RECEIVED Pamela Jones FILED Water Quality Control Commission
By Water Quality Control Commission at 5:10 pm, Oct 23, 2024

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF:

PETITION TO AMEND 20.6.4.126 NMAC AND 20.6.4.141 NMAC TO ESTABLISH A SEGMENT-SPECIFIC TEMPERATURE CRITERION FOR A PORTION OF THE UPPER SANDIA CANYON ASSESSMENT UNIT

WQCC No. 24-65

Triad National Security, LLC and U.S. Department of Energy's National Nuclear Security Administration,

Petitioners.

PETITION FOR RULEMAKING TO AMEND 20.6.4.126 AND 20.6.4.141 NMAC TO ESTABLISH A SEGMENT-SPECIFIC TEMPERATURE CRITERION FOR A PORTION OF THE UPPER SANDIA CANYON ASSESSMENT UNIT

Triad National Security, LLC (Triad), the management and operating contractor of Los Alamos National Laboratory (Laboratory or LANL) and the United States Department of Energy's National Nuclear Security Administration (NNSA), by and through the Los Alamos Field Office, (NA-LA) (Triad and NA-LA are, collectively, "Petitioners"), pursuant to NMSA 1978, § 74-6-6(B) (1993), 20.1.6.200 NMAC, and 20.6.4.15(D) NMAC, hereby submit this Petition for Rulemaking to amend the New Mexico Water Quality Control Commission's (Commission or WQCC) Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC. Petitioners propose amendment of the designated use for a portion of the Sandia Canyon water quality assessment unit, NM-9000.A_047 within segment 20.6.4.126 NMAC (Assessment Unit or AU), based upon a Use Attainability Analysis (UAA) conducted pursuant to a work plan approved by the New Mexico Environment Department (Department or NMED). The specific amendments Petitioners propose are to 20.6.4.126 and 20.6.4.141 NMAC.

SUMMARY OF PROPOSED REGULATORY CHANGES

This Petition is presented to establish a segment-specific temperature criterion for the westernmost portion of the Upper Sandia Canyon AU[1], which is wholly located within the Laboratory's boundaries. NMED's most recent Integrated Report (IR), the 2024-2026 Integrated Report, Appendix A, lists the Upper Sandia Canyon AU as impaired for temperature and assigns it to IR Category 5/5B.[2] An AU is listed in Category 5/5B when it is impaired for one or more designated or existing uses. IR, Appendix A, p. iv. Appendix A of the IR states that, "AUs are listed in this category when it is possible that water quality standards are not being met because one or more current designated use is inappropriate. After a review of the water quality standard is conducted, a Use Attainability Analysis (UAA) will be developed and submitted to USEPA for consideration…." *Id*., at iv-v.; *see also* NMAC 20.6.4.15(A)(1). Coldwater aquatic life is the currently assigned designated aquatic life use for the Upper Sandia Canyon AU. 20.6.4.126 NMAC. The temperature criterion currently associated with the Upper Sandia Canyon AU is "6T3 temperature 20°C (68°F), maximum temperature 24°C (75°F) . . . [but w]here a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 6T3 temperature applies." 20.6.4.900 H(2) NMAC. There is currently not a segment-specific temperature criterion indicated for the Upper Sandia Canyon AU.

The United States Environmental Protection Agency (EPA) describes a UAA as "a structured scientific assessment of the factors affecting the attainment of uses specified in Section 101(a)(2) of the Clean Water Act," where the factors considered include "the physical, chemical,

[1] The UAA addresses only the portion of Sandia Canyon identified as AU NM-9000.A_047 and refers to this segment as "Upper Sandia Canyon." This petition and the UAA propose amending the designated use and associated temperature criteria for only the upstream, westernmost part of the AU.

[2] *See* https://www.env.nm.gov/surface-water-quality/303d-305b/ (2024-2026 Integrated Report plus all appendices; Appendix A, p. 196 (Assessment Unit Name: Sandia Canyon (Sigma Canyon to NPDES outfall 001)).

biological, and economic use removal criteria described in the EPA's water quality standards (WQS) regulation at 40 CFR 131.10(g)(1)-(6)." *See* U.S. EPA, *What is a UAA?* at https://www.epa.gov/wqs-tech/use-attainability-analysis-uaa. Under New Mexico regulations, a UAA is described as "a scientific study conducted for the purpose of assessing the factors affecting the attainment of a use." 20.6.4.7.U(2) NMAC. When a UAA is conducted by third parties, New Mexico regulations require the development of a work plan, and approval of the work plan by the Department, prior to conducting a UAA. 20.6.4.15(E) NMAC.

On April 9, 2020, NMED approved Petitioners' Work Plan, allowing Petitioners to proceed with a UAA to determine "if natural thermal conditions are preventing the attainment of Coldwater Aquatic Life Use in the perennial reach of the Sandia Canyon Assessment Unit[3], (AU) – 9000.A_047 – Water Quality Segment 20.6.4.126." *See* Petitioners' **Exhibit A** (LANL UAA_0001 to 0021) ("**Approved Work Plan**"). In other words, the UAA supporting this Petition was designed to study whether the current temperature criteria for the Upper Sandia Canyon AU are not consistently met because, as indicated by New Mexico's IR Category 5/5B assignment, a review of the water quality standard is required to verify the appropriate designated or existing use and/or criterion.

In accordance with the Approved Work Plan, after comprehensive technical study and evaluation, Petitioners submitted a draft UAA report to NMED and EPA in October 2021. Additionally, Petitioners provided the draft UAA report for public review and received public comments in March 2022. After considering comments from NMED, EPA, and the public, Petitioners conducted additional study and prepared a revised UAA report to address comments.

[3] This Petition and the Final UAA report refer to this segment (or AU) as "Upper Sandia Canyon." Maps of Upper Sandia Canyon, including the segment described in 20.6.4.126 NMAC, are included as Petitioners' Exhibit B, at LANL UAA_0032 to 0033.

The revised UAA report contains recommendations that are modified from those contained in the draft UAA report. Petitioners submitted an updated UAA report to NMED on February 16, 2024. *See* Petitioners' **Exhibit B**, *Use Attainability Analysis for Upper Sandia Canyon, Rev. 1*, (LANL UAA_0022 to 0070) ("**Final UAA**").[4]

The Final UAA examines air and water temperature data, flow data, and modeling results over a multi-year span, analyzes presence of threatened or endangered species and critical habitat, and considers aquatic life surveys and additional designated use criteria including dissolved oxygen and pH data. The Final UAA concludes that the current designated use of coldwater aquatic life is not attainable throughout the entire AU. Therefore, the Petitioners propose the Water Quality Standard be amended to divide the current Upper Sandia Canyon AU into two AUs, including an upper AU (the western portion of the reach) assigned a coolwater aquatic life use designation with an additional protective 25°C 6T3 criterion, and a lower AU (the eastern portion of the reach) with no change to the aquatic life designation.

Consistent with the Final UAA, Petitioners hereby propose changes to 20.6.4.126 NMAC as follows[5]:

20.6.4.126 RIO GRANDE BASIN:

Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL), including but not limited to: Cañon de Valle from LANL stream gage E256 upstream to Burning Ground spring, Sandia canyon ~~from Sigma canyon upstream to LANL NPDES outfall 001~~ <u>at Sigma canyon upstream to Sandia canyon at Bedrock Road</u>, Pajarito canyon from 0.5 miles below Arroyo de La Delfe upstream to Homestead spring, Arroyo de la Delfe from Pajarito canyon to Kieling spring, Starmers

[4] Although a UAA is a defined as scientific study, by convention the resulting UAA report is also referred to as the UAA. Exhibits referenced in the Final UAA were provided to NMED in electronic format, are incorporated by reference, and can be made available upon request.

[5] Note that the proposed versions of 20.6.4.126 and 20.6.4.141 NMAC differ slightly from those presented in the UAA Report offered for public comment. Here, 20.6.4.126 NMAC fully quotes the existing language of current rather than using ellipses, and 20.6.4.141 NMAC now includes "The following" preceding the remainder of the proposed language. *See* Petitioners' **Exhibit M**, LANL UAA_0203-0207, which lists errata and proposed clarifications and minor changes to the Final UAA Report. Note that no proposed correction or clarification changes the conclusions or recommendations presented in the Final UAA report.

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 NMAC are applicable to the designated uses.

[20.6.4.126 NMAC -N, 5/23/2005; A, 12/1/2010; A,4/23/2022; A, X/XX/XXXX]

Also, based on the Final UAA, Petitioners further propose amendment of 20.6.4.141 NMAC, which is currently a reserved section, as follows:

20.6.4.141 RIO GRANDE BASIN:

Sandia canyon from Sandia canyon at Bedrock Road upstream to LANL NPDES outfall 001.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following additional segment-specific criterion applies: a 6T3 temperature of 25 °C (77 °F).

[20.6.4.141 NMAC -N, X/XX/XXXX]

Pursuant to 20.1.6.200(B) NMAC, the entire rule, including the proposed regulatory change, is attached to this petition as Petitioners' **Exhibit N**, LANL UAA_0208-0266 (with changes at LANL UAA_0237 and 0240).

BACKGROUND

A. Petitioners

1. Petitioner Triad is a Delaware limited liability company authorized to do business in New Mexico. Triad is comprised of three non-profit entities: Battelle Memorial Institute; the University of California; and the Texas A&M University System.

2. Triad manages and operates the Laboratory on behalf of the NNSA pursuant to Contract No. 89233218CNA000001 (M&O Contract). For most purposes, when discussing the national laboratory, Triad and LANL are synonymous terms.[6]

3. The Laboratory is a national security laboratory that spans almost 40 square miles and has almost 900 individual facilities and 13 nuclear facilities.[7] The Laboratory is primarily located in Los Alamos County and a portion of Santa Fe County, but also has personnel and functions in Eddy County and in Nevada. The Laboratory shares its boundary with the Pueblo de San Ildefonso, Sandoval County, Santa Fe County, the Department of Interior's National Park Service, and the Department of Agriculture's U.S. Forest Service.

4. As a federally funded research and development center (FFRDC), the Laboratory aligns its strategic plan with priorities set by NNSA and key national strategy guidance documents and executes work across NNSA missions including national security, science, and energy. [8]

5. NNSA is a semi-autonomous agency within the DOE responsible for enhancing national security through the military application of nuclear science. NNSA maintains and enhances the safety, security, and effectiveness of the U.S. nuclear weapons stockpile; works to reduce the global danger from weapons of mass destruction; provides the U.S. Navy with safe and militarily effective nuclear propulsion; and responds to nuclear and radiological emergencies in the United States and abroad.[9]

[6] Other DOE offices and contractors also perform other important work at and around the LANL site, including the vital work of the Department of Energy's Office of Environmental Management ("DOE-EM"). DOE-EM, by and through its field office in Los Alamos, is dedicated to the cleanup of legacy contamination of radioactive and chemical materials and waste resulting from operations during the Manhattan Project and the Cold War era, which is a period that was prior to the implementation of most modern environmental laws.

[7] *See* 50 U.S.C. § 2501; *and see* https:// about.lanl.gov.

[8] *See* https://mission.lanl.gov/.

[9] *See* https://www.energy.gov/nnsa/about-nnsa.

6. NNSA is run from headquarters sites located in Washington D.C., Maryland, and Albuquerque, New Mexico. NNSA oversees its contractor-operated national laboratories through field offices that are co-located with each laboratory. The NNSA field offices are responsible for ensuring compliance with the federal contracts issues to manage and operate these national security assets.[10]

7. Petitioner NA-LA is the NNSA field office responsible for ensuring Triad's compliance with the Laboratory's Management and Operating Contract.

8. Triad is co-permittee with DOE, by and through NA-LA, on federal National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 issued by EPA, for discharges to surface waters through eleven mission-critical outfalls. NPDES Permit No. NM0028355 includes requirements from New Mexico water quality standards contained in 20.6.4 NMAC.

B. Legal Authority

9. In accordance with federal Clean Water Act (CWA) regulations, each State is responsible for reviewing, establishing, and revising water quality standards. 40 CFR § 131.4(a). States must specify appropriate water uses to be achieved and protected. 40 CFR § 131.10. "States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act." 40 CFR § 131.2.

10. A water quality standard "defines the goals for a water body, or portion thereof, by designating the uses to be made of the water and by setting criteria necessary to protect the uses." *Id*.

---

[10] *See* https://www.energy.gov/nnsa/locations.

11. Under the New Mexico Water Quality Act (WQA), NMSA 1978, §§ 74-6-1 to 74-6-17, the Commission is required to adopt water quality standards for surface and ground waters of the State of New Mexico based on "credible scientific data and other evidence," including the designated uses of the waters and "the water quality criteria necessary to protect such uses." NMSA 1978, § 74-6-4(D) (2019).

12. The WQCC has adopted water quality standards for surface waters in New Mexico. *See* 20.6.4 NMAC. These standards include the designated uses and water quality criteria for waters in the Rio Grande Basin, including waters in Upper Sandia Canyon within the Laboratory. *See* 20.6.4.126 NMAC.

13. The Laboratory is the only national laboratory or federal site within New Mexico that has specific water quality standards segments, found at 20.6.126 NMAC, 20.6.127 NMAC, 20.6.128 NMAC, and 20.6.140 NMAC.

14. The WQCC "…may remove a designated use, that is not an existing use, …if a use attainability analysis demonstrates that attaining the use is not feasible because of a factor listed in 40 CFR. 131.10(g)." 20.6.4.15(A)(1) NMAC.

15. The state of New Mexico's 2024-2026 CWA §303(d)/§305(b) Integrated Report satisfies the statutory requirements of §303(d), §305(b), and §314 of the federal Water Pollution Control Act. The IR presents basic information on water quality and water pollution control programs in New Mexico to the U.S. EPA and the U.S. Congress, as well as to the general public. The IR is approved by the WQCC and is typically submitted to EPA Region 6 by April 1 of every even-numbered year.

16. New Mexico's IR assigns an AU to IR Category 5/5B when it is impaired for one or more designated uses and it is possible that a water quality standard is not being met because

the associated designated use is inappropriate. IR, Appendix A, p. iv-v. Appendix A of the IR provides that, in such cases, "[a]fter a review of the water quality standard is conducted, a Use Attainability Analysis (UAA) *will be developed and submitted* to USEPA for consideration…." *Id*. (emphasis added).

17. The state of New Mexico's 2018-2020 IR listed the Sandia Canyon water quality AU NM-9000.A_047 as not supporting coldwater aquatic life, livestock watering, and wildlife habitat designated uses.[11]

18. If a UAA demonstrates that the designated use is not attainable based on one of the factors in 40 CFR 131.10(g), it must determine the highest attainable use, as defined in 40 CFR 131.3(m), for the protection and propagation of fish, shellfish and wildlife and recreation. 20.6.4.15(C) NMAC.

19. Under the WQA, any person may petition to have the Commission adopt, amend, or repeal a regulation or water quality standard. NMSA 1978, § 74-6-6(B), *and see* 20.1.6.200 NMAC.

20. In New Mexico, requirements for a UAA are set forth in 20.6.4.15 NMAC. In accordance with 20.6.4.15(E) NMAC, any person may submit notice to NMED stating their intent to conduct a UAA. 20.6.4.15(E) NMAC sets out the requirements for the process of developing a UAA, obtaining approval and review by NMED and EPA, and identifies minimum work plan elements.

21. Pursuant to the above authority, this Petition requests that the WQCC amend the water quality standards applicable within Upper Sandia Canyon, currently set forth in 20.6.4.126 NMAC, to correct an unattainable aquatic life use designation in the upper reach of the Canyon

---

[11] *See* 2024-2024 IR, Appendix A, p. 196, noting the AU was first listed in IR Category 5/5B for temperature non-attainment in 2018.

while retaining the current designation and criteria in the eastern reach. These recommended amendments are further explained and supported in the Final UAA. *See* Exh. B, pp. LANL UAA_0022 to 0070.

C. Upper Sandia Canyon Setting

22. Sandia Canyon is currently comprised of two AUs, including: (1) the Upper Sandia Canyon AU (NM-9000.A_047), a 2.21 mile reach, from the Laboratory's NPDES Outfall 001 to Sigma Canyon; and (2) the Lower Sandia Canyon AU (NM-128.A_11), a 3.4 mile reach, from Sigma Canyon to the Laboratory's boundary at New Mexico State Road (SR) 4. The Upper Sandia Canyon AU originates in the Laboratory's Core Area, at Technical Area 03 (TA-03).

23. The Upper Sandia Canyon AU is an effluent-dominated perennial stream reach within the Laboratory, currently described in New Mexico regulations as the reach "from NPDES outfall 001 to Sigma Canyon." 20.6.4.126 NMAC.

24. The Laboratory is situated on the Pajarito Plateau, which slopes downward from the base of the Jemez mountains (at around 7,800 ft) to the Rio Grande (5,400 ft) in the Pojoaque Valley. Exh. B, p. LANL UAA_0038. The Upper Sandia Canyon AU stretches through a transitional foothills ecoregion between a higher, cooler zone and a drier, flatter xeric region. *Id.*

25. The source of perennial flow for the Upper Sandia Canyon AU is discharge through an industrial outfall, namely Outfall 001. Outfall 001 is one of eleven mission-critical outfalls permitted under the Laboratory's NPDES Permit No. NM0028355.

26. Outfall 001 discharges cooling water from the Laboratory's power plant, treated sanitary wastewater effluent from the Laboratory's Sanitary Wastewater System Facility, recycled sanitary effluent from the Laboratory's Sanitary Effluent Reclamation Facility, and treated cooling tower blowdown from the Laboratory's Strategic Computing Complex. The outfall discharges an

average of 154,000 gallons per day. If not for this industrial wastewater discharge, the Upper Sandia Canyon AU would be ephemeral. Exh. B, pp. LANL UAA_0031, 0034.

27. The industrial wastewater discharge from Outfall 001 has created and sustains a 3.65-acre wetland within the Upper Sandia Canyon segment. Exh. B, pp. LANL UAA_0031, 0034. The wetland is, in part, also sustained by a grade control structure, installed in 2013 as a Supplemental Environmental Project, to reduce erosion at its downstream end. *Id.*

28. Studies cited in the Final UAA conclude that the Upper Sandia Canyon AU is a net-neutral or a net-losing stream from the wetland to the end of the segment. This means that the amount of water in the stream is stable or decreases over its length due to evaporation, infiltration, or surface water loss to alluvial groundwater. Exh. B, p. LANL UAA_0034.

STATEMENT OF REASONS

A. Petitioners Obtained Department Approval of the Work Plan and Executed a Comprehensive Work Plan

29. The UAA Work Plan was approved by the Department. *See* Exh. A, (LANL UAA_0001 to 0021). The Approved Work Plan identified, as the primary focus of the UAA inquiry, the first factor under 40 CFR 131.10(g), whether "Naturally occurring pollutant concentrations prevent the attainment of coldwater aquatic life use." 40 CFR 131.10(g)(1).

30. In accordance with the Approved Work Plan, Petitioners' Final UAA considers the following lines of evidence and areas of analysis:

a. NMED's Air-Water Temperature Correlation guidance document and model;

b. PRISM (Parameter-evaluation Relationships on Independent Slopes Model) surface air temperature data for the two PRISM grid cells coterminous with the Upper Sandia Canyon AU;

c. Near surface air temperature measurements from the LANL meteorological monitoring network;

d. Data from thermographs deployed throughout the Upper Sandia Canyon AU;

e. Flow data from three permanent (E121, E122, and E123) and two temporary (E123.6 and E123.8) gage stations in the Upper Sandia Canyon AU;

f. Reported NPDES Permit No. NM0028355 discharge volumes;

g. Potential impact of any proposed water quality changes on listed threatened or endangered species located within the Upper Sandia Canyon AU;

h. Report and summary of aquatic life surveys, including an update of unique taxa populations identified within the Upper Sandia Canyon AU;

i. Consideration of the identification of the Upper Sandia Canyon ecoregion in relation to measured and predicted temperatures;

j. Consideration of dissolved oxygen and pH measurements from within the Upper Sandia Canyon AU; and

k. Application of the Stream Segment Temperature Model (SSTEMP) as a contingency method for determining the highest attainable designated use.

31. The Approved Work Plan also set out a framework for stakeholder outreach, public engagement, and consultation with appropriate state and federal entities. Under this framework, Petitioners completed a draft UAA document and the Final UAA taking into account comments and feedback from the public, EPA, and NMED. The following is brief synopsis of key actions pertaining to the development of the Final UAA and associated public outreach:

a. On April 9, 2020, NMED provided written approval of the Work Plan. Exh. A, p. LANL_UAA 0002.

b. On December 20, 2020, Petitioners gave a presentation concerning the UAA and upcoming public comment period at the East Jemez Resources Council meeting. Petitioners' **Exhibit C** (LANL UAA_0071 to 0073).

c. On February 23, 2021, Petitioners gave a presentation concerning the UAA and initial 45-day public comment period (from December 20, 2021 to February 3, 2022) at the Accord Technical Exchange Meeting. Petitioners' **Exhibit D** (LANL UAA_0074 to 0075).

d. On October 25, 2021, Petitioners submitted the first "final draft UAA" to NMED. Petitioners' **Exhibit E** (LANL UAA_0076 to 0121).

e. On March 4, 2022, Petitioners received comments from NMED, which also included comments from EPA, dated February 14, 2022. Petitioners' **Exhibit F** (LANL UAA_0122 to 0129).

f. On March 7, 2022, Petitioners received combined public comments from Communities for Clean Water, Amigos Bravos, Tewa Women United, New Mexico Acequia Association, Concerned Citizens for Nuclear Safety, Breath of My Heart Birthplace, and Partnership for Earth Spirituality. Petitioners' **Exhibit G** (LANL UAA_0130 to 0133).

g. From Spring of 2022 through fall of 2023, Petitioners revised the UAA and modified recommended amendments to 20.6.4.126 NMAC based on public comments and ongoing discussion with NMED staff.

h. Petitioners provided responses to EPA and NMED comments on November 6, 2023. Petitioners' **Exhibit H** (LANL UAA_0134 to 0175).

i. Petitioners provided the Final UAA to NMED for review and discussion on February 21, 2024. Petitioners' **Exhibit B** (LANL UAA_0022 to 0070).

j. On February 21, 2024, Petitioners gave a presentation concerning the Final UAA and upcoming public comment period at the Accord Technical Exchange Meeting. Petitioners' **Exhibit I** (LANL UAA_0176 to 0177).

k. Petitioners provided responses to combined prior public comments on March 15, 2024. Petitioners' **Exhibit J** (LANL UAA_0178 to 0190).

l. On May 7, 2024, Petitioners gave a presentation concerning the Final UAA and upcoming public comment period at the East Jemez Resources Council meeting. Petitioners' **Exhibit K** (LANL UAA_0191 to 0192).

m. On May 9, 2024, petitioners published notice of the availability of the Final UAA for public comment, from May 13 to June 12, 2024, in the Rio Grande Sun, the Los Alamos Daily Post, and the Santa Fe New Mexican. Petitioners' **Exhibits L1, L2, L3** (LANL UAA_0193 to 0198). Petitioners also provided notice on LANL's Electronic Public Reading Room, provided copies of the Final UAA at LANL's Physical Reading Room in Pojoaque, and sent notice to subscribers of LANL's GovDelivery email service. Petitioners' **Exhibits L4, L5** (LANL UAA_0199 to 0202).

n. Petitioners received no public comments on the Final UAA.

B. The Final UAA Demonstrates that the Current Regulatory-Defined Designated Use of Coldwater Aquatic Life Is Not an Existing Use Throughout the Entire Upper Sandia Canyon Assessment Unit

32. In 2005, the Commission first adopted the Upper Sandia Canyon segment as a classified water of the state, with a designated use of coldwater aquatic life and a segment-specific temperature criterion of 24°C. Exh. B, p. LANL UAA_0034.

33. The coldwater temperature criterion applicable in the Upper Sandia Canyon AU evolved twice in subsequent years under New Mexico regulations.

34. First, in 2010, the WQCC administratively eliminated the site-specific criterion and replaced it with a general coldwater standard, which was still set at 24°C.

35. Later, in 2017, the Commission administratively adopted a general 6T3[12] criterion of 20°C for all waters statewide that were assigned the coldwater designated use. Exh. B, p. LANL UAA_0035; NM Register Vol. XXVIII, Issue 2, p. 48 (January 31, 2017).

36. A 2002 study had informed the initial coldwater designation for the Upper Sandia Canyon AU, with the associated segment-specific temperature criterion. However, that study did not include time-averaged peak temperatures, which had not yet been adopted by the WQCC as part of New Mexico's water quality standards. Exh. B, p. LANL UAA_0035.

37. In addition, there were significant differences between key characteristics[13] of Upper Sandia Canyon and the reference site used in the 2002 study, namely Los Alamos Canyon. Exh. B, p. LANL UAA_0037 to 0038. This means that some of the features that supported the original coldwater designated use, based upon Los Alamos Canyon's attributes, may not have even been present or reflective the conditions in the Upper Sandia Canyon AU. *Id*.

38. This Final UAA, which studied the Upper Sandia Canyon AU, analyzed measured and modeled water and air temperature data and results from Upper Sandia Canyon and information from nearby meteorological stations. Results from the Final UAA support the

[12] A "'6T3 temperature' means the temperature not to be exceeded for six or more consecutive hours in a 24-hour period on more than three consecutive days." *See* 20.6.4.7(A)(3) NMAC.

[13] For example, the Upper Sandia Canyon AU is lower and shallower than Los Alamos Canyon and is dominated by different vegetation (pinion-juniper woodland, as opposed to spruce-fir) than Los Alamos Canyon, and is impaired for aluminum, chromium, and PCBs. Exh. B, p. LANL UAA_0037. Also, the flow in Upper Sandia Canyon AU is effluent driven.

conclusion that the currently assigned coldwater designated use is not appropriate for the entire Upper Sandia Canyon AU.

39. The Final UAA utilized six deployed thermographs[14] to directly measure water temperature in the Upper Sandia Canyon AU, between 2014 and 2018. Exh. B, p. LANL UAA_0038.

40. During this period, water temperatures exceeded the 6T3 threshold for coldwater (20°C) at some point at every thermograph except for the thermograph at Sigma Canyon.[15] Exh. B, p. LANL UAA_0038 to 0040.

41. Additionally, during this period, the coldwater TMAX criterion (24°C) was exceeded at least once during the study period at every thermograph upstream of Sandia Canyon below E123. *Id*.

42. Furthermore, time-averaged 6T3 temperatures exceeded the coldwater criterion at every thermograph except Sandia Canyon at Sigma Canyon, with exceedances most persistent upstream of Sandia Canyon below E123. *Id*.

43. This actual temperature data, as reported in the Final UAA, provides strong support for the conclusion that natural conditions prevent attainment of the coldwater designated use if the segment includes the entire reach as it is currently defined in 20.6.4.126 NMAC.

44. Modeled results likewise provide strong support for the conclusion that a coldwater designated use is not the appropriate designated aquatic life use for the entire Upper Sandia Canyon AU. Predicted water TMAX and 6T3 temperatures – whether based on air temperature (see the

[14] Thermograph locations are described in the UAA as: below Outfall 001, below the Sanitary Effluent Reclamation Facility, at E123, below E123, Sandia Canyon at Bedrock Road, and Sandia Canyon at Sigma Canyon. Exh. B, pp. LANL UAA_0032 to 0033, 0039.

[15] Here, "water temperatures" should not be confused with calculated 6T3 values. This statement refers to instantaneous measurements, as represented in Final UAA, Figure 3. Exh. B, p. LANL UAA_0040.

Final UAA application and analysis the NMED Surface Water Quality Bureau Air-Water Temperature Correlation (AWTC) model) or based on watershed geometry, hydrology, and meteorology (as in the Final UAA's analysis using the SSTEMP program) were consistently higher than those provided for under a coldwater designation. Exh. B, pp. LANL UAA_0041, 0051 to 0055.

45. AWTC results predicted even higher-than-actual temperatures for both TMAX and 6T3 for the Upper Sandia Canyon AU and support that attainment of the coldwater designation is not possible across the AU. Exh. B, p. LANL UAA_0041.

46. SSTEMP estimates, utilizing factors such as inflow temperature, mean air temperature, and wind speed, best support attainability of the coolwater designated use. Exh. B, LANL UAA_0054 to 0055.

47. Both AWTC and SSTEMP results produce higher-than-measured temperatures for a number of reasons, including the effects of microclimates (due to characteristics such as stream morphology and shading) and the disparity between meteorological conditions measured on the top of the Pajarito Plateau[16] as compared to those down in Upper Sandia Canyon. Exh. B, p. LANL UAA_0030, 0042 to 0043.

48. The Final UAA also includes an analysis of 6T3 and TMAX values calculated using another approach, namely Maximum Weekly Average Water Temperature (MWAT) data. Final UAA Table 4 shows that, when compared to 6T3 and TMAX values based on average July air temperatures (ATEMP)[17], predicted 6T3 and TMAX values based on MWAT data are even more variable over time and throughout the AU. Exh. B, p. LANL UAA_0044. This suggests

[16] Data used in both the PRISM model and from LANL meteorological networks stations originates at stations on top of the Pajarito Plateau. Exh. B, p. LANL UAA_0039, and 0042 to 0043.

[17] The NMED AWTC Model assumes water temperatures generally correlate to ATEMP values; AWTC modeled 6T3 and TMAX results are typically calculated using ATEMP values. *See* Exh. LANL UAA_0041.

microclimate effects may influence water temperatures in the AU, and this is not accounted for when modeled values rely on air temperatures from PRISM. *Id.*, pp. LANL UAA_0042 to 0044. Final UAA Table 4 also shows that MWAT-based results almost uniformly predict that coolwater is the attainable use within the AU. *Id.*

49. The Final UAA findings support the conclusion that local air temperature has a significant influence on water temperature in the Upper Sandia Canyon AU. This is especially evident when viewing Final UAA Table 5, showing TMAX and 6T3 attainment based on hourly Outfall 001 water temperature data in summer months in the years from 2015 to 2018. Exh. B, p. LANL UAA_0045.

50. Final UAA Table 5 shows visually how, compared to thermograph data across the Upper Sandia Canyon AU, temperatures at the Outfall (that is, where the water has not been exposed to surface conditions/local air temperature within the Canyon) vary less and are generally lower than temperatures reported in Final UAA Table 3. Exh. B, p. LANL UAA_0045.

51. Although modeled results predict non-attainment by a greater margin than measured results and would support adoption of a designated use other than coolwater, the Final UAA recommendations reflect a conservative approach that is supported by both actual data and results predicted through modeling.

C. The Final UAA Supports Splitting the Upper Sandia Canyon AU into Two Reaches

52. Thermograph data indicate that while coldwater aquatic life use is likely attainable in the eastern portion of the Upper Sandia Canyon AU (*i.e.*, downstream from Sandia Canyon at Bedrock Road), it is not attainable in the upper portion of the segment, from Bedrock Road to Outfall 001. Exh. B, p. LANL UAA_0041. There is only one year of data for Sandia Canyon at Bedrock Road itself, but multiple years of data in the upstream and downstream reaches support locating the segment division at this point. *Id.*

53. This shift within the Sandia Canyon AU at Bedrock Road, with cooler water further downstream, appears to occur independent of water temperatures in the upper portion of the Sandia Canyon AU. The system appears to naturally cool downstream, from Sandia at Bedrock Road to Sigma Canyon. Exh. B, p. LANL UAA_0046.

D. Petitioners' Proposed Amendments Reflect the Highest Attainable Use and Would Not Negatively Affect Water Quality Within the Segment or in Downstream Segments

54. In accordance with 40 CFR 131.10(g) and 20.6.4.15(C) NMAC, a proposed amendment to a current designated use must identify, in a supporting UAA, the highest attainable use for a defined stream segment. As set out in the Approved Work Plan, the UAA was required to evaluate consequences of any proposed change in the Upper Sandia Canyon AU to other segments downstream. Ex. A, p. LANL UAA_0016.

55. The Final UAA proposed changes to 20.6.4.126 NMAC for the lower portion of the current Upper Sandia Canyon AU preserves the coldwater designated use and the associated criteria set forth in 20.6.4.900 NMAC. The proposed change to 20.6.4.141 NMAC for the upper portion of the Upper Sandia Canyon AU accurately reflects the existing and attainable use of coolwater, while also adding a more protective 6T3 segment-specific criterion.

56. Changing the designated use for western portion of the Upper Sandia Canyon AU to reflect its existing and attainable use of coolwater will not impact downstream portions of the canyon to the Rio Grande. Flow data, measured from water year 2012 to water year 2021, shows that downstream of the Upper Sandia Canyon AU, flow is ephemeral. Exh. B, p. LANL UAA_0046. This means that flows from Upper Sandia Canyon seldom reach the Lower Sandia Canyon AU (AU NM-128.A_11 under 20.6.4.128 NMAC) or the Rio Grande. Downstream segments and the Rio Grande (20.4.114 NMAC) have either lower-quality designated aquatic life

uses with less stringent associated water quality criteria, or no promulgated water quality standards. *Id.*, p. LANL UAA_0045. S*ee also*, Exh. H, LANL UAA_0139 to 0141.

57. The Final UAA also includes an evaluation of the impacts of proposed changes upon aquatic life and upon threatened or endangered species present in the Upper Sandia Canyon AU, concluding that there are no impacts. There are no fish within the Upper Sandia Canyon AU, and populations of macroinvertebrates appear to be adapted to existing conditions. The western segment, where changes are proposed, does not include any threatened or endangered species. The lower eastern segment of the Upper Sandia Canyon AU is within Mexican spotted owl habitat, however, no changes are proposed to this segment. Exh. B, p. LANL UAA_0047.

58. The Final UAA evaluation of dissolved oxygen and pH concentrations within the Upper Sandia Canyon AU also shows that both are within acceptable levels for coldwater and coolwater designated aquatic life uses. Exh. B, p. LANL UAA_0048.

59. The amendments recommended in the Final UAA articulate a standard that is expected to improve attainment without negatively impacting protections of aquatic life.

E. Petitioners Provided Appropriate Consideration of and Response to Comments

60. Petitioners considered all comments received and, where appropriate, made adjustments to the UAA. Petitioners' responses to public comments are presented in Petitioners' Exhibits H and K and summarized as follows:

a. Petitioners revised the UAA to place less emphasis on modeled results and included additional requested data points.

b. Petitioners revised the recommended amendments to 20.6.4.126 NMAC and included a new recommendation to split the Upper Sandia Canyon AU, such that a coldwater designated use could be retained in the eastern portion of the Upper Sandia Canyon AU.

c. Petitioners provided their interpretation of data showing that changing the designated use temperature criterion in the western portion of the Upper Sandia Canyon AU will not negatively impact water quality downstream, primarily because of limited continuity of flows and the dominant effects of air temperature on in-stream water temperatures.

d. Petitioners provided additional information about existing Best Management Practices, current controls (such as cooling at the Outfall) and the limitations of these interventions on attainability of the current coldwater designated aquatic life use, especially in the western portion of the Upper Sandia Canyon AU.

CONCLUSION

Based on the foregoing, Petitioners request that the WQCC schedule a public hearing on their Petition to Amend 20.6.4.126 NMAC and 20.6.4.141 NMAC to Establish a Segment-Specific Temperature Criterion for the Upper Sandia Canyon Assessment Unit. Petitioners estimate that a hearing on its proposed amendments may take two days to complete.

Respectfully submitted,

TRIAD NATIONAL SECURITY, LLC

By: *\/s/ Maureen Dolan*

Maureen Dolan
Maxine McReynolds
Office of General Counsel
Los Alamos National Laboratory
P.O. Box 1660, MS A187
Los Alamos, New Mexico 87545
(505) 667-3766
dolan@lanl.gov
mcreynolds@lanl.gov

DEPARTMENT OF ENERGY'S NATIONAL
NUCLEAR SECURITY ADMINISTRATION,
LOS ALAMOS FIELD OFFICE

By: *__/s/ Stephen Jochem__*
Stephen Jochem
U.S. Department of Energy
NNSA Los Alamos Field Office
3747 West Jemez Road
Los Alamos, New Mexico 87544
(505) 423-3681
stephen.jochem@nnsa.doe.gov

CERTIFICATE OF SERVICE

I hereby certify that on October 23, 2024, a true copy of the foregoing *Petition for Rulemaking to Amend 20.6.4.126 and 20.6.4.141 NMAC to Establish a Segment-Specific Temperature Criterion for a Portion of the Upper Sandia Canyon Assessment Unit* was served via electronic mail to the following:

Pamela Jones
New Mexico Environment Department
Pamela.Jones@env.nm.gov

Lisa Chai
New Mexico Environment Department
Lisa.chai1@env.nm.gov

By: *__/s/ Maureen Dolan_________*
Maureen Dolan

EXHIBIT A

Work Plan Approved by NMED on April 9, 2020

Environmental Protection & Compliance Division
Compliance Programs Group
P.O. Box 1663, LANL MS K490
Los Alamos, New Mexico 87545
(505) 667-0666

National Nuclear Security Administration
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, New Mexico 87544
(505) 667-7314/Fax (505) 667-5948

Symbol: EPC-DO: 20-040
LA-UR: 20-21137
Date: FEB 10 2020

Ms. Jennifer Fullam
Standards Coordinator
New Mexico Environment Department
Surface Water Quality Bureau
P.O. Box 5469
Santa Fe, NM 87502

Subject: Request for Approval - Work Plan – Use Attainability Analysis – Determine if Naturally Occurring Thermal Conditions Prevent Attainment of Coldwater Aquatic Life Use in the Perennial Reach of Sandia Canyon Assessment Unit (9000.A_047) – Water Quality Segment 20.6.4.126

Dear Ms. Fullam:

In accordance with 20.6.4.15.D NMAC, the U.S. Department of Energy and Triad National Security, LLC, request approval of the attached Work Plan (Plan). The purpose of the Plan is to present the framework that will be used to prepare a Use Attainability Analysis to determine if natural thermal conditions are preventing the attainment of Coldwater Aquatic Life Use in the perennial reach of the Sandia Canyon Assessment Unit (AU) – 9000.A – Water Quality Segment 20.6.4.126.

The Plan identifies the factors affecting use attainment that will be analyzed, the scope of data currently available and the scope of data to be gathered, and provisions for public notice and consultation with appropriate state and federal agencies. The classified segment 20.6.4.126 comprises perennial waters within Los Alamos National Laboratory boundaries and includes the Sandia Canyon AU. See Attachment 1 for more details.

Please contact Karen E. Armijo by telephone at (505) 665-7314 or by email at Karen.Armijo@nnsa.doe.gov, or Michael T. Saladen by telephone at (505) 665-6085 or by email at Saladen@lanl.gov if you have questions regarding this information.

Sincerely,

Taunia S. Van Valkenburg
Group Leader
Compliance Programs
Triad National Security, LLC

Sincerely,

Karen E. Armijo
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S. Department of Energy

TVV/KEA/MTS/RMG:jdm

Attachment(s): Attachment 1 Work Plan – Use Attainability Analysis – Determine if Naturally Occurring Thermal Conditions Prevent Attainment of Coldwater Aquatic Life Use in the Perennial Reach of Sandia Canyon – Water Quality Segment 20.6.4.126

Copy: Shelly Lemon, NMED/SWQB, Shelly.Lemon@state.nm.us
Kristopher Barrios, NMED/SWQB, Kristopher.Barrios@state.nm.us
Peter Maggiore, LASO-MA, peter.maggiore@nnsa.doe.gov
Michael W. Hazen, ALDESHQSS, mhazen@lanl.gov
William R. Mairson, ALDESHQSS, wrmairson@lanl.gov
Enrique Torres, EWP, etorres@lanl.gov
Jennifer E. Payne, EPC-DO, jpayne@lanl.gov
Taunia S. Van Valkenburg, EPC-DO, tauniav@lanl.gov
Michael T. Saladen, EPC-CP, saladen@lanl.gov
Robert M. Gallegos, EPC-CP, rgallegos@lanl.gov
Brian M. Iacona, EPC-CP, biacona@lanl.gov
Adesh-records@lanl.gov
epccorrespondence@lanl.gov
epccat@lanl.gov

Attachment 1

Work Plan – Use Attainability Analysis – Determine if Naturally Occurring Thermal Conditions Prevent Attainment of Coldwater Aquatic Life Use in the Perennial Reach of Sandia Canyon – Water Quality Segment 20.6.4.126

EPC-DO: 20-040

LA-UR-19-24784

Date: FEB 1 0 2020

Use Attainability Analysis Work Plan – Determine if Naturally Occurring Thermal Conditions Prevent the Attainment of Coldwater Aquatic Life Use in the Perennial Reach of Sandia Canyon Assessment Unit (9000.A_047) – Water Quality Segment 20.6.4.126

Introduction

This document is a work plan for a use attainability analysis (UAA)[1] to determine whether coldwater aquatic life[2] is an attainable designated use for the Sandia Canyon water quality assessment unit NM-9000.A_047 ("Upper Sandia Canyon AU"). The work plan will be implemented by Triad National Security, LLC (Triad) and the U.S. Department of Energy, National Nuclear Security Agency (DOE-NA-LA). Upon approval of this work plan by the New Mexico Environment Department, Surface Water Quality Bureau (NMED-SWQB), Triad/DOE-NA-LA will conduct the UAA in accordance with the approved work plan. Upon completion of the work, Triad/DOE-NA-LA will submit the data, findings and conclusions to NMED-SWQB in a draft UAA. The work plan identifies the factors affecting use attainment that will be analyzed, the scope of data currently available and the scope of data to be gathered, and provisions for public notice and consultation with appropriate state and federal agencies. Work is anticipated to commence in 2020 shortly after work plan approval, followed by public notice/consultations; the draft UAA submittal is anticipated within 3-6 months of work plan approval.

The purpose of this document is to present a work plan pursuant to the requirements contained in 20.6.4.15.D NMAC to determine if natural thermal conditions are preventing the attainment of coldwater aquatic life use in the perennial reach of the Upper Sandia Canyon AU. The Upper Sandia Canyon AU is located in a perennial reach of upper Sandia Canyon between Sigma Canyon and NPDES Outfall 001 (Figure 4). The classified Segment 20.6.4.126 NMAC (Segment) comprises perennial waters within Los Alamos National Laboratory (LANL) boundaries and includes the Upper Sandia Canyon AU. The persistent surface flows to the Upper Sandia Canyon AU originate from NPDES permitted effluent discharges. These discharges have occurred since the early 1950's and continue today. The sources for the discharges are LANL's treated sanitary waste water (outfalls 03A027 and 03A199) and TA-3 power plant waste water (Outfall 001). Most of the outfall discharge originates from NPDES permitted Outfall 001.

The Upper Sandia Canyon AU is listed as not meeting the coldwater aquatic life use and one of the listed causes for the impairment includes temperature. NMED assigned it to IR Category of 5B indicating the need for review of the water quality standard. Temperature is one of the three most common causes for water quality impairment in New Mexico (NMED 2018).

[1] A UAA is a scientific study conducted for the purposes of assessing the factors affecting the attainment of a designated use (§20.6.4.15 NMAC). A UAA shall assess the physical, chemical, biological, economic or other factors affecting the attainment of a use, relying on scientifically defensible methods.

[2] The criteria applicable to the coldwater aquatic life designated use are dissolved oxygen 6.0 mg/L or more, 6T3 temperature 20°C (68°F), maximum temperature 24°C (75°F) and pH within the range of 6.6 to 8.8 (§20.6.4.900.H(2) NMAC).

Regulatory History of the Upper Sandia Canyon AU

In 2005, the Water Quality Control Commission (WQCC) adopted the Upper Sandia Canyon AU as a classified water of the State with the designated use of coldwater aquatic life and the segment-specific temperature criteria of 24°C. The decision to adopt the segment-specific temperature criteria was based on the 2002 U.S. Fish and Wildlife Service (USFWS 2002) study that included continuous temperature recording within the Upper Sandia Canyon AU during the summer of 1997. During summer time conditions, stream temperatures within the Upper Sandia AU exceeded the coldwater (fishery) aquatic life use. The study concluded that a coldwater aquatic life designated use, defined by a site-specific maximum temperature of 24°C was appropriate. Low flow conditions were not identified as a contributing factor. NMED SWQB prepared a UAA (NMED 2007) detailing the attainable aquatic life uses for the new Segment and submitted it to EPA for approval. EPA approved Segment 20.6.4.126 NMAC in September of 2007.

In 2010, as part of a revision of the New Mexico Water Quality Standards, the WQCC discontinued site-specific temperature listings when they did not differ from the coldwater temperature criteria contained in 20.6.4.900.H NMAC. The Upper Sandia Canyon AU's site-specific maximum temperature standard of 24°C was eliminated and replaced with the general coldwater temperature criteria contained in 20.6.4.900.H NMAC, which also specify a maximum temperature of 24°C but also include the criterion that a temperature of 20°C not be exceeded for six or more consecutive hours in a 24-hour period on more than three consecutive days (6T3). Attainability for the Upper Sandia Canyon AU of the general coldwater criteria, and specifically the 6T3 requirement, has not been previously analyzed. Because naturally occurring conditions (in particularly in June, July and August air temperatures) might prevent attainment, preparation of a UAA is necessary.

In the NMED's 2018-2020 Integrated Report (IR) (NMED 2018), the Upper Sandia Canyon AU is listed as not meeting the coldwater aquatic life designated use for temperature. Temperature was added and assigned an IR Category of 5B indicating the need for review of the water quality standard.

Problem Statement

The Upper Sandia Canyon AU is classified in segment 20.6.4.126 NMAC[3] as the perennial water body that extends from Sigma Canyon upstream to LANL NPDES Outfall 001 (Figure 4).[4] Unlike other segment 126 perennial waters, which emanate from springs, the perennial flow in the Upper Sandia Canyon AU originates from continuous flows of treated effluent discharged in accordance with National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355. This NPDES permit authorizes pollutant

[3] Hereafter referred to as "segment 126." Segment 126 was established in New Mexico water quality standards adopted in 2005.

[4] Besides the Upper Sandia AU, Segment 126 includes waters in perennial portions of Cañon de Valle from LANL stream gage E256 upstream to Burning Ground Spring, 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.

discharges to the Upper Sandia Canyon AU through three outfalls[5]. Storm water discharges to the AU are also authorized under separate NPDES permits[6]. The water quality in the Upper Sandia Canyon AU water body is listed as impaired due in part to exceedances of the water quality criteria for temperature applicable to the coldwater aquatic life use (NMED 2018). The proposed UAA will evaluate the attainability of this designated use for the Upper Sandia AU.[7]

20.6.4.15.A(1) NMAC provides that the Water Quality Control Commission "may remove a designated use specified in Section 101(a)(2) of the federal Clean Water Act . . . only if a use attainability analysis demonstrates that attaining the use is not feasible because of a factor listed in 40 CFR 131.10(g)." 20.6.4.15.A NMAC further provides that "[w]henever a use attainability analysis is conducted, it shall be subject to the requirements and limitations set forth in 40 CFR Part 131, Water Quality Standards; specifically, Subsections 131.3(g), 131.10(g), 131.10(h) and 131.10(j) shall be applicable."

40 CFR § 131.10(g) provides that a State may remove a designated use that is not an existing use, as defined in 40 CFR §131.3, if a UAA demonstrates that attaining the use is not feasible because:

1. Naturally occurring pollutant concentrations prevent the attainment of the use;
2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met;
3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;
4. Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use and is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the use;
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6. Controls more stringent than those required by sections 301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

---

[5] Outfalls 001, 03A027 and 03A199. Only one of these outfalls (001) has numeric effluent limitations for water temperature. According to NPDES Permit No. NM0028355, Outfall 001 discharges LANL power plant waste water from cooling towers, boiler blowdown drains, demineralizer backwash, R/O reject, floor and sink drains, and treated sanitary wastewater.

[6] Storm water discharged to the Upper Sandia Canyon AU is authorized under NPDES Permit No. NMR05GB21 for current industrial activities, and NPDES Permit No. NM0030759 for certain solid waste management units and areas of concern. Storm water also is discharged to the Upper Sandia Canyon AU from LANL and Los Alamos County areas that do not require an NPDES permit.

[7] "Existing use" means a use actually attained in a surface water of the state on or after November 28, 1975, whether or not it is a designated use (§20.6.4.7 NMAC).

If the findings of the proposed UAA establish that the coldwater aquatic life designated use is not attainable in the Upper Sandia Canyon AU, then Triad and DOE-NA-LA will request a change to Water Quality Standards and propose the most protective designated use.

Site Characteristics and Ecoregion Setting

LANL is located in northern New Mexico on the Pajarito Plateau, which extends eastward from the Sierra de los Valles, the eastern portion of the Jemez Mountains. Most of the finger-like mesas at the Laboratory are formed from Bandelier Tuff, which is composed of ash fall, ash-fall pumice, and rhyolite tuff. Deposited by major eruptions in the Jemez Mountains volcanic center 1.2 to 1.6 million years ago, the tuff is more than 1000 ft. thick in the western part of the plateau and thins to about 260 ft. eastward above the Rio Grande.

On the western part of the Pajarito Plateau, the Bandelier Tuff overlaps onto the Tschicoma Formation, which consists of older volcanics that form the Jemez Mountains. In the central Pajarito Plateau and near the Rio Grande, the Bandelier Tuff is underlain by the Puye Formation. The Cerros del Rio basalts interfinger with the Puye Formation along the river and extend beneath the Bandelier Tuff to the west. These formations overlie the sediments of the Santa Fe Group, which extend across the basin between the Laboratory and the Sangre de Cristo Mountains and are more than 3300 ft. thick. Figure 1 is a generalized geologic cross-section of the Pajarito Plateau (LANL 2018).

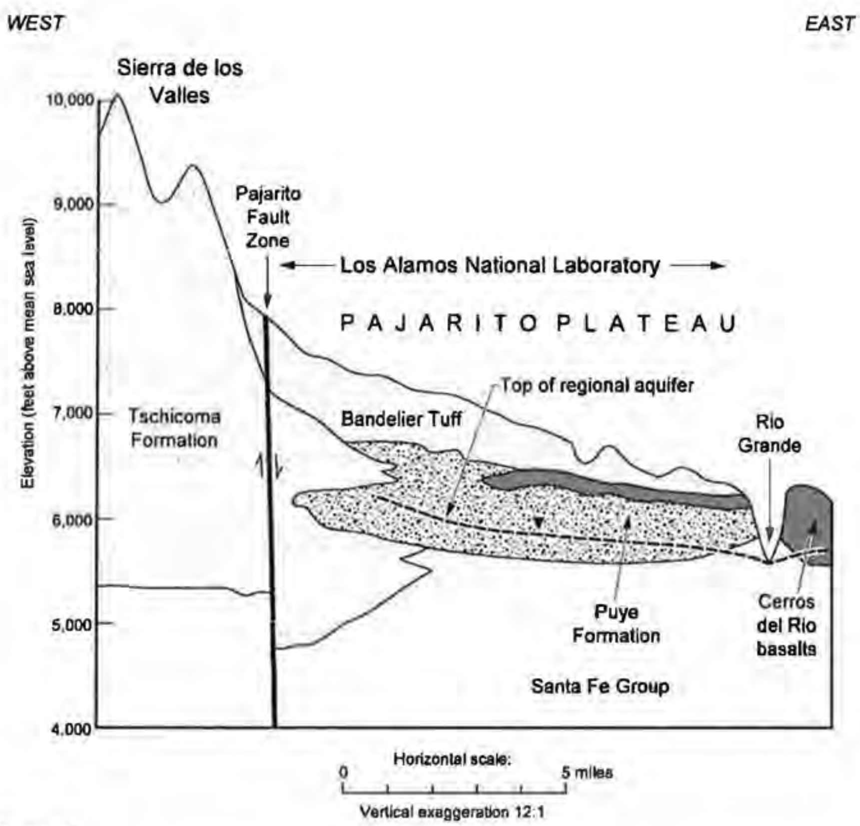


Figure 1

The plateau slopes downward to the east-southeast, covering a distance of more than 15 miles from the base of the Jemez Mountains (approximately 7800 ft.) to a location just above the Rio Grande River (approximately 6200 ft.) Numerous alternating finger mesas and canyons run along the plateau slope line. The Canyons are 150-300 ft. deep and 300 to 600 ft. wide. Laboratory lands contain all or parts of seven primary watersheds that drain to the Rio Grande. Listed from north to south, the major canyons for these watersheds are Los Alamos, Sandia, Mortandad, Pajarito, Water, Ancho and Chaquehui Canyons. Each of these watersheds includes tributary canyons of various sizes (Figure 2). Los Alamos, Pajarito and Water have their headwaters west of the Laboratory in the eastern Jemez Mountains. The remainder of the primary watersheds have their headwaters on the Pajarito Plateau.

