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Date: April 18, 2022
Refer To: N3B-2022-0121

Jennifer Fullam
Standards, Planning & Reporting Team Leader
Surface Water Quality Bureau
New Mexico Environment Department
1190 S. St. Francis Drive
Santa Fe, NM 87502-5469

Subject: Response to New Mexico Environment Department Request for Additional Information and Comments for the Pajarito Plateau Site-Specific Water Quality Copper Criteria Demonstration

Dear Ms. Fullam:

On November 9, 2021, the U.S. Department of Energy Environmental Management Los Alamos Field Office (EM-LA) and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) received comments from the New Mexico Environment Department (NMED) Surface Water Quality Bureau on the "Demonstration Report for Copper Site-Specific Criteria for Surface Waters on the Pajarito Plateau" (hereafter, Demonstration Report, dated July 28, 2021; Revision 1 dated August 20, 2021). The letter with comments, sent via email, was titled "Re: Request for Additional Information for the Pajarito Plateau Site-Specific Water Quality Copper Criteria Demonstration."

EM-LA/N3B appreciate NMED's review and comments on the Demonstration Report, as well as the follow-up technical discussion, which occurred via teleconference on January 13, 2022. EM-LA/N3B are pleased to provide the enclosed response to NMED's request for additional information and comments for the Pajarito Plateau site-specific water quality copper criteria demonstration (Enclosure 1). Also enclosed is a revised Demonstration Report that addresses the elements and clarifications requested by NMED (Enclosure 2). As discussed on January 13, 2022, further review by NMED would be appreciated, with the understanding that NMED's review may require up to 60 days.

If you have questions, please contact Amanda White at (505) 309-1366 (amanda.white@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Steve Veenis
Water Program Director
Environmental Remediation
N3B-Los Alamos

Sincerely,

ARTURO DURAN
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Arturo Q. Duran
Compliance and Permitting Manager
Office of Quality and Regulatory Compliance
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Enclosure(s):

1. Response to New Mexico Environment Department Surface Water Quality Bureau's "Request for Additional Information for the Pajarito Plateau Site-Specific Water Quality Copper Criteria Demonstration," Dated November 9, 2021
2. Copper Site-Specific Water Quality Criteria for the Pajarito Plateau: Demonstration Report, final draft

cc (letter and enclosure[s] emailed):
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ENCLOSURE 1

Response to New Mexico Environment Department Surface Water Quality Bureau's "Request for Additional Information for the Pajarito Plateau Site-Specific Water Quality Copper Criteria Demonstration," Dated November 9, 2021

Response to New Mexico Environment Department Surface Water Quality Bureau's "Request for Additional Information for the Pajarito Plateau Site-Specific Water Quality Copper Criteria Demonstration," Dated November 9, 2021

INTRODUCTION

On November 9, 2021, the U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office received comments from the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB) on the "Demonstration Report for Copper Site-Specific Criteria for Surface Waters on the Pajarito Plateau" (hereafter Demonstration) dated July 28, 2021 (Revision 1 dated August 20, 2021). DOE appreciates NMED's review and comments on the Demonstration, as well as the follow-up technical discussion, which occurred via teleconference on January 13, 2022. The following is DOE's response to NMED's comments and request for additional information.

NMED noted in the introduction to specific comments that "site-specific numeric criteria are relevant and justified when site-specific conditions in a watershed or specific surface water warrant a different criterion (see 20.6.4.10(D)(1) NMAC for a list of potential conditions)." The site-specific water quality criteria (SSWQC) for copper described in the Demonstration are relevant, justified, and scientifically defensible in accordance with the U.S. Environmental Protection Agency (EPA) recommendations and New Mexico's Water Quality Standards (20.6.4 New Mexico Administrative Code [NMAC]).

Paragraph 1 of Subsection D of 20.6.4.10 NMAC states, "The commission may adopt site-specific numeric criteria applicable to all or part of a surface water of the state based on relevant site-specific conditions." One such condition is "physical or chemical characteristics at a site such as pH or hardness alter the biological availability and/or toxicity of the chemical" [20.6.4.10(D)(1)(b) NMAC]. EPA notes this condition relates to differences in ambient water chemistry at a particular site relative to laboratory dilution waters used to develop EPA 304(a) National Clean Water Act Section 304(a) criteria or state criteria (EPA 1983, EPA 1985, EPA 1994, EPA 2001).

New Mexico's current hardness-based criteria do not consider the effects of other water quality parameters on copper toxicity. In 2007, EPA issued the "Aquatic Life Ambient Freshwater Quality Criteria – Copper" to account for the effects of multiple parameters using the copper biotic ligand model (BLM) (EPA 2007). Before this, EPA recommended site-specific adjustments for copper using the water effect ratio (WER) procedure to account for the influence of water chemistry parameters other than hardness between site and laboratory dilution waters (EPA 1994, EPA 2001).

The BLM-based copper SSWQC described in the Demonstration was developed in accordance with EPA Section 304(a) recommendations. EPA 304(a) copper criteria are relevant and justified for all surface waters of the state; however, BLM parameters are not available for most other surface waters in New Mexico. As discussed in the Demonstration, BLM parameters have been extensively monitored in surface waters of the Pajarito Plateau in order to make the plateau a suitable setting for establishing BLM-based copper criteria pursuant to 20.6.4.10(D)(c) NMAC.

As described by EPA, BLM-based water quality criteria provide the same level of protection (LOP) relative to hardness-based criteria, but are based on the best available science with improved accuracy of the intended LOP (EPA 2007, EPA 2021). The proposed copper SSWQC is an important step to incorporate the best available science and current EPA recommendations into the various surface water compliance and environmental management programs for the Pajarito Plateau.

Enclosed is a revised Demonstration that addresses the elements and clarifications requested by NMED. Responses to specific NMED comments are provided below. As discussed on January 13, 2022, further review by NMED would be appreciated, with the understanding that NMED's review may require up to 60 days.

To facilitate review of this response, NMED's comments are included verbatim. DOE's responses follow each of NMED's comments.

NMED Comment

1. ***Based on the findings of the Demonstration and pursuant to 20.1.6.200 NMAC, N3B must include the amended language of 20.6.4 NMAC as it will be proposed to the Water Quality Control Commission.***

DOE Response

1. DOE acknowledges that the petition to the Water Quality Control Commission (WQCC) must include, as an exhibit, the proposed rule, "indicating any language proposed to be added or deleted" (20.1.6.200.B NMAC). While DOE does not agree the proposed rule must be in the Demonstration, the proposed language is provided below.

   Because surface waters classified as ephemeral or intermittent within the Laboratory's vicinity are designated as limited aquatic life and subject to acute aquatic life criteria only, the acute SSWQC equation applies to those waters. Both acute and chronic aquatic life criteria apply to unclassified and perennial surface waters within the vicinity of the Laboratory. DOE anticipates that the copper SSWQC equations will be proposed to be added to current sections of 20.6.4 NMAC as follows (additions are underscored):

   - 20.6.4.126 RIO GRANDE BASIN: Perennial portions of Cañon de Valle from Los Alamos national laboratory (LANL) stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to LANL NPDES outfall 001, Pajarito canyon from Arroyo de La Delfe upstream into Starmers gulch and Starmers spring and Water canyon from Area-A canyon upstream to State Route 501.

     A. Designated uses: coldwater aquatic life, livestock watering, wildlife habitat and secondary contact.

     B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 are applicable to the designated uses, except that the following segment-specific criteria apply:

        1. Acute aquatic life copper criteria (µg/L) = exp(-22.912 + 1.017*ln(DOC) + 0.045*ln(hardness) + 5.176*pH – 0.261*pH^2)

        2. Chronic aquatic life copper criteria (µg/L) = exp(-23.382 + 1.017*ln(DOC) + 0.045*ln(hardness) + 5.174*pH – 0.261*pH^2)

   - 20.6.4.127 RIO GRANDE BASIN: Perennial portions of Los Alamos canyon upstream from Los Alamos reservoir and Los Alamos reservoir.

     A. Designated uses: coldwater aquatic life, livestock watering, wildlife habitat, irrigation and primary secondary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 are applicable to the designated uses, except that the following segment-specific criteria apply:

1. Acute aquatic life copper criteria (μg/L) = exp(-22.912 + 1.017*ln(DOC) + 0.045*ln(hardness) + 5.176*pH – 0.261*pH^2)

2. Chronic aquatic life copper criteria (μg/L) = exp(-23.382 + 1.017*ln(DOC) + 0.045*ln(hardness) + 5.174*pH – 0.261*pH^2)

- 20.6.4.128 RIO GRANDE BASIN: Ephemeral and intermittent portions of watercourses within lands managed by U.S. department of energy (DOE) within LANL, including but not limited to: Mortandad canyon, Cañada del Buey, Ancho canyon, Chaquehui canyon, Indio canyon, Fence canyon, Potrillo canyon and portions of Cañon de Valle, Los Alamos canyon, Sandia canyon, Pajarito canyon and Water canyon not specifically identified in 20.6.4.126 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded).

A. Designated uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent) and:

1. Acute aquatic life copper criteria (μg/L) = exp(-22.912 + 1.017*ln(DOC) + 0.045*ln(hardness) + 5.176*pH – 0.261*pH^2)

Both 20.6.4.126 NMAC and 20.6.4.128 NMAC (Section 126 and 128) are subject to other amendments based on the 2020 Triennial Review. The copper SSWQC equations would apply regardless of these amendments according to the underlying aquatic life use designations. Also, NMED proposed to create a new classified standards section, 20.6.4.140 NMAC (Section 140), for certain reaches currently classified under Section 128. Should the WQCC adopt this new section based on either NMED- or Los Alamos National Laboratory- (LANL-) proposed amendments, similar amended language would be proposed to incorporate both the acute and chronic copper SSWQC equations. Finally, because the spatial boundary of the copper SSWQC encompasses additional surface waters on the Pajarito Plateau not specifically included in the current or proposed NMAC sections (see Section 6.2 of the Demonstration), the following options will be considered: (1) proposing two new classified standards sections to encompass unclassified intermittent and perennial waters, including presumed designated uses in accordance with 20.6.4.11.H NMAC or (2) amending 20.6.4.97 and 20.6.4.98 NMAC to include the surface waters of the Pajarito Plateau not specifically included in the sections discussed above and the applicable SSWQC equations.

NMED Comment

2. N3B must list the surface waters of the state to which the Demonstration applies, in accordance with 20.6.4.10(D)(3)(a) NMAC, including the applicable assessment unit, current designated uses, and any applicable site-specific criteria.

DOE Response

2. The list of surface waters for which the copper SSWQC are proposed is described in Section 6.2 of the Demonstration and in DOE Response #1. A list of assessment units, as well as their current designated uses, has been added to Section 6.2 and Appendix A of the revised Demonstration.

NMED Comment

3. N3B must show that the site-specific criteria will not be in conflict with the State's antidegradation policy protections for existing uses, in accordance with 20.6.4.8 NMAC. N3B should provide a list of existing uses for each tributary and how these existing uses were derived, particularly as they pertain to copper, as supporting evidence.

DOE Response

3. The SSWQC proposal is based on EPA 304(a) criteria for copper. "Section 304(a) criteria are developed by EPA under authority of section 304(a) of the Clean Water Act based on the latest scientific information on the relationship that the effect of a constituent concentration has on a particular aquatic species and/or human health." [40 Code of Federal Regulations (CFR) Section 131.3(c)]. Note that New Mexico is required to adopt EPA 304(a) criteria or explain why it has not done so "when it submits the result of its triennial review to the Regional Administrator consistent with CWA section 303(c)(1) and the requirements of 40 CFR §131.20(c)." [40 CFR Section131.20(a) (see DOE Response #4)].

   The SSWQC proposal does not propose changes to existing uses. Rather, site-specific copper criteria are proposed for aquatic life uses based on EPA 304(a) criteria and consistent with 20.6.4.10 NMAC. EPA's 304(a) criteria provide extensive technical basis and justification for the conclusion that BLM-based criteria provide the most accurate level of protection for aquatic life uses (Section 2.2 of the Demonstration; please also see DOE Response #15). Consequently, the proposed SSWQC provide the most appropriate basis with which to evaluate the copper levels necessary to support aquatic life uses and thus do not conflict with New Mexico's antidegradation policy.

   Designated uses and NMAC classifications have been added to Section 6.2 and Appendix A of the Demonstration. The comment "how existing uses were derived, particularly as they pertain to copper" is unclear. None of the streams currently have site-specific copper criteria. The derivation of existing uses is unrelated to copper or other chemical concentrations.

   As EPA's "Aquatic Life Ambient Freshwater Quality Criteria – Copper" (EPA 2007) describes,

   > 'Stringency' likely varies depending on the specific water chemistry of the site. The 1986 hardness-based equation and resulting copper criteria reflected the effects of water chemistry factors such as hardness (and any of the other factors that were correlated with hardness, chiefly pH and alkalinity). However, the hardness based criteria, unadjusted with the WER [water effect ratio], did not explicitly consider the effects of DOC and pH, two of the more important parameters affecting copper toxicity. The application resulted in copper criteria that were potentially under-protective (i.e., not stringent enough) at low pH and potentially over-protective (i.e., too stringent) at higher DOC levels.
   >
   > By contrast, the BLM-based recommended criterion should more accurately yield the level of protection intended to protect and maintain aquatic life uses. By using the latest science currently available, application of the BLM-derived copper criteria should be neither under-protective nor over-protective for protection and maintenance of aquatic life uses affected by copper.

NMED Comment

4. ***Consistent with 20.6.4.10(D)(1) NMAC, N3B must provide the relevant site-specific condition(s) that warrant site-specific criteria and why these criteria would not be applicable to adopt as a state-wide numeric criteria. N3B should consider why the multiple linear regression ("MLR") translation of the biotic ligand model ("BLM") is appropriate for this Demonstration as opposed to a broad, state-wide application.***

DOE Response

4. The EPA 304(a) criteria for copper are appropriate for the entire state. As part of New Mexico's 2020 Triennial Review, EPA recommended that New Mexico consider updating its aquatic life criteria for copper to reflect the latest science contained in the 304(a) copper criteria (EPA 2020). NMED stated in direct testimony that the BLM provides a more accurate assessment of copper bioavailability than New Mexico's hardness-based criteria calculation but noted, as a potential limitation, that the copper BLM requires multiple water quality parameters (some of which are not commonly available) and therefore recommended that the WQCC not adopt the criteria state-wide (NMED 2020). The limitation described in the 2020 Triennial Review is not an issue for the current proposal because BLM parameters have been sampled in Pajarito Plateau surface waters since 2005 and evaluated following EPA's data quality objective (DQO) and data quality assessment (DQA) framework (Section 5.1; Appendices A, B of the Demonstration). EPA's BLM-based criteria have been demonstrated to be accurately generated from pH, dissolved organic carbon (DOC), and hardness inputs for the site-specific waters and hydrologic regimes included in the proposal.

   Regarding the spatial scope of the proposed criteria, the multiple linear regression (MLR) equations were developed, validated, and determined to be highly accurate in generating BLM-based criteria over the range of site-specific water chemistries and flow regimes observed on the Pajarito Plateau (Figures 5-2, 5-3, 5-5, and 5-6; Appendix B of the Demonstration). No recommendation has been made for state-wide application to surface waters that could (1) be outside the range of the Pajarito Plateau data used to develop the MLR equations or (2) contain substantially different ionic compositions from those of the surface waters in the data set used to develop the MLR equations.

NMED Comment

5. ***Consistent with 20.6.4.10(D)(2) NMAC, N3B must provide evidence in the Demonstration that the site-specific criteria fully protect the applicable designated uses and are therefore still protective of downstream uses, in accordance with 40 C.F.R. 131.10(b).***

DOE Response

5. The proposed SSWQC are based on EPA 304(a)-recommended criteria and thus are fully protective of aquatic life uses on the Pajarito Plateau. BLM-based criteria would also provide more accurate criteria for aquatic life uses in the Rio Grande although that is beyond the scope of the proposal.

   Section 5.6 and Appendix D (Table D-1) of the revised Demonstration provide an evaluation of the Rio Grande conditions. Based on United States Geological Survey (USGS) monitoring data, copper concentrations in the Rio Grande are substantially less than NMAC hardness-based criteria and BLM-based criteria at locations above and below confluences with Pajarito Plateau tributaries. Copper concentrations in the Rio Grande above and below the Pajarito Plateau have remained low and stable over the period of USGS monitoring (2005−2021). It is notable that copper concentrations in the Rio Grande are comparable to or less than copper background threshold values (BTVs) derived for undeveloped conditions on the Pajarito Plateau and substantially less than BTVs for developed conditions (urban runoff) unrelated to LANL (Windward 2020).

USGS's findings are consistent with NMED's copper assessments of the Rio Grande. The State of New Mexico Section 303(d)/305(b) integrated reports, available on NMED's webpage (https://www.env.nm.gov/surface-water-quality/303d-305b/), which includes 303(d)/305(b) listings for the 2008−2010 through the 2022−2024 (draft) assessment cycles, have not listed the Rio Grande above and below the Pajarito Plateau tributaries as impaired with respect to copper. As described in Section 2.2 of the Demonstration, the SSWQC proposal does not propose new activities or discharges that could potentially impact water quality criteria on the Pajarito Plateau. Instead, the proposed copper criteria for aquatic life are based on EPA 304(a) criteria. Finally, surface water flows from the Pajarito Plateau rarely reach the Rio Grande because of the limited flow durations and infiltration in canyon reaches upgradient of the Rio Grande.

NMED Comment

6. ***N3B should expand Section 2.1.1 regarding relevant conditions for developing site-specific surface water quality criteria to describe the physical and chemical characteristics of the site affecting the bioavailability and toxicity of copper. N3B should also explain how, even though these conditions exist, the proposed criteria will fully protect designated uses and downstream waters.***

DOE Response

6. Section 2.1.1 has been expanded based on DOE Response #4. References to other sections of the Demonstration that discuss in more detail the importance of pH and DOC (versus hardness alone) on the bioavailability and toxicity of copper have also been included in Section 2.1.1. The protectiveness of the proposed SSWQC to designated uses is discussed in DOE Responses #3, #4, and #5.

NMED Comment

7. ***N3B should discuss current National Pollutant Discharge Elimination System ("NPDES") Individual Permit ("IP") target action levels, multi-sector general permit ("MSGP") benchmarks, and water quality-based effluent limits ("WQBELs") for copper applicable to LANL's NPDES discharges, and any reported exceedances.***

DOE Response

7. Section 2.4 of the Demonstration discusses the four types of National Pollutant Discharge Elimination System (NPDES) discharges and identifies that New Mexico's hardness-based criteria are the basis for the various copper values used in these permits.

   While DOE does not agree that more information is needed for the Demonstration, the various copper values and exceedances are summarized below.

   NPDES Individual Permit (IP) Permit No. NM0030759 (DOE and Newport News Nuclear BWXT-Los Alamos, LLC [N3B] as Permittees): The maximum target action level (TAL) for dissolved copper (4.3 µg/L) in the current permit (EPA 2010) is based on and equivalent to New Mexico's hardness-based copper criteria provided in 20.6.4 NMAC. The dissolved copper TALs in the draft permit

(EPA NM0030759) (ranging from 4.3 µg/L to 6.7 µg/L) are also hardness based by major watershed in accordance with 20.6.4.900 NMAC. TAL exceedances are reported annually to EPA in the IP Annual Report and the Site Discharge Pollution Prevention Plan, with copies provided to NMED. These reports can be found on the IP Public Website, https://ext.em-la.doe.gov/ips.

Between 2010 and 2021 dissolved copper has been analyzed in 335 storm water samples collected as part of the IP. Each sample has been screened against the IP copper TAL. Of those 335 samples, 177 samples exceeded the TAL. Note that corrective action samples that did not have exceedances for copper in baseline monitoring were not analyzed for copper in subsequent monitoring.

Multi-Sector General Permit (MSGP) (N3B as Permittee): The discharge of storm water from six N3B-operated outfalls is authorized under the 2021 MSGP. Four of six outfalls discharge to an assessment unit that is impaired for dissolved copper (Pajarito Canyon, lower LANL boundary to Twomile Canyon), as shown in Table 1. Thus, annual monitoring for dissolved copper is conducted at MSGP Outfalls 49, 51, 53, and 69. Results of this monitoring are reported on EPA's website (https://cdx.epa.gov), and analytical results can be found on https://www.intellusnm.com/. Dissolved copper results are compared against the New Mexico's hardness-based acute criterion of 4.35 µg/L (using a hardness of 30.2 mg/L for Pajarito Canyon, to be consistent with the 2019 draft IP).

Note that for the 2021 MSGP, EPA modified the copper benchmark to reflect EPA's BLM-based 304(a) criteria. EPA notes that the BLM-based criteria reflect the best available science and provide improved accuracy of the intended level of protection (EPA 2007). However, copper benchmarks are not identified for MSGP Sectors K or P, which are the applicable sectors for N3B's MSGP outfalls.

Dissolved copper was first listed as an impairment for Pajarito Canyon (lower LANL boundary to Twomile Canyon) in 2018. Since 2018, 14 MSGP storm water samples have been analyzed for dissolved copper. Of the 14 samples, 10 were collected under the 2015 permit, and 4 were collected since August 1, 2021, under the 2021 MSGP requirements. Of the 14 samples, 8 exceeded New Mexico's hardness-based value of 4.35 µg/L. Dissolved copper is an impairment parameter (versus a benchmark parameter), and thus it is compared with New Mexico's hardness-based copper criteria. A result above criteria is not considered a permit violation; rather, it is tracked to identify a potential need for additional control measures to prevent impacts to impaired water.

MSGP (currently Triad National Security, LLC, as Permittee): From 2016 to present, storm water discharges have been authorized under two separate coverages for Los Alamos National Security, LLC (LANS) and Triad. During this period, discharges to assessment units impaired for dissolved copper (at that time) occurred (Table 1). These assessment units include Sandia Canyon (Sigma Canyon to NPDES outfall 001), Mortandad Canyon (within LANL), and Arroyo de la Delfe (Pajarito Canyon to headwaters).

From 2016 to present, dissolved copper has been analyzed in 106 impaired waters and quarterly benchmark storm water samples. Results of this monitoring are reported on EPA's electronic website (https://cdx.epa.gov), and analytical results can be found on the Intellus database website (https://www.intellusnm.com/). Dissolved copper monitoring was first required in the 2015 MSGP. Prior versions of the permit required monitoring for total copper; therefore, those results are excluded from this summary.

Table 1
Summary of MSGP Implementation and
Assessment Unit Discharges Monitored for Dissolved Copper

Permit	Operator	Monitoring Period	Number of MSGP-Authorized Outfalls	Number of Monitored Outfalls Discharging to Assessment Units Impaired for Dissolved Copper	Number of Monitored Outfalls Discharging to Sandia Canyon	Number of Monitored Outfalls Discharging to Mortandad Canyon	Number of Monitored Outfalls Discharging to Arroyo de la Delfe	Number of Monitored Outfalls Discharging to Pajarito Canyon
2015 MSGP	LANS	2016−2018	25	18	16	2	0	0
2015 MSGP	Triad	2019−2020	17	17	15	2	0	0
2015 MSGP	N3B	2018−2021	6	4	0	0	0	4
2021 MSGP	Triad	2021−present	14	13	10	2	1	0
2021 MSGP	N3B	2021−present	6	4	0	0	0	4

Beginning with the 2015 MSGP, the NMED 401 Certification (Part 9.6.2 of the 2015 and 2021 MSGP), requires that hardness-based benchmarks be modified to reflect New Mexico water quality standards. Therefore, dissolved copper results as both an impairment and benchmark parameter are compared against the NMED hardness-based acute aquatic life standard for each assessment unit.

Appendix J of the 2021 MSGP specifies that hardness data used to determine hardness-based benchmarks be less than 10 years old; therefore, average hardness is recalculated using Permittee data for each notice of intent to include only data collected within the allowed timeframe. Consequently, the calculated average hardness (and applicable standard) may vary for each assessment unit per permit cycle. However, for the purpose of this demonstration, results are compared against the NMED hardness-based acute aquatic life standard for each major canyon as shown in Table 2, to be consistent with the 2019 draft IP and the 2020 NMED 401 Certification for the LANL Individual Storm Water Permit.

For impaired waters monitoring, a result above a particular standard is not considered an exceedance or a permit violation; rather, it is tracked to identify a potential need for additional control measures to prevent impacts to impaired waters.

In the 2021 MSGP, EPA modified the total recoverable copper benchmark to reflect EPA's BLM-based 304(a) criteria. However, the 401 Certification required the copper benchmark be modified to reflect hardness-based acute aquatic life criteria. Triad's current operations do not include facilities under sectors that require benchmark monitoring for copper; therefore, those benchmarks do not apply.

Table 2
Summary of MSGP Impaired Waters Monitoring for Dissolved Copper

Assessment Unit	MSGP Outfalls Monitored for Dissolved Copper	Number of Impaired Waters Samples Collected for Dissolved Copper	Hardness (mg/L)*	Water Quality Criteria (µg/L)*	Number of Samples Exceeding WQC	Percent of Samples Exceeding WQC
Sandia Canyon	002, 005, 009, 012, 017, 018, 020, 022, 026, 029, 032, 037, 039, 042, 073, 074, 075, 076, 077	77	43	6.0	63	82
Mortandad Canyon	031, 043	7	29.5	4	5	71
Arroyo de la Delfe	079	1	30.2	4	1	100
Pajarito Canyon	049, 051, 053, 069	14	30.2	4	8	57

*Per the 2020 NMED 401 Certification for the LANL Individual Storm Water Permit.

Under LANS coverage for the 2015 MSGP (2016−2018), one facility (TA-3-66 Sigma Complex, discharging to Sandia Canyon) operated under Sector F, which required benchmark monitoring for copper. Sigma acquired a No Exposure exclusion status in 2018; therefore, monitoring was discontinued per Part 1.4 of the 2015 MSGP.

A benchmark exceedance occurs when the average of four quarterly samples exceeds the benchmark, or if the average of fewer than four quarterly samples is mathematically certain to exceed the benchmark. Table 3 summarizes benchmark dissolved copper monitoring and exceedances relative to hardness-based acute aquatic life standards from 2016 to the present. A benchmark exceedance is not a violation of the permit but requires evaluation and/or modification of control measures to meet the permit benchmark limit.

Table 3
MSGP Benchmark Dissolved Copper Monitoring and Exceedances Relative to Hardness-Based Acute Aquatic Life Standards

Permit	Operator	Monitoring Period	Sectors	Sectors with a Copper Benchmark	Number of Benchmark Samples Collected for Dissolved Copper	Number of Benchmark Exceedances
2015 MSGP	LANS	2016−2018	A, AA, D, F, K, N, O, P	F	12	2
2015 MSGP	Triad	2019−2020	A, AA, D, N, O, P	none	none	none
2021 MSGP	Triad	2021−present	AA, D, N, P	none	none	none

NPDES Outfall Permit No. NM0028355 (DOE-NNSA and Triad as Permittees): The copper water quality-based effluent limit (WQBEL) promulgated with the NPDES Outfall Permit No. NM0028355, upon its issuance in 2014, was based on New Mexico’s hardness-based copper criteria and a concurrent hardness value at each outfall. There have been three WQBEL exceedances since the permit was issued. Table 4 shows summary results in comparison with the applicable WQBEL at each outfall.

Table 4
Summary of WQBEL Exceedances

Outfall Number	Total/Dissolved Copper	WQBEL (µg/L) Daily Maximum unless Otherwise Indicated	Permit-Required Sampling Frequency	Number of Samples Taken	Number of Exceedances (concentration, date)
001	Dissolved Cu	7.3	Yearly	21	1 (61.8 µg/L, 6/24/2021)
13S	n/a*	None	n/a	n/a	n/a
051	Total Cu	14	3/week	18	0
05A055	n/a	None	n/a	n/a	n/a
04A022	Dissolved Cu	Report	1/term	2	n/a
03A181	Dissolved Cu	11.5	1/year	6	0
03A113	Dissolved Cu	21.8	1/year	8	2 (39.7 µg/L, 8/11/2020) (43.5 µg/L, 8/11/2020)
03A027	Dissolved Cu	7.3	1/year	3	0
03A048	Dissolved Cu	23.3	1/year	7	0
03A160	Dissolved Cu	21 (monthly average) 32 (daily maximum)	3/week	280	0
03A199	Dissolved Cu	7.3	1/year	7	0

*n/a = Not applicable.

As discussed in Section 2.4 of the Demonstration, the copper SSWQC are intended for eventual use in NPDES permits. If the WQCC adopts the SSWQC, updated TALs, benchmarks, and WQBELs will be developed in accordance with each permitting program using the proposed SSWQC equations and appropriate data sets.

NMED Comment

8. ***In Section 3.4.1, regarding sampling, N3B identifies sampling for all BLM parameters. However, from the information provided in Section 1.1 of the Demonstration, N3B is only evaluating pH, Dissolved Organic Carbon ("DOC") and hardness. For clarification, in Section 3.4.1 of the Demonstration, N3B should include the parameters sampled, particularly if not all ten of the parameters are included in a BLM.***

DOE Response

8. Section 1.1 of the Demonstration has been updated to describe that pH, DOC, and hardness were identified based on statistical analyses of the site-specific BLM data set.

   MLR analyses evaluated BLM-based criteria from samples collected across the Pajarito Plateau. The 10 BLM parameters were input to the BLM to calculate BLM-based criteria data used for MLR development. As part of that development, it was determined that pH, DOC, and hardness accurately generates BLM-criteria; these three parameters explain 98% of the variance observed in BLM-based criteria in the site-specific data set.

   Section 3.4.1 of the Demonstration has been updated, along with references to Section 3.4.2, to include analytical methods used for the analyses of BLM parameters, and Appendix A has been updated to include BLM input data used in the MLR analyses. BLM parameters presented in Appendix A were used to generate BLM output, and the MLR was developed to very accurately predict BLM output using the three parameters to which the BLM is most sensitive, and which are regarded in the scientific literature and EPA guidance as most important for determining copper bioavailability and toxicity. Please refer to DOE Response #16 for further discussion.

NMED Comment

9. Because some of the BLM input parameters are known to vary seasonally, N3B should provide at least one sampling event per season. To show this, N3B should include a distribution of sampling frequency for each month.

DOE Response

9. Section 3.4.1 of the Demonstration was updated as suggested with a sampling frequency distribution by month and a discussion of seasonal variability. Many surface waters on the Pajarito Plateau are ephemeral or intermittent and do not contain water for much of the year. Therefore, seasonal sampling is not feasible or relevant in many of the drainages.

   As described in Section 3.4.1, storm water samples are collected across the Pajarito Plateau by automated sampling devices triggered by flow events, which ensures representative samples are collected in the ephemeral, intermittent, and perennial drainages. In perennial drainages, base flow samples are also collected via grab sampling.

   Appendix A presents the data used to develop the MLR equations. Data are available in some canyons for multiple seasons; these are generally perennial waters. In most canyons, however, because of the ephemeral and intermittent nature of the surface waters, most samples have been collected during the summer/early autumn monsoonal season when water is present.

   The Pajarito Plateau data set used to develop the proposed SSWQC equations (n = 517 samples; Appendix A) spans multiple seasons, canyons, and flow conditions (i.e., ephemeral, intermittent, and perennial). These equations were demonstrated to accurately generate BLM-based criteria across these conditions. Any specific SSWQC value for a given drainage or permitted discharge would be determined using the proposed SSWQC equations and the applicable data set for that drainage/discharge in accordance with the respective permitting program.

NMED Comment

10. N3B should include a table with sampling locations, their relative assessment units, and designated uses.

DOE Response

10. Appendix A and Section 6.2 of the Demonstration have been updated to include this information.

NMED Comment

11. There was insufficient information regarding the sampling schedule and quality assurance for the sampling events to evaluate the Demonstration effectively. This includes explaining how data were validated and verified, and determined to be scientifically defensible, as well as

custody sheets, holding times, sampling methodology (i.e. grab or 24-hour composite), sources of sample (i.e. baseflow, effluent, stormflow, combination) and the occurrence of precipitation events that would influence the flow, offsetting baseflow conditions. Until this information is provided in the Demonstration the Department and EPA are unable to evaluate the technical merit of the Demonstration effectively.

DOE Response

11. Regarding sampling schedule, Section 3.4.1 has been expanded to provide additional information on sampling schedules, durations, and methods associated with the five general sampling programs from which the BLM data set was developed. The BLM data set in Appendix A has also been updated with this information.

    Regarding quality assurance, Section 3.4.2 of the Demonstration provides additional information on the analytical methods and data validation procedures associated with the BLM data used to develop the SSWQC equations.

    Analytical results meet the N3B minimum DQOs as outlined in N3B-PLN-SDM-1000, "Sample and Data Management Plan." N3B-PLN-SDM-1000 sets the validation frequency criteria at 100% Level 1 examination and Level 2 verification of data, and at 10% minimum Level 3 validation of data. A Level 1 examination assesses the completeness of the data as delivered from the analytical laboratory, identifies reporting errors, and checks the usability of the data based on the analytical laboratory's evaluation of the data. A Level 2 verification evaluates the data to determine the extent to which the laboratory met the analytical method and the contract-specific quality control and reporting requirements. A Level 3 validation includes Levels 1 and 2 criteria and determines the effect of potential anomalies encountered during analysis and possible effects on data quality and usability. A Level 3 validation is performed manually with method-specific data validation procedures. Laboratory analytical data are validated by N3B personnel as outlined in N3B-PLN-SDM-1000; N3B-AP-SDM-3000, "General Guidelines for Data Validation"; N3B-AP-SDM-3014, "Examination and Verification of Analytical Data"; and additional method-specific analytical data validation procedures. Associated validation procedures have been developed, where applicable, from EPA QA/G-8 "Guidance on Environmental Data Verification and Data Validation" (https://www.epa.gov/sites/production/files/2015-06/documents/g8-final.pdf), the Department of Defense/DOE "Consolidated Quality Systems Manual for Environmental Laboratories" (https://denix.osd.mil/edqw/documents/manuals/qsm-version-5-3-final/), and EPA National Functional Guidelines for Data Review (https://www.epa.gov/clp/superfund-clp-national-functional-guidelines-nfgs-data-review).

    Also, EPA's DQO/DQA process was previously applied to establish an appropriate water quality data set for BLM inputs (Windward 2018). As noted in Section 5.1 and Appendix B, this process was also applied to water quality data collected through 2019 (i.e., the two additional years of monitoring data not assessed in the 2018 DQO/DQA report). Surface water samples were collected in accordance with standardized sampling methodology and shipped to the analytical laboratory under chain-of-custody (COC). Samples were analyzed for BLM parameters according to EPA and standard methods, and analytical data were independently validated. Full data packages (i.e., analytical results, COC forms, and ancillary information such as precipitation data) are available through the Intellus website (https://intellusnm.com). Additionally, the BLM data set provided in Appendix A has been updated with sample types and COC codes. Additional information about the use of data validation results and quality assurance/quality control (QA/QC) information to construct the Appendix A data set is provided in Section 3.4.2 of the Demonstration.

Regarding the comment "the occurrence of precipitation events that would influence the flow, offsetting baseflow conditions," many of the drainages do not flow or contain water without precipitation, as previously discussed. The statistical evaluations presented in the Demonstration (Appendix B) validate that the proposed SSWQC equations accurately generate EPA's 304(a) criteria over the hydrologic regimes and site-specific chemistries observed in surface waters of the Pajarito Plateau based on 15 years of monitoring. Also, EPA's BLM-based criteria apply regardless of flow conditions or hydrologic regimes.

NMED Comment

12. N3B should provide the findings of steps one through seven in Section 5.1 regarding Data Quality Objectives ("DQOs") and Data Quality Assurances ("DQAs") prior to discussing the outcome of the process. Discussion should include the performance and acceptance criteria for the data and the frequency of the data that was determined acceptable.

DOE Response

12. Section B2 of Appendix B discusses the data aggregation process that was laid out in the DQO/DQA report (Windward 2018). NMED has already reviewed and commented on the DQO/DQA report. However, the outcome of steps one through seven of the DQO/DQA process from Appendix B and Windward (2018) is also now summarized in Section 5.1 of the Demonstration.

    The numbers of samples that were included or excluded as a result of different DQO steps are presented in Sections B2.2 and B2.3. The final frequency of acceptability was not explicitly calculated for the Demonstration, but the final number is 517 of 1323 samples or 39% acceptance. This is based on the availability in the surface water data set of the BLM parameters or sufficient information to reasonably estimate parameters (as discussed in Section B2.2). The quality of the underlying data is assured through N3B's various standard operating procedures, quality assurance program plans, and the QA/QC procedures followed in the field and contract laboratory (see DOE Response # 11).

NMED Comment

13. Section 5 should include figures comparing chronic exceedance ratios in addition to acute.

DOE Response

13. Section 5 has been updated to include figures showing chronic exceedance ratios.

NMED Comment

14. In Section 6, regarding conclusions and recommended criteria, N3B concludes with chronic and acute equations for waters on the Pajarito Plateau; however, N3B did not adequately demonstrate the need for site-specific criteria nor the applicability of the chronic and acute equations to site-specific waters on the Pajarito Plateau.

DOE Response

14. Neither EPA nor NMED regulations require demonstration of a need for site-specific criteria [including when adopting EPA 304(a)-recommended criteria]. Nonetheless, DOE has addressed the value of using site-specific criteria in other comment responses (e.g., DOE Response #4). Additionally, other

than identifying that site-specific water chemistry influences copper bioavailability and toxicity [an acceptable condition for developing site-specific criteria pursuant to 20.6.4.10(D) NMAC], it is unclear how a “need for site-specific criteria” would be demonstrated or is relevant when the proposed criteria is EPA 304(a)-recommended criteria.

As discussed in Section 6 and DOE Response #1, the acute and chronic equations would apply to the specific surface waters on the Pajarito Plateau according to the aquatic life use designations. EPA’s 304(a) criteria apply to all flow regimes.

NMED Comment

15. N3B should add a table comparing the current hardness based acute and chronic criteria for each of the proposed site-specific waters to the acute and chronic criteria calculated using the modified BLM equations to demonstrate the criteria are protective of designated uses and downstream waters.

DOE Response

15. Appendix A has been expanded to include the hardness-based criteria and MLR acute and chronic criteria. This information is also provided in Figures 5-7 through 5-10. As described by EPA, using BLM-based water quality criteria provides the same LOP but is based on the best available science with improved accuracy of the intended LOP relative to hardness-based criteria. In some cases, BLM-based criteria will be higher than the hardness-based criteria, and in other cases it will be lower. The BLM-based water quality criteria for copper provide an improved framework for evaluating a LOP that is consistent with the LOP intended by EPA 1985 guidelines (EPA 1985, EPA 2007, EPA 2021).

NMED Comment

16. N3B should include a summary table and discussion of a sensitivity analysis supporting why only pH, hardness, and DOC are relevant for an MLR translation.

DOE Response

16. A summary table has been added to Section 5 as suggested (Table 5-3), along with a discussion of the importance of pH, hardness, and DOC in the context of copper bioavailability and BLM output. The statistical evaluations presented in Section 5.4 (and detailed in Appendix B) demonstrate the accuracy with which the three-parameter (pH, hardness, and DOC) MLR equations generate EPA’s BLM-based criteria.

    Sensitivity analyses using the 10 BLM inputs have already been conducted by others and published in peer-reviewed scientific literature. Examples are cited in the Demonstration (e.g., Brix et al. 2017; Ryan et al. 2009). The outcome of those studies was consistent that pH, DOC, and hardness are the sensitive parameters driving copper bioavailability and toxicity. In addition to support from the literature, Appendix B lays out a detailed process by which DOE tested the importance of the various input parameters to the MLR (i.e., pH, hardness, and DOC). The results of this process were equations that explained 98% of the variability in BLM output for Pajarito Plateau surface water samples using three parameters: pH, hardness, and DOC. Thus, the addition of other parameters would not substantially improve the model (i.e., ≤2% improvement).

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ENCLOSURE 2

Copper Site-Specific Water Quality Criteria for the Pajarito Plateau: Demonstration Report, final draft

COPPER SITE-SPECIFIC WATER QUALITY CRITERIA FOR THE PAJARITO PLATEAU: DEMONSTRATION REPORT

Prepared for

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March 30, 2022

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Table of Contents

Tables

Figures

Maps

Acronyms

%HA	percent humic acid
AIC	Akaike's Information Criterion
APS	automated pump samplers
AU	Assessment Unit
BIC	Bayesian Information Criterion
BLM	biotic ligand model
BTV	background threshold value
CCC	Criterion Continuous Concentration
CFR	Code of Federal Regulations
CMC	Criterion Maximum Concentration
COC	chain of custody
CWA	Clean Water Act
DOC	dissolved organic carbon
DOE	US Department of Energy
DQA	data quality assessment
DQO	data quality objective
EIM	Environmental Information Management
EPA	US Environmental Protection Agency
ESA	Endangered Species Act
ID	identification
IP	Individual Permit
IPAC	Information for Planning and Consultation
IR	integrated report
LAC	Los Alamos County
LANL	Los Alamos National Laboratory
LOP	level of protection
MLR	multiple linear regression
MSGP	Multi-Sector General Permit
N3B	Newport News Nuclear BWXT Los Alamos
NMAC	New Mexico Administrative Code

NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
ONRW	Outstanding National Resource Water
QA/QC	quality assurance/quality control
SSWQC	site-specific water quality criteria
SWQB	Surface Water Quality Bureau
TAL	target action level
TMDL	total maximum daily load
TOC	total organic carbon
USGS	United States Geological Survey
WER	water-effect ratio
Windward	Windward Environmental LLC
WQC	water quality criteria
WQCC	Water Quality Control Commission
WQS	water quality standards
WWTF	wastewater treatment facility

Executive Summary

This report describes the development of site-specific water quality criteria (SSWQC) for copper in surface waters of the Pajarito Plateau, in accordance with the US Environmental Protection Agency's (EPA's) nationally recommended water quality criteria and New Mexico Water Quality Standards (20.6.4 NMAC) procedures for site-specific criteria.

In 2007, EPA issued revised nationally recommended freshwater aquatic life criteria for copper based upon the biotic ligand model (BLM). EPA recognizes the BLM as best available science for setting copper criteria, because it explicitly considers the effects of multiple water chemistry parameters beyond hardness that affect the bioavailability of copper and its toxicity to aquatic life.

The BLM is recognized by the New Mexico Environment Department (NMED) as a more accurate method of assessing copper bioavailability than New Mexico's current hardness-based criteria (NMWQCC 2021). While New Mexico has not yet adopted EPA's ambient water quality criteria statewide because of the data needed to calculate BLM-based copper criteria, it has approved the BLM as a copper SSWQC method (20.6.4.10D(4)(c) NMAC).

Streams on the Pajarito Plateau have been extensively monitored under a variety of EPA and NMED programs over a 15-year period in order to make the Pajarito Plateau a suitable setting for developing BLM-based SSWQC. A site-specific dataset of BLM parameters was developed based on monitoring conducted from 2005 to 2019. The dataset includes a total of 531 discrete samples with sufficient water chemistry parameters to generate BLM-based criteria in accordance with EPA (2007a). Samples were collected from 50 different locations across 9 different watersheds and under a diverse set of hydrologic regimes.

Statistical evaluation of the site-specific dataset demonstrated that pH, dissolved organic carbon (DOC), and hardness account for 98% of the variation in BLM-based criteria for the Pajarito Plateau streams. The copper BLM can thus be simplified into the following acute Criterion Maximum Concentration (CMC) and chronic Criterion Continuous Concentration (CCC) equations while retaining a high degree of accuracy to and the scientific rigor of the BLM:

$$\boldsymbol{CMC = exp(-22.914 + 1.017 \times ln(DOC) + 0.045 \times ln(hardness) + 5.176 \times pH - 0.261 \times pH^2)} \quad \textbf{Equation ES-1}$$

$$\boldsymbol{CCC = exp(-23.391 + 1.017 \times ln(DOC) + 0.045 \times ln(hardness) + 5.176 \times pH - 0.261 \times pH^2)} \quad \textbf{Equation ES-2}$$

This report demonstrates that these equations accurately generate BLM-based criteria over the range of water chemistries and hydrologic regimes observed on the Pajarito

Plateau. Therefore, these equations can be adopted as copper SSWQC for surface waters of the Pajarito Plateau to provide accurate criteria that are protective of aquatic life uses in accordance with EPA recommendations.

1 Introduction

On behalf of Newport News Nuclear BWXT Los Alamos (N3B), Windward Environmental LLC (Windward) has prepared this demonstration report, which describes the development of copper site-specific water quality criteria (SSWQC) for surface waters of the Pajarito Plateau in Los Alamos County (LAC), New Mexico. This report presents and justifies the derivation of a dissolved copper SSWQC in accordance with New Mexico Water Quality Standards (WQS) (20.6.4.10 New Mexico Administrative Code [NMAC]). It also presents the methods, available data, and spatial boundaries for deriving copper SSWQC for surface waters of the Pajarito Plateau.

New Mexico's current aquatic life water quality criteria (WQC) for copper (20.6.4.900 NMAC) are based on the 1996 US Environmental Protection Agency (EPA)-recommended copper criteria (EPA 1996), which were based on an equation that considered only the effect of water hardness on copper bioavailability and toxicity. EPA periodically revises its nationally recommended WQC for aquatic life to reflect current scientific knowledge. In 2007, EPA released updated Clean Water Act (CWA) §304(a) guidance for copper WQC to reflect new knowledge and an improved understanding of the effects of multiple water chemistry parameters on copper toxicity. The EPA (2007a)-recommended copper criteria reflect the "best available science" and significant advancements in scientific understanding of metal speciation, bioavailability, and toxicity.

Per EPA's recommendation, the biotic ligand model (BLM) incorporates these advancements and can be used to generate aquatic life WQC based on local water chemistry. The BLM builds on the old hardness-based criteria by incorporating additional water chemistry parameters that affect copper speciation, bioavailability, and toxicity. The current version of the copper BLM software is available through EPA (https://www.epa.gov/wqc/aquatic-life-criteria-copper).

The approach described in this report for developing copper SSWQC for surface waters of the Pajarito Plateau follows EPA (2007a) recommendations in using the copper BLM and New Mexico WQS procedures to develop copper SSWQC. The physical and chemical characteristics (i.e., BLM parameters) of Pajarito Plateau surface waters have been rigorously monitored at a variety of locations, so it is a suitable setting to develop BLM-based copper SSWQC. The proposed SSWQC are intended for eventual use in all National Pollutant Discharge Elimination System (NPDES) permits and by New Mexico Environment Department (NMED) for CWA §303(d)/305(b) Integrated Assessments.

1.1 Rationale and Methods

Copper is an abundant trace element that occurs naturally in the earth's crust and an essential micronutrient required by virtually all plants and animals. At elevated concentrations, copper can have adverse effects on some forms of aquatic life, but such effects depend on site-specific chemistry. Both natural and anthropogenic sources introduce copper to Pajarito Plateau surface waters (Los Alamos National Laboratory [LANL] 2013; Windward 2020).

To protect aquatic life uses from copper toxicity, New Mexico's WQS establish the following state-wide dissolved copper criteria based on EPA's outdated 1996 ambient water quality criteria document (EPA 1996):

Acute criterion (µg/L) = exp(0.9422 × ln(hardness) – 1.700) × 0.96

Chronic criterion (µg/L) = exp(0.8545 × ln(hardness) – 1.702) × 0.96

As described by EPA (2018c), these hardness-based copper criteria were developed from an empirical relationship between toxicity and water hardness. Their development did not explicitly consider the effects of other water chemistry parameters that markedly affect copper bioavailability and toxicity.

In February 2007, EPA published *Aquatic Life Ambient Freshwater Quality Criteria – Copper* to address water chemistry parameters beyond hardness, and to reflect the latest scientific knowledge on copper bioavailability and toxicity (EPA 2007a). The criteria document "contains EPA's latest criteria recommendations for protection of aquatic life in ambient freshwater from acute and chronic toxic effects from copper. These criteria are based on the latest scientific information, supplementing EPA's previously published recommendation for copper. This criteria revision incorporated new data on the toxicity of copper and used the Biotic Ligand Model (BLM), a metal bioavailability model, to update the freshwater criteria. With these scientific and technical revisions, the criteria will provide improved guidance on the concentration of copper that will be protective of aquatic life." This demonstration report has been prepared to utilize the latest available scientific information and EPA's current recommendations for the development of copper SSWQC.

EPA's regulation at 40 Code of Federal Regulations (CFR) 131.11(b)(1)(ii) provides that states and tribes may adopt WQC that have been modified to reflect site-specific conditions. New Mexico WQS describe conditions under which SSWQC may be developed, including "physical or chemical characteristics at a site such as pH or hardness alter the biological availability and/or toxicity of the chemical" (20.6.4.10.D(1) NMAC). Consistent with EPA regulations, New Mexico WQS require a scientifically defensible method to derive SSWQC. The WQCC explicitly recognizes "the biotic ligand model as described in aquatic life ambient freshwater quality criteria – copper" (EPA 2007a) as one such scientifically defensible method to derive SSWQC (20.6.4.10.D(4) NMAC).

In addition, 40 CFR 131.20(a) requires that States adopt EPA Section 304(a) criteria or provide an explanation if not adopted when the results of the Triennial Review are submitted consistent with CWA section 303(c). As part of New Mexico's 2020 Triennial Review, EPA recommended that New Mexico update its aquatic life criteria for copper to reflect the latest science contained in the 304(a) copper criteria (EPA 2020). NMED stated in direct testimony that the BLM provides a more accurate assessment of copper bioavailability than New Mexico's hardness-based criteria calculation, but noted that it requires multiple water quality parameters (some of which are not commonly available) as a potential limitation of the copper BLM, and therefore, recommended that the WQCC not adopt the criteria state-wide. The limitation described in the 2020 Triennial Review is not an issue for the current proposal because BLM parameters have been sampled in Pajarito Plateau surface waters since 2005.

The EPA (2007a) copper BLM explicitly and quantitatively accounts for how individual water quality parameters affect the bioavailability and toxicity of copper to aquatic organisms. The BLM software relies on 12 water chemistry parameters as inputs to generate BLM-based WQC, but most parameters have little or no effect on the speciation, bioavailability, and toxicity of copper and, thus, on the magnitude of any resulting BLM-based WQC.[1]

To provide a more streamlined and transparent approach for adopting and implementing copper SSWQC for the Pajarito Plateau, BLM-based WQC were simplified into three-parameter acute and chronic equations using a multiple linear regression (MLR) method. This approach is consistent with EPA's approach for setting WQC for other chemicals,[2] as well as with approaches described in the scientific literature for developing copper WQC (e.g., Brix et al. 2017) and EPA-approved approaches for simplifying the copper BLM into an MLR equation for SSWQC (EPA 2016a).

The proposed copper SSWQC equations were developed based on statistical analyses of BLM parameters monitored in Pajarito Plateau streams from 2005 to 2019. Three parameters (pH, dissolved organic carbon [DOC], and hardness) were found to have a significant impact on BLM-based criteria for the site-specific dataset. The SSWQC equations build upon New Mexico's current hardness-based equations to incorporate the combined effects of pH, hardness, and DOC. The evaluations presented in this report demonstrate the proposed SSWQC equations accurately generate EPA (2007a)

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[1] The BLM can also be used to evaluate the site-specific speciation, bioavailability, and toxicity of copper and several other metals. The sensitivity of the BLM's output to a given water chemistry parameter varies among different metals. When the BLM is being used to develop WQC for a single metal—in this case, copper—the model can be simplified to include only the sensitive parameters for that metal as model variables.

[2] For example, EPA-recommended aquatic life criteria for aluminum and ammonia are based on MLR equations that use multiple water quality parameters to generate criteria (EPA 2013, 2018b).

BLM-based copper criteria over the range of water chemistries and hydrologic regimes of the Pajarito Plateau.

1.2 Report Contents

The remaining report is organized into the following sections:

- Regulatory background for establishing SSWQC (Section 2)
- Background on the physical setting, New Mexico WQS, permitted discharges, and monitoring programs (Section 3)
- Overview of scientific methods and regulatory processes for deriving SSWQC (Section 4)
- Summary of available surface water data and methods for deriving copper SSWQC (Section 5)
- Recommended copper SSWQC for surface waters of the Pajarito Plateau (Section 6)
- References cited (Section 7)

Additionally, there are four appendices to this report:

- Appendix A is a table of the data used to develop SSWQC.
- Appendix B provides additional details on the SSWQC development methods and results.
- Appendix C is the Public Involvement Plan (also see Section 2.1.5).
- Appendix D is an evaluation of threatened and endangered species (also see Section 2.5).

2 Regulatory Background

This section provides the regulatory background and framework for developing SSWQC in accordance with EPA guidance and New Mexico's WQS.

2.1 Regulatory Framework for Developing SSWQC

EPA's regulation at 40 CFR 131.11(b)(1)(ii) provides that states and tribes may adopt WQC that are "modified to reflect site-specific conditions." As with all criteria, SSWQC must be based on sound scientific rationale, protect designated uses, and are subject to EPA review and approval or disapproval under §303(c) of the CWA (EPA 2007a).

New Mexico's WQS (20.6.4.10.D NMAC) specify the following requirements for adopting SSWQC for New Mexico surface waters:

- Relevant site-specific conditions for developing SSWQC
- Protectiveness of SSWQC to designated uses
- Scientific methods for deriving SSWQC
- Petition and stakeholder/public review process for adopting SSWQC

Each factor is discussed in the following sections.

2.1.1 Relevant conditions for developing SSWQC

In accordance with New Mexico's WQS (20.6.4.10.D.1 NMAC), SSWQC may be adopted based on relevant site-specific conditions, such as:

- Actual species at a site are more or less sensitive than those used in the national criteria dataset.
- Physical or chemical characteristics at a site, such as pH or hardness, alter the biological availability and/or toxicity of a chemical.
- Physical, biological, or chemical factors alter the bioaccumulation potential of a chemical.
- The concentration resulting from natural background exceeds numeric criteria for aquatic life, wildlife habitat, or other uses if consistent with Subsection E of 20.6.4.10 NMAC.
- Other factors or combination of factors, upon review by Water Quality Control Commission (WQCC), may warrant modification of the default criteria, subject to EPA review and approval.

The rationale for the copper SSWQC described in this report is that water chemistry parameters beyond hardness alter the bioavailability and toxicity of copper to aquatic organisms (EPA 2007a). EPA recommends using the copper BLM to establish copper criteria, as the BLM incorporates the effects of multiple water chemistry parameters and reflects the best available scientific information.

NMED recognizes that the BLM represents the best available science for setting copper WQC (NMWQCC 2021). It recommended that within New Mexico the BLM be adopted on a site-specific basis. Because LANL has analyzed BLM parameters for a large number of surface water samples from the Pajarito Plateau (Appendices A and B), site-specific adoption of the BLM for waters of the Pajarito Plateau is appropriate and consistent with the New Mexico WQS. The BLM-based proposed SSWQC are based on statistical evaluations that demonstrate that pH, DOC, and hardness have a significant effect on accurately generating BLM-based copper criteria, consistent with findings that others have reported (EPA 2007a). Additional discussion of Pajarito Plateau-specific water chemistry conditions and how they influence copper criteria is provided in Section 5 (e.g., Sections 5.1, 5.3, and 5.4).

2.1.2 Protectiveness of SSWQC

In accordance with 20.6.4.10.D.2 NMAC, "site-specific criteria must fully protect the designated use to which they apply." The copper SSWQC described in this report are based on EPA (2007a) criteria for protection of aquatic life uses and will fully protect aquatic life uses on the Pajarito Plateau to the same extent as the EPA (2007a) criteria.

Relative to hardness-based copper WQC for aquatic life, EPA (2007a) reports:

> 'Stringency' likely varies depending on the specific water chemistry of the site. The 1986 hardness-based equation and resulting copper criteria reflected the effects of water chemistry factors such as hardness (and any of the other factors that were correlated with hardness, chiefly pH and alkalinity). However, the hardness based criteria, unadjusted with the WER [water effect ratio], did not explicitly consider the effects of DOC and pH, two of the more important parameters affecting copper toxicity. The application resulted in copper criteria that were potentially under-protective (i.e., not stringent enough) at low pH and potentially over-protective (i.e., too stringent) at higher DOC levels.
>
> By contrast, the BLM-based recommended criterion should more accurately yield the level of protection intended to protect and maintain aquatic life uses. By using the latest science currently available, application of the BLM-derived copper criteria should be neither under-protective nor over-protective for protection and maintenance of aquatic life uses affected by copper.

BLM-based WQC may be higher or lower than hardness-based WQC, depending on water chemistry. When the BLM-based WQC are lower, they are sometimes mistakenly referred to as "more stringent" (and vice-versa). Rather, changes in the BLM-based WQC reflect changes in water chemistry and copper bioavailability, not changes in the stringency (i.e., level of protection [LOP]). As described by EPA (2021), BLM-based criteria will in some cases be higher and in other cases be lower than hardness-based criteria. "Although there is not a single water quality criteria value to use for comparison purposes, the BLM-based water quality criteria for copper provides an improved framework for evaluating a LOP that is consistent with the LOP that was intended by the 1985 Guidelines (i.e., a 1-in-3-year exceedance frequency that will be protective of 95% of the genera" (EPA 2021).

Thus, BLM-based copper SSWQC described in this report will fully protect aquatic life uses on the Pajarito Plateau in accordance with EPA recommendations.

As part of this evaluation, Rio Grande water chemistry data from the National Water Quality Monitoring Council's Water Quality Portal website (National Water Quality Monitoring Council 2019) were considered to ensure that the SSWQC would not affect waters downstream of the Pajarito Plateau. The Rio Grande has not been listed as impaired due to copper in past 303(d) evaluations presented in New Mexico's integrated reports (IRs) (e.g., NMED 2018), neither above nor below confluences with Pajarito Plateau tributaries. Using New Mexico's current hardness-based copper criteria, the copper BLM, and the simplified SSWQC, copper concentrations in the Rio Grande were found not to exceed any criteria (more detail in Section 5.6). Therefore, a change on the Pajarito Plateau from the hardness-based criterion to the SSWQC would not adversely impact the Rio Grande downstream of its confluence with plateau tributaries.

No changes are proposed to existing or designated aquatic life uses or for non-aquatic life criteria such as irrigation, livestock watering, wildlife habitat, primary or secondary human contact, or drinking water. In addition, the proposed SSWQC change is not associated with new discharges of copper nor changes to existing discharges of copper.

2.1.3 Scientific methods for SSWQC

Under 20.6.4.10.D.4 NMAC, "a derivation of site-specific criteria shall rely on a scientifically defensible method, such as one of the following:

(a) the recalculation procedure, the water-effect ratio procedure metals procedure or the resident species procedure as described in the water quality standards handbook (EPA-823-B-94-005a, 2nd edition, August 1994)

(b) the streamlined WER procedure for discharges of copper (EPA-822-R-01-005, March 2001)

(c) the biotic ligand model as described in aquatic life ambient freshwater quality criteria – copper (EPA-822R-07-001, February 2007)

(d) the methodology for deriving ambient water quality criteria for the protection of human health (EPA-822-B-00-004, October 2000) and associated technical support documents; or

(e) a determination of the natural background of the water body as described in Subsection E of 20.6.4.10 NMAC."

In accordance with current EPA recommendations, the copper SSWQC described in this report utilize the copper BLM to generate WQC reflective of site-specific water chemistry.

Prior to its publication of the 2007 copper criteria document, EPA recommended the water-effect ratio (WER) procedure to adjust copper criteria "to address more completely the modifying effects of water quality than the hardness regressions achieve" (EPA 2007a). EPA's Science Advisory Board found that compared to the WER procedure, the BLM can significantly improve predictions of copper toxicity to aquatic life across an expanded range of water chemistry parameters (EPA 2000).

As described in Section 5 of this report, EPA's BLM method was streamlined to substitute simple MLR equations for acute and chronic SSWQC[3] from a relatively complex software-based model. MLR is also a scientifically defensible method for generating WQC as a function of multiple water chemistry parameters (Section 4.3). Given the high degree of agreement between the MLR-predicted and BLM-based WQC (Section 5.4.2) and the scientific rigor associated with the BLM, the copper SSWQC presented in this report meet the 20.6.4.10.D.4 NMAC requirement that SSWQC be derived based on a scientifically defensible method.

2.1.4 Copper SSWQC petition

In accordance with WQCC regulations (20.1.6.200.A and 20.6.4.10.D(3) NMAC), any person may petition the WQCC to adopt SSWQC. WQCC regulations require that a petition for the adoption of SSWQC "be in writing and shall include a statement of the reasons for the regulatory change. The petition shall cite the relevant statutes that authorize the commission to adopt the proposed rules and shall estimate the time that will be needed to conduct the hearing. A copy of the entire rule, including the proposed regulatory change, indicating any language proposed to be added or deleted, shall be attached to the petition. The entire rule and its proposed changes shall be submitted to the commission in redline fashion, and shall include line numbers" (20.1.6.200.B NMAC). In addition, the regulations at 20.6.4.10.D(3) NMAC require that a petition do the following:

(a) Identify the specific waters to which the SSWQC would apply.

(b) Explain the rationale for proposing the SSWQC.

[3] The proposed SSWQC equations are analogous to the hardness-based equations used in the statewide WQS for copper, but the proposed SSWQC equations are more accurate because they include DOC and pH in addition to hardness.

(c) Describe the methods used to notify and solicit input from potential stakeholders and from the general public in the affected area, and present and respond to the public input received.

(d) Present and justify the derivation of the proposed SSWQC.

LANL will develop a draft petition for copper SSWQC based on: 1) conclusions and recommendations presented herein, 2) NMED and EPA comments on this report, and 3) input from other potential stakeholders, tribes, and the general public. The petition will include all information required under 20.1.6.200 and 20.6.4.10 NMAC for WQCC review.

2.1.5 Public involvement plan

A public involvement plan was developed to outline the general process and schedule for public, tribal, and stakeholder involvement in the development of the copper SSWQC. The complete plan is provided in Appendix C. Specific objectives of the plan are as follows:

- Identify potential stakeholders, tribes, and general public members who may be affected by the proposed copper SSWQC.
- Establish a process to present the proposed copper SSWQC to stakeholders, tribes, and the general public.
- Establish a process to receive and respond to input from stakeholders, tribes, and the general public on the proposed copper SSWQC.
- Develop a draft schedule for stakeholder, tribal, and general public engagement.

2.2 ANTIDEGRADATION

New Mexico's antidegradation policy (20.6.4.8 NMAC) applies to all surface waters of the state and to all activities with the potential to adversely affect water quality or existing or designated uses. Such activities include::

- Any proposed new or increased point source or nonpoint source discharge of pollutants that would lower water quality or affect the existing or designated uses
- Any proposed increase in pollutant loadings to a waterbody when the proposal is associated with existing activities
- Any increase in flow alteration over an existing alteration
- Any hydrologic modifications, such as dam construction and water withdrawals (NMED 2020a)

This petition does not propose new activities that could impact water quality or existing or designated uses on the Pajarito Plateau. Instead, it proposes updated copper WQC intended to more accurately achieve the level of protection for aquatic life stipulated by EPA guidance (Section 2.1.2). Therefore, an antidegradation review is not required for the proposed SSWQC.

If the proposed copper SSWQC are adopted by the WQCC into New Mexico's WQS, the SSWQC would establish the "level of water quality necessary to protect existing or designated uses" for any future antidegradation review related to any new proposed activity, as defined under New Mexico's antidegradation policy and in accordance with EPA recommendations for the protection of aquatic life uses (Section 2.1.2).

2.3 New Mexico WQS for Pajarito Plateau Surface Waters

Most water bodies on the Pajarito Plateau are classified in New Mexico WQS as ephemeral or intermittent waters (20.6.4.128 NMAC), which are designated as providing limited aquatic life use. According to NMAC, these water bodies are subject to acute criteria only. Only a few water bodies in the area are classified as perennial (20.6.4.121 and 20.6.4.126 NMAC), which are subject to both acute and chronic aquatic life criteria (i.e., Upper Sandia Canyon associated with wastewater treatment plant discharges; isolated segments of Cañon de Valle and Pajarito Canyon associated with local springs; and El Rito de los Frijoles in Bandelier National Monument). Unclassified surface waters (20.6.4.98 NMAC) are designated as providing a marginal warmwater aquatic life use, to which both acute and chronic aquatic life criteria apply. As discussed in Section 5, the proposed copper SSWQC include both acute and chronic criteria equations, so they can be applied as appropriate in accordance with NMAC surface water classifications.

NMED has assigned Assessment Units (AUs) to various surface water segments across the Pajarito Plateau; there are 52 AUs, 38 of which are located within the Laboratory or receive discharges regulated by the Individual Permit (IP), the Multi-Sector General Permits (MSGP), the LANL industrial discharges, or the LAC wastewater treatment facility (WWTF) permit. New Mexico's most recent CWA §303(d)/305(b) IR for the 2020 to 2022 assessment cycle identifies multiple AUs impaired for aquatic life uses due to exceedances of NMED's hardness-based copper WQC, along with other causes (NMED 2020b). The IR impairment category provided for copper in these surface waters is 5/5B, defined as "impaired for one or more designated or existing uses and a review of the water quality standard will be conducted" (NMED 2018). The assessment rationale for the 2020 to 2022 IR explains that "[s]pecific impairments are noted as IR Cat 5B to acknowledge LANL's ongoing discussions and research regarding applicable water quality standards on the Pajarito Plateau for these parameters." The copper SSWQC described herein, being based on the best available science and current EPA recommendations, should provide more appropriate copper criteria for NMED's CWA §303(d)/305(b) assessments and other site assessments conducted by LANL.

2.4 NPDES Discharges

The NPDES permit regulates four principal types of discharges to Pajarito Plateau waters:

- Stormwater discharges associated with legacy contamination and industrial activities are regulated under the LANL's NPDES Storm Water IP (No. NM0030759).
- Stormwater discharges associated with current industrial activities are regulated under EPA NPDES MSGPs (Nos. NMR050011, NMR050012, and NMR050013).
- Industrial and sanitary wastewater and cooling water discharged from 11 outfalls are regulated under NPDES Permit No. NM0028355.
- Municipal sanitary wastewater discharged to Lower Pueblo Canyon by the LAC WWTF is regulated under NPDES Permit No. NM0020141.

These NPDES permits generally require water quality monitoring and certain actions based on concentrations of copper and other parameters. Current IP target action levels (TALs), MSGP benchmarks, and water quality-based effluent limits for copper applicable to Laboratory NPDES wastewater permits are based on New Mexico's hardness-based dissolved copper criteria (20.6.4.900 NMAC). In its 2019 draft IP Fact Sheet (EPA 2019), EPA suggested that BLM-based values may be considered for effluent benchmarks if BLM-based copper SSWQC are adopted into New Mexico WQS, and if NMED and N3B reach mutually agreeable BLM values through the annual sampling implementation plan. The copper SSWQC presented in this report are intended for eventual use in all NPDES permits and by NMED for CWA §303(d)/305(b) Integrated Assessments.

2.5 Threatened and Endangered Species

Possible effects of copper SSWQC on threatened and endangered species under the federal Endangered Species Act (ESA) were considered as part of this analysis. The Information for Planning and Consultation (IPAC) tool from the US Fish and Wildlife Service's Environmental Conservation Online System website (USFWS 2018) was used to identify listed species potentially present on the Pajarito Plateau and in downstream waters of the Rio Grande. The proposed scope for the SSWQC includes all watersheds from Guaje Canyon in the north to El Rito de Frijoles in the south, as well as from the headwaters of each canyon to the west and their confluences with the Rio Grande to the east. The following species were determined by the IPAC tool to be potentially present on the Pajarito Plateau or in Rio Grande waters (within a reasonable distance downstream of its confluence with Pajarito Plateau streams)[4]:

- New Mexico jumping mouse (*Zapus hudsonius luteus*)
- Mexican spotted owl (*Strix occidentalis lucida*)
- Southwestern willow flycatcher (*Empidonax traillii extimus*)
- Yellow-billed cuckoo (*Coccyzus americanus*)
- Jemez Mountains salamander (*Plethodon neomexicanus*)
- Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*)
- Rio Grande silvery minnow (*Hybognathus amarus*)

Critical habitat for Mexican spotted owl and Jemez Mountains salamander would fall within the area potentially affected by the SSWQC (Map 3-1), and Rio Grande silvery minnow critical habitat is downstream of these waters. Each species is briefly evaluated and discussed in Appendix D. Based on these evaluations, it is not expected that implementation of the proposed SSWQC would adversely affect ESA-listed species (directly or indirectly) or their critical habitats.

In general, the species listed above are terrestrial and feed on terrestrial prey (Appendix D), suggesting that exposures to dissolved copper in Pajarito Plateau watersheds should be infrequent. Moreover, the copper BLM (and, by extension, the proposed SSWQC) represents criterion levels intended to be protective of sensitive aquatic species, including salmonids and cyprinids like the Rio Grande cutthroat trout and silvery minnow. It also protects potential prey items of these fish and other species.

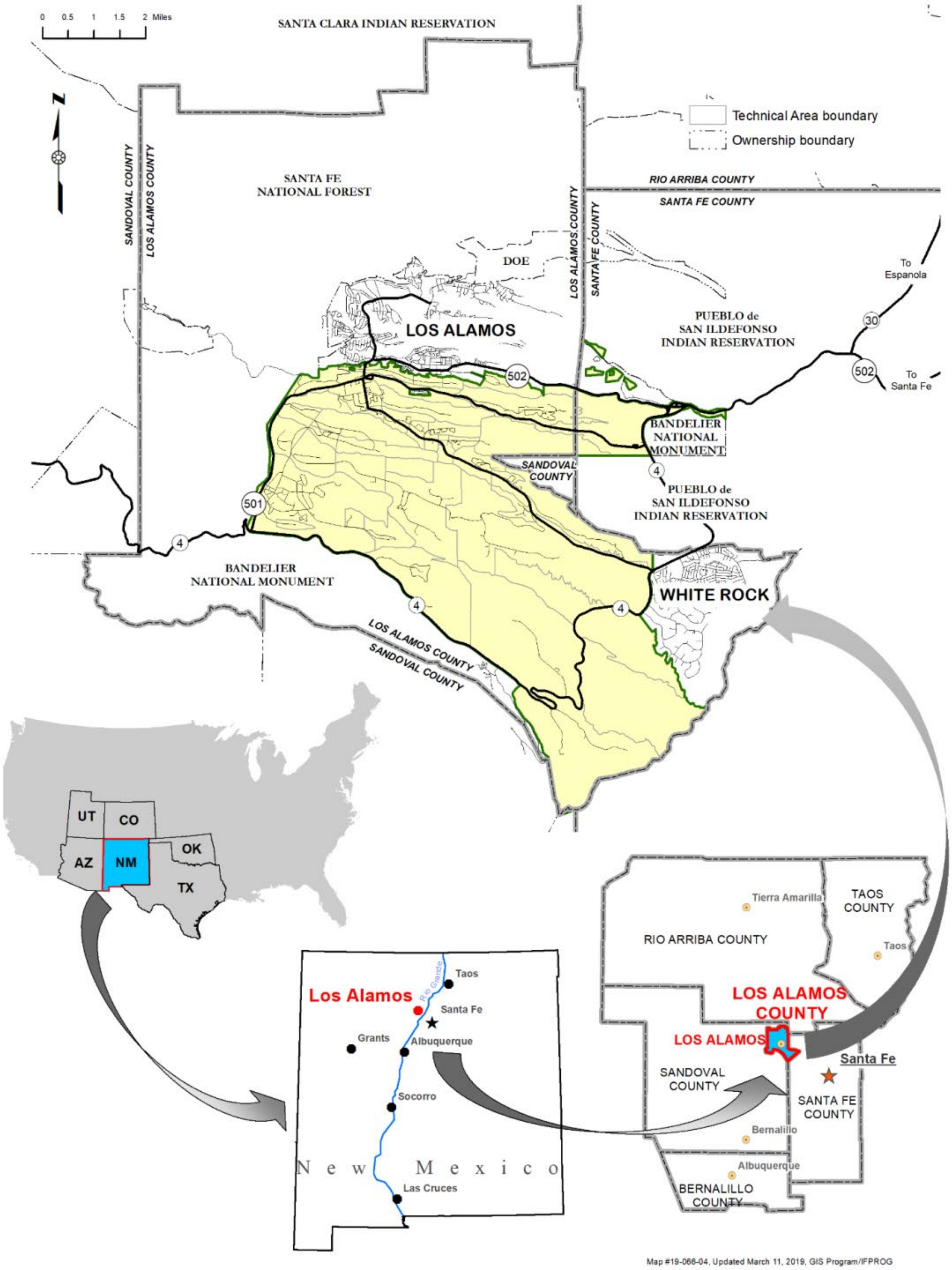
[4] A polygon was drawn using IPAC that included the Pajarito Plateau watersheds plus a 2 mile (approximate) buffer around the plateau (all watersheds). This captured the Rio Grande below the confluence with Pajarito Plateau watersheds.

3 Site Background

The following sections provide general background information on the physical setting, New Mexico's WQS, permitted discharges, and surface water monitoring programs for the Pajarito Plateau.

3.1 Geographic Setting

The Laboratory occupies approximately 36 square miles of US Department of Energy (DOE) lands in LAC in north-central New Mexico, approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe (Figure 3-1). The general region encompassing the Laboratory, towns of Los Alamos and White Rock, Bandelier National Monument, San Ildefonso Pueblo lands, western slopes of the Jemez Mountains, and other surrounding areas is known, geographically, as the Pajarito Plateau. Lands north, west, and south of the Laboratory are largely undeveloped areas held by the Santa Fe National Forest, US Bureau of Land Management, Bandelier National Monument, and LAC (LANL 2013). The communities closest to the Laboratory are the towns of Los Alamos, located just to the north of the main Laboratory complex, and White Rock, located a few miles to the east-southeast.



Source: Hansen et al. (2020)

Figure 3-1.Geographic setting for LANL BLM dataset

3.2 GEOLOGIC SETTING

The Laboratory is situated on fingerlike mesas capped mostly by Bandelier Tuff. The Bandelier Tuff consists of ash fall, pumice, and rhyolite tuff that vary from 1,000 feet thick on the western side of the plateau to about 260 ft thick eastward above the Rio Grande (Broxton and Eller 1995). The mesa tops slope from elevations of approximately 7,800 feet on the flanks of the Jemez Mountains to about 6,200 feet at the mesas' eastern terminus above the Rio Grande Canyon. Natural background copper concentrations in Bandelier Tuff range from 0.25 to 6.2 mg/kg with a median of 0.665 mg/kg (Ryti et al. 1998).

Background copper concentrations in Pajarito Plateau surface waters were recently characterized by Windward (2020). Based on surface water samples collected by LANL between 2015 and 2018, Windward estimated that background dissolved copper concentrations draining from undeveloped landscapes (i.e., excluding the influence of urban runoff) are fairly low (≤ 5.6 µg/L).

3.3 HYDROLOGIC SETTING

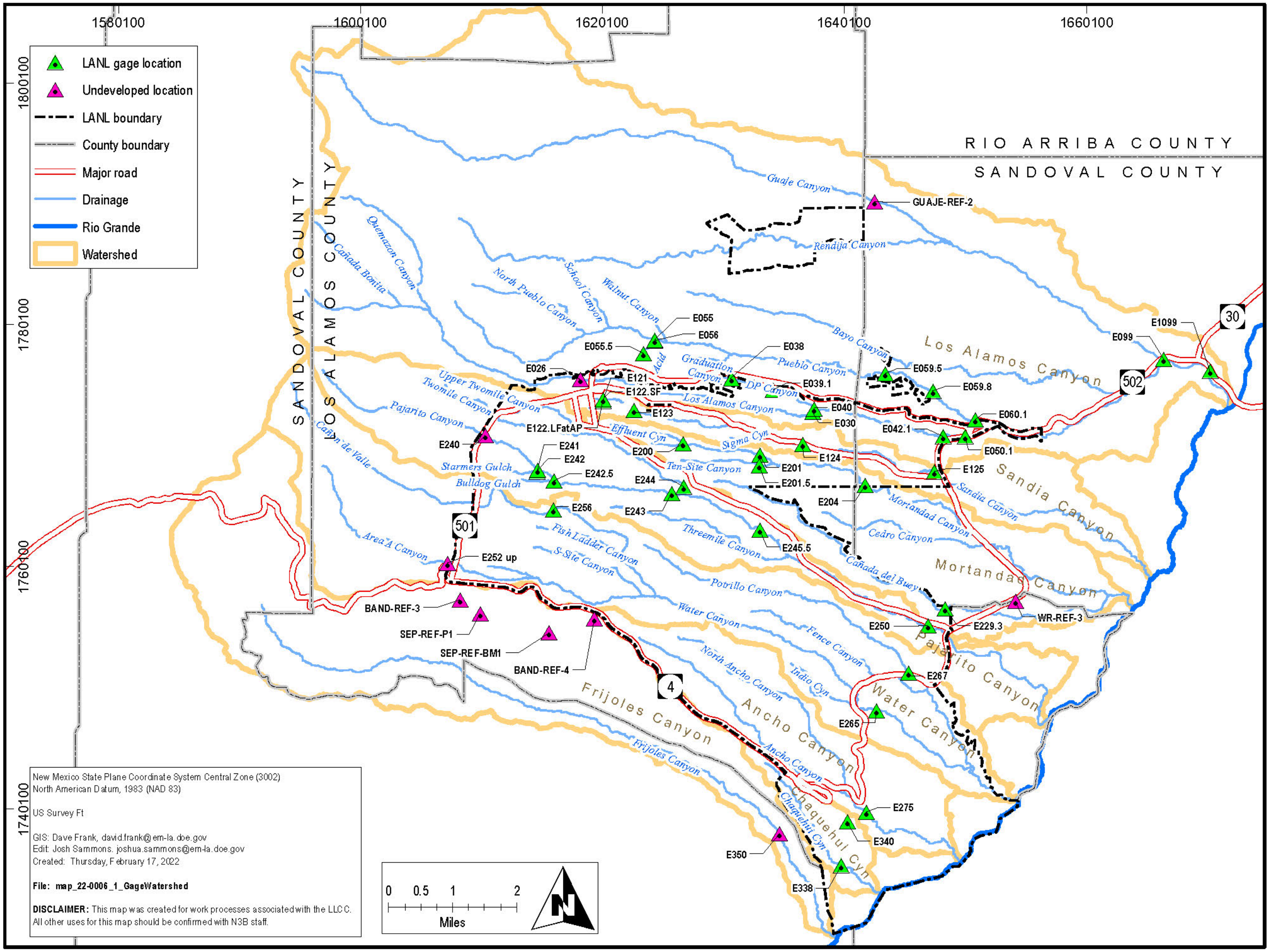
The Laboratory lies within a segment of the upper Rio Grande Basin denoted by the US Geological Survey eight-digit hydrologic unit code 13020101. The upper Rio Grande Basin is a large watershed (approximately 7,500 square miles) that generally flows from north to south. The New Mexico portion of the basin falls within seven counties: Rio Arriba, Taos, Santa Fe, Los Alamos, Sandoval, Mora, and San Miguel.

