2017 Monitoring Activity Full Report

Sampling Logistics

The Agricultural Chemicals & Groundwater Protection Program (Program) sampled groundwater in Weld County (WC), West Slope – Southwest (SW) in 2017. The SW sampling was the first in the southwest part of Colorado since the Program's efforts in 1998-1999. Additionally, the Program assisted the Town of Flagler, CO – which sits atop the High Plains aquifer – with collection of groundwater samples to help assess rising nitrate levels in the area. The largest monitoring project for the year was the initiation of a bi-weekly sampling project using a subset of eight WC monitoring wells (WC-8) which is another phase in the continued in-depth monitoring of South Platte alluvial groundwater in Weld County. Total sample numbers are as follows: 19 samples from municipal, commercial or domestic wells in the Flagler area in May; 22 WC monitoring wells sampled in early June as normal; 119 additional samples collected over 15 sampling events on WC-8 from mid-June through December 29, 2017; and 43 SW domestic wells collected in September.

Laboratory Logistics

The CDA's Biochemistry Lab analyzed for a suite of seven anions and 99 pesticide compounds, including glyphosate and its main degradate, AMPA. The insecticide clothianidin was added to the screen per request of the Colorado Department of Public Health and Environment (CDPHE). All samples were analyzed for these constituents except for 21 samples from WC-8 that did not have glyphosate and AMPA analysis done. Numerous split samples were collected for various purposes depending on the sample area. Split samples collected as part of the Town of Flagler study, were sent to both the *Stable Isotope Lab* at the University of California at Davis for ^{15}N and ^{18}O determination and to the *ICPMS Laboratory* at the University of Utah for analysis of the isotopes ^{11}B and ^{87}Sr along with 29 other elements. Once per month, split samples collected WC-8 were sent to both the *Center for Environmental Mass Spectrometry* at the University of Colorado – Boulder for analysis of pharmaceuticals and wastewater indicators and to the CDPHE laboratory in Denver, CO for analysis of total soluble phosphorus (TSP) by EPA Method 365.1 FIA analysis. Split samples collected in SW were sent to the *ALS Environmental Laboratory* in Fort Collins, CO for analysis of dissolved metals, total dissolved solids (TDS), hardness and alkalinity, and total soluble phosphorus Method SW6010B ICP analysis.

Sampling Results

All results from sampling events that occurred in 2017 are summarized in **Table 2** and **Table 3** at the end of this summary along with **Table 4** which shows detection limits for all parameters. A discussion of 2017 sampling projects follows.

WC: Historical nitrate-nitrogen (NO_3-N) concentrations in the MW network since 1992 show a median just below 20 mg L^{-1} or parts-per-million (ppm) and a range of 0.6-111.3 ppm. The June sampling of the 22 monitoring well (MW) network was conducted exclusively with the HydraSleeve™ – a no-purge

sampling method – showed a median NO_3-N of 20 ppm which is on par with the long-term median. One deviation to sampling is that Well ID WL-M-003A was inadvertently missed and not sampled. The typical nitrate concentrations seen in this well may have caused the median annual nitrate to be slightly higher but not exceptionally so. While most of the MWs that were sampled did not deviate significantly from their long-term record, there are some notable exceptions. Well ID WL-M-007, which had a NO_3-N ppm in the 40's since 2012, jumped up to 84 ppm in 2017. Similarly, Well ID WL-M-013 jumped up from 31.6 ppm NO_3-N in 2016 to 53.3 ppm in 2017. While this well has a long-term downward trend in nitrate since the early 2000's, the last three years have seen incremental increases to levels above the long-term median of 22 ppm. The final notable exception is Well ID WL-M-023 which saw an increase of more than 30 ppm NO_3-N since 2016 to a level of 74.2 ppm. This is the highest concentration seen at this location since the well was installed in 2008 and it is more than twice the long-term median of 35.5 ppm. Well ID's WL-M-009 and WL-M-401 continue to be the only two wells that have yet to exceed the U.S. EPA Maximum Contaminant Level (MCL) for NO_3-N of 10.0 ppm. This is fairly surprising given the well locations amidst intensive irrigated agricultural production – similar to most of the other wells in the MW network. These two wells were included in the WC-8 sampling efforts which will be talked about separately.

A total of 88 detections of 17 different pesticide active ingredients were reported in 2017, which given the missed sampling of Well ID WL-M-003A – a well that has consistently seen four or more detections every sampling event – is right on par with the 95 detections in 2016 and with results seen in Weld County MWs since the pesticide screening list was expanded to around 100 compounds in 2009. The herbicide metolachlor's breakdown products metolachlor ESA (MESA) and metolachlor OA (MOA) continue to account for about 40% of all detections with MESA having a 100% detection frequency in 2017. Clothianidine was discovered in seven wells with concentration ranging 0.12-1.07 µg/L or parts-per-billion (ppb). No pesticide concentrations were reported above established standards for the primary WC sampling event in June.

