Preliminary Analysis of Immediate Effects of Gold King Mine Release on Water Quality in the San Juan River, Utah

Summary

In this report, the Department of Environmental Quality (DEQ) summarizes its analysis of the immediate, short-term, effects of the Gold King Mine release on Water Quality in the San Juan River, Utah. This interpretation may change as additional data and information continue to be collected and interpreted.

DEQ scientists believe that the **highest levels of contaminants associated with the initial spill event have passed through the San Juan River in Utah**. DEQ makes this statement based on several considerations:

- At all monitoring locations, the dissolved concentrations of key dissolved metals have peaked and subsequently declined to concentrations reflective of historic data and that are below established environmental screening levels.
- Total metals concentrations are highly variable and difficult to interpret with respect to this event.
- The monsoon storm events that occurred over the last couple of weeks are characteristic, but complicate interpretation of monitoring results, especially with respect to total metals.
- It is not currently possible to address all possible future states because the long-term effects of observed peaks remain unknown.
- Over the long-term, any metals from the event that arrive in Utah will ultimately be deposited in Lake Powell. DEQ discusses its consideration of these long-term effects later in this analysis.

Introduction

DEQ scientists have reviewed water quality data collected by agency monitoring staff from August 8 to August 17, 2015 to evaluate whether patterns in the data can help answer three key questions that have been posed by the public, media, stakeholders, and communities impacted by and responding to the Gold King Mine release in Utah:

1. Have the highest contaminant concentrations of the plume passed through the San Juan River in Utah?
2. Has the San Juan River returned to concentrations similar to historic conditions?
3. Does the San Juan River pose a risk to those who rely on the river for agricultural uses, recreational uses, and drinking water?

DEQ’s analysis includes examination of data collected by DEQ monitoring staff following the spill at four sites along the San Juan River (Figure 1), twice daily from Saturday, August 8 to Tuesday, August 11, 2015, and then once daily through Monday, August 17, 2015. DEQ has also reviewed data collected by the New Mexico Environment Department and the U.S. Environmental Protection Agency (EPA) on the San Juan River upstream of Utah and also compiled and evaluated historic data collected by DEQ and the U. S. Geological Survey (USGS) beginning in the late 1970’s to place recent results in context with respect to the range of conditions observed historically. The results of these analyses are summarized in this document.

Metal concentrations in any river, especially a desert river system, are highly variable. These concentrations naturally vary through time due to weather events and soil erosion within contributing watersheds. Naturally-occurring metal concentrations also vary from place-to-place due to:

- Changes in local lithology (the intrinsic characteristics of the rock and soils);
- Weather events, especially important because summertime thunderstorms create concentrated events that may differ greatly over relatively small areas; and
- Hydrology (the delivery of metals from place-to-place in water).

Variation associated with any of these background conditions would complicate the analysis of a metal release anywhere; the conditions of the San Juan watershed represent extremes with respect to all of these sources of variability.

Given these considerations, DEQ scientists initiated analysis of the Gold King Mine release by evaluating which metals would be expected to occur at detectable concentrations downstream of the spill in the San Juan River in Utah, recognizing that much of the material from the event would likely be deposited in the river bottoms of the Animas River and the San Juan River in New Mexico.

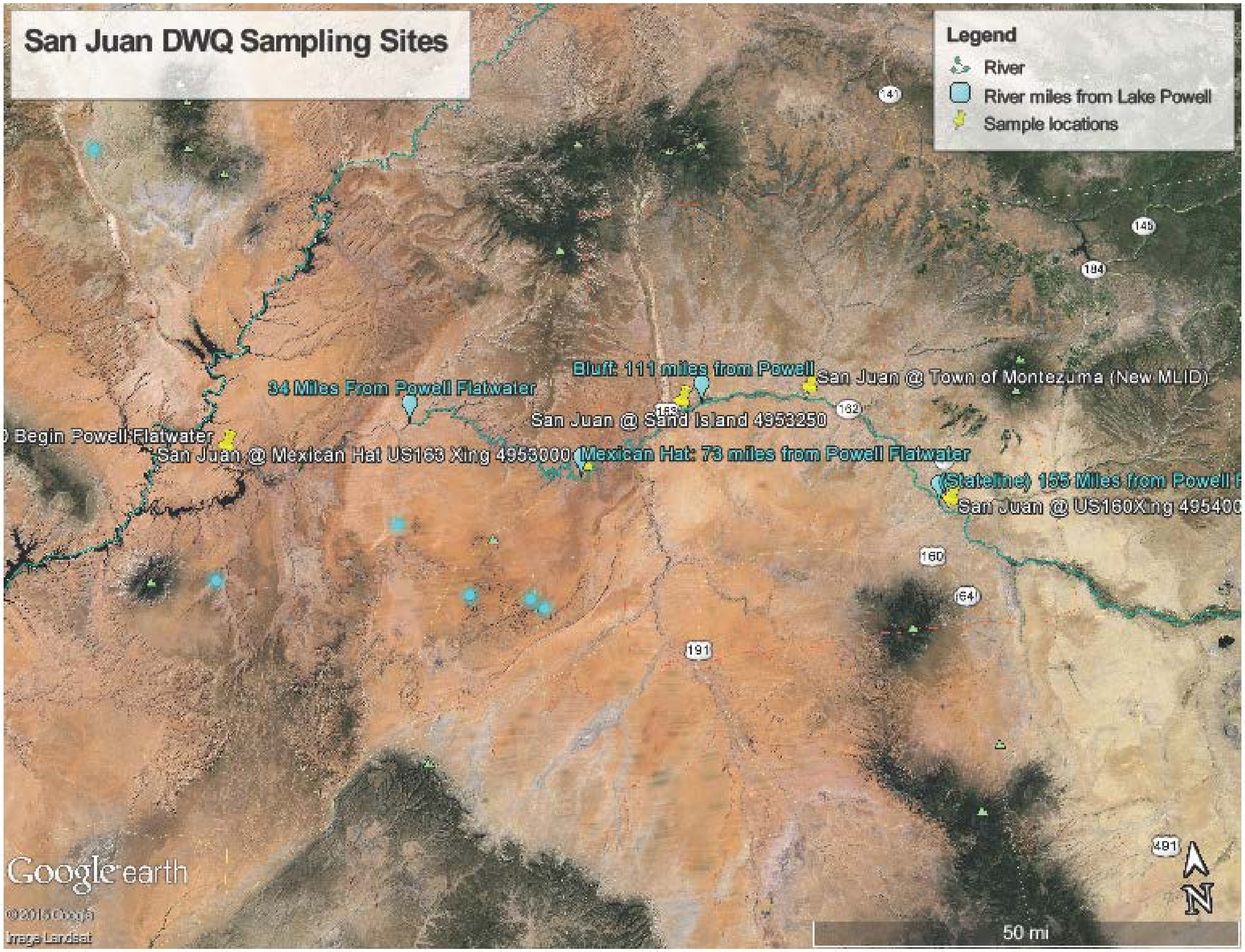


Figure 1. DEQ monitoring locations on the San Juan River.

Estimated Plume Arrival in Utah

The interpretation of ongoing monitoring results of metal concentrations required estimates of when the plume would be expected to reach DEQ monitoring locations along the San Juan River in Utah. DEQ scientists predicted the date and time of the leading edge of the plume (Table 1) by comparing the discharge measured at four USGS gages against field measurements of river velocity. The discharge-velocity relationships allowed DEQ scientists to estimate the most likely time that the plume reached monitoring stations on the San Juan River.

The leading edge of the plume was first established from field observations of the time when orange-colored water first reached the San Juan River. The predicted plume was then subsequently tracked downstream from location to location using time-specific measures of discharge from the closest upstream gage. Periods of relatively stable discharge were averaged to obtain an expected velocity of a stream segment, and then readjusted as necessary to account for changes in hydrology associated with inputs from storms or other upstream diversions. The ultimate goal was to follow the leading edge of the Gold King Plume from the confluence of the San Juan and Animas rivers downstream to the monitoring locations established by DEQ and others.

Table 1. Estimated plume arrival times for Utah Monitoring Sites

Location	Sample Location	Earliest Estimated Arrival	Latest Estimated Arrival
Near Border	San Juan R @ US 160 Xing in CO	8/9/15 @ 8:30 PM	8/10/15@ 8:30 AM
~30 miles from border	San Juan R @ Town of Montezuma	8/10/15 @ 9:30 AM	8/10/15 @ 9:30 PM
~25 miles from Montezuma	San Juan R @ Sand Island	8/10/15 @ 7:00 PM	8/11/15 @ 7:00 AM
~30 miles from San Island	San Juan R @ Mexican Hat US 163 Xing	8/11/15 @ 5:00 AM	8/11/15 @ 5:00 PM
~75 miles from Mexican Hat	Lake Powell, San Juan Delta	8/12/15 @ 5:00 AM	8/12/15 @ 5:00 PM
~160 river miles from the border			

Estimated Time of Arrival for Gold King Mine Spill

Source: US National Park Service, Sources: Esri, DeLorme, USGS, NPS, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Figure 2. Map showing estimated arrival time of the leading edge of the plume in Utah.

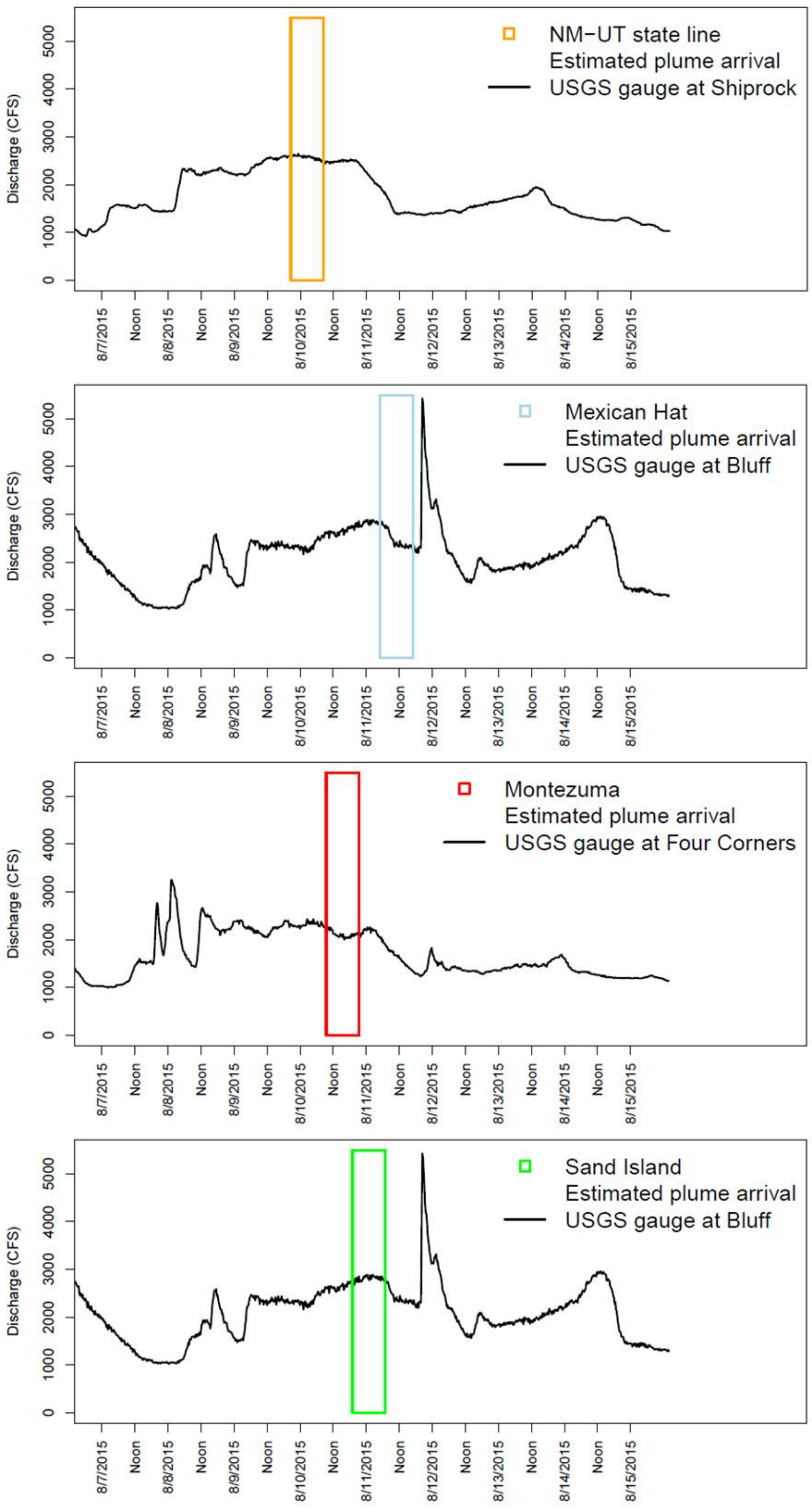


Figure 3. Hydrographs of USGS gage data on the San Juan River and estimated arrival time of the leading edge of the plume at monitoring stations in Utah.

Expected Plume Signature in Utah

DEQ scientists identified a subset of metals most strongly associated with the Gold King Mine release by reviewing recently released EPA data from samples that were collected immediately downstream of the Gold King Mine over the first days following the incident. The initial analyses focused on dissolved metals that:

1. Represented the majority of the metals released in the Gold King Mine release; and
2. Were particularly high relative to metal concentrations that have been previously documented in the lower San Juan River.

The list of potential metals to be used to detect the signature of the plume was further refined by reviewing data from samples collected in response to the Gold King Mine release to determine whether, and to what extent, any metals concentrations remained elevated relative to background concentrations as the leading edge of the plume reached the San Juan River. This analysis was not intended to quantify the overall impacts of the release; rather it was intended to highlight elevated concentrations that would likely be observable in the lower San Juan River in Utah. That is, DEQ aimed to compare plume concentrations with pre-plume background concentrations to identify those contaminants that would provide the best signature.

The above analysis was confined to the dissolved metals fraction that were released, because dissolved metals present the most immediate threat to resident fish and wildlife in the San Juan River, or to stock animals that drink water from the river. Total metals were also considered, but these data are more difficult to interpret in the context of this event because:

- Total metals are naturally high and variable in the San Juan River system due to local geology and hydrology;
- Metals associated with soil particles can enter the river system during storm runoff events, three of which occurred between August 5 and August 12, 2015, and may overwhelm and mask the signature of the plume;
- Total metals are particularly susceptible to laboratory interference; and
- A significant fraction of total metals likely is traveling along the bed of the river and would not be reflected uniformly in water column samples.

The preliminary screen of priority pollutants to use as markers for this event revealed two principal dissolved metals that could be used to trace the plume, if evident, through Utah:

- Aluminum
- Iron

An additional three metals were identified as complimentary tracers because they were a significant component of the mine release, but at much lower concentrations;

- Manganese
- Zinc

- Cobalt

Together, these metals represent ~95% of potentially toxic metals that were released to the Animas and San Juan Rivers. Some elements were eliminated as priority tracers because they are relatively non-toxic or are naturally occurring in relatively high concentrations (e.g., calcium, sodium, and magnesium). Finally, several metals were observed at elevated concentrations, but were eliminated as candidate tracers (e.g., copper and lead), because they were not observable downstream due to dilution from the San Juan River or due to other biogeochemical processes that may have retained the metals upstream.

Analysis of Trends in Water Quality Data

DEQ has prepared time-series plots (Figures 4 – 8; Appendix 1) that show the concentrations of water-quality parameters through time at four separate sampling locations (Figure 1). The data include samples collected by both DEQ and EPA.

Plots for sites at the New Mexico-Utah state line, Montezuma, and Sand Island are based on data from DEQ. Plots for the sites at Shiprock and Hoback include only data from EPA. Sites are color coded as described in the legend in the upper right corner of the plot. In addition, dates of significant rain events are noted along the bottom of the plot as black triangles. Along the bottom axis, the date labels are placed at midnight of that day. Samples were also collected at Mexican Hat, but were not included in the plots because of the strong interference suspected by Chinle Wash, just upstream of Mexican Hat, on water quality patterns.

Relevant water quality screening criteria for each parameter are also displayed on the plot as black dashed lines. These criteria include:

- Standards for domestic-source water
- Warm water aquatic life
- Agricultural uses

In addition to the lines displayed on the plots, the numeric values for each standard are presented in the legend in the upper left corner of the plot. Parameters without established criteria for particular uses are noted with NA for not applicable.

Where available, the historically observed ranges of parameters in the San Juan River from two data sources, DEQ and USGS, are displayed as boxplots to the right of the time series data. These ranges represent observed pre-spill conditions for the San Juan River.

Dissolved Metal Trends Linked to Plume

After identifying the metals from the release that would be most likely to manifest at Utah monitoring locations, it was important to determine whether these elements were observed in samples collected from the San Juan River in Utah. Since the Gold King Mine release was first announced, DEQ has been collecting samples at several locations in the San Juan River. The EPA, among other entities, has responded similarly.

There are a couple of predictions that can be made by combining estimates of expected travel time with monitoring results of key “tracer” constituents of the Gold King Mine release:

- If the plume was measureable in the San Juan in Utah, DEQ would expect to see peak concentrations of key constituents, especially dissolved iron and aluminum, at concentrations higher than has been observed historically in the San Juan River. If coincident peaks in the concentrations of manganese, zinc, or cobalt are also observed at atypically high concentrations, this would further corroborate the interpretation that these peaks are the result of the Gold King Mine release.
- The peak concentrations of key these key tracer metals should occur at roughly the time predicted by the travel time predictions and should occur increasingly later as the leading edge of the plume moves downstream.

These predictions are manifest in data from DEQ and EPA water samples. This is evidenced in both the time series graphs (Appendix 1) and in the tables that provide specific monitoring results. Both sources of results show that peak concentrations of key tracers occurred at approximately the time predicted by travel time estimates. Moreover, the peaks of tracer elements like aluminum and iron occurred first at samples collected at the Utah-New Mexico border and then progressively later at downstream locations. The box plots accompanying the time-series plots also reveal that peaks in dissolved aluminum and iron were greater than concentrations observed from historical routine monitoring in the San Juan River. Observed peak concentrations of these key metals persisted, depending on the monitoring location, from about 12-24 hours (although precise estimates the extent of dispersion of the plume are immediately impossible to determine due to the 12-hour lag between samples).

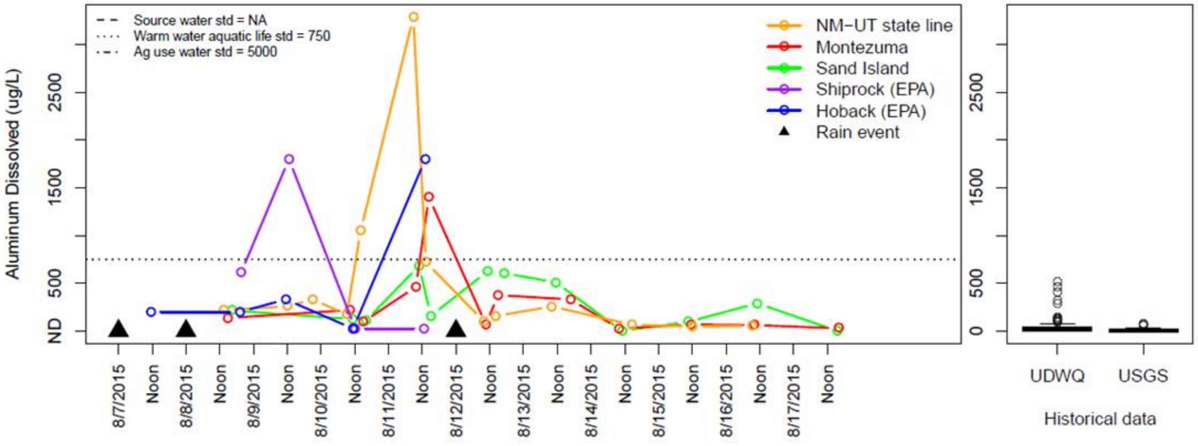


Figure 4. Time-series plot of dissolved aluminum in the San Juan River, Utah.

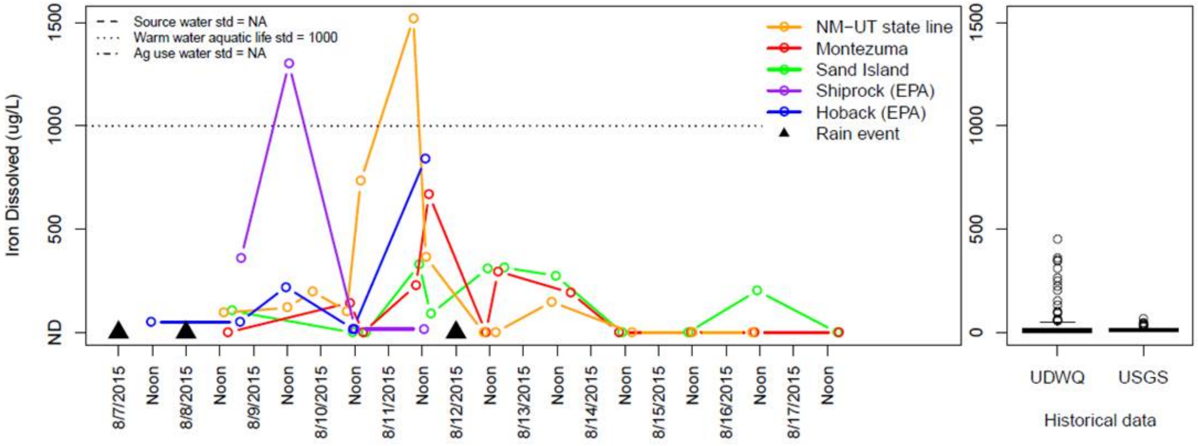


Figure 5. Time-series plot of dissolved iron in the San Juan River, Utah.

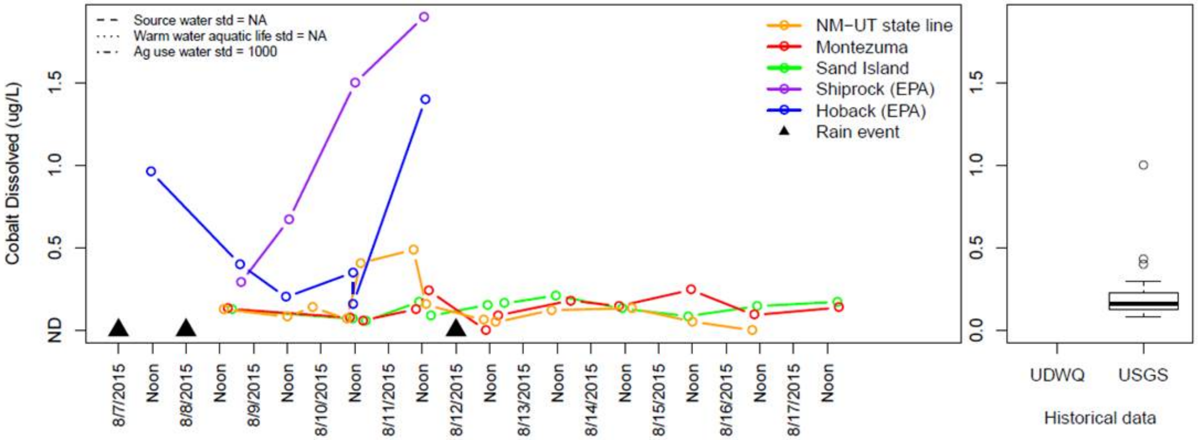


Figure 6. Time-series plot of dissolved cobalt in the San Juan River, Utah.

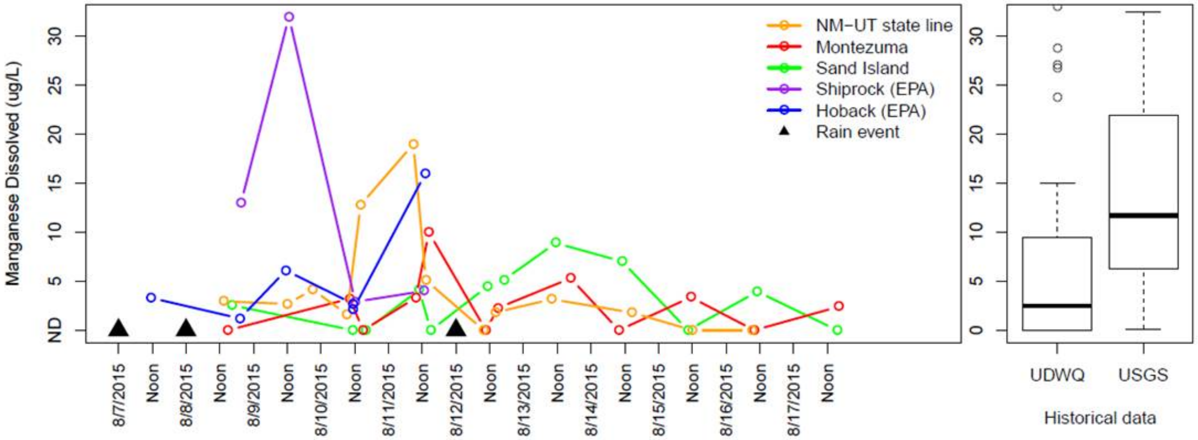


Figure 7. Time-series plot of dissolved manganese in the San Juan River, Utah.

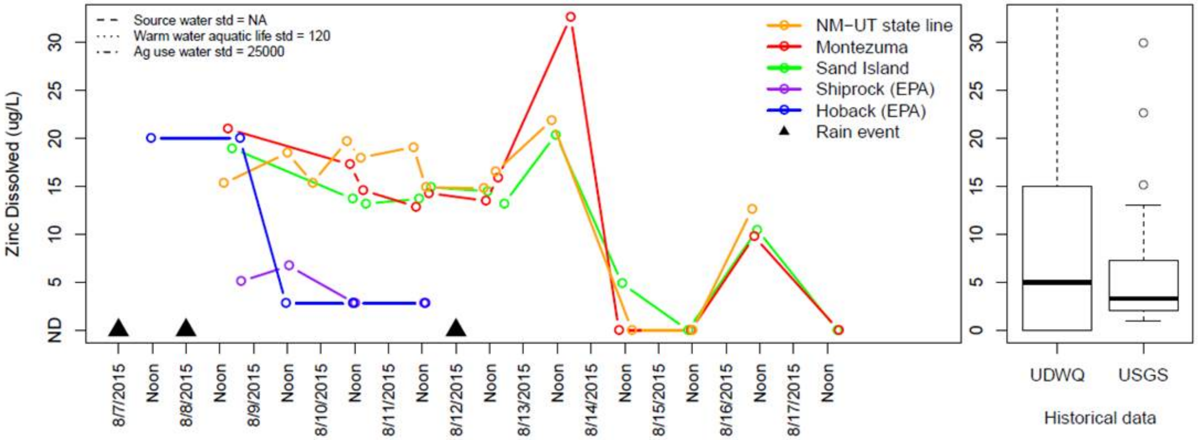


Figure 8. Time-series plot of dissolved zinc in the San Juan River, Utah.

Total Metal Patterns in the River Difficult to Link to Plume

DEQ was not able to use patterns in total metals concentrations to evaluate the effects of the release on the San Juan River. Total metals interpretation was complicated by high background concentrations, storm and natural geology influence, the potential for laboratory interference, and sedimentation and remobilization processes.

Background total metals concentrations

Total metal concentrations are naturally high in the San Juan River. In most cases, total concentrations were one to several orders of magnitude greater than dissolved concentrations. Moreover, at several monitoring locations, the highest total metal concentrations for several key constituents were greatest in samples that were clearly collected before the spill arrived.

