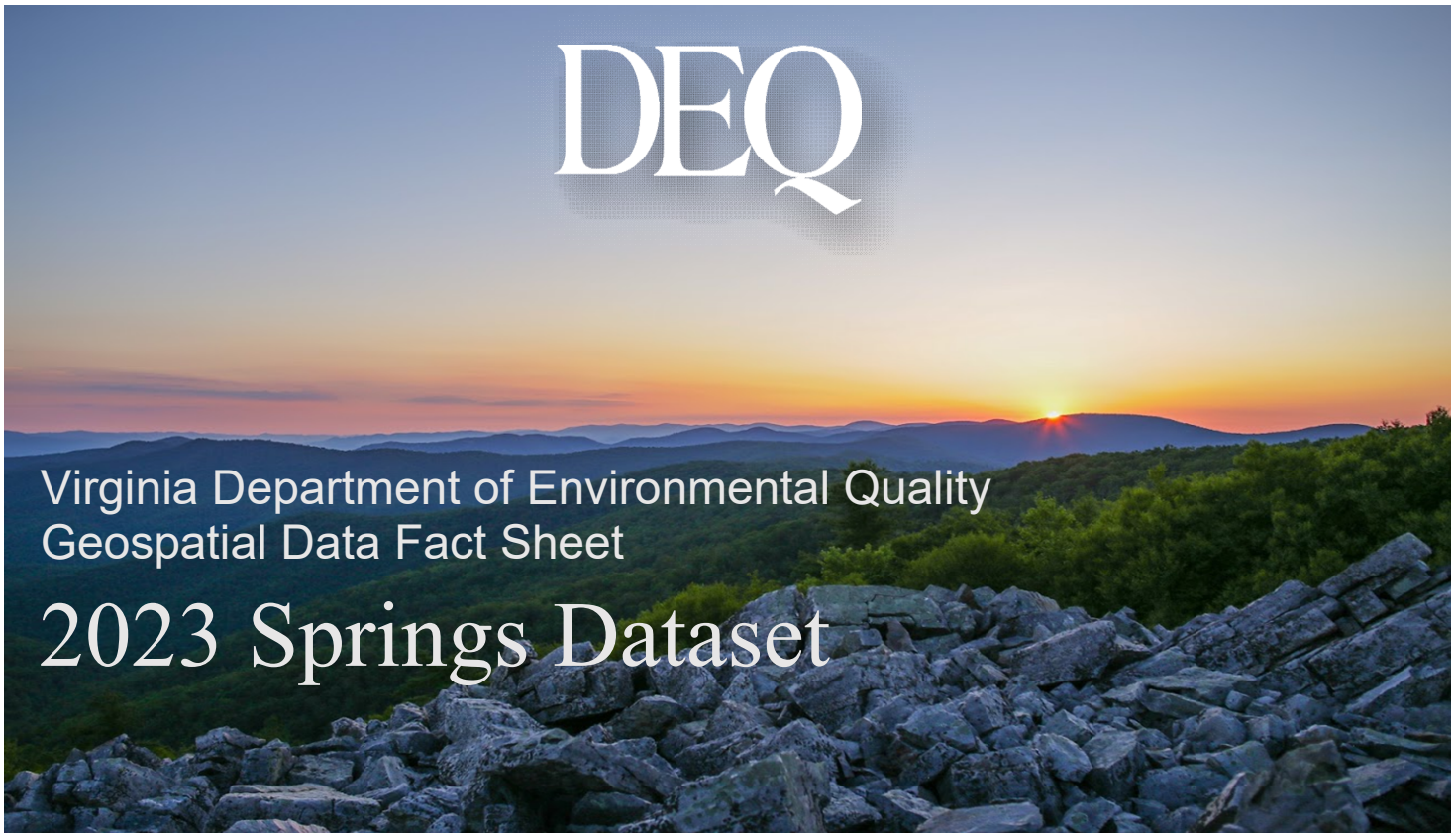


DEQ

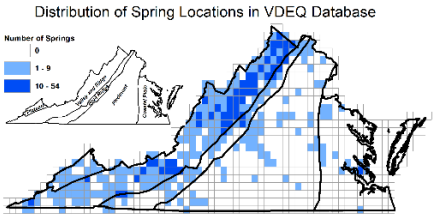
Virginia Department of Environmental Quality
Geospatial Data Fact Sheet

2023 Springs Dataset

Dataset Summary

2023 DEQ Statewide Spring GIS dataset. The geographic layers provided contain data describing the geographic locations of natural springs throughout the commonwealth inventoried by DEQ staff, its predecessor agency, and several other state and federal contributors. Site attributes, measured field parameters, and water chemistry are provided for a subset of springs in the database where available. The database is a combination of modern and historical sources and contains only spring locations known to exist with a reasonable degree of certainty on the date of publication. Current coverage is known to be poor in many areas of the state and cannot replace site specific inventorying or receptor surveys but the dataset may assist research in an area of interest.





