Sedimentation Pond and Plant Filter Strip in Mitigating RIFA Insecticide Runoff at el modeno Gardens

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Outline

- Introduction
- Runoff Monitoring
- Runoff Mitigation
- Conclusions

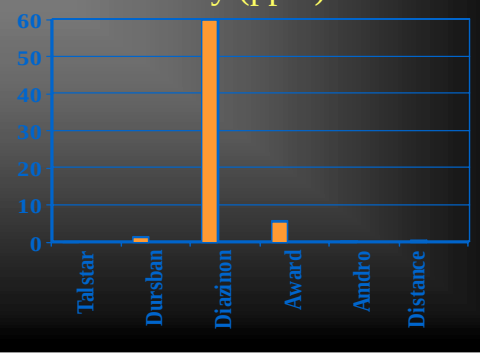
The Insecticides

- Bifenthrin (Talstar®)
- Fenoxycarb (Award®)
- Hydramethylnon (Amdro®)
- Pyriproxyfen (Distance®)
- Chlorpyrifos (Dursban®)
- Diazinon
- Malathion
- Dimethoate

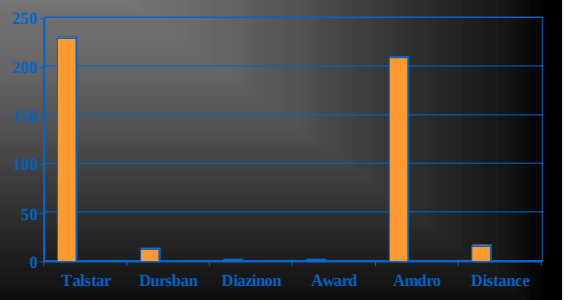
Insecticide Factors

- Vapor Pressure (mm Hg)
- Water Solubility (ppm, mg/L)
- Soil Adsorption Coefficient (Koc)
- Field Dissipation ($t_{1/2}$, days)

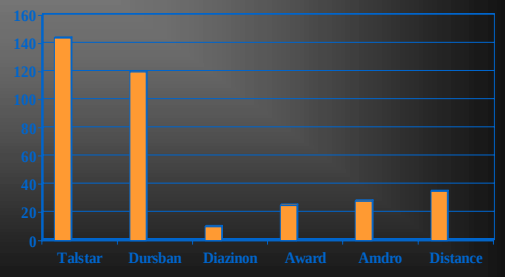
Water Solubility (ppm)



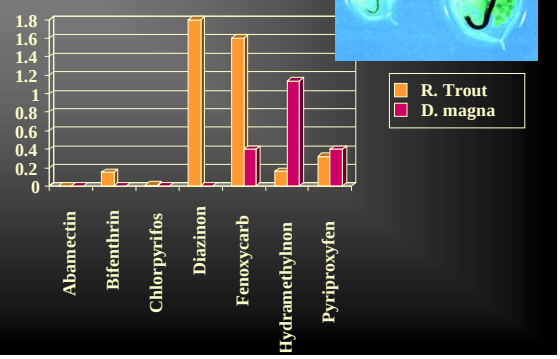
Soil Adsorption Coefficient



Field Dissipation Half-Life (Days)