Storm influence

Based on historic water-quality monitoring data, total metal concentrations are highly variable in the San Juan River, and much of this variation is considered to be natural. High levels of variation complicate the ability to ascribe any single observation to the Gold King Mine release. This is especially true given the monsoon rains that occurred episodically after the Gold King Mine release, which are expected to increase the delivery of total metals to the San Juan River ecosystem.

A review of precipitation and hydrological data from the Colorado Basin Forecast Center demonstrates the effect monsoon-rain events have on flow in the San Juan River. Two major precipitation events occurred on August 8, 2015 and August 12, 2015. Figure 9 shows the intensity and areal coverage of these events and the corresponding response to flow in the San Juan River. The August 12, 2015, storm event was particularly strong and created a large flash flood event in the Chinle Creek basin, which intersects the San Juan River between Bluff, UT and Mexican Hat, UT. Storm events of this magnitude likely deliver large quantities of total metals from a variety of source areas throughout the watershed. Further investigation is needed to statistically relate these events to observed total metal concentrations.

Watershed geology

The geology of the San Juan River basin ranges widely in age from contemporary sand dunes and river deposits to quartzite exposures over 500 million year old. Geologic strata exposed at the surface vary from highly resistant rocks near the Goosenecks portion of the San Juan River to extremely erodible marine shales near the Mancos River in New Mexico and Colorado. The combination of both highly resistant and highly erodible geological strata within the watershed allow for great quantities of water and sediment to be added to the main river system in response to sporadic but locally intense summer monsoon storms. These factors contribute to the high sediment load of the San Juan River. In addition, marine shales commonly have substantial concentrations of trace elements, including toxic metals that may also be present in mine waste. Evaluation of the longer term impacts of the spill may include an assessment of the surficial geologic deposits and soils within the watershed to develop a better understanding of potential naturally occurring nonpoint sources of metals to the San Juan.

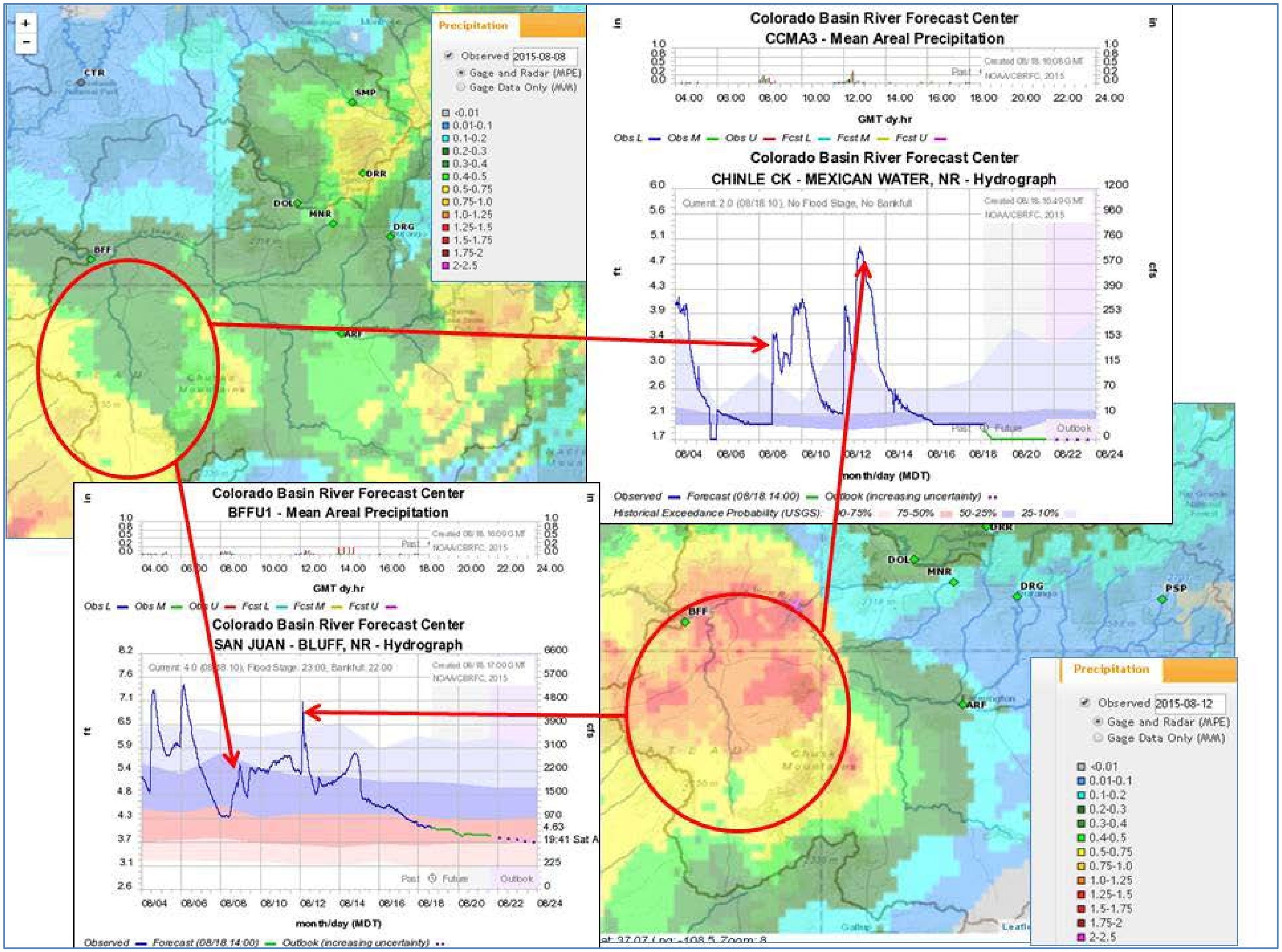


Figure 9. Areal Distribution of Total Observed Precipitation and Hydrographs for August 8th and August 12th Storm Events.

Source: National Weather Service Colorado Basin River Forecast Center

Sediment deposition and remobilization

Flow in the San Juan River is largely influenced by spring snowmelt, summer monsoon rain events, and reservoir release from Navajo Lake. An example of two summer monsoon events is presented in Figure 9. This figure demonstrates that the San Juan River can receive a significant amount of water from storm events that occur in isolated sub-basins within the watershed.

Given the geology of the watershed, there is a significant amount of fine-grained sediment available for transport by the San Juan River and its tributaries. These sediments exist as fine grained sands, silts, and clay as well as some larger boulder and cobble bed load. Fine-grained bed load is particularly important in the context of deposition and remobilization of metals delivered to the river in the initial plume. During large flow events fine-grained sediments become highly mobile and are transported easily throughout the system. This was observed in recent sampling events with the increase of total suspended solids from upstream to downstream monitoring stations. When flow levels recede, these fine-grained sediments are deposited first in backwater areas of the river channel then in the main river channel as flow recedes further.

It is expected that total metals and the flocculants observed with the mine release will respond similarly to fine-grained sediments. Metals and flocculants will continue to be deposited , mobilized, and transported downstream with subsequent high flow events , ultimately being deposited in Lake Powell. It is expected that eventually these will be capped off and covered up with fine-grained sands and silts from future precipitation events.

Lab interference

Total metals are particularly susceptible to laboratory interference, especially under circumstances where ambient conditions with elevated dissolved and suspended solids. Such interferences can alter laboratory results because, among other things, they often necessitate dilution of samples prior to analysis. Such dilutions are accounted for, but the variation in the extent of dilution from one collection event to the next complicates data interpretation. This is especially true for constituents such as metals, that are measured at very low (parts per billion) concentrations.

Water Quality Data Compared to Screening Values for River Uses

The most important immediate question related to the Gold King Mine release on Utah's waters is whether any observed increases in metals concentrations pose a threat to the uses of the San Juan River. DEQ has addressed this concern by collaborating with Utah's Department of Health and Department of Agriculture and Food to establish threshold values and appropriate ways for interpreting these values for those uses that were determined to be at greatest threat from this event. These tables and associated indicator values have been published daily and will continue on a weekly basis until monitoring efforts associated with this event have ceased. Appendix 2 includes a detailed summary of the screening values used in this analysis as well as comparison against water quality data collected from

August 8, 2015 to August 17, 2015. These ongoing results continue to be evaluated with respect to the threat that elevated concentrations potentially pose to several important uses of the San Juan River:

- Drinking Water
- Recreation
- Fish and Wildlife
- Agriculture

Generally, professionals from all state agencies have concluded that, even at peak concentrations, the observable increase in metals from the Gold King Mine release have posed minimal threat to all of these uses. Summary statements from other state agencies with respect to threats are summarized in the following sections. Estimated results-values below the laboratory's reporting limit are not included in this analysis but will be further evaluated by DEQ. These results generally show low-level concentrations and are not expected to significantly affect the analysis outcome. DEQ's detailed screening-level analysis tables and report are presented in Appendix 2. The following sections provide a description and interpretation of current results.

Aquatic Life

In terms of immediate threat, the most appropriate criteria are those established in Utah Water Quality Standards for acute (4-day) exposure to metals associated with the Gold King Mine release. A comparison of monitoring data against these thresholds reveals a violation of acute criteria for dissolved aluminum, at most locations, for two consecutive monitoring events (~12-18 hours). Dissolved iron also exceeded acute concentrations, but only for a single sample event at the most upstream location. Obvious effects from these exceeded values, such as fish kills, have not been reported. More subtle effects, such as harm to particularly sensitive young life stages of fish or any deleterious effects to less obvious assemblages (e.g., macroinvertebrates) may have occurred, but given the relatively short duration of metal peaks and the limited number of metals at elevated concentrations, DEQ does not believe that such responses are likely. Nevertheless, Utah's Division of Wildlife Resources and the U.S. Fish and Wildlife Service have ongoing monitoring activities aimed at the protection of fish species to help ascertain any more subtle, long-term effects of the Gold King Mine release.

Recreation

The total metals analysis provides results for metals that are both dissolved and present as very small particles. Total metals analysis is used to evaluate recreational exposures so as to be as protective as possible of human health.. Agency for Toxic Substance and Disease Registry (ATSDR) health-based comparison values (CVs) were used when available. In some cases, EPA risk-based Regional Screening Levels (RSLs) were used in the absence of an established CV. CVs exist for acute (up to two weeks), intermediate (two weeks to one year) and chronic (more than one year) exposures. Intermediate CVs were used followed by chronic CVs in the absence of intermediate CVs. Further analysis of this dataset was provided by UDOH in a series of statements of evaluation for recreational exposures. The latest evaluation as of the release of this document can be found here: Statement of Evaluation.

Drinking Water Sources

DEQ's Division of Drinking Water (DDW) compared the measured levels of total metals and dissolved metals from the San Juan River water samples to the EPA-established drinking water Maximum Contaminant Levels (MCLs) for metals. For drinking water quality, it is more protective of public health to use the total metals result to determine how safe water is to drink. Because of this, MCLs are compared against the total metals analysis when treated waters are assessed for safety.

The sampling results from August 8, 2015, through August15, 2015 so far indicate that:

- The total metals in the untreated river water samples have exceeded the drinking water MCLs for aluminum, arsenic, iron, manganese, and the action level of lead.
- The dissolved metals in the untreated river water samples meet these drinking water MCLs.

Therefore, it is likely that the suspended particles in the river water contributed to the MCL exceedance of aluminum, arsenic, iron, manganese, and lead.

Drinking water systems that can properly treat surface water and meet the required turbidity standards established by the EPA can successfully remove the suspended particles during the water treatment process. As the dissolved metals data meet MCLs, DDW finds that the San Juan River can be a viable water source if adequate treatment (e.g., filtration, precipitation, etc.) exists to remove the suspended particles and to meet turbidity standards.

DEQ continues to coordinate with three San Juan County water systems regulated by the State of Utah (Mexican Hat, Bluff, and Sand Island) in regards to monitoring the public drinking water wells located near the San Juan River. It is important to note that none of these three water systems draw their source waters directly from the San Juan River. Mexican Hat's long-term monitoring strategy includes taking metals samples from its wells this week, and continuing periodic metals sampling as needed beginning in six months' time.

The compliance sampling data for all public water systems regulated by State of Utah are available from DDW. To obtain the data from DDW, fill out the request form and fax the form to (801)536-4211.

Public water systems located on tribal lands are being managed by their appropriate authorities, for example, Navajo Tribal Utility Authority (NTUA).

Residents with a private well can call a certified drinking water lab to get it tested. The laboratories provide the required bottles, sampling instructions and return instructions.

Dissolved metals are usually considered more mobile and biologically available (can be absorbed by the body). The screening values used in this table are from Utah's water quality standards protective of source water for domestic use.

The Water Quality Interpretation Tool developed by Utah State University Extension Services allows users to enter their water quality data online and receive interpretation of those data pertaining to drinking water, irrigation water, livestock water, and environmental water state standards. The explanation of results from this tool provides information on the analyte health effects, the susceptible populations, and typical routes of exposure.

Agriculture

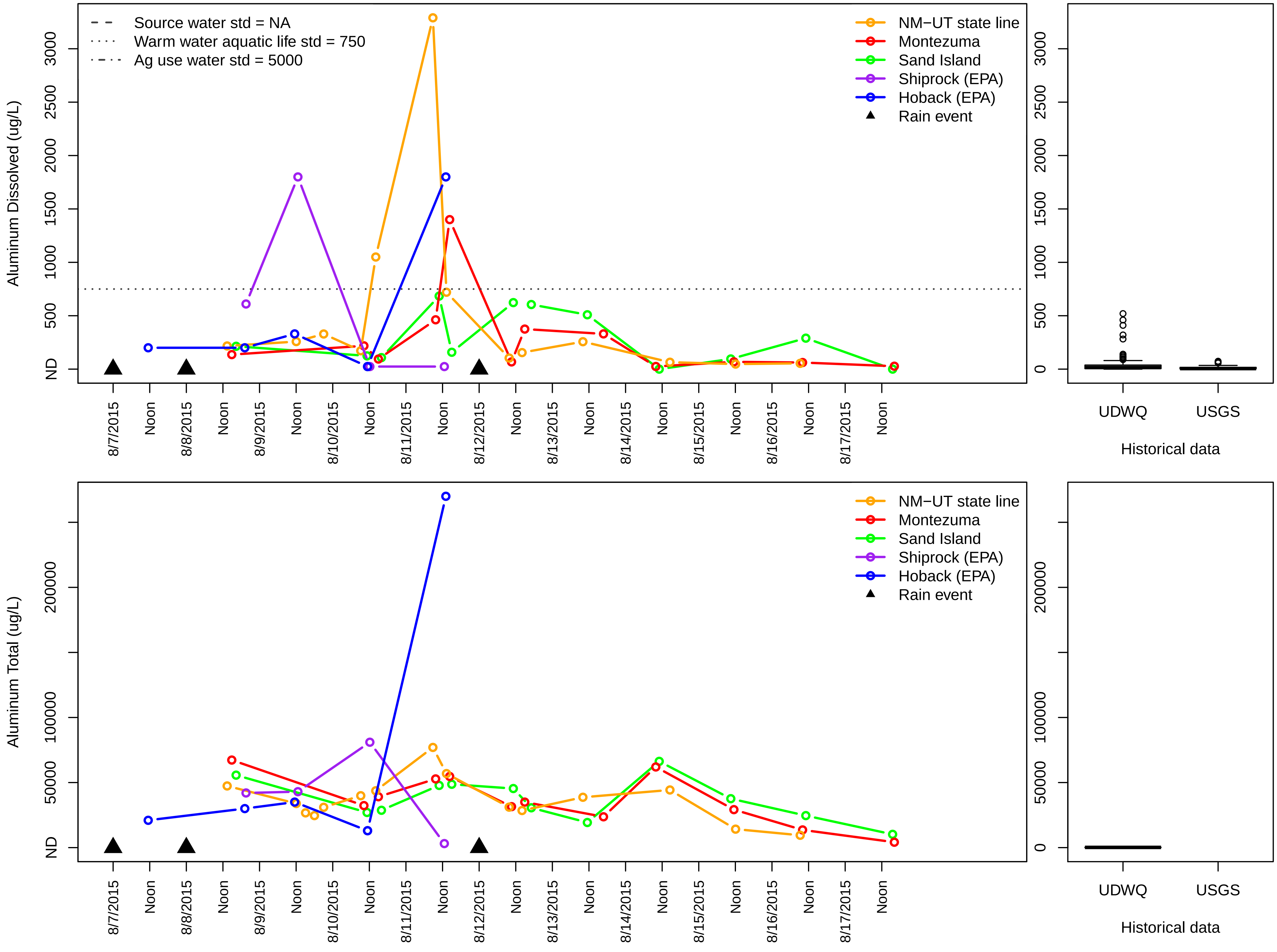
The Utah Department of Agriculture and Food (UDAF) lifted all advisories against using San Juan River water for crop irrigation and livestock watering on August 14, 2015.

Based on the latest DEQ evaluation of the San Juan River water sample data, Utah State University's veterinary toxicologist reports that the river's highest levels of contamination posed no adverse effects on plants, soils and animals, only short-term and minimal exposure risks. The UDAF advises farmers and ranchers to remain cautious and report any changes in the health of their crops and livestock.

Evaluating Long-term Effects of the Spill on Utah's Waters

Over the long-term, DEQ scientists project that most metals from the Gold King Mine release that arrive in Utah will ultimately be deposited in Lake Powell. Ideally, these metals will be covered by a sufficient layer of non-toxic sediment to reduce aquatic life exposures to high metal concentrations. The high sediment load of the San Juan River, the depositional area in the San Juan arm of Lake Powell, and the long residence-time of water and its constituents in the lake before being transported downstream (roughly 7.2 years), should help reduce the effects of this event. Many questions regarding the long-term impacts of this spill remain unanswered. For example, impacts of the contamination on nearby groundwater drinking water aquifers, aquatic ecosystems, and soils irrigated with river waters are just a few of the many potential issues that will need to be addressed. These issues will require that DEQ, in collaboration with other Utah agencies, develop a long-term monitoring plan.

Appendix 1. Water Quality Trend Graphics


Source water std = NA
Warm water aquatic life std = 750
Ag use water std = 5000
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Aluminum Dissolved (ug/L)
ND
500
1000
1500
2000
2500
3000
0
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
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Noon
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Noon
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Noon
8/17/2015
Noon
UDWQ
USGS
Historical data
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Aluminum Total (ug/L)
ND
50000
100000
200000
0
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
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8/12/2015
Noon
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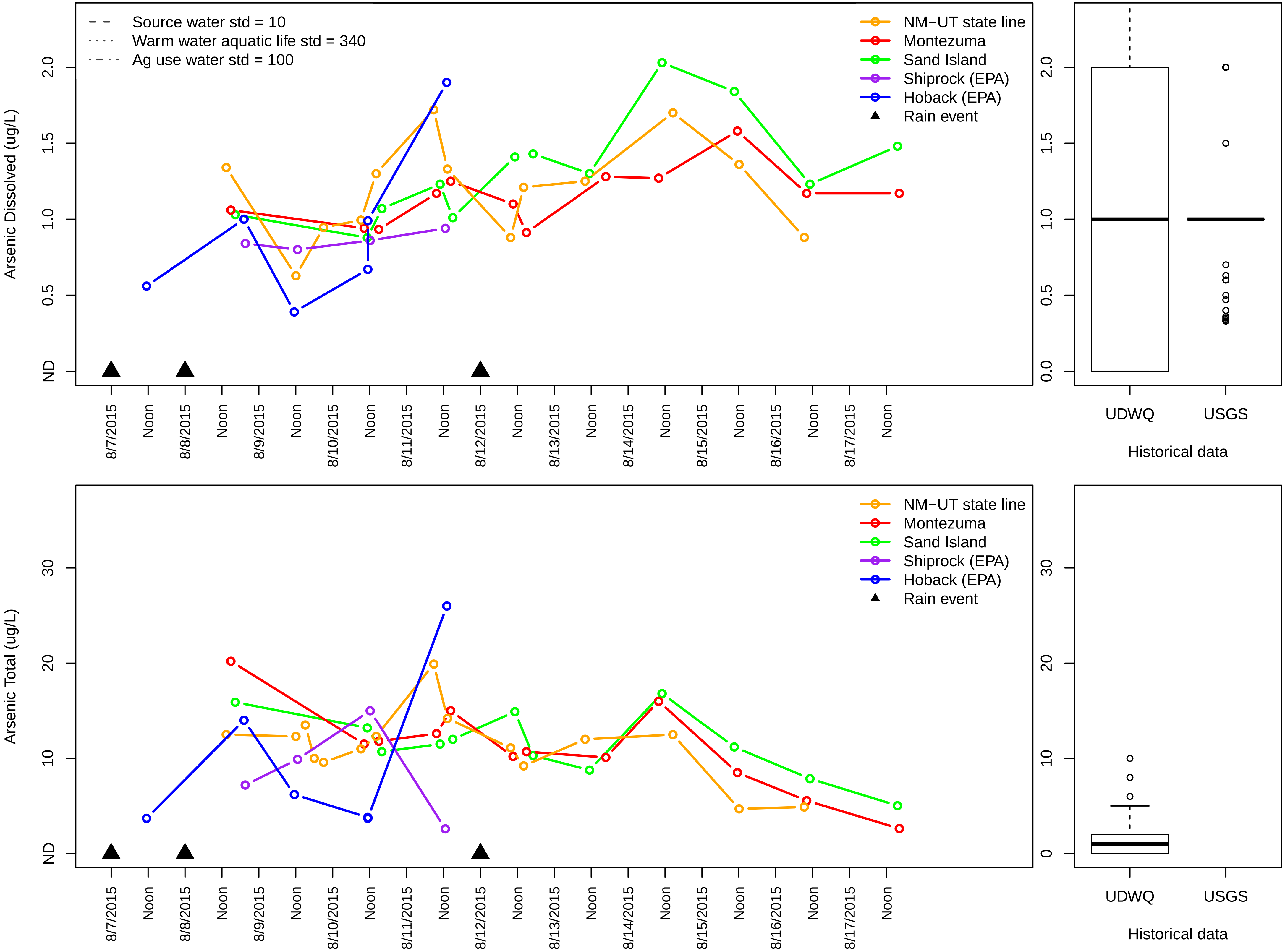
Noon
UDWQ
USGS
Historical data


