CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

# REGIONAL WATER QUALITY CONTROL BOARD
# CENTRAL VALLEY REGION

# AMENDMENTS
# TO
# THE WATER QUALITY CONTROL PLAN FOR THE SACRAMENTO RIVER AND SAN JOAQUIN RIVER BASINS
# FOR
# THE CONTROL OF DIAZINON AND CHLORPYRIFOS RUNOFF INTO THE LOWER SAN JOAQUIN RIVER

## APPENDIX D
## SAN JOAQUIN RIVER DIAZINON AND CHLORPYRIFOS ECONOMIC SCENARIOS

PEER REVIEW DRAFT STAFF REPORT

***February 2004***

*State of California*

*California Environmental Protection Agency*

**REGIONAL WATER QUALITY CONTROL BOARD**
**CENTRAL VALLEY REGION**

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| APPLES | dormant application (acres) | irrigation application (acres) | | | | | | | irrigation application (acres) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| diazinon | | diazinon | chlorpyrifos | methidathion | phosmet | azinphos methyl | malathion | parathion | esfenvalerate | permethrin | Bt | spinosad | carbaryl | pyriproxyfen | Total | % |
| 2000 | 525 | 0 | 96 | 0 | 154 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 282 | |
| 2001 | 341 | 0 | 0 | 0 | 590 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 140 | 0 | 755 | |
| 2002 | 211 | 0 | 0 | 0 | 610 | 80 | 0 | 0 | 210 | 0 | 0 | 0 | 160 | 0 | 1060 | |
| **average** | **359** | | | | | | | | | | | | | | 699 | 195 |
| | | | | | | | | | | | | | | | | |
| **chlorpyrifos** | | | | | | | | | | | | | | | | |
| 2000 | 1072 | 6 | 0 | 0 | 1959 | 1050 | 0 | 0 | 436 | 0 | 329 | 24 | 0 | 0 | 3804 | |
| 2001 | 741 | 0 | 0 | 0 | 511 | 75 | 0 | 0 | 125 | 0 | 0 | 27 | 61 | 0 | 799 | |
| 2002 | 676 | 0 | 3 | 0 | 336 | 205 | 0 | 0 | 71 | 0 | 0 | 17 | 109 | 0 | 741 | |
| **average** | **829.67** | | | | | | | | | | | | | | 1781 | 215 |
| | | | | | | | | | | | | | | | | |
| **methidathion** | | | | | | | | | | | | | | | | |
| 2000 | 687 | 6 | 462 | 0 | 2283 | 1000 | 0 | 0 | 568 | 0 | 329 | 24 | 171 | 0 | 4843 | |
| 2001 | 957 | 0 | 0 | 0 | 464 | 1485 | 0 | 0 | 0 | 0 | 0 | | 965 | 0 | 2914 | |
| 2002 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **average** | **556.33** | | | | | | | | | | | | | | 2586 | 465 |
| | | | | | | | | | | | | | | | | |
| **permethrin** | | | | | | | | | | | | | | | | |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2001 | 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| **average** | **0.5** | | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **esfenvalerate** | | | | | | | | | | | | | | | | |
| 2000 | 343 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 58 | |
| 2001 | 96 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| **average** | **146.33** | | | | | | | | | | | | | | 26 | 18 |
| | | | | | | | | | | | | | | | | |
| **Bt** | | | | | | | | | | | | | | | | |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| **average** | **0** | | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **spinosad** | | | | | | | | | | | | | | | | |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| **average** | **0** | | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **dormant oils** | | | | | | | | | | | | | | | | |
| 2000 | 769 | 0 | 321 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 321 | |
| 2001 | 0 | | | | | | | | | | | | | | 0 | |
| 2002 | | | | | | | | | | | | | | | 0 | |
| **average** | **384.5** | | | | | | | | | | | | | | 107 | 28 |
| **pyriproxyfen** | | | | | | | | | | | | | | | | |
| 2000 | | | | | | | | | | | | | | | | |
| 2001 | | | | | | | | | | | | | | | 0 | |
| 2002 | 500 | | | | | | | | | | | | | | 0 | |
| **average** | **500** | | | | | | | | | | | | | | 0 | |
| | | | | | | | | | | | | | | | 0 | |

| Peach | dormant application (acres) | irrigation application (acres) | | | | | | | | irrigation application (acres) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| diazinon | | diazinon | chlorpyrifos | methidathion | phosmet | azinphos methyl | malathion | parathion | esfenvalerate | permethrin | Bt | spinosad | carbaryl | pyriproxyfen | Total | % |
| 2000 | 2100 | 702 | 0 | 0 | 877 | 0 | 0 | 0 | 459 | 58 | 99 | 0 | 0 | 0 | 2195 | |
| 2001 | 2182 | 0 | 0 | 0 | 998 | 0 | 0 | 0 | 928 | 0 | 0 | 50 | 0 | 0 | 1976 | |
| 2002 | 2348 | 294 | 0 | 0 | 195 | 0 | 0 | 0 | 1074 | 80 | 0 | 0 | 41 | 0 | 1684 | |
| **average** | **2210** | | | | | | | | | | | | | | **1952** | **88** |
| | | | | | | | | | | | | | | | | |
| **chlorpyrifos** | | | | | | | | | | | | | | | | |
| 2000 | 418 | 0 | 0 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | |
| 2001 | 1105 | 11 | 0 | 0 | 181 | 0 | 0 | 0 | 18 | 838 | 0 | 0 | 2 | 0 | 1050 | |
| 2002 | 1331 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 405 | 111 | 0 | 0 | 11 | 0 | 527 | |
| **average** | **951** | | | | | | | | | | | | | | **547** | **57** |
| | | | | | | | | | | | | | | | | |
| **methidathion** | | | | | | | | | | | | | | | | |
| 2000 | 5022 | 41 | 0 | 0 | 96 | 23 | 0 | 0 | 503 | 1596 | 20 | 117 | 125 | 0 | 2521 | |
| 2001 | 2802 | 0 | 0 | 0 | 64 | 0 | 0 | 0 | 166 | 0 | 0 | 170 | 17 | 0 | 417 | |
| 2002 | 1797 | 0 | 0 | 20 | 95 | 0 | 0 | 0 | 684 | 43 | 9 | 0 | 92 | 0 | 943 | |
| **average** | **3207** | | | | | | | | | | | | | | **1294** | **40** |
| | | | | | | | | | | | | | | | | |
| **permethrin** | | | | | | | | | | | | | | | | |
| 2000 | 2252 | 0 | 0 | 0 | 113 | 0 | 0 | 0 | 333 | 861 | 158 | 0 | 0 | 0 | 1465 | |
| 2001 | 1189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 310 | 256 | 0 | 0 | 0 | 0 | 566 | |
| 2002 | 2280 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 724 | 552 | 0 | 0 | 521 | 0 | 1825 | |
| **average** | **1907** | | | | | | | | | | | | | | **1285** | **67** |
| | | | | | | | | | | | | | | | | |
| **esfenvalerate** | | | | | | | | | | | | | | | | |
| 2000 | 4383 | 734 | 0 | 0 | 1011 | 18 | 0 | 0 | 922 | 40 | 298 | 184 | 18 | 0 | 3225 | |
| 2001 | 3510 | 628 | 0 | 0 | 572 | 0 | 0 | 0 | 279 | 487 | 0 | 221 | 27 | 0 | 2214 | |
| 2002 | 3118 | 151 | 0 | 0 | 341 | 0 | 0 | 0 | 1328 | 92 | 108 | 153 | 127 | 0 | 2300 | |
| **average** | **3670** | | | | | | | | | | | | | | **2580** | **70** |
| | | | | | | | | | | | | | | | | |
| **Bt** | | | | | | | | | | | | | | | | |
| 2000 | 58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **average** | **19.33** | | | | | | | | | | | | | | **0** | **0** |
| | | | | | | | | | | | | | | | | |
| **spinosad** | | | | | | | | | | | | | | | | |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2001 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2002 | 81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **average** | **32.33** | | | | | | | | | | | | | | **0** | **0** |
| | | | | | | | | | | | | | | | | |
| **dormant oils** | | | | | | | | | | | | | | | | |
| 2000 | 5052 | 0 | 0 | 0 | 303 | 0 | 0 | 0 | 1856 | 736 | 0 | 92 | 0 | 0 | 2987 | |
| 2001 | 3338 | | | | | | | | | | | | | | 0 | |
| 2002 | | | | | | | | | | | | | | | 0 | |
| **average** | **4195** | | | | | | | | | | | | | | **996** | **23.73** |
| | | | | | | | | | | | | | | | | |

