

**SAME Water Conference
Sacramento, CA
October 28-29, 2009**

**SAME
2009 Water
Conference**

Sacramento, CA
October 28, 2009

Weed
Management in
Flood Control
Facilities: Costs &
Water Quality
Impacts

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Today's Talk

- Weeds...Why Bother?
- Types of Weeds
- Available Tools
- Regulatory Constraints
- Costs
- Water Quality Impacts

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Why Bother?Maintain Flow



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Why Bother ?....Protect Infrastructure



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Emergent

- Cattails
- Tules
- Bulrush
- Ex. Flood Control District

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Terrestrial (that may become aquatic)

- Pampas Grass
- Ex. Urban Creek
- Blackberries
- Ex. Flood Control

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Floating

- Primrose
- Ex: Laguna de Santa Rosa



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Tools for Control

- Biological
- Mechanical
- Chemical

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Biological Control

- Ex. Goats for Emergent and Terrestrial Weeds

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Mechanical Control

- Hand Cutting for Emergent Weeds
- Harvesters for Floating Weeds

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14



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Chemical Control

- The California "10"



Chemicals
Triclopyr
Diquat Dibromide
Glyphosate
Fluridone
Na ₂ CO ₃ Peroxyhydrate
Non-Ionic Surfactants
2,4-D
Imazapyr
Endothall
Acrolein *
Copper *

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Regulatory Constraints

- NPDES Aquatic Pesticide Permit
- Two Injunctions
 - 2006 Red Legged Frog
 - 2009 Goby 11



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NPDES Permit




Chemical	WQO (ug/L)
Triclopyr	N/A, monitoring required
Diquat Dibromide	20
Glyphosate	700
Fluridone	560
Na ₂ CO ₃ Peroxyhydrate	Pending
Non-Ionic Surfactant (nonylphenol)	6.6
2,4-D	70
Imazapyr	N/A, monitoring required
Endothall	100
Acrolein	320
Copper	3-52 (Hardness Dependent)

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Red Legged Frog

- 2006 Injunction
- 4 aquatic pesticides:
 - Imazapyr
 - 2,4-D
 - Glyphosate
 - Triclopyr
- 62 terrestrial pesticides
- 40K acres & 33 counties



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RLF Habitat Restrictions

- No applications
 - Ground: < 60' of habitat
 - Aerial: < 200' of habitat
 - Spot treatment >15' away OK
- Exceptions:
 - Public Health Vector Control
 - Invasive Species & Noxious Weeds



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“Goby 11”

- 2009 Injunction
- 11 Species
 - Tiger salamander
 - SJ Kit Fox
 - Alameda Whip Snake
 - SF Garter Snake
 - Salt Marsh Harvest Mouse
 - CA Clapper Rail
 - CA Freshwater Shrimp
 - Bay Checkerspot Butterfly
 - VELB
 - Tidewater Goby
 - Delta Smelt



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“Goby 11”

- 3 Aquatic Pesticides
 - 2,4-D
 - Acrolein
 - Diquat
- 8 Bay Area Counties
- No use within habitat
- Must use 100 - 400 ft. buffer Zones



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23

Regulatory Costs

- NPDES Aquatic Pesticide Permit **\$2K-15K/Year**
- Injunctions **\$0 to ??**
 - 2006 Red Legged Frog **\$0 to ??**
 - 2009 Goby 11 **\$0 to ??**

?? = scouting, legal defense, etc

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2003 Cost & Water Quality Study

- Contra Costa County
 - Rodeo Creek:
 - Bettencourt Basin:
- Sacramento County
 - Reclamation District 999:

Techniques

**Manual
Goats**

**Mechanical &
Chemical/
Mechanical**

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Chemical/Physical Properties Measured

- Turbidity
- N & P
- TDS
- Coliform & E. Coli
- Dissolved Oxygen
- Petroleum Hydrocarbons
- Regrowth



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Economic Parameters Measured

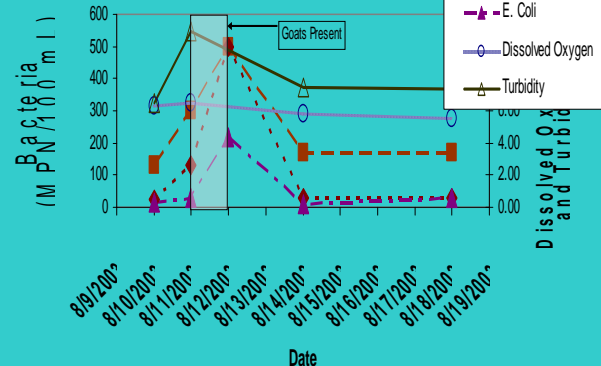
- Manpower
- Equipment
- Workers Compensation Claim Costs
- Normalized to \$/Acre Treated