Source water std = 10
Warm water aquatic life std = 340
Ag use water std = 100
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
▲ Rain event
Arsenic Dissolved (ug/L)
ND
0.5
1.0
1.5
2.0
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
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8/16/2015
Noon
8/17/2015
Noon
0.0
0.5
1.0
1.5
2.0
UDWQ
USGS
Historical data
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
▲ Rain event
Arsenic Total (ug/L)
ND
10
20
30
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
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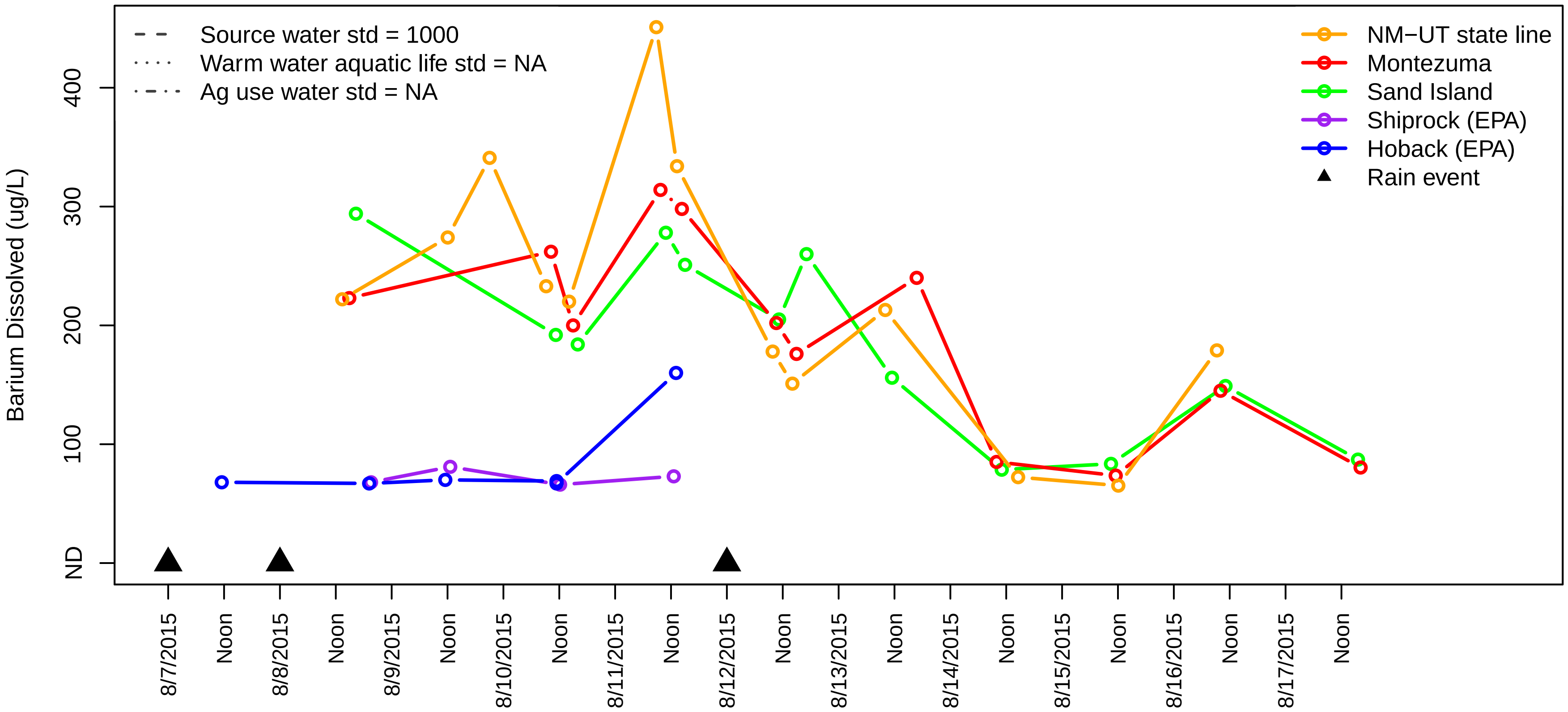
Noon
0
10
20
30
UDWQ
USGS
Historical data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Warm water aquatic life std = NA
Ag use water std = NA
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Barium Dissolved (ug/L)
ND
100
200
300
400
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
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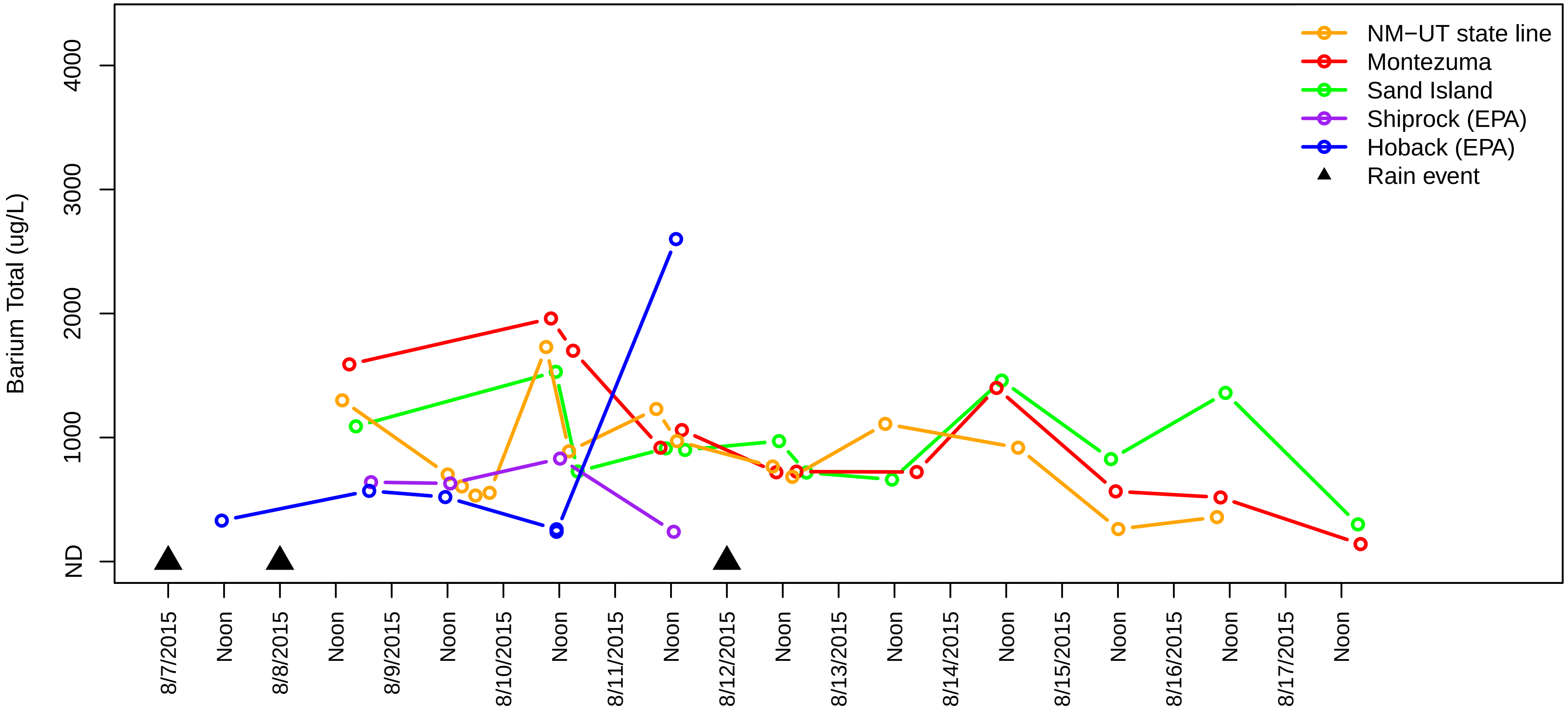
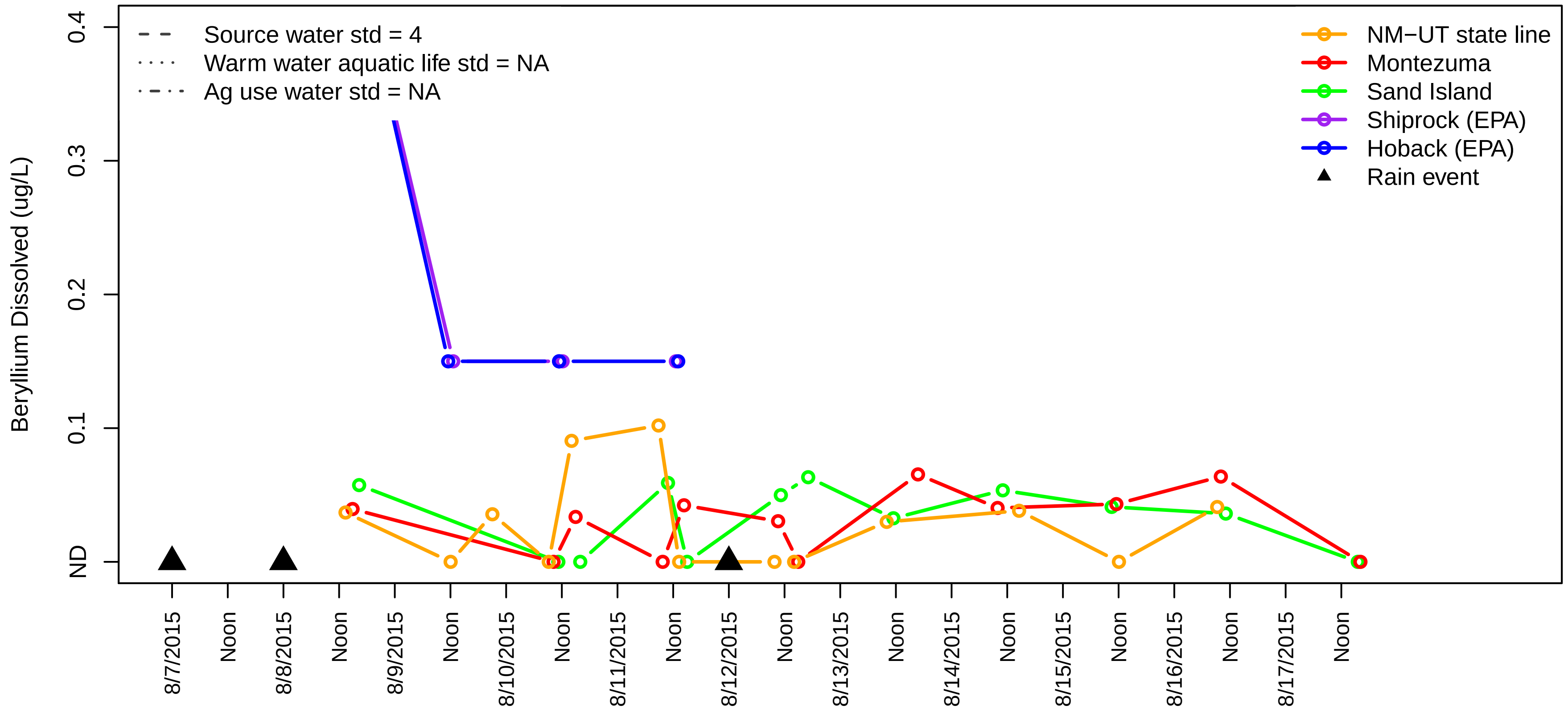
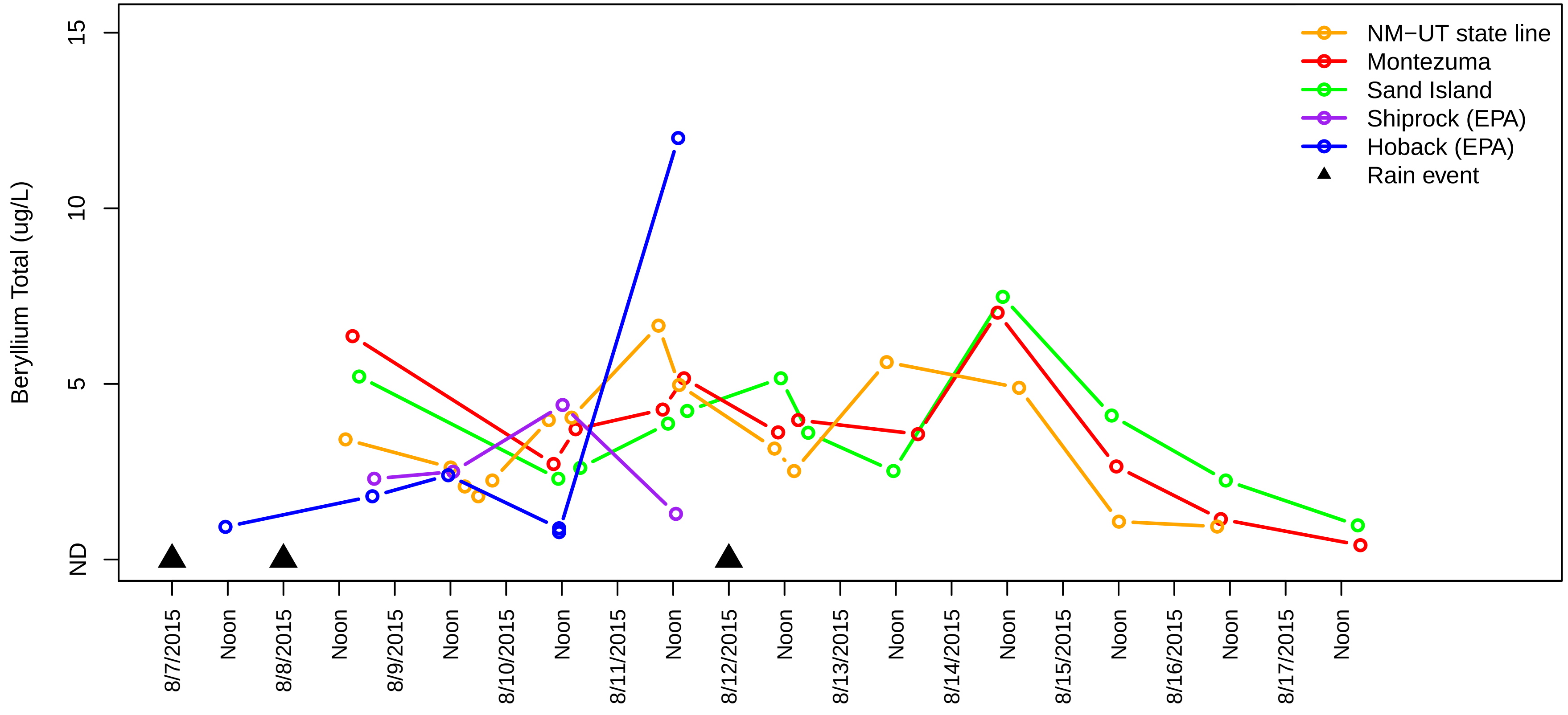
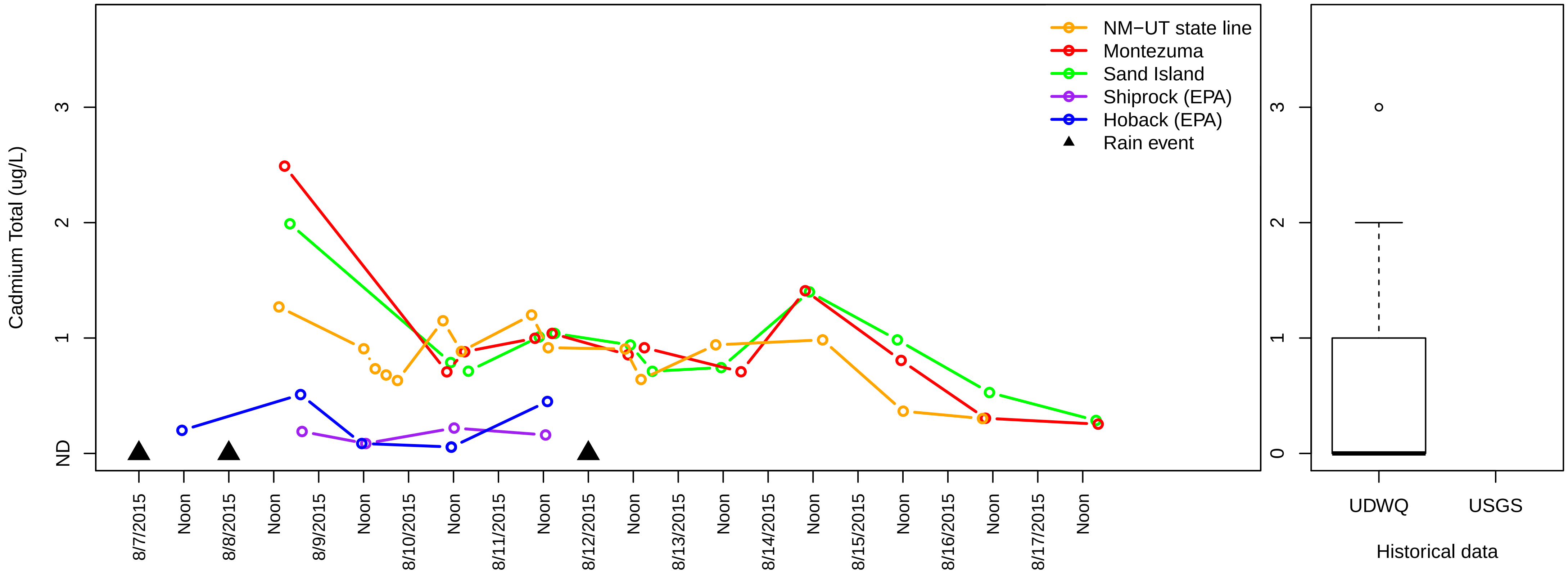
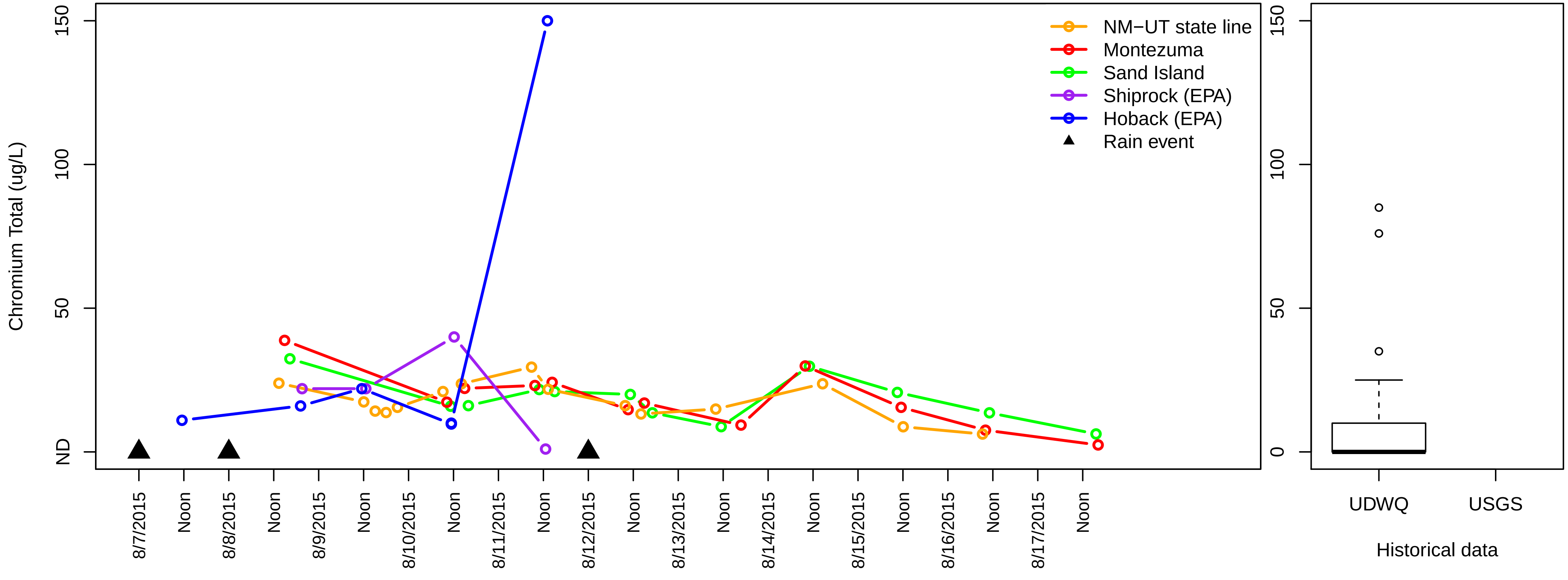
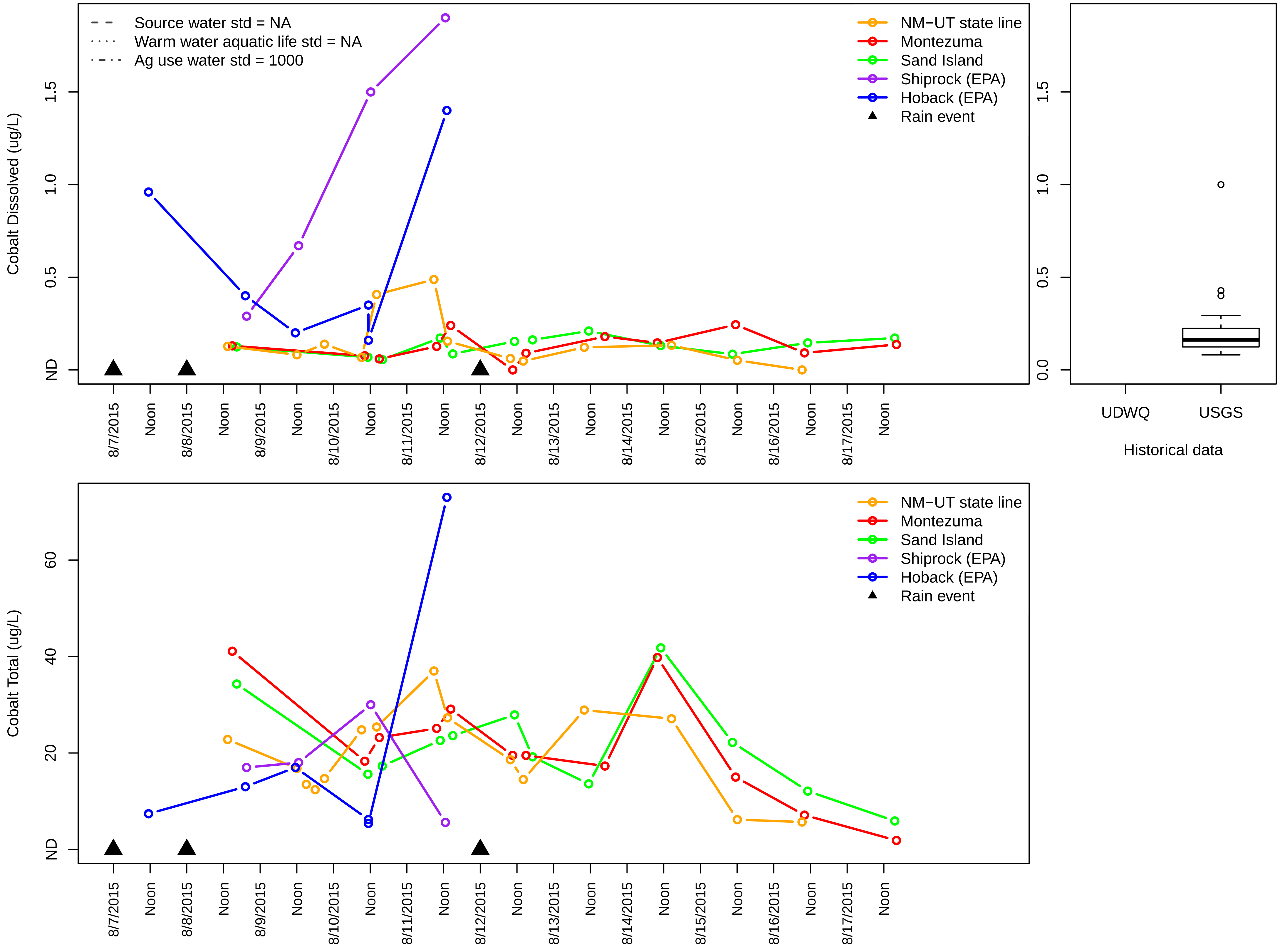

NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Barium Total (ug/L)
ND
1000
2000
3000
4000
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon

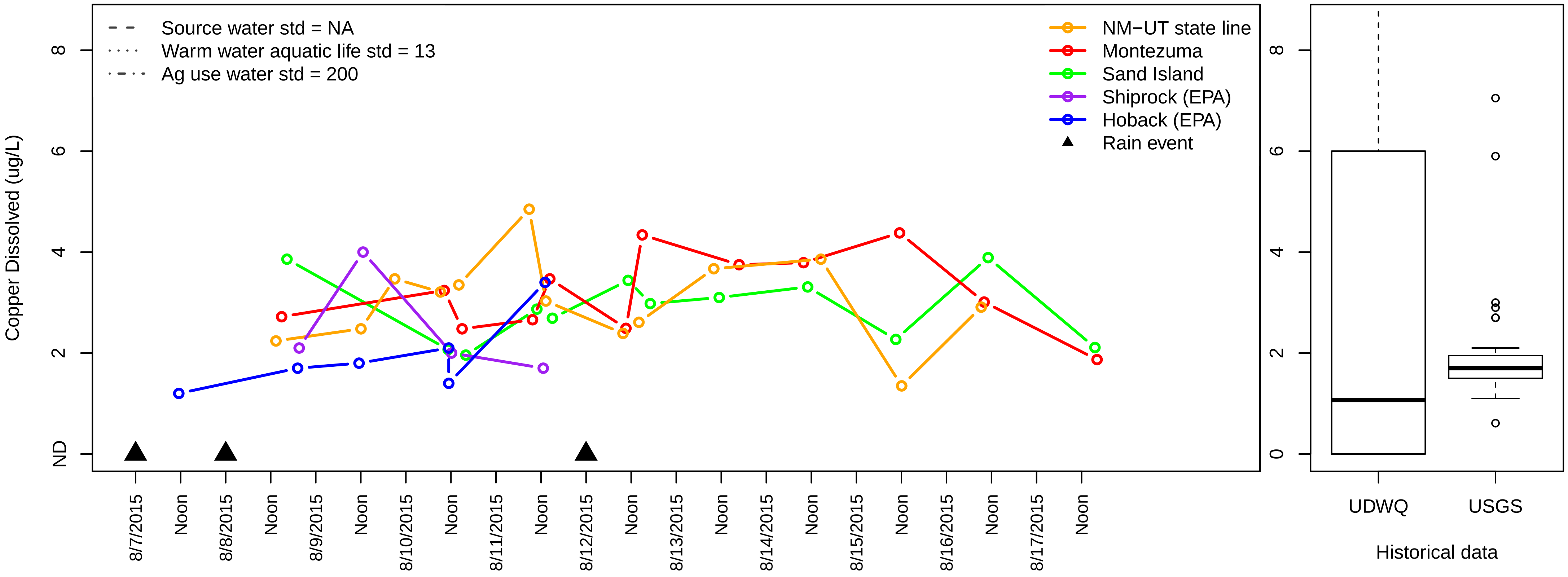

Beryllium Dissolved (ug/L)
ND
0.1
0.2
0.3
0.4
Source water std = 4
Warm water aquatic life std = NA
Ag use water std = NA
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon

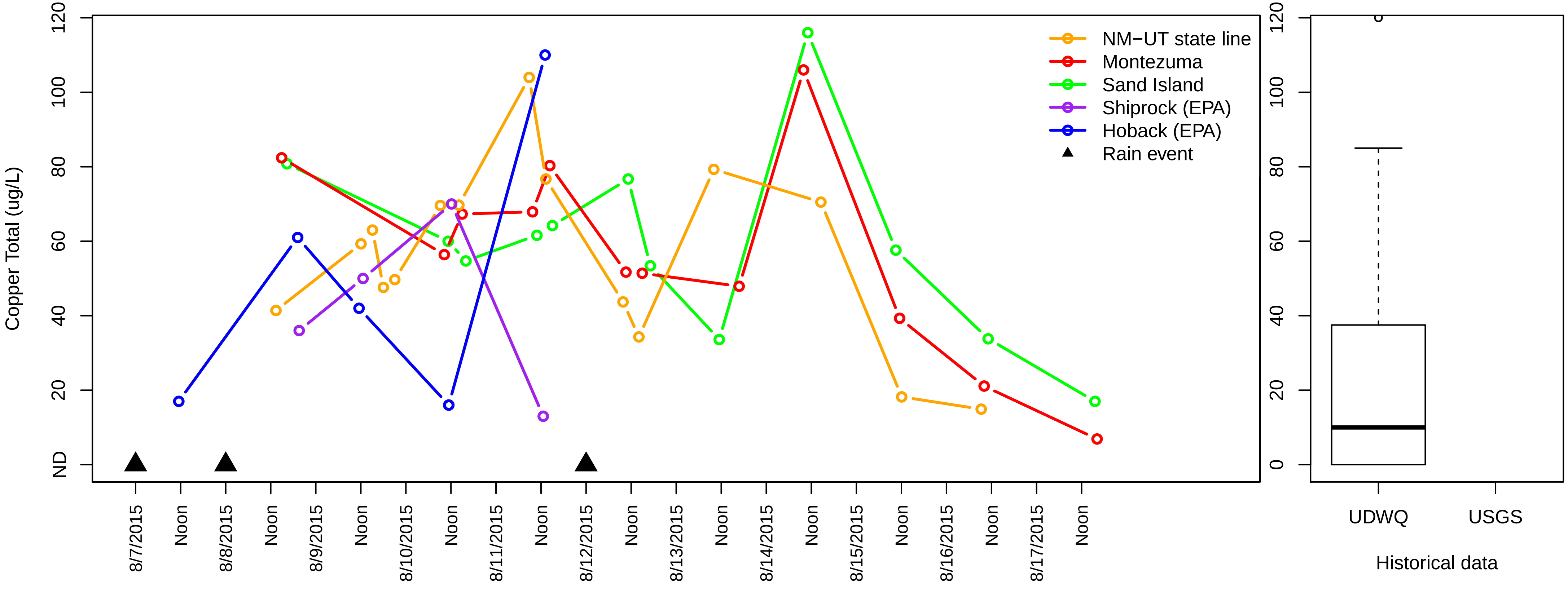

Beryllium Total (ug/L)
ND
5
10
15
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon

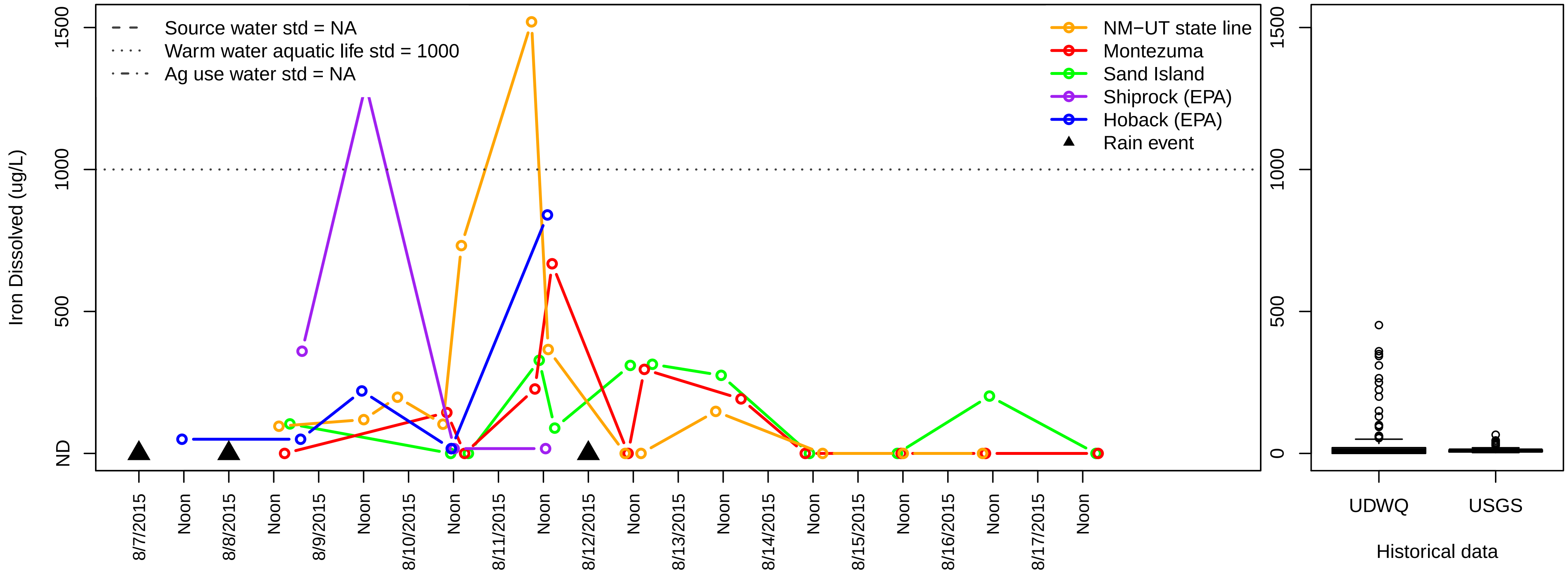

Cadmium Total (ug/L)
ND
1
2
3
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
1
2
3
UDWQ
USGS
Historical data

