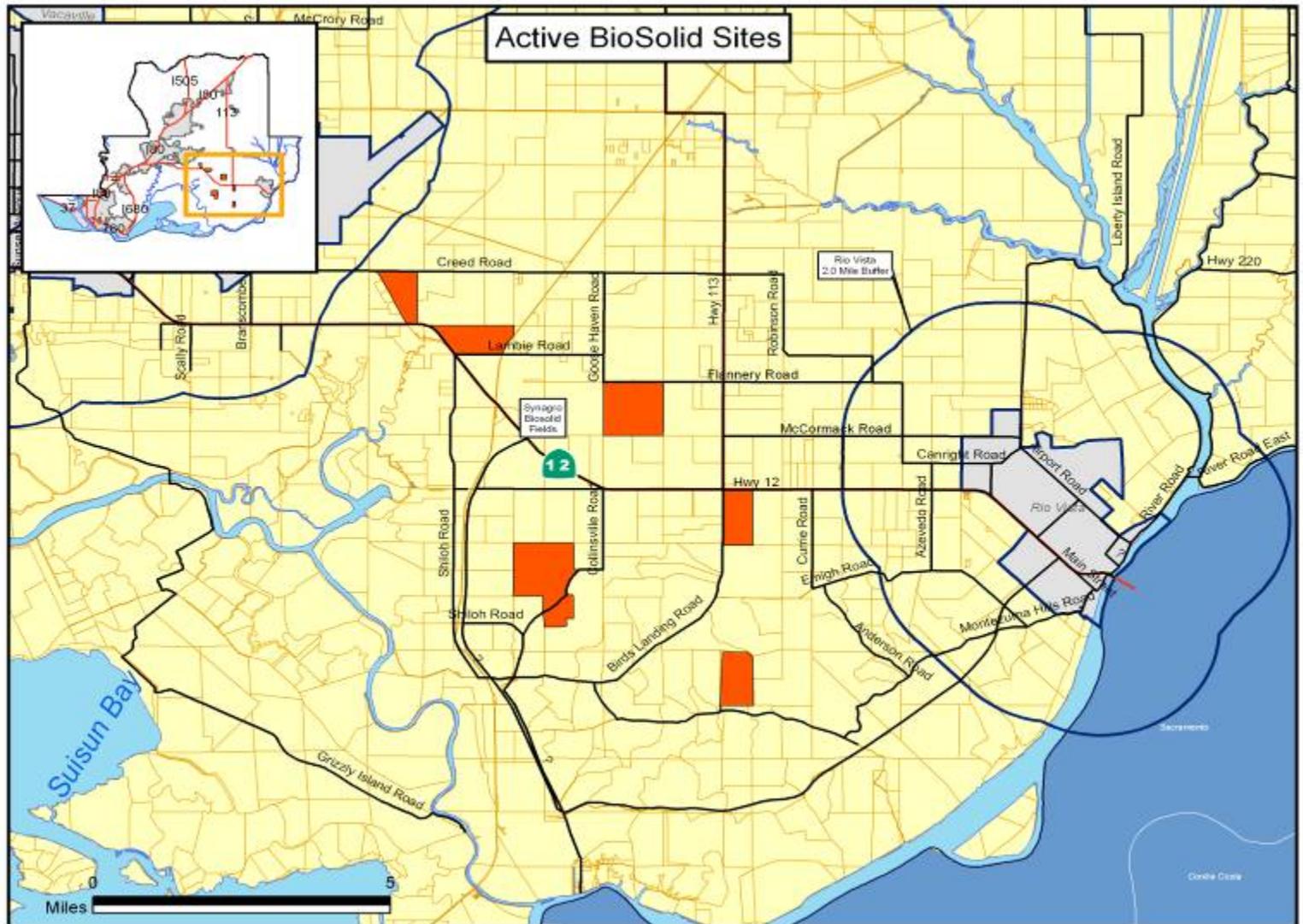
October 16, 2007



Solano County



Map of Registered Sites - 2006



SO1-103: 127 acres, Collinsville Rd



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Types of Biosolids

- Solid organic matter produced from specific wastewater treatment processes and certified safe for beneficial reuse.
- **Class A:** Pathogens reduced to level that biosolids are considered safe without additional site controls.
- **Class B:** Pathogens reduced, but not eliminated. Rely upon site controls to protect public health and the environment until the pathogens naturally die in the environment.
- Both Class A and Class B must undergo vector attraction reduction and cannot exceed specified levels for certain chemicals.
- Both can be applied in bulk. Class A may also be sold in bags at retail if metal content is reduced below more stringent levels.



