Lake Dillon Monitoring Project

2016 Annual Report

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Rpt381

Introduction

This report summarizes the results of water quality monitoring supported by the Summit Water Quality Committee in the calendar year 2016. It provides an overview of the results for the year and gives comparisons with previous years.

Monitoring Plan

Lake Dillon was sampled on 13 dates and the watershed sites were sampled on 17 dates during 2016 (Table 1). Samples were taken throughout the year, but sampling was most frequent for streams during the runoff months and most frequent for lakes during the growing season because of the greater importance of these months to the calculation of loading rates and trophic-status indicators.

|  |  |  |
| --- | --- | --- |
| Lake Dillon |  | Watershed |
| 27-Jan-16 |  | 27-Jan-16 |
| 18-Feb-16 |  | 18-Feb-16 |
| 10-Mar-16 |  | 10-Mar-16 |
| 9-Jun-16 |  | 14-Apr-16 |
| 23-Jun-16 |  | 12-May-16 |
| 14-Jul-16 |  | 26-May-16 |
| 28-Jul-16 |  | 09-Jun-16 |
| 11-Aug-16 |  | 23-Jun-16 |
| 25-Aug-16 |  | 14-Jul-16 |
| 15-Sep-16 |  | 28-Jul-16 |
| 29-Sep-16 |  | 11-Aug-16 |
| 13-Oct-16 |  | 25-Aug-16 |
| 10-Nov-16 |  | 15-Sep-16 |
|  |  | 29-Sep-16 |
|  |  | 13-Oct-16 |
|  |  | 10-Nov-16 |
|  |  | 8-Dec-16 |

Table 1. Summary of sampling dates for 2016.

The Summit Water Quality Committee alternates the emphasis of its monitoring program on Lake Dillon and Green Mountain Reservoir. In years of emphasis on Green Mountain Reservoir, Lake Dillon is monitored only monthly, and for a reduced set of variables and no watershed sampling except for Regulation 85 sampling locations. Year 2016 was a year of focus on Lake Dillon. Therefore, a full set of lake and watershed monitoring was completed for Lake Dillon; Green Mountain Reservoir was not sampled.

Four stations (index station near the dam and one station for each arm of the lake) were sampled on Lake Dillon (Figure 1). At the index station, a complete profile was taken from the top to the bottom of the water column on each of the sampling dates. The three additional stations were sampled at 0-5 m (integrated sample). The watershed sampling sites included the Blue River at its exit point from Lake Dillon, tributaries, and effluents (Figure 1, Table 2).

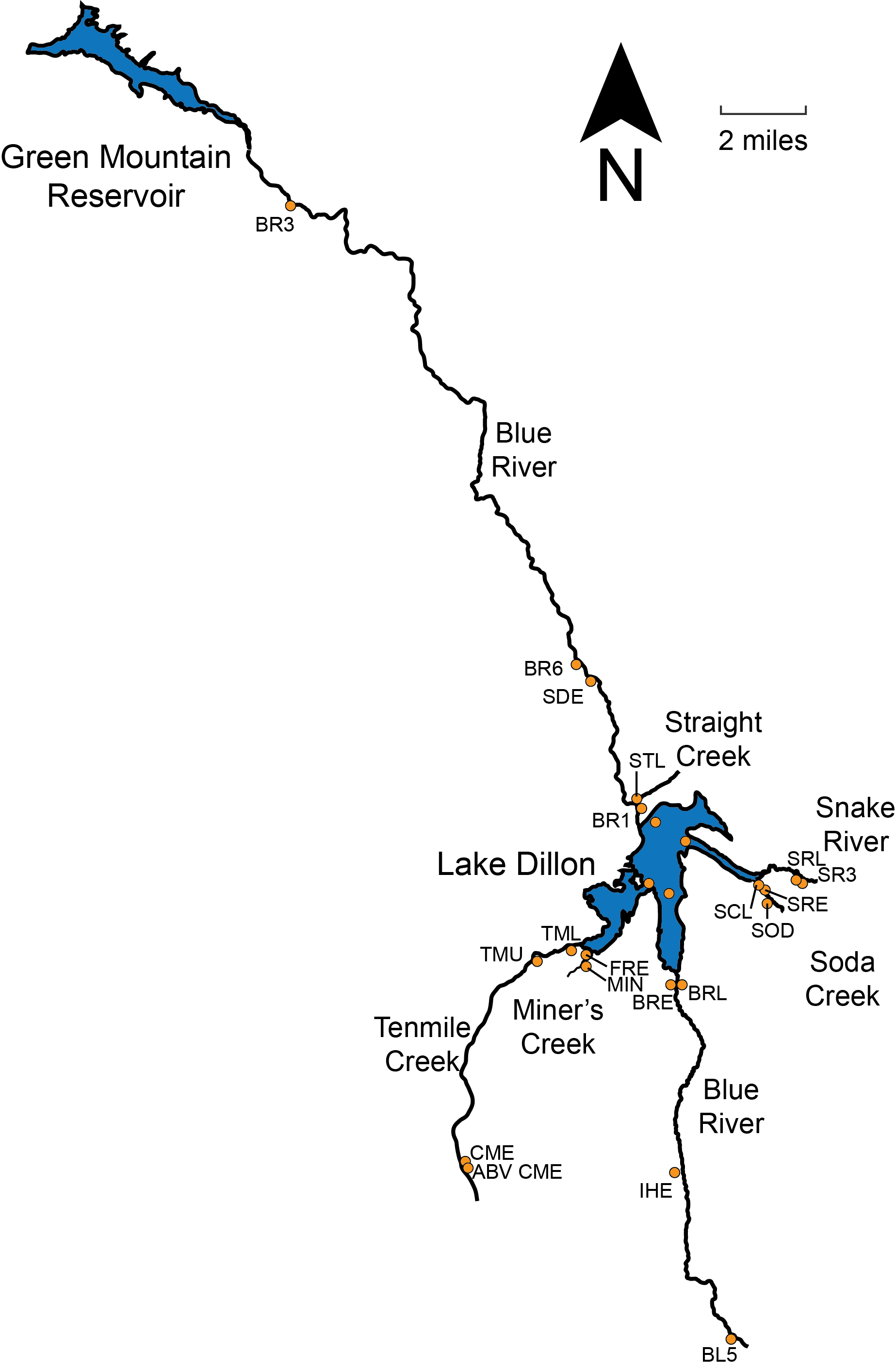


Figure 1. Map of the study area showing sampling stations for 2016. See Table 2 for description of sampling stations.

|  |  |
| --- | --- |
| Code | Description of Site |
| ABV CME | Tenmile Creek upstream of Copper Mountain WWTF |
| BR1 | Blue River below Dillon |
| BR3 | Blue River at inlet to Green Mountain |
| BR6 | Blue River below Silverthorne, above Bushee Creek |
| BRE | Breckenridge WWTP effluent |
| BRL | Blue River near Dillon |
| CME | Copper Mountain WWTP effluent |
| FRE | Frisco WWTP effluent |
| IHE | Iowa Hill WWTF |
| MIN | Miners Creek just above Highway 9 |
| SDE | Silverthorne Dillon WWTP effluent |
| SOD | Soda Creek at mouth near Dillon |
| SRE | Snake River WWTP effluent |
| SRL | Snake River above inlet to Dillon Reservoir |
| STL | Straight Creek at Mouth near Frisco |
| TML | Tenmile Creek at Frisco |
| TMU | Tenmile Creek below North Tenmile Creek, at Frisco |
| DB | Dillon Reservoir at Blue River arm |
| DI | Dillon Reservoir near dam, over deepest water |
| DS | Dillon Reservoir at Snake River arm |
| DT | Dillon Reservoir at Tenmile creek arm |
| SCL | Soda Creek inlet to Dillon Reservoir |
| BL5 | Blue River below Goose Pasture Tarn |
| SR3 | Snake River at USGS gage, below North Fork |

Table 2. Location of watershed sampling stations, 2016.

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Lake Index Station | Other Lake Stations | Stream Stations |
| Temperature | **+** | **+** | **+** |
| Transparency | **+** | **+** | **-** |
| Discharge | **-** | **-** | **+** |
| Conductance | **+** | **+** | **+** |
| Nitrate | **+** | **+** | **+** |
| Soluble Reactive P | **+** | **+** | **+** |
| Total Soluble P | **+** | **+** | **+** |
| Particulate P | **+** | **+** | **+** |
| Total P | **+** | **+** | **+** |
| Total Suspended Solids | **+** | **+** | **+** |
| Chlorophyll *a* | **+** | **+** | **-** |
| Dissolved Oxygen | **+** | **+** | **-** |
| Phytoplankton | **+** | **-** | **-** |

Table 3. Summary of analytical coverage for the three categories of sampling stations.

Methods

Table 3 summarizes the analytical coverage for the lake and watershed sampling programs. The methods used in 2016 were identical to those used in previous years.

Results

*Hydrology*

Water-surface elevations, inflows, and outflows for Lake Dillon are summarized in Tables 4 and 5. Water flowed over the spillway for 37 days (June 19-July 25; Table 6). Operation of Lake Dillon during 2016 resulted in a hydraulic residence time of 1.2 years based on outflow (Table 6).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Month | Mid-month Elevation, Ft | Inflow, AF | Blue River Outflow, AF | Roberts Tunnel Outflow, AF | Total Outflow, AF |
| Jan | 9011 | 5967 | 5568 | 0 | 5633 |
| Feb | 9011 | 5148 | 5421 | 0 | 5421 |
| Mar | 9011 | 5560 | 6256 | 0 | 6256 |
| Apr | 9011 | 10074 | 6637 | 0 | 6637 |
| May | 9012 | 29569 | 33077 | 20 | 33097 |
| Jun | 9016 | 82857 | 60667 | 224 | 60893 |
| Jul | 9017 | 25264 | 19372 | 10417 | 29790 |
| Aug | 9016 | 13601 | 6635 | 13297 | 19933 |
| Sep | 9015 | 8490 | 6320 | 2549 | 8868 |
| Oct | 9014 | 6134 | 3452 | 6363 | 12815 |
| Nov | 9011 | 5247 | 5981 | 5822 | 11940 |
| Dec | 9009 | 5550 | 4639 | 5653 | 10439 |
|  |  |  |  |  |  |
| Total |  | 203461 | 164025 | 44345 | 211722 |
| Monthly Average |  | 16955 | 13669 | 3695 | 17644 |

Table 4. Elevation, computed inflow, and outflow for Lake Dillon (2016).

The water sources for Lake Dillon are shown in Table 7. Stream flows in Table 7 are based on gage data and calculated inflows provided by the Denver Water Department. Measured inflows were adjusted proportionately to match the total inflow reported by the Denver Water Department, with correction for net evaporation. Relative importance of surface inflows has remained comparatively stable across the years. As in previous years, Tenmile Creek and the Blue River constituted about 33% of the total inflow to Lake Dillon. Addition of the Snake River inflows to those of Tenmile Creek and the Blue River accounts for about 86% of the total inflow (Tables 7, 8). Runoff was the 13th highest since monitoring began for the reservoir (1981).

|  |  |  |
| --- | --- | --- |
| Year | Days over Spillway | Rank for Spillway Flow |
| 1981 | 0 | 23 |
| 1982 | 119 | 1 |
| 1983 | 58 | 10 |
| 1984 | 0 | 23 |
| 1985 | 67 | 9 |
| 1986 | 104 | 2 |
| 1987 | 90 | 5 |
| 1988 | 43 | 15 |
| 1989 | 42 | 16 |
| 1990 | 38 | 17 |
| 1991 | 74 | 7 |
| 1992 | 42 | 16 |
| 1993 | 36 | 19 |
| 1994 | 27 | 22 |
| 1995 | 95 | 4 |
| 1996 | 56 | 12 |
| 1997 | 78 | 6 |
| 1998 | 78 | 6 |
| 1999 | 96 | 3 |
| 2000 | 57 | 11 |
| 2001 | 49 | 14 |
| 2002 | 0 | 23 |
| 2003 | 0 | 23 |
| 2004 | 0 | 23 |
| 2005 | 29 | 21 |
| 2006 | 42 | 16 |
| 2007 | 53 | 13 |
| 2008 | 56 | 12 |
| 2009 | 78 | 6 |
| 2010 | 67 | 9 |
| 2011 | 32 | 20 |
| 2012 | 0 | 23 |
| 2013 | 0 | 23 |
| 2014\* | 0 | 23 |
| 2015 | 72 | 8 |
| 2016 | 37 | 18 |

\* Denver Water placed a siphon over the spillway in 2014.

Table 5. Importance of spillway overflow since 1981, Lake Dillon.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Surface  Area, ha | Volume,  106 m3 | Residence Time  (Inflow), y | Residence Time  (Outflow), y |
| 1981 | 993 | 231 | 1.80 | 1.28 |
| 1982 | 1093 | 260 | 0.97 | 1.75 |
| 1983 | 1284 | 310 | 0.89 | 0.87 |
| 1984 | 1239 | 299 | 0.65 | 0.64 |
| 1985 | 1233 | 297 | 1.08 | 1.08 |
| 1986 | 1274 | 307 | 1.01 | 1.05 |
| 1987 | 1275 | 307 | 1.46 | 1.48 |
| 1988 | 1259 | 304 | 1.38 | 1.36 |
| 1989 | 1257 | 303 | 1.38 | 1.34 |
| 1990 | 1246 | 299 | 1.45 | 1.52 |
| 1991 | 1242 | 299 | 1.37 | 1.31 |
| 1992 | 1228 | 295 | 1.41 | 1.33 |
| 1993 | 1191 | 286 | 0.94 | 0.92 |
| 1994 | 1194 | 286 | 1.41 | 1.40 |
| 1995 | 1195 | 285 | 0.66 | 0.71 |
| 1996 | 1241 | 299 | 0.75 | 0.72 |
| 1997 | 1226 | 294 | 0.74 | 0.76 |
| 1998 | 1274 | 307 | 1.41 | 1.41 |
| 1999 | 1246 | 300 | 0.94 | 0.92 |
| 2000 | 1239 | 298 | 1.17 | 1.16 |
| 2001 | 1197 | 287 | 1.20 | 1.08 |
| 2002 | 939 | 219 | 1.86 | 1.06 |
| 2003 | 1019 | 241 | 0.90 | 1.47 |
| 2004 | 1151 | 275 | 1.89 | 1.68 |
| 2005 | 1187 | 284 | 1.43 | 1.68 |
| 2006 | 1252 | 302 | 1.08 | 1.11 |
| 2007 | 1273 | 306 | 1.09 | 1.09 |
| 2008 | 1251 | 297 | 0.98 | 0.95 |
| 2009 | 1249 | 300 | 0.96 | 0.99 |
| 2010 | 1246 | 299 | 1.29 | 1.16 |
| 2011 | 1205 | 289 | 0.67 | 0.71 |
| 2012 | 1161 | 277 | 2.15 | 1.36 |
| 2013 | 1107 | 264 | 1.12 | 1.68 |
| 2014 | 1160 | 297 | 0.80 | 0.82 |
| 2015 | 1275 | 307 | 0.98 | 0.93 |
| 2016 | 1275 | 302 | 1.20 | 1.16 |

Table 6. Summary of hydrologic statistics for Lake Dillon since 1981. Surface area and lake volume are averages based on daily values calculated from lake elevation. Volume is average storage (Denver Water), area is average (Denver Water).