Surface water runs off the adjacent Jemez Mountains and Pajarito Plateau through steep and narrow canyons, flowing primarily southeast to the Rio Grande; however, surface water flows rarely reach the Rio Grande due to the limited flow durations and infiltration in canyon reaches upgradient of the Rio Grande (N3B 2020; Hansen et al. 2020). Most drainages on the Pajarito Plateau are currently classified as ephemeral or intermittent, because flow only occurs for limited periods in response to rainfall or snowmelt. Summer monsoonal thunderstorms are the sole contributors to flow in the many ephemeral waters, which otherwise remain dry for most of the year. A few canyons contain relatively short segments of intermittent and/or perennial flow attributable to springs, snowmelt, and industrial/municipal effluent discharges. Flows either represent stormflow (e.g., in response to precipitation events) or baseflow conditions, with baseflow generally being limited to perennial reaches and stormflow dominating other reaches.[5]

The Laboratory encompasses seven major watersheds: Los Alamos, Sandia, Mortandad, Pajarito, Water/Cañon de Valle, Ancho, and Chaquehui Canyons. Many

[5] For the purpose of this discussion, "baseflow" includes both natural baseflow and effluent. For example, "baseflow" in Upper Sandia Canyon is effluent dominated or effluent dependent.

tributaries to these canyons are identified within the Laboratory as smaller sub-watersheds with other names. Additional sub-watersheds outside of the Laboratory include the 20.6.4.98 NMAC waters to the north (e.g., Pueblo, Bayo, Guaje, and Rendija Canyons and their tributaries). Frijoles Canyon, located to the south of the Laboratory, is another major watershed on the Pajarito Plateau. A depiction of the Pajarito Plateau, related water bodies, surface water sampling locations, the Laboratory, the towns of Los Alamos and White Rock, and Pueblo and County boundaries is presented in Map 3-1.



Map 3-1. Sampling locations for BLM data on the Pajarito Plateau

3.4 Sampling and Analysis Programs

This section provides a brief description of the sampling programs under which surface water quality data used to develop the copper SSWQC were collected. All samples included in the BLM dataset (Appendix A) were collected under sampling and analysis programs, validated, and reported previously to NMED under the various sampling programs described below.

3.4.1 Sampling

LANL conducts various surface water quality monitoring programs at many locations on the Pajarito Plateau. The programs are typically related to permit compliance monitoring and monitoring required under the NMED (2016) Compliance Order on Consent, although periodic investigative studies are also conducted to better understand and manage surface waters on the plateau. LANL is not obligated to sample and analyze for BLM parameters but has generally done so in response to EPA recommendations for developing aquatic life criteria for metals (EPA 2007a).[6]

Although surface water samples are sometimes collected as discrete grabs, most samples collected by LANL to date have been through its network of automated pump samplers (APS) located at various streamflow gaging stations. These devices are triggered when there is sufficient streamflow, often generated by a storm (typically during the summer monsoon season).[7] When there is sufficient flow, an internal pump initiates, drawing surface water into a series of sample bottles that remain in the APS until collected by a field technician (typically within 24 to 48 hours). Regardless of the sampling method, all samples are collected in pre-cleaned bottles to prevent contamination. The technician delivers the bottles to a sample processing facility, where each bottle is refrigerated, filtered, and/or chemically preserved as appropriate for the target analytes. Next, the sample is transferred to the sample management office and finally to LANL's contract laboratory for chemical analysis. This process is carried out by trained and qualified personnel under approved standard operating procedures (see Section 3.4.2). Quality control/quality assurance (QA/QC) measures are maintained during the sampling and transport processes, including the collection of field duplicates and maintenance of field blanks. Chain of custody (COC) forms are used to track the collection and delivery of samples to laboratories. Appendix A

[6] BLM parameters that have been consistently analyzed by LANL include pH, DOC, calcium, magnesium, alkalinity, potassium, sulfate, and chloride. Temperature, %HA, and sulfide values are generally not determined and have been assumed, as discussed in Section 4.2.

[7] APS are generally in operation during the summer, when storm events result in sufficient flow; outside of this time period, samples cannot be collected consistently, so APS are not always in operation. Therefore, multi-seasonal datasets cannot be established for many streams on the Pajarito Plateau. Multi-seasonal data are available, however, for perennial reaches such as Upper Sandia Canyon (Appendix A).

provides COC numbers associated with each sampling event, as well as the sample collection and retrieval dates/times and laboratory receipt and analysis dates/times.

Due to the ephemeral/intermittent nature of many of the drainages, most surface water samples are collected during the late spring to early fall, during the monsoon season. However, samples are also collected during other parts of the year in perennial stream segments. Figure 3-2 summarizes the distribution of sampling over the year by month and season for the samples included in the BLM dataset (Appendix A).[8]

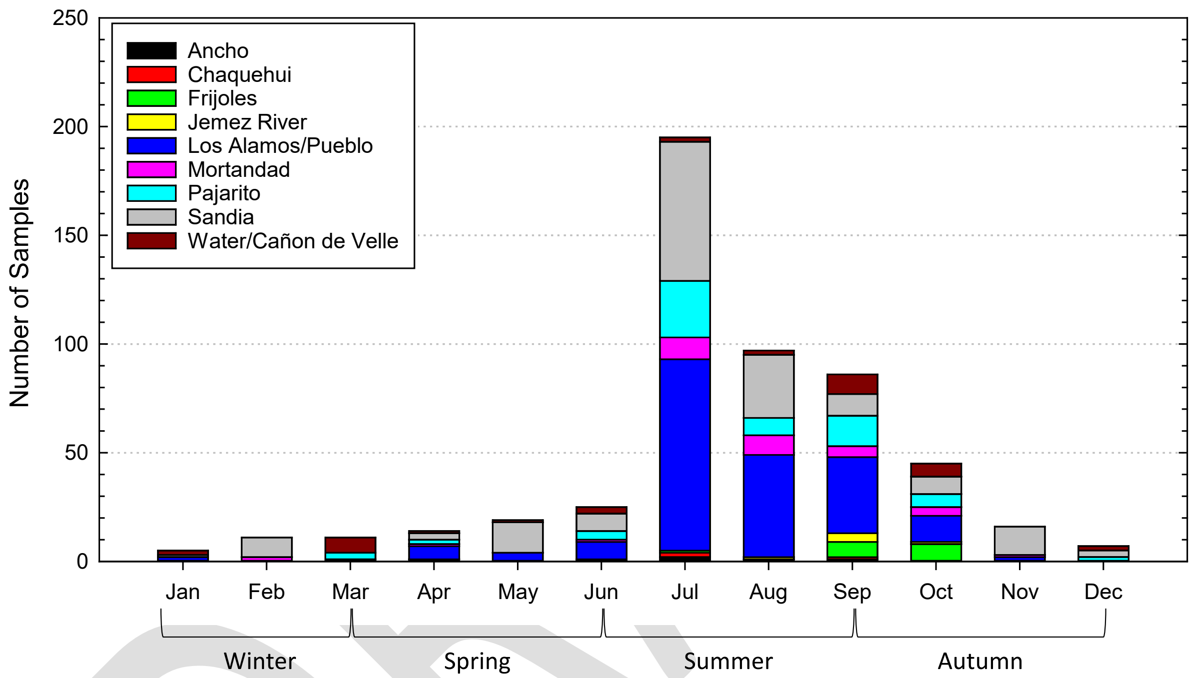


Figure 3-2. Distribution of BLM samples by watershed and season, 2005 to 2019

All BLM data from 2005 to 2019 were collected as part of five general programs in accordance with the laboratory and data validation procedures described in Section 3.4.2:

- Annual Site Environmental Report Program
- Los Alamos/Pueblo Canyon Sediment Monitoring Program
- Mortandad/Sandia Chromium Investigation and General Surveillance
- Sandia Wetlands Performance Monitoring Program
- Supplemental Environmental Program

[8] Figure 5-1 presents the sampling distribution similar to Figure 3-2 but across years instead of seasons.

Each of the sampling programs is associated with a sampling and analysis plan, which describes the sampling and analytical QA/QC for that program. Because they rely on similar samples and analytical data, these plans are comparable in scope and content.

3.4.2 Laboratory analysis and data validation

LANL contracted with several laboratories to analyze its surface water data between 2005 and 2019:

- General Engineering Laboratories, Inc., Charleston, South Carolina
- Environmental Sciences Division, Los Alamos, New Mexico
- Desert Research Institute, Reno, Nevada
- Cape Fear Analytical, Wilmington, North Carolina
- Brooks Applied Laboratories, Bothell, Washington

LANL's contract laboratories analyze the samples using standard analytical methods, usually EPA methods. The following methods are used:

- EPA 150.1 (pH)
- EPA 310.1 (alkalinity)
- SM-A2340B (hardness)
- SW-9060 (organic carbon)
- EPA 300.0 (anions – sulfate and chloride)
- EPA 200.7 and 200.8 and SW-846 methods 6010C, 6020, and 6020b (metals by inductively coupled plasma)

Each analytical method is considered appropriate and scientifically defensible for analysis of BLM parameters (EPA 2007b).

LANL's contract laboratories follow standard QA/QC procedures for analysis and data reporting and are accredited under the DOE Consolidated Audit Program for the analytes of interest. Detection and reporting limits are provided with samples, and non-detections are flagged by the laboratory and checked by independent data validators. Appendix A provides the detection status for each sample in the copper SSWQC database. When copper was not detected, reported results in Appendix A are equal to the detection limit.

N3B data validation is performed externally from the analytical laboratory and end-users of the data. This data validation process applies a defined set of performance-based criteria to analytical data that may result in the qualification of that data. Data validation provides a level of assurance, based on this technical evaluation, of the data quality.

Laboratory analytical data are validated by N3B personnel as outlined in N3B-PLN-SDM-1000, Sample and Data Management Plan; N3B-AP-SDM-3000, General Guidelines for Data Validation; N3B-AP-SDM-3014, Examination and Verification of Analytical Data; and additional method-specific analytical data validation guidelines. All procedures have been developed, as applicable, from the EPA QA/G-8 *Guidance on Environmental Data Verification and Data Validation* (EPA 2002), *Department of Defense/Department of Energy Consolidated Quality Systems Manual (QSM) for Environmental Laboratories* (DoD and DOE 2019), and the EPA national functional guidelines for data validation (EPA 2017a, b).

N3B validation of chemistry data includes a technical review of the analytical data package. This review covers the evaluation of both field and laboratory QC samples, the identification and quantitation of analytes, and the effect of QA/QC deficiencies on analytical data, as well as other factors affecting data quality.

The analytical laboratory uploads the data as an electronic data deliverable to the N3B Environmental Information Management (EIM) database. The data are then validated both manually and using EIM's automated validation process. Validated results are reviewed by an N3B chemist before being fully transferred to the EIM database.

This validation follows processes described in the N3B validation procedures listed above. Validation qualifiers and codes applied during this process are also reviewed and approved by an N3B chemist to assess data usability. The EIM data are then made available to the public in the Intellus New Mexico database (Intellus 2019). Any data rejected during data validation were not used to develop the copper SSWQC. Additionally, any data in Intellus with a BEST_VALUE_FLAG reported as "N" was excluded.[9]

4 Methods for Developing SSWQC

The following sections describe the technical and regulatory basis for the BLM and the resulting MLR equations for calculating BLM-based SSWQC.

4.1 Background on the BLM

The copper BLM is a software tool that mechanistically describes, and can predict, the bioavailability of copper under a wide range of water chemistry conditions observed in ambient surface waters. The copper BLM is scientifically robust and defensible, EPA recommended, and freely available. BLMs have been developed for metals in both freshwater and saltwater environments; however, to date, EPA has only released

[9] Some surface water samples were analyzed multiple times for the same analyte, with each analytical result being reported in Intellus; one of those measurements may have been flagged as the "best." Data reported with a BEST_VALUE_FLAG of "Y" in Intellus were used to develop the copper SSWQC, whereas those with a flag of "N" were excluded.

nationally recommended BLM-based WQC for copper. A general schematic for the BLM is depicted in Figure 4-1; arrows show the mechanistic relationships among various water quality parameters, the dissolved metal ("Me^{n+}"), and the biotic ligand, represented by the gill surface of an aquatic organism (or a homologous respiratory organ).

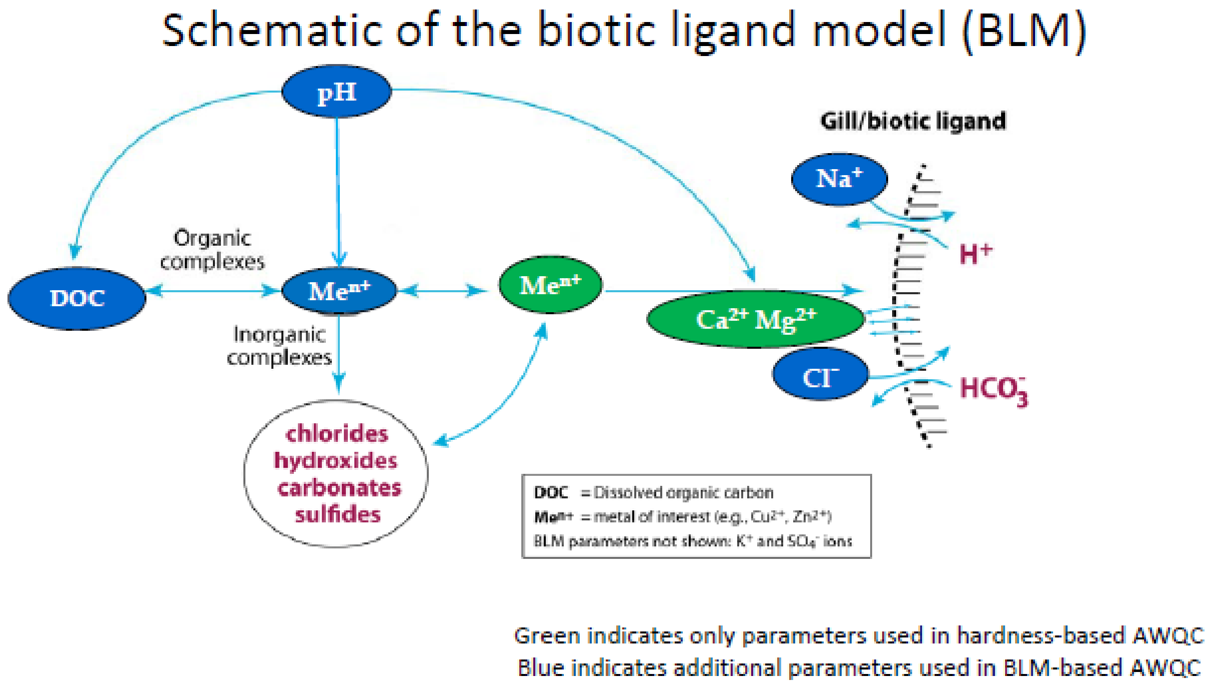


Figure 4-1.Schematic of the BLM

The BLM executable program that drives the Windows Interface version of the BLM software can be used to perform BLM calculations efficiently for large datasets. The Windows Interface version of the software (version 3.41.2.45) was used when developing this report.

The BLM's ability to incorporate metal speciation reactions and organism interactions allows for the prediction of metal effect levels associated with a variety of organisms over a wide range of water quality conditions. Accordingly, the BLM is a defensible and relevant method for deriving WQC across a broad range of water chemistry and physical conditions (EPA 2007a). It generates both acute (i.e., Criterion Maximum Concentration [CMC]) and chronic (i.e., Criterion Continuous Concentration [CCC]) criteria applicable to all aquatic life use categories specified in 20.6.4.10 NMAC.

The copper BLM is also applicable to stormwater flow and NPDES benchmarks. In 2019, EPA sponsored a study conducted by the National Academies of Sciences, Engineering, and Medicine's National Research Council for updating stormwater benchmarks under EPA's MSGP program (NAS 2019). Based on that study, EPA (2021) recommends that the copper BLM be used to derive stormwater benchmarks in accordance with EPA 304(a) guidance. EPA has also included stipulations for the use of the copper BLM at industrial facilities as part of the 2021 MSGP; the BLM may be used to show whether facility-specific discharge concentrations that exceed the generic MSGP copper benchmarks are in compliance.

4.2 DESCRIPTION OF BLM INPUTS AND FUNCTIONS

The copper BLM (EPA 2007a) utilizes 12 water quality parameters: pH, DOC, calcium, magnesium, sodium, potassium, sulfate, chloride, alkalinity, temperature, percent humic acid (%HA), and sulfide. While %HA is an input parameter, it is rarely measured in ambient surface waters, so the BLM user's guide recommends a default value of 10% (HydroQual 2007; Windward 2017). The selected default value for total sulfide was the recommended value from Windward (2019) of 1×10^{-10} mg/L, which is appropriate when sulfide data are not available. Total sulfide does not influence the copper BLM, however a small non-zero value is required to calculate BLM output. Measured copper concentrations are not needed to generate BLM-based WQC. For Pajarito Plateau samples, BLM inputs can all be found in Appendix A.

EPA (2007a, 2016b) provides guidance for developing datasets suitable for generating BLM-based copper WQC, including how a given parameter can be estimated from other parameters or regional datasets or set to a default value. A general overview of these approaches is described below. Section 5.1 and Appendix B describe the development of the site-specific BLM dataset for the Pajarito Plateau.

Generally, measured concentrations in water samples that have been filtered through a 0.45-µm filter (i.e., operationally defined as dissolved concentrations) are used as BLM inputs. If it can be demonstrated that dissolved and total (unfiltered) concentrations of BLM inputs are similar, then total concentrations can be substituted for dissolved concentrations if the latter are not available for a given sample.

In addition to substitution approaches, it may be necessary to estimate concentrations for some BLM input parameters based on other measured parameters. For example, calcium and magnesium may be estimated from hardness, DOC may be estimated from total organic carbon (TOC), and other cations or anions may be estimated from their relationships with conductivity or specific conductance. This estimation approach is contingent upon a demonstration that such estimates are appropriate and defensible.

Another approach to substituting missing BLM inputs makes use of the ecoregion-specific "default" estimates proposed by EPA (2016b). Oregon uses this approach to generate "default" copper WQC for purposes of initial screening assessments (Oregon DEQ 2016a, b; McConaghie and Matzke 2016), although state-specific datasets are used rather than EPA (2016b) values. This approach was not needed when aggregating data for the Pajarito Plateau for the analysis described herein, because sufficient water quality data were available (Section 5.1).

4.3 USE OF MLR IN DEVELOPING WQC

An MLR approach was used to develop a site-specific, three-parameter equation that accurately predicts BLM-based copper WQC for surface waters of the Pajarito Plateau using pH, DOC, and hardness values (Sections 5.3, 5.4, and 6). This approach parallels the one adopted in Georgia in 2016, whereby a two-parameter, BLM-based MLR equation was approved by EPA as the copper SSWQC for Buffalo Creek (Resolve 2015; EPA 2016a).[10] The MLR approach, where shown to be robust and accurate, reduces and sampling and analytical costs significantly as compared to using the full BLM, while still incorporating the BLM's scientific rigor.

EPA has commonly used linear regression to derive its nationally recommended WQC, most of which have been adopted in New Mexico WQS for metals and ammonia. EPA currently uses a simple linear regression with hardness as the independent variable to derive aquatic life criteria for cadmium, chromium, lead, nickel, silver, and zinc. EPA uses a two-parameter linear regression to derive aquatic life criteria for ammonia, using temperature and pH as independent variables. In 2018, EPA used a three-parameter MLR equation (using pH, DOC, and hardness) as the basis for its nationally recommended aquatic life criteria for aluminum (EPA 2018b). EPA is also currently evaluating MLRs as the potential bases of WQC for other metals (EPA 2018a). MLRs have been used by others to describe the effects of water chemistry on the bioavailability and toxicity of metals (EPA 1987; Esbaugh et al. 2012; Fulton and Meyer 2014; Rogevich et al. 2008), including in the development of copper WQC (Brix et al. 2017).

Hence, strong scientific and regulatory rationale exists for using the MLR approach to develop relatively simple equations that account for the effects of water chemistry on metal bioavailability.

MLRs can be evaluated by how well they match BLM predictions, a process described in Section 5. An MLR equation that matches copper BLM WQC well yields criteria that are consistent with best available science and with EPA's nationally recommended WQC (EPA 2007a). Using an MLR equation has the benefit of being a transparent and readily available regulatory option that can incorporate EPA (2007a) BLM-based copper WQC into New Mexico WQS as SSWQC for surface waters of the Pajarito Plateau, without the need for BLM software and training.

[10] The two parameters used for Buffalo Creek were pH and DOC (Resolve 2015).

5 Data Evaluation

This section describes the development of the Pajarito Plateau BLM dataset for the purpose of generating BLM-based copper WQC; it also describes how those data were used to generate an MLR equation for the Pajarito Plateau.

5.1 DQO/DQA Process and BLM Dataset

In 2018, EPA's data quality objective/data quality assessment (DQO/DQA) process was used to select appropriate BLM datasets for several metals (including copper) and determine their usability for performing BLM-based WQC calculations consistent with EPA guidance (Windward 2018b; EPA 2007a).

Both Appendix B to this report and Windward's DQO/DQA (2018b) provide additional information on the DQO/DQA process used to develop a scientifically defensible set of BLM input data. Each step of the 2018 DQO/DQA process pertaining to developing copper BLM inputs is summarized below:

1) **State the problem.** New Mexico's hardness-based copper criteria do not reflect the best available science regarding copper bioavailability and toxicity. Therefore, using the existing copper WQC may lead to erroneous conclusions about whether copper concentrations are protective of aquatic life, as well as erroneous decisions about management actions needed to protect aquatic life.
2) **Define study objectives.** The objectives were to identify and use appropriate data to generate BLM-based criteria for locations on or around the Pajarito Plateau near the Laboratory.
3) **Identify information inputs.** Inputs were sufficiently complete sets of BLM input parameters from discrete water sampling events in surface waters of the Pajarito Plateau. Water chemistry data used for BLM calculations were collected under a defined sampling plan using defensible sampling and analytical methods, QC review, and data validation procedures. The primary source of information for this evaluation was surface water monitoring data collected by LANL (Section 3.4; Appendix A; Appendix B, Section B2).
4) **Define study boundaries**. Temporal boundaries included the time periods over which sufficiently complete BLM input data exist for surface waters of the Pajarito Plateau. Surface water sampling events included either some form of dry weather baseflow (e.g., effluent, springs, and/or snowmelt) or stormflow generated by rainfall. Spatial boundaries included all surface water locations on the Pajarito Plateau in the vicinity of the Laboratory that have sufficient BLM datasets.
5) **Develop an analytical approach.** The overall analytical approach entailed 1) compiling a source dataset from LANL's EIM database, 2) aggregating and

evaluating data to determine the extent to which BLM-based criteria can be generated for each discrete event in accordance with available EPA (2007b) guidance (Appendix B, Section B2), and 3) calculating BLM-based "instantaneous criteria" using the EPA (2007a) copper BLM (Section 5.2) for each discrete event with sufficient BLM inputs.

6) **Specify performance and acceptance criteria.** The performance and acceptance criteria for developing an appropriate dataset were primarily based on whether sufficient water chemistry data were available to generate BLM-based WQC for the locations of interest. Specifically, BLM-based calculations were performed only when, at a minimum, pH and organic carbon were measured for the same water sampling event. As appropriate, substitutions or estimations of missing BLM input parameters were conducted as possible from available data, for example using a mathematical relationship between dissolved and total concentrations, substituting the average concentration for a given location, and/or using EPA guidance for such estimations. Acceptance criteria included that 1) samples were collected in ambient surface waters (i.e., within AUs) rather than from storm water runoff locations in developed areas; 2) data used for BLM calculations were validated; and 3) models used for calculations were applicable and defensible for calculating WQC.

7) **Develop a plan for obtaining data**. As discussed in Section 3.4, surface water data, including BLM inputs, have been collected by LANL at many locations since 2005. To perform the analyses described above, water quality data from the EIM database associated with receiving water samples were queried by LANL contractors, and the results were provided to Windward as a spreadsheet. Supplemental water quality data for the Rio Grande were obtained from National Water Quality Monitoring Council's online Water Quality Portal database (National Water Quality Monitoring Council 2019).

The outcome of this process, when applied to LANL's surface water data, was the establishment of a BLM database with sufficient quality and quantity to develop SSWQC for Pajarito Plateau waters and to compare those criteria to existing criteria for copper and other metals. Staff from NMED[11] participated in the review of the DQOs and the 2018 DQO/DQA report.

For this demonstration, the 2018 DQO/DQA process was applied to a water quality dataset that included BLM data collected through 2019 (i.e., two additional years of monitoring data not assessed in the 2018 DQO/DQA report). The complete BLM

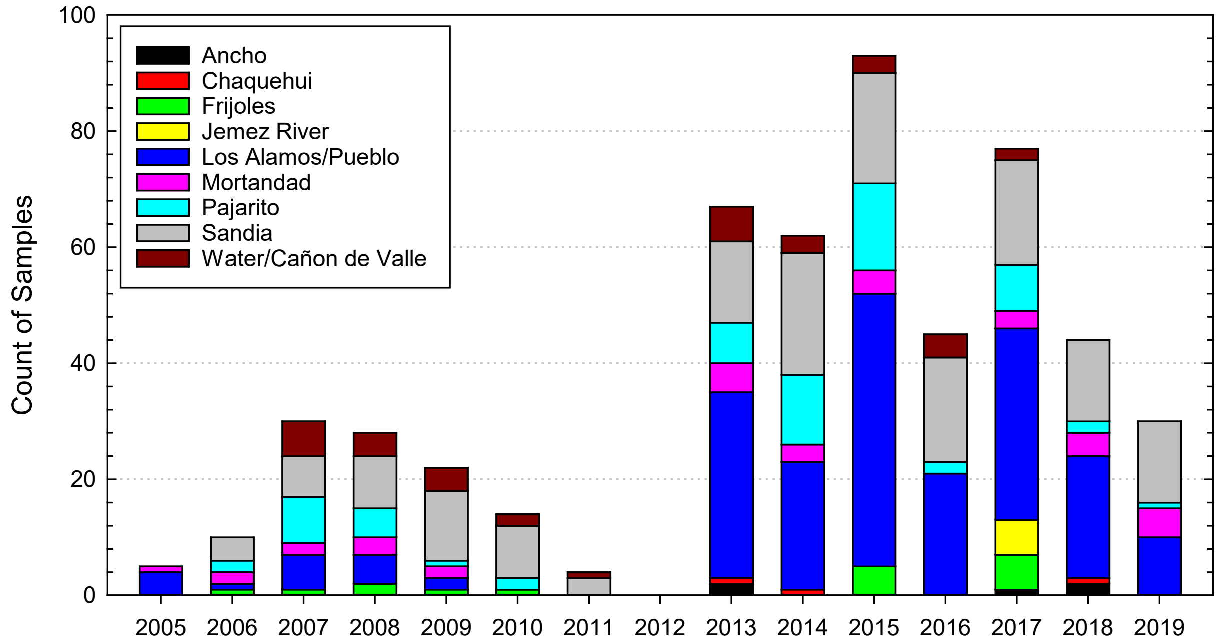
[11] NMED staff from the SWQB and DOE Oversight Bureau participated in kickoff meetings in March 2018, and they submitted comments on the draft DQO/DQA report that were addressed in the April 2018 BLM DQO/DQA report. NMED staff also participated in an October 2018 webinar with EPA Region 6 staff to review and discuss the BLM findings and their potential use as stormwater monitoring TALs for copper, lead, and zinc in the context of the IP.

dataset for the Pajarito Plateau is provided in Appendix A. The source dataset was generated by LANL/N3B (Section 3.4), uploaded to the EIM database, and then exported and provided to Windward by N3B. In addition to analytical data, N3B provided information about sampling locations to support interpretation of the BLM dataset. This information included major and minor watershed names, location classifications related to land use (i.e., undeveloped or downstream of a LANL site), and information on the type of water sample (e.g., surface water, snowmelt, persistent flow, or storm water runoff).

After receiving the source dataset from N3B, Windward aggregated water quality data to establish sufficient input parameters to generate BLM-based copper WQC for each discrete sampling event. Further information on the DQO/DQA process and data aggregation steps used to construct the complete BLM dataset for the Pajarito Plateau is provided in Appendix B (Section B2).

The complete BLM dataset for the Pajarito Plateau spans the period from 2005 to 2019 and includes a total of 531 discrete samples collected from 50 locations across 9 large watersheds.[12] Figure 5-1 shows a breakdown of when and where the 531 BLM samples in the final dataset were collected. Map 3-1 shows each surface water monitoring location. Figures 5-2 and 5-3 show the distributions of water quality parameters in the full dataset (Appendix A).

[12] Ultimately, 517 samples were used for MLR development; 14 samples with pH, DOC, and/or hardness values outside the prescribed ranges for the BLM were removed.



Note: No samples in the final BLM dataset were collected in 2012 due to drought conditions.

Figure 5-1. Distribution of BLM samples by watershed and over time, 2005 to 2019

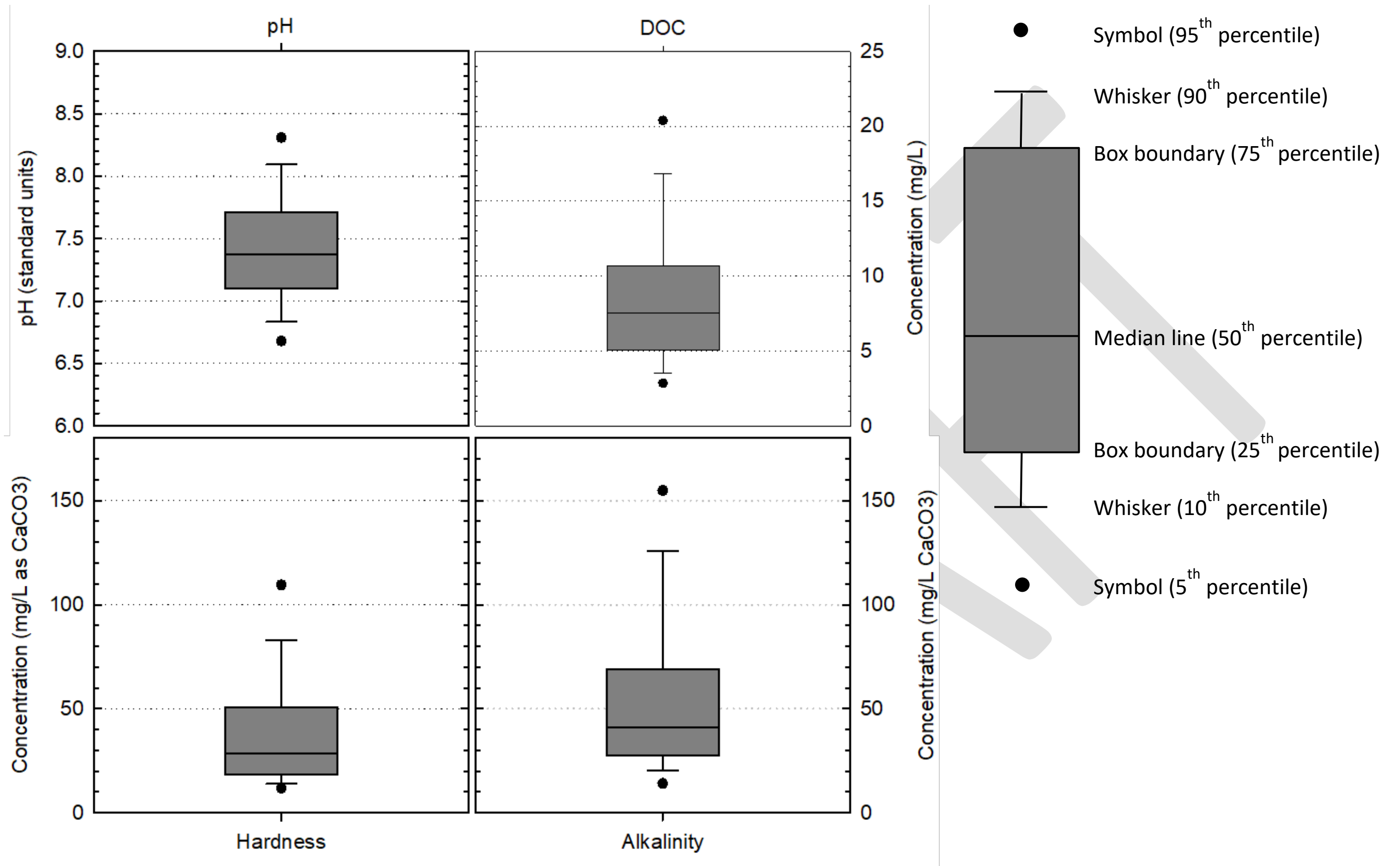
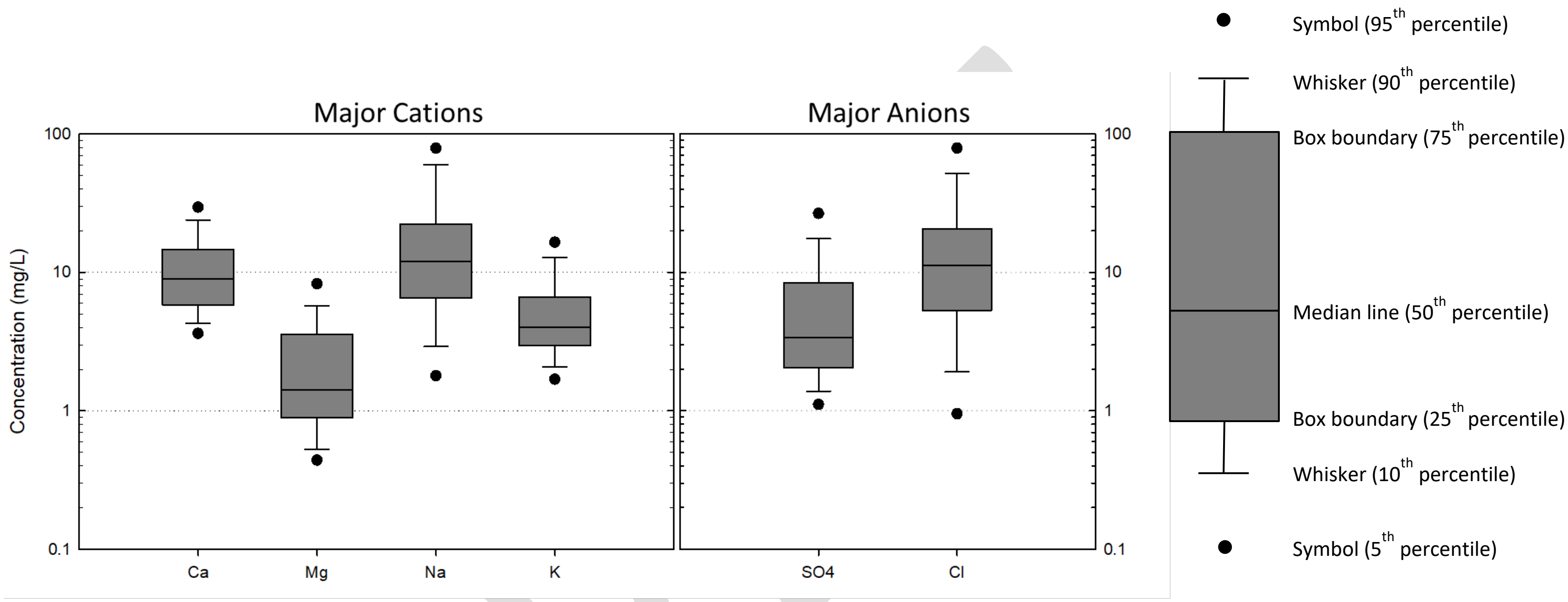


Figure 5-2.Distributions of water quality inputs to the MLR and/or BLM



Note: The following water chemistry parameters are shown: calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), sulfate (SO4), and chloride (Cl).

Figure 5-3. Distributions of major cation and anion inputs to the BLM

As discussed in this report and in Appendix B, hydrology was investigated in detail when developing copper SSWQC, because of the various hydrological classifications of surface waters on the Pajarito Plateau (i.e., ephemeral, intermittent, and perennial). According to New Mexico WQS, chronic and acute WQC apply in specific watersheds based on their respective hydrologic classifications, so the proposed acute and chronic SSWQC, if adopted, would apply similarly. For the purposes of developing and testing MLR equations to accurately generate BLM-based copper WQC, hydrology data were characterized using existing NMAC hydrologic classifications for surface waters of the Pajarito Plateau. Table 5-1 shows a tabular breakdown of samples by major watershed and current NMAC hydrologic classification. Additionally, Appendix B (Section B5.2.3) provides an investigation of potential updated classifications based on the most recent hydrology protocol efforts by NMED and LANL.

Table 5-1. New Mexico WQS hydrologic classification assignments for the BLM dataset by major watershed

Major Watershed	NMAC Hydrological Classification			N by Watershed
	Ephemeral/ Intermittent (20.6.4.128)	Default Intermittent (20.6.4.98)	Perennial (20.6.4.121/ 20.6.4.126)	
Ancho	5	0	0	**5**
Chaquehui	3	0	0	**3**
Frijoles	0	9	8	**17**
Jemez River	0	6	0	**6**
Los Alamos/Pueblo	142	62	0	**204**
Mortandad	28	6	0	**34**
Pajarito	62	0	3	**65**
Sandia	8	0	154	**162**
Water/Cañon de Valle	4	12	19	**35**
N by Hydrology Class	**252**	**95**	**176**	**531**

N – sample size
BLM – biotic ligand model
NMAC – New Mexico Administrative Code
WQS – water quality standard

5.2 BLM Execution

The final BLM dataset (Section 5.1; Appendix A) was input into the copper BLM software (version 3.41.2.45) (Windward 2018a) to generate acute and chronic BLM-based WQC for all samples.[13] These WQC were equivalent to EPA's 2007 copper WQC for freshwater (EPA 2007a) and were used in conjunction with water quality

[13] The most recent BLM software is accessible through the Windward website: https://www.windwardenv.com/biotic-ligand-model.

parameters to develop the copper MLR equations. The reduction of the full suite of BLM parameters to pH, DOC, and hardness for use in the MLR approach is summarized in Sections 5.3 and 5.4.

5.3 BLM Simplification

LANL is proposing MLR equations that will predict BLM-based copper WQC consistent with EPA (2007a) guidance for surface waters of the Pajarito Plateau in the vicinity of the Laboratory. This approach acknowledges both the advantages of the BLM—incorporating the effects of multiple water quality parameters on copper WQC—and the challenges—measuring BLM parameters across a large area with a range of water quality and flow conditions. Estimating BLM copper WQC accurately using fewer parameters than the full list of 12 inputs will facilitate copper evaluations.

As described in Section 5.1, site-specific water quality data were collated from 531 samples from 50 locations from 2005 to 2019 (Appendix A). A set of 517 samples spanning 8 watersheds[14] was carried forward to the first round of MLR modeling; 14 samples were removed due to DOC, hardness, or pH concentrations outside of the prescribed ranges (Table 5-2) for the BLM. Modeling methods are summarized in Section 5.4.1 and detailed in Appendix B.

Table 5-2. Prescribed ranges for BLM input parameters

BLM Parameter	BLM Prescribed Range	
	Minimum	Maximum
DOC	0.05	29.65
Hardness	7.9	525
pH	4.9	9.2

Source: Windward (2019)

BLM – biotic ligand model

DOC – dissolved organic carbon

Table 5-3 presents the results of a Spearman correlation analysis (i.e., Spearman rho values) that further substantiate the importance of pH, DOC, and hardness in calculating BLM-based criteria for the Pajarito Plateau. This table illustrates correlations among the three parameters and other BLM input parameters.

14 The six samples from the Jemez River watershed (Table 5-1) were not carried forward to the MLR analysis because hardness concentrations were < 7.9 mg/L as calcium carbonate (the minimum prescribed concentration for the BLM). Thus, the number of watersheds in the MLR dataset was eight, not nine.

Table 5-3. Spearman correlation analysis results (rho)

Parameter	BLM CMC	BLM CCC	pH	DOC	Hardness	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Alkalinity
BLM CMC	--	--	0.57	0.54	0.42	0.41	0.43	0.38	0.57	0.45	0.36	0.55
BLM CCC	--	--	0.57	0.54	0.42	0.41	0.43	0.38	0.57	0.45	0.36	0.55
pH	0.57	0.57	--	-0.29	0.57	0.57	0.53	0.5	0.36	0.5	0.44	0.66
DOC	0.54	0.54	-0.29	--	-0.09	-0.09	ns	-0.17	0.23	ns	-0.14	ns
Hardness	0.42	0.42	0.57	-0.09	--	0.99	0.92	0.63	0.63	0.73	0.54	0.83
Calcium	0.41	0.41	0.57	-0.09	0.99	--	0.86	0.6	0.6	0.69	0.52	0.82
Magnesium	0.43	0.43	0.53	ns	0.92	0.86	--	0.64	0.71	0.78	0.55	0.8
Sodium	0.38	0.38	0.5	-0.17	0.63	0.6	0.64	--	0.7	0.8	0.91	0.62
Potassium	0.57	0.57	0.36	0.23	0.63	0.6	0.71	0.7	--	0.72	0.61	0.66
Sulfate	0.45	0.45	0.5	ns	0.73	0.69	0.78	0.8	0.72	--	0.76	0.68
Chloride	0.36	0.36	0.44	-0.14	0.54	0.52	0.55	0.91	0.61	0.76	--	0.54
Alkalinity	0.55	0.55	0.66	ns	0.83	0.82	0.8	0.62	0.66	0.68	0.54	--

Note: All values are Spearman correlation coefficients, which can range from -1 to 1. Only significant correlations are reported (alpha = 0.05); color shading indicates relative strength of correlation (with blue being positive values and red being negative). BLM CMC and CCC correlations are identical because the acute and chronic BLM values differ only by an acute-to-chronic ratio.

BLM – biotic ligand model

CMC – criterion maximum concentration

CCC – criterion continuous concentration

DOC – dissolved organic carbon

ns – not significant

Table 5-3 shows that the strongest correlations with BLM output (i.e., CMC and CCC) are for pH (rho = 0.57), potassium (rho = 0.57), alkalinity (rho = 0.55), and DOC (rho = 0.54). Thus, pH and DOC are reasonable to retain for a simplified model, because they have relatively strong correlations and are well supported by the literature regarding mechanisms affecting copper bioavailability (i.e., copper speciation and complexation). While hardness is marginally less correlated with BLM output (rho = 0.44) than other parameters, hardness is significantly correlated ($p < 0.05$) with calcium, magnesium, alkalinity, and sodium. Consequently, including hardness in the simplified version incorporates the influence of these parameters on BLM output and builds upon New Mexico's current hardness-based copper criteria in response to which LANL has already collected a substantial amount of hardness data.

5.4 MLR Equation Development

This section describes the development of acute and chronic MLR equations using BLM input parameter data and corresponding BLM outputs (i.e., BLM-based WQC). For the MLR evaluations, DOC and hardness were transformed using the natural logarithm. This transformation was not required for pH, since it is already on a logarithmic scale. The evaluations were conducted primarily for the acute BLM-based WQC, because EPA (2007a) applies an acute-to-chronic ratio to generate chronic BLM-based WQC. As a result, the acute and chronic BLM WQC for copper vary by a constant factor (i.e., 1.61), regardless of water chemistry. Therefore, the following evaluations regarding the development of a best-fit MLR equation are applicable to both acute and chronic copper WQC.

5.4.1 Methods

Many candidate MLRs were developed, evaluated, and compared using standard statistical and visual methods, which included statistics related to each model's goodness-of-fit (e.g., adjusted R^2) and model assumptions (e.g., tests of the normality and homoscedasticity of residuals). Visual tools were used to evaluate model fit and to facilitate model refinements (Appendix B, Section B4).

The development of models followed several general steps iterated over several rounds of modeling. First, a basic model was tested that contained only pH, DOC, and hardness, consistent with previously developed MLR models (Brix et al. 2017) and the simplified BLM (Windward 2019). These three water quality parameters affect copper speciation (e.g., pH), complexation with the free cupric ion (copper^{2+}) (e.g., DOC), and competition with copper at a site of uptake by the organism (e.g., calcium^{+} represented by hardness and hydrogen^{+} represented by pH). As such, they capture the primary mechanisms affecting copper bioavailability that underpin the copper BLM.

Once this baseline model was established, various other, more complex models that included additional parameters were developed. For example, models included different slopes and/or intercepts for ephemeral/intermittent, intermittent, and perennial NMAC classifications. The development of these models was followed by a stepwise regression step, wherein the statistical software was allowed to test many permutations of the larger model by adding or removing the hydrologic slopes and intercepts and checking the goodness-of-fit of each permutation.[15] This step provided information about which of the variables in the most complex model might be important and which could be excluded during the model refinement step. The final step, model refinement, involved both the removal of unimportant variables and the addition of a new variable, squared pH (pH^2), to eliminate patterns observed in the model residuals (Figure 5-4).

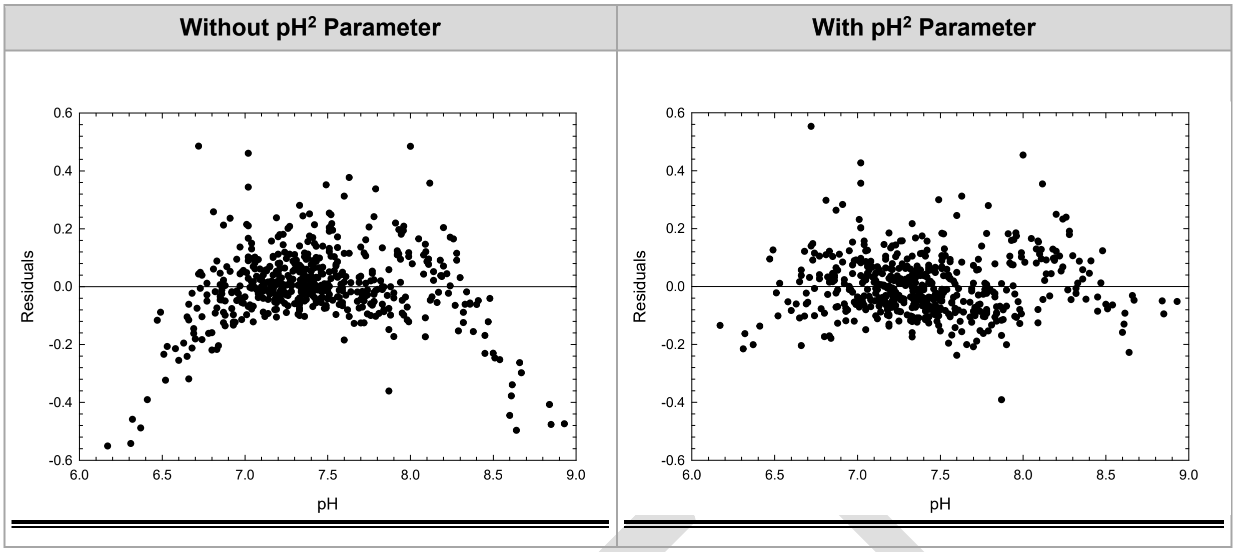
5.4.2 Results

A detailed discussion of the development of MLR equations is provided in Appendix B, Section B4. This section provides a summary of those findings and the stepwise MLR analyses that led to the proposed MLR equations for copper SSWQC.

As noted in Section 5.4.1, MLRs were developed over several rounds. The first round started with a simple model using pH, DOC, and hardness as the independent variables to predict BLM-based WQC. This model resulted in a very high adjusted R^2 of 0.969, indicating that 96.9% of the variation in BLM-based WQC can be accounted for by these three parameters.

More complex models including pH, DOC, and hardness, as well as hydrology-specific slopes and intercepts for the ephemeral/intermittent, intermittent, and perennial classifications, were considered in the second round. While evaluating this model structure, it was observed that MLR model residuals (i.e., difference between BLM WQC and MLR-predicted WQC) and pH had a curvilinear relationship (Figure 5-4, left panel). To address this, a pH^2 term was added to the model in the third round; this eliminated the curvilinear pattern in residuals (Figure 5-4, right panel).

[15] This step was limited to hydrological classification parameters, slopes, and intercepts. DOC, pH, and hardness were retained throughout the stepwise analysis.



Note: Horizontal line at a residual of zero indicates perfect prediction.

Figure 5-4. Comparison of MLR model residuals with and without a pH^2 parameter

After including the pH^2 term, models without hydrology factors were also developed as part of the third round of modeling. Comparisons of summary statistics among these various models (Table 5-4), analysis of residuals (Appendix B, Section B4), and consideration of the magnitudes of differences among models led to the conclusion that the use of hydrology-specific slopes and intercepts did not result in better MLR equations compared to the use of less complex (i.e., more parsimonious) models. For example, after removing all hydrological classification parameters from the MLR in the third round of modeling, the adjusted R^2 changed from 0.983 to 0.980, meaning that hydrology classification explained only 0.3% of the variation not already explained by pH, DOC, and hardness. From a practical standpoint, the added complexity of hydrological classification was not needed to accurately predict BLM-based copper WQC. Moreover, because the NMAC classes are subject to change over time (e.g., default intermittent waters are potentially reclassified through the hydrology protocol process), to include hydrologic classification could lead to unnecessary ambiguity in future applications of the MLR.

Table 5-4. Summary statistics of MLR models fit to BLM-based WQC

Model Description	Development Method[a]	Adjusted R^2	Predicted R^2	AIC	BIC	Shapiro-Wilk Test p-value[b]	Scores Test p-value[c]
Simplest model; includes pH, DOC, and hardness only (no distinction in hydrology)	full	0.969	0.968	-614	-593	<0.001	0.249
Hydrology slopes and intercepts	full	0.973	0.971	-677	-621	<0.001	0.751
	AIC	0.973	0.971	-681	-643	<0.001	0.704
	BIC	0.973	0.971	-681	-643	<0.001	0.704
Hydrology slopes and intercepts; pH^2 added	full	0.984	0.981	-928	-860	<0.001	0.0476
	AIC	0.984	0.981	-928	-860	<0.001	0.0476
	BIC	0.983	0.981	-918	-876	<0.001	0.00332
Hydrology intercepts only (slopes excluded); pH^2 term always included	full	0.982	0.982	-899	-865	<0.001	0.0204
	AIC	0.982	0.982	-899	-865	<0.001	0.0204
	BIC	0.982	0.982	-899	-865	<0.001	0.0204
No distinction in hydrology; pH^2 term always included; final models (proposed MLRs for copper SSWQC)	full (acute)	0.980	0.979	-833	-808	<0.001	0.083
	full (chronic)	0.980	0.979	-833	-808	<0.001	0.083

[a] Development methods are divided into "full" models (includes all variables indicated in model description) or AIC/BIC stepwise regression models.

[b] Shapiro-Wilk test for normality of residuals; $p < 0.05$ indicates non-normality.

[c] Scores test for homogeneity of residuals; $p < 0.05$ indicates non-constant variance (i.e., heteroscedasticity).

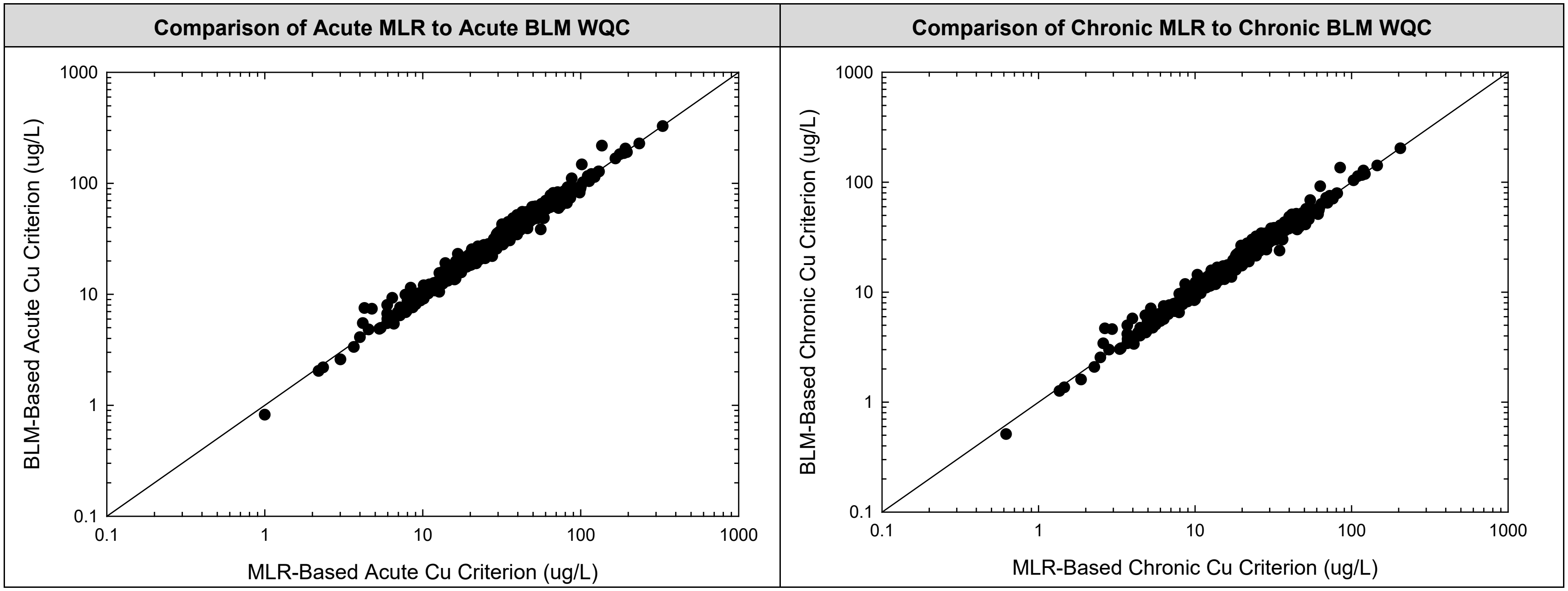
AIC – Akaike's Information Criterion
BIC – Bayesian Information Criterion
BLM – biotic ligand model
DOC – dissolved organic carbon
MLR – multiple linear regression
SSWQC – site-specific water quality criterion
WQC – water quality criterion

After demonstrating that an MLR model including hydrological class is not an improvement over a more parsimonious model, and after including a pH^2 parameter to address residual patterns, Equations 1 and 2 were selected to predict dissolved acute and chronic BLM-based copper WQC, respectively. These equations are proposed as SSWQC.

$$\boldsymbol{CMC = exp(-22.914 + 1.017 \times ln(DOC) + 0.045 \times ln(hardness) + 5.176 \times pH - 0.261 \times pH^2)} \quad \textbf{Equation 1}$$

$$\boldsymbol{CCC = \exp(-23.391 + 1.017 \times ln(DOC) + 0.045 \times ln(hardness) + 5.176 \times pH - 0.261 \times pH^2)} \quad \textbf{Equation 2}$$

Figure 5-5 shows comparisons of MLR-based WQC calculations to BLM-based copper WQC for the Pajarito Plateau BLM dataset. The figure shows that copper WQC are very similar between the two approaches (adjusted $R^2 = 0.980$ for the acute and chronic MLRs) and values are distributed evenly across the solid diagonal 1:1 line representing perfect agreement. Therefore, the three-parameter MLR equations provide highly accurate results. In addition, more points fall above the 1:1 line (n = 261) than below (n = 256) in Figure 5-5, indicating that overall, the proposed copper SSWQC equations provide more conservative copper WQC for the Pajarito Plateau than the BLM software.

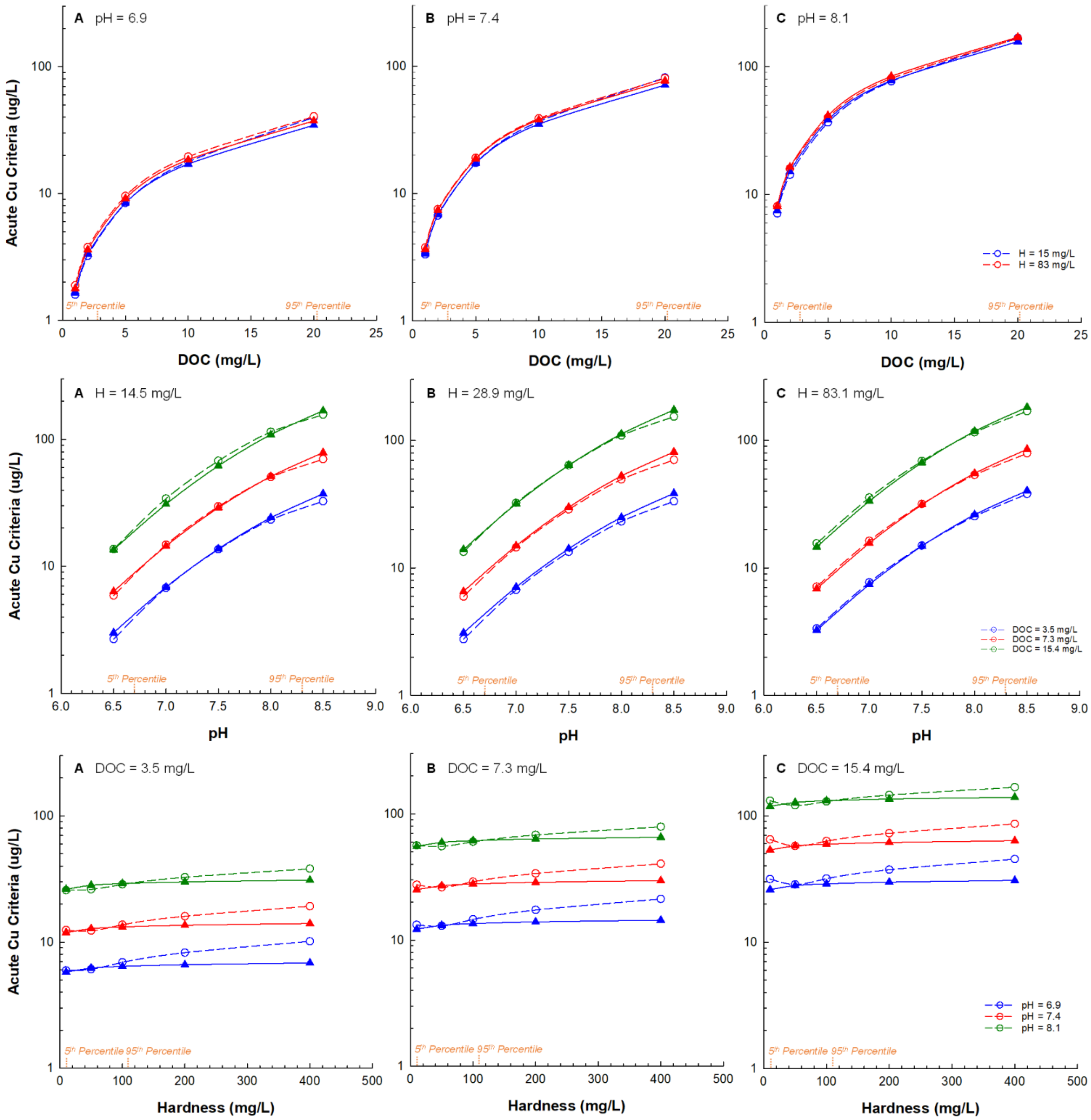


Note: Solid line represents a 1:1 relationship (perfect agreement).

N = 517 samples (BLM dataset for the Pajarito Plateau excluding samples outside the BLM prescribed ranges for pH, DOC, and hardness)

Figure 5-5. Comparison of proposed acute and chronic copper SSWQC predictions to acute and chronic BLM WQC

Figure 5-6 presents an additional comparison of MLR- and BLM-based copper WQC across varying concentrations and combinations of DOC, pH, and hardness.



Note: BLM-based criteria are shown as dashed lines and open circles. MLR-based acute criteria are shown as solid lines and triangles. Blue, red, and green plots represent the 10th, 50th, and 90th percentiles, respectively, in the BLM dataset for the Pajarito Plateau. The 5th and 95th percentiles for each parameter are shown in orange on each x-axis. For comparative purposes, BLM criteria were generated with the "simplified site chemistry" input option using median ion ratios in the site-specific dataset.

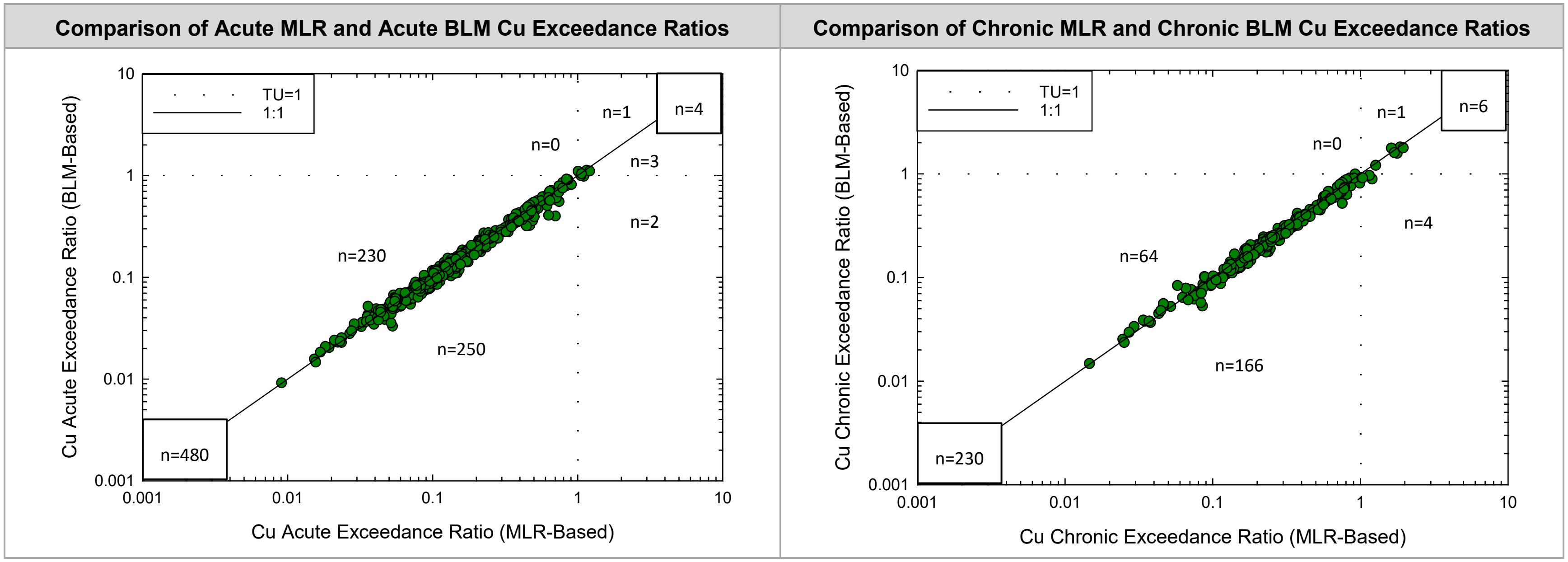
Figure 5-6. Comparison of BLM- and MLR-based acute criteria

Figure 5-6 shows how the MLR- and BLM-based copper WQC vary as a function of DOC (top row), pH (middle row), and hardness (bottom row). For comparative purposes, MLR- and BLM-based copper WQC were generated using various combinations of DOC, pH, and hardness concentrations corresponding to the 10th, 50th, and 90th percentiles in the BLM dataset for the Pajarito Plateau (shown as the colored lines and panels A, B, and C in Figure 5-6). This comparison further demonstrates the consistency between MLR-based copper WQC (solid lines, triangles) and BLM-based copper WQC (dashed lines, open circles) across a wide range of water chemistries. The greatest deviation between the two approaches occurs at high-hardness concentrations (≥ 200 mg/L); however, BLM-based copper WQC are greater than MLR-based copper WQC, indicating that the proposed copper WQC are conservative under high-hardness conditions. Furthermore, such conditions are uncommon in surface waters on the Pajarito Plateau, as indicated by the 5th and 95th percentiles shown on the x-axes in Figure 5-6. Overall, the high degree of consistency between BLM- and MLR-based WQC over the range of water chemistries observed throughout the Pajarito Plateau indicates that the proposed MLR equations provide a reliable and scientifically defensible method to accurately generate EPA's (2007a) nationally recommended copper WQC on a site-specific basis. Appendix B provides additional evaluations of the proposed MLR equations that further substantiate their selection as proposed copper SSWQC.

5.5 COMPARISON TO CURRENT COPPER WQC

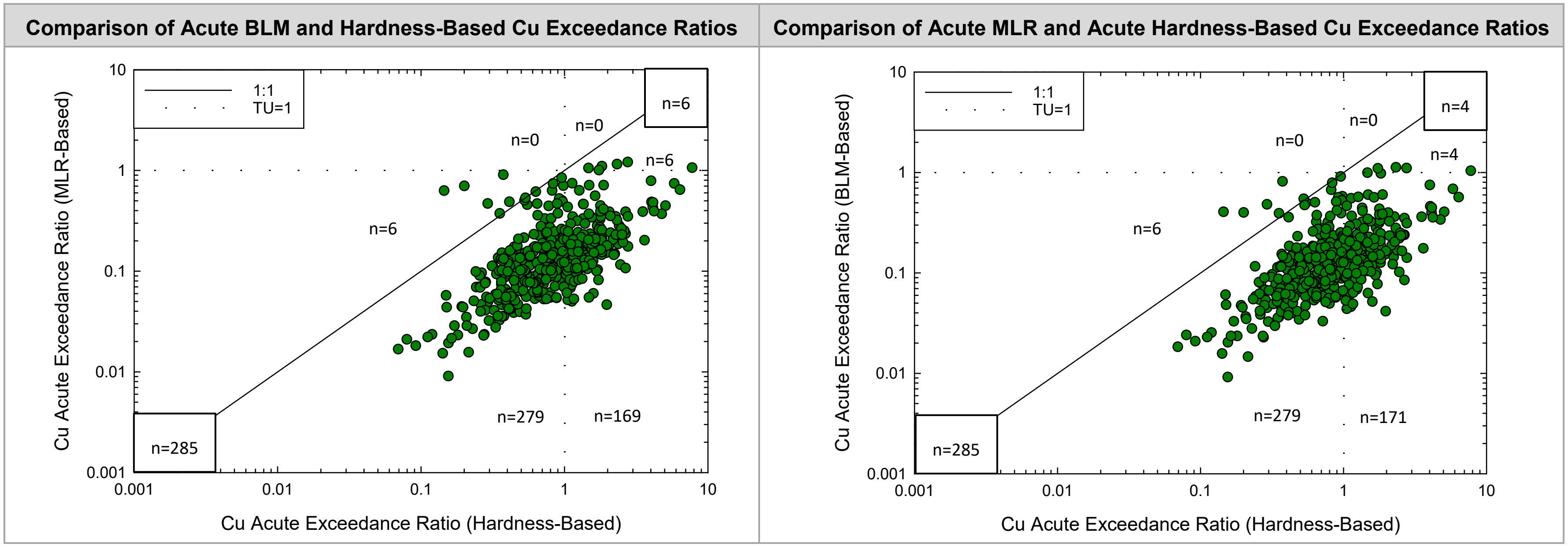
Comparisons of copper exceedance ratios[16] calculated using EPA's (2007a) BLM, the site-specific MLR (Equation 1), and New Mexico's current hardness-based WQC are shown in Figures 5-7 through 5-10. Figure 5-7 compares exceedance ratios for the acute and chronic BLM- and MLR-based criteria. Figure 5-8a compares acute exceedance ratios for the BLM- and MLR-based criteria to acute hardness-based criteria, and Figure 5-8b presents the same comparison for exceedance ratios of the analogous chronic criteria. Figures 5-9 and 5-10 present similar results as boxplots (showing results by watershed) for the acute and chronic criteria, respectively.

[16] Exceedance ratio = measured copper concentration divided by copper WQC.



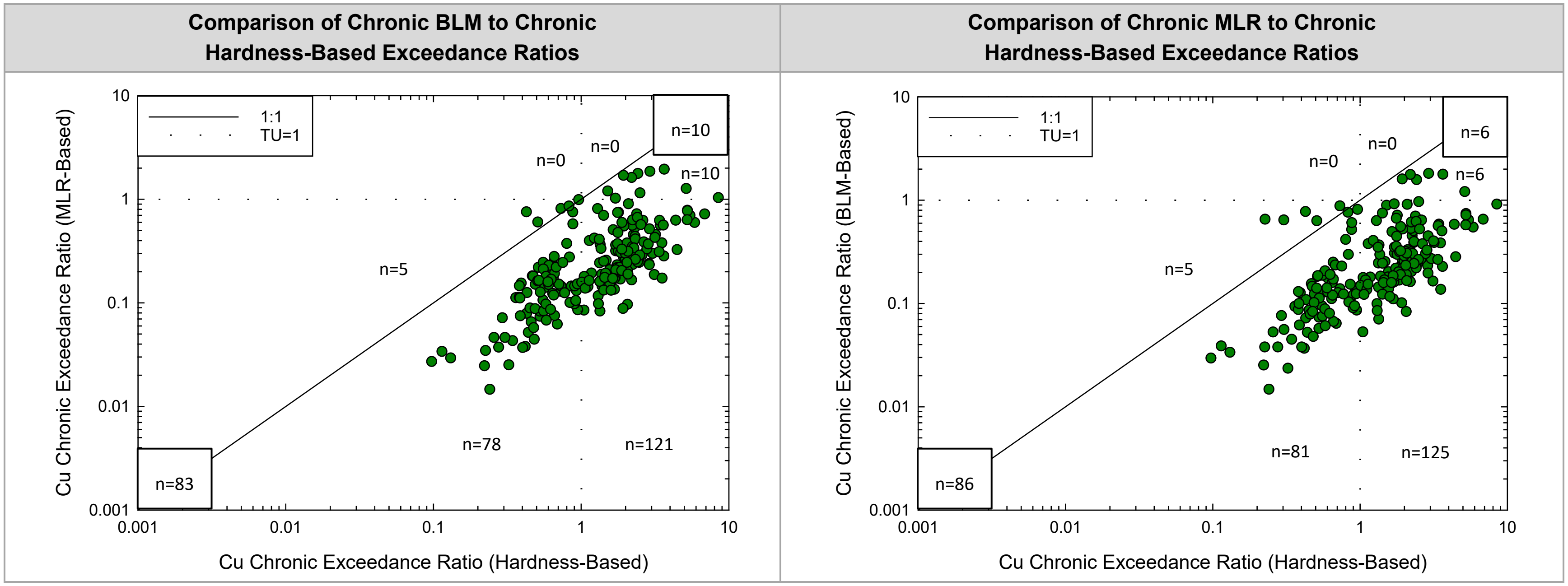
Note: Copper exceedance ratios are measured dissolved copper concentrations divided by a copper criterion. The solid 1:1 line represents perfect agreement between two criteria, and the dashed lines indicate the points at which copper concentrations exceed each criterion. "N" sample sizes represent the counts of samples in subareas of the plot defined by the solid and dashed lines. The "N" values in boxes represent the sums of samples in either the upper right or lower left quadrant, where there is general agreement between the two criteria (i.e., both predict an exceedance or non-exceedance of a copper criterion). The chronic exceedance ratio plot on the right excludes samples collected from locations classified under 20.6.4.128 NMAC in which only the acute criteria apply. Plots exclude samples in the Pajarito Plateau BLM dataset where copper detection limits were greater than BLM-based WQC.

Figure 5-7.Comparison of copper exceedance ratios between EPA (2007) BLM WQC and site-specific MLR WQC



Note: Copper exceedance ratios are measured dissolved copper concentrations divided by a copper criterion. The solid 1:1 line represents perfect agreement between two criteria, and the dashed lines indicate the points at which copper concentrations exceed each criterion. “N” sample sizes represent the count of samples in subareas of the plot defined by the solid and dashed lines. The “N” values in boxes represent the sums of samples in either the upper right or lower left quadrant, where there is general agreement between the two criteria (i.e., both predict an exceedance or non-exceedance of a copper criterion). Plots exclude samples in the Pajarito Plateau BLM dataset, where copper detection limits were greater than BLM-based or hardness-based WQC.

Figure 5-8a. Comparison of acute copper exceedance ratios between EPA (2007) BLM WQC or site-specific copper MLR WQC and New Mexico hardness-based WQC



Note: Copper exceedance ratios are measured dissolved copper concentrations divided by a copper criterion. The solid 1:1 line represents perfect agreement between two criteria, and the dashed lines indicate the points at which copper concentrations exceed each criterion. “N” sample sizes represent the count of samples in subareas of the plot defined by the solid and dashed lines. The “N” values in boxes represent the sums of samples in either the upper right or lower left quadrant, where there is general agreement between the two criteria (i.e., both predict an exceedance or non-exceedance of a copper criterion). Plots exclude samples in the Pajarito Plateau BLM dataset, where copper detection limits were greater than BLM-based or hardness-based WQC and samples collected from locations classified under 20.6.4.128 NMAC in which acute only criteria applies.

Figure 5-8b. Comparison of chronic copper exceedance ratios between EPA (2007) BLM WQC or site-specific copper MLR WQC and New Mexico hardness-based WQC

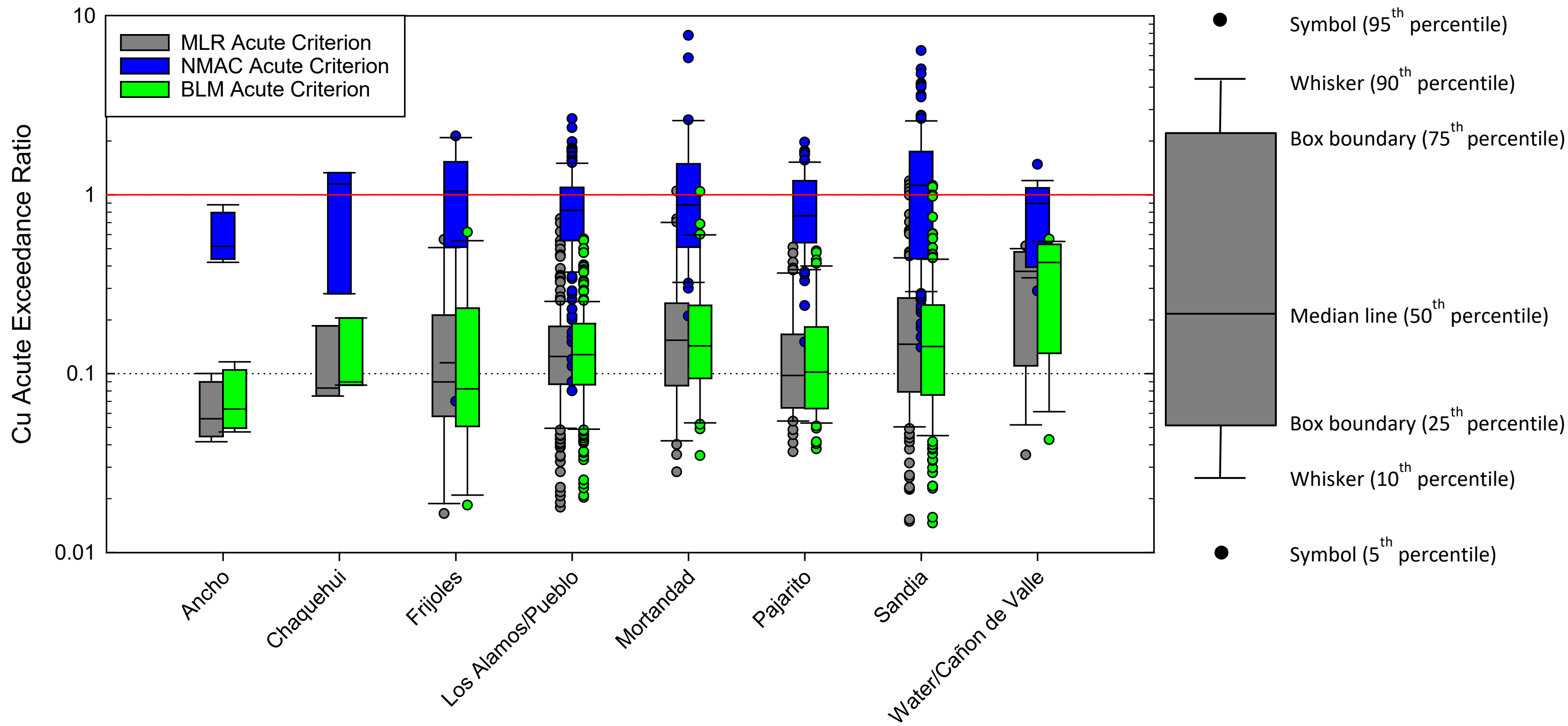


Figure 5-9. Acute copper exceedance ratios for EPA (2007) BLM, site-specific MLR, and New Mexico hardness-based WQC for major watersheds on the Pajarito Plateau

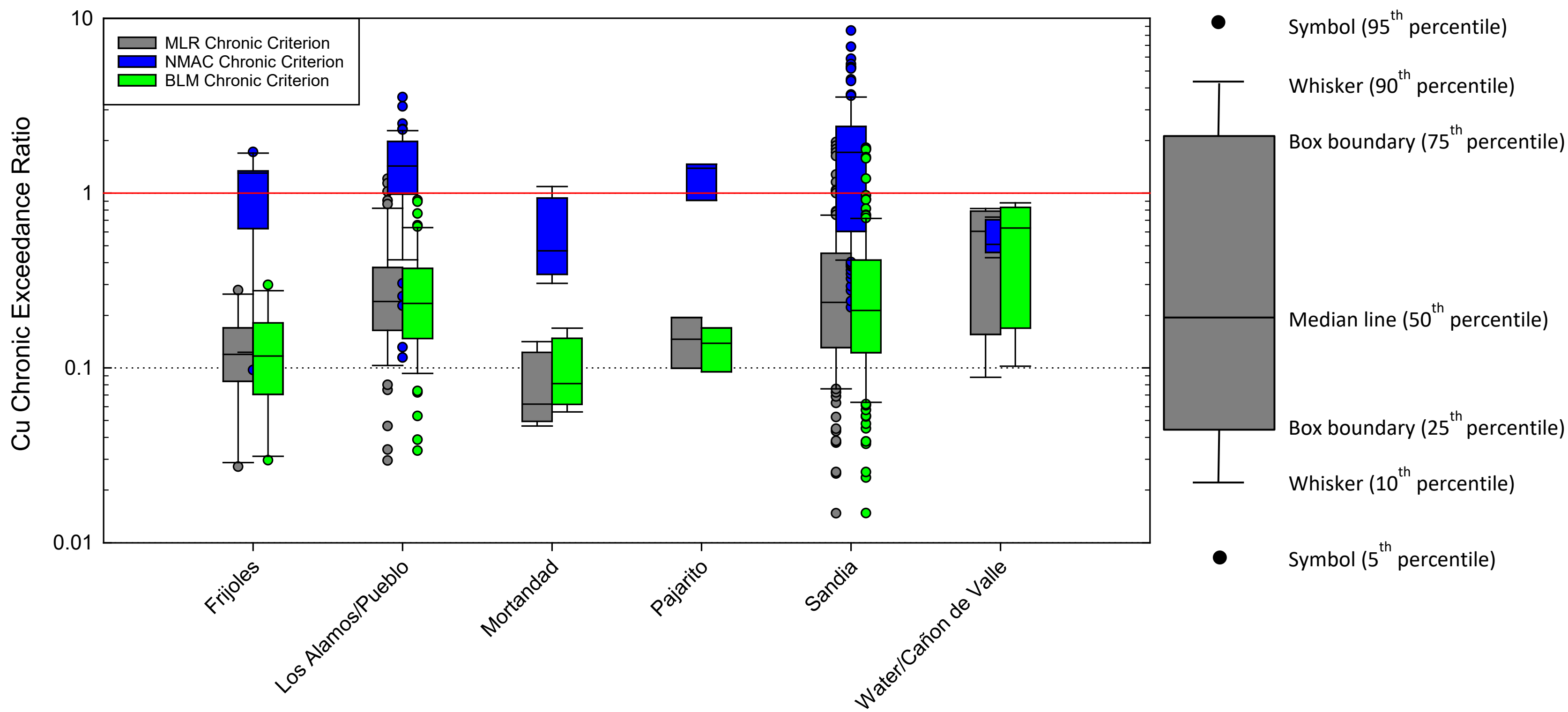


Figure 5-10. Chronic copper exceedance ratios for EPA (2007) BLM, site-specific MLR, and New Mexico hardness-based WQC for major watersheds on the Pajarito Plateau

Several conclusions can be drawn based on these comparisons. First, the frequency and magnitude with which copper concentrations exceed either BLM- or MLR-based acute WQC are very similar. For example, four exceedances of the acute BLM WQC and six exceedances of the acute MLR WQC and six exceedances of the chronic BLM WQC and 10 exceedances of the chronic MLR WQC were observed in the final DQO dataset (i.e., points above the horizontal dashed line or right of the vertical dashed line, respectively, in Figure 5-7).[17] The magnitude of these exceedances was low (i.e., acute exceedance ratios < 1.2 and chronic exceedance ratios < 2.0 for both models). Figure 5-7 also shows that exceedance ratios are highly correlated and distributed evenly around the solid diagonal 1:1 line (representing perfect agreement), again reflecting the high accuracy with which the MLR equations generate BLM software-based criteria.