| Almond | dormant application (acres) | irrigation application (acres) | | | | | | | | irrigation application (acres) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| diazinon | | diazinon | chlorpyrifos | methidathion | phosmet | azinphos methyl | malathion | parathion | esfenvalerate | permethrin | Bt | spinosad | carbaryl | pyriproxyfen | Total | % |
| 2000 | 5572 | 0 | 756 | 0 | 38 | 0 | 0 | 0 | 215 | 945 | 475 | 16 | 0 | 0 | 2445 | |
| 2001 | 9900 | 0 | 532 | 0 | 0 | 115 | 0 | 0 | 127 | 3700 | 541 | 0 | 0 | 0 | 5015 | |
| 2002 | 9172 | 0 | 855 | 0 | 0 | 180 | 0 | 0 | 396 | 4936 | 0 | 48 | 0 | 0 | 6415 | |
| **average** | **8215** | | | | | | | | | | | | | | **4625** | **56** |
| | | | | | | | | | | | | | | | | |
| **chlorpyrifos** | | | | | | | | | | | | | | | | |
| 2000 | 870 | 0 | 284 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 117 | 0 | 0 | 401 | |
| 2001 | 4193 | 2 | 641 | 0 | 97 | 0 | 0 | 0 | 180 | 261 | 135 | 0 | 92 | 0 | 1408 | |
| 2002 | 4764 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1273 | 485 | 0 | 0 | 0 | 0 | 1758 | |
| **average** | **3276** | | | | | | | | | | | | | | **1189** | **36** |
| | | | | | | | | | | | | | | | | |
| **methidathion** | | | | | | | | | | | | | | | | |
| 2000 | 3127 | 0 | 529 | 0 | 0 | 110 | 0 | 0 | 92 | 254 | 76 | 888 | 0 | 0 | 1949 | |
| 2001 | 3467 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 852 | 0 | 0 | 0 | 47 | 939 | |
| 2002 | 790 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 310 | 0 | 0 | 0 | 0 | 310 | |
| **average** | **2461** | | | | | | | | | | | | | | **1066** | **43** |
| | | | | | | | | | | | | | | | | |
| **permethrin** | | | | | | | | | | | | | | | | |
| 2000 | 11874 | 0 | 1433 | 0 | 724 | 537 | 0 | 0 | 833 | 938 | 54 | 64 | 0 | 0 | 4583 | |
| 2001 | 16618 | 0 | 2600 | 0 | 0 | 365 | 0 | 0 | 873 | 3260 | 192 | 40 | 0 | 40 | 7370 | |
| 2002 | 21341 | 0 | 4997 | 0 | 471 | 685 | 0 | 0 | 2260 | 2453 | 48 | 174 | 0 | 1415 | 12503 | |
| **average** | **16611** | | | | | | | | | | | | | | **8152** | **49** |
| | | | | | | | | | | | | | | | | |
| **esfenvalerate** | | | | | | | | | | | | | | | | |
| 2000 | 12467 | 108 | 3809 | 0 | 210 | 417 | 0 | 0 | 62 | 604 | 276 | 188 | 0 | 0 | 5674 | |
| 2001 | 27706 | 22 | 2420 | 0 | 144 | 719 | 0 | 0 | 1428 | 3674 | 0 | 156 | 0 | 0 | 8563 | |
| 2002 | 21586 | 0 | 2579 | 0 | 160 | 778 | 0 | 0 | 1388 | 5992 | 0 | 0 | 0 | 0 | 10897 | |
| **average** | **20586** | | | | | | | | | | | | | | **8378** | **41** |
| | | | | | | | | | | | | | | | | |
| **Bt** | | | | | | | | | | | | | | | | |
| 2000 | 8289 | 0 | 963 | 0 | 47 | 57 | 0 | 0 | 35 | 1169 | 2794 | 140 | 0 | 0 | 5205 | |
| 2001 | 638 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 148 | 178 | 68 | 0 | 0 | 449 | |
| 2002 | 101 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | | 0 | 0 | 19 | |
| **average** | **3,009** | | | | | | | | | | | | | | **1891** | **62.84** |
| | | | | | | | | | | | | | | | | |
| **spinosad** | | | | | | | | | | | | | | | | |
| 2000 | 241 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 0 | 78 | |
| 2001 | 589 | 0 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | |
| 2002 | 312 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 53 | |
| **average** | **381** | | | | | | | | | | | | | | **63.67** | **16.725044** |
| | | | | | | | | | | | | | | | | |
| **dormant oils** | | | | | | | | | | | | | | | | |
| 2000 | 78098 | 0 | 10145 | 0 | 1510 | 136 | 0 | 0 | 3679 | 4443 | 4001 | 1286 | 0 | 0 | 25200 | |
| 2001 | 65027 | | | | | | | | | | | | | | 0 | |
| 2002 | | | | | | | | | | | | | | | 0 | |
| **average** | **71,563** | | | | | | | | | | | | | | **8400** | **11.737991** |