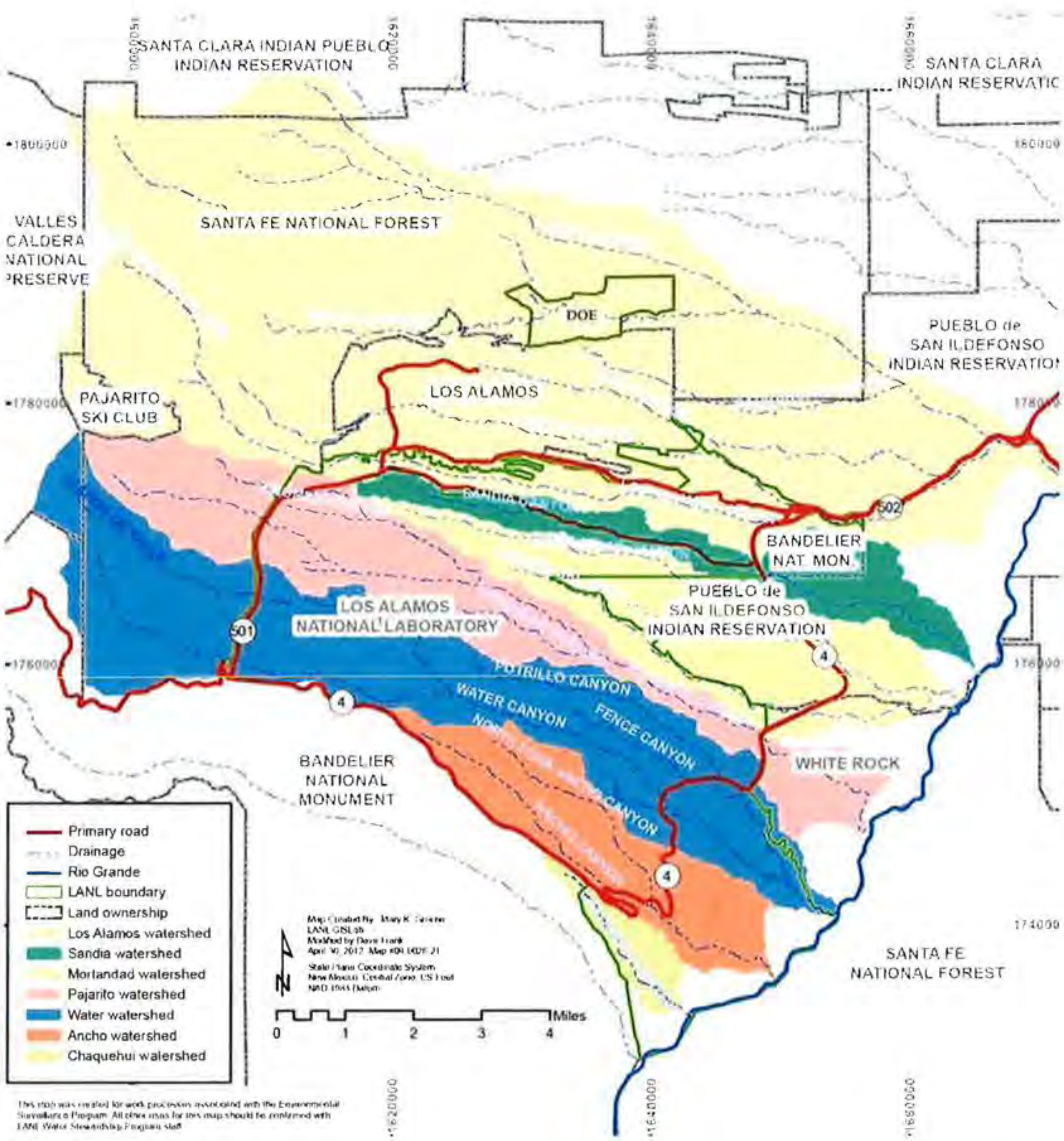


Figure 2

Los Alamos has a semiarid, temperate mountain climate. Summers have moderately warm days and cool nights. Afternoon temperatures are in the 70s and 80s (°F) and infrequently reach 90°F. Daily temperate ranges are relatively large at Los Alamos, especially during the summer. Annual precipitation normally totals more than 20 in. in the adjacent Jemez Mountains. Los Alamos precipitation is characteristic of a semiarid climate in that variations in precipitation from year to year are quite large. For instance, the annual precipitation extremes range from 6.80 to 30.34 in. over a 69-year period. Forty percent of the annual precipitation falls in July and August during the height of the monsoon season. The rainfall is often accompanied by small hailstones (LANL 1990).

Sandia Canyon heads on the Pajarito Plateau in Technical Area 03 (TA-3), has a maximum elevation of approximately 7600 ft. above sea level, and extends approximately 10.9 miles to the Rio Grande at an elevation of approximately 5445 ft. The watershed has a drainage area of 5.5 mi^2, of which 45% is on Laboratory land, 39% is on Pueblo de San Ildefonso land, 15% is within Bandelier National Monument, and 1% is on private land (LANL 2009).

The Upper Sandia Canyon AU originates at NPDES Outfall 001 in TA-3 at an elevation of approximately 7300 feet, extends approximately 2.22 miles, and terminates at the confluence with Sigma Canyon. The entire Upper Sandia AU is within the Laboratory on lands owned by the DOE. Approximately 250 acres of lands within the Upper Sandia Canyon AU are comprised of impervious surfaces located within an urban environment. TA-3 contains most of the Laboratory's administrative buildings and public and corporate access facilities and houses several Laboratory activities such as experimental sciences, special nuclear materials, theoretical/computations, and physical support operations. Remaining areas are comprised of parking lot and native perennial vegetation or landscaping. The watershed discharging to the Upper Sandia AU is comprised of approximately 800 acres of Laboratory property and 29 acres of area under the control of Los Alamos County (LANL Decision Support Tool) and Intellus GIS Map Tool (https://www.intellusnm.com/). No known springs are located within the Upper Sandia AU (LANL 2009).

Surface water in Upper Sandia Canyon AU originates from discharges from outfalls, stormwater runoff, and snowmelt runoff, the latter being a relatively minor component. The persistent surface flows to the upper Sandia Canyon AU originate from NPDES permitted effluent releases. Absent these flows, ephemeral conditions exist. Stormwater runoff supplements effluent discharges, and in some months can be a major contributor to the total surface water flow. Persistent surface flows and saturated alluvial aquifer conditions occur in the upper and middle portions of the AU. A wetland of approximately 7 acres has developed as a result of effluent discharges. Currently, three NPDES permitted outfalls discharge to upper Sandia Canyon in the TA-3 area:

- NPDES Outfall 001 discharges effluent from the Laboratory's TA-46 Sanitary Waste Water System Plant and the TA-3 Steam Plant boilers. Outfall 001 is the main effluent source of water to Sandia Canyon, discharging an average of 0.168 MGD in 2017.
- NPDES Outfall 03A027 and Outfall 03A199 (associated with cooling towers at the Strategic Computing Complex (SCC) and the Laboratory Data Communications Center (LDCC), respectively) discharge to Sandia Canyon. Blowdown from the SCC cooling towers is at this time diverted to Outfall 001. SCC tower water may also be sent to the Reuse Tank at the Power Plant

for treatment at Sanitary Effluent Reclamation Facility (SERF). Outfall 199 discharged an average of 0.0307 MGD in 2017.

The Sandia Canyon AU originates and is contained entirely within Level IV Ecoregion 21d (Figure 3), Foothill Woodlands and Scrublands (http://ecologicalregions.info/data/nm/nm_map.pdf). This semiarid region has rolling to irregular terrain of hills, ridges, and footslopes, with elevations mostly 6000 to 8500 feet, and a variety of rock and soil types. Ecoregion 21 contains the highest elevations and the lowest air temperatures in the Upper Rio Grande basin. Natural streams in Ecoregion 21 range from moderate to high gradient perennial, intermittent, and ephemeral streams with cobble, gravel and sandy substrates. Ecoregion 21d represents a transition between 21 and 22 (Figure 3).

New Mexico Level Ecoregion Map

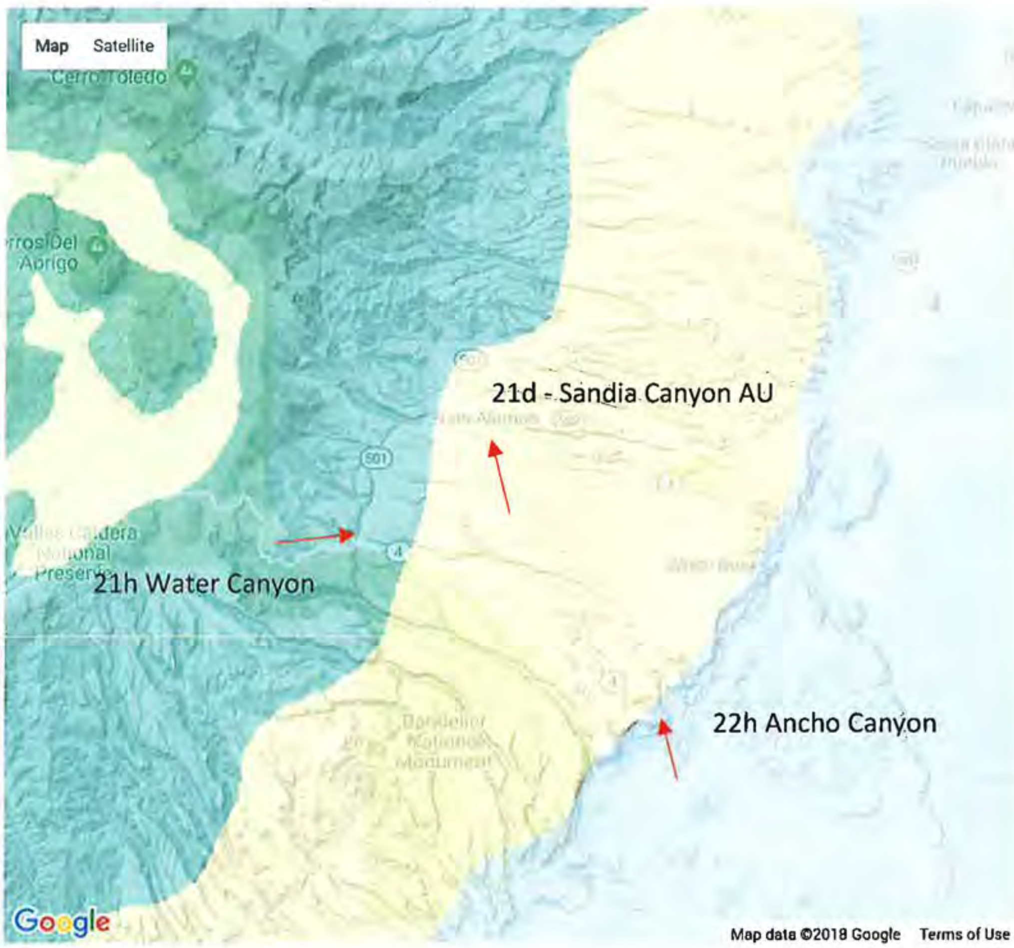


Figure 3

Groundwater beneath the Pajarito Plateau occurs in three modes: (1) perched alluvial groundwater in the bottom of some canyons, (2) small areas of intermediate-depth perched groundwater, and (3) the regional aquifer. For purposes of this work plan only alluvial-surface interactions will be discussed in detail.

Alluvial groundwater is a limited area of saturated rocks and sediments directly below canyon bottoms. Surface water percolates through the alluvium until downward flow is disrupted by less permeable layers of rock, resulting in shallow perched bodies of groundwater. Most of the canyons on the Pajarito Plateau have infrequent surface water flow and, therefore, little or no alluvial groundwater. A few canyons have saturated alluvium in their western ends supported by runoff from the Jemez Mountains. In some locations, surface water is supplemented or maintained by discharges from Laboratory outfalls. As alluvial groundwater moves down a canyon, it either evaporates, is used by plants, or percolates into underlying rock (LANL 2018).

Alluvial groundwater in Sandia Canyon is recharged daily by surface water flow, largely supplied by effluent from Outfall 001, and periodically by stormwater. It generally accumulates in the lower part of the alluvial reaches that fill the canyon bottom, most often perching on or within shallow bedrock units. Within the Upper Sandia AU, the alluvium thickness increases with increasing distance from the wetland. The alluvial groundwater system extends farther down canyon than do the daily stream-flow events. Sandia Canyon alluvial groundwater level responses to surface-water flow were considered in the 2009 Sandia Canyon Investigation Report (LANL 2009).

Factors Affecting Use Attainment That Will Be Analyzed

This UAA will examine Factor 1 (40 CFR 131.10(g)(1)): Naturally occurring pollutant concentrations prevent the attainment of coldwater aquatic life use. Based on the information above, an in consultation with NMED, Factor 1 was selected as the most appropriate alternative for determining the highest attainable use.

Lines of Evidence and Areas of Analysis

The UAA will analyze factor 1 – whether naturally occurring pollutant concentrations (temperature) prevent the attainment of the coldwater aquatic life designated use – using NMED's Air-Water Temperature Correlation (AWTC) guidance document and model (NMED (2011)) as the starting point for the analysis. The model was developed for identifying appropriate stream classifications and attainable aquatic life use subcategories. The AWTC model allows for estimation of attainable maximum weekly average temperatures (MWAT), T_{MAX}, 4T3 and 6T3 water temperatures using average air temperatures (ATEMP). For surface waters in the State, the MWAT is approximately equal to the location's July ATEMP. The UAA will then analyze water temperature and flow data obtained from the Upper Sandia Canyon AU.

The UAA will use several lines of evidence to determine whether the coldwater aquatic life designated use is attainable in the Upper Sandia Canyon AU:

1. PRISM (Parameter-elevation Relationships on Independent Slopes Model) AN81m surface air temperature data[8]. This data includes PRISM July monthly mean temperature (t_{mean}) data for the two PRISM grid cells coterminous with the Upper Sandia Canyon AU.[9] PRISM calculates average daily minimum and maximum surface air temperatures on a monthly time step (t_{min} and t_{max}) on a 30-arcsec (~800-m) grid across the contiguous United States.[10] It calculates t_{mean} as $(t_{max} + t_{min})/2$. A detailed description of the AN81m dataset is provided in PRISM Climate Group (2016).

2. Near surface air temperature measurements from the LANL meteorological monitoring network (LANL MET). This includes historical near-surface air temperature measurements collected from LANL MET stations TA-6[11] and TA-53. The TA-6 station is located at an elevation of 7,424 ft. near the head of Two-Mile Canyon, approximately one mile south of and at approximately the same elevation as Outfall 001. The TA-53 station is located at an elevation of 6,990 ft. on the narrow mesa between Sandia and Los Alamos Canyons, approximately a mile east of the lower end of the Upper Sandia Canyon AU. The location of the LANL MET stations and the boundaries of the coterminous PRISM grids cells are shown on Figure 4. Air temperature data required to support development of ATEMP for use in AWTC are available from LANLs Weather home page (The Weather Machine[12]). A detailed description of the Laboratory's Meteorological Monitoring Program including measurements made, tower locations, data management, and data accessibility is contained in Meteorology Monitoring at LANL at Los Alamos (LANL 2014). Meteorological monitoring is carried out pursuant to the Program's procedures (LANL 2016).

3. Water temperature data collected from four thermographs deployed in the Upper Sandia Canyon AU on July 2, 2014 and two additional thermographs deployed in the Upper Sandia Canyon AU on June 30, 2016 and May 17, 2018 will be analyzed. The locations of these thermographs were: (i) below NPDES Outfall 001; (ii) below Sanitary Effluent Reclamation Facility; (iii) within Upper Sandia wetland; (iv) at environmental surveillance gage E123; (v) below E123; (vi) at Cross Country Line; and (vii) Sandia at Confluence with Sigma Canyon.

---

[8] This is the official surface air temperature data set of the U.S. Department of Agriculture (Daly et al. 2008).

[9] Latitude 35.8755 longitude-1063181 elevation 7582' (Upper Sandia AU – west) and latitude 35.8694 longitude: -106.3073 elevation 7149' (Upper Sandia AU – east)

[10] PRISM calculates a climate – elevation regression for each digital elevation model grid cell. Surface stations used in the analysis numbered nearly 10,000 for temperature. Stations are weighted based on similarity of the station to the grid cell. Factors considered are location, elevation, coastal proximity, topographic facet orientation, vertical atmospheric layer, topographic position and orographic effectiveness of the terrain. For additional details, see Daly et al. (2008).

[11] The LANLMET station located in LANL Technical Area 6 (TA-6) has been the official meteorological station for Los Alamos since August 1990. Climate statistics for the upper Pajarito Plateau are compiled from observations from this station.

[12] The Weather Machine is operated by LANLs Meteorological Monitoring Program. The program is required by the U.S. Department of Energy orders in support of Laboratory operations and emergency preparedness.

Thermographs were deployed and maintained in accordance with NMED SOP 6.3[13] and EPC-CP-QP-1009 (LANL 2019)[14].

a. Thermographs were deployed throughout the AU in sites representative of ambient conditions.

   i. Deployed in water with consistent flows.

   ii. Thermographs were not deployed in deep pools and shallow riffles.

b. Prior to deployment, thermographs were checked to ensure temperature accuracy.

c. The thermographs were set to collect temperatures at 15-minute intervals.

d. Field deployment, data uploads and periodic inspection information was recorded on *NMED's Thermograph Deployment/Upload/Retrieval Field Sheet*. All data were uploaded to a LANL server.

e. The location of the Upper Sandia AU thermographs are shown on Figure 4.

f. Thermograph measurements will be verified for completeness and correctness.

g. Precipitation events, air temperature fluctuations, discharge volumes storm flow events will be evaluated against any data irregularities. Data irregularities may indicate the thermograph was out of the water, buried or in some cases was not working properly.

h. Data indicating invalid measurements will not be used in development of the UAA.

i. Thermograph measured data will be used with predicted data from PRISM to develop UAA conclusions.

j. Measured and predicted temperatures will be evaluated against microclimate impacts caused by natural AU features; i.e., wetlands, riparian vegetation, or canyon orientation.

4. Flow data is available from three permanent (E121, E122 and E123) and two temporary gage stations (E123.6 and E123.8):

   a. All gages all located within the Upper Sandia Canyon AU (Figure 4).

   b. Permanent gage data will be reviewed for the period of October 2014 through September 2018.

   c. The permanent gages are part of the Laboratory's Environmental Surveillance system.

[13] NMED Surface Water Quality Bureau Standard Operating Procedure for Temperature Data Loggers.
[14] EPC-CP-QP-1009 Compliance Programs Group Quality Procedure

d. In 2007 the temporary gages were installed in a narrow bedrock-dominated portion of Upper Sandia Canyon AU between E123 and E124 (LANL 2007, 2009) as part of a larger study to understand the location of surface water alluvial loss in Sandia Canyon between surface water gaging stations E123 and E124 (Figure 4).

e. Flow data from temporary gages may assist in determining if lateral migration and reemergence of surface into the channel (LANL 2007, 2009) impacts stream temperatures.

f. Evaluate AWTC predicted temperatures and measured temperatures and estimate potential cooling or warming effects as a result of surface-alluvial interactions. Diurnal variations in stream temperature may be reduced as a result of surface-alluvial interactions.

g. Examine the interactions between variation in stream temperatures and variation in stream flows.

Discharge is measured using meters and methods adopted by the USGS[15](USGS 1982).

h. Raw data are qualified using a standard set of numbers to better determine the quality of data.

i. Qualifiers are noted within the daily peak discharge tables with a letter or letters (e.g., E = Equipment malfunction, M = Missing data, I = ice, SS = silting and scouring, DS = datum shift, S = Snow).

j. Data are reliably estimated during short periods of time using precipitation data to verify no precipitation and/or, when applicable, upstream or downstream stream-gage data.

k. A complete record at a gage station includes stage and discharge measurements, directly observed factors that affect the stage/discharge relationship and weather records.

l. Rating curves were developed using the stage-discharge relationship curve determined from measured stage and the corresponding discharge.

m. The accuracy of stream discharge records is determined:

    i. Stability of stage discharge relationship.

[15] The methods are found in the USGS technique of Water Resources Investigations, Book 3 (Carter and Davidian 1968), Chapter A6; and the USGS Water Supply Paper 2175 (Rantz 1982)

   ii. Accuracy of measurements of stage, accuracy of discharge measurement, and interpretations of records

5. Upper Sandia Canyon AU NPDES Permit No. NM0028355 discharge volume. NPDES outfall discharge amounts and discharge temperatures are available from discharge monitoring reports (DMRs) provided monthly to EPA and NMED. Discharges from outfalls can fluctuate causing changes in stream flow that might impact temperatures. The interaction between variations in stream temperatures and variations in stream flow and discharge temperatures will be considered.

6. Threatened and Endangered Species and Critical Habitat. Existing documentation of presence or absence of threatened and endangered species and critical habitat in the Upper Sandia Canyon AU would be analyzed per LANL's Habitat Management Plan (HMP) (LANL 2017b). The HMP is a comprehensive plan that balances current operations at LANL and future development within habitat of listed species. The following federally listed threatened or endangered species currently have site plans at LANL: Mexican Spotted Owl (*Strix occidentalis lucida*), Jemez Mountains Salamander (*Plethodon neomexicanus*), and Southwestern Willow Flycatcher (*Empidonax trailii extimus*). The UAA would include an evaluation of potential impact of proposed water quality changes on listed threatened or endangered species located within the Upper Sandia Canyon AU.

7. In 2017 and 2018, LANL performed aquatic life surveys in the Upper Sandia Canyon AU pursuant to the sampling and monitoring Supplemental Environmental Project (LANL 2016) and in accordance with Berryhill and Gaulker (2017a). The survey data would be reported and summarized using standard metrics, and benthic invertebrate indices. The information will provide an update of unique taxa populations identified within the AU in previous investigations.

8. Ecoregion 21d represents a transition between 21 and 22 (Figure 3). A 2010 Jessup study, cited in the 2017 Tecolote Creek UAA (NMED 2017), classified level IV ecoregions in New Mexico into three sedimentation categories: Mountain, Foothills and Xeric based on habitat variables. For streams that support their designated aquatic life use, these ecoregions roughly, correspond to the aquatic life use designations of high quality coldwater/coldwater, coolwater and warmwater/marginal warmwater. The transition nature of 21d will be examined against measured and predicted temperatures. Thermographs were deployed in the summer of 2017 and 2018 within perennial waters in Ancho (Ecoregion 22h) and Water Canyons (21h) (Figure 3).

9. Dissolved oxygen (DO) and pH measurements are available from LANL's environmental surveillance gages E121, E122 and E123 for 2016, 2017, 2018 and 2019. The gages are located within the Upper Sandia Canyon AU (Figure 1). DO and pH data are collected pursuant to the

Laboratory's Interim Facility-Wide Groundwater[16] Monitoring Plan (LANL 2017). DO and pH will be evaluated to ensure constituents fall within acceptable levels and are not preventing attainment of use.

10. The Stream Segment Temperature (SSTEMP) Model[17], will be used to simulate temperatures and estimate the effects resulting from potential changes in alluvial groundwater inflow/outflow. SSTEMP will be applied in the Upper Sandia Canyon AU where measured flow data is available. Variables used in SSTEMP will be obtained from PRISM, LANL MET and Environmental Surveillance Gages. In cases where variables are not available, SSTEMP suggested values or methods will be utilized. SSTEMP will be applied as a contingency method for determining the highest attainable designated use if it is determined that use of NMED's AWTC Model is not appropriate.

Items will only be included if scientifically defensible analyses of the relevant data can be demonstrated to contribute to the analysis of use attainability.

Stakeholder Outreach and Public Engagement

During and after the preparation of the UAA, and pursuant to 20.6.4.15.D NMAC, Triad and DOE-NA-LA will provide for public notice and consult with appropriate state and federal agencies.

Public Notice

Triad/DOE-NA-LA will deliver a presentation on the UAA process two regularly scheduled Northern New Mexico Citizens Advisory Board ("NNMCAB") bi-monthly meetings. The advisory board is chartered to provide citizen input to the U.S. DOE on issues of environmental monitoring, remediation, waste management, and long-term environmental stewardship at LANL. Attendees of NNMCAB meetings typically include individuals affected by DOE site clean-up activities. The NNMCAB Board meeting announcements and agendas are published in the Federal Register, and newspaper. Board and committee meetings are also announced through a large email network consisting of over 100 individuals and organizations, and online at the NNMCAB web site - https://www.energy.gov/em/nnmcab/northern-new-mexico-citizens-advisory-board. The presentation at the first meeting will consist of a description of the Upper Sandia Canyon AU, existing conditions within the Upper Sandia Canyon AU. A second meeting will address the proposed UAA and if supported

[16] The Interim Facility-Wide Groundwater Monitoring Plan was required under the Compliance Order on Consent. And requires LANL collect and analyze groundwater and surface water samples at specific locations and specific constituents.

[17] The SSTEMP Model, Version 2.0.8, developed by the USGS Biological Resource Division (Bartholow 2002) was used to predict stream temperatures based on watershed geometry, hydrology, and meteorology. The model predicts mean, minimum, and maximum daily water temperatures throughout a stream reach by estimating the heat gained or lost from a parcel of water as it passes through a stream segment (Bartholow 2002). The predicted temperature values are compared to actual thermograph readings measured in the field in order to calibrate the model.

by the UAA – the proposed change to the Upper Sandia Canyon AU's designated use, and instructions about how to submit comments on the UAA.

The same presentation as described above will be provided at one or two regularly scheduled Accord Pueblo meeting. The Accord Pueblos include Pueblo de San Ildefonso, Santa Clara Pueblo, Pueblo of Jemez and Pueblo de Cochiti. The U.S. DOE entered into Accords with the four Pueblos in 1992 which formalize the government-to-government relationship. LANL routinely meets with the Accord Pueblos to consult on matters of mutual concern including but not limited to monitoring of cultural sites and tracking water quality issues. A decision about whether to schedule a second meeting will be made by Triad/DOE-NA-LA upon completion of the first meeting.

Triad/DOE-NA-LA will post a public comment draft UAA on LANL's Electronic Public Reading Room. A hard copy will be made available in the Public Reading Room in Pojoaque. Comments will be accepted for 30 days at the UAA specific email address or at a physical mailing address. Prior to commencement of the 30-day comment period, Triad/DOE-NA-LA will publish notice in a local newspaper that will provide information regarding the availability of electronic and physical copies of the public comment draft UAA and the process for submission of comments. The comment period will be extended as necessary to accommodate the schedules of the NNMCAB, Accord Pueblos and federal agencies. Persons providing comments will be afforded the opportunity to meet and discuss the issues with Triad/DOE-NA-LA staff. These individuals will be contacted directly and a mutually acceptable meeting site selected.

For the purpose of receiving comments and answering questions, Triad/DOE-NA-LA will, in its presentations, provide an email address specific to this UAA process. This email address will remain active until either a petition to modify the Upper Sandia Canyon AU coldwater aquatic life designated use is filed with WQCC, or a decision is made by Triad/DOE-NA-LA that the UAA findings do not warrant filing a petition.

Triad/DOE-NA-LA will evaluate comments and incorporate responses into the final UAA as appropriate. Triad/DOE-NA-LA will prepare a comment and response summary document that will be included with the petition submitted to the WQCC.

Consultation with Appropriate State and Federal Agencies

A request will be made to present the draft UAA to the East Jemez Resource Council. Established in 1996 after the Dome Fire the EJRC is made of land management agencies with the goal of maintaining and enhancing the natural and cultural resources of the East Jemez Mountains. EJRC members include: U.S Forest Service, National Park Service, U.S Geological Survey, U.S. Army Corp of Engineers, DOE, LANL and NMED. EJRC meets twice per year.

USEPA Region 6 will receive this work plan for review and comment and will also receive the related final water quality standard for review and approval, if the UAA results in changes to New Mexico water quality standards adopted by the WQCC.

NMED-SWQB and USEPA Region 6 will receive appropriate notices associated with related WQCC proceedings.

References cited

Bartholow, J.M. 2002. *SSTEMP for Windows: The Stream Segment Temperature Model* (Version 2.0). U.S. Geological Survey computer model and documentation. Available at http://www.fort.usgs.gov. Revised August 2002.

Berryhill and Gaulker. 2017 Sampling and Analysis Plan for Supplemental Environmental Project: Aquatic Life Surveys.

Daly C, Halbleib M, Smith JI, Gibson WP, Doggett MK, Taylor GH, Curtis J, Pasteris PP. 2008. Physiographically sensitive mapping of climatological temperature and precipitation across the conterminous United States. Int J Climatol 28(15):2031-2064. International Journal of Climatology

Griffith, G.E., Omernik, J.M., McGraw, M.M., Jacobi, G.Z., Canavan, C.M., Schrader, T.S., Mercer, D., Hill, R., and Moran, B.C., 2006, Ecoregions of New Mexico (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,400,000).

LANL.2019. EPC-CP-QP-1009 - Environment, Safety, Health, Quality, Safeguards, and Security Directorate Environment Protection and Compliance – Compliance Programs Group Quality Procedure -

LANL. 2018. Annual Site Environmenal Report. December 2019

LANL.2017 Interim Facility-Wide Groundwater Monitoring Plan for the 2018 Monitoring Year. May 2018

LANL.2017a. Sampling and Analysis plan for Supplemental Environmental Project: Aquatic Life Surveys. August 2017

LANL. 2017b. Threatened and Endangered Species Habitat Management Plan for Los Alamos National Laboratory. October 2017: T and E Habitat Managment Plan for LANL

LANL.2016 Supplemental Environmental Project, Supplemental Sampling and Monitoring Work Plan Regarding Settlement Agreement and Stipulated Final Order HWB-14-20, Addendum 3.

LANL.2016 Technical Project Plan for Meteorological Monitoring - May 2016

LANL.2014 Meteorological Monitoring at Los Alamos - May 2014: Meteorological Monitoring at Los Alamos

LANL. 2009. Sandia Canyon Investigation Report (Appendix F) – October 2009: Sandia Canyon Investigation Report October 2009

LANL.2007. Fate and Transport Modeling Report for Chromium Contamination from Sandia Canyon. September 2007: https://www.lanl.gov/environment/public-reading-room.php

LANL.1990 Los Alamos Climatology - Bowen May 1990

NMED. 2018. 2018-2020 state of New Mexico clean water act section 303(d)/section 305(b) integrated report. New Mexico Environmental Department. Surface Water Quality Bureau, Santa Fe, NM. Clean Water Act 303(d)/305(b) Integrated Report

NMED.2017. Use Attainability Analysis Aquatic Life Use Designation for Tecolote Creek, U.S. Interstate 25 (I-25) to Blue Creek, San Miguel County, NM

NMED. 2011. Air-water temperature correlation. New Mexico Environment Department, Surface Water Quality Bureau. Water Quality Standards - Air-Water Correlation

NMED. 2007. UAA for Water Located on Los Alamos National Laboratory as described in Sections 20.6.4.128 and 128 NMAC New Mexico Water Quality Standards, July 17, 2005, August 2007. Water Quality Standard Amendments

PRISM Climate Group. 2016. Descriptions of PRISM spatial climate datasets for the conterminous United States. Parameter-elevation Relationships on Independent Slopes Model Climate Group. PRISM Climate Group

USFWS 2002. Water Quality Assessment for Four Intermittent Streams in Los Alamos County, New Mexico USFWS July 2002

USGS 1982. Rantz - Measurements and Computations of Streamflow: Volume 1 Measurements of Stage and Discharge; Volume 2 Computation of Discharge - USGS Water Supply Paper 2175 (Rantz 1982)

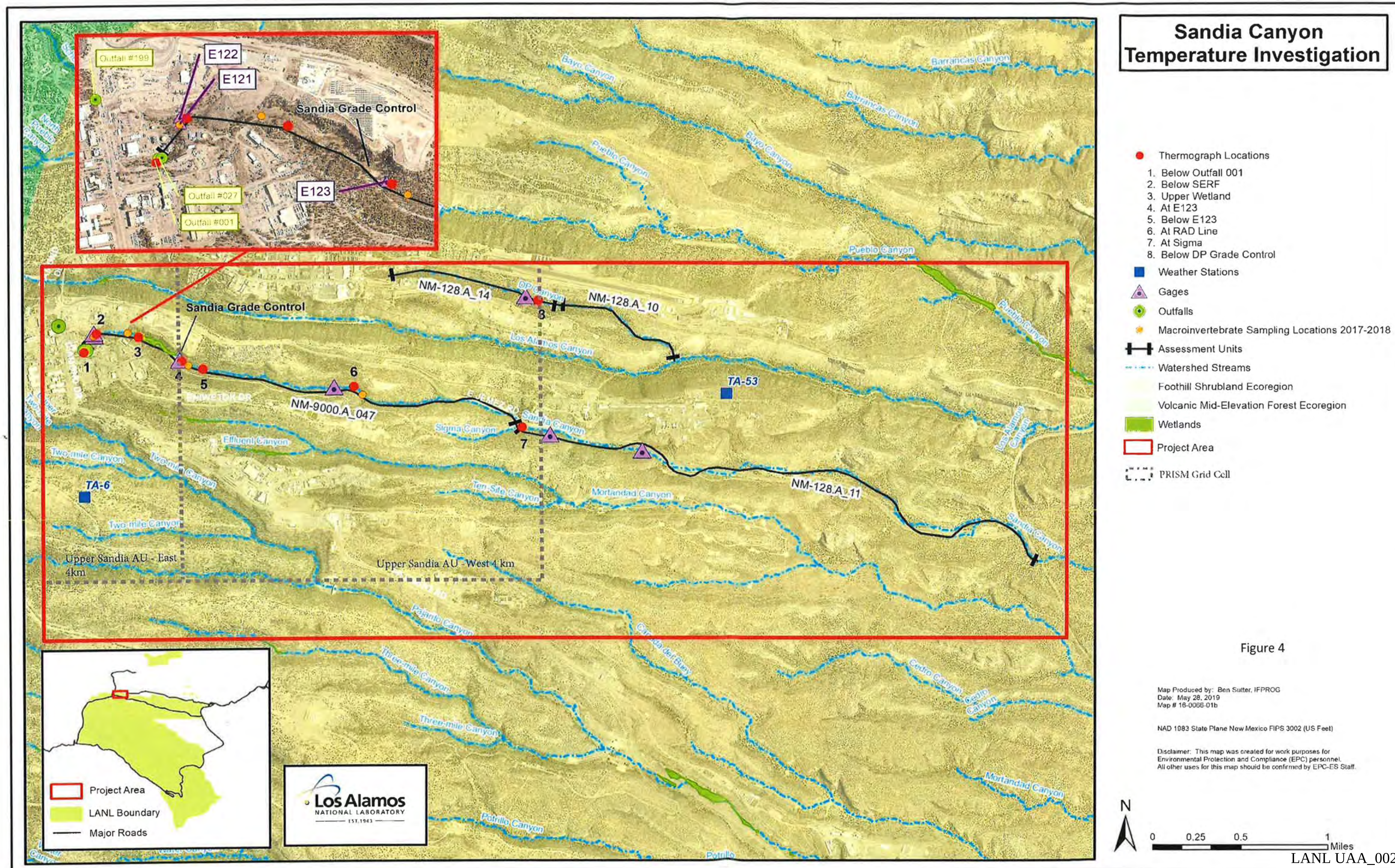

Sandia Canyon Temperature Investigation
Thermograph Locations
1. Below Outfall 001
2. Below SERF
3. Upper Wetland
4. At E123
5. Below E123
6. At RAD Line
7. At Sigma
8. Below DP Grade Control
Weather Stations
Gages
Outfalls
Macroinvertebrate Sampling Locations 2017-2018
Assessment Units
Watershed Streams
Foothill Shrubland Ecoregion
Volcanic Mid-Elevation Forest Ecoregion
Wetlands
Project Area
PRISM Grid Cell
Outfall #199
E122
E121
Sandia Grade Control
E123
Outfall #027
Outfall #001
NM-128.A_14
NM-128.A_10
NM-9000.A_047
NM-128.A_11
TA-53
TA-6
Upper Sandia AU - East 4km
Upper Sandia AU - West 4 km
Project Area
LANL Boundary
Major Roads
Los Alamos NATIONAL LABORATORY EST.1943
Figure 4
Map Produced by: Ben Sutter, IFPROG
Date: May 28, 2019
Map # 18-0068-01b
NAD 1983 State Plane New Mexico FIPS 3002 (US Feet)
Disclaimer: This map was created for work purposes for Environmental Protection and Compliance (EPC) personnel. All other uses for this map should be confirmed by EPC-ES Staff.
N
0 0.25 0.5 1 Miles

EXHIBIT B

Los Alamos National Laboratory
P.O. Box 1663, K490
Los Alamos, NM 87545
505-667-0666

Environmental Protection & Compliance Division
Compliance Programs Group

Symbol: EPC-DO: 23-389
LA-UR: 23-34161
Locates: N/A
Date: February 16, 2024

Shelly Lemon, Bureau Chief
New Mexico Environment Department
Surface Water Quality Bureau
1190 St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502

Subject: Use Attainability Analysis for Upper Sandia Canyon, Revision 1

Dear Ms. Lemon:

Attached is the updated Use Attainability Analysis (UAA) for Upper Sandia Canyon Assessment Unit (AU) NM-9000.A_47 in water quality segment 20.6.4.126 (126). This UAA supersedes the draft Upper Sandia Canyon UAA submitted to the New Mexico Environment Department (NMED) on October 21, 2021 (EPC-DO: 21-342) and has been revised based on comments received from the NMED, the Environmental Protection Agency, and the public. The UAA was prepared by the Department of Energy's National Nuclear Security Administration and Triad National Security, LLC (DOE-Triad) pursuant to requirements contained in 20.6.4.15 NMAC.

The Upper Sandia Canyon AU is listed in the NMED's 2022–2024 Integrated Report as impaired due to temperature exceedances and is assigned an IR Category of "5B," which indicates the need for review of the temperature water quality standard. The UAA was prepared in accordance with the work plan submitted by Triad on February 10, 2020 (EPC-DO: 20-040) and approved by NMED on April 9, 2020.

The purpose of the UAA is to determine the most protective aquatic life use attainable in the perennial portion of Sandia Canyon. The UAA findings include the following:

- Coldwater aquatic life use is attainable in the lower portion of the Sandia Canyon AU, from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road (formerly known as "Sandia at Crossing").
- Coldwater aquatic life use is not attainable in the upper portion of the AU, from Sandia Canyon at Bedrock Road to Outfall 001, because naturally occurring pollutant concentrations prevent the attainment of the use (40.CFR 131.10 (g)(1)).
- Coolwater aquatic life use is attainable in the upper portion of the AU and is the most protective aquatic life use for this portion of the AU.
- DOE-Triad propose to create a new coolwater segment for the upper portion of the AU, from Sandia at Bedrock Road to Outfall 001, with additional protection of a 6T3 standard of 25 °C.

The analyses in the UAA provide supporting data that the highest attainable use for the upper portion of the AU is the coolwater aquatic life use with a segment-specific 6T3 criterion of 25 °C. DOE-Triad recommend that the coldwater aquatic life use be retained for the lower portion of the AU and remain in segment 126.

The final UAA Revision 1 (Rev1) is provided to NMED in advance of DOE-Triad's completion of the Stakeholder Outreach and Public Engagement portion of the process. Triad intends to post this document for public comment on LANL's Electronic Public Reading Room and to publish notice of the UAA's availability in a local newspaper in accordance with the approved work plan.

In accordance with the approved work plan, the UAA will also be submitted to San Ildefonso Pueblo, Cochiti Pueblo, Jemez Pueblo, and Santa Clara Pueblo (Accord Pueblos); and the Northern New Mexico Citizen's Advisory Board. DOE/NA-LA/Triad have established an email address to receive comments and to answer questions specific to the Upper Sandia Canyon UAA: sandiacanyonuaa@lanl.gov.

Please contact Robert Gallegos at (505) 901-3824 or robert.gallegos@nnsa.doe.gov; or contact Tim Goering at (505) 350-6084 or goering@lanl.gov if you have any questions.

Sincerely,

SARAH HOLCOMB (Affiliate) Digitally signed by SARAH HOLCOMB (Affiliate) Date: 2024.02.09 08:38:43 -07'00'

Sarah S. Holcomb
Acting Group Leader
Environmental Compliance Programs
Triad National Security, LLC

Sincerely,

ROBERT GALLEGOS Digitally signed by ROBERT GALLEGOS Date: 2024.02.15 16:10:26 -07'00'

Robert A. Gallegos
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S Department of Energy

Attachment(s): Use Attainability Analysis for Upper Sandia Canyon

Copy: Lynette Guevara, NMED-SWQB, lynette.guevara@env.nm.gov
Karen E. Armijo, NA-LA, karen.armijo@nnsa.doe.gov
Robert A. Gallegos, NA-LA, robert.gallegos@nnsa.doe.gov
Stephen N. Jochem, NA-LA, stephen.jochem@nnsa.doe.gov
Steven A. Coleman, Triad, ALDESHQ, scoleman@lanl.gov
Jennifer E. Payne, Triad, ALDESHQ, jpayne@lanl.gov
Jeannette T. Hyatt, Triad, EWP, jhyatt@lanl.gov
Steven L. Story, Triad, EPC-DO, story@lanl.gov
Deepika Saikrishnan, Triad, EPC-DO, deepika@lanl.gov
Sarah S. Holcomb, Triad, EPC-CP, sholcomb@lanl.gov
Timothy J. Goering, Triad, EPC-CP, goering@lanl.gov
Matthew V. Segura, Triad, EPC-CP, msegura@lanl.gov
Maureen C. Dolan, Triad, GC-ESH, dolan@lanl.gov
epccorrespondence@lanl.gov
eshq-dcrm@lanl.gov
gc-esh@lanl.gov
lasomailbox@nnsa.doe.gov

LA-UR-23-34161
Revision 1
February 2024

Use Attainability Analysis for Upper Sandia Canyon

LANL UAA_0025

Prepared for: New Mexico Environment Department

Prepared by: Tim Goering, Environmental Professional
Matt Segura, Environmental Professional
Sarah Holcomb, Environmental Manager
Environmental Protection and Compliance Division
Environmental Compliance Programs Group (EPC-CP)

Editing and Layout by: Tamara Hawman, Communications Specialist
Communications and External Affairs Division
Technical Editing and Communications Group (CEA-TEC)

Caption: Sandia Canyon below Gage E123

Contents

Figures

Tables

Acronyms and Abbreviations

Acronym	Definition
4T3	water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days
6T3	water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days
ALU	aquatic life use
ATEMP	average July air temperature
AU	assessment unit
AWTC	air-water temperature correlation
CFR	Code of Federal Regulations
DO	dissolved oxygen
DOE	U.S. Department of Energy
GCS	grade control structure
HMP	habitat management plan
IR	integrated report
LANL	Los Alamos National Laboratory
LANL MET	Los Alamos National Laboratory meteorological monitoring network
MCW	marginal coldwater
MCWAL	marginal coolwater
MWAT	maximum weekly average (water) temperature
NMAC	New Mexico Administrative Code
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
PCBs	polychlorinated biphenyls
PRISM	Parameter-Elevation Relationships of Independent Slopes Model
SSTEMP	stream segment temperature
SU	standard units
TA	technical area
TMAX	maximum water temperature
Triad	Triad National Security, LLC
UAA	use attainability analysis
USFWS	U.S. Fish and Wildlife Service
WQCC	Water Quality Control Commission
WQS	water quality standards
WY	water year

LANL UAA_0029

1 Introduction

This document presents a use attainability analysis (UAA) for the perennial segment of upper Sandia Canyon (Figure 1), which is located within Los Alamos National Laboratory (LANL) property near Los Alamos, New Mexico.[1] The NMED approved workplan for this UAA is provided in Appendix A. The perennial reaches of Sandia Canyon are currently classified as 20.6.4.126 New Mexico Administrative Code (NMAC) (NMED 2022b):

> 20.6.4.126 RIO GRANDE BASIN: Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL), including but not limited to: Cañon de Valle from LANL stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to LANL NPDES outfall 001, Pajarito canyon from 0.5 miles below Arroyo de La Delfe upstream to Homestead spring, Arroyo de la Delfe from Pajarito canyon to Kieling spring, 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 NMAC are applicable to the designated uses. [20.6.4.126 NMAC - N, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

The perennial waters of Sandia Canyon are currently listed as impaired for temperature, dissolved copper, polychlorinated biphenyls (PCBs), and total recoverable aluminum under the Clean Water Act 303(d)/305(b) integrated report 2022–2024. The reach was placed in Category 5B, which means that it is impaired for one or more pollutant, and water quality standards are not being met due to the impairment (NMED 2022a).

Title 40 Code of Federal Regulations (CFR) 131.10(g)(1) permits a state to remove a designated use that is not an existing use (as defined in 40 CFR 131.3) if a UAA demonstrates that naturally occurring pollutant concentrations prevent the attainment of the use or if physical conditions related to the natural features of the water body preclude the attainment of the aquatic life protection use. This UAA considers whether natural, physical conditions in upper Sandia Canyon, specifically air and/or water temperatures, prevent the designated aquatic life use (ALU) water temperature limits (i.e., coldwater) from being attained in the perennial segment.

Upon thorough examination of instream thermograph data and air-water temperature modeling, DOE-Triad recommend that the coolwater ALU is the most protective attainable use for the upper portion of Sandia Canyon—from Sandia Canyon at Bedrock Road to NPDES[2] Outfall 001. Additional protection for this coolwater assessment unit (AU) is proposed by including a new segment 20.4.6.141 with a

[1] Within this document, the terms “LANL” and “Laboratory” are used to distinguish between the organization and the physical area on the Pajarito Plateau controlled and operated by LANL, respectively.
[2] NPDES = National Pollutant Discharge Elimination System.

segment-specific criterion (6T3)[3] of 25 °C (77 °F). The downstream segment of Sandia Canyon—from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road (Figure 2)—will remain coldwater ALU.

The new standards for segment changes would read as follows (changes in red):

20.6.4.141 RIO GRANDE BASIN: Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL), Sandia canyon from Sandia canyon at Bedrock Road upstream to LANL NPDES outfall 001.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: a 6T3 of 25 °C (77 °F) or less.

[20.6.4.141 NMAC - N, X/XX/XXXX]

This segment description will require the following changes to segment 20.6.4.126:

20.6.4.126 RIO GRANDE BASIN: Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL), including but not limited to: . . . Sandia canyon at Sigma canyon upstream to Sandia Canyon at Bedrock Road . . .

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 NMAC are applicable to the designated uses.

[20.6.4.126 NMAC - N, 5/23/2005; A, 12/1/2010; A, 4/23/2022; A, X/XX/XXXX]

2 Watershed Description and History

Upper Sandia Canyon is one of several segments described by 20.6.4.126 NMAC (NMED 2022b). It is a perennial reach originating within the Laboratory and includes one AU, "NM-9000.A_47, from NPDES outfall 001 to Sigma Canyon" (hereinafter referred to as the upper Sandia Canyon AU; Figure 1). Outfall 001, located at LANL's Technical Area (TA) 3, discharges an average of 154,000 gallons per day (and a maximum of 333,000 gallons per day), creating a continuously flowing waterbody in upper Sandia Canyon (USEPA 2020). Most of the water comes from the co-generating power and steam plant, which generates heat, electricity, and steam used for LANL activities. Although Outfall 001 is the primary source of water flow to the upper Sandia Canyon AU, two other NPDES outfalls—Outfall 027 and Outfall 199—also discharge much smaller volumes of effluent to the AU. Both outfalls discharge cooling tower effluents. Information on outfalls and discharge can be found in the N3B Sandia Wetland Performance Report (2019).

[3] 6T3 = Water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days.

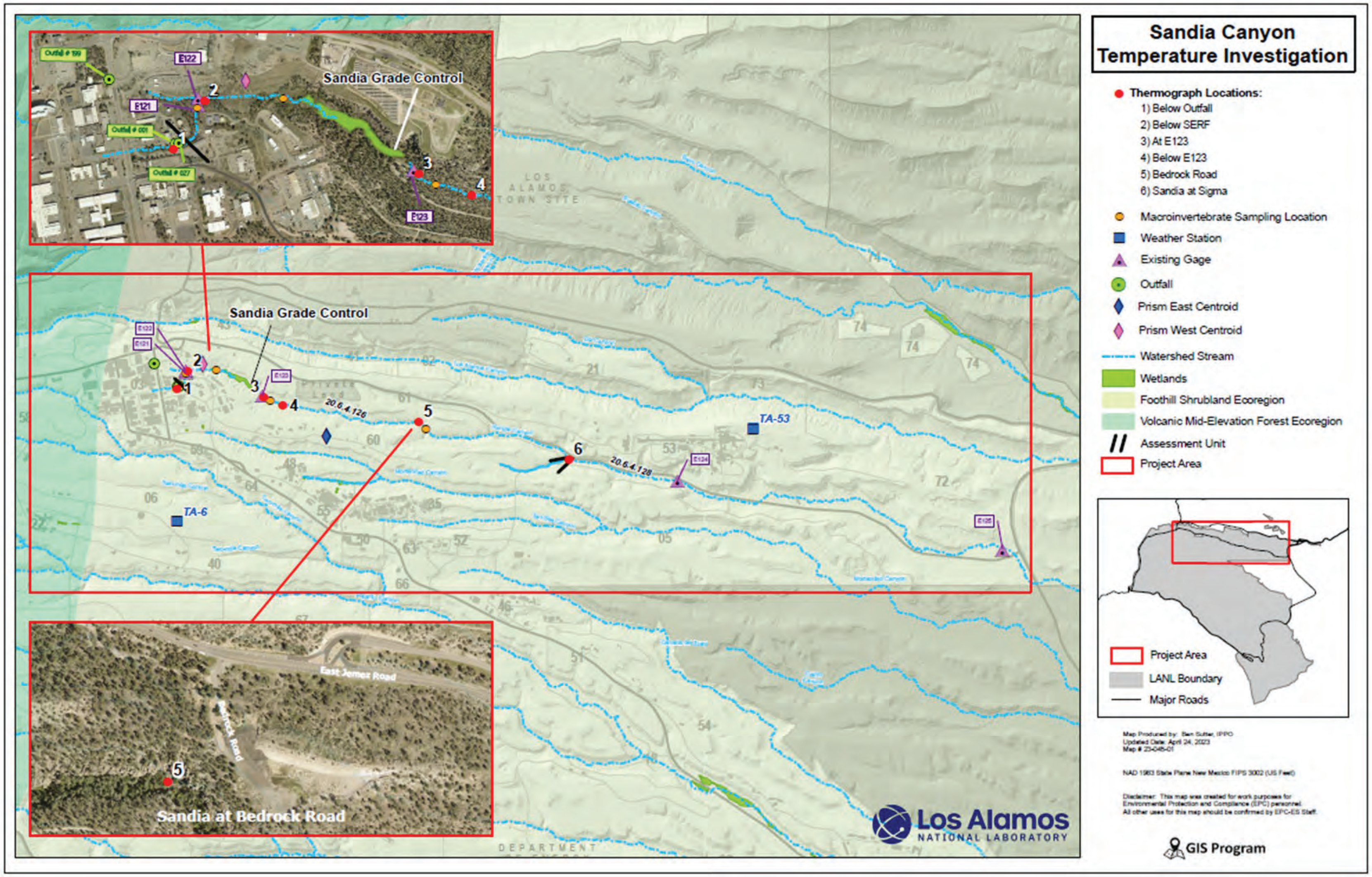


Figure 1. Upper Sandia Canyon assessment unit. GPS coordinates are provided in Appendix B.