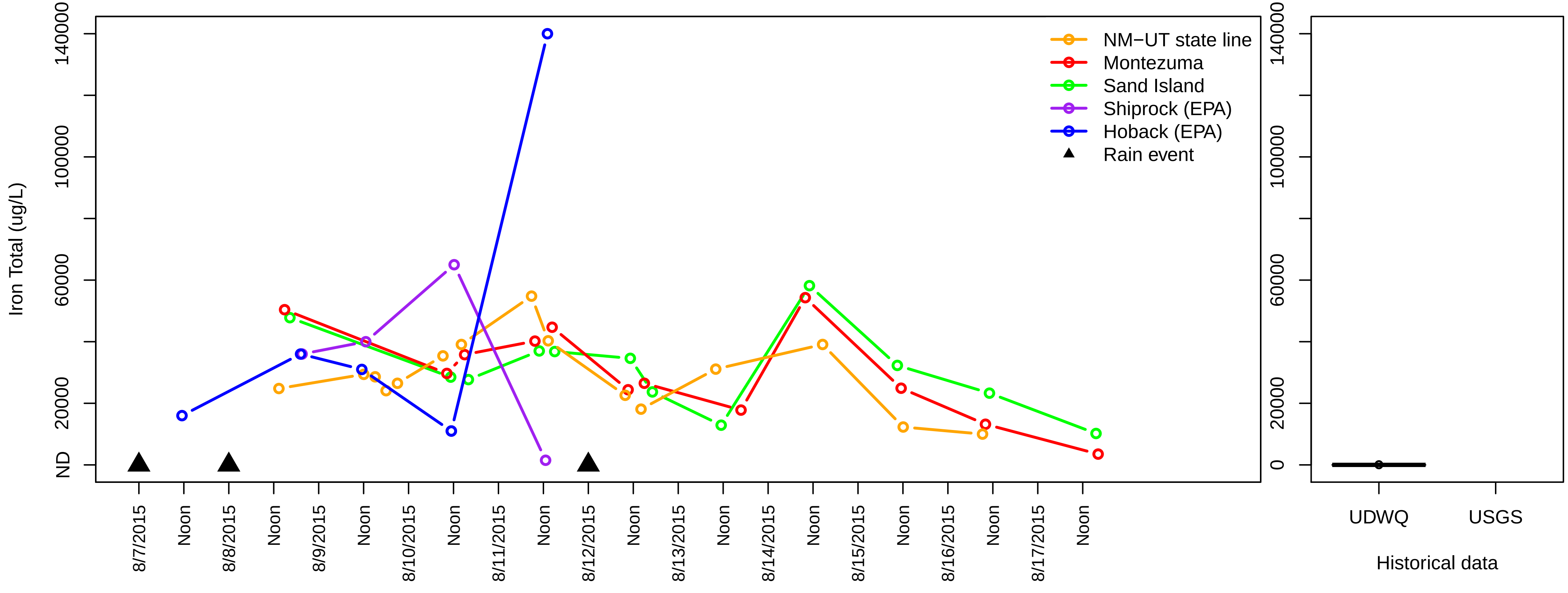

Chromium Total (ug/L)
ND
50
100
150
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
50
100
150
UDWQ
USGS
Historical data

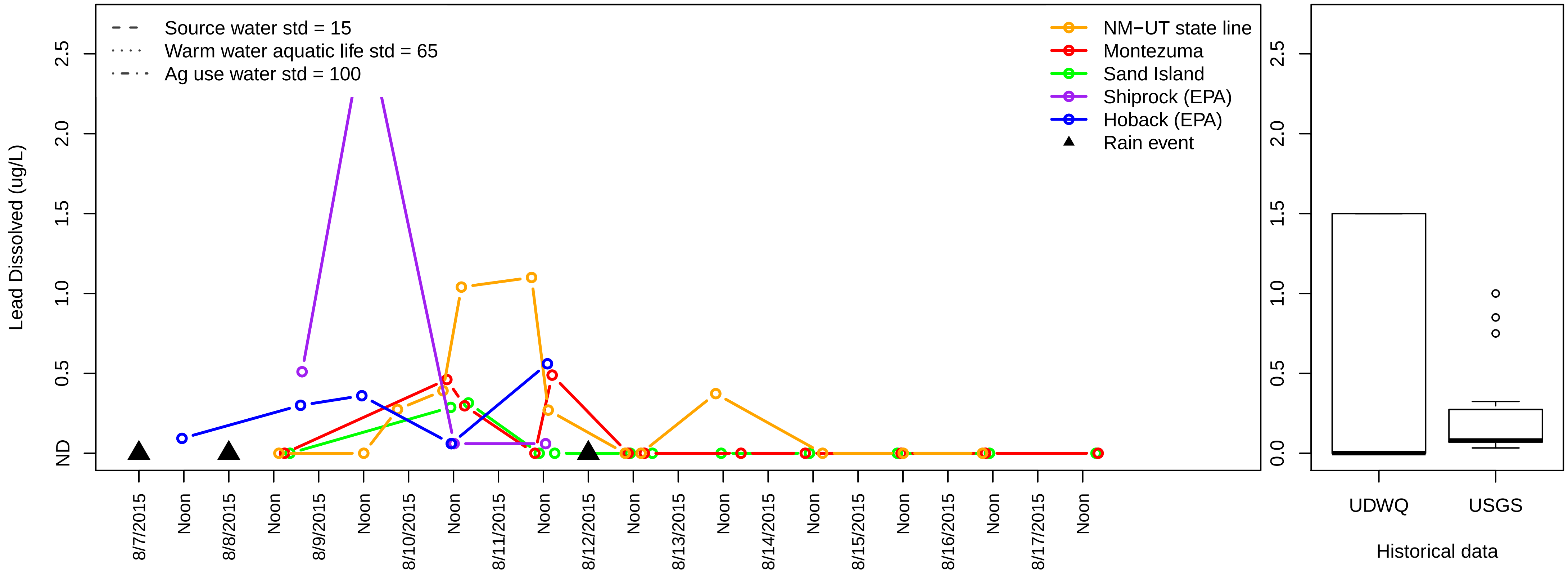

Source water std = NA
Warm water aquatic life std = NA
Ag use water std = 1000
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Cobalt Dissolved (ug/L)
ND
0.5
1.0
1.5
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0.0
0.5
1.0
1.5
UDWQ
USGS
Historical data
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Cobalt Total (ug/L)
ND
20
40
60
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon

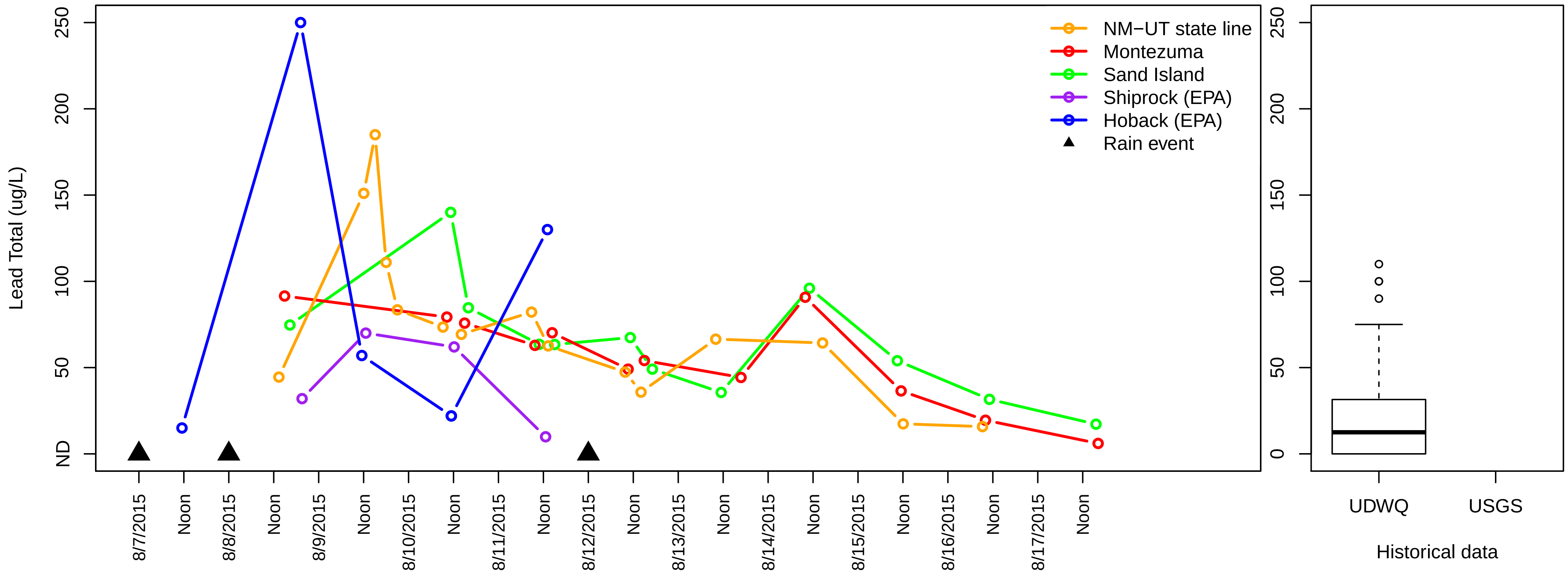

Source water std = NA
Warm water aquatic life std = 13
Ag use water std = 200
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Copper Dissolved (ug/L)
ND
2
4
6
8
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
2
4
6
8
UDWQ
USGS
Historical data

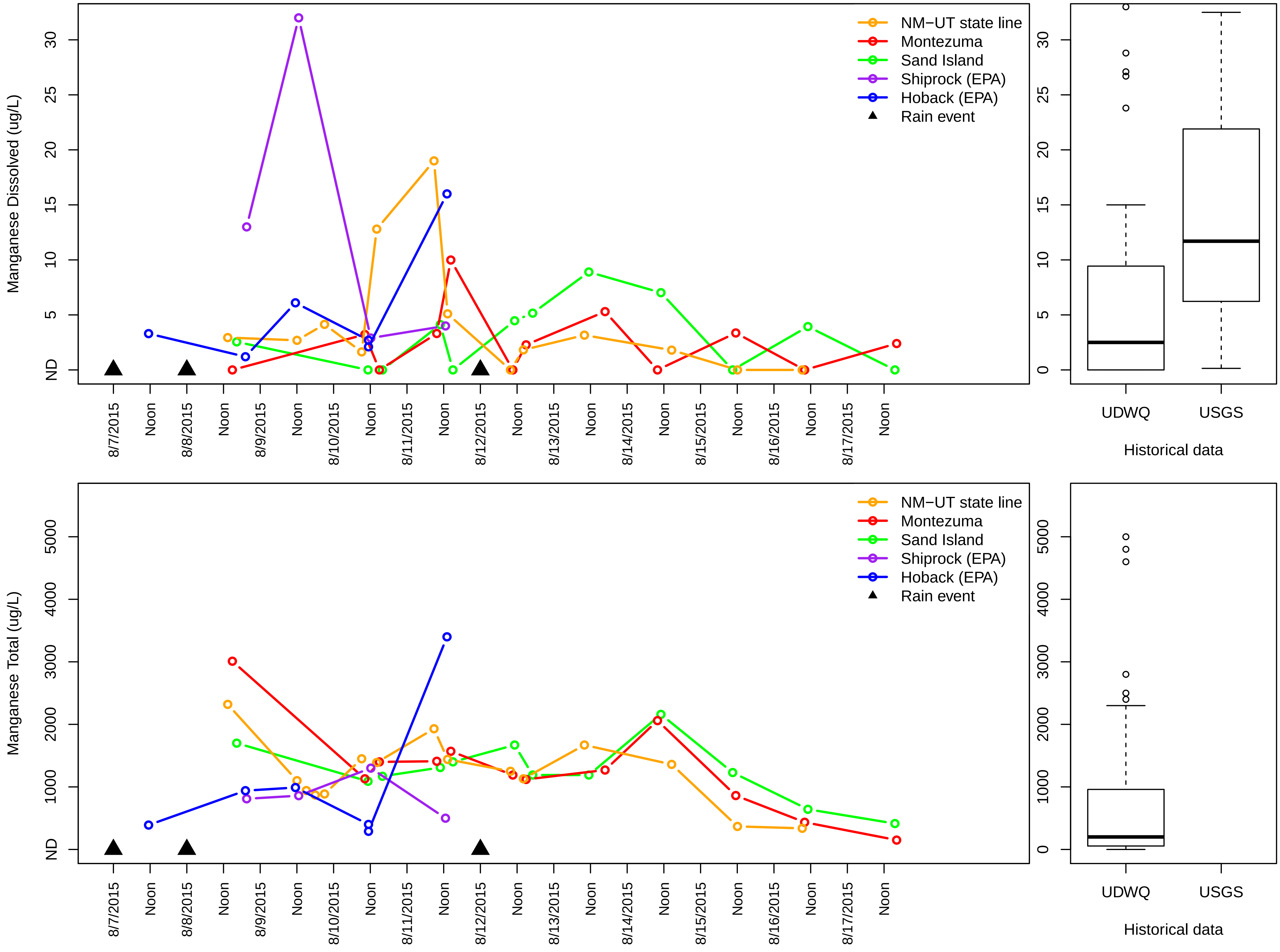

NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Copper Total (ug/L)
ND
20
40
60
80
100
120
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
20
40
60
80
100
120
UDWQ
USGS
Historical data

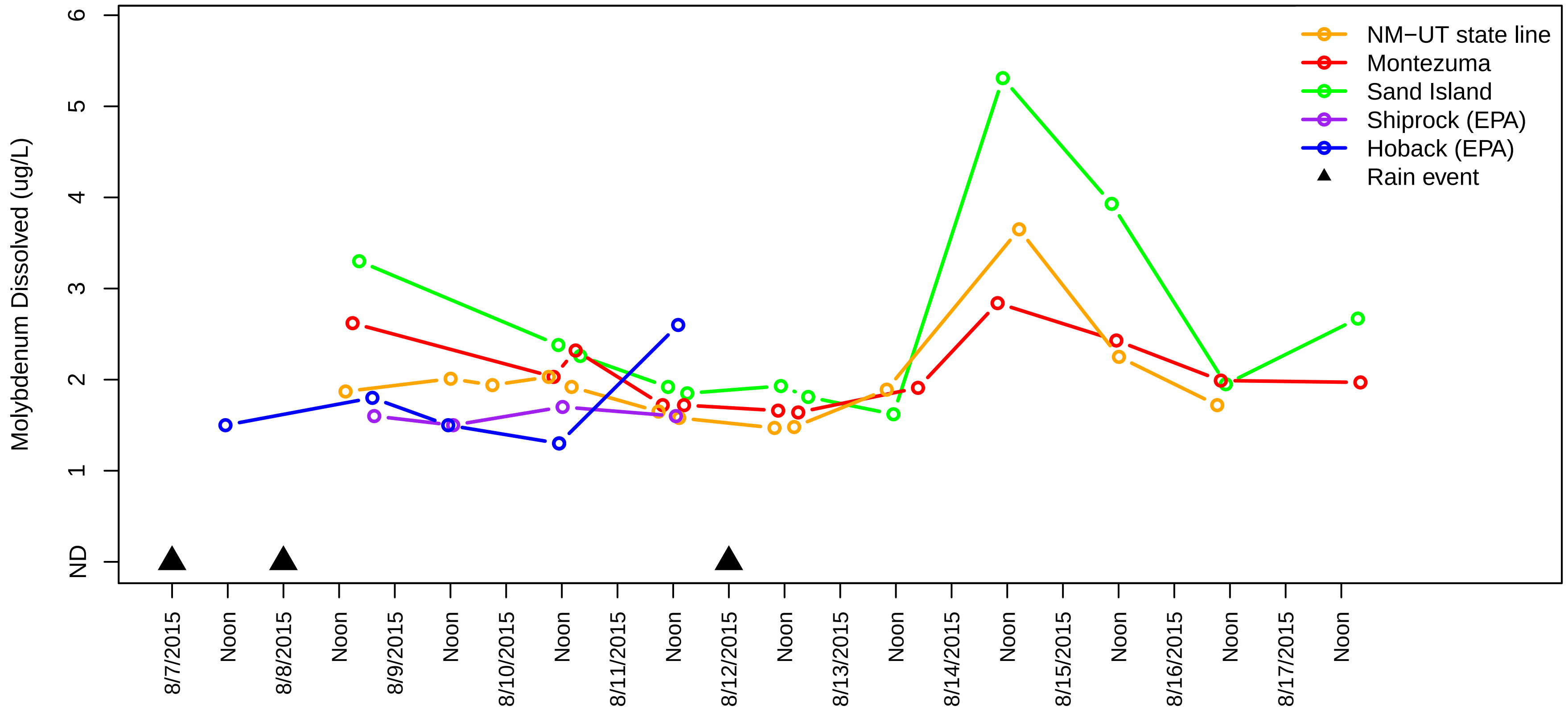

Iron Dissolved (ug/L)
ND
500
1000
1500
Source water std = NA
Warm water aquatic life std = 1000
Ag use water std = NA
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
500
1000
1500
UDWQ
USGS
Historical data

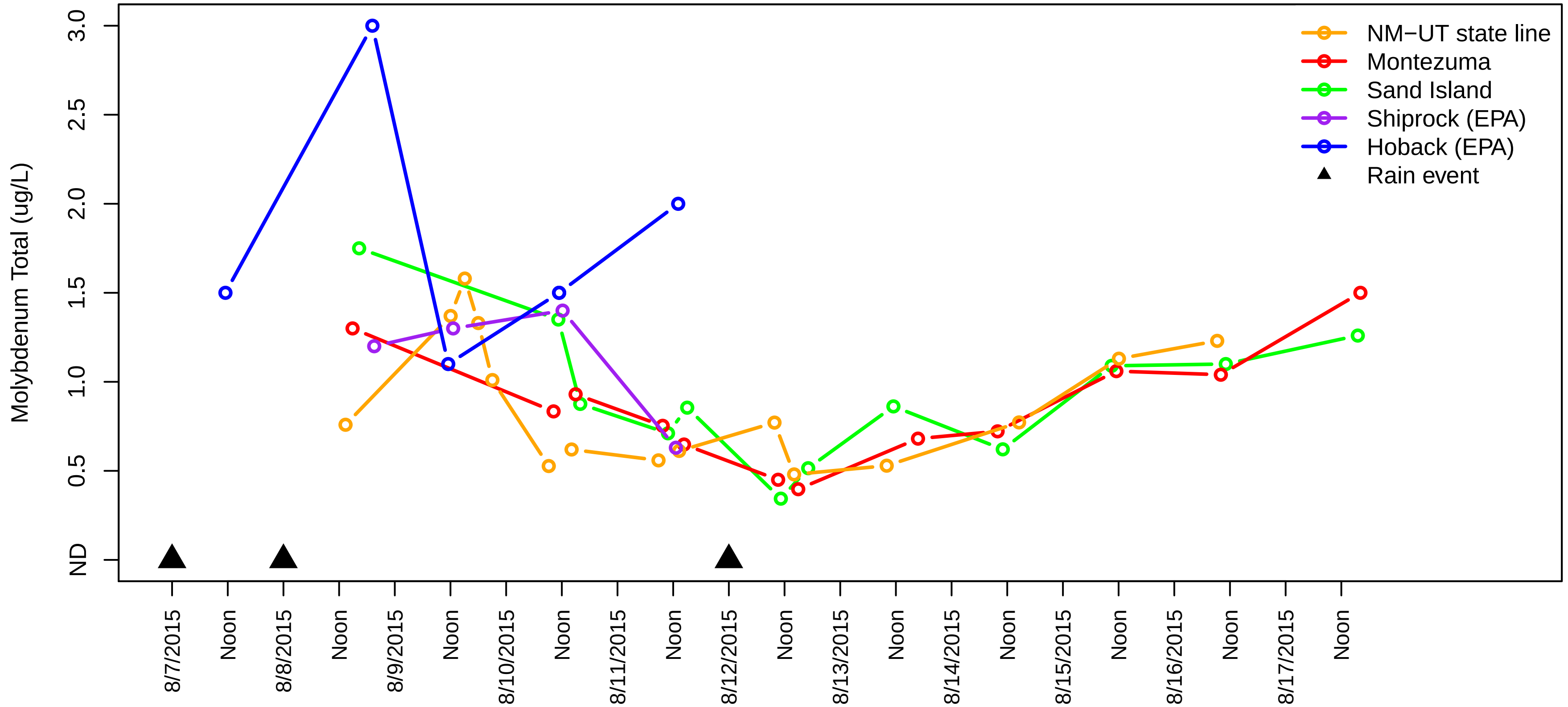

Iron Total (ug/L)
ND
20000
60000
100000
140000
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
20000
60000
100000
140000
UDWQ
USGS
Historical data

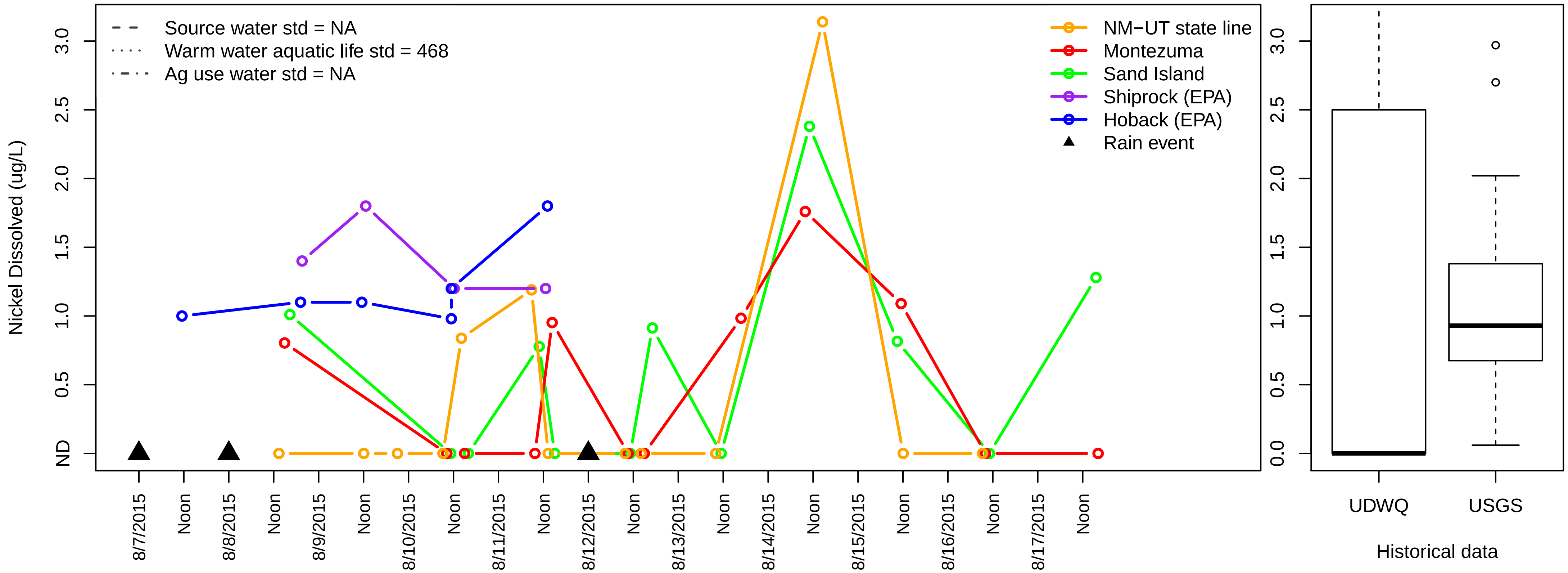

Source water std = 15
Warm water aquatic life std = 65
Ag use water std = 100
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Lead Dissolved (ug/L)
ND
0.5
1.0
1.5
2.0
2.5
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0.0
0.5
1.0
1.5
2.0
2.5
UDWQ
USGS
Historical data

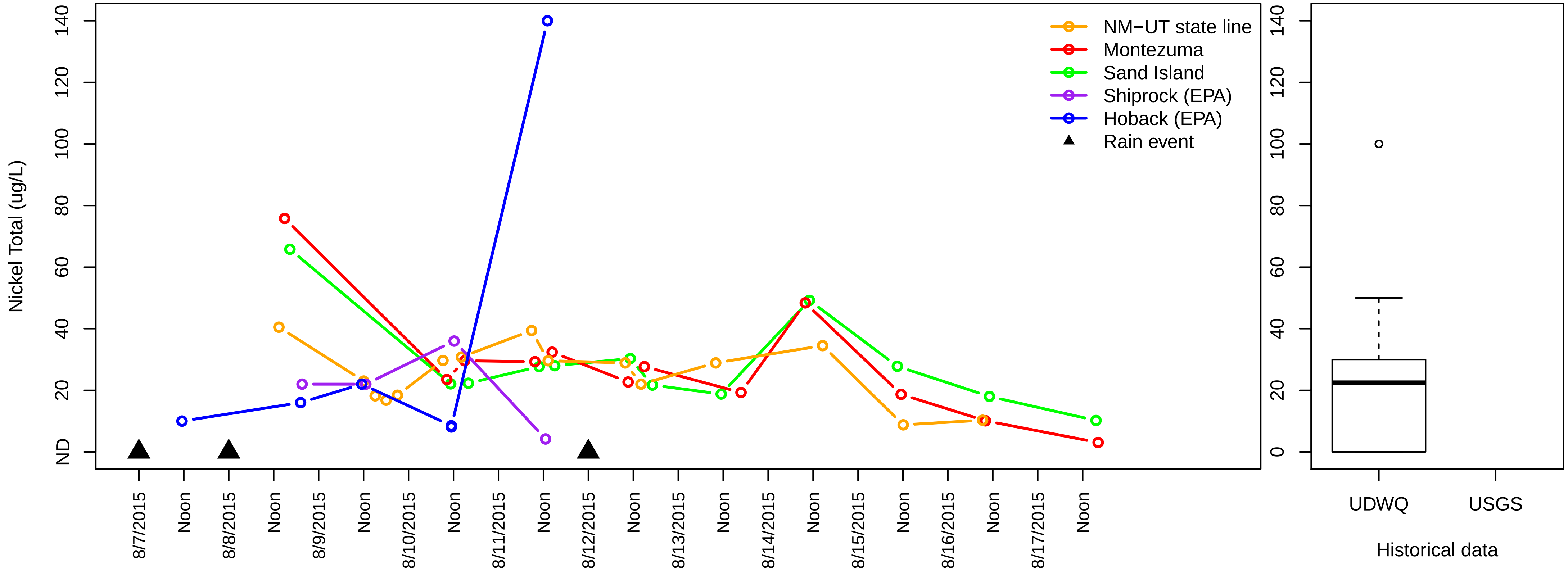

NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Lead Total (ug/L)
ND
50
100
150
200
250
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
50
100
150
200
250
UDWQ
USGS
Historical data