| Economic Analysis for Dormant Season Chlorpyrifos Base Case and Alternate Scenarios for Cling Peaches (UCCE 1998) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Base Case | Alternate Scenario 1[1] | Alternate Scenario 2 | Alternate Scenario 3 | Alternate Scenario 4 |
| | | | | DO + Chlorpyrifos | DO Alone | DO + Bt at Bloom[2] | DO + Success | DO + Pyrethroid. In-season treatments as needed. Cover crops to reduce runoff. |
| | Cost of One Application (per ac, based on 100 ac)(a) | | | $20 | $20 | $20 | $20 | $20 |
| | Cost of Two Applications (per ac, based on 100 ac)(a) | | | | | $40 | | |
| | Supreme Oil (4 gal/ac)(a) | | | $12 | $12 | $12 | $12 | $12 |
| | | Diazinon 50 (3.5 lb/ac)(a) | $19/acre | | | | | |
| | | Lorsban 4E (2qt/ac)(3)(a) | $15/acre | $15 | | | | |
| | | Guthion 50WP (4lbs/ac)(3)(a) | $45/acre | | | | | |
| | | Supracide 25 WP (8lbs/ac)(a) | $60/acre | | | | | |
| | | Imidan 70 WP (4.25 lbs/ac)(a) | $30/acre | $30 | $30 | $30 | $30 | $30 |
| | | Asana XL (4-6 oz/ac)(4)(a) | $5/acre | | | | | $5 |
| | | Ambush 25SP (12-25 oz/ac)(4)(a) | $30/acre | | | | | |
| | | Pounce 3.2 EC (8-16 oz/ac)(4)(a) | $23/acre | | | | | |
| | | Dipel (1 lb/ac)(2)(a) | $28/acre | | | $28 | | |
| | | Trilogy 90EC (2g/ac)(2)(a) | $140/acre | | | | | |
| | | Success (6 oz/ac)(a) | $30/acre | | | | $30 | |
| | | Sevin 80S (1.25 lb/ac)(a) | $8/acre | | | | | |
| | | Vendex 50WP (2 lb/ac)(a) | $56/acre | | | | | $56 |
| | | Apollo SC (4 oz/ac)(a) | $58/acre | | | | | |
| | | Omite 30 WP (7.5 lb/ac)(a) | $45/acre | | | | | |
| | Probability of Needing In-season Applications(b) | | | 0.6 | 1 | 0.9 | 0.9 | 1 |
| | Cover Crop(c) | | | | | | | $60 |
| | Cultural Costs--Not Including Dormant Sprays (d) | | | $1,415 | $1,415 | $1,415 | $1,415 | $1,415 |
| Total Cultural Costs | | | | $1,477 | $1,497 | $1,560 | $1,522 | $1,638 |
| Harvest Costs(d) | | | | $975 | $975 | $975 | $975 | $975 |
| Advisory Board Assessment(d) | | | | $47 | $47 | $47 | $47 | $47 |
| Interest on Operating Capital @ 10.46%(d) | | | | $45 | $45 | $45 | $45 | $45 |
| Cash Overhead(d) | | | | $248 | $248 | $248 | $248 | $248 |
| Non-Cash Overhead(d) | | | | $1,125 | $1,125 | $1,125 | $1,125 | $1,125 |
| Total Costs | | | | $3,917 | $3,937 | $4,000 | $3,962 | $4,078 |
| Gross Revenue(5)(d) | | | | $4,700 | $4,700 | $4,700 | $4,700 | $4,700 |
| Returns to Land, Mgt & Overhead | | | | $783 | $763 | $700 | $738 | $622 |
| Total Cultural Costs as Percent of Gross Revenue | | | | 31% | 21% | 21% | 21% | 21% |
| Total Costs as Percent of Gross Revenue | | | | 83% | 84% | 85% | 84% | 87% |
| Change in Total Cost from Base Case | | | | $0 | $20 | $83 | $45 | $161 |
| % Change in Total Cost from Base Case | | | | 0% | 0% | 2% | 1% | 3% |
| | | | | | | | | |
| * Imidan (phosmet) and Asana (esfenvalerate) were used for scenario because PUR records indicate they are commonly used on peaches | | | | | | | | |