Differences in exceedance frequencies between hardness-based WQC and BLM- or MLR-based WQC were substantial (e.g., n = 175 points to the right of the vertical dashed lines in Figure 5-8a and n = 131 points to the right of the vertical dashed lines in Figure 5-8b). Spatially, these hardness-based WQC exceedances occurred across most of the major Pajarito Plateau watersheds (Figure 5-9).

Finally, the differences observed between the hardness-based exceedance ratios and those calculated using either the BLM or MLR reflect the strong influence of water chemistry parameters other than hardness (e.g., pH and DOC) on the bioavailability and toxicity of copper. Consequently, continued application of the current hardness-based copper WQC is likely to lead to inaccurate and unnecessary regulatory actions (e.g., 303[d] listings and TMDLs), given that the MLR-based copper WQC are based on the best available science and provide a more accurate level of protection in accordance with EPA (1985, 2007a) recommendations.

5.6 CONSIDERATION OF DOWNSTREAM RIO GRANDE WATERS

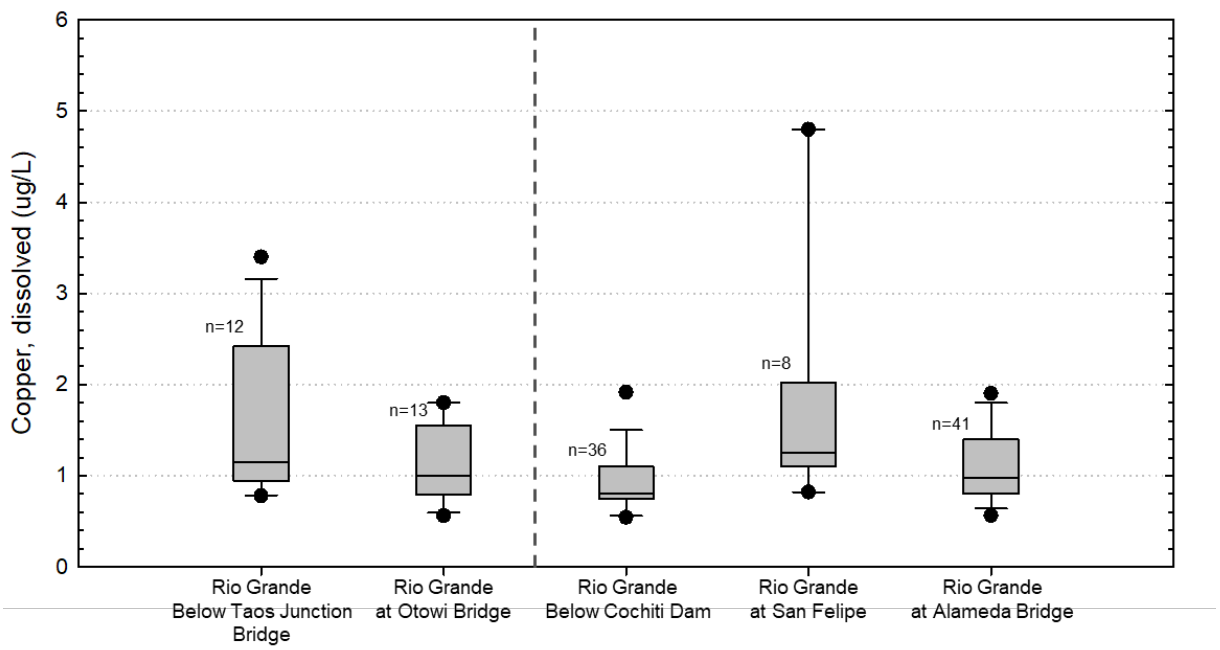
The SSWQC proposed in this report would apply to waters flowing into the Rio Grande from the Pajarito Plateau but not to waters of the Rio Grande. Potential impacts of the SSWQC on downstream waters in the Rio Grande were evaluated and found to be absent.

Rio Grande water quality data collected by the United States Geological Survey (USGS) were obtained from the National Water Quality Monitoring Council (2019) and were then input into the copper SSWQC equations and New Mexico's hardness-based copper criteria equations. Figure 5-11 shows available copper concentrations measured at USGS gaging stations on the Rio Grande from 2005 to 2021.[18] Copper concentrations in the Rio Grande upstream and downstream of confluences with

[17] Figures 5-7 to 5-9 exclude samples with non-detect copper concentrations exceeding the BLM-based copper WQC.

[18] Rio Grande data used for this evaluation are also presented in Appendix D (Table D-1).

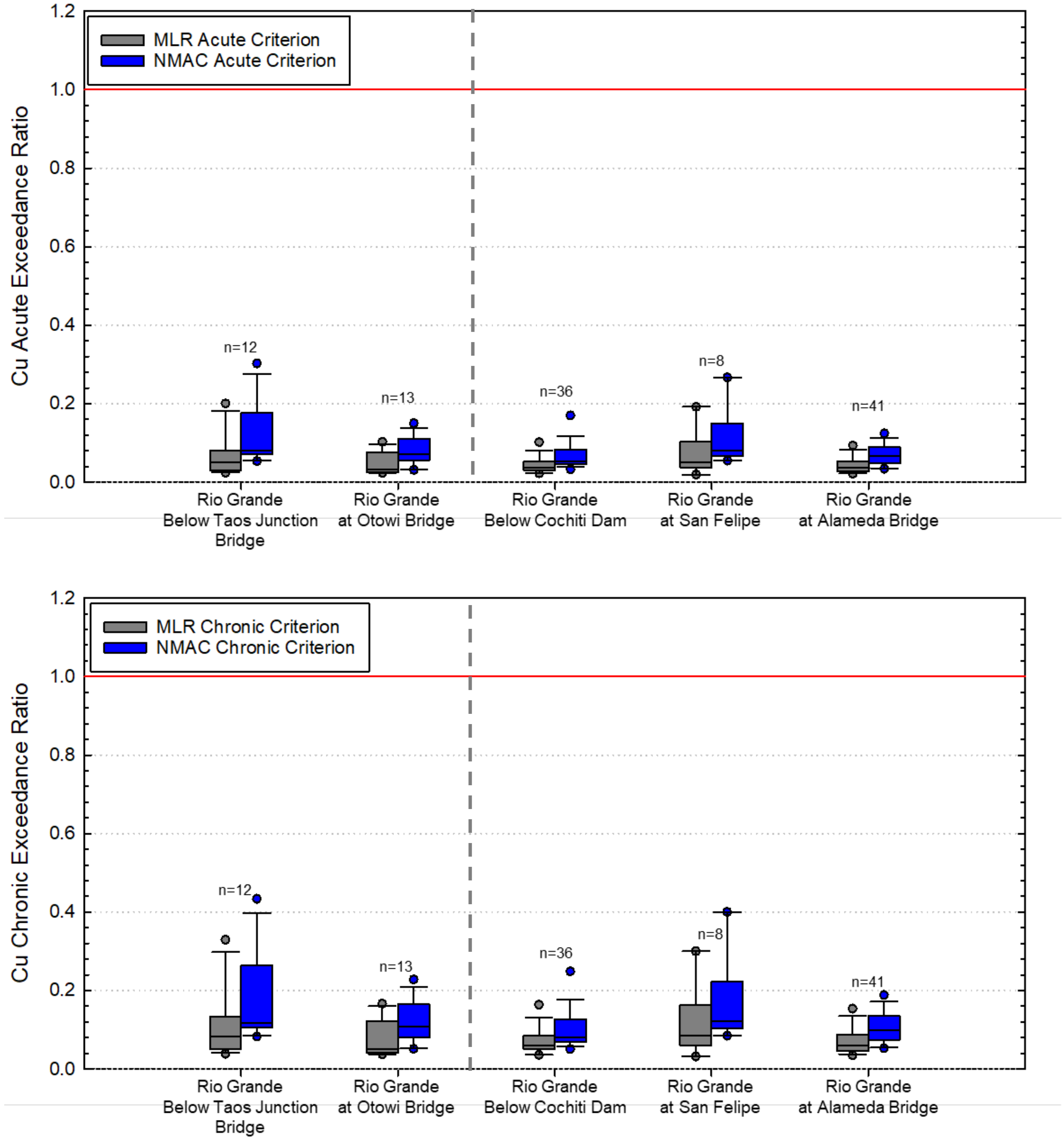
Pajarito Plateau tributaries are low and stable, and no samples contained copper concentrations in excess of either the hardness-based criteria or the BLM-based SSWQC (Figure 5-12). This finding is also consistent with the lack of 303(d) listings for copper in the Rio Grande in the vicinity (upstream and downstream) of the Laboratory. The two AUs of the Rio Grande above and three AUs below confluences with Pajarito Plateau tributaries have not been listed as impaired due to copper in New Mexico's 303(d)/305(b) IRs available on NMED's webpage (NMED 2021), which includes listings for the 2008-2010 IR through the draft 2022-2024 IR cycles. It is also notable that copper concentrations in the Rio Grande are comparable to or less than copper background threshold values (BTVs) derived for undeveloped conditions on the Pajarito Plateau (3.12 µg/L) and substantially less than BTVs for developed conditions (urban runoff) unrelated to LANL (9.03 µg/L) (Windward 2020).



Source: National Water Quality Monitoring Council (2019)

Note: The vertical dashed line indicates the division between locations that are upstream of confluences draining from the Pajarito Plateau (left of line) and those that are downstream (right of line).

Figure 5-11. Dissolved copper concentrations in Rio Grande surface water



Note: The vertical dashed line indicates the division between locations that are upstream of confluences draining from the Pajarito Plateau (left of line) and those that are downstream (right of line). The red line is the threshold above which copper exceeds the associated criterion.

Figure 5-12. Copper WQC exceedance ratios for Rio Grande surface waters

As discussed in Section 2.2, the proposed copper SSWQC do not entail new activities, such as new discharges or sources of copper, that could potentially lead to an increase in copper loads to the Rio Grande. In addition, surface flows from the Pajarito Plateau rarely reach the Rio Grande due to limited flow durations and infiltration in the canyon reaches upgradient of the Rio Grande (Section 3.3). Based on these considerations, adoption of the SSWQC is expected to remain protective of aquatic life uses in the Rio Grande.

6 Conclusions and Recommended Copper SSWQC

Over the past 40 years, the scientific understanding of metal toxicity and bioavailability to aquatic organisms and the corresponding environmental regulations have increased. EPA has revised nationally recommended copper WQC from a simple linear equation based on hardness to a mechanistic model (the copper BLM) that more accurately accounts for the modifying effect of site-specific water chemistry. Accordingly, the BLM was used to develop copper SSWQC for surface waters of the Pajarito Plateau.

Streams on the Pajarito Plateau are thoroughly monitored under a variety of EPA and NMED programs, so it is a suitable setting for developing BLM-based WQC. Using a site-specific dataset generated from long-term monitoring, the current evaluation demonstrates that pH, DOC, and hardness concentrations account for 98% of the variation in BLM-based WQC. Therefore, the copper BLM can be simplified to a three-parameter MLR equation without losing significant accuracy, and while retaining the scientific rigor afforded by the BLM.

Given the high degree of agreement between the acute and chronic MLRs and the BLM, the equations presented in Section 6.1 can be adopted as copper SSWQC. They will provide accurate criteria that are protective of aquatic life in surface waters of the Pajarito Plateau, consistent with EPA recommendations and New Mexico WQS (20.6.4.10 NMAC).

6.1 Proposed Copper SSWQC Equations and Applicability

MLR equations were developed for both acute and chronic copper SSWQC for application to surface waters of the Pajarito Plateau. The use of one or both of the SSWQC depends on the hydrologic classification of the waterbody, as described below.

The proposed acute SSWQC is as follows:

$$\boldsymbol{CMC = exp(-22.914 + 1.017 \times ln(DOC) + 0.045 \times ln(hardness) + 5.176 \times pH - 0.261 \times pH^2)}$$

The proposed chronic SSWQC is as follows:

$$\boldsymbol{CCC = exp(-23.391 + 1.017 \times ln(DOC) + 0.045 \times ln(hardness) + 5.176 \times pH - 0.261 \times pH^2)}$$

As described in Section 3.3, the Pajarito Plateau has ephemeral, intermittent, and perennial surface waters. Hydrologic classifications did not influence the ability of the proposed acute and chronic SSWQC to accurately generate BLM-based WQC. Therefore, the acute and chronic copper SSWQC equations can be applied to any water body on the Pajarito Plateau.

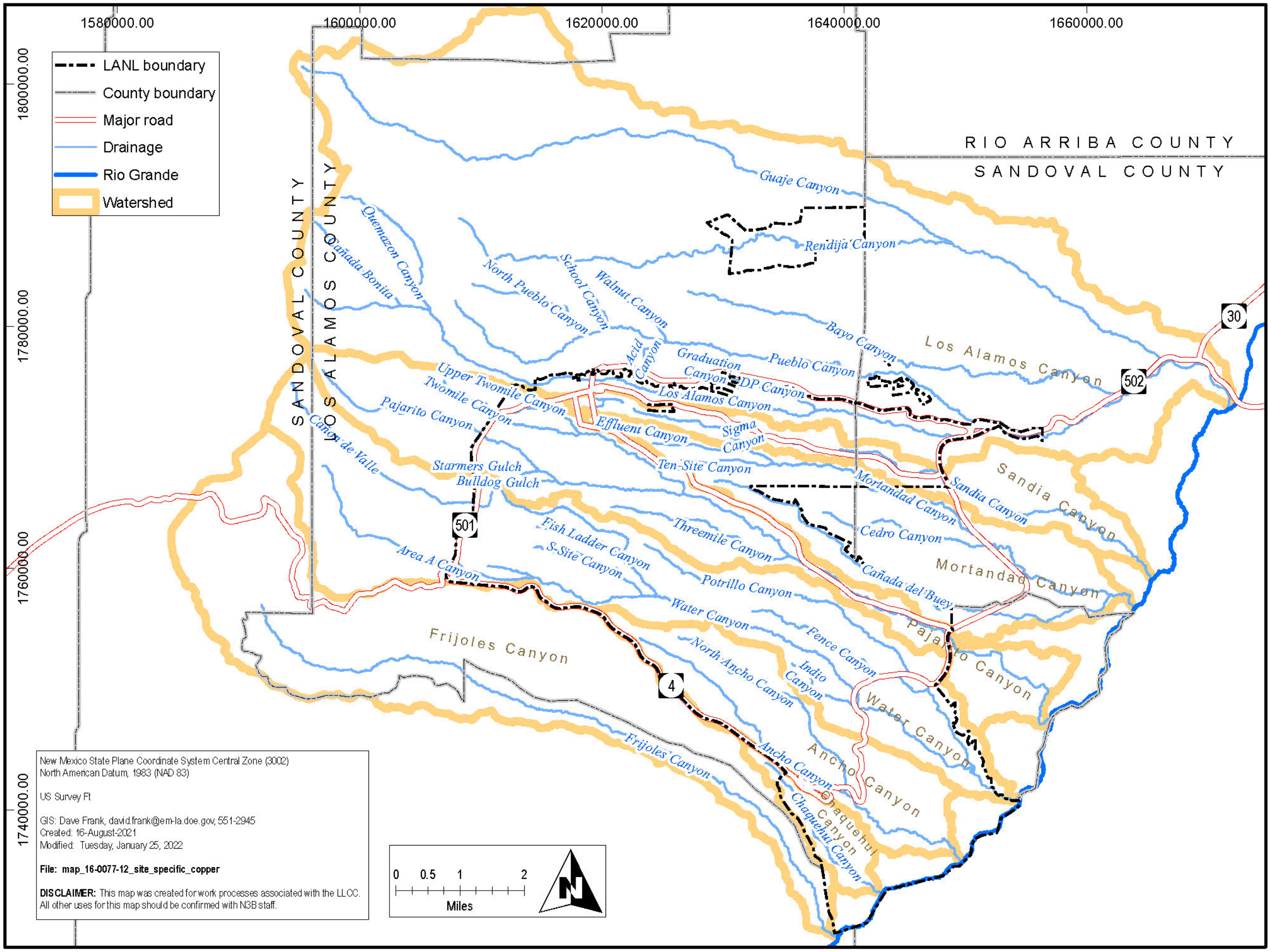
Most water bodies within the Laboratory's vicinity are classified as ephemeral or intermittent (20.6.4.128 NMAC); they are therefore designated as providing a limited aquatic life use and are subject to acute WQC only. Thus, the acute SSWQC equation would apply to those waters.

Other water bodies in the area are classified as perennial (20.6.4.126 and 20.6.4.121 NMAC) and are designated as providing higher-level aquatic life uses; these water bodies are subject to both acute and chronic aquatic life WQC. Unclassified surface water segments (20.6.4.98 NMAC) are designated as providing a marginal warm water aquatic life use and are subject to both acute and chronic WQC. Both the acute and chronic equations would apply to perennial and unclassified waters of the Pajarito Plateau.

As discussed in Section 2.4, the copper SSWQC are intended for eventual use in NPDES permits applicable to surface waters of the Pajarito Plateau. If the proposed copper SSWQC are adopted into New Mexico's WQS, updated TALs, benchmarks, and water quality-based effluent limits would be developed in accordance with each permitting program using the SSWQC criteria equations and appropriate datasets.

6.2 Spatial Boundaries for Proposed SSWQC

The spatial boundaries for the proposed SSWQC include all watersheds within the area of the Pajarito Plateau, from the Guaje Canyon watershed in the north to El Rito de Frijoles watershed in the south, from their headwaters to their confluence with the Rio Grande (Map 6-1). This area includes tributary streams and ephemeral or intermittent waters, regardless of whether they have a direct confluence with the Rio Grande or sufficient flow to reach the Rio Grande under normal conditions. Table 6-1 presents all AUs included in this area, their current classifications under NMAC, and their associated designated uses. The applicability of the acute and chronic SSWQC are also provided.



Map 6-1. Spatial boundary for proposed copper SSWQC

Table 6-1. Pajarito Plateau AUs where SSWQC would apply

AU ID	Major Watershed	AU Name	Stream Type	NMAC Class	Designated Use[a]							
					SSWQC Applicability	AL	Irr.	LW	WH	DW	PC	SC
NM-9000.A_054	Ancho	Ancho Canyon (Rio Grande to North Fork Ancho)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_055	Ancho	North Fork Ancho Canyon (Ancho Canyon to headwaters)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_046	Chaquehui	Ancho Canyon (North Fork to headwaters)	ephemeral	128	acute only	X		X	X			X
NM-128.A_03	Chaquehui	Chaquehui Canyon (within LANL)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_005	Chupaderos	Guaje Canyon (San Ildefonso bnd to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-2118.A_70	Frijoles	Rito de los Frijoles (Rio Grande to Upper Crossing)	perennial	121	acute and chronic	X	X	X	X	X	X	
NM-2118.A_74	Frijoles	Rito de los Frijoles (Upper Crossing to headwaters)	perennial	121	acute and chronic	X	X	X	X	X	X	
NM-126.A_03	Frijoles	Water Canyon (Area-A Canyon to NM 501)	perennial	126	acute and chronic	X	X	X	X			X
NM-97.A_002	Los Alamos/Pueblo	Acid Canyon (Pueblo to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-97.A_007	Los Alamos/Pueblo	Bayo Canyon (San Ildefonso bnd to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-128.A_14	Los Alamos/Pueblo	DP Canyon (Grade control to upper LANL bnd)	ephemeral	128	acute only	X		X	X			X
NM-128.A_10	Los Alamos/Pueblo	DP Canyon (Los Alamos Canyon to grade control)	intermittent	128	acute only	X		X	X			X
NM-97.A_005	Los Alamos/Pueblo	Graduation Canyon (Pueblo Canyon to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-97.A_003	Los Alamos/Pueblo	Kwage Canyon (Pueblo Canyon to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-2111_00	Los Alamos/Pueblo	Los Alamos above Rio Grande	ephemeral	128	acute only	X		X	X			X
NM-9000.A_063	Los Alamos/Pueblo	Los Alamos Canyon (DP Canyon to upper LANL bnd)	ephemeral	128	acute only	X		X	X			X
NM-127.A_00	Los Alamos/Pueblo	Los Alamos Canyon (Los Alamos Rsvr to headwaters)	perennial	127	acute and chronic	X	X	X	X		X	
NM-9000.A_006	Los Alamos/Pueblo	Los Alamos Canyon (NM-4 to DP Canyon)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_000	Los Alamos/Pueblo	Los Alamos Canyon (San Ildefonso bnd to NM-4)	intermittent	98	acute and chronic	X		X	X		X	
NM-9000.A_049	Los Alamos/Pueblo	Los Alamos Canyon (upper LANL bnd to Los Alamos Rsvr)	ephemeral	98	acute and chronic	X		X	X		X	
NM-9000.A_043	Los Alamos/Pueblo	Pueblo Canyon (Acid Canyon to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-99.A_001	Los Alamos/Pueblo	Pueblo Canyon (Los Alamos Canyon to Los Alamos WWTP)	ephemeral	98	acute and chronic	X		X	X		X	
NM-97.A_006	Los Alamos/Pueblo	Pueblo Canyon (Los Alamos WWTP to Acid Canyon)	ephemeral	98	acute and chronic	X		X	X		X	

AU ID	Major Watershed	AU Name	Stream Type	NMAC Class	Designated Use[a]							
					SSWQC Applicability	AL	Irr.	LW	WH	DW	PC	SC
NM-9000.A_045	Los Alamos/Pueblo	Rendija Canyon (Guaje Canyon to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-97.A_029	Los Alamos/Pueblo	South Fork Acid Canyon (Acid Canyon to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-97.A_004	Los Alamos/Pueblo	Walnut Canyon (Pueblo Canyon to headwaters)	ephemeral	98	acute and chronic	X		X	X		X	
NM-128.A_00	Mortandad	Canada del Buey (within LANL)	ephemeral	128	acute only	X		X	X			X
NM-128.A_17	Mortandad	Ten Site Canyon (Mortandad Canyon to headwaters)	ephemeral	128	acute only	X		X	X			X
NM-128.A_16	Pajarito	Arroyo de la Delfe (Pajarito Canyon to headwaters)	ephemeral	128	acute only	X		X	X			X
NM-126.A_01	Pajarito	Pajarito Canyon (Arroyo de La Delfe to Starmers Spring)	perennial	126	acute and chronic	X	X	X	X			X
NM-128.A_08	Pajarito	Pajarito Canyon (lower LANL bnd to Two Mile Canyon)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_040	Pajarito	Pajarito Canyon (Rio Grande to LANL bnd)	ephemeral	98	acute and chronic	X		X	X		X	
NM-128.A_06	Pajarito	Pajarito Canyon (Two Mile Canyon to Arroyo de La Delfe)	intermittent	128	acute only	X		X	X			X
NM-9000.A_048	Pajarito	Pajarito Canyon (upper LANL bnd to headwaters)	intermittent	98	acute and chronic	X		X	X		X	
NM-128.A_07	Pajarito	Pajarito Canyon (within LANL above Starmers Gulch)	intermittent	128	acute only	X		X	X			X
NM-9000.A_091	Pajarito	Three Mile Canyon (Pajarito Canyon to headwaters)	ephemeral	128	acute only	X		X	X			X
NM-128.A_15	Pajarito	Two Mile Canyon (Pajarito to headwaters)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_053	Rio Grande	Canada del Buey (San Ildefonso Pueblo to LANL bnd)	ephemeral	98	acute and chronic	X		X	X		X	
NM-9000.A_042	Sandia	Mortandad Canyon (within LANL)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_047	Sandia	Sandia Canyon (Sigma Canyon to NPDES outfall 001)	perennial	126	acute and chronic	X	X	X	X			X
NM-128.A_11	Sandia	Sandia Canyon (within LANL below Sigma Canyon)	ephemeral	128	acute only	X		X	X			X
NM-128.A_01	Water/Cañon de Valle	Canon de Valle (below LANL gage E256)	ephemeral	128	acute only	X		X	X			X
NM-126.A_00	Water/Cañon de Valle	Canon de Valle (LANL gage E256 to Burning Ground Spr)	perennial	126	acute and chronic	X	X	X	X			X
NM-9000.A_051	Water/Cañon de Valle	Canon de Valle (upper LANL bnd to headwaters)	intermittent	98	acute and chronic	X		X	X		X	
NM-128.A_02	Water/Cañon de Valle	Canon de Valle (within LANL above Burning Ground Spr)	ephemeral	128	acute only	X		X	X			X
NM-128.A_04	Water/Cañon de Valle	Fence Canyon (above Potrillo Canyon)	ephemeral	128	acute only	X		X	X			X
NM-128.A_05	Water/Cañon de Valle	Indio Canyon (above Water Canyon)	ephemeral	128	acute only	X		X	X			X

AU ID	Major Watershed	AU Name	Stream Type	NMAC Class	Designated Use[a]							
					SSWQC Applicability	AL	Irr.	LW	WH	DW	PC	SC
NM-128.A_09	Water/Cañon de Valle	Potrillo Canyon (above Water Canyon)	ephemeral	128	acute only	X		X	X			X
NM-9000.A_044	Water/Cañon de Valle	Water Canyon (Rio Grande to lower LANL bnd)	ephemeral	98	acute and chronic	X		X	X		X	
NM-9000.A_052	Water/Cañon de Valle	Water Canyon (upper LANL bnd to headwaters)	intermittent	98	acute and chronic	X		X	X		X	
NM-128.A_12	Water/Cañon de Valle	Water Canyon (within LANL above NM 501)	intermittent	128	acute only	X		X	X			X
NM-128.A_13	Water/Cañon de Valle	Water Canyon (within LANL below Area-A Cyn)	ephemeral	128	acute only	X		X	X			X

[a] AL – aquatic life; Irr. – irrigation; LW – livestock watering; WH – wildlife habitat; DW – drinking water; PC – primary contact; SC – secondary contact

AU – assessment unit

ID – identification

NMAC – New Mexico Administrative Code

SSWQC – site-specific water quality criteria

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DRAFT **Appendix A. LANL BLM Database**

Sample Information												Metals	BLM Parameters											
Location ID	Sample Date	Windward ID	X	Y	Sample Type	Landscape	Major Watershed	Minor Watershed	Current NMAC Code	Current Hydrologic Class	Proposed Hydrologic Class	Copper (ug/L)	Temp. (°C)	pH	DOC (mg/L)	Humic Acid (%)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Total Alkalinity (mg/L CaCO3)	Total Sulfide (mg/L)
Los Alamos above DP Canyon	4/28/2005	E030	1637449.1	1772912.232	WM	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.00	10.00	7.43	6.46	10.00	13.40	3.70	19.40	3.26	13.20	25.60	30.80	1E-10
Los Alamos below Ice Rink	4/29/2005	E026	1618215.135	1775624.331	WM	Undeveloped	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.00	10.00	7.32	6.21	10.00	11.60	3.46	10.10	3.02	12.50	15.20	37.20	1E-10
Mortandad below Effluent Canon	4/29/2005	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	3.50	10.00	7.51	6.67	10.00	14.70	3.06	36.80	7.25	10.50	34.60	61.70	1E-10
Acid above Pueblo	5/3/2005	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.00	10.00	6.72	3.12	10.00	37.40	3.60	180.00	6.47	10.40	248.00	70.20	1E-10
Pueblo above Acid	5/3/2005	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.00	10.00	7.77	11.10	10.00	18.10	2.63	29.95	4.09	23.40	36.50	47.30	1E-10
Mortandad below Effluent Canon	6/28/2006	E200	1626750.385	1770288.738	WP	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	9.00	10.00	7.52	2.97	10.00	21.80	2.95	65.70	7.46	10.10	15.70	168.00	1E-10
South Fork of Sandia at E122	6/29/2006	E122.SF	1620114.1	1773924.5	WP,WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	8.45	5.94	10.00	30.80	9.84	35.00	9.64	16.90	15.10	157.00	1E-10
Sandia below Wetlands	7/12/2006	E123	1622687.147	1773067.617	WP	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.20	10.00	7.91	4.84	10.00	24.30	6.98	91.30	12.10	13.70	69.20	144.00	1E-10
Acid above Pueblo	7/27/2006	E056	1624431.601	1778790.921	WS	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.00	10.00	7.02	3.08	10.00	11.10	1.13	77.90	3.67	8.25	72.90	68.70	1E-10
Pajarito above Twomile	8/29/2006	E243	1625793.513	1766185.42	WP	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	3.10	10.00	7.25	8.21	10.00	14.70	4.03	11.90	3.65	11.30	13.50	42.70	1E-10
Twomile above Pajarito	8/29/2006	E244	1626782.28	1766733.695	WP	Site	Pajarito	Twomile	128	E/I	Intermittent Stream		10.00	7.31	6.53	10.00	12.00	2.88	24.90	3.66	10.60	20.80	52.50	1E-10
Rio de los Frijoles at Band	9/20/2006	E350	1634678.6	1738080.2	WP	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream		10.00	8.09	2.23	10.00	11.60	3.54	12.00	2.11	3.85	5.55	61.10	1E-10
South Fork of Sandia at E122	10/17/2006	E122.SF	1620114.1	1773924.5	WP	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	8.84	12.97	10.00	43.10	13.30	55.00	8.76	13.70	21.90	222.00	1E-10
Sandia below Wetlands	10/18/2006	E123	1622687.147	1773067.617	WP	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.30	10.00	8.05	3.99	10.00	25.20	7.15	91.90	9.95	19.40	59.20	172.00	1E-10
Mortandad below Effluent Canon	10/27/2006	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream		10.00	7.47	5.13	10.00	19.70	3.05	40.40	5.58	8.38	13.70	109.00	1E-10
Water above SR-501	1/24/2007	E252 up	1607279.987	1760451	WP	Undeveloped	Water	Water	98	Intermittent	Perennial Stream	3.00	10.00	6.31	1.62	10.00	8.29	2.90	6.52	2.70	3.64	2.91	37.20	1E-10
Canon de Valle below MDA P	1/29/2007	E256	1616017.769	1764811.076	WP	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	3.00	10.00	7.27	2.07	10.00	20.50	5.83	17.50	3.29	7.22	22.10	68.00	1E-10
Sandia below Wetlands	2/20/2007	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.70	10.00	7.79	5.29	10.00	22.30	5.78	122.00	18.80	21.70	146.00	128.00	1E-10
South Fork of Sandia at E122	2/21/2007	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	8.40	17.35	10.00	28.60	7.88	75.50	19.10	11.50	129.00	154.00	1E-10
Mortandad below Effluent Canon	3/2/2007	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	4.10	10.00	6.81	5.34	10.00	21.40	4.63	85.70	8.20	14.80	128.00	41.40	1E-10
Pajarito above Twomile	4/3/2007	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream		10.00	7.40	6.84	10.00	12.10	3.70	13.30	2.87	14.80	14.80	11.00	1E-10
Twomile above Pajarito	4/3/2007	E244	1626782.28	1766733.695	WS	Site	Pajarito	Twomile	128	E/I	Intermittent Stream		10.00	7.31	3.48	10.00	17.90	4.51	32.40	3.29	10.60	60.30	7.15	1E-10
Los Alamos below Ice Rink	4/16/2007	E026	1618215.135	1775624.331	WS	Undeveloped	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.00	10.00	6.68	5.33	10.00	10.40	3.02	10.10	2.83	11.00	13.60	39.40	1E-10
Los Alamos above DP Canyon	4/17/2007	E030	1637449.1	1772912.232	WS	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.00	10.00	7.94	4.78	10.00	14.60	3.66	33.50	3.52	11.80	44.30	33.60	1E-10
Acid above Pueblo	4/18/2007	E056	1624431.601	1778790.921	WS	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.00	10.00	7.02	2.14	10.00	54.60	5.24	163.00	7.18	10.70	282.00	36.20	1E-10
Pueblo above Acid	4/18/2007	E055	1624411.282	1778877.63	WP	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.00	10.00	7.93	8.68	10.00	24.10	3.62	57.70	4.66	18.20	68.70	68.70	1E-10
Water above SR-501	5/31/2007	E252 up	1607279.987	1760451	WS	Undeveloped	Water	Water	98	Intermittent	Perennial Stream	3.00	10.00	6.80	3.97	10.00	10.20	3.60	9.29	3.18	9.88	5.11	42.30	1E-10
Canon de Valle below MDA P	6/1/2007	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	3.00	10.00	6.99	3.90	10.00	16.80	4.71	14.20	2.48	10.70	13.50	60.60	1E-10
Sandia below Wetlands	6/13/2007	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	7.96	8.85	10.00	23.40	6.26	90.20	14.50	9.12	71.40	142.00	1E-10
South Fork of Sandia at E122	6/13/2007	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	8.66	24.22	10.00	38.30	12.30	59.90	12.20	17.60	18.90	194.00	1E-10
Pajarito above Twomile	6/27/2007	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream		10.00	7.05	4.86	10.00	11.80	3.61	11.20	3.46	10.40	7.46	44.70	1E-10
Twomile above Pajarito	6/27/2007	E244	1626782.28	1766733.695	WS	Site	Pajarito	Twomile	128	E/I	Intermittent Stream		10.00	6.85	4.36	10.00	15.40	3.85	29.80	3.78	12.20	46.80	41.20	1E-10
Acid above Pueblo	7/25/2007	E056	1624431.601	1778790.921	WP	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream		10.00	7.49	3.44	10.00	13.70	1.37	83.60	3.93	6.02	78.70	68.30	1E-10
Pueblo above Acid	7/25/2007	E055	1624411.282	1778877.63	WP	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream		10.00	7.83	6.11	10.00	27.30	4.01	56.80	6.22	10.10	43.50	116.00	1E-10
South Fork of Sandia at E122	8/21/2007	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	8.45	11.25	10.00	32.50	10.60	52.60	24.60	53.80	18.30	158.00	1E-10
Mortandad below Effluent Canon	8/22/2007	E200	1626750.385	1770288.738	WP	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	3.10	10.00	7.73	4.07	10.00	16.40	2.52	41.10	8.21	22.60	12.60	79.60	1E-10
Sandia below Wetlands	8/22/2007	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	7.93	6.12	10.00	25.30	6.88	86.80	14.60	16.90	67.70	147.00	1E-10
Pajarito above Twomile	9/12/2007	E243	1625793.513	1766185.42	WP	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream		10.00	7.84	4.79	10.00	13.80	4.00	11.80	3.46	5.92	10.30	53.10	1E-10
Twomile above Pajarito	9/12/2007	E244	1626782.28	1766733.695	WP	Site	Pajarito	Twomile	128	E/I	Intermittent Stream		10.00	7.83	4.17	10.00	10.70	3.28	22.30	3.73	6.19	19.00	48.00	1E-10
Water above SR-501	10/17/2007	E252 up	1607279.987	1760451	WP	Undeveloped	Water	Water	98	Intermittent	Perennial Stream		10.00	7.48	1.80	10.00	11.30	4.06	7.44	3.23	3.15	3.92	54.40	1E-10
Canon de Valle below MDA P	10/25/2007	E256	1616017.769	1764811.076	WP	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream		10.00	7.87	3.73	10.00	24.70	6.32	14.20	3.44	5.45	16.80	93.60	1E-10
Rio de los Frijoles at Band	10/31/2007	E350	1634678.6	1738080.2	WP	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream	3.00	10.00	7.84	2.89	10.00	8.84	2.99	11.00	2.10	2.00	5.39	48.30	1E-10
Sandia below Wetlands	11/13/2007	E123	1622687.147	1773067.617	WP	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.09	3.66	10.00	27.60	8.13	96.20	14.20	15.70	111.00	126.00	1E-10
Pajarito above Twomile	12/17/2007	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	10.00	10.00	7.56	6.55	10.00	13.40	4.10	11.60	3.13	10.10	19.80	37.10	1E-10
Twomile above Pajarito	12/17/2007	E244	1626782.28	1766733.695	WS	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	10.00	10.00	7.51	4.99	10.00	11.60	3.28	22.90	3.39	7.25	32.20	37.70	1E-10
Acid above Pueblo	1/15/2008	E056	1624431.601	1778790.921	WS	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	10.00	10.00	6.87	2.51	10.00	13.90	1.42	63.50	3.77	5.87	85.10	43.50	1E-10
Pueblo above Acid	1/15/2008	E055	1624411.282	1778877.63	WS	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	10.00	10.00	7.52	4.19	10.00	45.50	7.03	61.80	5.57	14.30	124.00	77.00	1E-10
Sandia below Wetlands	2/14/2008	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.00	10.00	8.26	4.47	10.00	23.60	6.52	138.00	21.70	21.90	138.00	149.00	1E-10
South Fork of Sandia at E122	2/14/2008	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	7.20	10.00	8.00	17.87	10.00	23.00	3.85	245.00	75.10	13.00	346.00	74.30	1E-10
Mortandad below Effluent Canon	2/21/2008	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	4.80	10.00	7.39	6.08	10.00	20.20	4.00	67.10	7.30	5.99	121.00	35.10	1E-10
Pajarito above Twomile	3/5/2008	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	10.00	10.00	7.71	5.43	10.00	15.10	4.73	15.50	3.36	9.35	26.60	39.30	1E-10
Twomile above Pajarito	3/5/2008	E244	1626782.28	1766733.695	WS	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	10.00	10.00	7.52	2.81	10.00	19.60	5.16	37.80	4.12	6.79	77.90	25.90	1E-10
Canon de Valle below MDA P	3/31/2008	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.71	4.79	10.00	18.20	5.08	15.20	2.94	10.10	19.90	60.90	1E-10
Water above SR-501	4/3/2008	E252 up	1607279.987	1760451	WS	Undeveloped	Water	Water	98	Intermittent	Perennial Stream	10.00	10.00	7.37	5.83	10.00	12.30	4.24	9.49	3.12	11.90	11.80	36.00	1E-10
Rio de los Frijoles at Band	4/8/2008	E350	1634678.6	1738080.2	WS	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream	10.00	10.00	7.70	5.47	10.00	8.01	3.10	9.51	2.30	5.11	7.97	32.30	1E-10
Sandia below Wetlands	5/13/2008	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.22	5.09	10.00	20.10	6.00	76.30	13.40	22.20	48.50	135.00	1E-10
South Fork of Sandia at E122	5/21/2008	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.85	8.21	10.00	32.40	10.60	41.10	16.60	34.90	14.20	165.00	1E-10
Pajarito above Twomile	6/12/2008	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	10.00	10.00	6.32	4.64	10.00	10.90	3.28	12.30	3.32	8.64	8.28	45.70	1E-10
Sandia below Wetlands	8/11/2008	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.60	10.00	7.75	5.53	10.00	22.40	6.75	70.50	15.00	17.20	58.60	138.00	1E-10
South Fork of Sandia at E122	8/11/2008	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.12	9.19	10.00	29.50	9.43	40.80	25.20	49.00	19.00	153.00	1E-10
Mortandad below Effluent Canon	8/20/2008	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	5.00	10.00	7.60	7.89	10.00	14.00	2.56	75.60	11.70	12.30	48.50	110.00	1E-10
Acid above Pueblo	8/28/2008	E056	1624431.601	1778790.921	WT,WS	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.90	10.00	7.01	3.79	10.00	9.26	1.19	49.00	3.49	5.62	45.50	60.70	1E-10
Pueblo above Acid	8/28/2008	E055	1624411.282	1778877.63	WS	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	10.00	10.00	7.70	5.26	10.00	21.10	3.26	47.80	4.86	6.12	41.30	105.00	1E-10
DP above TA-21	9/2/2008	E038	1630683.66	1775660.775	WS	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	10.00	10.00	7.51	2.48	10.00	74.00	5.48	52.40	5.26	13.90	164.00	68.70	1E-10
Pajarito above Twomile	9/10/2008	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	10.00	10.00	7.76	4.46	10.00	13.40	3.97	13.20	3.45	5.81	12.10	57.60	1E-10
Twomile above Pajarito	9/10/2008	E244	1626782.28	1766733.695	WS	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	10.00	10.00	7.77	4.13	10.00	11.50	2.79	28.60	3.66	5.95	33.50	52.30	1E-10
Canon de Valle below MDA P	10/7/2008	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.64	3.78	10.00	22.30	5.87	16.00	4.19	5.79	19.20	81.60	1E-10
Water above SR-501	10/17/2008	E252 up	1607279.987	1760451	WS	Undeveloped	Water	Water	98	Intermittent	Perennial Stream	10.00	10.00	7.11	2.21	10.00	11.80	3.91	7.98	3.50	3.11	4.17	55.50	1E-10
Rio de los Frijoles at Band	10/23/2008	E350	1634678.6	1738080.2	WS	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream	10.00	10.00	7.84	2.89	10.00	9.23	2.99	11.00	1.99	2.00	3.95	51.80	1E-10
Sandia below Wetlands	11/3/2008	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.00	10.00	8.20	4.97	10.00	22.10	6.52	84.40	14.20	17.30	79.90	128.00	1E-10
Sandia right fork at Pwr Plant	11/3/2008	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.30	10.00	8.24	5.26	10.00	21.70	6.84	68.20	13.80	18.20	64.90	105.00	1E-10
South Fork of Sandia at E122	11/3/2008	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.32	17.95	10.00	31.70	10.30	53.20	34.40	71.00	12.00	162.00	1E-10
Mortandad below Effluent Canon	11/18/2008	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	9.70	10.00	7.42	3.64	10.00	14.90	2.22	53.70	7.25	15.10	31.10	106.00	1E-10
Sandia below Wetlands	2/9/2009	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.60	10.00	8.28	4.17	10.00	29.50	8.76	125.00	16.20	19.30	145.00	157.00	1E-10
Sandia right fork at Pwr Plant	2/9/2009	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.30	10.00	8.24	3.68	10.00	28.70	8.87	139.00	15.90	17.60	146.00	162.00	1E-10
South Fork of Sandia at E122	2/9/2009	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.67	9.19	10.00	43.20	13.70	54.40	20.40	42.20	25.60	209.00	1E-10
Mortandad below Effluent Canon	2/12/2009	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	7.40	10.00	7.63	3.38	10.00	22.30	3.34	118.00	10.40	21.30	132.00	94.10	1E-10
Pajarito above Twomile	3/11/2009	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	10.00	10.00	7.46	3.24	10.00	12.60	3.80	12.50	2.48	9.38	26.80	30.10	1E-10
Canon de Valle below MDA P	3/24/2009	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.59	2.50	10.00	18.20	5.09	16.80	3.25	7.13	22.20	67.00	1E-10
Water above SR-501	3/25/2009	E252 up	1607279.987	1760451	WS	Undeveloped	Water	Water	98	Intermittent	Perennial Stream	10.00	10.00	7.14	0.89	10.00	8.82	3.24	6.55	2.68	2.72	5.69	39.50	1E-10
Sandia below Wetlands	5/5/2009	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.41	10.00	8.48	4.88	10.00	31.80	9.20	109.00	17.30	19.90	131.00	146.00	1E-10
Sandia right fork at Pwr Plant	5/7/2009	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.28	1.68	10.00	32.10	9.56	97.40	16.00	15.90	19.12	130.00	1E-10
South Fork of Sandia at E122	5/7/2009	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.61	5.83	10.00	20.70	5.92	27.60	13.30	22.40	9.53	97.00	1E-10
Acid above Pueblo	7/9/2009	E056	1624431.601	1778790.921	WT,WS	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	4.43	10.00	6.91	3.40	10.00	9.15	1.02	56.10	3.30	4.74	55.10	51.50	1E-10
Pueblo above Acid	7/9/2009	E055	1624411.282	1778877.63	WS	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.31	10.00	7.78	5.95	10.00	23.30	3.35	80.50	5.54	7.47	67.40	105.00	1E-10
Sandia below Wetlands	8/7/2009	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.16	10.00	8.11	4.17	10.00	24.30	7.35	72.70	14.80	23.90	62.90	125.00	1E-10
Sandia right fork at Pwr Plant	8/7/2009	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.41	3.91	10.00	27.40	8.74	86.10	16.80	19.60	94.50	129.00	1E-10
South Fork of Sandia at E122	8/13/2009	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	9.05	10.00	8.51	8.39	10.00	31.40	10.40	43.20	28.70	58.30	11.90	147.00	1E-10
Mortandad below Effluent Canon	8/18/2009	E200	1626750.385	1770288.738	WS	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	5.56	10.00	7.41	6.20	10.00	14.20	2.26	42.00	8.14	4.64	27.10	96.70	1E-10
Canon de Valle below MDA P	10/15/2009	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.78	2.68	10.00	26.50	5.87	18.30	4.72	5.60	19.90	91.50	1E-10
Water above SR-501	10/16/2009	E252 up	1607279.987	1760451	WS	Undeveloped	Water	Water	98	Intermittent	Perennial Stream	10.00	10.00	6.94	1.28	10.00	9.87	3.47	7.63	2.81	1.87	3.69	50.20	1E-10
Rio de los Frijoles at Band	10/21/2009	E350	1634678.6	1738080.2	WS	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream	10.00	10.00	7.72	4.10	10.00	8.73	3.01	10.60	2.50	1.58	2.68	49.20	1E-10
Sandia right fork at Pwr Plant	11/2/2009	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.91	10.00	8.19	3.17	10.00	21.40	6.68	70.20	11.00	17.20	66.20	94.00	1E-10
South Fork of Sandia at E122	11/2/2009	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	32.80	10.00	8.50	7.95	10.00	27.80	9.31	45.40	23.90	45.30	13.10	141.00	1E-10
Sandia below Wetlands	11/4/2009	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.20	10.00	8.10	3.82	10.00	19.20	5.59	71.00	11.30	22.10	53.80	121.00	1E-10

DRAFT **Appendix A. LANL BLM Database**

Sample Information												Metals	BLM Parameters											
Location ID	Sample Date	Windward ID	X	Y	Sample Type	Landscape	Major Watershed	Minor Watershed	Current NMAC Code	Current Hydrologic Class	Proposed Hydrologic Class	Copper (ug/L)	Temp. (℃)	pH	DOC (mg/L)	Humic Acid (%)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Total Alkalinity (mg/L CaCO3)	Total Sulfide (mg/L)
Sandia below Wetlands	1/29/2010	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.72	10.00	8.07	82.98	10.00	71.40	46.60	912.00	571.00	424.00	1820.00	264.00	1E-10
Sandia right fork at Pwr Plant	2/1/2010	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.65	10.00	8.20	4.33	10.00	28.20	8.37	149.00	18.70	22.00	176.00	153.00	1E-10
South Fork of Sandia at E122	2/1/2010	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.36	10.22	10.00	43.20	13.60	77.90	46.60	66.90	64.00	205.00	1E-10
Sandia right fork at Pwr Plant	5/7/2010	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.95	10.00	8.36	4.47	10.00	22.40	6.59	70.30	13.10	12.90	87.60	96.50	1E-10
South Fork of Sandia at E122	5/7/2010	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	9.09	10.00	8.93	14.77	10.00	40.70	13.40	58.00	28.30	54.30	25.80	208.00	1E-10
Sandia below Wetlands	5/13/2010	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.17	10.00	8.14	4.13	10.00	18.00	5.22	65.30	12.00	12.60	61.10	101.00	1E-10
Pajarito above Twomile	6/8/2010	E243	1625793.513	1766185.42	WS	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	10.00	10.00	7.78	4.51	10.00	10.80	3.41	13.20	3.35	7.61	7.97	42.70	1E-10
Twomile above Pajarito	8/11/2010	E244	1626782.28	1766733.695	WS	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	10.00	10.00	7.60	4.07	10.00	17.80	4.20	40.20	5.09	10.40	60.70	48.00	1E-10
Canon de Valle below MDA P	9/7/2010	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.74	3.62	10.00	20.80	5.64	17.10	3.37	6.04	18.50	73.40	1E-10
Water above SR-501	9/10/2010	E252 up	1607279.987	1760451	WS	Undeveloped	Water	Water	98	Intermittent	Perennial Stream	10.00	10.00	7.30	2.24	10.00	11.00	3.92	9.07	3.31	3.19	3.95	53.10	1E-10
Rio de los Frijoles at Band	9/17/2010	E350	1634678.6	1738080.2	WS	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream	10.00	10.00	7.99	2.16	10.00	8.73	3.01	11.40	1.98	1.82	4.31	49.50	1E-10
Sandia right fork at Pwr Plant	11/9/2010	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.39	10.00	8.30	4.80	10.00	37.00	10.20	95.60	16.40	19.90	100.00	156.00	1E-10
South Fork of Sandia at E122	11/9/2010	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.48	10.00	8.47	9.88	10.00	47.60	13.50	76.70	18.70	123.00	18.10	166.00	1E-10
Sandia below Wetlands	11/11/2010	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.18	3.99	10.00	29.90	8.25	90.90	12.90	28.00	51.30	68.20	1E-10
Sandia below Wetlands	5/17/2011	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.14	6.15	10.00	24.70	7.45	61.00	16.10	37.00	36.50	146.00	1E-10
Sandia right fork at Pwr Plant	5/19/2011	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.23	10.00	8.34	4.56	10.00	24.50	7.62	80.70	16.40	20.90	67.20	141.00	1E-10
South Fork of Sandia at E122	5/19/2011	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.16	10.00	8.54	9.71	10.00	26.80	8.78	46.50	26.00	59.00	14.20	123.00	1E-10
Canon de Valle below MDA P	9/16/2011	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.88	10.48	10.00	53.10	11.30	18.70	7.40	5.70	18.90	193.00	1E-10
Canon de Valle below MDA P	3/28/2013	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.59	2.84	10.00	26.40	5.51	17.00	4.12	7.56	20.70	87.10	1E-10
Sandia below Wetlands	4/16/2013	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.68	10.00	7.94	7.41	10.00	14.85	3.77	74.02	13.51	27.29	48.11	167.92	1E-10
Sandia right fork at Pwr Plant	4/16/2013	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.24	10.00	7.96	6.39	10.00	12.43	3.29	73.88	10.77	26.49	51.57	157.31	1E-10
South Fork of Sandia at E122	4/16/2013	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.33	10.00	8.16	11.65	10.00	21.97	6.67	42.65	26.40	66.28	11.76	157.26	1E-10
Sandia below Wetlands	5/17/2013	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.97	10.00	7.53	9.65	10.00	19.73	4.96	59.83	12.91	32.05	45.25	178.97	1E-10
Sandia right fork at Pwr Plant	5/17/2013	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.15	10.00	8.01	5.54	10.00	13.65	3.72	54.67	9.90	26.54	49.31	134.79	1E-10
DP above TA-21	6/14/2013	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	8.01	10.00	6.88	30.60	10.00	15.20	1.35	14.40	5.13	4.76	14.60	51.30	1E-10
DP below grade ctrl structure	6/14/2013	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	7.60	10.00	6.83	20.50	10.00	12.10	1.23	26.20	6.98	5.68	30.10	41.90	1E-10
Pueblo above Acid	6/14/2013	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	5.36	10.00	6.74	17.60	10.00	9.37	1.23	22.90	5.08	4.99	27.90	35.60	1E-10
DP above TA-21	6/30/2013	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.39	10.00	6.93	8.02	10.00	10.70	0.92	8.32	2.94	2.40	8.25	32.80	1E-10
DP below grade ctrl structure	6/30/2013	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	6.10	10.00	7.06	12.40	10.00	9.55	1.15	17.80	4.91	3.69	20.10	31.20	1E-10
Sandia right fork at Pwr Plant	6/30/2013	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.48	10.00	7.12	9.39	10.00	8.96	0.98	14.30	5.65	5.84	29.70	29.10	1E-10
Acid above Pueblo	7/12/2013	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	5.11	10.00	6.86	9.60	10.00	6.41	0.85	11.40	3.53	1.85	12.40	25.50	1E-10
DP above TA-21	7/12/2013	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.23	10.00	7.12	4.01	10.00	9.80	0.76	5.24	2.24	2.00	4.99	23.90	1E-10
DP below grade ctrl structure	7/12/2013	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.54	10.00	7.32	5.20	10.00	10.10	1.04	6.99	3.11	2.28	8.37	28.10	1E-10
Los Alamos above low-head weir	7/12/2013	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.95	10.00	7.42	14.50	10.00	19.20	2.13	15.50	5.81	2.85	10.57	64.00	1E-10
Los Alamos below low-head weir	7/12/2013	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	4.16	10.00	7.17	14.30	10.00	14.10	2.00	11.80	5.93	5.17	14.10	51.50	1E-10
Mortandad above Ten Site	7/12/2013	E201	1633074.678	1769370.925	WT	Site	Mortandad	Mortandad	128	E/I	Ephemeral Stream	4.47	10.00	7.13	19.40	10.00	16.80	2.34	11.20	7.53	6.51	15.20	57.20	1E-10
Pajarito above Threemile	7/12/2013	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	2.76	10.00	7.17	16.70	10.00	11.80	1.92	9.20	6.72	2.56	11.40	41.60	1E-10
Sandia right fork at Pwr Plant	7/12/2013	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.30	10.00	7.20	26.10	10.00	5.96	0.81	9.81	4.10	5.04	13.70	22.90	1E-10
Sandia right fork at Pwr Plant	7/22/2013	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.84	10.00	8.17	2.95	10.00	14.00	4.12	46.50	11.00	16.80	25.20	85.30	1E-10
Ancho below SR-4	7/25/2013	E275	1641902.732	1739818.299	WT	Site	Ancho	Ancho	128	E/I	Ephemeral Stream	2.84	10.00	6.94	34.50	10.00	15.90	2.78	3.41	6.77	2.37	2.71	79.60	1E-10
Los Alamos above Rio Grande	7/25/2013	E1099	1670298.54	1776310.43	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.26	10.00	7.41	25.80	10.00	20.00	4.21	7.51	8.35	10.60	1.91	80.60	1E-10
Los Alamos above Rio Grande	7/26/2013	E1099	1670298.54	1776310.43	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.51	10.00	7.57	18.00	10.00	30.90	3.77	9.26	4.81	6.94	5.66	216.00	1E-10
DP above TA-21	7/28/2013	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.79	10.00	6.87	6.61	10.00	8.12	0.59	6.15	1.95	2.01	4.93	25.00	1E-10
DP below grade ctrl structure	7/28/2013	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	4.72	10.00	7.06	8.70	10.00	8.91	0.93	12.40	3.37	2.39	10.10	35.40	1E-10
Los Alamos above Rio Grande	8/3/2013	E1099	1670298.54	1776310.43	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.66	10.00	7.55	23.50	10.00	52.30	9.83	8.32	16.50	8.32	4.05	147.00	1E-10
Acid above Pueblo	8/5/2013	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.64	10.00	7.10	7.46	10.00	5.49	0.74	10.30	2.96	1.60	7.32	29.80	1E-10
DP above Los Alamos Canyon	8/5/2013	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.16	10.00	7.34	5.56	10.00	9.00	0.91	11.20	3.45	1.73	8.13	36.70	1E-10
Guaje at SR-502	8/5/2013	E099	1666451.92	1777248.77	WT	Site	Los Alamos	Guaje	98	Intermittent	Intermittent Stream	2.32	10.00	7.50	18.40	10.00	33.40	4.27	4.93	5.90	8.92	1.12	104.00	1E-10
Los Alamos above low-head weir	8/5/2013	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.74	10.00	7.36	6.95	10.00	9.46	1.22	12.90	4.03	2.20	9.72	43.60	1E-10
Los Alamos below low-head weir	8/5/2013	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.48	10.00	7.21	13.90	10.00	15.10	2.13	13.50	5.94	1.64	10.60	55.30	1E-10
DP above TA-21	8/9/2013	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream		10.00	7.42	6.06	10.00	7.69	0.52	5.58	1.53	2.00	4.30	29.80	1E-10
Pajarito below SR-501	8/20/2013	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream	2.44	10.00	6.88	18.70	10.00	14.50	2.88	2.04	7.59	3.66	1.01	36.70	1E-10
Water above SR-501	9/2/2013	E252 up	1607279.987	1760451	WT	Undeveloped	Water	Water	98	Intermittent	Perennial Stream		10.00	7.19	24.30	10.00	20.50	4.55	3.99	7.44	5.61	1.80	89.00	1E-10
DP above Los Alamos Canyon	9/10/2013	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.00	10.00	7.50	7.73	10.00	11.10	1.02	11.10	3.27	2.54	9.39	46.60	1E-10
DP below grade ctrl structure	9/10/2013	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.43	10.00	7.50	9.88	10.00	14.60	1.29	12.60	3.39	3.95	10.50	51.30	1E-10
Los Alamos above low-head weir	9/10/2013	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	5.16	10.00	7.64	12.20	10.00	12.50	1.59	15.10	4.17	3.62	15.10	59.10	1E-10
Pajarito below SR-501	9/10/2013	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream		10.00	7.04	24.90	10.00	10.00	1.85	2.48	5.55	2.11	1.54	8.90	1E-10
Los Alamos below low-head weir	9/11/2013	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.54	10.00	7.50	13.20	10.00	14.90	1.92	13.40	4.85	2.22	13.00	69.10	1E-10
Water above SR-501	9/11/2013	E252 up	1607279.987	1760451	WT	Undeveloped	Water	Water	98	Intermittent	Perennial Stream		10.00	7.71	14.50	10.00	9.95	2.85	5.99	3.44	2.22	1.02	42.40	1E-10
WR-REF-3 at RF13WR03	9/11/2013	WR-REF-3	1654224.752	1757295.268	WT	Undeveloped	Mortandad	Mortandad	98	Intermittent	Intermittent Stream		10.00	7.81	16.60	10.00	10.00	0.94	0.67	2.73	0.36	0.30	37.70	1E-10
Acid above Pueblo	9/12/2013	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.00	10.00	7.22	5.58	10.00	4.98	0.58	8.02	2.17	1.30	5.22	20.90	1E-10
Ancho below SR-4	9/12/2013	E275	1641902.732	1739818.299	WT	Site	Ancho	Ancho	128	E/I	Ephemeral Stream	2.99	10.00	7.05	13.00	10.00	13.80	2.06	2.17	3.99	1.08	1.15	51.80	1E-10
DP above TA-21	9/12/2013	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream		10.00	7.19	2.09	10.00	6.53	0.53	2.75	1.04	1.22	2.05	21.10	1E-10
Los Alamos above Rio Grande	9/12/2013	E1099	1670298.54	1776310.43	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	7.25	10.00	7.43	13.20	10.00	35.40	5.11	10.30	8.07	7.39	4.63	94.20	1E-10
Los Alamos below Ice Rink	9/12/2013	E026	1618215.135	1775624.331	WT	Undeveloped	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.80	10.00	7.84	14.40	10.00	26.50	4.65	23.40	6.84	9.79	12.20	114.00	1E-10
Los Alamos below low-head weir	9/12/2013	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.64	10.00	7.35	8.29	10.00	21.00	3.02	16.60	5.83	4.25	12.20	53.90	1E-10
Mortandad above Ten Site	9/12/2013	E201	1633074.678	1769370.925	WT	Site	Mortandad	Mortandad	128	E/I	Ephemeral Stream	7.43	10.00	7.20	17.70	10.00	11.90	1.77	16.90	6.89	5.45	15.80	33.00	1E-10
Pajarito above Threemile	9/12/2013	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	1.76	10.00	7.18	11.00	10.00	11.30	2.19	6.59	5.69	2.56	8.67	36.10	1E-10
Pajarito below SR-501	9/12/2013	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream	4.11	10.00	7.33	7.50	10.00	22.86	3.61	1.68	7.07	1.88	0.85	26.70	1E-10
Pueblo above Acid	9/12/2013	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.71	10.00	7.38	8.77	10.00	9.54	1.37	23.00	3.61	2.81	17.60	40.80	1E-10
Sandia left fork at Asph Plant	9/12/2013	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	2.44	10.00	7.63	4.51	10.00	14.50	1.25	5.65	2.93	2.43	9.45	32.40	1E-10
Sandia right fork at Pwr Plant	9/12/2013	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	2.65	10.00	7.44	3.27	10.00	4.06	0.64	8.29	3.01	3.05	7.71	20.90	1E-10
WR-REF-3 at RF13WR03	9/12/2013	WR-REF-3	1654224.752	1757295.268	WT	Undeveloped	Mortandad	Mortandad	98	Intermittent	Intermittent Stream		10.00	7.72	13.60	10.00	14.90	1.45	0.82	2.70	0.27	0.24	52.30	1E-10
Chaquehui at TA-33	9/13/2013	E338	1639792.836	1735450.235	WT	Site	Chaquehui	Chaquehui	128	E/I	Ephemeral Stream	4.13	10.00	6.74	16.20	10.00	7.48	1.46	0.90	4.37	2.44	0.72	31.40	1E-10
Pajarito above SR-4	9/13/2013	E250	1646963.683	1755252.105	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	3.02	10.00	7.08	13.70	10.00	11.60	2.42	9.00	8.14	5.39	16.10	30.30	1E-10
Sandia above SR-4	9/13/2013	E125	1647472.056	1767966.131	WT	Site	Sandia	Sandia	128	E/I	Ephemeral Stream	1.87	10.00	6.65	10.40	10.00	6.84	0.94	1.40	3.08	2.35	0.90	12.60	1E-10
South Fork of Acid Canyon	9/13/2013	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.45	10.00	6.87	6.67	10.00	5.11	0.67	4.41	1.93	1.07	5.92	13.10	1E-10
Ten Site above Mortandad	9/13/2013	E201.5	1633024.952	1768470.302	WT	Site	Mortandad	Tensite	128	E/I	Ephemeral Stream	4.92	10.00	6.98	11.70	10.00	11.80	2.27	3.84	4.90	2.77	3.65	35.60	1E-10
Water below SR-4	9/13/2013	E265	1642753.28	1748258.527	WT	Site	Water	Water	128	E/I	Ephemeral Stream	3.52	10.00	7.55	21.40	10.00	20.60	3.93	3.55	7.09	3.43	2.77	154.00	1E-10
Water above SR-501	9/18/2013	E252 up	1607279.987	1760451	WT	Undeveloped	Water	Water	98	Intermittent	Perennial Stream		10.00	7.59	6.86	10.00	17.20	5.05	7.79	4.43	11.50	4.90	59.10	1E-10
Water above SR-501	9/19/2013	E252 up	1607279.987	1760451	WT	Undeveloped	Water	Water	98	Intermittent	Perennial Stream		10.00	8.64	6.44	10.00	17.00	5.43	9.46	4.00	11.00	6.15	59.60	1E-10
Pajarito below SR-501	9/22/2013	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream		10.00	7.22	3.69	10.00	4.89	0.40	6.63	3.22	2.88	3.97	21.10	1E-10
Sandia below Wetlands	12/4/2013	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	2.87	10.00	8.18	4.96	10.00	14.66	3.99	67.49	10.96	26.89	91.96	139.13	1E-10
Sandia right fork at Pwr Plant	12/4/2013	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.39	10.00	8.09	4.51	10.00	13.05	3.76	76.65	10.15	23.27	110.28	128.44	1E-10
South Fork of Sandia at E122	12/4/2013	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.25	10.00	8.12	11.76	10.00	28.79	10.13	225.46	31.49	46.76	344.59	153.37	1E-10
Canon de Valle below MDA P	3/10/2014	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.77	2.71	10.00	20.20	4.02	15.30	3.44	9.78	16.40	78.70	1E-10
Sandia below Wetlands	5/23/2014	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	8.69	10.00	7.19	18.20	10.00	10.24	2.21	39.93	13.90	14.10	39.50	52.70	1E-10
Potrillo above SR-4	7/2/2014	E267	1645352.039	1751323.246	WT	Site	Water	Potrillo	128	E/I	Ephemeral Stream	1.94	10.00	6.83	10.20	10.00	10.20	2.01	1.14	3.49	1.86	0.76	58.50	1E-10
Acid above Pueblo	7/7/2014	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.89	10.00	6.51	7.83	10.00	5.23	0.69	11.00	2.96	2.17	11.10	24.30	1E-10
Pajarito above Threemile	7/7/2014	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	3.99	10.00	6.77	22.70	10.00	6.55	1.27	8.32	4.54	2.81	11.70	48.50	1E-10
Sandia below Wetlands	7/7/2014	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.73	10.00	6.85	9.30	10.00	8.36	1.23	14.83	6.50	5.83	13.00	30.10	1E-10
Sandia right fork at Pwr Plant	7/7/2014	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.55	10.00	6.77	4.26	10.00	7.49	1.44	24.83	6.19	4.50	12.10	17.40	1E-10
DP above TA-21	7/8/2014	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.43	10.00	7.33	7.18	10.00	10.70	1.11	6.71	2.08	2.57	5.15	47.50	1E-10
DP below grade ctrl structure	7/8/2014	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.02	10.00	7.08	8.20	10.00	13.40	1.14	14.30	3.43	3.33	15.60	46.90	1E-10
Mortandad above Ten Site	7/8/2014	E201	1633074.678	1769370.925	WT	Site	Mortandad	Mortandad	128	E/I	Ephemeral Stream	5.04	10.00	6.65	13.00	10.00	8.07	1.35	15.30	7.93	3.47	20.70	39.50	1E-10

DRAFT **Appendix A. LANL BLM Database**

Sample Information												Metals	BLM Parameters											
Location ID	Sample Date	Windward ID	X	Y	Sample Type	Landscape	Major Watershed	Minor Watershed	Current NMAC Code	Current Hydrologic Class	Proposed Hydrologic Class	Copper (ug/L)	Temp. (°C)	pH	DOC (mg/L)	Humic Acid (%)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Total Alkalinity (mg/L CaCO3)	Total Sulfide (mg/L)
DP above Los Alamos Canyon	7/9/2014	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.89	10.00	6.95	8.38	10.00	13.40	2.47	17.75	5.26	3.17	15.80	45.30	1E-10
Acid above Pueblo	7/15/2014	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.06	10.00	6.66	7.77	10.00	3.69	0.49	6.86	1.96	1.03	5.62	21.10	1E-10
DP above TA-21	7/15/2014	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.34	10.00	7.33	3.96	10.00	6.06	0.66	4.47	1.56	1.64	4.54	25.80	1E-10
DP below grade ctrl structure	7/15/2014	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.63	10.00	7.11	7.32	10.00	8.65	0.81	7.86	2.24	2.17	7.98	27.40	1E-10
Pajarito above Threemile	7/15/2014	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	1.56	10.00	6.60	8.86	10.00	3.95	0.89	2.99	3.17	1.61	2.89	42.20	1E-10
Sandia below Wetlands	7/15/2014	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.89	10.00	6.92	8.59	10.00	8.73	1.37	15.30	6.14	4.04	11.30	42.20	1E-10
Sandia right fork at Pwr Plant	7/15/2014	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.61	10.00	6.53	4.43	10.00	3.85	0.84	12.95	4.60	3.38	9.90	21.35	1E-10
Los Alamos below low-head weir	7/16/2014	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.63	10.00	6.98	11.60	10.00	10.40	1.48	10.80	4.05	4.43	13.50	58.00	1E-10
Pajarito above Threemile	7/19/2014	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	1.72	10.00	6.74	9.31	10.00	6.00	1.34	10.10	4.49	2.15	11.30	32.20	1E-10
Pajarito below SR-501	7/19/2014	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream	1.62	10.00	6.66	10.70	10.00	9.20	1.80	0.80	5.34	2.58	0.83	71.70	1E-10
Sandia below Wetlands	7/19/2014	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.80	10.00	6.71	8.11	10.00	7.32	1.47	16.37	7.13	4.06	10.30	32.20	1E-10
Sandia right fork at Pwr Plant	7/19/2014	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	9.69	10.00	6.97	4.18	10.00	7.04	1.57	20.68	6.08	3.70	8.26	24.80	1E-10
Sandia below Wetlands	7/21/2014	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.59	10.00	7.99	6.14	10.00	20.80	4.91	66.50	15.70	21.60	52.80	122.00	1E-10
Sandia right fork at Pwr Plant	7/21/2014	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.24	10.00	8.08	4.00	10.00	18.40	5.13	75.50	16.80	26.10	65.10	110.00	1E-10
Chaquehui at TA-33	7/23/2014	E338	1639792.836	1735450.235	WT	Site	Chaquehui	Chaquehui	128	E/I	Ephemeral Stream	1.89	10.00	6.84	15.10	10.00	14.90	2.64	1.60	5.78	3.13	0.86	91.00	1E-10
DP above TA-21	7/27/2014	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.77	10.00	6.93	7.18	10.00	7.59	0.47	4.20	1.44	3.20	8.94	21.40	1E-10
DP below grade ctrl structure	7/27/2014	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.82	10.00	7.00	9.71	10.00	11.10	0.93	10.10	2.82	2.92	8.64	15.90	1E-10
Pajarito above Threemile	7/27/2014	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	1.48	10.00	6.37	9.53	10.00	4.36	0.97	0.81	3.56	1.30	0.48	20.90	1E-10
Sandia left fork at Asph Plant	7/27/2014	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.82	10.00	7.03	5.99	10.00	5.47	0.48	4.98	2.96	3.38	7.32	22.80	1E-10
Sandia right fork at Pwr Plant	7/27/2014	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.27	10.00	6.73	6.28	10.00	8.95	1.55	25.80	6.90	6.70	17.30	25.50	1E-10
Acid above Pueblo	7/29/2014	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.40	10.00	6.83	5.78	10.00	4.13	0.55	6.09	1.98	1.23	4.85	21.40	1E-10
DP above TA-21	7/29/2014	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.04	10.00	7.18	3.38	10.00	6.18	0.42	3.15	1.30	1.25	2.33	20.00	1E-10
DP below grade ctrl structure	7/29/2014	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.31	10.00	7.01	4.21	10.00	6.87	0.62	5.08	1.95	1.49	4.10	20.90	1E-10
E059.5 Pueblo below LAC WWTF	7/29/2014	E059.5	1643469.866	1776062.519	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.20	10.00	6.86	7.90	10.00	7.88	1.49	17.90	5.55	4.38	14.10	45.00	1E-10
Los Alamos above low-head weir	7/29/2014	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.76	10.00	6.82	7.50	10.00	7.94	1.38	12.10	4.04	2.41	11.20	49.60	1E-10
Los Alamos below low-head weir	7/29/2014	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.50	10.00	6.96	9.00	10.00	9.44	1.57	14.30	4.63	3.42	14.10	46.00	1E-10
Pajarito below SR-501	7/29/2014	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream	1.58	10.00	6.80	10.40	10.00	14.30	2.64	1.69	6.54	2.65	0.99	58.20	1E-10
Sandia above Firing Range	7/29/2014	E124	1636600.69	1770215.618	WT	Site	Sandia	Sandia	128	E/I	Intermittent Stream	3.38	10.00	7.21	8.25	10.00	8.03	1.63	14.30	6.71	5.16	9.48	43.20	1E-10
Sandia below Wetlands	7/29/2014	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.31	10.00	7.34	8.30	10.00	8.43	1.42	16.35	6.07	6.91	23.73	73.80	1E-10
Sandia left fork at Asph Plant	7/29/2014	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.68	10.00	6.52	4.12	10.00	4.85	0.48	5.93	3.28	1.87	5.50	15.00	1E-10
Twomile above Pajarito	7/29/2014	E244	1626782.28	1766733.695	WT	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	2.38	10.00	6.69	15.40	10.00	7.42	1.66	7.30	4.88	2.01	7.79	64.60	1E-10
Sandia right fork at Pwr Plant	7/30/2014	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.11	7.36	10.00	12.71	3.28	67.70	13.14	41.50	73.79	120.03	1E-10
South Fork of Sandia at E122	7/30/2014	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.27	16.76	10.00	27.26	6.39	53.31	26.43	46.21	51.98	181.34	1E-10
DP above TA-21	7/31/2014	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	1.20	10.00	7.32	2.87	10.00	7.90	0.48	3.11	1.23	1.74	2.61	22.30	1E-10
DP below grade ctrl structure	7/31/2014	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.12	10.00	7.25	3.49	10.00	11.00	0.82	5.77	1.96	1.96	4.27	27.30	1E-10
E059.5 Pueblo below LAC WWTF	7/31/2014	E059.5	1643469.866	1776062.519	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	2.84	10.00	6.63	7.05	10.00	9.31	1.71	12.60	4.67	3.41	10.40	49.10	1E-10
Los Alamos above low-head weir	7/31/2014	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.68	10.00	6.97	8.16	10.00	7.03	1.37	12.20	3.87	2.59	11.80	70.10	1E-10
Los Alamos below low-head weir	7/31/2014	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.32	10.00	6.88	9.64	10.00	8.69	1.47	12.70	4.41	3.65	11.90	40.00	1E-10
Mortandad above Ten Site	7/31/2014	E201	1633074.678	1769370.925	WT	Site	Mortandad	Mortandad	128	E/I	Ephemeral Stream	4.77	10.00	6.82	15.00	10.00	8.80	1.33	14.40	6.85	1.99	9.58	49.10	1E-10
Mortandad at LANL Boundary	7/31/2014	E204	1641803.501	1766832.164	WT	Site	Mortandad	Mortandad	128	E/I	Ephemeral Stream	1.48	10.00	7.60	5.93	10.00	11.40	1.42	0.85	4.73	4.34	1.07	105.00	1E-10
Pajarito above SR-4	7/31/2014	E250	1646963.683	1755252.105	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	2.17	10.00	6.58	12.30	10.00	5.92	1.36	6.68	4.12	2.12	7.57	26.80	1E-10
Pajarito above Threemile	7/31/2014	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	1.50	10.00	6.70	6.93	10.00	4.60	1.12	5.00	3.79	1.21	4.01	28.20	1E-10
Pajarito below SR-501	7/31/2014	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream	1.44	10.00	6.78	9.94	10.00	5.42	1.18	1.46	3.76	2.08	1.29	20.50	1E-10
Pueblo above Acid	7/31/2014	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	2.51	10.00	6.86	6.00	10.00	5.63	0.90	11.30	2.48	2.57	9.61	26.80	1E-10
Sandia above Firing Range	7/31/2014	E124	1636600.69	1770215.618	WT	Site	Sandia	Sandia	128	E/I	Intermittent Stream	3.11	10.00	6.88	10.40	10.00	4.99	1.15	11.60	4.81	3.83	9.84	35.50	1E-10
Sandia above SR-4	7/31/2014	E125	1647472.056	1767966.131	WT	Site	Sandia	Sandia	128	E/I	Ephemeral Stream	3.98	10.00	7.07	9.12	10.00	12.20	2.30	17.00	6.55	8.45	12.00	83.30	1E-10
Sandia below Wetlands	7/31/2014	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.41	10.00	7.24	3.55	10.00	9.72	1.15	8.69	4.10	3.40	3.53	32.80	1E-10
Sandia left fork at Asph Plant	7/31/2014	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	1.84	10.00	7.36	2.40	10.00	7.42	0.45	2.70	2.04	1.26	3.32	25.50	1E-10
Sandia right fork at Pwr Plant	7/31/2014	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.79	10.00	6.97	2.40	10.00	7.05	1.11	16.99	4.43	2.26	4.18	25.00	1E-10
Twomile above Pajarito	7/31/2014	E244	1626782.28	1766733.695	WT	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	2.09	10.00	6.41	11.50	10.00	5.42	1.25	5.49	3.46	1.69	5.59	37.30	1E-10
Water below SR-4	7/31/2014	E265	1642753.28	1748258.527	WT	Site	Water	Water	128	E/I	Ephemeral Stream	1.99	10.00	6.93	12.20	10.00	8.79	2.22	3.28	4.67	1.96	1.75	55.50	1E-10
Pajarito below SR-501	10/9/2014	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream		10.00	7.20	8.36	10.00	4.33	0.53	5.04	2.65	1.58	1.69	22.10	1E-10
DP above Los Alamos Canyon	5/21/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.64	10.00	7.55	5.98	10.00	8.52	0.90	20.20	3.39	2.27	19.00	36.50	1E-10
DP below grade ctrl structure	5/21/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.49	10.00	7.39	4.96	10.00	5.93	0.57	10.50	2.15	1.50	9.95	25.70	1E-10
DP above Los Alamos Canyon	6/26/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.80	10.00	7.46	6.89	10.00	8.96	0.98	11.60	3.93	2.33	12.40	36.20	1E-10
DP above TA-21	6/26/2015	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.69	10.00	7.41	5.64	10.00	7.93	0.46	3.15	1.69	1.58	2.90	26.00	1E-10
DP below grade ctrl structure	6/26/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.79	10.00	7.47	7.84	10.00	8.13	0.86	7.62	3.04	2.06	9.20	30.60	1E-10
Sandia right fork at Pwr Plant	6/26/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.65	10.00	7.70	7.47	10.00	5.25	0.92	14.73	5.29	14.00	24.30	45.90	1E-10
Pueblo below GCS	7/2/2015	E060.1	1650902.66	1772289.42	WT	Site	Pueblo	Pueblo	128	E/I	Intermittent Stream	2.60	10.00	7.76	12.70	10.00	16.70	2.19	8.18	7.13	1.62	14.90	100.00	1E-10
Acid above Pueblo	7/3/2015	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.74	10.00	7.37	5.39	10.00	6.22	0.57	8.10	2.19	1.57	5.34	32.60	1E-10
DP above Los Alamos Canyon	7/3/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.30	10.00	7.58	6.18	10.00	8.80	0.95	13.00	3.63	1.70	12.70	38.20	1E-10
DP above TA-21	7/3/2015	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.44	10.00	7.43	3.83	10.00	6.12	0.41	3.16	1.31	0.98	1.91	23.40	1E-10
DP below grade ctrl structure	7/3/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.22	10.00	7.57	7.43	10.00	7.67	0.80	7.82	2.66	1.35	7.75	31.60	1E-10
E059.5 Pueblo below LAC WWTF	7/3/2015	E059.5	1643469.866	1776062.519	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.44	10.00	7.46	7.89	10.00	9.45	1.77	17.95	5.99	4.68	14.90	54.00	1E-10
Los Alamos above low-head weir	7/3/2015	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.20	10.00	7.54	8.32	10.00	11.60	2.18	21.30	5.01	2.95	24.70	60.10	1E-10
Pueblo above Acid	7/3/2015	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.26	10.00	7.59	8.07	10.00	6.51	0.92	12.60	3.00	2.07	10.80	36.70	1E-10
Sandia below Wetlands	7/3/2015	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.50	10.00	7.78	7.79	10.00	5.27	1.12	12.73	6.20	4.08	12.80	42.80	1E-10
Sandia right fork at Pwr Plant	7/3/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.33	10.00	7.78	5.16	10.00	4.68	0.76	11.30	4.21	10.00	22.40	55.50	1E-10
Pajarito above Twomile	7/6/2015	E243	1625793.513	1766185.42	WT	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	4.45	10.00	7.35	8.57	10.00	6.15	1.84	6.09	3.70	2.21	5.52	30.60	1E-10
Starmers above Pajarito	7/6/2015	E242	1614644.252	1767983.726	WT	Site	Pajarito	Starmers	126	Perennial	Perennial Stream	2.16	10.00	7.20	9.05	10.00	3.55	0.97	4.58	3.07	1.37	5.10	25.50	1E-10
DP above Los Alamos Canyon	7/7/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.29	10.00	7.83	8.87	10.00	9.77	1.05	17.10	3.21	2.06	23.80	64.20	1E-10
DP below grade ctrl structure	7/7/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	1.88	10.00	7.51	3.41	10.00	5.71	0.52	5.78	1.94	1.68	4.02	24.50	1E-10
Los Alamos above low-head weir	7/7/2015	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.92	10.00	7.69	8.49	10.00	9.43	1.78	17.80	4.32	2.82	17.50	50.40	1E-10
Los Alamos below low-head weir	7/7/2015	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.21	10.00	7.76	9.32	10.00	11.40	2.09	21.40	5.06	4.18	31.60	68.30	1E-10
Pajarito above Threemile	7/7/2015	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	2.22	10.00	7.52	8.76	10.00	6.51	1.54	10.80	4.32	2.73	12.80	35.70	1E-10
Pajarito above Starmers	7/15/2015	E241	1614687.844	1768103.439	WT	Site	Pajarito	Pajarito	128	E/I	Perennial Stream	1.58	10.00	7.39	8.10	10.00	5.78	1.30	5.09	3.48	1.71	5.06	43.30	1E-10
Pajarito above Threemile	7/15/2015	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	2.07	10.00	7.40	7.82	10.00	5.75	1.27	9.28	4.82	2.51	10.90	26.90	1E-10
Pajarito below SR-501	7/15/2015	E240	1610350.084	1770945.505	WT	Undeveloped	Pajarito	Pajarito	128	E/I	Intermittent Stream	2.07	10.00	7.05	8.48	10.00	3.72	0.84	2.27	3.49	1.88	0.99	12.40	1E-10
Sandia right fork at Pwr Plant	7/15/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.39	10.00	7.90	4.78	10.00	6.03	1.33	19.09	5.41	14.50	30.90	70.30	1E-10
Acid above Pueblo	7/20/2015	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.30	10.00	7.43	4.96	10.00	4.10	0.45	5.51	1.73	0.95	5.90	21.40	1E-10
DP above Los Alamos Canyon	7/20/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.35	10.00	7.51	5.09	10.00	6.57	0.68	9.04	3.02	1.30	8.00	30.90	1E-10
DP above TA-21	7/20/2015	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	1.89	10.00	7.38	3.43	10.00	4.49	0.34	2.48	1.27	1.13	1.88	14.40	1E-10
DP below grade ctrl structure	7/20/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.39	10.00	7.44	4.56	10.00	5.76	0.53	5.88	2.29	1.11	4.56	22.90	1E-10
La Delfe above Pajarito	7/20/2015	E242.5	1616053.533	1767185.074	WT	Site	Pajarito	Arroyo de la Delfe	128	E/I	Perennial Stream	2.67	10.00	7.11	8.69	10.00	3.77	1.05	3.98	2.51	2.07	3.27	20.90	1E-10
Los Alamos above low-head weir	7/20/2015	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.89	10.00	7.68	4.89	10.00	8.21	1.71	13.10	3.72	2.85	10.57	51.30	1E-10
Los Alamos below low-head weir	7/20/2015	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.56	10.00	7.86	6.99	10.00	16.20	3.34	22.30	5.21	7.30	31.50	79.60	1E-10
Pajarito above Starmers	7/20/2015	E241	1614687.844	1768103.439	WT	Site	Pajarito	Pajarito	128	E/I	Perennial Stream	0.97	10.00	7.38	5.84	10.00	4.33	0.95	3.37	2.47	1.16	2.90	34.80	1E-10
Pajarito above Threemile	7/20/2015	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	2.18	10.00	7.35	6.79	10.00	3.97	0.84	7.55	4.25	1.66	9.84	23.90	1E-10
Pajarito above Twomile	7/20/2015	E243	1625793.513	1766185.42	WT	Site	Pajarito	Pajarito	128	E/I	Intermittent Stream	2.58	10.00	7.38	10.50	10.00	5.76	1.47	5.33	3.34	2.21	5.75	36.80	1E-10
Pueblo below GCS	7/20/2015	E060.1	1650902.66	1772289.42	WT	Site	Pueblo	Pueblo	128	E/I	Intermittent Stream	2.02	10.00	7.99	7.21	10.00	9.35	1.27	43.70	8.59	3.22	56.60	52.80	1E-10
Sandia below Wetlands	7/20/2015	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.47	10.00	7.69	6.58	10.00	4.88	0.95	10.45	4.94	4.23	14.90	41.80	1E-10
Sandia right fork at Pwr Plant	7/20/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.38	10.00	7.80	4.66	10.00	4.76	0.85	12.37	4.07	7.22	17.90	50.80	1E-10
Twomile above Pajarito	7/20/2015	E244	1626782.28	1766733.695	WT	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	1.67	10.00	7.24	8.83	10.00	2.81	0.70	6.79	2.86	1.47	7.52	21.40	1E-10
Pajarito above SR-4	7/21/2015	E250	1646963.683	1755252.105	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	3.20	10.00	7.47	14.00	10.00	9.59	2.36	13.40	9.06	4.85	17.20	34.80	1E-10
Acid above Pueblo	7/29/2015	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.23	10.00	7.32	5.04	10.00	3.50	0.36	5.78	1.55	1.16	4.16	17.40	1E-10