Data Highlights:

- 1,638 Inventoried Spring Sites
- 5,913 Field Measurement Events
- 2,916 Laboratory Sampling Events

Dataset Description and Purpose

To document the occurrence of springs throughout the commonwealth of Virginia and enable the investigation of factors affecting the physical and chemical properties of groundwater discharging from them. All historical and modern spring data available to or collected by the author was compiled into a database that was used to document the ranges of physical and chemical spring characteristics throughout Virginia, and for the first time investigate geologic factors that may influence their occurrence in the region. Data were processed from a variety of sources (attributed in database) to remove duplication, improve locational accuracy, and evaluate available water quality sampling results. Spring site location information is provided in "VDEQ_Spring_SITES" layer. Field measurement data, where available, is provided for a subset of springs in "VDEQ_Springs_FIELD_MEASUREMENTS" layer. Laboratory water quality data, where available, is provided for a subset of springs in "VDEQ_Springs_WQ" layer. Site information from "VDEQ_Spring_Sites" layer is joined to both field measurement and water quality layers to facilitate ease of sorting and analysis.

Despite its incomplete and limited nature, the spring database has shown utility as a tool for uncovering previously undocumented hydrogeologic relationships in Virginia. It is hoped that the spring database and a preliminary analysis of the dataset (available here or by contacting data contact) will continue to be expanded on and assist future research in the region.

Please direct any questions, additions, about attribute accuracy to the Data Contact.

Resource Constraints / Use Limitations

Point locations and attributes should not be altered except by the developer (DEQ). Crediting the Virginia Department of Environmental Quality as data source is requested. This data may be shared with others.

Data Contact:

Organization: Virginia Department of Environmental Quality – Groundwater Characterization & Monitoring Program.

Name: Joel P. Maynard

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Email: joel.maynard@deq.virginia.gov

Dataset Credits:

> Joel P. Maynard, Virginia Department of Environmental Quality, Groundwater Characterization Program, 4411 Early Rd, PO Box 3000, Harrisonburg, VA 22801 (540) 574-7864

Update Cycle:

> Periodic

Data Disclaimer

This geographic information system (GIS) data is made available as a public service. **This dataset is to be used for reference purposes only and Virginia Department of Environmental Quality, is not responsible for any inaccuracies herein contained**. No responsibility is assumed for damages or other liabilities due to the accuracy, availability, use or misuse of the information herein provided. GIS information is in the public domain and may be copied without permission; citation of the source is suggested.

The information contained within this geospatial dataset is for reference purposes only and is **not** to be construed or used as a "legal description" or for legal purposes. This information is believed to be accurate, but accuracy is not guaranteed. Information drawn from this dataset must be used in consultation with appropriate federal, state, or local resource management

officials. Any errors or omissions should be reported to Virginia Department of Environmental Quality via email, or via the contact listed within this Fact Sheet.

Data Quality

The geospatial product was produced from a variety of sources* to remove duplication, improve locational accuracy, and evaluate available water quality sampling results. Spring locational accuracy varies depending on location method** if known (LATLONGSOURCE column). Spring locations were improved when possible through field work and the use of high-resolution orthoimagery and LIDAR (Laser Imaging, Detection and Ranging) data. Sampling and laboratory analysis errors were evaluated for a subset of springs by calculating anion/cation charge balance values when possible with reported values for major ions including (at a minimum) calcium, magnesium, potassium, sodium, bicarbonate, chloride, and sulfate. Reported values for Nitrate as N, carbonate, and fluoride were included in the charge balance calculation when available. Field determined values for bicarbonate and carbonate were used in the charge balance calculation when available. For much of the legacy DEQ groundwater sample data, bicarbonate values were derived from lab reported values of alkalinity (as mg/CaCO3) under the assumption that there was no contribution by carbonate to the reported alkalinity value. Charge balance values are reported in the "Charge Balance" column of the Spring WQ geodatabase. The closer the charge balance value is to unity (1), the lower the assumed charge balance error. In order to preserve the numerical capabilities of the database, non- numeric lab qualifiers were given the following numeric identifiers:- (minus sign) = less than the concentration specified to the right of the sign-11110 = estimated. -22220 = presence verified but not quantified. -33330 = radchem non-detect, below sslc. -4440 = analyzed for but not detected. -55550 = greater than the concentration to the right of the zero. -66660 = sample held beyond normal holding time. -77770 = quality control failure, data not valid. -88880 = sample held beyond normal holding time. Sample analyzed for but not detected. Value stored is limit of detection for process in use. -11120 = Value reported is less than the criteria of detection. -9999 = no data (parameter not quantified).