| Economic Analysis for Dormant Season Diazinon Base Case and Alternate Scenarios for Cling Peaches (UCCE 1998) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Base Case | Alternate Scenario 1[1] | Alternate Scenario 2 | Alternate Scenario 3 | Alternate Scenario 4 |
| | | | | DO + Diazinon | DO Alone | DO + Bt at Bloom[2] | DO w/ Success | DO + Pyrethroid. In-season treatments as needed. Cover crops to reduce runoff. |
| | Cost of One Application (per ac, based on 100 ac)(a) | | | $20 | $20 | $20 | $20 | $20 |
| | Cost of Two Applications (per ac, based on 100 ac)(a) | | | | | $40 | | |
| | Supreme Oil (4 gal/ac)(a) | | | $12 | $12 | $12 | $12 | $12 |
| | | Diazinon 50 (3.5 lb/ac)(a) | $19/acre | $19 | | | $19 | |
| | | Lorsban 4E (2qt/ac)(3)(a) | $15/acre | | | | | |
| | | Guthion 50WP (4lbs/ac)(3)(a) | $45/acre | | | | | |
| | | Supracide 25 WP (8lbs/ac)(a) | $60/acre | | | | | |
| | | Imidan 70 WP (4.25 lbs/ac)(a) | $30/acre | $30 | $30 | $30 | $30 | $30 |
| | | Asana XL (4-6 oz/ac)(4)(a) | $5/acre | | | | | $5 |
| | | Ambush 25SP (12-25 oz/ac)(4)(a) | $30/acre | | | | | |
| | | Pounce 3.2 EC (8-16 oz/ac)(4)(a) | $23/acre | | | | | |
| | | Dipel (1 lb/ac)(2)(a) | $28/acre | | | $28 | | |
| | | Trilogy 90EC (2g/ac)(2)(a) | $140/acre | | | | | |
| | | Success (6 oz/ac)(a) | $30/acre | | | | $30 | |
| | | Sevin 80S (1.25 lb/ac)(a) | $8/acre | | | | | |
| | | Vendex 50WP (2 lb/ac)(a) | $56/acre | | | | | $56 |
| | | Apollo SC (4 oz/ac)(a) | $58/acre | | | | | |
| | | Omite 30 WP (7.5 lb/ac)(a) | $45/acre | | | | | |
| | Probability of Needing In-season Applications(b) | | | 0.9 | 1 | 0.9 | 0.9 | 1 |
| | Cover Crop(c) | | | | | | | $60 |
| | Cultural Costs--Not Including Dormant Sprays (d) | | | $1,415 | $1,415 | $1,415 | $1,415 | $1,415 |
| Total Cultural Costs | | | | $1,511 | $1,497 | $1,560 | $1,541 | $1,638 |
| Harvest Costs(d) | | | | $975 | $975 | $975 | $975 | $975 |
| Advisory Board Assessment(d) | | | | $47 | $47 | $47 | $47 | $47 |
| Interest on Operating Capital @ 10.46%(d) | | | | $45 | $45 | $45 | $45 | $45 |
| Cash Overhead(d) | | | | $248 | $248 | $248 | $248 | $248 |
| Non-Cash Overhead(d) | | | | $1,125 | $1,125 | $1,125 | $1,125 | $1,125 |
| Total Costs | | | | $3,951 | $3,937 | $4,000 | $3,981 | $4,078 |
| Gross Revenue(5)(d) | | | | $4,700 | $4,700 | $4,700 | $4,700 | $4,700 |
| Returns to Land, Mgt & Overhead | | | | $749 | $763 | $700 | $719 | $622 |
| Total Cultural Costs as Percent of Gross Revenue | | | | 32% | 21% | 21% | 21% | 21% |
| Total Costs as Percent of Gross Revenue | | | | 84% | 84% | 85% | 85% | 87% |
| Change in Total Cost from Base Case | | | | $0 | -$14 | $49 | $30 | $127 |
| % Change in Total Cost from Base Case | | | | 0% | 0% | 1% | 1% | 3% |
| | | | | | | | | |
| * Imidan (phosmet) and Asana (esfenvalerate) were used for scenario because PUR records indicate they are commonly used on peaches | | | | | | | | |

| Economic Analysis for Dormant Season Chlorpyrifos Base Case and Alternate Scenarios for Apples (UCCE 2001a) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Base Case** | **Alternate Scenario 1** | **Alternate Scenario 2** | **Alternate Scenario 3** | **Alternate Scenario 4** |
| | | | DO + Diazinon | DO Alone | DO + *Bt* at Bloom(2) | DO + Success | DO + Pyrethroid. In-season treatments as needed. Cover crops to reduce runoff. |
| | Cost of One Application (per ac, based on 100 ac)(a) | | $20 | $20 | $20 | $20 | $20 |
| | Cost of Two Applications (per ac, based on 100 ac)(a) | | | | $40 | | |
| | Supreme Oil (4 gal/ac)(a) | | $12 | $12 | $12 | $12 | $12 |
| | Diazinon 50 (3.5 lb/ac)(a) | $19/acre | | | | | |
| | Lorsban 4E (2qt/ac)(3)(a) | $15/acre | $15 | | | | |
| | Guthion 50WP (4lbs/ac)(3)(a) | $45/acre | | | | | |
| | Supracide 25 WP (8lbs/ac)(a) | $60/acre | | | | | |
| | Imidan 70 WP (4.25 lbs/ac)(a) | $30/acre | $30 | $30 | $30 | $30 | $30 |
| | Asana XL (4-6 oz/ac)(4)(a) | $5/acre | | | | | |
| | Pounce 3.2 EC (8-16 oz/ac)(4)(a) | $23/acre | | | | | $23 |
| | Dipel (1 lb/ac)(2)(a) | $28/acre | | | $28 | | |
| | Trilogy 90EC (2g/ac)(2)(a) | $140/acre | | | | | |
| | Success (6 oz/ac)(a) | $30/acre | | | | $30 | |
| | Sevin 80S (1.25 lb/ac)(a) | $8/acre | | | | | |
| | Vendex 50WP (2 lb/ac)(a) | $56/acre | | | | | $56 |
| | Apollo SC (4 oz/ac)(a) | $58/acre | | | | | |
| | Omite 30 WP (7.5 lb/ac)(a) | $45/acre | | | | | |
| | Probability of Needing In-Season Application(b) | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Cover Crop(c) | | | | | | $60 |
| | Cultural Costs--Not Including Dormant Sprays(d) | | $1,332 | $1,332 | $1,332 | $1,332 | $1,332 |
| Total Cultural Costs | | | $1,429 | $1,414 | $1,482 | $1,444 | $1,573 |
| Harvest Costs per acre(d) | | | $1,740 | $1,740 | $1,740 | $1,740 | $1,740 |
| Processing Costs per acre(d) | | | $6,915 | $6,915 | $6,915 | $6,915 | $6,915 |
| Advisory Board Assessment(d) | | | $120 | $120 | $120 | $120 | $120 |
| Interest on Operating Capital @10.51%(d) | | | $151 | $151 | $151 | $151 | $151 |
| Cash Overhead(d) | | | $202 | $202 | $202 | $202 | $202 |
| Non-Cash Overhead(d) | | | $1,131 | $1,131 | $1,131 | $1,131 | $1,131 |
| Total Costs | | | $11,688 | $11,673 | $11,741 | $11,703 | $11,832 |
| Gross Revenue(5)(d) | | | $15,300 | $15,300 | $15,300 | $15,300 | $15,300 |
| Returns to Land, Mgt & Overhead | | | $3,612 | $3,627 | $3,559 | $3,597 | $3,468 |
| Total Cultural Costs as Percent of Gross Revenue | | | 9% | 9% | 10% | 9% | 10% |
| Total Costs as Percent of Gross Revenue | | | 76% | 76% | 77% | 76% | 77% |
| Change in Total Cost from Base Case | | | $0 | -$15 | $53 | $15 | $159 |
| % Change in Total Cost from Base Case | | | 0% | 0% | 0% | 0% | 1% |
| | | | | | | | |
| * Imidan (phosmet) and Pounce (permethrin) were used for scenarios because they are commonly used on apples | | | | | | | |

