**Chromophoric Dissolved Organic Matter (CDOM) Across An Elevational Gradient from Sea Level to Mountain Lakes.**

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**Supporting Information Table 1.** Sampling dates, coordinates and lake physical and landscape characteristics sorted from low to high elevation.

| **Lake** | **Sampling date** | **Latitude** | **Longitude** | **Surface area (ha)** | **Elevation (m)** | **Watershed area (ha)** | **% developed** | **% forest** | **% herbaceous + shrub** | **% cropland** | **% wetland** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cranberry | 23-Jul | 48.5004 | -122.6445 | 54.2 | 3 | 54.5 | 11.2 | 66.0 | 0.8 | 0.0 | 4.6 |
| Lone | 1-Aug | 48.0208 | -122.4623 | 36.5 | 6 | 641.1 | 17.9 | 66.1 | 7.7 | 2.1 | 1.4 |
| Tennant | 27-Jun | 48.8299 | -122.5782 | 32.4 | 7 | 224.7 | 45.3 | 4.3 | 1.4 | 5.3 | 42.8 |
| Honeymoon | 1-Aug | 48.0515 | -122.5525 | 2.6 | 8 | 452.6 | 13.0 | 67.4 | 13.0 | 2.3 | 3.1 |
| Beaver | 9-Jul | 48.4482 | -122.2189 | 29.3 | 10 | 1055.6 | 9.8 | 66.8 | 9.4 | 2.8 | 5.8 |
| Clear | 9-Jul | 48.4599 | -122.2236 | 89.2 | 11 | 422.3 | 15.3 | 35.9 | 13.7 | 7.0 | 10.5 |
| Campbell | 23-Jul | 48.4399 | -122.6146 | 158.2 | 15 | 622.8 | 10.4 | 58.1 | 4.3 | 7.7 | 7.3 |
| Whistle | 23-Jul | 48.4604 | -122.6052 | 15.0 | 17 | 195.4 | 1.1 | 91.5 | 0.3 | 0.0 | 1.3 |
| Big | 9-Jul | 48.4029 | -122.2413 | 217.0 | 25 | 4371.5 | 10.9 | 69.5 | 7.1 | 1.9 | 5.3 |
| Sunset | 16-Jul | 48.7765 | -122.4597 | 5.2 | 32 | 2907.0 | 27.5 | 42.2 | 2.6 | 19.9 | 7.4 |
| Erie | 23-Jul | 48.4532 | -122.6408 | 46.2 | 33 | 470.1 | 14.1 | 62.0 | 2.9 | 8.2 | 2.2 |
| Bug | 16-Jul | 48.7765 | -122.4724 | 2.9 | 34 | 82.6 | 58.1 | 11.4 | 1.3 | 1.0 | 27.1 |
| Hoag | 25-Jun | 48.7082 | -122.4825 | 1.0 | 35 | 22.4 | 40.2 | 57.0 | 0.0 | 2.0 | 0.0 |
| Pass | 23-Jul | 48.4197 | -122.6361 | 38.4 | 38 | 168.9 | 5.2 | 63.9 | 1.4 | 6.9 | 0.0 |
| Fazon | 27-Jun | 48.8652 | -122.3683 | 12.9 | 40 | 81.0 | 24.7 | 36.9 | 1.7 | 22.1 | 13.2 |
| Armstrong | 18-Jul | 48.2263 | -122.1239 | 12.2 | 42 | 122.3 | 5.0 | 64.7 | 13.6 | 0.3 | 6.5 |
| Goss | 1-Aug | 48.0371 | -122.4807 | 21.7 | 42 | 414.1 | 10.3 | 77.8 | 6.1 | 0.2 | 0.4 |