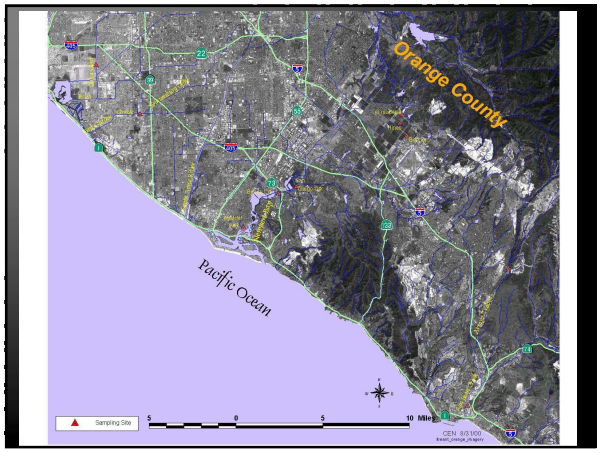
Aquatic Toxicity

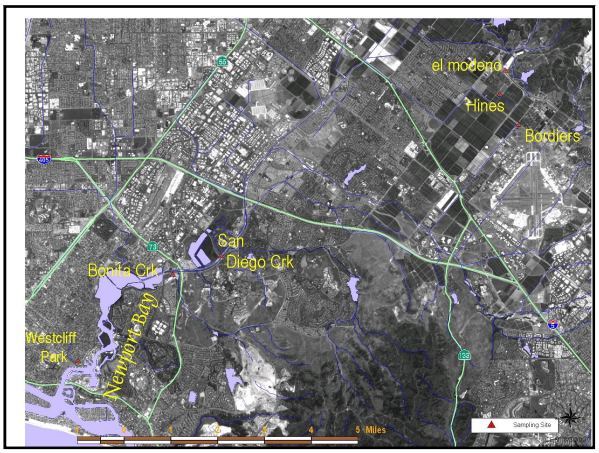


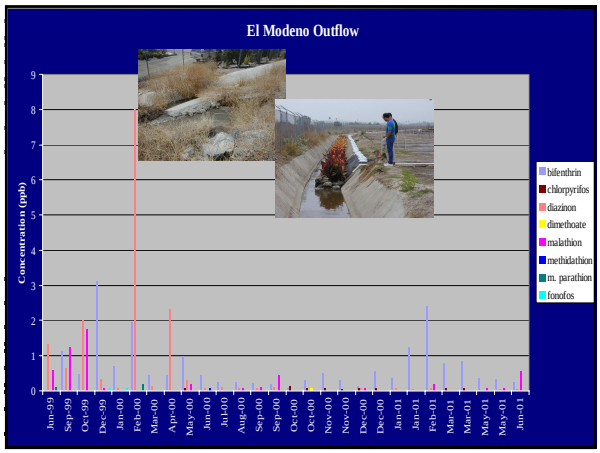
Offsite Movements

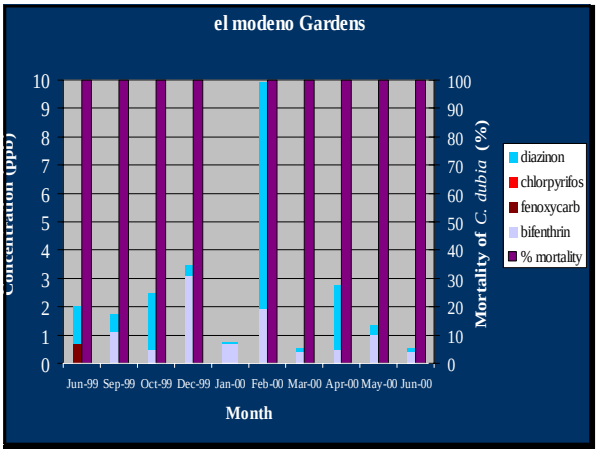
- Spray drift
  - primary, secondary
- Runoff
  - dissolved in water
  - adsorbed to soil particles and organic materials

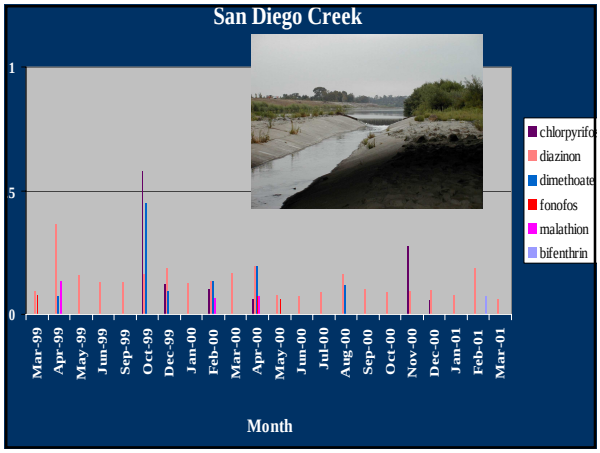
Runoff Monitoring

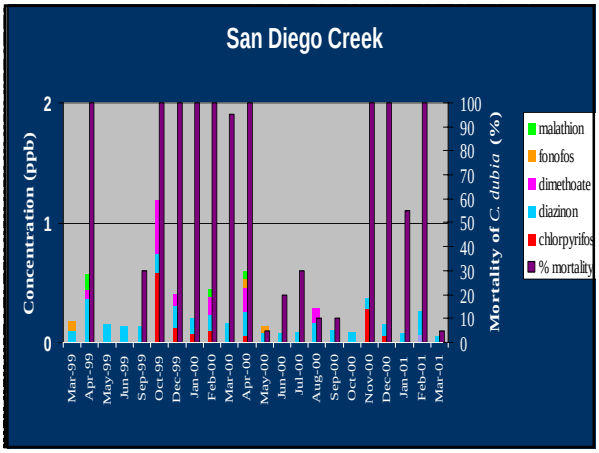



el modeno
Hines
Borders
San Diego Crk
Bonita Crk
Newport Bay
Westcliff Park
Sampling Site
5 Miles