| Economic Analysis for Dormant Season Diazinon Base Case and Alternate Scenarios for Apples (UCCE 2001a) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Base Case** | **Alternate Scenario 1** | **Alternate Scenario 2** | **Alternate Scenario 3** | **Alternate Scenario 4** |
| | | | DO + Diazinon | DO Alone | DO + *Bt* at Bloom(2) | DO + Success | DO + Pyrethroid. In-season treatments as needed. Cover crops to reduce runoff. |
| | Cost of One Application (per ac, based on 100 ac)(a) | | $20 | $20 | $20 | $20 | $20 |
| | Cost of Two Applications (per ac, based on 100 ac)(a) | | | | $40 | | |
| | Supreme Oil (4 gal/ac)(a) | | $12 | $12 | $12 | $12 | $12 |
| | Diazinon 50 (3.5 lb/ac)(a) | $19/acre | $19 | | | | |
| | Lorsban 4E (2qt/ac)(3)(a) | $15/acre | | | | | |
| | Guthion 50WP (4lbs/ac)(3)(a) | $45/acre | | | | | |
| | Supracide 25 WP (8lbs/ac)(a) | $60/acre | | | | | |
| | Imidan 70 WP (4.25 lbs/ac)(a) | $30/acre | $30 | $30 | $30 | $30 | $30 |
| | Asana XL (4-6 oz/ac)(4)(a) | $5/acre | | | | | |
| | Pounce 3.2 EC (8-16 oz/ac)(4)(a) | $23/acre | | | | | $23 |
| | Dipel (1 lb/ac)(2)(a) | $28/acre | | | $28 | | |
| | Trilogy 90EC (2g/ac)(2)(a) | $140/acre | | | | | |
| | Success (6 oz/ac)(a) | $30/acre | | | | $30 | |
| | Sevin 80S (1.25 lb/ac)(a) | $8/acre | | | | | |
| | Vendex 50WP (2 lb/ac)(a) | $56/acre | | | | | $56 |
| | Apollo SC (4 oz/ac)(a) | $58/acre | | | | | |
| | Omite 30 WP (7.5 lb/ac)(a) | $45/acre | | | | | |
| | Probability of Needing In-Season Application(b) | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Cover Crop(c) | | | | | | $60 |
| | Cultural Costs--Not Including Dormant Sprays(d) | | $1,332 | $1,332 | $1,332 | $1,332 | $1,332 |
| Total Cultural Costs | | | $1,433 | $1,414 | $1,482 | $1,444 | $1,573 |
| Harvest Costs per acre(d) | | | $1,740 | $1,740 | $1,740 | $1,740 | $1,740 |
| Processing Costs per acre(d) | | | $6,915 | $6,915 | $6,915 | $6,915 | $6,915 |
| Advisory Board Assessment(d) | | | $120 | $120 | $120 | $120 | $120 |
| Interest on Operating Capital @10.51%(d) | | | $151 | $151 | $151 | $151 | $151 |
| Cash Overhead(d) | | | $202 | $202 | $202 | $202 | $202 |
| Non-Cash Overhead(d) | | | $1,131 | $1,131 | $1,131 | $1,131 | $1,131 |
| Total Costs | | | $11,692 | $11,673 | $11,741 | $11,703 | $11,832 |
| Gross Revenue(5)(d) | | | $15,300 | $15,300 | $15,300 | $15,300 | $15,300 |
| Returns to Land, Mgt & Overhead | | | $3,608 | $3,627 | $3,559 | $3,597 | $3,468 |
| Total Cultural Costs as Percent of Gross Revenue | | | $0 | 9% | 10% | 9% | 10% |
| Total Costs as Percent of Gross Revenue | | | 76% | 76% | 77% | 76% | 77% |
| Change in Total Cost from Base Case | | | $0 | -$19 | $49 | $11 | $159 |
| % Change in Total Cost from Base Case | | | $0 | 0% | 0% | 0% | 1% |
| | | | | | | | |
| * Imidan (phosmet) and Pounce (permethrin) were used for scenarios because they are commonly used on apples | | | | | | | |

| Economic Analysis for Dormant Season Chlorpyrifos Base Case and Alternate Scenarios for Almonds (UCCE 2002a) | | | | | | |
|---|---|---|---|---|---|---|
| | | | **Base Case** | **Alternate Scenario 1[1]** | **Alternate Scenario 2** | **Alternate Scenario 3** |
| | | | DO + Chlorpyrifos | DO Alone | DO + *Bt* at Bloom[2] | DO + Success |
| | Cost of One Application(per ac, based on 100 ac)(a) | | $20 | $20 | $20 | $20 |
| | Cost of Two Applications(per ac, based on 100 ac)(a) | | | | $40 | |
| | Supreme Oil(4 gal/ac)(a) | | $12 | $12 | $12 | $12 |
| | Lorsban 4E (2qt/ac)(3)(a) | $15/acre | $15 | | | |
| | Guthion 50WP (4lbs/ac)(3)(a) | $45/acre | | | | |
| | Supracide 25 WP (8lbs/ac)(a) | $60/acre | | | | |
| | *Imidan 70WP (4.25 lb/ac)(a) | $30/acre | $30 | $30 | $30 | $30 |
| | Ambush 25SP (12-25 oz/ac)(4)(a) | $30/acre | | | | |
| | Pounce 3.2 EC (8-16 oz/ac)(4)(a) | $23/acre | | | | |
| | Dipel (1 lb/ac)(2)(a) | $28/acre | | | $28 | |
| | Success (6 oz/ac)(a) | $30/acre | | | | $30 |
| | Sevin 80S (1.25 lb/ac)(a) | $8/acre | | | | |
| | Vendex 50WP (2 lb/ac)(a) | $56/acre | | | | |
| | Apollo SC (4 oz/ac)(a) | $58/acre | | | | |
| | Omite 30 WP (7.5 lb/ac)(a) | $45/acre | | | | |
| | Probability of Needing In-season Applications(b) | | 0.40 | 1.00 | 0.60 | 0.60 |
| | Cover Crop(c) | $60/acre | | | | |
| Cultural Costs--Not Including Dormant Sprays(d,e) | | | $1,000 | $1,000 | $1,000 | $1,000 |
| Total Cultural Costs | | | $1,067 | $1,082 | $1,110 | $1,092 |
| Harvest Costs per acre(d) | | | $332 | $332 | $332 | $332 |
| Interest on Operating Capital @7.4%(d) | | | $24 | $24 | $24 | $24 |
| Cash Overhead(d) | | | $214 | $214 | $214 | $214 |
| Non-Cash Overhead(d) | | | $1,098 | $1,098 | $1,098 | $1,098 |
| Total Costs | | | $2,735 | $2,750 | $2,778 | $2,760 |
| Gross Revenue (5)(d) | | | $2,500 | $2,500 | $2,500 | $2,500 |
| Returns to Land, Mgt & Overhead | | | -$235 | -$250 | -$278 | -$260 |
| Total Cultural Costs as Percent of Gross Revenue | | | 43% | 43% | 44% | 44% |
| Total Costs as Percent of Gross Revenue | | | 109% | 110% | 111% | 110% |
| Change in Total Cost from Base Case | | | $0 | $15 | $43 | $25 |
| % Change in Total Cost from Base Case | | | 0% | 1% | 2% | 1% |
| | | | | | | |
| * Imidan (phosmet) and Pounce (permethrin) were used for scenario because PUR records indicate they are commonly used on almonds | | | | | | |

