



APPENDIX A

Hydrology & Operation Plans

Appendix A-1, Table 2
VAMP DAILY OPERATION PLAN, MARCH 12, 2003 (B) • HIGH

Target Flow Period: April 15–May 15 • Flow Target: 3,200 cfs

| San Joaquin River near Vernalis | | | | | Merced River at Cressey | | | | | Tuolumne River at LaGrange | | | | Stanislaus River below Goodwin | | | | Maintain Priority Flow Level M=Merced T=Tuol... | |
|---------------------------------|------------------|-------------------|-----------------------|-----------|---------------------------------|-----------------------------|---------------|-----------------------|-----------------------------|----------------------------|--------------------|-------------------------------------|------------------|--------------------------------|---------------|------------------|-------------------|---|-----------------------|
| Existing Flow | VAMP Suppl. Flow | Other Suppl. Flow | Cum. VAMP Suppl. Flow | VAMP Flow | SJR above Merced R. (2-day lag) | Ungaged Flow above Vernalis | Existing Flow | MeID VAMP Suppl. Flow | Exch Contr VAMP Suppl. Flow | VAMP Flow (3-day lag) | Desired FERC Pulse | Existing Flow – Adjusted FERC Pulse | VAMP Suppl. Flow | VAMP Flow (2-day lag) | Existing Flow | VAMP Suppl. Flow | Other Suppl. Flow | | VAMP Flow (2-day lag) |
| (cfs) | (cfs) | (cfs) | (TAF) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | |
| | | | | | 600 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 01 |
| | | | | | 595 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 02 |
| | | | | | 590 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 03 |
| 2,341 | | | | 2,341 | 585 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 04 |
| 2,336 | | | | 2,336 | 580 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 05 |
| 2,331 | | | | 2,331 | 575 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 06 |
| 2,326 | | | | 2,326 | 570 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 07 |
| 2,321 | | | | 2,321 | 565 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 08 |
| 2,316 | | | | 2,316 | 560 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 09 |
| 2,311 | | | | 2,311 | 555 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 746 | | | 746 | Apr 10 |
| 2,306 | | | | 2,306 | 550 | 600 | 250 | 100 | | 350 | 150 | 150 | | 150 | 746 | | | 746 | Apr 11 |
| 2,301 | | | | 2,301 | 545 | 600 | 250 | 300 | 0 | 550 | 302 | 302 | | 302 | 746 | | | 746 | Apr 12 |
| 2,296 | 0 | | | 2,296 | 540 | 600 | 250 | 300 | 0 | 550 | 628 | 660 | 0 | 660 | 746 | 0 | 0 | 746 | Apr 13 |
| 2,443 | 100 | | | 2,543 | 535 | 600 | 250 | 220 | 0 | 470 | 628 | 660 | 0 | 660 | 746 | 0 | 0 | 746 | Apr 14 |
| 2,796 | 300 | 0 | 0.60 | 3,096 | 531 | 600 | 250 | 160 | 0 | 410 | 606 | 660 | 0 | 660 | 936 | 0 | 0 | 936 | Apr 15 |
| 2,791 | 300 | 0 | 1.19 | 3,091 | 526 | 600 | 250 | 160 | 0 | 410 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 16 |
| 2,977 | 220 | 0 | 1.63 | 3,197 | 522 | 600 | 250 | 160 | 0 | 410 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 17 |
| 3,042 | 160 | 0 | 1.94 | 3,202 | 517 | 600 | 250 | 160 | 0 | 410 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 18 |
| 3,038 | 160 | 0 | 2.26 | 3,198 | 513 | 600 | 250 | 160 | 0 | 410 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 19 |
| 3,033 | 160 | 0 | 2.58 | 3,193 | 508 | 600 | 250 | 160 | 0 | 410 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 20 |
| 3,029 | 160 | 0 | 2.90 | 3,189 | 504 | 600 | 250 | 160 | 0 | 410 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 21 |
| 3,024 | 160 | 0 | 3.21 | 3,184 | 499 | 600 | 250 | 160 | 0 | 410 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 22 |
| 3,020 | 160 | 0 | 3.53 | 3,180 | 495 | 600 | 250 | 0 | 0 | 250 | 693 | 730 | 0 | 730 | 936 | 0 | 0 | 936 | Apr 23 |
| 3,015 | 160 | 0 | 3.85 | 3,175 | 490 | 600 | 250 | 0 | 0 | 250 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | Apr 24 |
| 3,011 | 160 | 0 | 4.17 | 3,171 | 486 | 600 | 250 | 0 | 0 | 250 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | Apr 25 |