WC-8: As mentioned earlier, the bi-weekly sampling of WC-8 was done out of effort to collect additional data for comparison to the hourly water level data being collected in the wells. It is a goal of this project to evaluate month to month variability over the next year or longer to determine if the variability seen in June on an annual basis is truly representative of the main water quality impacts understood to be present. The wells were selected based primarily on evidence of persistent orthophosphate concentrations and a coincidence with being near unlined irrigation canals or other structures believed to

	NO_3 as N (since 1992)				ort-PO_4 as PO_4 (since 2012)		
Well ID	AVG	MED	Conc Range	Conc Trend	AVG	MED	Conc Range
WL-M-001	9.9	10.3	4.3 - 16.7	Upward	1.4	1.3	1.2 - 2.0
WL-M-006A	22.9	28.0	1.3 - 39.2	Downward	0.3	0.3	0.1 - 0.6
WL-M-009	3.5	3.2	0.6 - 9.4	Downward	1.3	1.4	0.7 - 1.5
WL-M-010	12.3	10.2	3.0 - 31.3	None	2.9	2.9	2.8 - 3.0
WL-M-022*	13.2	12.0	1.1 - 22.5	None	1.2	1.5	0.7 - 1.6
WL-M-401	3.6	3.6	1.9 - 6.7	None	1.3	1.5	0.7 - 1.9
WL-M-501	24.9	16.5	6.5 - 80.8	None	3.6	3.5	2.5 - 5.1
WL-M-901	11.0	8.3	3.8 - 23.0	Upward	1.5	1.5	1.1 - 2.2

Table 1 Measured Nitrate-N (NO_3-N) and orthophosphate (ort-PO_4) concentrations in eight Weld County monitoring wells from annual June measurements. WL-M-022 was installed and first sampled in 2008. Concentrations are in units of mg/L.

be contributing to groundwater recharge in the area of the well. Additionally, the cropland around many of these locations is likely regularly amended with manure which could be contributing nitrogen and phosphorus to the soil, unsaturated zone, and ultimately, the groundwater.

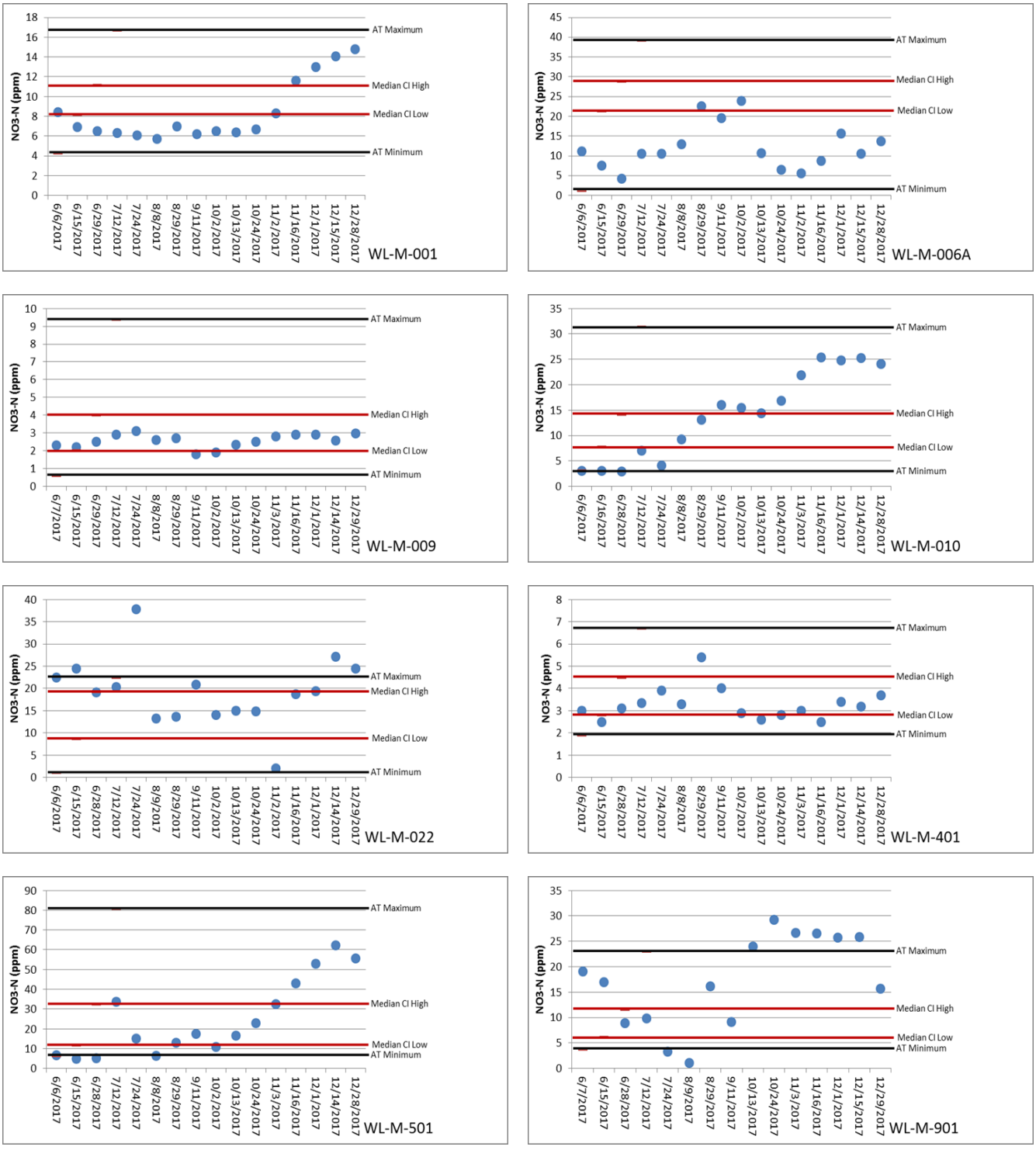

Figure 1 Nitrate concentrations measured over 15 sampling events from June through December 2017 in WC-8 monitoring wells in the South Platte alluvial aquifer within Weld County, Colorado. **Median CI**, is the 95% confidence interval around the all-time median nitrate concentration for each well. **AT**, all-time.