See the FGDC metadata included with the geodatabase for more information about the attribute fields.

*Data Sources in Database: VDEQ = Virginia Department of Environmental Quality *and* State Water Control Board (predecessor of DEQ), USGS = U.S. Geological Survey, VDGMR = Virginia Division of Geology and Mineral Resources, VDCR = Virginia Department of Conservation and Recreation, VDH = Virginia Department of Health Office of Drinking Water, Consultant = various consultants, Citizen = report from private citizen.

**Location methods in database: PPDGPS = Post Processed Differential GPS – submeter locational accuracy, VGIN = located using statewide high resolution digital ortho-imagery from Virginia Geographic Information Network 2002 – 2017 – meter-scale locational accuracy, GPS = location obtained using uncorrected data from a consumer grade GPS device – sub decameter accuracy, MAP = location was obtained by interpretation of 1:24,000 scale topographic map – accuracies have been found to be generally within 100 meters, UNDET (or blank) = no determination could be made – most likely obtained from topographic map.

Spatial Reference Information

Native: NAD83, Geographic Decimal Degrees (EPSG: 4269) https://epsg.io/4269

After Web Download: EPSG 3857: WGS 84 / Web Mercator – Spherical Mercator: https://epsg.io/3857

Data Dictionary / Field Information.

Field Name	Field Alias	Field Summary
OBJECTID*	OBJECTID*	Auto-generated number assigned to each feature

Field Name	Field Alias	Field Summary
Shape	Shape	Feature geometry type
DEQ_NUMBER	DEQ_NUMBER	DEQ well and spring numbering system
SPRING_NAME	SPRING_NAME	WITHHELD IN PUBLIC VERSION - Common name or names of spring
USGS_SITE_ID_LOCAL	USGS_SITE_ID_LOCAL	USGS Site ID and Local ID
VWUDS_MPID	VWUDS_MPID	WITHHELD IN PUBLIC VERSION - Virginia DEQ Water Use Database identification number
OTHER_ID	OTHER_ID	Other ID Numbers
SITE_COMMENTS	SITE_COMMENTS	WITHHELD IN PUBLIC VERSION – Site comments
DATE_INVENTORIED_INITIAL	DATE_INVENTORIED_INITIAL	Date of earliest known inventory
NUMBER_OF_OPENINGS	NUMBER_OF_OPENINGS	Number of spring discharge points
ALTITUDE_FT_AMSL	ALTITUDE_FT_AMSL	Elevation (ft above NGVD29) derived from topographic map
NED_10M_Elevation	NED_10M_Elevation	Elevation (ft above NAVD88) derived from USGS digital elevation model (DEM)
LATITUDE_NAD83_DMS	LATITUDE_NAD83_DMS	Latitude of spring in degrees minutes seconds
LONGITUDE_NAD83_DMS	LONGITUDE_NAD83_DMS	Longitude of spring in degrees minutes seconds
LATNAD83DD	LATNAD83DD	Latitude of spring in decimal degrees
LONGNAD83DD	LONGNAD83DD	Longitude of spring in decimal degrees
Site_Photos_Field_Notes	Site_Photos_Field_Notes	Availability of site photos or other field data scans (Y or N)
COUNTY	COUNTY	County
TOPO_SETTING	TOPO_SETTING	Topographic setting
WATER_USE	WATER_USE	WITHHELD IN PUBLIC VERSION – Reported spring use
IMPROVEMENTS	IMPROVEMENTS	Modifications or infrastructure to spring opening
SPHERE_OF_DISCHARGE	SPHERE_OF_DISCHARGE	Sub-aqueous or Sub-arial
OWNER	OWNER	WITHHELD IN PUBLIC VERSION
DATA_COLLECTOR	DATA_COLLECTOR	Organization supplying spring site information