DRAFT **Appendix A. LANL BLM Database**

Sample Information														Metals	BLM Parameters											
Location ID	Sample Date	Windward ID	X	Y	Sample Type	Landscape	Major Watershed	Minor Watershed	Current NMAC Code	Current Hydrologic Class	Proposed Hydrologic Class	Copper (ug/L)	Temp. (°C)	pH	DOC (mg/L)	Humic Acid (%)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Total Alkalinity (mg/L CaCO3)	Total Sulfide (mg/L)
DP above Los Alamos Canyon	7/29/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.63	10.00	7.48	5.33	10.00	6.44	0.61	9.03	2.78	1.60	8.75	26.40	1E-10
DP above TA-21	7/29/2015	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.40	10.00	7.25	3.70	10.00	3.76	0.25	2.29	1.10	1.30	1.88	10.50	1E-10
DP below grade ctrl structure	7/29/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.87	10.00	7.44	5.10	10.00	5.58	0.52	5.15	2.12	1.51	4.95	20.90	1E-10
Los Alamos below low-head weir	7/29/2015	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.91	10.00	7.90	7.20	10.00	15.70	3.27	22.10	4.92	6.71	31.50	72.20	1E-10
Pajarito above Threemile	7/29/2015	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	2.42	10.00	7.26	6.50	10.00	3.40	1.01	5.23	3.92	1.21	4.86	20.40	1E-10
RF09GU02	7/29/2015	GUAJE-REF-2	1642533.5	1790296.6	WT	Undeveloped	Los Alamos	Guaje	98	Intermittent	Intermittent Stream	0.72	10.00	7.79	6.67	10.00	15.20	4.51	7.75	5.44	8.42	1.92	66.70	1E-10
Sandia above Firing Range	7/29/2015	E124	1636600.69	1770215.618	WT	Site	Sandia	Sandia	128	E/I	Intermittent Stream	3.58	10.00	7.87	8.37	10.00	20.20	5.33	37.70	15.70	10.90	27.00	75.20	1E-10
Sandia below Wetlands	7/29/2015	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.38	10.00	7.58	4.50	10.00	4.39	0.93	10.41	5.17	2.31	7.16	28.40	1E-10
Sandia right fork at Pwr Plant	7/29/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	2.71	10.00	7.56	3.04	10.00	3.26	0.54	6.29	2.74	2.35	5.54	21.40	1E-10
WR-REF-3 at RF13WR03	7/29/2015	WR-REF-3	1654224.752	1757295.268	WT	Undeveloped	Mortandad	Mortandad	98	Intermittent	Intermittent Stream	5.10	10.00	7.90	8.78	10.00	14.50	2.58	2.39	4.79	0.66	0.29	63.20	1E-10
DP above Los Alamos Canyon	7/31/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.94	10.00	7.61	7.91	10.00	9.93	1.10	9.05	3.28	2.57	7.01	39.30	1E-10
DP above TA-21	7/31/2015	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.42	10.00	7.53	5.15	10.00	6.96	0.63	4.51	1.69	1.99	3.52	24.90	1E-10
DP below grade ctrl structure	7/31/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.23	10.00	7.59	4.71	10.00	7.71	0.70	5.93	2.20	1.92	4.59	31.40	1E-10
Los Alamos above low-head weir	7/31/2015	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.30	10.00	7.77	6.34	10.00	10.70	1.62	10.85	3.46	4.66	9.51	50.80	1E-10
Los Alamos below low-head weir	7/31/2015	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.75	10.00	7.74	7.25	10.00	12.95	2.43	18.10	4.51	5.25	23.20	57.20	1E-10
Rio de los Frijoles at Band	7/31/2015	E350	1634678.6	1738080.2	WT	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream	0.89	10.00	7.68	8.05	10.00	10.40	3.05	8.97	3.66	6.27	3.58	47.80	1E-10
Sandia above Firing Range	7/31/2015	E124	1636600.69	1770215.618	WT	Site	Sandia	Sandia	128	E/I	Intermittent Stream	3.19	10.00	7.51	15.50	10.00	5.77	1.15	13.05	5.50	3.07	11.00	36.80	1E-10
Sandia right fork at Pwr Plant	7/31/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.55	10.00	7.95	4.77	10.00	5.96	1.32	16.65	5.07	9.12	22.70	68.70	1E-10
Canon de Valle below MDA P	8/1/2015	E256	1616017.769	1764811.076	WT	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	1.94	10.00	7.87	5.61	10.00	12.30	1.93	4.65	2.95	1.91	2.38	49.30	1E-10
Water below SR-4	8/1/2015	E265	1642753.28	1748258.527	WT	Site	Water	Water	128	E/I	Ephemeral Stream	3.82	10.00	7.21	17.10	10.00	6.39	1.86	3.49	4.88	2.17	1.56	28.90	1E-10
La Delfe above Pajarito	8/2/2015	E242.5	1616053.533	1767185.074	WT	Site	Pajarito	Arroyo de la Delfe	128	E/I	Perennial Stream	2.78	10.00	7.23	11.30	10.00	4.72	1.31	4.02	2.74	1.73	2.51	39.80	1E-10
Starmers above Pajarito	8/2/2015	E242	1614644.252	1767983.726	WT	Site	Pajarito	Starmers	126	Perennial	Perennial Stream	1.71	10.00	7.29	9.18	10.00	4.41	1.24	6.47	2.95	1.87	6.07	16.40	1E-10
DP above TA-21	8/8/2015	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	1.76	10.00	7.11	2.64	10.00	3.79	0.24	2.14	0.98	0.87	1.27	12.90	1E-10
DP below grade ctrl structure	8/8/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.34	10.00	7.50	5.28	10.00	6.06	0.53	5.61	2.04	1.25	4.68	25.40	1E-10
Los Alamos below low-head weir	8/8/2015	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	0.99	10.00	7.97	6.16	10.00	18.40	4.41	27.50	5.10	11.70	32.20	69.20	1E-10
RF09GU02	8/8/2015	GUAJE-REF-2	1642533.5	1790296.6	WT	Undeveloped	Los Alamos	Guaje	98	Intermittent	Intermittent Stream	2.57	10.00	7.49	6.08	10.00	14.00	3.70	7.68	5.69	9.15	1.85	53.30	1E-10
WR-REF-3 at RF13WR03	8/11/2015	WR-REF-3	1654224.752	1757295.268	WT	Undeveloped	Mortandad	Mortandad	98	Intermittent	Intermittent Stream	2.37	10.00	7.66	11.30	10.00	18.10	1.80	2.18	4.04	1.36	0.51	77.00	1E-10
RF09GU02	8/17/2015	GUAJE-REF-2	1642533.5	1790296.6	WT	Undeveloped	Los Alamos	Guaje	98	Intermittent	Intermittent Stream	0.67	10.00	7.74	5.71	10.00	16.40	4.94	7.66	5.82	9.24	2.17	66.70	1E-10
Sandia below Wetlands	8/17/2015	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	9.03	10.00	7.60	8.34	10.00	6.60	1.62	12.19	7.37	5.45	18.00	40.80	1E-10
Sandia right fork at Pwr Plant	8/17/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.12	10.00	8.60	6.42	10.00	5.65	1.14	11.79	4.53	3.83	8.98	269.00	1E-10
WR-REF-3 at RF13WR03	8/17/2015	WR-REF-3	1654224.752	1757295.268	WT	Undeveloped	Mortandad	Mortandad	98	Intermittent	Intermittent Stream	2.00	10.00	7.87	8.71	10.00	14.30	1.29	1.15	3.29	0.99	0.56	682.00	1E-10
Sandia below Wetlands	8/20/2015	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	7.92	3.54	10.00	17.80	4.81	60.20	14.20	22.10	44.30	119.00	1E-10
Sandia right fork at Pwr Plant	8/20/2015	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.00	10.00	8.13	1.93	10.00	14.10	4.32	39.70	9.40	12.60	28.80	92.30	1E-10
WR-REF-3 at RF13WR03	8/27/2015	WR-REF-3	1654224.752	1757295.268	WT	Undeveloped	Mortandad	Mortandad	98	Intermittent	Intermittent Stream	2.08	10.00	7.70	13.20	10.00	24.95	2.54	1.54	3.96	0.60	0.40	94.30	1E-10
BAND-REF-3	9/9/2015	BAND-REF-3	1608295.878	1757405.797	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified	1.16	10.00	6.69	12.90	10.00	4.66	0.84	0.60	2.43	0.80	0.49	13.90	1E-10
BAND-REF-3	10/20/2015	BAND-REF-3	1608295.878	1757405.797	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified	0.82	10.00	6.17	16.70	10.00	3.30	0.54	0.45	2.21	0.85	0.52	8.47	1E-10
BAND-REF-4	10/20/2015	BAND-REF-4	1619402.965	1755871.917	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified	1.50	10.00	6.56	6.69	10.00	1.65	0.51	1.00	2.18	0.97	0.47	7.47	1E-10
Sandia below Wetlands	10/20/2015	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.01	10.00	7.55	5.64	10.00	4.89	1.25	14.60	7.93	4.64	10.10	29.50	1E-10
Acid above Pueblo	10/21/2015	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.16	10.00	7.35	5.69	10.00	4.40	0.49	5.58	2.09	1.66	3.72	20.90	1E-10
DP above Los Alamos Canyon	10/21/2015	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.75	10.00	7.11	6.41	10.00	8.12	0.83	11.10	3.16	2.95	10.80	28.90	1E-10
DP below grade ctrl structure	10/21/2015	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.39	10.00	7.26	4.50	10.00	5.81	0.55	5.44	2.29	1.90	5.80	20.90	1E-10
E059.8 Pueblo Below Wetlands	10/21/2015	E059.8	1647376.832	1774623.8	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	4.74	10.00	7.51	10.90	10.00	26.10	5.27	58.20	17.00	38.10	57.50	109.00	1E-10
Los Alamos above low-head weir	10/21/2015	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.03	10.00	7.48	6.84	10.00	6.40	1.22	8.45	3.20	2.17	6.91	32.90	1E-10
Los Alamos below low-head weir	10/21/2015	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.28	10.00	7.73	6.36	10.00	7.38	1.60	11.20	3.38	3.17	16.20	47.80	1E-10
Rio de los Frijoles at Band	10/22/2015	E350	1634678.6	1738080.2	WT	Undeveloped	Frijoles	Frijoles	121	Perennial	Perennial Stream	0.45	10.00	7.33	8.04	10.00	12.60	3.70	8.93	3.62	2.43	3.55	62.70	1E-10
Los Alamos below low-head weir	10/23/2015	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.95	10.00	7.33	5.87	10.00	7.97	1.79	12.00	3.55	2.74	11.90	38.20	1E-10
Sandia below Wetlands	10/23/2015	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.17	10.00	6.85	5.95	10.00	3.99	0.87	8.37	3.66	2.98	5.75	21.90	1E-10
Sandia left fork at Asph Plant	10/23/2015	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	2.74	10.00	7.52	6.98	10.00	2.43	0.27	2.38	1.63	4.02	15.20	25.50	1E-10
Sandia right fork at Pwr Plant	10/23/2015	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.77	10.00	7.79	3.46	10.00	4.29	0.93	11.25	2.86	7.62	14.90	41.20	1E-10
Canon de Valle below MDA P	12/11/2015	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.78	2.03	10.00	22.40	5.03	15.10	2.96	7.53	16.80	73.80	1E-10
Canon de Valle below MDA P	3/28/2016	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.96	2.83	10.00	20.00	4.51	17.10	3.06	9.77	22.50	65.00	1E-10
Canon de Valle below MDA P	6/21/2016	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.83	3.42	10.00	24.50	5.24	15.70	3.89	6.15	14.30	94.00	1E-10
Sandia right fork at Pwr Plant	7/1/2016	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.56	10.00	7.33	6.33	10.00	6.58	1.21	24.00	6.36	4.60	20.60	23.20	1E-10
Sandia right fork at Pwr Plant	7/15/2016	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.96	10.00	7.27	9.71	10.00	9.34	2.15	35.45	7.73	4.93	19.20	28.70	1E-10
Sandia below Wetlands	7/31/2016	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.19	10.00	7.08	10.50	10.00	6.12	1.32	18.17	7.92	6.52	17.70	31.10	1E-10
Sandia right fork at Pwr Plant	7/31/2016	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.87	10.00	7.13	4.89	10.00	5.44	0.96	14.86	3.96	2.88	13.80	21.10	1E-10
DP above Los Alamos Canyon	8/3/2016	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.25	10.00	7.33	8.24	10.00	11.00	1.10	18.40	4.78	2.63	23.80	39.20	1E-10
DP below grade ctrl structure	8/3/2016	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.63	10.00	7.28	6.50	10.00	9.30	0.92	10.40	3.82	1.80	15.50	29.10	1E-10
Los Alamos below Ice Rink	8/3/2016	E026	1618215.135	1775624.331	WT	Undeveloped	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.36	10.00	7.19	9.77	10.00	13.00	2.11	8.73	4.65	4.45	9.61	46.20	1E-10
Pajarito above Threemile	8/3/2016	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	4.80	10.00	6.66	18.70	10.00	5.79	1.57	10.60	6.08	2.42	12.40	24.10	1E-10
Sandia below Wetlands	8/3/2016	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.10	10.00	7.33	6.50	10.00	6.03	1.27	15.77	6.12	3.89	12.70	32.10	1E-10
Sandia right fork at Pwr Plant	8/3/2016	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.29	10.00	7.47	2.94	10.00	4.82	0.92	13.92	4.06	2.35	8.22	21.10	1E-10
Twomile above Pajarito	8/3/2016	E244	1626782.28	1766733.695	WT	Site	Pajarito	Twomile	128	E/I	Intermittent Stream	2.01	10.00	6.77	17.10	10.00	5.85	1.30	9.06	4.75	2.17	10.50	53.20	1E-10
Pueblo above Acid	8/7/2016	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	2.71	10.00	7.41	7.62	10.00	7.98	1.10	20.50	2.90	3.52	25.90	44.70	1E-10
Sandia below Wetlands	8/8/2016	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.80	10.00	7.72	11.48	10.00	12.46	2.96	34.50	12.14	10.65	33.55	76.30	1E-10
Sandia right fork at Pwr Plant	8/8/2016	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.44	10.00	8.29	5.79	10.00	11.90	4.16	29.52	4.76	10.71	32.15	73.30	1E-10
South Fork of Sandia at E122	8/9/2016	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.15	10.00	8.33	16.83	10.00	29.73	9.34	65.34	20.71	80.48	25.18	187.16	1E-10
DP above Los Alamos Canyon	8/19/2016	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.04	10.00	7.22	6.32	10.00	10.60	1.01	12.50	3.37	2.15	12.80	35.10	1E-10
DP above TA-21	8/19/2016	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.89	10.00	7.26	4.61	10.00	7.15	0.52	4.23	1.48	1.81	4.07	25.10	1E-10
South Fork of Acid Canyon	8/19/2016	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.71	10.00	7.18	6.56	10.00	5.43	0.51	6.31	2.26	1.48	5.58	22.10	1E-10
DP above Los Alamos Canyon	8/24/2016	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.47	10.00	7.42	6.10	10.00	7.92	0.78	9.08	2.33	1.67	9.17	37.10	1E-10
DP above TA-21	8/24/2016	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.34	10.00	7.34	4.70	10.00	5.00	0.39	3.47	1.20	1.43	2.74	20.10	1E-10
DP above Los Alamos Canyon	8/27/2016	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.52	10.00	7.46	4.46	10.00	8.61	0.72	7.21	2.13	1.58	6.63	40.20	1E-10
DP above TA-21	8/27/2016	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	1.75	10.00	7.49	3.69	10.00	6.67	0.43	3.01	1.17	1.30	2.40	28.10	1E-10
E059.5 Pueblo below LAC WWTF	8/27/2016	E059.5	1643469.866	1776062.519	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	3.19	10.00	6.85	9.60	10.00	6.10	1.34	19.60	5.84	3.93	15.90	35.10	1E-10
Los Alamos above low-head weir	8/27/2016	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.99	10.00	7.18	5.56	10.00	8.72	1.54	10.30	3.32	2.21	9.51	57.20	1E-10
Los Alamos below low-head weir	8/27/2016	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.16	10.00	7.15	7.08	10.00	9.09	1.60	11.60	4.10	2.88	12.10	49.20	1E-10
Sandia below Wetlands	8/27/2016	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.85	10.00	7.33	5.21	10.00	5.78	1.14	13.33	4.92	2.80	9.09	29.10	1E-10
Sandia right fork at Pwr Plant	8/27/2016	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.53	10.00	7.21	3.56	10.00	4.97	0.87	13.98	3.19	2.66	8.87	20.10	1E-10
South Fork of Acid Canyon	8/27/2016	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.64	10.00	7.01	7.22	10.00	3.31	0.42	5.21	1.63	1.12	3.86	15.10	1E-10
Pueblo above Acid	9/3/2016	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	2.39	10.00	7.40	7.57	10.00	6.04	0.91	14.40	2.59	2.11	13.10	40.20	1E-10
South Fork of Acid Canyon	9/3/2016	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	5.73	10.00	7.38	14.30	10.00	5.52	0.59	13.00	2.41	2.86	6.41	28.10	1E-10
DP above Los Alamos Canyon	9/6/2016	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.11	10.00	7.50	7.22	10.00	11.00	1.12	14.00	3.52	2.29	13.10	43.00	1E-10
DP below grade ctrl structure	9/6/2016	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.87	10.00	7.47	6.09	10.00	8.73	0.85	6.98	2.58	1.81	6.49	30.00	1E-10
Sandia below Wetlands	9/6/2016	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.05	10.00	7.43	5.71	10.00	5.03	1.08	13.53	5.53	3.40	9.40	13.00	1E-10
Sandia right fork at Pwr Plant	9/6/2016	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.86	10.00	7.30	2.75	10.00	5.63	1.25	20.29	4.24	2.35	6.20	18.00	1E-10
Canon de Valle below MDA P	9/9/2016	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.98	3.64	10.00	24.10	5.21	14.70	3.76	5.62	15.00	93.00	1E-10
Sandia left fork at Asph Plant	10/3/2016	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	17.33	10.00	6.74	30.20	10.00	11.80	2.03	21.27	8.24	10.70	15.90	36.00	1E-10
Sandia left fork at Asph Plant	10/8/2016	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	22.93	10.00	7.02	23.80	10.00	10.02	1.61	18.43	8.10	13.00	13.50	43.00	1E-10
Sandia left fork at Asph Plant	11/4/2016	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	37.93	10.00	6.47	43.20	10.00	12.75	1.95	20.70	9.04	12.60	17.90	38.90	1E-10
Sandia right fork at Pwr Plant	11/4/2016	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.29	10.00	7.16	5.08	10.00	6.49	1.47	26.95	4.90	2.69	7.72	23.00	1E-10
DP below grade ctrl structure	11/5/2016	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.10	10.00	7.04	5.91	10.00	6.86	0.64	5.67	2.82	2.22	5.80	27.90	1E-10
Sandia below Wetlands	11/5/2016	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.47	10.00	7.45	8.73	10.00	5.46	1.16	16.60	7.90	5.27	17.20	40.90	1E-10
Los Alamos above low-head weir	11/6/2016	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.83	10.00	7.20	10.50	10.00	7.09	1.14	9.06	3.61	2.51	7.47	40.90	1E-10
Canon de Valle below MDA P	12/9/2016	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream	10.00	10.00	7.88	1.86	10.00	18.10	3.92	13.20	2.37	6.87	17.10	69.60	1E-10

DRAFT **Appendix A. LANL BLM Database**

Sample Information														Metals	BLM Parameters												
Location ID	Sample Date	Windward ID	X	Y	Sample Type	Landscape	Major Watershed	Minor Watershed	Current NMAC Code	Current Hydrologic Class	Proposed Hydrologic Class			Copper (ug/L)	Temp. (°C)	pH	DOC (mg/L)	Humic Acid (%)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Total Alkalinity (mg/L CaCO3)	Total Sulfide (mg/L)	
Canon de Valle below MDA P	3/10/2017	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream			10.00	10.00	8.09	3.44	10.00	17.90	4.23	24.90	2.80	9.61	39.10	64.00	1E-10	
Canon de Valle below MDA P	6/2/2017	E256	1616017.769	1764811.076	WS	Site	Water	Cañon de Valle	126	Perennial	Perennial Stream			10.00	10.00	7.95	3.16	10.00	19.10	4.58	17.40	3.14	7.13	15.20	79.00	1E-10	
Sandia below Wetlands	6/6/2017	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			5.63	10.00	7.51	15.90	10.00	8.97	2.24	43.50	11.60	10.80	38.40	74.20	1E-10	
Sandia right fork at Pwr Plant	6/6/2017	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			8.49	10.00	7.23	10.50	10.00	7.30	1.46	27.50	6.09	4.10	19.80	32.00	1E-10	
Ancho below SR-4	6/25/2017	E275	1641902.732	1739818.299	WT	Site	Ancho	Ancho	128	E/I	Ephemeral Stream			3.46	10.00	7.23	22.00	10.00	8.34	1.53	2.76	4.53	2.58	2.03	52.40	1E-10	
Sandia below Wetlands	6/25/2017	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			8.68	10.00	7.02	23.30	10.00	6.08	1.48	24.80	11.50	8.47	23.50	51.80	1E-10	
Acid above Pueblo	7/8/2017	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			5.04	10.00	6.91	16.20	10.00	6.68	0.71	12.80	2.73	2.65	10.90	39.90	1E-10	
DP above Los Alamos Canyon	7/8/2017	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			3.87	10.00	7.28	10.30	10.00	12.10	1.18	13.50	4.26	3.21	15.80	49.80	1E-10	
DP above TA-21	7/8/2017	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			3.12	10.00	7.33	7.04	10.00	10.00	0.76	4.55	1.89	2.16	4.37	36.70	1E-10	
DP below grade ctrl structure	7/8/2017	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream			3.40	10.00	7.19	9.30	10.00	11.70	1.08	9.35	3.58	2.70	10.50	38.10	1E-10	
Sandia below Wetlands	7/18/2017	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			6.92	10.00	7.26	16.00	10.00	6.18	1.41	25.20	9.89	7.63	20.50	48.20	1E-10	
Sandia left fork at Asph Plant	7/18/2017	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			11.20	10.00	7.02	11.10	10.00	6.45	0.64	10.40	4.75	4.06	9.27	23.40	1E-10	
Sandia right fork at Pwr Plant	7/18/2017	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			6.13	10.00	7.63	7.02	10.00	5.36	0.96	21.70	4.49	6.78	20.80	55.90	1E-10	
Acid above Pueblo	7/26/2017	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			3.34	10.00	7.02	8.59	10.00	5.14	0.59	6.82	2.66	1.40	59.60	20.20	1E-10	
DP above Los Alamos Canyon	7/26/2017	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			3.53	10.00	7.19	8.82	10.00	8.48	0.80	8.31	2.96	2.53	9.29	45.00	1E-10	
DP above TA-21	7/26/2017	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			3.35	10.00	6.95	7.08	10.00	4.43	0.40	3.30	1.38	1.53	2.87	20.20	1E-10	
DP below grade ctrl structure	7/26/2017	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream			3.33	10.00	7.17	7.92	10.00	6.17	0.62	5.37	2.36	1.81	5.92	27.40	1E-10	
Los Alamos above low-head weir	7/26/2017	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			3.77	10.00	6.92	13.50	10.00	9.97	1.59	8.12	4.88	3.91	9.37	44.20	1E-10	
Mortandad below Effluent Canon	7/26/2017	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream			7.46	10.00	7.19	11.10	10.00	6.11	0.98	9.71	3.00	2.61	9.59	25.20	1E-10	
Sandia below Wetlands	7/26/2017	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			4.16	10.00	7.37	8.96	10.00	6.94	0.95	10.50	5.67	4.35	11.90	37.30	1E-10	
Sandia right fork at Pwr Plant	7/26/2017	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			7.24	10.00	7.04	4.73	10.00	8.17	1.51	32.20	5.31	4.27	16.00	16.70	1E-10	
South Fork of Acid Canyon	7/26/2017	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			4.28	10.00	6.92	9.46	10.00	5.21	0.65	7.64	3.09	1.88	9.98	25.20	1E-10	
South Fork of Acid Canyon	7/27/2017	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			9.42	10.00	7.33	26.40	10.00	8.30	0.85	29.60	4.10	4.83	18.00	57.90	1E-10	
Acid above Pueblo	7/29/2017	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			2.87	10.00	7.06	9.21	10.00	3.54	0.37	8.24	1.81	1.51	5.55	24.40	1E-10	
DP above TA-21	7/29/2017	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			1.86	10.00	7.16	6.89	10.00	4.60	0.34	2.67	1.18	0.91	1.40	15.70	1E-10	
DP below grade ctrl structure	7/29/2017	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream			2.68	10.00	7.32	9.53	10.00	7.16	0.69	6.51	2.50	1.47	4.53	30.90	1E-10	
Sandia below Wetlands	7/29/2017	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			4.64	10.00	7.29	8.51	10.00	4.54	0.94	12.10	5.95	3.73	11.00	31.70	1E-10	
Sandia left fork at Asph Plant	7/29/2017	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			4.62	10.00	7.12	8.10	10.00	5.22	0.49	6.26	3.43	2.76	5.84	21.80	1E-10	
Sandia right fork at Pwr Plant	7/29/2017	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			4.43	10.00	7.05	6.51	10.00	3.92	0.69	13.60	3.45	2.14	8.28	20.40	1E-10	
South Fork of Acid Canyon	7/29/2017	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			3.25	10.00	7.27	7.82	10.00	4.69	0.52	6.14	2.04	1.91	7.26	31.30	1E-10	
DP above TA-21	8/7/2017	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			2.98	10.00	7.35	6.79	10.00	5.99	0.41	3.27	1.39	1.64	2.39	26.00	1E-10	
DP below grade ctrl structure	8/7/2017	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream			3.66	10.00	7.17	9.88	10.00	7.49	0.69	7.21	2.90	1.99	6.30	30.30	1E-10	
Sandia below Wetlands	8/8/2017	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			3.00	10.00	7.92	8.45	10.00	16.20	3.57	50.50	9.91	9.43	33.80	111.00	1E-10	
Sandia right fork at Pwr Plant	8/8/2017	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			3.00	10.00	8.19	7.28	10.00	12.70	3.24	58.00	7.90	13.30	44.70	86.50	1E-10	
Sandia below Wetlands	8/10/2017	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			3.00	10.00	7.94	7.13	10.00	15.00	3.69	50.20	8.66	14.80	42.70	118.00	1E-10	
Sandia right fork at Pwr Plant	8/10/2017	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			3.00	10.00	8.23	6.13	10.00	13.40	3.62	51.60	8.98	14.10	48.90	97.40	1E-10	
South Fork of Sandia at E122	8/10/2017	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			3.00	10.00	8.38	12.20	10.00	21.60	6.51	43.50	11.00	45.30	11.20	130.00	1E-10	
Sandia left fork at Asph Plant	8/21/2017	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			7.59	10.00	7.30	6.83	10.00	3.33	0.51	5.60	3.25	2.67	3.45	16.90	1E-10	
Acid above Pueblo	8/23/2017	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			2.44	10.00	7.12	7.65	10.00	3.70	0.38	5.89	1.41	1.07	2.72	29.90	1E-10	
SEP-REF-SJM4 at RF17SJM04	8/24/2017	SEP-REF-SJM4	1524751.695	1723545.512	WT	Undeveloped	Jemez River	Jemez River	98	Intermittent	Not classified			1.29	10.00	6.48	18.50	10.00	1.70	0.39	0.44	2.78	0.48	0.36	6.39	1E-10	
SEP-REF-SJM1 at RF17SJM01	9/26/2017	SEP-REF-SJM1	1520615.217	1728030.12	WT	Undeveloped	Jemez River	Jemez River	98	Intermittent	Not classified			1.70	10.00	6.55	27.00	10.00	1.57	0.45	0.79	2.00	1.00	0.73	12.00	1E-10	
DP above Los Alamos Canyon	9/27/2017	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			2.94	10.00	7.61	9.98	10.00	6.52	0.71	9.21	2.74	2.05	7.02	35.90	1E-10	
Los Alamos above low-head weir	9/27/2017	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			2.63	10.00	7.40	8.12	10.00	5.32	0.96	7.86	3.28	1.49	5.28	30.90	1E-10	
Los Alamos below low-head weir	9/27/2017	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			2.50	10.00	7.43	8.13	10.00	11.37	2.73	28.19	11.70	1.65	6.27	28.50	1E-10	
Pueblo above Acid	9/27/2017	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream			3.18	10.00	7.43	8.00	10.00	5.08	0.80	13.50	2.22	2.18	9.50	34.50	1E-10	
SEP-REF-BM1 at RF17BM01	9/27/2017	SEP-REF-BM1	1615636.458	1754660.819	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified			2.46	10.00	6.47	29.20	10.00	4.26	1.22	2.64	3.51	4.16	1.71	11.80	1E-10	
SEP-REF-P1 at RF17P01	9/27/2017	SEP-REF-P1	1609944.04	1756279.877	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified			2.40	10.00	6.97	24.00	10.00	3.99	1.28	2.21	3.12	2.56	1.54	10.60	1E-10	
SEP-REF-SJM1 at RF17SJM01	9/27/2017	SEP-REF-SJM1	1520615.217	1728030.12	WT	Undeveloped	Jemez River	Jemez River	98	Intermittent	Not classified			1.83	10.00	6.35	16.90	10.00	1.90	0.55	0.62	2.52	0.71	0.53	5.19	1E-10	
SEP-REF-SJM4 at RF17SJM04	9/27/2017	SEP-REF-SJM4	1524751.695	1723545.512	WT	Undeveloped	Jemez River	Jemez River	98	Intermittent	Not classified			1.05	10.00	6.11	20.30	10.00	1.77	0.45	0.23	3.07	0.35	0.46	4.19	1E-10	
DP above Los Alamos Canyon	9/28/2017	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			2.77	10.00	7.73	8.19	10.00	10.20	1.04	17.30	3.19	3.40	17.30	60.30	1E-10	
La Delfe above Pajarito	9/28/2017	E242.5	1616053.533	1767185.074	WT	Site	Pajarito	Arroyo de la Delfe	128	E/I	Perennial Stream			2.06	10.00	7.39	15.50	10.00	7.22	2.02	8.15	3.08	6.98	12.30	38.90	1E-10	
Mortandad below Effluent Canon	9/28/2017	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream			6.69	10.00	7.30	9.37	10.00	5.44	1.18	9.96	3.02	3.34	7.23	27.70	1E-10	
SEP-REF-BM1 at RF17BM01	9/28/2017	SEP-REF-BM1	1615636.458	1754660.819	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified			2.46	10.00	6.49	22.20	10.00	3.22	0.89	2.00	2.61	2.91	1.63	7.98	1E-10	
SEP-REF-P1 at RF17P01	9/28/2017	SEP-REF-P1	1609944.04	1756279.877	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified			2.19	10.00	6.73	23.00	10.00	3.59	1.25	2.01	2.46	2.09	1.44	12.40	1E-10	
Starmers above Pajarito	9/28/2017	E242	1614644.252	1767983.726	WT	Site	Pajarito	Starmers	126	Perennial	Perennial Stream			1.70	10.00	6.68	12.10	10.00	2.48	0.72	4.41	2.35	2.48	5.39	13.80	1E-10	
E059.5 Pueblo below LAC WWTF	9/29/2017	E059.5	1643469.866	1776062.519	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream			3.24	10.00	7.27	11.50	10.00	5.26	1.17	14.10	4.86	4.39	11.80	32.50	1E-10	
E059.8 Pueblo Below Wetlands	9/29/2017	E059.8	1647376.832	1774623.8	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream			5.83	10.00	7.53	15.30	10.00	16.00	3.94	46.30	18.50	29.20	44.70	72.90	1E-10	
Los Alamos above DP Canyon	9/29/2017	E030	1637449.1	1772912.232	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			2.29	10.00	7.17	8.26	10.00	4.27	0.88	13.20	3.07	2.27	14.90	26.50	1E-10	
Los Alamos above low-head weir	9/29/2017	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			1.97	10.00	7.19	7.33	10.00	5.52	0.97	8.63	2.79	1.95	8.96	28.70	1E-10	
Los Alamos below low-head weir	9/29/2017	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			2.50	10.00	7.16	8.91	10.00	6.24	1.15	9.36	3.45	2.02	9.30	28.70	1E-10	
Pajarito above Threemile	9/29/2017	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream			2.14	10.00	7.04	13.90	10.00	3.53	0.93	9.73	3.91	2.37	12.40	16.00	1E-10	
Pueblo above Acid	9/29/2017	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream			3.18	10.00	7.54	9.09	10.00	6.26	0.98	16.90	2.07	3.49	14.80	36.70	1E-10	
Sandia above Firing Range	9/29/2017	E124	1636600.69	1770215.618	WT	Site	Sandia	Sandia	128	E/I	Intermittent Stream			3.93	10.00	7.56	12.70	10.00	8.13	1.72	18.30	6.61	6.16	16.40	51.30	1E-10	
SEP-REF-SJM1 at RF17SJM01	9/29/2017	SEP-REF-SJM1	1520615.217	1728030.12	WT	Undeveloped	Jemez River	Jemez River	98	Intermittent	Not classified			1.29	10.00	6.78	11.60	10.00	1.26	0.43	0.75	1.70	2.41	0.61	12.60	1E-10	
Twomile above Pajarito	9/29/2017	E244	1626782.28	1766733.695	WT	Site	Pajarito	Twomile	128	E/I	Intermittent Stream			1.62	10.00	7.02	10.20	10.00	2.50	0.66	11.60	3.39	1.67	16.20	16.00	1E-10	
Los Alamos above DP Canyon	10/4/2017	E030	1637449.1	1772912.232	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			1.73	10.00	7.40	8.03	10.00	11.00	1.94	16.50	4.05	0.17	0.18	44.90	1E-10	
Los Alamos above low-head weir	10/4/2017	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			2.38	10.00	6.88	17.80	10.00	7.95	1.45	2.47	4.13	4.57	1.91	32.70	1E-10	
Mortandad below Effluent Canon	10/4/2017	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream			3.79	10.00	7.24	13.30	10.00	4.83	0.75	6.50	2.50	3.03	8.96	37.50	1E-10	
Pajarito above Threemile	10/4/2017	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream			1.22	10.00	6.98	11.70	10.00	2.77	0.74	1.13	3.61	2.37	4.73	15.20	1E-10	
SEP-REF-P1 at RF17P01	10/4/2017	SEP-REF-P1	1609944.04	1756279.877	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified			2.16	10.00	6.95	19.10	10.00	3.74	1.09	1.86	2.82	1.81	1.21	11.80	1E-10	
SEP-REF-SJM1 at RF17SJM01	10/4/2017	SEP-REF-SJM1	1520615.217	1728030.12	WT	Undeveloped	Jemez River	Jemez River	98	Intermittent	Not classified			1.33	10.00	6.43	11.40	10.00	1.80	0.65	0.98	2.51	1.12	0.45	7.58	1E-10	
Twomile above Pajarito	10/4/2017	E244	1626782.28	1766733.695	WT	Site	Pajarito	Twomile	128	E/I	Intermittent Stream			1.66	10.00	7.11	7.92	10.00	4.13	0.81	7.72	2.95	2.01	9.40	23.00	1E-10	
E059.8 Pueblo Below Wetlands	10/5/2017	E059.8	1647376.832	1774623.8	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream			4.83	10.00	7.56	16.10	10.00	15.30	3.77	40.70	15.30	22.00	37.60	81.40	1E-10	
La Delfe above Pajarito	10/5/2017	E242.5	1616053.533	1767185.074	WT	Site	Pajarito	Arroyo de la Delfe	128	E/I	Perennial Stream			3.82	10.00	7.56	19.10	10.00	3.60	0.93	4.89	3.28	6.71	10.70	36.10	1E-10	
Los Alamos below low-head weir	10/5/2017	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream			2.14	10.00	7.28	8.79	10.00	8.84	1.42	10.70	3.86	3.38	10.20	37.90	1E-10	
Pajarito above Threemile	10/5/2017	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream			1.50	10.00	7.45	9.41	10.00	7.14	1.71	15.60	4.38	4.78	24.10	30.90	1E-10	
SEP-REF-P1 at RF17P01	10/5/2017	SEP-REF-P1	1609944.04	1756279.877	WT	Undeveloped	Frijoles	Frijoles	98	Intermittent	Not classified			2.84	10.00	6.89	20.30	10.00	4.00	1.24	2.08	2.62	2.12	1.37	11.00	1E-10	
Acid above Pueblo	7/13/2018	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			4.14	10.00	7.04	10.40	10.00	6.22	0.63	8.95	2.70	2.16	9.04	27.40	1E-10	
Mortandad below Effluent Canon	7/15/2018	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream			18.30	10.00	6.87	14.80	10.00	5.67	1.76	11.70	4.65	3.31	13.30	21.20	1E-10	
Acid above Pueblo	7/17/2018	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			3.40	10.00	6.99	8.33	10.00	4.23	0.43	8.75	2.01	1.69	8.04	14.60	1E-10	
Sandia below Wetlands	7/17/2018	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			6.28	10.00	7.23	14.20	10.00	7.08	1.44	22.00	10.70	6.59	26.80	37.00	1E-10	
Sandia right fork at Pwr Plant	7/17/2018	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream			5.35	10.00	7.36	7.81	10.00	5.67	0.57	15.00	4.02	3.10	17.60	22.40	1E-10	
Ancho below SR-4	7/23/2018	E275	1641902.732	1739818.299	WT	Site	Ancho	Ancho	128	E/I	Ephemeral Stream			3.01	10.00	7.43	18.50	10.00	13.10	1.54	3.22	4.94	1.82	0.86	49.00	1E-10	
Chaquehui tributary at TA-33	7/23/2018	E340	1640304.7	1739043.9	WT	Site	Chaquehui	Chaquehui tributary	128	E/I	Ephemeral Stream			3.79	10.00	7.15	17.70	10.00	6.09	0.98	1.02	3.93	1.19	0.53	43.80	1E-10	
Sandia below Wetlands	7/24/2018	E123	1622687.147	1773067.617	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			3.00	10.00	7.73	12.70	10.00	15.10	3.57	46.30	10.90	8.53	41.75	110.00	1E-10	
Sandia right fork at Pwr Plant	7/24/2018	E121	1620124.03	1773840.385	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			4.98	10.00	8.08	5.85	10.00	8.95	2.52	42.85	7.12	15.90	41.15	67.40	1E-10	
South Fork of Sandia at E122	7/24/2018	E122.SF	1620114.1	1773924.5	WS	Site	Sandia	Sandia	126	Perennial	Perennial Stream			3.11	10.00	8.62	8.95	10.00	18.15	5.57	34.45	10.65	27.95	12.50	117.50	1E-10	
DP above TA-21	8/2/2018	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream			3.37	10.00	7.14	11.70	10.00	5.48	0.37	2.69	1.32	1.38	2.33	21.80	1E-10	
DP below grade ctrl structure	8/2/2018	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream			6.56	10.00	7.13	13.00	10.00	8.65	0.81	7.45	4.38	3.70	9.31	31.40	1E-10	
South Fork of Acid Canyon	8/2/2018	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream			3.84	10.00	7.03	9.42	10.00	5.49	0.51	5.89	2.14	1.34	4.44	24.00	1E-10	

DRAFT **Appendix A. LANL BLM Database**

Sample Information													Metals	BLM Parameters												
Location ID	Sample Date	Windward ID	X	Y	Sample Type	Landscape	Major Watershed	Minor Watershed	Current NMAC Code	Current Hydrologic Class	Proposed Hydrologic Class	Copper (ug/L)	Temp. (℃)	pH	DOC (mg/L)	Humic Acid (%)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Total Alkalinity (mg/L CaCO3)	Total Sulfide (mg/L)
Ancho below SR-4	8/3/2018	E275	1641902.732	1739818.299	WT	Site	Ancho	Ancho	128	E/I	Ephemeral Stream	2.74	10.00	7.33	13.60	10.00	15.20	2.10	2.86	5.33	1.88	3.02	78.40	1E-10
Sandia right fork at Pwr Plant	8/7/2018	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.02	10.00	7.42	8.38	10.00	3.63	0.46	11.40	2.81	2.35	14.30	14.40	1E-10
Acid above Pueblo	8/9/2018	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	4.06	10.00	7.09	9.97	10.00	4.59	0.52	7.69	1.78	2.04	6.94	23.00	1E-10
Pueblo above Acid	8/9/2018	E055	1624411.282	1778877.63	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	2.28	10.00	7.13	9.21	10.00	5.62	0.81	11.30	2.73	2.76	11.90	23.40	1E-10
Sandia below Wetlands	8/9/2018	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.63	10.00	7.37	10.70	10.00	5.86	1.27	15.10	6.85	4.11	16.60	39.80	1E-10
Sandia right fork at Pwr Plant	8/9/2018	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.23	10.00	7.17	7.28	10.00	3.93	0.57	11.60	3.13	2.55	10.70	20.40	1E-10
CDB above SR-4	8/10/2018	E229.3	1648363.854	1756707.469	WT	Site	Mortandad	Cañada del Buey	128	E/I	Ephemeral Stream	2.30	10.00	7.19	16.30	10.00	12.00	1.40	2.19	3.92	2.58	0.71	46.60	1E-10
DP above Los Alamos Canyon	8/10/2018	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.64	10.00	7.37	18.30	10.00	11.10	1.07	13.10	3.85	3.55	15.00	48.40	1E-10
DP above TA-21	8/10/2018	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.58	10.00	7.22	6.29	10.00	4.27	0.94	1.40	4.31	1.53	3.80	22.20	1E-10
DP below grade ctrl structure	8/10/2018	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.65	10.00	7.35	8.38	10.00	9.42	0.93	8.04	3.27	2.46	9.53	31.00	1E-10
Mortandad below Effluent Canon	8/10/2018	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	5.81	10.00	7.38	20.10	10.00	7.23	1.21	11.10	3.36	2.80	9.39	53.20	1E-10
DP above TA-21	8/15/2018	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.40	10.00	7.03	7.50	10.00	6.36	0.41	2.90	1.30	1.45	2.95	17.20	1E-10
DP below grade ctrl structure	8/15/2018	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	4.16	10.00	7.20	28.20	10.00	8.51	0.79	7.25	2.86	2.14	6.02	28.40	1E-10
Sandia below Wetlands	8/15/2018	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.28	10.00	7.25	11.10	10.00	6.01	1.21	15.30	6.91	3.93	17.00	33.00	1E-10
Sandia right fork at Pwr Plant	8/15/2018	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.04	10.00	7.05	7.27	10.00	4.99	0.63	13.40	3.47	2.55	14.60	16.00	1E-10
DP above TA-21	9/3/2018	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.19	10.00	7.25	3.82	10.00	4.55	0.30	1.98	0.93	0.85	1.45	14.00	1E-10
DP below grade ctrl structure	9/3/2018	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	3.33	10.00	7.34	8.33	10.00	8.32	0.73	6.80	2.69	1.82	5.52	29.20	1E-10
Pajarito above Starmers	9/3/2018	E241	1614687.844	1768103.439	WT	Site	Pajarito	Pajarito	128	E/I	Perennial Stream	1.82	10.00	7.05	8.90	10.00	4.10	1.09	6.95	3.35	2.86	10.00	22.40	1E-10
Sandia below Wetlands	9/3/2018	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.87	10.00	7.42	7.06	10.00	4.81	1.02	11.60	5.99	2.85	12.90	29.00	1E-10
South Fork of Acid Canyon	9/3/2018	E055.5	1623467.575	1777746.088	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	2.20	10.00	7.10	6.16	10.00	4.42	0.43	4.00	1.63	0.86	2.53	14.60	1E-10
Acid above Pueblo	9/4/2018	E056	1624431.601	1778790.921	WT	Site	Pueblo	Acid	98	Intermittent	Intermittent Stream	3.20	10.00	7.43	6.94	10.00	4.92	0.50	12.50	1.78	2.99	10.00	36.20	1E-10
DP above Los Alamos Canyon	9/4/2018	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.48	10.00	7.22	5.75	10.00	5.94	0.57	6.21	2.12	1.65	6.65	33.20	1E-10
DP below grade ctrl structure	9/4/2018	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.85	10.00	7.22	5.70	10.00	5.36	0.52	3.96	1.83	1.18	3.81	20.00	1E-10
Los Alamos above low-head weir	9/4/2018	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.38	10.00	7.14	6.67	10.00	6.20	1.01	7.07	3.23	1.89	6.89	47.80	1E-10
Sandia below Wetlands	9/4/2018	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.62	10.00	7.29	5.86	10.00	5.09	0.91	9.53	5.30	2.87	9.92	29.00	1E-10
Sandia left fork at Asph Plant	9/4/2018	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.81	10.00	10.00	3.96	10.00	8.81	0.75	4.94	2.25	3.00	3.71	63.00	1E-10
Sandia right fork at Pwr Plant	9/4/2018	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	2.87	10.00	7.17	3.31	10.00	2.97	0.35	4.91	1.86	1.24	3.97	13.00	1E-10
DP above Los Alamos Canyon	9/5/2018	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.59	10.00	7.71	8.77	10.00	14.20	1.33	16.00	3.63	3.84	15.60	64.80	1E-10
DP above Los Alamos Canyon	10/23/2018	E040	1637555.718	1773169.199	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	3.09	10.00	7.36	8.52	10.00	8.89	0.95	14.90	3.10	2.65	19.90	44.40	1E-10
Mortandad below Effluent Canon	10/23/2018	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	5.31	10.00	7.35	8.86	10.00	17.50	3.87	60.10	6.61	4.47	112.00	39.80	1E-10
Pajarito above Starmers	10/24/2018	E241	1614687.844	1768103.439	WT	Site	Pajarito	Pajarito	128	E/I	Perennial Stream	1.10	10.00	7.21	6.72	10.00	14.20	4.19	14.30	3.95	10.70	30.40	32.00	1E-10
Mortandad below Effluent Canon	7/2/2019	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	59.70	10.00	7.15	21.00	10.00	14.20	4.81	18.10	9.12	5.63	25.50	44.90	1E-10
Sandia left fork at Asph Plant	7/2/2019	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	14.40	10.00	7.06	14.80	10.00	7.94	0.99	17.40	7.76	7.46	19.40	39.50	1E-10
Sandia right fork at Pwr Plant	7/2/2019	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	8.08	10.00	7.02	11.10	10.00	6.47	0.89	18.80	5.93	4.14	25.80	35.00	1E-10
Los Alamos below Ice Rink	7/7/2019	E026	1618215.135	1775624.331	WT	Undeveloped	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	0.89	10.00	7.36	5.88	10.00	12.10	2.79	10.80	4.09	6.53	15.90	64.80	1E-10
Sandia below Wetlands	7/7/2019	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	8.22	10.00	7.47	18.90	10.00	13.60	3.74	12.10	6.28	9.44	41.70	78.50	1E-10
Sandia left fork at Asph Plant	7/7/2019	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	8.97	10.00	7.13	7.77	10.00	4.75	0.61	10.70	5.60	4.01	9.70	25.00	1E-10
Sandia right fork at Pwr Plant	7/7/2019	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	10.10	10.00	7.09	5.65	10.00	4.73	1.25	12.10	4.78	2.95	15.30	26.80	1E-10
Los Alamos below low-head weir	7/8/2019	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	1.21	10.00	7.40	7.55	10.00	12.60	2.95	16.90	4.91	8.91	22.90	48.70	1E-10
Sandia left fork at Asph Plant	7/13/2019	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	23.50	10.00	6.81	23.80	10.00	8.35	1.07	16.20	7.69	5.54	17.50	32.00	1E-10
Sandia below Wetlands	7/15/2019	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	8.51	10.00	7.21	15.80	10.00	6.24	1.72	24.40	13.50	5.67	25.40	44.50	1E-10
Sandia left fork at Asph Plant	7/15/2019	E122.LFatAP	1620119.01	1773922.43	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.21	10.00	7.07	7.33	10.00	3.96	0.41	6.45	3.80	2.55	5.64	19.30	1E-10
Sandia right fork at Pwr Plant	7/15/2019	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	7.26	10.00	7.21	6.94	10.00	3.63	0.55	8.79	3.37	2.30	11.50	20.30	1E-10
Sandia below Wetlands	7/25/2019	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	6.02	10.00	7.39	14.30	10.00	7.45	1.96	28.00	13.70	6.79	30.80	56.00	1E-10
Sandia right fork at Pwr Plant	7/25/2019	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	5.40	10.00	7.34	6.33	10.00	4.50	0.77	12.00	4.04	3.45	16.70	33.60	1E-10
DP below grade ctrl structure	7/26/2019	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	4.30	10.00	7.62	4.94	10.00	9.30	0.86	6.18	2.84	2.04	6.00	43.10	1E-10
Los Alamos above low-head weir	7/26/2019	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.60	10.00	7.46	11.60	10.00	14.00	2.04	12.80	5.16	4.32	12.00	88.00	1E-10
Los Alamos below low-head weir	7/26/2019	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	3.00	10.00	7.44	10.30	10.00	11.10	1.71	12.00	4.81	3.98	12.50	59.00	1E-10
Mortandad above Ten Site	7/26/2019	E201	1633074.678	1769370.925	WT	Site	Mortandad	Mortandad	128	E/I	Ephemeral Stream	4.02	10.00	7.15	14.20	10.00	6.09	1.13	11.00	5.52	2.32	9.40	42.50	1E-10
Pajarito above Threemile	7/26/2019	E245.5	1633089.654	1763183.035	WT	Site	Pajarito	Pajarito	128	E/I	Ephemeral Stream	1.85	10.00	7.43	7.72	10.00	7.60	1.37	6.48	4.77	0.13	6.42	72.10	1E-10
Sandia above Firing Range	7/26/2019	E124	1636600.69	1770215.618	WT	Site	Sandia	Sandia	128	E/I	Intermittent Stream	2.85	10.00	7.31	16.70	10.00	8.03	1.51	12.20	6.49	3.68	12.10	41.10	1E-10
Sandia below Wetlands	7/26/2019	E123	1622687.147	1773067.617	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	4.30	10.00	7.82	8.55	10.00	11.83	2.75	27.08	8.76	7.96	34.45	115.00	1E-10
Sandia right fork at Pwr Plant	7/26/2019	E121	1620124.03	1773840.385	WT	Site	Sandia	Sandia	126	Perennial	Perennial Stream	3.69	10.00	8.32	4.85	10.00	13.32	3.52	41.40	11.46	9.44	42.40	134.00	1E-10
Ten Site above Mortandad	7/26/2019	E201.5	1633024.952	1768470.302	WT	Site	Mortandad	Tensite	128	E/I	Ephemeral Stream	3.59	10.00	6.72	17.70	10.00	5.65	1.31	16.80	8.32	1.11	1.32	48.30	1E-10
DP above TA-21	8/7/2019	E038	1630683.66	1775660.775	WT	Site	Los Alamos	DP	128	E/I	Ephemeral Stream	2.06	10.00	7.57	3.93	10.00	4.81	0.42	2.90	1.26	1.07	2.58	25.80	1E-10
DP below grade ctrl structure	8/7/2019	E039.1	1634183.14	1774716.075	WT	Site	Los Alamos	DP	128	E/I	Perennial Stream	2.25	10.00	7.71	4.31	10.00	6.48	0.65	4.74	1.91	1.29	4.37	31.80	1E-10
E059.5 Pueblo below LAC WWTF	8/7/2019	E059.5	1643469.866	1776062.519	WT	Site	Pueblo	Pueblo	98	Intermittent	Intermittent Stream	4.62	10.00	7.36	12.60	10.00	7.52	1.72	19.40	7.81	7.10	18.10	36.00	1E-10
Los Alamos above low-head weir	8/7/2019	E042.1	1648209.644	1770891.744	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.00	10.00	7.69	6.94	10.00	11.80	1.55	8.35	3.98	3.76	7.79	50.30	1E-10
Los Alamos below low-head weir	8/7/2019	E050.1	1650021.007	1770920.631	WT	Site	Los Alamos	Los Alamos	128	E/I	Intermittent Stream	2.29	10.00	7.41	8.12	10.00	8.90	1.29	8.76	3.71	2.66	9.55	56.60	1E-10
Mortandad below Effluent Canon	8/7/2019	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	4.86	10.00	7.98	12.30	10.00	12.50	1.88	16.40	4.97	2.72	15.20	86.40	1E-10
Mortandad below Effluent Canon	10/4/2019	E200	1626750.385	1770288.738	WT	Site	Mortandad	Mortandad	128	E/I	Intermittent Stream	8.24	10.00	7.42	9.76	10.00	6.98	1.18	7.91	3.26	2.91	6.03	39.70	1E-10

DRAFT **Appendix A. LANL BLM Database**

			MLR Input	Water Quality Criteria Estimates						MLR Investigative Parameters		Detected?											
Location ID	Sample Date	Windward ID	Hardness	Acute BLM	Chronic BLM	Acute MLR (SSWQC)	Chronic MLR (SSWQC)	Acute New Mexico Hardness-based (WQS)	Chronic New Mexico Hardness-based (WQS)	Potentially Fire-affected Sample?	BLM Parameter out of Prescribed Range?	Copper	pH	DOC	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Total Sulfide	Total Alkalinity	Hardness
Los Alamos above DP Canyon	4/28/2005	E030	48.60	24.18	15.02	24.70	15.33	6.81	4.83	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below Ice Rink	4/29/2005	E026	43.10	18.68	11.60	20.40	12.66	6.08	4.36	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	4/29/2005	E200	49.20	30.57	18.99	28.30	17.56	6.89	4.89	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	5/3/2005	E056	112.00	7.51	4.67	4.27	2.65	14.95	9.87	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	5/3/2005	E055	58.85	65.57	40.73	65.17	40.45	8.16	5.69	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	6/28/2006	E200	66.60	15.53	9.65	12.76	7.92	9.16	6.33	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	6/29/2006	E122.SF	117.00	63.18	39.24	67.51	41.90	15.58	10.24	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/12/2006	E123	89.40	40.57	25.20	33.26	20.64	12.09	8.14	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/27/2006	E056	32.40	9.28	5.76	6.41	3.98	4.65	3.42	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	8/29/2006	E243	53.30	23.14	14.37	24.86	15.43	7.43	5.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	8/29/2006	E244	41.80	21.88	13.59	21.14	13.12	5.91	4.25	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	9/20/2006	E350	43.50	15.73	9.77	17.54	10.89	6.13	4.40	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	10/17/2006	E122.SF	162.00	190.93	118.59	196.48	121.94	21.17	13.52	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	10/18/2006	E123	92.30	37.86	23.51	31.53	19.57	12.46	8.36	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	10/27/2006	E200	61.80	22.55	14.01	20.79	12.90	8.54	5.94	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	1/24/2007	E252 up	32.60	0.82	0.51	1.00	0.62	4.67	3.44	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	1/29/2007	E256	75.30	6.22	3.86	6.39	3.97	10.29	7.03	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	2/20/2007	E123	79.50	42.74	26.54	31.80	19.73	10.83	7.36	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	2/21/2007	E122.SF	104.00	205.15	127.42	192.29	119.34	13.95	9.26	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	3/2/2007	E200	72.50	11.44	7.11	8.39	5.21	9.93	6.80	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	4/3/2007	E243	45.40	23.89	14.84	25.09	15.57	6.39	4.56	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	4/3/2007	E244	63.20	11.89	7.38	11.36	7.05	8.72	6.05	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below Ice Rink	4/16/2007	E026	38.40	6.00	3.73	6.56	4.07	5.45	3.95	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above DP Canyon	4/17/2007	E030	51.60	33.69	20.93	33.05	20.51	7.20	5.09	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	4/18/2007	E056	158.00	7.39	4.59	4.76	2.95	20.68	13.24	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	4/18/2007	E055	75.10	66.87	41.53	60.94	37.82	10.26	7.01	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	5/31/2007	E252 up	40.20	5.48	3.41	5.94	3.69	5.69	4.11	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	6/1/2007	E256	61.30	7.64	4.75	8.03	4.98	8.47	5.90	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	6/13/2007	E123	84.30	78.07	48.49	64.45	40.00	11.44	7.74	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	6/13/2007	E122.SF	147.00	327.42	203.37	330.93	205.39	19.32	12.45	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	6/27/2007	E243	44.30	10.14	6.30	10.84	6.73	6.24	4.47	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	6/27/2007	E244	54.40	7.62	4.73	7.19	4.46	7.57	5.32	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/25/2007	E056	39.90	19.06	11.84	13.91	8.64	5.65	4.08	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	7/25/2007	E055	84.70	42.38	26.32	38.55	23.93	11.49	7.77	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	8/21/2007	E122.SF	125.00	127.56	79.23	129.76	80.54	16.58	10.84	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	8/22/2007	E200	51.30	24.05	14.94	22.32	13.86	7.17	5.06	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/22/2007	E123	91.40	51.45	31.96	43.15	26.78	12.35	8.29	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	9/12/2007	E243	50.90	26.85	16.67	29.77	18.48	7.11	5.03	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	9/12/2007	E244	40.20	25.07	15.57	25.27	15.68	5.69	4.11	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	10/17/2007	E252 up	44.80	6.45	4.01	7.17	4.45	6.31	4.51	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	10/25/2007	E256	87.60	22.07	13.71	24.40	15.15	11.86	8.00	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	10/31/2007	E350	34.40	16.21	10.07	17.46	10.84	4.92	3.60	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	11/13/2007	E123	102.00	35.86	22.27	30.11	18.69	13.69	9.11	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	12/17/2007	E243	50.50	27.07	16.81	29.60	18.37	7.06	5.00	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	12/17/2007	E244	42.40	21.03	13.06	20.92	12.98	5.99	4.30	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	1/15/2008	E056	40.40	5.50	3.41	4.17	2.59	5.72	4.13	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	1/15/2008	E055	142.00	21.07	13.09	18.73	11.62	18.70	12.08	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	2/14/2008	E123	85.90	55.26	34.32	42.71	26.51	11.65	7.87	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	2/14/2008	E122.SF	73.40	218.40	135.65	136.30	84.59	10.04	6.88	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	2/21/2008	E200	66.80	27.03	16.79	22.37	13.88	9.19	6.34	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	3/5/2008	E243	57.20	27.28	16.94	29.38	18.23	7.94	5.56	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	3/5/2008	E244	70.20	12.72	7.90	12.07	7.49	9.63	6.62	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	3/31/2008	E256	66.30	23.93	14.86	26.06	16.17	9.12	6.30	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	4/3/2008	E252 up	48.10	18.73	11.63	20.57	12.77	6.74	4.79	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	4/8/2008	E350	32.80	26.62	16.53	28.55	17.72	4.70	3.45	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	5/13/2008	E123	75.00	53.01	32.92	46.85	29.08	10.25	7.00	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	5/21/2008	E122.SF	124.00	113.88	70.73	122.64	76.12	16.46	10.76	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	6/12/2008	E243	40.80	2.58	1.60	3.01	1.87	5.77	4.16	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/11/2008	E123	83.70	37.25	23.14	31.88	19.79	11.36	7.69	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	8/11/2008	E122.SF	112.00	77.24	47.98	79.37	49.26	14.95	9.87	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	8/20/2008	E200	45.60	48.47	30.10	37.33	23.17	6.41	4.58	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	8/28/2008	E056	28.00	9.90	6.15	7.76	4.81	4.05	3.02	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	8/28/2008	E055	66.00	30.91	19.20	28.29	17.56	9.09	6.28	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	9/2/2008	E038	207.00	12.26	7.61	11.04	6.85	26.67	16.68	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	9/10/2008	E243	49.70	23.17	14.39	25.29	15.70	6.95	4.93	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	9/10/2008	E244	40.20	24.11	14.97	23.45	14.55	5.69	4.11	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	10/7/2008	E256	79.80	17.67	10.98	19.01	11.80	10.87	7.39	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	10/17/2008	E252 up	45.50	4.87	3.02	5.31	3.30	6.40	4.57	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	10/23/2008	E350	35.40	16.18	10.05	17.49	10.85	5.05	3.69	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	11/3/2008	E123	82.10	51.86	32.21	45.10	27.99	11.16	7.57	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	11/3/2008	E121	82.40	53.88	33.46	49.44	30.69	11.20	7.59	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	11/3/2008	E122.SF	121.00	186.87	116.07	187.82	116.57	16.08	10.54	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	11/18/2008	E200	46.40	16.13	10.02	13.59	8.43	6.52	4.65	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	2/9/2009	E123	110.00	50.45	31.34	40.93	25.40	14.70	9.72	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	2/9/2009	E121	108.00	44.71	27.77	34.79	21.59	14.45	9.56	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	2/9/2009	E122.SF	164.00	121.60	75.53	124.93	77.54	21.42	13.67	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	2/12/2009	E200	69.40	23.15	14.38	16.69	10.36	9.53	6.55	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	3/11/2009	E243	47.10	11.72	7.28	12.70	7.88	6.61	4.71	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	3/24/2009	E256	66.40	10.98	6.82	11.66	7.24	9.14	6.31	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	3/25/2009	E252 up	35.40	2.03	1.26	2.19	1.36	5.05	3.69	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	5/5/2009	E123	117.00	65.25	40.53	56.58	35.11	15.58	10.24	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	5/7/2009	E121	119.00	19.81	12.30	16.26	10.09	15.83	10.39	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	5/7/2009	E122.SF	76.00	65.39	40.61	73.02	45.32	10.38	7.08	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/9/2009	E056	27.00	8.00	4.97	5.95	3.69	3.91	2.93	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	7/9/2009	E055	72.00	43.08	26.76	35.29	21.90	9.86	6.76	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/7/2009	E123	91.10	39.01	24.23	34.84	21.62	12.31	8.27	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/7/2009	E121	104.00	47.38	29.43	42.56	26.42	13.95	9.26	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	8/13/2009	E122.SF	121.00	94.95	58.97	100.58	62.42	16.08	10.54	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	8/18/2009	E200	44.70	25.93	16.11	23.00	14.28	6.29	4.50	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	10/15/2009	E256	90.20	14.86	9.23	15.83	9.83	12.19	8.20	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	10/16/2009	E252 up	38.90	2.19	1.36	2.34	1.46	5.52	4.00	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	10/21/2009	E350	34.20	20.36	12.64	21.81	13.54	4.89	3.58	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	11/2/2009	E121	80.90	31.47	19.55	28.25	17.53	11.01	7.47	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	11/2/2009	E122.SF	108.00	90.11	55.97	93.96	58.31	14.45	9.56	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	11/4/2009	E123	71.00	35.59	22.11	31.26	19.40	9.73	6.68	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

DRAFT **Appendix A. LANL BLM Database**

			MLR Input	Water Quality Criteria Estimates						MLR Investigative Parameters		Detected?											
Location ID	Sample Date	Windward ID	Hardness	Acute BLM	Chronic BLM	Acute MLR (SSWQC)	Chronic MLR (SSWQC)	Acute New Mexico Hardness-based (WQS)	Chronic New Mexico Hardness-based (WQS)	Potentially Fire-affected Sample?	BLM Parameter out of Prescribed Range?	Copper	pH	DOC	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Total Sulfide	Total Alkalniity	Hardness
Sandia below Wetlands	1/29/2010	E123	370.00	1421.56	882.96	748.41	464.49	46.10	27.39	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	2/1/2010	E121	105.00	51.72	32.13	39.60	24.58	14.07	9.34	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	2/1/2010	E122.SF	164.00	116.02	72.06	110.97	68.87	21.42	13.67	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	5/7/2010	E121	83.00	50.06	31.10	46.37	28.78	11.28	7.64	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	5/7/2010	E122.SF	157.00	228.09	141.67	235.09	145.91	20.56	13.17	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	5/13/2010	E123	66.40	39.06	24.26	35.03	21.74	9.14	6.31	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	6/8/2010	E243	41.10	24.16	15.01	25.95	16.10	5.81	4.19	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	8/11/2010	E244	61.80	20.60	12.80	19.32	11.99	8.54	5.94	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	9/7/2010	E256	75.30	18.98	11.79	20.36	12.64	10.29	7.03	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	9/10/2010	E252 up	43.70	6.48	4.02	7.05	4.37	6.16	4.41	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	9/17/2010	E350	34.20	14.04	8.72	15.18	9.42	4.89	3.58	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	11/9/2010	E121	134.00	54.97	34.14	48.53	30.12	17.71	11.50	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	11/9/2010	E122.SF	174.00	120.91	75.10	117.13	72.70	22.65	14.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	11/11/2010	E123	109.00	41.48	25.76	35.82	22.23	14.58	9.64	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	5/17/2011	E123	92.40	56.64	35.18	53.28	33.07	12.47	8.37	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	5/19/2011	E121	92.50	52.07	32.34	46.83	29.06	12.49	8.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	5/19/2011	E122.SF	103.00	113.23	70.33	118.33	73.44	13.82	9.18	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	9/16/2011	E256	179.00	68.36	42.46	72.86	45.22	23.26	14.73	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	3/28/2013	E256	88.60	12.65	7.86	13.47	8.36	11.99	8.08	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	4/16/2013	E123	52.60	61.93	38.47	51.80	32.15	7.34	5.17	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	4/16/2013	E121	44.57	54.90	34.10	44.85	27.84	6.28	4.49	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	4/16/2013	E122.SF	82.27	102.02	63.37	103.51	64.24	11.18	7.58	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	5/17/2013	E123	69.65	49.26	30.60	42.59	26.43	9.56	6.57	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	5/17/2013	E121	49.37	45.51	28.27	41.15	25.54	6.91	4.90	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	6/14/2013	E038	43.60	56.47	35.08	54.12	33.59	6.15	4.41	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	6/14/2013	E039.1	35.30	37.69	23.41	32.93	20.44	5.04	3.68	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	6/14/2013	E055	28.50	27.41	17.02	24.11	14.96	4.12	3.06	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	6/30/2013	E038	30.50	13.88	8.62	14.76	9.16	4.39	3.25	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	6/30/2013	E039.1	28.60	29.66	18.43	27.95	17.35	4.13	3.07	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	6/30/2013	E121	26.40	23.00	14.29	22.93	14.23	3.83	2.87	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/12/2013	E056	19.50	16.26	10.10	15.56	9.65	2.88	2.22	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/12/2013	E038	27.60	8.77	5.45	9.67	6.00	4.00	2.98	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/12/2013	E039.1	29.40	15.33	9.52	16.74	10.39	4.24	3.15	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/12/2013	E042.1	56.70	53.41	33.17	55.87	34.68	7.87	5.51	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/12/2013	E050.1	43.60	36.85	22.89	38.67	24.00	6.15	4.41	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad above Ten Site	7/12/2013	E201	51.60	47.53	29.52	50.16	31.13	7.20	5.09	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/12/2013	E245.5	37.50	43.15	26.80	44.98	27.92	5.33	3.87	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/12/2013	E121	18.20	82.98	51.54	71.57	44.42	2.70	2.09	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/22/2013	E121	51.80	26.86	16.68	25.25	15.67	7.23	5.11	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ancho below SR-4	7/25/2013	E275	51.20	62.16	38.61	67.67	42.00	7.15	5.05	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above Rio Grande	7/25/2013	E1099	67.20	90.39	56.14	99.85	61.97	9.24	6.38	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above Rio Grande	7/26/2013	E1099	92.60	73.88	45.89	86.02	53.39	12.50	8.39	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/28/2013	E038	22.70	10.27	6.38	10.89	6.76	3.32	2.52	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/28/2013	E039.1	26.10	19.49	12.10	19.41	12.05	3.79	2.84	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above Rio Grande	8/3/2013	E1099	171.00	104.55	64.94	113.15	70.22	22.28	14.16	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	8/5/2013	E056	16.80	18.09	11.24	17.27	10.72	2.50	1.95	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	8/5/2013	E040	26.20	17.73	11.01	18.31	11.37	3.80	2.85	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Guaje at SR-502	8/5/2013	E099	101.00	70.50	43.79	80.95	50.24	13.57	9.03	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	8/5/2013	E042.1	28.70	23.14	14.38	23.70	14.71	4.15	3.08	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	8/5/2013	E050.1	46.40	38.53	23.93	39.89	24.76	6.52	4.65	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/9/2013	E038	21.30	20.68	12.85	22.02	13.67	3.13	2.39	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	8/20/2013	E240	47.90	29.39	18.26	32.94	20.44	6.72	4.77	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	9/2/2013	E252 up	69.90	61.65	38.29	69.70	43.26	9.59	6.59	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	9/10/2013	E040	31.80	30.00	18.64	31.82	19.75	4.57	3.36	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	9/10/2013	E039.1	41.90	38.75	24.07	41.34	25.66	5.92	4.26	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	9/10/2013	E042.1	37.70	58.40	36.27	60.53	37.57	5.36	3.89	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	9/10/2013	E240	32.60	54.42	33.80	55.45	34.41	4.67	3.44	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	9/11/2013	E050.1	45.00	52.50	32.61	55.69	34.56	6.33	4.53	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	9/11/2013	E252 up	36.60	71.93	44.68	78.20	48.54	5.21	3.79	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WR-REF-3 at RF13WR03	9/11/2013	WR-REF-3	28.90	88.42	54.92	99.36	61.67	4.17	3.10	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	9/12/2013	E056	14.80	15.72	9.77	15.19	9.43	2.22	1.75	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ancho below SR-4	9/12/2013	E275	42.50	25.68	15.95	29.41	18.25	6.00	4.31	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	9/12/2013	E038	18.50	4.96	3.08	5.42	3.36	2.74	2.12	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above Rio Grande	9/12/2013	E1099	110.00	48.42	30.08	53.00	32.90	14.70	9.72	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below Ice Rink	9/12/2013	E026	85.30	88.46	54.94	93.27	57.89	11.57	7.82	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	9/12/2013	E050.1	65.00	27.68	17.19	29.03	18.01	8.96	6.20	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad above Ten Site	9/12/2013	E201	36.90	51.71	32.12	49.77	30.89	5.25	3.82	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	9/12/2013	E245.5	37.40	27.42	17.03	29.84	18.52	5.32	3.86	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	9/12/2013	E240	71.90	22.17	13.77	25.63	15.91	9.85	6.76	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	9/12/2013	E055	29.50	33.18	20.61	30.87	19.16	4.25	3.16	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	9/12/2013	E122.LFatAP	41.40	18.97	11.78	21.83	13.55	5.85	4.22	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	9/12/2013	E121	12.80	12.18	7.57	11.79	7.32	1.94	1.55	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WR-REF-3 at RF13WR03	9/12/2013	WR-REF-3	43.30	62.83	39.02	74.68	46.35	6.11	4.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chaquehui at TA-33	9/13/2013	E338	24.60	20.15	12.52	22.02	13.66	3.59	2.70	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above SR-4	9/13/2013	E250	39.00	30.56	18.98	32.31	20.05	5.53	4.01	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia above SR-4	9/13/2013	E125	20.90	10.86	6.75	11.97	7.43	3.07	2.35	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	9/13/2013	E055.5	15.50	10.70	6.64	10.80	6.70	2.32	1.82	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ten Site above Mortandad	9/13/2013	E201.5	38.80	21.28	13.22	23.67	14.69	5.51	3.99	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water below SR-4	9/13/2013	E265	67.50	82.40	51.18	98.67	61.24	9.28	6.40	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	9/18/2013	E252 up	63.70	28.63	17.78	32.50	20.17	8.79	6.09	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water above SR-501	9/19/2013	E252 up	64.76	66.46	41.28	81.82	50.78	8.92	6.18	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	9/22/2013	E240	13.90	10.00	6.21	9.95	6.17	2.09	1.66	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	12/4/2013	E123	52.99	48.77	30.29	43.47	26.98	7.39	5.20	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	12/4/2013	E121	48.04	42.86	26.62	36.10	22.40	6.74	4.79	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	12/4/2013	E122.SF	113.50	147.64	91.70	101.77	63.16	15.14	9.98	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	3/10/2014	E256	67.00	14.28	8.87	15.60	9.68	9.22	6.36	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	5/23/2014	E123	34.63	61.43	38.16	50.33	31.24	4.95	3.62	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Potrillo above SR-4	7/2/2014	E267	33.80	13.80	8.57	16.16	10.03	4.84	3.54	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/7/2014	E056	15.90	6.87	4.27	6.94	4.31	2.38	1.86	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/7/2014	E245.5	21.60	34.21	21.25	32.41	20.12	3.17	2.42	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/7/2014	E123	25.97	15.46	9.60	15.01	9.32	3.77	2.83	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/7/2014	E121	24.63	6.69	4.15	5.95	3.69	3.59	2.70	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/8/2014	E038	31.30	21.42	13.31	23.62	14.66	4.50	3.32	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/8/2014	E039.1	38.20	18.53	11.51	19.15	11.89	5.43	3.94	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad above Ten Site	7/8/2014	E201	25.70	15.60	9.69	15.16	9.41	3.74	2.80	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