Table 1 shows the range of nitrate and phosphate that has been detected in the selected wells since the Program started sampling. The Program's lab started reporting phosphate (measured as orthophosphate) results in 2012. As can be seen, some wells show very low variability in phosphate concentration (i.e. WL-M-010) whereas some have shown upwards of a two ppm concentration spread since 2012.

Several Weld County MWs have statistically significant trends in nitrate concentration. Two each of upward and downward trending wells are included in the WC-8 subset. Two of the selected wells, WL-M-009 and WL-M-401, have never seen nitrate above the U.S. EPA maximum contaminant level (MCL) of 10.0 ppm for NO_3-N and have very low annual deviation in concentration at 2.2 and 1.3 ppm, respectively. Even over the 16 bi-weekly sampling events (which includes the sampling event that was part of the primary sampling of the entire network), these two wells showed little variability, especially WL-M-009 (**Figure 1**), and while WL-M-401 did have a small spike in concentration measured in late-August, it still did not exceed the U.S. EPA standard. The other six have seen annual deviation in concentration ranging from 3.3 to 20.1 ppm depending on the well, and this variability is replicated over the 16 sampling events in 2017 as well.

There does appear to be the beginning of a sinusoidal undulation in nitrate concentrations, but as of yet, it is not clear if this will emerge as such a pattern until more samples can be collected. The only artifact of significance right now is that for wells WL-M-001, WL-M-010, WL-M-501, and WL-M-901, the increase in nitrate concentration occurs likely after diversions of South Platte River

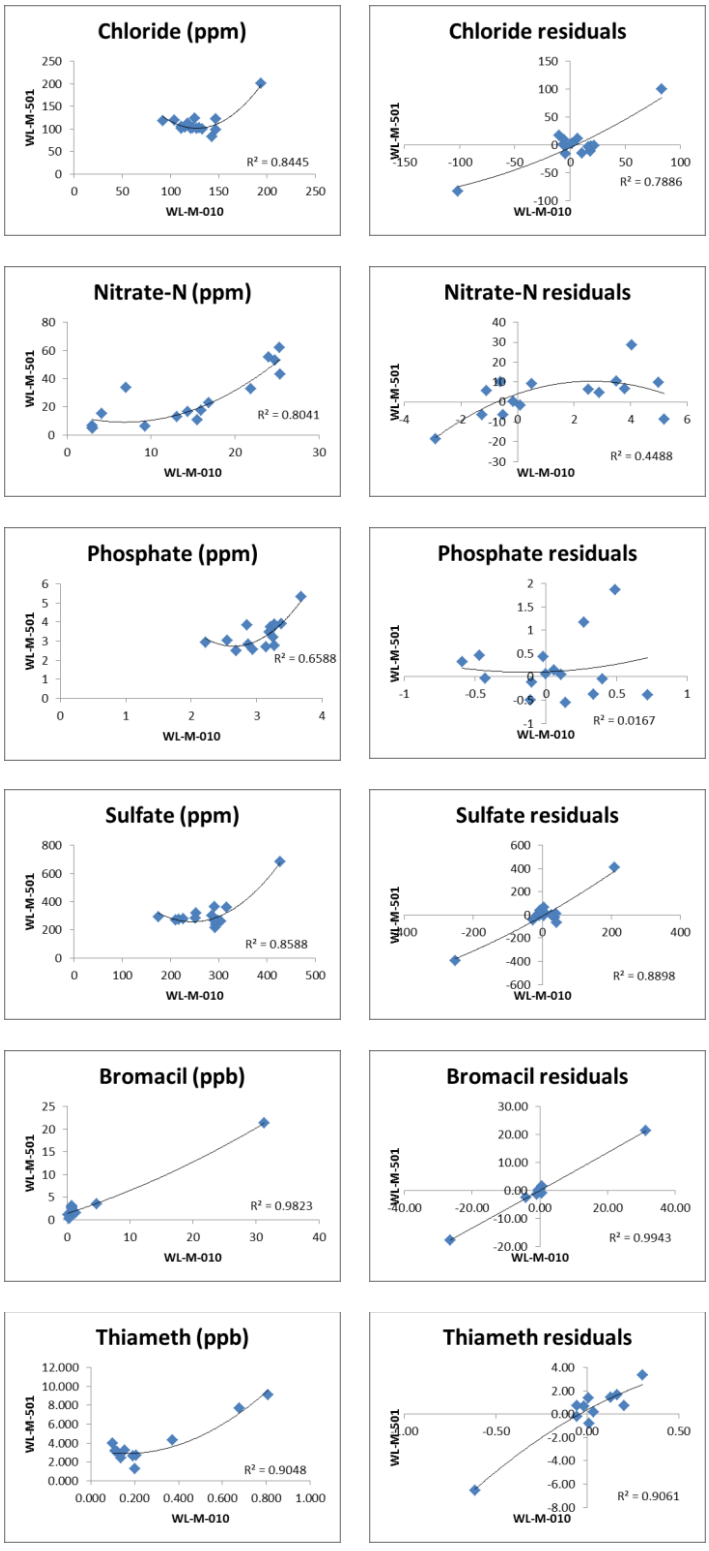

Figure 2 Concentration and residual scatterplots of various parameters measured in two Weld County monitoring wells believed to be along the same groundwater flow-path from June to December 2017. Thiameth is abbreviation of thiamethoxazole.