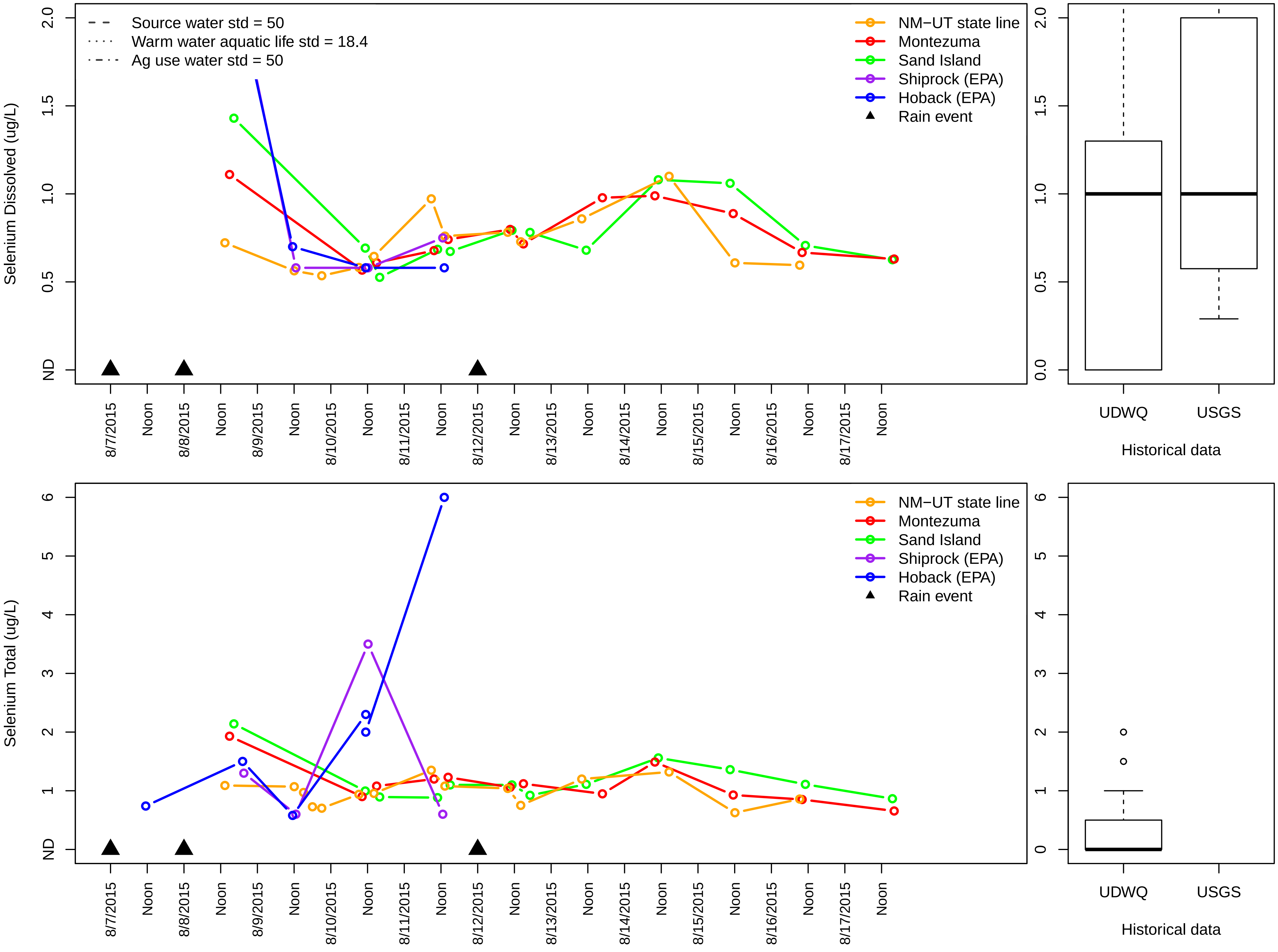

Manganese Dissolved (ug/L)
ND
5
10
15
20
25
30
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
5
10
15
20
25
30
UDWQ
USGS
Historical data
Manganese Total (ug/L)
ND
1000
2000
3000
4000
5000
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
1000
2000
3000
4000
5000
UDWQ
USGS
Historical data

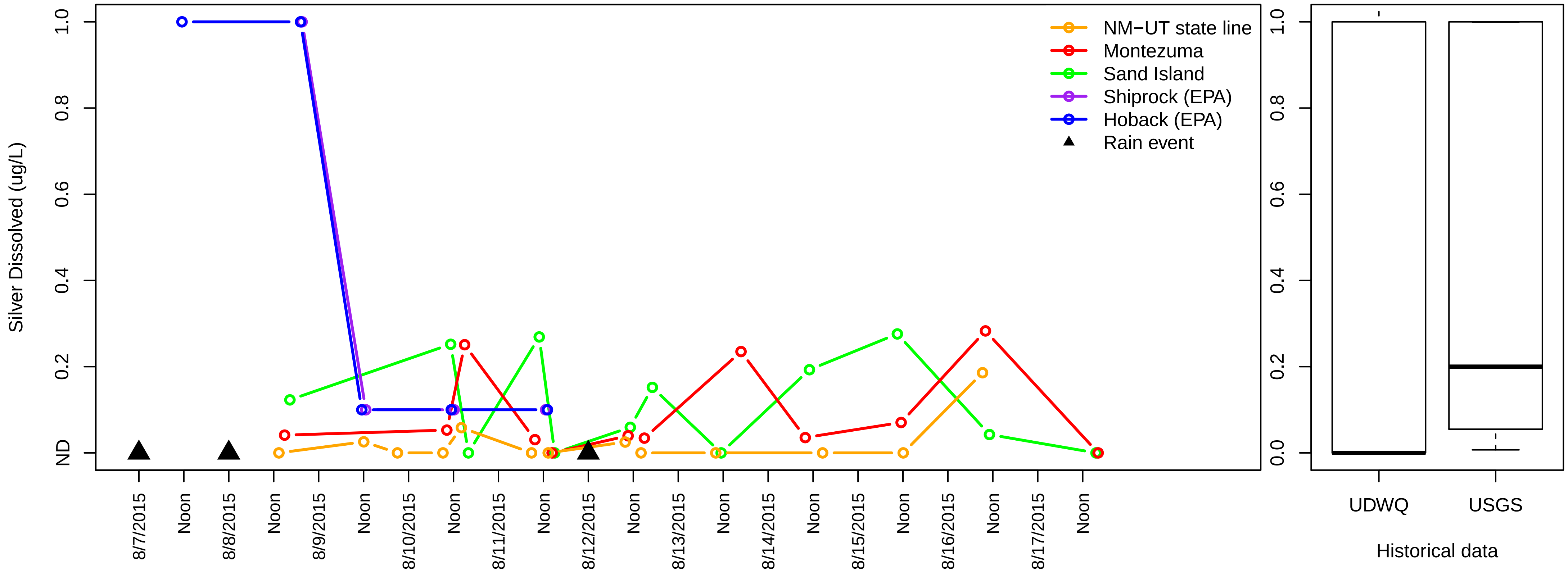

Molybdenum Dissolved (ug/L)
6
5
4
3
2
1
ND
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event

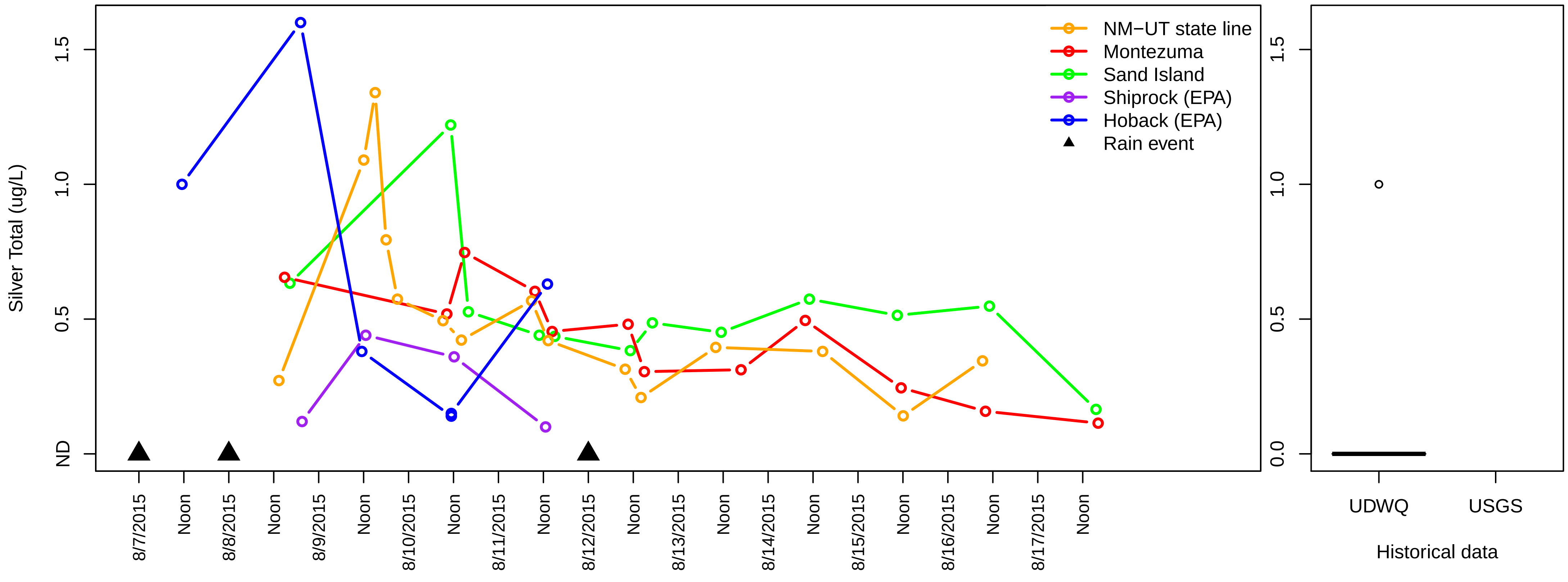

Molybdenum Total (ug/L)
3.0
2.5
2.0
1.5
1.0
0.5
ND
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event

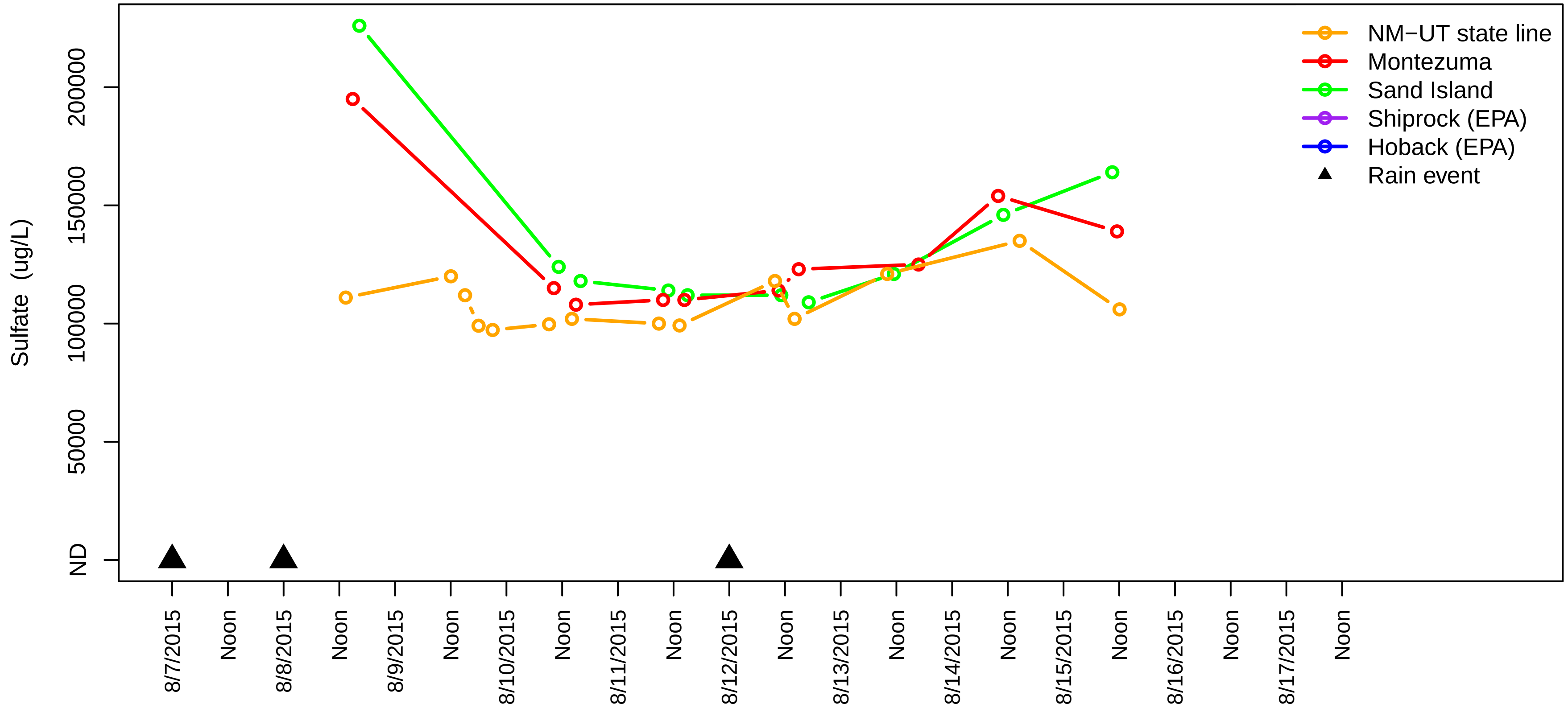

Source water std = NA
Warm water aquatic life std = 468
Ag use water std = NA
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Nickel Dissolved (ug/L)
ND
0.5
1.0
1.5
2.0
2.5
3.0
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0.0
0.5
1.0
1.5
2.0
2.5
3.0
UDWQ
USGS
Historical data


NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Nickel Total (ug/L)
ND
20
40
60
80
100
120
140
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
20
40
60
80
100
120
140
UDWQ
USGS
Historical data

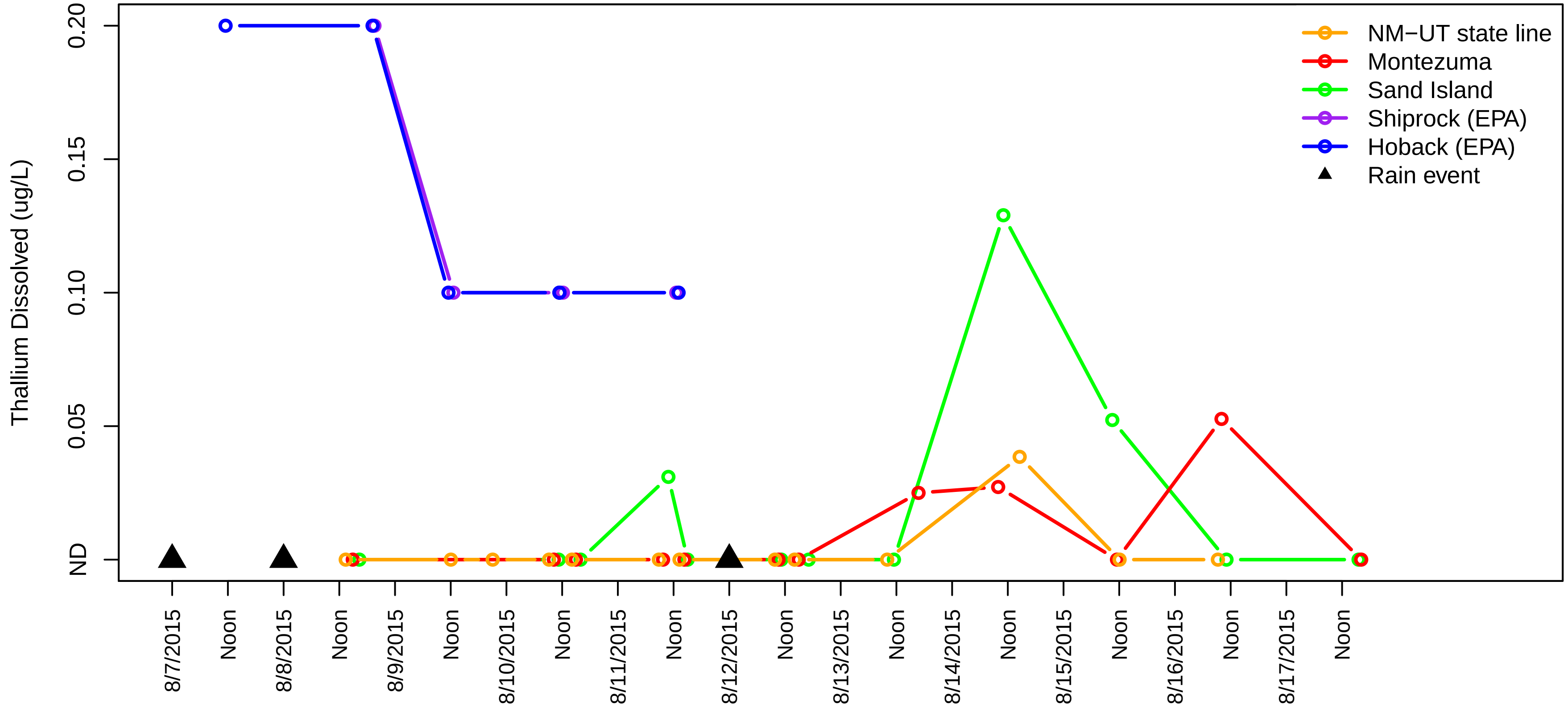

Source water std = 50
Warm water aquatic life std = 18.4
Ag use water std = 50
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Selenium Dissolved (ug/L)
ND
0.5
1.0
1.5
2.0
0.0
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
UDWQ
USGS
Historical data
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Selenium Total (ug/L)
ND
1
2
3
4
5
6
0
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
UDWQ
USGS
Historical data


Silver Dissolved (ug/L)
ND
0.2
0.4
0.6
0.8
1.0
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
0.0
0.2
0.4
0.6
0.8
1.0
UDWQ
USGS
Historical data

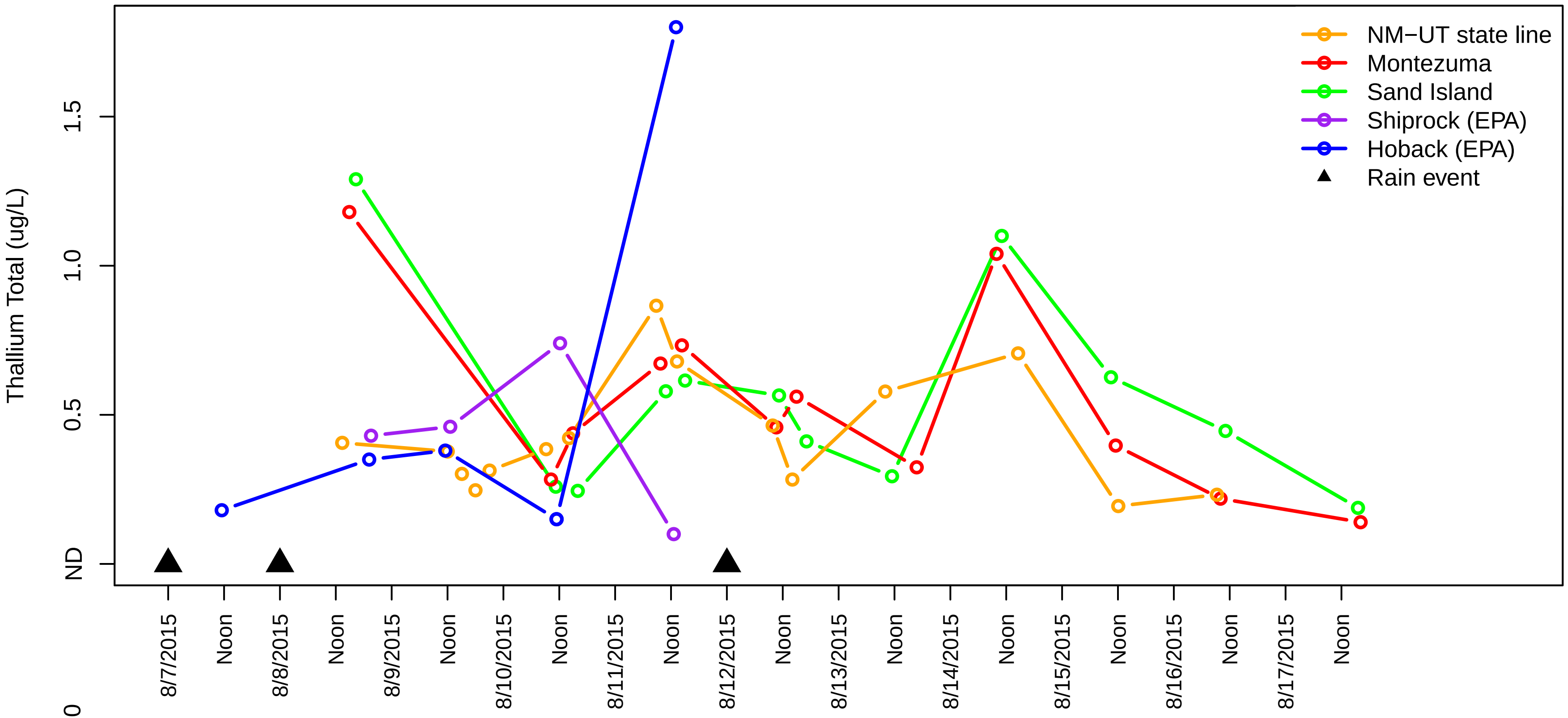

Silver Total (ug/L)
ND
0.5
1.0
1.5
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
0.0
0.5
1.0
1.5
UDWQ
USGS
Historical data



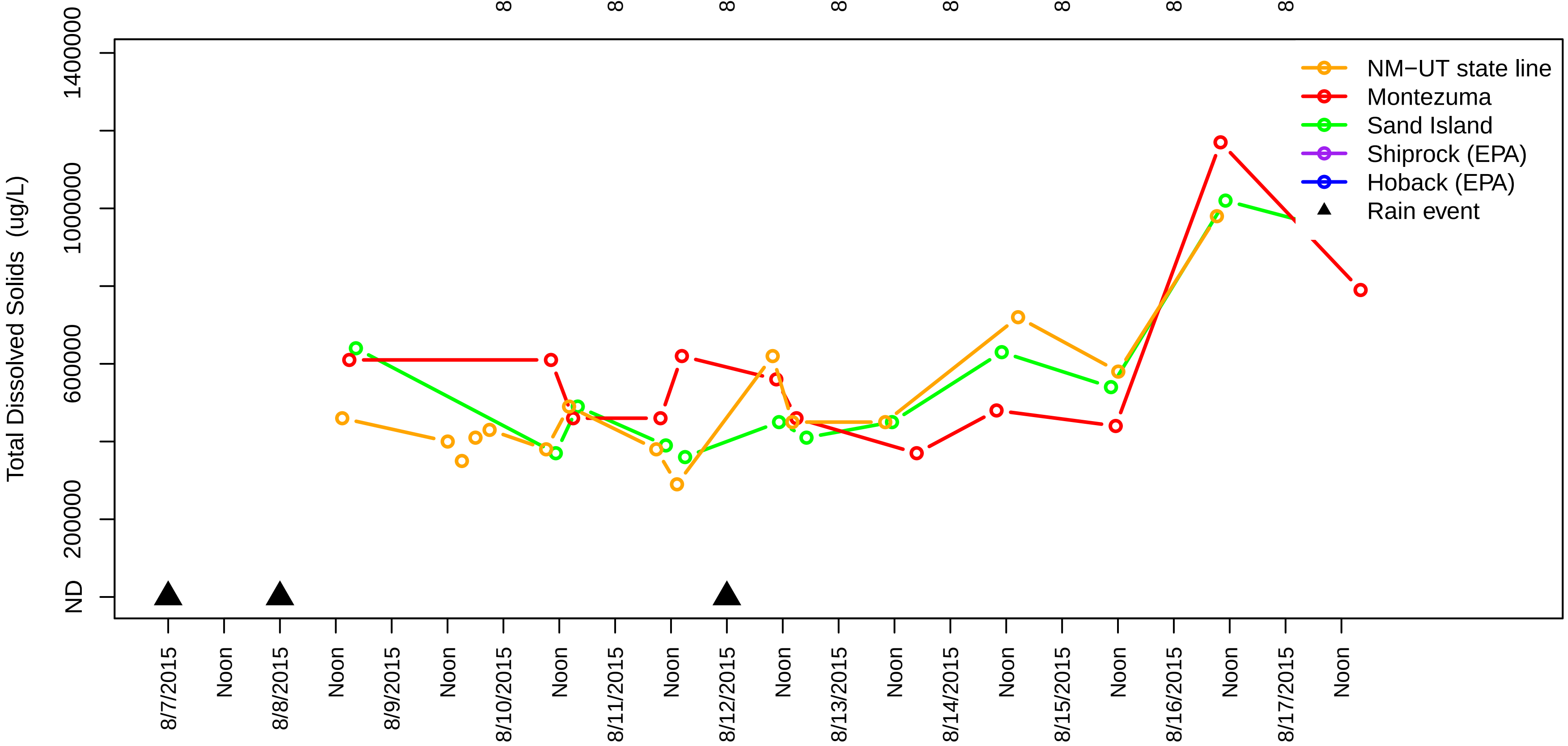
Sulfate (ug/L)
ND
50000
100000
150000
200000
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event



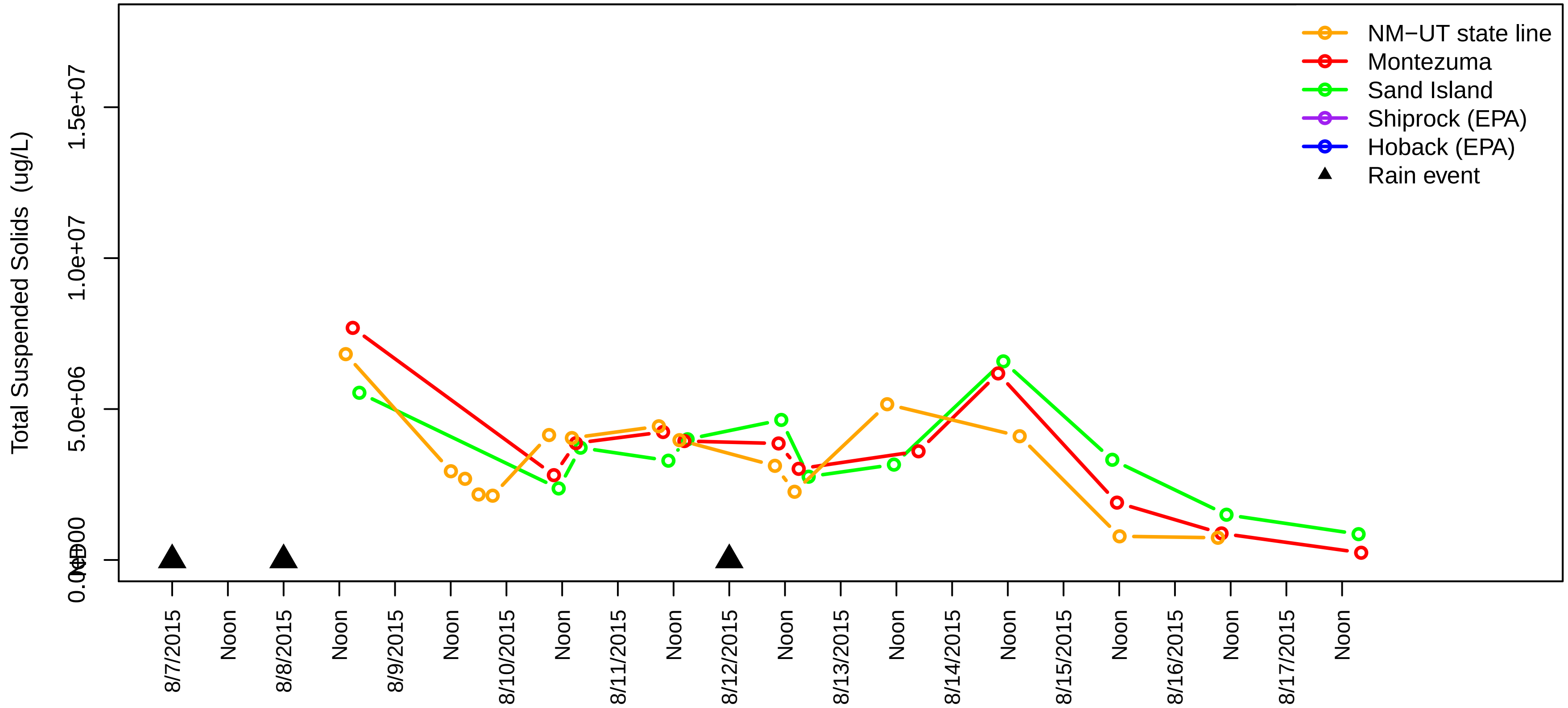
Thallium Dissolved (ug/L)
ND
0.05
0.10
0.15
0.20
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event