Regulation of Biosolids in Solano County

- Federal, State and Local regulations
- USEPA; Title 40 CFR Part 503 Regulations – 1993
- SWRCB; DWQ-2004-0012
- Solano County; Chapter 25, first amended in 1997
 - In 1998: Spreading season = April 15 – October 15
 - Ordinance revised in 2003 to include increased setbacks after a series of scientific presentations. Sunset provision added to allow staff time to evaluate science.
 - Research educational fee on 2004
- ➔ ➤ **Current ordinance in effect until October 12, 2012**



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Comparison: Local, State and Federal requirements

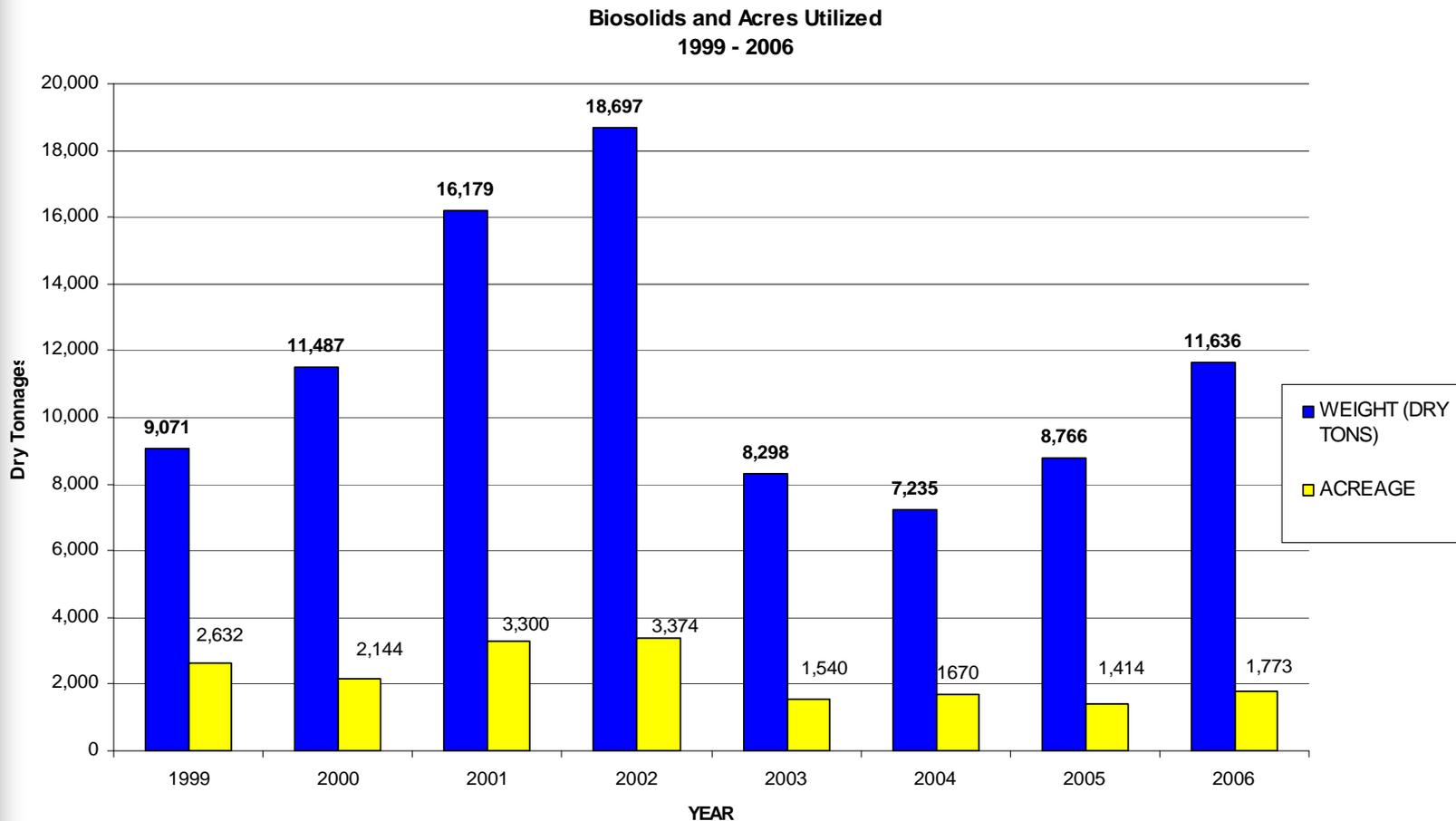
Sensitive Receptor or it 	Solano County Chapter 25	State DWQ-2004-0012	Fed 40CFR - Part 503
Cities	2 miles	1/2 mile from educational facilities	Not given
Rural residence	1,320' = 1/4 mile	500'	Not given
Domestic Wells	500'	500'	Not given
Non-domestic water wells	500'	100'	Not given
Surface water, marsh, drainages, creeks, ponds, lakes	200'	100'	33'
Agricultural drainage ways	200'	33'	33'
Domestic water supply intake	2,500'	2,500'	33'
Tributary to a domestic water supply	200'	200'	33'
Limitation on period of application	April 15 – Oct 15	Not given	Not given
Property lines	100'	10'	Not given
Wind speed	25 mph for 60 min (any moisture content)	25 mph (less than 75% moisture content- not typical in Solano County)	Not regulated
Adjacent residents	Protest rights	No specific protest rights	none No specific protest rights
Primary Marsh	Prohibited	Prohibited	No
Nuisance	Odor and Vector Reduction	Odor and Vector Reduction	Odor and Vector Reduction
Incorporation	Required	Not given	Not given