water to irrigation canals have ceased and groundwater elevation has begun falling. If the response in nitrate is due to this, then the rise in concentration may be indicative of the true baseline water quality of the alluvial aquifer when under limited impact from dilution due to groundwater recharge. Since these wells are screened at or very near

the top of the water table, it is not known whether such a response transmits to deeper portions of the saturated zone. Some of the sites have additional wells available that are screened at differing depths, and the Program may look into including some of these into the bi-weekly sampling effort to continue learning how water table fluctuations and groundwater recharge might be affecting deeper groundwater quality.

Multiple pesticides were detected during each of the 15 sampling events conducted after the primary sampling event as can be seen in **Table 3** at the end of this report. Clothianidin saw 59 additional detections coming from five of the WC-8 wells since the primary sampling in June, so this compound has a consistent presence at some sites. All other pesticides detected in the WC-8 wells align well with what is typically seen of the network as a whole in June. The 18 detections of bromacil all came from two wells, WL-M-010 and WL-M-501, which have shown a unique relationship to one another. WL-M-010 is north of and likely down-gradient from WL-M-501. Results for some analytes between these two wells have strong correlations while others do not as can be seen in **Figure 2**. These two wells may provide an opportunity to better understand fate and transport of agrichemicals typically seen in this part of the South Platte alluvial aquifer.

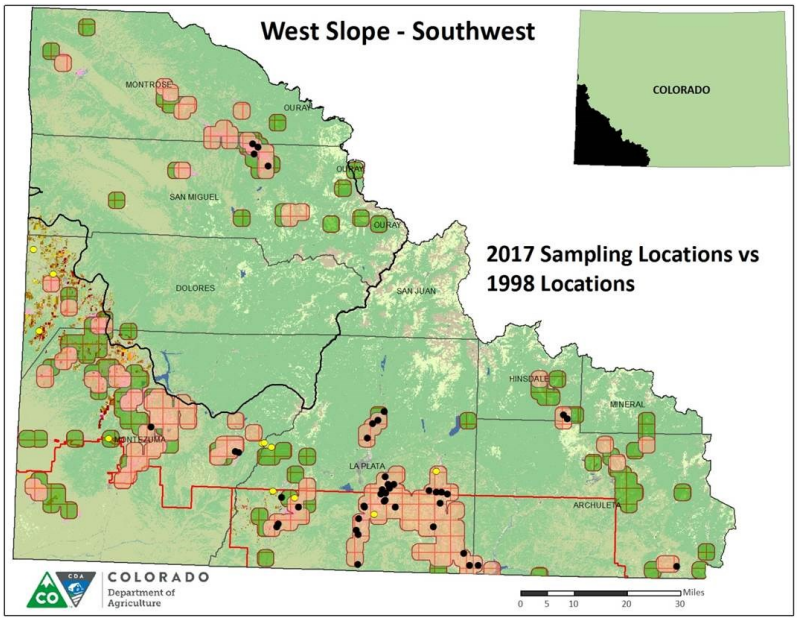

Figure 3 Map of locations in southwest Colorado sampled in 2017 (black circles) and the distribution within high priority (orange) and low priority (green) areas as compared to locations sampled in 1998 (yellow circles).

During the various sampling events of WC-8 in 2017, there was detection in late July of atrazine at 9.92 µg/L, or parts-per-billion (ppb), which is over the U.S. EPA MCL of 3.0 ppb for this compound. Exceedance of the atrazine standard in this well (WL-M-022) has occurred before back in late June 2013 where it spiked at 41.3 ppb. It is not clear why these pulses are occurring or how long ago a release event may have occurred prior to detection, but what is known is that the hydraulic conductivity in the area of WL-M-022 is very high. This is evidenced by the fact that the 2013 detection had reduced by 96% when a follow-up sample one month later showed only 1.51 ppb, and again in 2017 when a sample collected 16 days after the exceedance showed a 97% reduction. This well is located at the tail end of a furrow irrigated field usually growing corn, which is a crop that atrazine can be commonly applied to, but the farmer says no atrazine has been used on the field in several years. And even if he were applying atrazine, it would likely still require