# Temperature and Mixing

Lake Dillon was covered with ice from late December through May. The epilimnion formed in June and was stable into August, after which there was erosion of the thermocline leading to mixing in November (Figure 2).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Drainage | | | | | |  | Effluents | | | | Total | Ground- |  |  |
| Year | SRL | BRL | TML | SOD | MIN | Direct |  | BRE | CME | FRE | SRE | Surface | water | Precip | Total |
| 1981 | 29328327 | 39677841 | 47376146 | 198257 | 1472438 | 3926501 |  | 717420 | 0 | 428146 | 420929 | 123546006 | 8511012 | 3828506 | 135885524 |
| 1982 | 60860052 | 80634847 | 96076936 | 1555494 | 6113325 | 16302199 |  | 933359 | 0 | 477002 | 488660 | 263441873 | 8511012 | 4173013 | 276125897 |
| 1983 |  |  |  |  |  |  |  |  |  |  |  | 342677191 | 8511012 | 6830695 | 358018898 |
| 1984 | 101028008 | 160163650 | 157030476 | 1805363 | 8011691 | 21364509 |  | 1425557 | 392731 | 614477 | 514901 | 451958632 | 8534330 | 5961746 | 466454707 |
| 1985 | 68487871 | 92230292 | 87676302 | 1551256 | 5488819 | 14636851 |  | 1292665 | 272506 | 694760 | 554524 | 272613341 | 8511012 | 4070399 | 285194752 |
| 1986 | 83511798 | 85341059 | 105810380 | 2072459 | 5511297 | 14696793 |  | 1360752 | 303808 | 648154 | 529360 | 299482053 | 8511012 | 4785068 | 312778133 |
| 1987 | 43849675 | 64321309 | 81511109 | 975196 | 4002549 | 10673464 |  | 1406434 | 306672 | 668011 | 516838 | 207924585 | 8511012 | 4166839 | 220602436 |
| 1988 | 45708882 | 77265957 | 78390507 | 978696 | 3484071 | 9290857 |  | 1430352 | 354974 | 696427 | 594432 | 217840182 | 8534330 | 3692354 | 230066866 |
| 1989 | 43627233 | 74089858 | 76520235 | 925666 | 4972160 | 13259092 |  | 1367755 | 283548 | 728784 | 579960 | 216070743 | 8511012 | 4291388 | 228873143 |
| 1990 | 48408694 | 67670408 | 70851055 | 1019142 | 3704947 | 9879859 |  | 1327536 | 359424 | 558792 | 602424 | 204022858 | 8511012 | 4286886 | 216820756 |
| 1991 | 47550133 | 71834653 | 77681076 | 994145 | 3919873 | 10452994 |  | 1463140 | 337565 | 539719 | 580926 | 215016659 | 8511012 | 4218855 | 227746526 |
| 1992 | 48041233 | 69847171 | 71052878 | 1145486 | 3699750 | 9865999 |  | 1508155 | 338731 | 541426 | 756389 | 206458486 | 8534330 | 4007810 | 219000625 |
| 1993 | 71479025 | 88154640 | 109866627 | 1350424 | 7383323 | 19688862 |  | 1736856 | 360936 | 641606 | 680141 | 300981506 | 8511012 | 4312070 | 313804588 |
| 1994 | 46405235 | 64404117 | 72103963 | 701482 | 3945273 | 10520728 |  | 1668290 | 310812 | 591346 | 640776 | 200981210 | 8511012 | 3306522 | 212798745 |
| 1995 | 92857428 | 162219212 | 137022315 | 3064826 | 7587461 | 20233229 |  | 2105098 | 373672 | 695828 | 730638 | 426516034 | 8511012 | 5289313 | 440316359 |
| 1996 |  |  |  |  |  |  |  |  |  |  |  | 394252760 | 8534330 | 5657660 | 408444750 |
| 1997 | 97949888 | 129068344 | 133940486 | 3910300 | 7446596 | 19857588 |  | 2166437 | 431914 | 793454 | 850522 | 395983615 | 8511012 | 4370632 | 408865258 |
| 1998 |  |  |  |  |  |  |  |  |  |  |  | 215526490 | 8511012 | 4085610 | 228123113 |
| 1999 | 91926727 | 106185240 | 98879922 | 1898357 | 3262704 | 8700545 |  | 2335548 | 222316 | 772593 | 757331 | 314718968 | 8511012 | 5217606 | 328447586 |
| 2000 |  |  |  |  |  |  |  |  |  |  |  | 251765583 | 8534330 | 4900202 | 265200115 |
| 2001 | 53193649 | 83887729 | 77630694 | 2094437 | 4572571 | 12193523 |  | 1039555 | 271248 | 855242 | 857323 | 236324724 | 8511012 | 4060080 | 248895816 |
| 2002 |  |  |  |  |  |  |  |  |  |  |  | 113048416 | 8511012 | 2401730 | 123961158 |
| 2003 | 68814611 | 84461898 | 92891568 | 1427571 | 3429462 | 9145232 |  | 1124906 | 398209 | 824460 | 770026 | 262889735 | 8511012 | 4232113 | 275632860 |
| 2004 |  |  |  |  |  |  |  |  |  |  |  | 142409197 | 8534330 | 3473251 | 154416777 |
| 2005 |  |  |  |  |  |  |  | 771038 | 296433 | 893554 | 604420 | 194331337 | 8511012 | 4769161 | 207611510 |
| 2006 | 58961763 | 86918251 | 98309473 | 1660879 | 3964514 | 10572038 |  | 824391 | 414537 | 703004 | 722975 | 277094569 | 7240190 | 5081507 | 289416265 |
| 2007 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2008 | 61442490 | 112563935 | 98160394 | 1801507 | 5421908 | 14458422 |  | 1463622 | 397122 | 791579 | 935819 | 297277763 | 8534330 | 5140342 | 310952436 |
| 2009 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2010 | 48728581 | 83401764 | 77841940 | 1370263 | 3950778 | 10535407 |  | 1067515 | 295786 | 791431 | 578980 | 228469753 | 8511012 | 4352495 | 241333260 |
| 2011 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2012 | 25116624 | 42013367 | 44588424 | 604158 | 2574754 | 6866010 |  | 1629384 | 244763 | 659326 | 580681 | 124819499 | 8534330 | 3803509 | 137157338 |
| 2013 | 38656473 | 56288605 | 44633870 | 2300178 | - | - |  | 1617755 | 252322 | 647651 | 645320 | 230343502 | 8511012 | 5920233 | 244774747 |
| 2014 | 56216145 | 123701937 | 149226013 | 4244760 | 8213819 | 21903517 |  | 2313619 | 365126 | 849312 | 756000 | 367854228 | 8511012 | 5567929 | 381933168 |
| 2015 | 40815906 | 64962789 | 197941047 | 1746903 | - | - |  | 1913078 | 392422 | 982881 | 939875 | 310371938 | 8511012 | 6111893 | 324994843 |
| 2016 | 58033392 | 86639865 | 78521119 | 2004582 | 5185307 | 13827484 |  | 1253961 | 299589 | 790325 | 726172 | 246788629 | 8534330 | 5169515 | 260492474 |

Table 7. Water sources for Lake Dillon, as m3/y. Copper Mountain WWTP is not included in the total because that contribution is recorded at the Tenmile gage; IHE is part of Blue River at mouth. Watershed sites were not monitored in 1983, 1996, 1998, 2000, 2002, 2004, 2005, 2007, 2009, 2011, but were sampled at river mouths in all years after 2012 as a byproduct of Regulation 85 requirements.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Drainage | | | | | |  | Effluents | | |  | Total | Ground- |  |
| Year |  | SRL | BRL | TML | SOD | MIN | Direct |  | BRE | FRE | SRE |  | Surface | water | Precip |
| 1981 |  | 21.6 | 29.2 | 34.9 | 0.1 | 1.1 | 2.9 |  | 0.5 | 0.3 | 0.3 |  | 90.9 | 6.3 | 2.8 |
| 1982 |  | 22.0 | 29.2 | 34.8 | 0.6 | 2.2 | 5.9 |  | 0.3 | 0.2 | 0.2 |  | 95.4 | 3.1 | 1.5 |
| 1983 |  |  |  |  |  |  |  |  |  |  |  |  | 95.7 | 2.4 | 1.9 |
| 1984 |  | 21.7 | 34.3 | 33.7 | 0.4 | 1.7 | 4.6 |  | 0.3 | 0.1 | 0.1 |  | 96.9 | 1.8 | 1.3 |
| 1985 |  | 24.0 | 32.3 | 30.7 | 0.5 | 1.9 | 5.1 |  | 0.5 | 0.2 | 0.2 |  | 95.6 | 3.0 | 1.4 |
| 1986 |  | 26.7 | 27.3 | 33.8 | 0.7 | 1.8 | 4.7 |  | 0.4 | 0.2 | 0.2 |  | 95.7 | 2.7 | 1.5 |
| 1987 |  | 19.9 | 29.2 | 36.9 | 0.4 | 1.8 | 4.8 |  | 0.6 | 0.3 | 0.2 |  | 94.3 | 3.9 | 1.9 |
| 1988 |  | 19.9 | 33.6 | 34.1 | 0.4 | 1.5 | 4.0 |  | 0.6 | 0.3 | 0.3 |  | 94.7 | 3.7 | 1.6 |
| 1989 |  | 19.1 | 32.4 | 33.4 | 0.4 | 2.2 | 5.8 |  | 0.6 | 0.3 | 0.3 |  | 94.4 | 3.7 | 1.9 |
| 1990 |  | 22.3 | 31.2 | 32.7 | 0.5 | 1.7 | 4.6 |  | 0.6 | 0.3 | 0.3 |  | 94.1 | 3.9 | 2.0 |
| 1991 |  | 20.9 | 31.5 | 34.1 | 0.4 | 1.7 | 4.6 |  | 0.6 | 0.2 | 0.3 |  | 94.4 | 3.7 | 1.9 |
| 1992 |  | 21.9 | 31.9 | 32.4 | 0.5 | 1.7 | 4.5 |  | 0.7 | 0.2 | 0.3 |  | 94.3 | 3.9 | 1.8 |
| 1993 |  | 22.8 | 28.1 | 35.0 | 0.4 | 2.4 | 6.3 |  | 0.6 | 0.2 | 0.2 |  | 95.9 | 2.7 | 1.4 |
| 1994 |  | 21.8 | 30.3 | 33.9 | 0.3 | 1.9 | 4.9 |  | 0.8 | 0.3 | 0.3 |  | 94.4 | 4.0 | 1.6 |
| 1995 |  | 21.1 | 36.8 | 31.1 | 0.7 | 1.7 | 4.6 |  | 0.5 | 0.2 | 0.2 |  | 96.9 | 1.9 | 1.2 |
| 1996 |  |  |  |  |  |  |  |  |  |  |  |  | 96.5 | 2.1 | 1.4 |
| 1997 |  | 24.0 | 31.6 | 32.8 | 1.0 | 1.8 | 4.9 |  | 0.5 | 0.2 | 0.2 |  | 96.8 | 2.1 | 1.1 |
| 1998 |  |  |  |  |  |  |  |  |  |  |  |  | 94.5 | 3.7 | 1.8 |
| 1999 |  | 28.0 | 32.3 | 30.1 | 0.6 | 1.0 | 2.6 |  | 0.7 | 0.2 | 0.2 |  | 95.8 | 2.6 | 1.6 |
| 2000 |  |  |  |  |  |  |  |  |  |  |  |  | 94.9 | 3.2 | 1.8 |
| 2001 |  | 21.4 | 33.7 | 31.2 | 0.8 | 1.8 | 4.9 |  | 0.4 | 0.3 | 0.3 |  | 94.9 | 3.4 | 1.6 |
| 2002 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2003 |  | 25.0 | 30.6 | 33.7 | 0.5 | 1.2 | 3.3 |  | 0.4 | 0.3 | 0.3 |  | 95.4 | 3.1 | 1.5 |
| 2004 |  |  |  |  |  |  |  |  |  |  |  |  | 92.2 | 5.5 | 2.2 |
| 2005 |  |  |  |  |  |  |  |  | 0.4 | 0.4 | 0.3 |  | 93.6 | 4.1 | 2.3 |
| 2006 |  | 20.4 | 30.0 | 34.0 | 0.6 | 1.4 | 3.7 |  | 0.3 | 0.2 | 0.2 |  | 95.7 | 2.5 | 1.8 |
| 2007 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2008 |  | 19.8 | 36.2 | 31.6 | 0.6 | 1.7 | 4.6 |  | 0.5 | 0.3 | 0.3 |  | 95.6 | 2.7 | 1.7 |
| 2009 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2010 |  | 20.2 | 34.6 | 32.3 | 0.6 | 1.6 | 4.4 |  | 0.4 | 0.3 | 0.2 |  | 94.7 | 3.5 | 1.8 |
| 2011 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2012 |  | 18.3 | 30.6 | 32.5 | 0.4 | 1.9 | 5.0 |  | 1.2 | 0.5 | 0.4 |  | 91.0 | 6.2 | 2.8 |
| 2013 |  | 15.8 | 23.0 | 18.2 | 0.9 | - | - |  | 0.7 | 0.3 | 0.3 |  | 94.1 | 3.5 | 2.4 |
| 2014 |  | 14.7 | 32.4 | 39.1 | 1.1 | 2.2 | 5.7 |  | 0.6 | 0.2 | 0.2 |  | 96.3 | 2.2 | 1.5 |
| 2015 |  | 12.6 | 20.0 | 60.9 | 0.5 | - | - |  | 0.6 | 0.3 | 0.3 |  | 95.5 | 2.6 | 1.9 |
| 2016 |  | 22.3 | 33.3 | 30.1 | 0.8 | 2.0 | 5.3 |  | 0.5 | 0.3 | 0.3 |  | 94.7 | 3.3 | 2.0 |

Table 8. Water sources for Lake Dillon, as %. Copper Mountain WWTP is not included in the total because that contribution is recorded at the Tenmile gage; Iowa Hill is part of Blue River at mouth. Watershed sites were not monitored in 1983, 1996, 1998, 2000, 2002, 2004, 2005, 2007, 2009, or 2011.

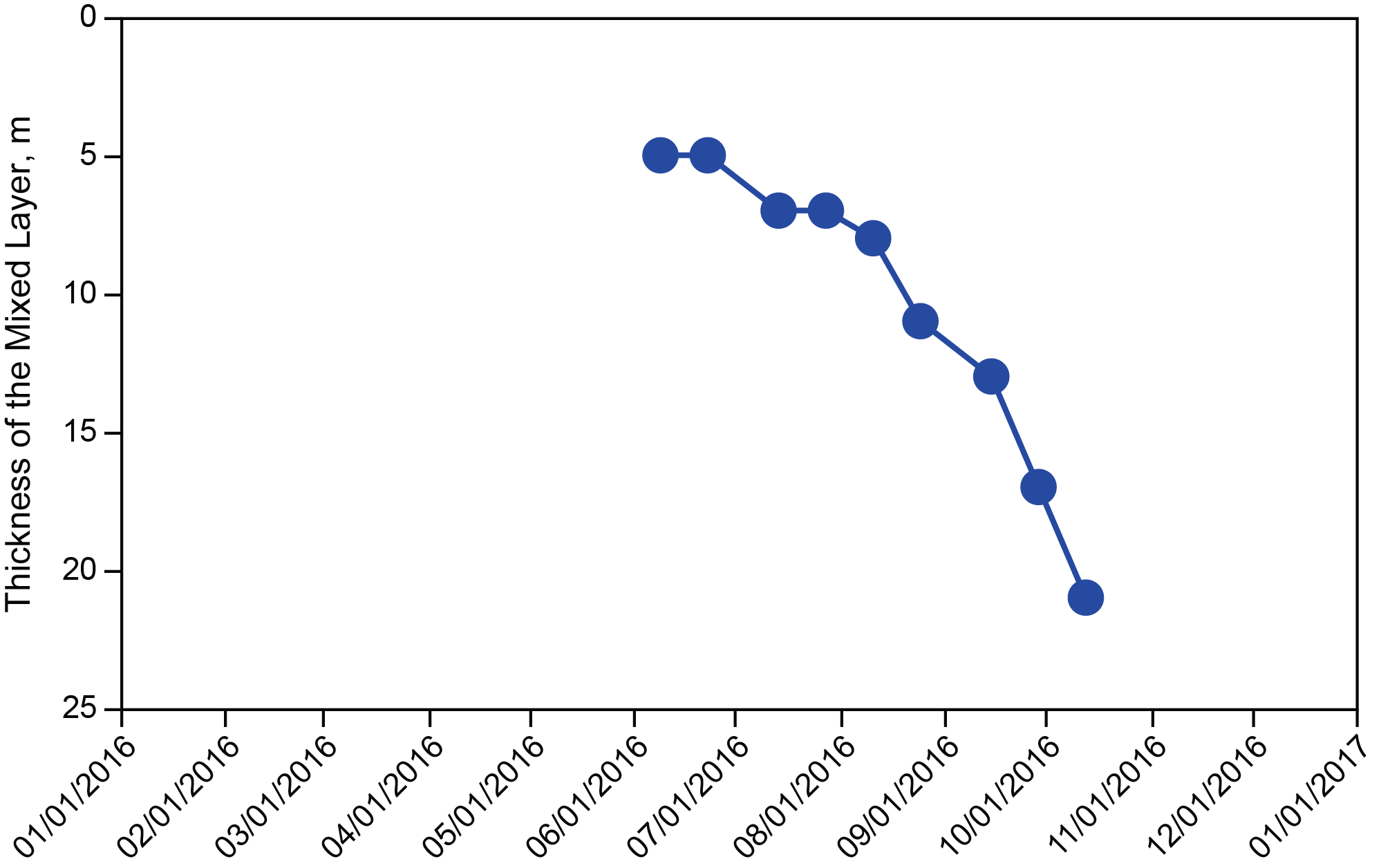


Figure 2. Thickness of the mixed layer, 2016.

# Transparency

Transparency of Lake Dillon was lowest in June (Figure 3), which is often the case because of inorganic turbidity that enters the lake with seasonal runoff, especially in wet years. Transparency increased after June, and reached a growing season maximum of 4.0 m in August. This pattern of change is typical for Lake Dillon.

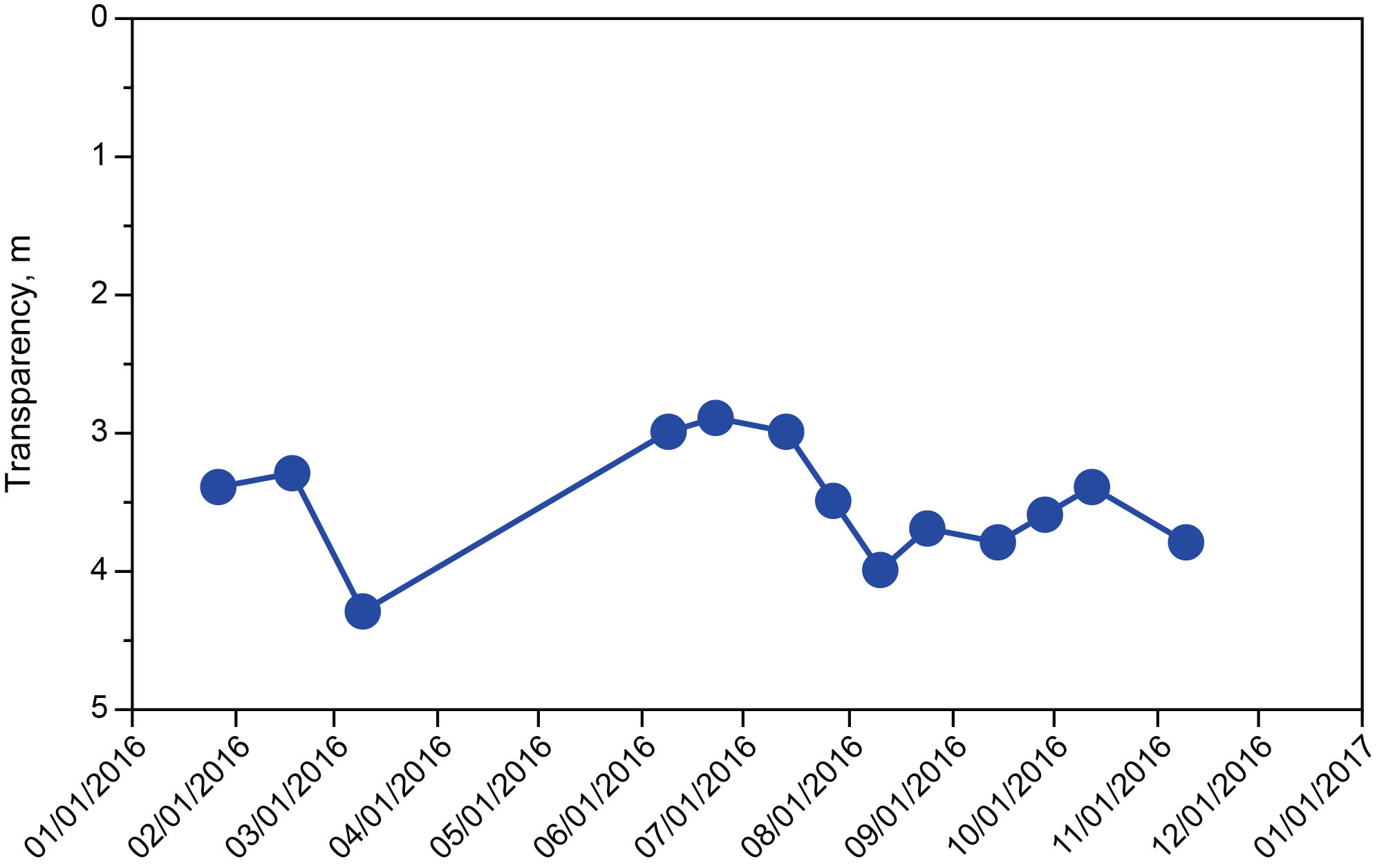


Figure 3. Secchi transparency, 2016.