Local Oversight and Monitoring

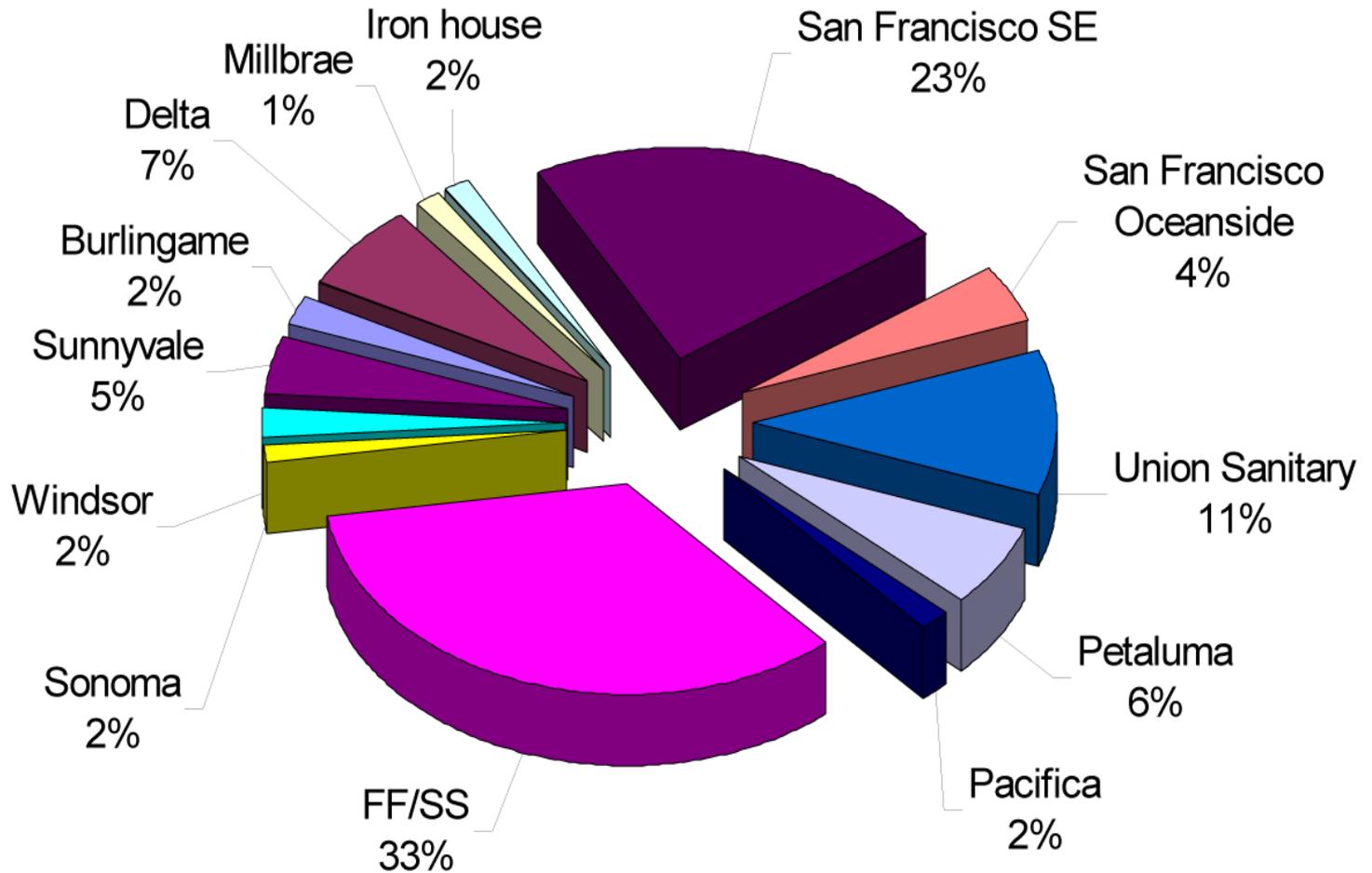
- **Site Registration and Land Spreading Notification**
- **Daily inspections:** e.g., 273 hours - 2006
- **Sampling and monitoring:** heavy metals, inorganic chemicals, pathogens in soil and water, meteorological conditions, etc.
- **Complaint investigation:** 24/7 Odor-Nuisance Response Protocol with after hours telephone complaint (866-329-0932) and web complaint form.
- **Protest Rights:** to address concerns of adjacent residents
- **Stakeholders Meetings**
- **Research Studies:** Pharmaceuticals, pathogen re-growth



Applied Quantities and Acreage of Land



Generators of Biosolids in 2006



Board Direction

Characterization of biosolids: Evaluation of metals, unregulated chemicals, radiation and pharmaceuticals.

Human health studies, including potential impacts from aerosols and vectors: Bioaerosol study performed by the University of Arizona.