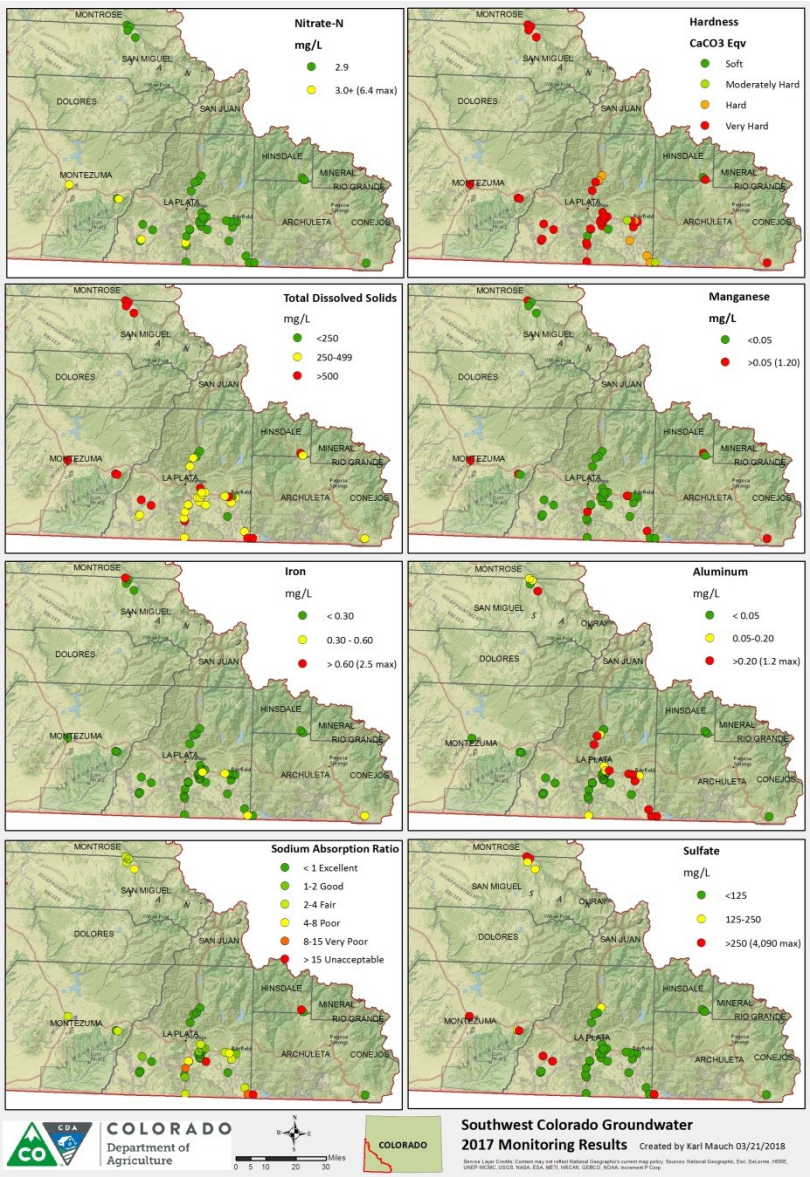

Figure 4 Mapped results of select groundwater quality parameters for domestic wells in southwest Colorado sampled in September, 2017.

significant spillage to get the concentrations seen in groundwater. Groundwater is shallow in the area; it was about 10 ft below land surface in 2013 at the time of the exceedance (with a 2.4 ft rise by the time of the follow-up sample) and just less than 7 ft below land surface in 2017. Given the thin substratum that is protecting groundwater from surface activities in this area it may not take a very significant spill to promulgate a concentration spike in groundwater.

SW: The Program used a similar strategy to its 2009 West Slope – Tri-Rivers project to delineate priority sampling areas and obtain good sample distribution. The map seen in **Figure 3** shows the final medium-high priority areas and low priority areas that were derived from inclusion of various geospatial data like alluvial aquifer boundaries, presence of irrigated acreage, oil & gas activity, and groundwater vulnerability. The final site distribution was a result of willing participants and lack of suitable wells in all areas, which unfortunately, didn't allow for good distribution across all prioritized sample areas in the southwest part of the state. Nonetheless, the areas in La Plata County, according to the vulnerability maps and extent of alluvial aquifer, had the most contiguous area of moderate-high sampling priority and ended up with a reasonable sample size. Overall, the sampling density and distribution was better than the 1998 effort as can be seen in the map.

A goal of this project was to obtain samples in alluvial or quaternary aquifers within the prioritized sample areas which limited acceptable well depth to typically less than 150 ft. The majority of wells were less than 100 ft deep with the deepest being 160 ft, but even this deepest well had a long screened interval from 30-160 ft. Median NO_3-N was 0.8 ppm and no sites exceeded the 10.0 ppm U.S. EPA MCL. Several locations saw manganese above the U.S. EPA Secondary Maximum Contaminant Level (SMCL) of 0.05 ppm, but one site north of Norwood, CO in San Miguel County, saw 1.2 ppm along with 22 ppm

nickel and 2.5 ppm iron which exceeded its 0.30 ppm SMCL. Several sites also saw aluminum above the 0.20 ppm U.S. EPA SMCL as can be seen in **Figure 4**. SMCL standards are unenforceable and primarily used to indicate contaminant levels that can impact the taste, color, or odor of water. A single detection of the herbicide imazapyr was discovered in a well east of Chromo, CO in Archuleta County, but there is no established standard for this pesticide. Overall water quality discovered in the parts of southwest Colorado that were sampled is in line with expectations from vulnerability assessments.

Flagler, CO: A full report was provided to the Town of Flager outlining in detail, the results of a project that was aimed at evaluating groundwater samples for the isotopes ^{15}N, ^{18}O, ^{11}B, and ^{87}Sr and other water quality parameters, to learn if specific sources of nitrate could be distinguished in order for the town to adjust its strategy in mitigating and preventing contamination and securing their drinking water supply. Due to the sensitivity of the town's source water protection plan, specific location information will not be shared in this summary. However, since the sampled locations in and around Flagler are part of the High Plains aquifer, which the Program samples on a regular basis, it is worth highlighting some of the key findings from the Flagler project.