Field Name	Field Alias	Field Summary
HDATUM_AS_COLLECTED	HDATUM_AS_COLLECTED	Horizontal datum as reported
LATLONGSOURCE	LATLONGSOURCE	PPDGPS = Post Processed Differential GPS – submeter locational accuracy, VGIN = located using statewide high resolution digital ortho-imagery from Virginia Geographic Information Network 2002 – 2017 – meter-scale locational accuracy, GPS = location obtained using uncorrected data from a consumer grade GPS device – sub decameter accuracy, MAP = location was obtained by interpretation of 1:24,000 scale topographic map – accuracies have been found to be generally within 100 meters, UNDET (or blank) = no determination could be made – most likely obtained from topographic map.
QUAD_NAME	QUAD_NAME	Topographic quadrangle map where spring is located
ROCK GROUPING	ROCK GROUPING	Hydrogeologic unit assigned during data analysis for DEQ OFR 23-01 Springs of Virginia report
USGS_500K_Geol_Label	USGS_500K_Geol_Label	Geologic label field of spring location derived from USGS geologic map of Virginia
USGS_500K_Geol_Unit_Link	USGS_500K_Geol_Unit_Link	Geologic unit link field of spring location derived from USGS geologic map of Virginia
USGS_500K_Geol_AGE	USGS_500K_Geol_AGE	Geologic age field of spring location derived from USGS geologic map of Virginia
USGS_500K_Geol_ROCKTYPE1	USGS_500K_Geol_ROCKTYPE1	Geologic primary rock type field of spring location derived from USGS geologic map of Virginia
USGS_500K_Geol_ROCKTYPE2	USGS_500K_Geol_ROCKTYPE2	Geologic secondary rock type field of spring location derived from USGS geologic map of Virginia
USGS_500K_Geol_GEOLOGY	USGS_500K_Geol_GEOLOGY	Geologic formation symbol field of spring location derived from USGS geologic map of Virginia
USGS_500K_Geol_FRM_NAME	USGS_500K_Geol_FRM_NAME	Geologic full formation name field of spring location derived from USGS geologic map of Virginia
USGS_500K_Geol_FRM_PERIOD	USGS_500K_Geol_FRM_PERIOD	Geologic formation time period of spring location field derived from USGS geologic map of Virginia
MAJOR_BASIN_NAME	MAJOR_BASIN_NAME	River basin name of spring location derived from Virginia generalized river basin shapefile GIS_BaseLayer_Datasets.gdb Feature Dataset: Hydrology Feature Class: VA_BASIN_GENERALIZED_STG
BASIN_NAME	BASIN_NAME	Basin name of spring location derived from Virginia 3rd order basin shapefile GIS_BaseLayer_Datasets.gdb Feature Dataset: Hydrology Feature Class: VA_BASINS_3RD_ORDER_STG
BASIN_CODE	BASIN_CODE	Basin code of spring location derived from Virginia 3rd order basin shapefile GIS_BaseLayer_Datasets.gdb Feature Dataset: Hydrology Feature Class: VA_BASINS_3RD_ORDER_STG
USGS_HUC_C	USGS_HUC_CODE	USGS HUC code derived from Virginia HUC 10 Watershed Boundaries shapefiles (https://geohub-vadeq.hub.arcgis.com/datasets/21c48fc763cd4cf68013ce7e032b7fa1_198/explore?location=37.936873%2C-79.464500%2C7.65)

Field Name	Field Alias	Field Summary
HUC_NAME	HUC_NAME	Watershed name derived from Virginia HUC 10 Watershed Boundaries shapefiles (https://geohub-vadeq.hub.arcgis.com/datasets/21c48fc763cd4cf68013ce7e032b7fa1_198/explore?location=37.936873%2C-79.464500%2C7.65)
HUC_DRAIN	HUC_DRAIN	Drain code derived from Virginia HUC 10 Watershed Boundaries shapefiles (https://geohub-vadeq.hub.arcgis.com/datasets/21c48fc763cd4cf68013ce7e032b7fa1_198/explore?location=37.936873%2C-79.464500%2C7.65)
VDOF_LAND_	VDOF_LAND_USE	Land cover classification of spring location derived from land cover dataset https://www.arcgis.com/apps/View/index.html?appid=d3d51bb5431a4d26a313f586c7c2c848
PROVINCE	PROVINCE	Physiographic province of spring location
DATE_MEASU	Date Measured	Date of Field Measurement
TIME_MEASU	Time Measured	Time of Field Measurement
DISCHARGE_	Discharge Method	Estimated, Reported, Measured, Not Measured, Observed (zero flows), Continuous Meter - Averaged
METER_TYPE	Discharge Measurement Type	Type of equipment used to measure spring discharge
DATA_SOURC	Field Measurement Data Source	Organization collecting field measurement data
DISCHARGE1	Discharge (GPM)	Field measured spring flow (gallons per minute). Numbers followed by E are estimated values
DISCHARG_1	Discharge (CFS)	Field measured spring flow (cubic feet per second). Numbers followed by E are estimated values
Temp_Water	Temperature Water (C)	Field measured water temperature (C)
Temp_Air_C	Temperature Air (C)	Field measured air temperature (C)
SpCond_uS_	Specific Conductivity (uS/cm @ 25C)	Field measured Specific Conductance of water
Cond_uS_cm	Conductivity (uS/cm)	Field measured conductance of water
TDS_mg_L	TDS Field (mg/L)	Total Dissolved Solids field measurement (mg/L)
Salinity_p	Salinity (ppt)	Field measured Salinity (ppt)
DO_Conc_mg/L	Dissolved Oxygen (mg/L)	Field measured Dissolved Oxygen (mg/L)
pH	pH (Standard Units)	Field measured pH (Standard Units)
Turbidity_	Turbidity (NTU)	Field measured Turbidity (NTU)
ANC_mg_L	Acid Neutralizing Capacity Filtered Field (mg/L)	Field measured Acid Neutralizing Capacity filtered (mg/L)
Bicarb_fie	Bicarbonate Filtered Field Titration (mg/L)	Field measured Bicarbonate Titration filtered (mg/L)
Carbonate_	Carbonate Filtered Field Titration (mg/L)	Field measured Carbonate Titration Filtered (mg/L)
Chloride_m	Chloride Filtered (mg/L)	Field measured Chloride Filtered (mg/L)
FIELD_COMM	Field Comments	Comments during Field Measurement