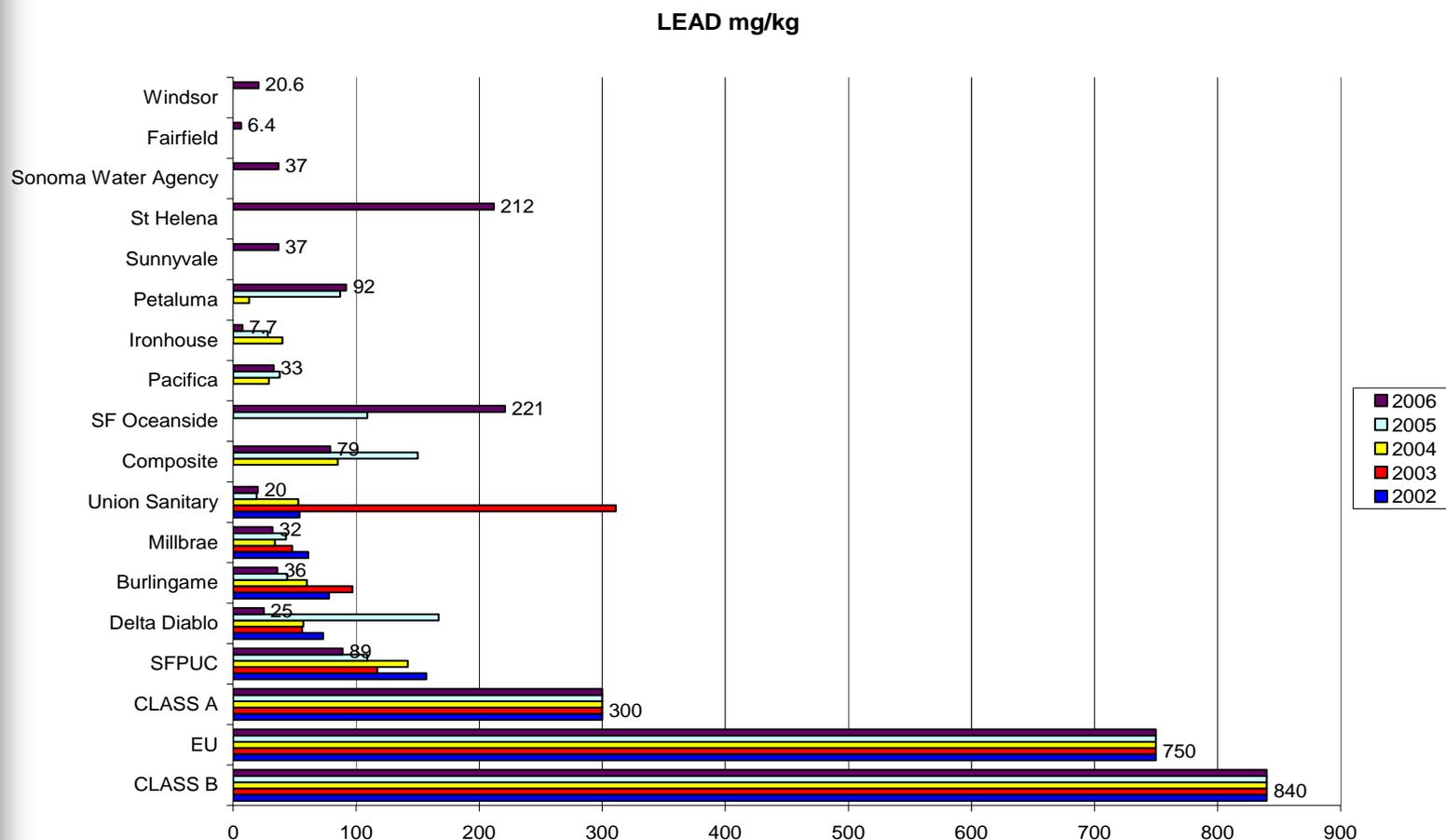
Determination of on-site and regional watershed impacts to water, soil and wildlife: Surface water and soil sampling performed by staff.

Bioaccumulation in pasture grass or feed and impact to domestic animals: Pharmaceutical study included evaluation of vegetative uptake.

Economic impact of using biosolids/sewage sludge, and comparison of cost/benefit to use of other chemical fertilizers or manure: Survey sent to generators and farmers

Characterization

➤ **Metals:** All heavy metals are below established Class B. Most meet Class A-EQ and proposed 2015 EU standards