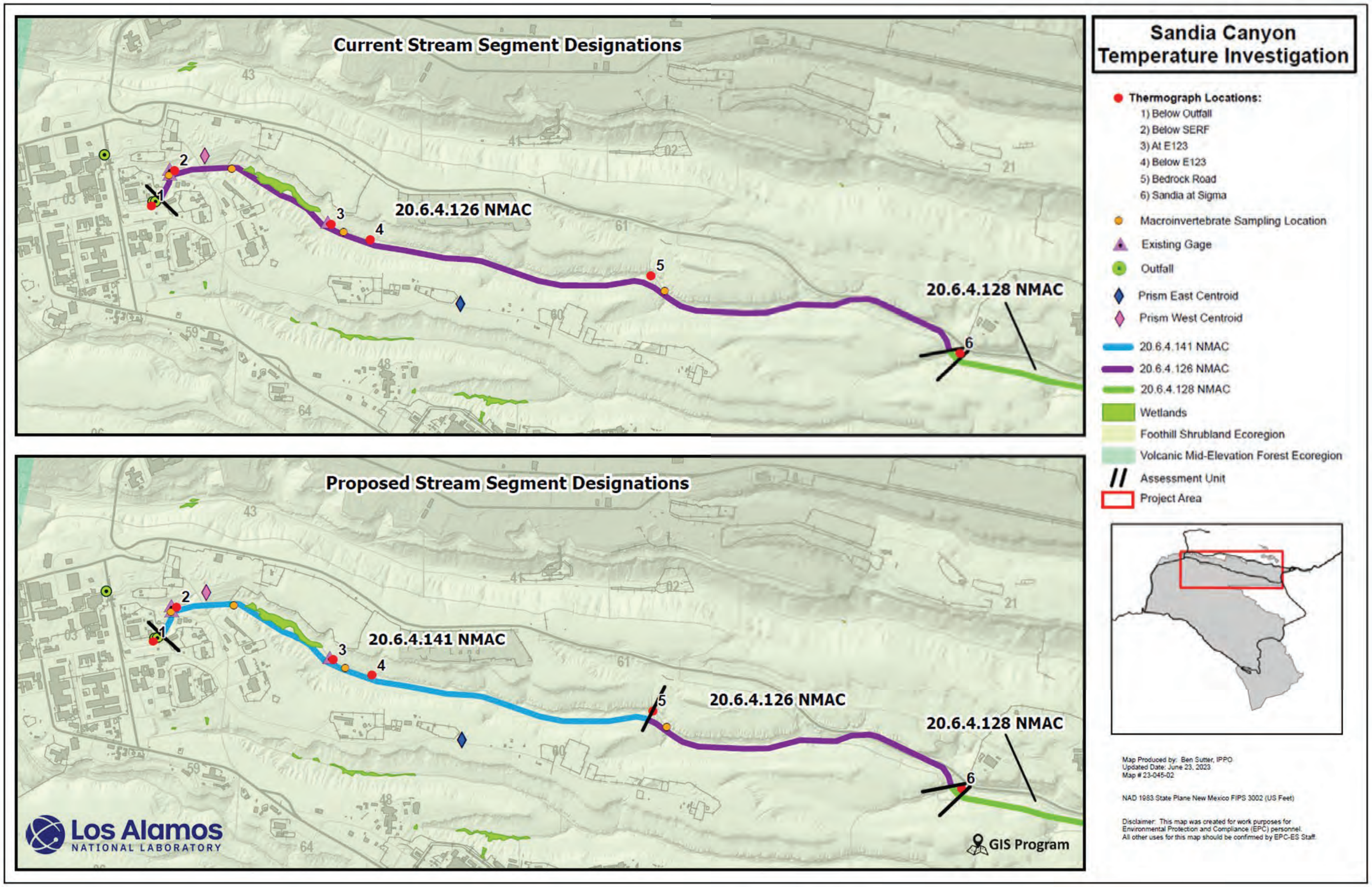


Figure 2. Proposed stream segment designations.

Upper Sandia Canyon is effluent dependent, meaning that without the point source discharge of wastewater, surface waters would be ephemeral (NMED 2020). Discharge into Sandia Canyon began in the 1950s (LANL 2008) and now supports a 3.65-acre wetland (Stanek et al. 2020) near the upper end of the upper Sandia Canyon AU, just downstream of the outfalls (Figure 1). Wetland sediments are underlain by the Bandelier Tuff, upon which alluvial groundwater is perched. Past investigations have shown little evidence of significant infiltration beneath the wetland (LANL 2013). For example, in a water balance study conducted between 2007 and 2008 (LANL 2008), only about 2 percent of the surface water entering the wetland infiltrated the underlying bedrock. Past comparisons of surface water chemistry results from above and below the wetland have demonstrated that baseflow has a short residence time and that there is little exchange between surface water and groundwater within the wetland (Iacona 2015).

Installation of a grade control structure (GCS) in 2013 reduced the rate of erosion at the downstream end of the wetland and created an impermeable barrier to subsurface flow, such that alluvial groundwater must now resurface before exiting the wetland. Given the impermeable nature of this barrier and the largely impermeable tuff that underlies the wetland, the wetland can conceptually be thought of like a bathtub that effectively holds water and slows down flow—excess water overflows from the wetland at the GCS. Annual evaluation of baseflow rates has confirmed this description, and rates entering and exiting the wetland (including transpiration losses) have been validated (N3B 2019).

LANL (2008) determined the water budget for sources of flow and loss throughout the canyon. The study concluded that the perennial segment of upper Sandia Canyon is a net-neutral or net-losing stream from the wetland to the end of the upper Sandia Canyon AU (Table 1); in other words, the amount of water in the stream is stable or decreases over its length as a result of evaporation, infiltration, or surface water loss to alluvial groundwater. Flow in alluvial well gages correlated with changes in outfall flow, as well as with precipitation events. Daily temperature swings in alluvial groundwater also correlated with air temperature fluctuations. These patterns indicate that the alluvial storage is minimal, and that the alluvium is recharged by Sandia Canyon surface water.

Table 1. Approximate Surface Water Budget in Upper Sandia Canyon from July 2007 to June 2008

Process and Area[a]	Estimated Gain or Loss (acre ft/yr)	Percent of Total
Discharge from outfalls	389	75
Runoff above E123	130	25
Evapotranspiration in wetland	−18	−3
Infiltration beneath wetland	−12	−2
Infiltration between wetland and D123.6	0	0
Surface water loss between D123.6 and D123.8	−119	−23
Surface water loss between 123.8 and E124	−334	−64
Surface water loss between E124 and E125	−36	−7

[a] E123, E124, and E125 are permanent surface water gage stations in upper Sandia Canyon. D123.6 and D123.8 were temporary gage stations for the water balance study (LANL 2008).

In 2005, the New Mexico Water Quality Control Commission (WQCC) adopted the upper Sandia Canyon segment as a classified water of the state, designating a use of coldwater aquatic life and a segment-specific temperature criterion of 24 °C. The decision to adopt the segment-specific temperature criterion was based on a 2002 U.S. Fish and Wildlife Service (USFWS) study (Lusk et al. 2002), which found that water temperatures within the upper Sandia Canyon AU exceeded 20°C but not the maximum summer temperature for the survival of brook trout (24 °C).[4] Time-averaged peak temperatures were not considered in that study because time-averaged criteria had not yet been adopted by the WQCC as part of the New Mexico water quality standards (WQS).

In 2010, as part of a revision of the New Mexico WQS, the WQCC eliminated and replaced the upper Sandia Canyon AU's site-specific criterion of 24 °C with the general coldwater aquatic life designated use temperature criterion (also 24 °C) from 20.6.4.900.H NMAC (NMED 2022). In a subsequent rulemaking proceeding, the WQCC adopted the 6T3 criterion[5] of 20 °C and made it applicable to the statewide coldwater designated use (Table 2). Attainability of the 6T3 criterion in the upper Sandia Canyon AU has not been previously analyzed.

Table 2. New Mexico Temperature Criteria for Aquatic Life Designated Uses

Designated ALU[a]	DO (mg/L)	4T3 (°C)	6T3 (°C)[b]	TMAX (°C)[b]	pH
High-Quality Coldwater	6.0	20	NA	23	6.6–8.8
Coldwater	6.0	NA	20	24	6.6–8.8
Marginal Coldwater[c]	6.0	NA	25[d]	29	6.6–9.0
Coolwater	5.0	NA	NA	29	6.6–9.0
Warmwater	5[e]	NA	NA	32.2	6.6–9.0
Marginal Warmwater	5	NA	NA	32.2	6.6–9.0
Limited Aquatic Life	NA	NA	NA	NA	NA

[a] These criteria are derived from the 4/23/2022 20.6.4 NMAC.
[b] Default criteria unless segment-specific criteria have been assigned.
[c] Based on the 2020 Triennial Review and technical support document, EPA determined that "marginal coldwater" in reference to ALU means that natural conditions severely limit maintenance of a coldwater aquatic life population during at least some portion of the year or historical data indicate that the temperature of the surface water of the state may exceed that which could continually support aquatic life adapted to coldwater [25 °C (77 °F)]." (USEPA, 2023b). Based on this updated definition of marginal coldwater, we believe that the marginal coldwater ALU would not apply to the perennial reach of upper Sandia Canyon because of the anthropogenic origin of the flow.
[d] With the exception of 20.6.4.114 NMAC, which contains a segment-specific 6T3 of 22 °C (NMED).
[e] Warmwater and marginal warmwater DO criterion has only one significant figure in 20.6.4 NMAC.
DO = dissolved oxygen.
4T3 = Water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days.
TMAX = maximum water temperature.
NA = not applicable.

Temperature is one of the most common causes of water quality impairment in New Mexico. The upper Sandia Canyon AU is listed as impaired due to temperature exceedances, as discussed in the New Mexico Environment Department (NMED) 2022–2024 Integrated Report (IR) (NMED 2022), and is assigned an IR Category of "5B," indicating the need for review of the WQS.

2.1 Existing Use

In the intricate landscape of environmental compliance and use attainability, a fundamental concept lies in understanding the idea of "existing use," which is defined by the USEPA and NMED as "those uses

[4] Sandia Canyon drains to the Rio Grande. The downstream end of the perennial reach is located approximately 8 miles upstream and 1,300 vertical feet above the Rio Grande. Aquatic life surveys of Sandia Canyon have found no fish (LANL 2017 and Lusk et al. 2002).
[5] Water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days.

actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards" (40 CFR 131.3, NMAC 20.6.4.7). In accordance with 40 C.F.R. 131.10(g), a designated use may be removed (and replaced with the highest attainable use) if it is not an existing use. Additionally, and pursuant to 40 C.F.R. 131.10(i), a designated use may not have criteria less stringent than the existing use. In the upper Sandia Canyon AU, DOE-Triad National Security, LLC (Triad) have conducted a comprehensive evaluation in upper Sandia Canyon to ensure that the proposed ALU not only complies with existing regulations but also is as stringent as the existing use.

Flow in upper Sandia Canyon is predominantly effluent from Outfall 001, with lesser quantities of effluent from Outfalls 199 and 027. Discharge from Outfall 001 is the primary factor that defines water quality in upper Sandia Canyon. Flow in upper Sandia Canyon is anthropogenic and primarily comprises effluent from the outfalls; however, under natural conditions (with no effluent), flow in upper Sandia Canyon would be ephemeral, with a limited aquatic life existing use. Perhaps more importantly, the water chemistry and characteristics of discharge from Outfall 001 have improved over the years (see Section 2.1.1), and the current attainable use is more protective than the limited aquatic life existing use.

Further details on the historical water quality and benthic macroinvertebrate data, which define the existing use for the segment, are presented in the following sections.

2.1.1 *Historical Water Quality Data*

Historical water quality data for upper Sandia Canyon from early Annual Site Environmental Reports (LANL 1978; LANL 1982) and macroinvertebrate studies in the 1990s (Bennett 1994; Cross 1994; and Cross 1995) indicate that the ALU for the reach has improved over time—concurrently with advancements in water treatment technology and improved detection capabilities for emerging contaminants. In the past, DO and pH data did not consistently meet criteria for marginal warmwater, and more protective ALUs (Lusk et al. 2002). Monthly grab samples conducted in upper Sandia Canyon in the 1990s measured DO below 5 mg/L and occasionally below 4 mg/L during the summer. In addition, pH values exceeding 9 standard units (SU) (and occasionally 10 SU) were measured. These water quality criteria did not meet New Mexico's ALU criteria for marginal warm water (MWWAL) of DO 5 mg/L or more and pH within the range of 6.6 to 9.0 SU.

2.1.2 *Historical Studies of Aquatic Life in Sandia Canyon*

LANL scientists, contract scientists, and NMED have studied the aquatic life of Sandia Canyon and surroundings since the early 1990s. Some of these studies were tied to spill events where macroinvertebrates were used as indicators of ecosystem health in response to these environmental stresses. These studies were not used to affirm attainable and existing use; however, it is important to acknowledge that the perennial section of upper Sandia Canyon—formed and influenced by treated effluent—hosts an aquatic community adapted to the historical and present water quality of the discharge.

2.1.3 *Absence of Fish*

In a study of intermittent streams on the plateau (Lusk et al. 2002), researchers scored fish habitat fitness as "low" for Sandia, owing to several factors:

- low stream discharge and velocity, cover, limited prey abundance and diversity, and excess nutrients in Sandia Canyon reduced potential trout habitat;

- stormflow scouring, erosion, and embedded substrates also reduce the quality of the habitat for benthic macroinvertebrates for this reach; and
- a test of caged fish exposures to Sandia waters (fathead minnows) showed some mortality, which was attributed to stormwater influences.

Perhaps the primary reasons that Pajarito Plateau waters are fishless are the poor habitat availability and—although hydrologic connectivity exists—the lack of migratory connection to waters with fish, owing to the steep drop-off to the Rio Grande at White Rock Canyon (Lusk et al. 2002).

2.1.4 *Benthic Macroinvertebrate Characteristics*

Upper Sandia Canyon, just below the discharge, supports an aquatic life community that is adapted to and less diverse than that found in the reference reach of Los Alamos Canyon (Schmid 1996). Los Alamos Canyon scored an EPT[6] Index of 6, whereas Sandia Canyon scored 0 in the upper reach in this study by NMED. The Biological Condition index of habitat fitness in Sandia Canyon was judged to be 40–50 percent of that in the reference reach, and the number of pollutant tolerant species was higher in upper Sandia Canyon (Schmid 1996). LANL studies have shown that improved diversity and abundance are noted the farther downstream in the perennial reach one goes (LANL 1994, 1995).

2.1.5 *Summary Based on Existing Use Evaluation*

Informed by a thorough examination of past studies and the environmental dynamics of this anthropogenic system, the proposed ALU of coolwater emerges as both attainable and in accordance with the existing use as characterized by discharge from the outfalls (40 CFR 131.3).

To further protect and enhance the water quality of the AU, we recommend the application of a segment-specific criterion of a 6T3 of 25 °C from Sandia Canyon at Bedrock Road to Sandia Canyon below Outfall 001. Concurrently we propose retaining the coldwater ALU for the lowermost segment of the reach—from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road. This approach not only aligns with regulatory standards but also reflects our proactive commitment to ensuring the resilience and health of our aquatic ecosystems.

2.2 Basis for Original Coldwater Aquatic Life Use Designation

The 2002 Lusk et al. study assessed Sandia Canyon and identified indicator species and habitat for a coldwater fishery. Based on the Lusk et al. findings, NMED (2007) classified upper Sandia Canyon as NMAC 20.6.4.128 (coldwater); however, chronic temperature monitoring and historical records from 2014 through 2018 led LANL to contest the erroneous application of the coldwater ALU to upper Sandia Canyon.

Significant differences—including elevation, vegetation, and water quality impairments—emerged when comparing Sandia Canyon with the reference site (Lusk et al. 2002) in upper Los Alamos Canyon. Sandia Canyon exhibited lower elevations, shallower canyon transects, piñon-juniper woodland (as opposed to spruce-fir), and impairments from contaminants such as aluminum, chromium, and PCBs. The benthic macroinvertebrate community in upper Sandia Canyon was moderately impaired, with a 30 percent degradation in water quality compared with the reference site from the Lusk study. The study also

[6] EPT (ephemeroptera, plecopteran, and trichoptera) are generally pollutant-sensitive taxa and are used to investigate water quality.

predates NMED's chronic temperature-monitoring criterion, revealing that in 2002, Sandia Canyon might have failed to meet a coldwater ALU if a 6T3 were applied.

These distinctions underscore the importance of long-term datasets and the effect of specific environmental factors on source water quality. Given these findings, a proposed coolwater ALU for the upper portion of Sandia Canyon is recommended, with additional protection using a segment-specific criterion of 25 °C (77 °F). The downstream segment of Sandia Canyon will remain coldwater.

3 Ecoregion Setting

The Laboratory was built upon the Pajarito Plateau, which the U.S. Environmental Protection Agency (USEPA 2023a) characterizes as southern Rocky Mountain foothill shrub lands, volcanic mid-elevation forests, and north-central New Mexico valleys and mesas. The Pajarito Plateau slopes downward to the east-southeast, covering approximately 15 miles from the base of the Jemez Mountains (7,800 ft elevation) to the Rio Grande (5,400 ft elevation). Habitat on the Pajarito Plateau consists of irregular rolling hills and finger mesas composed primarily of the soft, erodible Bandelier Tuff.

The upper Sandia Canyon AU falls within ecoregion 21d, "Northwestern Forested Mountains-Western Cordillera-Southern Rockies-Foothill Woodlands and Shrubs" (Griffith et al. 2006). Ecoregion 21d, which extends from Wyoming through Colorado and into northern New Mexico, is characteristically dry Rocky Mountain habitat dominated by piñon-juniper and oak woodland forests at 6,000 to 8,500 ft of elevation (Griffith et al. 2006). The upper Sandia AU is located within a transitional zone between mountainous and xeric regions, and air and water temperatures reflect this transition. Section 7 provides information that supports that water temperatures warm along the transition from mountainous to transitional to xeric ecoregions.

4 Water Temperature Data Evaluation

This section provides a discussion of available water temperature measurements from the upper Sandia Canyon AU, including temperatures from Outfall 001, which is the dominant source of water in the AU. All water temperature data are provided electronically with this report in Appendix C. The measured water temperature presented in this section provide clear evidence to the unattainability of the coldwater ALU for the headwaters of upper Sandia Canyon. Furthermore, this section shows support for splitting the reach—from Bedrock Road to Outfall 001—into a coolwater designation with increased protections of a 6T3 criterion of 25 °C. A coldwater designation will remain in place downstream at Sigma Canyon to Bedrock Road (Figure 2).

4.1 Upper Sandia Canyon Thermograph Water Temperatures

Between 2014 and 2017, LANL strategically deployed five thermographs in the upper Sandia Canyon AU to directly monitor water temperatures. To enhance the dataset, a sixth thermograph was deployed in 2018 in Sandia Canyon at Bedrock Road (formerly "Sandia at Crossing"; see Figure 1). Some challenges arose because thermographs faced exposure to air temperature during storm events or low-flow conditions, which resulted in inaccurately high temperature readings that reached 61 °C. LANL identified and subsequently excluded these exposed periods when calculating 6T3 values and determining exceedances of criteria. Figure 3 shows the refined 2014–2018 thermograph data, illustrating temperature variations over time at different positions along the upper Sandia Canyon AU. Specific dates for which data were excluded are reported in Table 3.

Figure 3 shows that—the instantaneous water temperatures exceeded the 6T3 threshold (green dotted line) for coldwater (20 °C) at every thermograph location during the study period; however, when we look at Table 3 using NMED 6T3 calculations, we see that the 6T3 criterion for coldwater was not exceeded at Sandia Canyon or Sigma Canyon between 2016 and 2018, nor at Sandia Canyon at E123 in 2017. However, the 6T3 criterion for coldwater was exceeded at Sandia Canyon at E123 from 2014 to 2016, again at Sandia Canyon below E123 in 2016, and every year (2014 to 2017) at Sandia Canyon below Outfall 001 and Sandia Canyon below SERF. Sandia Canyon at Bedrock Road exceeded coldwater 6T3, but only 1 year of data supports this exceedance of 20.1 °C. The coldwater TMAX criterion (24 °C) was exceeded at Sandia Canyon below Outfall 001, Sandia Canyon below SERF, and Sandia Canyon at E123 at least once during the study period, whereas the criterion was not exceeded any year at Sandia Canyon below E123, Sandia Canyon at Bedrock Road, or Sandia Canyon at Sigma Canyon. Actual 6T3 values were calculated using NMED long-term data management spreadsheets found in Appendix D.

The results presented in this section, with a focus on Table 3, illustrate variability in water temperature statistics within the upper Sandia Canyon AU. These variations indicate instances where actual water temperatures deviate from predictions made by the air-water temperature correlation (AWTC) in Section 8. Values were derived using a regression model with inherent uncertainties, so modeled deviations from observed water temperatures were anticipated. TMAX predictions exhibited a consistent bias toward higher temperatures—with limited exceptions—when compared with actual values.

Lower-than-expected water temperatures, particularly at stations downstream of E123, could have resulted from shading in canyon bottoms and effluent discharged from Outfall 001 that was cooler than the modeled water temperature for the upper Sandia AU (see Section 4.2). It is essential to note that data from Parameter-Elevation Relationships of Independent Slopes Model (PRISM) and Los Alamos National Laboratory meteorological monitoring network (LANL MET) stations represent temperatures on top of the Pajarito Plateau rather than within Sandia Canyon, so possible effects of shading and microclimate (e.g., cooler, denser air settling in the canyon bottom) seem reasonable when comparing the air and water temperature lines of evidence (Table 3 and Table 4). The difference between modeled and observed water temperatures was greater downstream of E123 compared with upstream, indicating that microclimate and hydrologic cooling influences intensify as shading increases and as the canyon narrows and steepens downstream.

The observed cooling trend over time might be correlated with the installation of the GCS in 2013, resulting in increased water retention and enhanced vegetative growth in the 0.4-mile-long wetland above gage E123 (Figure 1). Vegetation within the wetlands plays a significant role in shading, potentially maintaining lower water temperatures throughout the day. A survey conducted between 2014 and 2017 indicated a high density of vegetation within the wetland, increased plant diversity and tree canopy, and an annual increase in the areal extent of the wetland (Gallegos 2021). The GCS's mechanism of resurfacing alluvial groundwater before its exit from the wetland further contributes to the potential cooling effect on water temperatures at E123.

Measured water temperatures and AWTC-modeled water temperatures indicate that, with the exception of some years and locations, the coolwater use is attainable across the entire AU. It is assumed that the cooling will be sustained and that a coolwater designated use is representative of future conditions.

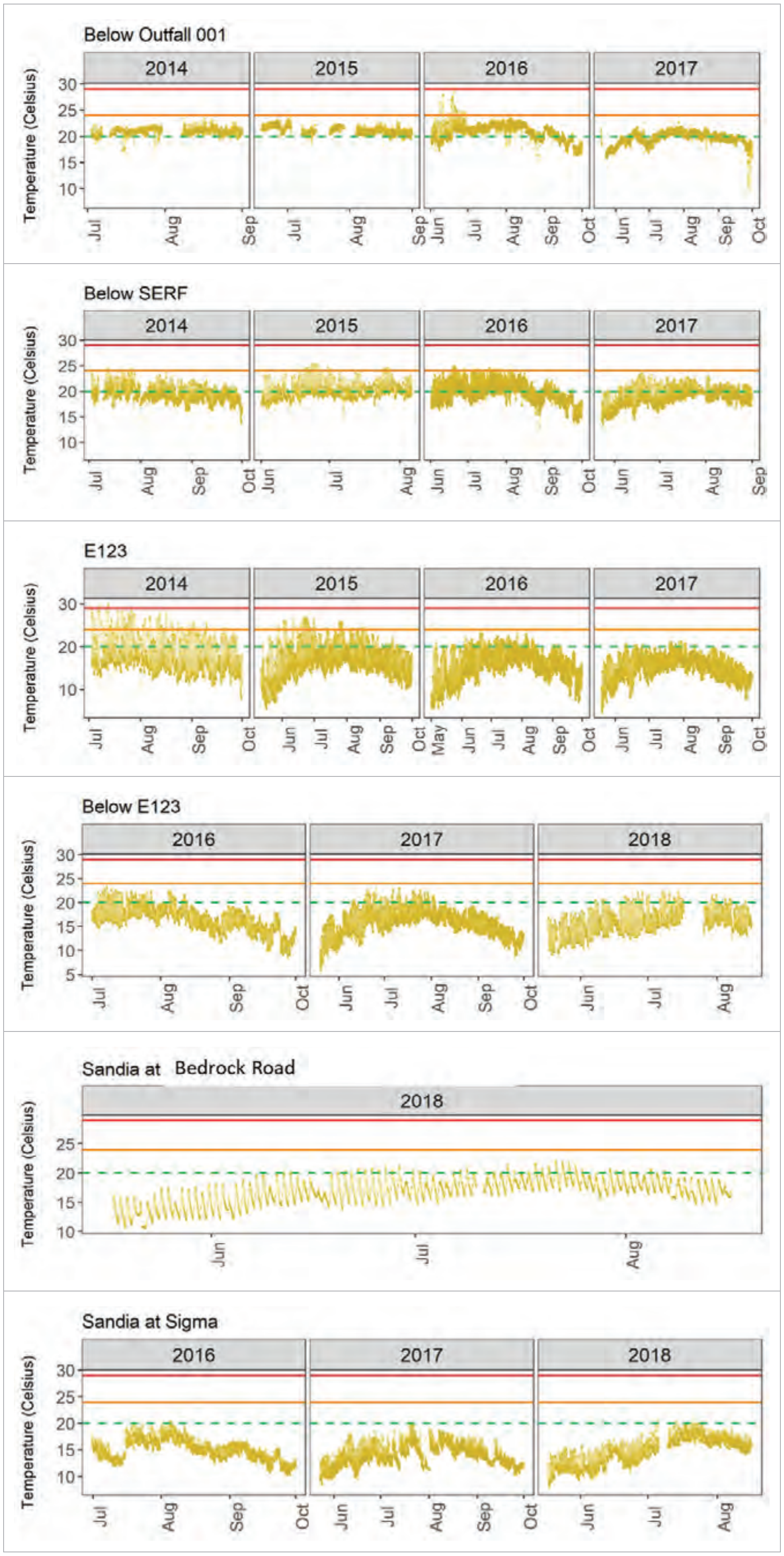


Figure 3. Water temperature in upper Sandia Canyon assessment unit 2014–2018. Source: LA-UR-18-28589. Sub-figures are organized in the direction of flow from below Outfall 001 to Sandia at Sigma. Horizontal lines represent temperature criteria associated with designated uses. Green dash = coldwater 6T3 (20 °C); orange solid = coldwater TMAX (24 °C); and red solid = coolwater TMAX (29 °C). High-quality coldwater TMAX of 23 °C not shown. Data were removed from thermograph datasets from periods when thermographs became exposed to air (Table 3).

Table 3. Measured and Predicted Water Temperature Thresholds[a] 2014–2018

Thermograph	Year	Actual TMAX (°C)	Actual 6T3[b] (°C)	AWTC TMAX (°C)	AWTC 6T3[b] (°C)	Designated Use Attained	Dates Exposed/Data Excluded
Sandia Canyon below Outfall 001	2014	23.9	21.6	27.4	22.6	Coolwater	7/7 to 7/9, 7/31 to 8/7
	2015	23.9	22.4	26.2	21.7	Coolwater	6/1 to 6/17, 7/3 to 7/7, 7/15 to 7/21, 7/29 to 8/3
	2016	29.1	23.4	30.8	26.2	Warmwater	None
	2017	22.9	21.0	28.5	24.0	Coolwater	None
Sandia Canyon below SERF	2014	24.7	21.5	27.4	22.6	Coolwater	7/7 to 7/9
	2015	25.4	22.5	26.2	21.7	Coolwater	None
	2016	25.2	22.8	30.8	26.2	Coolwater	None
	2017	23.6	21.0	28.5	24.0	Coolwater	None
Sandia Canyon at E123	2014	30.1	23.6	27.4	22.6	Warmwater	None
	2015	26.8	22.7	26.2	21.7	Coolwater	None
	2016	23.3	20.1	30.8	26.2	Coolwater	None
	2017	21.4	19.1	28.5	24.0	Coldwater	None
Sandia Canyon below E123	2016	23.5	20.7	30.8	26.2	Coolwater	None
	2017	23.2	19.7	28.5	24.0	Coldwater	None
	2018	22.6	18.9	28.9	24.4	Coldwater	7/17 to 7/25
Sandia Canyon at Bedrock Road	2018	22.1	20.1	28.9	24.4	Coolwater	7/10
Sandia Canyon at Sigma Canyon	2016	20.4	18.4	30.8	26.2	Coldwater	None
	2017	20.0	17.6	28.5	24.0	Coldwater	None
	2018	21.0	18.7	28.9	24.4	Coldwater	7/6 to 7/9

(orange)	Meets warmwater based on TMAX
(green)	Meets marginal coldwater based on TMAX and 6T3
(blue)	Meets high-quality coldwater based on TMAX and 4T3

[a] Predicted thresholds based on AWTC (Table 3, Equations 3 and 4).
[b] Actual 6T3 values were calculated using NMED long-term data management spreadsheets found in Appendix D.

LANL UAA_0041

Data Uncertainty

Uncertainties in thermograph data, PRISM air temperature data, and LANL meteorological station air temperature data are discussed in the following subsections.

Uncertainty in Thermograph Data

The thermographs used for the Sandia UAA were the HOBO Water Temp Pro (U22-001) logger, designed for long-term deployments in water. The thermographs have an accuracy of ±0.21 °C and a resolution of 0.021 °C at 25 °C.

Occasionally, DOE-Triad thermographs became exposed to the air due to storm events or low-flow conditions, leading to very high and inaccurate temperature readings in our records (up to 61 °C). DOE-Triad identified those periods when the thermographs became exposed, and those data were removed from consideration (e.g., when calculating 6T3 values and determining exceedances of criteria).

Uncertainty from PRISM Temperature Data

The PRISM Climate Group at Oregon State University provides estimated air-temperature data using PRISM. The accuracy of the model results depends on multiple factors, including the topography of the area modeled, the grid resolution, and the density of meteorological sensors that capture climate data to provide input for the model. Calculations used in this UAA for PRISM can be found in Appendix E.

A study published by S. Strachan and C. Daly (2017) tested 16 sites on open woodland slopes in California and Nevada to measure the accuracy of the PRISM air temperature model in semi-arid watersheds. Their study revealed high accuracy in the PRISM temperature data but systematic biases linked to topoclimatic (orographic) effects.

These biases may be apparent in the PRISM data set used with the NMED's AWTC model to predict water temperatures in upper Sandia Canyon, with predicted water temperatures biased high (Table 3). Both the PRISM and the LANL MET data represent temperatures on the Pajarito Plateau rather than within Sandia Canyon and do not reflect microclimate effects (e.g., cooler, denser air settling in the canyon bottom), or the increased shading in the lower part of the canyon. These microclimate cooling effects become greater as the canyon narrows and becomes steeper downstream (Table 3), with the greatest differences between predicted and actual water temperatures in the portion of the canyon downstream of E123.

Uncertainty in LANL Meteorological Station Air Temperature Data

Temperature data from LANL's meteorological stations introduce some minor uncertainty due to the accuracy of instruments used to measure air temperatures at the Laboratory. DOE has directed that the accuracies of the monitoring measurements should at least be consistent with the specifications set forth in either ANSI/ANS-3.11-2015 or EPA-454/R-99-005. In 2016, personnel at the Laboratory conducted an analysis of uncertainties in meteorological measurements (Dewart 2016) and determined that accuracy of the data is dominated by instrument uncertainty. The evaluation showed that uncertainties introduced by system components, such as the data logger and the data management system, are typically small. The instrument accuracy of air temperature data collected at LANL meteorological stations is ± 0.19 °C, well within the ANSI/ANS-3.11-2015 accuracy requirement (±) of ± 0.5 °C. LANL MET data used for this study can be found in Appendix E.

Additional uncertainty for the UAA modeled results using LANL meteorological data is introduced as a result of microclimate effects. The use of LANL meteorological data to predict the maximum water temperature (TMAX) in the perennial reach of Sandia Canyon introduces some bias toward higher predicted temperatures (versus actual temperatures in the water), as shown in Table 3; however, it must be considered that the source water is anthropogenic and potentially a blend of multiple origins.

This bias could reflect the fact that the LANL meteorological stations used for the Sandia UAA modeling of water temperature data in upper Sandia Canyon are located on the mesas of the Pajarito Plateau and not in the canyons. For this reason, temperature data from the meteorological stations do not accurately reflect microclimate influences of the canyon itself, particularly in the lower portion of Sandia Canyon at Sigma Canyon.

As Table 3 indicates, thermograph data from lower Sandia Canyon show significantly cooler in-stream temperatures than predicted using LANL MET data and the NMED's AWTC. In most cases, the maximum water temperature (TMAX) was higher than the predicted maximum temperature based on the air-water temperature correlation (AWTC TMAX), with the greatest differences in the lower part of Sandia Canyon, where the orographic microclimatological effects were most significant.

4.2 Maximum Weekly Average Water Temperatures

Maximum weekly average (water) temperature (MWAT) values were used to predict the attainable use based on the AWTC Model (NMED 2011a), discussed in Section 8. The NMED Surface Water Quality Bureau developed a statewide correlation in 2011 showing that average July air temperature (ATEMP) from PRISM data directly correlated to MWAT. According to the AWTC model, the attainable water MWAT equals ATEMP for locations where water temperature is controlled by ambient air temperature in streams that are not significantly influenced by groundwater (NMED 2011a). While MWAT proves valuable for predictions, DOE-Triad acknowledge the uncertainties with the model and emphasize thermograph data over modeled data. MWAT is considered a supplementary line of evidence in this context. MWAT calculations used for this study are provided in Appendix F.

As noted in Section 4.1, potential exists for microclimate effects in the upper Sandia Canyon AU, so the assumption that ATEMP equals MWAT may be invalid in this instance. Therefore, the equations from NMED (2011a) that rely on MWAT directly (Eq. 1 and 2) can be used instead of those that rely on ATEMP (and the assumption of its equivalency to MWAT). By inputting measured MWAT values into Equations 1 and 2, the 6T3 and TMAX values that should be observed in the upper Sandia Canyon AU can be more accurately estimated.

$$6T3 = 1.0346 \times MWAT + 1.3029 \quad \text{(Eq. 1)}$$

$$TMAX = 1.0661 \times MWAT + 4.9547 \quad \text{(Eq. 2)}$$

To calculate MWAT values for the six monitoring locations (listed in Table 4), 15-minute thermograph measurements were averaged over each day, and then 7-day rolling averages were calculated over each monitoring year. Data gaps exist where thermographs were exposed to the air (entire days; see Table 3) or when data were being downloaded (short periods during single days). Daily averages were calculated when small data gaps occurred during a day (from downloading data) but were not calculated for days when thermographs were exposed to air. Rolling averages were calculated for 7-day periods, so these values did not include data gaps. This approach led to significant uncertainty for the 2015 period for the thermograph at Sandia Canyon below Outfall 001, which was frequently exposed to the air; therefore, no MWAT was calculated for 2015. Table 4 reports the MWAT values, which vary spatially and temporally and range from 16.64 °C at Sandia Canyon at Sigma Canyon in 2017 to 22.35 °C at Sandia Canyon below Outfall 001 in 2016.

Table 4. Measured MWAT and Predicted 6T3 and TMAX Criteria Based on MWAT

Location	Year	Measured MWAT (°C)	Predicted 6T3 (°C)[a]	Predicted TMAX (°C)[a]	Predicted Attainable Use
Sandia Canyon below Outfall 001	2014	21.44	23.48	27.81	coolwater
	2015	nd[b]	nd[b]	nd[b]	nd[b]
	2016	22.31	24.20	28.55	coolwater
	2017	20.96	22.99	27.30	coolwater
Sandia Canyon below SERF	2014	20.67	22.69	26.99	coolwater
	2015	21.20	23.24	27.56	coolwater
	2016	21.18	23.22	27.53	coolwater
	2017	20.18	22.18	26.47	coolwater
Sandia Canyon at E123	2014	20.36	22.37	26.66	coolwater
	2015	19.35	21.32	25.58	coolwater
	2016	18.61	20.56	24.79	coolwater
	2017	17.87	19.79	24.01	coolwater
Sandia Canyon below E123	2016	19.29	21.26	25.52	coolwater
	2017	18.88	20.84	25.08	coolwater
	2018	17.62	19.53	23.74	coolwater
Sandia Canyon at Bedrock Road	2018	19.19	21.16	25.41	coolwater
Sandia Canyon at Sigma Canyon	2016	17.89	19.81	24.03	coolwater
	2017	16.63	18.51	22.68	coldwater
	2018	18.05	19.98	24.20	coolwater

[a] The 6T3 and TMAX values were predicted by inputting measured MWAT into Equations 1 and 2, respectively.
[b] nd = not determined; MWAT values were not determined for Sandia Canyon below Outfall 001 in 2015 because of frequent periods of exposure of the thermograph to air, which resulted in large data gaps and uncertainty in the MWAT calculation.

The attainable uses were predicted by inputting MWAT values into Equations 1 and 2 and then comparing the output to temperature criteria for designated uses (Table 2). Analysis of the MWAT data suggests that the coolwater ALU is attainable for the upper Sandia Canyon AU with a single exception: Sandia Canyon at Sigma Canyon in 2017 (Table 4). This analysis provides another line of evidence that supports a coolwater ALU, although—because it relies on modeling temperature criteria—it is not as strong a line of evidence as data presented in Section 4.1.

4.3 Outfall 001 Effluent Water Temperatures

Hourly Outfall 001 temperature data for the summer months of 2015–2018 (Gallegos 2018) reveal lower variability in effluent temperatures compared with instream temperatures. Table 5 displays observed TMAX and 6T3 values calculated for this period. The 6T3 was calculated using NMED long-term data management spreadsheets found in Appendix D. In 2016, TMAX exceeded the coldwater aquatic life criterion of 24 °C, and 6T3 exceeded the coldwater aquatic life criterion of 20 °C every year; the discharge from Outfall 001 did not exceed the coolwater criterion for TMAX (29 °C) during this time.

Table 5. Observed TMAX and Calculated 6T3 Outfall Temperatures

Year	TMAX (°C)	6T3 (°C)
2015	23.2	22.1
2016	24.6	23.7
2017	22.3	21.3
2018	22.5	21.8

Source: Gallegos 2018.

It is important to note that the outfall temperatures referenced in Table 5 were recorded before any artificial cooling or manipulation took place in later years to comply with NPDES requirements, indicating that natural air temperature is the primary factor that affects water temperatures in the canyon.

4.4 Protection of Downstream Waters

Under the proposed designated use change, downstream waters to upper Sandia Canyon will be protected and maintained in accordance with 40 CFR 131.10(b). Changes in the designated ALU for upper Sandia Canyon (Segment NM-9000.A_47) will not impact surface waters located downstream of the reach. These surface waters include the following (upstream to downstream):

- Sandia Canyon from Sigma Canyon to Bedrock Road in Water Quality Segment 20.6.4.126 (AU NM 9000.A_047). Perennial waters within lands managed by the U.S. Department of Energy (DOE) with designated uses of coldwater aquatic life, livestock watering, wildlife habitat, and secondary contact.
- Sandia Canyon in Water Quality Segment 20.6.4.128 (AU NM-9000.A_047). Ephemeral and intermittent waters within lands managed by U.S. Department of Energy (DOE) with designated uses of limited aquatic life, livestock watering, wildlife habitat, and secondary contact.
- Sandia Canyon below LANL Boundary 0.5-mile reach within Bandelier National Monument (presumably Water Quality Segment 20.6.4.98). Unclassified intermittent waters with designated uses of wildlife habitat, livestock watering, warmwater aquatic life, and primary contact.
- Sandia Canyon within San Ildefonso Pueblo.[7] Water quality standards not promulgated.
- Rio Grande in Water Quality Segment 20.6.4.114 (from Cochiti Pueblo boundary upstream to Rio Pueblo de Taos). Designated uses of irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, warmwater aquatic life, primary contact, and public water supply. Segment-specific temperature criteria of 6T3-22 °C (instead of 25 °C for marginal coldwater [MCW]) and maximum temperature of 25 °C (instead of 29 °C). Note: Marginal

[7] Waters that originate or pass through sovereign Pueblo or Tribal lands are under the jurisdiction of those Pueblos or Tribes. A notable exception is joint jurisdiction held by the Pueblo de San Ildefonso and the State of New Mexico for portions of the Rio Grande in segment 20.6.4.114 NMAC.

coolwater (MCWAL) not attained (2022–2024 IR) in Rio Grande WQS 20.6.4.114 NMAC - AU NM-2111_00.

Amending water quality standards requires assessing downstream protections for Segments 126, 128, and 114. Figure 2 illustrates the current and proposed ALU designations for the upper Sandia Canyon AU. Shifting Sandia Canyon's upper segment (Bedrock Road to Outfall 001) from coldwater (Segment 126) to coolwater (Segment 141) remains protective because the system naturally cools downstream into Segment 126 waters (from Sandia Canyon at Sigma Canyon to Bedrock Road). Water quality of Sandia Canyon at Sigma Canyon will remain designated within Segment 126 because it currently meets the coldwater ALU.

Thermograph data from 2016 to 2018 for Sandia Canyon at Sigma Canyon (Table 3) indicate compliance with the current coldwater standard without active cooling measures at Outfall 001. Segment 128 and Segment 114 waters of lower Sandia Canyon are designated as Limited ALU, a less-protective use.

Changing the designated use for upper Sandia Canyon will not impact downstream ephemeral portions of the canyon to the Rio Grande (Segments 20.6.4.128 –20.6.4.114). Laboratory gaging stations indicate that flows from upper Sandia Canyon seldom reach the Lab's eastern boundary (Figure 4), approximately 3.3 miles below the end of perennial flows (Figure 1). It is even more rare for surface flows to reach the Rio Grande—approximately 9 miles below the perennial section—and unlikely for surface flows to affect temperatures at the confluence. The data confirm that amending upper Sandia Canyon's designated ALU from coldwater to coolwater will not impact water quality and supports the attainment and maintenance of downstream standards.

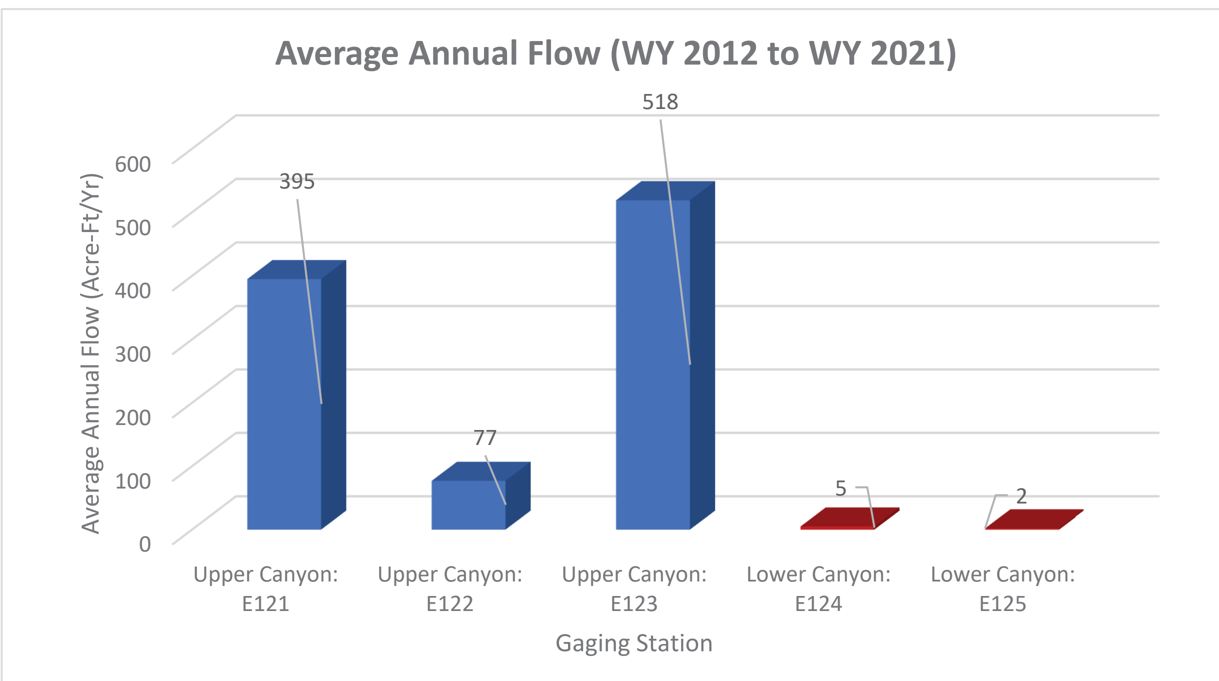


Figure 4. Average annual flow measured in Sandia Canyon gages during the period from October 1, 2011, through September 30, 2021.Period of record for Gage E124 spans only 8 years, from October 1, 2013, to September 30, 2021 (N3B 2022). WY = water year

5 Threatened and Endangered Species, Critical Habitat, and Aquatic Life

An evaluation was conducted of the potential impact of proposed water quality changes on Endangered Species Act–listed threatened and endangered species located within upper Sandia Canyon. Documentation of the presence or absence of threatened and endangered species and critical habitat in upper Sandia Canyon was analyzed in LANL's habitat management plan (HMP; (Hathcock, Keller, and Thompson 2017). The HMP is a comprehensive plan that balances current operations at the Laboratory and future development within the habitats of listed species. Three federally listed threatened or endangered species currently have site plans at the Laboratory: Mexican spotted owl (*Strix occidentalis lucida*), Jemez Mountains salamander (*Plethodon neomexicanus*), and southwestern willow flycatcher (*Empidonax trailii extimus*). The lower section of the upper Sandia Canyon AU is within delineated habitat for the Mexican spotted owl. Based on a review of the proposed work, the UAA work scope is within the framework of the HMP, so no further consultation is needed. Changes to the water quality designation are also within the framework of the HMP, requiring no further consultation.

Several aquatic life surveys have been conducted in Sandia Canyon (Hathcock, Keller, and Thompson 2017; LANL 2017). Fish have not been observed in the upper Sandia Canyon AU—despite attempts to survey them—which indicates that fish are not present. Aquatic life surveys have shown that benthic invertebrate species (macrofauna and meiofauna) are present: 86 taxa—the majority of the insects—were observed in 2017 (Appendix G)[8]; 35 percent were chironomid midges, and 19 percent were coleopterans (beetles), ephemeropterans (mayflies), or trichopterans (caddisflies). Small meiofaunal species (e.g., tardigrades) accounted for a limited portion of observed taxa. Observed taxa richness did not clearly increase with distance from Outfall 001 (Table 6).

Table 6. Count of Taxa Observed in Upper Sandia Canyon in 2017[a]

Reach	Reach Description	No. of Unique Taxa
1	Uppermost: near forks confluence (gages E121 and E122)	33
2	Upper: above wetland	59
3	Middle: below wetland (near E123)	37
4	Lower: midway between wetland and Sigma Canyon	47
All	Reaches 1, 2, 3, and 4	86

[a] The taxa observed in each reach are not mutually exclusive, so the sum of observed taxa is not equivalent to the total unique taxa observed among all reaches.

The benthic macroinvertebrate and meiofaunal species observed during the aquatic life surveys were compared with sensitive and protected species listed by the New Mexico Department of Game and Fish (NMDGF; BISON-M 2016) to determine if threatened or endangered species have been found in the upper Sandia Canyon AU. Review of the data revealed that no species listed as threatened or endangered by NMDGF and USFWS or discussed in Berryhill et al. (2020) were found within the upper Sandia Canyon AU during these surveys.

[8] Taxa overlap in some cases (e.g., "Annelida" was listed as a unique taxon in addition to Tubificidae, Enchytraeidae, and Lumbricina [among others], all of which are annelid taxa), so the total of 86 species may be an overestimation of species richness.

6 Evaluation of pH, Dissolved Oxygen

This section provides a discussion of other factors discussed in the UAA Work Plan (Gallegos 2020), provided in Appendix A, that may affect attainment of the coldwater aquatic life designated use.

In accordance with Gallegos 2020, DO and pH data from LANL's environmental surveillance gages E121, E122, and E123—located within the upper Sandia Canyon AU—were evaluated to determine whether DO and pH fell within acceptable levels during the monitoring period. The criteria applicable to the coldwater aquatic life designated use are DO ≥ 6.0 mg/L, pH between 6.6 and 8.8, 6T3 temperature < 20 °C, and maximum temperature < 24 °C (20.6.4.900.H(2) NMAC) (NMED 2022b).

DO and pH data were collected pursuant to LANL's interim facility-wide groundwater monitoring plan (LANL 2016) and provided in Appendix H. Data from 2016 through 2019 were downloaded from the Intellus New Mexico website (Intellus 2019). Sampling locations in the Intellus database that correspond with gages E121, E122, and E123 are "Sandia right fork at Pwr Plant," "South Fork of Sandia at E122," and "Sandia below Wetlands," respectively.

Figure 5 shows DO concentrations at E121, E122, and E123. During the period from 2016 to 2019, DO ranged from 6.26 to 11.23 mg/L, exceeding the criterion limit for coldwater designated use. DO concentrations vary seasonally, with the highest concentrations during winter months. The elevated DO concentrations in winter reflect the greater solubility of oxygen in cold water than in warmer summer water.