| Ketchum | 18-Jul | 48.2845 | -122.3440 | 9.7 | 58 | 166.3 | 41.9 | 31.6 | 1.4 | 15.5 | 3.4 |
| Martha | 6-Aug | 48.1685 | -122.3406 | 25.1 | 58 | 360.3 | 35.0 | 51.5 | 3.2 | 2.7 | 0.9 |
| Sunday | 18-Jul | 48.2294 | -122.2570 | 15.5 | 66 | 314.1 | 28.5 | 43.5 | 5.4 | 10.5 | 8.9 |
| Terrell | 27-Jun | 48.8661 | -122.6877 | 130.0 | 66 | 1244.7 | 10.0 | 19.2 | 2.0 | 29.4 | 28.5 |
| McMurray | 9-Jul | 48.3154 | -122.2325 | 62.9 | 69 | 864.3 | 17.5 | 61.2 | 9.5 | 2.5 | 2.5 |
| Howard | 6-Aug | 48.1572 | -122.3269 | 11.4 | 74 | 125.9 | 33.8 | 41.1 | 14.8 | 1.7 | 0.0 |
| Samish | 11-Jul | 48.6592 | -122.3798 | 327.8 | 83 | 3258.0 | 6.6 | 77.0 | 5.7 | 0.4 | 0.5 |
| Goodwin | 16-Aug | 48.1390 | -122.2796 | 216.7 | 100 | 7.5 | 39.0 | 54.9 | 3.7 | 2.4 | 0.0 |
| Shoecraft | 6-Aug | 48.1292 | -122.3027 | 53.3 | 100 | 1226.3 | 31.8 | 40.2 | 3.5 | 2.0 | 0.7 |
| Heart | 23-Jul | 48.4758 | -122.6306 | 25.7 | 103 | 185.5 | 7.8 | 75.5 | 0.5 | 0.0 | 2.4 |
| Deer | 1-Aug | 47.9739 | -122.3832 | 33.1 | 108 | 307.6 | 28.4 | 52.3 | 4.8 | 4.3 | 0.0 |
| Mirror | 11-Jul | 48.6629 | -122.2196 | 4.7 | 111 | 46.1 | 5.3 | 78.5 | 4.0 | 1.0 | 3.2 |
| Cain | 11-Jul | 48.6492 | -122.3292 | 28.8 | 121 | 410.5 | 23.9 | 72.8 | 1.0 | 0.7 | 0.1 |
| Reed | 11-Jul | 48.6632 | -122.3258 | 10.0 | 122 | 130.2 | 17.1 | 81.4 | 0.0 | 0.5 | 0.6 |
| Shannon | 22-Aug | 48.5842 | -121.7237 | 833.7 | 124 | 76383.3 | 1.0 | 67.3 | 14.0 | 0.0 | 0.4 |
| Crabapple | 6-Aug | 48.1318 | -122.2724 | 14.4 | 126 | 317.4 | 44.4 | 38.3 | 5.4 | 4.2 | 1.9 |
| Ki | 6-Aug | 48.1522 | -122.2647 | 38.7 | 127 | 175.8 | 36.4 | 39.4 | 1.3 | 0.5 | 0.0 |
| Sixteen | 9-Jul | 48.3440 | -122.2895 | 17.5 | 130 | 439.0 | 5.0 | 73.5 | 15.8 | 0.0 | 1.7 |
| Squires | 11-Jul | 48.6456 | -122.3535 | 3.1 | 133 | 58.0 | 1.4 | 90.6 | 0.8 | 0.0 | 4.1 |
| Wiser | 27-Jun | 48.9037 | -122.4803 | 47.0 | 134 | 965.6 | 22.8 | 1.4 | 0.7 | 68.0 | 2.4 |
| Padden | 25-Jun | 48.7022 | -122.4519 | 59.8 | 137 | 701.8 | 30.5 | 51.3 | 8.4 | 0.6 | 0.9 |
| Squalicum | 16-Jul | 48.7978 | -122.3507 | 12.6 | 147 | 3.8 | 4.8 | 57.1 | 0.0 | 0.0 | 21.4 |