| 3,276 | 0 | 0 | 4.17 | 3,276 | 481 | 600 | 250 | 0 | 0 | 250 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | Apr 26 |
| 3,272 | 0 | 0 | 4.17 | 3,272 | 477 | 600 | 250 | 0 | 0 | 250 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | Apr 27 |
| 3,267 | 0 | 0 | 4.17 | 3,267 | 472 | 600 | 250 | 0 | 0 | 250 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | Apr 28 |
| 3,263 | 0 | 0 | 4.17 | 3,263 | 467 | 600 | 250 | 0 | 0 | 250 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | Apr 29 |
| 3,258 | 0 | 0 | 4.17 | 3,258 | 463 | 600 | 250 | 0 | 0 | 250 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | Apr 30 |
| 3,253 | 0 | 0 | 4.17 | 3,253 | 458 | 600 | 250 | 160 | 0 | 410 | 1,127 | 1,000 | 0 | 1,000 | 936 | 0 | 0 | 936 | May 01 |
| 3,249 | 0 | 0 | 4.17 | 3,249 | 454 | 600 | 250 | 400 | 0 | 650 | 775 | 800 | 0 | 800 | 936 | 0 | 0 | 936 | May 02 |
| 3,244 | 0 | 0 | 4.17 | 3,244 | 449 | 600 | 250 | 400 | 0 | 650 | 519 | 570 | 0 | 570 | 936 | 0 | 0 | 936 | May 03 |
| 3,040 | 160 | 0 | 4.48 | 3,200 | 445 | 600 | 250 | 400 | 0 | 650 | 519 | 570 | 0 | 570 | 936 | 0 | 0 | 936 | May 04 |
| 2,805 | 400 | 0 | 5.28 | 3,205 | 440 | 600 | 250 | 400 | 0 | 650 | 519 | 570 | 0 | 570 | 936 | 0 | 0 | 936 | May 05 |
| 2,801 | 400 | 0 | 6.07 | 3,201 | 436 | 600 | 250 | 400 | 0 | 650 | 519 | 570 | 0 | 570 | 936 | 0 | 0 | 936 | May 06 |
| 2,796 | 400 | 0 | 6.86 | 3,196 | 431 | 600 | 250 | 400 | 0 | 650 | 519 | 570 | 0 | 570 | 936 | 0 | 0 | 936 | May 07 |
| 2,792 | 400 | 0 | 7.66 | 3,192 | 427 | 600 | 250 | 450 | 0 | 700 | 519 | 570 | 0 | 570 | 936 | 0 | 0 | 936 | May 08 |
| 2,787 | 400 | 0 | 8.45 | 3,187 | 422 | 600 | 250 | 450 | 0 | 700 | 497 | 530 | 0 | 530 | 936 | 0 | 0 | 936 | May 09 |
| 2,783 | 400 | 0 | 9.24 | 3,183 | 418 | 600 | 250 | 450 | 0 | 700 | 497 | 530 | 0 | 530 | 936 | 0 | 0 | 936 | May 10 |
| 2,738 | 450 | 0 | 10.14 | 3,188 | 413 | 600 | 250 | 450 | 0 | 700 | 476 | 530 | 0 | 530 | 936 | 0 | 0 | 936 | May 11 |
| 2,734 | 450 | 0 | 11.03 | 3,184 | 409 | 600 | 250 | 430 | 0 | 680 | 476 | 530 | 0 | 530 | 936 | 0 | 0 | 936 | May 12 |
| 2,729 | 450 | 0 | 11.92 | 3,179 | 404 | 600 | 250 | 100 | | 350 | 476 | 530 | 0 | 530 | 936 | 0 | 0 | 936 | May 13 |
| 2,725 | 450 | 0 | 12.81 | 3,175 | 400 | 600 | 250 | | | 250 | 389 | 389 | | 389 | 936 | | | 936 | May 14 |
| 2,720 | 430 | 0 | 13.67 | 3,150 | 395 | 600 | 250 | | | 250 | 302 | 302 | | 302 | 936 | | | 936 | May 15 |
| 2,574 | 100 | | | 2,674 | 391 | 600 | 250 | | | 250 | 215 | 215 | | 215 | 707 | | | 707 | May 16 |
| 2,483 | 0 | | | 2,483 | 386 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 17 |
| 2,163 | 0 | | | 2,163 | 382 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 18 |
| 2,093 | 0 | | | 2,093 | 377 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 19 |
| 2,089 | 0 | | | 2,089 | 373 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 20 |
| 2,084 | 0 | | | 2,084 | 368 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 21 |
| 2,080 | 0 | | | 2,080 | 364 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 22 |
| 2,075 | 0 | | | 2,075 | 359 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 23 |
| 2,071 | 0 | | | 2,071 | 355 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 24 |
| 2,066 | 0 | | | 2,066 | 350 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 25 |
| 2,062 | 0 | | | 2,062 | 346 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 26 |
| 2,057 | 0 | | | 2,057 | 341 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 27 |
| 2,053 | 0 | | | 2,053 | 337 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 28 |
| 2,048 | 0 | | | 2,048 | 332 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 29 |
| 2,044 | 0 | | | 2,044 | 328 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 30 |
| 2,039 | 0 | | | 2,039 | 323 | 600 | 250 | | | 250 | 150 | 150 | | 150 | 707 | | | 707 | May 31 |
| VAMP period | | | | | | | | | | | | | | | | | | | |
| 2,978 | 222 | | | 3,200 | 472 | 600 | 250 | 222 | 0 | 472 | 733 | 732 | 0 | 732 | 924 | 0 | 0 | 924 | Avg (cfs): |
| | 13.67 | | | | | | | 13.67 | 0.00 | | | | 0.00 | | | 0.00 | | | Suppl. Water (TAF) |