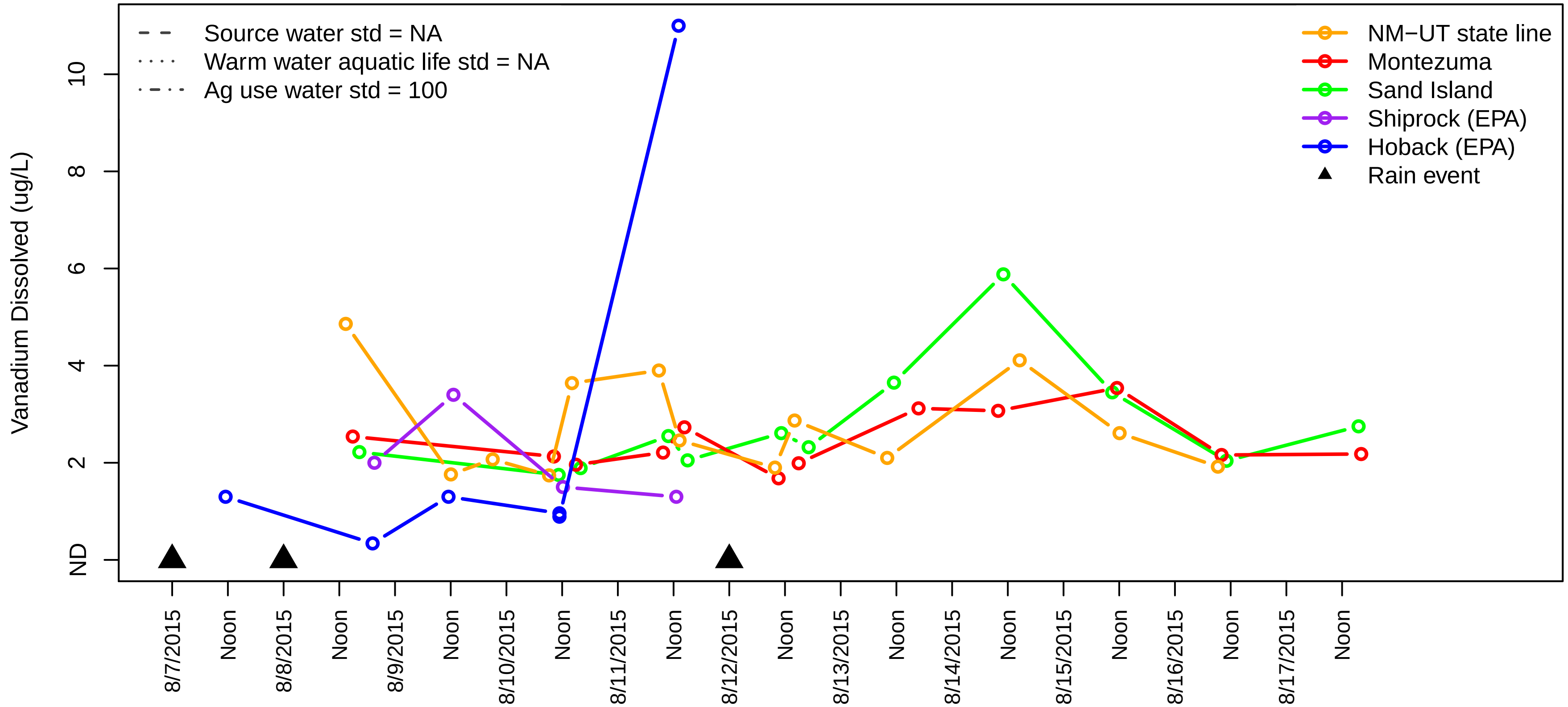
Thallium Total (ug/L)
1.5
1.0
0.5
ND
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon



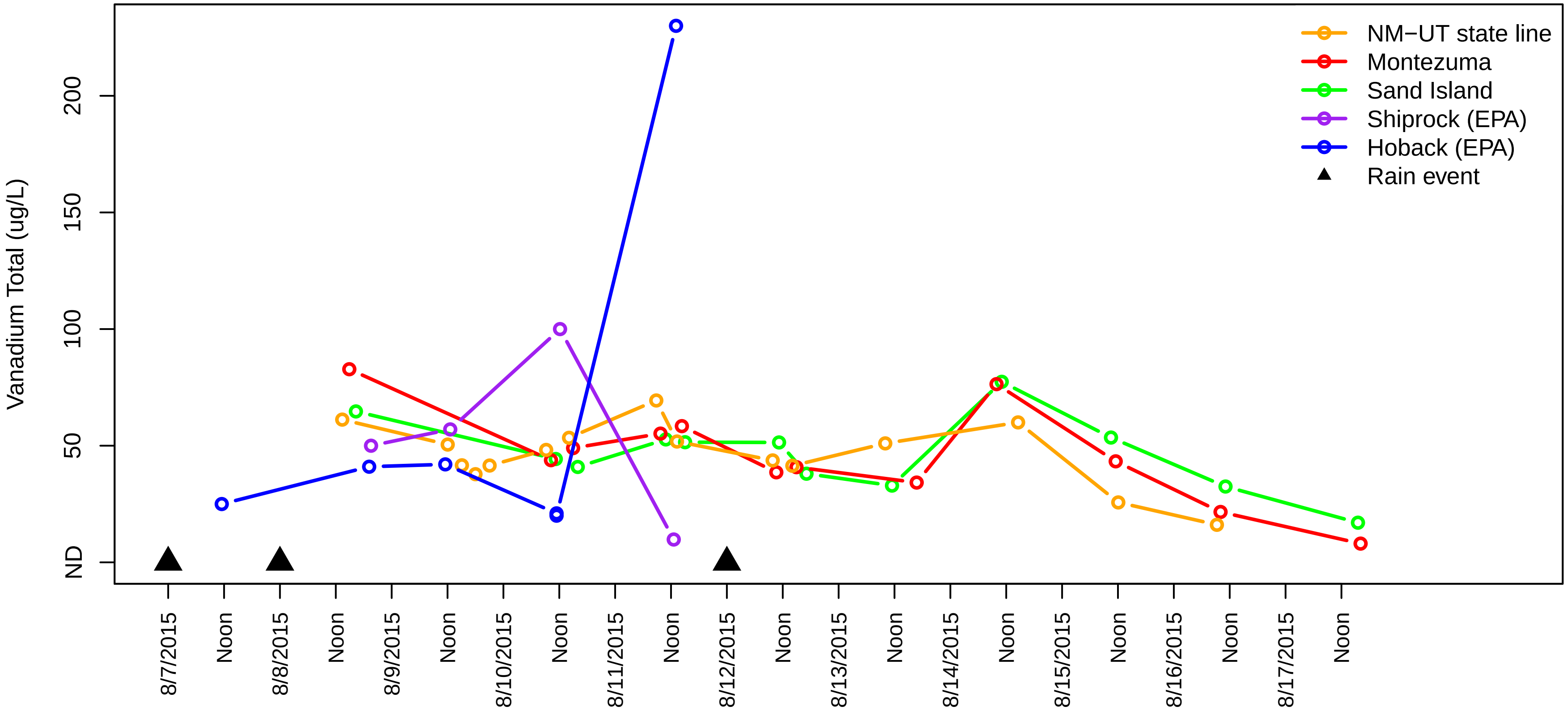
Total Dissolved Solids (ug/L)
1400000
1000000
600000
200000
ND
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon

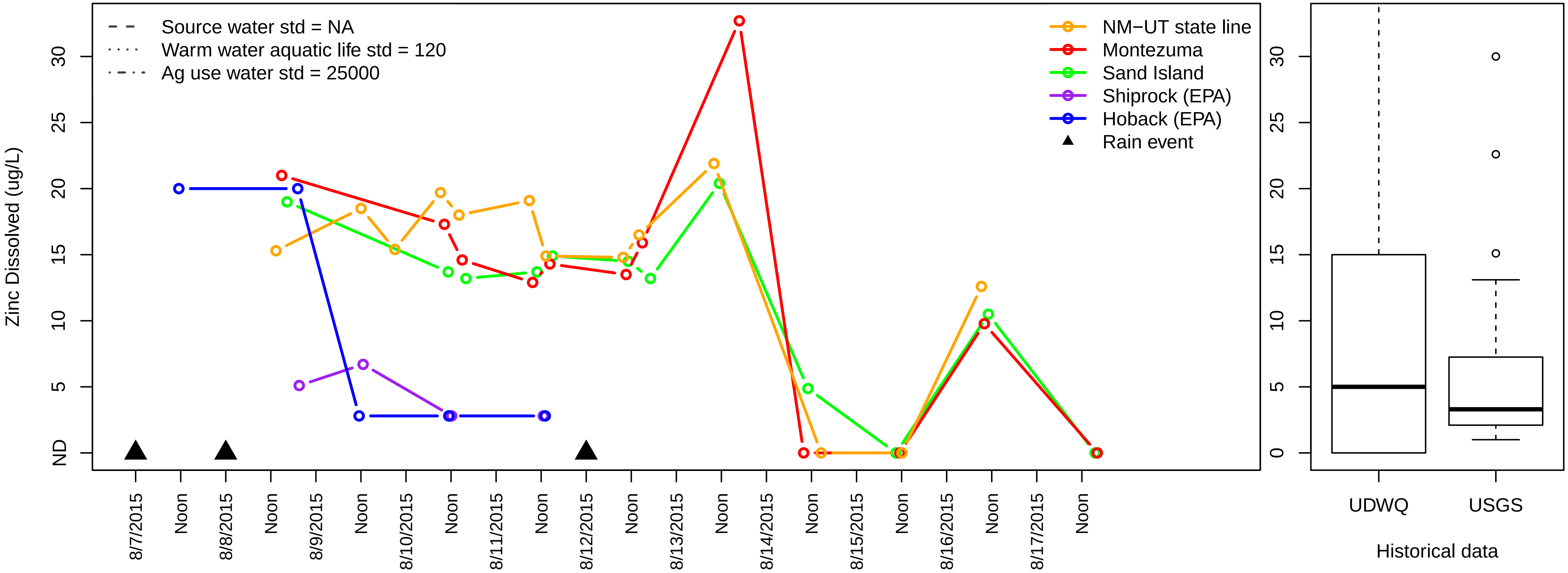


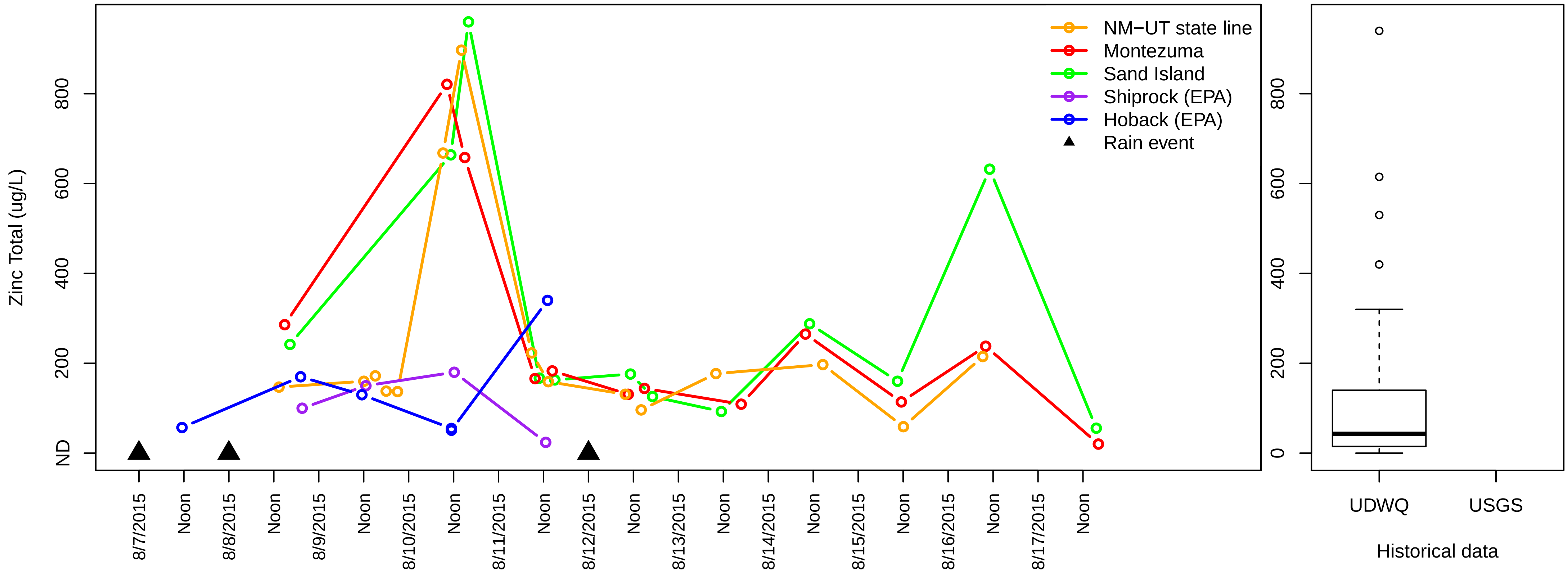
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Total Suspended Solids (ug/L)
0.0e+00
ND
5.0e+06
1.0e+07
1.5e+07
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon



Source water std = NA
Warm water aquatic life std = NA
Ag use water std = 100
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Vanadium Dissolved (ug/L)
ND
2
4
6
8
10
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon


NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Vanadium Total (ug/L)
ND
50
100
150
200
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon


Source water std = NA
Warm water aquatic life std = 120
Ag use water std = 25000
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
Zinc Dissolved (ug/L)
ND
5
10
15
20
25
30
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
5
10
15
20
25
30
UDWQ
USGS
Historical data

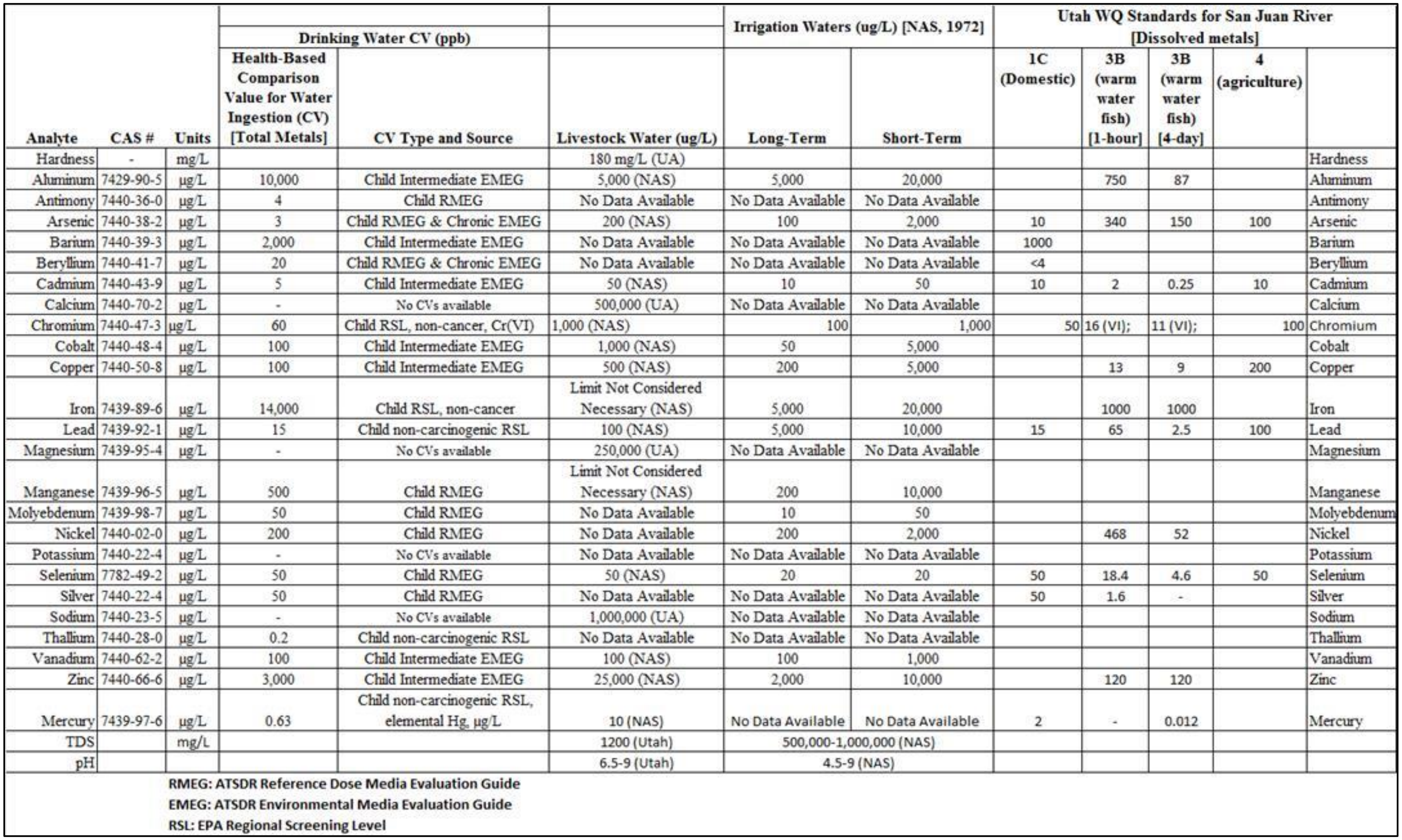


Zinc Total (ug/L)
ND
200
400
600
800
NM−UT state line
Montezuma
Sand Island
Shiprock (EPA)
Hoback (EPA)
Rain event
8/7/2015
Noon
8/8/2015
Noon
8/9/2015
Noon
8/10/2015
Noon
8/11/2015
Noon
8/12/2015
Noon
8/13/2015
Noon
8/14/2015
Noon
8/15/2015
Noon
8/16/2015
Noon
8/17/2015
Noon
0
200
400
600
800
UDWQ
USGS
Historical data

Appendix 2. Screening Value Analysis

Screening Values used in Evaluation of San Juan River Water Quality Samples

Screening values are taken from Agency for Toxic Substance and Disease Registry (ATSDR) comparison values (CVs) for drinking water when available. When ATSDR values were not available, EPA Regional Screening Levels (RSLs) for residential tap water were used. Total metal data was used for assessment of human-health based effects. Agricultural Screening Values are derived from National Academy of Science (NAS) Water Quality Criteria, 1972 (the Blue Book). Those guidelines are reprinted in EPA's Guidelines for the Reuse of Waters for Irrigation. Dissolved metal values were used for the assessment of agricultural use waters. Contaminants that do not exceed screening values are not considered to pose a risk of adverse health effects. Estimated results values below the laboratory's reporting limit are evaluated in this analysis. These results generally show low level concentrations and do not significantly affect the analysis outcome.



			Drinking Water CV (ppb)			**Irrigation Waters (ug/L) [NAS, 1972]**		**Utah WQ Standards for San Juan River [Dissolved metals]**				
Analyte	**CAS #**	**Units**	**Health-Based Comparison Value for Water Ingestion (CV) [Total Metals]**	**CV Type and Source**	**Livestock Water (ug/L)**	**Long-Term**	**Short-Term**	**1C (Domestic)**	**3B (warm water fish) [1-hour]**	**3B (warm water fish) [4-day]**	**4 (agriculture)**	
Hardness	-	mg/L			180 mg/L (UA)							Hardness
Aluminum	7429-90-5	µg/L	10,000	Child Intermediate EMEG	5,000 (NAS)	5,000	20,000		750	87		Aluminum
Antimony	7440-36-0	µg/L	4	Child RMEG	No Data Available	No Data Available	No Data Available					Antimony
Arsenic	7440-38-2	µg/L	3	Child RMEG & Chronic EMEG	200 (NAS)	100	2,000	10	340	150	100	Arsenic
Barium	7440-39-3	µg/L	2,000	Child Intermediate EMEG	No Data Available	No Data Available	No Data Available	1000				Barium
Beryllium	7440-41-7	µg/L	20	Child RMEG & Chronic EMEG	No Data Available	No Data Available	No Data Available	<4				Beryllium
Cadmium	7440-43-9	µg/L	5	Child Intermediate EMEG	50 (NAS)	10	50	10	2	0.25	10	Cadmium
Calcium	7440-70-2	µg/L	-	No CVs available	500,000 (UA)	No Data Available	No Data Available					Calcium
Chromium	7440-47-3	µg/L	60	Child RSL, non-cancer, Cr(VI)	1,000 (NAS)	100	1,000	50	16 (VI);	11 (VI);	100	Chromium
Cobalt	7440-48-4	µg/L	100	Child Intermediate EMEG	1,000 (NAS)	50	5,000					Cobalt
Copper	7440-50-8	µg/L	100	Child Intermediate EMEG	500 (NAS)	200	5,000		13	9	200	Copper
Iron	7439-89-6	µg/L	14,000	Child RSL, non-cancer	Limit Not Considered Necessary (NAS)	5,000	20,000		1000	1000		Iron
Lead	7439-92-1	µg/L	15	Child non-carcinogenic RSL	100 (NAS)	5,000	10,000	15	65	2.5	100	Lead
Magnesium	7439-95-4	µg/L	-	No CVs available	250,000 (UA)	No Data Available	No Data Available					Magnesium
Manganese	7439-96-5	µg/L	500	Child RMEG	Limit Not Considered Necessary (NAS)	200	10,000					Manganese
Molyebdenum	7439-98-7	µg/L	50	Child RMEG	No Data Available	10	50					Molyebdenum
Nickel	7440-02-0	µg/L	200	Child RMEG	No Data Available	200	2,000		468	52		Nickel
Potassium	7440-22-4	µg/L	-	No CVs available	No Data Available	No Data Available	No Data Available					Potassium
Selenium	7782-49-2	µg/L	50	Child RMEG	50 (NAS)	20	20	50	18.4	4.6	50	Selenium
Silver	7440-22-4	µg/L	50	Child RMEG	No Data Available	No Data Available	No Data Available	50	1.6	-		Silver
Sodium	7440-23-5	µg/L	-	No CVs available	1,000,000 (UA)	No Data Available	No Data Available					Sodium
Thallium	7440-28-0	µg/L	0.2	Child non-carcinogenic RSL	No Data Available	No Data Available	No Data Available					Thallium
Vanadium	7440-62-2	µg/L	100	Child Intermediate EMEG	100 (NAS)	100	1,000					Vanadium
Zinc	7440-66-6	µg/L	3,000	Child Intermediate EMEG	25,000 (NAS)	2,000	10,000		120	120		Zinc
Mercury	7439-97-6	µg/L	0.63	Child non-carcinogenic RSL, elemental Hg, µg/L	10 (NAS)	No Data Available	No Data Available	2	-	0.012		Mercury
TDS		mg/L			1200 (Utah)	500,000-1,000,000 (NAS)						
pH					6.5-9 (Utah)	4.5-9 (NAS)						

RMEG: ATSDR Reference Dose Media Evaluation Guide
EMEG: ATSDR Environmental Media Evaluation Guide
RSL: EPA Regional Screening Level

Comparison of San Juan River Raw Water Data with Finished Drinking Water Screening Values - Total Metals