DRAFT **Appendix A. LANL BLM Database**

			MLR Input	Water Quality Criteria Estimates						MLR Investigative Parameters		Detected?											
Location ID	Sample Date	Windward ID	Hardness	Acute BLM	Chronic BLM	Acute MLR (SSWQC)	Chronic MLR (SSWQC)	Acute New Mexico Hardness-based (WQS)	Chronic New Mexico Hardness-based (WQS)	Potentially Fire-affected Sample?	BLM Parameter out of Prescribed Range?	Copper	pH	DOC	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Total Sulfide	Total Alkalniity	Hardness
DP above Los Alamos Canyon	7/9/2014	E040	43.65	16.22	10.08	16.18	10.04	6.15	4.41	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/15/2014	E056	11.20	9.26	5.75	8.80	5.46	1.71	1.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/15/2014	E038	17.90	11.86	7.37	12.58	7.81	2.66	2.06	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/15/2014	E039.1	24.95	16.76	10.41	17.37	10.78	3.63	2.73	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/15/2014	E245.5	13.50	8.52	5.29	9.15	5.68	2.04	1.62	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/15/2014	E123	27.40	15.87	9.86	15.51	9.63	3.97	2.96	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/15/2014	E121	13.10	4.09	2.54	4.00	2.48	1.98	1.58	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/16/2014	E050.1	32.10	22.34	13.88	23.26	14.44	4.61	3.39	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/19/2014	E245.5	20.50	12.50	7.77	12.43	7.72	3.02	2.31	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	7/19/2014	E240	30.40	10.52	6.53	12.75	7.91	4.38	3.24	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/19/2014	E123	24.37	10.82	6.72	10.36	6.43	3.55	2.68	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/19/2014	E121	24.03	8.74	5.43	8.01	4.97	3.51	2.65	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/21/2014	E123	72.20	51.27	31.85	45.52	28.25	9.89	6.78	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/21/2014	E121	67.20	37.14	23.07	32.07	19.90	9.24	6.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chaquehui at TA-33	7/23/2014	E338	48.10	21.06	13.08	24.87	15.43	6.74	4.79	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/27/2014	E038	20.90	12.05	7.49	12.97	8.05	3.07	2.35	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/27/2014	E039.1	31.50	19.55	12.15	20.00	12.41	4.53	3.34	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/27/2014	E245.5	14.90	5.42	3.37	6.56	4.07	2.24	1.76	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/27/2014	E122.LFatAP	15.70	12.09	7.51	12.41	7.70	2.35	1.84	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/27/2014	E121	28.77	9.22	5.73	8.32	5.16	4.15	3.09	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/29/2014	E056	12.60	8.92	5.54	8.68	5.39	1.91	1.53	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/29/2014	E038	17.10	8.12	5.05	8.68	5.38	2.55	1.98	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/29/2014	E039.1	19.70	8.02	4.98	8.50	5.27	2.91	2.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.5 Pueblo below LAC WWTF	7/29/2014	E059.5	25.80	13.60	8.45	12.92	8.02	3.75	2.81	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/29/2014	E042.1	25.50	11.32	7.03	11.49	7.13	3.71	2.79	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/29/2014	E050.1	30.00	17.41	10.81	17.37	10.78	4.32	3.20	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	7/29/2014	E240	46.70	13.57	8.43	15.93	9.89	6.56	4.67	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia above Firing Range	7/29/2014	E124	26.80	23.11	14.36	22.89	14.21	3.89	2.91	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/29/2014	E123	20.20	26.99	16.77	27.03	16.77	2.98	2.28	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/29/2014	E122.LFatAP	14.07	3.34	2.08	3.66	2.27	2.12	1.68	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	7/29/2014	E244	25.40	18.37	11.41	19.26	11.96	3.69	2.78	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/30/2014	E121	45.21	69.65	43.26	60.22	37.37	6.36	4.55	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
South Fork of Sandia at E122	7/30/2014	E122.SF	94.35	167.20	103.85	166.01	103.03	12.72	8.52	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/31/2014	E038	21.70	8.13	5.05	9.02	5.60	3.19	2.43	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/31/2014	E039.1	30.90	9.14	5.68	10.16	6.31	4.44	3.28	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.5 Pueblo below LAC WWTF	7/31/2014	E059.5	30.30	7.55	4.69	7.92	4.92	4.36	3.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/31/2014	E042.1	23.20	15.69	9.75	15.79	9.80	3.39	2.57	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/31/2014	E050.1	27.80	16.41	10.19	16.38	10.17	4.02	3.00	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad above Ten Site	7/31/2014	E201	27.50	24.42	15.17	23.32	14.48	3.98	2.97	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad at LANL Boundary	7/31/2014	E204	34.30	22.08	13.72	27.58	17.12	4.90	3.59	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above SR-4	7/31/2014	E250	20.40	12.07	7.50	12.57	7.80	3.01	2.30	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/31/2014	E245.5	16.10	8.17	5.07	8.52	5.29	2.40	1.88	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	7/31/2014	E240	18.40	13.25	8.23	14.12	8.77	2.73	2.11	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	7/31/2014	E055	17.70	9.93	6.17	9.60	5.96	2.63	2.04	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia above Firing Range	7/31/2014	E124	17.20	18.56	11.53	17.32	10.75	2.56	1.99	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia above SR-4	7/31/2014	E125	40.00	20.65	12.83	21.07	13.08	5.67	4.09	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/31/2014	E123	28.97	9.47	5.88	10.16	6.31	4.18	3.11	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/31/2014	E122.LFatAP	20.40	7.10	4.41	7.92	4.91	3.01	2.30	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/31/2014	E121	22.20	4.81	2.99	4.54	2.82	3.25	2.47	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	7/31/2014	E244	18.70	7.61	4.73	8.63	5.36	2.77	2.14	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water below SR-4	7/31/2014	E265	31.10	20.37	12.65	22.63	14.05	4.47	3.30	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	10/9/2014	E240	13.00	23.29	14.46	22.15	13.75	1.97	1.57	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	5/21/2015	E040	25.00	27.04	16.80	25.80	16.01	3.64	2.74	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	5/21/2015	E039.1	17.20	17.44	10.83	17.10	10.61	2.56	1.99	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	6/26/2015	E040	26.40	25.87	16.07	26.68	16.56	3.83	2.87	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	6/26/2015	E038	21.70	18.42	11.44	20.22	12.55	3.19	2.43	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	6/26/2015	E039.1	23.80	29.20	18.14	30.67	19.03	3.48	2.63	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	6/26/2015	E121	16.90	39.09	24.28	38.04	23.61	2.52	1.96	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo below GCS	7/2/2015	E060.1	50.70	63.43	39.40	73.41	45.56	7.09	5.01	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/3/2015	E056	17.85	17.93	11.14	18.16	11.27	2.65	2.05	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	7/3/2015	E040	25.90	27.13	16.85	27.73	17.21	3.76	2.82	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/3/2015	E038	17.00	12.98	8.06	13.85	8.59	2.53	1.97	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/3/2015	E039.1	22.50	31.49	19.56	32.82	20.37	3.30	2.50	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.5 Pueblo below LAC WWTF	7/3/2015	E059.5	30.85	31.04	19.28	30.83	19.14	4.44	3.28	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/3/2015	E042.1	38.00	36.52	22.68	36.33	22.55	5.40	3.92	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	7/3/2015	E055	20.05	37.29	23.16	36.39	22.59	2.96	2.27	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/3/2015	E123	17.77	44.59	27.70	43.57	27.04	2.64	2.05	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/3/2015	E121	14.80	28.21	17.52	28.42	17.64	2.22	1.75	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	7/6/2015	E243	23.00	27.51	17.09	28.65	17.78	3.37	2.55	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Starmers above Pajarito	7/6/2015	E242	12.90	25.18	15.64	24.00	14.89	1.95	1.56	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	7/7/2015	E040	28.70	52.64	32.70	53.68	33.31	4.15	3.08	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/7/2015	E039.1	16.40	13.14	8.16	13.61	8.44	2.45	1.91	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/7/2015	E042.1	30.90	44.01	27.34	44.00	27.31	4.44	3.28	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/7/2015	E050.1	37.00	52.28	32.47	52.84	32.79	5.27	3.83	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/7/2015	E245.5	22.60	36.28	22.54	36.49	22.65	3.31	2.51	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Starmers	7/15/2015	E241	19.80	26.92	16.72	28.34	17.59	2.92	2.24	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/15/2015	E245.5	19.60	27.80	17.27	27.70	17.19	2.89	2.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito below SR-501	7/15/2015	E240	12.70	18.70	11.62	18.04	11.20	1.92	1.54	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/15/2015	E121	20.50	30.52	18.96	30.39	18.86	3.02	2.31	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/20/2015	E056	12.10	18.25	11.33	17.74	11.01	1.84	1.47	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	7/20/2015	E040	19.20	20.22	12.56	20.59	12.78	2.84	2.19	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/20/2015	E038	12.60	11.25	6.99	11.44	7.10	1.91	1.53	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/20/2015	E039.1	16.60	16.34	10.15	16.73	10.39	2.47	1.93	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
La Delfe above Pajarito	7/20/2015	E242.5	13.80	20.98	13.03	20.29	12.59	2.08	1.65	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/20/2015	E042.1	27.60	23.74	14.75	24.68	15.32	4.00	2.98	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/20/2015	E050.1	54.10	42.52	26.41	44.77	27.79	7.53	5.30	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Starmers	7/20/2015	E241	14.70	19.15	11.89	19.79	12.28	2.21	1.74	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/20/2015	E245.5	13.30	23.06	14.32	22.06	13.69	2.01	1.60	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Twomile	7/20/2015	E243	20.40	35.37	21.97	36.47	22.63	3.01	2.30	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo below GCS	7/20/2015	E060.1	28.60	58.76	36.50	51.40	31.90	4.13	3.07	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/20/2015	E123	16.10	33.25	20.65	32.98	20.47	2.40	1.88	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/20/2015	E121	15.40	26.42	16.41	26.25	16.29	2.31	1.81	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	7/20/2015	E244	9.87	27.78	17.26	24.46	15.18	1.52	1.24	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above SR-4	7/21/2015	E250	33.70	55.54	34.50	56.18	34.87	4.82	3.54	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/29/2015	E056	10.20	16.66	10.35	15.46	9.60	1.56	1.27	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

DRAFT **Appendix A. LANL BLM Database**

			MLR Input	Water Quality Criteria Estimates						MLR Investigative Parameters		Detected?											
Location ID	Sample Date	Windward ID	Hardness	Acute BLM	Chronic BLM	Acute MLR (SSWQC)	Chronic MLR (SSWQC)	Acute New Mexico Hardness-based (WQS)	Chronic New Mexico Hardness-based (WQS)	Potentially Fire-affected Sample?	BLM Parameter out of Prescribed Range?	Copper	pH	DOC	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Total Sulfide	Total Alkalinity	Hardness
DP above Los Alamos Canyon	7/29/2015	E040	18.60	20.56	12.77	20.75	12.88	2.75	2.13	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/29/2015	E038	10.40	10.53	6.54	10.27	6.37	1.59	1.29	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/29/2015	E039.1	16.00	18.29	11.36	18.72	11.62	2.39	1.87	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/29/2015	E050.1	52.60	45.68	28.38	48.08	29.84	7.34	5.17	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/29/2015	E245.5	12.60	19.40	12.05	18.62	11.56	1.91	1.53	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RF09GU02	7/29/2015	GUAJE-REF-2	56.50	34.54	21.45	39.63	24.59	7.85	5.50	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia above Firing Range	7/29/2015	E124	72.50	56.57	35.14	55.07	34.18	9.93	6.80	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/29/2015	E123	14.80	20.27	12.59	19.58	12.15	2.22	1.75	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/29/2015	E121	10.34	13.18	8.19	12.62	7.83	1.58	1.29	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WR-REF-3 at RF13WR03	7/29/2015	WR-REF-3	46.70	48.68	30.23	58.52	36.32	6.56	4.67	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	7/31/2015	E040	29.30	34.79	21.61	37.16	23.06	4.23	3.14	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/31/2015	E038	20.00	20.01	12.43	21.41	13.29	2.95	2.26	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/31/2015	E039.1	22.10	19.61	12.18	21.14	13.12	3.24	2.47	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/31/2015	E042.1	33.40	33.07	20.54	35.95	22.31	4.78	3.51	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/31/2015	E050.1	42.30	38.48	23.90	40.25	24.98	5.97	4.29	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	7/31/2015	E350	38.50	38.02	23.62	41.61	25.82	5.47	3.96	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia above Firing Range	7/31/2015	E124	19.15	69.46	43.14	63.90	39.66	2.83	2.18	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/31/2015	E121	20.33	31.63	19.65	31.93	19.82	3.00	2.30	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	8/1/2015	E256	38.65	30.59	19.00	35.64	22.12	5.49	3.97	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water below SR-4	8/1/2015	E265	23.55	46.98	29.18	47.77	29.65	3.44	2.60	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
La Delfe above Pajarito	8/2/2015	E242.5	17.20	31.61	19.63	31.79	19.73	2.56	1.99	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Starmers above Pajarito	8/2/2015	E242	16.10	29.00	18.01	27.88	17.30	2.40	1.88	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/8/2015	E038	10.40	6.00	3.73	5.96	3.70	1.59	1.29	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	8/8/2015	E039.1	17.30	20.33	12.62	21.01	13.04	2.57	2.00	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	8/8/2015	E050.1	64.10	42.95	26.68	44.50	27.62	8.84	6.12	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RF09GU02	8/8/2015	GUAJE-REF-2	50.10	22.28	13.84	25.12	15.59	7.01	4.96	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WR-REF-3 at RF13WR03	8/11/2015	WR-REF-3	52.50	48.37	30.04	58.19	36.11	7.32	5.16	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RF09GU02	8/17/2015	GUAJE-REF-2	61.30	28.00	17.39	32.10	19.93	8.47	5.90	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/17/2015	E123	23.13	37.78	23.47	38.34	23.79	3.38	2.56	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/17/2015	E121	18.77	65.35	40.59	75.09	46.61	2.78	2.14	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WR-REF-3 at RF13WR03	8/17/2015	WR-REF-3	41.10	38.45	23.88	55.91	34.70	5.81	4.19	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/20/2015	E123	64.30	27.16	16.87	24.06	14.93	8.86	6.14	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/20/2015	E121	53.00	16.48	10.24	15.86	9.85	7.39	5.21	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WR-REF-3 at RF13WR03	8/27/2015	WR-REF-3	72.75	59.79	37.13	72.46	44.97	9.96	6.82	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BAND-REF-3	9/9/2015	BAND-REF-3	15.10	15.55	9.66	15.72	9.75	2.26	1.78	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BAND-REF-3	10/20/2015	BAND-REF-3	10.50	6.89	4.28	7.81	4.84	1.61	1.31	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BAND-REF-4	10/20/2015	BAND-REF-4	6.19	6.73	4.18	6.19	3.84	0.98	0.83	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	10/20/2015	E123	17.40	25.26	15.69	23.92	14.85	2.59	2.01	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	10/21/2015	E056	13.00	18.92	11.75	18.41	11.43	1.97	1.57	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	10/21/2015	E040	23.70	15.10	9.38	15.25	9.47	3.46	2.62	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	10/21/2015	E039.1	16.80	12.58	7.81	12.98	8.06	2.50	1.95	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.8 Pueblo Below Wetlands	10/21/2015	E059.8	87.00	54.02	33.55	47.81	29.67	11.79	7.95	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	10/21/2015	E042.1	21.00	26.27	16.32	26.89	16.69	3.09	2.36	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	10/21/2015	E050.1	25.00	32.44	20.15	34.02	21.11	3.64	2.74	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio de los Frijoles at Band	10/22/2015	E350	46.60	24.67	15.32	26.98	16.75	6.55	4.66	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	10/23/2015	E050.1	27.30	18.66	11.59	19.13	11.87	3.95	2.95	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	10/23/2015	E123	13.57	9.70	6.02	9.26	5.75	2.05	1.62	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	10/23/2015	E122.LFatAP	7.16	29.98	18.62	27.50	17.07	1.12	0.94	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	10/23/2015	E121	14.54	19.28	11.97	19.13	11.87	2.18	1.72	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	12/11/2015	E256	76.60	10.95	6.80	11.83	7.34	10.45	7.13	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	3/28/2016	E256	68.40	18.28	11.35	20.00	12.41	9.40	6.47	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	6/21/2016	E256	82.70	19.52	12.12	21.35	13.25	11.24	7.61	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/1/2016	E121	21.40	23.03	14.30	20.43	12.68	3.14	2.40	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/15/2016	E121	32.20	35.19	21.85	29.62	18.39	4.62	3.40	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/31/2016	E123	20.73	26.50	16.46	23.96	14.87	3.05	2.33	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/31/2016	E121	17.53	12.62	7.84	11.77	7.30	2.61	2.02	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	8/3/2016	E040	32.00	27.54	17.10	27.20	16.88	4.59	3.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	8/3/2016	E039.1	27.00	19.00	11.80	19.81	12.30	3.91	2.93	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below Ice Rink	8/3/2016	E026	41.20	24.79	15.40	26.94	16.72	5.83	4.20	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	8/3/2016	E245.5	20.90	23.71	14.72	22.11	13.72	3.07	2.35	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/3/2016	E123	20.27	22.10	13.73	20.94	12.99	2.99	2.29	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/3/2016	E121	15.82	11.83	7.35	11.11	6.89	2.36	1.85	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	8/3/2016	E244	20.00	25.19	15.65	24.22	15.03	2.95	2.26	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	8/7/2016	E055	24.40	29.22	18.15	27.60	17.13	3.56	2.68	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/8/2016	E123	41.60	67.47	41.91	62.71	38.92	5.88	4.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/8/2016	E121	40.00	53.67	33.33	55.14	34.22	5.67	4.09	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	8/9/2016	E122.SF	112.63	182.25	113.20	176.76	109.70	15.03	9.91	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	8/19/2016	E040	30.50	17.24	10.71	17.81	11.05	4.39	3.25	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/19/2016	E038	20.00	12.46	7.74	13.41	8.32	2.95	2.26	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	8/19/2016	E055.5	15.60	17.11	10.62	16.96	10.53	2.33	1.83	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	8/24/2016	E040	23.00	21.36	13.27	22.24	13.80	3.37	2.55	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/24/2016	E038	14.10	14.70	9.13	15.01	9.32	2.12	1.68	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	8/27/2016	E040	24.50	15.77	9.79	17.08	10.60	3.57	2.69	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/27/2016	E038	18.40	13.25	8.23	14.45	8.97	2.73	2.11	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.5 Pueblo below LAC WWTF	8/27/2016	E059.5	20.80	17.25	10.71	15.35	9.53	3.06	2.34	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	8/27/2016	E042.1	28.10	13.92	8.65	14.72	9.13	4.06	3.03	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	8/27/2016	E050.1	29.30	17.41	10.82	18.06	11.21	4.23	3.14	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/27/2016	E123	19.13	17.31	10.75	16.68	10.35	2.83	2.18	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/27/2016	E121	15.95	10.23	6.35	9.51	5.91	2.38	1.87	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	8/27/2016	E055.5	9.99	15.80	9.81	14.27	8.86	1.53	1.25	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	9/3/2016	E055	18.80	28.18	17.50	26.75	16.60	2.78	2.15	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	9/3/2016	E055.5	15.60	56.09	34.84	49.33	30.62	2.33	1.83	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	9/6/2016	E040	32.20	28.74	17.85	29.70	18.43	4.62	3.40	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	9/6/2016	E039.1	25.30	22.20	13.79	23.79	14.76	3.68	2.77	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	9/6/2016	E123	17.00	22.29	13.85	20.79	12.90	2.53	1.97	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	9/6/2016	E121	19.21	9.33	5.79	8.36	5.19	2.84	2.19	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	9/9/2016	E256	81.70	23.83	14.80	26.63	16.53	11.11	7.54	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	10/3/2016	E122.LFatAP	37.73	48.23	29.96	42.28	26.24	5.36	3.89	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	10/8/2016	E122.LFatAP	31.53	56.47	35.07	51.31	31.84	4.53	3.34	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	11/4/2016	E122.LFatAP	39.80	43.35	26.93	38.26	23.74	5.64	4.08	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	11/4/2016	E121	22.25	15.14	9.40	12.91	8.01	3.26	2.48	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	11/5/2016	E039.1	19.80	11.94	7.41	12.56	7.79	2.92	2.24	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	11/5/2016	E123	18.40	35.42	22.00	32.96	20.46	2.73	2.11	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	11/6/2016	E042.1	22.40	28.49	17.69	28.61	17.76	3.28	2.49	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	12/9/2016	E256	61.40	10.82	6.72	11.94	7.41	8.49	5.90	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

DRAFT **Appendix A. LANL BLM Database**

			MLR Input	Water Quality Criteria Estimates						MLR Investigative Parameters		Detected?											
Location ID	Sample Date	Windward ID	Hardness	Acute BLM	Chronic BLM	Acute MLR (SSWQC)	Chronic MLR (SSWQC)	Acute New Mexico Hardness-based (WQS)	Chronic New Mexico Hardness-based (WQS)	Potentially Fire-affected Sample?	BLM Parameter out of Prescribed Range?	Copper	pH	DOC	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Total Sulfide	Total Alkalniity	Hardness
Canon de Valle below MDA P	3/10/2017	E256	62.10	26.02	16.16	27.69	17.19	8.58	5.96	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canon de Valle below MDA P	6/2/2017	E256	66.50	20.32	12.62	22.16	13.75	9.15	6.32	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	6/6/2017	E123	31.60	81.87	50.85	67.07	41.63	4.54	3.35	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	6/6/2017	E121	24.20	35.07	21.78	29.95	18.59	3.53	2.66	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ancho below SR-4	6/25/2017	E275	27.10	60.72	37.71	63.88	39.65	3.93	2.93	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	6/25/2017	E123	21.30	61.28	38.06	49.34	30.62	3.13	2.39	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/8/2017	E056	19.60	31.61	19.63	28.67	17.79	2.89	2.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	7/8/2017	E040	35.10	30.96	19.23	32.02	19.87	5.01	3.66	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/8/2017	E038	28.10	20.71	12.86	23.04	14.30	4.06	3.03	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/8/2017	E039.1	33.70	23.88	14.83	25.40	15.76	4.82	3.54	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/18/2017	E123	21.30	56.60	35.15	47.66	29.58	3.13	2.39	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/18/2017	E122.LFatAP	18.70	24.29	15.09	23.07	14.32	2.77	2.14	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/18/2017	E121	17.40	36.39	22.60	32.93	20.44	2.59	2.01	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/26/2017	E056	15.30	17.02	10.57	17.62	10.94	2.29	1.80	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	7/26/2017	E040	24.50	22.68	14.08	23.72	14.72	3.57	2.69	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/26/2017	E038	12.70	13.07	8.12	12.90	8.00	1.92	1.54	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/26/2017	E039.1	17.90	19.93	12.38	20.37	12.65	2.66	2.06	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/26/2017	E042.1	31.40	23.58	14.65	24.71	15.34	4.51	3.33	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	7/26/2017	E200	19.30	30.93	19.21	29.65	18.40	2.85	2.20	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/26/2017	E123	21.20	30.56	18.98	30.68	19.04	3.12	2.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/26/2017	E121	26.60	12.03	7.47	10.15	6.30	3.86	2.89	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	7/26/2017	E055.5	15.70	17.31	10.75	16.68	10.36	2.35	1.84	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	7/27/2017	E055.5	24.20	110.72	68.77	87.79	54.48	3.53	2.66	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/29/2017	E056	10.30	22.67	14.08	19.73	12.25	1.58	1.28	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	7/29/2017	E038	12.90	17.49	10.87	17.18	10.66	1.95	1.56	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/29/2017	E039.1	20.70	29.87	18.55	30.51	18.94	3.05	2.33	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/29/2017	E123	15.20	27.80	17.27	25.75	15.98	2.28	1.79	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/29/2017	E122.LFatAP	14.70	19.69	12.23	19.22	11.93	2.21	1.74	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/29/2017	E121	12.60	15.80	9.81	13.78	8.55	1.91	1.53	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	7/29/2017	E055.5	13.80	23.46	14.57	22.88	14.20	2.08	1.65	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/7/2017	E038	16.70	21.37	13.27	22.29	13.83	2.49	1.94	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	8/7/2017	E039.1	21.60	25.30	15.71	25.73	15.97	3.17	2.42	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/8/2017	E123	55.10	63.89	39.68	57.92	35.95	7.66	5.38	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/8/2017	E121	45.10	72.06	44.76	64.14	39.81	6.35	4.54	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/10/2017	E123	52.80	54.40	33.79	49.64	30.81	7.36	5.19	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/10/2017	E121	48.50	60.11	37.33	55.95	34.73	6.80	4.83	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	8/10/2017	E122.SF	80.70	127.57	79.23	130.77	81.16	10.98	7.46	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	8/21/2017	E122.LFatAP	10.40	22.32	13.86	20.52	12.73	1.59	1.29	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	8/23/2017	E056	10.80	19.41	12.06	17.89	11.10	1.65	1.34	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-SJM4 at RF17SJM04	8/24/2017	SEP-REF-SJM4	5.84	24.88	15.46	15.08	9.36	0.92	0.79	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-SJM1 at RF17SJM01	9/26/2017	SEP-REF-SJM1	5.74	146.82	91.19	25.07	15.56	0.91	0.78	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	9/27/2017	E040	19.20	46.58	28.93	46.19	28.66	2.84	2.19	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	9/27/2017	E042.1	17.20	29.04	18.04	28.61	17.76	2.56	1.99	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	9/27/2017	E050.1	39.65	33.80	20.99	30.93	19.19	5.62	4.06	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	9/27/2017	E055	16.00	31.66	19.66	29.21	18.13	2.39	1.87	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-BM1 at RF17BM01	9/27/2017	SEP-REF-BM1	15.70	27.41	17.03	24.64	15.29	2.35	1.84	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-P1 at RF17P01	9/27/2017	SEP-REF-P1	15.20	54.82	34.05	46.40	28.80	2.28	1.79	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-SJM1 at RF17SJM01	9/27/2017	SEP-REF-SJM1	7.03	13.38	8.31	10.94	6.79	1.10	0.93	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-SJM4 at RF17SJM04	9/27/2017	SEP-REF-SJM4	6.29	10.63	6.60	8.27	5.13	0.99	0.84	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	9/28/2017	E040	29.70	43.75	27.17	44.34	27.52	4.28	3.17	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
La Delfe above Pajarito	9/28/2017	E242.5	26.40	54.40	33.79	55.55	34.48	3.83	2.87	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	9/28/2017	E200	18.40	30.21	18.76	29.03	18.02	2.73	2.11	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-BM1 at RF17BM01	9/28/2017	SEP-REF-BM1	11.70	21.90	13.60	19.07	11.84	1.78	1.43	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-P1 at RF17P01	9/28/2017	SEP-REF-P1	14.10	35.43	22.01	30.16	18.72	2.12	1.68	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Starmers above Pajarito	9/28/2017	E242	9.15	16.18	10.05	14.16	8.79	1.41	1.16	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.5 Pueblo below LAC WWTF	9/29/2017	E059.5	18.00	37.60	23.36	34.28	21.28	2.67	2.07	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.8 Pueblo Below Wetlands	9/29/2017	E059.8	56.20	76.71	47.65	67.86	42.12	7.81	5.47	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above DP Canyon	9/29/2017	E030	14.30	23.45	14.56	21.05	13.07	2.15	1.70	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	9/29/2017	E042.1	17.80	19.66	12.21	19.37	12.02	2.64	2.05	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	9/29/2017	E050.1	20.30	23.10	14.35	22.77	14.13	2.99	2.29	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	9/29/2017	E245.5	12.60	34.40	21.37	29.37	18.23	1.91	1.53	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	9/29/2017	E055	19.70	41.59	25.83	38.60	23.96	2.91	2.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia above Firing Range	9/29/2017	E124	27.40	58.82	36.53	56.43	35.02	3.97	2.96	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-SJM1 at RF17SJM01	9/29/2017	SEP-REF-SJM1	4.91	23.14	14.37	15.57	9.67	0.79	0.68	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	9/29/2017	E244	8.97	25.42	15.79	20.49	12.71	1.39	1.14	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above DP Canyon	10/4/2017	E030	35.60	29.45	18.29	29.23	18.14	5.08	3.71	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	10/4/2017	E042.1	25.80	28.81	17.90	30.47	18.91	3.75	2.81	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	10/4/2017	E200	15.10	39.81	24.73	37.82	23.47	2.26	1.78	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	10/4/2017	E245.5	9.95	24.67	15.32	22.27	13.82	1.53	1.25	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-P1 at RF17P01	10/4/2017	SEP-REF-P1	13.80	40.73	25.30	35.51	22.04	2.08	1.65	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-SJM1 at RF17SJM01	10/4/2017	SEP-REF-SJM1	7.16	9.18	5.70	8.50	5.28	1.12	0.94	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Twomile above Pajarito	10/4/2017	E244	13.60	19.59	12.17	18.45	11.45	2.05	1.63	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.8 Pueblo Below Wetlands	10/5/2017	E059.8	53.60	81.88	50.86	74.02	45.94	7.47	5.26	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
La Delfe above Pajarito	10/5/2017	E242.5	12.80	92.08	57.19	82.58	51.25	1.94	1.55	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	10/5/2017	E050.1	27.90	26.21	16.28	26.97	16.74	4.04	3.01	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	10/5/2017	E245.5	24.90	37.05	23.01	36.06	22.38	3.63	2.73	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEP-REF-P1 at RF17P01	10/5/2017	SEP-REF-P1	15.10	39.13	24.30	34.54	21.44	2.26	1.78	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/13/2018	E056	18.10	23.06	14.32	22.22	13.79	2.69	2.08	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	7/15/2018	E200	21.40	26.64	16.55	24.65	15.30	3.14	2.40	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	7/17/2018	E056	12.30	17.94	11.15	16.16	10.03	1.87	1.49	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/17/2018	E123	23.60	45.74	28.41	40.67	25.24	3.45	2.61	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/17/2018	E121	16.50	28.35	17.61	26.03	16.16	2.46	1.92	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ancho below SR-4	7/23/2018	E275	39.10	63.81	39.63	71.32	44.26	5.55	4.01	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chaquehui tributary at TA-33	7/23/2018	E340	19.30	43.95	27.30	45.00	27.93	2.85	2.20	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/24/2018	E123	52.45	79.36	49.29	71.06	44.11	7.32	5.16	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/24/2018	E121	32.70	50.39	31.30	45.67	28.34	4.69	3.45	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Sandia at E122	7/24/2018	E122.SF	68.25	104.83	65.11	112.71	69.95	9.38	6.46	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/2/2018	E038	15.20	29.40	18.26	28.81	17.88	2.28	1.79	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	8/2/2018	E039.1	24.90	31.51	19.57	32.31	20.05	3.63	2.73	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	8/2/2018	E055.5	15.80	20.20	12.55	19.67	12.21	2.36	1.85	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

DRAFT **Appendix A. LANL BLM Database**

			MLR Input	Water Quality Criteria Estimates						MLR Investigative Parameters		Detected?											
Location ID	Sample Date	Windward ID	Hardness	Acute BLM	Chronic BLM	Acute MLR (SSWQC)	Chronic MLR (SSWQC)	Acute New Mexico Hardness-based (WQS)	Chronic New Mexico Hardness-based (WQS)	Potentially Fire-affected Sample?	BLM Parameter out of Prescribed Range?	Copper	pH	DOC	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Total Sulfide	Total Alkalniity	Hardness
Ancho below SR-4	8/3/2018	E275	46.60	39.25	24.38	46.05	28.58	6.55	4.66	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/7/2018	E121	10.90	34.19	21.24	29.71	18.44	1.67	1.35	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	8/9/2018	E056	13.60	24.55	15.25	22.64	14.05	2.05	1.63	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pueblo above Acid	8/9/2018	E055	17.40	23.87	14.83	22.39	13.90	2.59	2.01	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/9/2018	E123	19.80	39.08	24.27	36.64	22.74	2.92	2.24	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/9/2018	E121	12.20	20.70	12.86	18.38	11.41	1.85	1.48	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CDB above SR-4	8/10/2018	E229.3	35.60	40.11	24.91	45.05	27.96	5.08	3.71	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	8/10/2018	E040	32.20	64.97	40.35	64.63	40.11	4.62	3.40	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/10/2018	E038	14.50	16.40	10.19	17.14	10.64	2.18	1.72	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	8/10/2018	E039.1	27.40	26.66	16.56	28.23	17.52	3.97	2.96	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	8/10/2018	E200	23.00	74.82	46.47	70.97	44.04	3.37	2.55	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/15/2018	E038	17.50	15.07	9.36	15.68	9.73	2.60	2.02	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	8/15/2018	E039.1	24.50	84.69	52.60	78.47	48.70	3.57	2.69	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	8/15/2018	E123	20.00	34.90	21.68	32.32	20.06	2.95	2.26	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	8/15/2018	E121	15.10	17.17	10.67	15.55	9.65	2.26	1.78	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	9/3/2018	E038	12.60	10.52	6.54	10.70	6.64	1.91	1.53	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	9/3/2018	E039.1	23.80	26.25	16.30	27.51	17.07	3.48	2.63	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Starmers	9/3/2018	E241	14.70	19.95	12.39	19.07	11.84	2.21	1.74	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	9/3/2018	E123	16.20	26.62	16.53	25.40	15.77	2.42	1.89	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Fork of Acid Canyon	9/3/2018	E055.5	12.80	14.45	8.97	14.04	8.71	1.94	1.55	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acid above Pueblo	9/4/2018	E056	14.30	27.08	16.82	25.15	15.61	2.15	1.70	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	9/4/2018	E040	17.20	15.32	9.51	15.77	9.79	2.56	1.99	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	9/4/2018	E039.1	15.50	15.22	9.45	15.55	9.65	2.32	1.82	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	9/4/2018	E042.1	19.70	15.82	9.83	16.46	10.21	2.91	2.23	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	9/4/2018	E123	16.50	18.00	11.18	17.68	10.97	2.46	1.92	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	9/4/2018	E122.LFatAP	25.10	66.76	41.47	72.99	45.30	3.65	2.75	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	9/4/2018	E121	8.87	8.79	5.46	8.13	5.05	1.37	1.13	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	9/5/2018	E040	40.90	44.56	27.67	47.13	29.25	5.79	4.17	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above Los Alamos Canyon	10/23/2018	E040	26.10	29.16	18.11	29.03	18.02	3.79	2.84	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	10/23/2018	E200	59.60	37.12	23.06	30.94	19.20	8.25	5.76	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Starmers	10/24/2018	E241	52.70	18.09	11.23	19.16	11.89	7.35	5.18	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	7/2/2019	E200	55.30	57.26	35.57	56.14	34.84	7.69	5.40	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/2/2019	E122.LFatAP	23.90	36.07	22.40	33.19	20.60	3.49	2.64	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/2/2019	E121	19.80	25.84	16.05	23.13	14.36	2.92	2.24	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below Ice Rink	7/7/2019	E026	41.70	18.51	11.50	20.33	12.62	5.89	4.24	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/7/2019	E123	49.30	71.37	44.33	77.54	48.13	6.90	4.89	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/7/2019	E122.LFatAP	14.40	20.07	12.46	18.68	11.59	2.16	1.71	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/7/2019	E121	16.90	13.45	8.35	12.83	7.96	2.52	1.96	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/8/2019	E050.1	43.70	26.71	16.59	27.70	17.19	6.16	4.41	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/13/2019	E122.LFatAP	25.30	41.35	25.68	36.56	22.69	3.68	2.77	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/15/2019	E123	22.70	51.36	31.90	44.00	27.31	3.32	2.52	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia left fork at Asph Plant	7/15/2019	E122.LFatAP	11.60	17.12	10.63	15.96	9.91	1.77	1.42	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/15/2019	E121	11.30	20.27	12.59	18.47	11.46	1.72	1.39	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/25/2019	E123	26.70	58.28	36.20	51.21	31.78	3.87	2.90	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/25/2019	E121	14.40	21.57	13.40	20.34	12.63	2.16	1.71	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	7/26/2019	E039.1	26.80	20.90	12.98	23.21	14.40	3.89	2.91	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	7/26/2019	E042.1	43.30	42.97	26.69	46.33	28.75	6.11	4.38	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	7/26/2019	E050.1	34.70	37.52	23.31	39.61	24.59	4.96	3.63	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad above Ten Site	7/26/2019	E201	19.90	38.19	23.72	36.02	22.36	2.94	2.25	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pajarito above Threemile	7/26/2019	E245.5	24.60	26.26	16.31	28.72	17.82	3.59	2.70	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Sandia above Firing Range	7/26/2019	E124	26.20	55.47	34.46	53.82	33.40	3.80	2.85	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia below Wetlands	7/26/2019	E123	40.80	51.84	32.20	51.96	32.25	5.77	4.16	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sandia right fork at Pwr Plant	7/26/2019	E121	47.75	48.16	29.91	47.59	29.54	6.70	4.76	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ten Site above Mortandad	7/26/2019	E201.5	19.50	26.86	16.69	23.06	14.31	2.88	2.22	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP above TA-21	8/7/2019	E038	13.70	16.15	10.03	16.80	10.42	2.07	1.64	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DP below grade ctrl structure	8/7/2019	E039.1	18.90	20.55	12.77	22.10	13.72	2.80	2.16	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E059.5 Pueblo below LAC WWTF	8/7/2019	E059.5	25.90	46.59	28.94	43.21	26.82	3.76	2.82	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos above low-head weir	8/7/2019	E042.1	35.80	32.40	20.12	36.08	22.39	5.11	3.72	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Los Alamos below low-head weir	8/7/2019	E050.1	27.50	27.62	17.16	29.60	18.37	3.98	2.97	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	8/7/2019	E200	39.00	83.46	51.84	88.82	55.13	5.53	4.01	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mortandad below Effluent Canon	10/4/2019	E200	22.30	34.92	21.69	35.82	22.23	3.27	2.48	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

DRAFT **Appendix A. LANL BLM Database**

			Source of value[a]				
Location ID	Sample Date	Windward ID	pH	DOC	Sulfate	Chloride	Total Alkalinity
Los Alamos above DP Canyon	4/28/2005	E030	Filtered	"Filtered" TOC, assumed to be DOC	Filtered	Filtered	Filtered
Los Alamos below Ice Rink	4/29/2005	E026	Filtered	"Filtered" TOC, assumed to be DOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	4/29/2005	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Acid above Pueblo	5/3/2005	E056	Filtered	"Filtered" TOC, assumed to be DOC	Filtered	Filtered	Filtered
Pueblo above Acid	5/3/2005	E055	Filtered	Filtered	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	6/28/2006	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	6/29/2006	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	7/12/2006	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Acid above Pueblo	7/27/2006	E056	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	8/29/2006	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Twomile above Pajarito	8/29/2006	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Rio de los Frijoles at Band	9/20/2006	E350	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	10/17/2006	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	10/18/2006	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	10/27/2006	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Water above SR-501	1/24/2007	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Canon de Valle below MDA P	1/29/2007	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	2/20/2007	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	2/21/2007	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	3/2/2007	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	4/3/2007	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Twomile above Pajarito	4/3/2007	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Los Alamos below Ice Rink	4/16/2007	E026	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Los Alamos above DP Canyon	4/17/2007	E030	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Acid above Pueblo	4/18/2007	E056	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pueblo above Acid	4/18/2007	E055	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Water above SR-501	5/31/2007	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Canon de Valle below MDA P	6/1/2007	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	6/13/2007	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	6/13/2007	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	6/27/2007	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Twomile above Pajarito	6/27/2007	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Acid above Pueblo	7/25/2007	E056	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pueblo above Acid	7/25/2007	E055	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	8/21/2007	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	8/22/2007	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	8/22/2007	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	9/12/2007	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Twomile above Pajarito	9/12/2007	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Water above SR-501	10/17/2007	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Canon de Valle below MDA P	10/25/2007	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Rio de los Frijoles at Band	10/31/2007	E350	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	11/13/2007	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	12/17/2007	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Twomile above Pajarito	12/17/2007	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Acid above Pueblo	1/15/2008	E056	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pueblo above Acid	1/15/2008	E055	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	2/14/2008	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	2/14/2008	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	2/21/2008	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	3/5/2008	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Twomile above Pajarito	3/5/2008	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Canon de Valle below MDA P	3/31/2008	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Water above SR-501	4/3/2008	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Rio de los Frijoles at Band	4/8/2008	E350	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	5/13/2008	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	5/21/2008	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	6/12/2008	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	8/11/2008	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	8/11/2008	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	8/20/2008	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Acid above Pueblo	8/28/2008	E056	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pueblo above Acid	8/28/2008	E055	Filtered	Converted from TOC	Filtered	Filtered	Filtered
DP above TA-21	9/2/2008	E038	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	9/10/2008	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Twomile above Pajarito	9/10/2008	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Canon de Valle below MDA P	10/7/2008	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Water above SR-501	10/17/2008	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Rio de los Frijoles at Band	10/23/2008	E350	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	11/3/2008	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia right fork at Pwr Plant	11/3/2008	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	11/3/2008	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	11/18/2008	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	2/9/2009	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia right fork at Pwr Plant	2/9/2009	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	2/9/2009	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	2/12/2009	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pajarito above Twomile	3/11/2009	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Canon de Valle below MDA P	3/24/2009	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Water above SR-501	3/25/2009	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	5/5/2009	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia right fork at Pwr Plant	5/7/2009	E121	Filtered	Converted from TOC	Filtered	Location-averaged	Filtered
South Fork of Sandia at E122	5/7/2009	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Acid above Pueblo	7/9/2009	E056	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Pueblo above Acid	7/9/2009	E055	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	8/7/2009	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia right fork at Pwr Plant	8/7/2009	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	8/13/2009	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Mortandad below Effluent Canon	8/18/2009	E200	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Canon de Valle below MDA P	10/15/2009	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Water above SR-501	10/16/2009	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Rio de los Frijoles at Band	10/21/2009	E350	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia right fork at Pwr Plant	11/2/2009	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered
South Fork of Sandia at E122	11/2/2009	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered
Sandia below Wetlands	11/4/2009	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered

			QA/QC Information								
Location ID	Sample Date	Windward ID	Sample Collection Start Time	Sample Collection End Time	Sample Retrieval Start Time	Sample Retrieval End Time	Lab Receipt Start Time	Lab Receipt End Time	Analysis Start Time	Analysis End Time	Chain of Custody Number(s)
Los Alamos above DP Canyon	4/28/2005	E030	4/28/05 11:25	4/28/05 11:25	NA	NA	4/29/05 17:00	4/29/05 17:00	5/1/05 19:49	5/24/05 22:32	135561; 137173
Los Alamos below Ice Rink	4/29/2005	E026	4/29/05 8:50	4/29/05 8:50	NA	NA	5/2/05 17:00	5/2/05 17:00	5/3/05 19:29	5/24/05 22:44	135649; 137177
Mortandad below Effluent Canon	4/29/2005	E200	4/29/05 11:55	4/29/05 11:55	NA	NA	5/2/05 17:00	5/2/05 17:00	5/3/05 19:34	5/24/05 22:40	135660; 137099; 137174
Acid above Pueblo	5/3/2005	E056	5/3/05 10:12	5/3/05 10:12	NA	NA	5/3/05 17:00	5/3/05 17:00	5/4/05 20:24	5/24/05 22:30	135792; 137151
Pueblo above Acid	5/3/2005	E055	5/3/05 9:00	5/3/05 15:17	NA	NA	5/3/05 17:00	5/6/05 17:00	5/4/05 20:23	5/28/05 13:53	135792; 137151; 136044
Mortandad below Effluent Canon	6/28/2006	E200	6/28/06 9:40	6/28/06 9:40	NA	NA	6/29/06 17:00	6/29/06 17:00	7/4/06 11:33	7/22/06 17:05	166312
South Fork of Sandia at E122	6/29/2006	E122.SF	6/29/06 9:30	6/29/06 9:30	NA	NA	6/30/06 17:00	6/30/06 17:00	7/5/06 10:42	7/24/06 21:41	166359
Sandia below Wetlands	7/12/2006	E123	7/12/06 13:05	7/12/06 13:05	NA	NA	7/13/06 17:00	7/13/06 17:00	7/17/06 18:58	8/8/06 10:23	167148
Acid above Pueblo	7/27/2006	E056	7/27/06 11:40	7/27/06 11:40	NA	NA	7/30/06 17:00	7/30/06 17:00	8/1/06 11:38	8/23/06 12:48	168162
Pajarito above Twomile	8/29/2006	E243	8/29/06 10:00	8/29/06 10:00	NA	NA	8/30/06 17:00	8/30/06 17:00	9/1/06 11:16	9/26/06 15:30	170612
Twomile above Pajarito	8/29/2006	E244	8/29/06 8:40	8/29/06 8:40	NA	NA	8/30/06 17:00	8/30/06 17:00	9/1/06 11:16	9/26/06 15:30	170612
Rio de los Frijoles at Band	9/20/2006	E350	9/20/06 9:45	9/20/06 9:45	NA	NA	9/21/06 17:00	9/21/06 17:00	9/23/06 12:18	10/19/06 14:48	172455
South Fork of Sandia at E122	10/17/2006	E122.SF	10/17/06 9:50	10/17/06 9:50	NA	NA	10/18/06 17:00	10/18/06 17:00	10/20/06 16:36	10/31/06 13:23	174497
Sandia below Wetlands	10/18/2006	E123	10/18/06 8:35	10/18/06 8:35	NA	NA	10/18/06 17:00	10/18/06 17:00	10/20/06 16:42	10/31/06 13:23	174497
Mortandad below Effluent Canon	10/27/2006	E200	10/27/06 9:10	10/27/06 9:10	NA	NA	10/27/06 17:00	10/27/06 17:00	10/28/06 14:47	11/15/06 13:07	175123
Water above SR-501	1/24/2007	E252 up	1/24/07 9:50	1/24/07 9:50	NA	NA	1/25/07 16:00	1/25/07 16:00	1/26/07 18:13	2/19/07 15:05	179738
Canon de Valle below MDA P	1/29/2007	E256	1/29/07 10:35	1/29/07 10:35	NA	NA	1/30/07 16:00	1/30/07 16:00	2/1/07 19:40	2/28/07 13:47	179921
Sandia below Wetlands	2/20/2007	E123	2/20/07 10:15	2/20/07 10:15	NA	NA	2/21/07 16:00	2/21/07 16:00	2/26/07 15:17	3/15/07 10:30	181199
South Fork of Sandia at E122	2/21/2007	E122.SF	2/21/07 9:00	2/21/07 9:00	NA	NA	2/21/07 16:00	2/21/07 16:00	2/27/07 15:25	3/15/07 10:30	181199
Mortandad below Effluent Canon	3/2/2007	E200	3/2/07 11:07	3/2/07 11:07	NA	NA	3/5/07 16:00	3/5/07 16:00	3/7/07 15:34	3/26/07 10:36	181873
Pajarito above Twomile	4/3/2007	E243	4/3/07 12:30	4/3/07 12:30	NA	NA	4/3/07 17:00	4/3/07 17:00	4/5/07 16:49	4/27/07 9:43	183582
Twomile above Pajarito	4/3/2007	E244	4/3/07 10:40	4/3/07 10:40	NA	NA	4/3/07 17:00	4/3/07 17:00	4/5/07 16:46	4/27/07 9:43	183582
Los Alamos below Ice Rink	4/16/2007	E026	4/16/07 12:45	4/16/07 12:45	NA	NA	4/16/07 17:00	4/16/07 17:00	4/18/07 18:40	5/7/07 8:48	184348
Los Alamos above DP Canyon	4/17/2007	E030	4/17/07 14:55	4/17/07 14:55	NA	NA	4/18/07 17:00	4/18/07 17:00	4/23/07 12:29	5/14/07 9:38	184479
Acid above Pueblo	4/18/2007	E056	4/18/07 11:27	4/18/07 11:27	NA	NA	4/18/07 17:00	4/18/07 17:00	4/23/07 12:29	5/14/07 9:38	184479
Pueblo above Acid	4/18/2007	E055	4/18/07 10:45	4/18/07 10:45	NA	NA	4/18/07 17:00	4/18/07 17:00	4/23/07 12:29	5/14/07 9:38	184479
Water above SR-501	5/31/2007	E252 up	5/31/07 12:50	5/31/07 12:50	NA	NA	6/1/07 17:00	6/1/07 17:00	6/5/07 11:10	6/27/07 15:47	187064
Canon de Valle below MDA P	6/1/2007	E256	6/1/07 8:17	6/1/07 8:17	NA	NA	6/1/07 17:00	6/1/07 17:00	6/5/07 11:18	6/27/07 15:47	187064
Sandia below Wetlands	6/13/2007	E123	6/13/07 11:11	6/13/07 11:11	NA	NA	6/14/07 17:00	6/14/07 17:00	6/18/07 21:58	7/12/07 8:27	187921
South Fork of Sandia at E122	6/13/2007	E122.SF	6/13/07 12:25	6/13/07 12:25	NA	NA	6/14/07 17:00	6/14/07 17:00	6/18/07 21:56	7/12/07 8:27	187921
Pajarito above Twomile	6/27/2007	E243	6/27/07 10:10	6/27/07 10:10	NA	NA	6/28/07 17:00	6/28/07 17:00	7/3/07 1:01	7/25/07 8:33	188820
Twomile above Pajarito	6/27/2007	E244	6/27/07 11:45	6/27/07 11:45	NA	NA	6/28/07 17:00	6/28/07 17:00	7/3/07 0:28	7/25/07 8:33	188820
Acid above Pueblo	7/25/2007	E056	7/25/07 11:05	7/25/07 11:05	NA	NA	7/26/07 17:00	7/26/07 17:00	7/30/07 13:44	8/22/07 8:52	190281
Pueblo above Acid	7/25/2007	E055	7/25/07 9:10	7/25/07 9:10	NA	NA	7/26/07 17:00	7/26/07 17:00	7/30/07 13:44	8/22/07 8:52	190281
South Fork of Sandia at E122	8/21/2007	E122.SF	8/21/07 8:45	8/21/07 8:45	NA	NA	8/21/07 17:00	8/21/07 17:00	8/23/07 19:38	9/13/07 12:48	192146
Mortandad below Effluent Canon	8/22/2007	E200	8/22/07 13:35	8/22/07 13:35	NA	NA	8/23/07 17:00	8/23/07 17:00	8/25/07 15:11	9/17/07 12:35	192303
Sandia below Wetlands	8/22/2007	E123	8/22/07 9:30	8/22/07 9:30	NA	NA	8/22/07 17:00	8/22/07 17:00	8/25/07 15:05	9/13/07 12:48	192216
Pajarito above Twomile	9/12/2007	E243	9/12/07 11:56	9/12/07 11:56	NA	NA	9/13/07 17:00	9/13/07 17:00	9/17/07 15:44	10/6/07 16:05	193728
Twomile above Pajarito	9/12/2007	E244	9/12/07 9:30	9/12/07 9:30	NA	NA	9/13/07 17:00	9/13/07 17:00	9/17/07 15:44	10/6/07 16:05	193728
Water above SR-501	10/17/2007	E252 up	10/17/07 10:15	10/17/07 10:15	NA	NA	10/17/07 17:00	10/17/07 17:00	10/19/07 12:22	11/6/07 8:15	195926
Canon de Valle below MDA P	10/25/2007	E256	10/25/07 9:50	10/25/07 9:50	NA	NA	10/26/07 17:00	10/26/07 17:00	10/29/07 10:46	11/16/07 16:06	196538
Rio de los Frijoles at Band	10/31/2007	E350	10/31/07 14:10	10/31/07 14:10	NA	NA	11/1/07 17:00	11/1/07 17:00	11/6/07 11:26	11/28/07 9:20	196890
Sandia below Wetlands	11/13/2007	E123	11/13/07 15:22	11/13/07 15:22	NA	NA	11/14/07 16:00	11/14/07 16:00	11/16/07 0:00	12/6/07 0:00	08-176
Pajarito above Twomile	12/17/2007	E243	12/17/07 13:20	12/17/07 13:20	NA	NA	12/18/07 16:00	12/18/07 16:00	12/20/07 0:00	1/10/08 0:00	08-412
Twomile above Pajarito	12/17/2007	E244	12/17/07 11:40	12/17/07 11:40	NA	NA	12/18/07 16:00	12/18/07 16:00	12/20/07 0:00	1/10/08 0:00	08-412
Acid above Pueblo	1/15/2008	E056	1/15/08 10:05	1/15/08 10:05	NA	NA	1/15/08 16:00	1/15/08 16:00	1/17/08 0:00	2/7/08 0:00	08-499
Pueblo above Acid	1/15/2008	E055	1/15/08 9:45	1/15/08 9:45	NA	NA	1/15/08 16:00	1/15/08 16:00	1/17/08 0:00	2/7/08 0:00	08-499
Sandia below Wetlands	2/14/2008	E123	2/14/08 10:05	2/14/08 10:05	NA	NA	2/14/08 16:00	2/14/08 16:00	2/18/08 0:00	3/10/08 0:00	08-633
South Fork of Sandia at E122	2/14/2008	E122.SF	2/14/08 12:10	2/14/08 12:10	NA	NA	2/15/08 16:00	2/15/08 16:00	2/18/08 0:00	3/10/08 0:00	08-636
Mortandad below Effluent Canon	2/21/2008	E200	2/21/08 13:10	2/21/08 13:10	NA	NA	2/22/08 16:00	2/22/08 16:00	2/25/08 0:00	3/13/08 0:00	08-674
Pajarito above Twomile	3/5/2008	E243	3/5/08 12:50	3/5/08 12:50	NA	NA	3/6/08 16:00	3/6/08 16:00	3/10/08 0:00	3/26/08 0:00	08-748
Twomile above Pajarito	3/5/2008	E244	3/5/08 11:00	3/5/08 11:00	NA	NA	3/6/08 16:00	3/6/08 16:00	3/10/08 0:00	3/26/08 0:00	08-748
Canon de Valle below MDA P	3/31/2008	E256	3/31/08 10:30	3/31/08 10:30	NA	NA	4/1/08 17:00	4/1/08 17:00	4/2/08 0:00	4/23/08 0:00	08-892
Water above SR-501	4/3/2008	E252 up	4/3/08 11:45	4/3/08 11:45	NA	NA	4/3/08 17:00	4/3/08 17:00	4/5/08 0:00	4/24/08 0:00	08-923
Rio de los Frijoles at Band	4/8/2008	E350	4/8/08 14:04	4/8/08 14:04	NA	NA	4/9/08 17:00	4/9/08 17:00	4/11/08 0:00	5/1/08 0:00	08-956
Sandia below Wetlands	5/13/2008	E123	5/13/08 10:00	5/13/08 10:00	NA	NA	5/14/08 17:00	5/14/08 17:00	5/16/08 0:00	6/6/08 0:00	08-1132
South Fork of Sandia at E122	5/21/2008	E122.SF	5/21/08 11:25	5/21/08 11:25	NA	NA	5/22/08 17:00	5/22/08 17:00	5/27/08 0:00	6/10/08 0:00	08-1215; 08-1214
Pajarito above Twomile	6/12/2008	E243	6/12/08 11:35	6/12/08 11:35	NA	NA	6/13/08 17:00	6/13/08 17:00	6/16/08 0:00	7/1/08 0:00	08-1349
Sandia below Wetlands	8/11/2008	E123	8/11/08 12:00	8/11/08 12:00	NA	NA	8/12/08 17:00	8/12/08 17:00	8/14/08 0:00	9/11/08 0:00	08-1642
South Fork of Sandia at E122	8/11/2008	E122.SF	8/11/08 12:00	8/11/08 12:00	NA	NA	8/12/08 17:00	8/12/08 17:00	8/14/08 0:00	9/10/08 0:00	08-1645
Mortandad below Effluent Canon	8/20/2008	E200	8/20/08 12:35	8/20/08 12:35	NA	NA	8/21/08 17:00	8/21/08 17:00	8/25/08 0:00	9/17/08 0:00	08-1731; 08-1730
Acid above Pueblo	8/28/2008	E056	8/28/08 11:55	8/28/08 11:55	NA	NA	8/29/08 17:00	8/29/08 17:00	9/2/08 0:00	9/27/08 0:00	08-1805
Pueblo above Acid	8/28/2008	E055	8/28/08 11:00	8/28/08 11:00	NA	NA	8/29/08 17:00	8/29/08 17:00	9/2/08 0:00	9/27/08 0:00	08-1805
DP above TA-21	9/2/2008	E038	9/2/08 14:50	9/2/08 14:50	NA	NA	9/3/08 17:00	9/3/08 17:00	9/5/08 0:00	10/3/08 0:00	08-1826; 08-1825
Pajarito above Twomile	9/10/2008	E243	9/10/08 10:30	9/10/08 10:30	NA	NA	9/11/08 17:00	9/11/08 17:00	9/15/08 0:00	10/8/08 0:00	08-1908; 08-1907
Twomile above Pajarito	9/10/2008	E244	9/10/08 13:20	9/10/08 13:20	NA	NA	9/11/08 17:00	9/11/08 17:00	9/15/08 0:00	10/8/08 0:00	08-1908; 08-1907
Canon de Valle below MDA P	10/7/2008	E256	10/7/08 13:20	10/7/08 13:20	NA	NA	10/8/08 17:00	10/8/08 17:00	10/10/08 0:00	11/3/08 0:00	19603
Water above SR-501	10/17/2008	E252 up	10/17/08 11:30	10/17/08 11:30	NA	NA	10/20/08 17:00	10/20/08 17:00	10/22/08 0:00	11/11/08 0:00	09-122
Rio de los Frijoles at Band	10/23/2008	E350	10/23/08 9:50	10/23/08 9:50	NA	NA	10/23/08 17:00	10/23/08 17:00	10/28/08 0:00	11/12/08 0:00	09-166
Sandia below Wetlands	11/3/2008	E123	11/3/08 11:00	11/3/08 11:00	NA	NA	11/4/08 16:00	11/4/08 16:00	11/6/08 0:00	12/1/08 0:00	09-205; 09-204
Sandia right fork at Pwr Plant	11/3/2008	E121	11/3/08 14:50	11/3/08 14:50	NA	NA	11/4/08 16:00	11/4/08 16:00	11/6/08 0:00	12/1/08 0:00	09-205; 09-204
South Fork of Sandia at E122	11/3/2008	E122.SF	11/3/08 13:40	11/3/08 13:40	NA	NA	11/4/08 16:00	11/4/08 16:00	11/6/08 0:00	12/1/08 0:00	09-205; 09-204
Mortandad below Effluent Canon	11/18/2008	E200	11/18/08 14:07	11/18/08 14:07	NA	NA	11/19/08 16:00	11/19/08 16:00	11/21/08 0:00	12/17/08 0:00	09-338
Sandia below Wetlands	2/9/2009	E123	2/9/09 13:25	2/9/09 13:25	NA	NA	2/10/09 16:00	2/10/09 16:00	2/12/09 0:00	3/2/09 0:00	09-849; 09-847
Sandia right fork at Pwr Plant	2/9/2009	E121	2/9/09 10:45	2/9/09 10:45	NA	NA	2/10/09 16:00	2/10/09 16:00	2/12/09 0:00	3/2/09 0:00	09-849; 09-847
South Fork of Sandia at E122	2/9/2009	E122.SF	2/9/09 10:05	2/9/09 10:05	NA	NA	2/10/09 16:00	2/10/09 16:00	2/12/09 0:00	3/2/09 0:00	09-849; 09-847
Mortandad below Effluent Canon	2/12/2009	E200	2/12/09 15:00	2/12/09 15:00	NA	NA	2/13/09 16:00	2/13/09 16:00	2/16/09 0:00	3/12/09 0:00	09-893
Pajarito above Twomile	3/11/2009	E243	3/11/09 14:28	3/11/09 14:28	NA	NA	3/12/09 17:00	3/12/09 17:00	3/16/09 0:00	4/8/09 0:00	09-1196; 09-1195
Canon de Valle below MDA P	3/24/2009	E256	3/24/09 12:00	3/24/09 12:00	NA	NA	3/25/09 17:00	3/25/09 17:00	3/27/09 0:00	4/22/09 0:00	09-1278; 09-1277
Water above SR-501	3/25/2009	E252 up	3/25/09 9:25	3/25/09 9:25	NA	NA	3/26/09 17:00	3/26/09 17:00	3/28/09 0:00	4/22/09 0:00	09-1304; 09-1303
Sandia below Wetlands	5/5/2009	E123	5/5/09 14:10	5/5/09 14:10	NA	NA	5/6/09 17:00	5/6/09 17:00	5/8/09 0:00	6/3/09 0:00	09-1746; 09-1745
Sandia right fork at Pwr Plant	5/7/2009	E121	5/7/09 9:23	5/7/09 9:23	NA	NA	5/8/09 17:00	5/8/09 17:00	5/11/09 0:00	6/2/09 0:00	09-1792
South Fork of Sandia at E122	5/7/2009	E122.SF	5/7/09 8:30	5/7/09 8:30	NA	NA	5/8/09 17:00	5/8/09 17:00	5/11/09 0:00	6/2/09 0:00	09-1792
Acid above Pueblo	7/9/2009	E056	7/9/09 13:45	7/9/09 13:45	NA	NA	7/10/09 17:00	7/10/09 17:00	7/13/09 0:00	8/3/09 0:00	252994
Pueblo above Acid	7/9/2009	E055	7/9/09 13:45	7/9/09 13:45	NA	NA	7/10/09 17:00	7/10/09 17:00	7/13/09 0:00	8/3/09 0:00	252994
Sandia below Wetlands	8/7/2009	E123	8/7/09 11:30	8/7/09 11:30	NA	NA	8/10/09 17:00	8/10/09 17:00	8/12/09 0:00	9/3/09 0:00	09-2813; 09-2812
Sandia right fork at Pwr Plant	8/7/2009	E121	8/7/09 13:10	8/7/09 13:10	NA	NA	8/10/09 17:00	8/10/09 17:00	8/12/09 0:00	9/3/09 0:00	09-2813; 09-2812
South Fork of Sandia at E122	8/13/2009	E122.SF	8/13/09 15:45	8/13/09 15:45	NA	NA	8/14/09 17:00	8/14/09 17:00	8/17/09 0:00	9/4/09 0:00	09-2872; 09-2871
Mortandad below Effluent Canon	8/18/2009	E200	8/18/09 11:00	8/18/09 11:00	NA	NA	8/19/09 17:00	8/19/09 17:00	8/21/09 0:00	9/18/09 0:00	09-2924; 09-2923
Canon de Valle below MDA P	10/15/2009	E256	10/15/09 9:10	10/15/09 9:10	NA	NA	10/16/09 17:00	10/16/09 17:00	10/19/09 0:00	11/9/09 0:00	10-148
Water above SR-501	10/16/2009	E252 up	10/16/09 12:10	10/16/09 12:10	NA	NA	10/19/09 17:00	10/19/09 17:00	10/21/09 0:00	11/13/09 0:00	10-166; 10-165
Rio de los Frijoles at Band	10/21/2009	E350	10/21/09 11:15	10/21/09 11:15	NA	NA	10/22/09 17:00	10/22/09 17:00	10/26/09 0:00	11/17/09 0:00	10-224
Sandia right fork at Pwr Plant	11/2/2009	E121	11/2/09 14:53	11/2/09 14:53	NA	NA	11/3/09 16:00	11/3/09 16:00	11/5/09 0:00	11/23/09 0:00	10-322; 10-321
South Fork of Sandia at E122	11/2/2009	E122.SF	11/2/09 13:45	11/2/09 13:45	NA	NA	11/3/09 16:00	11/3/09 16:00	11/5/09 0:00	11/23/09 0:00	10-322; 10-321
Sandia below Wetlands	11/4/2009	E123	11/4/09 12:30	11/4/09 12:30	NA	NA	11/5/09 16:00	11/5/09 16:00	11/9/09 0:00	12/2/09 0:00	10-366; 10-365