Target flow period

Period of desired flow stability

Appendix A–2, Table 1
2003 VERNALIS ADAPTIVE MANAGEMENT PLAN (VAMP)

Final Accounting of Supplemental Water Contributions

Target Flow Period: April 15–May 15 • Target Flow: 3,200 cfs

| | Merced R. at Cressey (3 Day Travel Time to Vernalis) | | | Tuolumne R. below LaGrange Dam (2 Day Travel Time to Vernalis) | | | Stanislaus R. below Goodwin Dam (2 Day Travel Time to Vernalis) | | | SJRECWA (3 Day) | San Joaquin River at Vernalis | | |
|--|---|---------------|-------------------|---|---------------|-------------------|--|---------------|-------------------|--------------------|-------------------------------|---------------|-------------------|
| | Existing Flow | Observed Flow | VAMP Suppl. Water | Existing Flow | Observed Flow | VAMP Suppl. Water | Existing Flow | Observed Flow | VAMP Suppl. Water | VAMP Suppl. Water | Existing Flow | Observed Flow | VAMP Suppl. Water |
| | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) | (cfs) |
| Apr 01 | 228 | 228 | | 181 | 181 | | 606 | 606 | | | 1,950 | 1,950 | |
| Apr 02 | 232 | 232 | | 182 | 182 | | 604 | 604 | | | 2,010 | 2,010 | |
| Apr 03 | 253 | 253 | | 180 | 180 | | 650 | 650 | | | 2,050 | 2,050 | |
| Apr 04 | 252 | 252 | | 181 | 181 | | 709 | 709 | | | 2,030 | 2,030 | |
| Apr 05 | 259 | 259 | | 182 | 182 | | 709 | 709 | | | 2,080 | 2,080 | |
| Apr 06 | 257 | 257 | | 181 | 181 | | 700 | 700 | | | 2,010 | 2,010 | |
| Apr 07 | 253 | 253 | | 184 | 184 | | 757 | 757 | | | 2,050 | 2,050 | |
| Apr 08 | 250 | 250 | | 182 | 182 | | 801 | 801 | | | 1,970 | 1,970 | |
| Apr 09 | 254 | 254 | | 183 | 183 | | 801 | 801 | | | 1,920 | 1,920 | |
| Apr 10 | 261 | 261 | | 182 | 182 | | 802 | 802 | | | 1,850 | 1,850 | |
| Apr 11 | 250 | 386 | | 303 | 303 | | 808 | 808 | | | 1,880 | 1,880 | |
| Apr 12 | 250 | 649 | 399 | 472 | 472 | | 805 | 805 | 0 | | 1,980 | 1,980 | |
| Apr 13 | 250 | 681 | 431 | 700 | 891 | 191 | 500 | 732 | 232 | 0 | 2,260 | 2,260 | |
| Apr 14 | 250 | 701 | 451 | 1,000 | 1,300 | 300 | 500 | 647 | 147 | 0 | 2,610 | 2,610 | |
| Apr 15 | 250 | 688 | 438 | 1,000 | 1,310 | 310 | 500 | 649 | 149 | 0 | 2,017 | 2,839 | 822 |
| Apr 16 | 250 | 719 | 469 | 1,000 | 1,310 | 310 | 500 | 649 | 149 | 0 | 2,132 | 3,010 | 878 |
| Apr 17 | 250 | 702 | 452 | 1,000 | 1,310 | 310 | 500 | 649 | 149 | 0 | 2,190 | 3,100 | 910 |
| Apr 18 | 250 | 693 | 443 | 1,000 | 1,330 | 330 | 500 | 649 | 149 | 0 | 2,283 | 3,180 | 897 |
| Apr 19 | 250 | 678 | 428 | 1,000 | 1,330 | 330 | 500 | 649 | 149 | 0 | 2,272 | 3,200 | 928 |
| Apr 20 | 250 | 658 | 408 | 1,000 | 1,340 | 340 | 500 | 652 | 152 | 0 | 2,439 | 3,370 | 931 |
| Apr 21 | 250 | 637 | 387 | 1,000 | 1,330 | 330 | 500 | 652 | 152 | 0 | 2,578 | 3,500 | 922 |
| Apr 22 | 250 | 559 | 309 | 1,000 | 1,270 | 270 | 500 | 652 | 152 | 0 | 2,490 | 3,410 | 920 |
| Apr 23 | 250 | 502 | 252 | 780 | 1,030 | 250 | 500 | 781 | 281 | 0 | 2,420 | 3,310 | 890 |
| Apr 24 | 250 | 495 | 245 | 580 | 818 | 238 | 900 | 1,221 | 321 | 0 | 2,241 | 3,050 | 809 |
| Apr 25 | 250 | 519 | 269 | 430 | 602 | 172 | 1,250 | 1,512 | 262 | 0 | 2,230 | 3,070 | 840 |