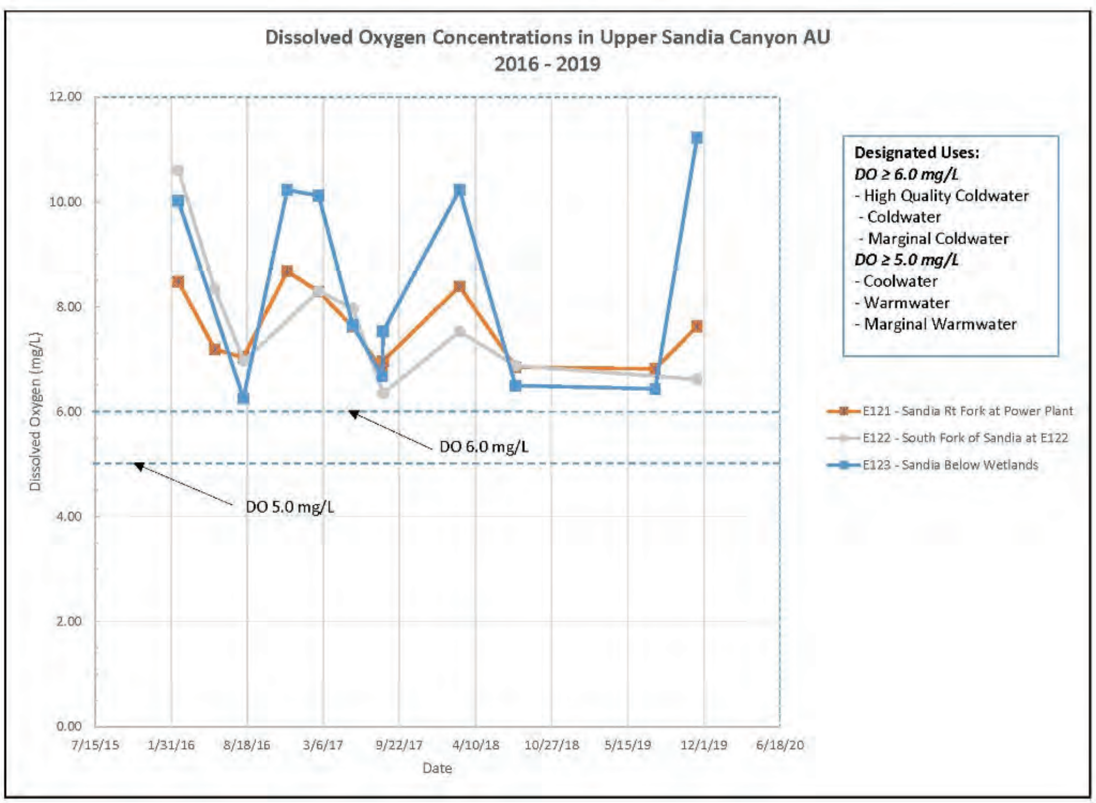


Figure 5. DO concentrations in upper Sandia Canyon assessment unit, 2016–2019.Coldwater aquatic life designated use criterion for DO is 6 mg/L.

Figure 5 shows the pH concentrations in the upper Sandia Canyon AU from 2016 to 2019. During this period, pH concentrations ranged from 7.43 to 8.80, remaining within the coldwater aquatic life designated use range of 6.6 to 8.8. The pH concentrations at E123 were observed to be slightly lower than those at E121 and E122.

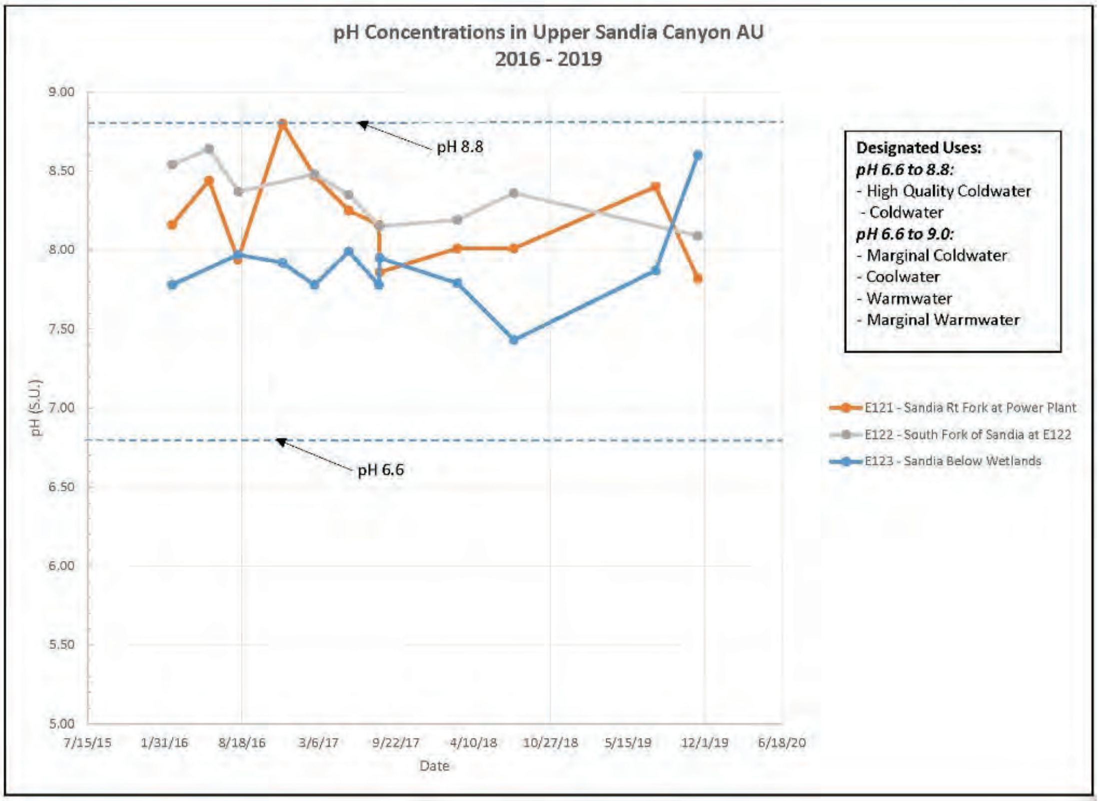


Figure 6. pH Concentrations in upper Sandia Canyon assessment unit 2016–2019.The coldwater aquatic life designated use criterion range for pH is 6.6 to 8.8.

In summary, DO and pH concentrations between 2016 and 2019 were entirely within acceptable levels for the coldwater aquatic life designated use. Therefore, DO and pH do not prevent attainment of the coldwater designated use.

7 Transitional Nature of Ecoregion 21d

Tetra Tech (2010), cited in the 2017 Tecolote Creek temperature UAA (NMED 2017), divided Level IV ecoregions in New Mexico into three sedimentation categories: mountain (21h), foothills (21d), and xeric (22h). This scheme recognizes the differences between high-elevation, steep-sloped, lush-vegetation mountain streams; lower and drier foothills streams; and flatter and still drier xeric streams. The Laboratory lies entirely within these three Level IV ecoregions, and upper Sandia Canyon falls within ecoregion 21d, which represents a transitional environment between 21h and 22h.

During the 2009 Triennial Review, NMED adopted the coolwater aquatic life designated use into its rulemaking process. The coolwater use criteria are intended to provide appropriate protection to aquatic species in transitional and coolwater areas between high-quality coldwater and coldwater use areas in mountainous streams and warmwater use areas in xeric streams (NMED 2009). Communities that live in naturally coolwater streams are tolerant of and adapted to coolwater conditions.

To illustrate how the concept of ecoregion relates to upper Sandia Canyon water temperatures, stream temperatures were measured in three perennial streams located within the Laboratory area: Water Canyon, upper Sandia Canyon, and lower Ancho Canyon. These streams are positioned in the mountains (21h), foothills (21d), and xeric (22h) landscapes, respectively, within the Laboratory area; therefore, they span the range of regional conditions for streams with comparable hydrologic regimes.

July water temperatures are plotted in Figure 7, which illustrates increasing temperatures from the mountain region in the west (Water Canyon) toward the xeric region in the east (lower Ancho Canyon) nearer the Rio Grande. Temperatures in upper Sandia Canyon are, on average, between those observed in the other two streams—consistent with expectations for the three ecoregions. Raw data are provided in Appendix I.

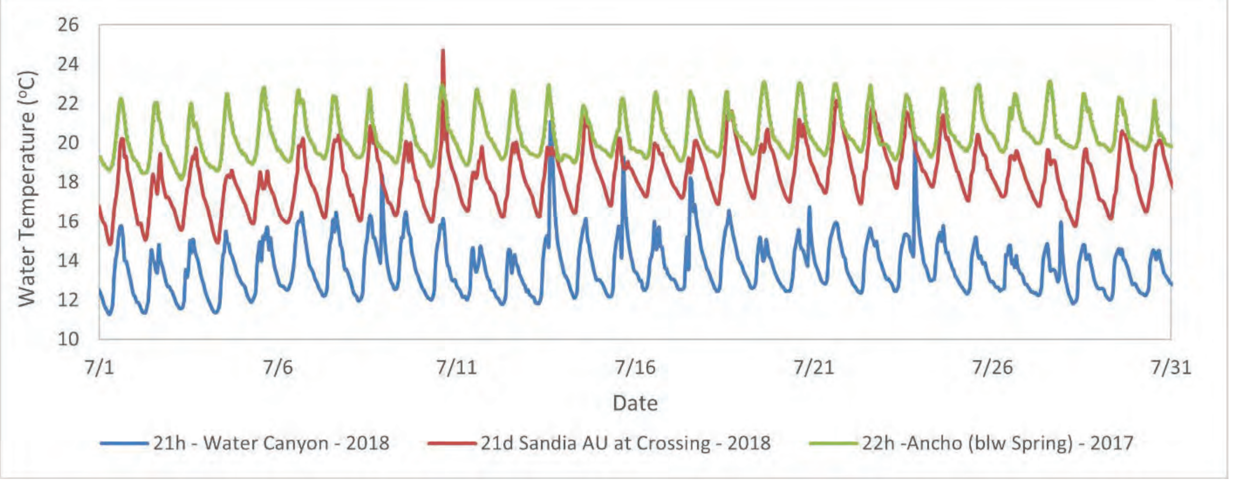


Figure 7. July 2017 and 2018 temperatures for perennial streams within ecoregions 21h, 21d, and 22h. Water Canyon, upper Sandia Canyon, and lower Ancho Canyon monitoring locations are located with ecoregions 21h (mountain), 21d (foothills), and 22h (xeric), respectively, and were sampled in 2018, 2018, and 2017, respectively. Foothills are transitional between mountain and xeric. The coldwater TMAX criterion (24 °C) was exceeded once during the 2018 monitoring period in upper Sandia Canyon; however, this period represents a time (7/10/2018) when the thermograph was exposed to the air (Table 5).

8 Air-Water Temperature Correlation Model

Air temperature and water temperature are highly correlated (NMED 2011a), so air temperature data can be used to understand what water temperatures can be attained in the upper Sandia Canyon AU. The NMED Surface Water Quality Bureau AWTC model has been used in past UAAs (e.g., NMED 2017, 2011b) to estimate water temperature statistics and substantiate which aquatic life designated uses are attainable. This UAA applies the same line of evidence, as described in this section. AWTC is considered a supplementary line of evidence, with greater emphasis placed on thermograph data. Data spreadsheets and calculations are provided in Appendix E.

8.1 Description of the AWTC

The statistics needed to determine attainable uses for the upper Sandia Canyon AU were the 6T3 and TMAX.[9] These statistics were estimated using the AWTC equations (Equations 3 and 4)[10] and then compared with New Mexico temperature criteria (Table 2) to estimate which aquatic life designated uses are likely attainable in the upper Sandia Canyon AU.

$$6T3 = 1.0346 \times ATEMP + 1.3029 \qquad \text{(Eq. 3)}$$

where:
ATEMP = average July air temperature in the upper Sandia Canyon AU.

$$TMAX = 1.0661 \times ATEMP + 4.9547 \qquad \text{(Eq. 4)}$$

where:
ATEMP = average July air temperature in the upper Sandia Canyon AU.

8.2 AWTC Model Application

Two datasets were used to generate independent ATEMP estimates:

- Near-surface air temperature data from the LANL meteorological monitoring network (LANL MET; LANL 2023).
- Parameter-Elevation Relationships of Independent Slopes Model (PRISM; Oregon State University 2023) daily mean air temperature data

[9] The 4T3 criterion (water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days) applies only to the high-quality, coldwater designated use (Table 2). This UAA confirms that the coldwater designated use cannot be attained because of elevated water and air temperatures, so the 4T3 and high-quality coldwater designated use were generally not considered herein. An exception is found in Table 5.

[10] Equations 3 and 4 are the final equations reported by NMED (2011a), which assumed an approximate equivalency between ATEMP and the maximum weekly average (water) temperature (MWAT); the MWAT value was used to generate the slopes and intercepts in Equations 3 and 4, but then ATEMP was substituted for MWAT. This is relevant to the discussion in Section 10, which revisits the AWTC.

The upper Sandia Canyon AU comprises two PRISM grid cells, referred to hereinafter as upper Sandia AU-West [11] and upper Sandia AU-East. [12] Data for the two PRISM cells, along with the July average temperatures estimated from the PRISM data, are provided in Appendix E.

Two LANL MET stations, TA-6 and TA-53, are in close proximity to the upper Sandia Canyon AU. TA-6 is located near the head of Twomile Canyon, approximately 1 mile south and at approximately the same elevation as Outfall 001 (Figure 1). TA-53 is located on the narrow mesa between Sandia Canyon and Los Alamos Canyon, approximately 1 mile east of the lower extent of the upper Sandia Canyon AU, at an elevation of 6,990 ft. Daily minimum and maximum temperatures from the thermometer closest to the ground (height = 1.2 m) at each station were recorded from July 2014 through July 2018. These data were used to estimate a daily mean air temperature (as the midpoint between the daily minimum and the daily maximum) [13] and an average July air temperature (Appendix E, Tables A3 and A4).

Table 3 presents the average July air temperatures for upper Sandia Canyon (based on two PRISM cells and two LANL MET stations) from 2014 to 2018, the associated AWTC-predicted 6T3s, TMAXs, and the designated uses that could be attained at those levels. The attainable uses were determined by comparing the 6T3 and TMAX values to temperature criteria (Table 2) and summarized in Table 3 by year and among years. The highest attainable use among the sources of air temperature data and among years was selected as the projected attainable use (according to the air temperature line of evidence). Based on the summary provided in Table 3 and air temperature thresholds specified by NMED (2011a), the current coldwater ALU is unattainable. This modeling exercise found the coolwater and warmwater ALUs to have been attainable in the upper Sandia Canyon AU between 2014 and 2018, based on air temperature data analyzed using the AWTC model (NMED 2011). With the exception of 2016 and 2018, modeling approaches more frequently predicted that coolwater (rather than warmwater) was attainable; in 2018, based on modeling, the two uses were equally likely. Altogether, these results from AWTC modeling suggest that the coolwater use should be attainable in most years and that a coldwater ALU is not attainable.

[11] Centroid for PRISM cell is at latitude 35.8755, longitude 106.3181; elevation 7,582 ft.
[12] Centroid for PRISM cell is at latitude 35.8694, longitude 106.3073; elevation 7,149 ft.
[13] The use of a midpoint in place of the mean assumes that the temporal trend in temperatures for each day was sinusoidal and approximately symmetrical about the mean.

Table 7. Attainability Evaluation for Upper Sandia Canyon Assessment Unit Waters Based on Average July Air Temperature over Various Periods of Record (OSU 2023)

Year	Average July Air Temperature (°C)				6T3 (°C)				TMAX (°C)				Projected Attainable Use by Year by Metric				Projected Attainable Use by Year(s)
	PRISM		LANL MET		PRISM		LANL MET		PRISM		LANL MET		PRISM		LANL MET		
	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	
1991–2020 Normals	19.7	20.9	NA	NA	21.6	22.8	NA	NA	26.0	27.3	NA	NA	MCW[c] or Coolwater	MCW[c] or Coolwater	NA	NA	NA
1981–2010 Normals	19.0	20.2	NA	NA	20.9	22.1	NA	NA	25.3	26.6	NA	NA	MCW[c] or Coolwater	MCW[c] or Coolwater	NA	NA	NA
1991–2020 Normals: 800m Headwater Grid[a]	NA	20.4	NA	NA	NA	22.3	NA	NA	NA	26.8	NA	NA	NA	MCW[c] or Coolwater	NA	NA	NA
2014	20.7	21.6	20	21.5	22.7	23.7	22.0	23.5	27.0	28.0	26.3	27.9	Coolwater	Coolwater	Coolwater	Coolwater	Coolwater
2015	19.7	20.5	19.4	19.6[b]	21.7	22.5	21.4	21.6	26.0	26.8	25.6	25.9	Coolwater	Coolwater	Coolwater	Coolwater	Coolwater
2016	24	25.2	22.9	24.6	26.1	27.4	25.0	26.8	30.5	31.8	29.4	31.2	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
2017	21.3	22.3	21.4	23	23.3	24.4	23.4	25.1	27.7	28.7	27.8	29.5	Coolwater	Coolwater	Coolwater	Warmwater	Warmwater
2018	22.2	22.6	21.6	23.3	24.3	24.7	23.7	25.4	28.6	29.0	28.0	29.8	Coolwater	Warmwater	Coolwater	Warmwater	Warmwater

[a] 30-year Normals: At the end of each decade, average values for temperature and precipitation are computed over the preceding 30 years. The current set of 30-year normal covers the period 1991–2020. The 1991–2020 dataset, Version M4, was released in December 2022 and is the default 30-year normal dataset for the PRISM Data Explorer (https://prism.oregonstate.edu/explorer/). The 30-year average July air temperatures are reported for the 4 km grid, which includes several canyons (including Los Alamos Canyon) and several plateaus. Upper Sandia AU-West has several grid cells in upper Los Alamos Canyon—in more mountainous and deeply incised areas west of State Highway 501.

[b] Daily maximum air temperatures were not available for July 2015 at TA-53 (except for July 15). Instead, daily maximum temperatures were calculated using 15-minute interval air temperature data from the thermometer 1.2 m above the ground (or from the thermometer 11.5 m above the ground when data from the lower thermometer were not available).

[c] Marginal coldwater; applies only to natural conditions that limit a water body from attaining coldwater uses.

NA = Not Applicable

8.3 Uncertainty in the Air-Water Temperature Model

As with any model, there are uncertainties associated with understanding the complexities of temperature dynamics within a system. The AWTC dataset might not correlate precisely with the July average air temperatures for several reasons, including:

- local conditions that cause the water temperature to be unusually high or low;
- unrepresentative thermograph locations;
- inconsistent periods of record;
- microclimates—in particular, sunny or shady areas; and
- groundwater influences.

The LANL meteorological stations are more local sources to use when gathering air temperature data; however, they do not account for the temperature at every thermograph location, and minor errors can be associated with that as well. LANL acknowledges the uncertainties associated with these models and encourages readers to seek guidance from NMED on the development of the AWTC (NMED 2011a).

9 Stream Segment Temperature Model

In accordance with LANL (2020), the stream segment temperature (SSTEMP) model was used to simulate temperatures in the upper Sandia Canyon AU and estimate effects that result from potential changes in alluvial groundwater inflow and outflow (see Appendix J). The model was developed to predict minimum, mean, and maximum daily stream temperatures based on watershed geometry, hydrology, and meteorology (Bartholow 2004). Four different modeling scenarios were evaluated using 2007 and 2017 data from several stream gages (Table 8). These time periods were selected because they had continuous streamflow data.

Table 8. SSTEMP Estimates

Model Scenario	SSTEMP Model Temperature Estimate (˚C)			No. of Days with Continuous Flow Data	Estimated Use Attained[a]
	Minimum[b]	Mean[b]	Maximum[b]		
E121/E122 to E123	13.91	20.37	26.87	31 (July 2017)	Coolwater
E123 to E123.6	15.74	22.04	28.37	8 (July 23–30, 2007)	Coolwater
E123 to E123.8	16.72	22.55	28.38	8 (July 23–30, 2007)	Coolwater
E123.6 to E123.8	16.85	22.98	29.11	8 (July 23–30, 2007)	Warmwater

[a] Estimated use is based on the predicted maximum temperature compared to TMAX criteria for aquatic life designated uses (Table 2). Minimum and mean estimates are not comparable to criteria; therefore, no comparison of SSTEMP estimates can be made to 6T3 or 4T3 criteria.

[b] Value was estimated on a daily basis and averaged among all modeling days.

The temperatures summarized in Table 8 were derived under a variety of flow conditions. The purpose of evaluating multiple conditions was to determine if inflow from the surrounding alluvium influences stream temperature predictions. The sensitivity analysis generated by SSTEMP for each scenario indicated that mean air temperature had the greatest influence over estimated mean stream temperatures, whereas inflow temperature, relative humidity, wind speed, and possible insolation had lesser (but still significant) influences over predicted mean temperatures. The SSTEMP modeling results support the AWTC modeling results described in Section 4 and provide another line of evidence that coldwater aquatic life criteria in the upper Sandia Canyon AU are not attainable. The results in Table 8 also suggest that a coolwater use designation for the upper Sandia Canyon AU is appropriate.

Uncertainty in the Stream Segment Temperature Model

SSTEMP 2.0 addresses limitations by incorporating an uncertainty feature using the *Monte Carlo analysis*. Monte Carlo analysis is a method that introduces randomness into input values. Instead of relying on a single "most likely" estimate, the model runs multiple simulations with randomly chosen input values (Bartholow 2004). This randomness captures the inherent variability and inaccuracies in measurements, estimations, and the environment. The technique ensures a more comprehensive exploration of potential values, acknowledging the uncertainties within the system.

In the Monte Carlo analysis of SSTEMP, values are drawn randomly from distributions that reflect measurement errors, estimation uncertainties, and landscape variability. The software uses either a uniform or normal distribution for sampling, with precautions to avoid unrealistic values. Although SSTEMP does not account for correlation among variables, the random sampling method aids in estimating average temperature responses and assessing the overall spread of predicted temperatures (Bartholow 2004). The number of trials and samples per trial in this method influences the precision of the results and the confidence interval around the mean temperature.

10 Discussion and Conclusions

The current designated use for the upper Sandia Canyon AU is coldwater, with TMAX and 6T3 temperature criterion of 24 °C and 20 °C, respectively; a DO criterion of 6 mg/L; and a pH range criterion of 6.6 to 8.8. Our recommendation is based on a comprehensive examination of both measured and modeled results from the Sandia UAA. These findings consistently indicate that the current designation of coldwater for the upper Sandia Canyon AU is not supported. This misclassification arose from past studies that failed to account for chronic temperature measurements (4T3 and 6T3), the use of a mismatched reference section (Section 2.2), and the lack of a long-term data set. This analysis looks at temperature over a 5-year study period. Based on the data from the UAA, DOE-Triad recommend splitting the reach into a coolwater ALU segment for upper Sandia Canyon, from Sandia Canyon at Bedrock Road to Sandia Canyon below Outfall 001, with a segment-specific criterion for a 6T3 of 25 °C. The lower segment will retain the coldwater ALU from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road.

Measured temperature data analyzed in Section 4 highlight the incongruity of the current coldwater designation. Table 3 exemplifies how instream temperatures frequently surpass the coldwater 6T3 criterion at most thermograph locations during the study period. Likewise, the coldwater TMAX criterion was exceeded at three of six thermograph locations at various points during the study period. Importantly, the coolwater TMAX criterion (29 °C) was exceeded at two locations during this time.

In examining stream and Outfall 001 temperature data (Table 3 and Table 5), it is evident that air temperature predominantly drives instream temperature dynamics. The data indicate that artificial cooling of the effluent might not result in a corresponding reduction in downstream temperatures at the bottom of the AU. It is essential to recognize that intensified cooling results in higher energy use and an increased carbon footprint for LANL, which is not consistent with the Laboratory's sustainability goals to address climate change. The Laboratory's Sustainability Program is currently developing a plan to move the facility toward a zero-carbon future by increasing efficiency and transitioning away from carbon-based energy. Striking a balance between temperature control and environmental sustainability is a complex challenge that requires careful consideration.

A notable and encouraging observation is the cooling trend recorded in the TMAX and 6T3 values for E123 in 2016 and 2017, contrasting with values from 2014 and 2015. We hypothesize that this cooling effect relates to the installation of the GCS in 2013, leading to vegetative growth and altered alluvial groundwater hydrology. This result implies that a coolwater designated use is likely attainable throughout the AU, possibly due to shade generated by vegetation or shifts in groundwater dynamics. Microclimate effects, especially in the lower reach, also seem to contribute to the cooler-than-expected water temperatures.

Predicted TMAX and 6T3 temperatures from the AWTC model, based on air temperature data, concur with the notion that a coolwater designation could have consistently been met across most study years in upper Sandia Canyon. Section 9 delves further into results from the SSTEMP model—aligning with the coolwater ALU—after considering air temperature, watershed characteristics, hydrology, and meteorology. Sections 8 and 9, though model driven, reinforce the case for a coolwater designation by looking at multiple factors that can affect water temperature.

Regulatory guidelines, specifically 40 CFR 131.10(g) and 40 CFR 131.10(i), support the replacement of a designated use with the highest attainable use when the designated use is unattainable and necessitate that the proposed use be at least as stringent as the existing use. LANL data, shown in Table 3, illustrate that the existing use in the upper Sandia Canyon AU has not met and does not currently meet coldwater aquatic life uses; however, that existing use is met in the lower segment. These data informed LANL's recommendation to maintain the existing use/designated use requirements in the lower segment and to modify the upper segment to reflect the highest attainable use of coolwater aquatic life. In compliance with these regulations, DOE-Triad has meticulously evaluated the ALU in upper Sandia Canyon, affirming that the proposed coolwater ALU for Sandia Canyon from Sandia Canyon at Bedrock Road to Sandia Canyon below Outfall 001—with a segment-specific criterion of a 6T3 of 25 °C— meets the highest attainable use designation. We also find that the coldwater ALU from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road is an existing use and recommend that it be maintained. This conclusion aligns with the improvements in water quality observed over the years and acknowledges the unique nature of the effluent-dependent upper Sandia Canyon system.

11 References

Disclaimer: Links to and/or PDFs of LANL documents have been made available as requested by NMED; however, some non-LANL primary scientific literature that was cited in this UAA lacks Creative Commons licensing or Open Access features. LANL is unable to include this literature in the data package that supports the UAA. Supplemental PDFs of references from LANL are provided in Appendix K.

Bartholow, J. 2004. Stream segment temperature model (SSTEMP) Version 2.0. U.S. Geological Survey.

Bennett, Kathryn. 1994. "Aquatic Macroinvertebrates and Water Quality in Sandia Canyon." Los Alamos National Laboratory report LA-12738-MS.

Berryhill, Jesse T., Jenna E. Stanek, Elisa J. Abeyta, and Charles D Hathcock. 2020. "Sensitive Species Best Management Practices Source Document, Revision 5." Los Alamos National Laboratory report LA-UR-20-24514.

Cross, Saul P., and Jesse Davila. 1996. “Aquatic Macroinvertebrates and Water Quality in Guaje and Los Alamos Canyons, 1995.” Los Alamos National Laboratory report LA-UR-96-0998.

Cross, Saul, and Heidie Nottelman. 1996. “Aquatic Macroinvertebrates and Water Quality of Sandia Canyon, Los Alamos National Laboratory, 1995.” Los Alamos National Laboratory report LA-UR-96-3684.

Cross, Saul. 1994. “Aquatic Macroinvertebrates and Water Quality of Sandia Canyon, Los Alamos National Laboratory, December 1992–October 1993.” Los Alamos National Laboratory status report LA-12734-SR.

Cross, Saul. 1995. “Aquatic Macroinvertebrates and Water Quality of Sandia Canyon, Los Alamos National Laboratory, November 1993 to October 1994. Los Alamos National Laboratory status report LA-12971-SR.

Dewart. 2016. “Uncertainties of Meteorology Measurements.” Memorandum EPC-DO-16-070 from Jean M. Dewart to Steven L. Story, David A. Bruggeman, and Gregory T. Stanton, March 14, 2016. LA-UR-23-33532.

Gallegos, Robert M. 2018. “Temperature and Dissolved Oxygen Data – Sandia Canyon Temperature Study – Determine if Naturally Occurring Thermal Conditions Prevent Attainment of Coldwater Aquatic Life Use in the Perennial Reach of Sandia Canyon.” Los Alamos National Laboratory report LA-UR-18-28589.

Gallegos, Robert M. 2018. “Temperature, Flow and Precipitation Data - Sandia Canyon Temperature Study - Determine if Naturally Occurring Thermal Conditions Prevent Attainment of Coldwater Aquatic Life Use in the Perennial Reach of Sandia Canyon.” Los Alamos National Laboratory report LA-UR-18-30926.

Gallegos, Robert M. 2020. “Work Plan – Use Attainability Analysis – Determine if Naturally Occurring Thermal Conditions Prevent Attainment of Coldwater Aquatic Life Use in the Perennial Reach of Sandia Canyon – Water Quality Segment 20.6.4.126.” EPC-DO-20-040. Los Alamos National Laboratory report LA-UR-19-24784.

Gallegos, Robert M. 2021. Summary of Vegetative Performance Post Construction of Grade Control Structure 2014–2017. Los Alamos National Laboratory report LA-UR-21-28841.

Griffith, G. E., J. M. Omernik, M. M. McGraw, G. Z. Jacobi, C. M. Canavan, T. S. Schrader, D. Mercer, R. Hill, and B. C. Moran. 2006. “Ecoregions of New Mexico” (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,400,000). https://commons.wikimedia.org/wiki/File:New_Mexico_EPA_ecoregions.pdf

Hathcock, C. D., D. C. Keller, and B. E. Thompson. 2017. “Threatened and Endangered Species Habitat Management Plan for Los Alamos National Laboratory.” Los Alamos National Laboratory report LA-UR-17-29454.

Iacona, Brian. M. 2015. “Evaluation of the Geochemical Stability of the Sandia Canyon Wetland.” Water Resources Program, The University of New Mexico, Albuquerque, New Mexico. https://digitalrepository.unm.edu/wr_sp/9

Intellus. 2019. Intellus New Mexico [online]. https://www.intellusnm.com/

LANL. 1978. “Environmental Surveillance at Los Alamos during 1977.” Los Alamos Scientific Laboratory report LA-7263-MS.

LANL. 1982. “Environmental Surveillance at Los Alamos during 1981.” Los Alamos National Laboratory report LA-9349-ENV.

LANL. 2008. "Fate and Transport Investigations Update for Chromium Contamination from Sandia Canyon." Los Alamos National Laboratory report LA-UR-08-04702.

LANL. 2013. "Fiscal Year 2012 Mitigation Action Plan Annual Report for the 2008 Los Alamos National Laboratory Site-Wide Environmental Impact Statement." DOE/EIS-0380 MAPAR 2012. Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL. 2016. "Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year, October 2016–September 2017." Los Alamos National Laboratory report LA-UR-16-23408.

LANL. 2017. "Data Quality Objectives for Sampling and Monitoring Supplemental Environmental Project" (Appendix E). Los Alamos National Laboratory report LA-UR-17-24492.

LANL. 2023. "The Weather Machine." Los Alamos National Laboratory [online]. Los Alamos National Security, LLC, Los Alamos, NM. Updated May 23, 2019. https://envweb.lanl.gov/weathermachine/

Lusk, J. D., R. K. MacRae, D. Chapman, and A. Allert. 2002. "A Water Quality Assessment of Four Intermittent Streams in Los Alamos County, New Mexico." U.S. Fish and Wildlife Service and U.S. Geological Survey, Albuquerque, NM.

N3B. 2019. "2018 Sandia Wetland Performance Report." EM2019-0091. N3B Los Alamos, Los Alamos, New Mexico. https://ext.em-la.doe.gov/GovFTPFiles/api/GetFiles/GetFile?fileName=EMID-700415-01_2018_Sandia_Wetland_Perf_Rpt_042519.pdf

N3B. 2022. "Surface Water Data at Los Alamos National Laboratory, Water Year 2021." EMID-702050. https://ext.em-la.doe.gov/GovFTPFiles/api/GetFiles/GetFile?fileName=EMID-702050.pdf

NMDGF-BISON-M. "Legal Status and Biology of Species in New Mexico." https://www.wildlife.state.nm.us/conservation/bison-m/.

NMED. 2007. "Use Attainability Analysis for Waters Located on Los Alamos National Laboratory as Described in Sections 20.6.4.126 and 128 NMAC New Mexico Water Quality Standards." New Mexico Environment Department, Surface Water Quality Bureau, Santa Fe, NM.

NMED. 2009. "2009 Triennial Review." New Mexico Environment Department, Surface Water Quality Bureau, Santa Fe, NM. https://www.env.nm.gov/surface-water-quality/2009-triennial-review-2/

NMED. 2011. "Air-Water Temperature Correlation." New Mexico Environment Department, Surface Water Quality Bureau. https://www.env.nm.gov/surface-water-quality/wp-content/uploads/sites/18/2021/12/Air-WaterTemperatureCorrelation08-2011.pdf

NMED. 2017. "Use Attainability Analysis Aquatic Life Use Designation for Tecolote Creek, U.S. Interstate 25 (I-25) to Blue Creek, San Miguel County, NM." New Mexico Environment Department, Surface Water Quality Bureau. https://www.env.nm.gov/wp-content/uploads/sites/25/2017/08/UAA-Tecolote-Creek-20180109-JTF.pdf

NMED. 2020. State of New Mexico Statewide Water Quality Management Plan and Continuing Planning Process. https://www.env.nm.gov/surface-water-quality/wqmp-cpp/

NMED. 2022a. "2022–2024 State of New Mexico Clean Water Act § 303 (d)/§ 305 (b) Integrated Report." New Mexico Environment Department Surface Water Quality Bureau. https://www.env.nm.gov/surface-water-quality/303d-305b/

NMED. 2022b. "State of New Mexico Standards for Interstate and Intrastate Surface Waters." 20.6.4 NMAC. New Mexico Environmental Department, Santa Fe, NM. 20.6.4.126 NMAC – N, 05-23-05; A, 12-01-10, Amended by New Mexico Register, Volume XXXIII, Issue 07, April 5, 2022, eff. 4/23/2022. https://www.srca.nm.gov/parts/title20/20.006.0004.html

OSU (Oregon State University). 2023. PRISM Climate Group; Northwest Alliance for Computational Science and Engineering (NACSE). https://prism.oregonstate.edu/

Schmid, R. F. "Reference Conditions for Los Alamos National Laboratory Streams Using Benthic Macroinvertabrate Assessment in Upper Pajarito Canyon." In *New Mexico Geological Society Guidebook, 47th Field Conference, Jemez Mountains Region*, 1996. https://nmgs.nmt.edu/publications/guidebooks/downloads/47/47_p0441_p0447.pdf

Stanek, J. E., E. J. Abeyta, J. M. Rodriguez, and C. D. Hathcock. 2020. "Monitoring Avian Productivity and Survivorship at the Sandia Wetlands at Los Alamos National Laboratory 2014–2019." Los Alamos National Laboratory report LA-UR-20-22996.

Strachan, S. and C. Daly. 2017. "Testing the Daily PRISM Air Temperature Model on Semiarid Mountain Slopes." *Journal of Geophysical Research: Atmospheres* 122(11). DOI:10.1002/2016JD025920

Tetra Tech. 2010. "Sediment in New Mexico Streams: Existing Conditions and Potential Benchmarks." Final report. Tetra Tech, Inc., Montpelier, VT. https://www.env.nm.gov/wp-content/uploads/sites/25/2019/04/Jessup-NMSedimentation2010.pdf

USEPA. 2020. NPDES Permit No. NM0028355 Fact Sheet. U.S. Environmental Protection Agency, Los Alamos, New Mexico.

USEPA. 2023a. Ecoregions of North America [online]. U.S. Environmental Protection Agency. Updated July 5, 2023. https://www.epa.gov/eco-research/ecoregions-north-america

USEPA. 2023b. "Interim Technical Support Document. EPA Action on the New Mexico Water Quality Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC. 2020 Triennial Revisions." U.S. EPA Region 6 Water Quality Protection Division. January 17, 2023. https://www.env.nm.gov/surface-water-quality/wp-content/uploads/sites/18/2023/02/2023-01-20-EPA-Letter-2020_Triennial_Review_20-51R-TSD_FINAL.pdf

Appendix A: UAA Work Plan

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix B: GPS Data for Thermograph, Gage, and Outfall Locations

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix C: Raw Thermograph and Outfall Water Temperature Data for 2014–2018

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix D: Long-Term Data Management Spreadsheets for 6T3 Calculations

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix E: AWTC, PRISM, and LANL MET Data

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix F: MWAT Data, Tables, and Equations

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix G: Habitat Management Plan and Aquatic Life Surveys

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix H: Interim Facility-Wide Groundwater Monitoring Plans

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix I: Transitional Nature of Ecoregions

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix J: SSTEMP Data and Model Outputs

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

Appendix K: Supplemental References from Los Alamos Unlimited Release Publications

This appendix is transmitted via

☐ Flash drive

☒ Electronic File Transfer

☐ Other:

EXHIBIT C

EAST JEMEZ RESOURCES COUNCIL
Meeting Agenda

Zoom Meeting Hosted by
Los Alamos Nature Center
December 10, 2020

9:00 – 9:05 Welcome and Introductions – Sam Loftin

9:05 – 9:45 Sandia Canyon Assessment Unit Temperature Study and Use Attainability Analysis– Robert Gallegos and Tim Goering (EPC-CP LANL)

The purpose of the study is to determine if natural thermal conditions are preventing the attainment of Coldwater Aquatic Life Use in the perennial reach of the upper Sandia Canyon Assessment Unit (Sandia AU). The New Mexico Water Quality Standards allow for a change in the designated use if a Use Attainability Analysis (UAA) demonstrates that the use is not attainable due to one or more of six factors listed in 40 CFR 131.10(g), including naturally occurring pollutant concentrations. The Sandia AU is located in a perennial reach of upper Sandia Canyon between Sigma Canyon and NPDES Outfall 001. The classified Segment 20.6.4.126 NMAC comprises perennial waters within Los Alamos National Laboratory boundaries and includes the Sandia AU. Persistent surface flows originate from NPDES permitted effluent releases. These releases have occurred since the early 1950's and continue today. The UAA examines several lines of evidence. NMED's Air-Water Temperature Correlation (AWTC) model is used for identifying appropriate stream classifications and attainable aquatic life use subcategories. The model correlates between July average air temperatures (ATEMP) and maximum weekly average stream temperatures. Air temperatures are obtained from PRISM and LANL Meteorological Towers and used to derive ATEMP. Thermographs were placed in the Sandia AU to obtain measured stream temperatures during summer months when stream temperatures are the highest. Measured data is used with AWTC modeled data to determine if the Sandia AU is meeting its natural air temperature-driven thermal condition.

9:45 – 10:30 A Naturalistic Approach to Watershed Restoration and Flood Mitigation - Garrett Altmann - GIS Coordinator, Project Manager Department of Forestry Santa Clara Pueblo

Santa Clara Pueblo is a federally recognized Native American Tribe located on the Rio Grande in Northern New Mexico. Since 1998, three severe wildfires have originated outside tribal boundaries, yet have burned over 80% of Santa Clara forested lands. Compounding these disasters, post-fire flooding devastated the Santa Clara Creek and Canyon, an area historically relied upon for recreation, economic revenue, and spiritual sanctuary. The magnitude of these events has resulted in Santa Clara Pueblo receiving five Presidential Disaster Declarations.

Guided by the National Disaster Recovery Framework (NDRF), Santa Clara Pueblo has embarked on a collaborative recovery strategy that is being made possible through interagency coordination and the implementation of specialized, innovative strategies. By leveraging capabilities from multiple agencies, non-governmental organizations and specialized consultants, the Tribe is able to maximize expertise in its forest and stream recovery efforts.

Our project area is contained within the Santa Clara Creek Watershed. Since the Santa Clara Creek is regarded as a sacred source of life, the Tribe has prioritized natural stream function in its flood mitigation and restoration design. This includes emphasizing innovative bioengineering principles that utilize natural materials while aiming to maximize ecosystem benefits, such as promoting habitat complexity while providing long term resilience to future disturbances.

10:30 – 11:15 The USGS Southwest Gravity Program - Meghan Bell – USGS New Mexico Water Science Center

The U.S. Geological Survey Southwest Gravity Program aims to provide high-precision time-lapse gravity (repeat microgravity) data for hydrologic studies in the southwestern US. Recent projects include monitoring recharge underneath ephemeral-stream channels, monitoring aquifer-storage change in unconfined and compressible aquifers, measuring preferential storage change at an artificial-recharge facility, and estimating specific yield through the correlation of gravity and water-level change in wells. Projects range in scale from the site-specific (individual recharge basins) to alluvial basin (e.g., the Tucson and Avra Valley groundwater basins).

11:15 – 12:00 Round Table Discussion – All

Instructions for Zoom meeting:

Join by desktop or laptop:

Join Zoom Meeting
https://us02web.zoom.us/j/82357314449

Meeting ID: 823 5731 4449
Passcode: eastjemez

You may have to download the Zoom Client software or join via your browser. Check to see that your Zoom software is updated.

Join by phone:

1 346 248 7799
Meeting ID: 823 5731 4449
Passcode: 060724771

If you have problems connecting, please email Siobhan Niklasson at educator@peecnature.org. Please be patient!

EXHIBIT D

AGENDA

Los Alamos - Pueblos Project
Accords Technical Exchange Meeting
February 23, 2021
Via Webex

9:00 – 9:05	Welcome & Overview of Agenda Donald Ami, NNSA Los Alamos Field Office Miquela Vargas, EM Los Alamos Field Office
9:05 – 9:25	Self-Introductions & Opening Remarks Lt. Governor Raymond Martinez, Pueblo de San Ildefonso Clarice Madalena, Jemez Pueblo Jason Romero, Pueblo de Cochiti Dino Chavarria, Santa Clara Pueblo Rosemary Maestas-Swazo, Tribal Liaison, Los Alamos National Laboratory/Triad
9:25 – 9:30	Introduction and Background – Use Attainability Analysis – Aquatic Life Uses for Perennial Reach of Sandia Canyon Karen Armijo, Permitting and Compliance Program Manager, NNSA Los Alamos Field Office
9:30 – 10:30	Use Attainability Analysis – Aquatic Life Uses for Perennial Reach of Sandia Canyon Robert Gallegos, LANL/Triad EPC-CP
10:30 – 11:15	Open Dialogue All
11:15 – 11:30	Date and Topics for Next Meeting
11:30	Adjourn

EXHIBIT E

Los Alamos
NATIONAL LABORATORY

Environmental Protection & Compliance Division
Compliance Programs Group

Los Alamos National Laboratory
PO Box 1663, K490
Los Alamos, NM 87545
505-667-0666

Symbol: EPC-DO: 21-342
LAUR: 21-30460
Locates: N/A
Date: OCT 25 2021

Shelly Lemon Bureau Chief
New Mexico Environment Department
Surface Water Quality Bureau
1190 St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502

Subject: Upper Sandia Canyon Assessment Unit Use Attainability Analysis

Dear Ms. Lemon:

Attached for your review is a Use Attainability Analysis (UAA) prepared by Department of Energy's National Nuclear Security Administration, Triad National Security, LLC (DOE-NA-LA/Triad) and Windward Environmental, LLC. The purpose of the UAA is to determine the most protective aquatic life use attainable in the perennial portion of the Upper Sandia Canyon AU – NM-9000.A_47. The Upper Sandia Canyon UAA was prepared pursuant to requirements contained in 20.6.4.15 NMAC.

The Upper Sandia Canyon AU is listed as impaired due to temperature exceedances, as discussed in the NMED's 2018–2020 Integrated Report (IR), and is assigned an IR Category of "5B," indicating the need for review of the Water Quality Standard. The UAA was prepared in accordance with a work plan submitted by Triad (EPC-DO: 20-040 February 10, 2020) and approved by NMED on April 9, 2020.

UAA findings include:

- Coldwater aquatic life use is unattainable in the Upper Sandia Canyon AU.
- Coldwater aquatic life use is not attainable because of 40.CFR 131.10 (g)(1): "Naturally occurring pollutant concentrations prevent the attainment of the use… ."
- Predicted TMAX and 6T3 from NMED's AWTC Model suggest that coolwater and warmwater aquatic life uses were attainable.
- Coolwater aquatic life use is well-supported by measured water temperatures.
- Demonstrates that coolwater aquatic life use is the most protective aquatic life in the Upper Sandia Canyon AU.

The analyses in the UAA provides multiple lines of evidence, and the overall weight of evidence indicates that the coldest attainable use for the Upper Sandia Canyon AU is the coolwater aquatic life designated use with a TMAX criterion of 29°C.

In accordance with the approved work plan, DOE-NA-LA/Triad provided preliminary data, findings and information regarding the UAA, as follows:

- Northern New Mexico Citizens Advisory Board (NNCAB) on November 13, 2019 and October 13, 2021

- Accord Pueblos on December 5, 2018 (Santa Clara), February 7, 2019 (San Ildefonso), April 25, 2019 (Jemez), September 3, 2020 (Joint Meeting Accord Pueblos) and February 23, 2021 (Joint meeting of Accord Pueblos)
- East Jemez Resource Council (EJRC) on November 14, 2019 and December 10, 2020.

The final draft is provided to NMED at this time in advance of DOE-NA-LA/Triad completing the Stakeholder Outreach and Public Engagement portion of the process. We request NMED complete its review within 30 days of receipt. Triad intends to post a public comment draft UAA on LANL's Electronic Public Reading Room and publish notice of the UAA's availability in a local newspaper in November 2021. In accordance with the approved work plan, the UAA will also be submitted to San Ildefonso Pueblo, Cochiti Pueblo, Jemez Pueblo and Santa Clara Pueblo (Accord Pueblos), the Northern New Mexico Citizen's Advisory Board (NNMCAB), and the East Jemez Resource Council (EJRC). DOE-NA-LA/Triad has established an email address to receive comments and answer questions specific to the Upper Sandia Canyon UAA: sandiacanyonuaa@lanl.gov.

Thank you for your assistance in this matter. Please contact Robert Gallegos at (505) 665-0450 or at rgallegos@lanl.gov, if you have any questions.

Sincerely,

Taunia Sandquist — Digitally signed by Taunia Sandquist Date: 2021.10.25 12:57:25 -06'00'

Taunia J. Sandquist
Group Leader

Attachment(s): Attachment 1 Use Attainability Analysis for Upper Sandia Canyon

Copy: Kris Barrios, NMED/SWQB, Kristopher.Barrios@state.nm.us
Jennifer Fullam, NMED/SWQB, Jennifer.Fullam@state.nm.us
Karen E. Armijo, NA-LA, Karen.Armijo@nnsa.doe.gov
Marcus Pinzel, NA-LA, marcus.pinzel@nnsa.doe.gov
Michael W. Hazen, Triad, ALDESHQSS, mhazen@lanl.gov
William R. Mairson, Triad, ALDESHQSS, wrmairson@lanl.gov
J'nette Hyatt, Triad, EWP, jhyatt@lanl.gov
Jennifer E. Payne, Triad, EPC-DO, jpayne@lanl.gov
Kristen Honig, Triad, EPC-DO, khonig@lanl.gov
Taunia J. Sandquist, EPC-CP, taunia@lanl.gov
Jackie C. Hurtle, Triad, EPC-CP, jhurtle@lanl.gov
Sarah S. Holcomb, Triad, EPC-CP, sholcomb@lanl.gov
Tim Goering, Triad, EPC-CP, goering@lanl.gov
Brian Iacona, Triad, EPC-CP, biacona@lanl.gov
Robert M. Gallegos, Triad, EPC-CP, rgallegos@lanl.gov
epccorrespondence@lanl.gov
eshqss-dcrm@lanl.gov
gc-esh@lanl.gov

Attachment 1

Use Attainability Analysis for Upper Sandia Canyon

EPC-DO: 21-342

LA-UR-21-30460

Date: OCT 2 5 2021

USE ATTAINABILITY ANALYSIS FOR UPPER SANDIA CANYON

DRAFT FINAL

Prepared for

Los Alamos National Laboratory

LA-UR-21-30460

For submittal to

New Mexico Environment Department

September 27, 2021

Prepared by: Windward environmental LLC

200 First Avenue West, Suite 500 ♦ Seattle, Washington ♦ 98119

Table of Contents

Tables

Figures

Acronyms

4T3	water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days
6T3	water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days
ARIMA	autoregressive integrated moving average
ATEMP	average July air temperature
AU	assessment unit
AWTC	air-water temperature correlation
CFR	Code of Federal Regulations
DO	dissolved oxygen
GCS	grade control structure
HMP	habitat management plan
IR	integrated report
LANL	Los Alamos National Laboratory
LANL MET	Los Alamos National Laboratory meteorological monitoring network
MWAT	maximum weekly average (water) temperature
NPDES	National Pollutant Discharge Elimination System
NMAC	New Mexico Administrative Code
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
PI	prediction intervals
PRISM	Parameter-elevation Relationships of Independent Slopes Model
RMSE	root mean square error
SSTEMP	stream segment temperature
SWQB	NMED Surface Water Quality Bureau
TMAX	maximum water temperature
Triad	Triad National Security
UAA	use attainability analysis
USFWS	US Fish and Wildlife Service

WQCC	Water Quality Control Commission
WQS	water quality standards

1 Introduction

This document presents a use attainability analysis (UAA) for the perennial segment of Upper Sandia Canyon, which is located within the Los Alamos National Laboratory (LANL) property near Los Alamos, New Mexico.[1] This UAA is consistent with 20.6.4.126 New Mexico Administrative Code (NMAC) (New Mexico Environment Department [NMED] 2011c), which describes the perennial segment as "Sandia Canyon from Sigma Canyon upstream to LANL [National Pollutant Discharge Elimination System] NPDES outfall 001." The perennial segment's designated uses are coldwater aquatic life, livestock watering, wildlife habitat, and secondary contact.

40 Code of Federal Regulations (CFR) § 131.10(g) permits a state to remove a designated use that is not an existing use (as defined in 40 CFR §131.3), if a UAA demonstrates that naturally occurring pollutant concentrations prevent the attainment of the use or if physical conditions related to the natural features of the water body preclude the attainment of the aquatic life protection use. This UAA considers whether natural physical conditions in Upper Sandia Canyon, specifically air and/or water temperatures, prevent the designated aquatic life use water temperature limits (i.e., coldwater) from being attained in the perennial segment. The weight of evidence presented in this UAA supports the conclusion that, based on air-water temperature modeling and instream thermograph data, the coolwater aquatic life designated use is currently the attainable use. Accordingly, it is recommended that the coolwater aquatic life designated use replace the coldwater aquatic life designated use in the Upper Sandia Canyon assessment unit (AU).

[1] Within this document, the terms "LANL" and "the Laboratory" are used to distinguish between the organization and the physical area on the Pajarito Plateau controlled and operated by LANL, respectively.

2 Site Description and History

Upper Sandia Canyon is one of several segments described by 20.6.4.126 NMAC (NMED 2011c). It is a perennial reach originating within the Laboratory and includes one AU, "NM-9000.A_47, from NPDES outfall 001 to Sigma Canyon" (hereinafter referred to as the Upper Sandia Canyon AU) (Figure 1). Outfall 001, located at LANL's Technical Area (TA) 3, discharges an average of 154,000 gallons per day (and a maximum of 333,000 gallons per day), creating a continuously flowing waterbody in Upper Sandia Canyon (EPA 2020). Most of the water comes from the co-generating power and steam plant, which generates heat, electricity, and steam used for LANL activities.[2] While Outfall 001 is the primary source of water flow to the Upper Sandia Canyon AU, two other NPDES outfalls, Outfall 027 and Outfall 199, also discharge much smaller volumes of effluent to the AU.[3] Both outfalls discharge cooling tower effluents.

[2] https://www.lanl.gov/environment/protection/compliance/industrial-permit/outfall-map.php

[3] Outfalls 027 and 199 (shown on Figure 1) are also known as Outfalls 03A027 and 03A199.

