***GREEN VALLEY 2019 SAMPLING METADATA***

Compiled by T.J. Butts, February 2022

|  |  |  |  |
| --- | --- | --- | --- |
| **Field Data: 2019\_gv\_nutrients.csv** | | | |
| **Column Name** | **Description** | **Details** | |
| project | project identifier | GVLmonitoring=Water Quality collected for the Iowa Department of Natural Resources Ambient Lakes Monitoring program | |
| year | year in which sample was taken | 2019 – 2020 | |
| doy | julian day of year, 2019 | number | |
| siteID | site identifier (1-6) | An arbitrary value assigned to the six sampling stations in Green Valley Lake in summer 2019. Data for this paper was only taken at the deep hole which was site 4 | |
| **Column Name** | **Description** | **Units** | **Method** |
| sampleDepth | sampling depths at sampling site | m | na |
| TP\_ugL | total phosphorus concentration | micrograms per liter (µg L-1) | EPA 365.1 v2 (USEPA, 1993) |
| flagTP | data quality flag for TP data | b=below detection limit; value replaced with 0.1 | |
| SRP\_ugL | soluble reactive phosphorus | micrograms per liter (µg L-1) | EPA 365.1 v2 (USEPA, 1993) |
| flagSRP | data quality flag for SRP data | b=below detection limit; value replaced with 0.1 | |
| TN\_mgL | total nitrogen concentration | milligrams per liter (mg L-1) |  |
| flagTN | data quality flag for TN data | b=below detection limit; value replaced with 0.1 | |
| NOx\_mgL | Nitrate (NO3) concentration | milligrams per liter (mg L-1) | second derivative spectroscopy |
| flagNOx | data quality flag for nitrate | b=below detection limit; value replaced with 0.1 | |
| microcystin | ammonium concentration | milligram per liter (mg L-1) |  |
| microcystin\_flag | data quality flag for ammonium | b=below detection limit; value replaced with 0.1 | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Field Data: 2019\_highfrequency\_gv\_EXO3.csv** | | | |
| **Column Name** | **Description** | **Units** | |
| doyfrac | Fraction of the day of year, based on time of day | Decimal day of year | |
| doy | Julian day of year, 2019 |  | |
| timefrac | Fraction of a day | Values 0-1 | |
| site | Site of the sensor deployment (Site 4) |  | |
| **Column Name** | **Description** | **Units** | **Method** |
| chl\_rfu | Chlorophyll a | Raw fluorescence units | Total algae probe for YSI EXO3 |
| chl | Chlorophyll a concentration | micrograms per liter (μg L-1) | Total algae probe for YSI EXO3 |
| cond | Conductivity | Micro Siemens per centimeter | Temp/conductivity probe on YSI EXO3 |
| nLF cond |  |  | |
| odo\_sat | Dissolved oxygen saturation | Percent saturation | Optical dissolved oxygen probe, YSI EXO3 |
| odo\_satlocal | Dissolved oxygen saturation corrected for local pressure | Percent saturation | |
| odo | Dissolved oxygen concentration | Milligrams per liter (mg L-1) | Optical dissolved oxygen probe, YSI EXO3 |
| salinity | Salinity | Practical salinity unity | |
| spcond | Specific Conductance | Micro Siemens per centimeter | Temp/conductivity probe on YSI EXO3 |
| pc\_rfu | Phycocyanin | Raw fluorescence units | |
| pc | Phycocyanin concentration | micrograms per liter (μg L-1) | Total algae probe for YSI EXO3 |
| tds | Total dissolved solids | Milligrams per liter | |
| wiper | Position of the sensor wiper during the measurement |  | |
| ph | pH | (na) | Ag/AgCl probe on YSI EXO3 |
| ph\_mv | pH electrical signal | Millivolts | Ag/AgCl probe on YSI EXO3 |
| temp | Water temperature | Celsius | Temp/conductivity probe on YSI EXO3 |
| battery | Battery voltage | Volts | |
| cablepower | Cable power voltage | Volts | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Bio Data: 2019\_site4\_gv\_zoopdata.csv** | | | |
| **Column Name** | **Description** | **Units** | |
| SAMPLE.ID | Laboratory sample identification number | **G**=Green Valley Lake/ A=Ambient Lake Program; **19**=Year; **041**=Lake ID for Green Valley Lake; **143**=Day of Year; **410**=sampled at the deep hole | |
| LAKE.NO | Lake Identification number assigned by the Iowa Department of Natural Resources | | |
| DOY | Julian day of year, 2019 | | |
| TAXON | Lowest taxonomic classification. Genera for cladocerans and rotifers, order for copepods, class for ostracods. Full list described in the supplement. | | |
| GROUP | Broader taxonomic grouping (described in the supplement) | | |
| **Column Name** | **Description** | **Units** | **Method** |
| BIOMASS.UG.L | Taxa-specific zooplankton biomass concentration | micrograms per liter (µg L-1) | Published length-weight regressions |
| INDV.L | Taxa-specific zooplankton density | individuals per liter (# L-1) |  |
| BIOMASS.UG | Taxa-specific dry mass | micrograms | Published length-weight regressions |