*Phosphorus in the Lakes*

Lake Dillon showed its highest phosphorus concentration in October (Figure 4), probably because of seasonal mixing (overturn) of the lake which brings deep water, which has more phosphorus than surface water, to the surface.

Between 1 July and 31 October (the growing season), the concentration of total phosphorus in the top 15 m of Lake Dillon was 6.0 µg/L (Table 9), which is near the interannual mean and is well below regulatory limit for Lake Dillon (7.4 µg/L).

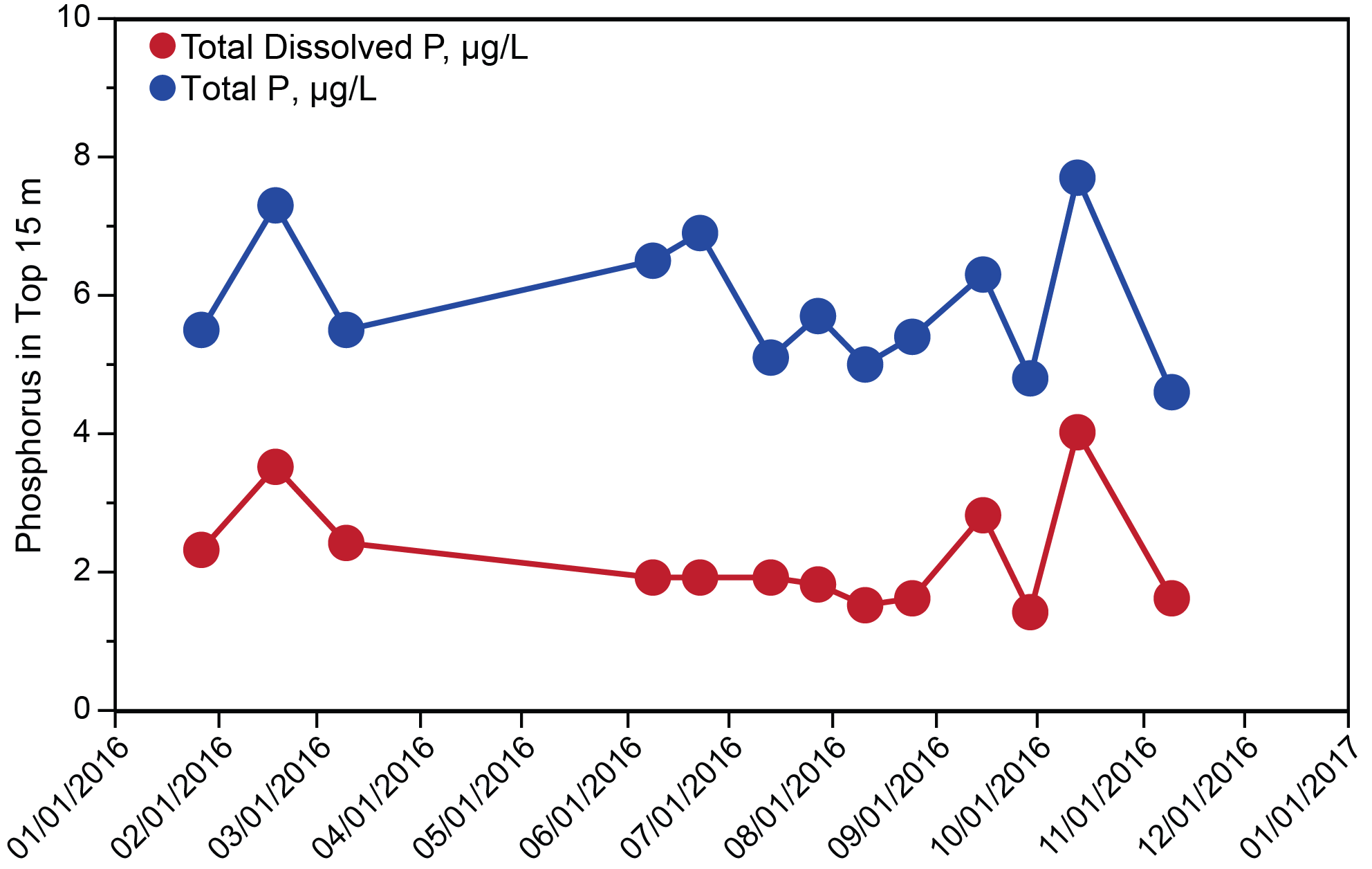


Figure 4. Concentrations of phosphorus, 2016.

# Nitrate

The concentrations of nitrate in Lake Dillon were high during spring (Figure 5), as is typical. Nitrate concentration was drawn down by algae during the growing season but was not completely depleted during 2016 (in some past years nitrate has shown complete depletion). Concentration of nitrate rebounded as soon as the mixed layer began to thicken in September, which brings up nitrate from the hypolimnion.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Total P, Growing Season | Total P in top 15m, µg/L  May-June | Chlorophyll, Growing Season, µg/L | Chlorophyll *a,* µg/L  July-August\*\* | Secchi Depth, m |
| 1981 | 6.8 | 7.7 | 7.5 |  | 2.8 |
| 1982 | 7.8 | 12.7 | 8.1 | 14.4 | 1.9 |
| 1983 |  |  |  |  |  |
| 1984 | 5.9 | 9.2 | 3.8 | 4.8 | 2.9 |
| 1985 | 7.4 | 7.8 | 3.6 | 3.5 | 3.1 |
| 1986 | 6.1 | 6.6 | 3.3 | 2.6 | 3.5 |
| 1987 | 5.4 | 6.2 | 5.5 | 3.8 | 2.9 |
| 1988 | 6.2 | 6.8 | 7.0 | 4.5 | 2.4 |
| 1989 | 5.9 | 5.9 | 4.6 | 3.3 | 2.8 |
| 1990 | 6.2 | 6.6 | 5.2 | 5.8 | 3.1 |
| 1991 | 7.0 | 7.2 | 4.9 | 5.1 | 3.0 |
| 1992 | 6.5 | 6.2 | 5.9 | 5.7 | 3.2 |
| 1993 | 6.1 | 7.3 | 4.9 | 4.2 | 3.3 |
| 1994 | 5.8 | 6.2 | 4.6 | 6.0 | 3.6 |
| 1995 | 6.1 | 9.3 | 5.5 | 5.9 | 2.3 |
| 1996\* | 6.1 | 8.0 | 5.6 | 5.9 |  |
| 1997 | 6.5 | 8.8 | 4.4 | 4.2 | 3.2 |
| 1998\* | 7.0 | 6.0 | 3.5 | 3.0 | 3.6 |
| 1999 | 5.8 | 6.8 | 3.8 | 3.7 | 3.5 |
| 2000\* | 6.2 | 6.4 | 2.9 | 2.7 | 3.9 |
| 2001 | 5.7 | 7.9 | 2.7 | 2.8 | 4.4 |
| 2002\*\* | 8.5 | 6.5 | 6.0 | 6.1 | 2.2 |
| 2003 | 7.0 | 11.3 | 2.5 | 3.3 | 2.8 |
| 2004\*\* | 8.4 | 7.9 | 2.1 | 3.3\*\*\* | 4.0 |
| 2005 | 5.5 | 6.7 | 5.8 | 4.3 | 3.4 |
| 2006 | 5.3 | 6.0 | 2.3 | 2.1 | 3.6 |
| 2007\*\* | 5.4 | 6.4 | 2.9 | 2.9 | 3.9 |
| 2008 | 5.4 | 5.7 | 3.8 | 3.4 | 3.3 |
| 2009\*\* | 4.9 | 6.4 | 3.0 | 3.0 | 3.6 |
| 2010 | 5.2 | 6.8 | 3.4 | 2.9 | 3.9 |
| 2011\*\* | 6.3 | 11.1 | 3.8 | 3.8 | 3.4 |
| 2012 | 6.8 | 8.1 | 3.6 | 3.5 | 4.3 |
| 2013\*\* | 6.1 | 12.1 | 1.7 | 2.1 | 5.1 |
| 2014 | 6.3 | 8.9 | 3.5 | 4.2 | 3.1 |
| 2015\*\* | 6.1 | 6.9 | 2.8 | 2.5 | 2.8 |
| 2016 | 6.0 | 6.7 | 3.4 | 3.5 | 3.6 |
|  |  |  |  |  |  |
| Mean | 6.3 | 7.6 | 4.2 | 4.2 | 3.3 |

\* Chlorophyll concentration applies to the part of the growing season in which the mixed layer is stable and

relatively thin (July-August, 0-5 m), but excluding dates showing nitrate depletion.

\*\* Years with greater uncertainty due to reduced sampling frequency (6/y instead of 15/y). Growing season =

July – October.

\*\*\* Substituted 5 meter chlorophyll value for surface value to complete calculation.

Table 9. Interyear comparisons for trophic status indicators, Lake Dillon.

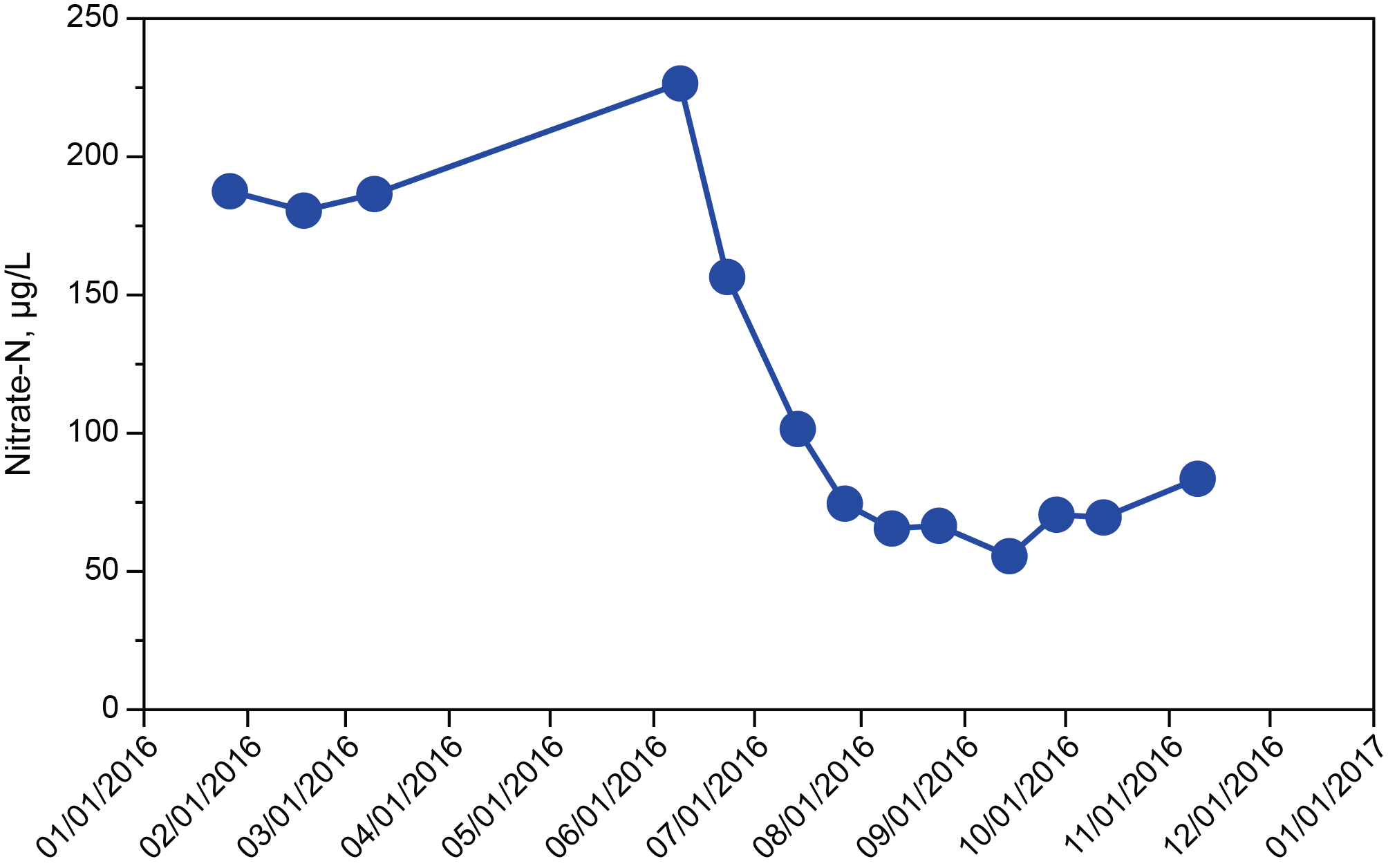


Figure 5. Concentrations of nitrate, 2016.

# Chlorophyll

Chlorophyll, which is an index of algal biomass, reached concentrations of 4.8 µg/L under ice in Lake Dillon but dropped in March, probably because of shading by snow (Figure 6). In general, the concentration of chlorophyll under the ice is a reflection of the transparency of the ice and the amount of snow cover.

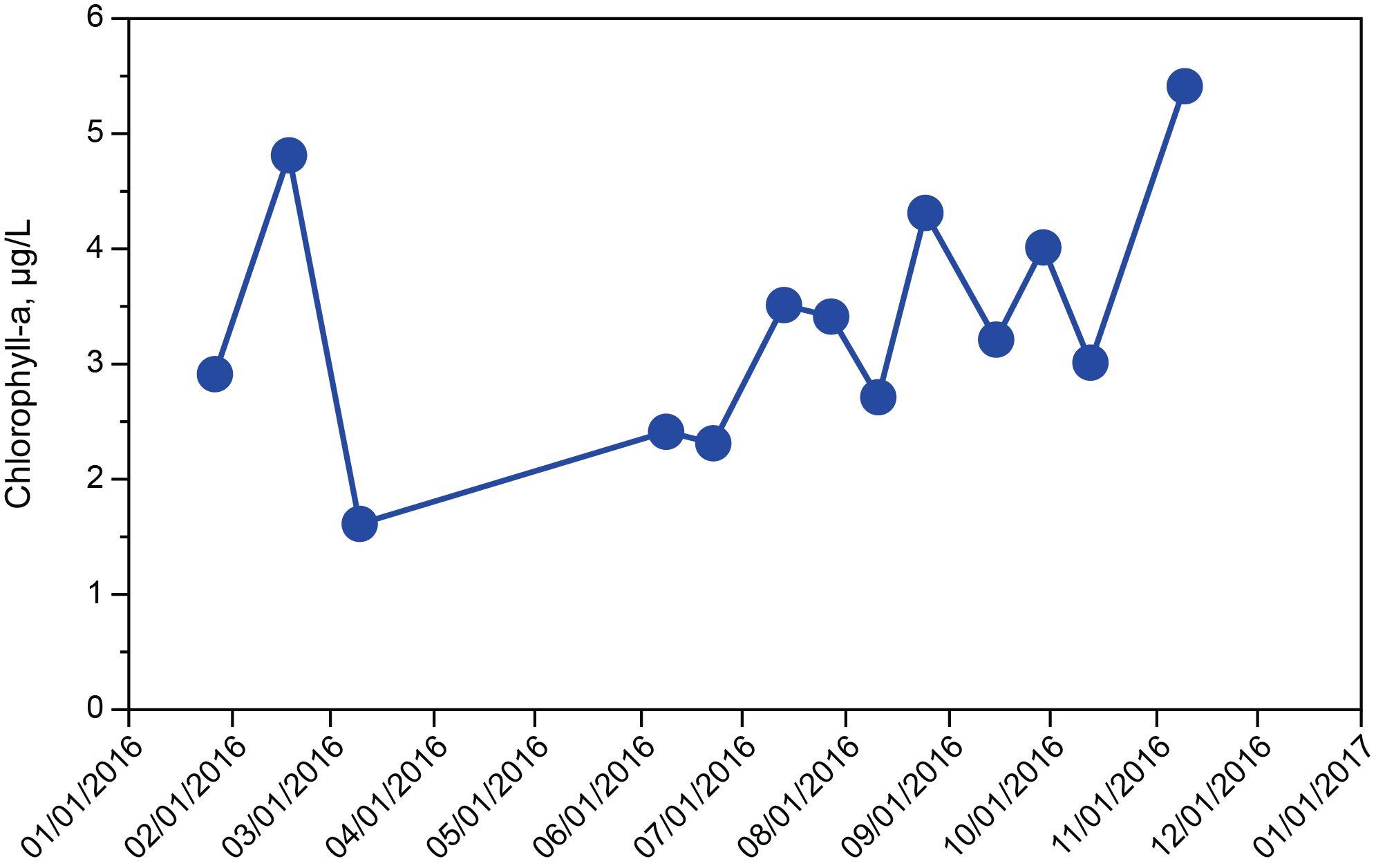


Figure 6. Concentrations of chlorophyll, 2016.

Chlorophyll increased progressively through the growing season to a peak in October. The mean growing season chlorophyll was slightly below the interannual mean in 2016.

