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Supporting Information for

**Development of Reservoir Operation Functions in SWAT+ for National Environmental Assessments**

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**Introduction** Details of selected reservoirs used in the study. Sim\_ave and Sim\_high are simulated mean and high outflows. Obs\_ave and Obs\_high are observed mean and high outflows (flow unit: ha-m).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number | Name | State | Latitude | Longitude | Sim\_ave | Obs\_ave | Sim\_high | Obs\_high |
| 1 | Wilson | AL | 34.8 | 87.63 | 19 | 21 | 466 | 416 |
| 2 | Beaver | AR | 36.42 | 93.85 | 302 | 328 | 10290 | 16411 |
| 3 | Bull shoals | AR | 36.37 | 92.58 | 1380 | 1513 | 15147 | 14358 |
| 4 | Norfork | AR | 36.03 | 92.24 | 468 | 470 | 12345 | 13725 |
| 5 | Greers Ferry | AR | 35.52 | 91.99 | 404 | 394 | 1178 | 2623 |
| 6 | Broken Bow | AR | 34.18 | 94.69 | 289 | 283 | 1540 | 2314 |
| 7 | Powell | AZ | 36.94 | 111.48 | 3303 | 3280 | 5349 | 22658 |
| 8 | Mohave | AZ | 35.44 | 114.64 | 3247 | 3251 | 3900 | 10792 |
| 9 | Oroville | CA | 39.54 | 121.49 | 1255 | 1290 | 2103 | 31891 |
| 10 | Don Pedro | CA | 37.71 | 120.4 | 452 | 496 | 1284 | 2874 |
| 11 | Blue Mesa | CO | 38.45 | 107.33 | 315 | 316 | 674 | 2044 |
| 12 | Coralville | IA | 41.72 | 91.53 | 642 | 642 | 1042 | 9656 |
| 13 | Red | IA | 41.37 | 92.98 | 2024 | 2068 | 8777 | 24420 |
| 14 | Rathbun | IA | 40.85 | 92.92 | 102 | 103 | 740 | 736 |
| 15 | Saylorville | IA | 41.73 | 93.7 | 854 | 877 | 7772 | 10766 |
| 16 | Jackson | ID | 43.9 | 110.67 | 237 | 331 | 1186 | 2686 |
| 17 | Minidoka | ID | 42.67 | 113.48 | 1528 | 1530 | 2293 | 10448 |
| 18 | Cascade | ID | 44.52 | 116.05 | 230 | 227 | 1631 | 1696 |
| 19 | Palisdes | ID | 43.33 | 111.2 | 1547 | 1540 | 3009 | 9861 |
| 20 | Lovewell | KS | 39.9 | 98.06 | 192 | 192 | 288 | 1413 |
| 21 | Perry | KS | 39.18 | 95.45 | 166 | 157 | 2359 | 3298 |
| 22 | Eldorado | KS | 37.85 | 96.82 | 22 | 30 | 314 | 1022 |
| 23 | Marion | KS | 38.37 | 97.09 | 15 | 14 | 175 | 542 |
| 24 | Clinton | KS | 38.92 | 95.33 | 52 | 53 | 409 | 981 |
| 25 | Tuttle Creek | KS | 39.26 | 96.59 | 551 | 564 | 12704 | 14681 |
| 26 | Cheney | KS | 37.76 | 97.84 | 26 | 25 | 459 | 392 |
| 27 | Milford | KS | 39.08 | 96.9 | 181 | 186 | 6662 | 8319 |
| 28 | John Redmond | KS | 38.23 | 95.78 | 340 | 368 | 5907 | 5305 |
| 29 | Elk City | KS | 37.28 | 95.79 | 119 | 123 | 4900 | 5889 |
| 30 | Toronto | KS | 37.74 | 95.93 | 112 | 126 | 4988 | 5109 |
| 31 | Kanopolis | KS | 38.63 | 98 | 46 | 47 | 1925 | 1590 |
| 32 | Big Hill | KS | 37.27 | 95.47 | 6 | 6 | 244 | 240 |
| 33 | Kentucky | KY | 37.01 | 88.27 | 14980 | 14995 | 19690 | 107319 |
| 34 | Martins Fork | KY | 36.75 | 83.26 | 22 | 22 | 200 | 303 |
| 35 | Smithville | MO | 39.42 | 94.53 | 33 | 32 | 377 | 489 |