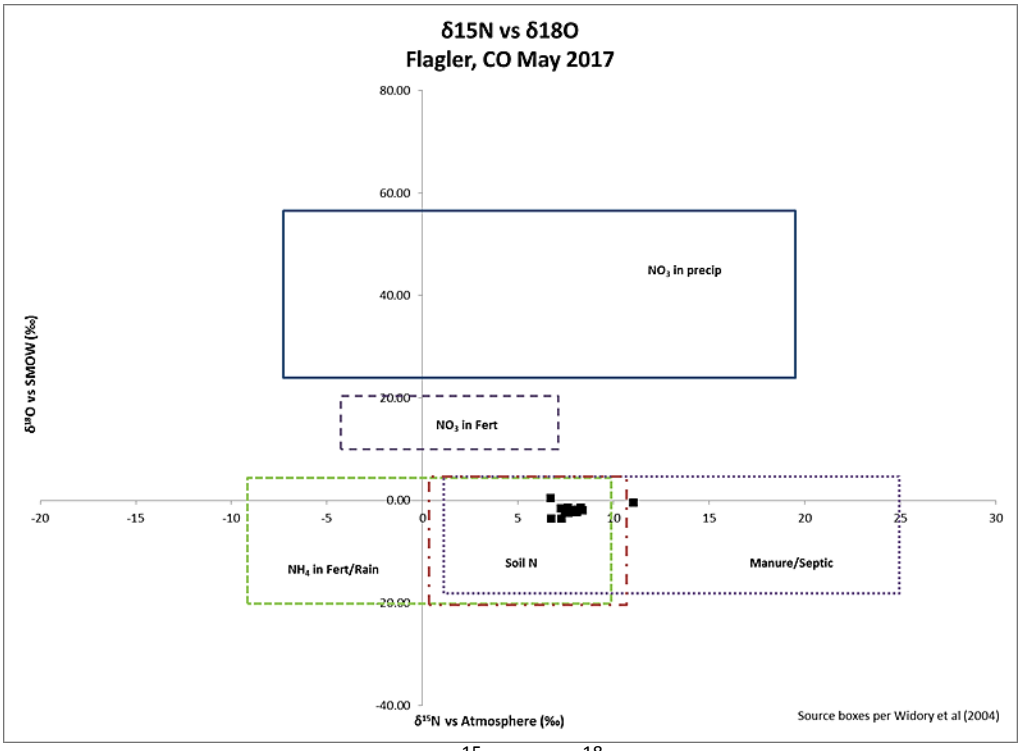

Figure 5 Distribution of results for $\delta^{15}N$ and $\delta^{18}O$ in groundwater sampled from wells in the Ogallala Formation near Flagler, CO in May, 2017.

The median NO_3-N was 9.3 ppm which was higher than initially expected. However, numerous factors (a thin 10-25 ft saturated thickness, current presence of dryland agricultural, historical presence of irrigated cropland and hog farm operations, well screens intersecting appreciable portions of the Pierre shale [the confining boundary below the Ogallala Formation], and other possible septic/sewage impacts) along with past research done by the U.S. Geological Survey in the High Plains, adequately explains how discovering this level of nitrate is indeed reasonable. Unfortunately, the complexity of these various factors and the mixing of nitrate from various sources did not allow for accurate indentification of nitrate sources outside of an isotopic signature indicative of manure from a single well northwest of Flagler which is not likely within the contributing portion of the aquifer pumped by the town's public supply wells. However, the Program's efforts did help establish that there is no apparent evidence of significant nitrate coming from synthetic fertilizer or from leaking

sewage infrastructure. For the most part, $\delta^{15}N$ and $\delta^{18}O$ results show a biogenic or soil source for nitrate as seen in **Figure 5**. Picloram was the only pesticide detected and was only found in two of the 19 wells with a maximum concentration of 0.33 µg/L.

Several recommendations were made to the town in order to better evaluate nitrate sources and for predicting future impacts of nitrate concentrations on the town's public supply. One of which is to install monitoring wells specifically for monitoring groundwater quality at the top of the water table to assess what nitrate concentrations are coming through the unsaturated zone into groundwater. Additional wells could be installed to monitor the bottom of the saturated thickness on top of the Pierre shale to determine if the shale is contributing any appreciable nitrate. During the drilling of these monitoring well boreholes, it was further recommended to collect sediment samples in order to adequately profile concentrations of various nutrients and elements in the unsaturated zone. If the town moves forward with installation of monitoring wells, the Program will assist as necessary.

All results (except isotope results) discussed in this summary can be queried and downloaded from the Program's online water quality database which can be found at: http://www.erams.com/co_groundwater. Program personnel contact information and other program information can be found at http://www.co.gov/ag/gw.