Phosphorus Loading

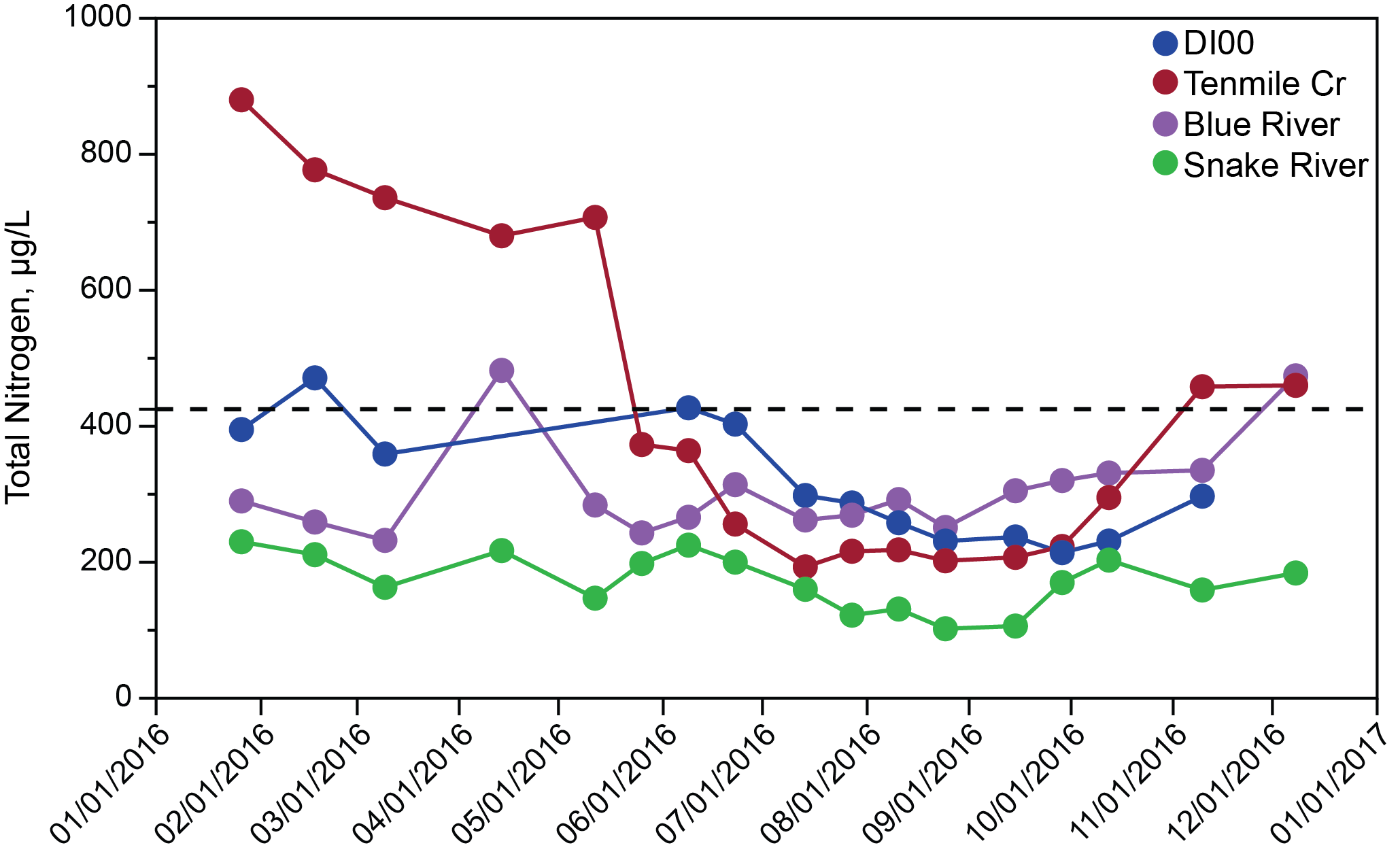
The total amount of phosphorus reaching Lake Dillon in 2016 was below average (Table 10), as expected for a year of moderate runoff. Discharge-weighted P concentrations were near the interannual mean (Table 11). Total load from the wastewater treatment plants was near the interannual mean for the last 20 years, and was a very small (2.6%) fraction of total load (Table 10).

Total phosphorus loading as shown in Table 10 and summary Table 13 was obtained by addition of the measured load to allowances for diffuse direct surface runoff, precipitation, and groundwater. These contributions are estimated by use of assumptions taken from the Lake Dillon Model. Diffuse direct surface runoff is assumed to have the same phosphorus yield per unit area as that measured for the Miners Creek drainage. Given an area of 4800 ha that drains directly to the lake, this component added 153 kg P to the lake in 2016. For precipitation, lake area in 2016 was used to derive an estimate of 329 kg P. For groundwater, the load (35 kg) was estimated from the inflow rate determined in the Clean Lakes Study and a phosphorus concentration equal to the long-term average of total dissolved phosphorus in the Snake River. The total of these estimated sources plus measured runoff was 2668 kg.

Table 13 also shows the 2016 load to Lake Dillon adjusted to 1982 hydrology. The moving average indicates a decline since 1985.

Watershed Nitrogen Concentrations

Data on total nitrogen concentrations for Lake Dillon (index station, surface) show compliance with interim standards for total N (426 µg/L, growing season mean). Lake Dillon tributaries at the point of discharge to the lake also were in compliance with the interim stream standard (1250 µg/L).



Summer average, interim N standard for lakes (426, lower dashed line) and streams (1250 off scale).

Figure 7. Total N during 2016.

Conclusions

Year 2016 was a year of moderate water inflow and moderate phosphorus concentrations, which produced a growing season mean total P concentration that was below the standard for Lake Dillon. Chlorophyll concentrations (3.5 μg/L) were slightly below the interannual average during the growing season for Lake Dillon. Total nitrogen concentrations (4.2 μg/L) in Lake Dillon and its tributaries were below the interim standards for cold water lakes and streams.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Drainage | | | | | |  | Effluents | | | |  | Total | Ground- |  |  |
| Year |  | SRL | BRL | TML | SOD | MIN | Direct |  | BRE | CME | FRE | SRE |  | Surface | water | Precip | Total |
| 1981 |  | 185 | 238 | 499 | 6 | 15 | 39 |  | 514 |  | 39 | 48 |  | 1583 | 35.4 | 636 | 2255 |
| 1982 |  | 589 | 666 | 872 | 67 | 61 | 164 |  | 462 |  | 291 | 74 |  | 3247 | 35.4 | 496 | 3778 |
| 1983 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1984 |  | 1564 | 2701 | 2582 | 65 | 109 | 289 |  | 121 | 35 | 72 | 25 |  | 7527 | 35.4 | 594 | 8156 |
| 1985 |  | 600 | 834 | 1201 | 81 | 49 | 131 |  | 74 | 15 | 220 | 19 |  | 3208 | 35.4 | 307 | 3551 |
| 1986 |  | 693 | 586 | 792 | 72 | 52 | 138 |  | 44 | 18 | 41 | 12 |  | 2430 | 35.4 | 389 | 2855 |
| 1987 |  | 270 | 420 | 940 | 25 | 43 | 116 |  | 38 | 16 | 83 | 12 |  | 1947 | 35.4 | 307 | 2290 |
| 1988 |  | 417 | 664 | 921 | 36 | 83 | 222 |  | 27 | 30 | 40 | 13 |  | 2424 | 35.4 | 253 | 2713 |
| 1989 |  | 267 | 466 | 378 | 64 | 74 | 198 |  | 32 | 11 | 42 | 10 |  | 1531 | 35.4 | 331 | 1897 |
| 1990 |  | 362 | 565 | 441 | 39 | 31 | 84 |  | 31 | 13 | 18 | 13 |  | 1584 | 35.4 | 330 | 1949 |
| 1991 |  | 443 | 610 | 609 | 48 | 42 | 113 |  | 42 | 22 | 24 | 17 |  | 1948 | 35.4 | 323 | 2307 |
| 1992 |  | 314 | 469 | 434 | 31 | 31 | 83 |  | 69 | 17 | 14 | 13 |  | 1458 | 35.4 | 295 | 1788 |
| 1993 |  | 533 | 938 | 852 | 49 | 102 | 273 |  | 43 | 27 | 17 | 8 |  | 2817 | 35.4 | 352 | 3204 |
| 1994 |  | 398 | 404 | 432 | 30 | 32 | 86 |  | 59 | 23 | 15 | 10 |  | 1465 | 35.4 | 168 | 1669 |
| 1995 |  | 1257 | 3932 | 1473 | 126 | 89 | 236 |  | 50 | 25 | 16 | 10 |  | 7189 | 35.4 | 254 | 7478 |
| 1996 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1997 |  | 931 | 1653 | 904 | 145 | 66 | 177 |  | 38 | 16 | 19 | 11 |  | 3945 | 35.4 | 353 | 4334 |
| 1998 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1999 |  | 743 | 1166 | 889 | 78 | 53 | 140 |  | 66 | 9 | 28 | 9 |  | 3173 | 35.4 | 467 | 3676 |
| 2000 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2001 |  | 296 | 570 | 409 | 95 | 35 | 93 |  | 16\* | 14 | 26 | 11 |  | 1553 | 35.4 | 296 | 1884 |
| 2002 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2003 |  | 608 | 707 | 853 | 49 | 35 | 93 |  | 16\* | 23 | 30 | 13 |  | 2404 | 35.4 | 361 | 2800 |
| 2004 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2005 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2006 |  | 349 | 529 | 446 | 62 | 32 | 85 |  | 15\* | 11 | 25 | 10 |  | 1554 | 35.4 | 431 | 2021 |
| 2007 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2008 |  | 507 | 1247 | 823 | 61 | 74 | 198 |  | 47 | 13 | 46 | 29 |  | 2885 | 35.4 | 453 | 3374 |
| 2009 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2010 |  | 263 | 550 | 405 | 37 | 32 | 84 |  | 20 | 10 | 31 | 10 |  | 1360 | 35.4 | 347 | 1742 |
| 2011 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2012 |  | 173 | 244 | 192 | 29 | 18 | 47 |  | 28 | 8 | 32 | 8 |  | 712 | 35.4 | 285 | 1032 |
| 2013 |  | 421 | 822 | 500 | 99 | - | - |  | 40 | 6 | 23 | 5 |  | 3363 | 35.4 | 632 | 4032 |
| 2014 |  | 360 | 1212 | 925 | 135 | 101 | 269 |  | 40 | 8 | 21 | 10 |  | 2943 | 35.4 | 539 | 3518 |
| 2015 |  | 400 | 793 | 871 | 32 | - | - |  | 33 | 8 | 23 | 9 |  | 2130 | 35.4 | 348 | 2513 |
| 2016 |  | 476 | 996 | 581 | 58 | 58 | 153 |  | 29 | 9 | 19 | 14 |  | 2323 | 35.4 | 329 | 2688 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mean |  | 516 | 959 | 797 | 62 | 55 | 146 |  | 85 | 16 | 48 | 16 |  | 2710 | 35 | 380 | 3126 |

\*IHE = 15.3 kg/y (2001), 15.2 kg/y (2003), 19 kg/y (2006), 17 kg/y (2008), 14 kg/y (2010), 9 k/y (2016).

Table 10. Phosphorus loads (kg/y) for Lake Dillon from all sources, 1981-2016. The load from Tenmile Creek includes the contribution of Copper Mountain WWTP. The contribution from direct surface runoff assumes that the areal yield matches that of Miners Creek. The load from BRE in 1981-1982 was estimated based on samples taken in the Blue River above and below the outfall as it was configured at that time. Watershed sources were not sampled in 1983, 1996, 1998, 2000, 2002, 2004, 2005, 2007, 2009, 2011.

|  |  | Drainage | | | | | |  | Effluents | | | |  | Total | Ground- |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year |  | SRL | BRL | TML | SOD | MIN | Direct |  | BRE | CME | FRE | SRE |  | Surface | water | Precip | Total |
| 1981 |  | 6.3 | 6.0 | 10.5 | 29.1 | 10.0 | 10.0 |  | 716.8 |  | 91.5 | 114.3 |  | 12.8 | 4.2 | 166.1 | 16.6 |
| 1982 |  | 9.7 | 8.3 | 9.1 | 43.1 | 10.0 | 10.0 |  | 495.0 |  | 611.0 | 151.6 |  | 12.3 | 4.2 | 118.9 | 13.7 |
| 1983 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1984 |  | 15.5 | 16.9 | 16.4 | 36.0 | 13.5 | 13.5 |  | 84.6 | 88.9 | 117.8 | 48.2 |  | 16.7 | 4.1 | 99.7 | 17.5 |
| 1985 |  | 8.8 | 9.0 | 13.7 | 52.3 | 8.9 | 8.9 |  | 57.2 | 54.9 | 316.7 | 33.5 |  | 11.8 | 4.2 | 75.5 | 12.5 |
| 1986 |  | 8.3 | 6.9 | 7.5 | 34.6 | 9.4 | 9.4 |  | 32.4 | 60.3 | 63.2 | 22.4 |  | 8.1 | 4.2 | 81.4 | 9.1 |
| 1987 |  | 6.1 | 6.5 | 11.5 | 25.5 | 10.8 | 10.8 |  | 27.3 | 52.5 | 123.7 | 24.0 |  | 9.4 | 4.2 | 73.7 | 10.4 |
| 1988 |  | 9.1 | 8.6 | 11.7 | 37.2 | 23.9 | 23.9 |  | 19.2 | 84.0 | 57.5 | 21.8 |  | 11.1 | 4.1 | 68.7 | 11.8 |
| 1989 |  | 6.1 | 6.3 | 4.9 | 69.4 | 15.0 | 15.0 |  | 23.6 | 38.1 | 57.2 | 16.4 |  | 7.1 | 4.2 | 77.0 | 8.3 |
| 1990 |  | 7.5 | 8.3 | 6.2 | 38.2 | 8.5 | 8.5 |  | 23.2 | 36.5 | 32.5 | 22.3 |  | 7.8 | 4.2 | 76.9 | 9.0 |
| 1991 |  | 9.3 | 8.5 | 7.8 | 48.6 | 10.8 | 10.8 |  | 28.8 | 64.4 | 43.8 | 28.8 |  | 9.1 | 4.2 | 76.5 | 10.1 |
| 1992 |  | 6.5 | 6.7 | 6.1 | 27.0 | 8.4 | 8.4 |  | 45.9 | 49.4 | 25.6 | 16.8 |  | 7.1 | 4.1 | 73.5 | 8.2 |
| 1993 |  | 7.5 | 10.6 | 7.8 | 36.3 | 13.9 | 13.9 |  | 24.9 | 73.8 | 26.1 | 12.2 |  | 9.4 | 4.2 | 81.6 | 10.2 |
| 1994 |  | 8.6 | 6.3 | 6.0 | 42.5 | 8.1 | 8.1 |  | 35.2 | 72.8 | 25.4 | 14.9 |  | 7.3 | 4.2 | 50.9 | 7.8 |
| 1995 |  | 13.5 | 24.2 | 10.8 | 41.1 | 11.7 | 11.7 |  | 23.8 | 65.6 | 22.5 | 13.3 |  | 16.9 | 4.2 | 48.1 | 17.0 |
| 1996 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1997 |  | 9.5 | 12.8 | 6.8 | 37.2 | 8.9 | 8.9 |  | 17.4 | 36.7 | 24.5 | 13.4 |  | 10.0 | 4.2 | 80.8 | 10.6 |
| 1998 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1999 |  | 8.1 | 11.0 | 9.0 | 41.3 | 16.1 | 16.1 |  | 28.4 | 38.3 | 36.2 | 12.1 |  | 10.1 | 4.2 | 89.5 | 11.2 |
| 2000 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2001 |  | 5.6 | 6.8 | 5.3 | 45.2 | 7.7 | 7.7 |  | 15.2\* | 51.0 | 30.9 | 13.4 |  | 6.6 | 4.2 | 72.9 | 7.6 |
| 2002 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2003 |  | 8.8 | 8.4 | 9.2 | 34.6 | 10.1 | 10.1 |  | 14.4\* | 56.6 | 36.4 | 16.5 |  | 9.1 | 4.2 | 85.3 | 10.2 |
| 2004 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2005 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2006 |  | 5.9 | 6.1 | 4.5 | 37.6 | 8.1 | 8.1 |  | 18.8\* | 26.8 | 35.3 | 14.0 |  | 5.6 | 4.9 | 84.8 | 7.0 |
| 2007 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2008 |  | 8.2 | 11.1 | 8.4 | 33.7 | 13.7 | 13.7 |  | 31.8 | 33.8 | 57.7 | 30.6 |  | 9.7 | 4.1 | 88.1 | 10.8 |
| 2009 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2010 |  | 5.4 | 6.6 | 5.2 | 27.3 | 8 | 8 |  | 18.6 | 34.4 | 38.8 | 16.6 |  | 6.0 | 4.2 | 79.7 | 7.3 |
| 2011 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2012 |  | 6.9 | 5.8 | 4.3 | 47.3 | 6.9 | 6.9 |  | 17.1 | 34.6 | 48.7 | 14.5 |  | 5.7 | 4.1 | 74.9 | 7.5 |
| 2013 |  | 10.9 | 14.6 | 11.2 | 43.2 | - | - |  | 25.0 | 22.3 | 35.4 | 7.9 |  | 10.4 | 4.2 | 106.8 | 15.9 |
| 2014 |  | 6.4 | 9.8 | 6.2 | 31.8 | 12.3 | 12.3 |  | 17.1 | 22.4 | 24.6 | 13.5 |  | 8.0 | 0.1 | 108.7 | 9.4 |
| 2015 |  | 9.8 | 12.2 | 4.4 | 18.6 | - | - |  | 17.0 | 19.7 | 22.9 | 9.2 |  | 6.9 | 4.2 | 56.9 | 7.7 |
| 2016 |  | 8.2 | 11.5 | 7.4 | 29 | 11.1 | 11.1 |  | 23.3 | 31.5 | 23.8 | 19.7 |  | 9.4 | 4.1 | 63.6 | 10.3 |

\* IHE = 18.3 µg/L (2001), 16.5 μg/L (2003), 16.6 μg/L (2006), 22.7 µg/L (2008), and 15.5 (2016).