| 36 | Stockon | MO | 37.64 | 93.77 | 262 | 257 | 1161 | 1569 |
| 37 | Pommedeterre | MO | 37.9 | 93.32 | 142 | 140 | 462 | 979 |
| 38 | Tablerock | MO | 36.57 | 93.3 | 966 | 1021 | 17006 | 16880 |
| 39 | Truman | MO | 38.26 | 93.4 | 2353 | 2340 | 18164 | 17403 |
| 40 | Canyon Ferry | MT | 46.65 | 111.73 | 1271 | 1270 | 1696 | 6293 |
| 41 | Sherburne | MT | 38.83 | 113.52 | 49 | 49 | 86 | 573 |
| 42 | Tiber | MT | 48.32 | 111.1 | 189 | 195 | 822 | 2520 |
| 43 | Clark Canyon | MT | 45 | 112.86 | 842 | 842 | 1625 | 5383 |
| 44 | Bighorn | MT | 45.31 | 107.96 | 801 | 790 | 6005 | 6049 |
| 45 | Nelson | MT | 48.53 | 107.52 | 78 | 78 | 242 | 699 |
| 46 | Gibson | MT | 47.6 | 112.76 | 2097 | 2177 | 18076 | 31000 |
| 47 | Garrison | ND | 47.5 | 101.41 | 5361 | 5306 | 21874 | 36832 |
| 48 | Navajo | NM | 36.8 | 107.61 | 261 | 260 | 419 | 1603 |
| 49 | Elephant Butte | NM | 33.15 | 107.19 | 363 | 338 | 761 | 1670 |
| 50 | Mead | NV | 36.25 | 114.39 | 3330 | 3288 | 4502 | 12430 |
| 51 | Canton | OK | 36.12 | 98.6 | 35 | 32 | 213 | 251 |
| 52 | Meredith | OK | 35.71 | 101.55 | 2131 | 2177 | 11764 | 31000 |
| 53 | Arcadia | OK | 35.64 | 97.36 | 10 | 10 | 107 | 357 |
| 54 | Foss | OK | 35.57 | 99.22 | 14 | 14 | 136 | 193 |
| 55 | Pine Creek | OK | 34.11 | 95.08 | 209 | 212 | 2808 | 1670 |
| 56 | Fort Cobb | OK | 35.2 | 98.48 | 8 | 8 | 150 | 250 |
| 57 | Millwood | OK | 33.75 | 94.02 | 1349 | 1379 | 7750 | 14565 |
| 58 | Skiatook | OK | 36.35 | 96.09 | 34 | 46 | 298 | 866 |
| 59 | Thunderbird | OK | 35.22 | 97.22 | 13 | 11 | 197 | 329 |
| 60 | Hugo | OK | 34.01 | 95.38 | 472 | 483 | 3384 | 4848 |
| 61 | McGee | OK | 34.36 | 95.89 | 37 | 36 | 263 | 955 |
| 62 | birch | OK | 36.53 | 96.16 | 8 | 8 | 75 | 264 |
| 63 | Arbuckle | OK | 34.43 | 97.03 | 14 | 13 | 184 | 450 |
| 64 | Sardis | OK | 34.66 | 95.38 | 68 | 65 | 444 | 972 |
| 65 | Hudson | OK | 36.23 | 95.18 | 1812 | 2081 | 23200 | 37019 |
| 66 | Wister | OK | 34.94 | 94.73 | 274 | 266 | 3178 | 3369 |
| 67 | Fall River | OK | 37.65 | 96.06 | 93 | 102 | 1463 | 1138 |
| 68 | Tenkiller Ferry | OK | 35.66 | 94.99 | 368 | 365 | 4172 | 3763 |
| 69 | Kaw | OK | 36.77 | 96.83 | 867 | 857 | 9135 | 12825 |
| 70 | Waurika | OK | 34.28 | 98.08 | 20 | 21 | 804 | 1514 |
| 71 | Tom Steed | OK | 34.76 | 98.99 | 1 | 1 | 46 | 104 |
| 72 | Texoma | OK | 33.83 | 96.57 | 981 | 997 | 9958 | 12299 |
| 73 | Atlus | OK | 34.93 | 99.3 | 10 | 10 | 585 | 1284 |
| 74 | Oologah | OK | 36.55 | 95.6 | 725 | 725 | 7853 | 7559 |
| 75 | Eufaula | OK | 35.31 | 95.36 | 1148 | 1207 | 10096 | 12313 |
| 76 | Haula | OK | 36.94 | 96.09 | 112 | 129 | 3806 | 7492 |
| 77 | Keystone | OK | 36.23 | 96.31 | 2105 | 2109 | 20347 | 28626 |
| 78 | Lake Copan | OK | 36.88 | 95.97 | 84 | 86 | 1110 | 2352 |
| 79 | Heyburn | OK | 35.95 | 96.3 | 15 | 16 | 1003 | 497 |
| 80 | Great Salt Plains | OK | 36.74 | 98.19 | 166 | 162 | 3202 | 3040 |