Inorganic Analysis Results from Various Networks Sampled in 2017

NETWORK	Statistic	Fluoride	Chloride	Nitrite-N	Bromide	Nitrate-N	Phosphate	Sulfate
Weld County MW's (22)	Average	0.85	135	0.15	0.38	25.8	1.31	402
	STD	0.27	52		0.12	23.9	0.99	317
	Minimum	0.26	41	0.15	0.20	2.3	0.09	121
	Median	0.82	131	0.15	0.36	21.0	1.17	286
	Maximum	1.26	254	0.15	0.61	83.9	2.87	1490
	% Detection	100%	100%	5%	100%	95%	41%	100%
WC-8 MW's (119)	Average	0.89	125	No Detection	0.29	12.9	1.74	230
	STD	0.27	32		0.06	11.5	1.04	75
	Minimum	0.32	35		0.14	1.1	0.07	40
	Median	0.91	124		0.29	9.8	1.25	223
	Maximum	1.46	209		0.51	62.1	5.32	685
	% Detection	100%	100%		100%	100%	90%	100%
West Slope Southwest (43)	Average	0.39	18	No Detection	0.18	1.1	0.15	271
	STD	0.37	19		0.18	1.3	0.07	710
	Minimum	0.08	1		0.06	0.0	0.08	8
	Median	0.23	11		0.12	0.8	0.14	64
	Maximum	1.83	80		0.91	6.4	0.27	4090
	% Detection	98%	100%		72%	77%	12%	100%
Flagler (19)	Average	0.65	45	No Detection	0.56	8.7	No Detection	66
	STD	0.21	20		0.27	2.8		37
	Minimum	0.13	20		0.23	3.2		21
	Median	0.61	41		0.51	9.3		58
	Maximum	0.98	80		1.07	13.7		164
	% Detection	100%	100%		100%	100%		100%

Table 2 Statistics for inorganic anions analyzed from sampling events of four different monitoring projects in 2017. Value in parentheses under each network is the number of wells sampled except for WC-8 MW's where the value is the number of samples collected from eight wells. All concentrations are in mg/L.

Pesticide Compounds Detected in Various Networks Sampled in 2017				
Pesticide Active Ingredient	**Network**	**% Detection**	**Conc. Range (Median)**	**Note**
2,4-D	Weld County MW	36.4%	0.106 - 1.31 (0.24)	U.S. EPA Drinking Water MCL 70 µg L^{-1}
	WC-8 MW	1.7%	0.20 - 0.28	
Acetochlor ESA	Weld County MW	4.5%	0.473	No Drinking Water Standard/Guideline
Aminopyralid	WC-8 MW	3.1%	0.19 - 0.31 (0.25)	U.S. EPA HHBP Chronic 3,500 µg L^{-1}
Atrazine	WC-8 MW	4.2%	0.21 - 9.92 (1.24)	U.S. EPA Drinking Water MCL 3.0 µg L^{-1}
Bromacil	WC-8 MW	15.1%	0.18 - 31.30 (1.19)	U.S. EPA Drinking Water HAL 6000 µg L^{-1}
Chlorantraniliprole	Weld County MW	4.5%	0.618	U.S. EPA HHBP Chronic 11,060 µg L^{-1}
	WC-8 MW	10.1%	0.19 - 1.86 (1.48)	
Chlorsulfuron	Weld County MW	4.5%	0.10	U.S. EPA HHBP Chronic 140 µg L^{-1}
Clothianidin	Weld County MW	31.8%	0.10 - 1.07 (0.39)	No Drinking Water Standard/Guideline
	WC-8 MW	49.6%	0.11 - 1.58 (0.31)	
Desethyl Atrazine	Weld County MW	22.7%	0.11 - 0.40 (0.12)	No Drinking Water Standard/Guideline
	WC-8 MW	18.5%	0.10 - 2.35 (0.26)	
Deisopropyl Atrazine	Weld County MW	9.1%	0.13 - 0.19	No Drinking Water Standard/Guideline
	WC-8 MW	10.1%	0.11 - 1.05 (0.15)	
Dicamba	Weld County MW	9.1%	0.20 - 1.66 (0.93)	U.S. EPA Drinking Water HAL 4000 µg L^{-1}
	WC-8 MW	11.8%	0.11 - 4.78 (0.54)	
Dimethenamid ESA	Weld County MW	4.5%	0.513	No Drinking Water Standard/Guideline
	WC-8 MW	2.5%	0.11 - 0.14 (0.12)	
Dimethoate	WC-8 MW	1.7%	0.27 - 0.56	U.S. EPA HHBP Chronic 15 µg L^{-1}
Diuron	Weld County MW	4.5%	0.123	No Drinking Water Standard/Guideline
	WC-8 MW	1.7%	0.14 - 0.37	
Hydroxy Atrazine	Weld County MW	31.8%	0.04 - 0.07 (0.06)	U.S. EPA HHBP Chronic 70 µg L^{-1}
	WC-8 MW	48.7%	0.04 - 0.09 (0.06)	
Imazapyr	Weld County MW	27.3%	0.11 - 1.34 (0.15)	U.S. EPA HHBP Chronic 17,500 µg L^{-1}
	WC-8 MW	30.3%	0.10 - 0.58 (0.13)	
	West Slope - Southwest	2.3%	0.157	
Metolachlor	Weld County MW	13.6%	0.11 - 5.62 (0.17)	U.S. EPA Drinking Water HAL 700 µg L^{-1}
	WC-8 MW	15.1%	0.10 - 12.10 (0.18)	
Metolachlor ESA	Weld County MW	100.0%	0.10 - 15.2 (3.23)	No Drinking Water Standard/Guideline
	WC-8 MW	98.3%	0.11 - 18.70 (0.42)	
Metolachlor OA	Weld County MW	77.3%	0.12 - 3.34 (0.77)	No Drinking Water Standard/Guideline
	WC-8 MW	42.9%	0.10 - 7.36 (0.68)	
Picloram	Flagler	10.5%	0.19 - 0.33	U.S. EPA Drinking Water MCL 500 µg L^{-1}
Propazine	WC-8 MW	0.8%	0.115	U.S. EPA Drinking Water HAL 10 µg L^{-1}
Thiamethoxam	Weld County MW	9.1%	0.12 - 0.18 (0.15)	U.S. EPA HHBP Chronic 84 µg L^{-1}
	WC-8 MW	27.7%	0.10 - 9.12 (0.61)	

Table 3 Pesticides detected in each of the sampled networks in 2017. **Conc Range (Median)** – concentration range for detected pesticides with median in parentheses for 3+ detections; **HAL** – Health Advisory Level; **MCL** – Maximum Contaminant Level; **HHBP** – Human Health Benchmark for Pesticides (non-enforceable); Concentrations are in µg/L.