Table 11. Discharge-weighted mean concentration of phosphorus (µg/L) in sources to Lake Dillon, 1981-2016. Watershed sources were not sampled in 1983, 1996, 1998, 2000, 2002, 2004, 2005, 2007, 2009, 2011.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | BRE | CME | FRE | SRE | IHE | Total |  |
| 1981 | 514 |  | 39 | 48 |  | 602 |  |
| 1982 | 462 |  | 291 | 74 |  | 828 |  |
| 1983 |  |  |  |  |  |  |  |
| 1984 | 121 | 35 | 72 | 25 |  | 253 |  |
| 1985 | 74 | 15 | 220 | 19 |  | 328 |  |
| 1986 | 44 | 18 | 41 | 12 |  | 115 |  |
| 1987 | 38 | 16 | 83 | 12 |  | 150 |  |
| 1988 | 27 | 30 | 40 | 13 |  | 110 |  |
| 1989 | 32 | 11 | 42 | 10 |  | 94 |  |
| 1990 | 31 | 13 | 18 | 13 |  | 76 |  |
| 1991 | 42 | 22 | 24 | 17 |  | 104 |  |
| 1992 | 69 | 17 | 14 | 13 |  | 112 |  |
| 1993 | 43 | 27 | 17 | 8 |  | 95 |  |
| 1994 | 59 | 23 | 15 | 10 |  | 106 |  |
| 1995 | 50 | 25 | 16 | 10 |  | 100 |  |
| 1996 |  |  |  |  |  |  |  |
| 1997 | 38 | 16 | 19 | 11 |  | 84 |  |
| 1998 |  |  |  |  |  |  |  |
| 1999 | 66 | 9 | 28 | 9 |  | 112 |  |
| 2000 |  |  |  |  |  |  |  |
| 2001 | 16 | 14 | 26 | 11 | 15 | 83 |  |
| 2002 |  |  |  |  |  |  |  |
| 2003 | 16 | 23 | 30 | 13 | 15 | 97 |  |
| 2004 |  |  |  |  |  |  |  |
| 2005 |  |  |  |  |  |  |  |
| 2006 | 15 | 11 | 25 | 10 | 13 | 79 |  |
| 2007 |  |  |  |  |  |  |  |
| 2008 | 47 | 13 | 46 | 29 | 17 | 152 |  |
| 2009 |  |  |  |  |  |  |  |
| 2010 | 20 | 10 | 31 | 10 | 14 | 84 |  |
| 2011 |  |  |  |  |  |  |  |
| 2012 | 28 | 8 | 32 | 8 | *\** | 91 |  |
| 2013 | 40 | 6 | 23 | 5 | *\** | 89 |  |
| 2014 | 40 | 8 | 21 | 10 | *\** | 94 |  |
| 2015 | 33 | 8 | 23 | 9 | *\** | 71 |  |
| 2016 | 29 | 9 | 19 | 14 | 9 | 80 |  |

\* Offline February 20, 2012; sampling resumed June 9, 2010.

Table 12. Estimated phosphorus yield (kg/y) from wastewater treatment plants, 1981-2016. Watershed sources were not sampled in 1983, 1996, 1998, 2000, 2002, 2004, 2005, 2007, 2009, or 2011.

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Observed Load | Load adjusted to 1982 conditions | 3-y moving average |
| 1981 | 2255 | 3535 |  |
| 1982 | 3778 | 3778 |  |
| 1983 |  |  | 4166\* |
| 1984 | 8156 | 4555 |  |
| 1985 | 3551 | 3450 | 3515 |
| 1986 | 2855 | 2539 | 2956 |
| 1987 | 2290 | 2878 | 2912 |
| 1988 | 2713 | 3319 | 2825 |
| 1989 | 1897 | 2278 | 2690 |
| 1990 | 1949 | 2474 | 2521 |
| 1991 | 2307 | 2811 | 2506 |
| 1992 | 1788 | 2234 | 2626 |
| 1993 | 3204 | 2832 | 2413 |
| 1994 | 1669 | 2175 | 3119 |
| 1995 | 7478 | 4349 |  |
| 1996 |  |  | 3600\* |
| 1997 | 4334 | 2852 |  |
| 1998 |  |  | 2984\* |
| 1999 | 3676 | 3115 |  |
| 2000 |  |  | 2601\* |
| 2001 | 1884 | 2087 |  |
| 2002 |  |  | 2418\* |
| 2003 | 2800 | 2749 |  |
| 2004 |  |  |  |
| 2005 |  |  | 2339\* |
| 2006 | 2021 | 1928 |  |
| 2007 |  |  | 2681\* |
| 2008 | 3374 | 3434 |  |
| 2009 |  |  | 2971\* |
| 2010 | 1742 | 2507 |  |
| 2011 |  |  | 2500\* |
| 2012 | 1032 | 2493 | 3768\* |
| 2013 | 4030 | 5043 | 3449 |
| 2014 | 3518 | 2811 | 3470 |
| 2015 | 2513 | 2556 | 2899 |
| 2016 | 2688 | 3329 | NA |

\*Two-year averages

Table 13. Total phosphorus loads (kg/y) to the reservoir, observed and with adjustment to 1982 hydrology. For comparison, the control regulation specifies a load of 3795 kg (8350 lb).

Appendix I

Tabular Summary of Water Quality Data for 2016

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Dillon Reservoir Monitoring Program 2016** | | | | | | | |  |  |  |  |  |  |
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| **SRP, ppb** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | <1.0 | 2.4 | 1.2 | <1.0 | 1.6 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 3.9 | <1.0 |
| DI05 | <1.0 | 1.1 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 3.7 | <1.0 |
| DI10 | 1.0 | <1.0 | 1.3 | <1.0 | 1.1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DI15 | <1.0 | <1.0 | 1.1 | <1.0 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 2.4 | <1.0 |
| DI20 | <1.0 | <1.0 | 1.2 | <1.0 | <1.0 | 1.1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 4.8 | <1.0 |
| DI25 | <1.0 | <1.0 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DI30 | <1.0 | <1.0 | 1.0 | 1.0 | 1.1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1.4 | <1.0 |
| DI35 | <1.0 | <1.0 | 1.1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DI40 | <1.0 | <1.0 | 1.3 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DI45 | 1.9 | <1.0 | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1.3 | <1.0 |
| DI50 | 1.1 | <1.0 | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DI55 | 1.0 | <1.0 | 1.2 | <1.0 | 1.0 | <1.0 | 1.3 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DT00 | #N/A | #N/A | #N/A | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DB00 | #N/A | #N/A | #N/A | <1.0 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| DS00 | #N/A | #N/A | #N/A | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 3.9 | <1.0 |
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| **TDP, ppb** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 2.2 | 4.8 | 2.6 | 1.8 | 1.9 | 2.3 | 2.9 | 1.6 | 1.2 | 1.7 | 1.3 | 5.1 | 2.1 |
| DI05 | 2.2 | 2.8 | 2.3 | 2.1 | 1.7 | 2.2 | 1.3 | 1.5 | 1.7 | 5.0 | 1.6 | 5.3 | 1.1 |
| DI10 | 2.4 | 2.8 | 2.3 | 1.9 | 2.1 | 1.2 | 1.3 | 1.5 | 1.8 | 1.7 | 1.3 | 1.7 | 1.7 |
| DI15 | 1.8 | 2.6 | 2.5 | 3.4 | 1.9 | 1.5 | 1.1 | 1.2 | 1.5 | 1.5 | 1.3 | 4.8 | 1.5 |
| DI20 | 2.0 | 2.4 | 2.5 | 1.9 | 1.7 | 1.5 | 1.0 | 1.3 | 0.9 | 1.4 | 1.1 | 6.0 | 0.9 |
| DI25 | 2.4 | 2.6 | 2.3 | 1.8 | 1.9 | 0.9 | 1.0 | 1.2 | 1.4 | 1.2 | 1.1 | 1.6 | 1.4 |
| DI30 | 2.6 | 2.4 | 2.3 | 2.8 | 2.8 | 1.2 | 1.1 | 1.3 | 1.1 | 1.4 | 1.3 | 1.4 | 1.1 |
| DI35 | 2.2 | 2.6 | 2.5 | 1.9 | 2.4 | 0.7 | 1.1 | 1.3 | 1.4 | 1.5 | 1.4 | 1.3 | 1.4 |
| DI40 | 2.4 | 2.4 | 2.6 | 2.1 | 1.7 | 1.0 | 2.2 | 1.2 | 1.4 | 1.5 | 1.1 | 1.3 | 2.0 |
| DI45 | 4.1 | 2.1 | 2.6 | 2.5 | 2.1 | 1.3 | 1.7 | 1.3 | 1.5 | 1.2 | 1.3 | 1.3 | 0.9 |
| DI50 | 3.2 | 2.4 | 2.3 | 2.3 | 2.1 | 1.2 | 1.0 | 1.5 | 1.5 | 1.5 | 1.9 | 1.4 | 1.4 |
| DI55 | 2.8 | 2.3 | 2.6 | 2.3 | 2.1 | 1.2 | 1.3 | 1.3 | 1.2 | 1.5 | 1.9 | 1.6 | 1.1 |
| DT00 | #N/A | #N/A | #N/A | 2.1 | 2.6 | 3.4 | 1.6 | 1.8 | 2.1 | 1.8 | 2.0 | 1.6 | 0.8 |
| DB00 | #N/A | #N/A | #N/A | 2.5 | 2.4 | 2.8 | 1.4 | 1.6 | 1.8 | 1.5 | 1.6 | 1.6 | 0.9 |
| DS00 | #N/A | #N/A | #N/A | 2.3 | 2.2 | 1.9 | 1.3 | 1.6 | 2.1 | 1.5 | 2.2 | 5.1 | 0.9 |
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| **TPP, ppb** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 3.8 | 5.4 | 3.2 | 4.6 | 5.2 | 3.3 | 4.0 | 3.3 | 4.1 | 3.3 | 3.8 | 4.2 | 2.7 |
| DI05 | 3.4 | 3.7 | 3.4 | 4.8 | 5.2 | 3.2 | 3.8 | 3.6 | 3.7 | 3.7 | 3.3 | 3.7 | 3.0 |
| DI10 | 2.6 | 2.4 | 2.7 | 4.3 | 4.5 | 3.2 | 3.8 | 3.6 | 3.8 | 3.4 | 3.0 | 3.0 | 3.2 |
| DI15 | 2.3 | 1.9 | 2.2 | 3.2 | 3.1 | 2.4 | 3.0 | 2.4 | 3.0 | 3.0 | 2.5 | 3.2 | 3.2 |
| DI20 | 2.2 | 1.8 | 1.8 | 2.4 | 2.7 | 2.1 | 2.1 | 1.9 | 2.5 | 2.4 | 2.4 | 3.1 | 3.0 |
| DI25 | 2.3 | 1.7 | 1.8 | 2.1 | 2.4 | 2.0 | 1.8 | 1.6 | 2.0 | 2.1 | 2.1 | 2.7 | 3.0 |
| DI30 | 2.1 | 1.8 | 1.8 | 3.0 | 2.5 | 1.9 | 1.7 | 1.8 | 1.6 | 2.1 | 2.0 | 1.7 | 3.1 |
| DI35 | 2.2 | 1.8 | 2.0 | 2.0 | 2.3 | 2.0 | 1.9 | 1.8 | 2.0 | 2.0 | 2.0 | 2.2 | 2.1 |
| DI40 | 3.3 | 1.9 | 1.9 | 2.0 | 2.3 | 1.9 | 1.9 | 1.5 | 1.9 | 1.9 | 2.0 | 1.8 | 2.2 |
| DI45 | 4.1 | 2.2 | 1.8 | 1.9 | 2.2 | 1.9 | 1.9 | 1.7 | 1.8 | 1.8 | 1.7 | 1.7 | 1.8 |
| DI50 | 3.5 | 2.2 | 2.0 | 1.8 | 2.3 | 2.0 | 2.1 | 1.8 | 1.8 | 1.8 | 1.7 | 1.9 | 1.7 |
| DI55 | 3.2 | 2.2 | 2.0 | 1.9 | 2.3 | 2.3 | 3.3 | 2.0 | 2.1 | 1.7 | 1.7 | 2.0 | 2.0 |
| DT00 | #N/A | #N/A | #N/A | 4.8 | 5.5 | 4.3 | 4.4 | 3.0 | 5.5 | 3.6 | 3.7 | 3.7 | 2.7 |
| DB00 | #N/A | #N/A | #N/A | 5.1 | 6.1 | 4.0 | 4.2 | 3.7 | 4.5 | 3.6 | 3.7 | 3.8 | 3.0 |
| DS00 | #N/A | #N/A | #N/A | 4.2 | 5.2 | 3.6 | 3.6 | 2.9 | 4.1 | 4.1 | 4.2 | 3.2 | 2.7 |
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| **Total P, ppb** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 6.0 | 10.2 | 5.8 | 6.4 | 7.1 | 5.6 | 6.9 | 4.9 | 5.3 | 5.0 | 5.1 | 9.3 | 4.8 |
| DI05 | 5.6 | 6.5 | 5.7 | 6.9 | 6.9 | 5.4 | 5.1 | 5.1 | 5.4 | 8.7 | 4.9 | 9.0 | 4.1 |
| DI10 | 5.0 | 5.2 | 5.0 | 6.2 | 6.6 | 4.4 | 5.1 | 5.1 | 5.6 | 5.1 | 4.3 | 4.7 | 4.9 |
| DI15 | 4.1 | 4.5 | 4.7 | 6.6 | 5.0 | 3.9 | 4.1 | 3.6 | 4.5 | 4.5 | 3.8 | 8.0 | 4.7 |
| DI20 | 4.2 | 4.2 | 4.3 | 4.3 | 4.4 | 3.6 | 3.1 | 3.2 | 3.4 | 3.8 | 3.5 | 9.1 | 3.9 |
| DI25 | 4.7 | 4.3 | 4.1 | 3.9 | 4.3 | 2.9 | 2.8 | 2.8 | 3.4 | 3.3 | 3.2 | 4.3 | 4.4 |
| DI30 | 4.7 | 4.2 | 4.1 | 5.8 | 5.3 | 3.1 | 2.8 | 3.1 | 2.7 | 3.5 | 3.3 | 3.1 | 4.2 |
| DI35 | 4.4 | 4.4 | 4.5 | 3.9 | 4.7 | 2.7 | 3.0 | 3.1 | 3.4 | 3.5 | 3.4 | 3.5 | 3.5 |
| DI40 | 5.7 | 4.3 | 4.5 | 4.1 | 4.0 | 2.9 | 4.1 | 2.7 | 3.3 | 3.4 | 3.1 | 3.1 | 4.2 |
| DI45 | 8.2 | 4.3 | 4.4 | 4.4 | 4.3 | 3.2 | 3.6 | 3.0 | 3.3 | 3.0 | 3.0 | 3.0 | 2.7 |
| DI50 | 6.7 | 4.6 | 4.3 | 4.1 | 4.4 | 3.2 | 3.1 | 3.3 | 3.3 | 3.3 | 3.6 | 3.3 | 3.1 |
| DI55 | 6.0 | 4.5 | 4.6 | 4.2 | 4.4 | 3.5 | 4.6 | 3.3 | 3.3 | 3.2 | 3.6 | 3.6 | 3.1 |
| DT00 | #N/A | #N/A | #N/A | 6.9 | 8.1 | 7.7 | 6.0 | 4.8 | 7.6 | 5.4 | 5.7 | 5.3 | 3.5 |
| DB00 | #N/A | #N/A | #N/A | 7.6 | 8.5 | 6.8 | 5.6 | 5.3 | 6.3 | 5.1 | 5.3 | 5.4 | 3.9 |
| DS00 | #N/A | #N/A | #N/A | 6.5 | 7.4 | 5.5 | 4.9 | 4.5 | 6.2 | 5.6 | 6.4 | 8.3 | 3.6 |
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| **TSS, mg/L** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 0.9 | 2.0 | 0.5 | 1.7 | 2.1 | 1.9 | 1.8 | 0.3 | 2.2 | 1.7 | 4.0 | 1.9 | 1.8 |
| DI05 | 0.5 | 1.1 | 0.8 | 1.9 | 2.1 | 1.8 | 1.8 | 1.2 | 1.2 | 1.6 | 2.0 | 2.1 | 1.6 |
| DI10 | 0.5 | 0.6 | 0.5 | 1.6 | 1.8 | 1.6 | 1.5 | 0.5 | 2.0 | 1.7 | 2.0 | 2.0 | 1.4 |
| DI15 | 0.5 | 1.3 | 0.4 | 1.5 | 1.6 | 1.0 | 1.0 | 0.8 | 1.5 | 1.5 | 2.0 | 1.6 | 1.8 |
| DI20 | 0.4 | 0.4 | 0.4 | 1.0 | 1.5 | 0.6 | 0.5 | 1.5 | 0.8 | 0.8 | 1.6 | 1.8 | 1.5 |
| DI25 | 0.6 | 0.4 | <0.2 | 0.8 | 1.4 | 1.0 | 0.3 | 0.7 | 1.3 | 0.7 | 0.7 | 1.4 | 1.8 |
| DI30 | 0.3 | 0.3 | 0.2 | 0.7 | 1.2 | 0.7 | 0.3 | 0.1 | 0.6 | 0.5 | 0.6 | 0.4 | 1.8 |
| DI35 | 0.3 | 0.3 | 0.2 | 0.6 | 1.2 | 0.8 | 0.3 | 0.1 | 0.7 | 0.5 | 0.6 | 0.6 | 1.1 |
| DI40 | 0.7 | 0.3 | 0.2 | 0.8 | 0.9 | 0.7 | 0.5 | 0.6 | 0.8 | 0.5 | 0.6 | 0.5 | 1.5 |
| DI45 | 2.3 | 1.5 | 0.4 | 0.3 | 1.0 | 0.6 | 0.3 | 0.0 | 0.6 | 0.4 | 0.5 | 0.3 | 0.3 |
| DI50 | 1.1 | 0.6 | 1.0 | 0.6 | 0.9 | 1.5 | 0.5 | 0.8 | 0.5 | 0.2 | 0.6 | 0.5 | 0.6 |
| DI55 | 1.0 | 1.0 | 0.4 | 0.2 | 1.0 | 0.8 | 1.4 | 0.3 | 0.9 | 0.4 | 0.6 | 0.3 | 0.4 |
| DT00 | #N/A | #N/A | #N/A | 1.5 | 1.8 | 1.6 | 1.6 | 1.1 | 2.5 | 1.7 | 2.2 | 2.3 | 1.4 |
| DB00 | #N/A | #N/A | #N/A | 1.5 | 2.5 | 2.1 | 1.8 | 0.3 | 0.2 | 1.6 | 2.4 | 1.8 | 1.4 |
| DS00 | #N/A | #N/A | #N/A | 2.1 | 1.7 | 2.1 | 1.4 | <0.2 | 1.2 | 1.7 | 2.4 | 2.1 | 1.9 |
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| **Chla, ug/L** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 2.9 | 4.8 | 1.6 | 2.4 | 2.3 | 3.5 | 3.4 | 2.7 | 4.3 | 3.2 | 4.0 | 3.0 | 5.4 |
| DI05 | 3.1 | 3.0 | 2.6 | 3.3 | 2.8 | 3.8 | 3.6 | 2.2 | 3.6 | 4.4 | 3.9 | 4.0 | 4.4 |
| DI10 | 1.8 | 2.0 | 0.9 | 4.4 | 2.7 | 4.2 | 4.8 | 3.6 | 3.7 | 4.0 | 1.2 | 4.0 | 4.9 |
| DI15 | 1.3 | 0.7 | 0.8 | 3.7 | 1.6 | 2.0 | 2.0 | 1.5 | 3.4 | 4.2 | 3.8 | 4.6 | 5.6 |
| DI20 | 0.8 | 0.7 | 0.4 | 1.4 | 1.3 | 0.8 | 1.1 | 1.3 | 1.2 | 1.7 | 2.8 | 3.8 | 5.5 |
| DI25 | 0.8 | 0.5 | 0.3 | 1.4 | 0.9 | 0.6 | 0.6 | 0.5 | 0.4 | 1.4 | 1.1 | 2.8 | 5.0 |
| DI30 | 0.6 | 0.6 | 0.3 | 0.9 | 0.7 | 0.4 | 0.5 | 0.4 | 0.5 | 1.1 | 0.6 | 0.7 | 5.1 |
| DI35 | 1.0 | 0.7 | 0.6 | 0.6 | 0.7 | 0.6 | 0.5 | 0.3 | 0.4 | 0.9 | 0.5 | 0.7 | 3.3 |
| DI40 | 2.5 | 0.8 | 0.4 | 0.7 | 0.4 | 0.5 | 0.4 | 0.2 | 0.4 | 0.3 | 0.4 | 0.5 | 1.5 |
| DI45 | 1.2 | 0.8 | 0.5 | 0.8 | 0.6 | 0.7 | 0.4 | 0.2 | 0.3 | 0.5 | 0.4 | 0.4 | 0.5 |
| DI50 | 1.4 | 1.0 | 0.5 | 0.6 | 0.7 | 0.7 | 0.6 | 0.2 | 0.2 | 0.4 | 0.4 | 0.3 | 0.5 |
| DI55 | 1.5 | 1.0 | 0.6 | 0.7 | 0.7 | 0.7 | 3.1 | 0.2 | 0.2 | 0.5 | 0.3 | 0.4 | 0.6 |
| DT00 | #N/A | #N/A | #N/A | 3.2 | 2.4 | 3.8 | 3.6 | 3.1 | 5.1 | 4.7 | 4.6 | 4.5 | 4.9 |
| DB00 | #N/A | #N/A | #N/A | 3.0 | 2.4 | 3.6 | 3.8 | 3.1 | 4.2 | 4.3 | 5.1 | 5.0 | 5.0 |
| DS00 | #N/A | #N/A | #N/A | 2.8 | 2.2 | 3.8 | 3.8 | 2.1 | 3.8 | 3.9 | 4.2 | 3.9 | 5.6 |
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| **Secchi, m** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 3.4 | 3.3 | 4.3 | 3.0 | 2.9 | 3.0 | 3.5 | 4.0 | 3.7 | 3.8 | 3.6 | 3.4 | 3.8 |
| DT00 | #N/A | #N/A | #N/A | 3.1 | 2.9 | 3.1 | 3.2 | 3.0 | 3.3 | 3.6 | 3.6 | 3.3 | 3.4 |
| DB00 | #N/A | #N/A | #N/A | 2.8 | 2.2 | 2.8 | 3.0 | 3.4 | 3.5 | 3.7 | 2.8 | 3.0 | 3.4 |
| DS00 | #N/A | #N/A | #N/A | 2.4 | 2.8 | 2.5 | 3.2 | 4.1 | 3.3 | 3.6 | 3.3 | 3.1 | 3.5 |
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| **Nitrate, ug/L** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 187 | 180 | 186 | 226 | 156 | 101 | 74 | 65 | 66 | 55 | 70 | 69 | 83 |
| DI05 | 179 | 175 | 176 | 155 | 156 | 100 | 74 | 64 | 65 | 55 | 69 | 68 | 116 |
| DI10 | 175 | 176 | 189 | 238 | 161 | 130 | 105 | 94 | 67 | 53 | 69 | 70 | 119 |
| DI15 | 173 | 179 | 197 | 247 | 193 | 170 | 147 | 151 | 128 | 101 | 70 | 69 | 121 |
| DI20 | 175 | 175 | 211 | 268 | 234 | 212 | 209 | 192 | 203 | 194 | 135 | 69 | 119 |
| DI25 | 175 | 183 | 231 | 285 | 261 | 241 | 251 | 225 | 229 | 235 | 234 | 146 | 121 |
| DI30 | 175 | 197 | 253 | 291 | 278 | 265 | 285 | 253 | 250 | 263 | 259 | 238 | 125 |
| DI35 | 191 | 205 | 251 | 294 | 278 | 281 | 292 | 263 | 261 | 275 | 284 | 232 | 213 |
| DI40 | 188 | 207 | 245 | 298 | 295 | 288 | 295 | 278 | 282 | 297 | 302 | 270 | 271 |
| DI45 | 198 | 210 | 233 | 290 | 309 | 292 | 303 | 285 | 285 | 306 | 309 | 276 | 305 |
| DI50 | 208 | 209 | 239 | 289 | 305 | 297 | 302 | 293 | 294 | 317 | 315 | 280 | 307 |
| DI55 | 212 | 213 | 241 | 286 | 310 | 302 | 113 | 292 | 301 | 319 | 315 | 289 | 318 |
| DT00 | #N/A | #N/A | #N/A | 212 | 140 | 81 | 40 | 40 | 50 | 44 | 45 | 64 | 119 |
| DB00 | #N/A | #N/A | #N/A | 214 | 159 | 113 | 84 | 65 | 75 | 59 | 71 | 67 | 115 |
| DS00 | #N/A | #N/A | #N/A | 216 | 161 | 99 | 85 | 71 | 68 | 56 | 71 | 70 | 116 |
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| **Nitrite, ug/L** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5 | 4 | <1 | <1 | <1 |
| DI05 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 5 | 4 | <1 | <1 | <1 |
| DI10 | <1 | <1 | 24 | <1 | <1 | <1 | <1 | <1 | 4 | 4 | <1 | <1 | <1 |
| DI15 | <1 | 4 | 29 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI20 | <1 | 10 | 8 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI25 | <1 | 13 | 9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI30 | <1 | 11 | 14 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI35 | <1 | 7 | 15 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI40 | <1 | 5 | 15 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI45 | <1 | 3 | 15 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI50 | <1 | 3 | 13 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DI55 | <1 | <1 | 8 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| DT00 | #N/A | #N/A | #N/A | <1 | <1 | <1 | <1 | <1 | 3 | 4 | <1 | <1 | 1 |
| DB00 | #N/A | #N/A | #N/A | <1 | <1 | <1 | <1 | <1 | 8 | 5 | <1 | <1 | 1 |
| DS00 | #N/A | #N/A | #N/A | <1 | <1 | <1 | <1 | 3 | 3 | 4 | <1 | <1 | 1 |
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| **TDN, ug/L** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 342 | 332 | 333 | 372 | 327 | 236 | 214 | 200 | 171 | 173 | 164 | 176 | 230 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **PN, ug/L** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 51.4 | 136.5 | 24.1 | 53.2 | 74.0 | 60.0 | 71.4 | 55.9 | 57.7 | 62.3 | 48.4 | 53.2 | 65.0 |
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| **TN, ug/L** | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov |
| DI00 | 393 | 469 | 357 | 425 | 401 | 296 | 285 | 256 | 229 | 235 | 212 | 229 | 295 |