| Beaver Pond | 11-Jul | 48.7321 | -122.3759 | 3.1 | 158 | 0.5 | 20.0 | 80.0 | 0.0 | 0.0 | 0.0 |
| Geneva | 11-Jul | 48.7326 | -122.3754 | 1.5 | 158 | 91.5 | 7.2 | 73.8 | 16.3 | 0.2 | 2.6 |
| Summer | 9-Jul | 48.3332 | -122.1682 | 2.8 | 170 | 47.3 | 8.5 | 40.1 | 24.6 | 2.6 | 18.7 |
| Loma | 6-Aug | 48.1340 | -122.2530 | 8.6 | 173 | 14.5 | 56.6 | 18.9 | 15.1 | 0.6 | 0.0 |
| Everett | 22-Aug | 48.5424 | -121.7251 | 3.5 | 201 | 516.3 | 3.4 | 87.7 | 7.5 | 0.0 | 0.9 |
| Toad | 16-Jul | 48.7911 | -122.3953 | 11.5 | 219 | 191.9 | 16.5 | 76.6 | 2.2 | 0.0 | 0.0 |
| Silver | 15-Aug | 48.9781 | -122.0694 | 63.7 | 233 | 695.6 | 3.1 | 85.6 | 2.6 | 0.0 | 0.4 |
| Grandy | 22-Aug | 48.5655 | -121.8002 | 22.9 | 243 | 858.8 | 6.5 | 72.8 | 13.0 | 0.0 | 5.6 |
| Cavanaugh | 9-Jul | 48.3262 | -122.0210 | 337.2 | 308 | 1881.9 | 6.3 | 67.2 | 7.1 | 0.0 | 1.6 |
| Vogler | 22-Aug | 48.5706 | -121.7735 | 5.9 | 325 | 742.1 | 9.9 | 79.7 | 5.8 | 0.0 | 1.6 |
| Monte Cristo | 8-Aug | 48.0534 | -121.4300 | 3.1 | 593 | 4811.2 | 0.4 | 70.2 | 15.2 | 0.0 | 0.3 |
| Myrtle | 8-Aug | 48.0536 | -121.4260 | 2.9 | 606 | 8.9 | 3.1 | 79.6 | 0.0 | 0.0 | 2.0 |
| Canyon | 20-Aug | 48.8332 | -122.0710 | 2.1 | 708 | 986.2 | 0.1 | 94.6 | 3.9 | 0.0 | 0.2 |
| Evan | 8-Aug | 48.0311 | -121.6880 | 1.8 | 843 | 44.4 | 0.8 | 89.3 | 0.0 | 0.0 | 0.0 |
| Bear | 8-Aug | 48.0586 | -121.7430 | 11.9 | 847 | 71.8 | 0.1 | 88.2 | 0.4 | 0.0 | 0.0 |
| Coal | 8-Aug | 48.1123 | -121.5170 | 2.7 | 1031 | 137.6 | 0.8 | 91.1 | 6.8 | 0.0 | 0.0 |
| Highwood | 15-Aug | 48.8646 | -121.6750 | 0.7 | 1253 | 8.2 | 24.4 | 61.1 | 14.4 | 0.0 | 0.0 |
| Picture | 15-Aug | 48.8655 | -121.6770 | 1.2 | 1255 | 19.3 | 33.6 | 53.0 | 3.2 | 0.0 | 0.0 |
| L. Bagley | 15-Aug | 48.8599 | -121.6840 | 3.1 | 1276 | 69.0 | 3.6 | 36.8 | 56.9 | 0.0 | 0.0 |
| Sunrise | 15-Aug | 48.8626 | -121.6800 | 0.4 | 1292 | 13.2 | 38.1 | 53.1 | 8.2 | 0.0 | 0.0 |
| U. Bagley | 15-Aug | 48.8541 | -121.6920 | 1.5 | 1321 | 232.7 | 1.4 | 8.7 | 48.3 | 0.0 | 0.0 |
| L. Twin | 20-Aug | 48.9510 | -121.6380 | 7.4 | 1574 | 44.9 | 4.2 | 22.7 | 58.2 | 0.0 | 0.0 |
| U. Twin | 20-Aug | 48.9529 | -121.6330 | 6.6 | 1574 | 41.6 | 0.4 | 36.2 | 38.3 | 0.0 | 0.0 |