Field Name	Field Alias	Field Summary
SINGLE_MUL	Site Type(Single / Multiple / Trend)	Field measurement site sampling frequency (Single / Multiple / Trend). Multiple: More than one to several. Trend: 4 or more measurement events within a 18 month period
COLLDATE	Sample collection date	Laboratory water quality sampling date
COLLTIME	Sample collection time	Laboratory water quality sampling time
WSCOMMENT	Water sample comment	Laboratory water quality sampling comment
ORIGDATA	Original WQ data source	Laboratory water quality data source
SMT	WQ sampling frequency type	Laboratory water quality sampling frequency (Single / Multiple / Trend). Multiple: More than one to several. Trend: 4 or more measurement events within a 18 month period
FPTOT	Total number of field parameter	Tally of field parameters collected during laboratory water quality sampling event
AFP	Total number of analytes	Tally of analytes sampled for during laboratory water quality sampling event
BAROPRESS	barometric pressure, mmHg	Barometric air pressure during laboratory sampling event (mmHG)
ANCFLDFIL	acid neutralizing capacity, field, filtered, titration, mg/L CaCO3	Field derived filtered ANC titration collected during laboratory water quality sampling event
ANCFLDUNF	acid neutralizing capacity, field, unfiltered, titration, mg/L CaCO3	Field derived unfiltered ANC titration collected during laboratory water quality sampling event
ANCLABUNF	acid neutralizing capacity, lab, unfiltered, titration, mg/L CACO3	Laboratory reported water quality result
ACIDITY	acidity, mg/L H	Laboratory reported water quality result
ALKFLDFIL	alkalinity, field, filtered, titration, mg/L CaCO3	Field derived filtered alkalinity titration as mg/L CaCO3 collected during laboratory water quality sampling event
ALKFIL	alkalinity, filtered, mg/L CaCO3	Laboratory reported water quality result
ALKTOT	alkalinity, total, mg/L CaCO3	Laboratory reported water quality result
COLFILPCU	color, filtered, PCU	Laboratory reported water quality result
COLPCU	color, PCU	Laboratory reported water quality result
TDSFLDEL	total dissolved solids, mg/L, field, electrochemical	Field derived total dissolved measurement collected by meter during laboratory water quality sampling event
RESFIXFIL	residue, fixed filtrable, mg/L	Laboratory reported water quality result
RESFIXNON	residue, fixed, nonfilterable, mg/L	Laboratory reported water quality result
RESTOT	residue, total, mg/L	Laboratory reported water quality result
RESTOTFIX	residue, total fixed, mg/L	Laboratory reported water quality result
RESTOTNON	residue, total nonfilterable, mg/L	Laboratory reported water quality result