| Apr 26 | 250 | 527 | 277 | 430 | 574 | 144 | 1,250 | 1,501 | 251 | 0 | 2,389 | 3,200 | 811 |
| Apr 27 | 250 | 527 | 277 | 430 | 573 | 143 | 1,250 | 1,503 | 253 | 0 | 2,561 | 3,240 | 679 |
| Apr 28 | 250 | 547 | 297 | 430 | 575 | 145 | 1,250 | 1,506 | 256 | 0 | 2,656 | 3,320 | 664 |
| Apr 29 | 250 | 536 | 286 | 430 | 551 | 121 | 1,250 | 1,503 | 253 | 0 | 2,747 | 3,420 | 673 |
| Apr 30 | 250 | 549 | 299 | 430 | 522 | 92 | 1,250 | 1,502 | 252 | 0 | 2,642 | 3,320 | 678 |
| May 01 | 250 | 598 | 348 | 430 | 524 | 94 | 1,250 | 1,502 | 252 | 0 | 2,609 | 3,280 | 671 |
| May 02 | 250 | 846 | 596 | 430 | 525 | 95 | 1,250 | 1,506 | 256 | 0 | 2,630 | 3,260 | 630 |
| May 03 | 250 | 1,190 | 940 | 430 | 525 | 95 | 1,100 | 1,268 | 168 | 0 | 2,685 | 3,330 | 645 |
| May 04 | 250 | 1,490 | 1,240 | 430 | 524 | 94 | 813 | 950 | 137 | 0 | 2,790 | 3,489 | 699 |
| May 05 | 250 | 1,490 | 1,240 | 430 | 524 | 94 | 550 | 598 | 48 | 0 | 2,600 | 3,459 | 859 |
| May 06 | 250 | 1,500 | 1,250 | 570 | 589 | 19 | 550 | 600 | 50 | 0 | 2,149 | 3,320 | 1,171 |
| May 07 | 250 | 1,530 | 1,280 | 570 | 585 | 15 | 550 | 604 | 54 | 0 | 1,828 | 3,210 | 1,382 |
| May 08 | 250 | 1,520 | 1,270 | 570 | 583 | 13 | 550 | 600 | 50 | 0 | 1,941 | 3,250 | 1,309 |
| May 09 | 250 | 1,520 | 1,270 | 570 | 574 | 4 | 550 | 607 | 57 | 0 | 1,981 | 3,300 | 1,319 |
| May 10 | 250 | 1,520 | 1,270 | 570 | 577 | 7 | 550 | 603 | 53 | 0 | 1,947 | 3,290 | 1,343 |
| May 11 | 250 | 1,420 | 1,170 | 570 | 579 | 9 | 550 | 603 | 53 | 0 | 2,059 | 3,390 | 1,331 |
| May 12 | 250 | 847 | 597 | 530 | 542 | 12 | 550 | 603 | 53 | 0 | 2,070 | 3,400 | 1,330 |
| May 13 | 250 | 524 | | 460 | 488 | 28 | 550 | 691 | 141 | | 1,898 | 3,230 | 1,332 |
| May 14 | 250 | 407 | | 407 | 407 | | 741 | 741 | | | 1,645 | 2,880 | 1,235 |
| May 15 | 250 | 315 | | 353 | 353 | | 733 | 733 | | | 1,884 | 2,650 | 766 |
| May 16 | 254 | 292 | | 306 | 306 | | 751 | 751 | | | 2,216 | 2,490 | |
| May 17 | 249 | 249 | | 228 | 228 | | 914 | 914 | | | 2,183 | 2,340 | |
| May 18 | 257 | 257 | | 185 | 185 | | 1,004 | 1,004 | | | 2,225 | 2,290 | |
| May 19 | 252 | 252 | | 184 | 184 | | 998 | 998 | | | 2,332 | 2,370 | |
| May 20 | 235 | 235 | | 348 | 348 | | 1,004 | 1,004 | | | 2,250 | 2,250 | |
| May 21 | 236 | 236 | | 563 | 563 | | 772 | 772 | | | 2,110 | 2,110 | |
| May 22 | 233 | 233 | | 565 | 565 | | 599 | 599 | | | 2,120 | 2,120 | |
| May 23 | 227 | 227 | | 569 | 569 | | 603 | 603 | | | 2,070 | 2,070 | |
| May 24 | 196 | 196 | | 567 | 567 | | 606 | 606 | | | 2,060 | 2,060 | |
| May 25 | 228 | 228 | | 568 | 568 | | 605 | 605 | | | 2,080 | 2,080 | |
| May 26 | 230 | 230 | | 568 | 568 | | 604 | 604 | | | 2,150 | 2,150 | |
| May 27 | 243 | 243 | | 569 | 569 | | 740 | 740 | | | 2,050 | 2,050 | |
| May 28 | 215 | 215 | | 566 | 566 | | 976 | 976 | | | 1,950 | 1,950 | |
| May 29 | 196 | 196 | | 512 | 512 | | 1,046 | 1,046 | | | 2,039 | 2,039 | |
| May 30 | 188 | 188 | | 323 | 323 | | 1,051 | 1,051 | | | 2,160 | 2,160 | |
| May 31 | 189 | 189 | | 266 | 266 | | 1,051 | 1,051 | | | 2,190 | 2,190 | |
| Total Supplemental Water (acre-feet): | | | 38,257 | | | 9,729 | | | 10,078 | 0 | | | 58,065 |
| Target Flow Period Average | | | | | | | | | | | 2,290 | 3,235 | |