El Modeno Outflow
Concentration (ppb)
bifenthrin
chlorpyrifos
diazinon
dimethoate
malathion
methidathion
m. parathion
fonofos


el modeno Gardens
Concentration (ppb)
Mortality of C. dubia (%)
diazinon
chlorpyrifos
fenoxycarb
bifenthrin
% mortality
Month

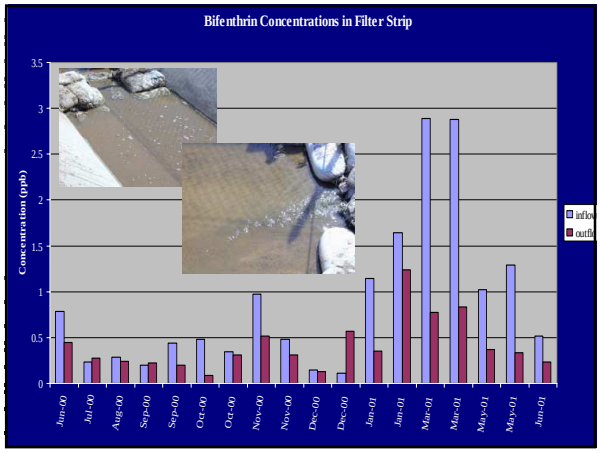

San Diego Creek
chlorpyrifos
diazinon
dimethoate
fonofos
malathion
bifenthrin
Month

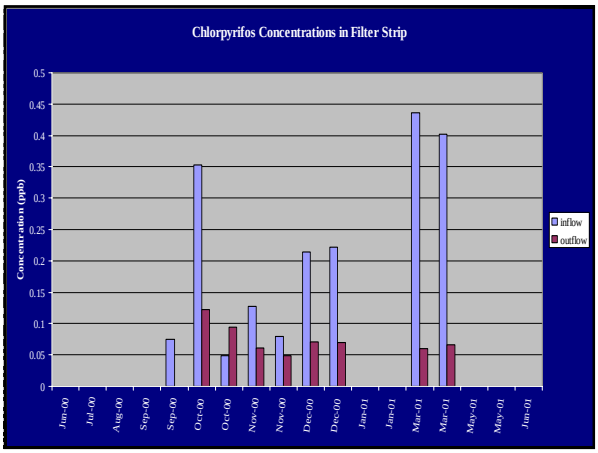

San Diego Creek
Concentration (ppb)
Mortality of C. dubia (%)
malathion
fonofos
dimethoate
diazinon
chlorpyrifos
% mortality