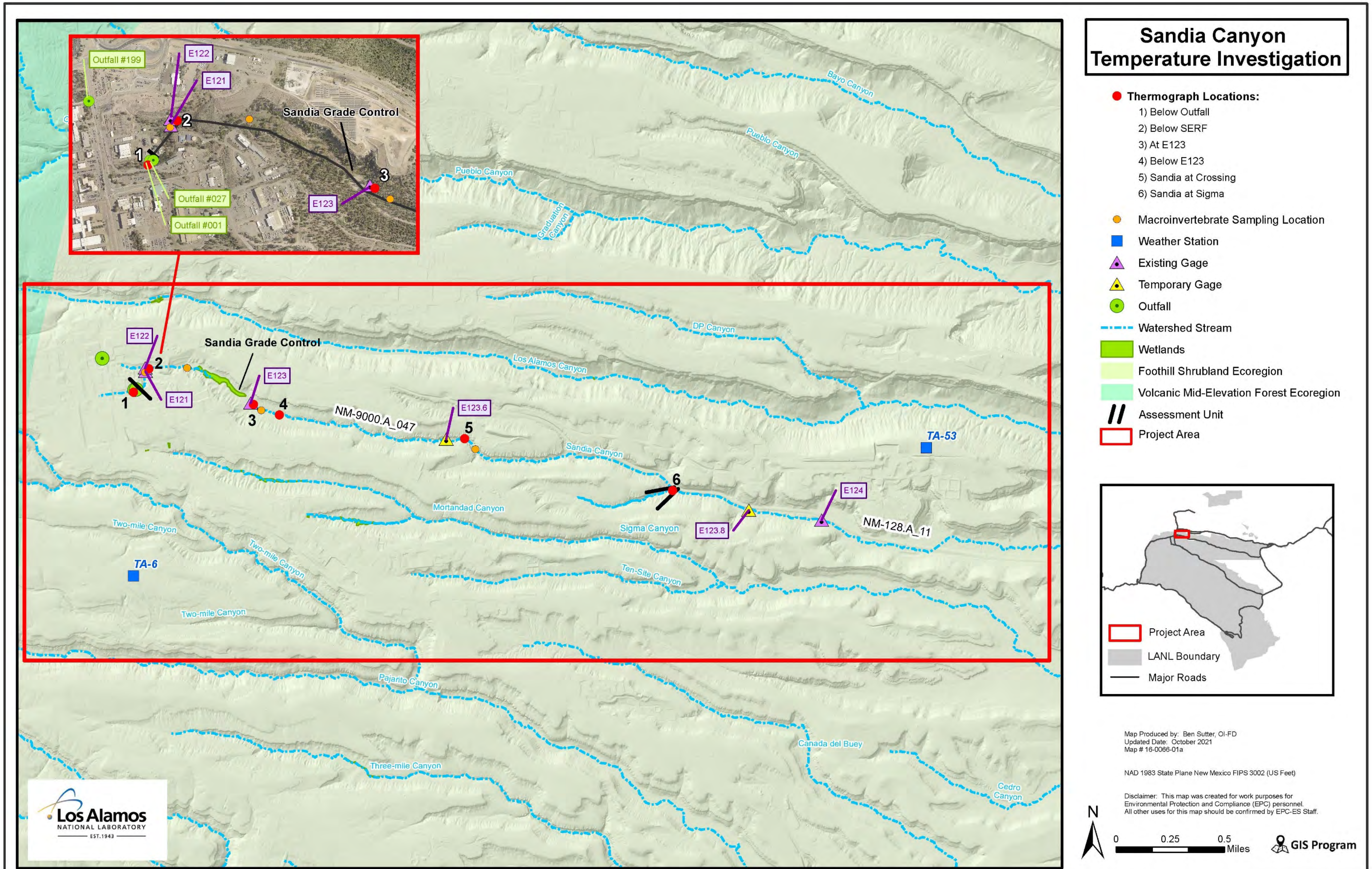


Figure 1. Upper Sandia Canyon AU

Upper Sandia Canyon is effluent dependent, meaning that it ~~it~~ would not be perennial without effluent inputs. Discharge into Sandia Canyon began in the 1950s (LANL 2008) and now supports a 3.65-acre wetland (Stanek et al. 2020) near the upper end of the Upper Sandia Canyon AU, just downstream of the outfalls. Wetland sediments are underlain by Bandelier Tuff, upon which alluvial groundwater is perched. Past investigations have shown little evidence of significant infiltration beneath the wetland (LANL 2013). For example, in a water balance study conducted between 2007 and 2008 (LANL 2008), only about 2% of the surface water entering the wetland infiltrated the underlying bedrock. Past comparisons of surface water chemistry results from above and below the wetland have demonstrated that baseflow has a short residence time, and that there is little exchange between surface water and groundwater within the wetland (Iacona 2015).

Installation of a grade control structure (GCS) in 2013 reduced the rate of erosion at the downstream end of the wetland and created an impermeable barrier to subsurface flow, such that alluvial groundwater must now resurface before exiting the wetland. Given the impermeable nature of this barrier and the largely impermeable tuff underlying the wetland, the wetland can conceptually be thought of like a bathtub that effectively holds water; excess water overflows from the wetland at the GCS. Annual evaluation of baseflow rates has confirmed this description, as rates entering and exiting the wetland have been similar (N3B 2019).

LANL (2008) determined the water budget for sources of flow and loss throughout the canyon. The study concluded that the perennial segment of Upper Sandia Canyon is a net-neutral or net-losing stream from the wetland to the end of the Upper Sandia Canyon AU (Table 1); in other words, the amount of water in the stream is stable or decreases over its length as a result of evaporation, infiltration, or surface water loss to alluvial groundwater. Flow in alluvial well gages correlated with changes in outfall flow, as well as with precipitation events. Daily temperature swings in alluvial groundwater also correlated with air temperature fluctuations. These patterns indicate that the alluvial storage is small, and that the alluvium is recharged by Sandia Canyon surface water.

Table 1. Approximate surface water budget in Upper Sandia Canyon from July 2007 to June 2008

Process and Area[a]	Estimated Gain or Loss (acre ft/yr)	Percent of Total
Discharge from outfalls	389	75
Runoff above E123	130	25
Evapotranspiration in wetland	-18	-3
Infiltration beneath wetland	-12	-2
Infiltration between wetland and D123.6	0	0
Surface water loss between D123.6 and D123.8	-119	-23

Process and Area[a]	Estimated Gain or Loss (acre ft/yr)	Percent of Total
Surface water loss between 123.8 and E124	-334	-64
Surface water loss between E124 and E125	-36	-7

Source: LANL (2008)

[a] E123, E124, and E125 are permanent surface water gage stations in Upper Sandia Canyon. D123.6 and D123.8 were temporary gage stations for the water balance study (LANL 2008).

In 2005, the New Mexico Water Quality Control Commission (WQCC) adopted the Upper Sandia Canyon AU as a classified water of the state, designating a use of coldwater aquatic life and a segment-specific temperature criterion of 24°C. The decision to adopt the segment-specific temperature criterion was based on a 2002 US Fish and Wildlife Service (USFWS) study (Lusk et al. 2002), which found that water temperatures within the Upper Sandia Canyon AU exceeded 20°C but not the maximum summer temperature for the survival of brook trout (24°C).[4] Time-averaged peak temperatures were not considered in that study, because time-averaged criteria had not yet been adopted by the WQCC as part of the New Mexico water quality standards (WQS).

In 2010, as part of a revision of the New Mexico WQS, the WQCC eliminated and replaced the Upper Sandia Canyon AU's site-specific criterion of 24°C with the general coldwater aquatic life designated use temperature criterion (also 24°C) from 20.6.4.900.H NMAC (NMED 2011c). In a subsequent rulemaking proceeding, the WQCC adopted the 6T3 criterion[5] of 20°C and made it applicable to the statewide coldwater designated use (Table 2). Attainability of the 6T3 criterion in the Upper Sandia Canyon AU has not been previously analyzed.

[4] Sandia Canyon drains to the Rio Grande. The downstream end of the perennial reach is located approximately 8 miles upstream and 1,300 vertical feet above the Rio Grande. Aquatic life surveys of Sandia Canyon have found no fish (LANL 2017).

[5] Water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days.

Table 2. New Mexico temperature criteria for aquatic life designated uses

Aquatic Life Designated Use	Maximum Temperature (°C)[a]	6T3 (°C)	4T3 (°C)
High-quality coldwater	23	--	20
Coldwater	24	20	--
Marginal coldwater[b]	29	25[c]	--
Coolwater	29	--	--
Warmwater	32.2	--	--
Marginal warmwater[b]	32.2	--	--
Limited[b]	no default established	--	--

Source: 20.6.4.900.H NMAC (NMED 2011c)

[a] Unless segment-specific maximum temperature criteria exist in 20.6.4.97 through 20.6.4.899 NMAC; default 4T3 and 6T3 are not applicable in these cases per 20.6.4.900.H(1)(2)(3) (NMED 2011c).

[b] Marginal and limited designated uses apply only to naturally low-flowing streams; therefore, these uses would not apply to the perennial reach of Upper Sandia Canyon.

[c] With the exception of 20.6.4.114 NMAC, which contains a segment-specific 6T3 of 22°C (NMED 2011c).

4T3 – water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

NMAC – New Mexico Administrative Code

Temperature is one of the most common causes of water quality impairment in New Mexico. The Upper Sandia Canyon AU is listed as impaired due to temperature exceedances, as discussed in the NMED's 2018–2020 Integrated Report (IR) (NMED 2018), and is assigned an IR Category of "5B," indicating the need for review of the WQS.

3 Ecoregion Setting

The Laboratory was built upon the Pajarito Plateau, which EPA (2019) characterizes as southern Rocky Mountain foothill shrub lands, volcanic mid-elevation forests, and north-central New Mexico valleys and mesas. The Pajarito Plateau slopes downward to the east-southeast, covering approximately 15 miles from the base of the Jemez Mountains (7,800 ft elevation) to the Rio Grande (5,400 ft elevation). Habitat on the Pajarito Plateau consists of irregular rolling hills and finger mesas composed primarily of soft, erodible Bandelier Tuff.

The Upper Sandia Canyon AU falls within ecoregion 21d, "Northwestern Forested Mountains-Western Cordillera-Southern Rockies-Foothill Woodlands and Shrubs" (EPA et al. 2006; EPA 2019). Ecoregion 21d, which extends from Wyoming through Colorado and into northern New Mexico, is characteristically dry Rocky Mountain habitat dominated by pinyon juniper and oak woodland forests at 6,000 to 8,500 ft of elevation (EPA et al. 2006). The Upper Sandia AU is located within a transitional zone between mountainous and xeric regions, and air and water temperatures reflect this transition. Section 9 provides information illustrating that water temperatures warm along the transition from the mountainous to transitional to xeric ecoregions.

4 Air-Water Temperature Correlation Model

Air temperature and water temperature are highly correlated (NMED 2011a), so air temperature data can be used to understand what water temperatures can be attained in the Upper Sandia Canyon AU. The NMED Surface Water Quality Bureau (SWQB) air-water temperature correlation (AWTC) model has been used in past UAAs (e.g., NMED 2017, 2011b) to estimate water temperature statistics and substantiate which aquatic life designated uses are attainable. This UAA applies the same line of evidence, as described in this section.

4.1 Description of the AWTC

The statistics needed to determine attainable uses for the Upper Sandia Canyon AU were the 6T3 and TMAX.[6] These statistics were estimated using the AWTC equations (Equations 1 and 2)[7] and then compared to New Mexico temperature criteria (Table 2) to estimate which aquatic life designated uses are likely attainable in the Upper Sandia Canyon AU.

6T3 = 1.0346 × ATEMP + 1.3029 **Equation 1**

Where:

ATEMP = average July air temperature in the Upper Sandia Canyon AU

TMAX = 1.0661 × ATEMP + 4.9547 **Equation 2**

Where:

ATEMP = average July air temperature in the Upper Sandia Canyon AU

4.2 AWTC Model Application to Site

Two datasets were used to generate independent ATEMP estimates:

- Near-surface air temperature data from the LANL meteorological monitoring network (LANL MET) (LANS 2019)

[6] The 4T3 criterion (water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days) only applies to the high-quality coldwater designated use (Table 2). This UAA confirms that the coldwater designated use cannot be attained because of elevated water and air temperatures, so the 4T3 and high-quality coldwater designated use were generally not considered herein. An exception is found in Table 5.

[7] Equations 1 and 2 are the final equations reported by NMED (2011a), which assumed an approximate equivalency between ATEMP and the maximum weekly average (water) temperature (MWAT); the MWAT value was used to generate the slopes and intercepts in Equations 1 and 2, but then ATEMP was substituted for MWAT. This is relevant to the discussion in Section 10, which revisits the AWTC.

- Parameter-elevation Relationships of Independent Slopes Model (PRISM) (NACSE 2019) daily mean air temperature data

The Upper Sandia Canyon AU comprises two PRISM grid cells, referred to hereinafter as Upper Sandia AU-west[8] and Upper Sandia AU-east.[9] Data for the two PRISM cells, along with the July average temperatures estimated from the PRISM data, are provided in Appendix A, Tables A1 and A2.

Two LANL MET stations, TA-6 and TA-53, are in close proximity to the Upper Sandia Canyon AU. TA-6 is located near the head of Twomile Canyon, approximately 1 mile south of and at approximately the same elevation as Outfall 001 (Figure 1). TA-53 is located on the narrow mesa between Sandia Canyon and Los Alamos Canyon, approximately 1 mile east of the lower extent of the Upper Sandia Canyon AU, at an elevation of 6,990 ft. Daily minimum and maximum temperatures from the thermometer closest to the ground (height = 1.2 m) at each station were recorded from July 2014 through July 2018. These data were used to estimate a daily mean air temperature (as the midpoint between the daily minimum and the daily maximum)[10] and an average July air temperature (Appendix A, Tables A3 and A4).

Table 3 presents the average July air temperatures for Upper Sandia Canyon (based on two PRISM cells and two LANL MET stations) from 2014 to 2018, the associated AWTC-predicted 6T3s, TMAXs, and the designated uses that could be attained at those levels. The attainable uses were determined by comparing the 6T3 and TMAX values to temperature criteria (Table 2) and summarized in Table 3 by year and among years. The warmest attainable use among the sources of air temperature data and among years was selected as the projected attainable use (per the air temperature line of evidence). Based on the summary provided in Table 3 and air temperature thresholds specified by NMED (2011a), the current coldwater aquatic life use is unattainable. This modeling exercise found the coolwater and warmwater aquatic life uses to have been attainable in the Upper Sandia Canyon AU between 2014 and 2018, based on air temperature data analyzed using the AWTC model (NMED, 2011). With the exception of 2016 and 2018, modeling approaches more frequently predicted that coolwater was attainable than was warmwater; in 2018, the two uses were equally likely based on modeling. Altogether, these results suggest that the coolwater use should be attainable in cooler years (e.g., 2014 and 2015) and warmwater should be attainable in warmer years (e.g., 2016). Overall, the warmest attainable use throughout the monitoring period was warmwater.

---

[8] Centroid for PRISM cell is at latitude 35.8755, longitude -106.3181; elevation 7,582 ft.

[9] Centroid for PRISM cell is at latitude 35.8694, longitude -106.3073; elevation 7,149 ft.

[10] The use of a midpoint in place of the mean assumes that the temporal trend in temperatures for each day was sinusoidal and approximately symmetrical about the mean.

Table 3. Use attainability evaluation for Upper Sandia Canyon AU based on TMAX from four estimators of average July air temperature over the period 2014–2018

Year	Average July Air Temperature (°C)				6T3 (°C)				TMAX (°C)				Projected Attainable Use by Year by Metric				Projected Attainable Use by Year
	PRISM		LANL MET		PRISM		LANL MET		PRISM		LANL MET		PRISM		LANL MET		
	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	
2014	20.7	21.6	20	21.5	22.7	23.7	22.0	23.5	27.0	28.0	26.3	27.9	coolwater	coolwater	coolwater	coolwater	coolwater
2015	19.7	20.5	19.4	19.6	21.7	22.5	21.4	21.6	26.0	26.8	25.6	25.9	coolwater	coolwater	coolwater	coolwater	coolwater
2016	24	25.2	22.9	24.6	26.1	27.4	25.0	26.8	30.5	31.8	29.4	31.2	warmwater	warmwater	warmwater	warmwater	warmwater
2017	21.3	22.3	21.4	23	23.3	24.4	23.4	25.1	27.7	28.7	27.8	29.5	coolwater	coolwater	coolwater	warmwater	warmwater
2018	22.2	22.6	21.6	23.3	24.3	24.7	23.7	25.4	28.6	29.0	28.0	29.8	coolwater	warmwater	coolwater	warmwater	warmwater
																Projected Attainable Use =	**Warmwater**

[a] Daily maximum air temperatures were not available for July 2015 at TA-53 (except for July 15). Instead, daily maximum temperatures were calculated using 15-minute interval air temperature data from the thermometer 1.2 m above the ground (or from the thermometer 11.5 m above the ground, when data from the lower thermometer were not available).

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

AU – Assessment Unit

LANL MET – Los Alamos National Laboratory meteorological monitoring network

PRISM – Parameter-evaluation Relationships of Independent Slopes Model

TA – Technical Area

TMAX – maximum water temperature

4.3 EVALUATION OF LANL MET AND PRISM MODEL DATA

A statistical modeling approach was used to determine whether 2014 to 2018 July air temperatures from LANL MET towers and PRISM were consistent with expectations based on previous years. If 2014 to 2018 air temperatures were "warm outliers," then that would call into question the representativeness of water temperature data for the same time period.[11]

Autoregressive integrated moving average (ARIMA) models were developed using the R statistical program (R Core Team 2017) and either LANL MET or PRISM data. Each ARIMA model was then used to forecast time-series data for 2014 to 2018. Prediction intervals (PIs) were generated around forecast results, and 2014 to 2018 temperature data were compared to PIs around the ARIMA forecast estimates. Temperature data that fell outside the PIs were considered to be extreme. Conversely, values within the PIs were considered to be within reasonable expectation, given historical trends.

In total, four ARIMA models were developed (Figure 2), two based on historical PRISM data and two based on historical LANL MET data:

- PRISM - Upper Sandia AU-east data from 1983 to 2013
- PRISM - Upper Sandia AU-west data from 1983 to 2013
- LANL MET data from tower TA-6 from 1990 to 2013
- LANL MET data from tower TA-53 from 1992 to 2013[12]

[11] Additional uncertainty associated with the air temperature data is discussed in Sections 6 and 10.
[12] Historical data for TA-6 and TA-53 only went as far back as 1990 and 1992, respectively.

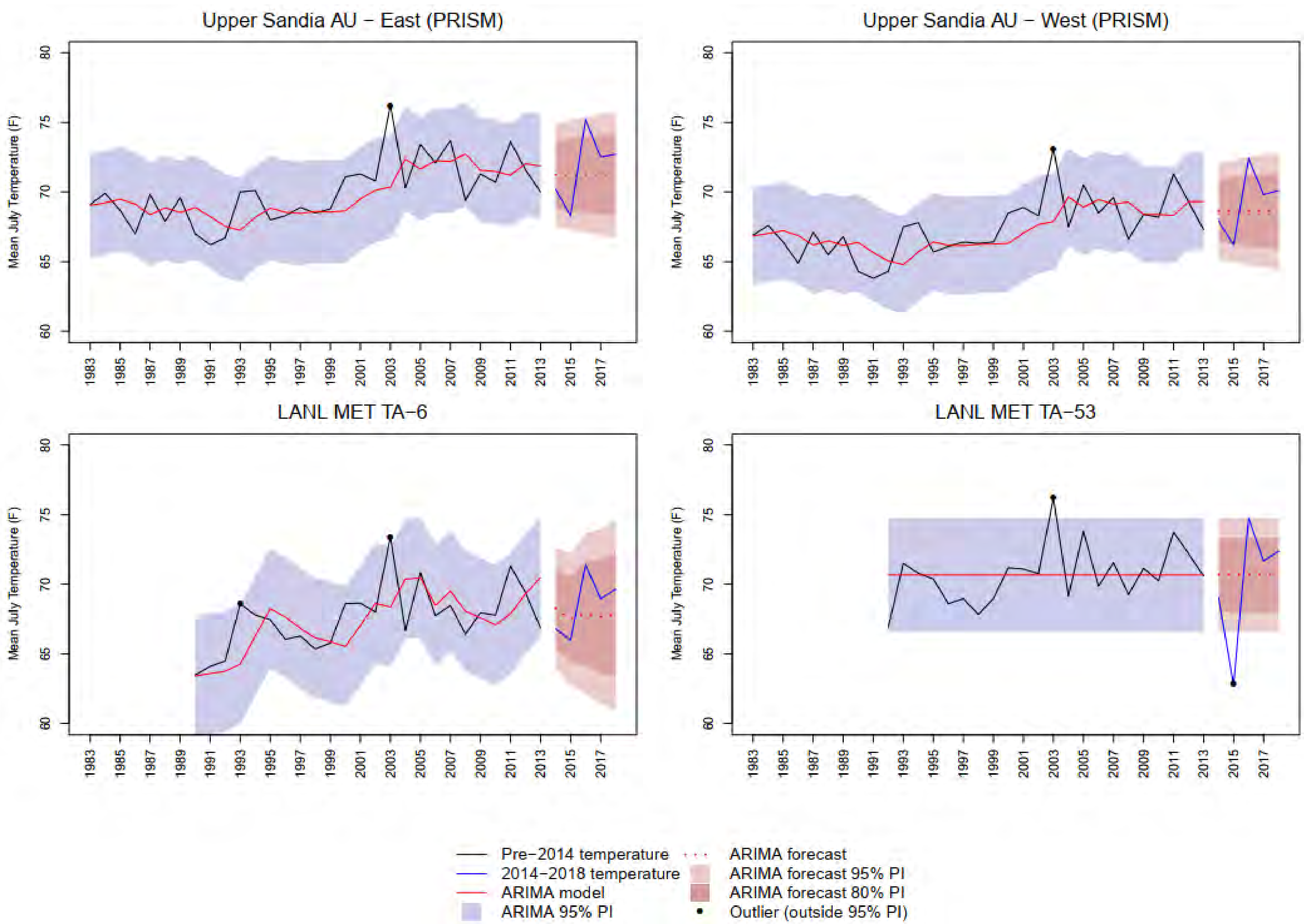


Figure 2. ARIMA model result for PRISM and LANL MET average July temperatures

Based on all four ARIMA forecasts, mean July temperatures from 2014 to 2018 were as expected (i.e., within the 95% PI). Following this logic, the water temperatures predicted by the AWTC model are not warmer than expected. One exception, which can be seen in Figure 2, results from 2015 data measured at TA-53; these data were colder than expected by ARIMA.[13] Overall, however, ARIMA-predicted 2014 to 2018 water temperatures should be considered representative of attainable water temperatures in "typical" years (given expected air temperatures).

[13] The TA-53 model is somewhat uncertain because no trend over time was discernible, resulting in a fixed mean temperature and relatively narrow PI. This differs from the other three ARIMA models.

5 Stream Segment Temperature Model

In accordance with LANL (2020), the stream segment temperature (SSTEMP) model was used to simulate temperatures in the Upper Sandia Canyon AU and estimate effects resulting from potential changes in alluvial groundwater inflow and outflow. The model was developed to predict minimum, mean, and maximum daily stream temperatures based on watershed geometry, hydrology, and meteorology (Bartholow 2004). Four different modeling scenarios were evaluated using 2007 and 2017 data from several stream gages (Table 4). These time periods were selected because they had continuous streamflow data.

Table 4. SSTEMP estimates

Model Scenario	SSTEMP Model Temperature Estimate (˚C)			No. of Days with Continuous Flow Data	Estimated Use Attained[a]
	Minimum[b]	Mean[b]	Maximum[b]		
E121/E122 to E123	13.91	20.37	26.87	31 (July 2017)	coolwater
E123 to E123.6	15.74	22.04	28.37	8 (July 23 to 30, 2007)	coolwater
E123 to E123.8	16.72	22.55	28.38	8 (July 23 to 30, 2007)	coolwater
E123.6 to E123.8	16.85	22.98	29.11	8 (July 23 to 30, 2007)	warmwater

[a] The estimated use is based on the predicted maximum temperature compared to TMAX criteria for aquatic life designated uses (Table 2). Minimum and mean estimates are not comparable to criteria, thus no comparison of SSTEMP estimates can be made to 6T3 or 4T3 criteria.

[b] Value was estimated on a daily basis and average among all modeling days.

4T3 – water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

SSTEMP – stream segment temperature

TMAX – maximum water temperature

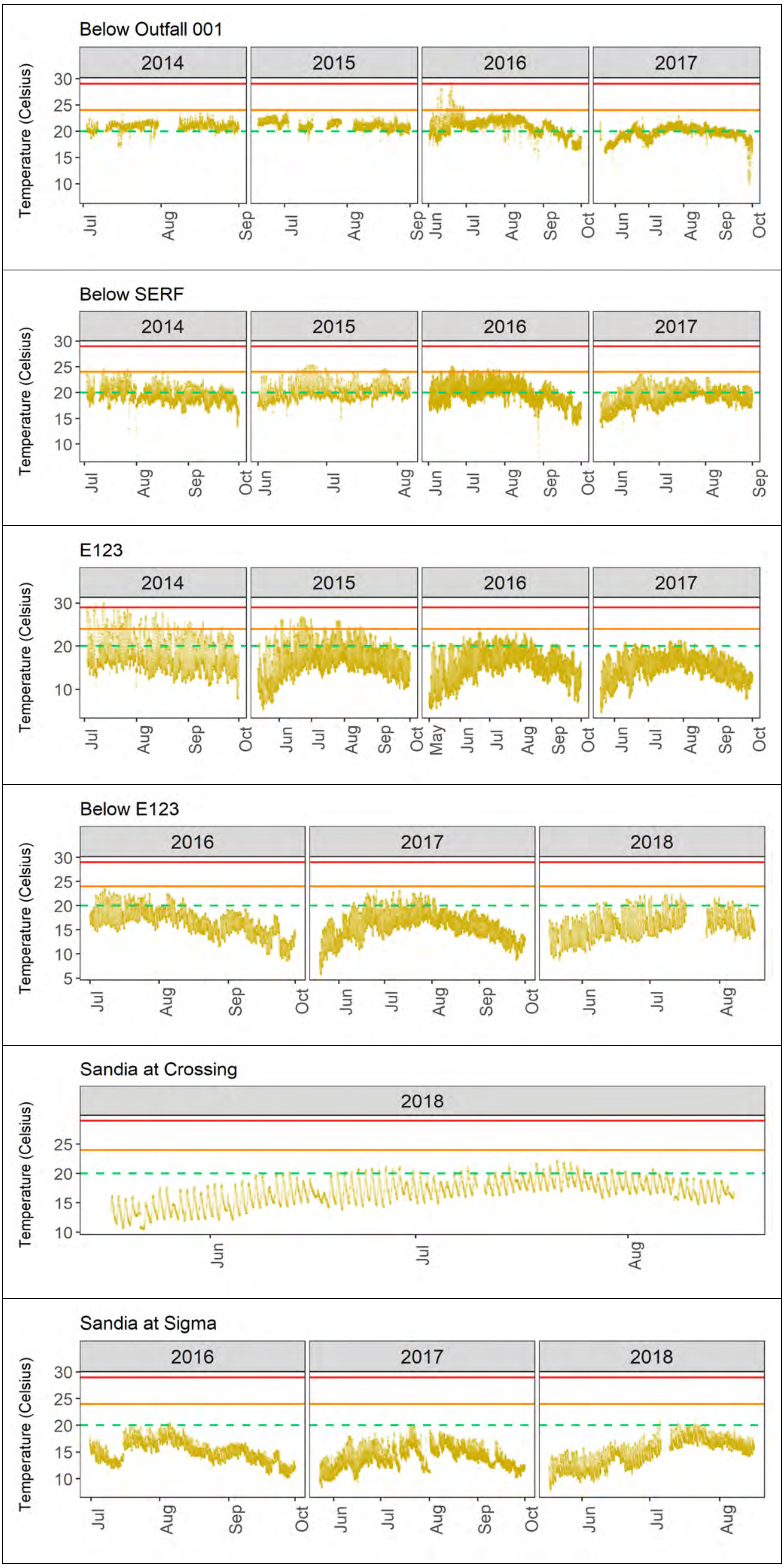
The temperatures summarized in Table 4 were derived under a variety of flow conditions. The purpose of evaluating multiple conditions was to determine if inflow from the surrounding alluvium influences stream temperature predictions. The sensitivity analysis generated by SSTEMP for each scenario indicated that mean air temperature had the greatest influence over estimated mean stream temperatures, while inflow temperature, relative humidity, wind speed, and possible sun had lesser (but still significant) influences over predicted mean temperatures. The SSTEMP modeling results support the AWTC modeling results described in Section 4 and provide another line of evidence that coldwater aquatic life criteria in the Upper Sandia Canyon AU are not attainable. The results in Table 4 also suggest that a coolwater use designation for the Upper Sandia Canyon AU is generally appropriate.

6 Water Temperature Data Evaluation

This section provides a discussion of available water temperature measurements from the Upper Sandia Canyon AU (Section 6.1), including temperatures from Outfall 001 (Section 6.2), which is the dominant source of water in the AU. All water temperature data were obtained directly from Los Alamos National Security/Triad National Security (Triad) in Microsoft© Excel files (LA-UR-18-28589 and LA-UR-18-30926). The unattainability of the coldwater aquatic life designated use with respect to air temperatures (and predicted water temperatures) is discussed in detail in Sections 4 and 5, and this section provides strong evidence for the unattainability of the coldwater use based on measured water temperatures.

6.1 Upper Sandia Canyon Thermograph Water Temperatures

Between 2014 and 2017, LANL deployed five thermographs in the Upper Sandia Canyon AU in order to monitor water temperatures directly. In 2018, a sixth thermograph was deployed at the Sandia at Crossing location. LANL's thermographs became exposed to the air on several occasions due to storm events or low flow conditions, leading to very high false temperature readings (up to 61°C). Triad identified those periods when the thermographs became exposed, and Windward Environmental LLC removed those data from consideration (e.g., when calculating 6T3 values and determining exceedances of criteria). Figure 3 shows the remaining 2014 to 2018 thermograph data, comparing temperatures over time at different positions along the Upper Sandia Canyon AU. Specific dates for which data were excluded are reported in Table 5.



Source: LA-UR18-28589

Note: Sub-figures are organized in the direction of flow from Below Outfall 001 to Sandia at Sigma. Horizontal lines represent temperature criteria associated with designated uses (Table 2); green dash = coldwater 6T3 (20°C), orange solid = coldwater TMAX (24°C), and red solid = coolwater TMAX (29°C). High-quality coldwater TMAX of 23°C not shown.

Data were removed from thermograph datasets from periods when thermographs became exposed to air (Table 5).

Figure 3. Water temperature in Upper Sandia Canyon AU, 2014 to 2018

Figure 3 shows that (on an instantaneous basis) water temperatures exceeded the 6T3 criterion for coldwater (20° C) at every thermograph location during the study period. If data from periods when thermographs were exposed are not considered, the 6T3 criterion for coldwater was not exceeded at Sandia at Sigma between 2016 and 2018, nor at E123 in 2017. The 6T3 criterion was exceeded at E123 in other years, as well as every year at the Below Outfall 001, Below SERF, Below E123, and Sandia at Crossing locations. The coldwater TMAX criterion (24° C) was exceeded at Below Outfall 001, Below SERF, and E123 at least once during the study period, whereas the criterion was not exceeded any year at Below E123, Sandia at Crossing, and Sandia at Sigma.

The results presented in this section (and Table 5 in particular) show that water temperature statistics in the Upper Sandia Canyon AU are sometimes less than those predicted by the AWTC and sometimes higher. Values were predicted using a regression model (with some amount of model uncertainty), so deviations from actuality were expected. In general, TMAX predictions were biased high (with few exceptions) relative to actual values, whereas 6T3 predictions were more balanced overall with possible temporal and spatial trends.

Lower-than-expected water temperatures, particularly at stations downstream of E123, may have resulted from shading in canyon bottoms and effluent discharged from Outfall 001 that was cooler than the modeled water temperature for the Upper Sandia AU (see Section 6.2). Data from PRISM and LANL MET stations represent temperatures on top of the Pajarito Plateau rather than within Sandia Canyon, so possible effects of shading and microclimate (e.g., cooler, denser air settling in the canyon bottom) seem reasonable when comparing the air and water temperature lines of evidence (Tables 3 and 5). The difference between predicted and actual water temperatures was greater downstream of E123 than upstream, suggesting that these microclimate or hydrologic cooling effects become greater as the canyon narrows and becomes steeper farther downstream.

Cooling over time could be related to the installation of the GCS in 2013, which has led to greater retention of water and vegetative growth in the 0.4-mile wetland reach above E123. Vegetation in the wetlands provides a shading effect, potentially keeping waters cooler throughout the day. A survey conducted between 2014 and 2017 indicated a high density of vegetation within the wetland, increasing wetland plant diversity and tree canopy, and an annual increase in the areal extent of the wetland (LA-UR-21-28841). The GCS also forces alluvial groundwater to resurface before exiting the wetland, which might contribute to cooler water temperatures at E123.

Table 5. Measured and predicted water temperature thresholds, 2014 to 2018

Thermograph	Year	Actual TMAX (°C)	Predicted TMAX (°C)[a]	Actual 6T3 (°C)	Predicted 6T3 (°C)[a]	Designated Use Attained	Dates Exposed/Data Excluded
Below Outfall 001	2014	**23.9**	27.4	23.9	22.6	coldwater	7/7 to 7/9, 7/31 to 8/7
	2015	**23.9**	26.2	23.9	21.7	coldwater	6/1 to 6/17, 7/3 to 7/7, 7/15 to 7/21, 7/29 to 8/3
	2016	29.1	30.8	29.1	26.2	warmwater	none
	2017	**22.9**	28.5	22.9	24.0	coolwater	none
Below SERF	2014	24.7	27.4	24.7	22.6	coolwater	7/7 to 7/9
	2015	25.4	26.2	25.4	21.7	coolwater	none
	2016	25.2	30.8	25.2	26.2	coolwater	none
	2017	**23.6**	28.5	23.6	24.0	coolwater	none
E123	2014	30.1	27.4	30.1	22.6	warmwater	none
	2015	26.8	26.2	26.8	21.7	coolwater	none
	2016	**23.3**	30.8	23.3	26.2	coolwater	none
	2017	**21.4**	28.5	**no exceedance**[b]	24.0	coldwater[c]	none
Below E123	2016	**23.5**	30.8	23.5	26.2	coolwater	none
	2017	**23.2**	28.5	23.1	24.0	coolwater	none
	2018[d]	**22.6**	28.9	22.3	24.4	coolwater	7/17 to 7/25
Sandia at Crossing	2018	**22.1**	28.9	22.1	24.4	coolwater	7/10
Sandia at Sigma	2016	**20.4**	30.8	**no exceedance**[b]	26.2	high-quality coldwater[c]	none
	2017	**20.0**	28.5	**no exceedance**[b]	24.0	high-quality coldwater[c]	none
	2018	**21.0**	28.9	**no exceedance**[b]	24.4	high-quality coldwater[c]	7/6 to 7/9

Green shaded cells indicate water temperatures that exceed the coolwater thresholds specified in Table 2.
Bold underlined text indicates water temperatures that meet the coldwater criteria specified in Table 2.

a Predicted thresholds based on AWTC (Table 3, Equations 1 and 2).

b In locations where and years when the coldwater use-specific 6T3 threshold was never exceeded, a 6T3 value was not calculated. This is what is meant by "no exceedance."

c High-quality coldwater attainment depends in part on the 4T3 criterion. The criterion (20ºC) was exceeded at E123 in 2017 (21.4°C) but never at Sandia at Sigma.

4T3 – water temperature not to be exceeded for 4 or more consecutive hours in a 24-hour period on more than 3 consecutive days

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

AWTC – air-water temperature correlation

TMAX – maximum water temperature

Measured water temperatures and AWTC-modeled water temperatures indicate that, with the exception of some years and locations, the coolwater use is attainable across the entire AU. It is assumed that the cooling will be sustained and that a coolwater designated use is representative of future conditions. The effect of global climate change will have to be evaluated periodically in the future, because it could change the use designations based on temperature.

6.2 Maximum Weekly Average Water Temperatures

Maximum weekly average (water) temperature (MWAT) values were used to predict the attainable use based on the AWTC Model (NMED 2011a). The NMED SWQB developed a statewide correlation in 2011 showing that ATEMP from PRISM data directly correlated to MWAT. According to the AWTC model, the attainable water MWAT equals ATEMP for locations where water temperature is controlled by ambient air temperature in streams that are not significantly influenced by groundwater (NMED 2011a). As noted in Section 6.1 there is the potential for microclimate effects in the Upper Sandia Canyon AU, so the assumption that ATEMP equals MWAT may be invalid in this instance. Therefore, the equations from NMED (2011a) that rely on MWAT directly (Equations 3 and 4) can be used instead of those that rely on ATEMP (and the assumption of its equivalency to MWAT). By inputting measured MWAT values into Equations 3 and 4, the 6T3 and TMAX values that should be observed in the Upper Sandia Canyon AU can be more accurately estimated.

$$6T3 = 1.0346 \times MWAT + 1.3029 \quad \text{Equation 3}$$

$$TMAX = 1.0661 \times MWAT + 4.9547 \quad \text{Equation 4}$$

To calculate MWAT values for the six monitoring locations (i.e., those listed in Table 5), 15-minute thermograph measurements were averaged over each day, and then 7-day rolling averages were calculated over each monitoring year. Data gaps exist where thermographs were exposed to the air (entire days) (Table 5) or when data were being downloaded (short periods during single days). Daily averages were calculated when there were small data gaps during a day (from downloading data) but were not calculated for days when thermographs were exposed to air. Rolling averages were only calculated for full seven-day periods, so these values did not include data gaps. This approach led to significant uncertainty for the 2015 period at the Below Outfall 001 thermograph, which was frequently exposed to the air, thus, no MWAT was calculated for 2015. Table 6 reports the MWAT values, which vary spatially and temporally and range from 16.64°C at Sandia at Sigma in 2017 to 22.35°C at Below Outfall 001 in 2016.

Table 6. Measured MWAT and predicted 6T3 and TMAX criteria based on MWAT

Location	Year	Measured MWAT (°C)	Predicted 6T3 (°C)[a]	Predicted TMAX (°C)[a]	Predicted Attainable Use
Below Outfall 001	2014	21.39	23.44	27.76	coolwater
	2015	nd[b]	nd[b]	nd[b]	nd[b]
	2016	22.35	24.43	28.78	coolwater
	2017	20.95	22.98	27.29	coolwater
Below SERF	2014	20.67	22.69	26.99	coolwater
	2015	21.15	23.19	27.50	coolwater
	2016	21.22	23.26	27.58	coolwater
	2017	20.18	22.19	26.47	coolwater
E123	2014	20.36	22.37	26.67	coolwater
	2015	19.35	21.32	25.59	coolwater
	2016	18.61	20.56	24.80	coolwater
	2017	17.87	19.79	24.00	coolwater
Below E123	2016	19.29	21.26	25.52	coolwater
	2017	18.88	20.84	25.09	coolwater
	2018	17.92	19.84	24.06	coolwater
Sandia at Crossing	2018	19.19	21.16	25.41	coolwater
Sandia at Sigma	2016	17.90	19.82	24.04	coolwater
	2017	16.64	18.52	22.70	coldwater
	2018	18.05	19.97	24.19	coolwater

[a] The 6T3 and TMAX values were predicted by inputting measured MWAT into Equations 3 and 4, respectively.

[b] MWAT values were not determined for Below Outfall 001 in 2015 because of frequent periods of exposure of the thermograph to air resulting in large data gaps and excessive uncertainty in the MWAT calculation.

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

MWAT – maximum weekly average (water) temperature

nd – not determined

TMAX – maximum water temperature

The attainable uses were predicted by inputting MWAT values into Equations 3 and 4 and then comparing the output to temperature criteria for designated uses (Table 2). Analysis of the MWAT data suggests that the coolwater aquatic life use is typically attainable for the Upper Sandia Canyon AU with a single exception, Sandia at Sigma in 2017 (Table 6). This analysis provides another line of evidence supporting a coolwater aquatic life use, although, because it relies on modeling temperature criteria, it is not as strong a line of evidence as that presented in Section 6.1.

6.3 OUTFALL 001 EFFLUENT WATER TEMPERATURES

Hourly Outfall 001 effluent water temperature data were available for the summer months from 2015 to 2018 (LA-UR-18-30926). Relative to instream temperatures, effluent temperatures have low variability over time. TMAX and 6T3 values calculated for that time period (Table 7) generally exceeded the 6T3 coldwater aquatic life criterion (Table 2). However, the maximum criterion was exceeded only once, in 2016, when air temperatures were relatively warm (Table 3).

Table 7. Calculated Outfall 001 water temperature thresholds, 2015 to 2018

Year	TMAX (°C)	6T3 (°C)
2015	23.2	23.2
2016	24.6	24.6
2017	22.3	22.3
2018	22.5	22.2

Source: LA-UR18-30926

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

TMAX – maximum water temperature

TMAX and 6T3 values for Outfall 001 (Table 7) were often similar to or less than those from downstream thermographs (Table 5). These data indicate that natural air temperatures in the Upper Sandia Canyon AU cause instream water temperatures to be warmer than those in discharge from Outfall 001 in the summer.

7 Threatened and Endangered Species, Critical Habitat and Aquatic Life

An evaluation was conducted of the potential impact of proposed water quality changes on Endangered Species Act-listed threatened and endangered species located within Upper Sandia Canyon. Documentation of the presence or absence of threatened and endangered species and critical habitat in Upper Sandia Canyon was analyzed per LANL's habitat management plan (HMP) (Hathcock et al. 2017 - LA-UR-17-29454). The HMP is a comprehensive plan that balances current operations at the Laboratory and future development within the habitats of listed species. The following federally listed threatened or endangered species currently have site plans at the Laboratory: Mexican spotted owl (*Strix occidentalis lucida*), Jemez Mountains salamander (*Plethodon neomexicanus*), and southwestern willow flycatcher (*Empidonax trailii extimus*). The lower section of the Upper Sandia Canyon AU is within delineated habitat for the Mexican spotted owl. Based on a review of the proposed work, the UAA work scope is within the framework of the HMP, so no further consultation is needed. Changes to the water quality designation are also within the framework of the HMP, requiring no further consultation.

Several aquatic life surveys have been conducted in Sandia Canyon (LANL 2017). Fish have not been observed in the Upper Sandia Canyon AU, despite attempts to survey them, indicating that fish are not present. Aquatic life surveys have shown that benthic invertebrate species (macrofauna and meiofauna) are present and diverse: 86 taxa, the majority of them insects, were observed in 2017 (Appendix B);[14] 35% were chironomid midges and 19% were coleopterans (beetles), ephemeropterans (mayflies), or trichopterans (caddisflies). Small meiofaunal species (e.g., tardigrades) accounted for a limited portion of observed taxa. Observed taxa richness did not clearly increase with distance from Outfall 001 (Table 8).

Table 8. Count of taxa observed in 2017 Upper Sandia Canyon

Reach	Reach Description	No. of Unique Taxa
1	uppermost: near forks confluence (gages E121 and E122)	33
2	upper: above wetland	59
3	middle: below wetland (near E123)	37
4	lower: midway between wetland and Sigma Canyon	47
All	Reaches 1, 2, 3, and 4	86

Note: The taxa observed in each reach are not mutually exclusive, so the sum of observed taxa is not equivalent to the total unique taxa observed among all reaches.

[14] Taxa overlap in some cases (e.g., "Annelida" was listed as a unique taxon in addition to Tubificidae, Enchytraeidae, and Lumbricina [among others], all of which are annelid taxa), so the total of 86 species may be an overestimation of species richness.

The benthic macroinvertebrate and meiofaunal species observed during the aquatic life surveys were compared to sensitive and protected species listed by the New Mexico Department of Game and Fish (NMDGF-BISON-M) to determine if threatened or endangered species have been found in Upper Sandia Canyon AU. Review of the data revealed that no species listed as threatened or endangered by NMDGF and USFWS or discussed in Berryhill et al. (2020) were found within the Upper Sandia Canyon AU during these surveys.

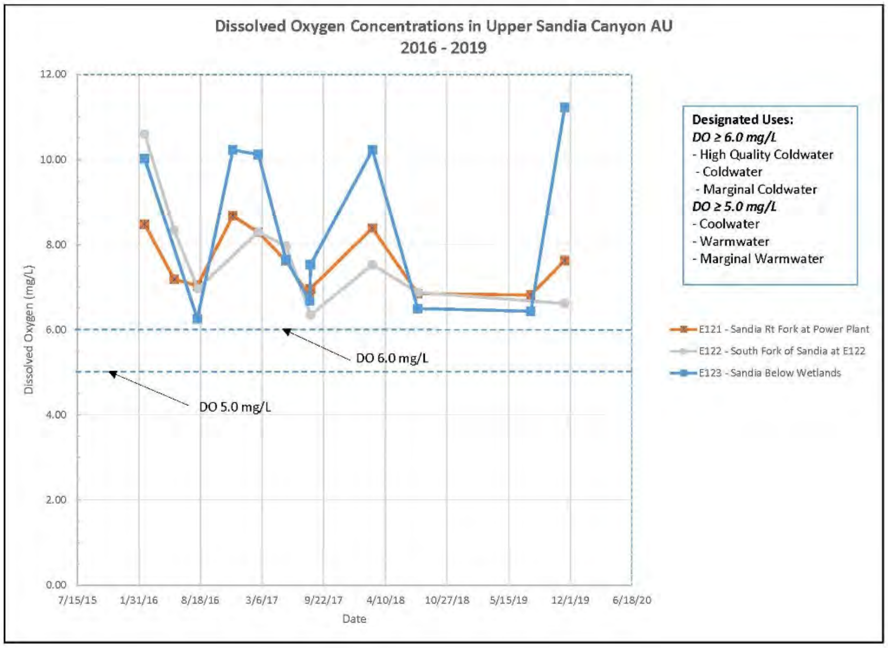
8 Evaluation of pH, Dissolved Oxygen

This section provides a discussion of other factors discussed in the UAA Work Plan (LANL 2020) that may affect attainment of the coldwater aquatic life designated use.

In accordance with LANL (2020), dissolved oxygen (DO) and pH data from LANL's environmental surveillance gages E121, E122, and E123, located within the Upper Sandia Canyon AU, were evaluated to determine whether DO and pH fell within acceptable levels during the monitoring period. The criteria applicable to the coldwater aquatic life designated use are DO ≥ 6.0 mg/L, pH between 6.6 and 8.8, 6T3 temperature < 20°C, and maximum temperature < 24°C (§20.6.4.900.H(2) NMAC) (NMED 2011c).

DO and pH data were collected pursuant to LANL's interim facility-wide groundwater monitoring plan (LANL 2016). Data from 2016 to 2019 were downloaded from the Intellus New Mexico website (Intellus 2019). Sampling locations in the Intellus database corresponding to gages E121, E122, and E123 are "Sandia right fork at Pwr Plant," "South Fork of Sandia at E122," and 'Sandia Below Wetlands," respectively.

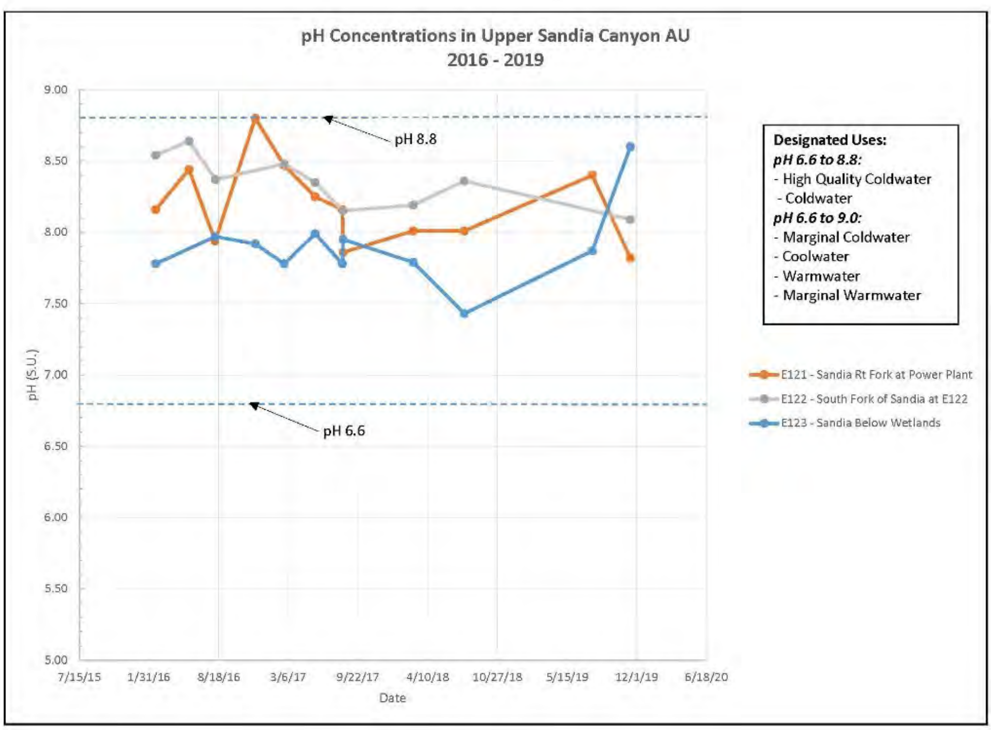
Figure 4 shows DO concentrations at E121, E122, and E123. During the period from 2016 to 2019, DO ranged from 6.26 to 11.23 mg/L, exceeding the criterion limit for coldwater designated use. DO concentrations vary seasonally, with the highest concentrations during winter months. The elevated DO concentrations in winter reflect the greater solubility of oxygen in cold water than in warmer summer water.



Note: Coldwater aquatic life designated use criterion for DO is 6 mg/L.

Figure 4. DO concentrations in Upper Sandia Canyon AU, 2016 to 2019

Figure 5 shows the pH concentrations in the Upper Sandia Canyon AU from 2016 to 2019. During this period, pH concentrations ranged from 7.43 to 8.80, remaining within the coldwater aquatic life designated use range of 6.6 to 8.8. The pH concentrations at E123 were observed to be slightly lower than those at E121 and E122.



Note: The coldwater aquatic life designated use criterion range for pH is 6.6 to 8.8.

Figure 5. pH Concentrations in Upper Sandia Canyon AU, 2016 to 2019

In summary, DO and pH concentrations between 2016 and 2019 were entirely within acceptable levels for the coldwater aquatic life designated use. Therefore, DO and pH do not prevent attainment of the coldwater designated use.

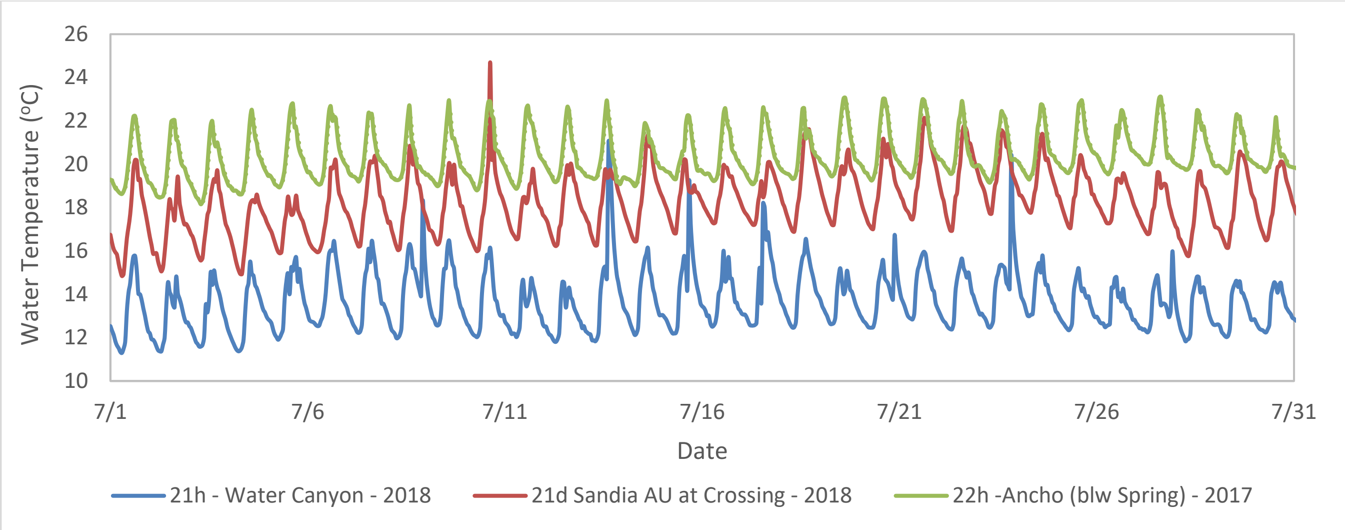
9 Transitional Nature of Ecoregion 21d

Tetra Tech (2010), cited in the 2017 Tecolote Creek temperature UAA (NMED 2017), divided Level IV ecoregions in New Mexico into three sedimentation categories: mountain (21h), foothills (21d), and xeric (22h). This scheme recognizes the differences between high-elevation, steep-sloped, lush-vegetation mountain streams; lower and drier foothills streams; and flatter and still drier xeric streams. The Laboratory lies entirely within these three Level IV ecoregions, and Upper Sandia Canyon falls within ecoregion 21d, which represents a transitional environment between 21h and 22h.