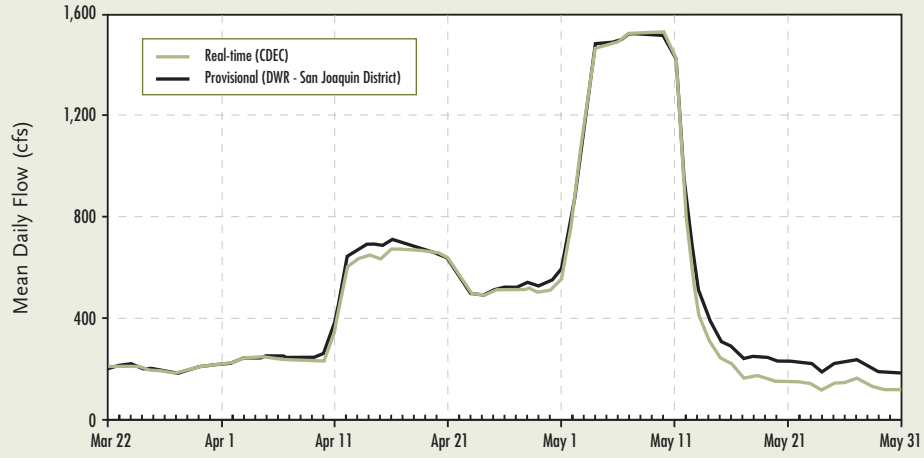
Observed Flow Sources (best available data as of July 31, 2003):

Merced River at Cressey (CA DWR B05155): California DWR, San Joaquin District • Tuolumne River below LaGrange Dam near LaGrange (USGS 11289650):

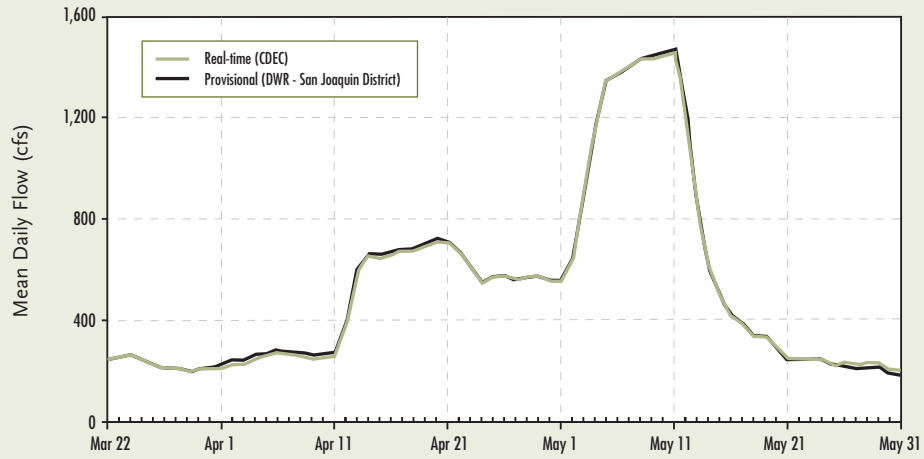
USGS Stanislaus River below Goodwin Dam: USBR, Goodwin Reservoir Daily Operations Report –OID/SSJID/Tri-Dams • San Joaquin River near Vernalis (USGS 11303500): USGS