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| **SWQC Watershed Monitoring 2016** | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **SRP, ppb** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 1.4 | <1.0 | 1.8 | 1.6 | 1.9 | #N/A | 1.4 | #N/A | 1.6 | #N/A | <1.0 | #N/A | 1.7 | #N/A | 1.1 | 1.1 | <1.0 |
| BR1 | 1.0 | <1.0 | 1.4 | <1.0 | 1.0 | 1.3 | <1.0 | <1.0 | <1.0 | 1.3 | <1.0 | <1.0 | <1.0 | <1.0 | 4.9 | <1.0 | <1.0 |
| BR6 | <1.0 | <1.0 | 1.3 | 1.0 | 1.4 | #N/A | <1.0 | #N/A | <1.0 | #N/A | <1.0 | #N/A | 1.0 | #N/A | 1.1 | <1.0 | <1.0 |
| SDE | 2.7 | 3.9 | 6.3 | 1.8 | 4.6 | #N/A | 2.8 | #N/A | 3.2 | #N/A | 3.3 | #N/A | 7.7 | #N/A | 2.1 | 19.2 | 27.0 |
| FRE | 1.8 | 1.6 | 1.7 | 1.1 | 1.7 | 1.0 | <1.0 | 1.2 | 1.1 | 0.7 | <1.0 | <1.0 | 1.1 | <1.0 | <1.0 | <1.0 | <1.0 |
| CME | 3.7 | 10.5 | 3.8 | 3.0 | 2.1 | 1.7 | 41.3 | 14.5 | 3.2 | 8.3 | 11.8 | 6.1 | 13.8 | 6.1 | 2.8 | 2.2 | 7.8 |
| BRE | 1.4 | <1.0 | 1.7 | 1.0 | 1.4 | 1.4 | <1.0 | <1.0 | 1.6 | <1.0 | <1.0 | 7.6 | <1.0 | <1.0 | 4.3 | 6.9 | 8.4 |
| SRE | 1.1 | 6.8 | 1.2 | 1.1 | 1.7 | 1.6 | <1.0 | 1.1 | 1.6 | <1.0 | 1.0 | <1.0 | 4.6 | <1.0 | 5.7 | 5.1 | <1.0 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 2.3 | <1.0 | <1.0 | 2.4 | 1.4 | <1.0 | 1.1 | <1.0 | 2.1 | <1.0 | <1.0 |
| BRL | 1.5 | <1.0 | 1.8 | 1.3 | 2.1 | 1.9 | 1.5 | 4.7 | 1.2 | 2.2 | <1.0 | <1.0 | 1.5 | <1.0 | <1.0 | <1.0 | <1.0 |
| TML | 2.7 | 1.0 | 1.0 | 1.5 | 1.1 | <1.0 | <1.0 | <1.0 | <1.0 | 0.3 | <1.0 | <1.0 | 1.0 | <1.0 | 3.8 | <1.0 | <1.0 |
| SRL | <1.0 | <1.0 | 1.1 | <1.0 | 1.3 | 1.5 | <1.0 | 1.1 | <1.0 | 1.2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| ABV CME | 3.4 | <1.0 | 1.8 | 1.6 | 2.3 | <1.0 | <1.0 | 0.8 | <1.0 | 1.2 | <1.0 | <1.0 | <1.0 | 2.2 | <1.0 | <1.0 | 1.1 |
| TMU | 3.2 | <1.0 | 1.0 | 1.0 | <1.0 | 1.3 | <1.0 | <1.0 | <1.0 | 1.3 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| SOD | 3.7 | #N/A | 2.3 | 16.4 | 4.9 | 4.0 | 2.4 | 3.8 | 4.8 | 4.4 | 2.5 | 2.4 | 1.9 | 1.9 | 1.8 | 1.0 | #N/A |
| MIN | 1.8 | 1.0 | 1.6 | 1.9 | 2.9 | 2.1 | <1.0 | 1.1 | 1.0 | 1.3 | <1.0 | <1.0 | 1.2 | <1.0 | 3.7 | <1.0 | 1.1 |
| SCL | 2.1 | 7.1 | 5.8 | 16.1 | 4.1 | 3.6 | 2.2 | 6.3 | 2.9 | 3.4 | 7.4 | 8.1 | 1.6 | 2.4 | 2.3 | 6.3 | #N/A |
| BL5 | 1.4 | <1.0 | 1.4 | 1.3 | 2.6 | 1.2 | <1.0 | 2.5 | 1.0 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 | 1.2 |
| SR3 | <1.0 | <1.0 | 1.0 | <1.0 | 1.2 | 1.0 | <1.0 | 1.1 | 1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
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| **TDP, ppb** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 3.4 | 2.8 | 3.5 | 3.9 | 3.2 | #N/A | 3.5 | #N/A | 2.4 | #N/A | 2.4 | #N/A | 2.0 | #N/A | 1.6 | 1.6 | 1.7 |
| BR1 | 3.4 | 2.4 | 2.8 | 2.6 | 2.0 | 2.1 | 2.1 | 2.3 | 2.1 | 1.8 | 1.6 | 1.7 | 1.7 | 1.4 | 6.6 | 2.0 | 1.7 |
| BR6 | 2.8 | 3.2 | 3.1 | 4.1 | 3.1 | #N/A | 2.8 | #N/A | 2.7 | #N/A | 1.9 | #N/A | 1.8 | #N/A | 2.9 | 2.6 | 1.7 |
| SDE | 18.7 | 21.3 | 23.3 | 12.0 | 12.0 | #N/A | 13.5 | #N/A | 13.5 | #N/A | 17.7 | #N/A | 24.6 | #N/A | 17.9 | 47.2 | 123.3 |
| FRE | 26.9 | 25.0 | 19.8 | 15.3 | 12.9 | 19.4 | 15.2 | 16.5 | 16.6 | 21.1 | 14.9 | 21.7 | 26.1 | 18.5 | 12.0 | 15.6 | 22.6 |
| CME | 21.4 | 41.7 | 17.1 | 14.8 | 7.1 | 5.5 | 47.2 | 20.1 | 12.5 | 19.7 | 24.8 | 19.8 | 25.5 | 14.3 | 10.7 | 8.7 | 23.2 |
| BRE | 12.7 | 12.8 | 14.0 | 10.7 | 15.7 | 8.5 | 8.1 | 6.9 | 12.6 | 8.5 | 10.6 | 20.2 | 15.7 | 10.6 | 15.4 | 19.7 | 54.8 |
| SRE | 9.8 | 22.3 | 10.8 | 8.8 | 7.1 | 5.8 | 6.1 | 6.1 | 8.9 | 12.7 | 13.3 | 8.2 | 13.9 | 7.8 | 13.1 | 13.6 | 8.7 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 10.0 | 8.4 | 8.5 | 13.8 | 8.6 | 12.1 | 10.1 | 6.7 | 10.7 | 6.4 | 6.3 |
| BRL | 1.8 | 2.4 | 3.5 | 4.7 | 4.6 | 4.0 | 4.9 | 5.0 | 2.9 | 3.3 | 1.9 | 1.9 | 2.0 | 1.8 | 1.9 | 1.4 | 0.9 |
| TML | 3.0 | 3.4 | 4.1 | 4.7 | 2.5 | 3.3 | 3.5 | 3.2 | 2.2 | 2.2 | 1.2 | 1.0 | 2.1 | 1.1 | 5.4 | 1.6 | 1.1 |
| SRL | 2.6 | 2.3 | 3.6 | 3.6 | 3.6 | 2.6 | 2.5 | 3.6 | 2.6 | 1.2 | 0.9 | 0.6 | 0.6 | 0.7 | 0.7 | <0.5 | 1.1 |
| ABV CME | 3.7 | 6.1 | 5.3 | 12.3 | 3.1 | 3.2 | 3.8 | 2.8 | 2.6 | 1.5 | 1.2 | 1.0 | 1.8 | 3.6 | 3.2 | 2.0 | 1.1 |
| TMU | 3.7 | 3.5 | 3.6 | 5.4 | 2.9 | 3.7 | 4.0 | 2.8 | 3.4 | 1.3 | 1.2 | 0.9 | 1.2 | 1.0 | 1.3 | 0.8 | 1.1 |
| SOD | 7.3 | #N/A | 10.1 | 31.4 | 14.6 | 12.4 | 8.9 | 10.7 | 11.3 | 8.5 | 7.8 | 6.9 | 7.1 | 6.0 | 7.9 | 5.2 | #N/A |
| MIN | 4.7 | 3.7 | 5.0 | 7.5 | 13.2 | 8.8 | 3.8 | 3.4 | 3.6 | 2.2 | 2.8 | 2.3 | 2.6 | 1.7 | 6.9 | 1.1 | 1.7 |
| SCL | 8.5 | 17.4 | 16.5 | 31.1 | 12.5 | 11.6 | 10.1 | 21.9 | 15.2 | 11.9 | 16.7 | 15.9 | 9.5 | 9.8 | 11.6 | 15.9 | #N/A |
| BL5 | 2.2 | 3.9 | 4.3 | 3.9 | 6.0 | 4.4 | 4.2 | 3.9 | 3.3 | 2.5 | 3.1 | 3.1 | 3.0 | 2.9 | 2.8 | 2.9 | 2.1 |
| SR3 | 1.1 | 2.6 | 4.5 | 3.4 | 3.1 | 3.3 | 3.5 | 3.4 | 3.1 | 0.6 | <0.5 | 0.7 | <0.5 | 0.5 | 1.0 | 1.1 | 0.8 |
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| **TPP, ppb** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 2.2 | 4.8 | 5.9 | 5.0 | 3.8 | #N/A | 10.6 | #N/A | 2.8 | #N/A | 4.7 | #N/A | 1.9 | #N/A | 1.5 | 1.2 | 2.8 |
| BR1 | 2.9 | 4.2 | 4.5 | 3.2 | 3.0 | 4.6 | 2.4 | 3.6 | 3.1 | 2.4 | 2.4 | 4.4 | 2.1 | 1.8 | 1.9 | 2.0 | 3.7 |
| BR6 | 63.0 | 3.3 | 6.6 | 5.3 | 4.6 | #N/A | 4.1 | #N/A | 7.9 | #N/A | 3.5 | #N/A | 2.5 | #N/A | 2.6 | 2.4 | 4.3 |
| SDE | 14.0 | 41.0 | 55.3 | 23.9 | 39.7 | #N/A | 29.0 | #N/A | 16.4 | #N/A | 22.4 | #N/A | 29.5 | #N/A | 22.4 | 95.9 | 163.1 |
| FRE | 11.9 | 7.8 | 12.8 | 1.5 | 1.9 | 3.4 | 2.0 | 2.1 | 1.9 | 8.3 | 5.5 | 3.9 | 8.7 | 5.2 | 4.8 | 7.2 | 1.9 |
| CME | 10.0 | 40.9 | 14.4 | 5.3 | 2.9 | 2.3 | 4.4 | 13.1 | 6.8 | 11.8 | 15.0 | 8.6 | 7.4 | 5.3 | 6.0 | 5.6 | 17.2 |
| BRE | 7.0 | 9.1 | 30.3 | 2.8 | 1.1 | 5.5 | 0.7 | 3.7 | 15.8 | 12.9 | 4.9 | 24.6 | 11.8 | 3.1 | 13.1 | 20.3 | 9.9 |
| SRE | 6.3 | 14.1 | 7.8 | 3.7 | 2.5 | 0.9 | 0.3 | 1.4 | 5.2 | 2.6 | 5.2 | 3.0 | 4.3 | 2.0 | 2.1 | 6.9 | 1.4 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 14.1 | 4.2 | 11.8 | 3.2 | 11.9 | 6.7 | 8.3 | 3.8 | 5.0 | 2.3 | 3.0 |
| BRL | 1.6 | 2.1 | 2.2 | 5.7 | 4.1 | 4.2 | 14.1 | 10.7 | 3.9 | 5.6 | 2.4 | 2.7 | 2.2 | 2.0 | 1.9 | 1.3 | 2.1 |
| TML | 1.6 | 4.1 | 5.7 | 2.4 | 2.1 | 2.8 | 6.5 | 5.4 | 1.3 | 0.9 | 1.0 | 1.0 | 1.4 | 1.1 | 1.2 | 1.1 | 1.0 |
| SRL | 1.3 | 1.9 | 2.8 | 4.0 | 2.5 | 4.3 | 8.3 | 5.1 | 2.7 | 3.1 | 3.1 | 3.0 | 2.4 | 1.9 | 2.1 | 0.8 | 0.7 |
| ABV CME | 2.1 | 1.2 | 2.8 | 3.2 | 3.0 | 3.2 | 8.4 | 4.0 | 1.3 | 1.5 | 1.8 | 0.8 | 1.8 | 0.7 | 1.7 | 1.4 | 0.8 |
| TMU | 1.2 | 0.6 | 0.9 | 2.7 | 0.9 | 4.0 | 6.5 | 6.2 | 1.3 | 1.0 | 1.5 | 0.5 | 1.6 | 1.1 | 1.2 | 0.9 | 1.5 |
| SOD | 8.4 | #N/A | 12.9 | 25.7 | 14.8 | 19.8 | 19.0 | 23.6 | 16.3 | 17.3 | 20.8 | 16.1 | 10.7 | 11.8 | 13.7 | 9.4 | #N/A |
| MIN | 3.4 | 0.7 | 3.1 | 7.0 | 6.5 | 8.8 | 7.5 | 7.4 | 3.6 | 3.5 | 5.2 | 3.7 | 14.6 | 4.2 | 2.9 | 2.7 | 2.3 |
| SCL | 7.8 | 15.9 | 22.6 | 27.2 | 10.7 | 15.4 | 14.2 | 40.2 | 30.3 | 27.9 | 20.0 | 17.5 | 23.0 | 20.3 | 18.3 | 18.1 | #N/A |
| BL5 | 5.2 | 5.1 | 8.0 | 6.1 | 5.1 | 7.5 | 10.8 | 7.1 | 5.4 | 5.3 | 4.0 | 3.6 | 8.1 | 3.8 | 3.2 | 4.7 | 4.6 |
| SR3 | 1.4 | 0.3 | 1.5 | 2.9 | 1.7 | 2.9 | 6.9 | 3.1 | 1.4 | 1.9 | 2.5 | 2.9 | 2.6 | 1.9 | 1.7 | 6.3 | 1.9 |
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| **Total P, ppb** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 5.6 | 7.6 | 9.4 | 8.9 | 7.0 | #N/A | 14.1 | #N/A | 5.2 | #N/A | 7.1 | #N/A | 3.9 | #N/A | 3.1 | 2.8 | 4.5 |
| BR1 | 6.3 | 6.6 | 7.3 | 5.8 | 5.0 | 6.7 | 4.5 | 5.9 | 5.2 | 4.2 | 4.0 | 6.1 | 3.8 | 3.2 | 8.5 | 4.0 | 5.4 |
| BR6 | 65.8 | 6.5 | 9.7 | 9.4 | 7.7 | #N/A | 6.9 | #N/A | 10.6 | #N/A | 5.4 | #N/A | 4.3 | #N/A | 5.5 | 5.0 | 6.0 |
| SDE | 32.7 | 62.3 | 78.6 | 35.9 | 51.7 | #N/A | 42.5 | #N/A | 29.9 | #N/A | 40.1 | #N/A | 54.1 | #N/A | 40.3 | 143.1 | 286.4 |
| FRE | 38.8 | 32.8 | 32.6 | 16.8 | 14.8 | 22.8 | 17.2 | 18.6 | 18.5 | 29.4 | 20.4 | 25.6 | 34.8 | 23.7 | 16.8 | 22.8 | 24.5 |
| CME | 31.4 | 82.6 | 31.5 | 20.1 | 10.0 | 7.8 | 51.6 | 33.2 | 19.3 | 31.5 | 39.8 | 28.4 | 32.9 | 19.6 | 16.7 | 14.3 | 40.4 |
| BRE | 19.7 | 21.9 | 44.3 | 13.5 | 16.8 | 14.0 | 8.8 | 10.6 | 28.4 | 21.4 | 15.5 | 44.8 | 27.5 | 13.7 | 28.5 | 40.0 | 64.7 |
| SRE | 16.1 | 36.4 | 18.6 | 12.5 | 9.6 | 6.7 | 6.4 | 7.5 | 14.1 | 15.3 | 18.5 | 11.2 | 18.2 | 9.8 | 15.2 | 20.5 | 10.1 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 24.1 | 12.6 | 20.3 | 17.0 | 20.5 | 18.8 | 18.4 | 10.5 | 15.7 | 8.7 | 9.3 |
| BRL | 3.4 | 4.5 | 5.7 | 10.4 | 8.7 | 8.2 | 19.0 | 15.7 | 6.8 | 8.9 | 4.3 | 4.6 | 4.2 | 3.8 | 3.8 | 2.7 | 3.0 |
| TML | 4.6 | 7.5 | 9.8 | 7.1 | 4.6 | 6.1 | 10.0 | 8.6 | 3.5 | 3.1 | 2.2 | 2.0 | 3.5 | 2.2 | 6.6 | 2.7 | 2.1 |
| SRL | 3.9 | 4.2 | 6.4 | 7.6 | 6.1 | 6.9 | 10.8 | 8.7 | 5.3 | 4.3 | 4.0 | 3.6 | 3.0 | 2.6 | 2.8 | 1.0 | 1.8 |