DRAFT **Appendix A. LANL BLM Database**

			Source of value[a]					QA/QC Information								
Location ID	Sample Date	Windward ID	pH	DOC	Sulfate	Chloride	Total Alkalinity	Sample Collection Start Time	Sample Collection End Time	Sample Retrieval Start Time	Sample Retrieval End Time	Lab Receipt Start Time	Lab Receipt End Time	Analysis Start Time	Analysis End Time	Chain of Custody Number(s)
Sandia below Wetlands	1/29/2010	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered	1/29/10 13:55	1/29/10 13:55	NA	NA	2/1/10 16:00	2/1/10 16:00	2/3/10 0:00	3/3/10 0:00	10-1502
Sandia right fork at Pwr Plant	2/1/2010	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	2/1/10 10:15	2/1/10 10:15	NA	NA	2/2/10 16:00	2/2/10 16:00	2/4/10 0:00	3/4/10 0:00	10-1538
South Fork of Sandia at E122	2/1/2010	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered	2/1/10 11:15	2/1/10 11:15	NA	NA	2/2/10 16:00	2/2/10 16:00	2/4/10 0:00	3/4/10 0:00	10-1538
Sandia right fork at Pwr Plant	5/7/2010	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	5/7/10 12:42	5/7/10 12:42	NA	NA	5/11/10 17:00	5/11/10 17:00	5/13/10 0:00	6/7/10 0:00	10-3091; 10-3090
South Fork of Sandia at E122	5/7/2010	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered	5/7/10 12:15	5/7/10 12:15	NA	NA	5/11/10 17:00	5/11/10 17:00	5/13/10 0:00	6/7/10 0:00	10-3091; 10-3090
Sandia below Wetlands	5/13/2010	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered	5/13/10 10:58	5/13/10 10:58	NA	NA	5/14/10 17:00	5/14/10 17:00	5/17/10 0:00	6/9/10 0:00	10-3172; 10-3171
Pajarito above Twomile	6/8/2010	E243	Filtered	Converted from TOC	Filtered	Filtered	Filtered	6/8/10 14:56	6/8/10 14:56	NA	NA	6/9/10 17:00	6/9/10 17:00	6/11/10 0:00	7/1/10 0:00	527320
Twomile above Pajarito	8/11/2010	E244	Filtered	Converted from TOC	Filtered	Filtered	Filtered	8/11/10 11:10	8/11/10 11:10	NA	NA	8/12/10 17:00	8/12/10 17:00	8/16/10 0:00	8/31/10 0:00	808192
Canon de Valle below MDA P	9/7/2010	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	9/7/10 10:02	9/7/10 10:02	NA	NA	9/8/10 17:00	9/8/10 17:00	9/10/10 0:00	9/24/10 0:00	10-4477; 10-4476
Water above SR-501	9/10/2010	E252 up	Filtered	Converted from TOC	Filtered	Filtered	Filtered	9/10/10 13:40	9/10/10 13:40	NA	NA	9/13/10 17:00	9/13/10 17:00	9/15/10 0:00	9/29/10 0:00	10-4548; 10-4547
Rio de los Frijoles at Band	9/17/2010	E350	Filtered	Converted from TOC	Filtered	Filtered	Filtered	9/17/10 14:50	9/17/10 14:50	NA	NA	9/20/10 17:00	9/20/10 17:00	9/21/10 0:00	10/4/10 0:00	1005423
Sandia right fork at Pwr Plant	11/9/2010	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	11/9/10 11:00	11/9/10 11:00	NA	NA	11/10/10 16:00	11/10/10 16:00	11/11/10 0:00	12/8/10 0:00	11-446; 11-445
South Fork of Sandia at E122	11/9/2010	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered	11/9/10 10:30	11/9/10 10:30	NA	NA	11/10/10 16:00	11/10/10 16:00	11/11/10 0:00	12/8/10 0:00	11-446; 11-445
Sandia below Wetlands	11/11/2010	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered	11/11/10 9:40	11/11/10 9:40	NA	NA	11/12/10 16:00	11/12/10 16:00	11/15/10 0:00	12/9/10 0:00	11-497
Sandia below Wetlands	5/17/2011	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered	5/17/11 9:46	5/17/11 9:46	NA	NA	5/18/11 17:00	5/18/11 17:00	5/23/11 0:00	6/8/11 0:00	11-2430; 11-2429
Sandia right fork at Pwr Plant	5/19/2011	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	5/19/11 12:55	5/19/11 12:55	NA	NA	5/20/11 17:00	5/20/11 17:00	5/24/11 0:00	6/8/11 0:00	210321
South Fork of Sandia at E122	5/19/2011	E122.SF	Filtered	Converted from TOC	Filtered	Filtered	Filtered	5/19/11 12:12	5/19/11 12:12	NA	NA	5/20/11 17:00	5/20/11 17:00	5/24/11 0:00	6/8/11 0:00	210321
Canon de Valle below MDA P	9/16/2011	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	9/16/11 14:40	9/16/11 14:40	NA	NA	9/19/11 17:00	9/19/11 17:00	9/20/11 0:00	10/12/11 0:00	11-3633; 11-3632
Canon de Valle below MDA P	3/28/2013	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	3/28/13 11:45	3/28/13 11:45	NA	NA	3/29/13 17:00	3/29/13 17:00	4/1/13 9:16	4/23/13 14:13	2013-682
Sandia below Wetlands	4/16/2013	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	4/16/13 2:07	4/16/13 2:07	NA	NA	4/15/13 17:00	4/15/13 17:00	4/17/13 13:00	4/21/13 13:00	2013-730
Sandia right fork at Pwr Plant	4/16/2013	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	4/16/13 12:15	4/16/13 12:19	NA	NA	4/15/13 17:00	4/15/13 17:00	4/17/13 13:00	4/21/13 13:00	2013-730
South Fork of Sandia at E122	4/16/2013	E122.SF	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	4/16/13 11:30	4/16/13 11:30	NA	NA	4/15/13 17:00	4/15/13 17:00	4/17/13 13:00	4/21/13 13:00	2013-730
Sandia below Wetlands	5/17/2013	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	5/17/13 11:30	5/17/13 11:30	NA	NA	5/21/13 17:00	5/21/13 17:00	5/23/13 13:00	6/3/13 13:00	2013-864
Sandia right fork at Pwr Plant	5/17/2013	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	5/17/13 11:00	5/17/13 11:00	NA	NA	5/21/13 17:00	5/21/13 17:00	5/23/13 13:00	6/3/13 13:00	2013-864
DP above TA-21	6/14/2013	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/14/13 12:45	6/14/13 15:15	6/17/13 14:16	6/17/13 14:16	6/19/13 17:00	6/20/13 17:00	6/21/13 23:52	7/18/13 13:27	2013-975; 2013-981
DP below grade ctrl structure	6/14/2013	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/14/13 14:00	6/14/13 15:10	6/17/13 15:40	6/17/13 15:40	6/19/13 17:00	6/20/13 17:00	6/22/13 0:54	7/18/13 13:01	2013-1004; 2013-977; 2013-975
Pueblo above Acid	6/14/2013	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/14/13 13:45	6/14/13 13:57	6/17/13 10:04	6/17/13 10:04	6/19/13 17:00	6/20/13 17:00	6/22/13 1:28	7/18/13 13:27	2013-975; 2013-980
DP above TA-21	6/30/2013	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/30/13 15:00	6/30/13 16:00	7/9/13 14:00	7/9/13 14:00	7/11/13 17:00	7/11/13 17:00	7/15/13 8:48	8/7/13 11:27	2013-1111; 2013-1104
DP below grade ctrl structure	6/30/2013	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/30/13 15:49	6/30/13 16:19	7/9/13 11:40	7/9/13 11:40	7/11/13 17:00	7/11/13 17:00	7/15/13 8:49	8/7/13 11:27	2013-1104; 2013-1112
Sandia right fork at Pwr Plant	6/30/2013	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/30/13 14:25	6/30/13 14:36	7/11/13 11:15	7/11/13 11:15	7/15/13 17:00	7/15/13 17:00	7/17/13 17:21	8/7/13 11:27	2013-1133; 2013-1126
Acid above Pueblo	7/12/2013	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/12/13 12:00	7/12/13 12:10	7/16/13 13:11	7/16/13 13:11	7/22/13 17:00	7/22/13 17:00	7/24/13 16:20	8/19/13 16:24	2013-1280; 2013-1268
DP above TA-21	7/12/2013	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/12/13 11:20	7/12/13 14:30	7/17/13 8:40	7/17/13 8:40	7/19/13 17:00	7/22/13 17:00	7/24/13 3:41	8/16/13 14:32	2013-1285; 2013-1245
DP below grade ctrl structure	7/12/2013	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/12/13 11:39	7/12/13 13:09	7/17/13 11:20	7/17/13 11:20	7/22/13 17:00	7/22/13 17:00	7/24/13 15:45	8/19/13 16:24	2013-1283; 2013-1261; 2013-1262
Los Alamos above low-head weir	7/12/2013	E042.1	Unfiltered	Filtered	Location-averaged	Location-averaged	Unfiltered	7/12/13 12:40	7/12/13 15:50	7/15/13 10:16	7/15/13 10:16	7/19/13 17:00	7/22/13 17:00	7/22/13 13:42	8/16/13 16:11	2013-1280; 2013-1265; 2013-1284; 2013-1247
Los Alamos below low-head weir	7/12/2013	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/12/13 13:15	7/12/13 16:25	7/15/13 11:06	7/15/13 11:06	7/18/13 17:00	7/22/13 17:00	7/24/13 0:35	8/16/13 16:11	2013-1286; 2013-1219; 2013-1249
Mortandad above Ten Site	7/12/2013	E201	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/12/13 12:25	7/12/13 12:26	7/16/13 13:25	7/16/13 13:25	7/19/13 17:00	7/24/13 17:00	7/24/13 2:50	8/28/13 13:00	2013-1242; 2013-1319
Pajarito above Threemile	7/12/2013	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/12/13 12:55	7/12/13 13:14	7/16/13 10:20	7/16/13 10:20	7/17/13 17:00	7/19/13 17:00	7/20/13 2:01	8/12/13 15:39	2013-1175; 2013-1185
Sandia right fork at Pwr Plant	7/12/2013	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/12/13 11:55	7/12/13 12:06	7/19/13 13:32	7/19/13 13:32	7/23/13 17:00	7/24/13 17:00	7/25/13 22:07	8/28/13 13:00	2013-1318; 2013-1296
Sandia right fork at Pwr Plant	7/22/2013	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	7/22/13 12:20	7/22/13 12:20	NA	NA	7/23/13 17:00	7/23/13 17:00	7/25/13 14:51	8/12/13 15:39	2013-1293
Ancho below SR-4	7/25/2013	E275	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/25/13 23:00	7/25/13 23:15	7/30/13 11:30	7/30/13 11:30	7/31/13 17:00	8/4/13 17:00	8/3/13 1:01	8/28/13 13:00	2013-1463; 2013-1424
Los Alamos above Rio Grande	7/25/2013	E1099	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/25/13 22:54	7/25/13 23:44	7/26/13 9:45	7/26/13 9:45	7/29/13 17:00	7/31/13 17:00	8/1/13 7:55	8/28/13 13:00	2013-1376; 2013-1375; 2013-1399
Los Alamos above Rio Grande	7/26/2013	E1099	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/13 0:04	7/26/13 17:44	7/26/13 9:45	7/29/13 10:00	7/31/13 17:00	8/4/13 17:00	8/3/13 1:34	8/28/13 13:00	2013-1399; 2013-1464; 2013-1425
DP above TA-21	7/28/2013	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/28/13 14:30	7/28/13 17:40	7/31/13 10:50	7/31/13 10:55	8/2/13 17:00	8/5/13 17:00	8/5/13 18:32	8/28/13 13:00	2013-1495; 2013-1489; 2013-1478
DP below grade ctrl structure	7/28/2013	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/28/13 15:04	7/28/13 15:34	7/31/13 12:13	7/31/13 12:13	8/2/13 17:00	8/5/13 17:00	8/5/13 19:06	8/28/13 13:00	2013-1495; 2013-1478
Los Alamos above Rio Grande	8/3/2013	E1099	Unfiltered	Filtered	Location-averaged	Location-averaged	Unfiltered	8/3/13 15:24	8/3/13 18:34	8/5/13 13:00	8/5/13 13:00	8/7/13 17:00	8/8/13 17:00	8/10/13 3:37	9/28/13 13:00	2013-1504DRI; 2013-1504
Acid above Pueblo	8/5/2013	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/5/13 13:45	8/5/13 13:55	8/7/13 9:10	8/7/13 9:10	8/8/13 17:00	8/8/13 17:00	8/10/13 7:17	9/28/13 13:00	2013-1554; 2013-1544
DP above Los Alamos Canyon	8/5/2013	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/5/13 14:24	8/5/13 14:37	8/7/13 12:02	8/7/13 12:02	8/9/13 17:00	8/12/13 17:00	8/14/13 16:24	9/28/13 13:00	2013-1592; 2013-1570
Guaje at SR-502	8/5/2013	E099	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/5/13 18:30	8/5/13 18:48	8/8/13 15:11	8/8/13 15:11	8/14/13 17:00	8/18/13 17:00	8/15/13 17:18	9/28/13 13:00	2013-1636; 2013-1660
Los Alamos above low-head weir	8/5/2013	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/5/13 15:04	8/5/13 16:10	8/6/13 15:02	8/6/13 15:02	8/12/13 17:00	8/12/13 17:00	8/14/13 16:32	9/28/13 13:00	2013-1592; 2013-1583; 2013-1595
Los Alamos below low-head weir	8/5/2013	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/5/13 17:49	8/5/13 19:55	8/6/13 14:20	8/6/13 14:20	8/9/13 17:00	8/12/13 17:00	8/14/13 16:28	9/28/13 13:00	2013-1591; 2013-1571
DP above TA-21	8/9/2013	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/9/13 13:36	8/9/13 13:36	8/12/13 12:05	8/12/13 12:05	8/20/13 17:00	8/20/13 17:00	8/22/13 17:58	9/17/13 14:30	2013-1692
Pajarito below SR-501	8/20/2013	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/20/13 15:25	8/20/13 15:40	8/21/13 15:00	8/21/13 15:00	8/28/13 17:00	8/29/13 17:00	8/30/13 17:25	9/28/13 13:00	2013-1753; 2013-1771
Water above SR-501	9/2/2013	E252 up	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/2/13 13:40	9/2/13 13:40	9/3/13 11:30	9/3/13 11:30	9/5/13 17:00	9/5/13 17:00	9/10/13 17:42	10/3/13 11:24	2013-1804
DP above Los Alamos Canyon	9/10/2013	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/10/13 18:54	9/10/13 19:09	9/12/13 14:00	9/12/13 14:00	9/16/13 17:00	9/17/13 17:00	9/19/13 16:17	10/11/13 14:24	2013-1924; 2013-1903
DP below grade ctrl structure	9/10/2013	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/10/13 16:09	9/10/13 19:19	9/12/13 15:18	9/12/13 15:18	9/16/13 17:00	9/17/13 17:00	9/17/13 13:43	10/11/13 14:24	2013-1902; 2013-1929; 2013-1906
Los Alamos above low-head weir	9/10/2013	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/10/13 19:33	9/10/13 22:39	9/11/13 13:36	9/11/13 13:36	9/13/13 17:00	9/17/13 17:00	9/16/13 11:40	10/7/13 13:26	2013-1927; 2013-1887
Pajarito below SR-501	9/10/2013	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/10/13 16:51	9/10/13 16:51	9/11/13 12:35	9/11/13 12:35	9/16/13 17:00	9/16/13 17:00	9/19/13 16:24	10/11/13 14:24	2013-1904
Los Alamos below low-head weir	9/11/2013	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/11/13 0:14	9/11/13 1:34	9/11/13 14:40	9/11/13 14:40	9/13/13 17:00	9/17/13 17:00	9/28/13 13:00	10/7/13 13:26	2013-1928; 2013-1885
Water above SR-501	9/11/2013	E252 up	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/11/13 10:05	9/11/13 10:05	9/11/13 10:10	9/11/13 10:10	9/17/13 17:00	9/17/13 17:00	9/21/13 14:08	10/14/13 15:31	2013-1921
WR-REF-3 at RF13WR03	9/11/2013	WR-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/11/13 0:53	9/11/13 0:53	9/11/13 13:20	9/11/13 13:20	9/18/13 17:00	9/18/13 17:00	9/21/13 14:44	10/14/13 15:31	2013-1964
Acid above Pueblo	9/12/2013	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 16:25	9/12/13 16:40	9/18/13 13:11	9/18/13 13:11	9/26/13 17:00	9/26/13 17:00	9/28/13 14:13	10/28/13 13:00	2013-2152; 2013-2145
Ancho below SR-4	9/12/2013	E275	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 15:55	9/12/13 16:09	9/20/13 10:25	9/20/13 10:25	9/24/13 17:00	9/24/13 17:00	9/26/13 17:09	10/22/13 9:14	2013-2106; 2013-2099
DP above TA-21	9/12/2013	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 17:59	9/12/13 17:59	9/27/13 9:57	9/27/13 9:57	6/11/14 17:00	6/11/14 17:00	6/14/14 1:42	7/29/14 13:00	2014-3532; 2014-3535
Los Alamos above Rio Grande	9/12/2013	E1099	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 15:39	9/12/13 18:49	9/24/13 12:30	9/24/13 12:30	9/27/13 17:00	9/30/13 17:00	10/3/13 7:41	10/28/13 17:22	2013-2177; 2013-2199; 2013-2183
Los Alamos below Ice Rink	9/12/2013	E026	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 16:49	9/12/13 19:59	9/17/13 12:00	9/17/13 12:00	9/25/13 17:00	9/26/13 17:00	9/26/13 18:09	10/28/13 13:00	2013-2130; 2013-2151
Los Alamos below low-head weir	9/12/2013	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 17:58	9/12/13 21:04	9/17/13 10:19	9/17/13 10:19	9/26/13 17:00	9/26/13 17:00	9/28/13 14:58	10/28/13 13:00	2013-2152; 2013-2145
Mortandad above Ten Site	9/12/2013	E201	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 19:04	9/12/13 19:06	9/19/13 12:00	9/19/13 12:00	9/26/13 17:00	9/26/13 17:00	9/28/13 15:22	10/28/13 13:00	2013-2153; 2013-2146
Pajarito above Threemile	9/12/2013	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 18:20	9/12/13 18:40	9/20/13 13:50	9/20/13 13:50	9/24/13 17:00	9/24/13 17:00	9/26/13 15:50	10/21/13 14:07	2013-2097; 2013-2106
Pajarito below SR-501	9/12/2013	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 11:59	9/12/13 16:01	9/23/13 10:50	9/23/13 10:50	9/24/13 17:00	6/20/14 17:00	9/26/13 17:15	7/21/14 16:18	2013-2102; 2013-2106; 2014-3594
Pueblo above Acid	9/12/2013	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 16:55	9/12/13 17:04	9/18/13 12:40	9/18/13 12:40	9/26/13 17:00	9/26/13 17:00	9/28/13 15:18	10/28/13 13:00	2013-2145; 2013-2152
Sandia left fork at Asph Plant	9/12/2013	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 7:29	9/12/13 7:38	9/24/13 10:25	9/24/13 10:25	9/26/13 17:00	9/30/13 17:00	10/3/13 15:02	10/28/13 13:00	2013-2201; 2013-2163
Sandia right fork at Pwr Plant	9/12/2013	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 16:10	9/12/13 16:23	9/24/13 11:01	9/24/13 11:01	9/26/13 17:00	9/30/13 17:00	10/3/13 15:11	10/28/13 13:00	2013-2201; 2013-2163
WR-REF-3 at RF13WR03	9/12/2013	WR-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/12/13 15:30	9/12/13 15:30	9/16/13 3:30	9/16/13 3:30	9/30/13 17:00	9/30/13 17:00	10/3/13 8:34	10/24/13 13:29	2013-2212
Chaquehui at TA-33	9/13/2013	E338	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/13/13 5:29	9/13/13 5:41	9/20/13 8:30	9/20/13 8:30	9/24/13 17:00	9/24/13 17:00	9/26/13 15:37	10/21/13 14:07	2013-2106; 2013-2097
Pajarito above SR-4	9/13/2013	E250	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/13/13 7:09	9/13/13 7:20	9/18/13 12:45	9/18/13 12:45	9/23/13 17:00	9/24/13 17:00	9/24/13 17:41	10/17/13 14:57	2013-2058; 2013-2107
Sandia above SR-4	9/13/2013	E125	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/13/13 6:34	9/13/13 6:36	9/18/13 16:38	9/18/13 16:38	9/26/13 17:00	9/26/13 17:00	9/28/13 15:26	10/28/13 13:00	2013-2153; 2013-2146
South Fork of Acid Canyon	9/13/2013	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/13/13 6:55	9/13/13 7:08	9/18/13 11:45	9/18/13 11:45	9/26/13 17:00	9/26/13 17:00	9/28/13 15:20	10/28/13 13:00	2013-2145; 2013-2152
Ten Site above Mortandad	9/13/2013	E201.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/13/13 7:45	9/13/13 7:46	9/19/13 11:15	9/19/13 11:15	9/26/13 17:00	9/30/13 17:00	9/28/13 15:31	10/28/13 13:00	2013-2201; 2013-2165
Water below SR-4	9/13/2013	E265	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/13/13 6:14	9/13/13 6:26	9/19/13 15:45	9/19/13 15:45	9/23/13 17:00	9/24/13 17:00	9/28/13 11:46	10/21/13 14:07	2013-2061; 2013-2107
Water above SR-501	9/18/2013	E252 up	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/18/13 10:00	9/18/13 10:00	9/18/13 10:00	9/18/13 10:00	6/11/14 17:00	6/11/14 17:00	6/14/14 2:13	7/2/14 10:55	2014-3532
Water above SR-501	9/19/2013	E252 up	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/19/13 11:10	9/19/13 11:10	NA	NA	6/20/14 17:00	6/20/14 17:00	6/23/14 21:05	7/8/14 12:13	2014-3591
Pajarito below SR-501	9/22/2013	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/22/13 18:54	9/22/13 18:54	NA	NA	6/20/14 17:00	6/20/14 17:00	6/23/14 22:07	7/21/14 16:18	2014-3594
Sandia below Wetlands	12/4/2013	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	12/4/13 14:50	12/4/13 15:00	NA	NA	12/8/13 16:00	12/8/13 16:00	12/10/13 13:00	12/10/13 13:00	2014-2620
Sandia right fork at Pwr Plant	12/4/2013	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	12/4/13 14:15	12/4/13 14:20	NA	NA	12/8/13 16:00	12/8/13 16:00	12/10/13 13:00	12/10/13 13:00	2014-2620
South Fork of Sandia at E122	12/4/2013	E122.SF	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	12/4/13 14:00	12/4/13 14:05	NA	NA	12/8/13 16:00	12/8/13 16:00	12/10/13 13:00	12/10/13 13:00	2014-2620
Canon de Valle below MDA P	3/10/2014	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	3/10/14 13:35	3/10/14 13:35	NA	NA	3/11/14 17:00	3/11/14 17:00	3/14/14 8:55	4/8/14 8:42	2014-2970
Sandia below Wetlands	5/23/2014	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	5/23/14 15:50	5/23/14 22:00	5/29/14 11:40	5/29/14 11:40	5/30/14 17:00	6/3/14 17:00	6/5/14 18:22	7/28/14 13:00	2014-3477; 2014-3469
Potrillo above SR-4	7/2/2014	E267	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/2/14 19:41	7/2/14 19:59	7/7/14 12:15	7/7/14 12:15	7/7/14 17:00	7/14/14 17:00	7/9/14 9:17	8/4/14 11:11	2014-3675; 2014-3723
Acid above Pueblo	7/7/2014	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/14 16:00	7/7/14 16:09	7/10/14 12:30	7/10/14 12:30	7/15/14 17:00	7/15/14 17:00	7/17/14 11:55	8/12/14 0:55	2014-3811; 2014-3821
Pajarito above Threemile	7/7/2014	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/14 16:49	7/7/14 16:51	7/8/14 11:00	7/8/14 11:00	7/10/14 17:00	7/14/14 17:00	7/18/14 10:56	8/7/14 13:36	2014-3737; 2014-3797
Sandia below Wetlands	7/7/2014	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/14 15:40	7/7/14 21:50	7/8/14 11:11	7/8/14 11:30	7/11/14 17:00	7/14/14 17:00	7/18/14 14:05	8/7/14 16:34	2014-3796; 2014-3754; 2014-3786
Sandia right fork at Pwr Plant	7/7/2014	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/14 15:10	7/7/14 17:20	7/10/14 11:20	7/10/14 11:20	7/11/14 17:00	7/14/14 17:00	7/18/14 14:36	8/8/14 11:25	2014-3797; 2014-3768; 2014-3786
DP above TA-21	7/8/2014	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/14 14:24	7/8/14 14:44	7/10/14 9:30	7/10/14 9:30	7/15/14 17:00	7/15/14 17:00	7/17/14 13:58	8/11/14 15:13	2014-3806; 2014-3818; 2014-3808
DP below grade ctrl structure	7/8/2014	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/14 15:04	7/8/14 15:34	7/10/14 10:15	7/10/14 10:15	7/15/14 17:00	7/16/14 17:00	7/17/14 14:29	8/11/14 22:08	2014-3835; 2014-3818; 2014-3807
Mortandad above Ten Site	7/8/2014	E201	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/14 15:31	7/8/14 15:31	7/11/14 13:45	7/11/14 13:45	7/15/14 17:00	7/15/14 17:00	7/17/14 13:27	8/13/14 18:24	2014-3812; 2014-3820

DRAFT Appendix A. LANL BLM Database

			Source of value[a]					QA/QC Information								
Location ID	Sample Date	Windward ID	pH	DOC	Sulfate	Chloride	Total Alkalinity	Sample Collection Start Time	Sample Collection End Time	Sample Retrieval Start Time	Sample Retrieval End Time	Lab Receipt Start Time	Lab Receipt End Time	Analysis Start Time	Analysis End Time	Chain of Custody Number(s)
DP above Los Alamos Canyon	7/9/2014	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/9/14 5:09	7/9/14 5:21	7/9/14 14:02	7/9/14 14:02	7/16/14 17:00	7/17/14 17:00	7/22/14 16:01	8/28/14 13:00	2014-3835; 2014-3892
Acid above Pueblo	7/15/2014	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/14 22:30	7/15/14 22:40	7/16/14 0:00	7/16/14 14:40	7/18/14 17:00	7/21/14 17:00	7/23/14 21:40	8/28/14 13:00	2014-3911; 2014-3942
DP above TA-21	7/15/2014	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/14 22:04	7/15/14 22:31	7/16/14 9:10	7/16/14 9:10	7/22/14 17:00	7/23/14 17:00	7/29/14 4:02	8/28/14 13:00	2014-3959; 2014-3991
DP below grade ctrl structure	7/15/2014	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/14 1:04	7/15/14 23:54	7/15/14 12:50	7/17/14 8:25	7/17/14 17:00	7/23/14 17:00	7/22/14 19:52	8/28/14 13:00	2014-3881; 2014-3957; 2014-3927; 2014-3926; 2014-3991; 2014-3992
Pajarito above Threemile	7/15/2014	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/14 22:49	7/15/14 22:51	7/16/14 11:40	7/16/14 11:40	7/17/14 17:00	7/21/14 17:00	7/23/14 19:59	8/28/14 13:00	2014-3889; 2014-3928
Sandia below Wetlands	7/15/2014	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/14 22:35	7/15/14 23:45	7/17/14 12:10	7/17/14 12:10	7/18/14 17:00	7/23/14 17:00	7/29/14 0:46	8/28/14 13:00	2014-3993; 2014-3920; 2014-3995; 2014-3956
Sandia right fork at Pwr Plant	7/15/2014	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/14 2:05	7/15/14 23:44	7/15/14 11:15	7/17/14 10:05	7/17/14 17:00	7/23/14 17:00	7/23/14 20:33	8/28/14 13:00	2014-3928; 2014-3996; 2014-3884; 2014-3920; 2014-3997; 2014-3889; 2014-3956
Los Alamos below low-head weir	7/16/2014	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/16/14 0:00	7/16/14 2:44	7/16/14 13:11	7/16/14 13:11	7/18/14 17:00	7/21/14 17:00	8/8/14 19:03	8/28/14 13:00	2014-3913; 2014-3942
Pajarito above Threemile	7/19/2014	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/19/14 14:59	7/19/14 15:01	7/22/14 11:10	7/22/14 11:10	7/24/14 17:00	7/28/14 17:00	7/29/14 5:56	8/28/14 13:00	2014-4005; 2014-4036
Pajarito below SR-501	7/19/2014	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/19/14 13:48	7/19/14 14:10	7/21/14 13:30	7/21/14 13:30	7/23/14 17:00	7/28/14 17:00	7/29/14 3:22	8/28/14 13:00	2014-3986; 2014-4033
Sandia below Wetlands	7/19/2014	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/19/14 14:20	7/19/14 20:30	7/21/14 9:50	7/21/14 9:50	7/23/14 17:00	7/28/14 17:00	7/29/14 3:52	8/28/14 13:00	2014-4032; 2014-3988
Sandia right fork at Pwr Plant	7/19/2014	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/19/14 13:34	7/19/14 19:44	7/21/14 11:09	7/21/14 11:09	7/23/14 17:00	7/28/14 17:00	8/1/14 2:34	8/28/14 13:00	2014-4033; 2014-3982; 2014-4034; 2014-4037
Sandia below Wetlands	7/21/2014	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered	7/21/14 10:40	7/21/14 10:40	NA	NA	7/22/14 17:00	7/22/14 17:00	7/29/14 16:23	8/15/14 10:31	2014-3960
Sandia right fork at Pwr Plant	7/21/2014	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	7/21/14 12:35	7/21/14 12:35	NA	NA	7/22/14 17:00	7/22/14 17:00	7/29/14 16:23	8/14/14 9:44	2014-3960
Chaquehui at TA-33	7/23/2014	E338	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/23/14 12:59	7/23/14 13:01	7/28/14 11:00	7/28/14 11:00	7/28/14 17:00	7/30/14 17:00	8/1/14 2:01	8/28/14 13:00	2014-4039; 2014-4061
DP above TA-21	7/27/2014	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/27/14 20:29	7/27/14 22:39	7/28/14 9:25	7/28/14 9:55	7/29/14 17:00	7/30/14 17:00	8/5/14 15:17	8/28/14 13:00	2014-4049; 2014-4063; 2014-4048
DP below grade ctrl structure	7/27/2014	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/27/14 21:04	7/27/14 22:34	7/28/14 11:00	7/28/14 11:20	7/29/14 17:00	7/30/14 17:00	8/1/14 3:36	8/28/14 13:00	2014-4064; 2014-4050
Pajarito above Threemile	7/27/2014	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/27/14 21:39	7/27/14 21:41	7/30/14 10:55	7/30/14 10:55	7/31/14 17:00	8/4/14 17:00	8/5/14 18:13	8/28/14 13:00	2014-4156; 2014-4092
Sandia left fork at Asph Plant	7/27/2014	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/27/14 21:24	7/27/14 23:54	7/28/14 14:30	7/28/14 14:30	7/29/14 17:00	7/30/14 17:00	8/1/14 4:28	8/28/14 13:00	2014-4062; 2014-4051
Sandia right fork at Pwr Plant	7/27/2014	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/27/14 18:59	7/27/14 23:49	7/31/14 9:35	7/31/14 9:35	8/4/14 17:00	8/4/14 17:00	8/6/14 18:46	8/28/14 13:00	2014-4144; 2014-4163; 2014-4139
Acid above Pueblo	7/29/2014	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 11:40	7/29/14 11:49	7/30/14 12:20	7/30/14 12:20	7/31/14 17:00	8/4/14 17:00	8/5/14 21:01	8/28/14 13:00	2014-4105; 2014-4155
DP above TA-21	7/29/2014	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 11:04	7/29/14 13:34	7/30/14 9:40	7/30/14 9:50	7/31/14 17:00	8/4/14 17:00	8/5/14 21:34	8/28/14 13:00	2014-4154; 2014-4105
DP below grade ctrl structure	7/29/2014	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 11:29	7/29/14 13:59	7/30/14 10:35	7/30/14 10:35	8/4/14 17:00	8/4/14 17:00	8/6/14 21:35	8/28/14 13:00	2014-4141; 2014-4158
E059.5 Pueblo below LAC WWTF	7/29/2014	E059.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 13:10	7/29/14 16:20	7/30/14 13:25	7/30/14 13:25	8/4/14 17:00	8/4/14 17:00	8/6/14 22:09	8/28/14 13:00	2014-4141; 2014-4159
Los Alamos above low-head weir	7/29/2014	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 12:45	7/29/14 15:55	7/30/14 12:35	7/30/14 12:35	7/31/14 17:00	8/4/14 17:00	8/6/14 18:01	8/28/14 13:00	2014-4162; 2014-4161; 2014-4105; 2014-4135
Los Alamos below low-head weir	7/29/2014	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 13:14	7/29/14 16:24	7/30/14 11:40	7/30/14 11:40	8/4/14 17:00	8/4/14 17:00	8/6/14 20:44	8/28/14 13:00	2014-4157; 2014-4140
Pajarito below SR-501	7/29/2014	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 12:09	7/29/14 12:31	7/31/14 11:30	7/31/14 11:30	8/4/14 17:00	8/4/14 17:00	8/6/14 23:45	8/28/14 13:00	2014-4149; 2014-4156
Sandia above Firing Range	7/29/2014	E124	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 13:25	7/29/14 13:43	7/30/14 14:40	7/30/14 14:40	7/31/14 17:00	8/4/14 17:00	8/5/14 20:27	8/28/14 13:00	2014-4103; 2014-4156
Sandia below Wetlands	7/29/2014	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 10:00	7/29/14 17:55	7/31/14 8:35	7/31/14 8:45	8/3/14 17:00	8/4/14 17:00	8/5/14 13:00	8/28/14 13:00	2014-4145; 2014-4160; 2014-4139; 2014-4085
Sandia left fork at Asph Plant	7/29/2014	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 11:19	7/29/14 13:29	7/31/14 8:30	7/31/14 10:30	8/4/14 17:00	8/4/14 17:00	8/6/14 22:43	8/28/14 13:00	2014-4156; 2014-4144
Twomile above Pajarito	7/29/2014	E244	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/14 12:50	7/29/14 13:12	7/31/14 14:05	7/31/14 14:05	8/4/14 17:00	8/4/14 17:00	8/7/14 0:18	8/28/14 13:00	2014-4156; 2014-4149
Sandia right fork at Pwr Plant	7/30/2014	E121	Filtered	Filtered	Filtered	Filtered	Filtered	7/30/14 11:51	7/30/14 11:51	NA	NA	8/3/14 17:00	8/3/14 17:00	8/5/14 13:00	8/18/14 13:00	2014-4087
South Fork of Sandia at E122	7/30/2014	E122.SF	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/30/14 10:30	7/30/14 10:30	NA	NA	8/3/14 17:00	8/3/14 17:00	8/5/14 13:00	8/18/14 13:00	2014-4087
DP above TA-21	7/31/2014	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:14	7/31/14 19:24	8/5/14 12:55	8/5/14 12:55	8/12/14 17:00	8/13/14 17:00	8/13/14 21:37	9/3/14 16:39	2014-4339; 2014-4325
DP below grade ctrl structure	7/31/2014	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:34	7/31/14 19:44	8/5/14 13:45	8/5/14 13:45	8/12/14 17:00	8/13/14 17:00	8/13/14 21:41	9/3/14 16:39	2014-4338; 2014-4325
E059.5 Pueblo below LAC WWTF	7/31/2014	E059.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 18:45	7/31/14 21:15	8/4/14 10:15	8/4/14 10:15	8/11/14 17:00	8/12/14 17:00	8/13/14 21:28	9/3/14 16:39	2014-4307; 2014-4324; 2014-4301
Los Alamos above low-head weir	7/31/2014	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 18:30	7/31/14 21:40	8/1/14 10:35	8/1/14 10:35	8/4/14 17:00	8/7/14 17:00	8/11/14 23:52	8/28/14 13:00	2014-4263; 2014-4265; 2014-4135; 2014-4219
Los Alamos below low-head weir	7/31/2014	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 18:35	7/31/14 21:45	8/1/14 11:40	8/1/14 11:40	8/4/14 17:00	8/7/14 17:00	8/12/14 1:30	8/28/14 13:00	2014-4266; 2014-4136; 2014-4218; 2014-4267
Mortandad above Ten Site	7/31/2014	E201	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 18:19	7/31/14 18:21	8/6/14 12:30	8/6/14 12:30	8/7/14 17:00	8/11/14 17:00	8/12/14 21:20	8/31/14 1:35	2014-4279; 2014-4305
Mortandad at LANL Boundary	7/31/2014	E204	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:40	7/31/14 17:42	8/6/14 10:30	8/6/14 10:30	8/12/14 17:00	8/13/14 17:00	8/13/14 21:49	9/8/14 14:22	2014-4327; 2014-4340
Pajarito above SR-4	7/31/2014	E250	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 21:40	7/31/14 22:02	8/5/14 12:30	8/5/14 12:30	8/7/14 17:00	8/11/14 17:00	8/12/14 17:12	8/31/14 4:55	2014-4282; 2014-4305
Pajarito above Threemile	7/31/2014	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:59	7/31/14 18:01	8/5/14 11:45	8/5/14 11:45	8/7/14 17:00	8/7/14 17:00	8/12/14 20:46	8/31/14 7:56	2014-4268; 2014-4258
Pajarito below SR-501	7/31/2014	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:29	7/31/14 17:51	8/4/14 10:00	8/4/14 10:00	8/6/14 17:00	8/7/14 17:00	8/11/14 23:19	8/30/14 10:51	2014-4222; 2014-4264
Pueblo above Acid	7/31/2014	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:50	7/31/14 17:59	8/5/14 9:15	8/5/14 9:15	8/12/14 17:00	8/13/14 17:00	8/13/14 21:33	9/3/14 16:39	2014-4324; 2014-4338
Sandia above Firing Range	7/31/2014	E124	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:39	7/31/14 18:01	8/6/14 12:20	8/6/14 12:20	8/7/14 17:00	8/11/14 17:00	8/12/14 18:04	8/31/14 5:08	2014-4281; 2014-4305
Sandia above SR-4	7/31/2014	E125	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 19:40	7/31/14 19:42	8/6/14 15:30	8/6/14 15:30	8/11/14 17:00	8/11/14 17:00	8/13/14 19:53	9/2/14 9:11	2014-4298; 2014-4305
Sandia below Wetlands	7/31/2014	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:30	7/31/14 23:20	8/6/14 10:35	8/6/14 10:45	8/7/14 17:00	8/13/14 17:00	8/13/14 21:56	8/30/14 6:23	2014-4341; 2014-4327; 2014-4257
Sandia left fork at Asph Plant	7/31/2014	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:14	7/31/14 23:24	8/6/14 9:15	8/6/14 9:15	8/7/14 17:00	8/11/14 17:00	8/13/14 21:07	8/30/14 6:37	2014-4304; 2014-4257; 2014-4298
Sandia right fork at Pwr Plant	7/31/2014	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 17:14	7/31/14 23:24	8/6/14 9:30	8/6/14 9:40	8/7/14 17:00	8/11/14 17:00	8/13/14 21:16	8/31/14 6:02	2014-4281; 2014-4306; 2014-4298
Twomile above Pajarito	7/31/2014	E244	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 18:15	7/31/14 18:37	8/5/14 10:00	8/5/14 10:00	8/6/14 17:00	8/7/14 17:00	8/11/14 22:45	8/30/14 13:38	2014-4264; 2014-4223
Water below SR-4	7/31/2014	E265	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/14 19:50	7/31/14 19:52	8/5/14 9:30	8/5/14 9:30	8/7/14 17:00	8/11/14 17:00	8/12/14 21:53	8/31/14 2:01	2014-4305; 2014-4279
Pajarito below SR-501	10/9/2014	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/9/14 14:56	10/9/14 14:56	10/14/14 13:30	10/14/14 13:30	10/16/14 17:00	10/20/14 17:00	10/21/14 23:31	12/28/14 13:00	2015-93; 2015-109
DP above Los Alamos Canyon	5/21/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	5/21/15 19:14	5/21/15 19:27	5/22/15 9:50	5/22/15 9:50	5/27/15 17:00	5/28/15 17:00	5/29/15 20:28	6/17/15 12:55	2015-1298; 2015-1306
DP below grade ctrl structure	5/21/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	5/21/15 18:10	5/21/15 19:40	5/22/15 11:10	5/22/15 11:10	5/27/15 17:00	5/28/15 17:00	5/29/15 19:57	6/17/15 12:55	2015-1299; 2015-1305
DP above Los Alamos Canyon	6/26/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/26/15 19:29	6/26/15 19:40	6/29/15 14:40	6/29/15 14:40	7/6/15 17:00	7/6/15 17:00	7/8/15 9:20	8/10/15 13:00	2015-1500; 2015-1505
DP above TA-21	6/26/2015	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/26/15 18:05	6/26/15 18:25	6/29/15 9:10	6/29/15 9:10	7/6/15 17:00	7/6/15 17:00	7/8/15 16:14	8/10/15 13:00	2015-1500; 2015-1503
DP below grade ctrl structure	6/26/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/26/15 18:35	6/26/15 19:01	6/29/15 11:05	6/29/15 11:05	7/6/15 17:00	7/6/15 17:00	7/8/15 9:26	8/10/15 13:00	2015-1500; 2015-1504
Sandia right fork at Pwr Plant	6/26/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/26/15 18:25	6/26/15 23:55	6/29/15 12:05	6/29/15 12:05	7/1/15 17:00	7/6/15 17:00	7/2/15 15:41	8/10/15 13:00	2015-1480; 2015-1485
Pueblo below GCS	7/2/2015	E060.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/2/15 14:39	7/2/15 16:29	7/6/15 10:30	7/6/15 10:30	7/8/15 17:00	7/8/15 17:00	7/10/15 14:18	8/10/15 13:00	2015-1567; 2015-1553; 2015-1548
Acid above Pueblo	7/3/2015	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 14:25	7/3/15 14:36	7/9/15 11:55	7/9/15 11:55	7/13/15 17:00	8/3/15 17:00	7/15/15 13:23	9/9/15 8:51	2015-1648; 2015-1956ADD; 2015-1660
DP above Los Alamos Canyon	7/3/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 16:04	7/3/15 16:15	7/6/15 14:45	7/6/15 14:45	7/8/15 17:00	7/8/15 17:00	7/10/15 14:27	8/10/15 13:00	2015-1552; 2015-1565
DP above TA-21	7/3/2015	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 14:55	7/3/15 15:07	7/8/15 11:25	7/8/15 11:25	7/13/15 17:00	7/14/15 17:00	7/15/15 12:59	8/19/15 13:00	2015-1649; 2015-1660
DP below grade ctrl structure	7/3/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 15:10	7/3/15 18:20	7/6/15 11:40	7/6/15 11:40	7/8/15 17:00	7/8/15 17:00	7/10/15 14:21	8/10/15 13:00	2015-1549; 2015-1566
E059.5 Pueblo below LAC WWTF	7/3/2015	E059.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 17:00	7/3/15 20:14	7/8/15 13:30	7/8/15 13:30	7/13/15 17:00	8/3/15 17:00	7/15/15 13:30	9/9/15 8:51	2015-1644; 2015-1956ADD; 2015-1659
Los Alamos above low-head weir	7/3/2015	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 16:55	7/3/15 19:05	7/6/15 15:35	7/6/15 15:35	7/8/15 17:00	7/8/15 17:00	7/10/15 14:24	8/10/15 13:00	2015-1564; 2015-1547; 2015-1551
Pueblo above Acid	7/3/2015	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 15:05	7/3/15 15:16	7/9/15 11:30	7/9/15 11:30	7/13/15 17:00	8/3/15 17:00	7/15/15 13:26	9/9/15 8:51	2015-1645; 2015-1956ADD; 2015-1660
Sandia below Wetlands	7/3/2015	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 15:05	7/3/15 16:55	7/8/15 10:50	7/8/15 10:50	7/8/15 17:00	7/9/15 17:00	7/10/15 19:15	7/19/15 13:00	2015-1577; 2015-1609; 2015-1596
Sandia right fork at Pwr Plant	7/3/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/3/15 14:10	7/3/15 20:20	7/9/15 9:50	7/9/15 10:30	7/9/15 17:00	7/14/15 17:00	7/15/15 15:37	8/19/15 13:00	2015-1620; 2015-1661; 2015-1647
Pajarito above Twomile	7/6/2015	E243	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/6/15 13:50	7/6/15 14:12	7/8/15 0:00	7/8/15 16:10	7/9/15 17:00	7/14/15 17:00	7/14/15 12:00	8/19/15 13:00	2015-1658; 2015-1622
Starmers above Pajarito	7/6/2015	E242	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/6/15 12:41	7/6/15 12:55	7/13/15 14:00	7/13/15 14:00	7/14/15 17:00	7/19/15 17:00	7/16/15 13:15	8/19/15 13:00	2015-1715; 2015-1689
DP above Los Alamos Canyon	7/7/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/15 4:58	7/7/15 5:14	7/7/15 13:30	7/7/15 13:30	7/14/15 17:00	7/19/15 17:00	7/15/15 18:43	8/19/15 13:00	2015-1680; 2015-1714
DP below grade ctrl structure	7/7/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/15 4:04	7/7/15 6:14	7/8/15 10:00	7/8/15 10:00	7/13/15 17:00	7/14/15 17:00	7/15/15 13:36	8/19/15 13:00	2015-1637; 2015-1656
Los Alamos above low-head weir	7/7/2015	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/15 5:20	7/7/15 8:30	7/7/15 10:40	7/7/15 10:40	7/9/15 17:00	7/9/15 17:00	7/11/15 15:30	8/10/15 13:00	2015-1604; 2015-1585; 2015-1584
Los Alamos below low-head weir	7/7/2015	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/15 5:35	7/7/15 8:45	7/7/15 11:11	7/7/15 11:11	7/9/15 17:00	7/9/15 17:00	7/11/15 16:02	8/3/15 17:13	2015-1606; 2015-1582; 2015-1583
Pajarito above Threemile	7/7/2015	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/15 5:49	7/7/15 5:51	7/7/15 11:45	7/7/15 11:45	7/8/15 17:00	7/9/15 17:00	7/10/15 14:30	8/3/15 12:18	2015-1607; 2015-1570
Pajarito above Starmers	7/15/2015	E241	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/15 18:02	7/15/15 18:17	7/17/15 10:15	7/17/15 10:15	7/20/15 17:00	7/23/15 17:00	7/22/15 14:27	8/19/15 13:00	2015-1826; 2015-1755
Pajarito above Threemile	7/15/2015	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/15 13:59	7/15/15 14:01	7/20/15 13:00	7/20/15 13:00	7/21/15 17:00	7/23/15 17:00	7/24/15 17:06	8/19/15 13:00	2015-1826; 2015-1765
Pajarito below SR-501	7/15/2015	E240	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/15 17:49	7/15/15 17:51	7/20/15 14:15	7/20/15 14:15	7/21/15 17:00	7/23/15 17:00	7/24/15 16:34	8/19/15 13:00	2015-1826; 2015-1777
Sandia right fork at Pwr Plant	7/15/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/15 17:50	7/15/15 23:40	7/16/15 12:00	7/16/15 12:00	7/17/15 17:00	7/20/15 17:00	7/22/15 13:58	8/19/15 13:00	2015-1744; 2015-1751; 2015-1743
Acid above Pueblo	7/20/2015	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 18:45	7/20/15 18:56	7/22/15 15:00	7/22/15 15:00	7/27/15 17:00	7/27/15 17:00	7/29/15 0:13	8/19/15 13:00	2015-1875; 2015-1885
DP above Los Alamos Canyon	7/20/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 19:39	7/20/15 19:50	7/21/15 15:35	7/21/15 15:35	7/24/15 17:00	7/27/15 17:00	7/28/15 23:10	8/19/15 13:00	2015-1865; 2015-1881
DP above TA-21	7/20/2015	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 18:29	7/20/15 23:59	7/22/15 11:45	7/22/15 11:45	7/27/15 17:00	7/27/15 17:00	7/29/15 0:45	8/19/15 13:00	2015-1875; 2015-1884
DP below grade ctrl structure	7/20/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 13:19	7/20/15 19:26	7/23/15 11:15	7/23/15 11:15	7/28/15 17:00	7/30/15 17:00	7/31/15 16:07	8/20/15 21:37	2015-1889; 2015-1924
La Delfe above Pajarito	7/20/2015	E242.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 18:55	7/20/15 19:06	7/22/15 10:20	7/22/15 10:20	7/23/15 17:00	7/27/15 17:00	7/24/15 22:25	8/19/15 13:00	2015-1880; 2015-1857
Los Alamos above low-head weir	7/20/2015	E042.1	Unfiltered	"Unfiltered" DOC, converted as if TOC	Location-averaged	Location-averaged	Unfiltered	7/20/15 20:10	7/20/15 23:20	7/21/15 14:55	7/21/15 14:55	7/24/15 17:00	7/27/15 17:00	7/28/15 23:42	8/19/15 13:00	2015-1881; 2015-1865
Los Alamos below low-head weir	7/20/2015	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 20:25	7/20/15 23:35	7/21/15 13:30	7/21/15 13:30	7/23/15 17:00	7/23/15 17:00	7/25/15 3:08	8/19/15 13:00	2015-1823; 2015-1840
Pajarito above Starmers	7/20/2015	E241	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 18:12	7/20/15 18:25	7/22/15 9:40	7/22/15 9:40	7/23/15 17:00	7/27/15 17:00	7/24/15 17:11	8/19/15 13:00	2015-1880; 2015-1858
Pajarito above Threemile	7/20/2015	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 19:29	7/20/15 19:31	7/21/15 13:05	7/21/15 13:05	7/23/15 17:00	7/23/15 17:00	7/25/15 0:31	8/19/15 13:00	2015-1826; 2015-1837
Pajarito above Twomile	7/20/2015	E243	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 19:26	7/20/15 19:38	7/21/15 10:55	7/21/15 10:55	7/23/15 17:00	7/23/15 17:00	7/25/15 1:02	8/19/15 13:00	2015-1826; 2015-1839
Pueblo below GCS	7/20/2015	E060.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 18:33	7/20/15 18:59	7/21/15 12:40	7/21/15 12:40	7/27/15 17:00	7/27/15 17:00	7/29/15 2:21	8/20/15 8:57	2015-1885; 2015-1875
Sandia below Wetlands	7/20/2015	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 19:04	7/20/15 23:54	7/22/15 8:45	7/22/15 8:45	7/23/15 17:00	7/27/15 17:00	7/24/15 22:57	8/19/15 13:00	2015-1855; 2015-1880; 2015-1857
Sandia right fork at Pwr Plant	7/20/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 18:20	7/20/15 23:50	7/22/15 7:50	7/22/15 8:00	7/23/15 17:00	7/27/15 17:00	7/24/15 17:43	8/19/15 13:00	2015-1858; 2015-1882; 2015-1872
Twomile above Pajarito	7/20/2015	E244	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/20/15 19:25	7/20/15 19:47	7/21/15 9:55	7/21/15 9:55	7/23/15 17:00	7/23/15 17:00	7/25/15 2:37	8/19/15 13:00	2015-1826; 2015-1839
Pajarito above SR-4	7/21/2015	E250	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/21/15 3:44	7/21/15 3:45	7/21/15 10:35	7/21/15 10:35	7/21/15 17:00	7/23/15 17:00	7/24/15 16:03	8/19/15 13:00	2015-1826; 2015-1777
Acid above Pueblo	7/29/2015	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 20:15	7/29/15 20:36	8/5/15 11:55	8/5/15 11:55	8/10/15 17:00	8/10/15 17:00	8/12/15 14:28	9/19/15 13:00	2015-2088; 2015-2102

DRAFT **Appendix A. LANL BLM Database**

			Source of value[a]					QA/QC Information								
Location ID	Sample Date	Windward ID	pH	DOC	Sulfate	Chloride	Total Alkalinity	Sample Collection Start Time	Sample Collection End Time	Sample Retrieval Start Time	Sample Retrieval End Time	Lab Receipt Start Time	Lab Receipt End Time	Analysis Start Time	Analysis End Time	Chain of Custody Number(s)
DP above Los Alamos Canyon	7/29/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 21:09	7/29/15 21:20	7/31/15 11:55	7/31/15 11:55	8/3/15 17:00	8/4/15 17:00	8/6/15 21:25	9/9/15 8:51	2015-1995; 2015-1988; 2015-1956ADD
DP above TA-21	7/29/2015	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 20:02	7/29/15 20:06	7/31/15 9:20	7/31/15 9:20	8/3/15 17:00	8/4/15 17:00	8/6/15 21:58	9/9/15 8:51	2015-1988; 2015-1956ADD
DP below grade ctrl structure	7/29/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 20:14	7/29/15 22:44	7/31/15 10:30	7/31/15 10:30	8/4/15 17:00	8/4/15 17:00	8/6/15 22:31	8/27/15 21:25	2015-1988; 2015-1992
Los Alamos below low-head weir	7/29/2015	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 22:50	7/29/15 23:48	7/30/15 9:55	7/30/15 9:55	7/31/15 17:00	8/3/15 17:00	8/4/15 16:48	8/27/15 19:04	2015-1968; 2015-1949; 2015-1953
Pajarito above Threemile	7/29/2015	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 20:09	7/29/15 20:11	7/30/15 10:30	7/30/15 10:30	7/31/15 17:00	8/3/15 17:00	8/4/15 16:43	8/20/15 10:45	2015-1969; 2015-1945
RF09GU02	7/29/2015	GUAJE-REF-2	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 13:30	7/29/15 13:30	8/4/15 14:20	8/4/15 14:20	8/10/15 17:00	11/1/15 16:00	8/12/15 13:27	1/15/16 13:00	2015-2108; 2015-2142
Sandia above Firing Range	7/29/2015	E124	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 22:30	7/29/15 22:48	7/30/15 13:55	7/30/15 13:55	8/3/15 17:00	8/3/15 17:00	8/4/15 17:06	8/27/15 19:27	2015-1963; 2015-1970
Sandia below Wetlands	7/29/2015	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 20:44	7/29/15 23:34	7/30/15 11:35	7/30/15 11:35	7/31/15 17:00	8/3/15 17:00	8/4/15 16:53	9/9/15 8:51	2015-1950; 2015-1970; 2015-1956ADD; 2015-1956
Sandia right fork at Pwr Plant	7/29/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 19:45	7/29/15 23:55	7/30/15 14:55	7/30/15 15:00	8/3/15 17:00	8/3/15 17:00	8/4/15 16:58	8/27/15 19:01	2015-1956; 2015-1970
WR-REF-3 at RF13WR03	7/29/2015	WR-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/15 20:34	7/29/15 20:34	7/30/15 13:50	7/30/15 13:50	8/6/15 17:00	8/10/15 17:00	8/11/15 18:04	9/19/15 13:00	2015-2067; 2015-2095
DP above Los Alamos Canyon	7/31/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 13:51	7/31/15 13:54	8/3/15 13:05	8/3/15 13:05	8/5/15 17:00	8/5/15 17:00	8/6/15 19:12	8/27/15 14:36	2015-2016
DP above TA-21	7/31/2015	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 12:54	7/31/15 13:44	8/4/15 10:05	8/4/15 10:05	8/6/15 17:00	8/10/15 17:00	8/11/15 17:27	9/19/15 13:00	2015-2047; 2015-2096
DP below grade ctrl structure	7/31/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 13:33	7/31/15 13:36	8/3/15 11:40	8/3/15 11:40	8/6/15 17:00	8/6/15 17:00	8/11/15 17:36	8/28/15 12:24	2015-2047
Los Alamos above low-head weir	7/31/2015	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 14:10	7/31/15 17:20	8/4/15 12:00	8/4/15 12:00	8/3/15 17:00	8/10/15 17:00	8/11/15 17:51	9/19/15 13:00	2015-2093; 2015-2069; 2015-1956ADD
Los Alamos below low-head weir	7/31/2015	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 14:41	7/31/15 15:13	8/3/15 14:45	8/3/15 14:45	8/3/15 17:00	8/5/15 17:00	8/6/15 19:43	9/9/15 8:51	2015-2015; 2015-1956ADD
Rio de los Frijoles at Band	7/31/2015	E350	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 16:55	7/31/15 16:55	8/3/15 14:15	8/3/15 14:15	8/10/15 17:00	11/1/15 16:00	8/12/15 13:32	1/15/16 13:00	2015-2108; 2015-2142
Sandia above Firing Range	7/31/2015	E124	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 13:40	7/31/15 13:58	8/3/15 10:30	8/3/15 10:30	8/3/15 17:00	8/4/15 17:00	8/6/15 23:04	9/9/15 8:51	2015-1987; 2015-1956ADD; 2015-1994
Sandia right fork at Pwr Plant	7/31/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/15 12:45	7/31/15 18:55	8/3/15 9:05	8/3/15 9:05	8/5/15 17:00	8/10/15 17:00	8/11/15 17:22	9/19/15 13:00	2015-2031; 2015-2099; 2015-2046
Canon de Valle below MDA P	8/1/2015	E256	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/1/15 11:40	8/1/15 11:42	8/4/15 15:30	8/4/15 15:30	8/3/15 17:00	8/10/15 17:00	8/11/15 17:59	9/19/15 13:00	2015-2068; 2015-1956ADD; 2015-2094
Water below SR-4	8/1/2015	E265	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/1/15 13:50	8/1/15 13:50	8/3/15 10:00	8/3/15 10:00	8/3/15 17:00	8/5/15 17:00	8/6/15 17:08	9/9/15 8:51	2015-2018; 2015-1956ADD
La Delfe above Pajarito	8/2/2015	E242.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/2/15 13:50	8/2/15 13:53	8/4/15 11:45	8/4/15 11:45	8/5/15 17:00	8/5/15 17:00	8/6/15 20:45	8/20/15 10:45	2015-2032
Starmers above Pajarito	8/2/2015	E242	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/2/15 13:54	8/2/15 14:00	8/4/15 10:55	8/4/15 10:55	8/5/15 17:00	8/5/15 17:00	8/6/15 21:16	8/20/15 10:45	2015-2032
DP above TA-21	8/8/2015	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/8/15 18:09	8/8/15 19:19	8/11/15 8:40	8/11/15 8:40	8/13/15 17:00	8/24/15 17:00	8/15/15 14:34	9/19/15 13:00	2015-2150; 2015-2181
DP below grade ctrl structure	8/8/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/8/15 18:39	8/8/15 19:29	8/11/15 10:40	8/11/15 10:40	8/13/15 17:00	8/24/15 17:00	8/15/15 15:05	9/19/15 13:00	2015-2150; 2015-2180
Los Alamos below low-head weir	8/8/2015	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/8/15 20:30	8/8/15 23:20	8/10/15 11:25	8/10/15 11:25	8/11/15 17:00	8/24/15 17:00	8/13/15 8:53	9/19/15 13:00	2015-2145; 2015-2128
RF09GU02	8/8/2015	GUAJE-REF-2	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/8/15 0:00	8/8/15 0:00	8/13/15 13:00	8/13/15 13:00	8/17/15 17:00	8/24/15 17:00	8/20/15 0:45	9/19/15 13:00	2015-2165; 2015-2179
WR-REF-3 at RF13WR03	8/11/2015	WR-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/11/15 18:00	8/11/15 18:00	8/12/15 14:00	8/12/15 14:00	8/17/15 17:00	8/24/15 17:00	8/20/15 1:28	9/19/15 13:00	2015-2179; 2015-2165
RF09GU02	8/17/2015	GUAJE-REF-2	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/17/15 13:00	8/17/15 13:00	8/18/15 15:10	8/18/15 15:10	8/24/15 17:00	8/24/15 17:00	8/25/15 19:21	9/19/15 13:00	2015-2242; 2015-2239
Sandia below Wetlands	8/17/2015	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/17/15 12:44	8/17/15 15:34	8/19/15 0:00	8/19/15 10:05	8/20/15 17:00	8/24/15 17:00	8/25/15 19:26	9/19/15 13:00	2015-2224; 2015-2240; 2015-2214
Sandia right fork at Pwr Plant	8/17/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/17/15 12:00	8/17/15 18:10	8/19/15 11:10	8/19/15 11:10	8/20/15 17:00	8/24/15 17:00	8/25/15 19:29	9/19/15 13:00	2015-2214; 2015-2240; 2015-2224
WR-REF-3 at RF13WR03	8/17/2015	WR-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/17/15 14:55	8/17/15 14:55	8/18/15 11:30	8/18/15 11:30	8/24/15 17:00	8/24/15 17:00	8/25/15 19:31	9/19/15 13:00	2015-2223; 2015-2239
Sandia below Wetlands	8/20/2015	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered	8/20/15 12:40	8/20/15 12:40	NA	NA	8/24/15 17:00	8/24/15 17:00	8/26/15 15:56	9/9/15 18:04	2015-2227
Sandia right fork at Pwr Plant	8/20/2015	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	8/20/15 13:42	8/20/15 13:42	NA	NA	8/24/15 17:00	8/24/15 17:00	8/25/15 20:05	9/9/15 18:07	2015-2227
WR-REF-3 at RF13WR03	8/27/2015	WR-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/15 13:30	8/27/15 13:30	9/2/15 12:12	9/2/15 12:20	9/8/15 17:00	10/27/15 17:00	9/10/15 9:37	1/15/16 13:00	2015-2308; 2016-151
BAND-REF-3	9/9/2015	BAND-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/9/15 13:45	9/9/15 13:45	9/16/15 15:15	9/16/15 15:15	9/21/15 17:00	10/27/15 17:00	9/24/15 8:29	1/15/16 13:00	2016-153; 2015-2354
BAND-REF-3	10/20/2015	BAND-REF-3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/20/15 18:25	10/20/15 18:25	10/28/15 15:50	10/28/15 15:50	11/5/15 16:00	12/16/15 16:00	11/7/15 12:29	2/19/16 13:00	2016-521; 2016-270
BAND-REF-4	10/20/2015	BAND-REF-4	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/20/15 19:25	10/20/15 19:25	10/28/15 15:20	10/28/15 15:20	11/5/15 16:00	12/16/15 16:00	11/7/15 12:20	2/19/16 13:00	2016-521; 2016-267
Sandia below Wetlands	10/20/2015	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/20/15 18:09	10/20/15 18:59	10/21/15 0:00	10/21/15 9:50	10/23/15 17:00	10/27/15 17:00	10/24/15 15:12	1/15/16 13:00	2016-118; 2016-156
Acid above Pueblo	10/21/2015	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/21/15 11:00	10/21/15 11:11	10/23/15 8:45	10/23/15 8:45	10/27/15 17:00	10/27/15 17:00	10/28/15 18:44	1/15/16 13:00	2016-145; 2016-160
DP above Los Alamos Canyon	10/21/2015	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/21/15 11:59	10/21/15 12:10	10/26/15 15:15	10/26/15 15:15	11/2/15 16:00	11/3/15 16:00	11/4/15 12:51	1/15/16 13:00	2016-241; 2016-234
DP below grade ctrl structure	10/21/2015	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/21/15 11:09	10/21/15 14:19	10/22/15 11:25	10/22/15 11:30	10/27/15 17:00	10/27/15 17:00	10/28/15 22:33	1/15/16 13:00	2016-140; 2016-159
E059.8 Pueblo Below Wetlands	10/21/2015	E059.8	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/21/15 14:24	10/21/15 22:14	10/27/15 15:15	10/27/15 15:15	11/2/15 16:00	11/3/15 16:00	11/4/15 12:54	1/15/16 13:00	2016-241; 2016-234
Los Alamos above low-head weir	10/21/2015	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/21/15 15:15	10/21/15 18:55	10/22/15 10:45	10/22/15 10:46	10/27/15 17:00	10/27/15 17:00	10/28/15 19:50	1/15/16 13:00	2016-140; 2016-162; 2016-139
Los Alamos below low-head weir	10/21/2015	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/21/15 17:20	10/21/15 20:10	10/22/15 10:15	10/22/15 10:15	10/27/15 17:00	10/27/15 17:00	10/28/15 20:23	1/15/16 13:00	2016-139; 2016-140; 2016-161
Rio de los Frijoles at Band	10/22/2015	E350	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/22/15 1:10	10/22/15 1:10	10/28/15 14:45	10/28/15 14:55	11/5/15 16:00	12/16/15 16:00	11/10/15 16:56	2/19/16 13:00	2016-270; 2016-267; 2016-521
Los Alamos below low-head weir	10/23/2015	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/23/15 23:00	10/23/15 23:50	10/26/15 16:15	10/26/15 16:15	10/29/15 17:00	11/1/15 16:00	10/30/15 16:05	1/15/16 13:00	2016-199; 2016-214; 2016-198
Sandia below Wetlands	10/23/2015	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/23/15 20:09	10/23/15 21:44	10/27/15 11:25	10/27/15 11:25	10/29/15 17:00	11/3/15 16:00	11/4/15 12:56	1/15/16 13:00	2016-196; 2016-236; 2016-242
Sandia left fork at Asph Plant	10/23/2015	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/23/15 19:44	10/23/15 23:54	10/27/15 9:45	10/27/15 9:45	10/29/15 17:00	11/1/15 16:00	10/30/15 15:35	1/15/16 13:00	2016-210; 2016-195; 2016-204
Sandia right fork at Pwr Plant	10/23/2015	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/23/15 19:39	10/23/15 23:45	10/27/15 12:00	10/27/15 12:00	10/29/15 17:00	11/1/15 16:00	10/30/15 16:11	1/15/16 13:00	2016-194; 2016-213; 2016-200
Canon de Valle below MDA P	12/11/2015	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	12/11/15 10:00	12/11/15 10:00	NA	NA	12/14/15 16:00	12/14/15 16:00	12/16/15 2:06	1/6/16 13:33	2016-512
Canon de Valle below MDA P	3/28/2016	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	3/28/16 13:04	3/28/16 13:04	NA	NA	3/29/16 17:00	3/29/16 17:00	3/30/16 17:13	4/18/16 15:03	2016-961
Canon de Valle below MDA P	6/21/2016	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	6/21/16 10:13	6/21/16 10:13	NA	NA	6/22/16 17:00	6/22/16 17:00	6/23/16 21:52	7/13/16 13:44	2016-1433
Sandia right fork at Pwr Plant	7/1/2016	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/1/16 14:10	7/1/16 17:20	7/5/16 10:20	7/5/16 12:15	7/6/16 17:00	7/12/16 17:00	7/8/16 16:16	8/19/16 13:00	2016-1562; 2016-1563; 2016-1662
Sandia right fork at Pwr Plant	7/15/2016	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/16 11:25	7/15/16 14:35	7/18/16 10:15	7/18/16 10:15	7/19/16 17:00	7/26/16 17:00	7/22/16 15:27	9/8/16 13:00	2016-1728; 2016-1789; 2016-1726
Sandia below Wetlands	7/31/2016	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/16 14:10	7/31/16 17:20	8/1/16 10:50	8/1/16 10:50	8/2/16 17:00	8/9/16 17:00	8/5/16 17:48	9/9/16 13:00	2016-1861; 2016-1849; 2016-1972
Sandia right fork at Pwr Plant	7/31/2016	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/31/16 13:00	7/31/16 16:10	8/1/16 12:20	8/1/16 12:40	8/2/16 17:00	8/9/16 17:00	8/5/16 19:59	9/9/16 13:00	2016-1850; 2016-1861; 2016-1972
DP above Los Alamos Canyon	8/3/2016	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/16 20:34	8/3/16 20:54	8/5/16 8:30	8/5/16 8:30	8/9/16 17:00	8/9/16 17:00	8/12/16 13:42	9/16/16 13:00	2016-1984; 2016-1966
DP below grade ctrl structure	8/3/2016	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/16 19:29	8/3/16 22:39	8/5/16 7:35	8/5/16 7:35	8/10/16 17:00	8/16/16 17:00	8/12/16 13:52	9/16/16 13:00	2016-1996; 2016-2072
Los Alamos below Ice Rink	8/3/2016	E026	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/16 15:50	8/3/16 16:12	8/4/16 15:00	8/4/16 15:00	8/9/16 17:00	8/9/16 17:00	8/12/16 13:45	9/16/16 13:00	2016-1966; 2016-1984
Pajarito above Threemile	8/3/2016	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/16 17:49	8/3/16 18:11	8/4/16 14:00	8/4/16 14:00	8/8/16 17:00	8/9/16 17:00	8/12/16 1:58	9/16/16 13:00	2016-1975; 2016-1937
Sandia below Wetlands	8/3/2016	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/16 20:05	8/3/16 23:15	8/4/16 12:15	8/4/16 12:22	8/8/16 17:00	8/9/16 17:00	8/12/16 2:40	9/2/16 10:23	2016-1939; 2016-1976; 2016-1960
Sandia right fork at Pwr Plant	8/3/2016	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/16 18:55	8/3/16 22:05	8/4/16 13:50	8/4/16 13:50	8/8/16 17:00	8/9/16 17:00	8/12/16 3:25	9/13/16 13:00	2016-1940; 2016-1960; 2016-1977
Twomile above Pajarito	8/3/2016	E244	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/16 16:54	8/3/16 17:06	8/5/16 10:45	8/5/16 10:45	8/9/16 17:00	8/9/16 17:00	8/12/16 13:47	9/16/16 13:00	2016-1983; 2016-1967
Pueblo above Acid	8/7/2016	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/16 13:20	8/7/16 13:40	8/9/16 12:30	8/9/16 12:30	8/11/16 17:00	8/16/16 17:00	8/16/16 20:25	9/16/16 13:00	2016-2026; 2016-2074
Sandia below Wetlands	8/8/2016	E123	Filtered	Filtered	Filtered	Filtered	Filtered	8/8/16 13:50	8/8/16 13:50	NA	NA	8/8/16 17:00	8/10/16 17:00	8/10/16 13:00	10/3/16 13:00	2016-1961; 2016-1969; 2016-1993
Sandia right fork at Pwr Plant	8/8/2016	E121	Filtered	Filtered	Filtered	Filtered	Filtered	8/8/16 15:40	8/8/16 15:40	NA	NA	8/8/16 17:00	8/10/16 17:00	8/10/16 13:00	9/29/16 13:00	2016-1961; 2016-1969; 2016-1992
South Fork of Sandia at E122	8/9/2016	E122.SF	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/9/16 13:29	8/9/16 13:29	NA	NA	8/8/16 17:00	8/16/16 17:00	8/10/16 13:00	9/27/16 13:00	2016-1986; 2016-2070
DP above Los Alamos Canyon	8/19/2016	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/19/16 13:03	8/19/16 13:25	8/23/16 14:45	8/23/16 14:45	8/25/16 17:00	8/25/16 17:00	8/27/16 17:32	9/16/16 13:00	2016-2186; 2016-2168
DP above TA-21	8/19/2016	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/19/16 11:49	8/19/16 12:25	8/22/16 12:00	8/22/16 12:00	8/23/16 17:00	8/25/16 17:00	8/24/16 18:36	9/20/16 13:00	2016-2143; 2016-2185
South Fork of Acid Canyon	8/19/2016	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/19/16 11:54	8/19/16 12:16	8/22/16 16:00	8/22/16 16:00	8/23/16 17:00	8/25/16 17:00	8/24/16 18:40	9/20/16 13:00	2016-2143; 2016-2185
DP above Los Alamos Canyon	8/24/2016	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/24/16 13:44	8/24/16 14:06	8/25/16 11:50	8/25/16 11:50	8/29/16 17:00	8/29/16 17:00	8/31/16 18:49	9/23/16 12:48	2016-2233; 2016-2215
DP above TA-21	8/24/2016	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/24/16 12:39	8/24/16 14:09	8/25/16 15:25	8/25/16 15:25	8/29/16 17:00	8/29/16 17:00	8/31/16 18:40	9/23/16 12:48	2016-2214; 2016-2234
DP above Los Alamos Canyon	8/27/2016	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 12:18	8/27/16 12:40	8/30/16 15:10	8/30/16 15:10	9/1/16 17:00	9/6/16 17:00	9/7/16 20:21	10/3/16 13:00	2016-2348; 2016-2312
DP above TA-21	8/27/2016	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 11:08	8/27/16 11:58	8/31/16 9:55	8/31/16 10:00	9/1/16 17:00	9/6/16 17:00	9/7/16 21:04	10/3/16 13:00	2016-2313; 2016-2352
E059.5 Pueblo below LAC WWTF	8/27/2016	E059.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 12:57	8/27/16 16:04	8/30/16 9:50	8/30/16 10:10	9/1/16 17:00	9/6/16 17:00	9/8/16 15:43	10/3/16 13:00	2016-2315; 2016-2351; 2016-2316
Los Alamos above low-head weir	8/27/2016	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 12:44	8/27/16 15:54	8/29/16 10:45	8/29/16 10:45	8/30/16 17:00	8/31/16 17:00	9/3/16 0:21	9/23/16 12:48	2016-2261; 2016-2292; 2016-2277
Los Alamos below low-head weir	8/27/2016	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 13:15	8/27/16 15:25	8/29/16 9:45	8/29/16 9:50	8/30/16 17:00	8/31/16 17:00	9/2/16 22:11	9/23/16 12:48	2016-2258; 2016-2259; 2016-2291
Sandia below Wetlands	8/27/2016	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 11:54	8/27/16 15:04	8/29/16 16:00	8/29/16 16:00	8/31/16 17:00	8/31/16 17:00	9/3/16 6:52	9/23/16 13:00	2016-2278; 2016-2280; 2016-2294
Sandia right fork at Pwr Plant	8/27/2016	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 10:59	8/27/16 14:09	8/29/16 1:50	8/29/16 15:40	8/31/16 17:00	8/31/16 17:00	9/3/16 6:21	9/23/16 13:00	2016-2279; 2016-2281; 2016-2295
South Fork of Acid Canyon	8/27/2016	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/27/16 11:09	8/27/16 11:34	8/31/16 11:10	8/31/16 11:10	9/1/16 17:00	9/6/16 17:00	9/7/16 19:36	9/23/16 13:00	2016-2311; 2016-2347
Pueblo above Acid	9/3/2016	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/3/16 13:20	9/3/16 13:38	9/6/16 14:05	9/6/16 14:05	9/7/16 17:00	9/8/16 17:00	9/8/16 20:19	10/14/16 13:00	2016-2369; 2016-2389
South Fork of Acid Canyon	9/3/2016	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/3/16 14:05	9/3/16 14:19	9/6/16 14:40	9/6/16 14:40	9/7/16 17:00	9/8/16 17:00	9/8/16 20:23	10/14/16 13:00	2016-2369; 2016-2388
DP above Los Alamos Canyon	9/6/2016	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/6/16 19:04	9/6/16 19:26	9/7/16 15:10	9/7/16 15:10	9/12/16 17:00	9/12/16 17:00	9/14/16 18:32	10/4/16 15:57	2016-2442; 2016-2433
DP below grade ctrl structure	9/6/2016	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/6/16 18:05	9/6/16 21:15	9/7/16 11:30	9/7/16 11:45	9/8/16 17:00	9/8/16 17:00	9/10/16 4:37	10/14/16 13:00	2016-2385; 2016-2390
Sandia below Wetlands	9/6/2016	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/6/16 18:20	9/6/16 20:50	9/8/16 13:00	9/8/16 13:00	9/9/16 17:00	9/12/16 17:00	9/14/16 15:03	10/14/16 13:00	2016-2410; 2016-2409; 2016-2443
Sandia right fork at Pwr Plant	9/6/2016	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/6/16 17:20	9/6/16 20:30	9/8/16 14:05	9/8/16 14:05	9/9/16 17:00	9/12/16 17:00	9/14/16 14:29	10/14/16 13:00	2016-2439; 2016-2407; 2016-2406
Canon de Valle below MDA P	9/9/2016	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	9/9/16 12:50	9/9/16 12:50	NA	NA	9/12/16 17:00	9/12/16 17:00	9/14/16 16:17	10/4/16 15:57	2016-2425
Sandia left fork at Asph Plant	10/3/2016	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/3/16 3:50	10/3/16 6:40	10/6/16 14:50	10/6/16 14:50	10/11/16 17:00	10/12/16 17:00	10/13/16 17:20	11/4/16 15:53	2017-79; 2017-76; 2017-96
Sandia left fork at Asph Plant	10/8/2016	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/8/16 16:44	10/8/16 19:54	10/11/16 10:18	10/11/16 11:00	10/12/16 17:00	10/12/16 17:00	10/14/16 13:30	11/4/16 15:53	2017-93; 2017-97; 2017-94
Sandia left fork at Asph Plant	11/4/2016	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	11/4/16 12:39	11/4/16 15:49	11/7/16 11:20	11/7/16 11:20	11/8/16 16:00	11/14/16 16:00	11/10/16 23:18	11/30/16 16:52	2017-392; 2017-366; 2017-403
Sandia right fork at Pwr Plant	11/4/2016	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	11/4/16 16:04	11/4/16 19:14	11/7/16 12:15	11/7/16 12:15	11/8/16 16:00	11/13/16 16:00	11/10/16 23:47	11/29/16 13:43	2017-401; 2017-369; 2017-368
DP below grade ctrl structure	11/5/2016	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	11/5/16 7:09	11/5/16 10:19	11/7/16 14:35	11/7/16 14:35	11/9/16 16:00	11/9/16 16:00	11/14/16 8:51	11/30/16 16:17	2017-391; 2017-404
Sandia below Wetlands	11/5/2016	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	11/5/16 22:49	11/5/16 23:59	11/7/16 10:35	11/7/16 10:35	11/8/16 16:00	11/9/16 16:00	11/14/16 7:46	11/29/16 13:43	2017-393; 2017-367; 2017-406
Los Alamos above low-head weir	11/6/2016	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	11/6/16 0:30	11/6/16 3:00	11/8/16 10:05	11/8/16 10:05	11/9/16 16:00	11/15/16 16:00	11/14/16 9:35	12/2/16 13:00	2017-408; 2017-463; 2017-407
Canon de Valle below MDA P	12/9/2016	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	12/9/16 12:35	12/9/16 12:35	NA	NA	12/12/16 16:00	12/12/16 16:00	12/15/16 8:33	1/6/17 16:39	2017-690

DRAFT **Appendix A. LANL BLM Database**

			Source of value[a]					QA/QC Information								
Location ID	Sample Date	Windward ID	pH	DOC	Sulfate	Chloride	Total Alkalinity	Sample Collection Start Time	Sample Collection End Time	Sample Retrieval Start Time	Sample Retrieval End Time	Lab Receipt Start Time	Lab Receipt End Time	Analysis Start Time	Analysis End Time	Chain of Custody Number(s)
Canon de Valle below MDA P	3/10/2017	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	3/10/17 13:19	3/10/17 13:19	NA	NA	3/13/17 17:00	3/13/17 17:00	3/17/17 18:42	4/7/17 12:34	2017-1178
Canon de Valle below MDA P	6/2/2017	E256	Filtered	Converted from TOC	Filtered	Filtered	Filtered	6/2/17 9:59	6/2/17 9:59	NA	NA	6/5/17 17:00	6/5/17 17:00	6/6/17 20:14	6/26/17 14:05	2017-1647
Sandia below Wetlands	6/6/2017	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/6/17 13:29	6/6/17 13:45	6/7/17 9:10	6/7/17 9:10	6/12/17 17:00	6/14/17 17:00	6/14/17 1:53	7/6/17 10:28	2017-1681; 2017-1722
Sandia right fork at Pwr Plant	6/6/2017	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/6/17 11:48	6/6/17 15:04	6/7/17 11:06	6/7/17 11:42	6/12/17 17:00	6/14/17 17:00	6/14/17 1:24	7/6/17 10:28	2017-1682; 2017-1683; 2017-1722
Ancho below SR-4	6/25/2017	E275	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/25/17 16:49	6/25/17 17:11	6/27/17 9:15	6/27/17 9:15	6/28/17 17:00	7/4/17 17:00	6/30/17 19:00	7/25/17 9:41	2017-1864; 2017-1842
Sandia below Wetlands	6/25/2017	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	6/25/17 17:20	6/25/17 20:30	6/27/17 11:55	6/27/17 11:55	6/28/17 17:00	7/4/17 17:00	6/30/17 21:21	7/25/17 9:41	2017-1834; 2017-1841; 2017-1863
Acid above Pueblo	7/8/2017	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/17 13:40	7/8/17 13:58	7/10/17 17:45	7/10/17 17:45	7/13/17 17:00	7/19/17 17:00	7/15/17 12:30	8/9/17 11:24	2017-1959; 2017-2001
DP above Los Alamos Canyon	7/8/2017	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/17 14:19	7/8/17 14:37	7/10/17 15:50	7/10/17 15:50	7/13/17 17:00	10/2/17 17:00	7/15/17 13:28	10/18/17 13:00	2017-1962; 2017-2002; 2018-49
DP above TA-21	7/8/2017	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/17 12:54	7/8/17 13:25	7/10/17 12:20	7/10/17 12:20	7/12/17 17:00	7/16/17 17:00	7/13/17 23:21	8/1/17 11:56	2017-1923; 2017-1941; 2017-1947
DP below grade ctrl structure	7/8/2017	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/17 13:23	7/8/17 14:53	7/10/17 14:31	7/10/17 14:34	7/12/17 17:00	7/16/17 17:00	7/14/17 0:48	8/1/17 11:56	2017-1925; 2017-1940; 2017-1946
Sandia below Wetlands	7/18/2017	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/18/17 19:53	7/18/17 20:09	7/19/17 14:10	7/19/17 16:00	7/21/17 17:00	7/26/17 17:00	7/26/17 19:11	8/17/17 9:06	2017-2068; 2017-2098
Sandia left fork at Asph Plant	7/18/2017	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/18/17 18:19	7/18/17 21:29	7/19/17 16:00	7/19/17 16:00	7/21/17 17:00	8/22/17 17:00	7/26/17 21:31	8/25/17 13:00	2017-2068; 2017-2044; 2017-2052; 2017-2525; 2017-2099
Sandia right fork at Pwr Plant	7/18/2017	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/18/17 18:24	7/18/17 21:34	7/19/17 16:00	7/19/17 16:00	7/21/17 17:00	7/26/17 17:00	7/26/17 22:18	8/17/17 9:06	2017-2039; 2017-2068; 2017-2097
Acid above Pueblo	7/26/2017	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 11:35	7/26/17 11:55	7/26/17 11:35	7/26/17 11:55	7/31/17 17:00	8/1/17 17:00	8/3/17 21:05	8/28/17 12:11	2017-2209; 2017-2235
DP above Los Alamos Canyon	7/26/2017	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 12:24	7/26/17 12:42	7/27/17 10:57	7/27/17 10:57	7/28/17 17:00	8/1/17 17:00	8/1/17 0:04	8/24/17 10:44	2017-2152; 2017-2248
DP above TA-21	7/26/2017	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 11:24	7/26/17 12:14	7/26/17 15:45	7/26/17 15:45	7/28/17 17:00	8/1/17 17:00	8/1/17 0:48	8/24/17 10:44	2017-2157; 2017-2114; 2017-2239
DP below grade ctrl structure	7/26/2017	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 11:48	7/26/17 13:18	7/26/17 16:45	7/26/17 16:45	7/28/17 17:00	8/1/17 17:00	7/31/17 23:20	8/24/17 10:44	2017-2161; 2017-2121; 2017-2242
Los Alamos above low-head weir	7/26/2017	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 13:16	7/26/17 16:24	7/27/17 9:40	7/27/17 9:40	7/28/17 17:00	8/1/17 17:00	8/2/17 13:00	8/24/17 10:44	2017-2134; 2017-2250; 2017-2135
Mortandad below Effluent Canon	7/26/2017	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 11:39	7/26/17 11:57	7/26/17 11:39	7/26/17 11:57	7/31/17 17:00	8/1/17 17:00	8/3/17 21:52	8/28/17 12:13	2017-2236; 2017-2211
Sandia below Wetlands	7/26/2017	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 11:45	7/26/17 12:31	7/26/17 16:20	7/26/17 16:20	7/28/17 17:00	8/1/17 17:00	8/1/17 1:33	8/24/17 10:44	2017-2110; 2017-2165; 2017-2247
Sandia right fork at Pwr Plant	7/26/2017	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 11:10	7/26/17 14:20	7/26/17 11:20	7/27/17 13:00	7/31/17 17:00	8/1/17 17:00	8/2/17 13:00	8/28/17 13:42	2017-2139; 2017-2205; 2017-2233
South Fork of Acid Canyon	7/26/2017	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/17 11:36	7/26/17 11:55	7/26/17 11:36	7/26/17 11:55	7/31/17 17:00	8/1/17 17:00	8/3/17 23:26	8/28/17 12:29	2017-2204; 2017-2232
South Fork of Acid Canyon	7/27/2017	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/27/17 20:44	7/27/17 21:03	7/28/17 9:40	7/28/17 9:40	7/31/17 17:00	8/1/17 17:00	8/3/17 22:39	8/30/17 13:19	2017-2187; 2017-2237
Acid above Pueblo	7/29/2017	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/17 19:50	7/29/17 20:08	8/1/17 10:30	8/1/17 10:30	8/3/17 17:00	8/9/17 17:00	8/5/17 15:03	9/1/17 10:14	2017-2306; 2017-2388
DP above TA-21	7/29/2017	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/17 19:23	7/29/17 20:18	7/31/17 9:40	7/31/17 9:40	8/1/17 17:00	8/9/17 17:00	8/5/17 10:08	8/30/17 14:06	2017-2229; 2017-2199; 2017-2249
DP below grade ctrl structure	7/29/2017	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/17 19:53	7/29/17 21:23	7/31/17 10:20	7/31/17 10:20	8/1/17 17:00	8/23/17 17:00	8/5/17 11:37	8/30/17 15:09	2017-2228; 2017-2191; 2017-2250
Sandia below Wetlands	7/29/2017	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/17 20:05	7/29/17 20:51	7/31/17 8:45	7/31/17 9:00	8/4/17 17:00	8/9/17 17:00	8/10/17 18:59	9/1/17 9:16	2017-2329; 2017-2394; 2017-2259
Sandia left fork at Asph Plant	7/29/2017	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/17 18:59	7/29/17 19:31	7/31/17 12:04	7/31/17 12:04	8/2/17 17:00	8/10/17 17:00	8/5/17 12:35	8/30/17 16:42	2017-2214; 2017-2282; 2017-2383
Sandia right fork at Pwr Plant	7/29/2017	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/29/17 14:43	7/29/17 22:10	7/31/17 10:50	7/31/17 10:50	8/3/17 17:00	8/9/17 17:00	8/5/17 15:32	9/1/17 10:14	2017-2304; 2017-2389; 2017-2272
South Fork of Acid Canyon	7/29/2017	E055.5	Unfiltered	Filtered	Location-averaged	Location-averaged	Unfiltered	7/29/17 19:29	7/29/17 19:38	7/31/17 0:00	7/31/17 12:30	8/2/17 17:00	8/9/17 17:00	8/5/17 13:05	8/31/17 13:00	2017-2281; 2017-2384
DP above TA-21	8/7/2017	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/17 11:48	8/7/17 12:58	8/8/17 10:45	8/8/17 10:45	8/10/17 17:00	8/14/17 17:00	8/17/17 19:35	9/7/17 13:32	2017-2430; 2017-2407; 2017-2436
DP below grade ctrl structure	8/7/2017	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/17 12:28	8/7/17 13:38	8/8/17 11:31	8/8/17 12:04	8/10/17 17:00	8/14/17 17:00	8/17/17 19:06	9/7/17 13:32	2017-2431; 2017-2404; 2017-2437
Sandia below Wetlands	8/8/2017	E123	Filtered	Converted from TOC	Filtered	Filtered	Filtered	8/8/17 16:00	8/8/17 16:00	NA	NA	8/9/17 17:00	8/9/17 17:00	8/12/17 7:52	9/6/17 13:55	2017-2415
Sandia right fork at Pwr Plant	8/8/2017	E121	Filtered	Converted from TOC	Filtered	Filtered	Filtered	8/8/17 14:04	8/8/17 14:04	NA	NA	8/9/17 17:00	8/9/17 17:00	8/12/17 9:21	9/6/17 13:55	2017-2415
Sandia below Wetlands	8/10/2017	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/17 12:16	8/10/17 12:16	NA	NA	8/11/17 17:00	8/15/17 17:00	8/15/17 8:14	9/1/17 14:19	2017-2456; 2017-2471; 2017-2450
Sandia right fork at Pwr Plant	8/10/2017	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/17 10:24	8/10/17 10:24	NA	NA	8/11/17 17:00	8/15/17 17:00	8/15/17 9:42	9/1/17 14:19	2017-2450; 2017-2456; 2017-2471
South Fork of Sandia at E122	8/10/2017	E122.SF	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/17 9:58	8/10/17 9:58	NA	NA	8/11/17 17:00	8/15/17 17:00	8/15/17 17:53	9/1/17 14:19	2017-2456; 2017-2471; 2017-2450
Sandia left fork at Asph Plant	8/21/2017	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/21/17 1:54	8/21/17 2:30	8/21/17 10:43	8/21/17 10:43	8/22/17 17:00	8/22/17 17:00	8/24/17 14:55	9/15/17 13:29	2017-2525; 2017-2527; 2017-2530
Acid above Pueblo	8/23/2017	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/23/17 12:20	8/23/17 12:38	8/24/17 11:55	8/24/17 11:55	8/25/17 17:00	8/30/17 17:00	8/29/17 16:36	9/21/17 9:15	2017-2559; 2017-2617
SEP-REF-SJM4 at RF17SJM04	8/24/2017	SEP-REF-SJM4	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/24/17 16:08	8/24/17 16:08	8/28/17 10:40	8/28/17 10:40	8/30/17 17:00	8/30/17 17:00	9/5/17 22:43	9/25/17 13:20	2017-2611; 2017-2620
SEP-REF-SJM1 at RF17SJM01	9/26/2017	SEP-REF-SJM1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/26/17 17:52	9/26/17 17:52	9/27/17 12:15	9/27/17 12:15	9/29/17 17:00	10/12/17 17:00	10/4/17 14:32	10/26/17 15:35	2017-2965; 2018-48; 2018-297
DP above Los Alamos Canyon	9/27/2017	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 19:09	9/27/17 19:17	9/28/17 13:15	9/28/17 13:15	10/2/17 17:00	10/2/17 17:00	10/5/17 17:30	10/26/17 15:35	2018-20; 2018-49
Los Alamos above low-head weir	9/27/2017	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 20:14	9/27/17 22:44	9/28/17 14:02	9/28/17 14:02	10/2/17 17:00	10/2/17 17:00	10/5/17 17:35	10/26/17 15:35	2018-13; 2018-43; 2018-41
Los Alamos below low-head weir	9/27/2017	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 0:19	9/27/17 23:59	9/28/17 16:53	9/28/17 16:55	10/5/17 17:00	10/10/17 17:00	10/9/17 10:11	10/31/17 15:36	2018-234; 2018-287; 2018-279; 2018-232
Pueblo above Acid	9/27/2017	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 19:04	9/27/17 19:22	9/28/17 11:45	9/28/17 11:45	9/29/17 17:00	10/2/17 17:00	10/4/17 15:36	10/26/17 15:35	2017-2990; 2018-44
SEP-REF-BM1 at RF17BM01	9/27/2017	SEP-REF-BM1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 16:03	9/27/17 16:03	9/27/17 13:30	9/27/17 13:30	10/2/17 17:00	10/2/17 17:00	10/5/17 17:37	10/26/17 15:35	2018-12; 2018-40
SEP-REF-P1 at RF17P01	9/27/2017	SEP-REF-P1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 22:27	9/27/17 22:27	9/28/17 14:50	9/28/17 14:50	10/2/17 17:00	10/2/17 17:00	10/5/17 17:43	10/26/17 15:35	2018-7; 2018-36
SEP-REF-SJM1 at RF17SJM01	9/27/2017	SEP-REF-SJM1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 16:54	9/27/17 16:54	9/28/17 10:40	9/28/17 10:40	10/3/17 17:00	10/3/17 17:00	10/5/17 17:32	10/30/17 9:29	2018-78
SEP-REF-SJM4 at RF17SJM04	9/27/2017	SEP-REF-SJM4	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/27/17 17:32	9/27/17 17:32	9/28/17 11:20	9/28/17 11:20	10/3/17 17:00	10/31/17 17:00	10/5/17 17:51	11/8/17 13:00	2018-80; 2018-668
DP above Los Alamos Canyon	9/28/2017	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/28/17 22:14	9/28/17 22:32	9/29/17 14:35	9/29/17 14:35	10/3/17 17:00	10/4/17 17:00	10/5/17 19:23	10/27/17 14:31	2018-100; 2018-133
La Delfe above Pajarito	9/28/2017	E242.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/28/17 22:59	9/28/17 23:15	10/2/17 11:30	10/2/17 11:30	10/4/17 17:00	10/4/17 17:00	10/7/17 2:35	11/2/17 12:19	2018-168; 2018-160
Mortandad below Effluent Canon	9/28/2017	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/28/17 20:45	9/28/17 20:55	9/29/17 14:55	9/29/17 14:55	10/4/17 17:00	10/4/17 17:00	10/7/17 0:39	11/2/17 12:19	2018-136
SEP-REF-BM1 at RF17BM01	9/28/2017	SEP-REF-BM1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/28/17 20:03	9/28/17 20:03	9/29/17 13:00	9/29/17 13:00	10/3/17 17:00	10/3/17 17:00	10/5/17 17:54	10/27/17 14:31	2018-74
SEP-REF-P1 at RF17P01	9/28/2017	SEP-REF-P1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/28/17 23:55	9/28/17 23:55	9/29/17 15:10	9/29/17 15:10	10/3/17 17:00	10/3/17 17:00	10/5/17 22:04	10/31/17 13:26	2018-77
Starmers above Pajarito	9/28/2017	E242	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/28/17 23:15	9/28/17 23:37	10/2/17 11:30	10/2/17 11:30	10/5/17 17:00	10/10/17 17:00	10/7/17 5:18	10/31/17 15:36	2018-209; 2018-281
E059.5 Pueblo below LAC WWTF	9/29/2017	E059.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 1:30	9/29/17 4:40	9/29/17 10:45	9/29/17 10:45	10/3/17 17:00	10/4/17 17:00	10/5/17 17:09	10/27/17 14:31	2018-75; 2018-56
E059.8 Pueblo Below Wetlands	9/29/2017	E059.8	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 11:19	9/29/17 13:44	9/29/17 16:30	9/29/17 16:30	10/5/17 17:00	10/10/17 17:00	10/9/17 14:15	10/31/17 15:36	2018-210; 2018-282; 2018-280
Los Alamos above DP Canyon	9/29/2017	E030	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 0:54	9/29/17 1:12	9/29/17 15:45	9/29/17 15:45	10/4/17 17:00	10/4/17 17:00	10/7/17 4:02	11/2/17 12:19	2018-132; 2018-157
Los Alamos above low-head weir	9/29/2017	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 0:44	9/29/17 3:54	9/29/17 15:47	9/29/17 15:56	10/3/17 17:00	10/4/17 17:00	10/5/17 21:18	10/30/17 9:29	2018-90; 2018-137; 2018-128
Los Alamos below low-head weir	9/29/2017	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 0:56	9/29/17 3:39	9/27/17 13:30	9/29/17 13:30	10/3/17 17:00	10/4/17 17:00	10/5/17 21:41	11/2/17 12:19	2018-95; 2018-143; 2018-131; 2018-138
Pajarito above Threemile	9/29/2017	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 1:58	9/29/17 2:10	9/29/17 11:00	9/29/17 11:00	10/3/17 17:00	10/3/17 17:00	10/5/17 20:55	10/30/17 9:29	2018-76
Pueblo above Acid	9/29/2017	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 0:14	9/29/17 0:32	9/29/17 17:24	9/29/17 17:24	10/4/17 17:00	10/4/17 17:00	10/7/17 0:10	11/2/17 12:19	2018-134; 2018-158
Sandia above Firing Range	9/29/2017	E124	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 1:15	9/29/17 1:51	9/29/17 12:10	9/29/17 12:10	10/3/17 17:00	10/4/17 17:00	10/5/17 20:32	10/27/17 14:31	2018-81; 2018-156
SEP-REF-SJM1 at RF17SJM01	9/29/2017	SEP-REF-SJM1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 9:37	9/29/17 9:37	10/2/17 12:40	10/2/17 12:40	10/5/17 17:00	10/10/17 17:00	10/11/17 15:19	10/31/17 15:36	2018-204; 2018-286
Twomile above Pajarito	9/29/2017	E244	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/29/17 0:24	9/29/17 0:40	9/29/17 13:55	9/29/17 13:55	10/3/17 17:00	10/4/17 17:00	10/5/17 19:45	10/27/17 14:31	2018-102; 2018-135
Los Alamos above DP Canyon	10/4/2017	E030	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/17 22:42	10/4/17 22:50	10/5/17 16:40	10/5/17 16:40	10/6/17 17:00	10/6/17 17:00	10/11/17 20:19	11/2/17 16:05	2018-268
Los Alamos above low-head weir	10/4/2017	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/17 1:14	10/4/17 23:54	10/5/17 13:55	10/5/17 13:55	10/10/17 17:00	10/10/17 17:00	10/12/17 13:12	11/7/17 10:40	2018-318; 2018-334
Mortandad below Effluent Canon	10/4/2017	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/17 21:17	10/4/17 21:33	10/5/17 14:11	10/5/17 14:11	10/6/17 17:00	10/10/17 17:00	10/11/17 19:56	11/2/17 16:05	2018-262; 2018-290
Pajarito above Threemile	10/4/2017	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/17 21:59	10/4/17 22:15	10/5/17 13:55	10/11/17 9:10	10/10/17 17:00	10/12/17 17:00	10/12/17 18:45	11/7/17 10:40	2018-344; 2018-402
SEP-REF-P1 at RF17P01	10/4/2017	SEP-REF-P1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/17 22:06	10/4/17 22:06	10/5/17 16:45	10/5/17 16:45	10/12/17 17:00	10/12/17 17:00	10/14/17 13:55	11/10/17 10:19	2018-382
SEP-REF-SJM1 at RF17SJM01	10/4/2017	SEP-REF-SJM1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/17 20:16	10/4/17 20:16	10/5/17 12:25	10/5/17 12:25	10/12/17 17:00	10/12/17 17:00	10/14/17 13:51	11/10/17 10:19	2018-381
Twomile above Pajarito	10/4/2017	E244	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/17 21:54	10/4/17 22:10	10/5/17 15:43	10/5/17 15:43	10/6/17 17:00	10/10/17 17:00	10/11/17 20:43	11/2/17 16:05	2018-269; 2018-303
E059.8 Pueblo Below Wetlands	10/5/2017	E059.8	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/5/17 0:29	10/5/17 3:39	10/5/17 15:03	10/5/17 15:04	10/10/17 17:00	10/10/17 17:00	10/12/17 13:21	11/7/17 10:40	2018-321; 2018-317
La Delfe above Pajarito	10/5/2017	E242.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/5/17 20:15	10/5/17 20:27	10/6/17 13:26	10/6/17 13:26	10/10/17 17:00	10/10/17 17:00	10/12/17 13:15	11/7/17 10:40	2018-328
Los Alamos below low-head weir	10/5/2017	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/5/17 0:02	10/5/17 0:04	10/5/17 12:00	10/5/17 12:00	10/6/17 17:00	10/6/17 17:00	10/11/17 18:46	11/2/17 16:05	2018-259
Pajarito above Threemile	10/5/2017	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/5/17 19:48	10/5/17 20:00	10/11/17 9:10	10/11/17 9:10	10/12/17 17:00	10/12/17 17:00	10/13/17 18:19	11/8/17 14:09	2018-257
SEP-REF-P1 at RF17P01	10/5/2017	SEP-REF-P1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/5/17 19:12	10/5/17 19:12	10/6/17 15:00	10/6/17 15:00	10/12/17 17:00	10/12/17 17:00	10/14/17 14:20	11/10/17 10:19	2018-391; 2018-416
Acid above Pueblo	7/13/2018	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/13/18 13:49	7/13/18 14:07	7/16/18 14:13	7/16/18 14:13	7/18/18 17:00	7/22/18 17:00	7/19/18 0:00	8/16/18 13:00	N3B-2018-3099; N3B-2018-3055; N3B-2018-3054; N3B-2018-3121
Mortandad below Effluent Canon	7/15/2018	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/18 14:44	7/15/18 15:04	7/17/18 0:00	7/17/18 0:00	7/18/18 17:00	7/22/18 17:00	7/19/18 0:00	8/12/18 4:38	N3B-2018-3040; 2018-3041; 2018-3039
Acid above Pueblo	7/17/2018	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/17/18 11:54	7/17/18 12:12	7/18/18 12:18	7/18/18 12:18	7/19/18 17:00	7/22/18 17:00	7/20/18 0:00	8/15/18 16:10	N3B-2018-3073; N3B-2018-3074; N3B-2018-3072
Sandia below Wetlands	7/17/2018	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/17/18 12:19	7/17/18 15:09	7/18/18 10:40	7/18/18 10:40	7/19/18 17:00	7/22/18 17:00	7/20/18 0:00	8/16/18 10:54	N3B-2018-3067; N3B-2018-3068; N3B-2018-3066; N3B-2018-3069
Sandia right fork at Pwr Plant	7/17/2018	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/17/18 11:15	7/17/18 14:25	7/18/18 0:00	7/18/18 0:00	7/19/18 17:00	7/24/18 17:00	7/20/18 0:00	8/15/18 23:12	2018-3059; N3B-2018-3060; N3B-2018-3057; N3B-2018-3061
Ancho below SR-4	7/23/2018	E275	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/23/18 17:59	7/23/18 19:19	7/24/18 16:30	7/24/18 16:30	7/25/18 17:00	7/26/18 17:00	7/26/18 0:00	8/22/18 13:00	N3B-2018-3187; N3B-2018-3190; N3B-2018-3185
Chaquehui tributary at TA-33	7/23/2018	E340	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/23/18 17:54	7/23/18 18:12	7/24/18 11:30	7/24/18 11:30	7/25/18 17:00	7/25/18 17:00	7/26/18 0:00	8/22/18 13:00	N3B-2018-3159; N3B-2018-3160; N3B-2018-3156
Sandia below Wetlands	7/24/2018	E123	Filtered	Filtered	Filtered	Filtered	Filtered	7/24/18 10:11	7/24/18 10:11	NA	NA	7/25/18 17:00	7/29/18 17:00	7/26/18 0:00	8/17/18 20:34	N3B-2018-3188; N3B-2018-3184; N3B-2018-3191; N3B-2018-3193; N3B-2018-3228
Sandia right fork at Pwr Plant	7/24/2018	E121	Filtered	Filtered	Filtered	Filtered	Filtered	7/24/18 11:37	7/24/18 11:37	NA	NA	7/25/18 17:00	7/29/18 17:00	7/26/18 0:00	8/18/18 0:01	N3B-2018-3188; N3B-2018-3184; N3B-2018-3191; N3B-2018-3193; N3B-2018-3228
South Fork of Sandia at E122	7/24/2018	E122.SF	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/24/18 12:20	7/24/18 12:20	NA	NA	7/25/18 17:00	7/29/18 17:00	7/26/18 0:00	8/18/18 1:09	N3B-2018-3184; N3B-2018-3191; N3B-2018-3193; N3B-2018-3228
DP above TA-21	8/2/2018	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/2/18 18:54	8/2/18 20:04	8/3/18 10:45	8/3/18 10:45	8/6/18 17:00	8/6/18 17:00	8/7/18 0:00	8/31/18 12:47	N3B-2018-3326; N3B-2018-3309; N3B-2018-3308; N3B-2018-3313
DP below grade ctrl structure	8/2/2018	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/2/18 19:38	8/2/18 20:48	8/3/18 12:12	8/3/18 12:25	8/6/18 17:00	8/6/18 17:00	8/7/18 0:00	8/31/18 12:47	N3B-2018-3329; N3B-2018-3318; N3B-2018-3317; N3B-2018-3319; N3B-2018-3321
South Fork of Acid Canyon	8/2/2018	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/2/18 18:54	8/2/18 19:16	8/3/18 13:45	8/3/18 18:57	8/6/18 17:00	8/6/18 17:00	8/7/18 0:00	9/3/18 11:22	N3B-2018-3330; N3B-2018-3324; N3B-2018-3323