Characterization

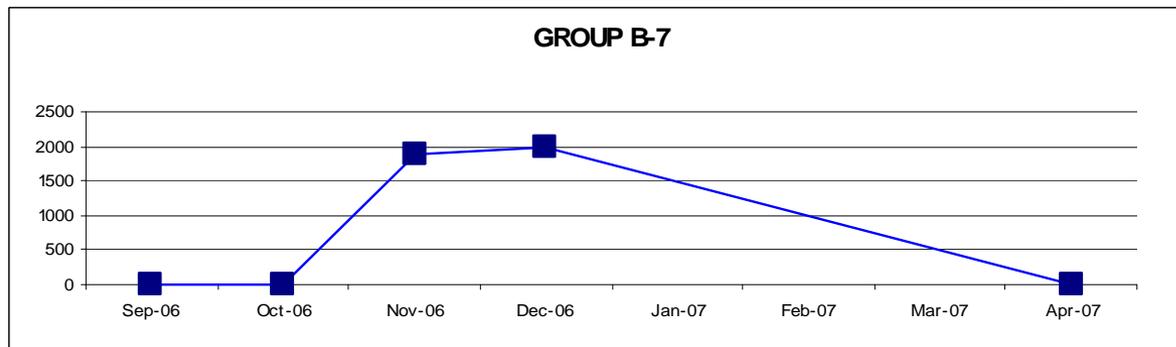
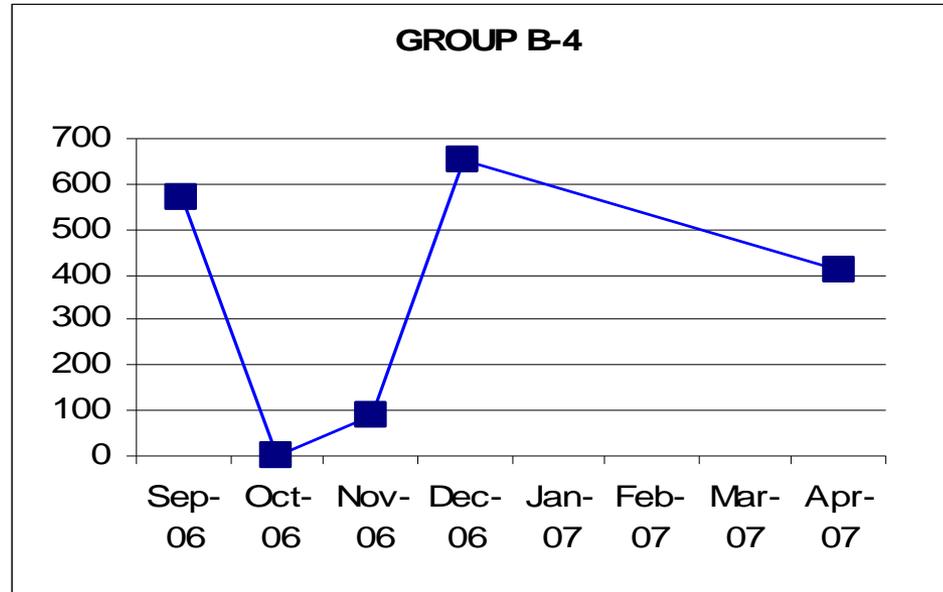


- **Unregulated chemicals:** such as phthalates, hepta dioxins and dioxin, may be present but are below preliminary remediations goals (PRGs) established by San Francisco Bay Regional Water Board for residential construction.
- **Radiation:** no radiation above background levels
- **Pathogen regrowth:** USEPA standards of 2 million fecal coliform bacteria per dry gram of biosolids is met at the plant, but regrowth can occur during transport and delivery. However, soil field testing (30, 60, 90 and 210 day intervals), shows a significant decrease compared to the initial levels found on the biosolids material.

Characterization



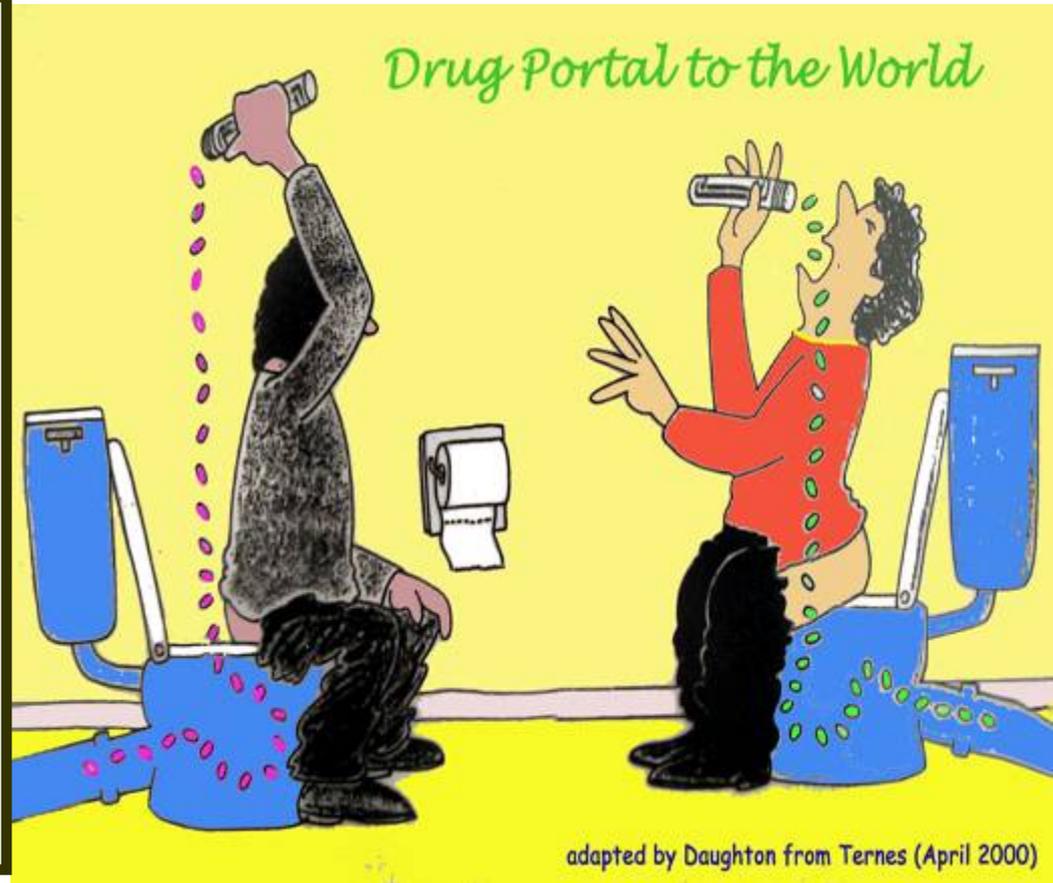
Pathogen regrowth: MPN/gr



How do PPCPs end up in biosolids?