| Economic Analysis for Dormant Season Diazinon Base Case and Alternate Scenarios for Almonds (UCCE 2002a) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Base Case** | **Alternate Scenario 1[1]** | **Alternate Scenario 2** | **Alternate Scenario 3** | **Alternate Scenario 4** |
| | | | DO + Diazinon | DO Alone | DO + *Bt* at Bloom[2] | DO w/ Success | DO + Pyrethroid. In-season treatments as needed. Cover crops to reduce runoff. |
| | Cost of One Application(per ac, based on 100 ac)(a) | | $20 | $20 | $20 | $20 | $20 |
| | Cost of Two Applications(per ac, based on 100 ac)(a) | | | | $40 | | |
| | Supreme Oil(4 gal/ac)(a) | | $12 | $12 | $12 | $12 | $12 |
| | Diazinon 50 (3.5 lb/ac)(a) | $19/acre | $19 | | | | |
| | Guthion 50WP (4lbs/ac)(3)(a) | $45/acre | | | | | |
| | Supracide 25 WP (8lbs/ac)(a) | $60/acre | | | | | |
| | *Imidan 70WP (4.25 lb/ac)(a) | $30/acre | $30 | $30 | $30 | $30 | $30 |
| | Ambush 25SP (12-25 oz/ac)(4)(a) | $30/acre | | | | | |
| | *Pounce 3.2 EC (8-16 oz/ac)(4)(a) | $23/acre | | | | | $23 |
| | Dipel (1 lb/ac)(2)(a) | $28/acre | | | $28 | | |
| | Success (6 oz/ac)(a) | $30/acre | | | | $30 | |
| | Sevin 80S (1.25 lb/ac)(a) | $8/acre | | | | | |
| | Vendex 50WP (2 lb/ac)(a) | $56/acre | | | | | $56 |
| | Apollo SC (4 oz/ac)(a) | $58/acre | | | | | |
| | Omite 30 WP (7.5 lb/ac)(a) | $45/acre | | | | | |
| | Probability of Needing In-season Applications(b) | | 0.60 | 1.00 | 0.60 | 0.60 | 1.00 |
| | Cover Crop(c) | $60/acre | | | | | $60 |
| Cultural Costs--Not Including Dormant Sprays(d,e) | | | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 |
| Total Cultural Costs | | | $1,081 | $1,082 | $1,110 | $1,092 | $1,241 |
| Harvest Costs per acre(d) | | | $332 | $332 | $332 | $332 | $332 |
| Interest on Operating Capital @7.4%(d) | | | $24 | $24 | $24 | $24 | $24 |
| Cash Overhead(d) | | | $214 | $214 | $214 | $214 | $214 |
| Non-Cash Overhead(d) | | | $1,098 | $1,098 | $1,098 | $1,098 | $1,098 |
| Total Costs | | | $2,749 | $2,750 | $2,778 | $2,760 | $2,909 |
| Gross Revenue (5)(d) | | | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 |
| Returns to Land, Mgt & Overhead | | | -$249 | -$250 | -$278 | -$260 | -$409 |
| Total Cultural Costs as Percent of Gross Revenue | | | 0.43 | 0.43 | 0.44 | 0.44 | 0.50 |
| Total Costs as Percent of Gross Revenue | | | 110% | 110% | 111% | 110% | 116% |
| Change in Total Cost from Base Case | | | $0 | $1 | $29 | $11 | $160 |
| % Change in Total Cost from Base Case | | | 0% | 0% | 1% | 0% | 6% |
| | | | | | | | |
| * Imidan (phosmet) and Pounce (permethrin) were used for scenario because PUR records indicate they are commonly used on almonds | | | | | | | |

| Economic Analysis for Irrigation Season Chlorpyrifos (Base Case) and Alternate Scenarios for Almonds. (UCCE 2002a, 2002b) | | | | | | |
|---|---|---|---|---|---|---|
| **Chlorpyrifos applied in-season (July) to control Naval Orange Worm** | | | **Base Case** | **Alternate Scenario 1** | **Alternate Scenario 2** | **Alternate Scenario 3** |
| | | | Chlorpyrifos 60% of growers use basin flood irrigation with berms, 40% use drip or microsprinkler | Orchard sanitation + *Bt* at hull split. Same irrigation as Base Case | Guthion Same irrigation as Base Case, cover crops to reduce runoff | Chlorpyrifos 100% of growers use drip or microsprinklers to reduce runoff. |
| | Cost of One Application(per ac, based on 100 ac)(a) | | $20 | | $20 | $20 |
| | Cost of Two Applications(per ac, based on 100 ac)(a) | | | $40 | | |
| | Lorsban 4E (2qt/ac)(3)(a) | $15/acre | $15 | | | $15 |
| | Guthion 50WP (4lbs/ac)(3)(a) | $45/acre | | | $45 | |
| | Imidan 70WP (4.25 lb/ac)(a) | $30/acre | | | | |
| | Asana XL (4-6 oz/ac)(4)(a) | $5/acre | | | | |
| | Dipel (1 lb/ac)(2)(a) | $28/acre | | $28 | | |
| | Orchard sanitation© | $70/acre | | $70 | | |
| | Cover Crop(c) | $60/acre | | | $60 | |
| | Microsprinklers cost differential | $196/acre | $196 | $196 | $196 | $196 |
| Cultural Costs--Not Including management variable(d) | | | $1,000 | $1,000 | $1,000 | $1,000 |
| Total Cultural Costs | | | $1,113 | $1,216 | $1,203 | $1,231 |
| Harvest Costs per acre(d) | | | $332 | $332 | $332 | $332 |
| Interest on Operating Capital @7.4%(d) | | | $24 | $24 | $24 | $24 |
| Cash Overhead(d) | | | $214 | $214 | $214 | $214 |
| Non-Cash Overhead(d) | | | $1,098 | $1,098 | $1,098 | $1,098 |
| Total Costs | | | $2,781 | $2,884 | $2,871 | $2,899 |
| Gross Revenue (5)(d) | | | $2,500 | $2,500 | $2,500 | $2,500 |
| Returns to Land, Mgt & Overhead | | | -$281 | -$384 | -$371 | -$399 |
| Total Cultural Costs as Percent of Gross Revenue | | | 45% | 49% | 48% | 49% |
| Total Costs as Percent of Gross Revenue | | | 111% | 115% | 115% | 116% |
| Change in Total Cost from Base Case | | | $0 | $103 | $90 | $118 |
| % Change in Total Cost from Base Case | | | 0% | 4% | 3% | 4% |
| | | | | | | |
| Guthion (azinphos-methyl) was used for scenario because it was first on list of alternatives from UCIPM guidelines. | | | | | | |
| Pyrethroid scenario was not included becaue pyrethroids are not recommended for in-season use on almonds. | | | | | | |