Field Name	Field Alias	Field Summary
RESTOTVOL	residue, total volatile, mg/L	Laboratory reported water quality result
RESVOLFIL	residue volatile filtrable, mg/L	Laboratory reported water quality result
RESVOLNON	residue, volatile nonfilterable, mg/L	Laboratory reported water quality result
RESTFI105	residue, total filtrable (dried 105C), mg/L	Laboratory reported water quality result
RESTOTFIL	residue, total filtrable (dried 180C), mg/L	Laboratory reported water quality result
RESFILSOC	residue, filtrable, sum of constituents, mg/L	Laboratory reported water quality result
HARD	hardness, mg/L CaCO3	Laboratory reported water quality result
HARDFIL	hardness, filtered, mg/L CaCO3	Laboratory reported water quality result
NCHDFLFLT	noncarbonate hardness, field, mg/L CaCO3, filtered	Field derived filtered noncarbonate hardness measurement collected during laboratory water quality sampling event
NCHDFL	noncarbonate hardness, field, mg/L CaCO3	Field derived unfiltered noncarbonate hardness measurement collected during laboratory water quality sampling event
NONCHARDF	noncarbonate hardness, mg/L CaCO3, filtered	Laboratory reported water quality result
NONCHARD	noncarbonate hardness, mg/L CaCO3	Laboratory reported water quality result
PHFLDEL	pH, field, standard units	Field derived pH measurement collected during laboratory water quality sampling event
PH	pH, standard units	Laboratory reported water quality result
SPCONDFLD	specific conductance, field, µS/cm@25ºC	Field derived specific conductance, field, µS/cm@25ºC measurement collected during laboratory water quality sampling event
SPCOND	specific conductance, µS/cm@25ºC	Laboratory reported water quality result
TEMPWATC	temperature, water, ºC	Field derived water temperature ºC measurement collected during laboratory water quality sampling event
TEMPWATF	temperature, water, ºF	Field derived water temperature ºF measurement collected during laboratory water quality sampling event
TEMPAIRC	temperature, air, ºC	Field derived air temperature ºC measurement collected during laboratory water quality sampling event
TEMPAIRF	temperature, air, ºF	Field derived air temperature ºF measurement collected during laboratory water quality sampling event
TURBFLD	turbidity, field, NTU	Field derived turbidity measurement collected during laboratory water quality sampling event
TURB	turbidity, NTU	Laboratory reported water quality result
TURBJCU	turbidity, JCU	Laboratory reported water quality result
CALFIL	calcium, filtered, mg/L	Laboratory reported water quality result
CAL	calcium, mg/L	Laboratory reported water quality result

Field Name	Field Alias	Field Summary
MAGFIL	magnesium, filtered, mg/L	Laboratory reported water quality result
MAG	magnesium, mg/L	Laboratory reported water quality result
POTFIL	potassium, filtered, mg/L	Laboratory reported water quality result
POT	potassium, filtered, mg/L	Laboratory reported water quality result
SODFIL	sodium, filtered, mg/L	Laboratory reported water quality result
SOD	sodium, mg/L	Laboratory reported water quality result
HCO3FLFLD	bicarbonate alkalinity, filtered, field, titration, mg/L CaCO3	Field derived filtered bicarbonate alkalinity field titration measurement collected during laboratory water quality sampling event
HCO3MGLFF	bicarbonate, filtered, field, titration, mg/L	Field derived filtered bicarbonate field titration measurement collected during laboratory water quality sampling event
HCO3FLD	bicarbonate alkalinity, field, mg/L CacO3	Field derived unfiltered bicarbonate alkalinity field titration measurement collected during laboratory water quality sampling event
HC3MGLF	bicarbonate, field, mg/L	Field derived unfiltered bicarbonate field titration measurement collected during laboratory water quality sampling event
HCO3FL	bicarbonate alkalinity, filtered, mg/L CaCO3	Laboratory reported water quality result
HCO3FLMGL	bicarbonate, filtered, mg/L	Laboratory reported water quality result
HCO3	bicarbonate alkalinity, mg/L CaCO3	Laboratory reported water quality result
HCO3MGL	bicarbonate, mg/L	Laboratory reported water quality result
CO3FLFLD	carbonate alkalinity, filtered, field, titration, mg/L CaCO3	Field derived filtered carbonate alkalinity field titration measurement collected during laboratory water quality sampling event
CO3FLFLD_1	carbonate, filtered, field, titration, mg/L	Field derived filtered carbonate field titration measurement collected during laboratory water quality sampling event
CO3FLD	carbonate alkalinity, unfiltered, field, titration, mg/L CaCO3	Field derived unfiltered carbonate alkalinity field titration measurement collected during laboratory water quality sampling event
CO3FLDMGL	carbonate, unfiltered, field, titration, mg/L	Field derived unfiltered carbonate field titration measurement collected during laboratory water quality sampling event
CO3	carbonate alkalinity, mg/L CaCO3	Laboratory reported water quality result
CO3MGL	carbonate, mg/L	Laboratory reported water quality result
SO4FL	sulfate, filtered, mg/L	Laboratory reported water quality result
SO4	sulfate, mg/L	Laboratory reported water quality result
CLFL	chloride, filtered, mg/L	Laboratory reported water quality result
CL	chloride, mg/L	Laboratory reported water quality result