“The red are for the illness, the blues are for the side effects of the red and the greens are for the side effects of the blue.”



Characterization



➤ **Pharmaceuticals and Personal care Products (PPCPs):**

- It is an emerging area of concern
- Staff attended several conferences
- On June 2006 partnered with scientist of the Mississippi State University to study the presence of PPCPs in biosolids, their persistence in the soil of formerly biosolids land applied sites, and the uptake and accumulation of polybrominated diphenyl ethers (PBDEs - flame retardants) by vegetation grown in the soils receiving biosolids in Solano County.
- Most PPCPs were not detected. Estrone and antihistamine were detected in the materials but not in the soil. Nonylphenols were detected in the materials, and reduced in the soils by 1000 times.

Research – Pharmaceuticals and Personal Care Products (PPCPs)

- 6 fields were selected (2000 – 2005)
- Materials from 9 POTWS
- Vegetation Samples - ND
- December 01, 2006 – Final Report
- Levels of most PPCPs below ND
- Antihistamine and hormone found in 2 samples
- Levels were in **ppm** on the materials
- Levels on the soil were on **ppb**
- ➔ ➤ PPCPs bind strongly to the soil after application
- Data consistent with US and European studies



17 PPCPs were tested:

- amoxicillin, oxytetracycline, tetracycline
- citalopram, fluoxetine, fluvoxamine, paroxetine, sertraline
- estrone, estradiol, ethinylestradiol
- 4-nonylphenol