| Economic Analysis for Irrigation Season Chlorpyrifos (Base Case) and Alternate Scenarios for Alfalfa. (UCCE 2003) | | | | | |
|---|---|---|---|---|---|
| **Chlorpyrifos applied in-season (March) to control Egyptian Alfalfa Weevil** | | | **Base Case** | **Alternate Scenario 1** | **Alternate Scenario 2** |
| | | | Chlorpyrifos Flood irrigation, no tailwater control or vegetated buffer | Pyrethroid Same irrigation as Base Case, tailwater control to reduce runoff | Pyrethroid Same irrigation as Base Case, vegetated buffer to reduce runoff |
| | Cost of One Application(per ac, based on 100 ac)(a) | $20/acre | $20 | $20 | $20 |
| | Cost of Two Applications(per ac, based on 100 ac)(a) | $40/acre | | | |
| | Lorsban 4E (2qt/ac)(3)(a) | $15/acre | $15 | | |
| | Ambush 25SP (12-25 oz/ac)(4)(a) | $30/acre | | $30 | $30 |
| | Imidan 70WP (4.25 lb/ac)(a) | $30/acre | | | |
| | Vegetated Buffer(c) | $60/acre | | | $60 |
| | Tailwater control (Surface Drainage recirculation) | $100/acre/year | | $100 | |
| Cultural Costs--Not Including management variable(d) | | | $290 | $290 | $290 |
| Total Cultural Costs | | | $325 | $440 | $400 |
| Harvest Costs per acre(d) | | | $198 | $198 | $198 |
| Interest on Operating Capital @7.14%(d) | | | $9 | $9 | $9 |
| Cash Overhead(d) | | | $77 | $77 | $77 |
| Non-Cash Overhead(d) | | | $400 | $400 | $400 |
| Total Costs | | | $1,009 | $1,124 | $1,084 |
| Gross Revenue (5)(d) | | | $875 | $875 | $875 |
| Returns to Land, Mgt & Overhead | | | -$134 | -$249 | -$209 |
| Total Cultural Costs as Percent of Gross Revenue | | | 37% | 50% | 46% |
| Total Costs as Percent of Gross Revenue | | | 115% | 128% | 124% |
| Change in Total Cost from Base Case | | | $0 | $115 | $75 |
| % Change in Total Cost from Base Case | | | 0% | 11% | 7% |
| | | | | | |
| Guthion (azinphos-methyl) was used for scenario because it was first on list of alternatives from UCIPM guidelines. | | | | | |
| Pyrethroid scenario was not included becaue pyrethroids are not recommended for in-season use on almonds. | | | | | |

Explanations and Footnotes for Tables

1) May result in unacceptable level of damage
2) Two applications required--cost is for two applications
3) One to three applications required when used as an in-season treatment; cost is for one application
4) Choice of this pesticide will also probably require use of miticide such as Vendex, Apollo, Omite, Kelthane, Agri-Mek
5) Yield for almonds: 1 ton per acre Price per ton: $2500
Yield for peaches: 20 tons per acre Price per ton: $235 Cost data are for 1998 (except advisory board assessment).
An inflation rate of 3% was applied to all costs. Yield, price, and advisory board assessment data are for 2003 (R. Duncan, pers.comm>)
Yield for apples: 30 tons per acre Price per ton: $510 (70% fresh, 20% peelers, 10% juicers)

a) Costs are from Zalom, et al., 1999.
b) Estimated probability is based on CDPR Pesticide Use Report data, 2000-2002, when possible. No probabilities could be obtained for apple.
Probabilities for dormant oil alone, dormant oil plus Bt, and dormant oil plus spinosad on almond and peach could not be obtained from PUR data.
Probabilites were estimated for these scenarios.
c) Costs are from Thomas, F. CERUS Consulting. Personal Communication
d) Costs for typical practices are from University of California Cooperative Extension --see citations below. Specific practices vary by crop.
"Cultural Costs--Not Including Management Alternative(s)" includes annual cost per acre for typical cultural practices such as irrigation using flood system, pruning, fertilization, pollination, leaf analysis, non-dormant season insect pest control, vertebrate pest, weed, and disease control, vehicle use, and consultant fees.
It does not include the cost of the management alternative being compared in the scenario, e.g., a specific pesticide.
"Harvest Costs" include shaking, raking, sweeping, pickup and haul, hull and shell, bin distribution, hand picking, and field sorting, depending on the crop type
"Processing Costs" include cooling, sorting, packing, and storing. These costs apply to apples only
"Advisory Board Assessment" is a mandatory fee assessed on each ton harvested. Not all crops are assessed an advisory board fee.
"Interest on Operating Capital" is based on cash operating costs and is calculated monthly until harvest at a yearly rate that varies by crop
"Cash Overhead" are expenses assigned to the whole farm, including office expense, liability insurance, sanitation fees, property taxes, insurance, and equipment repairs
"Non-Cash Overhead" includes buildings, fuel tanks, shop and hand tools, irrigation pump, filter, and sprinklers, land, and orchard establishment costs.
e) Includes cost of removing mummies for control of Naval Oranage Worm in almonds ($70 per acre)

"Gross Revenues" is the price paid per ton, times the number of tons typically harvested per acre. Tons per acre and price per ton for each crop is identified in (5), above
"Returns to Land, Management, and Overhead" is the difference between Gross Revenues and Total Costs per acre.

**CITATIONS**

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Ferriera, Bill. Apricot Producers Association. Personal Communication. Telephone Call. May 20, 2003. 209/524-0801.

University of California Cooperative Extension (UCCE). 2002a. Sample Costs to Establish an Almond Orchard and Produce Almonds. San Joaquin Valley North. Flood Irrigation.

UCCE. 2002b. Sample Costs to Establish an Almond Orchard and Produce Almonds. San Joaquin Valley North. Micro-sprinkler Irrigation.