2017 Analyte Reporting Limits					
Analyte Name	Reporting Limit	Units	Analyte Name	Reporting Limit	Units
2,4-D	0.1	ug/L	Imazamox	0.1	ug/L
2,4-DB	0.1	ug/L	Imazapic	0.1	ug/L
2,4-DP	0.1	ug/L	Imazapyr	0.1	ug/L
3-Hydroxycarbofuran	0.1	ug/L	Imazethapyr	0.1	ug/L
Acetochlor	0.1	ug/L	Imidacloprid	0.1	ug/L
Acetochlor ESA	0.1	ug/L	Isoxaflutole	0.1	ug/L
Acetochlor OA	0.1	ug/L	Kresoxim methyl	0.1	ug/L
Acifluorfen	0.1	ug/L	Linuron	0.5	ug/L
Alachlor	0.1	ug/L	Malathion	0.1	ug/L
Alachlor ESA	0.1	ug/L	MCPA	0.1	ug/L
Alachlor OA	0.1	ug/L	MCPP	0.1	ug/L
Aldicarb	0.1	ug/L	Metalaxyl	0.1	ug/L
Aldicarb sulfone	0.2	ug/L	Metconazole	0.1	ug/L
Aldicarb sulfoxide	0.1	ug/L	Methomyl	0.1	ug/L
Aminopyralid	0.2	ug/L	Metolachlor	0.1	ug/L
AMPA	2.0	ug/L	Metolachlor ESA	0.1	ug/L
Atrazine	0.1	ug/L	Metolachlor OA	0.1	ug/L
Azoxystrobin	0.1	ug/L	Metribuzin	0.1	ug/L
Bentazon	0.25	ug/L	Metsulfuron methyl	0.1	ug/L
Bromacil	0.2	ug/L	Nicosulfuron	0.1	ug/L
Carbaryl	0.2	ug/L	Norflurazon	0.2	ug/L
Carbofuran	0.1	ug/L	Norflurazon desmethyl	0.5	ug/L
Chlorantraniliprole	0.1	ug/L	Oxamyl	0.2	ug/L
Chlorimuron ethyl	0.1	ug/L	Oxydemeton methyl	0.1	ug/L
Chlorsulfuron	0.1	ug/L	Picloram	0.1	ug/L
Clopyralid	0.1	ug/L	Prometon	0.1	ug/L
Cyanazine	0.1	ug/L	Propazine	0.1	ug/L
Cyproconazole	0.1	ug/L	Propoxur	0.1	ug/L
Cyromazine	0.1	ug/L	Prosulfuron	0.1	ug/L
Desethyl Atrazine	0.1	ug/L	Pyrimethanil	0.1	ug/L
Desisopropyl Atrazine	0.1	ug/L	Quinclorac	0.1	ug/L
Dicamba	0.1	ug/L	Simazine	0.1	ug/L
Diflufenzopyr	0.25	ug/L	Sulfentrazone	0.2	ug/L
Dimethenamid	0.1	ug/L	Sulfometuron methyl	0.1	ug/L
Dimethenamid ESA	0.1	ug/L	Sulfosulfuron	0.1	ug/L
Dimethenamid OA	0.1	ug/L	Tebuconazole	0.1	ug/L
Dimethoate	0.1	ug/L	Tebufenozide	0.1	ug/L
Dinotefuran	0.1	ug/L	Tebuthiuron	0.1	ug/L
Disulfoton sulfone	0.1	ug/L	Terbacil	0.1	ug/L
Disulfoton sulfoxide	0.1	ug/L	Thiamethoxam	0.1	ug/L
Diuron	0.1	ug/L	Triadimefon	0.1	ug/L
Ethofumesate	0.2	ug/L	Triallate	0.1	ug/L
Ethoprop	0.1	ug/L	Triasulfuron	0.1	ug/L
Fenamiphos	0.1	ug/L	Trichlorfon	0.2	ug/L
Fenamiphos sulfone	0.1	ug/L	Triclopyr	0.2	ug/L
Florasulam	0.1	ug/L	Triticonazole	0.1	ug/L
Flufenacet	0.1	ug/L	Bromide	0.05	mg/L
Flumetsulam	0.1	ug/L	Chloride	0.05	mg/L
Glyphosate	1.0	ug/L	Fluoride	0.05	mg/L
Halofenozide	0.1	ug/L	Nitrate as N	0.011	mg/L
Halosulfuron methyl	0.1	ug/L	Nitrite as N	0.015	mg/L
Hydroxy Atrazine	0.04	ug/L	Ortho-phosphate (Dissolved)	0.05	mg/L
Imazamethabenz ester	0.1	ug/L	Sulfate	0.05	mg/L

Table 4 Reporting limits of parameters analyzed and reported by the Colorado Department of Agriculture's Biochemistry Laboratory in 2017.