**Supplementary Information Table S2.** Comparison of shoreline and deep site water quality data for Lake Padden from two dates in 2011. Note that sampling of shoreline and deep sites took place within 7 days. Shore sites represent an average of three samples, whereas the deep site sample was taken at the surface.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Site** | **Month** | **Day** | **Year** | **TN**  **(μg L-1)** | **TP**  **(μg L-1)** | **Specific**  **conductance (μS cm-1)** | **pH** | **Temperature (°C)** | **Dissolved oxygen**  **(mg L-1)** |
| shore | 8 | 22 | 2011 | 297.7 | 3.9 | 100.1 | 7.9 | 21.1 | 8.5 |
| deep site | 8 | 29 | 2011 | 287.0 | 5.6 | 100.1 | 8.1 | 20.9 | 8.7 |
| shore | 11 | 14 | 2011 | 289.8 | 19.0 | 102.9 | 7.5 | 9.3 | 10.5 |
| deep site | 11 | 7 | 2011 | 272.8 | 21.2 | 102.4 | 7.5 | 9.9 | 9.8 |

**Supporting Information Table 3**. Study lake water quality parameters sorted from low to high elevation.

| **Lake** | **Water temperature (°C)** | **Dissolved oxygen (mg/L)** | **pH** | **Specific conductance (mS cm-1)** | **Chlorophyll *a* (mg L-1)** | **Alkalinity (mg L-1)** | **Turbidity (NTU)** | **Total nitrogen (mg L-1)** | **Total phosphorus (mg L-1)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cranberry | 24.4 | 12.3 | 9.4 | 242.6 | 41.5 | 61.4 | 8.1 | 1203 | 22.6 |
| Lone | 24.0 | 10.4 | 9.5 | 167.9 | 30.1 | 62.1 | 4.56 | 939 | 246.8 |
| Tennant | 16.2 | 7.0 | 6.5 | 125.6 | 50.5 | 47.1 | 11 | 1431 | 168.8 |
| Honeymoon | 22.6 | 7.6 | 8.9 | 170.7 | 190.3 | 64.2 | 21.1 | 1994 | 90.2 |
| Beaver | 22.9 | 9.4 | 7.6 | 94.6 | 22.2 | 43.8 | 6.25 | 760 | 44.7 |
| Clear | 22.7 | 8.7 | 7.2 | 3.3 | 6.3 | 33.4 | 2.87 | 441 | 12.6 |
| Campbell | 24.0 | 9.0 | 8.3 | 247.3 | 16.2 | 85.7 | 4.15 | 785 | 33.4 |
| Wiser | 21.9 | 10.3 | 8.9 | 459.6 | 42 | 71.4 | 12.5 | 1294 | 118.9 |
| Big | 22.9 | 9.1 | 7.7 | 82.2 | 8.4 | 31.9 | 3.17 | 297 | 15.1 |
| Sunset | 24.8 | 10.6 | 9.2 | 183.9 | 2.3 | 57.9 | 1.53 | 326 | 14.8 |
| Erie | 23.6 | 9.6 | 8.6 | 241.1 | 54.5 | 81.1 | 20.3 | 1541 | 49.1 |
| Bug | 24.3 | 6.4 | 7.5 | 190.9 | 3.6 | 85.5 | 1.93 | 533 | 26.7 |
| Hoag | 19.0 | 6.5 | 7.4 | 142 | 26.7 | 65.2 | 4.35 | 1031 | 75.6 |
| Pass | 22.1 | 9.4 | 8.7 | 271.1 | 13.5 | 69.5 | 3.46 | 680 | 26.7 |
| Fazon | 21.3 | 9.3 | 7.6 | 243.9 | 46.1 | 45.7 | 5.09 | 1174 | 76.5 |
| Armstrong | 24.4 | 8.1 | 7.9 | 54.8 | 2.9 | 22.3 | 0.65 | 390 | 14.1 |
| Goss | 24.0 | 8.4 | 8.1 | 122.1 | 2.6 | 37.2 | 1.22 | 452 | 8.7 |
| Ketchum | 24.5 | 8.8 | 8.2 | 155 | 4.3 | 42.3 | 0.96 | 534 | 10.1 |
| Martha | 19.4 | 9.0 | 6.8 | NA | 2.1 | 32.2 | 0.49 | 429 | 7.8 |
| Terrell | 20.8 | 11.7 | 9.8 | 93.3 | 145.1 | 35.4 | 23.5 | 2073 | 62.5 |
| Sunday | 23.7 | 3.8 | 6.5 | 70.1 | 2.5 | 21.4 | 0.63 | 519 | 21.2 |
| McMurray | 22.2 | 9.4 | 8.3 | 93.2 | 5.1 | 27.8 | 1 | 338 | 12.2 |
| Howard | 23.6 | 8.5 | 7.9 | 118.4 | 1.8 | 46.6 | 0.53 | 425 | 7.9 |