UCCE. 2001a. Sample Costs to Establish an Apple Orchard and Produce Apples. Granny Smith Variety. San Joaquin Valley-North. Micro-sprinkler Irrigation.

UCCE. 2001b. Sample Costs to Establish a Prune Orchard and Produce Prunes (Dried Plums). Sacramento Valley. French Variety & Low-Volume Irrigation

UCCE. 1998. Sample Costs to Establish a Cling Peach Orchard and Produce Cling Peaches. Sacramento and San Joaquin Valleys. Flood Irrigation.

UCCE. 1991. Apricot Establishment and Production Costs for the Northern San Joaquin Valley - 1991.

Note: UCCE 2001b was used instead of an older cost study for dried plums in the San Joaquin Valley because the data in UCCE 2001b are more recent

UCCE 1998 was used instead of a more recent cost study for fresh market peaches in the San Joaquin Valley because canning (cling) peaches represent a larger part of the acreage.

| | | | | | |
|---|---|---|---|---|---|
| **Alternative #1 SJR Main Stem estimates** | | | | | |
| **Estimated Water Quality Monitoring Cost** | | | **Planning Cost** | | |
| | | | | Person-Months to prepare | |
| Number of Sites | 6 | | Monitoring Plan & QAPP | 3 | |
| Number of Sampling Days (assumes 12 days each - dormant and irrigation season samplng) | 24 | | Implementation Plan | 3 | |
| % QA/QC Samples | 30% | | Annual Monitoring Report | 3 | |
| Cost per Sample | $200 | | Annual Implementation Plan Report | 3 | |
| Total analytical costs | $37,440 | | Monitoring Program Coordination | 4 | |
| Number of Person-days for sample collection. Assumes 2 person crew can cover 6 sites. | 96 | | Implementation Plan Coordination - Basin-wide | 12 | |
| Sample collection preparation as a percent of Person-days for sampling. | 25% | | Cost per person-month for professional services | $10,000 | |
| Total Person-days for Sample Collection & Preparation | 120 | | Total planning cost | $280,000 | |
| Cost per Person-day | $150 | | | | |
| Sampling personnel cost | $18,000 | | | | |
| Travel Costs (400 mi per trip from Sacramento)/ $0.35 per mile. | $ 3,360 | | | | |
| Equipment/Supplies | $20,000 | | | | |
| Flow estimates ($100 /site) | $300 | | | | |
| Total Sampling Cost | $75,740 | | | | |
| | | | | | |
| | | | | | |
| **Effectiveness Evaluation** | | | **Total annual cost for basin-wide monitoring, planning, and evaluation** | | |
| Cost per project | $400,000 | | | | |
| Number of projects per year | 0.5 | | Total Cost | $580,740 | |
| Annual surveys of grower implementation | $25,000 | | Total Number of Orchard Growers | 1000 | |
| | | | Cost per Grower | $580.74 | |
| Total effectiveness evaluation cost | $225,000 | | | | |
| | | | | | |

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|---|---|---|---|---|---|
| **Alternative 2 - Individual Discharger Estimates working under waiver** | | | | | |
| **Estimated Water Quality Monitoring Cost** | | | **Planning Cost** | | |
| | | | | Person-Hours to prepare | |
| Number of Sites | 1 | | Monitoring Plan & QAPP | 2 | |
| Number of Sampling Days (assumes 12 days each dormant and irrigation season samplng) | 24 | | Implementation Plan | 4 | |
| % QA/QC Samples | 30% | | Annual Monitoring Report | 1 | |
| Cost per Sample | $200 | | Annual Implementation Plan Report | 2 | |
| Total analytical costs | $6,240 | | Monitoring Program Coordination | 0 | |
| Number of Person-days for sample collection. Assumes 1 person crew. | 24 | | Implementation Plan Coordination - Basin-wide | 0 | |
| Sample collection preparation as a percent of Person-days for sampling. | 25% | | Cost per person-hours for grower to perform | $40 | |
| Total Person-days for Sample Collection & Preparation | 30 | | Total planning cost | $360 | |
| Cost per Person-day (assume grower collects) | $0 | | | | |
| Sampling personnel cost | $0 | | | | |
| Travel Costs (50 mi per trip/ $0.35 per mile. | $ 420 | | | | |
| Equipment/Supplies (Gloves $20 + $20/sample bottle) | $644 | | | | |
| Flow Estimate ($100/site) | $100 | | | | |
| Total Sampling Cost per site | $6,984 | | | | |
| Total number of sites | 1000 | | | | |
| Total cost for 1000 sites | $6,984,000 | | | | |
| | | | | | |
| **Effectiveness Evaluation** | | | **Total annual cost for basin-wide monitoring, planning, and evaluation** | | |
| Annual farm evaluation | $2,000 | | | | |
| Assume - farm evaluation is idependent review of farm operations and w.q. data. | | | Cost per Grower | $9,344 | |
| | | | Total Number of Growers | 1000 | |
| | | | Basin-wide Cost | $9,344,000 | |
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| Assume - Regional Board or some other entity prepares standard forms to fill out for monitoring and implementation plan | | | | | |
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| **Dormant Season costs** | | | | **Irrigation season costs** | | |
| | | | | | | |
| **Almonds** | | **COST** | | **Almonds** | | **COST** |
| Minimum cost increase | 11 | 764500 | | Minimum cost increase | 90 | 6255000 |
| Maximum cost increase | 163 | 11328500 | | Maximum cost increase | 118 | 8201000 |
| Total acres using d &/or c | 69,500 | | | Total acres using d &/or c | 69,500 | |
| | | | | | | |
| | | | | | | |
| **Peach** | | | | **Alfalfa** | | |
| Minimum cost increase/decrease | -14 | -23520 | | Minimum cost increase | 75 | 937500 |
| Maximum cost increase | 161 | 270480 | | Maximum cost increase | 115 | 1437500 |
| Total acres using d &/or c | 1680 | | | Total acres using d &/or c | 12,500 | |
| | | | | | | |
| | | | | | | |
| **Apple** | | | | | | |
| Minimum cost increase/decrease | -19 | -19000 | | | | |
| Maximum cost increase | 159 | 159000 | | | | |
| Total acres using d &/or c | 1000 | | | | | |
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| **Dormant cost range** | | | | **Irrigation cost range** | | |
| Minimum | 721980 | | | Minimum | 7192500 | |
| Maximum | 11757980 | | | Maximum | 9638500 | |
| | | | | | | |
| **Monitoring cost range** | | | | **Total cost range** | | |
| Minimum | 600,000 | | | Minimum | 8,514,480 | |
| Maximum | 9,500,000 | | | Maximum | 30,896,480 | |