

**Cal-IPC  
Visalia, CA  
October 9, 2009**

**Cal-IPC  
Annual  
Meeting**

Visalia, CA  
October 9, 2009

***Aquatic Weed  
Management: A  
Survey of  
Techniques &  
Environmental  
Impacts 2001-  
Present***

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Agricultural & Environmental  
Consultants



**Today's Talk**

- Types of Weeds
- Available Tools
- Regulatory Update
- Water Quality Impacts



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***Types of Aquatic Weeds***

- Emergent
- Riparian
- Floating
- Submersed
- Algae

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***Emergent***

- Cattails
- Tules
- Bulrush
- Ex. Golf Course Ponds

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***Riparian (that may become aquatic)***

- Blackberry (terrestrial)
- Arundo
- Pampas Grass
- Ex. Urban Creeks



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***Floating***

- Primrose
- Duckweed
- Azolla
- Ex: Laguna de Santa Rosa

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***Submersed***

- Pond Weeds
  - Sago
  - American
  - Curly Leaf
- Milfoil
- Hydrilla
- Ex. Irrigation Canals

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## Algae

- Planktonic
  - Ex: Microcystis
- Filamentous
  - Ex: Anabaena, Planktothrix
- Ex. Drinking Water Reservoir



Anabaena 1600x

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## Tools for Control

- Biological
- Mechanical
- Chemical
- Other



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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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**Chemical Control**

- Only 10 registered for Use in CA



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**Chemicals**

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

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**Regulatory Constraints**

- 2004 NPDES Aquatic Pesticide Permit
- 2006 Red Legged Frog
- 2009 Goby 11



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**NPDES Aquatic Pesticide Permit  
You Need One if....**

- You apply aquatic pesticides to "Waters of U.S."
- Your chemical leaves a "residue" greater than its WQO or "Produces Unintended Effects"
- Perceived CWA Violations and Subsequent Citizen Lawsuits Concern You



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**"Waters of the U.S."**




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### “Water Quality Objectives”



Chemical	WQO (ug/L)
Triclopyr	N/A, monitoring required
Diquat Dibromide	20
Glyphosate	700
Fluridone	560
Na <sub>2</sub> CO <sub>3</sub> 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)

\* Requires SIP Exception

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### Red Legged Frog



- Oct 2006: Stipulated Injunction
- 66 pesticides restricted within designated habitat

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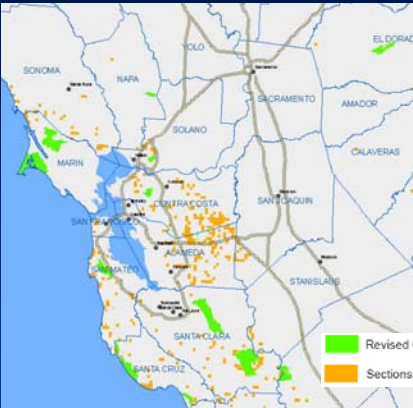
### Red Legged Frog



- 4 aquatic pesticides on list:
  - Imazapyr
  - 2,4-D
  - Glyphosate
  - Triclopyr
- ~40K Ac & 33 Counties

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### Examples of RLF Habitat in Northern California



Source: Center for Biological Diversity

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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”**

- ESA Failure Alleged by CBD
- 11 Species
- 74 Pesticides
- 8 Counties



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**“Goby 11”**

- 11 Species
 

<ul style="list-style-type: none"> <li>– Tiger salamander</li> <li>– SJ Kit Fox</li> <li>– Alameda Whip Snake</li> <li>– SF Garter Snake</li> <li>– Salt Marsh Harvest Mouse</li> </ul>	<ul style="list-style-type: none"> <li>– CA Clapper Rail</li> <li>– CA Freshwater Shrimp</li> <li>– Bay Checkerspot Butterfly</li> <li>– VELB</li> <li>– Tidewater Goby</li> <li>– Delta Smelt</li> </ul>
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**“Goby 11”**

- 3 Aquatic Pesticides
  - 2,4-D
  - Acrolein
  - Diquat
- 8 Counties
 

<ul style="list-style-type: none"> <li>– Alameda</li> <li>– Contra Costa</li> <li>– Marin</li> <li>– Napa</li> </ul>	<ul style="list-style-type: none"> <li>– San Mateo</li> <li>– Santa Clara</li> <li>– Solano</li> <li>– Sonoma</li> </ul>
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**“Goby 11”**

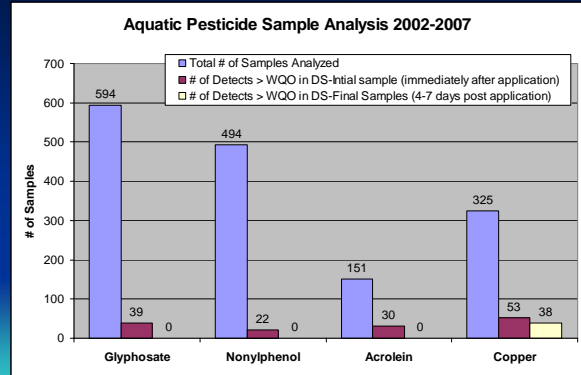


- No use within habitat
- Must use 100 - 400 ft. buffer Zones

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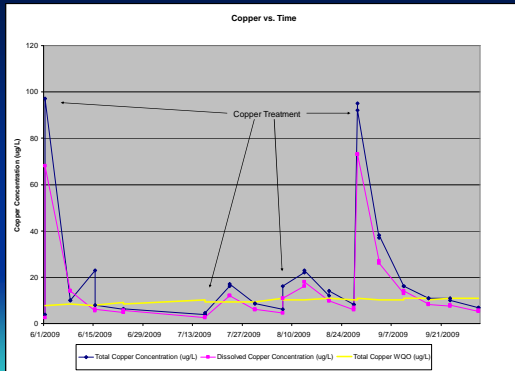
**Water Quality Impacts**



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**Water Quality Impacts**



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