🟩 No Exceedence 🟧 Above Screening Level 🟦 Prior to Plume Arrival 🟨 Estimated Plume Arrival ⬜ Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Health Based Comparison Values for Water Ingestion				**10,000**	**4**	**3**	**2,000**	**20**	**5**	**(blank)**	**60**	**100**		**14,000**	**15**	**(blank)**	**500**	**0.63**	**50**	**200**	**(blank)**	**50**		**(blank)**	**0.2**	**100**	**3,000**
Monitoring Location	**Site Description**	**Collection Date**	**Collection Time**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
4954000	San Juan R @ US160 Xing in CO	8/8/2015	1:23 PM	47,400	0.27	12.5	1300	3.42	1.27	336	23.9	22.8	41.4	24,800	44.5	56.3	2,320	0.077	0.76	40.5	12.2	1.09	0.27	38.6	0.41	61.2	147
		8/9/2015	12:02 PM	33,900	0.499	12.3	702	2.62	0.907	108	17.4	16.8	59.3	29,400	151	20.3	1,100	0.07	1.37	23	9.04	1.07	1.09	29.8	0.38	50.5	160
		8/9/2015	3:05 PM	26,700	0.573	13.5	606	2.08	0.734	92.8	14.2	13.5	63	28,600	185	17.2	942	0.063	1.58	18.2	7.53	0.97	1.34	27	0.3	41.6	172
		8/9/2015	6:00 PM	24,600	0.502	10	532	1.8	0.68	86.2	13.7	12.4	47.6	24,100	111	15.8	870	0.045	1.33	16.8	7.04	0.73	0.79	26.1	0.25	37.8	138
		8/9/2015	9:02 PM	31,000	0.416	9.59	554	2.25	0.632	78.8	15.5	14.7	49.7	26,500	83.5	15.3	887	0.048	1.01	18.4	7.18	0.7	0.57	29.5	0.31	41.5	137
		8/10/2015	9:11 AM	39,900	0.163	11	1730	3.97	1.15	90.8	21	24.8	69.6	35,400	73.5	20.2	1,450	0.115	0.53	29.7	8.24	0.94	0.49	36.6	0.39	48.2	668
		8/10/2015	2:06 PM	43,700	0.19	12.3	889	4.04	0.884	86.7	23.7	25.4	69.7	39,100	69.3	20.1	1,390	0.117	0.62	30.8	8.89	0.96	0.42	38.5	0.42	53.4	897
		8/11/2015	8:50 AM	77,000	0.216	19.9	1230	6.66	1.2	109	29.5	37	104	54,800	82.2	24.9	1,930	0.187	0.56	39.4	11.8	1.35	0.57	42.9	0.87	69.4	223
		8/11/2015	1:17 PM	56,900	0.181	14.2	971	4.97	0.916	95	21.8	27.3	76.7	40,300	62.6	20	1,440	0.13	0.61	29.6	9.65	1.08	0.42	37.4	0.68	51.8	159
		8/12/2015	9:50 AM	31,100	0.23	11.1	766	3.16	0.905	164	16.1	18.6	43.7	22,600	47.4	24.7	1,250	0.098	0.77	28.9	7.9	1.04	0.31	32.7	0.46	43.7	131
		8/12/2015	2:04 PM	28,500	0.252	9.21	683	2.52	0.641	146	13.2	14.5	34.3	18,100	35.8	24.5	1,130	0.058	0.48	22	7.37	0.75	0.21	28.7	0.28	41.4	96.2
		8/13/2015	10:01 AM	38,700	0.156	12	1110	5.62	0.941	124	14.9	28.9	79.3	31,100	66.5	22.5	1,670	0.153	0.53	28.9	8.54	1.2	0.4	45	0.58	51	177
		8/14/2015	2:33 PM	44,300	0.413	12.5	918	4.89	0.984	114	23.7	27.1	70.5	39,100	64.3	22.4	1,360	0.148	0.77	34.5	10.4	1.32	0.38	54.8	0.71	60	197
		8/15/2015	12:04 PM	14,200	0.279	4.7	262	1.08	0.366	68.1	8.75	6.18	18.2	12,300	17.4	12.7	368	0.03	1.13	8.78	5.16	0.63	0.14	27.7	0.19	25.7	58.9
		8/16/2015	9:15 AM	9,500	0.837	4.89	358	0.94	0.302	78	6.21	5.69	14.9	10,000	15.8	13.3	338	0.028	1.23	10.3	5.78	0.86	0.35	31.2	0.23	16.1	215
4953990	San Juan R @ Town of Montezuma	8/8/2015	2:54 PM	67,300	0.395	20.2	1590	6.36	2.49	390	38.8	41.1	82.4	50,400	91.5	59.1	3,010	0.222	1.3	75.8	17.7	1.93	0.66	51.7	1.18	82.8	286
		8/10/2015	10:13 AM	32,300	0.216	11.5	1960	2.72	0.707	93.7	17.3	18.3	56.4	29,700	79.3	20.1	1,130	0.072	0.83	23.5	7.45	0.9	0.52	34.6	0.28	43.8	821
		8/10/2015	2:58 PM	39,100	0.228	11.8	1700	3.71	0.881	97.1	22.1	23.2	67.3	35,800	75.8	22.5	1,400	0.098	0.93	29.6	8.49	1.08	0.75	34.9	0.44	49	658
		8/11/2015	9:44 AM	52,800	0.295	12.6	918	4.27	0.998	99.7	23.1	25.1	67.9	40,200	62.9	22.5	1,410	0.122	0.75	29.3	9.63	1.2	0.6	36.9	0.67	55.2	166
		8/11/2015	2:20 PM	54,700	0.232	15	1060	5.16	1.04	102	24.2	29.1	80.3	44,700	70.2	24	1,570	0.137	0.65	32.4	9.47	1.23	0.45	38.6	0.73	58.4	183
		8/12/2015	10:37 AM	31,500	0.247	10.2	720	3.62	0.855	108	14.7	19.5	51.7	24,400	49.1	18.4	1,190	0.078	0.45	22.7	7.04	1.06	0.48	33	0.46	38.6	131
		8/12/2015	2:57 PM	35,000	0.272	10.7	725	3.97	0.916	130	17	19.5	51.4	26,500	54.1	20.5	1,120	0.112	0.4	27.7	8.29	1.12	0.31	34.5	0.56	40.8	144
		8/13/2015	4:46 PM	23,700	0.156	10.1	722	3.57	0.708	127	9.33	17.3	47.9	17,800	44.3	20.8	1,270	0.103	0.68	19.3	6.73	0.95	0.31	34.2	0.32	34.2	109
		8/14/2015	9:55 AM	62,000	0.443	16	1400	7.03	1.41	153	29.9	39.8	106	54,300	90.8	32.9	2,060	0.247	0.72	48.4	12.7	1.49	0.5	59.5	1.04	76.4	265
		8/15/2015	11:31 AM	29,200	0.329	8.5	566	2.65	0.806	90.2	15.5	15	39.3	24,900	36.5	19.7	862	0.075	1.06	18.7	7.88	0.93	0.25	39.4	0.4	43.3	114
		8/16/2015	10:02 AM	13,600	0.232	5.56	517	1.15	0.305	78.8	7.56	7.12	21.1	13,200	19.5	14.6	435	0.033	1.04	10.1	7.25	0.85	0.16	39.3	0.22	21.6	238
		8/17/2015	4:07 PM	4,160	0.35	2.63	141	0.41	0.254	65.6	2.42	1.87	6.89	3,510	6.05	13.5	150	0.012	1.5	3.06	3.63	0.66	0.11	31	0.14	8.04	20.2
4953250	San Juan R @ Sand Island	8/8/2015	4:19 PM	55,700	0.436	15.9	1090	5.21	1.99	252	32.4	34.3	80.8	47,800	74.7	33.8	1,700	0.158	1.75	65.8	13.3	2.14	0.63	58.8	1.29	64.7	242
		8/10/2015	11:15 AM	27,000	0.3	13.2	1530	2.3	0.788	104	15.9	15.6	60	28,500	140	21.2	1,090	0.065	1.35	22.1	7.83	1	1.22	30.9	0.26	44.3	664
		8/10/2015	3:58 PM	28,700	0.293	10.7	726	2.61	0.713	99.9	16.1	17.3	54.7	27,700	84.7	20.4	1,170	0.073	0.88	22.3	7.29	0.89	0.53	33.2	0.25	40.9	960
		8/11/2015	10:53 AM	47,800	0.218	11.5	913	3.87	1.01	98.9	21.7	22.6	61.6	37,000	63.5	22.2	1,310	0.113	0.71	27.7	9.34	0.88	0.44	36.4	0.58	52.7	167
		8/11/2015	3:01 PM	48,700	0.272	12	900	4.23	1.04	102	21	23.6	64.2	36,800	63.4	22.4	1,400	0.115	0.86	28	9.46	1.1	0.44	38.2	0.62	51.5	163
		8/12/2015	11:12 AM	45,400	0.202	14.9	971	5.16	0.94	109	20	27.9	76.7	34,600	67.4	21.9	1,670	0.128	0.34	30.3	8.43	1.1	0.38	38.4	0.57	51.4	176
		8/12/2015	5:06 PM	30,600	0.259	10.3	718	3.61	0.712	90.9	13.6	19.2	53.4	23,700	49.1	17.3	1,190	0.08	0.52	21.7	6.84	0.92	0.49	33.2	0.41	38	126
		8/13/2015	11:28 AM	19,300	0.215	8.77	661	2.52	0.744	168	8.79	13.6	33.6	12,900	35.6	22.8	1,190	0.06	0.86	18.8	6.83	1.11	0.45	31.6	0.29	32.9	92.7
		8/14/2015	11:02 AM	66,300	0.545	16.8	1460	7.48	1.4	148	29.8	41.8	116	58,200	96	35.6	2,160	0.27	0.62	49.2	12.5	1.56	0.57	55.7	1.1	77.4	288
		8/15/2015	10:30 AM	37,600	0.394	11.2	826	4.1	0.984	108	20.7	22.2	57.6	32,300	54	23.1	1,230	0.163	1.09	27.8	9.22	1.36	0.51	51	0.63	53.5	160
		8/16/2015	11:06 AM	24,600	0.279	7.87	1360	2.25	0.528	86.1	13.6	12.1	33.8	23,300	31.6	18.8	642	0.063	1.1	18	7.32	1.11	0.55	39.4	0.45	32.5	632
		8/17/2015	3:33 PM	10,200	0.454	5.03	300	0.97	0.286	85	6.25	5.91	17	10,200	17.2	16.7	414	0.03	1.26	10.2	5.05	0.87	0.17	31.8	0.19	17	55.5

These data are provisional and subject to change and are undergoing DWQ's quality assurance and quality control procedures. Data are released in the interest of providing timely data to the public. Neither DWQ nor the State of Utah may be liable for any damages resulting from its use.

🟩	No Exceedence	🟧	Above Screening Level	🟦	Prior to Plume Arrival	🟨	Estimated Plume Arrival	⬜	Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Health Based Comparison Values for Water Ingestion				**10,000**	**4**	**3**	**2,000**	**20**	**5**	**(blank)**	**60**	**100**		**14,000**	**15**	**(blank)**	**500**	**0.63**	**50**	**200**	**(blank)**	**50**		**(blank)**	**0.2**	**100**	**3,000**
Monitoring Location	**Site Description**	**Collection Date**	**Collection Time**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
4953000	San Juan R @ Mexican Hat US163 Xing	5:40 PM	5:40 PM	63,400	1.31	16.3	1,540	7.23	1.5	167	29.4	41.5	103	51,900	86.7	30.6	2,800	0.18	1.3	47.8	14.4	1.43	0.56	63.9	0.84	70.5	261
		11:53 AM	11:53 AM	90,800	0.171	20.6	2,300	7.61	1.53	314	43.1	40.2	72.8	43,400	82.1	57	3,230	0.142	0.65	70.9	19.7	1.37	0.4	46.1	0.62	80	843
		4:44 PM	4:44 PM	80,600	0.316	22.7	1,910	6.12	1.27	254	36.8	32.8	69.8	38,100	171	49.4	2,430	0.133	0.67	58.4	18.1	1.28	1.1	52.6	0.44	83.3	815
		11:31 AM	11:31 AM	111,000	0.193	22.2	2,430	8.13	1.39	259	43.5	38.5	74.3	47,300	102	57.4	2,710	0.175	0.58	64.6	22.2	1.25	0.59	57.8	0.83	88.4	209
		3:43 PM	3:43 PM	56,400	0.345	13.3	1,350	5.09	1.09	150	23.5	25.3	61	35,900	75.1	30.1	1,660	0.13	0.77	34.2	11.7	0.93	0.48	41.6	0.59	57.2	168
		12:09 PM	12:09 PM	54,700	0.775	17.5	1,350	6.77	1.17	186	23.2	33.2	80.8	37,500	82.9	33.3	2,170	0.143	0.31	38.9	10.7	1.22	0.49	44.4	0.6	63.7	190
		5:50 PM	5:50 PM	71,400	0.224	22.7	2,010	8.74	1.55	282	28.5	40.1	82.4	38,600	101	47.9	3,070	0.18	0.23	51.7	14	1.53	0.54	55.6	0.63	78.5	210
		12:05 PM	12:05 PM	44,700	1.9	16.5	1,450	5.44	1.25	246	18.3	25	49.5	21,600	62.5	41.9	1,840	0.127	0.68	39.2	12.5	1.59	0.52	48.8	0.43	66.1	145
		11:43 AM	11:43 AM	124,000	1.14	37.2	4,320	15.2	3.74	720	51.1	59.6	84.2	46,900	166	105	5,630	0.372	0.92	111	30.4	2.41	1.11	78.6	0.99	115	270
		9:43 AM	9:43 AM	63,700	1.16	16.8	1,620	7.29	1.46	207	29.8	35.5	79	45,100	86.7	40.7	2,330	0.198	0.96	47.8	14	1.57	0.63	59.6	0.86	75.5	220
		11:58 AM	11:58 AM	34,300	0.18	9.96	892	2.87	0.6	111	17.1	16.3	40.2	25,600	39.4	22.6	976	0.077	0.79	24	10.6	0.97	0.19	47.6	0.42	40.5	294
		3:04 PM	3:04 PM	16,800	0.698	6.85	496	2.07	0.429	92.3	8.24	9.82	24.3	13,500	27.1	18	641	0.063	1.06	14.1	6.41	0.98	0.33	38.4	0.26	26.2	72.6
4952940	San Juan R @ Clay Hills	2:42 PM	2:42 PM	42,900	0.144	18.4	1,760	7.39	1.47	355	15.6	32.3	68.8	23,000	83.4	49.7	2,960	0.185	0.56	35.7	11.5	1.39	0.49	52	0.41	64.3	162
		2:33 PM	2:33 PM	73,900	0.377	21.7	2,040	7.21	2.22	422	33.8	35.1	59.7	34,700	89.2	63.4	2,900	0.168	1.03	62.9	17.3	1.82	0.66	59.7	0.67	84.5	198
		2:30 PM	2:30 PM	154,000	0.281	36.6	4,170	16.6	2.88	960	55.3	63.1	93.2	54,000	175	110	5,740	0.33	0.73	110	33	2.38	0.92	82.9	1.01	116	294
		2:46 PM	2:46 PM	91,000	0.175	22	2,250	8.19	1.52	253	40.5	45.4	104	64,500	105	53.5	2,850	0.228	0.62	65.8	19.5	1.88	0.48	63.3	1.12	89.8	477
		1:03 PM	1:03 PM	26,200	0.544	9.76	920	3.44	0.737	132	11.3	16.2	39.4	18,300	43.8	24.3	1,240	0.098	1.04	20.8	8.96	1.11	0.54	48.6	0.41	40.7	105

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Comparison of San Juan River Raw Water Data with Screening Values for Domestic Source Water - Dissolved Metals

🟩	No Exceedence	🟧	Above Screening Level	🟦	Prior to Plume Arrival	🟨	Estimated Plume Arrival	▨	Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Utah Domestic Source Criteria				(blank)		10	1,000	4	10	(blank)	50	(blank)			15	(blank)		2	(blank)			50		(blank)			
Monitoring Location	Site Description	Collection Date	Collection Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4954000	San Juan R @ US160 Xing in CO	8/8/2015	1:23 PM	217	0.52	1.34	222	0.04	ND	51.5	ND	0.13	2.24	95.8	ND	7.85	2.94	ND	1.87	ND	2.96	0.72	ND	32.2	ND	4.86	15.3
		8/9/2015	12:02 PM	258	0.34	0.63	274	ND	ND	50.6	ND	0.08	2.48	119	ND	6.86	2.69	ND	2.01	ND	2.61	0.56	0.03	28.5	ND	1.76	18.5
		8/9/2015	9:02 PM	329	0.35	0.95	341	0.04	ND	46	ND	0.14	3.47	198	0.27	6.3	4.14	ND	1.94	ND	2.38	0.54	ND	30	ND	2.07	15.4
		8/10/2015	9:11 AM	172	0.46	0.99	233	ND	ND	44.6	ND	0.07	3.21	103	0.39	6.01	1.64	ND	2.03	ND	2.51	0.58	ND	34.1	ND	1.74	19.7
		8/10/2015	2:06 PM	1050	0.71	1.3	220	0.09	ND	44.2	ND	0.41	3.35	732	1.04	6.02	12.8	ND	1.92	0.84	2.72	0.65	0.06	35.1	ND	3.64	18
		8/11/2015	8:50 AM	3290	0.36	1.72	451	0.1	ND	39.8	ND	0.49	4.85	1520	1.1	5.05	19	0.02	1.65	1.19	3	0.97	ND	43.7	ND	3.9	19.1
		8/11/2015	1:17 PM	720	0.05	1.33	334	ND	ND	41.7	ND	0.16	3.03	366	0.27	5.11	5.1	ND	1.58	ND	2.91	0.76	ND	37	ND	2.46	14.9
		8/12/2015	9:50 AM	104	0.59	0.88	178	ND	ND	52.1	ND	0.06	2.39	ND	ND	7.2	ND	ND	1.47	ND	2.79	0.78	0.03	30.3	ND	1.9	14.8
		8/12/2015	2:04 PM	155	0.55	1.21	151	ND	ND	47.9	ND	0.05	2.61	ND	ND	6.97	1.82	ND	1.48	ND	2.74	0.73	ND	27.3	ND	2.87	16.5
		8/13/2015	10:01 AM	257	0.16	1.25	213	0.03	ND	48.3	ND	0.12	3.67	148	0.37	6.48	3.16	ND	1.89	ND	2.87	0.86	ND	42.5	ND	2.1	21.9
		8/14/2015	2:33 PM	64.8	0.42	1.7	72.3	0.04	ND	53.4	ND	0.13	3.86	ND	ND	6.61	1.8	ND	3.65	3.14	3.66	1.1	ND	52.4	0.04	4.11	ND
		8/15/2015	12:04 PM	47.5	0.45	1.36	65.2	ND	ND	52.8	ND	0.05	1.35	ND	ND	7.91	ND	ND	2.25	ND	2.61	0.61	ND	25.9	ND	2.61	ND
		8/16/2015	9:15 AM	54.4	1.12	0.88	179	0.04	ND	53.9	ND	ND	2.91	ND	ND	8.18	ND	ND	1.72	ND	2.54	0.6	0.19	26.1	ND	1.92	12.6
4953990	San Juan R @ Town of Montezuma	8/8/2015	2:54 PM	136	0.75	1.06	223	0.04	ND	71.5	ND	0.13	2.72	ND	ND	9.92	ND	ND	2.62	0.8	3.84	1.11	0.04	43.5	ND	2.54	21
		8/10/2015	10:13 AM	218	0.66	0.94	262	ND	ND	49.8	ND	0.08	3.24	144	0.46	7.7	3.22	ND	2.03	ND	2.69	0.57	0.05	32.1	ND	2.13	17.3
		8/10/2015	2:58 PM	94.5	1.31	0.93	200	0.03	ND	48.6	ND	0.06	2.48	ND	0.3	7.35	ND	ND	2.32	ND	2.59	0.61	0.25	31.8	ND	1.96	14.6
		8/11/2015	9:44 AM	462	0.57	1.17	314	ND	ND	44.6	ND	0.13	2.66	227	ND	6.49	3.31	ND	1.72	ND	2.64	0.68	0.03	37.1	ND	2.21	12.9
		8/11/2015	2:20 PM	1400	0.14	1.25	298	0.04	ND	44.8	ND	0.24	3.47	668	0.49	6.57	9.99	ND	1.72	0.95	2.96	0.74	ND	38.3	ND	2.73	14.3
		8/12/2015	10:37 AM	67.5	0.8	1.1	202	0.03	ND	48.3	ND	ND	2.49	ND	ND	7.23	ND	ND	1.66	ND	2.67	0.8	0.04	31.9	ND	1.68	13.5
		8/12/2015	2:57 PM	375	0.82	0.91	176	ND	ND	48.9	ND	0.09	4.34	296	ND	7.5	2.28	ND	1.64	ND	2.84	0.72	0.03	33.8	ND	1.99	15.9
		8/13/2015	4:46 PM	330	1.88	1.28	240	0.07	ND	49.4	ND	0.18	3.75	192	ND	8.08	5.3	ND	1.91	0.98	2.62	0.98	0.24	32.9	0.03	3.12	32.7
		8/14/2015	9:55 AM	24.8	0.58	1.27	85.1	0.04	ND	55.1	ND	0.15	3.79	ND	ND	7.81	ND	ND	2.84	1.76	3.51	0.99	0.04	53	0.03	3.07	ND
		8/15/2015	11:31 AM	68.1	0.64	1.58	73.6	0.04	ND	55	ND	0.24	4.38	ND	ND	8.57	3.36	ND	2.43	1.09	3.16	0.89	0.07	35.8	ND	3.54	ND
		8/16/2015	10:02 AM	61.8	0.84	1.17	145	0.06	ND	57.5	ND	0.09	3.01	ND	ND	9.36	ND	ND	1.99	ND	2.96	0.67	0.28	30.3	0.05	2.16	9.78
		8/17/2015	4:07 PM	27.3	0.29	1.17	80.4	ND	ND	60.2	ND	0.14	1.87	ND	ND	11.6	2.4	ND	1.97	ND	2.82	0.63	ND	29.4	ND	2.18	ND
4953250	San Juan R @ Sand Island	8/8/2015	4:19 PM	214	1.38	1.03	294	0.06	ND	73.7	ND	0.12	3.86	104	ND	9.24	2.55	ND	3.3	1.01	4.11	1.43	0.12	51.2	ND	2.22	19
		8/10/2015	11:15 AM	124	1.24	0.88	192	ND	ND	53.2	ND	0.07	2.07	ND	0.29	8.4	ND	ND	2.38	ND	2.86	0.69	0.25	28.4	ND	1.75	13.7
		8/10/2015	3:58 PM	108	0.57	1.07	184	ND	ND	48.4	ND	0.06	1.96	ND	0.32	7.83	ND	ND	2.26	ND	2.67	0.53	ND	30.6	ND	1.89	13.2
		8/11/2015	10:53 AM	684	1.18	1.23	278	0.06	ND	45.8	ND	0.17	2.87	328	ND	6.93	4.12	ND	1.92	0.78	2.72	0.69	0.27	36.8	0.03	2.55	13.7
		8/11/2015	3:01 PM	158	0.27	1.01	251	ND	ND	45.3	ND	0.09	2.69	89.2	ND	6.65	ND	ND	1.85	ND	2.76	0.67	ND	36.6	ND	2.05	14.9
		8/12/2015	11:12 AM	623	1.08	1.41	205	0.05	ND	46.8	ND	0.15	3.44	310	ND	6.98	4.47	ND	1.93	ND	2.91	0.79	0.06	37.8	ND	2.61	14.5
		8/12/2015	5:06 PM	605	1.78	1.43	260	0.06	ND	46.6	ND	0.16	2.98	314	ND	7.07	5.16	ND	1.81	0.91	2.79	0.78	0.15	33.5	ND	2.32	13.2
		8/13/2015	11:28 AM	509	0.67	1.3	156	0.03	ND	53.6	ND	0.21	3.1	275	ND	8.21	8.9	ND	1.62	ND	2.96	0.68	ND	29.2	ND	3.65	20.4
		8/14/2015	11:02 AM	ND	1.03	2.03	78.6	0.05	ND	53.2	ND	0.13	3.31	ND	ND	8.26	7.02	ND	5.31	2.38	3.27	1.08	0.19	49.5	0.13	5.88	4.87
		8/15/2015	10:30 AM	95.2	1.12	1.84	83.5	0.04	ND	55.7	ND	0.09	2.27	ND	ND	8.4	ND	ND	3.93	0.82	3.46	1.06	0.28	46.7	0.05	3.45	ND
		8/16/2015	11:06 AM	290	0.43	1.23	149	0.04	ND	55.8	ND	0.15	3.89	202	ND	10.2	3.94	ND	1.95	ND	2.91	0.71	0.04	36.3	ND	2.04	10.5
		8/17/2015	3:33 PM	ND	0.41	1.48	87.1	ND	ND	62.4	ND	0.17	2.11	ND	ND	11.2	ND	ND	2.67	1.28	3.13	0.63	ND	30	ND	2.75	ND

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🟩	No Exceedence	🟧	Above Screening Level	🟦	Prior to Plume Arrival	🟨	Estimated Plume Arrival	⬜	Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Utah Domestic Source Criteria				**(blank)**		**10**	**1,000**	**4**	**10**	**(blank)**	**50**	**(blank)**			**15**	**(blank)**		**2**	**(blank)**			**50**		**(blank)**			
Monitoring Location	**Site Description**	**Collection Date**	**Collection Time**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
4953000	San Juan R @ Mexican Hat US163 Xing	8/8/2015	5:40 PM	264	1.38	1.57	308	0.04	ND	49.2	ND	0.13	3.95	144	ND	5.75	2.81	ND	3.15	0.89	4.15	0.92	0.1	62.6	ND	3.13	14.2
		8/10/2015	11:53 AM	325	0.38	1.94	299	ND	ND	44.6	ND	0.1	2.95	140	0.32	7.84	2.55	ND	2.43	ND	3.41	0.61	0.03	43.6	ND	7.59	17.6
		8/10/2015	4:44 PM	149	1.26	1.4	265	ND	ND	44.2	ND	0.08	2.48	ND	0.32	7.87	ND	ND	2.63	ND	3.35	0.75	0.19	41.9	ND	6.67	18.5
		8/11/2015	11:31 AM	907	1.42	1.98	391	0.05	ND	37.2	ND	0.18	3.13	382	ND	6.72	4.55	ND	2.46	0.85	3.29	0.78	0.21	51.3	0.04	7.82	12.4
		8/11/2015	3:43 PM	1790	1.23	1.59	445	0.07	ND	43.6	ND	0.31	5.28	787	0.57	7.19	11.6	ND	1.98	1.02	3.11	0.82	0.23	41.4	0.03	4.55	17.4
		8/12/2015	12:09 PM	125	1.41	1.59	245	0.03	ND	59.8	ND	0.05	3.34	ND	ND	7.86	ND	ND	2.27	ND	3.09	0.92	0.15	42.1	ND	3.07	14.2
		8/12/2015	5:50 PM	105	2.23	1.79	185	0.09	ND	48.9	ND	0.07	3.19	ND	ND	7.22	ND	ND	2.64	ND	3.16	1.16	0.26	48.7	ND	4.34	16.1
		8/13/2015	12:05 PM	293	1.61	2.06	201	ND	ND	42.6	ND	0.15	3.46	143	ND	7.21	3.54	ND	2.33	0.76	3.3	1.18	0.18	44.4	ND	7.13	19.8
		8/14/2015	11:43 AM	120	1.04	2.33	157	0.04	ND	46.2	ND	0.24	5.86	ND	ND	10.5	2.43	ND	5.87	1.75	4.29	1.56	0.15	68	0.18	8.06	ND
		8/15/2015	9:43 AM	135	1.04	1.7	117	0.03	ND	53.7	ND	0.58	8.56	ND	ND	9.03	7.42	ND	3.28	1.66	3.62	1.19	0.19	51.9	0.06	5.65	6.18
		8/16/2015	11:58 AM	84.3	0.45	1.35	194	0.03	ND	57.7	ND	0.12	3.92	ND	ND	8.96	ND	ND	2.31	ND	3.5	0.84	0.03	40.2	ND	3.31	13.8
		8/17/2015	3:04 PM	52.3	0.82	1.55	108	ND	ND	59.3	ND	0.13	2.85	ND	ND	10.3	ND	ND	2.55	1.23	3.42	0.86	0.19	37.3	0.04	3.4	ND
4952940	San Juan R @ Clay Hills	8/13/2015	2:42 PM	643	0.18	1.76	411	0.06	ND	52.3	ND	0.3	4.36	388	0.92	7.5	13.8	ND	2.16	1.09	3.09	0.91	ND	47	ND	4.99	19.2
		8/14/2015	2:33 PM	38.5	0.32	1.89	121	ND	ND	51.1	ND	0.13	3.6	ND	ND	8.23	ND	ND	3.3	1.28	3.69	1.13	0.03	49.8	ND	5.38	ND
		8/15/2015	2:30 PM	119	0.34	1.75	136	ND	ND	43.1	ND	0.08	2.6	ND	ND	8.99	ND	ND	4.27	0.95	3.62	1.18	ND	66.3	ND	5.48	ND
		8/16/2015	2:46 PM	925	0.25	1.71	319	0.05	ND	52.7	ND	0.31	5.26	490	0.46	9.48	9.63	ND	2.78	0.84	4.17	0.91	ND	58.2	ND	5.71	20.6
		8/17/2015	1:03 PM	101	0.26	1.63	132	ND	ND	53.2	ND	0.25	4.65	ND	ND	8.79	2.7	ND	2.55	1.36	3.89	0.73	ND	44.5	ND	4.83	ND

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Comparison of San Juan River Raw Water Data with Screening Values for <u>Agricultural Uses</u> (Stock watering and Irrigation) – Dissolved Metals