| ABV CME | 5.8 | 7.3 | 8.1 | 15.5 | 6.1 | 6.4 | 12.2 | 6.8 | 3.9 | 3.0 | 3.0 | 1.8 | 3.6 | 4.3 | 4.9 | 3.4 | 1.9 |
| TMU | 4.9 | 4.1 | 4.5 | 8.1 | 3.8 | 7.7 | 10.5 | 9.0 | 4.7 | 2.3 | 2.7 | 1.4 | 2.8 | 2.1 | 2.5 | 1.7 | 2.6 |
| SOD | 15.7 | #N/A | 23.0 | 57.1 | 29.4 | 32.2 | 27.9 | 34.3 | 27.6 | 25.8 | 28.6 | 23.0 | 17.8 | 17.8 | 21.6 | 14.6 | #N/A |
| MIN | 8.1 | 4.4 | 8.1 | 14.5 | 19.7 | 17.6 | 11.3 | 10.8 | 7.2 | 5.7 | 8.0 | 6.0 | 17.2 | 5.9 | 9.8 | 3.8 | 4.0 |
| SCL | 16.3 | 33.3 | 39.1 | 58.3 | 23.2 | 27.0 | 24.3 | 62.1 | 45.5 | 39.8 | 36.7 | 33.4 | 32.5 | 30.1 | 29.9 | 34.0 | #N/A |
| BL5 | 7.4 | 9.0 | 12.3 | 10.0 | 11.1 | 11.9 | 15.0 | 11.0 | 8.7 | 7.8 | 7.1 | 6.7 | 11.1 | 6.7 | 6.0 | 7.6 | 6.7 |
| SR3 | 2.5 | 2.9 | 6.0 | 6.3 | 4.8 | 6.2 | 10.4 | 6.5 | 4.5 | 2.5 | 2.9 | 3.6 | 3.0 | 2.4 | 2.7 | 7.4 | 2.7 |
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| **TSS, mg/L** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 0.5 | 3.5 | 4.1 | 2.8 | 2.7 | #N/A | 3.0 | #N/A | 0.9 | #N/A | 1.7 | #N/A | 1.6 | #N/A | 0.8 | 1.1 | 1.2 |
| BR1 | 0.8 | 0.7 | 0.6 | 1.7 | 0.5 | 2.7 | 0.4 | 1.1 | 1.3 | 0.3 | 0.4 | 1.7 | 0.6 | 0.3 | 0.5 | 0.6 | 1.3 |
| BR6 | 17.0 | 0.9 | 6.6 | 5.2 | 1.6 | #N/A | 1.2 | #N/A | 1.1 | #N/A | 2.0 | #N/A | 1.0 | #N/A | 0.8 | 1.2 | 1.5 |
| SDE | 0.5 | 2.7 | 3.4 | 2.2 | 1.6 | #N/A | 2.3 | #N/A | 1.3 | #N/A | 1.7 | #N/A | 1.9 | #N/A | 2.6 | 7.9 | 8.2 |
| FRE | 1.8 | 1.8 | 1.4 | 0.4 | 0.5 | 1.0 | 0.4 | 0.5 | 0.4 | 1.6 | 0.6 | 1.0 | 1.3 | 0.7 | 0.9 | 1.1 | 0.4 |
| CME | 0.3 | 2.7 | 0.9 | 0.4 | 0.4 | 0.6 | 0.3 | 1.0 | 0.8 | 1.0 | 1.7 | 1.2 | 1.3 | 0.4 | 1.2 | 0.5 | 1.0 |
| BRE | 0.7 | 1.4 | 2.2 | 1.1 | 0.4 | 1.3 | 0.3 | 1.0 | 2.9 | 0.5 | 0.9 | 2.4 | 1.9 | 0.7 | 2.8 | 5.4 | 3.2 |
| SRE | 1.5 | 4.1 | 2.6 | 0.6 | 0.3 | 0.5 | <0.2 | 0.4 | 0.6 | 2.6 | <0.2 | 0.8 | 0.4 | 0.3 | 1.1 | 0.7 | 0.4 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 3.2 | 0.5 | 1.1 | 0.7 | 0.9 | 1.2 | 1.1 | 0.4 | 0.6 | 0.3 | 0.4 |
| BRL | 1.1 | 0.9 | 1.4 | 3.8 | 2.1 | 2.7 | 10.7 | 8.1 | 3.2 | 3.4 | 2.0 | 1.7 | 1.0 | 1.1 | 0.4 | 0.9 | 1.3 |
| TML | 2.5 | 1.5 | 3.1 | 1.6 | 1.1 | 1.5 | 4.1 | 3.3 | 0.5 | 0.4 | 0.7 | 0.7 | 0.8 | 0.3 | 1.2 | 0.8 | 0.3 |
| SRL | 2.6 | 3.9 | 2.9 | 5.1 | 3.5 | 5.6 | 6.0 | 5.8 | 4.5 | 4.8 | 4.8 | 6.4 | 4.9 | 3.9 | 3.9 | 3.5 | 0.3 |
| ABV CME | 1.4 | 1.4 | 2.3 | 1.8 | 1.5 | 1.8 | 0.4 | 1.8 | <0.2 | 1.3 | 0.5 | 0.9 | 0.7 | 0.2 | 0.9 | 1.3 | 1.0 |
| TMU | 0.9 | 1.2 | 0.6 | 1.9 | 0.3 | 2.0 | 4.3 | 6.1 | 0.6 | 0.7 | 0.8 | 0.4 | 0.9 | 0.5 | 0.6 | 0.9 | 0.9 |
| SOD | 2.0 | #N/A | 12.6 | 14.1 | 7.3 | 12.0 | 13.6 | 19.4 | 10.8 | 11.1 | 13.8 | 10.8 | 5.2 | 6.0 | 6.2 | 4.4 | #N/A |
| MIN | 2.7 | 1.1 | 2.4 | 3.7 | 4.1 | 6.7 | 6.4 | 6.0 | 1.7 | 1.8 | 2.5 | 2.2 | 13.1 | 2.7 | 0.9 | 1.0 | 1.4 |
| SCL | <0.2 | 6.1 | 9.4 | 11.9 | 5.1 | 8.0 | 6.0 | 12.2 | 8.7 | 8.4 | 6.3 | 6.3 | 6.3 | 5.4 | 5.5 | 5.2 | #N/A |
| BL5 | 1.4 | 1.3 | 1.2 | 1.8 | 1.5 | 3.1 | 5.7 | 4.0 | 2.0 | 1.4 | 1.8 | 1.6 | 1.5 | 1.3 | 1.0 | 1.7 | 1.7 |
| SR3 | 3.6 | 3.6 | 4.1 | 4.4 | 3.2 | 3.7 | 5.8 | 2.6 | 2.7 | 4.4 | 4.6 | 6.0 | 6.9 | 6.1 | 5.6 | 7.0 | 2.5 |
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| **TDN, ppb** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 309 | 236 | 297 | 353 | 313 | #N/A | 248 | #N/A | 173 | #N/A | 183 | #N/A | 181 | #N/A | 217 | 287 | 326 |
| BR1 | 379 | 355 | 365 | 391 | 405 | 426 | 412 | 400 | 310 | 419 | 414 | 391 | 387 | 394 | 411 | 396 | 271 |
| BR6 | 484 | 449 | 459 | 462 | 450 | #N/A | 407 | #N/A | 308 | #N/A | 473 | #N/A | 407 | #N/A | 413 | 428 | 308 |
| SDE | 6850 | 5700 | 6480 | 6340 | 5840 | #N/A | 7780 | #N/A | 6700 | #N/A | 7620 | #N/A | 6260 | #N/A | 9660 | 8400 | 8540 |
| FRE | 6300 | 8900 | 8550 | 12800 | 7640 | 12240 | 5680 | 4120 | 5900 | 8020 | 6440 | 5440 | 4180 | 5020 | 3820 | 5160 | 6020 |
| CME | 4000 | 2620 | 3100 | 1735 | 5480 | 4440 | 3050 | 2760 | 2990 | 3540 | 2570 | 3430 | 2520 | 3110 | 2610 | 11060 | 2400 |
| BRE | 22800 | 25300 | 26600 | 18000 | 15300 | 15350 | 17100 | 14900 | 24200 | 16100 | 20300 | 17750 | 20550 | 23800 | 21400 | 22300 | 21150 |
| SRE | 14100 | 7300 | 8750 | 7300 | 14050 | 12550 | 9450 | 11350 | 12600 | 22800 | 14050 | 16250 | 9950 | 22500 | 14800 | 6780 | 7040 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 10200 | 12100 | 17350 | 17450 | 15350 | 12300 | 13800 | 15350 | 4500 | 14650 | 14200 |
| BRL | 283 | 235 | 218 | 447 | 260 | 210 | 218 | 272 | 239 | 248 | 273 | 225 | 287 | 306 | 315 | 318 | 442 |
| TML | 870 | 760 | 710 | 665 | 685 | 348 | 328 | 226 | 176 | 198 | 202 | 184 | 194 | 209 | 277 | 433 | 445 |
| SRL | 228 | 198 | 155 | 197 | 131 | 166 | 175 | 165 | 133 | 108 | 110 | 75 | 92 | 156 | 187 | 137 | 172 |
| ABV CME | 1225 | 1150 | 1190 | 1250 | 866 | 482 | 355 | 258 | 154 | 211 | 259 | 212 | 220 | 215 | 349 | 589 | 694 |
| TMU | 980 | 860 | 465 | 778 | 270 | 362 | 329 | 374 | 246 | 199 | 213 | 90 | 210 | 252 | 274 | 436 | 519 |
| SOD | 167 | #N/A | 144 | 439 | 308 | 284 | 265 | 294 | 251 | 225 | 175 | 108 | 116 | 137 | 138 | 145 | #N/A |
| MIN | 137 | 84 | 78 | 177 | 197 | 149 | 119 | 122 | 130 | 78 | 76 | 43 | 56 | 32 | 69 | 63 | 104 |
| SCL | 6620 | 6000 | 5700 | 1430 | 860 | 820 | 1220 | 2100 | 2340 | 3030 | 4000 | 2460 | 2250 | 4290 | 840 | 2420 | #N/A |
| BL5 | 307 | 274 | 259 | 302 | 269 | 226 | 226 | 167 | 150 | 138 | 139 | 73 | 60 | 65 | 90 | 76 | 156 |
| SR3 | 356 | 293 | 246 | 270 | 185 | 174 | 195 | 166 | 129 | 127 | 118 | 89 | 91 | 84 | 153 | 227 | 248 |
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| **TN, ppb** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 310 | 266 | 316 | 377 | 323 | #N/A | 272 | #N/A | 184 | #N/A | 207 | #N/A | 194 | #N/A | 227 | 303 | 363 |
| BR1 | 397 | 382 | 385 | 413 | 425 | 454 | 475 | 434 | 348 | 439 | 435 | 413 | 400 | 403 | 427 | 418 | 334 |
| BR6 | 752 | 475 | 510 | 499 | 472 | #N/A | 441 | #N/A | 344 | #N/A | 498 | #N/A | 426 | #N/A | 435 | 459 | 364 |
| SDE | 6873 | 5782 | 6603 | 6387 | 5887 | #N/A | 7838 | #N/A | 6735 | #N/A | 7658 | #N/A | 6314 | #N/A | 9708 | 8633 | 8830 |
| FRE | 6344 | 8954 | 8593 | 12820 | 7651 | 12262 | 5692 | 4133 | 5916 | 8069 | 6471 | 5473 | 4204 | 5045 | 3841 | 5207 | 6036 |
| CME | 4021 | 2813 | 3132 | 1752 | 5498 | 4451 | 3076 | 2805 | 3009 | 3573 | 2610 | 3456 | 2542 | 3141 | 2626 | 11096 | 2473 |
| BRE | 22824 | 25363 | 26650 | 18006 | 15305 | 15371 | 17108 | 14916 | 24278 | 16162 | 20342 | 17956 | 20614 | 23824 | 21462 | 22447 | 21250 |
| SRE | 14130 | 7375 | 8794 | 7321 | 14068 | 12567 | 9463 | 11355 | 12629 | 22817 | 14078 | 16281 | 9963 | 22534 | 14814 | 6808 | 7053 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 10269 | 12112 | 17398 | 17462 | 15377 | 12329 | 13829 | 15370 | 4526 | 14669 | 14227 |
| BRL | 288 | 257 | 230 | 480 | 282 | 241 | 264 | 312 | 260 | 267 | 290 | 249 | 303 | 318 | 329 | 333 | 472 |
| TML | 878 | 775 | 734 | 678 | 705 | 371 | 362 | 254 | 191 | 214 | 216 | 200 | 205 | 221 | 293 | 456 | 458 |
| SRL | 228 | 209 | 161 | 215 | 145 | 196 | 223 | 198 | 158 | 120 | 129 | 100 | 104 | 168 | 201 | 157 | 182 |
| ABV CME | 1245 | 1165 | 1203 | 1265 | 898 | 500 | 382 | 275 | 168 | 229 | 272 | 218 | 233 | 221 | 365 | 610 | 714 |
| TMU | 1016 | 878 | 481 | 809 | 280 | 384 | 357 | 418 | 263 | 210 | 229 | 116 | 225 | 264 | 288 | 459 | 540 |
| SOD | 208 | #N/A | 153 | 540 | 346 | 362 | 358 | 428 | 326 | 305 | 280 | 225 | 178 | 211 | 237 | 222 | #N/A |
| MIN | 179 | 94 | 89 | 210 | 241 | 189 | 163 | 171 | 157 | 113 | 109 | 65 | 195 | 65 | 84 | 80 | 136 |
| SCL | 6666 | 6084 | 5771 | 1532 | 894 | 910 | 1282 | 2301 | 2510 | 3242 | 4161 | 2573 | 2405 | 4429 | 946 | 2535 | #N/A |
| BL5 | 332 | 303 | 301 | 319 | 292 | 259 | 278 | 204 | 194 | 170 | 159 | 109 | 75 | 93 | 113 | 125 | 191 |
| SR3 | 371 | 304 | 259 | 275 | 195 | 196 | 220 | 184 | 139 | 141 | 130 | 107 | 114 | 95 | 167 | 265 | 264 |
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| **Nitrate-N, µg/L** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 212 | 206 | 188 | 260 | 213 | #N/A | 87 | #N/A | 118 | #N/A | 121 | #N/A | 157 | #N/A | 141 | 235 | 273 |
| BR1 | 192 | 225 | 249 | 287 | 294 | 290 | 295 | 273 | 209 | 299 | 311 | 311 | 327 | 315 | 296 | 310 | 151 |
| BR6 | 273 | 317 | 337 | 324 | 294 | #N/A | 259 | #N/A | 206 | #N/A | 360 | #N/A | 345 | #N/A | 289 | 347 | 201 |
| SDE | 4860 | 5100 | 4160 | 4360 | 3980 | #N/A | 5560 | #N/A | 5440 | #N/A | 6990 | #N/A | 4550 | #N/A | 4790 | 7130 | 7370 |
| FRE | 4020 | 8640 | 7920 | 10140 | 6080 | 4880 | 4420 | 2860 | 4040 | 5660 | 4500 | 4490 | 4220 | 3880 | 2570 | 4460 | 5080 |
| CME | 2520 | 2165 | 2660 | 1200 | 4780 | 3540 | 2400 | 1580 | 2320 | 2655 | 1965 | 3040 | 2270 | 1410 | 1850 | 8910 | 2020 |