A-3. COMPARISON OF “REAL-TIME” AND PROVISIONAL FLOWS

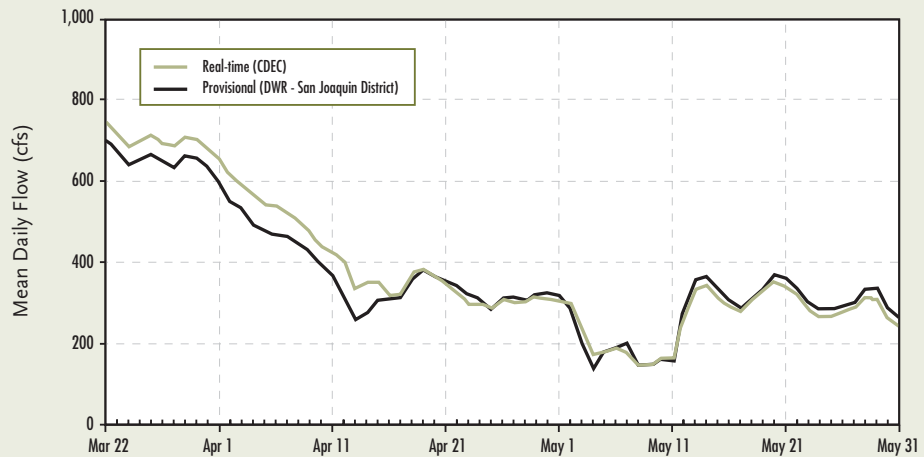
Merced River Near Cressey



Merced River Near Stevinson

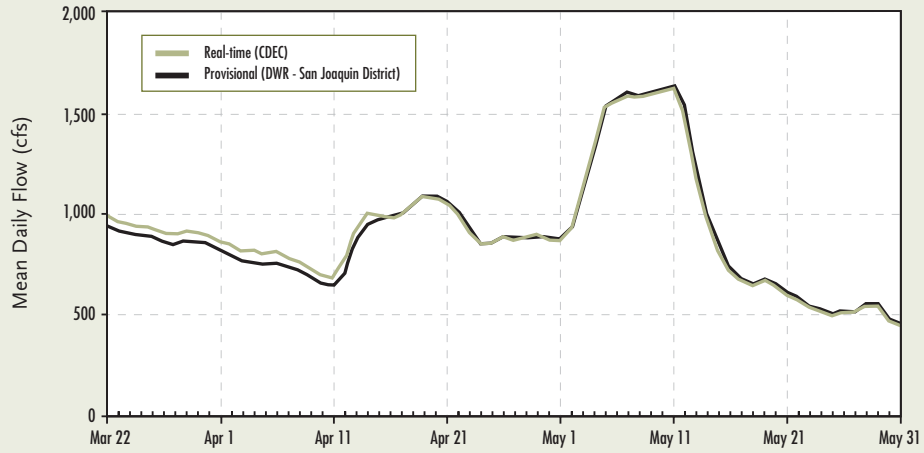


San Joaquin River Above Merced River

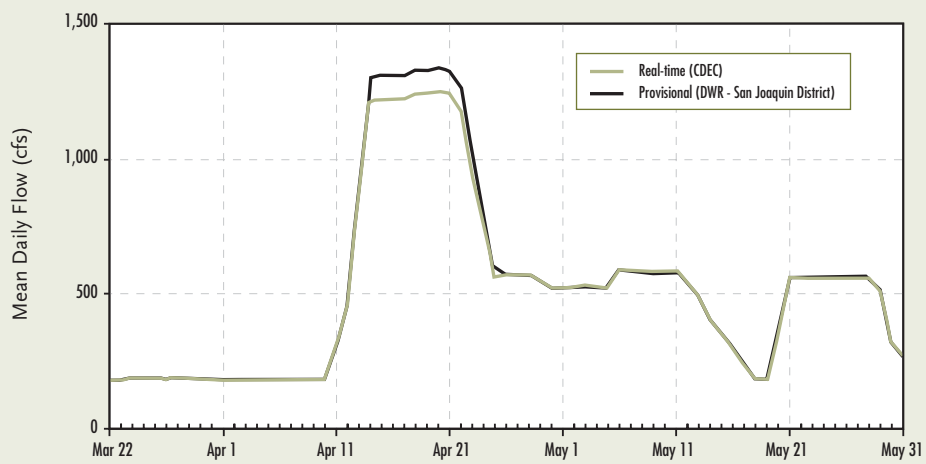


A-3. COMPARISON OF "REAL-TIME" AND PROVISIONAL FLOWS

San Joaquin River near Newman

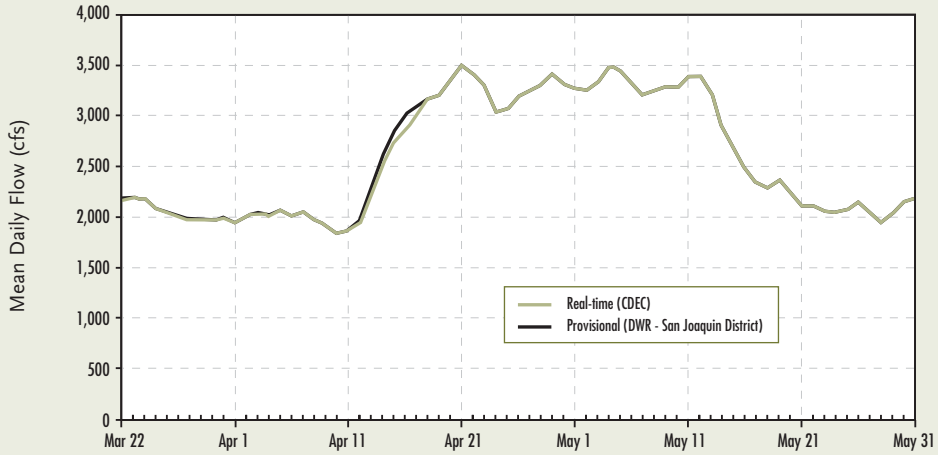


Tuolumne River below LaGrange Dam

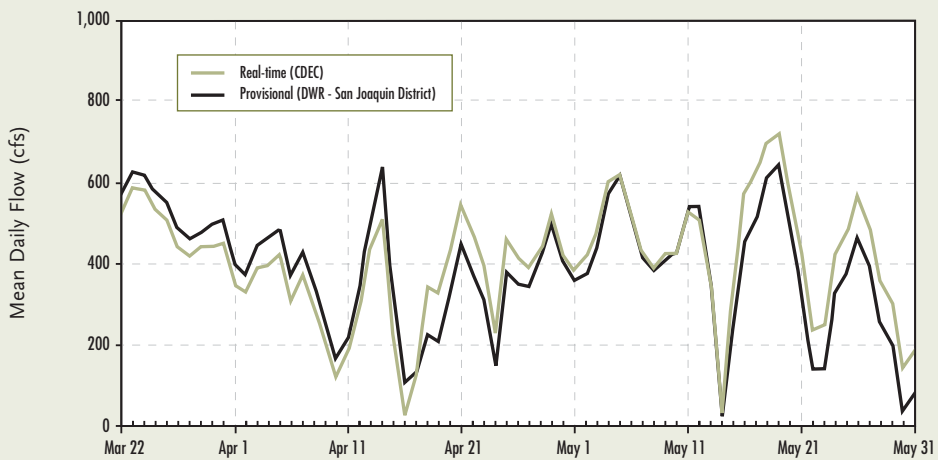


A-3. COMPARISON OF "REAL-TIME" AND PROVISIONAL FLOWS

San Joaquin River near Vernalis



Ungaged Flow in San Joaquin near Vernalis



Appendix A-4
FLOW IN SAN JOAQUIN RIVER AND OLD RIVER NEAR HORB

All values in cfs

| | San Joaquin River near Vernalis (1) | Old River at Head (2) | San Joaquin River below Old River (3) | Through HORB Culverts (4) | Estimated HORB Seepage (5) |
|--------|-------------------------------------|-----------------------|---------------------------------------|---------------------------|----------------------------|
| Mar 01 | 2,020 | 1,081 | 939 | | |
| Mar 02 | 2,050 | 1,032 | 1,018 | | |
| Mar 03 | 2,120 | 1,102 | 1,018 | | |
| Mar 04 | 2,130 | 1,005 | 1,125 | | |
| Mar 05 | 2,050 | 1,007 | 1,043 | | |
| Mar 06 | 2,070 | 974 | 1,096 | | |
| Mar 07 | 2,130 | 1,046 | 1,084 | | |
| Mar 08 | 2,210 | 938 | 1,272 | | |
| Mar 09 | 2,240 | 916 | 1,324 | | |
| Mar 10 | 2,260 | 945 | 1,315 | | |
| Mar 11 | 2,200 | 969 | 1,231 | | |
| Mar 12 | 2,200 | 1,016 | 1,184 | | |
| Mar 13 | 2,280 | 1,101 | 1,179 | | |
| Mar 14 | 2,270 | 1,070 | 1,200 | | |
| Mar 15 | 2,470 | 1,179 | 1,291 | | |
| Mar 16 | 2,620 | 1,224 | 1,396 | | |
| Mar 17 | 2,540 | 1,292 | 1,248 | | |
| Mar 18 | 2,500 | 1,302 | 1,198 | | |