| 81 | Fall Creek | OR | 43.94 | 122.76 | 137 | 140 | 245 | 1101 |
| 82 | Lost Creek | OR | 42.68 | 122.65 | 452 | 445 | 908 | 3915 |
| 83 | Green Peter | OR | 44.45 | 122.55 | 386 | 392 | 2383 | 3225 |
| 84 | Gavins Point | SD | 42.85 | 97.48 | 6671 | 6789 | 12901 | 39307 |
| 85 | Ohae | SD | 44.45 | 100.4 | 5952 | 5933 | 38614 | 39209 |
| 86 | Fort Randall | SD | 43.07 | 98.55 | 6114 | 6156 | 41402 | 39136 |
| 87 | Watts Bar | TN | 35.62 | 84.78 | 6702 | 6702 | 8597 | 50992 |
| 88 | Cherokee | TN | 36.17 | 83.5 | 1083 | 1083 | 1549 | 5203 |
| 89 | Cordell Hull | TN | 36.29 | 85.94 | 3099 | 3098 | 3924 | 27832 |
| 90 | Norris | TN | 36.22 | 84.09 | 997 | 997 | 5128 | 6509 |
| 91 | Pickwick | TN | 35.04 | 88.19 | 12824 | 13416 | 18265 | 135458 |
| 92 | Fontana | TN | 35.45 | 83.8 | 967 | 965 | 2035 | 6492 |
| 93 | Laurel | TN | 36.95 | 84.27 | 98 | 98 | 2922 | 3366 |
| 94 | Dale Hollow | TN | 36.54 | 85.45 | 354 | 350 | 1591 | 2962 |
| 95 | Wolf Creek | TN | 36.87 | 85.15 | 2272 | 2179 | 8638 | 9491 |
| 96 | Percy Priest | TN | 36.16 | 86.62 | 344 | 345 | 3171 | 4976 |
| 97 | Center Hill | TN | 36.1 | 85.83 | 900 | 893 | 5932 | 7188 |
| 98 | Lake Kemp | TX | 33.76 | 99.15 | 22 | 21 | 298 | 553 |
| 99 | Ray Roberts | TX | 33.36 | 97.05 | 49 | 68 | 1584 | 1713 |
| 100 | Proctor | TX | 31.97 | 98.48 | 46 | 42 | 1551 | 5564 |
| 101 | Granger | TX | 30.7 | 97.34 | 57 | 57 | 421 | 1495 |
| 102 | O' the Pines | TX | 31.97 | 98.48 | 139 | 137 | 735 | 770 |
| 103 | Navarro Mills | TX | 31.95 | 96.7 | 36 | 35 | 215 | 527 |
| 104 | Georgetown | TX | 30.67 | 97.72 | 15 | 15 | 170 | 828 |
| 105 | Lewisville | TX | 33.07 | 96.96 | 113 | 146 | 3320 | 4612 |
| 106 | Stillhouse | TX | 31.02 | 97.53 | 63 | 68 | 1556 | 1694 |
| 107 | Sam\_Rayborn | TX | 31.06 | 94.11 | 626 | 638 | 2196 | 4715 |
| 108 | Waco | TX | 31.58 | 97.2 | 107 | 107 | 2492 | 3444 |
| 109 | Benbrook | TX | 32.63 | 97.46 | 25 | 25 | 597 | 1540 |
| 110 | Cooper | TX | 33.34 | 95.63 | 47 | 71 | 693 | 1039 |
| 111 | Belton | TX | 31.11 | 97.47 | 107 | 151 | 2181 | 2321 |
| 112 | Grapevinetx | TX | 32.97 | 97.06 | 54 | 54 | 1521 | 1816 |
| 113 | Aquilla | TX | 31.91 | 97.2 | 54 | 54 | 1928 | 1816 |
| 114 | Somerville | TX | 30.33 | 96.53 | 53 | 67 | 706 | 1348 |
| 115 | whitney | TX | 31.87 | 97.37 | 126 | 128 | 5090 | 5373 |
| 116 | Caddo | TX | 32.71 | 94.01 | 524 | 524 | 3852 | 4271 |
| 117 | Pat Mayse | TX | 33.85 | 95.54 | 21 | 22 | 216 | 231 |
| 118 | Flaming Gorge | UT | 41.16 | 109.55 | 488 | 478 | 3054 | 3010 |
| 119 | Steinaker | UT | 40.52 | 109.53 | 8 | 8 | 30 | 73 |
| 120 | Grand Coulee | WA | 47.96 | 118.98 | 25234 | 25240 | 31155 | 72224 |
| 121 | Seminoe | WY | 42.16 | 106.91 | 328 | 327 | 559 | 3957 |
| 122 | Pathfinder | WY | 42.47 | 106.85 | 349 | 352 | 612 | 2325 |
| 123 | Boysen | WY | 43.42 | 108.18 | 336 | 332 | 3021 | 3476 |

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