DRAFT **Appendix A. LANL BLM Database**

			Source of value[a]					QA/QC Information								
Location ID	Sample Date	Windward ID	pH	DOC	Sulfate	Chloride	Total Alkalinity	Sample Collection Start Time	Sample Collection End Time	Sample Retrieval Start Time	Sample Retrieval End Time	Lab Receipt Start Time	Lab Receipt End Time	Analysis Start Time	Analysis End Time	Chain of Custody Number(s)
Ancho below SR-4	8/3/2018	E275	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/3/18 13:30	8/3/18 13:43	8/6/18 14:00	8/6/18 14:00	8/7/18 17:00	8/9/18 17:00	8/8/18 0:00	9/4/18 8:58	N3B-2018-3338; N3B-2018-3340; N3B-2018-3341
Sandia right fork at Pwr Plant	8/7/2018	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/18 14:03	8/7/18 17:13	8/8/18 11:30	8/8/18 11:30	8/9/18 17:00	8/9/18 17:00	8/10/18 0:00	8/31/18 12:47	N3B-2018-3364; N3B-2018-3365; N3B-2018-3363; N3B-2018-3366
Acid above Pueblo	8/9/2018	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/9/18 17:45	8/9/18 18:03	8/10/18 11:47	8/10/18 11:47	8/13/18 17:00	8/13/18 17:00	8/14/18 0:00	9/7/18 13:36	N3B-2018-3426; N3B-2018-3427; N3B-2018-3425
Pueblo above Acid	8/9/2018	E055	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/9/18 18:00	8/9/18 18:18	8/10/18 11:47	8/10/18 11:47	8/13/18 17:00	8/13/18 17:00	8/14/18 0:00	9/7/18 13:36	N3B-2018-3431; N3B-2018-3432; N3B-2018-3428
Sandia below Wetlands	8/9/2018	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/9/18 18:47	8/9/18 19:03	8/10/18 12:15	8/10/18 12:15	8/13/18 17:00	8/13/18 17:00	8/14/18 0:00	9/7/18 13:36	N3B-2018-3422; N3B-2018-3423; N3B-2018-3424
Sandia right fork at Pwr Plant	8/9/2018	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/9/18 17:23	8/9/18 20:33	8/10/18 12:15	8/10/18 12:15	8/13/18 17:00	8/13/18 17:00	8/14/18 0:00	9/7/18 13:36	N3B-2018-3417; N3B-2018-3419; N3B-2018-3418; N3B-2018-3421
CDB above SR-4	8/10/2018	E229.3	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/18 16:12	8/10/18 16:30	8/13/18 11:56	8/13/18 11:56	8/15/18 17:00	8/15/18 17:00	8/16/18 0:00	9/19/18 15:12	N3B-2018-3457; N3B-2018-3458; N3B-2018-3456
DP above Los Alamos Canyon	8/10/2018	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/18 17:28	8/10/18 17:46	8/13/18 12:50	8/13/18 17:28	8/15/18 17:00	8/15/18 17:00	8/16/18 0:00	9/19/18 15:12	N3B-2018-3453; N3B-2018-3455; N3B-2018-3452
DP above TA-21	8/10/2018	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/18 16:10	8/10/18 17:20	8/13/18 10:56	8/13/18 10:56	8/14/18 17:00	8/15/18 17:00	8/15/18 0:00	9/11/18 17:41	N3B-2018-3438; N3B-2018-3439; N3B-2018-3437; N3B-2018-3441
DP below grade ctrl structure	8/10/2018	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/18 16:39	8/10/18 17:29	8/13/18 14:21	8/13/18 14:39	8/15/18 17:00	8/15/18 17:00	8/16/18 0:00	9/19/18 15:12	N3B-2018-3449; N3B-2018-3450; N3B-2018-3448; N3B-2018-3451
Mortandad below Effluent Canon	8/10/2018	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/10/18 16:20	8/10/18 16:28	8/14/18 9:40	8/14/18 9:40	8/15/18 17:00	8/15/18 17:00	8/16/18 0:00	9/19/18 15:12	N3B-2018-3494; N3B-2018-3495; N3B-2018-3491
DP above TA-21	8/15/2018	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/15/18 12:59	8/15/18 14:09	8/16/18 11:51	8/16/18 11:51	8/17/18 17:00	8/20/18 17:00	8/18/18 0:00	9/19/18 13:00	N3B-2018-3566; N3B-2018-3567; N3B-2018-3564; N3B-2018-3573
DP below grade ctrl structure	8/15/2018	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/15/18 13:49	8/15/18 14:39	8/16/18 13:45	8/16/18 13:45	8/20/18 17:00	8/20/18 17:00	8/21/18 0:00	9/19/18 15:12	N3B-2018-3570; N3B-2018-3571; N3B-2018-3565; N3B-2018-3572
Sandia below Wetlands	8/15/2018	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/15/18 13:58	8/15/18 17:08	8/16/18 11:05	8/16/18 12:44	8/17/18 17:00	8/20/18 17:00	8/18/18 0:00	9/19/18 13:00	N3B-2018-3556; N3B-2018-3557; N3B-2018-3555; N3B-2018-3559
Sandia right fork at Pwr Plant	8/15/2018	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/15/18 12:48	8/15/18 15:58	8/16/18 12:15	8/16/18 12:15	8/20/18 17:00	8/20/18 17:00	8/21/18 0:00	9/19/18 15:12	N3B-2018-3590; N3B-2018-3592; N3B-2018-3589; N3B-2018-3593
DP above TA-21	9/3/2018	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/3/18 12:29	9/3/18 13:39	9/5/18 10:45	9/5/18 10:45	9/6/18 17:00	9/12/18 17:00	9/7/18 0:00	10/5/18 13:00	N3B-2018-3745; N3B-2018-3746; N3B-2018-3744; N3B-2018-3747
DP below grade ctrl structure	9/3/2018	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/3/18 13:17	9/3/18 13:47	9/4/18 10:30	9/4/18 10:30	9/5/18 17:00	9/12/18 17:00	9/6/18 0:00	10/5/18 13:00	N3B-2018-3709; N3B-2018-3711; N3B-2018-3708; N3B-2018-3712
Pajarito above Starmers	9/3/2018	E241	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/3/18 12:23	9/3/18 12:45	9/12/18 14:30	9/12/18 14:30	9/18/18 17:00	9/20/18 17:00	9/19/18 0:00	11/5/18 13:00	N3B-2018-3867; N3B-2018-3868; N3B-2018-3866
Sandia below Wetlands	9/3/2018	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/3/18 13:18	9/3/18 16:28	9/4/18 12:35	9/4/18 12:35	9/5/18 17:00	9/7/18 17:00	9/7/18 0:00	10/2/18 13:00	N3B-2018-3742; N3B-2018-3743; N3B-2018-3741; N3B-2018-3718
South Fork of Acid Canyon	9/3/2018	E055.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/3/18 12:28	9/3/18 12:49	9/4/18 15:21	9/4/18 15:21	9/5/18 17:00	9/5/18 17:00	9/6/18 0:00	10/1/18 14:25	N3B-2018-3716; N3B-2018-3717; N3B-2018-3715
Acid above Pueblo	9/4/2018	E056	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/4/18 13:30	9/4/18 13:48	9/6/18 10:50	9/6/18 10:50	9/7/18 17:00	9/10/18 17:00	9/8/18 0:00	10/24/18 13:00	N3B-2018-3785; N3B-2018-3786; N3B-2018-3784
DP above Los Alamos Canyon	9/4/2018	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/4/18 14:03	9/4/18 14:21	9/5/18 14:23	9/5/18 14:23	9/7/18 17:00	9/10/18 17:00	9/8/18 0:00	10/16/18 13:00	N3B-2018-3764; N3B-2018-3765; N3B-2018-3763
DP below grade ctrl structure	9/4/2018	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/4/18 13:22	9/4/18 14:52	9/5/18 11:16	9/5/18 11:27	9/6/18 17:00	9/10/18 17:00	9/7/18 0:00	10/2/18 13:00	N3B-2018-3751; N3B-2018-3752; N3B-2018-3749; N3B-2018-3753
Los Alamos above low-head weir	9/4/2018	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/4/18 15:03	9/4/18 17:33	9/5/18 15:25	9/5/18 15:51	9/7/18 17:00	9/10/18 17:00	9/8/18 0:00	10/16/18 13:00	N3B-2018-3779; N3B-2018-3780; N3B-2018-3778; N3B-2018-3782; N3B-2018-3781
Sandia below Wetlands	9/4/2018	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/4/18 13:38	9/4/18 16:48	9/5/18 14:00	9/5/18 14:00	9/10/18 17:00	9/10/18 17:00	9/11/18 0:00	10/29/18 13:00	N3B-2018-3789; N3B-2018-3790; N3B-2018-3791; N3B-2018-3788
Sandia left fork at Asph Plant	9/4/2018	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/4/18 12:42	9/4/18 14:32	9/5/18 12:45	9/5/18 12:45	9/7/18 17:00	9/10/18 17:00	9/8/18 0:00	10/24/18 13:00	N3B-2018-3757; N3B-2018-3758; N3B-2018-3756; N3B-2018-3759
Sandia right fork at Pwr Plant	9/4/2018	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/4/18 12:49	9/4/18 15:54	9/5/18 12:45	9/5/18 12:45	9/10/18 17:00	9/10/18 17:00	9/11/18 0:00	11/1/18 13:00	N3B-2018-3792; N3B-2018-3794; N3B-2018-3798
DP above Los Alamos Canyon	9/5/2018	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	9/5/18 20:28	9/5/18 20:46	9/6/18 14:22	9/6/18 14:42	9/10/18 17:00	9/10/18 17:00	9/11/18 0:00	10/29/18 13:00	N3B-2018-3808; N3B-2018-3806; N3B-2018-3807
DP above Los Alamos Canyon	10/23/2018	E040	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/23/18 17:39	10/23/18 17:57	10/24/18 10:20	10/24/18 10:20	10/25/18 17:00	10/28/18 17:00	10/26/18 0:00	11/21/18 7:40	N3B-2019-221; N3B-2019-222; N3B-2019-220
Mortandad below Effluent Canon	10/23/2018	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/23/18 16:47	10/23/18 16:53	10/24/18 12:45	10/24/18 13:45	10/25/18 17:00	10/28/18 17:00	10/26/18 0:00	11/21/18 12:52	N3B-2019-239; N3B-2019-240; N3B-2019-238
Pajarito above Starmers	10/24/2018	E241	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/24/18 5:58	10/24/18 6:20	10/25/18 13:33	10/25/18 13:33	10/29/18 17:00	10/29/18 17:00	10/30/18 0:00	11/26/18 15:43	N3B-2019-269; N3B-2019-270; N3B-2019-268
Mortandad below Effluent Canon	7/2/2019	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/2/19 13:34	7/2/19 13:56	7/3/19 13:35	7/3/19 13:35	7/8/19 17:00	7/8/19 17:00	7/9/19 0:00	7/25/19 17:25	N3B-2019-2391; N3B-2019-2385; N3B-2019-2380
Sandia left fork at Asph Plant	7/2/2019	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/2/19 13:07	7/2/19 15:35	7/3/19 10:20	7/3/19 10:20	7/5/19 17:00	7/8/19 17:00	7/6/19 0:00	7/29/19 12:02	N3B-2019-2390; N3B-2019-2389; N3B-2019-2369; N3B-2019-2383
Sandia right fork at Pwr Plant	7/2/2019	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/2/19 13:14	7/2/19 13:36	7/3/19 10:40	7/3/19 10:40	7/5/19 17:00	7/8/19 17:00	7/6/19 0:00	7/29/19 12:02	N3B-2019-2390; N3B-2019-2386; N3B-2019-2369; N3B-2019-2383
Los Alamos below Ice Rink	7/7/2019	E026	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/19 17:40	7/7/19 18:00	7/8/19 14:50	7/8/19 14:50	7/9/19 17:00	7/10/19 17:00	7/11/19 0:00	8/6/19 15:59	N3B-2019-2406; N3B-2019-2433; N3B-2019-2432
Sandia below Wetlands	7/7/2019	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/19 18:00	7/7/19 21:10	7/8/19 13:03	7/8/19 13:03	7/9/19 17:00	7/10/19 17:00	7/11/19 0:00	8/6/19 15:59	N3B-2019-2406; N3B-2019-2433; N3B-2019-2432
Sandia left fork at Asph Plant	7/7/2019	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/19 16:00	7/7/19 19:10	7/8/19 18:27	7/8/19 18:27	7/9/19 17:00	7/10/19 17:00	7/11/19 0:00	8/6/19 15:59	N3B-2019-2406; N3B-2019-2433; N3B-2019-2432
Sandia right fork at Pwr Plant	7/7/2019	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/7/19 16:04	7/7/19 19:14	7/8/19 17:27	7/8/19 17:27	7/10/19 17:00	7/11/19 17:00	7/11/19 0:00	8/8/19 15:26	N3B-2019-2440; N3B-2019-2461; N3B-2019-2465
Los Alamos below low-head weir	7/8/2019	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/8/19 0:10	7/8/19 0:32	7/8/19 10:27	7/8/19 10:27	7/10/19 17:00	7/11/19 17:00	7/11/19 0:00	8/8/19 15:26	N3B-2019-2465; N3B-2019-2440; N3B-2019-2461
Sandia left fork at Asph Plant	7/13/2019	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/13/19 14:15	7/13/19 17:25	7/15/19 0:00	7/15/19 10:30	7/16/19 17:00	7/16/19 17:00	7/17/19 0:00	8/12/19 13:00	N3B-2019-2532; N3B-2019-2524; N3B-2019-2525
Sandia below Wetlands	7/15/2019	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/19 19:45	7/15/19 22:55	7/16/19 10:46	7/16/19 10:46	7/17/19 17:00	7/18/19 17:00	7/18/19 0:00	8/13/19 17:36	N3B-2019-2556; N3B-2019-2588; N3B-2019-2553
Sandia left fork at Asph Plant	7/15/2019	E122.LFatAP	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/19 18:10	7/15/19 21:20	7/16/19 10:15	7/16/19 10:15	7/17/19 17:00	7/18/19 17:00	7/19/19 0:00	8/14/19 14:29	N3B-2019-2561; N3B-2019-2588; N3B-2019-2577
Sandia right fork at Pwr Plant	7/15/2019	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/15/19 18:14	7/15/19 20:00	7/16/19 11:05	7/16/19 11:05	7/17/19 17:00	7/18/19 17:00	7/19/19 0:00	8/14/19 14:29	N3B-2019-2561; N3B-2019-2588; N3B-2019-2577
Sandia below Wetlands	7/25/2019	E123	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/25/19 14:10	7/25/19 17:20	7/26/19 11:00	7/26/19 11:00	7/29/19 17:00	8/1/19 17:00	7/30/19 0:00	8/28/19 13:00	N3B-2019-2693; N3B-2019-2674; N3B-2019-2676
Sandia right fork at Pwr Plant	7/25/2019	E121	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/25/19 12:35	7/25/19 15:45	7/26/19 10:15	7/26/19 11:00	7/29/19 17:00	8/1/19 17:00	7/30/19 0:00	8/28/19 13:00	N3B-2019-2693; N3B-2019-2680; N3B-2019-2681
DP below grade ctrl structure	7/26/2019	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/19 17:25	7/26/19 19:15	7/29/19 14:16	7/29/19 14:20	7/31/19 17:00	8/1/19 17:00	8/1/19 0:00	9/16/19 13:00	N3B-2019-2778; N3B-2019-2763; N3B-2019-2766; N3B-2019-2754
Los Alamos above low-head weir	7/26/2019	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/19 18:24	7/26/19 21:34	7/29/19 11:15	7/29/19 11:25	7/30/19 17:00	8/1/19 17:00	7/31/19 0:00	9/9/19 13:00	N3B-2019-2752; N3B-2019-2701; N3B-2019-2705
Los Alamos below low-head weir	7/26/2019	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/19 18:35	7/26/19 21:45	7/29/19 10:55	7/29/19 10:55	7/30/19 17:00	8/1/19 17:00	7/31/19 0:00	9/10/19 13:00	N3B-2019-2753; N3B-2019-2725; N3B-2019-2720; N3B-2019-2751; N3B-2019-2707
Mortandad above Ten Site	7/26/2019	E201	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/19 17:34	7/26/19 17:56	7/29/19 14:35	7/29/19 14:35	7/30/19 17:00	8/1/19 17:00	7/31/19 0:00	9/10/19 13:00	N3B-2019-2749; N3B-2019-2724; N3B-2019-2718
Pajarito above Threemile	7/26/2019	E245.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/19 17:09	7/26/19 17:31	7/30/19 10:20	7/30/19 10:20	7/30/19 17:00	8/1/19 17:00	7/31/19 0:00	9/10/19 13:00	N3B-2019-2749; N3B-2019-2724; N3B-2019-2722
Sandia above Firing Range	7/26/2019	E124	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/19 17:30	7/26/19 17:53	7/29/19 10:05	7/29/19 10:05	7/30/19 17:00	8/1/19 17:00	7/31/19 0:00	9/10/19 13:00	N3B-2019-2749; N3B-2019-2703; N3B-2019-2706
Sandia below Wetlands	7/26/2019	E123	Filtered	Filtered	Filtered	Filtered	Filtered	7/26/19 8:55	7/26/19 20:50	7/29/19 14:40	7/29/19 14:40	7/29/19 17:00	8/1/19 17:00	7/30/19 0:00	9/10/19 13:00	N3B-2019-2753; N3B-2019-2741; N3B-2019-2745; N3B-2019-2670
Sandia right fork at Pwr Plant	7/26/2019	E121	Filtered	Filtered	Filtered	Filtered	Filtered	7/26/19 9:55	7/26/19 19:45	7/29/19 16:30	7/29/19 16:30	7/29/19 17:00	8/1/19 17:00	7/30/19 0:00	9/16/19 13:00	N3B-2019-2778; N3B-2019-2763; N3B-2019-2766; N3B-2019-2670
Ten Site above Mortandad	7/26/2019	E201.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	7/26/19 17:00	7/26/19 17:12	7/29/19 13:40	7/29/19 13:40	7/31/19 17:00	8/1/19 17:00	8/1/19 0:00	9/10/19 13:00	N3B-2019-2749; N3B-2019-2740; N3B-2019-2742
DP above TA-21	8/7/2019	E038	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/19 13:25	8/7/19 15:15	8/8/19 9:31	8/8/19 9:31	8/9/19 17:00	8/13/19 17:00	8/10/19 0:00	9/24/19 13:00	N3B-2019-2933; N3B-2019-2909; N3B-2019-2904; N3B-2019-2935
DP below grade ctrl structure	8/7/2019	E039.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/19 13:55	8/7/19 16:45	8/8/19 12:32	8/8/19 12:32	8/9/19 17:00	8/13/19 17:00	8/10/19 0:00	9/19/19 13:00	N3B-2019-2931; N3B-2019-2938; N3B-2019-2913; N3B-2019-2934
E059.5 Pueblo below LAC WWTF	8/7/2019	E059.5	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/19 16:00	8/7/19 19:10	8/8/19 13:30	8/8/19 13:30	8/9/19 17:00	8/13/19 17:00	8/10/19 0:00	10/4/19 13:00	N3B-2019-2931; N3B-2019-2938; N3B-2019-2912; N3B-2019-2937
Los Alamos above low-head weir	8/7/2019	E042.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/19 14:49	8/7/19 17:59	8/9/19 10:08	8/9/19 10:25	8/12/19 17:00	8/13/19 17:00	8/13/19 0:00	10/22/19 13:00	N3B-2019-2952; N3B-2019-2954; N3B-2019-2961; N3B-2019-2950
Los Alamos below low-head weir	8/7/2019	E050.1	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/19 15:05	8/7/19 18:15	8/8/19 10:40	8/8/19 10:40	8/9/19 17:00	8/13/19 17:00	8/10/19 0:00	10/7/19 13:00	N3B-2019-2936; N3B-2019-2908; N3B-2019-2907; N3B-2019-2905
Mortandad below Effluent Canon	8/7/2019	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	8/7/19 14:01	8/7/19 14:23	8/9/19 14:15	8/9/19 14:15	8/12/19 17:00	8/13/19 17:00	8/13/19 0:00	9/25/19 13:00	N3B-2019-2951; N3B-2019-2953; N3B-2019-2955
Mortandad below Effluent Canon	10/4/2019	E200	Unfiltered	Filtered	Filtered	Filtered	Unfiltered	10/4/19 11:19	10/4/19 11:39	10/7/19 0:00	10/7/19 11:15	10/8/19 17:00	10/14/19 17:00	10/9/19 0:00	11/5/19 14:20	N3B-2020-76; N3B-2020-59; N3B-2020-54

APPENDIX B. SUPPLEMENTAL STATISTICAL ANALYSES

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Acronyms

AIC	Akaike's Information Criterion
APS	automated pump sampler
BIC	Bayesian Information Criterion
BLM	biotic ligand model
DOC	dissolved organic carbon
DQA	data quality assessment
DQO	data quality objective
EIM	Environmental Information Management
EPA	US Environmental Protection Agency
LANL	Los Alamos National Laboratory
MLR	multiple linear regression
N3B	Newport News Nuclear BWXT Los Alamos
NMAC	New Mexico Administrative Code
RCRA	Resource Conservation and Recovery Act
SSWQC	site-specific water quality criteria
TOC	total organic carbon
Windward	Windward Environmental LLC
WQS	water quality standards

B1 Overview

This appendix provides additional information on the development of copper site-specific water quality criteria (SSWQC) proposed for surface waters on the Pajarito Plateau, Los Alamos County, New Mexico. The general approach is discussed in the main text, but this appendix provides additional technical details. The approach involves developing multiple linear regressions (MLRs) that accurately predict US Environmental Protection Agency (EPA) (2007) copper biotic ligand model (BLM) criteria based on available site-specific water chemistry.

The remainder of this appendix is organized as follows:

- Section B2 – Data Aggregation
- Section B3 – Data Analysis Methods
- Section B4 – Model Evaluation
- Section B5 – Model Uncertainty
- Section B6 – Summary of MLR Development

Section B2 provides a discussion of the aggregation of the Los Alamos National Laboratory's (LANL's) BLM data that were used to develop and evaluate MLRs. Section B3 provides a detailed discussion of the methods used to develop MLRs, and Section B4 presents the results of the development process. Section B5 provides a brief evaluation of dataset and model uncertainties not discussed in Sections B3 or B4, including a detailed evaluation of models using updated hydrology classifications based on recent hydrology protocol assessments by the New Mexico Environment Department (NMED) and Triad National Security. Section B6 summarizes the key results and conclusions from the development of MLRs. References cited in this appendix are presented in Section B7.

B2 Data Aggregation

This section describes the aggregation of BLM data for the development of MLRs. Aggregation involved the acquisition of source data, estimation of missing data to fill gaps, and cleanup and removal of data. Cleanup and removal of data occurred at different points during the aggregation process, as certain limitations of the dataset (with respect to BLM calculations and MLR development) were recognized.

B2.1 Source Data

The source dataset was generated by LANL/Newport News Nuclear BWXT Los Alamos (N3B) and their contractors, uploaded to the Environmental Information Management (EIM) database, and then exported and provided to Windward Environmental LLC (Windward) by N3B. This occurred in two phases for data included in the 2018 data quality objective (DQO)/data quality assessment (DQA) report (Windward 2018) and for data collected through 2019. All data were reviewed and treated in a similar manner. The complete dataset (2005 to 2019) was compiled to provide all available EIM records for the following information:

- BLM analyte concentrations, starting with pH and dissolved organic carbon (DOC) pairs but including all parameters as available
- Secondary analytes that could aid in filling data gaps and further interpretation of the BLM dataset and outcomes (e.g., hardness and specific conductance)
- Water sample types, including surface water (WS), snowmelt (WM) persistent flow (WP), and storm water (WT)[1]
- Sampling location names, aliases, and coordinates
- Analytical quality control/validation flags
- Other sample information deemed to be of potential interest by N3B (e.g., sampling method and date, analytical method, sample preparation/filtration method, sampling program)

N3B also provided various other sample classifications not currently in EIM that could support SSWQC development. These classifications were generally produced through GIS analysis and field surveys conducted at the LANL property (hereinafter referred to as the Laboratory). These classifications included but were not limited to New Mexico Administrative Code (NMAC) stream hydrologic type, additional sample type classification (e.g., "stormwater runoff" versus "surface water"), land use, and historical wildfires. "Stormwater runoff" data were excluded from the development of the MLR because the BLM is intended to apply to receiving water streams (including stormflow events), not to stormwater discharge or effluent.

B2.2 AGGREGATION AND ADDRESSING DATA GAPS

Starting with the source dataset (n = 1,323 events), acceptable data were sequentially selected for use. Aggregation steps for BLM parameters (including steps wherein BLM parameters were estimated) were as follows:

1) Process used measured concentrations of each parameter from filtered samples for each event, if available.
2) When measured, filtered concentrations were not available for pH and alkalinity, so unfiltered sample results from the same event were used. Unfiltered alkalinity was shown by Windward (2018) to be comparable to

[1] A subset of stormwater samples was excluded from the BLM dataset because these samples were not clearly associated with a surface water assessment unit. These samples were collected at or near a stormwater discharge point rather than in a stream channel during a stormflow event.

filtered alkalinity in paired samples. The measurement of pH is almost always measured in unfiltered samples.

3) To fill gaps in the dataset, DOC was estimated from total organic carbon (TOC) for a subset of samples by applying a conversion factor, discussed later in this section.

4) If measured concentrations were unavailable from both filtered and unfiltered samples, some BLM input parameters were estimated from another water chemistry characteristic; for example, hardness was calculated from calcium and magnesium.[2]

5) For samples with BLM inputs that could not be estimated reasonably from another water chemistry characteristic (i.e., measured in neither filtered nor unfiltered samples), an average concentration was used for the location (using concentrations from other samples from the same location). This approach applied only to sulfate and chloride.

6) If no data were available for a BLM input, then either a default value from the BLM guidance was applied (e.g., 10% humic acid), or a sensitivity analysis was performed to identify a static input value leading to a conservative BLM output. The sensitivity analysis step applied to temperature only and had been carried out previously by Windward (2018).

Non-detected analytical results were replaced by one-half the detection limit. This approach was used because statistical approaches (e.g., Kaplan-Meier method, maximum likelihood estimation, or regression on order statistics) are not appropriate for predicting single concentrations.[3]

Consistent with the 2018 DQO/DQA evaluation, a conservative temperature of 10°C was applied to all samples when running the BLM (Windward 2018). This is the lower bound of the BLM's prescribed range for temperature (Windward 2019), and temperature is known to have little if any effect on BLM output. Humic acid was set to 10% for all samples, consistent with guidance (Windward 2019). Sulfide was set equal to the lower bound of the BLM's prescribed range, 1×10^{-3} mg/L (Windward 2019).

Because the estimation of DOC from TOC was necessary for 124 samples, a comparison of DOC and TOC in samples in which both analytes were measured was performed. As described in EPA (2007), TOC values are not recommended in place of DOC; however, the proportion of organic carbon expected to be dissolved can be estimated based on relationships between paired measures of DOC and TOC. Various approaches were used to compare DOC and TOC, including regression and

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[2] A standard equation for calculating total hardness in mg/L calcium carbonate was used: hardness = 2.5 × calcium + 4.1 × magnesium.

[3] Rather, non-detect estimation methods such as the Kaplan-Meier method are appropriate for estimating summary statistic parameters like the mean and confidence limits.

ratio-based approaches (carried out using R software) (R Core Team 2020). Linear, log-linear, and quantile (median) regression methods were applied to the DOC and TOC data, and outliers were identified and removed based on large model residuals (i.e., prediction error) or influence (quantified using Cook's distance metric and screened against a metric threshold of 0.5). Additionally, mean and median DOC-to-TOC ratios were calculated as a relatively simple approach, consistent with EPA (2007) recommendations.

Regardless of the method used, there were concerns with the underlying DOC and TOC data. For example, the mean and median DOC-to-TOC ratios exceeded one; more than one-half of the available data indicate that DOC exceeds TOC, which is conceptually impossible. This appears to be a consistent analytical uncertainty. To address this uncertainty in a conservative way, samples were considered only when DOC was less than or equal to TOC.[4]

Ultimately, the DOC:TOC conversion factor of 0.859 used to estimate DOC from TOC was taken as the median DOC-to-TOC ratio after removing any result wherein DOC exceeded TOC. This value (0.859) is approximately equal to the conversion factor used by Windward (2018) (0.86) and the national average presented by EPA (2007) (0.86) for streams; it is also similar to the value (0.83) used by the Oregon Department of Environmental Quality in its copper BLM-based WQC implementation guidance (Oregon DEQ 2016). The median ratio was also comparable to the model slopes from the linear, log-linear, and quantile regression approaches (after removing outliers but not excluding values wherein DOC exceeded TOC). The removal of DOC values that exceeded their paired TOC values intentionally introduced a bias toward a lower estimate of DOC, which will, in turn, bias copper BLM-based WQC to be low (i.e., conservative). Still, the translator value is comparable to that derived by other researchers (e.g., Oregon DEQ 2016) and EPA (1998, 2007) and, therefore, it provides reasonable and defensible estimates of DOC in Pajarito Plateau waters for the subset of samples in which DOC was estimated from TOC.

After working through the above steps, the following numbers of samples were sequentially aggregated:

- Among the 1,323 initial location-date sample pairings in the BLM dataset, there were 10 instances in which pH, DOC, and alkalinity were all measured in filtered samples. These samples were retained.
- A total of 479 samples were retained after adding 469 samples with pH and alkalinity from unfiltered samples.[5]

[4] This limitation on the dataset only applied to the calculation of a DOC-to-TOC conversion faction, not to the entire MLR development process.

[5] Alkalinity from unfiltered samples was used as a substitute for missing dissolved alkalinity inputs. This was consistent with the 2018 DQO approach, which determined that unfiltered and filtered alkalinity values were comparable (when both values were reported for a single sample).

- A total of 606 samples were retained after adding 127 samples with representations or estimates of DOC.
    - Three filtered samples in which TOC was reported and therefore assumed to be DOC (incorrectly reported in EIM)
    - 124 samples for which DOC was estimated from TOC
- A total of 611 events were retained after inputting major anion data for 5 events.
    - Four samples lacked sulfate concentrations, so they were estimated using location-specific averages.
    - One sample lacked a chloride concentration, so it was estimated using a location-specific average.

B2.3 Data Cleanup

At the conclusion of the data aggregation steps described in Section B2.2, 611 samples had been retained. Data reduction steps were then taken to limit the dataset to BLM-relevant samples. First, any duplicated sample entries in EIM (of which four were observed) were reduced to a single unique sample. Then, all "stormwater discharge" samples were excluded, leaving only surface water samples (including many "WT" stormflow samples). Lastly, any samples with pH, DOC, or hardness values falling outside the BLM's prescribed ranges (Table 5-2 of the main text) were excluded. After data cleanup, the result was a modeling dataset with 517 samples.

B2.4 Final Dataset

Table B1 shows a tabular breakdown of the 517 samples used for MLR development by major watershed and current NMAC hydrologic classification.[6]

Table B1. New Mexico WQS hydrologic classification assignments for the BLM dataset by major watershed

Major Watershed	NMAC Hydrological Classification			N by Watershed
	Ephemeral/ Intermittent (128)	Default Intermittent (98)	Perennial (121/126)	
Ancho	4	0	0	4
Chaquehui	3	0	0	3
Frijoles	0	9	8	17
Jemez River	0	6	0	6
Los Alamos/Pueblo	140	61	0	201
Mortandad	28	2	0	30

[6] Figure 3-1 and Map 3-1 in the main text provide additional spatial context for the BLM dataset.

Major Watershed	NMAC Hydrological Classification			N by Watershed
	Ephemeral/ Intermittent (128)	Default Intermittent (98)	Perennial (121/126)	
Pajarito	62	0	3	65
Sandia	8	0	148	156
Water/Cañon de Valle	4	12	19	35
N by Hydrology Class	**249**	**90**	**178**	**517**

BLM – biotic ligand model
N – sample size
NMAC – New Mexico Administrative Code
WQS – water quality standards

Appendix A provides the final dataset of BLM data, including the 517 samples used to develop MLRs and the 14 samples removed during the final data filtering step. The exclusion of data outside the prescribed BLM range (for pH, DOC, and hardness) was intended to avoid extrapolation of the BLM; however, BLM guidance suggests that removing such data is not necessary (Windward 2019). Therefore, the 14 samples removed during the last filtering step are included in Appendix A to facilitate future modeling efforts, which may include BLM data outside the prescribed ranges. Thus, the dataset provided in Appendix A includes 531 samples with all data needed to run the copper BLM.

B2.5 Additional Data Considerations

Although land use can have an effect on downgradient water quality, there is no need to separate these data when developing or evaluating an MLR, if it can be demonstrated the MLR equation responds as well as the BLM software does to changes in water quality. This is discussed further in Section B5.2. Evaluations of samples potentially affected by historical fires showed BLM WQC and MLR-predicted WQC similar to those of unaffected samples; this is discussed in Section B5.3. Therefore, data potentially affected by different land uses and/or historical fires were not treated differently from other data when developing MLRs.

Hydrology was investigated in detail when developing the MLR (Sections B3 and B4), because of the various water types on the Pajarito Plateau (i.e., ephemeral, intermittent, and perennial). According to New Mexico WQS, stream hydrology determines whether acute only or both acute and chronic WQC apply, so the proposed acute and chronic SSWQC, if adopted, would apply similarly.[7] For the purposes of developing and testing MLRs, existing NMAC hydrologic classifications for LANL waters were used (Section B4); however, Section B5.4 also details the investigation of proposed classifications from the most recent hydrology protocol efforts by NMED and the Laboratory. These updated classifications have not yet been approved, but

[7] Acute WQC apply in ephemeral and intermittent streams, whereas acute and chronic WQC apply in perennial and unclassified streams.

they represent reasonable changes to previously unclassified (20.6.4.98 NMAC) waters based on standard methods.

B3 Data Analysis Methods

The final BLM dataset was evaluated iteratively to select the final MLR equation that accurately and most precisely predicted the BLM WQC. To arrive at a parsimonious model, the process considered the effects of continuous water quality variables, hydrological classification, and the possible influences of other sampling location characteristics not included in the model. Analyses were conducted using a series of well-accepted statistical methods (including common graphical evaluations), all of which were carried out in the R statistical environment (R Core Team 2020).

B3.1 Initial Model

An initial log-log linear MLR was developed and tested that included the parameters pH, DOC, and hardness. DOC and hardness were transformed using the natural log, whereas pH, already reported as a log-unit, was input to the model as-is. The structure of the initial model (Model 1) formed the basis for comparisons of models described in Section B3.2.

ln(BLM) = intercept + ln(DOC) + ln(hardness) + pH **Model 1**

Where:

BLM = calculated BLM-based WQC

ln = the natural logarithm

B3.2 Hydrologic Classification-specific Models

To address potential differences in model performance (or bias) among NMAC hydrologic classifications, these classifications were added to MLRs in different ways and tested over several rounds. The first round of analyses evaluated the precision and goodness of fit of a "full" model (Model 2)[8] that included the main categorical and continuous variables assumed to be important for predicting the BLM WQC. Three continuous water quality variables—DOC, hardness, and pH—were selected *a priori* to incorporate primary mechanisms that underpin the copper BLM (EPA 2007; Brix et al. 2017). Model 2 also included NMAC hydrological classifications (i.e., ephemeral/intermittent, intermittent, or perennial) as a categorical term, which introduced classification-specific slopes (for each of the continuous variables) and intercepts.

[8] In this appendix, the terms "Model" and "Equation" are used in different ways. They are distinguished as the general structure of the equation (model) versus the equation with specified coefficient values (equation).

$$\ln(BLM) = HC_{int} + HC_{slope\_DOC}*\ln(DOC) + HC_{slope\_hardness}*\ln(hardness) + HC_{slope\_pH}*pH$$

Model 2

Where:

HC_{int} = hydrologic classification-specific intercept

HC_{slope} = hydrologic classification-specific and continuous variable-specific slope

Stepwise regression procedures based on the Akaike's and Bayesian Information Criteria (AIC and BIC) were used to determine whether the hydrology-specific slopes and/or intercepts provided statistically important contributions to the prediction of BLM WQC.[9] In other words, it was determined whether or not slopes and/or intercepts for DOC, hardness, and pH differed statistically among hydrologic classifications and how important those slopes and intercepts were for predicting the BLM WQC. When running the stepwise regression algorithm, the computational output describes the best-fitting equation, which contains only those parameters that significantly improve BLM WQC predictions. The final list of AIC or BIC model parameters is always a subset of the full model, potentially including all of the parameters in the full model.

The full model (including all hydrologic class-specific slopes and intercepts) was compared to the best-fitting models generated by each stepwise procedure using a number of statistics and visual tools. These tools described each model's goodness-of-fit (of predicted WQC to calculated WQC values) and the extent to which model residuals[10] met the assumptions of the linear modeling framework. The summary statistics reported include:

- Adjusted R^2 – fraction of variance in the BLM WQC explained by the MLR, penalized for the number of variables in the model
- Predicted R^2 – ability of MLR to predict out-of-sample BLM WQC and therefore a measure of how well the model might predict future WQC; also describes model's reliance on single data points, with low predicted R^2 suggesting that model has too many parameters
- AIC and BIC – measures of model fit, with lower values indicating better fit
- Shapiro-Wilk test – indicates whether residuals are normally distributed (assumption of MLR), with $p < 0.05$ suggesting non-normality

[9] To control model complexity, the AIC and BIC reduce (penalize) the measure of model fit based on the number of parameters in the model. The BIC also penalizes the fit based on sample size. Above a certain sample size, AIC tends to result in larger models (i.e., retain more model terms), whereas BIC tends to generate smaller models with fewer terms.

[10] Model residuals = actual WQC – predicted WQC

- Scores test – indicates whether residuals are homoscedastic (assumption of MLR), with $p < 0.05$ suggesting non-constant variance or heteroscedasticity

Standard diagnostic plotting methods of model residuals were evaluated, including plots to assess normality, homogeneity of variance, and relationships between residuals and independent continuous variables of the model (i.e., pH, DOC, and hardness).[11] Residual distributions were plotted by watershed and by hydrologic class to assess whether models were performing similarly across these categories.

In addition, the magnitudes of any statistically significant differences between hydrology-specific model terms were considered in terms of their impact on or relevance to ecological and regulatory issues. In other words, it was determined whether a significant difference was large enough to warrant an increase in MLR complexity. In addition to potentially impacting the predictive capability of the MLR for future data, increased complexity can make the model more difficult to use as a regulatory tool, for example, by requiring that the hydrological classification of a sampling location be known prior to applying the MLR.

Using the information about the importance of individual model terms provided by each line of investigation of model fit, the tradeoffs of simpler and more complex models were assessed, and a final set of models was recommended. The steps taken to refine the full model are described more completely in Section B4.

B4 Model Evaluations

This section provides the results of MLR development. Section B4.1 discusses the initial model (Model 1), and Section B4.2 discusses the hydrologic classification-specific models (Models 2 through 4) and the final model (Model 5).

B4.1 Initial Model Evaluation

Table B2 provides a summary of the initial model, Model 1. Evaluation of this model did not involve a stepwise regression step, since only the full model was considered. Subsequent models are discussed in Section B4.2. The model fit was strong even without added complexity (e.g., addition of hydrology classification factors), with an adjusted R^2 value of 0.969 and a predicted R^2 value of 0.968.

Table B2. Summary of MLR based on Model 1 structure

Model Parameter	Model Coefficient	Standard Error	Coefficient Significance (p-value)
Intercept	-8.21655	0.10778	<0.0001
DOC slope	1.00066	0.01039	<0.0001

[11] Default plots were generated in R using the plot.lm function.

Model Parameter	Model Coefficient	Standard Error	Coefficient Significance (p-value)
Hardness slope	0.01166	0.01110	0.294
pH slope	1.27290	0.01625	<0.0001
Adjusted R^2	**0.969**		
Predicted R^2	**0.968**		

DOC – dissolved organic carbon

MLR – multiple linear regression

B4.2 HYDROLOGIC CLASSIFICATION-SPECIFIC MODEL EVALUATION

The more complex Model 2 resulted in high adjusted and predicted R^2 values of 0.973 and 0.971, respectively (Table B3), although these values represented increases of only 0.004 and 0.003, respectively, relative to Model 1 (Table B2). The AIC and BIC models both resulted in the removal of hydrology-specific slopes for DOC and hardness but not pH.

Table B3. Summary of MLRs based on the Model 2 structure with comparison of full, AIC, and BIC models

Hydrologic Classification	Model Parameter	Model Coefficient		Coefficient Significance (p-value)[a]	
		Full	AIC/BIC Model	Full	AIC/BIC Model
Ephemeral/intermittent	intercept	-9.387119	-9.349237	<0.0001	<0.0001
Intermittent	intercept	-8.345361	-8.416672	0.000992	0.00178
Perennial	intercept	-7.324505	-7.340531	<0.0001	<0.0001
Ephemeral/intermittent	DOC slope	1.0182168	1.012158	<0.0001	<0.0001
Intermittent	DOC slope	1.0000358	na[b]	0.488	na[b]
Perennial	DOC slope	1.0211608	na[b]	0.899	na[b]
Ephemeral/intermittent	hardness slope	0.014166	0.032618	0.389	0.00231
Intermittent	hardness slope	0.050238	na[b]	0.206	na[b]
Perennial	hardness slope	0.039968	na[b]	0.297	na[b]
Ephemeral/intermittent	pH slope	1.425394	1.413439	<0.0001	<0.0001
Intermittent	pH slope	1.275228	1.289743	0.00133	0.00262
Perennial	pH slope	1.140642	1.148362	<0.0001	<0.0001
Adjusted R^2		**0.973**	**0.973**		
Predicted R^2		**0.971**	**0.971**		

[a] The significances of perennial and ephemeral coefficients represent differences from intermittent coefficients.

[b] AIC and BIC models excluded hydrology-specific coefficient; coefficient and p-value reported in table for ephemeral/intermittent applies to all samples.

AIC – Akaike's Information Criterion

MLR – multiple linear regression

BIC – Bayesian Information Criterion	na – not applicable
DOC – dissolved organic carbon	

A clear curvilinear pattern emerged when comparing the residuals to pH (Figure 5-4 in the main text), suggesting a non-linear relationship between pH and the BLM WQC (when combined with hardness, DOC, and other parameters in an MLR). To address this, a new term was added in the model to eliminate the curvilinearity: When a squared pH term (pH^2) was added to the model formula (Model 3),[12] the adjusted R^2 increased from 0.973 to 0.984 (Table B4), and residuals became more normally distributed.

$$\ln(BLM) = HC_{int} + HC_{slope\_DOC}*\ln(DOC) + HC_{slope\_hardness}*\ln(hardness) + HC_{slope+pH}*pH + HC_{slope\_pH2}*pH^2$$

Model 3

Table B4. Summary of MLRs based on the Model 3 structure with comparison of full, AIC, and BIC models

Hydrologic Classification	Model Parameter	Model Coefficient		Coefficient Significance (p-value)[a]	
		Full and AIC	BIC	Full and AIC	BIC
Ephemeral/intermittent	intercept	-26.237	-26.728	<0.0001	<0.0001
Intermittent	intercept	-30.37868	-26.214669	0.187	<0.0001
Perennial	intercept	-25.882931	-26.742375	0.899	0.899
Ephemeral/intermittent	DOC slope	1.016194	1.032831	<0.0001	<0.0001
Intermittent	DOC slope	1.021582	na[b]	0.794	na[b]
Perennial	DOC slope	1.064993	na[b]	0.00849	na[b]
Ephemeral/intermittent	hardness slope	0.030987	0.052566	0.0180	<0.0001
Intermittent	hardness slope	0.080043	na[b]	0.0301	na[b]
Perennial	hardness slope	0.063531	na[b]	0.0967	na[b]
Ephemeral/intermittent	pH slope	6.089031	6.198747	<0.0001	<0.0001
Intermittent	pH slope	7.351267	na[b]	0.144	na[b]
Perennial	pH slope	5.959203	na[b]	0.865	na[b]
Ephemeral/intermittent	pH^2 slope	-0.323072	-0.330876	<0.0001	<0.0001
Intermittent	pH^2 slope	-0.420227	-0.33943	0.104	0.000152

[12] The implication of using a pH^2 term in the MLR is that, when DOC and hardness remain constant, the relationship between pH and the BLM WQC is parabolic (curved). In this case, pH exerts a smaller effect on the predicted WQC at the extremes of the pH range compared to the middle of the range.

Hydrologic Classification	Model Parameter	Model Coefficient		Coefficient Significance (p-value)[a]	
		Full and AIC	BIC	Full and AIC	BIC
Perennial	pH^2 slope	-0.314137	-0.328996	0.863	0.362
Adjusted R^2		**0.984**	**0.983**		
Predicted R^2		**0.981**	**0.981**		

[a] Significances of perennial and intermittent coefficients are differences from ephemeral/intermittent coefficients, whereas the significances of the ephemeral/intermittent coefficients are differences from zero.

[b] BIC model excluded hydrology-specific coefficient; coefficient and p-value reported in table for ephemeral/intermittent applies to all samples

AIC – Akaike's Information Criterion
BIC – Bayesian Information Criterion
DOC – dissolved organic carbon
MLR – multiple linear regression
na – not applicable

Although some hydrology-specific slopes and intercepts were retained by both the AIC and BIC stepwise procedures, the high adjusted R^2 and the relatively small differences among intercepts and slopes of the three hydrologic categories indicated that Model 3 could be simplified by removing the hydrology-specific slopes with little loss of information (Model 4). When hydrology-specific slopes were removed and a pH^2 term retained, Model 4 had both adjusted and predicted R^2 values of 0.981 (reduction of only 0.002 from Model 3), with little change in the patterns of residuals from the more complex model (Table B5).

$$\ln(BLM) = HC_{int} + \ln(DOC) + \ln(hardness) + pH + pH^2 \qquad \textbf{Model 4}$$

Table B5. Summary of MLR based on the Model 4 structure

Hydrological Classification	Model Parameter	Model Coefficient	Coefficient Significance (p-value)[a]
Ephemeral/intermittent	intercept	-24.793152	<0.0001
Intermittent	intercept	-24.731783	<0.0001
Perennial	intercept	-24.699674	<0.0001
na	DOC slope	1.028540	<0.0001
na	hardness slope	0.051764	<0.0001
na	pH slope	5.689560	<0.0001
na	pH^2 slope	-0.297282	<0.0001
Adjusted R^2		**0.982**	
Predicted R^2		**0.982**	

Note: AIC and BIC stepwise regression process resulted in the same equation as the full model.

[a] The significance of perennial and intermittent intercepts describe differences from the ephemeral/intermittent intercept, whereas the significance of the ephemeral/intermittent intercept is a difference from zero.

AIC – Akaike's Information Criterion
BIC – Bayesian Information Criterion
DOC – dissolved organic carbon
MLR – multiple linear regression
na – not applicable

As was true of the change between Models 2 and 3, the high adjusted R^2 and small differences among hydrology-specific intercepts indicated that an even simpler model than Model 4 could be adequate.

With a single intercept and single slopes for the continuous independent variables (Model 5), the adjusted and predicted R^2 values dropped to only 0.980 (from 0.981) (Table B6). Plots of calculated versus predicted BLM WQC values and MLR residuals versus independent variables (i.e., pH, DOC, and hardness) were similar to those from more complex models (Section B5).

$$\ln(\text{BLM}) = \text{intercept} + \ln(\text{DOC}) + \ln(\text{hardness}) + \text{pH} + \text{pH}^2 \qquad \textbf{Model 5}$$

Table B6. Summary of MLR based on the Model 5 structure

Model Parameter	Model Coefficient	Coefficient Significance (p-value)
Intercept	-23.0286	<0.0001
DOC slope	1.0131	<0.0001
Hardness slope	0.0466	<0.0001
pH slope	5.2063	<0.0001
pH^2 slope	-0.2627	<0.0001
Adjusted R^2	**0.980**	
Predicted R^2	**0.980**	

DOC – dissolved organic carbon
MLR – multiple linear regression

Based on the strong performance of and rationale for an MLR using the Model 5 structure, the final acute and chronic MLRs were generated using that structure (Tables B7 and B8).[13] These MLRs are proposed as the acute and chronic copper SSWQC. Table B9 provides a summary of the models described in this section.

[13] Because of the similarities between the acute and chronic BLMs (i.e., underlying toxicity datasets and chemical mechanisms), the MLR for predicting chronic BLM WQC was developed using the same methods as the acute MLR but using chronic BLM WQC instead of acute WQC as the dependent variable in the MLR.

Table B7. Final acute MLR

Model Parameter	Model Coefficient	Standard Error	Coefficient Significance (p-value)
Intercept	-22.914288	0.893512	<0.001
DOC slope	1.017377	0.008459	<0.001
Hardness slope	0.044941	0.009199	<0.001
pH slope	5.176081	0.236519	<0.001
pH^2 slope	-0.260743	0.015776	<0.001
Adjusted R^2	**0.980**		
Predicted R^2	**0.980**		

Note: Model structure based on Model 5 (Equation 1 in the main text).

DOC – dissolved organic carbon

MLR – multiple linear regression

Table B8. Final chronic MLR

Model Parameter	Model Coefficient	Standard Error	Coefficient Significance (p-value)
Intercept	-23.390522	0.893512	<0.001
DOC slope	1.017377	0.008459	<0.001
Hardness slope	0.044941	0.009199	<0.001
pH slope	5.176081	0.236519	<0.001
pH^2 slope	-0.260743	0.015776	<0.001
Adjusted R^2	**0.980**		
Predicted R^2	**0.980**		

Note: model structure based on Model 5 (Equation 2 in the main text).

DOC – dissolved organic carbon

MLR – multiple linear regression

Table B9. Summary statistics of MLR models fit to acute BLM WQC

Model Description	Development Method[a]	Adjusted R^2	Predicted R^2	AIC	BIC	Shapiro-Wilk Test p-value[b]	Scores Test p-value[c]
Model 1: Simplest model; includes pH, DOC, and hardness only (no distinction in hydrology)	full	0.969	0.968	-614	-593	<0.001	0.249
Model 2: Hydrology slopes and intercepts	full	0.973	0.971	-677	-621	<0.001	0.751
	AIC	0.973	0.971	-681	-643	<0.001	0.704
	BIC	0.973	0.971	-681	-643	<0.001	0.704
Model 3: Hydrology slopes and intercepts; pH^2 added	full	0.984	0.981	-928	-860	<0.001	0.0476
	AIC	0.984	0.981	-928	-860	<0.001	0.0476
	BIC	0.983	0.981	-918	-876	<0.001	0.00332
Model 4: Hydrology intercepts only (slopes excluded); pH^2 term always included	full	0.982	0.982	-899	-865	<0.001	0.0204
	AIC	0.982	0.982	-899	-865	<0.001	0.0204
	BIC	0.982	0.982	-899	-865	<0.001	0.0204
Model 5: No distinction in hydrology; pH^2 term always included; final models (proposed MLRs for copper SSWQC)	full (acute)	0.980	0.979	-833	-808	<0.001	0.083
	full (chronic)	0.980	0.979	-833	-808	<0.001	0.083

[a] Model descriptions are identified according to the key differences in model structure (left column) and the approach used to generate the model (right column). Key differences relate to the inclusion of hydrological classes as model parameters and the inclusion/exclusion of certain data. The approaches to generate the models include approaches for “full” models (i.e., all pre-determined variables included as indicated in the left column and including DOC, pH, and hardness) and AIC or BIC stepwise regression approaches, which involve sequentially adding and removing model parameters and checking improvements in model fit.

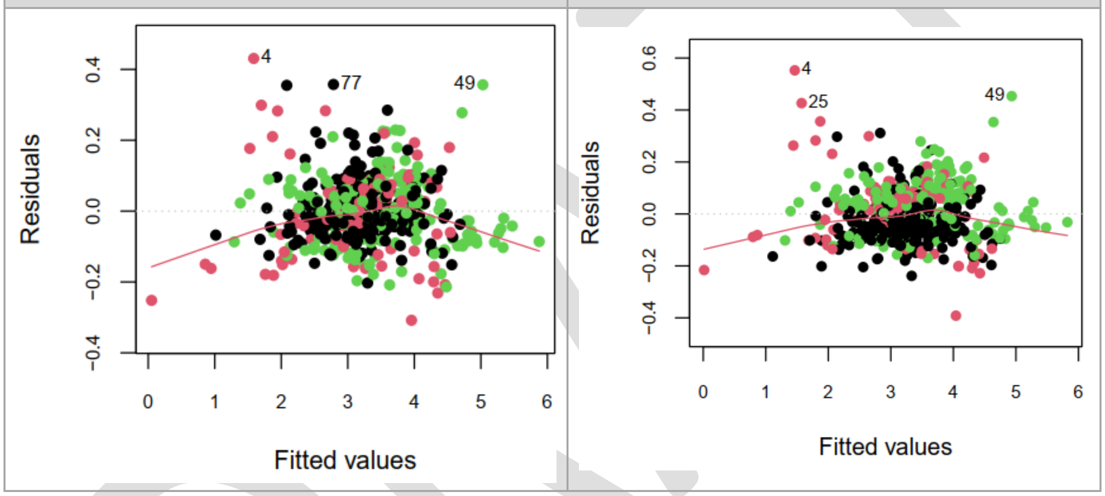
[b] Shapiro-Wilk test for normality of residuals; $p < 0.05$ indicates non-normality

[c] Score test for homogeneity of residuals; $p < 0.05$ indicates heteroscedasticity

AIC - Akaike’s Information Criterion
BIC – Bayesian Information Criterion
BLM – biotic ligand model
DOC – dissolved organic carbon
MLR – multiple linear regression
SSWQC – site-specific water quality criteria
WQC – water quality criteria

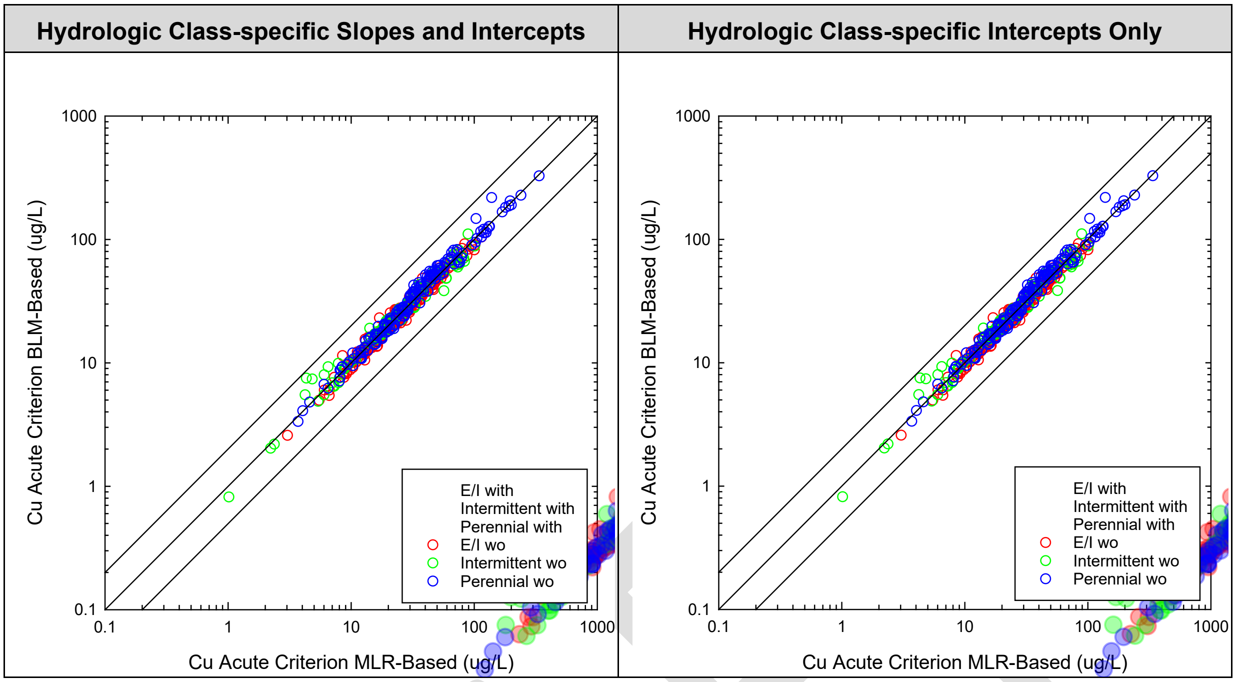
Although the stepwise AIC and BIC models retained hydrology-specific intercepts and slopes when using Model 2 and 3 structures (Tables B3 and B4), hydrologic specificity did not eliminate residual patterns (Figure B1). Also, plots of calculated versus predicted BLM WQC values (Figure B2) show very small or negligible changes resulting from the inclusion or exclusion of hydrology-specific slopes. Moreover, the decrease in R^2 statistics (i.e., percent of variance in BLM WQC explained by the MLR) after removing hydrology-specific intercepts and/or slopes is small (< 1%) compared to the total variance explained (R^2 values, Tables B2 to B5). Together, these observations indicate that the hydrologic classification of a water body is not an important factor in site-specific MLRs relative to the continuous variables that underpin the BLM mechanisms.

With Hydrologic-Specific Slopes and Intercepts (Model 3)	Without Hydrologic-Specific Parameters (Model 5)



Note: Point colors indicate hydrologic classification: black = ephemeral/intermittent, red = intermittent, and green = perennial. Red line is a curve fit to residuals indicating trend. Ideally, the curve would align with the dotted line.

Figure B1. Comparison of residual patterns for models with and without hydrologic classification-specific parameters



Note: Closed circles indicate the values predicted by the MLR with hydrologic-specific classification; open circles are predictions after removing hydrologic classification parameters from the MLR; dashed line is the 1:1 relationship between BLM and MLR output, and solid lines are plus or minus a factor of 2 from the 1:1 line.

Figure B2. Comparison of acute BLM-based WQC to MLR-based WQC with and without hydrologic-specific MLR terms

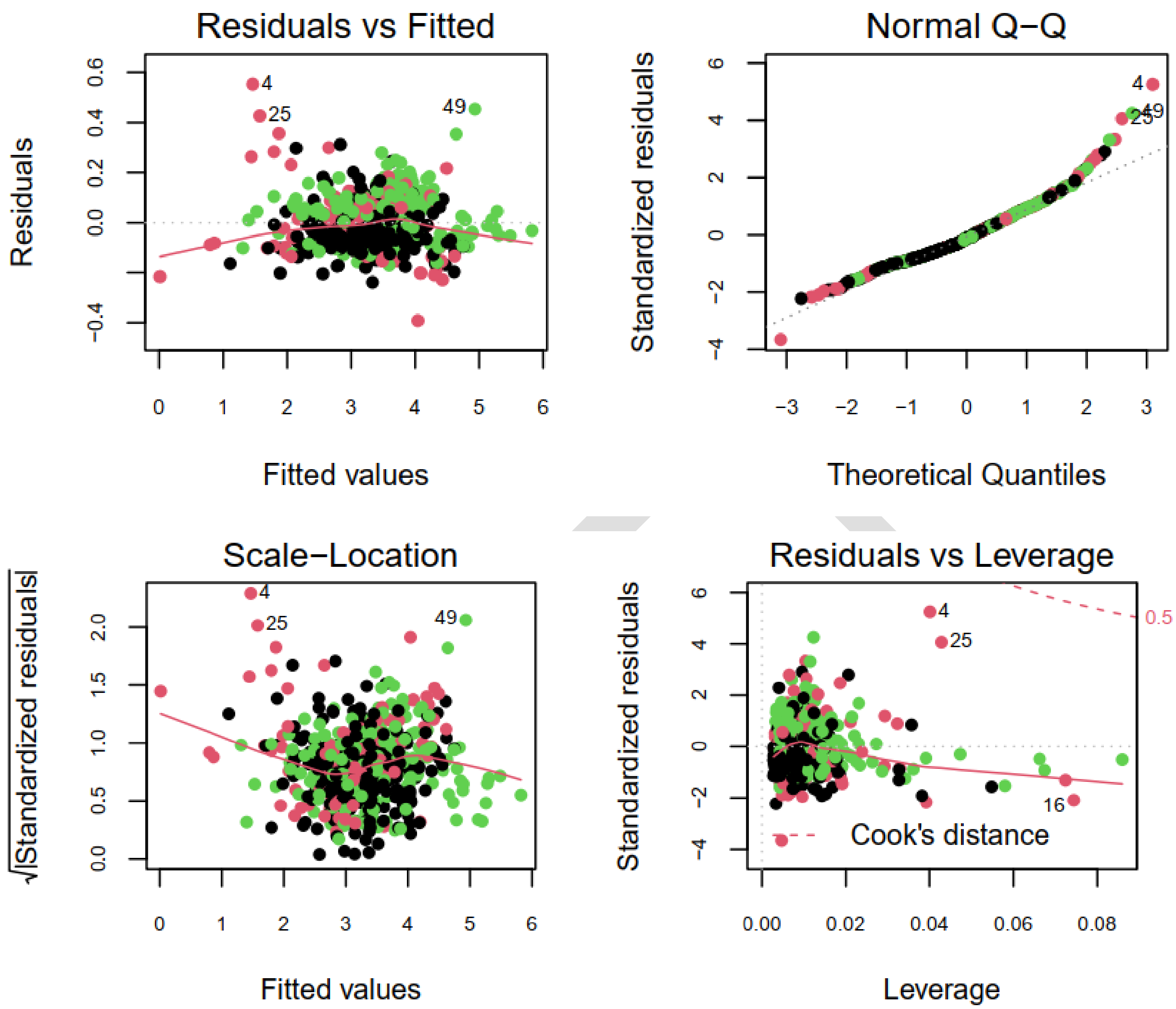
From a practical standpoint, the parsimonious Model 5 does not change the predictions of WQC exceedances when compared to the more complex models (Figure B2) and does not display any biases related to hydrology or watershed.

B5 Model Validation

Even for robust models with strong fits, like those presented in Section B4, there is inherent uncertainty associated with any MLR. This section provides a discussion of investigations into model uncertainties associated with the proposed acute and chronic copper SSWQC (Tables B7 and B8).

B5.1 INITIAL MODEL DIAGNOSTICS

Once the final MLRs were developed and proposed (Tables B7 and B8), several visual and statistical diagnostic procedures were carried out to evaluate those final models. Figure B3 provides diagnostic plots generated to evaluate the final acute MLR. The relationships shown in Figure B3 are comparable to those observed for the final chronic MLR.



Note: Figures are described in the text. Although hydrologic classifications were not included in the final MLR, the various classes are shown as colors in Figure B3: ephemeral/intermittent = black, intermittent = red, and ephemeral = green. Fitted and residual values are on a natural-log scale. The numbered points on plots correspond to potential outliers; the numbers correspond to the samples' indices within R (arbitrary ordering).

Figure B3. Model diagnostic plots for the proposed acute copper SSWQC

Figure B3 presents four diagnostic plots. The upper- and lower-left panes show MLR residuals versus the "fitted values," the natural-log of acute BLM WQC. The lines through the points indicate that there are minor trends in residuals toward the extremes of the data; however, the vast majority of data points are evenly spread around a residual of zero.

The top-right pane of Figure B3 shows a normal Q-Q plot, which is a way to visualize normality of residuals and to identify multiple populations within a distribution. A perfectly normal distribution would align with the dashed line. In general, the data align well with the dashed line, deviating from normality primarily at the upper end. This suggests that the residuals are approximately normal, but that there is some skewedness toward the extremes of the residuals (also visible as high residuals in the top-left pane). In this application, however, the deviation of residuals from normality is a minor uncertainty because the assumption of normal residuals is considered to be relatively unimportant when estimating values (e.g., BLM WQC) with linear models (Gelman and Hill 2006). The assumption of normality is important, however, when considering confidence intervals (not calculated herein) or conducting statistical tests (e.g., p-values for coefficients), neither of which were relied upon heavily to develop MLRs. Therefore, the proposed SSWQC can be used with a high degree of confidence despite minor uncertainties.

In the bottom-right pane of Figure B3, the influence of individual points is quantified using the leverage and standardized residual statistics. A Cook's distance level of 0.5 is overlaid on the figure as a dashed line, defining a general threshold for points with excessive leverage and residuals. Because no points occur beyond that threshold, no single point is considered to significantly influence the regression. This is perhaps unsurprising given how many data points are in the underlying dataset (n = 517), which makes the MLR robust despite extreme values. The points with highest leverage appear to be the perennial location samples identifiable in the top-left pane; the overall influence of the samples is low because their residual values are low.

The information provided by Figure B3 leads to the conclusion that the final acute MLR is reasonable but with some degree of model uncertainty related to groups of high residuals toward the extremes of the distribution (which are not likely "outliers" and so should be retained in the model). Considering of the strong relationship between the BLM WQC and MLR predictions (e.g., adjusted and predicted R^2 values of 0.980) and the reasonable appearance of residuals, the MLR models can be used with confidence to predict BLM WQC. This conclusion is further supported by evaluations presented in Sections 5.4.2 and 5.5 of the main text, which found MLR- and BLM-based WQC were highly comparable 1) for samples comprising the BLM dataset for the Pajarito Plateau (e.g., BLM-observed versus MLR-predicted WQC presented in Figure 5-5 of the main text); 2) across a wide range and combination of water quality conditions (e.g., Figure 5-6 of the main text); and 3) accordingly, for exceedance ratios calculated with either the BLM or MLR equation yield (e.g., Figure 5-7 of the main text).

B5.2 Sensitivity Analysis

In addition to evaluating the potential influence of hydrologic classification on the MLR, other possible factors were considered: fire-related effects caused by the Las Conchas Fire of 2011, land use effects related to urbanization, and hydrologic classification status revised using more recent hydrology protocol data.