antibiotics

SSRIs

hormones

17 PPCPs were tested ...

- atorvastatin
- acetaminophen, ibuprofen

Lipid lowering agent

anti-inflammatory

- diphenhydramine
- polybromated diphenylethers

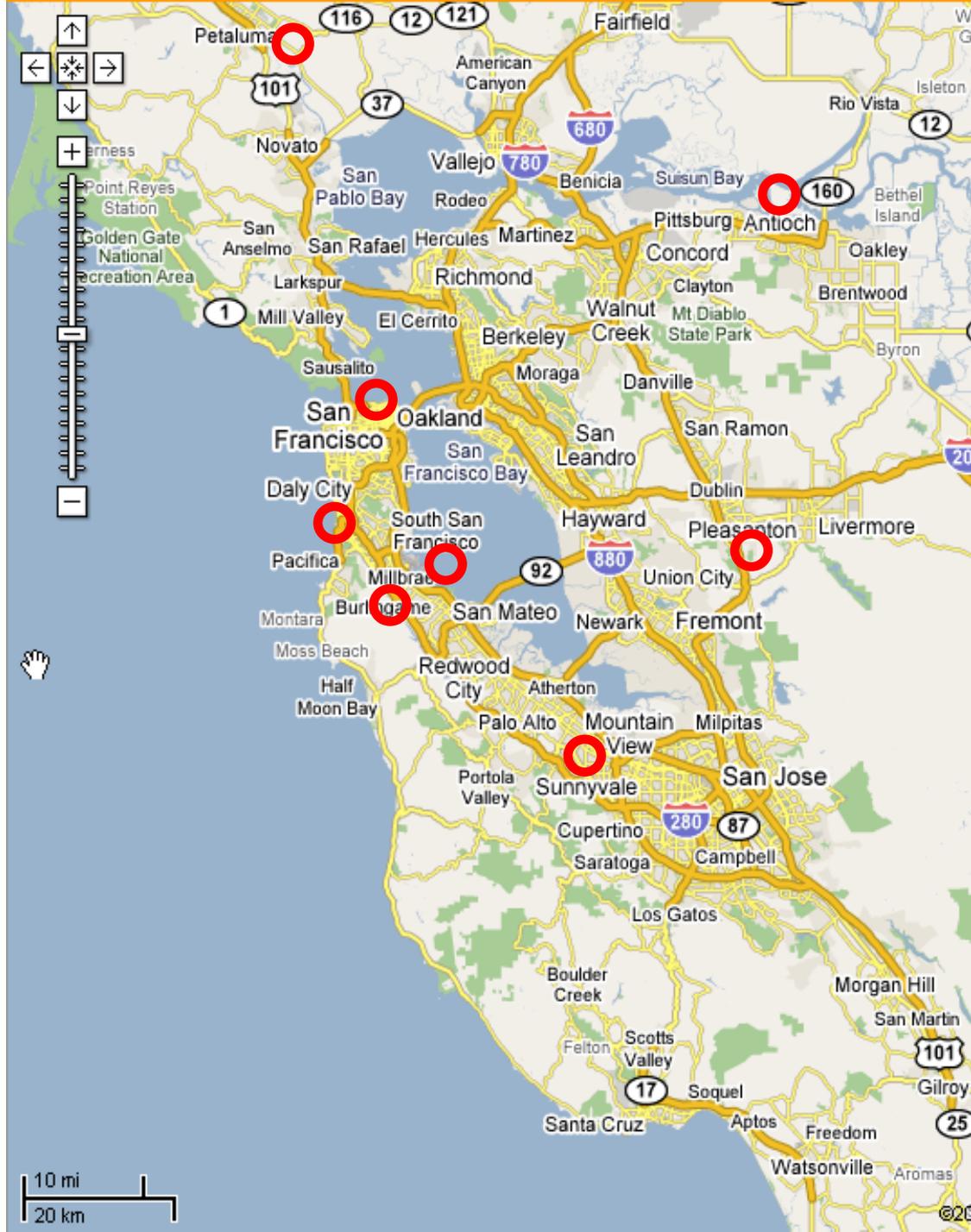
antihistamine

(PBDEs)

flame retardant

9 POTWs:

- Burlingame
- Delta Diablo
- Milbrae
- Pacifica
- Petaluma
- Sunnyvale
- Union Sanitary
- San Francisco



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Research – Pharmaceuticals and Personal Care Products (PPCPs)

- 13 out of the 17 PPCPs tested in biosolids were below the detection limits**
- 15 out of the 17 PPCPs tested in top top 15-cm biosolids-applied soils were below the detection limits**
- limited accumulation of certain PPCPs in soils**
- plant uptake of PBDEs was not observed**

Human health: aerosols and vectors



- **Human health:** No human health studies conducted yet in Solano County. Studies by WERF are in progress in other locations: University of North Carolina (\$ 200,000), to develop a protocol for epidemiological surveillance, outbreaks and etiological investigation of the potential health impacts of land application of biosolids in neighboring populations.
- **Aerosols:** Local study by Dr. Pepper – 2005, minimal risk to residence located within 100 feet from application sites, based on observation of no airborne pathogens detected beyond **50 feet** of loading operations.
- **Note:** Minimum setback to residence in Solano County is either **1,320 feet** for rural or **2 miles** for urban

On-site and regional watershed impact to water, soil and wildlife



- **Soils:** Pathogen re-growth sampling on 30, 60, 90 and 210 day intervals. From original 170,000 to 39 million MPN of fecal coliform per gram of dry biosolids. Overall trend in the 210 day interval after application shows an increased reduction in the soil when compared to initial levels
- **Surface Water:** sampling shows no increase in total or fecal coliform in areas applied with biosolids compared to areas not associated with land application sites
- **USEPA Guidance Criteria for Nonylphenols:** only for freshwater and saltwater environments and for aquatic life. There are no current established health or environmental standards for nonylphenols in biosolids, soil or terrestrial organisms.

Bioaccumulation in pasture grass or feed



- **Polybrominated diphenyl ethers (PBDEs – flame retardants):** No PBDEs were found in grass collected in Solano County by the University of Mississippi as part of their research performed on June of 2006