| Samish | 21.4 | 9.6 | 8.2 | 62 | 1.7 | 20.5 | 0.39 | 309 | <5 |
| Shoecraft | 23.6 | 8.5 | 7.8 | 95.3 | 2.5 | 34.5 | 1.24 | 372 | 5.5 |
| Goodwin | 24.2 | 8.6 | 7.9 | 87.9 | 1.7 | 28.7 | 0.6 | 362 | <5 |
| Heart | 22.8 | 9.1 | 8.3 | 250.9 | 7.1 | 72.3 | 1.17 | 728 | 16.4 |
| Deer | 24.6 | 8.6 | NA | 79.8 | 2.2 | 23.1 | 0.55 | 405 | 5.8 |
| Mirror | 21.5 | 9.1 | 7.5 | 40.2 | 2.1 | 19.3 | 0.74 | 249 | 8.7 |
| Cain | 22.4 | 9.8 | 8.7 | 51.2 | 4.5 | 18.8 | 1.74 | 554 | 7.4 |
| Reed | 21.4 | 8.9 | 7.2 | 54.5 | 2 | 22.7 | 1.29 | 363 | 23.8 |
| Shannon | 20.4 | 9.5 | 7.9 | 46.4 | 1.9 | 14.8 | 1.59 | 69.5 | 5.7 |
| Crabapple | 23.4 | 8.7 | 7.5 | 46 | 4.7 | 12.6 | 0.91 | 478 | 8.3 |
| Ki | 24.1 | 8.9 | 8.3 | 46.8 | 2.6 | 11.6 | 0.43 | 280 | <5 |
| Sixteen | 22.9 | 8.9 | 8.0 | 76.9 | 1.7 | 27.9 | 1.06 | 298 | 11.6 |
| Squires | 22.0 | 8.2 | NA | 42.5 | 4 | 18.4 | 2.38 | 411 | 18.2 |
| Whistle | 21.6 | 9.5 | 8.3 | 156.3 | 4.6 | 47.1 | 0.75 | 372 | 17.5 |
| Padden | 22.1 | 9.5 | 8.6 | 91.4 | 3.8 | 25.9 | 0.88 | 251 | 10.2 |
| Squalicum | 22.6 | 6.5 | 7.5 | 67.3 | 2.8 | 25.9 | 1.74 | 745 | 26.8 |
| Geneva | 19.2 | 4.3 | 6.3 | 35.8 | 13.1 | 16 | 4.4 | 819 | 95.2 |
| Beaver Pond | 16.6 | 0.8 | 6.1 | 46.1 | 2.6 | 19.5 | 2.11 | 559 | 33.7 |
| Summer | 22.7 | 8.0 | 7.3 | NA | 16.2 | 11.2 | 1.73 | 493 | 23.1 |
| Loma | 24.0 | 7.9 | 7.2 | 45.1 | 11.8 | 10 | 0.69 | 655 | 25.8 |
| Everett | 21.3 | 9.4 | 7.9 | 136.6 | 1.8 | 67 | 1.15 | 205 | 5 |
| Toad | 23.5 | 9.5 | 8.6 | 115.4 | 4.8 | 45.2 | 2.47 | 707 | 17.4 |
| Silver | 23.5 | 9.4 | 8 | 140.5 | 5.4 | 53.3 | 1.02 | 260 | 9.4 |
| Grandy | 21.0 | 7.3 | 7.6 | 148.2 | 7.5 | 74.2 | 2.3 | 311 | 15.1 |
| Cavanaugh | 20.4 | 9.3 | 7.7 | 27.3 | 0.5 | 10.2 | 0.38 | 130 | <5 |
| Vogler | 21.8 | 7.5 | 6.6 | 14.7 | 5.6 | 3.4 | 2.09 | 614 | 20.9 |
| Monte Cristo | 17.9 | 6.3 | 6.8 | 82.2 | 2.4 | 28.7 | 3.97 | 130 | 8.5 |
| Myrtle | 22.2 | 7.3 | 7 | 23.7 | 4.7 | 10.4 | 1.21 | 282 | 12 |
| Canyon | 19.1 | 8.1 | 7.6 | 22.9 | 1.4 | 9.7 | 0.47 | 87.3 | <5 |
| Evan | 24.7 | 7.8 | 6.8 | 9.9 | 3.8 | 2.1 | 0.85 | 341 | 12.8 |
| Bear | 25.1 | 7.6 | 7.2 | 5.6 | 1.5 | 1.2 | 1.45 | 159 | 6 |
| Coal | 17.2 | 9.2 | 7.9 | 53.1 | 0.9 | 25.4 | 0.42 | 48 | <5 |
| Highwood | 19.7 | 8.0 | 7.4 | 24.9 | 1.6 | 5.5 | 0.69 | 126 | 6.9 |
| Picture | 19.8 | 7.8 | 7.4 | 22.3 | 1.3 | 5.3 | 0.56 | 144 | 7.1 |
| L. Bagley | 11.2 | 9.6 | 7.1 | 14.6 | 0.4 | 6.5 | 0.21 | 27.5 | <5 |
| Sunrise | 19.1 | 8.5 | 8.2 | 48.1 | 6.8 | 18.2 | 1.24 | 244 | 10.7 |
| U. Bagley | 9.9 | 8.7 | 7.2 | 5.6 | 0.5 | 6.3 | 0.25 | 23.2 | <5 |
| U. Twin | 15.1 | 9.0 | 8.0 | 73.5 | 0.3 | 24 | 0.17 | 16.2 | <5 |
| L. Twin | 15.8 | 8.9 | 7.9 | 52.4 | 0.5 | 24 | 0.29 | 24.3 | <5 |

**Supporting information Figure 1.**

Graphical user interface

Description automatically generated with low confidence

Figure S1. Lake names corresponding to RDA (Figure 6).