🟩 No Exceedence | 🟧 Above Screenin | Prior to Plume Arrival | 🟨 Estimated Plume Arrival | ⬜ Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc	Sulfphate	Total Dissolved Solids
Livestock Water				**5,000**	**(blank)**	**200**	**(blank)**		**50**	**500**	**1,000**		**500**	**(blank)**	**100**	**250,000**	**(blank)**	**10**	**(blank)**			**50**	**(blank)**	**1,000,000**	**(blank)**	**100**	**25,000**	**(blank)**	**1,200**
Irrigation Water Short-term NAS, 1972				**5,000**	**(blank)**	**100**	**(blank)**		**10**	**(blank)**	**100**	**50**	**200**	**5000**		**(blank)**	**200**	**(blank)**	**10**	**200**	**(blank)**	**20**	**(blank)**			**100**	**2,000**	**(blank)**	**500,000**
Irrigation Water Long-term NAS, 1972				**20,000**	**(blank)**	**2,000**	**(blank)**		**50**	**(blank)**	**1,000**	**5,000**		**20,000**	**10,000**	**(blank)**	**10,000**	**(blank)**	**50**	**2,000**	**(blank)**	**20**	**(blank)**			**1000**	**10,000**	**(blank)**	
Utah DWQ Agricultural Use Criteria 4						**100**	**(blank)**		**10**	**(blank)**	**100**	**(blank)**	**200**	**(blank)**	**100**	**(blank)**						**50**	**(blank)**						**1,200**
Monitoring Location	**Site Description**	**Collection Date**	**Collection Time**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**mg/L**
4954000	San Juan R @ US160 Xing in CO	8/8/2015	1:23 PM	217	0.524	1.34	222	0.04	ND	51.5	ND	0.127	2.24	95.8	ND	7.85	2.94	ND	1.87	ND	2.96	0.72	ND	32.2	ND	4.86	15.3	111	460
		8/9/2015	12:02 PM	258	0.341	0.63	274	ND	ND	50.6	ND	0.0817	2.48	119	ND	6.86	2.69	ND	2.01	ND	2.61	0.56	0.0257	28.5	ND	1.76	18.5	120	400
		8/9/2015	3:05 PM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	112	350
		8/9/2015	6:00 PM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	99.1	410
		8/9/2015	9:02 PM	329	0.347	0.95	341	0.04	ND	46	ND	0.139	3.47	198	0.274	6.3	4.14	ND	1.94	ND	2.38	0.54	ND	30	ND	2.07	15.4	97.3	430
		8/10/2015	9:11 AM	172	0.458	0.99	233	ND	ND	44.6	ND	0.0673	3.21	103	0.391	6.01	1.64	ND	2.03	ND	2.51	0.58	ND	34.1	ND	1.74	19.7	99.7	380
		8/10/2015	2:06 PM	1,050	0.711	1.3	220	0.09	ND	44.2	ND	0.407	3.35	732	1.04	6.02	12.8	ND	1.92	0.84	2.72	0.65	0.0586	35.1	ND	3.64	18	102	490
		8/11/2015	8:50 AM	3,290	0.364	1.72	451	0.1	ND	39.8	ND	0.488	4.85	1520	1.1	5.05	19	0.015	1.65	1.19	3	0.97	ND	43.7	ND	3.9	19.1	100	380
		8/11/2015	1:17 PM	720	0.0516	1.33	334	ND	ND	41.7	ND	0.155	3.03	366	0.27	5.11	5.1	ND	1.58	ND	2.91	0.76	ND	37	ND	2.46	14.9	99.2	290
		8/12/2015	9:50 AM	104	0.586	0.88	178	ND	ND	52.1	ND	0.0614	2.39	ND	ND	7.2	ND	ND	1.47	ND	2.79	0.78	0.0252	30.3	ND	1.9	14.8	118	620
		8/12/2015	2:04 PM	155	0.548	1.21	151	ND	ND	47.9	ND	0.0478	2.61	ND	ND	6.97	1.82	ND	1.48	ND	2.74	0.73	ND	27.3	ND	2.87	16.5	102	450
		8/13/2015	10:01 AM	257	0.158	1.25	213	0.03	ND	48.3	ND	0.122	3.67	148	0.373	6.48	3.16	ND	1.89	ND	2.87	0.86	ND	42.5	ND	2.1	21.9	121	450
		8/14/2015	2:33 PM	65	0.421	1.7	72.3	0.04	ND	53.4	ND	0.133	3.86	ND	ND	6.61	1.8	ND	3.65	3.14	3.66	1.1	ND	52.4	0.0385	4.11	ND	135	720
		8/15/2015	12:04 PM	48	0.445	1.36	65.2	ND	ND	52.8	ND	0.052	1.35	ND	ND	7.91	ND	ND	2.25	ND	2.61	0.61	ND	25.9	ND	2.61	ND	106	580
		8/16/2015	9:15 AM	54	1.12	0.88	179	0.04	ND	53.9	ND	ND	2.91	ND	ND	8.18	ND	ND	1.72	ND	2.54	0.6	0.186	26.1	ND	1.92	12.6	NS	980
4953990	San Juan R @ Town of Montezuma	8/8/2015	2:54 PM	136	0.747	1.06	223	0.04	ND	71.5	ND	0.13	2.72	ND	ND	9.92	ND	ND	2.62	0.8	3.84	1.11	0.0412	43.5	ND	2.54	21	195	610
		8/10/2015	10:13 AM	218	0.66	0.94	262	ND	ND	49.8	ND	0.0764	3.24	144	0.461	7.7	3.22	ND	2.03	ND	2.69	0.57	0.0529	32.1	ND	2.13	17.3	115	610
		8/10/2015	2:58 PM	95	1.31	0.93	200	0.03	ND	48.6	ND	0.0595	2.48	ND	0.297	7.35	ND	ND	2.32	ND	2.59	0.61	0.251	31.8	ND	1.96	14.6	108	460
		8/11/2015	9:44 AM	462	0.568	1.17	314	ND	ND	44.6	ND	0.127	2.66	227	ND	6.49	3.31	ND	1.72	ND	2.64	0.68	0.0307	37.1	ND	2.21	12.9	110	460
		8/11/2015	2:20 PM	1,400	0.136	1.25	298	0.04	ND	44.8	ND	0.24	3.47	668	0.489	6.57	9.99	ND	1.72	0.95	2.96	0.74	ND	38.3	ND	2.73	14.3	110	620
		8/12/2015	10:37 AM	68	0.799	1.1	202	0.03	ND	48.3	ND	ND	2.49	ND	ND	7.23	ND	ND	1.66	ND	2.67	0.8	0.0397	31.9	ND	1.68	13.5	114	560
		8/12/2015	2:57 PM	375	0.822	0.91	176	ND	ND	48.9	ND	0.0898	4.34	296	ND	7.5	2.28	ND	1.64	ND	2.84	0.72	0.0343	33.8	ND	1.99	15.9	123	460
		8/13/2015	4:46 PM	330	1.88	1.28	240	0.07	ND	49.4	ND	0.18	3.75	192	ND	8.08	5.3	ND	1.91	0.98	2.62	0.98	0.235	32.9	0.025	3.12	32.7	125	370
		8/14/2015	9:55 AM	25	0.582	1.27	85.1	0.04	ND	55.1	ND	0.146	3.79	ND	ND	7.81	ND	ND	2.84	1.76	3.51	0.99	0.0355	53	0.0272	3.07	ND	154	480
		8/15/2015	11:31 AM	68	0.642	1.58	73.6	0.04	ND	55	ND	0.244	4.38	ND	ND	8.57	3.36	ND	2.43	1.09	3.16	0.89	0.0705	35.8	ND	3.54	ND	139	440
		8/16/2015	10:02 AM	62	0.835	1.17	145	0.06	ND	57.5	ND	0.092	3.01	ND	ND	9.36	ND	ND	1.99	ND	2.96	0.67	0.283	30.3	0.0527	2.16	9.78	NS	1,170
		8/17/2015	4:07 PM	27	0.285	1.17	80.4	ND	ND	60.2	ND	0.137	1.87	ND	ND	11.6	2.4	ND	1.97	ND	2.82	0.63	ND	29.4	ND	2.18	ND	NS	790
4953250	San Juan R @ Sand Island	8/8/2015	4:19 PM	214	1.38	1.03	294	0.06	ND	73.7	ND	0.124	3.86	104	ND	9.24	2.55	ND	3.3	1.01	4.11	1.43	0.123	51.2	ND	2.22	19	226	640
		8/10/2015	11:15 AM	124	1.24	0.88	192	ND	ND	53.2	ND	0.0685	2.07	ND	0.287	8.4	ND	ND	2.38	ND	2.86	0.69	0.252	28.4	ND	1.75	13.7	124	370
		8/10/2015	3:58 PM	108	0.574	1.07	184	ND	ND	48.4	ND	0.0556	1.96	ND	0.315	7.83	ND	ND	2.26	ND	2.67	0.53	ND	30.6	ND	1.89	13.2	118	490
		8/11/2015	10:53 AM	684	1.18	1.23	278	0.06	ND	45.8	ND	0.172	2.87	328	ND	6.93	4.12	ND	1.92	0.78	2.72	0.69	0.269	36.8	0.031	2.55	13.7	114	390
		8/11/2015	3:01 PM	158	0.271	1.01	251	ND	ND	45.3	ND	0.0864	2.69	89.2	ND	6.65	ND	ND	1.85	ND	2.76	0.67	ND	36.6	ND	2.05	14.9	112	360
		8/12/2015	11:12 AM	623	1.08	1.41	205	0.05	ND	46.8	ND	0.154	3.44	310	ND	6.98	4.47	ND	1.93	ND	2.91	0.79	0.0594	37.8	ND	2.61	14.5	112	450
		8/12/2015	5:06 PM	605	1.78	1.43	260	0.06	ND	46.6	ND	0.162	2.98	314	ND	7.07	5.16	ND	1.81	0.91	2.79	0.78	0.152	33.5	ND	2.32	13.2	109	410
		8/13/2015	11:28 AM	509	0.667	1.3	156	0.03	ND	53.6	ND	0.21	3.1	275	ND	8.21	8.9	ND	1.62	ND	2.96	0.68	ND	29.2	ND	3.65	20.4	121	450
		8/14/2015	11:02 AM	ND	1.03	2.03	78.6	0.05	ND	53.2	ND	0.131	3.31	ND	ND	8.26	7.02	ND	5.31	2.38	3.27	1.08	0.193	49.5	0.129	5.88	4.87	146	630
		8/15/2015	10:30 AM	95	1.12	1.84	83.5	0.04	ND	55.7	ND	0.085	2.27	ND	ND	8.4	ND	ND	3.93	0.82	3.46	1.06	0.276	46.7	0.0523	3.45	ND	164	540
		8/16/2015	11:06 AM	290	0.425	1.23	149	0.04	ND	55.8	ND	0.146	3.89	202	ND	10.2	3.94	ND	1.95	ND	2.91	0.71	0.0426	36.3	ND	2.04	10.5	NS	1,020
		8/17/2015	3:33 PM	ND	0.408	1.48	87.1	ND	ND	62.4	ND	0.172	2.11	ND	ND	11.2	ND	ND	2.67	1.28	3.13	0.63	ND	30	ND	2.75	ND	NS	930

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🟩	No Exceedence	🟧	Above Screenin	Prior to Plume Arrival	🟨 Estimated Plume Arrival	⬜ Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc	Sulfphate	Total Dissolved Solids
Livestock Water				**5,000**	**(blank)**	**200**	**(blank)**		**50**	**500**	**1,000**		**500**	**(blank)**	**100**	**250,000**	**(blank)**	**10**	**(blank)**			**50**	**(blank)**	**1,000,000**	**(blank)**	**100**	**25,000**	**(blank)**	**1,200**
Irrigation Water Short-term NAS, 1972				**5,000**	**(blank)**	**100**	**(blank)**		**10**	**(blank)**	**100**	**50**	**200**	**5000**		**(blank)**	**200**	**(blank)**	**10**	**200**	**(blank)**	**20**	**(blank)**			**100**	**2,000**	**(blank)**	**500,000**
Irrigation Water Long-term NAS, 1972				**20,000**	**(blank)**	**2,000**	**(blank)**		**50**	**(blank)**	**1,000**	**5,000**		**20,000**	**10,000**	**(blank)**	**10,000**	**(blank)**	**50**	**2,000**	**(blank)**	**20**	**(blank)**			**1000**	**10,000**	**(blank)**	
Utah DWQ Agricultural Use Criteria 4						**100**	**(blank)**		**10**	**(blank)**	**100**	**(blank)**	**200**	**(blank)**	**100**	**(blank)**						**50**	**(blank)**						**1,200**
Monitoring Location	**Site Description**	**Collection Date**	**Collection Time**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**mg/L**
4953000	San Juan R @ Mexican Hat US163 Xing	8/8/2015	5:40 PM	264	1.38	1.57	308	0.04	ND	49.2	ND	0.127	3.95	144	ND	5.75	2.81	ND	3.15	0.89	4.15	0.92	0.0956	62.6	ND	3.13	14.2	154	730
		8/10/2015	11:53 AM	325	0.376	1.94	299	ND	ND	44.6	ND	0.102	2.95	140	0.315	7.84	2.55	ND	2.43	ND	3.41	0.61	0.0297	43.6	ND	7.59	17.6	126	590
		8/10/2015	4:44 PM	149	1.26	1.4	265	ND	ND	44.2	ND	0.0789	2.48	ND	0.315	7.87	ND	ND	2.63	ND	3.35	0.75	0.193	41.9	ND	6.67	18.5	132	660
		8/11/2015	11:31 AM	907	1.42	1.98	391	0.05	ND	37.2	ND	0.179	3.13	382	ND	6.72	4.55	ND	2.46	0.85	3.29	0.78	0.205	51.3	0.0362	7.82	12.4	117	980
		8/11/2015	3:43 PM	1,790	1.23	1.59	445	0.07	ND	43.6	ND	0.311	5.28	787	0.569	7.19	11.6	ND	1.98	1.02	3.11	0.82	0.23	41.4	0.027	4.55	17.4	129	600
		8/12/2015	12:09 PM	125	1.41	1.59	245	0.03	ND	59.8	ND	0.0512	3.34	ND	ND	7.86	ND	ND	2.27	ND	3.09	0.92	0.151	42.1	ND	3.07	14.2	157	450
		8/12/2015	5:50 PM	105	2.23	1.79	185	0.09	ND	48.9	ND	0.0691	3.19	ND	ND	7.22	ND	ND	2.64	ND	3.16	1.16	0.264	48.7	ND	4.34	16.1	143	470
		8/13/2015	12:05 PM	293	1.61	2.06	201	ND	ND	42.6	ND	0.148	3.46	143	ND	7.21	3.54	ND	2.33	0.76	3.3	1.18	0.182	44.4	ND	7.13	19.8	135	490
		8/14/2015	11:43 AM	120	1.04	2.33	157	0.04	ND	46.2	ND	0.236	5.86	ND	ND	10.5	2.43	ND	5.87	1.75	4.29	1.56	0.152	68	0.182	8.06	ND	173	760
		8/15/2015	9:43 AM	135	1.04	1.7	117	0.03	ND	53.7	ND	0.575	8.56	ND	ND	9.03	7.42	ND	3.28	1.66	3.62	1.19	0.192	51.9	0.0557	5.65	6.18	191	710
		8/16/2015	11:58 AM	84	0.447	1.35	194	0.03	ND	57.7	ND	0.12	3.92	ND	ND	8.96	ND	ND	2.31	ND	3.5	0.84	0.0298	40.2	ND	3.31	13.8	NS	1,380
		8/17/2015	3:04 PM	52	0.817	1.55	108	ND	ND	59.3	ND	0.128	2.85	ND	ND	10.3	ND	ND	2.55	1.23	3.42	0.86	0.186	37.3	0.0425	3.4	ND	NS	880
4952940	San Juan R @ Clay Hills	8/13/2015	2:42 PM	643	0.18	1.76	411	0.06	ND	52.3	ND	0.3	4.36	388	0.924	7.5	13.8	ND	2.16	1.09	3.09	0.91	ND	47	ND	4.99	19.2	158	500
		8/14/2015	2:33 PM	39	0.316	1.89	121	ND	ND	51.1	ND	0.125	3.6	ND	ND	8.23	ND	ND	3.3	1.28	3.69	1.13	0.0286	49.8	ND	5.38	ND	144	570
		8/15/2015	2:30 PM	119	0.343	1.75	136	ND	ND	43.1	ND	0.0773	2.6	ND	ND	8.99	ND	ND	4.27	0.95	3.62	1.18	ND	66.3	ND	5.48	ND	159	920
		8/16/2015	2:46 PM	925	0.25	1.71	319	0.05	ND	52.7	ND	0.314	5.26	490	0.458	9.48	9.63	ND	2.78	0.84	4.17	0.91	ND	58.2	ND	5.71	20.6	NS	1,480
		8/17/2015	1:03 PM	101	0.263	1.63	132	ND	ND	53.2	ND	0.253	4.65	ND	ND	8.79	2.7	ND	2.55	1.36	3.89	0.73	ND	44.5	ND	4.83	ND	NS	1,020

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Comparison of San Juan River Raw Water Data with Screening Values for Aquatic Life Use (Warm-water Fishery) – Dissolved Metals

🟩	No Exceedence	🟧	Above Screening Level	🟦	Prior to Plume Arrival	🟨	Estimated Plume Arrival	⬜	Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Utah Aquatic Life Use Criteria 1-hr				750	(blank)	340	(blank)		2	(blank)	570	(blank)	13	1,000	65	(blank)				468	(blank)	18.4	1.6	(blank)			120
Utah Aquatic Life Use Criteria 4-day				87	(blank)	150	(blank)		0.25	(blank)	74	(blank)	9	1,000	2.5	(blank)		0.01	(blank)	52	(blank)	4.6	(blank)				120
Monitoring Location	Site Description	Collection Date	Collection Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
4954000	San Juan R @ US160 Xing in CO	8/8/2015	1:23 PM	217	1	1	222	0.04	ND	52	ND	0.13	2.2	96	ND	8	3	ND	1.87	ND	3	0.7	ND	32	ND	5	15
		8/9/2015	12:02 PM	258	0	1	274	ND	ND	51	ND	0.08	2.5	119	ND	7	3	ND	2.01	ND	3	0.6	0	29	ND	2	19
		8/9/2015	9:02 PM	329	0	1	341	0.04	ND	46	ND	0.14	3.5	198	0	6	4	ND	1.94	ND	2	0.5	ND	30	ND	2	15
		8/10/2015	9:11 AM	172	0	1	233	ND	ND	45	ND	0.07	3.2	103	0	6	2	ND	2.03	ND	3	0.6	ND	34	ND	2	20
		8/10/2015	2:06 PM	1,050	1	1	220	0.09	ND	44	ND	0.41	3.4	732	1	6	13	ND	1.92	1	3	0.6	0	35	ND	4	18
		8/11/2015	8:50 AM	3,290	0	2	451	0.10	ND	40	ND	0.49	4.9	1,520	1	5	19	0.02	1.65	1	3	1.0	ND	44	ND	4	19
		8/11/2015	1:17 PM	720	0	1	334	ND	ND	42	ND	0.16	3.0	366	0	5	5	ND	1.58	ND	3	0.8	ND	37	ND	2	15
		8/12/2015	9:50 AM	104	1	1	178	ND	ND	52	ND	0.06	2.4	ND	ND	7	ND	ND	1.47	ND	3	0.8	0	30	ND	2	15
		8/12/2015	2:04 PM	155	1	1	151	ND	ND	48	ND	0.05	2.6	ND	ND	7	2	ND	1.48	ND	3	0.7	ND	27	ND	3	17
		8/13/2015	10:01 AM	257	0	1	213	0.03	ND	48	ND	0.12	3.7	148	0	6	3	ND	1.89	ND	3	0.9	ND	43	ND	2	22
		8/14/2015	2:33 PM	65	0	2	72	0.04	ND	53	ND	0.13	3.9	ND	ND	7	2	ND	3.65	3	4	1.1	ND	52	0.04	4	ND
		8/15/2015	12:04 PM	48	0	1	65	ND	ND	53	ND	0.05	1.4	ND	ND	8	ND	ND	2.25	ND	3	0.6	ND	26	ND	3	ND
		8/16/2015	9:15 AM	54	1	1	179	0.04	ND	54	ND	ND	2.9	ND	ND	8	ND	ND	1.72	ND	3	0.6	0	26	ND	2	13
4953990	San Juan R @ Town of Montezuma	8/8/2015	2:54 PM	136	1	1	223	0.04	ND	72	ND	0.13	2.7	ND	ND	10	ND	ND	2.62	1	4	1.1	0	44	ND	3	21
		8/10/2015	10:13 AM	218	1	1	262	ND	ND	50	ND	0.08	3.2	144	0	8	3	ND	2.03	ND	3	0.6	0	32	ND	2	17
		8/10/2015	2:58 PM	95	1	1	200	0.03	ND	49	ND	0.06	2.5	ND	0	7	ND	ND	2.32	ND	3	0.6	0	32	ND	2	15
		8/11/2015	9:44 AM	462	1	1	314	ND	ND	45	ND	0.13	2.7	227	ND	6	3	ND	1.72	ND	3	0.7	0	37	ND	2	13
		8/11/2015	2:20 PM	1,400	0	1	298	0.04	ND	45	ND	0.24	3.5	668	0	7	10	ND	1.72	1	3	0.7	ND	38	ND	3	14
		8/12/2015	10:37 AM	68	1	1	202	0.03	ND	48	ND	ND	2.5	ND	ND	7	ND	ND	1.66	ND	3	0.8	0	32	ND	2	14
		8/12/2015	2:57 PM	375	1	1	176	ND	ND	49	ND	0.09	4.3	296	ND	8	2	ND	1.64	ND	3	0.7	0	34	ND	2	16
		8/13/2015	4:46 PM	330	2	1	240	0.07	ND	49	ND	0.18	3.8	192	ND	8	5	ND	1.91	1	3	1.0	0	33	0.03	3	33
		8/14/2015	9:55 AM	25	1	1	85	0.04	ND	55	ND	0.15	3.8	ND	ND	8	ND	ND	2.84	2	4	1.0	0	53	0.03	3	ND
		8/15/2015	11:31 AM	68	1	2	74	0.04	ND	55	ND	0.24	4.4	ND	ND	9	3	ND	2.43	1	3	0.9	0	36	ND	4	ND
		8/16/2015	10:02 AM	62	1	1	145	0.06	ND	58	ND	0.09	3.0	ND	ND	9	ND	ND	1.99	ND	3	0.7	0	30	0.05	2	10
		8/17/2015	4:07 PM	27	0	1	80	ND	ND	60	ND	0.14	1.9	ND	ND	12	2	ND	1.97	ND	3	0.6	ND	29	ND	2	ND
4953250	San Juan R @ Sand Island	8/8/2015	4:19 PM	214	1	1	294	0.06	ND	74	ND	0.12	3.9	104	ND	9	3	ND	3.30	1	4	1.4	0	51	ND	2	19
		8/10/2015	11:15 AM	124	1	1	192	ND	ND	53	ND	0.07	2.1	ND	0	8	ND	ND	2.38	ND	3	0.7	0	28	ND	2	14
		8/10/2015	3:58 PM	108	1	1	184	ND	ND	48	ND	0.06	2.0	ND	0	8	ND	ND	2.26	ND	3	0.5	ND	31	ND	2	13
		8/11/2015	10:53 AM	684	1	1	278	0.06	ND	46	ND	0.17	2.9	328	ND	7	4	ND	1.92	1	3	0.7	0	37	0.03	3	14
		8/11/2015	3:01 PM	158	0	1	251	ND	ND	45	ND	0.09	2.7	89	ND	7	ND	ND	1.85	ND	3	0.7	ND	37	ND	2	15
		8/12/2015	11:12 AM	623	1	1	205	0.05	ND	47	ND	0.15	3.4	310	ND	7	4	ND	1.93	ND	3	0.8	0	38	ND	3	15
		8/12/2015	5:06 PM	605	2	1	260	0.06	ND	47	ND	0.16	3.0	314	ND	7	5	ND	1.81	1	3	0.8	0	34	ND	2	13
		8/13/2015	11:28 AM	509	1	1	156	0.03	ND	54	ND	0.21	3.1	275	ND	8	9	ND	1.62	ND	3	0.7	ND	29	ND	4	20
		8/14/2015	11:02 AM	ND	1	2	79	0.05	ND	53	ND	0.13	3.3	ND	ND	8	7	ND	5.31	2	3	1.1	0	50	0.13	6	5
		8/15/2015	10:30 AM	95	1	2	84	0.04	ND	56	ND	0.09	2.3	ND	ND	8	ND	ND	3.93	1	3	1.1	0	47	0.05	3	ND
		8/16/2015	11:06 AM	290	0	1	149	0.04	ND	56	ND	0.15	3.9	202	ND	10	4	ND	1.95	ND	3	0.7	0	36	ND	2	11
		8/17/2015	3:33 PM	ND	0	1	87	ND	ND	62	ND	0.17	2.1	ND	ND	11	ND	ND	2.67	1	3	0.6	ND	30	ND	3	ND

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🟩	No Exceedence	🟧	Above Screening Level	🟦	Prior to Plume Arrival	🟨	Estimated Plume Arrival	⬜	Post Plume Arrival

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Utah Aquatic Life Use Criteria 1-hr				**750**	**(blank)**	**340**	**(blank)**		**2**	**(blank)**	**570**	**(blank)**	**13**	**1,000**	**65**	**(blank)**				**468**	**(blank)**	**18.4**	**1.6**	**(blank)**			**120**
Utah Aquatic Life Use Criteria 4-day				**87**	**(blank)**	**150**	**(blank)**		**0.25**	**(blank)**	**74**	**(blank)**	**9**	**1,000**	**2.5**	**(blank)**		**0.01**	**(blank)**	**52**	**(blank)**	**4.6**	**(blank)**				**120**
Monitoring Location	**Site Description**	**Collection Date**	**Collection Time**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**mg/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
4953000	San Juan R @ Mexican Hat US163 Xing	8/8/2015	5:40 PM	264	1	2	308	0.04	ND	49	ND	0.13	4.0	144	ND	6	3	ND	3.15	1	4	0.9	0	63	ND	3	14
		8/10/2015	11:53 AM	325	0	2	299	ND	ND	45	ND	0.10	3.0	140	0	8	3	ND	2.43	ND	3	0.6	0	44	ND	8	18
		8/10/2015	4:44 PM	149	1	1	265	ND	ND	44	ND	0.08	2.5	ND	0	8	ND	ND	2.63	ND	3	0.8	0	42	ND	7	19
		8/11/2015	11:31 AM	907	1	2	391	0.05	ND	37	ND	0.18	3.1	382	ND	7	5	ND	2.46	1	3	0.8	0	51	0.04	8	12
		8/11/2015	3:43 PM	1,790	1	2	445	0.07	ND	44	ND	0.31	5.3	787	1	7	12	ND	1.98	1	3	0.8	0	41	0.03	5	17
		8/12/2015	12:09 PM	125	1	2	245	0.03	ND	60	ND	0.05	3.3	ND	ND	8	ND	ND	2.27	ND	3	0.9	0	42	ND	3	14
		8/12/2015	5:50 PM	105	2	2	185	0.09	ND	49	ND	0.07	3.2	ND	ND	7	ND	ND	2.64	ND	3	1.2	0	49	ND	4	16
		8/13/2015	12:05 PM	293	2	2	201	ND	ND	43	ND	0.15	3.5	143	ND	7	4	ND	2.33	1	3	1.2	0	44	ND	7	20
		8/14/2015	11:43 AM	120	1	2	157	0.04	ND	46	ND	0.24	5.9	ND	ND	11	2	ND	5.87	2	4	1.6	0	68	0.18	8	ND
		8/15/2015	9:43 AM	135	1	2	117	0.03	ND	54	ND	0.58	8.6	ND	ND	9	7	ND	3.28	2	4	1.2	0	52	0.06	6	6
		8/16/2015	11:58 AM	84	0	1	194	0.03	ND	58	ND	0.12	3.9	ND	ND	9	ND	ND	2.31	ND	4	0.8	0	40	ND	3	14
		8/17/2015	3:04 PM	52	1	2	108	ND	ND	59	ND	0.13	2.9	ND	ND	10	ND	ND	2.55	1	3	0.9	0	37	0.04	3	ND
4952940	San Juan R @ Clay Hills	8/13/2015	2:42 PM	643	0	2	411	0.06	ND	52	ND	0.30	4.4	388	1	8	14	ND	2.16	1	3	0.9	ND	47	ND	5	19
		8/14/2015	2:33 PM	39	0	2	121	ND	ND	51	ND	0.13	3.6	ND	ND	8	ND	ND	3.30	1	4	1.1	0	50	ND	5	ND
		8/15/2015	2:30 PM	119	0	2	136	ND	ND	43	ND	0.08	2.6	ND	ND	9	ND	ND	4.27	1	4	1.2	ND	66	ND	5	ND
		8/16/2015	2:46 PM	925	0	2	319	0.05	ND	53	ND	0.31	5.3	490	0	9	10	ND	2.78	1	4	0.9	ND	58	ND	6	21
		8/17/2015	1:03 PM	101	0	2	132	ND	ND	53	ND	0.25	4.7	ND	ND	9	3	ND	2.55	1	4	0.7	ND	45	ND	5	ND

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