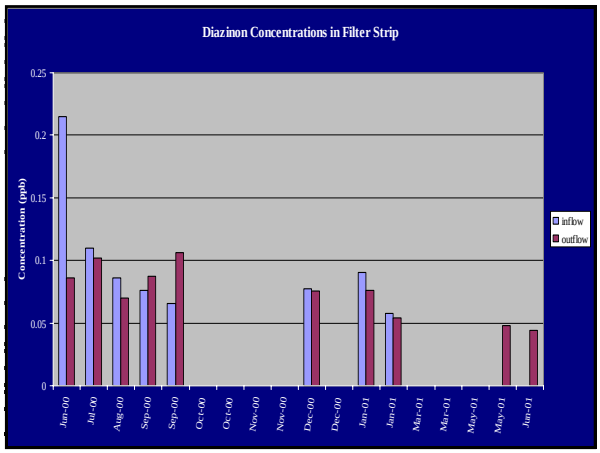
Mitigation

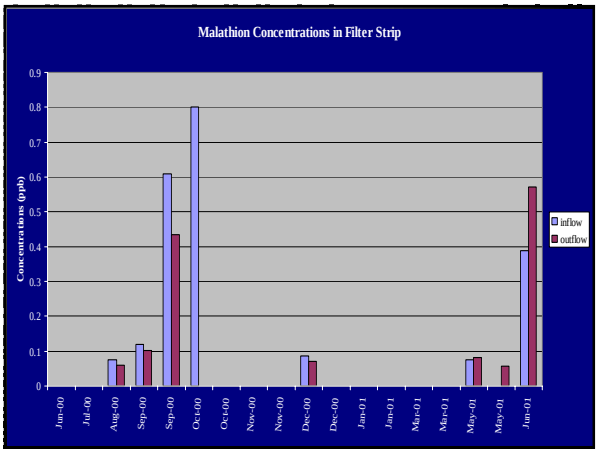
Prevention & Mitigation

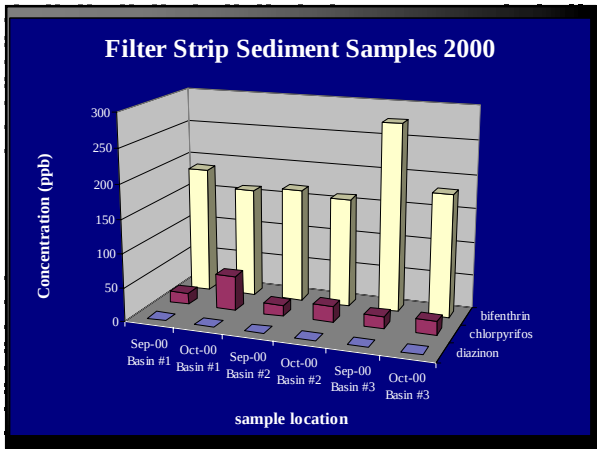
- Insecticide & Application
- Irrigation Management
- Water Recovery
- Holding Pond
- Buffer Strip

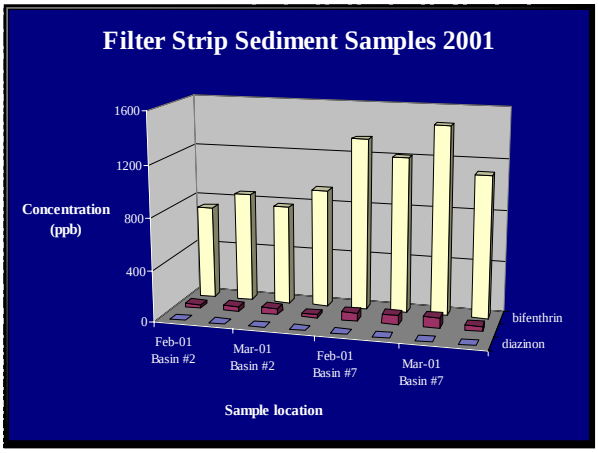






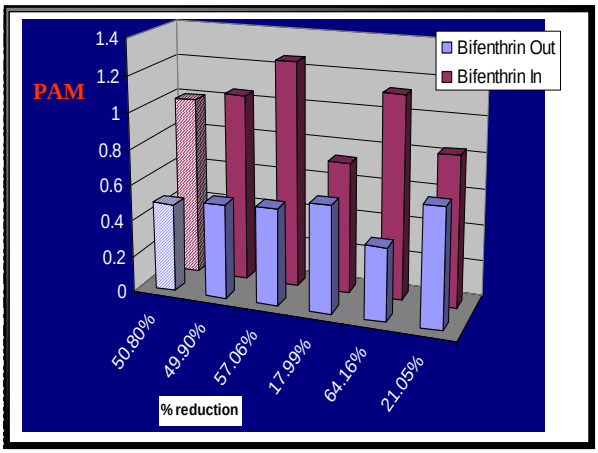


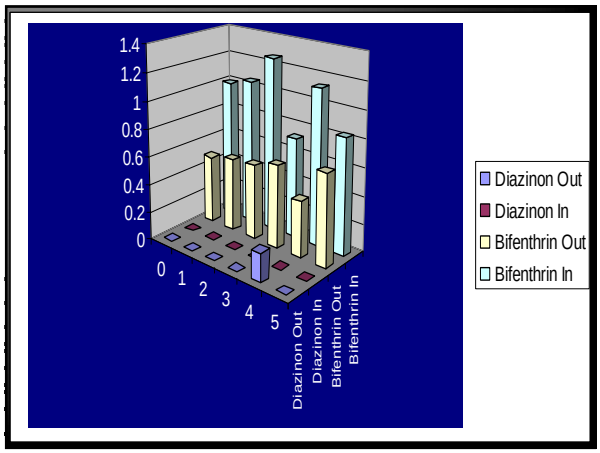




dpr

Polyacrylamide (PAM)





Conclusions

Runoff

- Bifenthrin, diazinon, malathion
- Bifenthrin high>3 ppb, currently <1 ppb
- Diazinon high>8 ppb, currently trace
- Peaks at rain runoff
- Toxic to *C. dubia*

Mitigation

Reduction in Water Concentration

- **Bifenthrin 52%**
- **Chlorpyrifos 61%**
- **Diazinon –13%**
- **Malathion 31%**

dpr

Sediments

- Bifenthrin
  - Increased through time
    - 200 – 1400 ppb
  - Increased downstream basin
    - 150 –250 ppb
    - 800 – 1200 ppb
- Chlorpyrifos <80 ppb
- Diazinon none detected

Acknowledgments
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