B5.2.1 Fire effects

Additional evaluation of the potential effects of fire was conducted. This was accomplished by visualizing the BLM- and MLR-based WQC data and color-coding the data points according to whether a location was potentially impacted by the Las Conchas Fire of 2011. Figure B4 shows this for the BLM- and MLR-based WQC comparison, and Figure B5 shows the comparison of BLM- and MLR-based exceedance ratios. Functionally, the figures indicate whether there is systematic bias in the prediction of fire-affected samples compared with the prediction of samples that were not fire affected. Samples with no classification with respect to potential fire effects (n = 13) were excluded from these comparisons.

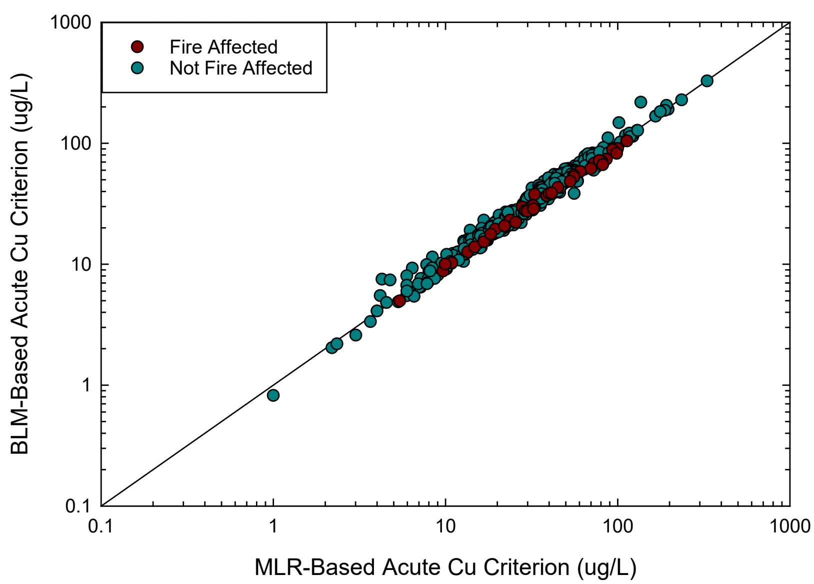


Figure B4. Comparison of BLM- and MLR-based WQC with respect to potential fire effects

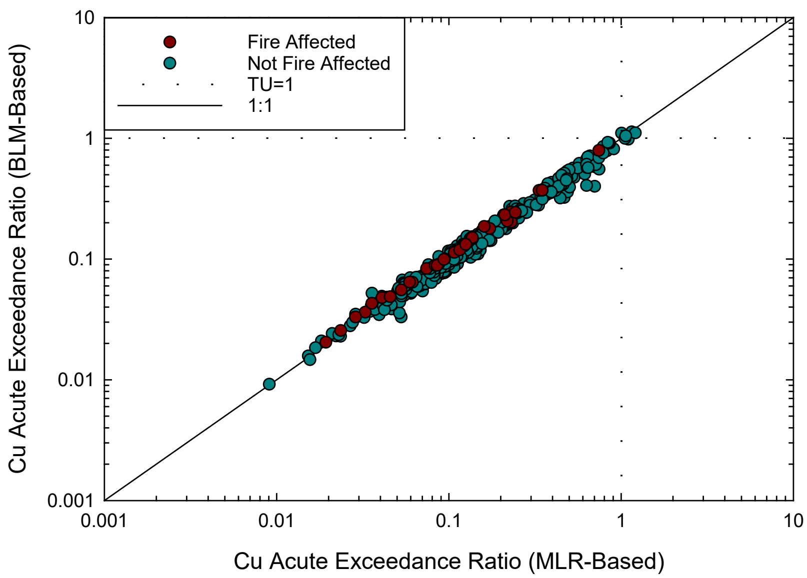


Figure B5. Comparison of BLM- and MLR-based exceedance ratios with respect to potential fire effects

Figures B4 and B5 illustrate several points:

- The relationship between the MLR- and BLM-based WQC and exceedance ratios is very strong; all points are close to the 1:1 line.
- The majority of samples were collected in watersheds (or at times) unimpacted by the Las Conchas Fire.
- WQC and exceedance ratios from fire-affected samples fall throughout the range of unaffected data, with only a few samples being relatively high; this applies to both the MLR- and BLM-based WQC and exceedance ratios.
- There does not appear to be a systematic bias in predictions, in that all points are spread evenly around the 1:1 line.

Based on these figures and evaluations of residual values described in Section B2.1, potentially fire-affected surface water samples do not have a substantial influence on MLR development, and the final MLR equation predicts potentially fire-affected samples and non-affected samples equally well.

B5.2.2 Land use effects

Similar to the evaluation of fire effects in Section B2.2, this section describes the evaluation of potential effects of land use. BLM- and MLR-based WQC data were color-coded according to whether a sample was collected from a location classified as "undeveloped" or "developed" (i.e., downstream of a LANL Resource Conservation and Recovery Act [RCRA] site). Figure B6 shows the color-coding results for the BLM-and MLR-based WQC comparison, and Figure B7 shows the comparison of BLM- and MLR-based exceedance ratios.

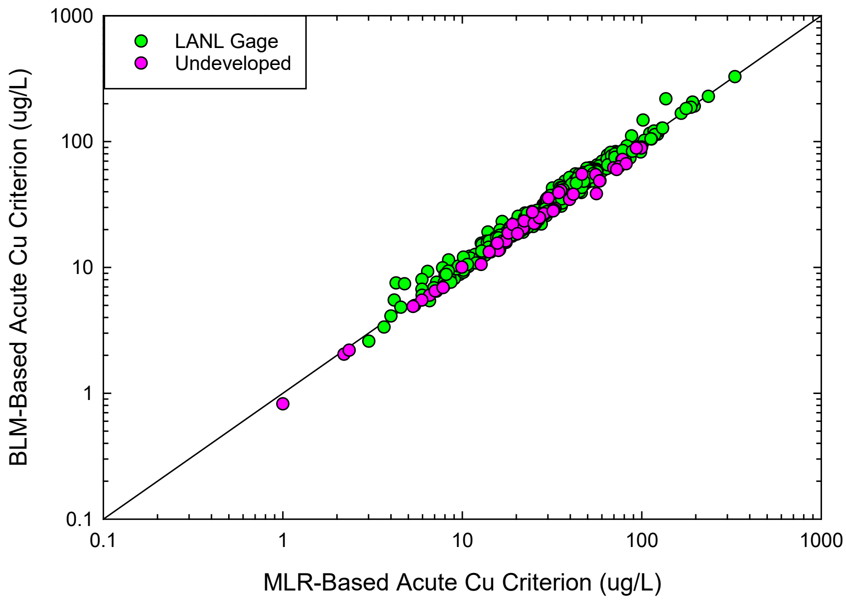


Figure B6. Comparison of BLM- and MLR-based WQC with respect to land use classifications

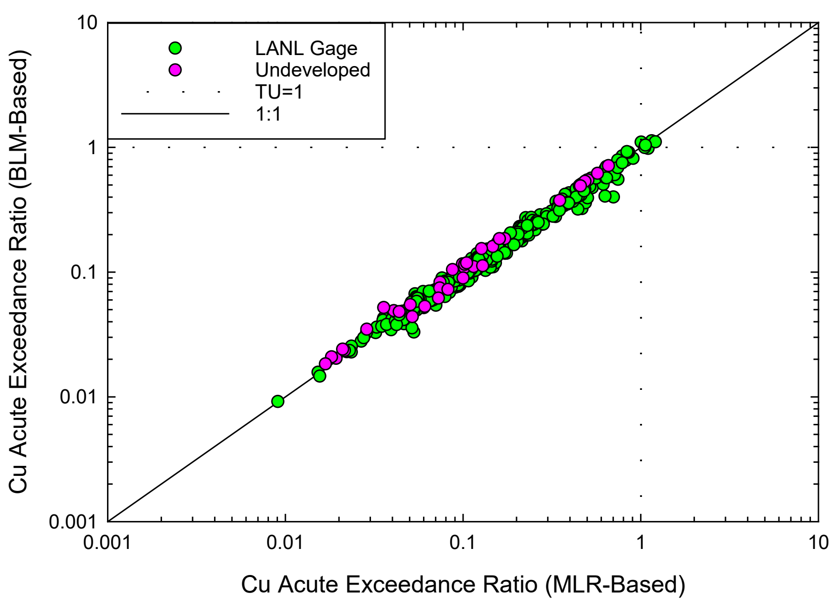


Figure B7. Comparison of BLM- and MLR-based exceedance ratios with respect to land use classification

Figures B6 and B7 illustrate several points:

- The relationship between the BLM- and MLR-based WQC and exceedance ratios is very strong; points are close to the 1:1 line.
- The majority of samples were collected downstream of LANL RCRA sites.
- BLM- and MLR-based WQC and exceedance ratios from samples collected in undeveloped locations fall throughout the ranges observed for developed locations in the BLM dataset for the Pajarito Plateau.
- There does not appear to be a systematic bias in predictions, in that all points are spread evenly around the 1:1 line.

Based on this figure and evaluations of residual values described in Section B2.1, undeveloped surface water samples do not have a substantial influence on MLR development, and the final MLR equation predicts both undeveloped and developed sample locations equally well.

B5.2.3 Alternate hydrological classifications

Section B4.2 provides a detailed evaluation of MLR models that consider current NMAC hydrologic classifications. Over the past several years, additional hydrology surveys of surface waters on the Pajarito Plateau have been conducted by NMED and the Laboratory; these surveys may lead to updated hydrology-based classifications (e.g., ephemeral, intermittent, perennial) and corresponding aquatic life use designations (e.g., limited aquatic life, marginal warm water, warm water). When developing MLRs, these potential ("alternate") classifications were considered along with current NMAC classifications; this section provides a brief overview of those findings.

As noted in Section B4.2, NMAC hydrologic classifications did not improve MLR performance, so the proposed copper SSWQC equations exclude hydrology-specific parameters (e.g., slopes and intercepts). This result was entirely consistent with the outcome of models developed using alternate hydrologic classifications based on more recent hydrological surveys and information. Table B10 shows a tabular breakdown of samples by major watershed and alternate classifications.[14] The number of samples presented in Table B10 (n = 509) is fewer than that in Table B1 (n = 517); this reflects the removal of eight samples without a clearly defined alternate hydrologic classification.

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[14] The potential alternate hydrology classifications were developed based on findings from recent surveys conducted by NMED and the Laboratory. The alternate classifications are preliminary but included as an additional scenario to evaluate the sensitivity of MLR equations to underlying hydrology-based classifications.

Table B10. Hydrological classifications assignments for the BLM dataset by major watershed

Major Watershed	Alternate Hydrological Classification			N by Watershed
	Ephemeral	Intermittent	Perennial	
Ancho	4	0	0	**4**
Chaquehui	3	0	0	**3**
Frijoles	0	0	8	**8**
Los Alamos/Pueblo	53	117	33	**203**
Mortandad	9	25	0	**34**
Pajarito	19	35	11	**65**
Sandia	2	6	149	**157**
Water/Cañon de Valle	4	0	31	**35**
N by Alternate Hydrological Classification	**94**	**183**	**232**	**509**

BLM – biotic ligand model

N – sample size

Table B11 provides a comparison of MLRs using alternate hydrological classifications to those used in the simpler MLR equation proposed for copper SSWQC equations (i.e., Model 5, excluding hydrology-specific terms). Including hydrology-specific terms increased the adjusted and predicted R^2 values by only by 0.003 (after considering pH, DOC, and hardness). This is the same negligible change observed when comparing models with and without NMAC classification-specific parameters (Table B8). Thus, the same conclusion was reached regarding hydrology classifications: They are not necessary in the development of MLR equations to predict BLM-based WQC accurately and precisely for surface waters on the Pajarito Plateau. This conclusion is illustrated further in Figure B8.

Table B11. Summary statistics of MLR models developed using alternate hydrologic classifications

Model Description[a]		Adjusted R^2	Predicted R^2	AIC	BIC	Shapiro-Wilk Test p-value[b]	Scores Test p-value[c]
Model 3: hydrology-specific slopes and intercepts, with pH^2 terms	full	0.983	0.982	-909	-841	<0.0001	0.215
	AIC	0.983	0.982	-909	-841	<0.0001	0.215
	BIC	0.983	0.983	-906	-855	<0.0001	0.418
Model 4: hydrology-specific intercepts only	full	0.981	0.981	-848	-814	<0.0001	0.0264
	AIC	0.981	0.981	-848	-814	<0.0001	0.0264
	BIC	0.981	0.981	-848	-814	<0.0001	0.0264
Model 5: no hydrology-specific parameters	full	0.980	0.980	-823	-797	<0.0001	0.0839

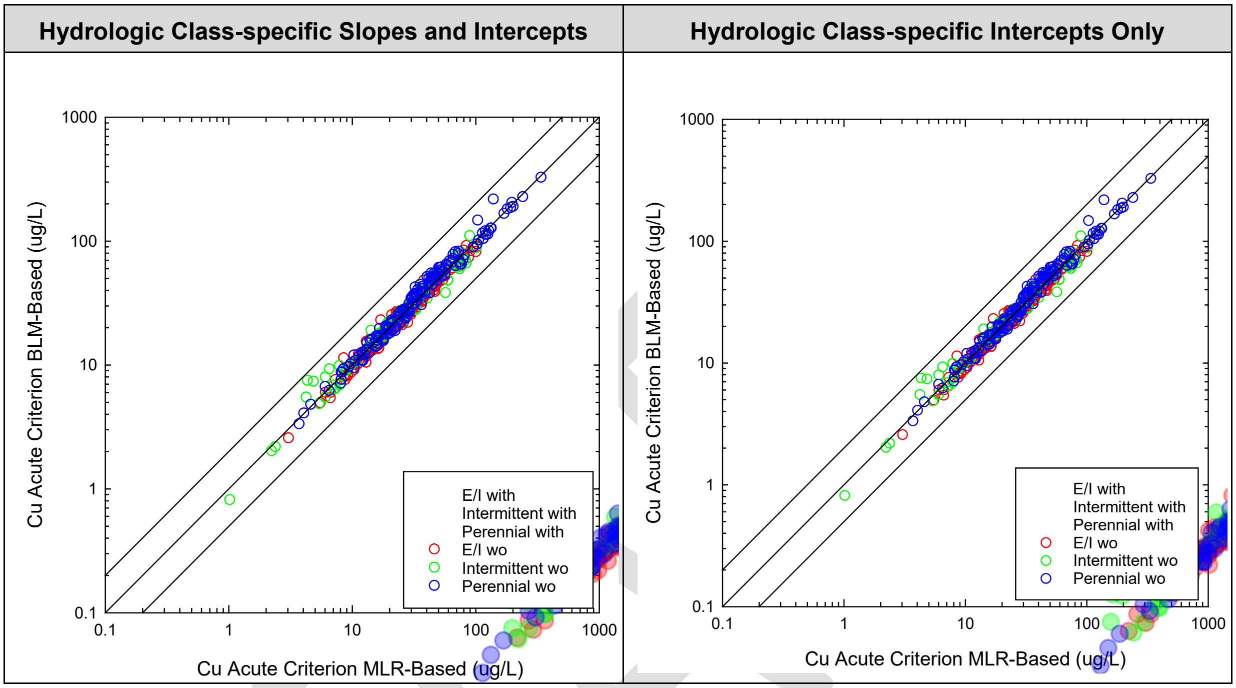
[a] Model descriptions are identified according to the key differences in model structure (left column) and the approach used to generate the model (right column). See Section B4.2 for more details.

[b] Shapiro-Wilk test for normality of residuals; $p < 0.05$ indicates non-normality.

[c] Score test for homogeneity of residuals; $p < 0.05$ indicates heteroscedasticity.

AIC – Akaike's Information Criterion BIC – Bayesian Information Criterion BLM – biotic ligand model MLR – multiple linear regression

Figure B8 shows a comparison of acute BLM- and MLR-based WQC with and without alternate hydrology terms included in the MLR equations. Consistent with the evaluation presented in Section B4.2, this figure shows very small or negligible changes resulting from the inclusion or exclusion of hydrology-specific terms.



Note: Closed circles indicate the values predicted by the MLR with hydrologic-specific classification; open circles are predictions after removing hydrologic classification parameters from the MLR; solid line is the 1:1 line..

Figure B8. Comparison of acute BLM-based WQC to MLR-based WQC with and without alternate hydrologic-specific MLR terms

B6 Conclusions and Recommended copper SSWQC

Over the past 40 years, the scientific understanding of metal toxicity and bioavailability to aquatic organisms and the corresponding environmental regulations have increased. EPA has revised nationally recommended copper WQC from a simple linear equation based on hardness to a mechanistic model (the copper BLM) that incorporates several additional parameters. The BLM provides an improved method for setting copper WQC because it more accurately accounts for the modifying effect of site-specific water chemistry than do hardness-based equations (EPA 2007). Accordingly, the BLM was used to develop copper SSWQC for surface waters of the Pajarito Plateau.

Streams on the Pajarito Plateau are thoroughly monitored under a variety of EPA and NMED programs, so it is a suitable setting for developing BLM-based WQC.

The BLM dataset for the Pajarito Plateau (Appendix A) was generated from long-term monitoring data (Section 3.4 of the main text) and spans a wide range of surface water conditions. The current evaluation demonstrates that pH, DOC, and hardness concentrations account for 98% of the variation in BLM-based WQC. Potential refinements based on land use, fire effects, or hydrology were evaluated but did not result in a more accurate MLR equation.

Given these findings, the copper BLM can be simplified into a three-parameter MLR equation without losing a significant amount of accuracy and retaining the scientific rigor afforded by the BLM. The high degree of agreement between the acute and chronic MLRs and the BLM indicates that the equations presented in Section B6.1 can be adopted as copper SSWQC to provide accurate criteria that are protective of aquatic life in surface waters of the Pajarito Plateau, consistent with EPA recommendations and New Mexico WQS (20.6.4.10 NMAC).

B6.1 PROPOSED COPPER SSWQC AND APPLICABILITY

MLR equations were developed for both acute and chronic copper SSWQC for application to surface waters of the Pajarito Plateau.

The proposed acute SSWQC is as follows:

$$\mathbf{SSWQC_{acute} = exp(-22.914 + 1.017*ln(DOC) + 0.045*ln(hardness) + 5.176*pH - 0.261*pH^2)}$$

The proposed chronic SSWQC is as follows:

$$\mathbf{SSWQC_{chronic} = exp(-23.391 + 1.017*ln(DOC) + 0.045*ln(hardness) + 5.176*pH - 0.261*pH^2)}$$

As described in Section 3.3 of the main text, the Pajarito Plateau comprises ephemeral, intermittent, and perennial surface waters. Through the MLR development process, it was determined that hydrologic classifications did not influence the ability of the proposed acute and chronic SSWQC to accurately generate BLM-based WQC. Therefore, the acute and chronic copper SSWQC equations can be applied to any water body on the Pajarito Plateau. Most water bodies within the Laboratory's vicinity are classified as ephemeral or intermittent (20.6.4.128 NMAC); they are therefore designated as providing a limited aquatic life use and subject to acute WQC only. Other water bodies in the area are classified as perennial (20.6.4.126 and 20.6.4.121 NMAC) and are designated as providing higher-level aquatic life uses; these water bodies are subject to both acute and chronic aquatic life WQC. Unclassified surface water segments (20.6.4.98 NMAC) are designated as providing a marginal warm water aquatic life use and are subject to both acute and chronic WQC.

B7 References

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APPENDIX C. COPPER SITE-SPECIFIC WATER QUALITY CRITERIA FOR THE PAJARITO PLATEAU: PUBLIC INVOLVEMENT PLAN

Prepared for:
N3B Los Alamos

Prepared by: Windward environmental LLC

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C1 Introduction

On behalf of Newport News Nuclear BWXT Los Alamos (N3B), Windward Environmental LLC (Windward) has prepared this Public Involvement Plan (hereinafter referred to as the Plan) to provide a process for public, tribal, and stakeholder engagement on the development of copper site-specific water quality criteria (SSWQC) for surface waters of the Pajarito Plateau in Los Alamos County, New Mexico. The Plan identifies the information, activities, and schedule needed to solicit participation from the various entities.

C1.1 Background

Copper SSWQC are being developed for the Pajarito Plateau in accordance with the US Environmental Protection Agency's (EPA's) nationally recommended copper water quality criteria (WQC) for the protection of aquatic life (EPA 2007). The approach utilizes EPA's copper biotic ligand model (BLM), which incorporates the effects of multiple water chemistry parameters on the bioavailability and toxicity of copper. EPA (2007) considers the copper BLM to represent the best available science for setting copper WQC. The physical and chemical characteristics (BLM parameters) of Pajarito Plateau surface waters have been rigorously monitored at a variety of locations, so the Pajarito Plateau is a suitable setting for BLM-based Cu SSWQC.

C1.2 Objectives

This Plan provides a general process and schedule for public, tribal, and stakeholder involvement in the development of Cu SSWQC for waters of the Pajarito Plateau. Specific objectives are as follows:

- Identify potential stakeholders, tribes, and the public which may be affected by the proposed Cu SSWQC (Section C2)
- Establish a process to present the proposed Cu SSWQC to stakeholders, tribes, and the general public and to receive and respond to input (Section C3)
- Develop a draft schedule with milestones for stakeholder, tribal, and public engagement (Section C4)

C2 Stakeholders, Tribes, and the Public

Key stakeholders, tribes, and the public are identified in this section. These groups are the target for involvement outreach, and it is expected that several groups will engage in the activities described in Section C3.

C2.1 Potential Stakeholders

Potential stakeholders are non-tribal public entities, agencies, and natural resource trustees that may be directly impacted by the proposed copper SSWQC. Their input will be solicited separately from public and tribal input.

Potential stakeholders include:

- New Mexico Department of Environment Surface Water Quality Bureau (NMED SWQB)
- US Environmental Protection Agency (EPA) Region 6
- US Bureau of Land Management
- US Forest Service
- National Park Service
- Los Alamos County
- Eastern Jemez Resource Council
- Northern New Mexico's Citizen's Advisory Board

This list is not necessarily comprehensive and might change in response to feedback from NMED SWQC and EPA Region 6.

C2.2 Tribes

Tribal outreach is intended to involve leadership/representatives of local pueblos and engagements will be separate from stakeholder and public engagements. All tribal members will be welcome to attend public engagements as well. Local pueblos identified for outreach include:

- San Ildefonso Pueblo
- Santa Clara Pueblo
- Cochiti Pueblo
- Jemez Pueblo

This list is not necessarily comprehensive and might change in response to feedback from NMED SWQC and EPA Region 6.

C2 General Public

The public includes any individuals on or around the Pajarito Plateau, including but not limited to those living in and near Los Alamos County, Cochiti Lake, San Ildefonso Pueblo, Santa Clara Pueblo, Cochiti Pueblo, and Jemez Pueblo. Public engagements will be open to all who wish to attend, and anyone from the public will have the ability to provide comments on the draft SSWQC demonstration report.

C3 Planned Activities

There are eleven activities associated with the public involvement process, eight to be conducted by Windward and N3B and three to be conducted by stakeholders, tribes, and the public. Activities to be conducted by Windward or N3B include:

1. Submit draft work plan for developing the copper SSWQC for review by NMED SWQB and EPA Region 6[1]
2. Prepare response to NMED and EPA comments on the work plan
3. Prepare and submit draft copper SSWQC demonstration report for initial review by NMED and EPA
4. Host the digital version of the draft copper SSWQC demonstration report and an abbreviated fact sheet summarizing the report, on the N3B Environmental Public Reading Room (EPRR, https://ext.em-la.doe.gov/EPRR), the N3B outreach website (https://n3b-la.com/outreach), and the IP Public Website (https://ext.em-la.doe.gov/ips)
5. Notify the public of the open comment period (30-day) in local newspapers, on the N3B Environmental Public Reading Room (EPRR, https://ext.em-la.doe.gov/EPRR), on the N3B outreach website (https://n3b-la.com/outreach), on the IP Public Website (https://ext.em-la.doe.gov/ips), and through direct communication with identified stakeholders (Section C2)
6. Hold a series of meetings in-person and/or by webinar for stakeholders, tribes, and the public
7. Review public comments submitted via email to N3BOutreach@em-la.doe.gov
8. Prepare formal response to public comments and append to the final copper SSWQC demonstration report
9. Submit demonstration report to the New Mexico Water Quality Control Commission as part of a formal petition to change New Mexico's Water Quality Standards

Activities to be conducted by stakeholders, tribes, and public are to review documents, attend the appropriate engagements, and submit comments via email to N3BOutreach@em-la.doe.gov.

[1] This was completed as of July 7, 2020. NMED SWQC and EPA Region 6 provided comments back to N3B on March 9, 2021.

C4 Schedule of Activities

Table C1 provides a tentative schedule of the activities listed in Section C3. The schedule shows the intended order of activities and their relative position over time. Specific dates are subject to change.

Table C1. Schedule of Activities

Activity	Acting Group(s)	Target Audience	Dates
Submit draft Work Plan	DOE EM-LA/N3B	NMED SWQB and EPA Region 6	July 7, 2020
Receive NMED/EPA Region 6 comments on Work Plan	NMED SWQB and EPA Region 6	DOE EM-LA/N3B	March 9, 2021
Respond to NMED/EPA comments on Work Plan	DOE EM-LA/N3B	NMED SWQB and EPA Region 6	June 11, 2021
Submit draft Demonstration Report to NMED/EPA	DOE EM-LA/N3B	NMED SWQB and EPA Region 6	August 20, 2021
Receive NMED/EPA Region 6 comments on Demonstration Report	NMED SWQB and EPA Region 6	DOE EM-LA/N3B	November 9, 2021
Respond to NMED/EPA comments and request for additional information on Demonstration Report	DOE EM-LA/N3B	NMED SWQB and EPA Region 6	April 15, 2022
Receive NMED/EPA Region 6 final comments on Demonstration Report	NMED SWQB and EPA Region 6	DOE EM-LA/N3B	June 15, 2022
Respond to NMED/EPA final comments and on Demonstration Report	DOE EM-LA/N3B	NMED SWQB and EPA Region 6	August 1, 2022
Submit draft Demonstration Report for 30-day public review and notify stakeholders, tribes, and public about comment period	DOE EM-LA/N3B	stakeholders, tribes, and public	August 1, 2022
Meeting with stakeholders, tribes, and public	DOE EM-LA/N3B	stakeholders, tribes, and public	Throughout 2021-2022
Develop response to public comments	DOE EM-LA/N3B	stakeholders, tribes, public, and WQCC	September 2022
Finalize Demonstration Report	DOE EM-LA/N3B	stakeholders, tribes, public, and WQCC	October 2022
File formal petition with final Demonstration Report and response to comments	DOE EM-LA/N3B	WQCC	October 2022

N3B – Newport News Nuclear BWXT Los Alamos
SSWQC – site-specific water quality criteria
ID – identification
NMED SWQB – New Mexico Environment Department Surface Water Quality Bureau
EPA – Environmental Protection Agency
WQCC – Water Quality Control Commission

C5 References

EPA. 2007. Aquatic life ambient freshwater quality criteria - copper, 2007 revision. EPA-822-R-07-001. Office of Water, US Environmental Protection Agency Washington, DC.

APPENDIX D. THREATENED AND ENDANGERED SPECIES CONSIDERATIONS

D1 Overview

This appendix identifies threatened and endangered (T&E) species that may occur on or in the vicinity of the Pajarito Plateau (Map D-1). It also discusses the protectiveness of the proposed copper site-specific water quality criteria (SSWQC) to these species.

In accordance with Section 7 of the federal Endangered Species Act (ESA), the Environmental Protection Agency (EPA) consults with the US Fish and Wildlife Service (USFWS) to ensure that any action[1] authorized by the EPA is not likely to jeopardize the continued existence of T&E species or result in the destruction or adverse modification of T&E species or their critical habitats. In the context of this SSWQC proposal, such action would include adoption of EPA's national recommended ambient water quality criteria (AWQC) for copper (EPA 2007) as this is the basis of the proposed copper SSWQC. Importantly, the proposed SSWQC is not associated with any new actions or discharges that would result in increased copper loading to surface waters of the Pajarito Plateau.

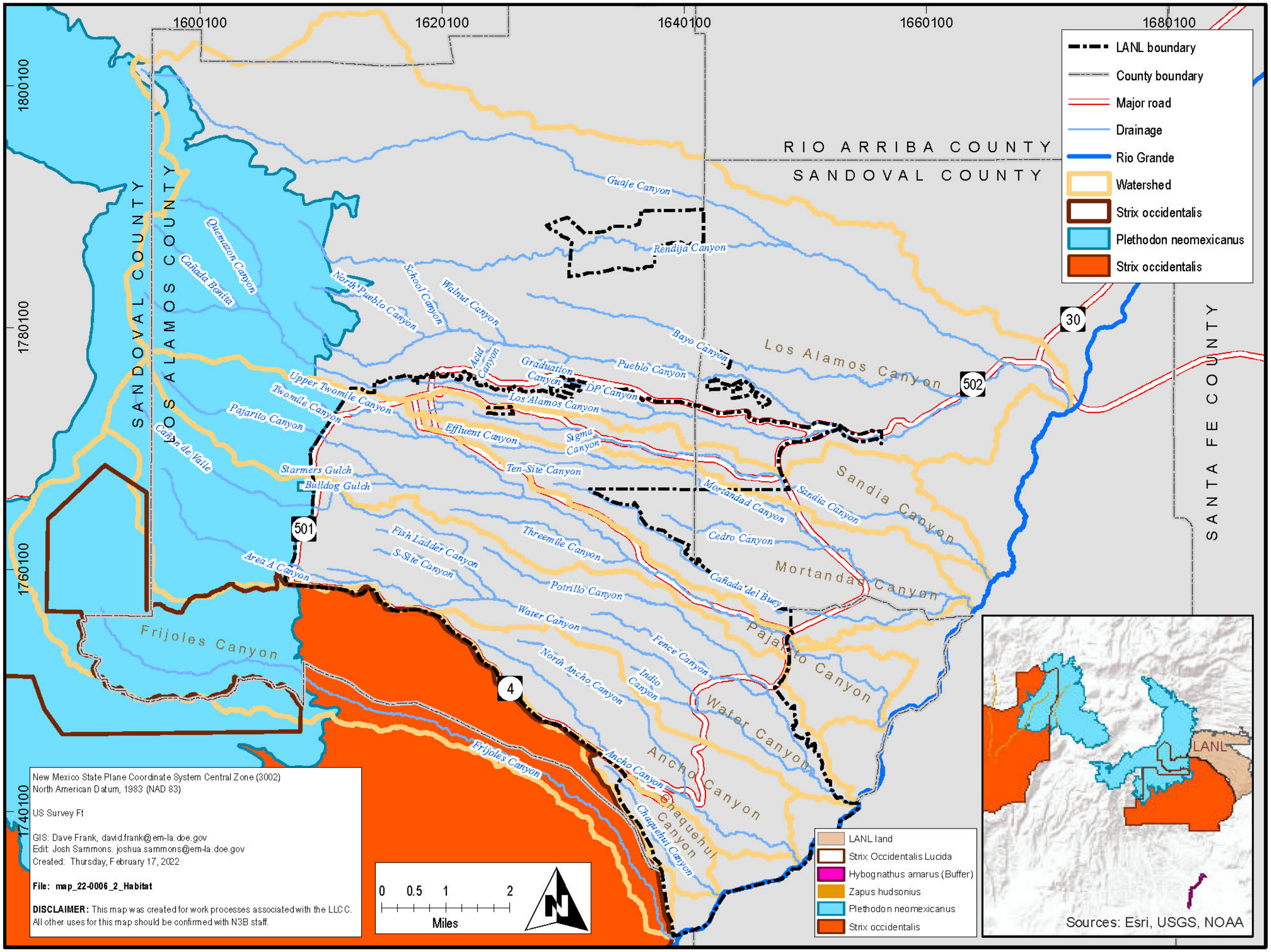
EPA's national recommended AWQC for the protection of aquatic life are derived from empirical toxicity data and are designed to be stringent enough to protect sensitive aquatic species potentially exposed to a contaminant in any water body in the United States. Below these thresholds, significant adverse effects on aquatic communities are not anticipated. In accordance with EPA guidelines (EPA 1985), AWQC are only developed if an eight-family rule is met, which requires toxicity results with at least one species in at least eight different families. The acute toxicity dataset used to derive EPA's national recommended AWQC for copper comprises empirical toxicity data for 39 species across 27 genera and 20 families.[2] As such, the database used to develop the copper AWQC represents a diverse group of aquatic species and, as discussed in this appendix, is expected to provide sufficient protection to both aquatic and terrestrial T&E species.

Sections D2 and D3 identify aquatic T&E species that may reside in surface waters downstream of the Pajarito Plateau and discuss how the SSWQC is protective of these species.

Sections D4 through D8 identify terrestrial T&E species that may reside in the vicinity of the Pajarito Plateau and discuss how the SSWQC is protective of these species.

[1] Under the ESA, an "action" includes all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States. This includes promulgation of regulations, including oversight of State and tribal water quality criteria.

[2] As discussed in the main text, chronic AWQC are based on an acute-to-chronic ratio rather than a distinct chronic toxicity dataset; therefore, the chronic dataset also is composed of 39 species, 27 genera, and 20 families.



Map D-1. Threatened and endangered species habitat on the Pajarito Plateau

D2 Rio Grande Cutthroat Trout (*Oncorhynchus clarkii virginalis*)

The Rio Grande cutthroat trout is a subspecies of cutthroat trout (genus *Oncorhynchus*), the range of which spans the Rio Grande, the Pecos River, and the Canadian River drainages of southern Colorado and northern New Mexico (Pritchard and Cowley 2006). Populations are spatially restricted and fragmented, primarily confined to headwater streams and small high-elevation lakes. Cutthroat trout are opportunistic foragers that feed on aquatic and terrestrial invertebrates such as midge (Chironomidae) larvae, mayflies (Ephemeroptera), ostracods, caddisflies (Tricoptera), and other flies (Diptera) (RGCT Conservation Team 2013; Pritchard and Cowley 2006).

The SSWQC is intended to be protective of aquatic life species, including Rio Grande cutthroat trout and their prey. For example, the copper biotic ligand model (BLM) database includes acute and/or chronic toxicity test results for cutthroat trout (*O. clarkii*), Lahontan cutthroat trout (*O. clarkii henshawi*), and several other taxonomically similar salmonids (e.g., *Oncorhynchus* spp. and *Salmo* spp.).

Of the species included in the copper BLM database, salmonids are not the most sensitive. Therefore, the BLM (and, by extension, the SSWQC) is protective of salmonids as well as sensitive invertebrates, including potential prey items. In addition, the USFWS and the National Marine Fisheries Service (NMFS) previously concluded the copper BLM provides an improved level of protection to these salmonids relative to hardness-based WQC (NMFS 2014; USFWS 2015). Therefore, implementing the SSWQC is not expected to adversely affect Rio Grande cutthroat trout.

Copper concentrations in the Rio Grande were compared to copper WQC (Table D-1). It was shown that in 110 samples collected at 5 separate sampling locations along the mainstem of the Rio Grande near the Pajarito Plateau (i.e., Taos Junction Bridge, Otowi Bridge, Cochiti Dam, San Felipe, and Alameda Bridge) between 2005 and 2021, there were no exceedances of acute or chronic copper BLM-based criteria, proposed copper SSWQC, or New Mexico's current hardness-based criteria. These results show that moving from the hardness-based WQC to the proposed SSWQC would not adversely affect aquatic species in the Rio Grande downstream of the Pajarito Plateau.

Table D-1. Rio Grande copper concentrations and water quality criteria

Location ID	Date	X	Y	Temp. (C)	Copper (ug/L)	pH	DOC (mg/L)	Hardness (mg/L CaCO3)	Ca	Mg	Na	K	Sulfate	Cl	Alkalinity (mg/L CaCO3)	BLM (ug/L)		MLR SSWQC (ug/L)		New Mexico Hardness-based Criteria (ug/L)		BLM		MLR SSWQC		New Mexico Hardness-based Criteria	
									(mg/L)							Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute TU	Chronic TU	Acute TU	Chronic TU	Acute TU	Chronic TU
Rio Grande below Taos Junction Bridge near Taos, NM	12/5/05	1054516	361912.12	1.5	1	8.5	1.02	87.7	26.8	5.06	14.5	2.63	24	4.57	171	9	6	12	7.1	12	8.3	0.11	0.18	0.08	0.14	0.08	0.12
Rio Grande below Taos Junction Bridge near Taos, NM	4/18/06	1054516	361912.12	13	1.9	8.8	1	93.1	27.4	6	19.1	2.91	33.2	5.89	194	14	8	14	8.5	13	8.8	0.14	0.23	0.14	0.22	0.15	0.22
Rio Grande below Taos Junction Bridge near Taos, NM	8/7/06	1054516	361912.12	22	0.92	8.6	1.92	85.8	25.2	5.57	20.2	3.29	28.8	5.71	195	27	17	24	15	12	8.2	0.03	0.05	0.04	0.06	0.08	0.11
Rio Grande below Taos Junction Bridge near Taos, NM	11/27/06	1054516	361912.12	4	0.78	8.5	1.4	72.3	21.9	4.3	13	2.51	19.4	3.76	151	12	8	16	9.7	10	7.1	0.06	0.10	0.05	0.08	0.08	0.11
Rio Rio Grande below Taos Junction Bridge near Taos, NM	4/30/07	1054516	361912.12	15	3.4	8.5	8.6	119	35.2	7.49	27.4	3.79	74.4	7.84	207	100	62	103	63	16	11	0.03	0.05	0.03	0.05	0.21	0.31
RIO Grande below Taos Junction Bridge near Taos, NM	8/13/07	1054516	361912.12	21	2.6	8.2	4.15	59.7	17.6	3.84	11.3	2.45	19	3.12	139	37	23	37	23	8.6	6	0.07	0.11	0.07	0.11	0.30	0.43
Rio Grande below Taos Junction Bridge near Taos, NM	11/5/08	1054516	361912.12	9	2.6	8.4	1.22	100	29.1	6.66	19	2.95	33.1	6.38	218	12	7	13	7.9	14	9.3	0.22	0.36	0.20	0.33	0.19	0.28
Rio Grande below Taos Junction Bridge near Taos, NM	6/4/09	1054516	361912.12	15	1.2	8.1	5.99	142	42.9	8.7	29.9	4.65	94.2	7.37	205	50	31	51	31	20	13	0.02	0.04	0.02	0.04	0.06	0.09
Rio Grande below Taos Junction Bridge near Taos, NM	8/11/09	1054516	361912.12	19.5	0.8	8.7	2.05	104	30.8	6.68	21.9	2.95	41.5	6.67	210	31	19	27	17	15	9.7	0.03	0.04	0.03	0.05	0.05	0.08
Rio Grande below Taos Junction Bridge near Taos, NM	11/16/09	1054516	361912.12	7.2	1	8.6	1.38	103	30.1	6.66	17.9	2.93	35.1	5.81	211	14	9	17	10	14	9.5	0.07	0.11	0.06	0.10	0.07	0.11
Rio Grande below Taos Junction Bridge near Taos, NM	5/4/10	1054516	361912.12	12	1.3	8.3	4.49	91.4	28	5.25	14.3	2.81	36.3	4.29	158	39	24	45	27	13	8.6	0.03	0.05	0.03	0.05	0.10	0.15
Rio Grande below Taos Junction Bridge near Taos, NM	8/9/10	1054516	361912.12	20.8	1.1	8.7	1.63	108	31.9	7.02	20.2	3.06	39.6	6.45	210	25	16	22	13	15	10	0.04	0.07	0.05	0.08	0.07	0.11
Rio Grande at Otowi Bridge, NM	12/13/05	1060832.8	355228.2	2	1.5	8.4	1.58	123	38.7	6.39	18.4	2.72	33.6	6.1	224	14	9	17	10	17	11	0.11	0.18	0.09	0.15	0.09	0.14

																BLM (ug/L)		MLR SSWQC (ug/L)		New Mexico Hardness-based Criteria (ug/L)		BLM		MLR SSWQC		New Mexico Hardness-based Criteria	
Location ID	Date	X	Y	Temp. (C)	Copper (ug/L)	pH	DOC (mg/L)	Hardness (mg/L CaCO3)	Ca (mg/L)	Mg	Na	K	Sulfate	Cl	Alkalinity (mg/L CaCO3)	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute TU	Chronic TU	Acute TU	Chronic TU	Acute TU	Chronic TU
Rio Grande at Otowi Bridge, NM	4/19/06	1060832.8	355228.2	12	1.6	8.4	1.75	109	34	5.81	16.1	2.39	36.7	5.11	195	17	11	19	12	15	10	0.09	0.15	0.08	0.13	0.11	0.16
Rio Grande at Otowi Bridge, NM	8/8/06	1060832.8	355228.2	24.5	1.3	8.2	2.07	115	36.9	5.49	19	3.75	34.9	6.45	244	22	14	19	12	16	10	0.06	0.10	0.07	0.11	0.08	0.13
Rio Grande at Otowi Bridge, NM	11/28/06	1060832.8	355228.2	5.5	0.78	8.4	0.73	93.2	28.7	5.25	14.8	2.38	31.5	4.61	186	7	4	7.6	4.7	13	8.8	0.12	0.19	0.10	0.17	0.06	0.09
Rio Grande at Otowi Bridge, NM	5/1/07	1060832.8	355228.2	16	1.8	8.4	6.7	107	32.9	6	19.4	2.76	51.4	6.31	198	70	44	73	45	15	9.9	0.03	0.04	0.02	0.04	0.12	0.18
Rio Grande at Otowi Bridge, NM	8/14/07	1060832.8	355228.2	23	1.5	8.2	3.74	94.7	29.5	5.13	14.2	2.18	33.4	3.79	188	36	23	34	21	13	8.9	0.04	0.07	0.04	0.07	0.12	0.17
Rio Grande at Otowi Bridge, NM	11/20/07	1060832.8	355228.2	7.5	0.8	8.5	1.07	99.1	30.2	5.78	18.3	2.79	29.8	5.85	213	11	7	12	7.5	14	9.3	0.08	0.12	0.07	0.11	0.06	0.09
Rio Grande at Otowi Bridge, NM	11/7/08	1060832.8	355228.2	4	0.64	8.3	2.32	130	39.7	7.56	21.9	2.84	39.9	8.01	273	20	12	23	14	18	12	0.03	0.05	0.03	0.05	0.04	0.05
Rio Grande at Otowi Bridge, NM	5/6/09	1060832.8	355228.2	11	1.8	8.1	6.78	82.9	26.2	4.25	9.91	1.98	30.5	2.7	141	48	30	57	35	12	7.9	0.04	0.06	0.03	0.05	0.15	0.23
Rio Grande at Otowi Bridge, NM	8/13/09	1060832.8	355228.2	19.5	0.86	8.1	4.18	115	37.2	5.44	13.2	2.11	47.1	3.19	191	35	22	35	22	16	11	0.02	0.04	0.02	0.04	0.05	0.08
Rio Grande at Otowi Bridge, NM	11/17/09	1060832.8	355228.2	6.5	0.56	8.5	2.06	127	39.5	6.88	20.5	2.68	39.5	6.88	244	20	13	24	15	18	11	0.03	0.04	0.02	0.04	0.03	0.05
Rio Grande at Otowi Bridge, NM	5/6/10	1060832.8	355228.2	11	1	8.2	4.28	99.3	31.3	5.15	12.3	2.06	37.6	3.45	164	34	21	39	24	14	9.3	0.03	0.05	0.03	0.04	0.07	0.11
Rio Grande at Otowi Bridge, NM	8/11/10	1060832.8	355228.2	20.3	0.9	8.2	3.28	118	37.4	5.98	12.7	2.07	39	3.97	204	31	19	30	19	16	11	0.03	0.05	0.03	0.05	0.06	0.08
Rio Grande below Cochiti Dam, NM	11/19/09	1061926.2	353704.8	9.7	0.5	8.2	2.44	122	38.5	6.29	18	2.65	39.3	5.92	236	20	12	22	14	17	11	0.03	0.04	0.02	0.04	0.03	0.05
Rio Grande below Cochiti Dam, NM	5/10/10	1061926.2	353704.8	12.7	1.2	8.2	4.52	92.4	29.4	4.62	11.8	2.1	33.8	3.49	162	36	22	41	25	13	8.7	0.03	0.05	0.03	0.05	0.09	0.14
Rio Grande below Cochiti Dam, NM	8/16/10	1061926.2	353704.8	22.7	0.79	7.8	3.56	121	39	5.64	14.4	2.62	37.9	4.33	213	23	14	22	14	17	11	0.04	0.06	0.04	0.06	0.05	0.07
Rio Grande below Cochiti Dam, NM	12/2/10	1061926.2	353704.8	6.2	0.56	8.2	2.05	122	38.2	6.44	18.4	2.66	38	5.74	242	16	10	19	11	17	11	0.03	0.06	0.03	0.05	0.03	0.05
Rio Grande below Cochiti Dam, NM	6/2/11	1061926.2	353704.8	16.4	0.73	8.2	3.52	119	37	6.49	16	2.48	44.3	4.64	204	31	19	32	20	16	11	0.02	0.04	0.02	0.04	0.05	0.07

																BLM (ug/L)		MLR SSWQC (ug/L)		New Mexico Hardness-based Criteria (ug/L)		BLM		MLR SSWQC		New Mexico Hardness-based Criteria	
Location ID	Date	X	Y	Temp. (C)	Copper (ug/L)	pH	DOC (mg/L)	Hardness (mg/L CaCO3)	Ca (mg/L)	Mg	Na	K	Sulfate	Cl	Alkalinity (mg/L CaCO3)	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute TU	Chronic TU	Acute TU	Chronic TU	Acute TU	Chronic TU
Rio Grande below Cochiti Dam, NM	8/12/11	1061926.2	353704.8	23.1	0.56	7.9	3.8	99.9	31	5.49	13.1	2.97	34.2	3.44	181	26	16	26	16	14	9.3	0.02	0.03	0.02	0.04	0.04	0.06
Rio Grande below Cochiti Dam, NM	12/7/11	1061926.2	353704.8	5.6	0.8	8	2.2	105	32.5	5.71	15.3	2.51	31.6	5.14	204	14	9	16	10	15	9.7	0.06	0.09	0.05	0.08	0.05	0.08
Rio Grande below Cochiti Dam, NM	4/25/12	1061926.2	353704.8	13.1	1.5	8	3.39	90.2	27.9	5.01	12.3	2.1	29.1	4.25	178	23	14	25	16	13	8.5	0.07	0.11	0.06	0.09	0.12	0.18
Rio Grande below Cochiti Dam, NM	8/22/12	1061926.2	353704.8	22.4	0.9	8.2	4.07	120	38.1	5.93	14.8	3.06	41.4	3.55	200	40	25	37	23	17	11	0.02	0.04	0.02	0.04	0.05	0.08
Rio Grande below Cochiti Dam, NM	12/18/12	1061926.2	353704.8	4.7	0.8	8.2	2.56	130	40.9	6.98	18.1	2.78	46.5	5.21	226	20	12	23	14	18	12	0.04	0.06	0.03	0.06	0.04	0.07
Rio Grande below Cochiti Dam, NM	5/9/13	1061926.2	353704.8	13.6	0.8	7.9	2.47	125	38.5	7	19.1	2.59	52.1	5.07	224	16	10	17	10	17	11	0.05	0.08	0.05	0.08	0.05	0.07
Rio Grande below Cochiti Dam, NM	8/1/13	1061926.2	353704.8	22.4	0.8	8	4.62	125	39.6	6.44	20.4	4.07	52	4.72	238	38	23	35	22	17	11	0.02	0.03	0.02	0.04	0.05	0.07
Rio Grande below Cochiti Dam, NM	12/17/13	1061926.2	353704.8	3.8	0.8	8.1	2.67	121	37.7	6.44	18.1	2.82	38.9	5.78	225	19	12	22	14	17	11	0.04	0.07	0.04	0.06	0.05	0.07
Rio Grande below Cochiti Dam, NM	5/12/14	1061926.2	353704.8	13.4	0.8	8.1	3.08	125	39.2	6.54	19.2	2.73	56.5	5.5	213	24	15	26	16	17	11	0.03	0.05	0.03	0.05	0.05	0.07
Rio Grande below Cochiti Dam, NM	8/21/14	1061926.2	353704.8	22.3	1.4	7.9	3.37	121	38.8	5.81	16.2	3.57	41	4.18	215	24	15	23	14	17	11	0.06	0.09	0.06	0.10	0.08	0.13
Rio Grande below Cochiti Dam, NM	1/5/15	1061926.2	353704.8	2.6	0.8	8.1	2.05	108	33.6	5.93	18.7	2.65	37.2	5.53	217	14	9	17	10	15	10	0.06	0.09	0.05	0.08	0.05	0.08
Rio Grande below Cochiti Dam, NM	3/28/15	1061926.2	353704.8	10.2	1.6	7.7	3.02	95.5	29.6	5.27	16.6	2.65	29.8	6.17	197	15	9	16	10	13	9	0.11	0.17	0.10	0.16	0.12	0.18
Rio Grande below Cochiti Dam, NM	8/11/15	1061926.2	353704.8	22.6	0.8	7.9	3.32	111	35	5.66	14.2	2.71	34.8	3.83	192	23	15	23	14	15	10	0.03	0.06	0.03	0.06	0.05	0.08
Rio Grande below Cochiti Dam, NM	1/25/16	1061926.2	353704.8	2.9	0.8	7.9	2.25	112	34.6	6.27	16.4	2.42	38.1	5.62	105	14	8	15	9	15	10	0.06	0.10	0.05	0.09	0.05	0.08
Rio Grande below Cochiti Dam, NM	5/25/16	1061926.2	353704.8	15.7	1.1	8.1	4.29	99	30.8	5.32	12.7	2.48	32.6	3.82	84	33	21	36	22	13	9	0.03	0.05	0.03	0.05	0.08	0.12
Rio Grande below Cochiti Dam, NM	8/25/16	1061926.2	353704.8	21.5	0.96	8	3.54	117	37.6	5.4	14.1	2.73	44	3.92	97.4	27	17	27	17	16	10	0.03	0.06	0.04	0.06	0.06	0.09
Rio Grande below Cochiti Dam, NM	12/12/16	1061926.2	353704.8	5.6	0.66	8.1	2.2	123	37.7	6.8	19	2.59	43.2	5.82	112	16	10	18	11	16	11	0.04	0.07	0.04	0.06	0.04	0.06

Location ID	Date	X	Y	Temp. (C)	Copper (ug/L)	pH	DOC (mg/L)	Hardness (mg/L CaCO3)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Sulfate (mg/L)	Cl (mg/L)	Alkalinity (mg/L CaCO3)	BLM (ug/L)		MLR SSWQC (ug/L)		New Mexico Hardness-based Criteria (ug/L)		BLM		MLR SSWQC		New Mexico Hardness-based Criteria	
																Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute TU	Chronic TU	Acute TU	Chronic TU	Acute TU	Chronic TU
Rio Grande below Cochiti Dam, NM	4/26/17	1061926.2	353704.8	12.7	1.2	7.9	5.66	86.2	26.9	4.57	10.4	1.98	31.7	3.19	70.8	34	21	39	24	12	8	0.04	0.06	0.03	0.05	0.10	0.15
Rio Grande below Cochiti Dam, NM	8/17/17	1061926.2	353704.8	--	1.4	8	3.6	75.2	23.6	3.87	9.81	1.76	31.4	4.3	98.4	23	14	27	16	10	7	0.06	0.10	0.05	0.08	0.14	0.20
Rio Grande below Cochiti Dam, NM	1/24/18	1061926.2	353704.8	3.1	0.66	7.8	2.1	114	35.5	6	17.6	2.59	36.1	5.79	104	12	7	13	8	15	10	0.06	0.09	0.05	0.08	0.04	0.07
Rio Grande below Cochiti Dam, NM	4/12/18	1061926.2	353704.8	10.7	0.55	8	1.97	116	35.6	6.37	18.6	2.81	36.2	6.24	107	14	9	15	9	15	10	0.04	0.06	0.04	0.06	0.04	0.05
Rio Grande below Cochiti Dam, NM	8/20/18	1061926.2	353704.8	22.4	0.99	7.9	3.11	130	41.1	6.57	14.8	2.66	55.7	3.73	101	22	14	21	13	17	11	0.04	0.07	0.05	0.08	0.06	0.09
Rio Grande below Cochiti Dam, NM	2/26/19	1061926.2	353704.8	4	1.1	7.7	1.8	129	39.4	7.22	20.2	2.7	50.4	7.22	112	9	6	10	6	17	11	0.12	0.19	0.11	0.18	0.06	0.10
Rio Grande below Cochiti Dam, NM	5/21/19	1061926.2	353704.8	11.5	3.7	8.2	5.4	75.5	23.8	3.84	7.96	1.94	20.9	2.77	65.4	41	26	49	30	10	7	0.09	0.14	0.08	0.12	0.36	0.53
Rio Grande below Cochiti Dam, NM	8/19/19	1061926.2	353704.8	22.3	1.1	7.9	2.98	76	24.2	3.71	9.05	2.13	18.9	2.69	73.5	20	12	20	12	10	7	0.06	0.09	0.06	0.09	0.11	0.16
Rio Grande below Cochiti Dam, NM	1/13/20	1061926.2	353704.8	2.6	0.68	7.9	2.11	107	33.2	5.86	16	2.37	37.5	6	102	13	8	14	9	14	9	0.05	0.09	0.05	0.08	0.05	0.07
Rio Grande below Cochiti Dam, NM	5/11/20	1061926.2	353704.8	15.1	0.85	8	2.73	107	33.2	5.87	15.6	2.39	37.8	5.98	100	19	12	21	13	14	9	0.04	0.07	0.04	0.07	0.06	0.09
Rio Grande below Cochiti Dam, NM	8/17/20	1061926.2	353704.8	23	0.9	8.1	3.02	130	40.7	6.92	16.5	2.57	60.7	4.44	100	28	17	25	16	17	11	0.03	0.05	0.04	0.06	0.05	0.08
Rio Grande below Cochiti Dam, NM	1/7/21	1061926.2	353704.8	3.1	0.72	8.3	2.02	124	38.2	6.77	20	2.56	48	7.22	115	17	11	20	12	16	11	0.04	0.07	0.04	0.06	0.04	0.07
Rio Grande below Cochiti Dam, NM	5/3/21	1061926.2	353704.8	13.1	1.5	7.8	2.67	115	35.2	6.56	16.6	2.3	55	5.81	102	15	9	16	10	15	10	0.10	0.16	0.09	0.15	0.10	0.15
Rio Grande below Cochiti Dam, NM	8/9/21	1061926.2	353704.8	22.9	0.97	7.7	3.69	114	36.2	5.72	15.1	2.81	40.7	4.81	103	21	13	20	12	15	10	0.05	0.08	0.05	0.08	0.06	0.10
Rio Grande at San Felipe, NM	12/7/05	1062623.4	352640.5	3.5	1.1	8.5	1.69	123	39.4	6.1	17.2	2.68	33.6	5.57	223	16	10	20	12	17	11	0.07	0.11	0.06	0.09	0.06	0.10
Rio Grande at San Felipe, NM	12/7/05	1062623.4	352640.5	3.5	1.1	8.5	1.94	115	36.6	5.69	16.1	2.48	33.6	5.57	223	18	11	23	14	16	10	0.06	0.10	0.05	0.08	0.07	0.11
Rio Grande at San Felipe, NM	4/24/06	1062623.4	352640.5	11	1.5	8.3	1.34	114	35.3	6.27	18.3	2.61	36.4	5.92	223	12	8	13	8.1	16	10	0.12	0.20	0.12	0.19	0.09	0.15
Rio Grande at San Felipe, NM	8/14/06	1062623.4	352640.5	22.5	1.3	8.5	3.2	105	34.2	4.91	16.4	3.14	36.6	4.82	217	42	26	37	23	15	9.8	0.03	0.05	0.04	0.06	0.09	0.13
Rio Grande at San Felipe, NM	12/4/06	1062623.4	352640.5	3.5	0.82	8.3	1.37	104	32.6	5.54	16.3	2.52	33.2	4.79	198	11	7	13	8.3	15	9.7	0.07	0.12	0.06	0.10	0.05	0.08

Location ID	Date	X	Y	Temp. (C)	Copper (ug/L)	pH	DOC (mg/L)	Hardness (mg/L CaCO3)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Sulfate (mg/L)	Cl (mg/L)	Alkalinity (mg/L CaCO3)	BLM (ug/L) Acute	BLM (ug/L) Chronic	MLR SSWQC (ug/L) Acute	MLR SSWQC (ug/L) Chronic	New Mexico Hardness-based Criteria (ug/L) Acute	New Mexico Hardness-based Criteria (ug/L) Chronic	BLM Acute TU	BLM Chronic TU	MLR SSWQC Acute TU	MLR SSWQC Chronic TU	New Mexico Hardness-based Criteria Acute TU	New Mexico Hardness-based Criteria Chronic TU
Rio Grande at San Felipe, NM	5/3/07	1062623.4	352640.5	13	2.2	8.2	5.49	94.8	29.4	5.2	16.6	2.53	42.6	5.96	195	45	28	50	31	13	8.9	0.05	0.08	0.04	0.07	0.17	0.25
Rio Grande at San Felipe, NM	8/22/07	1062623.4	352640.5	21.5	1.2	8.2	6.63	118	37.2	6.2	18.8	3.07	43.6	4.93	222	65	40	62	38	16	11	0.02	0.03	0.02	0.03	0.08	0.11
Rio Grande at San Felipe, NM	11/12/08	1062623.4	352640.5	8	4.8	8.3	2.54	132	41.7	6.76	20	2.83	39.7	6.24	255	22	14	25	16	18	12	0.22	0.35	0.19	0.30	0.27	0.40
Rio Grande at Alameda Bridge at Alameda, NM	12/12/05	1063834	351151.8	2.5	1.5	8.3	1.58	140	44.9	6.81	25.3	3.28	44.1	11.6	255	14	8	16	9.7	19	12	0.11	0.18	0.09	0.15	0.08	0.13
Rio Grande at Alameda Bridge at Alameda, NM	4/25/06	1063834	351151.8	16	1.5	8.6	2.16	112	35.1	6.05	20	2.94	38.8	7.37	215	27	17	27	17	16	10	0.06	0.09	0.06	0.09	0.09	0.15
Rio Grande at Alameda Bridge at Alameda, NM	8/15/06	1063834	351151.8	22	1.6	8	2.97	360	126	11.1	83.2	7.47	398	44.7	194	31	19	24	15	47	28	0.05	0.08	0.07	0.11	0.03	0.06
Rio Grande at Alameda Bridge at Alameda, NM	12/5/06	1063834	351151.8	3	0.77	8.6	1.11	110	34.7	5.74	21.9	2.88	38.1	9.68	208	11	7	14	8.4	15	10	0.07	0.11	0.06	0.09	0.05	0.08
Rio Grande at Alameda Bridge at Alameda, NM	5/4/07	1063834	351151.8	14	1.6	8.1	4.35	98.7	31.3	5.01	24.6	3.18	45.9	11.8	193	35	22	36	22	14	9.2	0.05	0.07	0.04	0.07	0.11	0.17
Rio Grande at Alameda Bridge at Alameda, NM	8/23/07	1063834	351151.8	21	1.8	7.9	7.13	119	37.5	6.25	19.2	3.06	44.4	5.32	221	50	31	50	30	17	11	0.04	0.06	0.04	0.06	0.11	0.16
Rio Grande at Alameda Bridge at Alameda, NM	11/13/08	1063834	351151.8	7.5	1.9	8.4	2.44	138	44.1	6.98	26.7	3.49	44.9	12.9	273	24	15	27	16	19	12	0.08	0.13	0.07	0.12	0.10	0.16
Rio Grande at Alameda Bridge at Alameda, NM	5/20/09	1063834	351151.8	16	1.2	8.1	6.77	91.2	29.2	4.47	10.4	2.36	29.6	3.38	154	52	32	57	35	13	8.6	0.02	0.04	0.02	0.03	0.09	0.14
Rio Grande at Alameda Bridge at Alameda, NM	8/21/09	1063834	351151.8	24.5	0.85	8.6	3.04	119	38	5.81	17.1	2.79	45.4	5.18	202	47	29	38	23	16	11	0.02	0.03	0.02	0.04	0.05	0.08
Rio Grande at Alameda Bridge at Alameda, NM	11/23/09	1063834	351151.8	8.6	1	8.4	2.37	132	42.1	6.59	22.9	3.03	45.7	9.32	254	23	14	26	16	18	12	0.04	0.07	0.04	0.06	0.06	0.08
Rio Grande at Alameda Bridge at Alameda, NM	5/11/10	1063834	351151.8	13.6	0.87	8.2	4.7	94.5	30.3	4.59	13.7	2.26	33.9	5.42	172	39	24	43	26	13	8.9	0.02	0.04	0.02	0.03	0.07	0.10
Rio Grande at Alameda Bridge at Alameda, NM	8/17/10	1063834	351151.8	25.6	1.2	8.1	4.03	113	36	5.52	18.4	3.29	47.3	7.84	201	38	24	34	21	16	10	0.03	0.05	0.04	0.06	0.08	0.12
Rio Grande at Alameda Bridge at Alameda, NM	12/3/10	1063834	351151.8	5.9	0.5	8.4	1.96	138	43.7	7.12	26.9	3.46	47.8	12.7	258	19	12	21	13	19	12	0.03	0.04	0.02	0.04	0.03	0.04
Rio Grande at Alameda Bridge at Alameda, NM	6/3/11	1063834	351151.8	16.9	0.71	8.2	3.38	122	38.2	6.59	17.1	2.7	47.3	5.32	210	30	19	31	19	17	11	0.02	0.04	0.02	0.04	0.04	0.06
Rio Grande at Alameda Bridge at Alameda, NM	8/18/11	1063834	351151.8	27.9	0.81	8.1	3.86	104	32.3	5.57	14	2.99	37	3.86	186	37	23	32	20	14	9.6	0.02	0.03	0.03	0.04	0.06	0.08

Location ID	Date	X	Y	Temp. (C)	Copper (ug/L)	pH	DOC (mg/L)	Hardness (mg/L CaCO3)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Sulfate (mg/L)	Cl (mg/L)	Alkalinity (mg/L CaCO3)	BLM (ug/L) Acute	BLM (ug/L) Chronic	MLR SSWQC (ug/L) Acute	MLR SSWQC (ug/L) Chronic	New Mexico Hardness-based Criteria (ug/L) Acute	New Mexico Hardness-based Criteria (ug/L) Chronic	BLM Acute TU	BLM Chronic TU	MLR SSWQC Acute TU	MLR SSWQC Chronic TU	New Mexico Hardness-based Criteria Acute TU	New Mexico Hardness-based Criteria Chronic TU
Rio Grande at Alameda Bridge at Alameda, NM	12/9/11	1063834	351151.8	3.2	0.8	8.1	2.53	119	37.2	6.29	17.8	2.89	35.8	6.49	223	18	11	21	13	16	11	0.04	0.07	0.04	0.06	0.05	0.07
Rio Grande at Alameda Bridge at Alameda, NM	4/26/12	1063834	351151.8	16	0.92	8.3	3.83	95.7	29.9	5.13	17.9	2.68	29.7	9.18	184	37	23	38	23	13	9	0.03	0.04	0.02	0.04	0.07	0.10
Rio Grande at Alameda Bridge at Alameda, NM	8/23/12	1063834	351151.8	23.5	1	8.2	4	131	42.1	6.54	17.5	3.75	43.3	4.82	226	41	26	37	23	18	12	0.02	0.04	0.03	0.04	0.06	0.08
Rio Grande at Alameda Bridge at Alameda, NM	12/20/12	1063834	351151.8	1.2	0.8	8.2	2.58	137	43.3	7.12	20.3	2.83	49.8	6.45	240	20	12	24	15	19	12	0.04	0.07	0.03	0.05	0.04	0.07
Rio Grande at Alameda Bridge at Alameda, NM	5/10/13	1063834	351151.8	16.3	0.8	8.1	2.35	124	38.1	7	21.3	2.87	54.5	6.1	231	20	12	20	12	17	11	0.04	0.07	0.04	0.07	0.05	0.07
Rio Grande at Alameda Bridge at Alameda, NM	8/2/13	1063834	351151.8	23.2	0.84	8.1	4.52	141	45.3	6.81	22.3	4.26	55.9	6.24	255	43	27	38	24	19	13	0.02	0.03	0.02	0.04	0.04	0.06
Rio Grande at Alameda Bridge at Alameda, NM	12/18/13	1063834	351151.8	4	1.8	8.2	2.77	135	42.5	7.07	26	3.44	49.9	12.1	252	22	14	25	16	19	12	0.08	0.13	0.07	0.11	0.09	0.15
Rio Grande at Alameda Bridge at Alameda, NM	5/13/14	1063834	351151.8	11.9	0.8	8.2	2.97	127	40.1	6.59	21.6	3.02	58.7	7.59	220	25	16	27	17	18	11	0.03	0.05	0.03	0.05	0.04	0.07
Rio Grande at Alameda Bridge at Alameda, NM	8/22/14	1063834	351151.8	21.4	1.2	8.2	3.21	123	39.9	5.71	17.8	3.76	40.7	22.6	220	32	20	29	18	17	11	0.04	0.06	0.04	0.07	0.07	0.11
Rio Grande at Alameda Bridge at Alameda, NM	1/7/15	1063834	351151.8	5.6	0.8	8.1	2.06	122	38.1	6.54	26	3.28	49.4	14.6	243	15	10	17	11	17	11	0.05	0.08	0.05	0.07	0.05	0.07
Rio Grande at Alameda Bridge at Alameda, NM	3/28/15	1063834	351151.8	12.8	1.6	7.5	3.53	98.6	30.9	5.23	20.7	3.06	32.5	10.4	212	15	9	15	9.3	14	9.2	0.11	0.18	0.11	0.17	0.11	0.17
Rio Grande at Alameda Bridge at Alameda, NM	5/26/16	1063834	351151.8	17.1	0.98	8	4.35	105	32.8	5.56	15.8	2.67	36.7	5.37	90.1	32	20	33	20	14	9	0.03	0.05	0.03	0.05	0.07	0.10
Rio Grande at Alameda Bridge at Alameda, NM	8/30/16	1063834	351151.8	23.8	1.9	8	2.98	114	37.5	4.8	17	2.88	50.7	6.09	98.4	24	15	23	14	15	10	0.08	0.13	0.08	0.14	0.12	0.19
Rio Grande at Alameda Bridge at Alameda, NM	12/14/16	1063834	351151.8	7.3	0.89	8.4	1.91	132	41.4	6.94	23	3.05	48.7	9.25	120	18	11	21	13	17	11	0.05	0.08	0.04	0.07	0.05	0.08
Rio Grande at Alameda Bridge at Alameda, NM	4/28/17	1063834	351151.8	11.6	1.2	7.9	4.84	90.8	28.5	4.71	12.6	2.12	33.9	5.07	77.9	29	18	33	20	12	8	0.04	0.07	0.04	0.06	0.10	0.15
Rio Grande at Alameda Bridge at Alameda, NM	8/18/17	1063834	351151.8	23.1	1.1	8.2	3.31	107	33.8	5.35	16.1	2.79	34.1	6.56	103	33	20	30	19	14	9	0.03	0.05	0.04	0.06	0.08	0.12
Rio Grande at Alameda Bridge at Alameda, NM	1/25/18	1063834	351151.8	1.7	0.59	8	1.98	126	39.8	6.39	27.5	3.11	45.5	15.2	118	14	9	15	9	17	11	0.04	0.07	0.04	0.06	0.04	0.05

Location ID	Date	X	Y	Temp. (C)	Copper (ug/L)	pH	DOC (mg/L)	Hardness (mg/L CaCO3)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Sulfate (mg/L)	Cl (mg/L)	Alkalinity (mg/L CaCO3)	BLM (ug/L)		MLR SSWQC (ug/L)		New Mexico Hardness-based Criteria (ug/L)		BLM		MLR SSWQC		New Mexico Hardness-based Criteria	
																Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute TU	Chronic TU	Acute TU	Chronic TU	Acute TU	Chronic TU
Rio Grande at Alameda Bridge at Alameda, NM	4/13/18	1063834	351151.8	9.6	0.56	8.2	1.72	120	37.6	6.37	23	3.33	39.5	9.12	115	15	9	16	10	16	10	0.04	0.06	0.04	0.06	0.04	0.05
Rio Grande at Alameda Bridge at Alameda, NM	8/22/18	1063834	351151.8	22.9	1.1	7.9	3.1	118	37.7	5.71	14.9	2.6	54.9	4.69	103	22	14	21	13	16	10	0.05	0.08	0.05	0.08	0.07	0.11
Rio Grande at Alameda Bridge at Alameda, NM	2/28/19	1063834	351151.8	7.5	1.3	8.1	1.78	113	35.1	6.18	20.9	2.66	52.3	11.3	119	13	8	15	9	15	10	0.10	0.16	0.09	0.14	0.09	0.13
Rio Grande at Alameda Bridge at Alameda, NM	8/21/19	1063834	351151.8	22.3	0.92	8.3	2.82	82.5	26.2	4.06	10.6	2.46	21.2	3.39	79.6	29	18	28	17	11	8	0.03	0.05	0.03	0.05	0.08	0.12
Rio Grande at Alameda Bridge at Alameda, NM	1/15/20	1063834	351151.8	3.7	1.1	8.5	2.12	120	37.7	6.23	21.5	2.72	43.9	11.6	115	20	13	25	15	16	10	0.05	0.09	0.04	0.07	0.07	0.11
Rio Grande at Alameda Bridge at Alameda, NM	8/19/20	1063834	351151.8	23.9	2.8	8.5	3.1	136	42.9	6.94	20.3	3.07	61.3	7.23	108	44	27	37	22	18	12	0.06	0.10	0.08	0.12	0.16	0.24
Rio Grande at Alameda Bridge at Alameda, NM	1/11/21	1063834	351151.8	3.7	0.62	8.4	2.01	138	43.1	7.35	23.7	3.02	54.3	9.44	127	19	12	22	13	18	12	0.03	0.05	0.03	0.05	0.03	0.05
Rio Grande at Alameda Bridge at Alameda, NM	5/5/21	1063834	351151.8	14.3	0.91	8.3	2.82	122	37.4	6.73	20.3	2.67	56.3	8.61	106	27	17	28	17	16	11	0.03	0.05	0.03	0.05	0.06	0.09
Rio Grande at Alameda Bridge at Alameda, NM	8/11/21	1063834	351151.8	23.1	0.81	8.2	3.28	123	39.4	5.87	18.6	3.2	43.7	7.15	112	33	21	30	19	16	11	0.02	0.04	0.03	0.04	0.05	0.08

BLM – biotic ligand model
MLR – multiple linear regression
SSWQC – site-specific water quality criteria
TU – toxic unit

D3 Rio Grande Silvery Minnow (*Hybognathus amarus*)

The Rio Grande silvery minnow (family *Cyprinidae*) is a small schooling fish species that lives in a restricted range of the Rio Grande in New Mexico between Cochiti Pueblo and Elephant Butte Reservoir. Historically, the range this species was larger; it has been fragmented by dams and degraded by various hydrologic modifications (USFWS 2021). Silvery minnow prefer large, warm, riverine habitat with low to moderate flows over relatively fine substrates. They are benthic feeders, consuming plant material and benthic invertebrates at the sediment-water interface.

As with the Rio Grande cutthroat trout, discussed above, adverse effects on minnow are not expected as a result of the proposed copper SSWQC. Adopting and implementing these criteria would provide a suitable level of protection for sensitive aquatic life (including minnow prey), and historical copper concentrations have not exceeded the proposed SSWQC (Table D-1). The EPA (2007) dataset contains toxicity data for other cyprinids that are less sensitive than salmonids (discussed above) and substantially less sensitive than aquatic invertebrates included in that dataset.

D4 New Mexico Jumping Mouse (*Zapus hudsonius luteus*)

The range of the New Mexico jumping mouse (*Zapus hudsonius luteus*) includes the Jemez, Sangre de Cristo, San Juan, White, and Sacramento Mountains of New Mexico, Arizona, and Colorado as well as riparian areas along the mainstem of Rio Grande (USFWS 2020). This species generally inhabits elevations below 9,500 feet and is typically observed within close proximity to perennial streams. The jumping mouse hibernates from September or October to May or June with a limited active period. They are mainly active in summer months when riparian forb, sedge, and grass seeds are plentiful. Therefore, upon emergence from hibernation, jumping mice must breed, rear their young, and then accumulate sufficient fat reserves to sustain them through the next hibernation period all within a few months. While little research is available on jumping mouse hibernacula, what data are available suggest that jumping mice hibernate in small nests made of vegetation under shrubs or in underground burrows, typically close perennial water bodies.

Jumping mice primarily breed in July or August and likely only have one litter each year (USFWS 2020). Jumping mice use dense riparian herbaceous vegetation as shelter and food source, however females use areas outside the moist riparian zone for giving birth and rearing young. Jumping mice most likely only have a life span of one to two years and are prey for snakes, foxes, weasels, and birds of prey.

It is not expected that the SSWQC would adversely impact the New Mexico jumping mouse. Jumping mice feed primarily on terrestrial plant matter and to a lesser extent on invertebrates (e.g., insects and snails) and fruit (USFWS 2020), and these dietary items would not be adversely impacted by a change in the copper WQC. Copper concentrations associated with the SSWQC are protective of fish and small aquatic invertebrate species; the potential for impacts in a larger mammalian species that is exposed to a far lesser degree (i.e., through water ingestion or dermal exposures), is expected to be very low.

D5 Mexican Spotted Owl (*Strix occidentalis lucida*)

The Mexican spotted owl occupies a broad geographic range which extends north from Aguascalientes, Mexico, throughout Arizona, New Mexico, Utah, Colorado, and into western Texas (Palumbo and Johnson 2015). The owl commonly occupies mixed-conifer forests, and the highest densities of owl occur in forests that have minimal human disturbance. Home ranges for Mexican spotted owl vary from about 260 to 1,500 hectares.

Mexican spotted owl consume a variety of terrestrial prey including small and medium sized rodents (e.g., woodrats, mice, and voles), bats, birds, and reptiles. Nesting habitats are in areas with complex forest structure or rocky canyons that contain mature or old growth conifer forests (Palumbo and Johnson 2015). Some Mexican spotted owls are year-round residents within an area and some move considerable distances, generally to more open habitat at lower elevations during the winter (Palumbo and Johnson 2010).

It is not expected that the Mexican spotted owl would be adversely affected by a change in copper WQC consistent with EPA's national recommended copper AWQC for aquatic life. They prey on small terrestrial mammals, birds, and reptiles rather than aquatic life. Exposures of owls to dissolved copper would be very limited; owls tend not to drink water (instead getting water through their diet) but may be dermally exposed periodically while bathing. Considering the relatively low potential (including frequency and duration) for exposure, the low potential for copper toxicity through a dermal route of exposure (and lack of a route through ingestion), and the relative insensitivity of large birds to copper exposures at what should be an acceptable level for small, sensitive aquatic life, it is concluded that Mexican spotted owl will not be affected by a change in the copper WQC.

D6 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The southwestern willow flycatcher has a broad range across the southwest including California, Arizona, New Mexico, Colorado, Utah, and Nevada (Sogge et al. 2010). They breed in North America, but winter in the subtropical and tropical regions of southern Mexico, Central America, and northern South America. Breeding and nesting habitat is dense riparian vegetation (with tree and shrub cover) where there is surface water present or where soil moisture is high enough to maintain dense vegetation. Flycatcher habitat selection appears to be driven more by plant structure than by species composition; nests are placed where there is suitable twig and vegetative structure.

Flycatchers are insectivores and prey upon a variety of taxa including leafhoppers (Homoptera), dragonflies (Odonata), true bugs (Hemiptera), bees and wasps (Hymenoptera), and flies (Diptera) (Sogge et al. 2010). Flycatcher's diet may include species with an aquatic larval life stage. The copper BLM (and, by extension, the SSWQC) is not expected to adversely impact flycatcher dietary items; rather, the BLM is intended to be protective of aquatic life and should therefore be protective of flycatcher prey.

Flycatchers may directly ingest dissolved copper while drinking or bathing. As noted above, birds are less sensitive to copper than is aquatic life, so the copper BLM (and, by extension, the SSWQC) should also be protective of birds exposed dermally or through drinking and protective of potential prey bases for birds.

D7 Yellow-billed Cuckoo (*Coccyzus americanus*)

Historically, the yellow-billed cuckoo bred throughout most of continental North America, but currently it is only found in the southwest, Midwest, and eastern US and Canada (Wiggins 2005). Yellow-billed cuckoos winter in South America, mostly east of the Andes Mountains, only spending late spring and summer months in North America. In southwest regions cuckoos prefer to nest in riparian woodlands, particularly those with an intact understory. Nests are made in dense patches of broad-leaved deciduous trees close to water.

Yellow-billed cuckoos feed on insects including grasshoppers, crickets, and katydids (Orthoptera), caterpillars (Lepidoptera), true bugs (Hemiptera), and beetles (Coleoptera). Prey types change seasonally based on availability. However, because the BLM and SSWQC are intended to be protective of aquatic life, it is unlikely that cuckoo's prey would be adversely affected by copper exposures below the criteria.

D8 Jemez Mountains Salamander (*Plethodon neomexicanus*)

The Jemez Mountains Salamander is restricted to coniferous forests at elevations between approximately 7,000 and 11,000 ft in north-central New Mexico (78 FR 69569), including the Jemez Mountains in Los Alamos, Rio Arriba, and Sandoval Counties and around Valles Caldera National Preserve (primarily along the rim of the collapsed caldera with some occurring within the caldera) (Ramotik and Scott 1988).

The Jemez Mountains salamander is strictly terrestrial and does not use standing water for any life stage (78 FR 55600). They spend much of their life underground but emerge when conditions are warm and wet, typically from July through September. Aboveground activity usually occurs under decaying logs, rocks, bark, or moss mats. Salamanders prey on ants (e.g., Hymenoptera and Formicidae), mites (Acari), and beetles (Coleoptera). While reproduction in the wild has not been observed, based on the laboratory setting, mating is believed to occur between July and August during the summer monsoon season. Eggs are thought to be laid underground, and fully formed salamanders hatch from the eggs; there is no tadpole life stage that would be subject to waterborne exposure.

Because they are limited to terrestrial habitat and prey, the use of the SSWQC is not expected to adversely affect the Jemez Mountain salamander directly or indirectly (through diet or habitat alteration). It is assumed that Jemez Mountain salamander, like other salamander species, absorb moisture from their environment rather than drinking water from streams; therefore, this species would not be exposed to dissolved copper levels related to the SSWQC.

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