| BRE | 11260 | 1169 | 9410 | 3060 | 4840 | 3140 | 3000 | 1620 | 5280 | 8750 | 11090 | 7220 | 8860 | 13600 | 19680 | 20200 | 4790 |
| SRE | 10280 | 6960 | 8260 | 5400 | 2013 | 6920 | 8820 | 9500 | 9500 | 894 | 11860 | 14300 | 11180 | 20700 | 11840 | 6120 | 6040 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 7940 | 10600 | 13360 | 14780 | 13220 | 11280 | 12560 | 13890 | 3490 | 12050 | 13240 |
| BRL | 214 | 221 | 218 | 384 | 153 | 119 | 113 | 103 | 168 | 161 | 221 | 203 | 291 | 283 | 238 | 277 | 391 |
| TML | 454 | 508 | 366 | 413 | 604 | 135 | 91 | 81 | 73 | 99 | 116 | 137 | 154 | 144 | 163 | 347 | 338 |
| SRL | 182 | 187 | 148 | 145 | 96 | 77 | 86 | 92 | 75 | 64 | 68 | 73 | 77 | 75 | 81 | 136 | 138 |
| ABV CME | 541 | 442 | 418 | 471 | 269 | 175 | 145 | 126 | 73 | 111 | 169 | 163 | 160 | 147 | 182 | 324 | 351 |
| TMU | 482 | 546 | 281 | 438 | 84 | 142 | 100 | 92 | 82 | 105 | 127 | 74 | 160 | 151 | 168 | 392 | 366 |
| SOD | 33 | #N/A | 64 | 190 | 50 | 31 | 45 | 60 | 78 | 39 | 13 | <1 | <1 | 5 | 4 | 62 | #N/A |
| MIN | 61 | 65 | 38 | 79 | 30 | 7 | 47 | 52 | 21 | 5 | <1 | 7 | 4 | 3 | 3 | 33 | 68 |
| SCL | 6385 | 4720 | 4810 | 800 | 186 | 415 | 740 | 1380 | 1700 | 2140 | 3410 | 2356 | 2110 | 3160 | 1000 | 2195 | #N/A |
| BL5 | 202 | 236 | 231 | 220 | 167 | 109 | 85 | 75 | 64 | 49 | 46 | 30 | 17 | 20 | 11 | 28 | 104 |
| SR3 | 295 | 276 | 233 | 218 | 114 | 73 | 79 | 91 | 82 | 69 | 75 | 83 | 88 | 82 | 88 | 194 | 205 |
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| **Nitrite-N, µg/L** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | <1 | <1 | <1 | <1 | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | <1 | <1 |
| BR1 | <1 | 2 | 9 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| BR6 | <1 | <1 | 6 | <1 | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | <1 | <1 |
| SDE | <1 | <1 | 0 | <1 | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | #N/A | <1 | <1 | <1 |
| FRE | <1 | <1 | 0 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| CME | <1 | 3 | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 15 | <1 | <1 | <1 | <1 | 20 | <1 |
| BRE | 221 | 2 | 268 | 13 | <1 | <1 | 73 | 113 | 1860 | 2160 | 3700 | 4990 | 8180 | 6530 | 480 | 140 | 80 |
| SRE | <1 | 1 | <1 | <1 | 5 | 26 | 3 | <1 | <1 | 1930 | 120 | <1 | <1 | <1 | <1 | <1 | <1 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 10 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| BRL | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| TML | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| SRL | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| ABV CME | <1 | <1 | <1 | 7 | 6 | <1 | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 2 | <1 |
| TMU | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| SOD | <1 | #N/A | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | #N/A |
| MIN | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| SCL | <1 | <1 | 7 | <1 | <1 | <1 | 1 | 140 | 100 | 30 | 25 | 13 | 30 | 20 | <1 | 14 | #N/A |
| BL5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| SR3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
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| **Ammonia, ug/L** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 4.8 | 4.0 | 8.8 | 4.8 | 5.5 | #N/A | 6.3 | #N/A | 4.7 | #N/A | 8.5 | #N/A | 5.8 | #N/A | 3.8 | 2.6 | 13.6 |
| BR1 | 43.4 | 46.0 | 26.4 | 4.1 | 10.5 | 8.8 | 6.3 | 4.4 | 4.1 | 5.5 | 9.9 | 6.5 | 4.1 | 2.9 | 5.3 | 8.0 | 8.7 |
| BR6 | 30.1 | 26.3 | 18.2 | 29.2 | 12.4 | #N/A | 10.1 | #N/A | 5.9 | #N/A | 10.8 | #N/A | 20.6 | #N/A | 9.7 | 4.4 | 5.5 |
| SDE | 126.5 | 68.0 | 68.0 | 1300 | 1150 | #N/A | 2130 | #N/A | 82.4 | #N/A | 22.3 | #N/A | 1530 | #N/A | 4360 | 506.0 | 156.5 |
| FRE | 168.0 | 211.0 | 106.0 | 59.0 | 664.0 | 758.0 | 544.0 | 284.0 | 63.0 | 880.0 | 90.4 | 249.5 | 48.9 | 45.7 | 30.1 | 60.2 | 90.0 |
| CME | 32.0 | 50.9 | 56.2 | 25.1 | 57.0 | 16.7 | 14.1 | 19.6 | 16.0 | 16.6 | 21.1 | 18.5 | 10.9 | 9.0 | 14.4 | 17.9 | 17.0 |
| BRE | 9350 | 22750 | 15900 | 13900 | 8650 | 10100 | 12100 | 11150 | 14600 | 668 | 4140 | 5920 | 4000 | 1830 | 524 | 186 | 1500 |
| SRE | 204.0 | 103.0 | 63.0 | 37.0 | 13300 | 4850 | 72.1 | 20.4 | 490.0 | 17250 | 15.3 | 14.9 | 10.0 | 8.1 | 26.4 | 27.3 | 18.3 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 87.0 | 36.0 | 28.4 | 28.3 | 61.0 | 24.4 | 23.0 | 68.7 | 10.1 | 21.2 | 15.7 |
| BRL | 3.9 | 3.9 | 6.8 | 3.6 | 3.4 | 10.2 | 4.3 | 4.6 | 5.2 | 7.8 | 9.1 | 6.3 | 5.2 | 2.4 | 3.9 | 2.9 | 4.3 |
| TML | 255.0 | 243.0 | 299.0 | 157.0 | 169.0 | 51.3 | 15.2 | 2.6 | 1.8 | 5.2 | 5.2 | 4.2 | 1.5 | 2.0 | 2.0 | 34.3 | 46.1 |
| SRL | 4.9 | 7.7 | 6.7 | 5.4 | 2.7 | 13.5 | 2.6 | 3.3 | 1.7 | 5.2 | 5.0 | 4.4 | <1.1 | 1.6 | 2.0 | 5.4 | 1.4 |
| ABV CME | 744.0 | 644.0 | 628.0 | 552.0 | 462.0 | 192.0 | 55.2 | 6.2 | 4.3 | 9.1 | 13.8 | 7.2 | 9.5 | 2.6 | 39.0 | 244.0 | 270.0 |
| TMU | 299.0 | 297.0 | 135.0 | 206.0 | 26.3 | 56.2 | 18.7 | 5.4 | 3.6 | 3.0 | 6.2 | 1.4 | 1.1 | <1.1 | <1.1 | 37.9 | 67.9 |
| SOD | 3.7 | #N/A | 10.0 | 16.4 | 3.9 | 8.7 | 9.1 | 6.8 | 9.1 | 6.2 | 6.1 | 2.8 | 1.6 | 1.9 | 1.2 | 1.9 | #N/A |
| MIN | 5.6 | 4.0 | 5.0 | 4.1 | 4.8 | 4.1 | 1.8 | 2.2 | 2.1 | <1.1 | 3.9 | <1.1 | 2.9 | <1.1 | <1.1 | 2.1 | 2.9 |
| SCL | 244.5 | 1094.0 | 460.0 | 33.9 | 394.0 | 236.0 | 23.8 | 56.9 | 141.0 | 53.8 | 21.5 | 11.5 | 10.0 | 33.9 | 46.7 | 145.0 | #N/A |
| BL5 | 43.5 | 18.1 | 28.2 | 33.6 | 25.6 | 14.0 | 4.3 | 1.1 | 7.4 | 5.2 | 7.1 | 3.2 | 4.0 | 1.4 | 1.9 | 1.7 | 9.5 |
| SR3 | 3.0 | 3.7 | 4.2 | 4.2 | <1.1 | 3.7 | 2.9 | 3.0 | 2.6 | 2.5 | 4.7 | 3.9 | <1.1 | 1.9 | 1.8 | 3.2 | 2.0 |
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| **SpCond, uS/cm** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 27-Jan | 18-Feb | 10-Mar | 14-Apr | 12-May | 26-May | 9-Jun | 23-Jun | 14-Jul | 28-Jul | 11-Aug | 25-Aug | 15-Sep | 29-Sep | 13-Oct | 10-Nov | 8-Dec |
| STL | 326.0 | 630.0 | 427.0 | 469.0 | 383.0 | #N/A | 110.3 | #N/A | 134.5 | #N/A | 180.6 | #N/A | 208.9 | #N/A | 218.6 | 242.5 | 255.9 |
| BR1 | 303.0 | 380.0 | 365.0 | 366.0 | 366.0 | 310.0 | 282.7 | 250.9 | 214.5 | 251.4 | 246.8 | 250.4 | 242.1 | 237.7 | 236.5 | 238.9 | 225.9 |
| BR6 | 302.0 | 392.0 | 368.0 | 357.0 | 347.0 | #N/A | 252.8 | #N/A | 196.1 | #N/A | 242.6 | #N/A | 246.1 | #N/A | 246.2 | 245.8 | 235.2 |
| SDE | 695.0 | 830.0 | 832.0 | 889.0 | 721.0 | #N/A | 674.0 | #N/A | 608.0 | #N/A | 659.0 | #N/A | 650.0 | #N/A | 663.0 | 684.0 | 684.0 |
| FRE | 909.0 | 1043.0 | 881.0 | 875.0 | 774.0 | 767.0 | 753.0 | 748.0 | 727.0 | 738.0 | 706.0 | 738.0 | 706.0 | 669.0 | 679.0 | 734.0 | 824.0 |
| CME | 552.0 | 611.0 | 596.0 | 582.0 | 503.0 | 554.0 | 587.0 | 591.0 | 556.0 | 609.0 | 613.0 | 596.0 | 808.0 | 531.0 | 540.0 | 585.0 | 621.0 |
| BRE | 659.0 | 835.0 | 773.0 | 644.0 | 570.0 | 549.0 | 580.0 | 559.0 | 735.0 | 746.0 | 683.0 | 689.0 | 727.0 | 689.0 | 729.0 | 643.0 | 679.0 |
| SRE | 571.0 | 616.0 | 579.0 | 609.0 | 550.0 | 455.0 | 431.0 | 430.0 | 469.0 | 527.0 | 539.0 | 527.0 | 505.0 | 536.0 | 511.0 | 481.0 | 575.0 |
| IHE | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | 630.0 | 552.0 | 678.0 | 640.0 | 638.0 | 695.0 | 647.0 | 632.0 | 832.0 | 693.0 | 724.0 |
| BRL | 188.5 | 211.9 | 204.9 | 209.8 | 178.0 | 152.9 | 128.2 | 110.1 | 140.6 | 157.2 | 164.4 | 176.8 | 186.0 | 191.4 | 194.5 | 198.6 | 199.1 |
| TML | 1419.0 | 1571.0 | 1620.0 | 1279.0 | 969.0 | 432.0 | 234.2 | 163.1 | 207.3 | 397.0 | 392.0 | 524.0 | 616.0 | 429.0 | 748.0 | 1005.0 | 962.0 |
| SRL | 181.1 | 197.8 | 184.3 | 188.4 | 167.4 | 124.9 | 94.6 | 98.5 | 129.3 | 144.4 | 152.8 | 165.0 | 185.4 | 188.8 | 188.9 | 186.2 | 186.1 |
| ABV CME | 2265.0 | 2298.0 | 2183.0 | 2209.0 | 1495.0 | 742.0 | 385.0 | 216.9 | 114.0 | 581.0 | 525.0 | 736.0 | 883.0 | 266.7 | 1202.0 | 1767.0 | 1731.0 |
| TMU | 1581.0 | 1739.0 | 814.0 | 1442.0 | 214.0 | 479.0 | 267.2 | 193.8 | 235.6 | 445.0 | 431.0 | 218.1 | 672.0 | 458.0 | 806.0 | 1046.0 | 1121.0 |
| SOD | 211.5 | #N/A | 215.3 | 211.9 | 157.6 | 153.9 | 163.0 | 162.8 | 159.7 | 148.3 | 138.2 | 139.9 | 145.5 | 140.3 | 144.6 | 172.5 | #N/A |
| MIN | 84.4 | 90.2 | 86.7 | 83.3 | 69.3 | 61.7 | 49.8 | 51.6 | 65.5 | 73.1 | 77.2 | 83.3 | 85.0 | 82.2 | 86.3 | 88.7 | 86.3 |
| SCL | 458.0 | 522.0 | 490.0 | 306.0 | 202.0 | 197.8 | 226.9 | 288.1 | 316.0 | 297.5 | 318.0 | 310.0 | 331.0 | 316.0 | 294.9 | 368.0 | #N/A |
| BL5 | 221.4 | 243.2 | 235.0 | 220.7 | 198.3 | 177.4 | 137.4 | 100.7 | 138.9 | 159.7 | 156.3 | 172.9 | 180.3 | 190.5 | 200.6 | 210.7 | 232.4 |
| SR3 | 172.6 | 194.1 | 178.4 | 200.0 | 176.8 | 116.5 | 70.0 | 78.8 | 104.1 | 131.2 | 137.2 | 157.7 | 177.3 | 178.6 | 178.2 | 183.0 | 195.4 |