|  |  |  |  |
| --- | --- | --- | --- |
| **Bio Data: 2019\_site4\_gv\_zooplog.csv** | | | |
| **Column Name** | **Description** | **Units** | |
| SAMPLE.ID | Laboratory sample identification number | **G**=Green Valley Lake/ A=Ambient Lake Program; **19**=Year; **041**=Lake ID for Green Valley Lake; **143**=Day of Year; **410**=sampled at the deep hole | |
| lake | Lake Identification number assigned by | | |
| doy | Julian day of year, 2019 | | |
| **Column Name** | **Description** | **Units** | **Method** |
| SAMPLEVOLUME | Volume of zooplankton sample | milliliters (mL) |  |
| VOLUMECOUNTED | Volume of subsample counted | milliliters (mL) |  |
| TOW | Depth of zooplankton tow | meters (m) | WI net |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bio Data: 2019\_zoop\_cnpratios.csv** | | | | | | |
| **Column Name** | | **Description** | | **Units** | | |
| taxon | | Lowest taxonomic classification. Genera for cladocerans and rotifers, order for copepods, class for ostracods | | | | |
| lake | | broader taxonomic grouping (described in the supplement) | | | | |
| **Column Name** | | **Description** | | **Units** | | **Method** |
| %C | | Taxa-specific percent carbon composition | | | | Literature compilation |
| %N | | Taxa-specific percent nitrogen composition | | | |
| %P | | Taxa-specific percent phosphorus composition | | | |
| **Bio Data: 2019\_site4\_gv\_phydata.csv** | | | | | | |
| **Column Name** | **Description** | | **Units** | | | |
| SAMPLE.ID | Laboratory sample identification number | | **G**=Green Valley Lake/ A=Ambient Lake Program; **19**=Year; **041**=Lake ID for Green Valley Lake; **143**=Day of Year; **410**=sampled at the deep hole | | | |
| LAKE.NO | Lake Identification number assigned by the Iowa Department of Natural Resources | | | | | |
| DAY | Julian day of year, 2019 | | | | | |
| DIVISION | phylogenetic division of the phytoplankton taxon | | | | | |
| TAXON | Genera of identified phytoplankton taxa. Full list described in the supplement | | | | | |
| TREATMENT | Categorical variable of an incubator experiment representing data pre- and post-incubation of phytoplankton species in a 10 L aerated tank | | **pre =** phytoplankton directly sampled from the lake  **post =** phytoplankton after undergoing 24-hours of zooplankton grazing by zooplankton naturally within the sample | | | |
| **Column Name** | **Description** | | **Units** | | **Method** | |
| BIOMASS.MG.L | taxa-specific phytoplankton biovolume | | milligrams per liter (mg L-1) | | Based on phytoplankton shape and converted to wet biomass assuming a 1:1 biovolume to wet biomass ratio | |

|  |  |
| --- | --- |
| **Bio Data: 2019\_gv\_phytoplanktongrouping.csv** | |
| **Column Name** | **Description** |
| taxon | Genera of identified phytoplankton taxa. Full list described in the supplement |
| group | Genera or phyla of identified phytoplankton. Column used to separate and specify certain taxa of interest (e.g., *Microcystis spp.* from other cyanobacteria) based on their biomass contributions versus larger phylum groupings of less abundant species |

|  |  |  |
| --- | --- | --- |
| **Bio Data: 2019\_gv\_gald-bodymass.csv** | | |
| **Column Name** | **Description** | |
| doy | Julian day of year, 2019 | |
| **Column Name** | **Description** | **Units** |
| gald | Greatest axial linear distance of a phytoplankton single-cell or colony | ocular units (multiply by 2.5 to get micrometers, µm) |
| mass | Individual zooplankton body mass derived from length-weight regressions | micrograms (µg) |

|  |  |  |
| --- | --- | --- |
| **Bio Data: 2019\_gv\_gald-length.csv** | | |
| **Column Name** | **Description** | |
| doy | Julian day of year, 2019 | |
| **Column Name** | **Description** | **Units** |
| gald | Greatest axial linear distance of a phytoplankton single-cell or colony | ocular units (multiply by 2.5 to get micrometers, µm) |
| length | individual zooplankton body size | micrometers (µm) |