During the 2009 Triennial Review, NMED adopted the coolwater aquatic life designated use into its rulemaking process. The coolwater use criteria are intended to provide appropriate protection to aquatic species in transitional and coolwater areas between high-quality coldwater and coldwater use areas in mountainous streams and warmwater use areas in xeric streams (NMED 2008). Communities living in naturally coolwater streams are tolerant of and adapted to coolwater conditions.

In order to illustrate how the concept of ecoregion relates to Upper Sandia Canyon water temperatures, stream temperatures were measured in three perennial streams located within the Laboratory area: Water Canyon, Upper Sandia Canyon, and Lower Ancho Canyon. These streams are positioned, respectively, in the mountains (21h), foothills (21d), and xeric (22h) landscapes within the Laboratory area, and therefore they span the range of regional conditions for streams with comparable hydrologic regimes.

July water temperatures are plotted in Figure 6, which illustrates increasing temperatures from the mountain region in the west (Water Canyon) towards the xeric region in the east (Lower Ancho Canyon) nearer to the Rio Grande. Temperatures in Upper Sandia Canyon are, on average, between those observed in the other two streams, consistent with expectations for the three ecoregions.



Note: Water, Upper Sandia, and Lower Ancho Canyon monitoring locations are located with ecoregions 21h (mountain), 21d (foothills), and 22h (xeric), respectively, and were sampled in 2018, 2018, and 2017, respectively. Foothills are transitional between mountain and xeric. The coldwater TMAX criterion (24˚C) was exceeded once during the 2018 monitoring period in Upper Sandia Canyon; however, this period represents a time (7/10/2018) when the thermograph was exposed to the air (Table 5).

Figure 6. July 2017 and 2018 temperatures for perennial streams within ecoregions 21h, 21d, and 22h

10 AWTC Uncertainty Evaluation

As noted in Section 6.1, the AWTC consistently overpredicted the TMAX statistic (using Equation 2) for the Upper Sandia Canyon AU (Table 5). This section quantitatively evaluates this bias to better understand uncertainty related to the AWTC and air temperatures, allowing for the reconciliation of multiple lines of evidence to strengthen the overall weight of evidence and conclusions regarding attainable use. This analysis expands on Section 6.2, where MWAT values were calculated to better estimate 6T3 and TMAX values and determine attainable uses.

Because the predictions of the AWTC are biased high, either the air temperature data input to the model must be biased high, the water temperature must be biased low, or the AWTC must be inaccurate. However, water temperatures were accurately and appropriately measured in the Upper Sandia Canyon AU according to standard methods by qualified environmental professionals,[15] and based on the thorough analysis of NMED (2011a), the AWTC is assumed to be an accurate representation of the relationship between air and water temperatures in New Mexico. On the other hand, air temperature was not measured in the bottom of Upper Sandia Canyon and (based on the discussion provided in Section 6.1) is expected to be lower in canyon bottoms than on mesa tops (where air temperatures were measured). Therefore, it is reasonable to assume that the bias in AWTC predictions is the result of biased air temperature inputs to the model.

This section investigates how much cooler air would need to be to bring the water temperature predictions into alignment with actual water temperatures (each represented by MWAT); then, this section determines what the attainable use would be given the decrease in air temperatures. If the temperature difference is reasonable and leads to a result consistent with the water temperature line of evidence (Section 6), the weight of evidence can be concluded to support the proposed attainable use.

10.1 Uncertainty Evaluation Approach

In developing the AWTC, NMED (2011a) provided several preliminary equations for predicting MWAT from ATEMP; variations of these models were generated from datasets without relatively cold water data from sites thought to be affected by microclimate or groundwater. Equation 5 is NMED's equation based on all available data (including data from some colder sites); this model is used because it is based on a more robust dataset, includes data from locations that are potentially influenced by microclimate (similar to the Upper Sandia Canyon AU), and is similar to other models presented in the same report. Ultimately, NMED concluded that a 1:1 relationship between ATEMP (based on PRISM) and MWAT was justified for its modeling

[15] Extreme temperature measurements caused by exposure of thermographs to the air were removed to ensure data accuracy.

purposes; for the evaluation presented in this section, the analysis is based on Equation 5 instead of treating ATEMP and MWAT as equivalent. Also, the LANL MET TA-6 monitoring data are used, as that is the local air temperature monitoring station closest to the Upper Sandia Canyon AU (and therefore, a better predictor of air temperature than is PRISM).

$$\mathbf{MWAT = 0.8675 \times ATEMP + 2.3758} \quad \textbf{Equation 5}$$

Where:

ATEMP = average July air temperature

The discrepancy between MWAT predictions and the actual MWAT (Table 10) was addressed by reducing ATEMP values to minimize model error. This was accomplished using Equation 6, which modifies Equation 5 by changing the ATEMP input by an average adjustment value. To minimize model error (i.e., the difference between measured and predicted MWAT), a series of adjustment values was sequentially input into Equation 6, and the model error associated with each adjustment value was calculated. Model error was quantified using the root mean square error (RMSE) statistic. The adjustment value that resulted in the lowest RMSE was selected for subsequent calculations.

$$\mathbf{MWAT = 0.8675 \times (ATEMP + adjustment) + 2.3758} \quad \textbf{Equation 6}$$

Table 10. Measured and predicted air and water temperature data used for uncertainty evaluation

Monitoring Gage	Year	LANL MET TA-6 ATEMP (°C)	Predicted MWAT (°C)	Measured MWAT (°C)
Below Outfall 001	2014	20.0	19.73	21.39
	2015	19.4	19.21	nd[a]
	2016	22.9	22.24	22.35
	2017	21.4	20.94	20.95
Below SERF	2014	20.0	19.73	20.67
	2015	19.4	19.21	21.15
	2016	22.9	22.24	21.22
	2017	21.4	20.94	20.18
E123	2014	20.0	19.73	20.36
	2015	19.4	19.21	19.35
	2016	22.9	22.24	18.61
	2017	21.4	20.94	17.87
Below E123	2016	22.9	22.24	19.29
	2017	21.4	20.94	18.88
	2018	21.6	21.11	17.92

Monitoring Gage	Year	LANL MET TA-6 ATEMP (°C)	Predicted MWAT (°C)	Measured MWAT (°C)
Sandia at Crossing	2018	21.6	21.11	19.19
Sandia at Sigma	2016	22.9	22.24	17.90
	2017	21.4	20.94	16.64
	2018	21.6	21.11	18.05

[a] No MWAT was determined for Below Outfall 001 in 2015 due to excessive uncertainty (Section 6.2).
ATEMP – average July air temperature
LANL MET – Los Alamos National Laboratory meteorological monitoring network
MWAT – maximum weekly average (water) temperature
nd – not determined

After selecting an adjustment value that minimized model errors in predicting MWAT from ATEMP, the 6T3 and TMAX statistics were recalculated using new MWAT values (using Equation 6). Instead of using Equations 1 and 2 to calculate 6T3 and TMAX, NMED's formulation of the AWTC that uses MWAT instead of ATEMP (Equations 3 and 4) was used (NMED 2011a).

10.2 Uncertainty Evaluation Results

After testing potential adjustment values (20,000 equally spaced numbers between -10 and 10), the adjustment value that minimized model error in Equation 6 (RMSE = 2.1°C) was -1.3°C, which represented a reasonable (i.e., not extreme) reduction in air temperature. This value is the average reduction at all monitoring locations, including those with negligible effects from the wetlands (i.e., Below Outfall 001 and Below SERF). If considering only locations downstream of the wetland (excluding Below Outfall 001 and Below SERF), the adjustment value would decrease to -2.9°C (RMSE = 1.6°C), which would also be reasonable.

The adjustment of -1.3°C was inserted into Equation 6 to calculate revised MWAT predictions (Table 11) for each monitoring year; these predictions apply to the entire AU rather than individual monitoring locations. Predicted MWAT values were then inserted into Equations 3 and 4 to predict adjusted 6T3 and TMAX statistics. Based on the statistics calculated in this way, the designated use criteria would not be exceeded at the coolwater level (Table 2).[16] The coldwater aquatic life designated use is unattainable based on this evaluation. Thus, this evaluation addresses uncertainty associated with the air temperature line of evidence (Sections 4) and brings it into accord with the water temperature line of evidence (Section 6).[17] Therefore, the conclusion in Section 4 that a coolwater designated use is attainable (despite the

[16] The temperature statistics also fall below the marginal coldwater criteria, but marginal designations are reserved for naturally low-flowing streams. Therefore, a marginal coldwater designation would not apply to the perennial portion of the Upper Sandia Canyon AU.

[17] The SSTEMP-based analysis in Section 5 was in general agreement with the water temperature line of evidence in Section 6.

warmwater designated use being attainable in some years and locations) is justified by the analysis presented in this section.

Table 11. Results of uncertainty evaluation

Year	LANL MET TA-6 ATEMP (°C)	Predicted MWAT (°C) (Equation 6)[a]	Predicted 6T3 (°C)[b]	Predicted TMAX (°C)[b]	Attainable Use[c]
2014	20.0	18.56	20.50	24.74	coolwater
2015	19.4	18.04	19.97	24.19	coolwater
2016	22.9	21.08	23.11	27.42	coolwater
2017	21.4	19.77	21.76	26.04	coolwater
2018	21.6	19.95	21.94	26.22	coolwater

[a] An adjustment value of -1.3°C was used when predicting MWAT using Equation 6.

[b] The 6T3 and TMAX values were predicted using Equations 3 and 4; the predicted MWAT was used as input to those equations.

[c] The attainable use is based on a comparison of the predicted 6T3 and TMAX values to criteria in Table 2. Marginal coldwater would not apply to the Upper Sandia Canyon AU because it is a perennial stream reach.

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

ATEMP – average July air temperature

AU – assessment unit

LANL MET – Los Alamos National Laboratory meteorological monitoring network

MWAT – maximum weekly average (water) temperature

TMAX – maximum water temperature

11 Conclusions

The current designated use for the Upper Sandia Canyon AU is coldwater, with TMAX and 6T3 temperature criteria of 24°C and 20°C, respectively, a DO criterion of 6 mg/L, and a pH range criterion of 6.6 to 8.8. Although the DO and pH criteria are consistently met in the Upper Sandia Canyon AU, the temperature criteria are not. The various analyses of air and water temperature data presented herein indicate that the coldwater aquatic life designated use is unattainable in the Upper Sandia Canyon AU.

Predicted TMAX and 6T3 temperatures from the AWTC model (based on air temperature data) suggest that the designated use that could have consistently been attained across most study years in Upper Sandia Canyon was coolwater (although only warmwater was attainable in some years). Section 5 discusses additional results from the SSTEMP model that support a coolwater attainable use conclusion on the basis of air temperature, as well as watershed geology, hydrology, and meteorology. Sections 6.2 and 10 further justify the conclusion that a coolwater use is attainable by minimizing uncertainty associated with the air temperature line of evidence presented in Section 4.

The conclusion that a coolwater designated use is attainable is well-supported by measured water temperature data analyzed in Section 6. Measured temperatures tend to be lower than predicted by the AWTC downstream of the E123 monitoring location. Table 5 shows that instream water temperatures exceeded the coldwater 6T3 criterion at most thermograph locations during the study period. Similarly, the coldwater TMAX criterion was exceeded at three of six thermograph locations at least once during the study period, and the coolwater TMAX criterion (29°C) was exceeded at two locations during the study period. The 2016 and 2017 TMAX and 6T3 values for E123 were cooler than the values from 2014 and 2015, suggesting a cooling trend below the wetlands. This trend suggests that there could have been a cooling effect from the installation of a GCS in 2013 that resulted in vegetative growth and altered alluvial groundwater hydrology. If the vegetation is creating shade and the shade is responsible for cooling, or if the resurfacing of alluvial groundwater caused by the GCS is responsible for cooling, then a coolwater designated use should be attainable throughout the AU. Shading and microclimate effects, particularly lower in the AU, are also potentially responsible for the lower-than-expected water temperatures.

The analyses provided in this UAA provide multiple lines of evidence, and the overall weight of evidence indicates that the coldest attainable use for the Upper Sandia Canyon AU is the coolwater aquatic life designated use with a TMAX criterion of 29°C. A change in designated use from coldwater to coolwater aquatic life is not expected to impact threatened or endangered species in the vicinity of the Laboratory. The change is also expected to be conservative, given that there were exceedances of the coolwater criterion in some locations and years (based on both estimates from air temperature and measured water temperatures).

12 References

Bartholow J. 2004. Stream segment temperature model (SSTEMP) Version 2.0. US Geological Survey.

EPA. 2019. Ecoregions of North America [online]. US Environmental Protection Agency. Updated November 12, 2016. Available from: https://www.epa.gov/eco-research/ecoregions-north-america.

EPA. 2020. NPDES permit no. NM0028355 fact sheet. US Environmental Protection Agency, Los Alamos, New Mexico.

EPA, USGS, NRCS, State of New Mexico, NMED, NMGF, NMSU, New Mexico Cooperative Research Unit. 2006. Ecoregions of New Mexico. US Environmental Protection Agency, US Geological Survey, Natural Resources Conservation Service, State of New Mexico, New Mexico Environment Department, New Mexico Game & Fish, New Mexico State University, and New Mexico Cooperative Fish & Wildlife Research Unit.

Hathcock CD, Keller DC, Thompson BE. 2017. Threatened and endangered species habitat management plan for Los Alamos National Laboratory. Los Alamos National Laboratory.

Hathcock CD, Hansen LA, Keller DC. 2015. Sensitive species best management practices source document (updated March 2015). Los Alamos National Laboratory, Los Alamos, New Mexico.

Iacona BM. 2015. Evaluation of the geochemical stability of the Sandia Canyon Wetland. Master of Water Resources. Water Resources Program, The University of New Mexico, Albuquerque, New Mexico.

Intellus. 2019. Intellus New Mexico [online]. Available from: https://www.intellusnm.com/.

LANL. 2008. Fate and transport investigations update for chromium contamination from Sandia Canyon. LA-UR-08-4702. Los Alamos Nationa Laboratory.

LANL. 2013. Fiscal year 2012 mitigation action plan annual report for the 2008 Los Alamos National Laboratory site-wide environmental impact statement. DOE/EIS-0380. Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL. 2016. Interim facility-wide groundwater monitoring plan for the 2017 monitoring year, October 2016-September 2017. LA-UR-16-23408. Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL. 2017. Data quality objectives for sampling and monitoring supplemental environmental project. Los Alamos National Laboratory, Los Alamos, NM.

LANL. 2020. Work Plan - Use Attainability Analysis - Determine if naturally occurring thermal conditions prevent attainment of coldwater aquatic life use in the perennial reach of Sandia Canyon - Water Quality Segment 20.6.4.126. EPC-DO-20-040. LA-UR-19-24784. Los Alamos National Laboratory, Los Alamos, New Mexico.

LANS. 2019. The weather machine. Los Alamos National Laboratory [online]. Los Alamos National Security, LLC, Los Alamos, NM. Updated May 23, 2019. Available from: https://envweb.lanl.gov/weathermachine/.

Lusk JD, MacRae RK, Chapman D, Allert A. 2002. A water quality assessment of four intermittent streams in Los Alamos County, New Mexico. US Fish and Wildlife Service and US Geological Survey, Albuquerque, NM.

N3B. 2019. 2018 Sandia Wetland performance report. EM2019-0091. N3B Los Alamos, Los Alamos, New Mexico.

NACSE. 2019. PRISM climate data [online]. Northwest Alliance for Computational Science & Engineering, Corvallis, OR. Available from: http://prism.oregonstate.edu/.

NMED. 2008. Proposal to add coolwater aquatic life use. New Mexico Environment Department, Surface Water Quality Bureau, Santa Fe, NM.

NMED. 2011a. Air-water temperature correlation. New Mexico Environment Department, Surface Water Quality Bureau.

NMED. 2011b. Lower Dry Cimarron River use attainability analysis. New Mexico Environment Department.

NMED. 2011c. State of New Mexico standards for interstate and intrastate surface waters. 20.6.4 NMAC. New Mexico Environmental Department, Santa Fe, NM.

NMED. 2017. Use attainability analysis aquatic life use designation for Tecolote Creek, U.S. Interstate 25 (I-25) to Blue Creek, San Miguel County, NM. New Mexico Environment Department, Surface Water Quality Bureau.

NMED. 2018. 2018-2020 state of New Mexico clean water act section 303(d)/section 305(b) integrated report. New Mexico Environmental Department. Surface Water Quality Bureau, Santa Fe, NM.

NMDGF-BISON-M Legal status and biology of species in New Mexico https://www.wildlife.state.nm.us/conservation/bison-m/ .

R Core Team. 2017. R: A language and environment for statistical computing [online]. R Foundation for Statistical Computing, Vienna, Austria. Available from: http://www.R-project.org/.

Stanek JE, Abeyta EJ, Rodriguez JM, Hathcock CD. 2020. Monitoring avian productivity and survivorship at the Sandia Wetlands at Los Alamos National Laboratory 2014-2019. Los Alamos National Laboratory.

Tetra Tech. 2010. Sediment in New Mexico streams: existing conditions and potential benchmarks. Final report. Tetra Tech, Inc., Montpelier, VT.

Appendix A. Air Temperature Data

Appendix B. Aquatic Life Survey of Surface Waters within Sandia Canyon

EXHIBIT F

MICHELLE LUJAN GRISHAM
GOVERNOR

JAMES C. KENNEY
CABINET SECRETARY

Via Email

March 4, 2022

Steve Story, Group Leader
Los Alamos National Laboratory
Environmental Protection & Compliance Division
Compliance Programs Group
Via email to story@lanl.gov

Re: Comments for the Sandia Canyon Use Attainability Analysis

Dear Steve Story,

On October 25, 2021, the New Mexico Environment Department ("Department" or "NMED") Surface Water Quality Bureau ("SWQB") received a Use Attainability Analysis ("UAA") of Aquatic Life Use Designations within upper Sandia Canyon. Windward Environmental prepared the UAA on behalf of the U.S. Department of Energy's National Nuclear Security Administration, and Triad National Security, LLC ("DOE-Triad") for Los Alamos National Laboratory ("LANL").

This UAA considers whether natural physical conditions in Upper Sandia Canyon, specifically air and/or water temperatures, prevent attainment of the designated coldwater aquatic life use in Sandia Canyon from Sigma Canyon upstream to the National Pollutant Discharge Elimination System ("NPDES") permit outfall 001. This perennial water is classified in 20.6.4.126 NMAC. The New Mexico Water Quality Control Commission ("WQCC") established the designated aquatic life use in 2005 based on an existing aquatic life use study on four identified tributaries within Los Alamos, which included Sandia Canyon. At the time, the coldwater aquatic life use did not have a chronic temperature exposure limit. Since that time, the WQCC adopted acute and chronic temperature criteria to protect coldwater aquatic life as follows: an acute maximum temperature ("Tmax") of 24° Celsius ("C"), which is never to be exceeded, and a chronic temperature limit of 20°C, which is not to be exceeded for six or more consecutive hours in a 24-hour period on more than three consecutive days ("6T3").

The Department reviewed the UAA and has the following comments and suggestions to consider. Comments and suggestions sent to the Department from the U.S. Environmental Protection Agency ("EPA") Region 6 are included as an attachment.

General

1. DOE-Triad should include the proposed amendments to 20.6.4 NMAC that are supported by the evidence presented in the UAA.
2. Pursuant to 40 C.F.R. 131.10(b), amending a designated use requires the water quality standards for downstream waters to be protected and maintained. As such, DOE-Triad must take into consideration the water quality standards of downstream waters by identifying the downstream waters to "Upper Sandia Canyon" and their applicable water quality standards and demonstrating how a potential amendment to Upper Sandia Canyon's designated aquatic life use provides for the attainment and maintenance of the water quality standards of downstream waters.
3. The demonstration should provide information on the available water quality data and the reasoning for choosing to use certain data as part of the analysis, particularly for determining the existing aquatic life use.
4. The discussion of models as the method to demonstrate attainable uses is overreaching. The Air Water Temperature Correlation ("AWTC") and Stream Segment Temperature ("SSTEMP") models have limitations

for determining attainable uses in comparison to actual data. The actual water quality data should be the driving element used to support any aquatic life use amendments. DOE-Triad should restructure the UAA with this in mind.

5. Although summaries are helpful, all the tables in the UAA should have accompanying data sets or citations to validate the findings.
6. On page 20 of the UAA, it states "[t]he effect of global climate change will have to be evaluated periodically in the future, because it could change the use designations based on temperature." The Department suggests this statement be removed in its entirety. Water quality standards must protect for existing uses as defined in 40 C.F.R. 131.3.

Geographical References

7. The Department requests the latitude and longitude be included for the sampling locations as well as the NPDES outfalls.
8. The Department requests the map with sampling locations (Figure 1) include the centroids for the two 800-meter Parameter-elevation Relationships of Independent Slopes Model ("PRISM") cells (i.e., Upper Sandia AU-east and -west) used in the AWTC model.

References

9. The reference to LANL's Data Quality Objectives for Sampling and Monitoring Supplemental Environmental Project (2017) was not retrievable through LANL's Electronic Public Reading Room (https://www.lanl.gov/library/about/environmental.php), nor was it found to be accessible elsewhere online. In addition, LANL's Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year, October 2016-September 2017 (LANL 2016) is accessible but has had several updates not reflected in the reference. The Department requests all references used for this analysis be provided via attachment or via functioning web links and include all applicable revisions.

Attainable Use and Existing Use

10. In accordance with 40 C.F.R. 131.10(g), a designated use may be removed (and replaced with the highest attainable use) if it is not an existing use. Additionally, and pursuant to 40 C.F.R. 131.10(i), a designated use may not have criteria less stringent than the existing use. As such, DOE-Triad must evaluate the existing aquatic life use and identify the highest attainable use to ensure the proposed use and associated criteria are at least as stringent as the existing use (as defined in 40 C.F.R. 131.3).
11. In table 5 on page 18 of the UAA, the attained Tmax and 6T3 criteria must be included as part of the description for the existing use.
12. On page 23 of the UAA, the findings of the benthic macroinvertebrate surveys must be included as part of the description for the existing use.
13. On pages 24 and 25 of the UAA, the attained criteria for both DO and pH should be included in the description for the existing use.

Highest Attainable Use

14. In accordance with 40 C.F.R. 131.10(g), DOE-Triad must demonstrate the highest attainable use. On page 31, DOE-Triad assert that the flows to Upper Sandia Canyon are not subject to consideration for protections under marginal coldwater aquatic life uses due to the anthropogenic source of the flows to the tributary. However, the definition for "marginal coldwater" does not state it is limited to waters with a natural origin. The definition at 20.6.4.7(M)(1) NMAC states that natural conditions severely limit maintenance of a coldwater aquatic life population or historical data indicate that surface water temperature may exceed 25°C. Therefore, DOE-Triad must consider the marginal coldwater designated aquatic life use when determining the highest attainable use in this UAA.
15. On page 9 of the UAA, it states that the "warmest attainable use among the sources of air temperature

data and among years was selected as the projected attainable use…" In accordance with 40 C.F.R. 131.10, the highest attainable use, meaning the use with the most stringent criteria, must be demonstrated. As it pertains to temperature criteria for the protection of aquatic life, these would be the lowest temperatures from the maximum and 6T3 temperature spectrum during the warmest months of the year, not the warmest temperatures during the warmest months of the year. The Department requests the evaluation determine the highest attainable use, as prescribed in 40 C.F.R. 131.10 and 20.6.4.15 NMAC.

16. Actual data is the preferential means to demonstrate the attainable use, whereas water temperature modeling should only support the actual data or provide insight to areas lacking data, pending the model can be calibrated to actual data. DOE-Triad present actual data but use the models to demonstrate the highest attainable use. This should be reversed. DOE-Triad should use actual data to demonstrate the highest attainable use and if necessary, provide clarification and discussion on the models beyond what the actual data already demonstrate.
17. Table 5 on page 18 of the UAA suggests that the existing and attainable designated use for Sandia Canyon at Sigma Canyon is high-quality coldwater. Given this reach has an existing (and attainable) use with criteria that are more stringent than the criteria for the current designated aquatic life use, DOE-Triad should include proposed language for 20.6.4 NMAC to amend the aquatic life use for this reach in accordance with 40 C.F.R. 131.10(i), or explain why the Upper Sandia Canyon AU is homogenous given these results.
18. The graphs provided on page 16 of the UAA demonstrate that the temperature criteria for the designated coldwater aquatic life use are attained at some stations. DOE-Triad should provide the extent of attainable aquatic life uses within Upper Sandia Canyon, as applicable. DOE-Triad should explain whether the AU is homogenous or where the data indicate breaks or shifts in stream conditions and attainable/existing uses.

<u>Water Quality Data</u>

19. In Table 5 on page 18 of the UAA, the Department noted the values for 6T3, for all five years at all six sampling locations, were equivalent to the Tmax. Based on what the Tmax and 6T3 represent, and the omission of the raw data used to determine these values, the Department disputes the findings as presented in the UAA for actual Tmax and 6T3. Without accurate actual Tmax and 6T3 data, the aquatic life use attained at each site cannot be determined.
20. In accordance with 40 C.F.R. 131.10(h), a designated use may not have criteria less stringent than the existing use. Should the data for the actual 6T3 be demonstrated to be valid, all evidence suggests the 6T3 criteria for marginal coldwater aquatic life use is being attained at some sites during some years. DOE-Triad should provide more reasoning and explanation regarding which aquatic life use (coolwater or marginal coldwater) is the highest attainable use for all or part of the Upper Sandia Canyon AU.
21. DOE-Triad should provide the datasets used to create the graphs on page 16 and to calculate actual Tmax and 6T3 values in Table 5.
22. On page 17 of the UAA, it states that "[f]igure 3 shows that (on an instantaneous basis) water temperatures exceeded the 6T3 criterion for coldwater…". Given that 6T3 is determined on a continuous basis, this should be reworded to simply state that the instantaneous water temperatures exceeded 20°C at every thermograph location during the study period.
23. On page 17 of the UAA, it states that "the 6T3 criterion for coldwater was not exceeded at Sandia at Sigma between 2016 and 2018". On page 17 of the UAA, it states that "[l]ower-than-expected water temperatures…may have resulted from shading in canyon bottoms…" DOE-Triad must clarify why the proposed amendments are applicable to Sandia Canyon at Sigma Canyon even though in some years this reach may attain coldwater criteria. DOE-Triad should discuss and describe the extent of the reach where coldwater temperature criteria are not attainable. The proposed amendments to 20.6.4 NMAC should be consistent with the extent discussion and findings of the UAA.
24. On page 17 of the UAA, it states that "[c]ooling over time could be related to the installation of the [grade control structure] in 2013, which has led to greater retention of water and vegetative growth…above E123." Again, DOE-Triad should clearly delineate the extent to which the current coldwater use is not

attainable and provide the highest attainable use, based on existing data.

25. Table 7 on page 22 of the UAA is labeled "Calculated Outfall 001 water temperature thresholds, 2015 to 2018". However, there is no discussion describing how or what a "temperature threshold" is, nor is the reference provided. Perhaps this should be renamed to "Calculated Outfall 001 water temperature statistics." Similar to Comment 20, the Department noted the values for 6T3 were equivalent to the Tmax. DOE-Triad should provide the dataset used to calculate Tmax and 6T3 in Table 7 to verify these results.
26. Page 24 of the UAA states that dissolved oxygen and pH data from 2016 to 2019 were collected pursuant to LANL's interim facility-wide groundwater monitoring plan ("IFGWP") for the 2017 monitoring year. The IFGMP reference provided was only valid for data collection between October 2016 to September 30, 2017. In order to consider data defensible for purposes of this analysis, DOE-Triad should include all relative quality assurance documents under which DO and pH data were collected.

<u>Air Water Temperature Correlation Model</u>

27. DOE-Triad should discuss the uncertainties and assumptions associated with of each part of the analysis in the applicable sections of the UAA, not at the end of the document. The uncertainties and assumptions must be taken into consideration to understand and interpret the data and model results.
28. Table 3, on page 10 of the UAA, presents PRISM data as unique values for each year, 2014-2018; however, the PRISM data used to develop the Department's AWTC model is the 30-year average July maximum temperature (1981-2010) and does not change year-to-year. DOE-Triad should recalculate the 6T3 and Tmax values in Table 3 using the PRISM 30-year average July temperature.
29. In Table 3, the data indicate Upper Sandia Canyon may attain water temperature criteria protective of the marginal coldwater and coolwater designated uses. As such, the Department requests DOE-Triad review the evidence, criteria, and definitions to evaluate whether marginal coldwater aquatic life or coolwater aquatic life is the appropriate and attainable aquatic life use.
30. In Section 4.3 of the UAA, entitled "Evaluation of LANL MET and PRISM Model Data", DOE-Triad should define how a "warm outlier" was determined.
31. In Section 4.3 of the UAA, entitled "Evaluation of LANL MET and PRISM Model Data", DOE-Triad discuss the use of Autoregressive Integrated Moving Average ("ARIMA") models. This model was not discussed in the approved work plan and is not applicable for this UAA.
32. The UAA states on page 20 that "[b]y inputting measured MWAT values into Equations 3 and 4, the 6T3 and TMAX values that should be observed in the Upper Sandia Canyon [assessment unit] can be more accurately estimated." Modeled 6T3 and Tmax temperatures from actual MWAT measurements are not substitutes for actual 6T3 and Tmax results. The dataset used to calculate the MWAT values can and should be used to calculate actual, observed 6T3 and Tmax values - not modeled to estimate these values. The work plan, approved by the Department, did not discuss modifying the model to fit within the desired parameters, and is therefore not applicable to this analysis.

<u>SSTEMP Model</u>

33. The work plan says SSTEMP will be "used to simulate temperatures and estimate the effects resulting from potential changes in alluvial groundwater inflow/outflow." The work plan also states that "SSTEMP will be applied as a contingency method for determining the highest attainable designated use if it is determined that use of NMED's AWTC Model is not appropriate." DOE-Triad should ensure the UAA is consistent with the approved work plan.
34. On page 14 of the UAA, it states that "The sensitivity analysis generated by SSTEMP for each scenario indicated that mean air temperature had the greatest influence over estimated mean stream temperatures, while inflow temperature, relative humidity, wind speed, and possible sun had lesser (but still significant) influences over predicted mean temperatures." DOE-Triad must include the SSTEMP model inputs, identify data sources for the input parameters, and provide the model results, including sensitivity

analyses, as an appendix to the UAA to support and verify this statement and the SSTEMP section in general.

Given the extent and technical complexity presented in the UAA, the comments presented here may not be comprehensive. In addition, the Department requests to be identified as a stakeholder in this matter, as the agency responsible for implementing such water quality standards, should they be adopted by the WQCC and approved by EPA. If you have any questions regarding these comments or the process, please contact Jennifer Fullam by email at jennifer.fullam@state.nm.us or by phone at 505.946.8954.

Sincerely,

Shelly Lemon Digitally signed by Shelly Lemon
Date: 2022.03.04 10:49:57 -07'00'

Shelly Lemon, Chief
Surface Water Quality Bureau

Attachment: 2022-02-14 – EPA – UAA Sandia Demonstration Comments (FINAL) JDL

Cc: Sandia Canyon Use Attainability Analysis Public Comment (sandiacanyonuaa@lanl.gov)
Russell Nelson, Water Quality Division, EPA Region 6 (nelson.russell@epa.gov)
Jasmin Lopez-Diaz, Water Quality Division, EPA Region 6 (DiazLopez.Jasmins@epa.gov)
John Verheul, NMED Deputy General Counsel (john.verheul@state.nm.us)
Susan Lucas Kamat, NMED-SWQB, Point Source Regulation (susan.lucaskamat@state.nm.us)
Kris Barrios, NMED-SWQB, Monitoring, Assessment and Standards (kristopher.barrios@state.nm.us)
Jennifer Fullam, NMED-SWQB, Standards Planning and Reporting (jennifer.fullam@state.nm.us)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270

2/14/2022

Ms. Jennifer Fullam
Standards, Planning & Reporting Team Leader
Surface Water Quality Bureau
New Mexico Environment Department
1190 S. St. Francis Drive
Santa Fe, NM 87505

Dear Ms. Fullam:

Thank you for the opportunity to review the final draft of the Use Attainability Analysis (UAA) focusing on the perennial portion of the Upper Sandia Canyon AU- NM-9000.A-47 prepared by Department of Energy's National Nuclear Security Administration, Trias National Security, LCC (DOE-NA-LA/Triad) and Winward Environmental, LLC. I have completed my review of the UAA and found NMED has identified some of the EPA's main concerns in its comments. Specifically general comment number two which addresses the need to identify downstream waters for the UAA pursuant 40 C.F.R. § 131.10(b), site specific comment number ten requesting a descriptions of flow conditions in Uper Sandia Canyon and influence of impoundment on stream temperatures, and water quality data comment number 25 and 26 regarding 40 C.F.R. § 131.10(h) and need for discussion of any conditions that could be contributing to the elevated surface water temperatures. EPA supports these comments and the concerns NMED raises regarding the development of this UAA. Please see additional comments below.

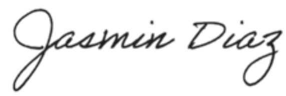
1. On page 2, it states, "Outfall 001 is the primary source of water flow to the Upper Sandia Canyon UA, two other NPDES outfalls… also discharge much smaller volumes of effluent to the AU". The EPA suggests including the MGD for each outfall to be included in the Site Description and History and for the UAA to also consider the influence these NPDES outfalls may also have to the water temperature of the AU.

2. On page 4, it states " Upper Sandia Canyon is effluent dependent, meaning that it would not be perennial without the effluent inputs". Although this is true, the UAA must determine if natural conditions are preventing the attainment of coldwater aquatic use in the perennial reach of Sandia Canyon AU NM-9000.A_047. The UAA must consider what the water temperature would be if not for the possible elevated temperature of the NPDES discharger or other anthropogenic causes.

3. Sensitivity Analysis generated by SSTEMP is discussed and said to support the AWTC modeling results described in Section 4. However, the results of the sensitivity analysis are not shown within the study. Suggestion to include in report.

Given EPA's oversight role, I am providing the SWQB with these comments and recommendations, I appreciate you forwarding them to Mr. Story. I would appreciate if you keep me informed as to the timing of the DOE-NA-LA/Triad rulemaking process. Please let me know if you have any questions concerning this letter via phone at (214) 665-2733 or email at diazlopez.jasmins@epa.gov.

Sincerely,



Jasmin Diaz
Region 6
Water Quality Standards

EXHIBIT G

Comments on the Public Comment Draft Upper Sandia Use Attainability Analysis
Sent to:sandiacanyonuaa@lanl.gov.
Date: 3/7/22

To Whom it May Concern:

Communities for Clean Water, Amigos Bravos, Tewa Women United, New Mexico Acequia Association, Concerned Citizens for Nuclear Safety, Breath of My Heart Birthplace, and Partnership for Earth Spirituality submit the following comments on the September 21, 2021 Public Comment Draft of the Upper Sandia Use Attainability Analysis ("Draft UAA") prepared by Los Alamos National Laboratory ("LANL").

SUMMARY OF DRAFT UAA:
The Draft UAA examines the appropriate aquatic life use for the NM assessment unit NM-9000.A_47 ("Upper Sandia AU") which includes a perennial stretch of Upper Sandia Canyon from Sigma Canyon upstream to the LANL National Pollutant Discharge Elimination System ("NPDES") Permit No. NM0028355 outfall #001. The majority of flow in this section is derived from the average 154,000 gallon a day discharge from NPDES outfall #001, though lesser flows are also contributed from outfalls #027 and #119, which are also regulated under NPDES Permit No. NM0028355.

The Draft UAA includes data from six temperature monitoring stations numbered 1-6. These temperature stations are located in numerical order upstream to downstream with the Station 1 located just below NPDES outfall #001, Station 2 located below the SERF, Station 3 located at E123, Station 4 located below E123, Station 5 located at Crossing below E123.6 and Station 6 located at Sandia at Sigma Canyon. The Draft UAA examines whether the temperature criteria associated with the currently applicable coldwater aquatic life use of 24°C single sample and 20°C 6T3 (water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days) or the temperature criterion of 29°C single sample and no 6T3 associated with the coolwater aquatic life use is appropriate for the Upper Sandia AU.

The Draft UAA recommends that the current designated use of coldwater aquatic life be replaced with the coolwater aquatic life use.

COMMENTS:

- The model employed by LANL does not reflect the on the ground conditions and therefore should not be utilized as a basis for downgrading the standard.

Specifically, the model employed by LANL predicts that the coolwater aquatic life use is appropriate for the upper portion (above E123.6) and that a warmwater aquatic life use is appropriate for the lower portion of the Upper Sandia AU between E123.6 and 123.8 (See Table 4) yet the actual water temperature data that was collected at the six thermograph stations show cooler temperatures in the lower portions of the Upper Sandia AU (See Figure 3). Temperature exceedances at Sigma Canyon (Station 6) which falls between E.123.6 and E123.8 are rare while temperature exceedances in the upper portions of the Upper Sandia AU are more common.

- It appears the model did not examine what would be the expected temperatures at the six stations if the effluent temperature at outfall #001 were to be reduced to at least meet the 6T3 standard. This is contrary to Clean Water Act ("CWA") requirements which deem uses to be attainable "if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306" 40 CFR § 131.10(d).
- In addition, CWA regulations also deem uses to be attainable if the implementation of "reasonable best management practices for nonpoint source control" can result in the attainment of the use. 40 CFR § 131.10(d). Yet, it does not appear that LANL has looked at whether the implementation of best management practices such as increasing shade and decreasing urban runoff would result in attainment of the coldwater aquatic life use. Notably, the Draft UAA identifies that runoff from "above E123" accounts for 25% of the flow in the canyon (Table 1). This area of Sandia Canyon is located near urban development which can contribute to increased stream temperatures.[1]
- The data presented in the Draft UAA show that the only year (2016) that the coldwater temperature TMAX criterion of 24°C was exceeded at Station 1 (which is directly below outfall #001) is the year that the outfall effluent at outfall #001 itself exceeded the TMAX temperature criteria (Tables 5 and 7). All other years presented demonstrated that when the outfall temperature was at or below the criteria the TMAX criteria in the stream were not exceeded at Station 1.
- While the 6T3 criterion was exceeded in the stream at Station 1 for all years shown, that is to be expected since the outfall accounts for 75% of the flow (Table 1) and the outfall temperatures exceeded the 63T criteria for every year presented (Table 7).
- We question whether modeling was done to demonstrate whether lower temperatures in the upper part of the canyon (which could potentially be

[1] https://www.epa.gov/caddis-vol2/caddis-volume-2-sources-stressors-responses-urbanization-temperature

achieved by decreasing effluent temperatures and implementing non-point source best management practices to decrease urban runoff and increase shading) would result in attainment of the coldwater aquatic life use in the downstream segments. The data indicate a decrease in recorded water temperature the further downstream (and further away from anthropogenic sources) that the water travels. If the water flowing into the lower portions of the canyon were slightly decreased it is possible that the coldwater aquatic life use in the lower part of the canyon could be attained.

CONCLUSION: The Draft UAA does not conclusively show that recorded exceedances of the coldwater aquatic life criteria are due to natural conditions of the waterbody as claimed. In fact, the data presented in the Draft UAA demonstrates that LANL, as permittees, are consistently discharging at levels that exceed the applicable coldwater aquatic life criteria in violation of its permit. Steps to both decrease the temperature in the effluent at NPDES outfalls along with implementation of non-point source best management practices should be taken prior to any attempt to downgrade the designated uses for Sandia Canyon.

For questions related to these comments please contact Rachel Conn (CCW and Amigos Bravos) at rconn@amigosbravos.org or 575.770.8327

EXHIBIT H

Environmental Compliance Programs Group
Los Alamos National Laboratory
P.O. Box 1663, K490
Los Alamos, NM 87545
505-667-0666

National Nuclear Security Administration
Los Alamos Field Office
3747 West Jemez Road, A316
Los Alamos, NM 87544
505-665-7314/Fax 505-667-5948

Symbol: EPC-DO: 23-145
Date: November 6, 2023
LA-UR: 23-24193
Locates Action No.: NA

Shelly Lemon, Chief
Surface Water Quality Bureau
New Mexico Environment Department
1190 Saint Francis Drive, Suite N4050
Santa Fe, NM 87505

Subject: Response to Comments – Upper Sandia Canyon Assessment Unit Use Attainability Analysis

Dear Ms. Lemon:

Attached are Triad/NNSA's responses to the New Mexico Environment Department and Environmental Protection Agency's comments on the Upper Sandia Canyon Assessment Unit Use Attainability Analysis (UAA). Also attached are Triad/NNSA's responses to the public comments received on March 7, 2022. The draft Upper Sandia Canyon UAA was submitted to NMED on October 25, 2021.

The purpose of the UAA is to determine the most protective aquatic life use attainable in the perennial portion of the Upper Sandia Canyon AU – NM-9000.A_47. Based on the temperature data collected for the UAA, Triad/NNSA propose to create a new coolwater segment for Sandia Canyon at Bedrock Road (formerly known as "Sandia at Crossing") to Outfall 001. Additional protection for this segment will be provided by including a 6T3 criterion of 25°C. The lower reach from Sandia Canyon at Sigma to Sandia Canyon at Bedrock Road will retain the coldwater ALU.

The Upper Sandia Canyon UAA will be finalized pursuant to requirements contained in 20.6.4.15 NMAC, pending comment resolution and completion of the Triad/NNSA Stakeholder Outreach and Public Engagement process.

Please contact Robert A. Gallegos at (505) 901-3824 or robert.gallegos@nnsa.doe.gov or Timothy J. Goering at (505) 412-9963 or goering@lanl.gov if you have questions regarding these responses.

Sincerely,

SARAH HOLCOMB (Affiliate) Digitally signed by SARAH HOLCOMB (Affiliate) Date: 2023.10.30 12:59:34 -06'00'

Sarah S. Holcomb
Acting Group Leader
Environmental Compliance Programs
Triad National Security, LLC

Sincerely,

Robert A. Gallegos Digitally signed by Robert A. Gallegos Date: 2023.11.02 16:26:01 -06'00'

Robert A. Gallegos
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S. Department of Energy

Attachment(s):

1) Sandia Canyon Use Attainability Analysis: Responses to NMED and EPA Comments
2) Sandia Canyon Use Attainability Analysis: Responses to Public Comments

Copy: Lynette Guevara, NMED-SWQB, lynette.guevara@env.nm.gov
Karen E. Armijo, NA-LA, karen.armijo@nnsa.doe.gov
Robert A. Gallegos, NA-LA, robert.gallegos@nnsa.doe.gov
Stephen N. Jochem, NA-LA, stephen.jochem@nnsa.doe.gov
Steven A. Coleman, Triad, ALDESHQ, scoleman@lanl.gov
Jennifer E. Payne, Triad, ALDESHQ, jpayne@lanl.gov
Jeannette T. Hyatt, Triad, EWP, jhyatt@lanl.gov
Steven L. Story, Triad, EPC-DO, story@lanl.gov
Deepika Saikrishnan, Triad, EPC-DO, deepika@lanl.gov
Sarah S. Holcomb, Triad, EPC-CP, sholcomb@lanl.gov
Timothy J. Goering, Triad, EPC-CP, goering@lanl.gov
Matthew V. Segura, Triad, EPC-CP, msegura@lanl.gov
Maureen C. Dolan, Triad, GC-ESH, dolan@lanl.gov
epccorrespondence@lanl.gov
eshq-dcrm@lanl.gov
gc-esh@lanl.gov
lasomailbox@nnsa.doe.gov

Attachment 1

Sandia Canyon Use Attainability Analysis:
Responses to NMED and EPA Comments

EPC-DO: 23-145

LA-UR: 23-24193

Date: November 6, 2023

Attachment 1

Sandia Canyon Use Attainability Analysis:
Responses to NMED and EPA Comments
November 6, 2023

This document includes Triad National Security LLC's responses to the New Mexico Environment Department (NMED) and Environmental Protection Agency's Comments on the Upper Sandia Canyon Assessment Unit Use Attainability Analysis (UAA). The draft Upper Sandia Canyon UAA was submitted to NMED by DOE-NA-LA/Triad to NMED on October 25, 2021.

Comments on the draft Upper Sandia UAA were received from the NMED and EPA on March 4, 2022. Triad provided draft responses to these comments to NMED on April 24, 2023. These comment responses were subsequently updated based on communication with NMED and further analysis of the temperature data collected for the Sandia Canyon UAA. Triad's updated responses to the NMED and EPA comments are provided below.

General

1. DOE-Triad should include the proposed amendments to 20.6.4 NMAC that are supported by the evidence presented in the UAA.

   LANL Response:

   DOE-Triad agree. For clarity, DOE-Triad has included the proposed revised segment language for 20.6.4 NMAC in the Introduction of the UAA, and in the conclusion of the UAA. Below is language of proposed amendments addressing designated uses and aquatic life uses of high quality coldwater (HQCWAL) coldwater (CWAL), marginal coldwater (MCWAL), and coolwater (CoolWAL). DOE-Triad proposes to create a new coolwater segment for Sandia Canyon at Bedrock Road (formerly known as "Sandia at Crossing") to Outfall 001. Additional protection for this segment will be provided by including a 6T3 criterion of 25 °C. The downstream segment from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road will retain the coldwater ALU.

   20.6.4.141 RIO GRANDE BASIN: Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL), Sandia canyon from Bedrock Road upstream to LANL NPDES outfall 001.
   A. Designated uses: coolwater aquatic life, livestock watering, wildlife habitat and secondary contact.
   B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion apply: a 6T3 of 25 °C (77 °F).
   [20.6.4.141 NMAC - N, X/XX/XXXX]

   and

   This segment description will require the following changes to segment 20.6.4.126:

   20.6.4.126 RIO GRANDE BASIN: Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL), including but not

limited to: Cañon de Valle from LANL stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to Sandia Canyon at Bedrock Road, Pajarito canyon from 0.5 miles below Arroyo de La Delfe upstream to Homestead spring, Arroyo de la Delfe from Pajarito canyon to Kieling spring, 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 NMAC are applicable to the designated uses.

[20.6.4.126 NMAC - N, 5/23/2005; A, 12/1/2010; A, 4/23/2022; A, X/XX/XXXX]

2. Pursuant to 40 C.F.R. 131.10(b), amending a designated use requires the water quality standards for downstream waters to be protected and maintained. As such, DOE-Triad must take into consideration the water quality standards of downstream waters by identifying the downstream waters to "Upper Sandia Canyon" and their applicable water quality standards and demonstrating how a potential amendment to Upper Sandia Canyon's designated aquatic life use provides for the attainment and maintenance of the water quality standards of downstream waters.

LANL Response:

Under the proposed designated use, downstream waters to Upper Sandia Canyon will be protected and maintained in accordance with 40 C.F.R. 131.10(b). Changes in the designated ALU for Upper Sandia Canyon (Segment NM-9000.A_47) will not impact surface waters located downstream of the reach. These surface waters include the following (upstream to downstream):

- Sandia Canyon in Water Quality Segment 20.6.4.126 (AU NM 9000.A_047)- Perennial waters within lands managed by the U.S. department of energy (DOE) with designated uses of coldwater aquatic life, livestock watering, wildlife habitat and secondary contact.
- Sandia Canyon in Water Quality Segment 20.6.4.128 (AU NM-9000.A_047)- Ephemeral and intermittent waters within lands managed by U.S. department of energy (DOE) with designated uses of limited aquatic life, livestock watering, wildlife habitat and secondary contact.
- Sandia Canyon below LANL Boundary 0.5-mile reach within Bandelier National Monument (presumably WQS 20.6.4.98) –Unclassified intermittent waters with designated uses of wildlife habitat, livestock watering, warmwater aquatic life and primary contact.
- Sandia Canyon within San Ildefonso Pueblo[1] – water quality standards not promulgated.
- Rio Grande in WQS 20.6.4.114 (from Cochiti Pueblo boundary upstream to Rio Pueblo de Taos) – with designated uses of irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, warmwater aquatic life, primary contact, and public water supply. Segment-specific temperature criterion of 6T3-22°C (instead of 25° for MCWAL) and

[1] Waters which originate or pass through sovereign pueblo or tribal lands are under the jurisdiction of those pueblos or tribes. A notable exception is joint jurisdiction held by the Pueblo of San Ildefonso and the State of New Mexico for portions of the Rio Grande in segment 20.6.4.114 NMAC.

maximum temperature of 25°C (instead of 29°C). Note: MCWAL not attained (2022-2024 IR) in Rio Grande WQS 20.6.4.114 NMAC - AU NM-2111_00.

Amending water quality standards require assessing downstream protections to Segment 126, Segment 128 and Segment 114. Shifting Sandia Canyon's upper segment (20.6.4.126) from CWAL to CoolWAL, would remain protective as it discharges into the remaining Segment 126 waters (from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road), and the Segment 128 waters of lower Sandia Canyon that have the less protective Limited Aquatic Life use. Sandia Canyon at Sigma will remain designated within segment 126, as it currently meets the coldwater use.

The current and proposed ALU designations and water quality segments for the Upper Sandia Canyon AU are shown on Figure 1. Figure 1 shows the current ALU designations for the Upper Sandia Canyon reach, and the proposed ALU designations based on the results of the Upper Sandia Canyon UAA.

The change in the designated use from CWAL to CoolWAL in Upper Sandia Canyon will not impede attainment and maintenance of WQS to downstream waters. Thermograph data from Sandia Canyon at Sigma Canyon from 2016 through 2018 (Table 5 in the UAA) showed attainment of the current CWAL standard for the study period, with few active measures taken to cool discharge from Outfall 001 during this period.

The change in the designated use for Upper Sandia Canyon will not impact surface waters further downstream of the reach either. Based on data from the Laboratory's five gaging stations in Sandia Canyon, flows from upper Sandia Canyon do not typically reach the eastern boundary of the Laboratory located approximately 3.3 miles below the end of perennial flows. However, surface water in Lower Sandia Canyon does not appear to affect temperatures in the Rio Grande.

Figure 3 shows the total monthly volume of discharge for the five stream gaging stations within Sandia watershed during "Water Year" (WY) 2021. Variations within the discharge reflect precipitation events throughout the monsoon season and variations in effluent discharged to the three NPDES outfalls in the canyon (Outfalls 001, 027, and 199). Most of the flow in Sandia Canyon occurs in the upper portion of the canyon, with the highest monthly volumes measured at gaging stations E121, E122, and E123. Little or no flow was observed in Lower Sandia Canyon at Gaging Stations E124 and E125. There is no apparent correlation between flows in Upper Sandia Canyon (E121, E122, and E123), and flow in the Lower Sandia Canyon (E124 and E125).