| Mar 19 | 2,420 | 1,138 | 1,282 | | |
| Mar 20 | 2,320 | 1,095 | 1,225 | | |
| Mar 21 | 2,230 | 1,037 | 1,193 | | |
| Mar 22 | 2,180 | 1,011 | 1,169 | | |
| Mar 23 | 2,200 | 992 | 1,208 | | |
| Mar 24 | 2,180 | 1,032 | 1,148 | | |
| Mar 25 | 2,100 | 973 | 1,127 | | |
| Mar 26 | 2,060 | 1,020 | 1,040 | | |
| Mar 27 | 2,010 | 1,135 | 875 | | |
| Mar 28 | 1,980 | 1,039 | 941 | | |
| Mar 29 | 1,980 | 879 | 1,101 | | |
| Mar 30 | 1,970 | 953 | 1,017 | | |
| Mar 31 | 2,000 | 932 | 1,068 | | |
| Apr 01 | 1,950 | 1,017 | 933 | | |
| Apr 02 | 2,010 | 820 | 1,190 | | |
| Apr 03 | 2,050 | 846 | 1,204 | | |
| Apr 04 | 2,030 | 838 | 1,192 | | |
| Apr 05 | 2,080 | 862 | 1,218 | | |
| Apr 06 | 2,010 | 832 | 1,178 | | |
| Apr 07 | 2,050 | 709 | 1,341 | | |
| Apr 08 | 1,970 | 649 | 1,321 | | |
| Apr 09 | 1,920 | 507 | 1,413 | | |
| Apr 10 | 1,850 | 617 | 1,233 | | |
| Apr 11 | 1,880 | 368 | 1,512 | | |
| Apr 12 | 1,970 | 262 | 1,708 | | |
| Apr 13 | 2,260 | 379 | 1,881 | | |
| Apr 14 | 2,600 | 415 | 2,185 | 138 | 277 |
| Apr 15 | 2,839 | 354 | 2,485 | 153 | 201 |
| Apr 16 | 3,000 | 388 | 2,612 | 186 | 202 |
| Apr 17 | 3,090 | 467 | 2,623 | 198 | 269 |
| Apr 18 | 3,160 | 427 | 2,733 | 195 | 232 |
| Apr 19 | 3,180 | 469 | 2,711 | 192 | 277 |
| Apr 20 | 3,350 | 459 | 2,891 | 186 | 273 |
| Apr 21 | 3,469 | 409 | 3,060 | 174 | 235 |
| Apr 22 | 3,390 | 280 | 3,110 | 180 | 100 |
| Apr 23 | 3,300 | 291 | 3,009 | 180 | 111 |
| Apr 24 | 3,050 | 207 | 2,843 | 168 | 39 |
| Apr 25 | 3,070 | 179 | 2,891 | 177 | 2 |
| Apr 26 | 3,200 | 270 | 2,930 | 177 | 93 |
| Apr 27 | 3,240 | 284 | 2,956 | 177 | 107 |
| Apr 28 | 3,320 | 218 | 3,102 | 165 | 53 |
| Apr 29 | 3,420 | 285 | 3,135 | 171 | 114 |
| Apr 30 | 3,320 | 322 | 2,998 | 174 | 148 |