|  |  |  |
| --- | --- | --- |
| **Excretion Data: Hebert\_extract\_N** | | |
| **Column Name** | **Description** | **Units** |
| X | the natural log of zooplankton dry mass extracted from figure 3A in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer | milligrams (mg) |
| Y | the natural log of ammonia excretion extracted from figure 3A in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer | nmol N-NH4 ind-1 h-1 |
| **Excretion Data: Hebert\_extract\_N\_FW** | | |
| **Column Name** | **Description** | **Units** |
| X | the natural log of zooplankton dry mass extracted from figure 3A in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer. Data represent only data points from freshwater data sources. | milligrams (mg) |
| Y | the natural log of ammonia excretion extracted from figure 3A in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer. Data represent only data points from freshwater data sources. | nmol N-NH4+ ind-1 h-1 |
| **Excretion Data: Hebert\_extract\_P** | | |
| **Column Name** | **Description** | **Units** |
| X | the natural log of zooplankton dry mass extracted from figure 3B in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer. Data represent only data points from freshwater data sources. | milligrams (mg) |
| Y | the natural log of phosphate excretion extracted from figure 3B in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer. Data represent only data points from freshwater data sources. | nmol P-PO43- ind-1 h-1 |
| **Excretion Data: Hebert\_extract\_P\_FW** | | |
| **Column Name** | **Description** | **Units** |
| X | the natural log of zooplankton dry mass extracted from figure 3B in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer. Data represent only data points from freshwater data sources. | milligrams (mg) |
| Y | the natural log of phosphate excretion extracted from figure 3B in Hebert et al. 2016 (https://doi.org/10.1890/15-1084.1) using WebPlotDigitizer. Data represent only data points from freshwater data sources. | nmol P-PO43- ind-1 h-1 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Historical Data: gv\_alm\_historical.csv** | | | |
| **Column Name** | **Description** | **Details** | |
| siteID | Site Identification associated with Green Vallley Lake | Assigned by the Iowa Department of Natural Resources | |
| name | Lake name |  | |
| sampleDate | Date-time of sample collection | month-day-year-hour-minute | |
| Year | Year of sample collection |  | |
| DOYfrac | Fraction of the day of year based on time of day |  | |
| DOY | Julian day of year, 2019 |  | |
| DOYFrac | Fraction of the day of year based on year progression |  | |
| **Column Name** | **Description** | **Units** | **Method** |
| analyte | Total Phosphorus | micrograms per liter (µg L-1) | EPA 365.1 v2 (USEPA, 1993) |
| Orthophosphate (as P) | micrograms per liter (µg L-1) | EPA 365.1 v2 (USEPA, 1993) |
| Total Nitrogen | milligrams per liter (mg L-1) | second-derivative spectroscopy |
| Nitrate | milligrams per liter (mg L-1) | EPA 353.2 v2  (USEPA, 1993) |
| Ammonia-nitrogen (as N) | milligram per liter (mg L-1) | EPA 350.1 v2  (USEPA, 1993) |
| Alkalinity, total | milligram per liter (mg L-1 CaCO3) | SM 2320-B  (APHA, 1998) |
| Chlorophyll a | micrograms per liter (µg L-1) | USEPA Method 445.0 Rev. 1.2 |
| Fixed suspended solids | milligram per liter (mg L-1) | USGS I-3765-85 |
| Kjedahl nitrogen | milligram per liter (mg L-1) | EPA 351.2 v2  (USEPA, 1993) |
| Total suspended solids | milligram per liter (mg L-1) | USGS I-3765-85 |
| Volatile Suspended Solids | milligram per liter (mg L-1) | USGS I-3765-85 |
| result | Concentration of analyte | Units described in ‘unit’ column | |
| unit | Units of measurement |  | |
| detect | Detect limit of analyte | TRUE = above detection limit  FALSE = below detection limit | |
| detectLimit | Value of detection limit of analyte |  | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Historical Data: gv\_plankton\_historical.csv** | | | |
| **Column Name** | **Description** | **Details** | |
| Year | Year of sample collection |  | |
| DOYFrac | Fraction of the day of year based on year progression |  | |
| **Column Name** | **Description** | **Units** | **Method** |
| PhytoBiomass | Total phytoplankton biomass | milligrams per liter (mg L-1) | See plankton analysis subsection in methods section of manuscript |
| Bacillariophyta | Biomass of bacillariophytes | milligrams per liter (mg L-1) |
| Chlorophyta | Biomass of chlorophytes | milligrams per liter (mg L-1) |
| Chrysophyta | Biomass of chrysophytes | milligrams per liter (mg L-1) |
| Cryptophyta | Biomass of cryptophytes | milligram per liter (mg L-1) |
| Cyanophyta | Biomass of cyanophytes | milligram per liter (mg L-1 CaCO3) |
| Dinophyta | Biomass of dinophytes | milligrams per liter (mg L-1) |
| Euglenophyta | Biomass of eugleonphytes | milligram per liter (mg L-1) |
| Haptophyta | Biomass of haptophytes | milligram per liter (mg L-1) |

|  |  |  |  |
| --- | --- | --- | --- |
| **Historical Data: zp\_historical.csv** | | | |
| **Column Name** | **Description** | **Details** | |
| sampledate | Sampling date | month-day-year | |
| doyfrac | Fraction of the day of year based on time of day |  | |
| doy | Julian day of year |  | |
| year | year of sample collection |  | |
| yearfrac | Fraction of the day of year based on year progression |  | |
| genus | Lowest taxonomic classification | Genera for cladocerans and rotifers, order for copepods, class for ostracods | |
| division | Broader taxonomic grouping | Chydoridae; Rotifer; Bosmina; Calanoida; Ceriodaphnia; Cyclopoida; Daphnia; Daphniid; Diaphanosoma; Leptodora; Nauplii; Calanoid; Cyclopoid; Ostracod | |
| **Column Name** | **Description** | **Units** | **Method** |
| biomass | zooplankton biomass | micrograms per liter (µg L-1) | See plankton analysis subsection in methods section of manuscript |