Historical data over a ten-year period (for Gages E121, E122, E123, and E125) and over an eight-year period for Gage E124 show similar characteristics, and lack of correlation between flow in Upper Sandia Canyon and Lower Sandia Canyon (Figure 4). Water balance studies show that most of this surface water is lost due to infiltration, evaporation, or surface water loss to alluvial groundwater prior to gaging station E124. Average annual flow at the lowermost gaging station, E125, is only 2 acre-feet per year, based on ten years of record from WY 2012 to WY 2021. This represents only 0.4% of the total flow observed at E123, and reflects ephemeral flow following precipitation events, rather than continuous flow down the entire Sandia Canyon.

Figure 4 shows average annual flow (acre-ft) at each gage in Sandia Canyon, based on a ten-year period of record from WY 2012 to WY 2021 for Gages E121, E122, E123, and E125, and on an 8-year period of record for Gage E124. Data from gages in Upper Sandia Canyon (E121, E122, and E123) are shown in blue, while data from gages in Lower Sandia Canyon (E124 and E1245) are shown in red. The average annual flow in acre feet at each gaging station over the 10-yr period is shown above each bar in the graph. The highest flow volumes are recorded at gaging station E123, located below the Sandia Wetland, with average annual flow of 518 acre-ft per year. Reference: N3B, 2022. "Surface Water Data at Los Alamos National Laboratory, Water Year 2021. EMID-702050]

The measured temperatures from 2014-2018 in the Upper Sandia Canyon AU from Sandia Canyon at Bedrock Road to Outfall 001 do not meet the CWAL temperature criteria, however temperatures at Sandia Canyon at Sigma from 2016 to 2018 meet CWAL standards. Discontinuous flows in Sandia Canyon reflected by the historical gage network in the upper and lower portions of the canyon are unlikely to influence stream temperatures downstream, in ephemeral portions of the canyon, or the Rio Grande WQS 20.6.4.114 (from Cochiti Pueblo boundary upstream to Rio Pueblo de Taos). The data demonstrate that an amendment to Upper Sandia Canyon's designated aquatic life use, from CWAL to CoolWAL, will not impact downstream water quality and would support the attainment and maintenance of those standards in downstream waters.

3. The demonstration should provide information on the available water quality data and the reasoning for choosing to use certain data as part of the analysis, particularly for determining the existing aquatic life use.

   LANL Response:

   The Sandia Canyon UAA will incorporate available water quality data to support the proposed designated use (including temperature, DO (dissolved oxygen) and discussion of macroinvertebrates). The models, including the Air Water Temperature Correlation ("AWTC") and Stream Segment Temperature ("SSTEMP") models (NMED, 2011 and Bartholow, 2004), have limitations for determining attainable uses, when compared to actual data, but nonetheless support the proposed designated use in the UAA. The rationale for the data selected was based on the approved work plan, and available data at the time the first draft was developed.

4. The discussion of models as the method to demonstrate attainable uses is overreaching. The Air Water Temperature Correlation ("AWTC") and Stream Segment Temperature ("SSTEMP") models have limitations for determining attainable uses in comparison to actual data. The actual water quality data should be the driving element used to support any aquatic life use amendments. DOE-Triad should restructure the UAA with this in mind.

   LANL Response:

   The UAA has been restructured to present the actual water quality data first and emphasize these data rather than the model data. The actual water quality data are the driving element to support the proposed aquatic life use amendments. The models discussed (AWTC; NMED 2011 and SSTEMP; Bartholow, 2004) are also presented, but with less emphasis.

5. Although summaries are helpful, all the tables in the UAA should have accompanying data sets or citations to validate the findings.

   LANL Response:

   All the tables in the final UAA will have accompanying data sets and citations to validate our findings. The findings will be provided in the supplemental material provided electronically with the final UAA. Similarly, citations will be appropriately referenced, and where possible, provided electronically as well.

6. On page 20 of the UAA, it states "[t]he effect of global climate change will have to be evaluated periodically in the future, because it could change the use designations based on temperature." The Department suggests this statement be removed in its entirety. Water quality standards must protect for existing uses as defined in 40 C.F.R. 131.3.

   LANL Response:

   Climate change statement has been removed in its entirety, per NMED's suggestion. The proposed water quality standards in the UAA protect for existing uses as defined in 40 C.F.R. 131.3.

Geographical References

7. The Department requests the latitude and longitude be included for the sampling locations as well as the NPDES outfalls.

   LANL Response:

   Latitude and longitudes for the sampling locations and outfalls will be included in the finalized UAA.

8. The Department requests the map with sampling locations (Figure 2) include the centroids for the two 800-meter Parameter-elevation Relationships of Independent Slopes Model ("PRISM") cells (i.e., Upper Sandia AU-east and -west) used in the AWTC model.

   LANL Response:

   The map with sampling locations (Figure 2) has been updated to show the centroids for the two Parameter-elevation Relationships of Independent Slopes Model ("PRISM") cells (i.e., Upper Sandia AU-east and -west) used in the AWTC model. These centroids are located at the following coordinates:

- PRISM EAST: Location: Lat: 35.8694 Lon: -106.3026 Elev: 2179m
- PRISM WEST: Location: Lat: 35.8760 Lon: -106.3166 Elev: 2311m

The Prism Climate Group website (https://prism.oregonstate.edu/) was used to generate new PRISM EAST and WEST 30-year normal for average July air temperatures. The website states that "at the end of each decade, average values for temperature and precipitation are computed over the preceding 30 years. The current set of 30-year covers the period from 1991-2020. The WEST and EAST PRISM cells, however, appear to have been for the 4 km grids and for the prior default 30-year span (1981-2010). Therefore, we report the two 30-year periods of July temperature averages for the 4 km grid and for 800 m grids for several thermograph locations in Upper Sandia for comparison. These data are presented in Table 1, which is an updated version of Table 3 in the UAA.

A new version of the PRISM 1991-2020 normals has been released, Version M4, in December 2022, which incorporates a more stable method for adjusting short-period-of-record station averages, as well as additional data quality control measures. We report these new 30-year data predictions, using Version M4, in Table 1 (Table 3 of the UAA). We also report the prior 30-year July average for comparison. Additionally, because mountainous areas integrate over wide variations of elevation (canyon bottoms and plateaus), we posited that the new 30-year and the 800 m grid resolution within the EAST grid was likely the more representative data set with which to work as the WEST grid included significant western mountain areas west of the lab (west of State Road 501). The EAST 800 m grid encompasses both headwater branches of Sandia Canyon.

While the PRISM 30-year averages are what NMED required of LANL in comment #8, the value of keeping the annual LANL meteorological towers is that, although a shorter record, the air temperatures are actuals and not interpolated over the landscape from distant National Weather Service sites. Additionally, the reporting by-year over the course of the temperature study allows for comparison to water temperatures and an indication of interannual variation.

References

9. The reference to LANL's Data Quality Objectives for Sampling and Monitoring Supplemental Environmental Project (2017) was not retrievable through LANL's Electronic Public Reading Room (https://www.lanl.gov/library/about/environmental.php), nor was it found to be accessible elsewhere online. In addition, LANL's Interim Facility-Wide Groundwater Monitoring Plan for the 2017 Monitoring Year, October 2016-September 2017 (LANL 2016) is accessible but has had several updates not reflected in the reference. The Department requests all references used for this analysis be provided via attachment or via functioning web links and include all applicable revisions.

LANL Response:

The citation to "LANL, 2017" was incorrect. This citation referred to the following document, "Los Alamos National Laboratory 2016 Annual Site Environmental Report" (Hansen, 2017; LA-UR-17-27987).

References to the Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) have been updated to include annual updates from the Interim Facility Groundwater Monitoring Plan from 2017 through 2020. The pH and DO data discussed in Section 8 of the Draft Sandia UAA were collected under the IFGMP as part of the monitoring program for these years.

LANL-generated references used for development of the Sandia UAA are listed in the "References" section below and will be provided electronically in the supplemental materials for the UAA.

Attainable Use and Existing Use

10. In accordance with 40 C.F.R. 131.10(g), a designated use may be removed (and replaced with the highest attainable use) if it is not an existing use. Additionally, and pursuant to 40 C.F.R. 131.10(i), a designated use may not have criteria less stringent than the existing use. As such, DOE-Triad must evaluate the existing aquatic life use and identify the highest attainable use to ensure the proposed use and associated criteria are at least as stringent as the existing use (as defined in 40 C.F.R. 131.3).

LANL Response:

DOE-Triad has evaluated the existing aquatic life use of upper Sandia Canyon to ensure that the proposed use in the Use Attainability Analysis is at least as stringent as the existing use. The proposed use of coolwater ALU for Sandia Canyon from Sandia Canyon at Bedrock Road to Outfall 001, with a segment-specific criterion for a 6T3 of 25 °C, and coldwater ALU from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road are more stringent than the existing aquatic life use of upper Sandia Canyon. The flow in upper Sandia Canyon is predominantly based on effluent from the outfalls, and the system is not a natural system. Existing use was not formally determined in the past, however based on historical water quality data (see below), it is believed to have been limited aquatic life use as defined by the characteristics of the discharge from the outfalls in an otherwise ephemeral stream. With technological advances, such as improved water quality treatment and control capabilities, the water quality of the discharge to Sandia Canyon has significantly improved over the years.

Historical Water Quality Data:

Historical water quality data collected from early Annual Site Environmental Reports (LANL 1977; LANL 1981) and during macroinvertebrate studies in upper Sandia Canyon are limited but suggest the existing use has improved over time concurrently with advancements in water treatment technology, and with improved detection capabilities for emerging contaminants. In the past, dissolved oxygen (DO) and pH data, did not consistently meet criteria for marginal warmwater, or more protective aquatic life uses (ALUs) (Lusk et al, 2002).

Monthly grab samples conducted in Upper Sandia Canyon in the 1990s measured DO below 5 mg/l, and occasionally below 4 mg/L, during the summer. In addition, pH values exceeding 9 SU (and occasionally 10 SU) were measured. These water quality criteria did not meet New Mexico's aquatic life use criteria for marginal warm water (MWWAL) of dissolved oxygen 5 mg/L or more, and pH within the range of 6.6 to 9.0 SU. Examples of these data are shown in Table 2, and the references will be provided electronically with the UAA.

Historical Studies of Aquatic Life in Sandia Canyon:

LANL scientists, contract scientists, and NMED have studied the aquatic life of Sandia Canyon and surroundings since the early 1990's. Some of these studies were tied to spill events where macroinvertebrates were used as indicators of ecosystem health in response to these environmental stresses. Studies targeted to assessing harm to the aquatic community from events will not be used to affirm attainable and existing use, although since the perennial section of upper Sandia is a habitat created by treated effluent discharge, it must be noted that the existing aquatic life community is likely one adapted to the current or past water qualities of the discharge.

Fish:

In a study of intermittent streams on the plateau (Lusk et al., 2002), researchers scored fish habitat fitness as low for Sandia owing to several factors. Low stream discharge and velocity, cover, limited prey abundance and diversity, and excess nutrients in Sandia reduced potential trout habitat. Stormflow scouring, erosion, and embedded substrates also reduce the quality of the habitat for benthic macroinvertebrates for this reach. A test of caged fish exposures to Sandia waters (fathead minnows) showed some mortality however this was likely attributable to stormwater losses (Lusk et al., 2002). Perhaps the primary reason Pajarito Plateau waters are fishless is both that there is poor habitat availability, and although there is hydrologic connectivity, there is no migratory connection to waters with fish owing to the steep drop off to the Rio Grande at White Rock Canyon (Lusk et al., 2002).

Macroinvertebrates:

Upper Sandia just below the discharge supports an aquatic life community that is adapted to, and less diverse than the reference reach of Los Alamos Canyon (Ford-Schmid, 1999). Los Alamos canyon scored an EPT Index of 6, while Sandia scored 0 in the upper reach in this study by NMED. EPT (Ephemeroptera, Plecoptera and Trichoptera) are generally pollutant-sensitive taxa and are used to investigate water quality. The Biological Condition index of habitat fitness in Sandia was judged to be 40 to 50 % of that in the reference reach and the number of pollutant tolerant species was higher in Upper Sandia (Ford-Schmid, 1999). LANL studies have shown that improved diversity and abundance are noted the further downstream in the perennial reach one goes (Bennett, 1994; Cross, 1994; Cross, 1995; and Cross & Nottelman, 1997).

Summary:

We take a conservative approach and suggest that the attainable aquatic life use for the reach is a coolwater ALU with a segment-specific criterion for a 6T3 of 25°C. Based on these studies and the anthropogenically-manipulated environment, DOE-Triad believes this is attainable and ensures the proposed use and associated criteria are at least as stringent as the existing use either characterized by the discharge from the outfalls or in recognition that this would otherwise be an ephemeral stream (40 C.F.R. 131.3). This approach also ensures protection of the downstream coldwater ALU.

11. In table 5 on page 18 of the UAA, the attained Tmax and 6T3 criteria must be included as part of the description for the existing use.

    LANL Response:

    The attained Tmax and 6T3 criteria are presented in the attached Table 3 (Table 5 in the revised UAA). Supporting data will be provided electronically with the UAA.

12. On page 23 of the UAA, the findings of the benthic macroinvertebrate surveys must be included as part of the description for the existing use.

    LANL Response:

    LANL will include findings and interpretations of the several macroinvertebrate studies in Sandia Canyon. Macroinvertebrate studies conducted in the 1990s are discussed above in the response to Comment 10 regarding Existing Use. Supporting data and reports will be provided electronically with the UAA.

13. On pages 24 and 25 of the UAA, the attained criteria for both DO and pH should be included in the description for the existing use.

    LANL Response:

    DO and pH shall be included in the final UAA when describing the existing use. DO and pH data are discussed above in response to Comment 10.

<u>Highest Attainable Use</u>

14. In accordance with 40 C.F.R. 131.10(g), DOE-Triad must demonstrate the highest attainable use. On page 31, DOE-Triad assert that the flows to Upper Sandia Canyon are not subject to consideration for protections under marginal coldwater aquatic life uses due to the anthropogenic source of the flows to the tributary. However, the definition for "marginal coldwater" does not state it is limited to waters with a natural origin. The definition at 20.6.4.7(M)(1) NMAC states that natural conditions severely limit maintenance of a coldwater aquatic life population or historical data indicate that surface water temperature may exceed 25°C. Therefore, DOE-Triad must consider the marginal coldwater designated aquatic life use when determining the highest attainable use in this UAA.

    LANL Response:

    In the EPA's recently issued "Response and Technical Support Document" regarding the 2020 Triennial revisions, EPA clarified the definition of marginal coldwater, and stated, "While the EPA recognizes natural variability, it is important to note that **establishing a seasonal or year-round**

marginal coldwater aquatic life use must be based on natural and not anthropogenic conditions." Given that the perennial flow in upper Sandia Canyon AU is anthropogenic and not a natural system, the marginal coldwater ALU would seem to not apply to the Upper Sandia Canyon AU.

NMED is correct that protections (of any kind) do not hinge on waters only of natural origin. Marginal coldwater is an ALU category that only pertains to waters that cannot attain coldwater ALU for natural reasons. The best indicator of natural conditions absent an anthropogenic source (effluent dominated) is NMED's Air-Water Temperature Correlation that shows both marginal coldwater and coolwater may apply. However, LANL has been asked to de-emphasize modelling approaches (Comment # 4), including NMED's Air-Water Correlation, and the MWAT statistic which is tied to the physiology of temperature-sensitive fishes. Under current operations, warmer temperatures in discharged effluent are highly managed to meet the current coldwater ALU. However, natural air temperatures preclude the reach from attaining the coldwater ALU. In keeping with recent UAAs adopted by the WQCC, several high quality coldwater, coldwater, marginal warmwater and marginal coldwater fisheries were changed to coolwater ALU based upon natural air temperatures. Thus, we propose a new coolwater segment for Sandia Canyon at Bedrock Road to Outfall 001, and we propose to retain the coldwater ALU for the segment from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road where changes in the geologic setting support a CWAL designation.

LANL is also factoring in good environmental stewardship on a broader scale. Evaluation of the Laboratory's carbon footprint and reducing contributing factors to global climate change show that using fossil fuels to artificially cool the effluent from Outfall 001 into Sandia Canyon may have more deleterious effects over time.

After consideration of all these factors (biological community, current and existing uses of the waterbody, real data, AWTC modeling results, and the EPA clarification regarding the applicability of the marginal coldwater ALU) LANL believes that the coolwater ALU is appropriate for the segment from Sandia Canyon at Bedrock Road to Outfall 001, Additional protection for this segment will be provided by including a 6T3 criterion of 25 °C. The downstream segment from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road will retain the coldwater ALU.

15. On page 9 of the UAA, it states that the "warmest attainable use among the sources of air temperature data and among years was selected as the projected attainable use…" In accordance with 40 C.F.R. 131.10, the highest attainable use, meaning the use with the most stringent criteria, must be demonstrated. As it pertains to temperature criteria for the protection of aquatic life, these would be the lowest temperatures from the maximum and 6T3 temperature spectrum during the warmest months of the year, not the warmest temperatures during the warmest months of the year. The Department requests the evaluation determine the highest attainable use, as prescribed in 40 C.F.R. 131.10 and 20.6.4.15 NMAC.

LANL Response:

"Warmest attainable use" was a typographic error and should have said "highest attainable use". The Sandia Use Attainability Analysis, as prescribed in 40 C.F.R. 131.10 and 20.6.4.15

NMAC, provides evidence that the highest attainable use is coolwater for the segment from Sandia Canyon at Bedrock Road to Outfall 001, with a segment-specific criterion 6T3 of 25°C. The lowermost segment from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road would be retained as coldwater ALU.

16. Actual data is the preferential means to demonstrate the attainable use, whereas water temperature modeling should only support the actual data or provide insight to areas lacking data, pending the model can be calibrated to actual data. DOE-Triad present actual data but use the models to demonstrate the highest attainable use. This should be reversed. DOE-Triad should use actual data to demonstrate the highest attainable use and if necessary, provide clarification and discussion on the models beyond what the actual data already demonstrate.

    LANL Response:

    LANL concurs to a point. Updated UAA language emphasizes actual data; modelled data prove corroborative evidence for the proposed use.

17. Table 5 on page 18 of the UAA suggests that the existing and attainable designated use for Sandia Canyon at Sigma Canyon is high-quality coldwater. Given this reach has an existing (and attainable) use with criteria that are more stringent than the criteria for the current designated aquatic life use, DOE-Triad should include proposed language for 20.6.4 NMAC to amend the aquatic life use for this reach in accordance with 40 C.F.R. 131.10(i), or explain why the Upper Sandia Canyon AU is homogenous given these results.

    LANL Response:

    The AU is not homogenous. The open, wide canyon bottom in the Sandia wetland becomes more constrained down-canyon, where the canyon floor is underlain by a thin layer of alluvium becomes deeply incised in the welded Bandelier tuff. The lower area is shaded by ponderosa pine forest, providing for cooler temperatures.

    DOE-Triad propose a new coolwater segment for Sandia Canyon at Bedrock Road to Outfall 001, with a 6T3 criterion of 25 °C. The lower segment from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road would retain the coldwater ALU (see response to comment 1). In reference to meeting high quality coldwater, this use was designed to address stream qualities that make for a high-quality fishery (see 20.6.4.7 (H)(3) NMAC), which is not applicable to Sandia Canyon within LANL boundary.

18. The graphs provided on page 16 of the UAA demonstrate that the temperature criteria for the designated coldwater aquatic life use are attained at some stations. DOE-Triad should provide the extent of attainable aquatic life uses within Upper Sandia Canyon, as applicable. DOE-Triad should explain whether the AU is homogenous or where the data indicate breaks or shifts in stream conditions and attainable/existing uses.

    LANL Response:

The AU is not homogenous (see response to Comment 17), and water temperatures in Sandia Canyon generally decrease down canyon. These changes may be due to the natural progression of the reach and/or the grade control structure that has generated enhanced wetland plant establishment (shading). Table 4 (Table 6 in the UAA) presents data that shows that natural conditions at Sigma canyon warrant a coldwater protection. Therefore, we propose to split the reach with Upper Sandia Canyon from Sandia Canyon at Bedrock Road to Outfall 001 designated as a coolwater ALU (with a 6T3 of 25°C), while the lowermost portion of the canyon from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road will retain the coldwater ALU (Figures 1 and 2).

19. In Table 5 on page 18 of the UAA, the Department noted the values for 6T3, for all five years at all six sampling locations, were equivalent to the Tmax. Based on what the Tmax and 6T3 represent, and the omission of the raw data used to determine these values, the Department disputes the findings as presented in the UAA for actual Tmax and 6T3. Without accurate actual Tmax and 6T3 data, the aquatic life use attained at each site cannot be determined.

LANL Response:

Table 5 has been updated based on guidance from NMED and all data underpinning this table will be provided. Table 5 from the UAA is presented in this Comment Response document as Table 3.

20. In accordance with 40 C.F.R. 131.10(h), a designated use may not have criteria less stringent than the existing use. Should the data for the actual 6T3 be demonstrated to be valid, all evidence suggests the 6T3 criteria for marginal coldwater aquatic life use is being attained at some sites during some years. DOE-Triad should provide more reasoning and explanation regarding which aquatic life use (coolwater or marginal coldwater) is the highest attainable use for all or part of the Upper Sandia Canyon AU.

LANL Response:

Actual 6T3s are being met through operational interventions that change mixing ratios, attenuate discharge, utilize electric blowers and recirculate using pumps to cool effluent waters before discharge. Because the flow system in the upper Sandia Canyon AU is anthropogenic, the marginal coldwater ALU should not apply (see USEPA 2023, "EPA's Response and Technical Support Document). Lastly, in the absence of effluent, the natural conditions of most of the upper Sandia AU, as indicated by the modeling and inferences from the Upper LA canyon reference site in the original 2007 UAA suggest that the original coldwater designation is not appropriate.

Data presented in Table 3 (Table 5 in the UAA) for "Actual TMAX" and" Actual 6T3" measured between 2014 and 2018 indicate the upper portion of Segment NM-9000.A_047 meets the coolwater aquatic life use from Sandia Canyon at Bedrock Road to Outfall 001, while the lowermost portion of the reach (Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road) meets "high-quality coldwater" aquatic life use. The cooler temperatures observed in water within the Sigma portion of the reach reflect changes within the canyon itself, resulting in microclimate or hydrologic cooling effects as the canyon narrows and becomes steeper downstream. The segment from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock

Road would retain the coldwater ALU. Although the high quality coldwater standard is indeed more protective, this use was designed to address stream qualities that would support a high-quality fishery (see 20.6.4.7 (H)(3) NMAC). This standard has never been shown to be appropriate for Sandia Canyon.

21. DOE-Triad should provide the datasets used to create the graphs on page 16 and to calculate actual Tmax and 6T3 values in Table 5.

LANL Response:

All thermograph data used to determine actual Tmax and 6T3 values in Table 5 of the UAA will be provided electronically. The "actual 6T3" statistic was recalculated using macros from NMED SWQB's website.

22 On page 17 of the UAA, it states that "[f]igure 3 shows that (on an instantaneous basis) water temperatures exceeded the 6T3 criterion for coldwater…". Given that 6T3 is determined on a continuous basis, this should be reworded to simply state that the instantaneous water temperatures exceeded 20°C at every thermograph location during the study period.

LANL Response:

The UAA has been revised using the updated 6T3 calculations, based on NMED-based calculators.

23 On page 17 of the UAA, it states that "the 6T3 criterion for coldwater was not exceeded at Sandia at Sigma between 2016 and 2018". On page 17 of the UAA, it states that "[l]ower-than-expected water temperatures…may have resulted from shading in canyon bottoms…" DOE-Triad must clarify why the proposed amendments are applicable to Sandia Canyon at Sigma Canyon even though in some years this reach may attain coldwater criteria. DOE-Triad should discuss and describe the extent of the reach where coldwater temperature criteria are not attainable. The proposed amendments to 20.6.4 NMAC should be consistent with the extent discussion and findings of the UAA.

LANL Response:

The proposed amendments to 20.6.4 NMAC, which are consistent with the discussion and findings of the UAA, are presented in DOE-Triad's Response to Comment 1. DOE-Triad propose to create a new coolwater segment for Sandia Canyon at Bedrock Road to Outfall 001, with a 6T3 criterion of 25 °C. The segment from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road would retain the coldwater ALU (Figure 1).

Absent the anthropogenic discharge to the outfalls at the head of Sandia Canyon, there is no other natural input to the system other than from precipitation. Without the effluent in this reach, Sandia Canyon would be an ephemeral system. Although the high quality coldwater standard is indeed more protective, this use was designed to address stream qualities (and even aesthetic properties) that would support a high-quality fishery (see 20.6.4.7 (H)(3) NMAC). This standard has never been shown to be appropriate for Sandia Canyon.

24 On page 17 of the UAA, it states that "[c]ooling over time could be related to the installation of the [grade control structure] in 2013, which has led to greater retention of water and vegetative growth…above E123." Again, DOE-Triad should clearly delineate the extent to which the current coldwater use is not attainable and provide the highest attainable use, based on existing data.

LANL Response:

The extent to which the current coldwater use is not attainable is discussed in the UAA. In the portion of Sandia Canyon where the coldwater use cannot be attained, DOE-Triad propose a coolwater ALU with a 6T3 criterion of 25 °C, which is the highest attainable use based on existing data.

25 Table 7 on page 22 of the UAA is labeled "Calculated Outfall 001 water temperature thresholds, 2015 to 2018". However, there is no discussion describing how or what a "temperature threshold" is, nor is the reference provided. Perhaps this should be renamed to "Calculated Outfall 001 water temperature statistics." Similar to Comment 20, the Department noted the values for 6T3 were equivalent to the Tmax. DOE-Triad should provide the dataset used to calculate Tmax and 6T3 in Table 7 to verify these results.

LANL Response:

LANL will change the terminology in this section and better define what was meant. The 6T3 statistics have been recalculated, and the corrected values are presented in the updated UAA. Data used to calculate Tmax and 6T3 will be provided in the electronic submittal of supplemental information to be provided with the UAA.

26 Page 24 of the UAA states that dissolved oxygen and pH data from 2016 to 2019 were collected pursuant to LANL's IFGMP for the 2017 monitoring year. The IFGMP reference provided was only valid for data collection between October 2016 to September 30, 2017. In order to consider data defensible for purposes of this analysis, DOE-Triad should include all relative quality assurance documents under which DO and pH data were collected.

LANL Response:

Measurement of field parameters for samples collected under the IFGMP are summarized in Table B-3.0, "Methods and Instruments Used for Field Measurements" of the IFGMP. The IFGMP is updated annually and submitted to NMED each year. The references in the Sandia UAA have been updated to include the IFGMPs under which DO and pH data were collected, and the procedures used to measure DO and pH will be provided with the electronic submittal of supplemental information to be provided with the UAA.

Air Water Temperature Correlation Model

27 DOE-Triad should discuss the uncertainties and assumptions associated with of each part of the analysis in the applicable sections of the UAA, not at the end of the document. The uncertainties

and assumptions must be taken into consideration to understand and interpret the data and model results.

LANL Response:

LANL agrees that the uncertainties and assumptions must be taken into consideration to understand and interpret the data and model results. Uncertainties and assumptions associated with each part of the analysis will be discussed in the applicable sections of the UAA, rather than at the end of the document.

28 Table 3, on page 10 of the UAA, presents PRISM data as unique values for each year, 2014-2018; however, the PRISM data used to develop the Department's AWTC model is the 30-year average July maximum temperature (1981-2010) and does not change year-to-year. DOE-Triad should recalculate the 6T3 and Tmax values in Table 3 using the PRISM 30-year average July temperature.

LANL Response:

Table 3 of the UAA (Table 1 in this document) has been updated to be consistent with the Department's AWTC model. The 6T3 and Tmax values in shown in Table 1 (Table 3 of the UAA) were calculated using the 30-year average July temperature for the Upper Sandia AU-West and Upper Sandia AU-East PRISM grid cells. The 6T3 and Tmax values were calculated from the updated 30-year average July temperature data from 1991 to 2020, as well as the original 30-year average July temperature data from 1981 to 2020 for comparison. The calculated 6T3 and Tmax parameters were similar for both 30-year data sets and indicate that Upper Sandia Canyon reach can meet coolwater aquatic life use standards (under current conditions) based on the modeled AWTC approach. This is consistent with the results from the actual thermograph data.

29 In Table 3, the data indicate Upper Sandia Canyon may attain water temperature criteria protective of the marginal coldwater and coolwater designated uses. As such, the Department requests DOE-Triad review the evidence, criteria, and definitions to evaluate whether marginal coldwater aquatic life or coolwater aquatic life is the appropriate and attainable aquatic life use.

LANL Response:

DOE-Triad have reviewed the evidence, criteria, and definitions to evaluate whether marginal coldwater aquatic life or coolwater aquatic life is the appropriate and attainable aquatic life use. Because the flow system in the upper Sandia Canyon AU is anthropogenic, DOE-Triad ascertain that the marginal coldwater ALU does not apply (see USEPA 2023, "EPA's Response and Technical Support Document").

The Sandia Canyon reach is not homogenous, with warmer water temperatures in the upper part of the canyon, and cooler temperatures in the lower part of the canyon. Thermograph data and NMED's MWAT and AWTC models show that ambient air temperature is the limiting factor for water temperatures within the reach.

To ensure the highest attainable aquatic life use is designated for the entire reach, DOE-Triad propose to create a new coolwater segment for the upper part of the reach (from Sandia Canyon at Bedrock Road to Outfall 001), while retaining the coldwater ALU for the lower part of the reach from Sigma to Bedrock Road. Additional protection for the upper part of the reach will be provided with a 6T3 criterion of 25 °C.

30 In Section 4.3 of the UAA, entitled "Evaluation of LANL MET and PRISM Model Data", DOE-Triad should define how a "warm outlier" was determined.

LANL Response:

Section 4.3 of the UAA has been revised for clarification, and the concept of "warm outliers" is no longer discussed. See response to Comment 31.

31 In Section 4.3 of the UAA, entitled "Evaluation of LANL MET and PRISM Model Data", DOE-Triad discuss the use of Autoregressive Integrated Moving Average ("ARIMA") models. This model was not discussed in the approved work plan and is not applicable for this UAA.

LANL Response:

The evaluation of LANL MET and PRISM model data using the ARIMA statistical approach was conducted to determine whether the 2014 to 2018 July air temperature data were consistent with expectations based on previous years. The results showed that water temperatures should be considered representative of attainable water temperatures in "typical" years, given the air temperatures this study period. However, because the ARIMA analysis was not discussed in the approved work plan, the discussion presented in Section 4.3 has been removed from the final Sandia UAA report.

32 The UAA states on page 20 that "[b]y inputting measured MWAT values into Equations 3 and 4, the 6T3 and TMAX values that should be observed in the Upper Sandia Canyon [assessment unit] can be more accurately estimated." Modeled 6T3 and Tmax temperatures from actual MWAT measurements are not substitutes for actual 6T3 and Tmax results. The dataset used to calculate the MWAT values can and should be used to calculate actual, observed 6T3 and Tmax values - not modeled to estimate these values. The work plan, approved by the Department, did not discuss modifying the model to fit within the desired parameters, and is therefore not applicable to this analysis.

LANL Response:

DOE-Triad agrees with NMED that modeled 6T3 and Tmax results (shown in Table 6 of the UAA, and Table 4 in this document) are not substitutes for the actual 6T3 and Tmax parameters measured using thermographs shown in Table 3 (Table 5 of the UAA). However, in accordance with the NMED-approved Work Plan for the UAA, the Laboratory used the NMED's Air-Water Temperature Correlation (AWTC) guidance document and model to calculate Tmax and 6T3 to develop additional evidence regarding the appropriateness of the coldwater aquatic life designed use attainability for Upper Sandia Canyon AU.

Because Upper Sandia AU is an effluent-dominated reach driven by anthropogenic input from three NPDES outfalls, the analysis using the NMED's AWTC model provides valuable information regarding the relative influence of the discharge from the outfalls. The results from the AWTC analysis allow us to better understand the naturally modeled temperatures of flow in upper Sandia Canyon, assuming no discharge from the outfalls. Without the discharge from the outfalls, flow in the reach would be ephemeral (or possibly intermittent), occurring after significant snowmelt events and significant summer monsoons.

The Laboratory agrees that modification of the AWTC model to fit within the desired parameters (see Section 10 of the draft UAA) was not within the scope of the work plan, and this discussion has been removed from the final Sandia Canyon UAA.

SSTEMP Model

33 The work plan says SSTEMP will be "used to simulate temperatures and estimate the effects resulting from potential changes in alluvial groundwater inflow/outflow." The work plan also states that "SSTEMP will be applied as a contingency method for determining the highest attainable designated use if it is determined that use of NMED's AWTC Model is not appropriate." DOE-Triad should ensure the UAA is consistent with the approved work plan.

LANL Response:

In accordance with the work plan, SSTEMP was used to simulate temperatures and estimate the effects resulting from potential changes in alluvial groundwater inflow/flow. SSTEMP was applied in the Upper Sandia Canyon using measured flow data and variables obtained from PRISM, the LANL meteorological stations, and LANL's Environmental Surveillance Gages.

Although the thermograph data collected during the Sandia UAA study provided a data set to evaluate the highest attainable use for the upper Sandia Canyon AU, the NMED's AWTC model also provided corroborating data in support of the UAA results. The AWTC model is informative for the Sandia UAA because it provides estimated water temperatures assuming there were no anthropogenic inputs (see EPA Comment Response #2) below).

For these reasons, there was no need to use SSTEMP as a contingency method to determine the highest attainable designated use. However, SSTEMP was used to address the original objectives discussed in the work plan and listed above, i.e., simulating temperatures and the results from potential influx of alluvial groundwater inflow. The SSTEMP analysis supports the AWTC modeling results and provides additional evidence that the coldwater ALU in upper Sandia Canyon is not attainable.

34 On page 14 of the UAA, it states that “The sensitivity analysis generated by SSTEMP for each scenario indicated that mean air temperature had the greatest influence over estimated mean stream temperatures, while inflow temperature, relative humidity, wind speed, and possible sun had lesser (but still significant) influences over predicted mean temperatures." DOE-Triad must include the SSTEMP model inputs, identify data sources for the input parameters, and provide the model results, including sensitivity analyses, as an appendix to the UAA to support and verify this statement and the SSTEMP section in general.

LANL Response:

DOE-Triad will include the SSTEMP model inputs, data sources for all input parameters, and provide model results with sensitivity analysis in the supplemental information provided with the final UAA.

Responses to EPA Comments

EPA Comment 1:

On page 2, it states, “Outfall 001 is the primary source of water flow to the Upper Sandia Canyon UA, two other NPDES outfalls… also discharge much smaller volumes of effluent to the AU”. The EPA suggests including the MGD for each outfall to be included in the Site Description and History and for the UAA to also consider the influence these NPDES outfalls may also have to the water temperature of the AU.

LANL Response:

LANL has reported the relevant discharge amounts and histories in the section on Site Description and History for the UAA. Figure 5 shows the average monthly release volumes in thousands of gallons per day or “kg/day” Outfall 001, Outfall 03A199, and Outfall 03A027, Attribution: N3B (2022), EM2022-0012. 2021 Sandia Wetland Performance Report.

EPA Comment 2:

On page 4, it states “Upper Sandia Canyon is effluent-dependent, meaning that it would not be perennial without the effluent inputs”. Although this is true, the UAA must determine if natural conditions are preventing the attainment of coldwater aquatic use in the perennial reach of Sandia Canyon AU NM-9000.A_047. The UAA must consider what the water temperature would be if not for the possible elevated temperature of the NPDES discharger or other anthropogenic causes.

LANL Response:

Under natural conditions (without anthropogenic inputs from NPDES outfalls or other anthropogenic sources), the upper reach of Sandia Canyon would be dry most of the year, with ephemeral (or possibly intermittent) flow conditions. Flow in upper Sandia Canyon would be similar to flow along lower segments of the canyon, for example the ephemeral flows observed at gages E124 or E125. These intermittent flow conditions might be observed during spring runoff and following significant precipitation events during the summer monsoon season. During these intermittent periods of flow, the temperature of water flowing in Sandia Canyon would be controlled by the snowmelt in spring, and by ambient air temperature during the summer months, as described by the NMED’s Air Water Temperature Correlation (AWTC).

The NMED SWQB has demonstrated that air temperature and water temperature are highly correlated (NMED 2011a). The NMED AWTC model has been used in past UAAs (e.g., NMED, 2011b; NMED, 2017, and Good, J., 2021), as well as in the current Upper Sandia Canyon UAA to estimate water temperature statistics and substantiate which aquatic life designated uses are attainable.

The AWTC analysis for Upper Sandia Canyon is described in detail in the Sandia Canyon UAA. Table 1 (Table 3 in the UAA) presents the average July air temperature for upper Sandia Canyon based on LANL Met data and PRISM. According to the NMED's AWTC model, the maximum weekly average water temperature (MWAT) is approximately equal to the average July air temperature. Therefore, the first four columns in Table 1 present reasonable estimates for the water temperature in Upper Sandia Canyon, assuming no anthropogenic inputs from NPDES outfalls or other anthropogenic causes.

EPA Comment 3:

Sensitivity Analysis generated by SSTEMP is discussed and said to support the AWTC modeling results described in Section 4. However, the results of the sensitivity analysis are not shown within the study. Suggestion to include in report.

LANL Response:
DOE-Triad will include the SSTEMP model inputs, data sources for all input parameters, and provide model results with sensitivity analysis in the supplemental material provided with the final UAA.

References

Bartholow, John. (2004). *Stream Segment Temperature Model (SSTEMP) Version 2.0, Revised August 2004*. US Geological Survey, Ft. Collins, Colorado.

Bennett, Kathryn. (1994). *Aquatic macroinvertebrates and water quality in Sandia Canyon*. Los Alamos National Laboratory.

Cross, Saul (1994). *Aquatic Macroinvertebrates and Water Quality of Sandia Canyon, Los Alamos National Laboratory December 1992–0ctober 1993*. Los Alamos, New Mexico.

Cross, Saul. (1995). *Aquatic Macroinvertebrates and Water Quality of Sandia Canyon, Los Alamos National Laboratory, November 1993 to October 1994*. Los Alamos, New Mexico.

Cross, Saul, and Nottelman, Heidie. (1997). *Aquatic macroinvertebrates and water quality of Sandia Canyon, Los Alamos National Laboratory, 1995*. Los Alamos, New Mexico.

Ford-Schmid, Ralph. (1999). Aquatic macroinvertebrate species lists and comparisons of community metrics for Upper Los Alamos, Sandia, Pajarito, and Valle Canyons.

Good, Jim. (2021). Final Draft-*Aquatic Life Uses for the Lower Rio Ruidoso and Upper Rio Hondo in New Mexico: Use Attainability Analysis.* Prepared for Village of Ruidoso and City of Ruidoso Downs, Regional Wastewater Treatment Plant Joint Use Board. ESA Project Number D201900875.01.

Hansen, Leslie Ann. (2017). Los Alamos National Laboratory 2016 Annual Site Environmental Report. LA-UR-17-27987. Los Alamos, New Mexico.

Los Alamos National Laboratory. (2017). *Interim Facility-Wide Groundwater Monitoring Plan for the 2018 Monitoring Year, October 2017–September 2018* (LA-UR-17-24070). Los Alamos National Lab. (LANL), Los Alamos, New Mexico.

Lusk, Joel D, MacRae, Russell K, Chapman, Duane, & Allert, Anne. (2002). *A Water Quality Assessment of Four Intermittent Streams in Los Alamos County, New Mexico*. *Los Alamos National Lab. (LANL), Los Alamos, NM (United States)*.

New Mexico Environment Department, Surface Water Quality Bureau. (2011). *Air-Water Temperature Correlation*.

New Mexico Environment Department. (2011b). *Lower Dry Cimarron River Use Attainability Analysis*.

New Mexico Environment Department, Surface Water Quality Bureau. (2017). Use Attainability Analysis Aquatic Life Use Designation for Tecolote Creek, U.S. Interstate 25 (I-25) To Blue Creek, San Miguel County, New Mexico.

US Environmental Protection Agency. (2023). *Interim Technical Support Document*. EPA Action on the New Mexico Water Quality Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC. 2020 Triennial Revisions. U.S. EPA Region 6 Water Quality Protection Division. January 17, 2023.

FIGURES

EPC-DO: 23-145

LA-UR-23-24193

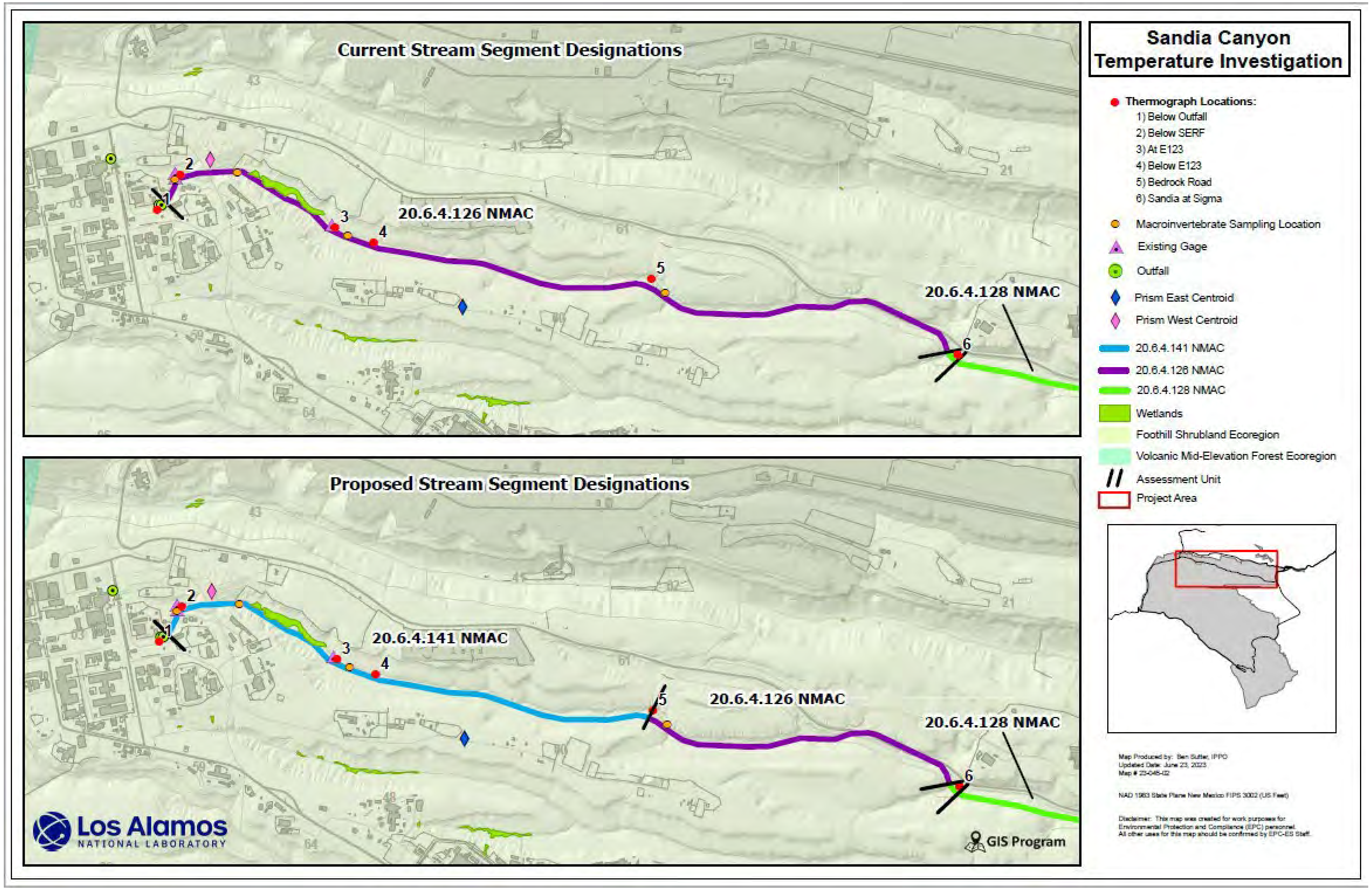


Figure 1. Current ALU designations and proposed ALU designations for Upper Sandia Canyon AU.

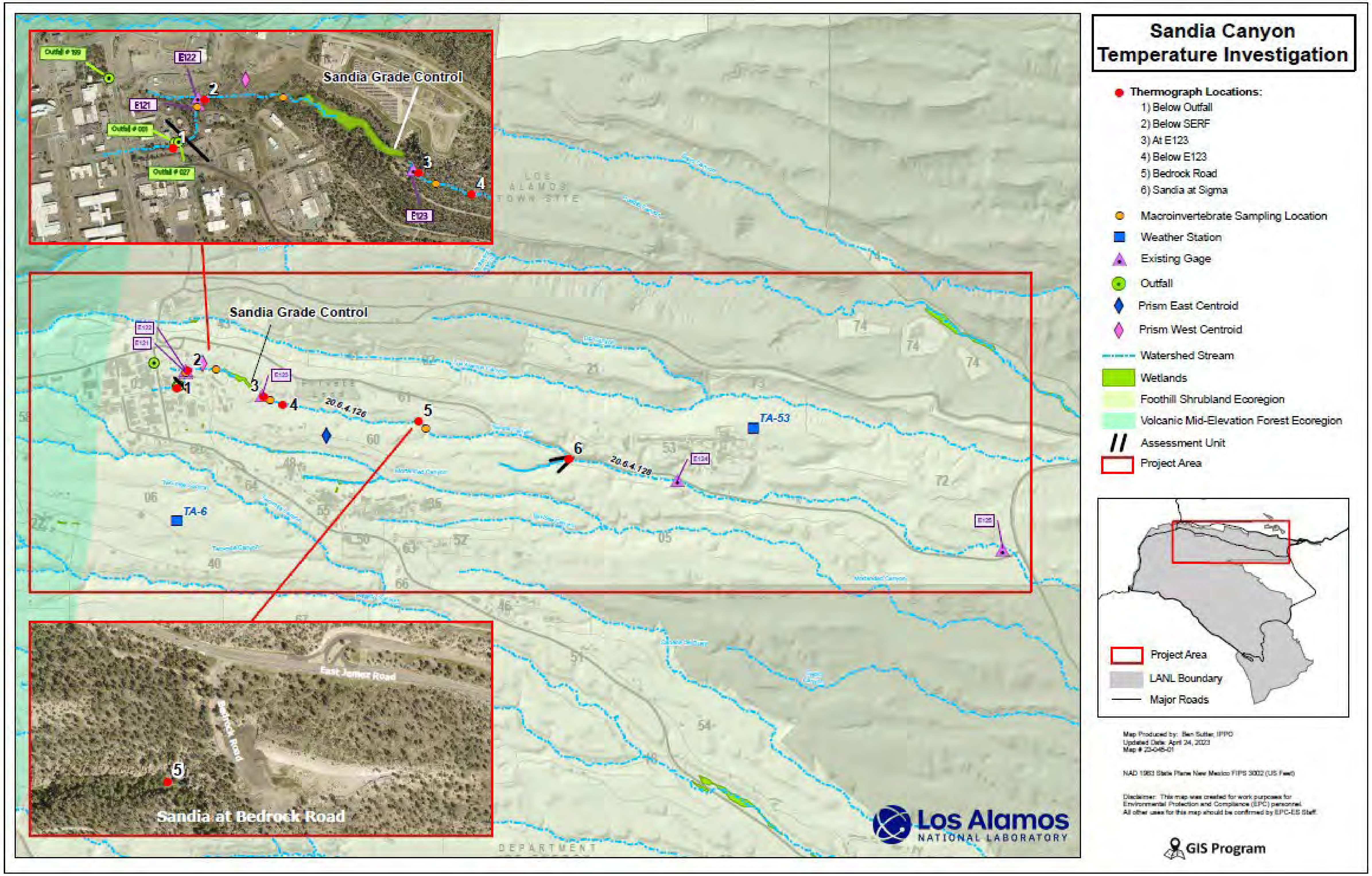


Figure 2. Upper Sandia Canyon Assessment Unit Study Area.

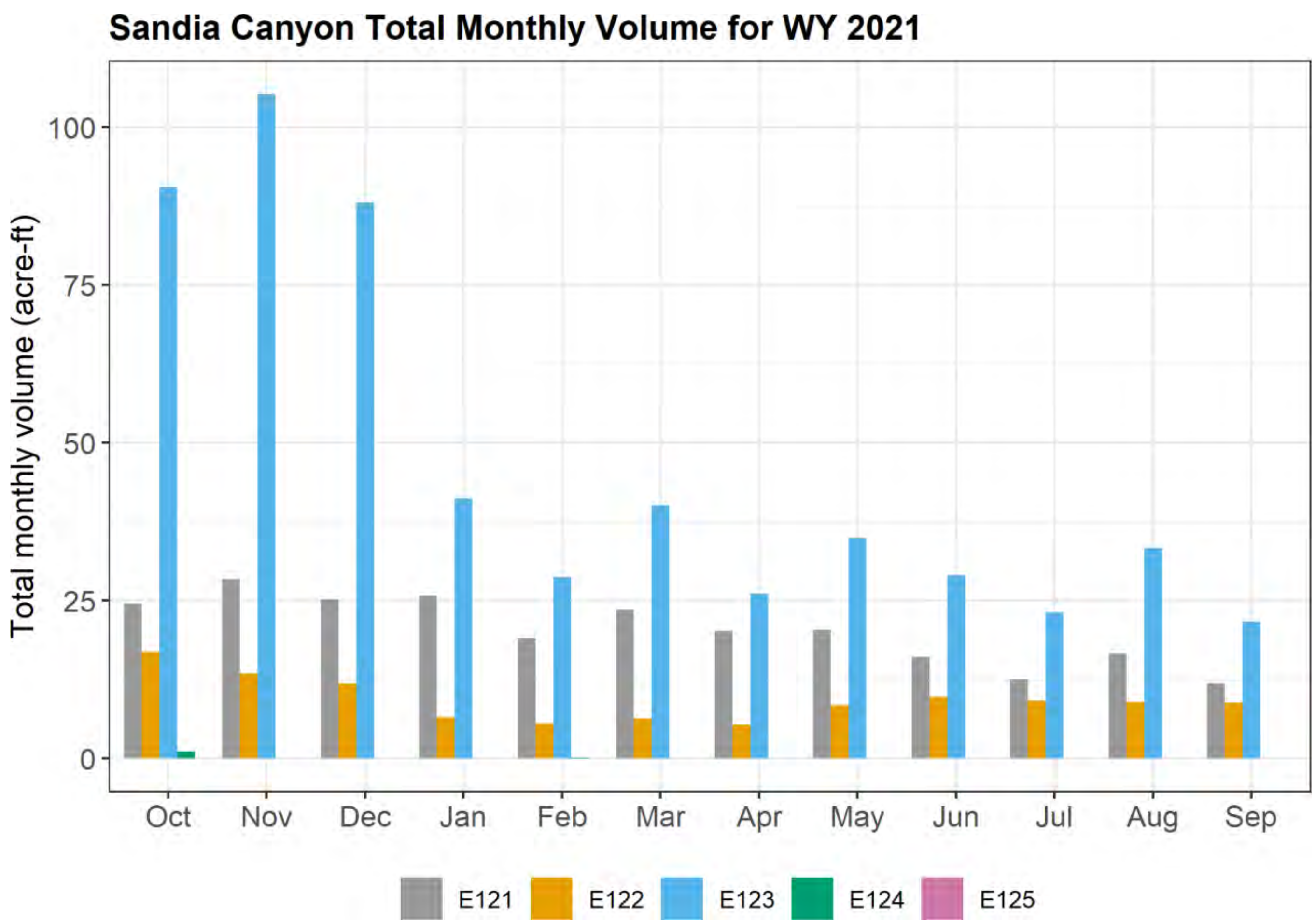


Figure 3. Total monthly discharge at each gaging station in Sandia Canyon during the period from October 1, 2020, through September 30, 2021. Attribution: N3B, 2022. "Surface Water Data at Los Alamos National Laboratory, Water Year 2021". EMID-702050.