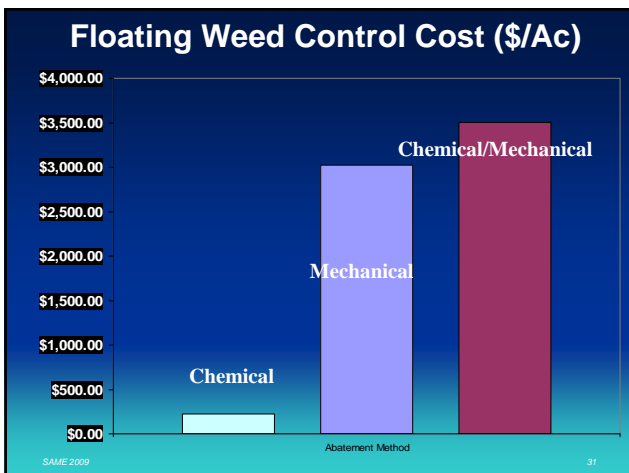
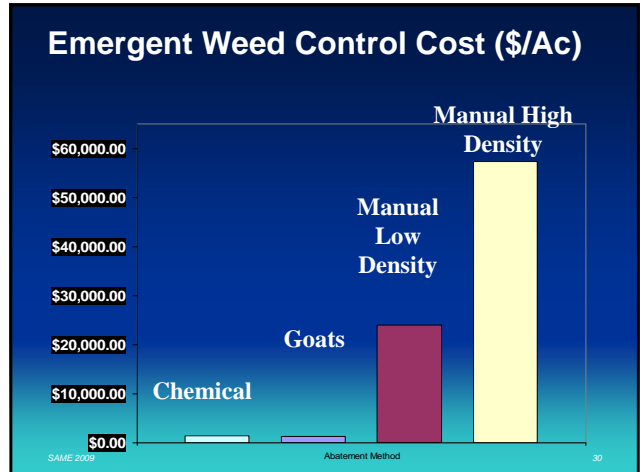
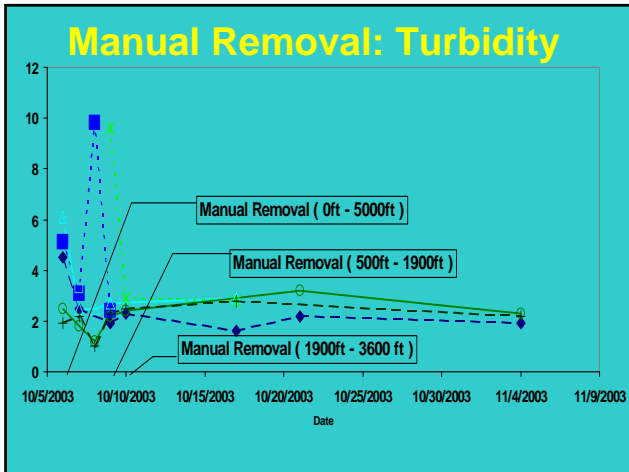
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27

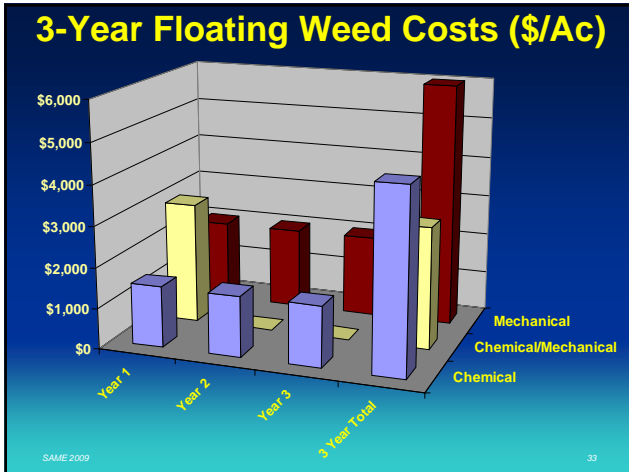
Goats: Coliform & DO



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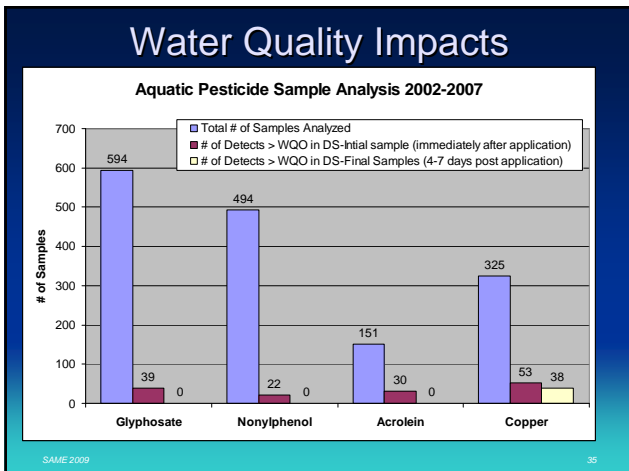


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Summary

- Mechanical Techniques Alone Are Expensive & Are Required Annually
- Goats Work Well
- Water Quality Impacts Transitory
- Chemical then Mechanical is Best
- Risk of aquatic pesticides is minimal



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