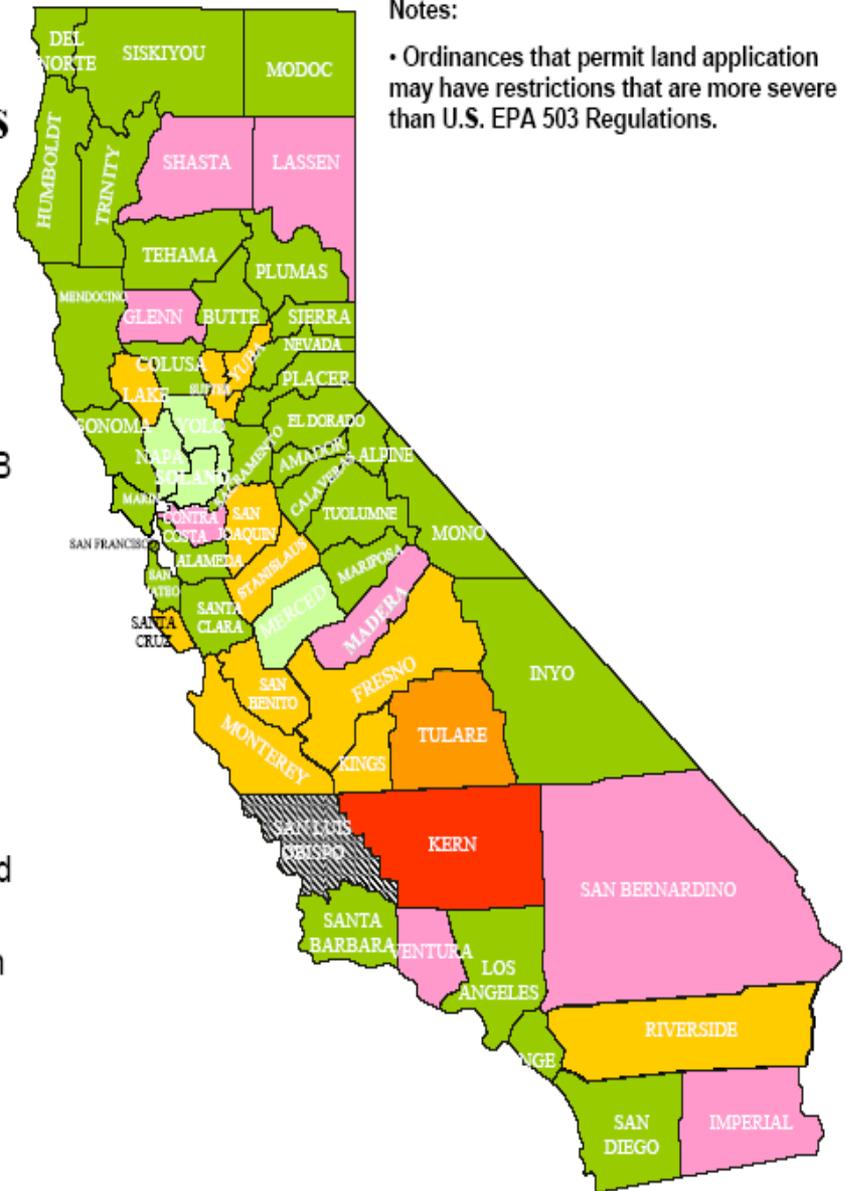
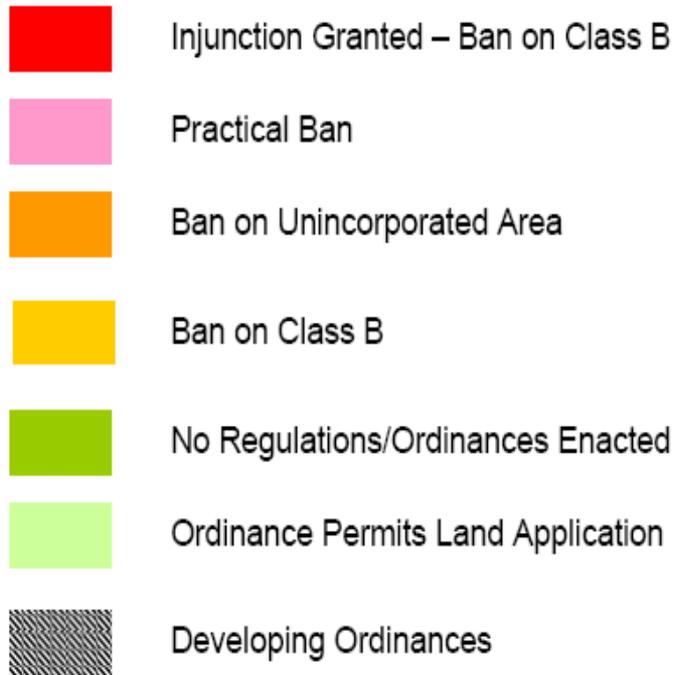
Economic Impact of using biosolids



- Survey sent to generators, ranchers and stakeholders
- Farmers receive an economic advantage since they do not need to pay for fertilizers
- Generators are concerned with a high cost associated with the production of Class A biosolids
- Generators estimate a timeframe of 10 years to produce Class A biosolids and in production of alternative energy
- Steps would be to identify the site of a potential site, developing plans, completing an Environmental Impact Report, then the construction and operation of the regional facility. **The Board gave them only 5 years ...**

Biosolids Recycling Status of County Ordinances State of California

Effective 12/06



Notes:

- Ordinances that permit land application may have restrictions that are more severe than U.S. EPA 503 Regulations.

Commerce Clause and other Issues



- Commerce Clause
- Integrated Waste Management Act
- Police Power
- CEQA Issues

Other Agencies Involvement

- Stakeholders
- City County Coordinating Council (CCCC)
- Agricultural Advisory Committee,
- Suisun Resource Conservation District

Evaluation of the Science

To date, the studies and sample results obtained do not indicate environmental or health risk from the land application of biosolids if done in accordance with Solano County Code, Chapter 25 requirements



Moving Forward



- Staff continues to work with stakeholders (community representatives, citizens, wastewater treatment operators, applicators and ranchers)
- Continue with research and sampling: heavy metals, pathogens in the soil, surface water, partnerships with academia.
- In September 11 2007, the Board of Supervisors adopted an ordinance revision allowing the local program to continue until October 12, 2012.

Moving Forward



- To promote the development and implementation of other uses of biosolids, such as the conversion of biosolids to energy, in place of land spreading or land filling-composting Class B
- Prohibition to apply Class B Biosolids after October 12, 2012, unless generator produces a portion of biosolids as Class A Exceptional Quality, converts biosolids to energy, or otherwise diverts Class B biosolids away from land application or placing into landfill.

Moving Forward

- Yearly updates to the Board to include status of the generators in converting their class B biosolids to some other form of beneficial reuse, such as Class A - Exceptional Quality (EQ) or biosolids to energy
- Prohibition to stage & apply biosolids if wind speed is 25 mph for 60 minutes
- Provide notice at beginning of land application period in the local newspapers indicating the starting and ending dates of the land spread period to city(s) nearest proposed land spreading areas.
- Prohibits the land application of biosolids in the secondary marsh
- Requires signs to be posted at land application sites indicating dates of biosolids land application for 60 days



Questions ???



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