Field Name	Field Alias	Field Summary
FLFL	fluoride, filtered, mg/L	Laboratory reported water quality result
FL	fluoride, mg/L	Laboratory reported water quality result
ALFL	aluminum, filtered, µg/L	Laboratory reported water quality result
AL	aluminum, µg/L	Laboratory reported water quality result
ANTFL	antimony, filtered, µg/L	Laboratory reported water quality result
ANT	antimony, µg/L	Laboratory reported water quality result
ASFL	arsenic, filtered, µg/L	Laboratory reported water quality result
AS_	arsenic, µg/L	Laboratory reported water quality result
BAFL	barium, filtered, µg/L	Laboratory reported water quality result
BA	barium, µg/L	Laboratory reported water quality result
BEFL	beryllium, filtered,µg/L	Laboratory reported water quality result
BE	beryllium, µg/L	Laboratory reported water quality result
B	boron, µg/L	Laboratory reported water quality result
BRFIL	bromide, filtered, mg/L	Laboratory reported water quality result
CDFL	cadmium, filtered, µg/L	Laboratory reported water quality result
CD	cadmium, filtered, µg/L	Laboratory reported water quality result
CRFL	chromium, filtered, µg/L	Laboratory reported water quality result
CR	chromium, µg/L	Laboratory reported water quality result
COFL	cobalt, filtered, µg/L	Laboratory reported water quality result
CO	cobalt, µg/L	Laboratory reported water quality result
CUFL	copper, filtered, µg/L	Laboratory reported water quality result
CU	copper, µg/L	Laboratory reported water quality result
FEFL	iron, filtered, µg/L	Laboratory reported water quality result
FE	iron, µg/L	Laboratory reported water quality result
PBFL	lead, filtered, µg/L	Laboratory reported water quality result
PB	lead, µg/L	Laboratory reported water quality result
LIFL	lithium, filtered, µg/L	Laboratory reported water quality result
MNFL	manganese, filtered, µg/L	Laboratory reported water quality result
MN	manganese, µg/L	Laboratory reported water quality result

Field Name	Field Alias	Field Summary
HGFL	mercury, filtered, µg/L	Laboratory reported water quality result
HG	mercury, µg/L	Laboratory reported water quality result
MOFL	molybdenum, filtered, µg/L	Laboratory reported water quality result
MO	molybdenum, µg/L	Laboratory reported water quality result
NIFL	nickel, filtered, µg/L	Laboratory reported water quality result
NI	nickel, µg/L	Laboratory reported water quality result
RBFL	rubidium, filtered, µg/L	Laboratory reported water quality result
SEFL	selenium, filtered, µg/L	Laboratory reported water quality result
SE	selenium, µg/L	Laboratory reported water quality result
AGFIL	silver, filtered, µg/L	Laboratory reported water quality result
AG	silver, µg/L	Laboratory reported water quality result
SRFIL	strontium, filtered, µg/L	Laboratory reported water quality result
TIFL	thallium, filtered, µg/L	Laboratory reported water quality result
TI	thallium, µg/L	Laboratory reported water quality result
VFIL	vanadium, filtered, µg/L	Laboratory reported water quality result
V	vanadium, µg/L	Laboratory reported water quality result
ZNFIL	zinc, filtered, µg/L	Laboratory reported water quality result
ZN	zinc, µg/L	Laboratory reported water quality result
CTOT	carbon, total, mg/L	Laboratory reported water quality result
CINORGFL	carbon, inorganic, filtered, mg/L	Laboratory reported water quality result
CINORG	carbon, inorganic, mg/L	Laboratory reported water quality result
CORGFIL	carbon, organic, filtered, mg/L	Laboratory reported water quality result
CORG	carbon, organic, mg/L	Laboratory reported water quality result
H	hydrogen, mg/L	Laboratory reported water quality result
IFIL	iodide,filtered, mg/L	Laboratory reported water quality result
PFIL	phosphorus, filtered, mg/L P	Laboratory reported water quality result
P	phosphorus, mg/L P	Laboratory reported water quality result
SILFIL	silica, filtered, mg/L	Laboratory reported water quality result
SIL	silica, filtered, mg/L	Laboratory reported water quality result