| | San Joaquin River near Vernalis (1) | Old River at Head (2) | San Joaquin River below Old River (3) | Through HORB Culverts (4) | Estimated HORB Seepage (5) | |
|--|-------------------------------------|-----------------------|---------------------------------------|---------------------------|----------------------------|--------|
| | 3,280 | 258 | 3,022 | 168 | 90 | May 01 |
| | 3,260 | 189 | 3,071 | 168 | 21 | May 02 |
| | 3,330 | 192 | 3,138 | 162 | 30 | May 03 |
| | 3,489 | 326 | 3,163 | 168 | 158 | May 04 |
| | 3,459 | 341 | 3,118 | 177 | 164 | May 05 |
| | 3,320 | 354 | 2,966 | 168 | 186 | May 06 |
| | 3,210 | 325 | 2,885 | 159 | 166 | May 07 |
| | 3,240 | 388 | 2,852 | 156 | 232 | May 08 |
| | 3,290 | 360 | 2,930 | 171 | 189 | May 09 |
| | 3,270 | 334 | 2,936 | 171 | 163 | May 10 |
| | 3,370 | 305 | 3,065 | 171 | 134 | May 11 |
| | 3,360 | 316 | 3,044 | 171 | 145 | May 12 |
| | 3,190 | 359 | 2,831 | 171 | 188 | May 13 |
| | 2,829 | 434 | 2,395 | 162 | 272 | May 14 |
| | 2,600 | 389 | 2,211 | 159 | 230 | May 15 |
| | 2,430 | 372 | 2,058 | 153 | 219 | May 16 |
| | 2,270 | 385 | 1,885 | | | May 17 |
| | 2,210 | 373 | 1,837 | | | May 18 |
| | 2,290 | 661 | 1,629 | | | May 19 |
| | 2,160 | 462 | 1,698 | | | May 20 |
| | 2,020 | 432 | 1,588 | | | May 21 |
| | 2,010 | 500 | 1,510 | | | May 22 |
| | 1,960 | 603 | 1,357 | | | May 23 |
| | 1,940 | 721 | 1,219 | | | May 24 |
| | 1,950 | 756 | 1,194 | | | May 25 |
| | 2,020 | 675 | 1,345 | | | May 26 |
| | 1,900 | 613 | 1,287 | | | May 27 |
| | 1,810 | 663 | 1,147 | | | May 28 |
| | 1,890 | 822 | 1,068 | | | May 29 |
| | 2,000 | 945 | 1,055 | | | May 30 |
| | 2,020 | 906 | 1,114 | | | May 31 |
| | 2,000 | 881 | 1,119 | | | Jun 01 |
| | 1,980 | 858 | 1,122 | | | Jun 02 |
| | 1,920 | 957 | 963 | | | Jun 03 |
| | 1,840 | 1,048 | 792 | | | Jun 04 |
| | 1,870 | 999 | 871 | | | Jun 05 |
| | 1,920 | 1,025 | 895 | | | Jun 06 |
| | 2,070 | 1,067 | 1,003 | | | Jun 07 |
| | 2,150 | 1,026 | 1,124 | | | Jun 08 |
| | 2,200 | 1,086 | 1,114 | | | Jun 09 |
| | 2,130 | 956 | 1,174 | | | Jun 10 |
| | 2,080 | 742 | 1,338 | | | Jun 11 |
| | 1,990 | 554 | 1,436 | | | Jun 12 |
| | 1,980 | 678 | 1,302 | | | Jun 13 |
| | 2,010 | 650 | 1,360 | | | Jun 14 |
| | 2,150 | 620 | 1,530 | | | Jun 15 |
| | 2,200 | 663 | 1,537 | | | Jun 16 |
| | 2,150 | 683 | 1,467 | | | Jun 17 |
| | 2,120 | 738 | 1,382 | | | Jun 18 |
| | 2,030 | 622 | 1,408 | | | Jun 19 |
| | 1,970 | 635 | 1,335 | | | Jun 20 |
| | 1,960 | 545 | 1,415 | | | Jun 21 |
| | 2,000 | 473 | 1,527 | | | Jun 22 |
| | 2,020 | 515 | 1,505 | | | Jun 23 |
| | 2,020 | 501 | 1,519 | | | Jun 24 |
| | 1,990 | 507 | 1,483 | | | Jun 25 |
| | 1,980 | 529 | 1,451 | | | Jun 26 |
| | 2,039 | 599 | 1,440 | | | Jun 27 |
| | 2,050 | 604 | 1,446 | | | Jun 28 |
| | 2,090 | 649 | 1,441 | | | Jun 29 |
| | 2,100 | 652 | 1,448 | | | Jun 30 |

VAMP target flow period highlighted

- (1) USGS provisional data as of 11/6/2003
- (2) DWR Acoustic Doppler Current Meter located 840 ft. downstream of HORB
- (3) (1)-(2)
- (4) Three times the measured flow in HORB Culvert #4
- (5) (2)-(4)