Field Name	Field Alias	Field Summary
SULFFLFIL	sulfide, field, filtered, mg/L	Field derived filtered sulfide measurement collected during laboratory water quality sampling event
SULFL	sulfide, field, unfiltered, mg/L	Field derived unfiltered sulfide measurement collected during laboratory water quality sampling event
SULFFIL	sulfide, filtered, mg/L	Laboratory reported water quality result
SULF	sulfide, mg/L	Laboratory reported water quality result
CO2	carbon dioxide, mg/L	Laboratory reported water quality result
CH4	methane, mg/L	Laboratory reported water quality result
02FLDEL	oxygen, field, electrochemical, mg/L	Field derived dissolved oxygen measurement collected during laboratory water quality sampling event
02FLD	oxygen, field, electrochemical, percent saturation	Field derived dissolved oxygen measurement collected during laboratory water quality sampling event
02	oxygen, mg/L	Laboratory reported water quality result
02PCTSAT	oxygen, percent saturation	Laboratory reported water quality result
NH4FIL	ammonia, filtered, mg/L N	Laboratory reported water quality result
NH4	ammonia, mg/L N	Laboratory reported water quality result
NO3NO2FIL	nitrate + nitrite, filtered, mg/L N	Laboratory reported water quality result
NO3NO2	nitrate + nitrite, mg/L N	Laboratory reported water quality result
NO3FIL	nitrate, filtered, mg/L N	Laboratory reported water quality result
NO3	nitrate, mg/L N	Laboratory reported water quality result
NO2FIL	nitrite, filtered, mg/L N	Laboratory reported water quality result
NO2	nitrite, mg/L N	Laboratory reported water quality result
NORGFIL	nitrogen, organic, filtered, mg/L N	Laboratory reported water quality result
NORG	nitrogen, organic, mg/L N	Laboratory reported water quality result
TKNFIL	nitrogen, total kjeldahl, filtered, mg/L N	Laboratory reported water quality result
TKN	nitrogen, total kjeldahl, mg/L N	Laboratory reported water quality result
NFILT	nitrogen, total, filtered, mg/L N	Laboratory reported water quality result
N	nitrogen, total, filtered, mg/L N	Laboratory reported water quality result
PO4TOT	total orthophosphate, mg/L P	Laboratory reported water quality result
PO4FIL	orthophosphate, filtered, mg/L P	Laboratory reported water quality result
PO4	orthophosphate, mg/L P	Laboratory reported water quality result

Field Name	Field Alias	Field Summary
PO4FIL_1	phosphate, filtered, mg/L P	Laboratory reported water quality result
Pasp	phosphate, mg/L P	Laboratory reported water quality result
ALRADUGL	alpha radioactivity, µg/L	Laboratory reported water quality result
ALRADPCIL	alpha radioactivity, PCi/L	Laboratory reported water quality result
BRADUGL	beta radioactivity, µg/L	Laboratory reported water quality result
BRADPCIL	beta radioactivity, PCi/L	Laboratory reported water quality result
GALFILUGL	gross alpha rdioactivity, filtered, µg/L	Laboratory reported water quality result
GALRADUR	gross alpha radium and uranium, no radon, PCi/L	Laboratory reported water quality result
GARAD	gross alpha radium no uranium no radon	Laboratory reported water quality result
GAL30PCL	gross alpha radioactivity, 30d, PCi/L	Laboratory reported water quality result
GAL30PCLF	gross alpha radioactivity, filtered, 30d, PCi/L	Laboratory reported water quality result
GAL72PCL	gross alpha radioactivity, 72hr, PCi/L	Laboratory reported water quality result
GAL72PCLF	gross alpha radioactivity, filtered, 72hr, PCi/L	Laboratory reported water quality result
GBEFILPCL	gross beta activity, filtered, PCi/L	Laboratory reported water quality result
GBE	gross beta, PCi/L	Laboratory reported water quality result
GBE30PCIL	gross beta activity, 30d, PCi/L	Laboratory reported water quality result
GBE30PCLF	gross beta activity, 30d, filtered, PCi/L	Laboratory reported water quality result
GBE72PCL	gross beta activity, 72hr, PCi/L	Laboratory reported water quality result
GBE72PCLF	gross beta activity, 72hr, filtered, PCi/L	Laboratory reported water quality result
RAD224FIL	Radium-224, filtered, PCi/L	Laboratory reported water quality result
RAD226FIL	Radium-226, filtered, PCi/L	Laboratory reported water quality result
RAD226	Radium-226, PCi/L	Laboratory reported water quality result
RAD228FIL	Radium-228, filtered, PCi/L	Laboratory reported water quality result
RAD228	Radium-228	Laboratory reported water quality result
RAD222	Radon-222 PCi/L	Laboratory reported water quality result
K40FIL	Potassium-40, filtered, PCi/L	Laboratory reported water quality result

Field Name	Field Alias	Field Summary
TRITIUM	Tritium, PCi/L	Laboratory reported water quality result
URFIL	Uranium, filtered, µg/L	Laboratory reported water quality result
UR	Uranium, µg/L	Laboratory reported water quality result
CHGBAL	Charge Balance with NO3	Charge balances were calculated for samples with reported values for major ions including (at a minimum) calcium, magnesium, potassium, sodium, bicarbonate, chloride, and sulfate. Reported values for Nitrate as N, carbonate, and fluoride were included in the charge balance calculation when available. Field determined values for bicarbonate and carbonate were used in the charge balance calculation when available. For much of the legacy DEQ groundwater sample data, bicarbonate values were derived from lab reported values of alkalinity (as mg/CaCO3) under the assumption that there was no contribution by carbonate to the reported alkalinity value.