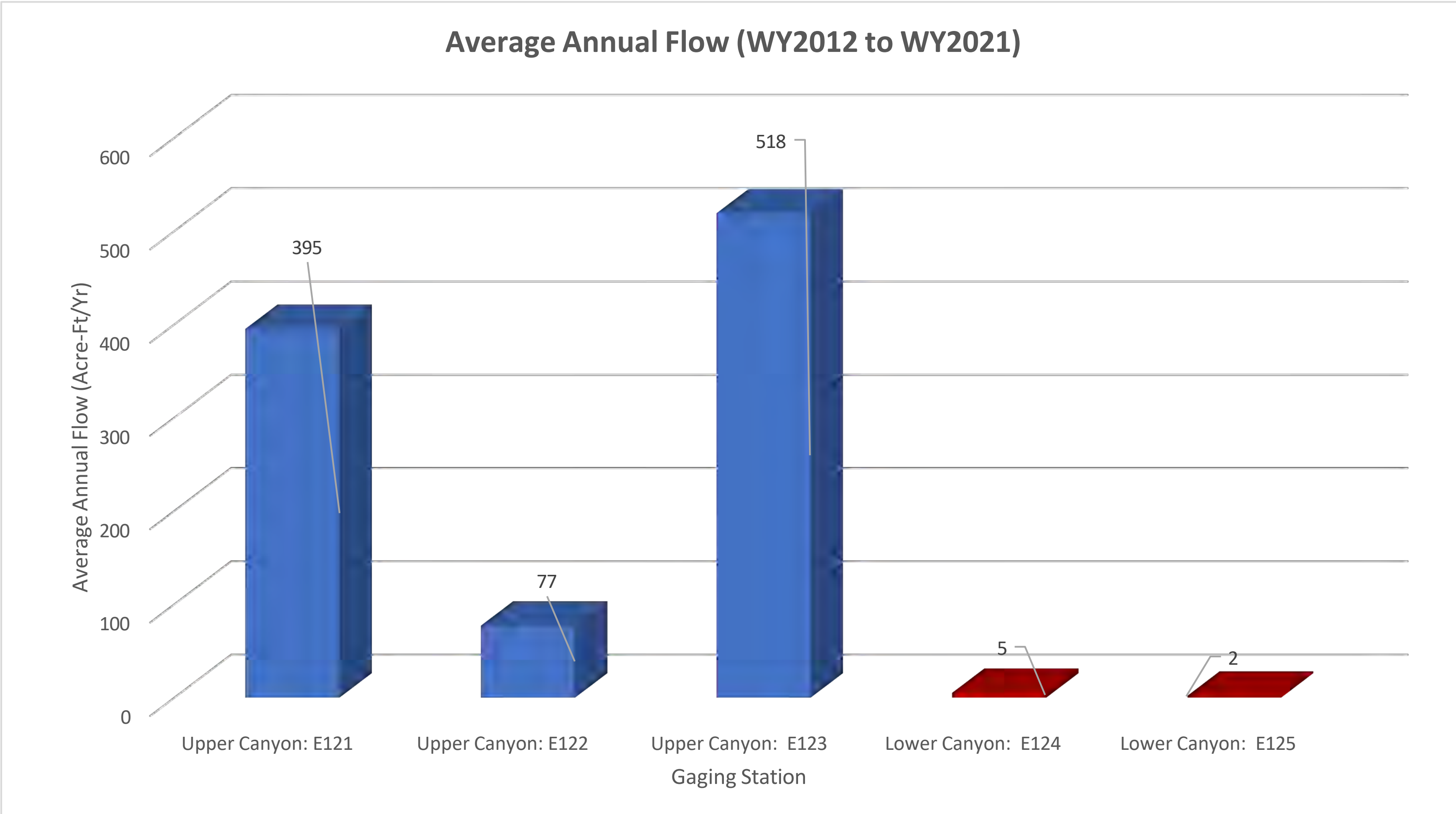


Figure 4. Average annual flow measured in Sandia Canyon gages* during the period from October 1, 2011 through September 30, 2021. * Note: Period of record for Gage E124 spans only 8 years, from October 1, 2013 through September 30, 2021. Attribution: N3B, 2022. "Surface Water Data at Los Alamos National Laboratory, Water Year 2021". EMID-702050.

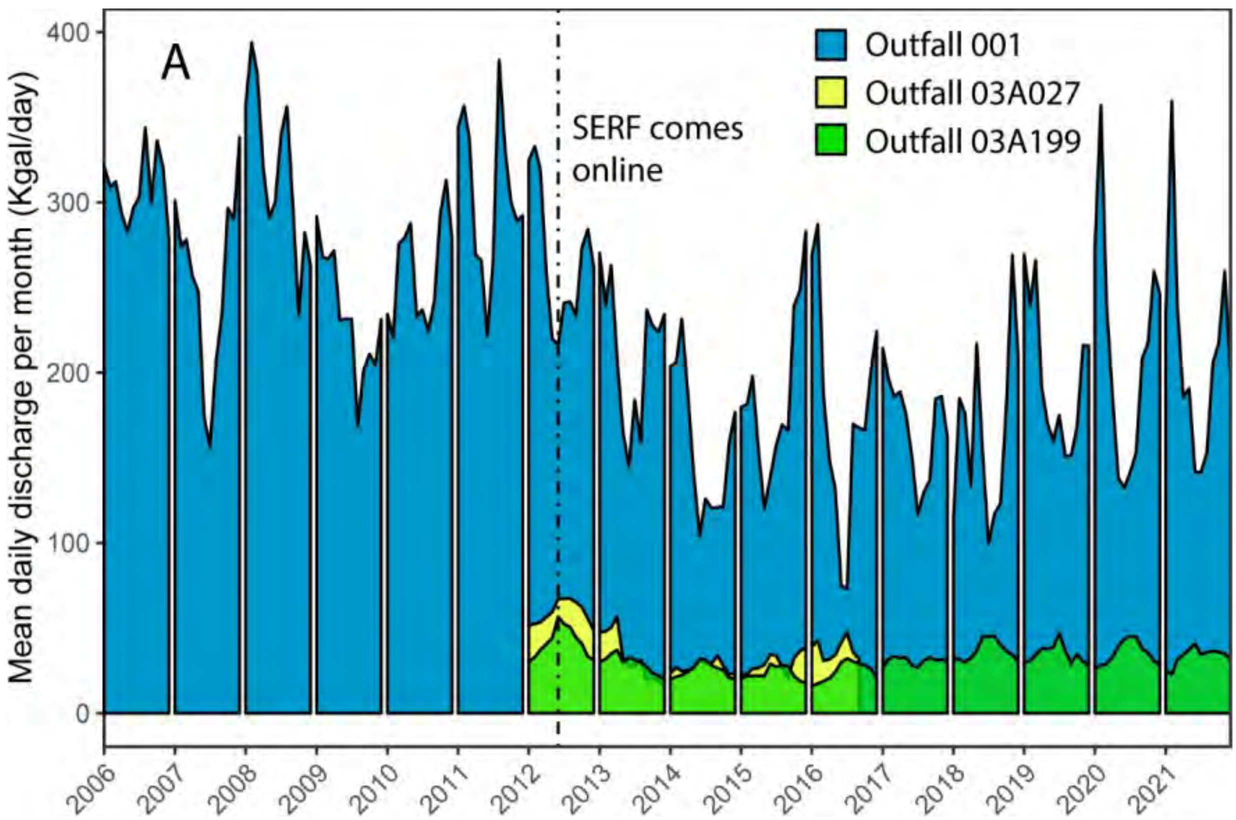


Figure 5: Monthly average effluent release volumes (thousands of gallons per day or "kg/day") are shown for Outfall 001 from January 2006 through December 2021 (blue); Outfall 03A027 from January 2012 through September 2016 (yellow); and Outfall 03A199 from January 2012 through December 2021 (green). Note that no discharges to Outfall 03A027 have occurred since September 2016. SERF is the Sanitary Effluent Reclamation Facility. Attribution: N3B (2022), EM2022-0012. 2021 Sandia Wetland Performance Report.

TABLES

EPC-DO: 23-145

LA-UR-23-24193

Table 1. Attainability evaluation for Upper Sandia Canyon AU waters based on average July air temperature over various periods of record. Note: This is Table 3 in the UAA.

Year	Average July Air Temperature (°C)				6T3 (°C)				TMAX (°C)				Projected Attainable Use by Year by Metric				Projected Attainable Use by Year(s)
	PRISM		LANL MET		PRISM		LANL MET		PRISM		LANL MET		PRISM		LANL MET		
	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	Upper Sandia AU-West	Upper Sandia AU-East	TA-6	TA-53	
1991-2020 Normals	19.7	20.9	NA	NA	21.6	22.8	NA	NA	26.0	27.3	NA	NA	MCW or Coolwater	MCW or Coolwater	NA	NA	NA
1981-2010 Normals	19.0	20.2	NA	NA	20.9	22.1	NA	NA	25.3	26.6	NA	NA	MCW or Coolwater	MCW or Coolwater	NA	NA	NA
1991-2020 Normals: 800m Headwater Grid[1]	NA	20.4	NA	NA	NA	22.3	NA	NA	NA	26.8	NA	NA	NA	MCW or Coolwater	NA	NA	NA
2014	20.7	21.6	20	21.5	22.7	23.7	22.0	23.5	27.0	28.0	26.3	27.9	Coolwater	Coolwater	Coolwater	Coolwater	Coolwater
2015	19.7	20.5	19.4	19.6	21.7	22.5	21.4	21.6	26.0	26.8	25.6	25.9	Coolwater	Coolwater	Coolwater	Coolwater	Coolwater
2016	24	25.2	22.9	24.6	26.1	27.4	25.0	26.8	30.5	31.8	29.4	31.2	Warmwater	Warmwater	Warmwater	Warmwater	Warmwater
2017	21.3	22.3	21.4	23	23.3	24.4	23.4	25.1	27.7	28.7	27.8	29.5	Coolwater	Coolwater	Coolwater	Warmwater	Warmwater
2018	22.2	22.6	21.6	23.3	24.3	24.7	23.7	25.4	28.6	29.0	28.0	29.8	Coolwater	Warmwater	Coolwater	Warmwater	Warmwater
																Projected Attainable Use =	**Warmwater**

[a] Daily maximum air temperatures were not available for July 2015 at TA-53 (except for July 15). Instead, daily maximum temperatures were calculated using 15-minute interval air temperature data from the thermometer 1.2 m above the ground (or from the thermometer 11.5 m above the ground, when data from the lower thermometer were not available).

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days.

30-year Normals-- At the end of each decade, average values for temperature and precipitation are computed over the preceding 30 years. The current set of 30-year normals covers the period 1991-2020. The 1991-2020 dataset, Version M4, was released in December 2022 and is the default 30-Year Normal dataset for the PRISM Data Explorer at https://prism.oregonstate.edu/explorer/. The 30-year Average July Air Temperatures are reported for the 4 km grid which includes several canyons, including Los Alamos canyon, and several plateaus. Upper Sandia AU-west has several grid cells in upper Los Alamos Canyon in more mountainous and deeply incised areas west of State Highway 501.

AU – Assessment Unit

LANL MET – Los Alamos National Laboratory meteorological monitoring network.

MCW—Marginal Coldwater applies only to natural conditions that limit a water body from attaining Coldwater uses.

NA=Not Applicable

PRISM – Parameter-evaluation Relationships of Independent Slopes Model

TA – Technical Area TMAX – maximum water temperature

Table 2. Historical water quality parameters measured in Upper Sandia Canyon, 1973 through 1999.

Reference(s)	Publication Date	Authors	Study Dates	Temperature	pH	Dissolved Oxygen
Aquatic Macroinvertebrates and Water Quality in Sandia Canyon, Nov 93 to Oct 94.	5/1/94	Kathyrn Bennett	1990 to 1992	SC1 had highest temperatures, with Tmax at 30 in 1992.	pH at SC1 > 9 for several months in 1991.	DO at SC2 in 1992 < 4.
Aquatic Macroinvertebrates and Water Quality of Sandia Canyon, Los Alamos National Laboratory, December 1992 - October 1993.	9/1/94	Saul Cross	Dec 1992 to Oct 1993	Tmax >25 at SC2 in June 1993 (Fig 7).	pH > 9 in SC1, October 1993 (Fig 8).	DO < 5 for all 5 locations (SC1, SC2, SC3, SC4, and SC5) in June 1993.
Aquatic Macroinvertebrates and Water Quality in Sandia Canyon	5/1/94	Kathyrn Bennett	1990, 1991, 1992	SC1 had highest temperatures, with Tmax at 30 in 1992.	pH at SC1 > 9 for several months in 1991.	DO at SC2 in 1992 < 4 (Fig 12).
Aquatic Macroinvertebrates and Water Quality of Sandia Canyon, Los Alamos National Laboratory, Nov 93 to Oct 94.	August 1995	Saul Cross (Ecological Studies Team (EST) of ESH-20)	Nov 1993 to Oct 1994.	Tmax of 24 degrees C in September 1994, SC2 (Fig 4)	pH 9.3, 9.4 at SC1, SC2 in February 1994 (Fig 5)	DO measured at 4.6 mg/L at SC3 in Oct 1994 (Fig 7).
A Water Quality Assessment of Four Intermittent Streams in Los Alamos County New Mexico.	July-02	J.D. Lusk and R.K MacRae	1996, 1997	Tmax > 20 in June, July 1997 (Figure 27). 6T3 of 20 degrees potentially exceeded.	pH > 7; meets criteria (Figure 39)	DO < 6 in June, July 1997; several times below 5 (Figure 31)
Early Annual Site Environmental Reports (ASERs)	1973, 1977 to 1999 reviewed	Various authors	1973, 1977 to 1999 reviewed	Limited temperature data - grab samples. No exceedances above criteria noted.	pH 3.4 measured at SCS-1 on 9-24-81. pH 8.9 measured in SCS-2 in 1977.	No dissolved oxygen data available.

Table 3. Actual and AWTC-predicted Tmax and 6T3 water quality criteria for Upper Sandia Canyon based on 2014 through 2018 thermograph and meteorological data. Note – this is an updated Table 5 in the UAA.

Thermograph	Year	Actual TMAX (°C)	Actual 6T3 (°C)	AWTC TMAX (°C)	AWTC 6T3 (°C)	Designated Use Attained	Dates Exposed/Data Excluded
Below Outfall 001	2014	**23.9**	**21.6**	27.4	22.6	coolwater	7/7 to 7/9, 7/31 to 8/7
	2015	**23.9**	**22.4**	26.2	21.7	coolwater	6/1 to 6/17, 7/3 to 7/7, 7/15 to 7/21, 7/29 to 8/3
	2016	**29.1**	**23.4**	30.8	26.2	warmwater	none
	2017	**22.9**	**21.0**	28.5	24.0	coolwater	none
Below SERF	2014	**24.7**	**21.5**	27.4	22.6	coolwater	7/7 to 7/9
	2015	**25.4**	**22.5**	26.2	21.7	coolwater	none
	2016	**25.2**	**22.8**	30.8	26.2	coolwater	none
	2017	**23.6**	**21.0**	28.5	24.0	coolwater	none
E123	2014	**30.1**	**23.6**	27.4	22.6	warmwater	none
	2015	**26.8**	**22.7**	26.2	21.7	coolwater	none
	2016	**23.3**	**20.1**	30.8	26.2	coolwater	none
	2017	**21.4**	**19.1**	28.5	24.0	coldwater	none
Below E123	2016	**23.5**	**20.7**	30.8	26.2	coolwater	none
	2017	**23.2**	**19.7**	28.5	24.0	coldwater	none
	2018[d]	**22.6**	**18.9**	28.9	24.4	coldwater	7/17 to 7/25
Sandia at Bedrock	2018	**22.1**	**20.1**	28.9	24.4	coolwater	7/10
Sandia at Sigma	2016	**20.4**	**18.4**	30.8	26.2	coldwater	none
	2017	**20.0**	**17.6**	28.5	24.0	coldwater	none
	2018	**21.0**	**18.7**	28.9	24.4	coldwater	7/6 to 7/9

(red outline)	meets warmwater based on Tmax
(green)	meets marginal coldwater based on Tmax and 6T3
(blue)	meets high quality coldwater based on Tmax and 4T3
AWTC	Air Water Temperature Correlation

Table 4. Measured Maximum Weekly Average Water Temperature (MWAT), and predicted 6T3 and Tmax criteria based on MWAT.

Location	Year	Measured MWAT (°C)	Predicted 6T3 (°C)[a]	Predicted TMAX (°C)[a]	Predicted Attainable Use
Below Outfall 001	2014	21.39	23.44	27.76	coolwater
	2015	nd[b]	nd[b]	nd[b]	nd[b]
	2016	22.35	24.43	28.78	coolwater
	2017	20.95	22.98	27.29	coolwater
Below SERF	2014	20.67	22.69	26.99	coolwater
	2015	21.15	23.19	27.50	coolwater
	2016	21.22	23.26	27.58	coolwater
	2017	20.18	22.19	26.47	coolwater
E123	2014	20.36	22.37	26.67	coolwater
	2015	19.35	21.32	25.59	coolwater
	2016	18.61	20.56	24.80	coolwater
	2017	17.87	19.79	24.00	coolwater
Below E123	2016	19.29	21.26	25.52	coolwater
	2017	18.88	20.84	25.09	coolwater
	2018	17.92	19.84	24.06	coolwater
Sandia at Crossing	2018	19.19	21.16	25.41	coolwater
Sandia at Sigma	2016	17.90	19.82	24.04	coolwater
	2017	16.64	18.52	22.70	coldwater
	2018	18.05	19.97	24.19	coolwater

[a] The 6T3 and TMAX values were predicted using the NMED's AWTC correlation.

[b] MWAT values were not determined for Below Outfall 001 in 2015 because of frequent periods of exposure of the thermograph to air resulting in large data gaps and excessive uncertainty in the MWAT calculation.

6T3 – water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days

MWAT – maximum weekly average (water) temperature

nd – not determined

TMAX – maximum water temperature

Attachment 2

Sandia Canyon Use Attainability Analysis: Responses to Public Comments

EPC-DO: 23-145

LA-UR: 23-27166

Date: November 6, 2023

Attachment 2

DOE-TRIAD Responses to Public Comments on Draft Upper Sandia Canyon Assessment Unit Use Attainability Analysis October 2023

"Comments on the Public Comment Draft Upper Sandia Use Attainability Analysis" sent to:sandiacanyonuaa@lanl.gov.

Date: 3/7/22

To Whom it May Concern:

Communities for Clean Water, Amigos Bravos, Tewa Women United, New Mexico Acequia Association, Concerned Citizens for Nuclear Safety, Breath of My Heart Birthplace, and Partnership for Earth Spirituality submit the following comments on the September 21, 2021 Public Comment Draft of the Upper Sandia Use Attainability Analysis ("Draft UAA") prepared by Los Alamos National Laboratory ("LANL").

SUMMARY OF DRAFT UAA:

The Draft UAA examines the appropriate aquatic life use for the NM assessment unit NM-9000.A_47 ("Upper Sandia AU") which includes a perennial stretch of Upper Sandia Canyon from Sigma Canyon upstream to the LANL National Pollutant Discharge Elimination System ("NPDES") Permit No. NM0028355 outfall #001. The majority of flow in this section is derived from the average 154,000 gallon a day discharge from NPDES outfall #001, though lesser flows are also contributed from outfalls #027 and #119, which are also regulated under NPDES Permit No. NM0028355.

The Draft UAA includes data from six temperature monitoring stations numbered 1-6. These temperature stations are located in numerical order upstream to downstream with the Station 1 located just below NPDES outfall #001, Station 2 located below the SERF, Station 3 located at E123, Station 4 located below E123, Station 5 located at Crossing below E123.6 and Station 6 located at Sandia at Sigma Canyon. The Draft UAA examines whether the temperature criteria associated with the currently applicable coldwater aquatic life use of 24°C single sample and 20°C 6T3 (water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days) or the temperature criterion of 29°C single sample and no 6T3 associated with the coolwater aquatic life use is appropriate for the Upper Sandia AU.

The Draft UAA recommends that the current designated use of coldwater aquatic life be replaced with the coolwater aquatic life use.

Attachment 2

COMMENTS AND RESPONSES

COMMENTS:

1. The model employed by LANL does not reflect the on the ground conditions and therefore should not be utilized as a basis for downgrading the standard. Specifically, the model employed by LANL predicts that the coolwater aquatic life use is appropriate for the upper portion (above E123.6) and that a warmwater aquatic life use is appropriate for the lower portion of the Upper Sandia AU between E123.6 and 123.8 (See Table 4) yet the actual water temperature data that was collected at the six thermograph stations show cooler temperatures in the lower portions of the Upper Sandia AU (See Figure 3).

   Temperature exceedances at Sigma Canyon (Station 6) which falls between E.123.6 and E123.8 are rare while temperature exceedances in the upper portions of the Upper Sandia AU are more common.

LANL Response:

The intention of the Air Water Temperature Correlation (AWTC) model is to show the relationship between water and air temperature in Sandia Canyon during the summer months. This modeling was done to meet the requirements of the NMED-approved Work Plan for the UAA. LANL used NMED's AWTC guidance document and model to calculate Tmax and 6T3 to develop an additional line of evidence regarding the appropriateness of the coldwater aquatic life designed use attainability for Upper Sandia Canyon AU. For this reason, this model analysis has been retained in the final Sandia Canyon UAA.

Because Upper Sandia AU is an effluent-dominated reach driven by anthropogenic input from three NPDES outfalls, the analysis using the NMED's AWTC model provides valuable information regarding the relative influence of the discharge from the outfalls. The results from the AWTC analysis allow us to better understand the natural temperatures which would be attained in upper Sandia Canyon, assuming no discharge from the outfalls and assuming perennial flow. However, without discharge from the outfalls, flow in the reach would be ephemeral, occurring only after significant snowmelt events and significant summer monsoons.

Furthermore, the maximum weekly average air temperature parameter, MWAT, is tied to actual tolerances of temperature sensitive biota (including fish). This parameter is also used by several states, and is familiar to the USEPA, who must provide final approval of the UAA.

Thermograph data, which represents "on the ground conditions," will be more strongly emphasized in the updated UAA. The assessment unit is not homogenous, and water temperatures are cooler downstream. These changes may be due to the natural physiognomy of the reach and/or the grade control structure that has generated enhanced wetland plant establishment (shading). The thermograph data collected for the UAA support a coolwater segment for upper Sandia Canyon. However, the attainable use when the canyon becomes more incised and shaded is the current coldwater aquatic life use (ALU). To accurately reflect the thermograph data for the upper portion of the AU, DOE-Triad propose a new coolwater segment for Sandia at Bedrock Road (formerly at "Crossing") to Outfall 001. Additional protection for this segment will be provided by including a 6T3 standard of 25 °C. OE-Triad recognizes that cooler temperatures are observed in the lower portions of the AU, and to ensure that the most protective water quality standards are applied, DOE-Triad proposes retention of the coldwater ALU for the segment from Sandia at Sigma to Sandia at Bedrock Road.

2. It appears the model did not examine what would be the expected temperatures at the six stations if the effluent temperature at outfall #001 were to be reduced to at least meet the 6T3 standard. This is contrary to Clean Water Act ("CWA") requirements which deem uses to be attainable "if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306" 40 CFR § 131.10(d).

LANL Response:

Although coldwater uses could be obtained at the outfall by cooling effluent water, this would be extremely energy intensive, resulting in a significant energy tradeoff, with negative environmental impacts from the energy used to cool the effluent. The increased use of carbon-based energy will release additional greenhouse gases and contribute negatively toward climate change. The thermograph data indicate that although temperatures upstream are slightly warmer, the natural factors of the canyon, like shading and incision, as well as best management practices (BMPs) like the wetlands grade control structure, result in natural cooling of the water, and should ensure that a coldwater ALU will continue to be met in the lower portion of the reach from Sandia at Sigma to Outfall 001.

40 CFR Part 131.10(g) states that "States may designate a use or remove a use that is *not* an existing use, if the State conducts a use attainability analysis as specified in paragraph (j) of this section that demonstrates attaining the use is not feasible because of one of the six factors in this paragraph." DOE-Triad has demonstrated in this UAA that Sandia Canyon falls into (g)(2) of this section, and that "natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use..." The amount of discharge that is present in Sandia Canyon is related to operational decisions and is not a constant source of flow. As an anthropogenic source to a naturally ephemeral system, sometimes flow is less, which can also contribute to higher temperatures in the upper portion of the AU.

3. In addition, CWA regulations also deem uses to be attainable if the implementation of "reasonable best management practices for nonpoint source control" can result in the attainment of the use. 40 CFR § 131.10(d). Yet, it does not appear that LANL has looked at whether the implementation of best management practices such as increasing shade and decreasing urban runoff would result in attainment of the coldwater aquatic life use. Notably, the Draft UAA identifies that runoff from "above E123" accounts for 25% of the flow in the canyon (Table 1). This area of Sandia Canyon is located near urban development which can contribute to increased stream temperatures.[1]

1 https://www.epa.gov/caddis-vol2/caddis-volume-2-sources-stressors-responses-urbanization-temperature

LANL Response:

The Laboratory has already incorporated BMPs with construction of the grade control structure at the downgradient portion of the Sandia wetland to protect the integrity of the wetland, and the surface water and groundwater resources downgradient of the wetland. There is some evidence that the grade control structure has positively influenced water temperatures downstream in the reach. Additionally, historical temperature data show that coldwater aquatic life use is being attained in the lower portion of the AU. To ensure that the most protective water quality standards are applied to this portion of the reach, the coldwater ALU is proposed for this portion of the canyon from Sandia at Sigma to Sandia at Bedrock Road.

4. The data presented in the Draft UAA show that the only year (2016) that the coldwater temperature TMAX criterion of 24C was exceeded at Station 1 (which is directly below outfall #001) is the year that the outfall effluent at outfall #001 itself exceeded the TMAX temperature criteria (Tables 5 and 7). All other years presented demonstrated that when the outfall temperature was at or below the criteria the TMAX criteria in the stream were not exceeded at Station 1.

LANL Response:

It is true that 2016 was the only year that a coldwater TMax of 24C was exceeded at station 1, below the outfall. However, it is important to look at 6T3 when evaluating protections for a coldwater ALU. Table 5 in the revised UAA for Upper Sandia Canyon AU has been updated in accordance with NMED equations and guidance using existing thermograph data from Sandia Canyon. As Table 5 indicates, during the period from 2014- 2017, the 6T3 of 20^{o}C was exceeded each year based on the thermograph data.

5. While the 6T3 criterion was exceeded in the stream at Station 1 for all years shown, that is to be expected since the outfall accounts for 75% of the flow (Table 1) and the outfall temperatures exceeded the 6T3 criteria for every year presented (Table 7). We question whether modeling was done to demonstrate whether lower temperatures in the upper part of the canyon (which could potentially be achieved by decreasing effluent temperatures and implementing non-point source best management practices to decrease urban runoff and increase shading) would result in attainment of the coldwater aquatic life use in the downstream segments. The data indicate a decrease in recorded water temperature the further downstream (and further away from anthropogenic sources) that the water travels. If the water flowing into the lower portions of the canyon were slightly decreased, it is possible that the coldwater aquatic life use in the lower part of the canyon could be attained.

LANL Response:

See response to question 2. LANL has implemented BMPs in the past, including installation of the grade control structure at the foot of the wetlands in Sandia Canyon. This structure, along with the natural canyon topography, has allowed for the lower portion of Sandia Canyon to maintain a coldwater ALU. This additional protection for this portion of the canyon will be proposed in the updated UAA.

This comment suggests that if the water flowing into the lower portions of the canyon were slightly decreased, the coldwater ALU could be attained. However, the coldwater ALU is already being attained in this portion of the canyon, and there is no need to further reduce flow into this portion of the canyon.

CONCLUSION (from Public Comments):

The Draft UAA does not conclusively show that recorded exceedances of the coldwater aquatic life criteria are due to natural conditions of the waterbody as claimed. In fact, the data presented in the Draft UAA demonstrates that LANL, as permittees, are consistently discharging at levels that exceed the applicable coldwater aquatic life criteria in violation of its permit. Steps to both decrease the temperature in the effluent at NPDES outfalls along with implementation of non-point source best management practices should be taken prior to any attempt to downgrade the designated uses for Sandia Canyon.

LANL Response:

The thermograph data collected for the Upper Sandia UAA indicate that the upper portion of Sandia Canyon, from Bedrock Road (formerly Crossing) to Outfall 001 meets coolwater ALU criteria, under current conditions. These conditions are predominantly driven by the natural air temperature of the canyon, which has a significant influence on water temperature. The AWTC modeling results indicate that under natural conditions, flow in upper Sandia Canyon will not meet coldwater ALU criteria (assuming no discharge from the outfalls). Thus, taking steps to decrease the temperature in the effluent would be ineffective at meeting the coldwater ALU, which would not naturally occur in this reach. Even with the coolwater ALU currently attained in the upper portion of the canyon, the lower portion of the canyon is protected by the natural characteristics of the canyon and has historically met the coldwater ALU. These protections would remain in the revised standards proposed in the updated UAA.

Additionally, there is a significant environmental cost and tradeoff to manipulate discharge temperatures from Outfall 001; this would negatively impact the Laboratory’s carbon footprint and would result in the generation of significant greenhouse gas, with little or no benefit to the lower portion of Sandia Canyon. For this reason, there is little or no benefit to further manipulations in the temperature of the discharge, and additional temperature manipulation is not recommended for Upper Sandia Canyon.

EXHIBIT I

UNITED STATES DEPARTMENT OF ENERGY
National Nuclear Security Administration – Los Alamos Field Office
Office of Environmental Management – Los Alamos Field Office
Los Alamos, New Mexico

AGENDA

Los Alamos - Pueblos Project
Accords Technical Exchange Meeting

2945 Rodeo Park Dr. East, Suite 7, Santa Fe NM
February 21, 2024

9:00 – 9:10	Welcome—Miquela Vargas, EM-LA Opening Prayer—TBD Overview of Agenda—Donald Ami, NA-LA
9:10 – 9:20	Self-Introductions & Opening Remarks • Accord Pueblos • EM-LA and N3B • NA-LA and LANL
9:20 – 9:45	Office of Environmental Management – Los Alamos Field Office • Field Office Manager transition update and tribal continuity strategy: Sarah and Miquela (5 minutes) • Website Update, mapping tool live tour: Sarah Chandler (10 minutes) • Update on Strategic Vision: Sarah Chandler (5 minutes) • EM-LA Internship discussion: Miquela Vargas (5 minutes)
9:45 – 10:00	Self-Introduction and Remarks Brian Kenny, Biological & Cultural Resources Program Manager – NNSA Los Alamos Field Office
10:00 – 10:15	Electric Power Capacity Upgrade (EPCU) Project Kristen Dors, NEPA Compliance Officer, NNSA Los Alamos Field Office
10:15 – 10:35	Sandia Canyon UAA Tim Goering, EPC-Water Quality, Los Alamos National Laboratory Matt Segura, EPC-Water Quality, Los Alamos National Laboratory
10:35 – 11:00	Roundtable of Topics/Events for STGWG, Executive Level Meetings, and Feedback from Sacred Sites Workshop in Denver
11:00 – 11:30	Date and Topics for Next Meeting
11:30	Adjourn

EXHIBIT J

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
P.O. Box 1663, K490
Los Alamos, NM 87545
505-667-0666

Environmental Protection & Compliance Division
Compliance Programs Group

Symbol: EPC-DO: 24-017
LA-UR: 24-20216
Locates: N/A
Date: March 15, 2024

Rachel Conn, Deputy Director
Amigos Bravos
114 Des Georges Pl.
Taos, NM 87571

Subject: Response to comments on the draft Upper Sandia Canyon Use Attainability Analysis

Dear Ms. Conn:

Attached are Triad National Security LLC's responses to the comments received from Amigos Bravos on March 7, 2022, regarding the Upper Sandia Canyon Assessment Unit Use Attainability Analysis (UAA), submitted to the New Mexico Environment Department (NMED) by the Department of Energy and Triad (DOE/Triad) on October 25, 2021. The UAA for Sandia Canyon has been updated as "Revision 1" to address input received from the public, NMED and Environmental Protection Agency (EPA). The updated version of the Sandia Canyon UAA will be posted for public comment once NMED has completed their final review of the document.

To address NMED and public concerns, the updated UAA proposes more protective water quality standards than those proposed in the original 2021 Sandia Canyon UAA. Specifically, DOE-Triad propose to create a new coolwater segment for Sandia at Bedrock Road (formerly known as "Sandia at Crossing") to Outfall 001. Additional protection for this segment will be provided by including a 6T3 criterion of 25°C. The lower segment from Sandia at Sigma to Sandia at Bedrock Road will retain the coldwater ALU.

The revised Sandia Canyon UAA will be finalized pursuant to requirements contained in 20.6.4.15 NMAC. Given the changes in Revision 1 of the UAA are significant, DOE/Triad are reopening the stakeholder outreach and public engagement process. This will include posting a public comment draft of the revised UAA in the Electronic Public Reading Room, and in the Public Reading Room in Pojoaque. for public review and holding a public comment period later this spring. Comments will be accepted at sandiacanyonuaa@lanl.gov.

Thank you for your feedback and participation in this process.

Sincerely,

SARAH HOLCOMB (Affiliate) Digitally signed by SARAH HOLCOMB (Affiliate) Date: 2024.03.01 10:53:03 -07'00'

Sarah S. Holcomb, Acting Group Leader
Environmental Compliance Programs
Triad National Security, LLC
Los Alamos National Laboratory

Sincerely,

ROBERT GALLEGOS Digitally signed by ROBERT GALLEGOS Date: 2024.03.14 11:32:02 -06'00'

Robert A. Gallegos
Permitting and Compliance Program Manager
National Nuclear Security Administration
U.S. Department of Energy

Attachment(s): Responses to Public Comments on the draft Use Attainability Analysis for Upper Sandia Canyon

Copy:

Karen E. Armijo, NA-LA, karen.armijo@nnsa.doe.gov
Robert A. Gallegos, NA-LA, robert.gallegos@nnsa.doe.gov
Stephen N. Jochem, NA-LA, stephen.jochem@nnsa.doe.gov
Steven L. Story, Triad, EPC-DO, story@lanl.gov
Deepika Saikrishnan, Triad, EPC-DO, deepika@lanl.gov
Sarah S. Holcomb, Triad, EPC-CP, sholcomb@lanl.gov
Timothy J. Goering, Triad, EPC-CP, goering@lanl.gov
Matthew V. Segura, Triad, EPC-CP, msegura@lanl.gov
Maureen C. Dolan, Triad, GC-ESH, dolan@lanl.gov
epccorrespondence@lanl.gov
eshq-dcrm@lanl.gov
gc-esh@lanl.gov
lasomailbox@nnsa.doe.gov

ATTACHMENT 1

Responses to Public Comments
on the draft Use Attainability
Analysis for Upper Sandia Canyon

EPC-DO: 24-017
LA-UR: 24-20216

Date: March 15, 2024

DOE-TRIAD Responses to Public Comments on Draft Upper Sandia Canyon Assessment Unit Use Attainability Analysis
March 2024

"Comments on the Public Comment Draft Upper Sandia Use Attainability Analysis" sent to:sandiacanyonuaa@lanl.gov.

Date: 3/7/22

To Whom it May Concern:

Communities for Clean Water, Amigos Bravos, Tewa Women United, New Mexico Acequia Association, Concerned Citizens for Nuclear Safety, Breath of My Heart Birthplace, and Partnership for Earth Spirituality submit the following comments on the September 21, 2021, Public Comment Draft of the Upper Sandia Use Attainability Analysis ("Draft UAA") prepared by Los Alamos National Laboratory ("LANL").

SUMMARY OF DRAFT UAA:

The Draft UAA examines the appropriate aquatic life use for the NM assessment unit NM-9000.A_47 ("Upper Sandia AU") which includes a perennial stretch of Upper Sandia Canyon from Sigma Canyon upstream to the LANL National Pollutant Discharge Elimination System ("NPDES") Permit No. NM0028355 outfall #001. The majority of flow in this section is derived from the average 154,000 gallon a day discharge from NPDES outfall #001, though lesser flows are also contributed from outfalls #027 and #119, which are also regulated under NPDES Permit No. NM0028355.

The Draft UAA includes data from six temperature monitoring stations numbered 1-6. These temperature stations are in numerical order upstream to downstream with the Station 1 located just below NPDES outfall #001, Station 2 located below the SERF, Station 3 located at E123, Station 4 located below E123, Station 5 located at Crossing below E123.6 and Station 6 located at Sandia at Sigma Canyon. The Draft UAA examines whether the temperature criteria associated with the currently applicable coldwater aquatic life use of 24°C single sample and 20°C 6T3 (water temperature not to be exceeded for 6 or more consecutive hours in a 24-hour period on more than 3 consecutive days) or the temperature criterion of 29°C single sample and no 6T3 associated with the coolwater aquatic life use is appropriate for the Upper Sandia AU.

The Draft UAA recommends that the current designated use of coldwater aquatic life be replaced with the coolwater aquatic life use.

Following DOE/Triad's UAA submittal in 2021 and after receiving and considering comments, Triad/DOE have amended the proposal and updated the UAA as Revision 1. The responses to comments included here reflect DOE/Triad consideration of the Amigos Bravos comments from 2022 and refer to the updated UAA.

UAA.**COMMENTS AND RESPONSES**

COMMENTS:

1. The model employed by LANL does not reflect the on the ground conditions and therefore should not be utilized as a basis for downgrading the standard. Specifically, the model employed by LANL predicts that the coolwater aquatic life use is appropriate for the upper portion (above E123.6) and that a warmwater aquatic life use is appropriate for the lower portion of the Upper Sandia AU between E123.6 and 123.8 (See Table 4) yet the actual water temperature data that was collected at the six thermograph stations show cooler temperatures in the lower portions of the Upper Sandia AU (See Figure 3).

   Temperature exceedances at Sigma Canyon (Station 6) which falls between E.123.6 and E123.8 are rare while temperature exceedances in the upper portions of the Upper Sandia AU are more common.

LANL Response:

The purpose of the Air Water Temperature Correlation (AWTC) model is to show the relationship between water and air temperature in Sandia Canyon during the summer months. This modeling was done to meet the requirements of the NMED-approved Work Plan for the UAA. LANL used NMED's AWTC guidance document and model to calculate Tmax and 6T3 to develop an additional line of evidence regarding the appropriateness of the coldwater aquatic life designed use attainability for Upper Sandia Canyon AU. For this reason, this model analysis has been retained in the final Sandia Canyon UAA.

Because Upper Sandia AU is an effluent-dominated reach driven by anthropogenic input from three NPDES outfalls, the analysis using the NMED's AWTC model provides valuable information regarding the relative influence of the discharge from the outfalls. The results from the AWTC analysis allow us to better understand the natural temperatures which would be attained in upper Sandia Canyon, assuming no discharge from the outfalls and assuming perennial flow. However, without discharge from the outfalls, flow in the reach would be ephemeral, occurring only after significant snowmelt events and significant summer monsoons.

Furthermore, the maximum weekly average air temperature parameter, MWAT, is tied to actual tolerances of temperature sensitive biota (including fish). MWAT is used by several states and is recognized by USEPA as an implementation metric for temperature. EPA will provide final approval of the UAA.

Thermograph data, which represents "on the ground conditions," will be more strongly emphasized in the updated UAA. The assessment unit is not homogenous, and water temperatures are cooler downstream. These changes may be due to the natural geology of the reach and/or the grade control structure (Figure 1) that has generated enhanced wetland plant establishment (shading). The thermograph data collected for the UAA support a coolwater segment for upper Sandia Canyon (Table 1). However, the attainable use when the canyon becomes more incised and shaded is the current coldwater aquatic life use (ALU). To accurately reflect the thermograph data for the upper portion of the AU, DOE-Triad propose a new coolwater segment for Sandia Canyon at Bedrock Road (formerly at "Crossing") to Outfall 001. Additional protection for this segment will be provided by including a segment-specific 6T3 criterion of 25 °C (see Figure 2). DOE-Triad recognizes that cooler temperatures are observed in the lower portions of the AU, and to ensure that the most protective water quality standards are applied, DOE-Triad proposes retention of the coldwater ALU for the segment from Sandia at Sigma to Sandia at Bedrock Road.

2. It appears the model did not examine what would be the expected temperatures at the six stations if the effluent temperature at outfall #001 were to be reduced to at least meet the 6T3 standard. This is contrary to Clean Water Act ("CWA") requirements which deem uses to be attainable "if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306" 40 CFR § 131.10(d).

LANL Response:

Although coldwater uses could be attained at the outfall by cooling effluent water, this would be extremely energy intensive, resulting in a significant energy tradeoff, with negative environmental impacts from the energy used to cool the effluent. The increased use of carbon-based energy will release additional greenhouse gases and contribute negatively toward climate change. The thermograph data indicate that although temperatures upstream are slightly warmer, the natural factors of the canyon, like shading and incision, as well as best management practices (BMPs) like the wetlands grade control structure, result in natural cooling of the water, and should ensure that a coldwater ALU will continue to be met in the lower portion of the reach from Sandia Canyon at Sigma Canyon to Outfall 001.

40 CFR Part 131.10(g) states that "States may designate a use or remove a use that is *not* an existing use, if the State conducts a use attainability analysis as specified in paragraph (j) of this section that demonstrates attaining the use is not feasible because of one of the six factors in this paragraph." DOE-Triad has demonstrated in this UAA that Sandia Canyon falls into (g)(1) of this section, and that "Naturally occurring pollutant concentrations prevent the attainment of the use" –The "naturally occurring pollutant" being temperature. Naturally occurring air temperatures contribute to higher temperatures in the upper portion of the AU.

3. In addition, CWA regulations also deem uses to be attainable if the implementation of "reasonable best management practices for nonpoint source control" can result in the attainment of the use. 40 CFR § 131.10(d). Yet, it does not appear that LANL has looked at whether the implementation of best management practices such as increasing shade and decreasing urban runoff would result in attainment of the coldwater aquatic life use. Notably, the Draft UAA identifies that runoff from "above E123" accounts for 25% of the flow in the canyon (Table 1). This area of Sandia Canyon is located near urban development which can contribute to increased stream temperatures.[1]

[1] https://www.epa.gov/caddis-vol2/caddis-volume-2-sources-stressors-responses-urbanization-temperature

LANL Response:

The Laboratory has already incorporated BMPs with construction of the grade control structure at the downgradient portion of the Sandia wetland to promote plant growth and shading, protect the integrity of the wetland and the surface water and groundwater resources downgradient of the wetland (Figure 1). There is some evidence that the grade control structure has positively influenced water temperatures downstream in the reach. Additionally, historical temperature data show that coldwater aquatic life use is being attained in the lower portion of the AU. To ensure that the most protective water quality standards are applied to this portion of the reach, the coldwater ALU is proposed for this portion of the canyon from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road.

The Laboratory has also constructed ~30 stormwater BMPs in the impervious areas surrounding Sandia Canyon. These include detention ponds, berms, flow controls, and media filters. In addition, the Laboratory requires that predevelopment hydrology be maintained during new construction and renovation using BMPs that are also designed to protect water quality.

Details of some of these urban runoff BMPs can be found at NMED's website:
https://www.env.nm.gov/surface-water-quality/wp-content/uploads/sites/25/2017/07/ENV-DO-14-0236_August2014-4b_Demo_Copper-UpperSandiaAU.pdf

4. The data presented in the Draft UAA show that the only year (2016) that the coldwater temperature TMAX criterion of 24°C was exceeded at Station 1 (which is directly below outfall #001) is the year that the outfall effluent at outfall #001 itself exceeded the TMAX temperature criteria (Tables 5 and 7). All other years presented demonstrated that when the outfall temperature was at or below the criteria the TMAX criteria in the stream were not exceeded at Station 1.

LANL Response:

It is true that 2016 was the only year that a coldwater TMax of 24°C was exceeded at station 1, below the outfall. However, it is important to look at all criteria, including the chronic temperature protections of the 6T3 criterion when evaluating protections for a coldwater ALU. Table 5 in the revised UAA for Upper Sandia Canyon AU has been updated in accordance with NMED equations and guidance using existing thermograph data from Sandia Canyon (Table 1 in this document). As Table 1 indicates, during the period from 2014- 2017, the 6T3 criterion of 20°C was exceeded each year based on the thermograph data. As an additional note, the chronic 6T3 statistic did not exist when the original UAA (Lusk et al., 2002) determined the ALU to be coldwater.

In the EPA's recently issued "Response and Technical Support Document" regarding the 2020 Triennial revisions, EPA clarified the definition of marginal coldwater, and stated, "While the EPA recognizes natural variability, it is important to note that **establishing a seasonal or year-round marginal coldwater aquatic life use must be based on natural and not anthropogenic conditions**." Given that the perennial flow in upper Sandia Canyon AU is anthropogenic and not a natural system, the marginal coldwater ALU would seem to not apply to the Upper Sandia Canyon AU.

5. While the 6T3 criterion was exceeded in the stream at Station 1 for all years shown, that is to be expected since the outfall accounts for 75% of the flow (Table 1) and the outfall temperatures exceeded the 6T3 criteria for every year presented (Table 7 in the UAA). We question whether modeling was done to demonstrate whether lower temperatures in the upper part of the canyon (which could potentially be achieved by decreasing effluent temperatures and implementing non-point source best management practices to decrease urban runoff and increase shading) would result in attainment of the coldwater aquatic life use in the downstream segments. The data indicate a decrease in recorded water temperature the further downstream (and further away from anthropogenic sources) that the water travels. If the water flowing into the lower portions of the canyon were slightly decreased, it is possible that the coldwater aquatic life use in the lower part of the canyon could be attained.

LANL Response:

See response to question 2. LANL has implemented BMPs in the past, including installation of the grade control structure at the foot of the wetlands in Sandia Canyon. This structure, along with the natural canyon topography, has allowed for the lower portion of Sandia Canyon to support a coldwater ALU. This protection for this portion of the canyon will be retained in the updated UAA.

This comment suggests that if the water flowing into the lower portions of the canyon were slightly decreased, the coldwater ALU could be attained. However, the coldwater ALU is already being attained in this portion of the canyon, and there is no need to further reduce flow into this portion of the canyon.

CONCLUSION (from Public Comments):

The Draft UAA does not conclusively show that recorded exceedances of the coldwater aquatic life criteria are due to natural conditions of the waterbody as claimed. In fact, the data presented in the Draft UAA demonstrates that LANL, as permittees, are consistently discharging at levels that exceed the applicable coldwater aquatic life criteria in violation of its permit. Steps to both decrease the temperature in the effluent at NPDES outfalls along with implementation of non-point source best management practices should be taken prior to any attempt to downgrade the designated uses for Sandia Canyon.

LANL Response:

Controls within the LANL area primarily consist of several small detention ponds, riprap structures at various discharge locations, and a grade control structure within Sandia Canyon (Figure 1). The detention ponds capture runoff from adjacent buildings and surrounding impervious areas, and discharge flow through controlled outlet structures. These ponds are designed to manage runoff velocity to pre-development levels and facilitate the settling and capture of sediment transported in storm water runoff.

Riprap is placed at various discharge locations to reduce runoff and minimize the potential for erosion within and adjacent to Sandia Canyon. For example, both surface runoff and flow collected in the storm drain infrastructure system from a significant portion of the LANL area discharge directly at the head of Sandia Canyon. A riprap structure and a small riprap basin have been installed at this discharge location to manage these flows. The riprap reduces runoff velocity in the flows prior to discharge into Sandia Canyon.

The thermograph data collected for the Upper Sandia UAA indicate that the upper portion of Sandia Canyon, from Bedrock Road (formerly Crossing) to Outfall 001 meets coolwater ALU criteria, under current conditions. These conditions are predominantly driven by the natural air temperature of the canyon, which has a significant influence on water temperature. The AWTC modeling results indicate that under natural conditions, flow in upper Sandia Canyon will not meet coldwater ALU criteria (assuming no discharge from the outfalls). Thus, taking steps to decrease the temperature in the effluent would be ineffective at meeting the coldwater ALU, which would not naturally occur in this reach. Even with the coolwater ALU currently attained in the upper portion of the canyon, the lower portion of the canyon is protected by the natural characteristics of the canyon and has historically met the coldwater ALU. These protections would remain in the revised standards proposed in the updated UAA.

Additionally, there is a significant environmental cost and tradeoff to manipulate discharge temperatures from Outfall 001; this would negatively impact the Laboratory's carbon footprint and would result in the generation of significant greenhouse gas, with little or no benefit to the lower portion of Sandia Canyon. For this reason, there is little or no benefit to further manipulations in the temperature of the discharge, and additional temperature manipulation is not recommended for Upper Sandia Canyon.

Based on these comments and UAA results, DOE-Triad propose a new coolwater segment for Sandia Canyon at Bedrock Road (formerly at "Crossing") to Outfall 001. Additional protection for this segment will be provided by including a segment-specific 6T3 criterion of 25 °C (see Figure 2). Given that the perennial flow in upper Sandia Canyon AU is anthropogenic and not a natural system, the marginal coldwater ALU would not apply to the Upper Sandia Canyon AU.

DOE-Triad recognizes that cooler temperatures are observed in the lower portions of the AU, and to ensure that the most protective water quality standards are applied, DOE-Triad propose retention of the coldwater ALU for the segment from Sandia at Sigma to Sandia at Bedrock Road.

Thermograph	Year	Actual TMAX (°C)	Actual 6T3 (°C)	AWTC TMAX (°C)	AWTC 6T3 (°C)	Designated Use Attained	Dates Exposed/Data Excluded
Sandia Canyon below Outfall 001	2014	**23.9**	**21.6**	27.4	22.6	coolwater	7/7 to 7/9, 7/31 to 8/7
	2015	**23.9**	**22.4**	26.2	21.7	coolwater	6/1 to 6/17, 7/3 to 7/7, 7/15 to 7/21, 7/29 to 8/3
	2016	**29.1**	**23.4**	30.8	26.2	warmwater	none
	2017	**22.9**	**21.0**	28.5	24.0	coolwater	none
Sandia Canyon below SERF	2014	**24.7**	**21.5**	27.4	22.6	coolwater	7/7 to 7/9
	2015	**25.4**	**22.5**	26.2	21.7	coolwater	none
	2016	**25.2**	**22.8**	30.8	26.2	coolwater	none
	2017	**23.6**	**21.0**	28.5	24.0	coolwater	none
Sandia Canyon at E123	2014	**30.1**	**23.6**	27.4	22.6	warmwater	none
	2015	**26.8**	**22.7**	26.2	21.7	coolwater	none
	2016	**23.3**	**20.1**	30.8	26.2	coolwater	none
	2017	**21.4**	**19.1**	28.5	24.0	coldwater	none
Sandia Canyon below E123	2016	**23.5**	**20.7**	30.8	26.2	coolwater	none
	2017	**23.2**	**19.7**	28.5	24.0	coldwater	none
	2018	**22.6**	**18.9**	28.9	24.4	coldwater	7/17 to 7/25
SandiaCanyon at Bedrock Road	2018	**22.1**	**20.1**	28.9	24.4	coolwater	7/10
Sandia Canyon at Sigma Canyon	2016	**20.4**	**18.4**	30.8	26.2	coldwater	none
	2017	**20.0**	**17.6**	28.5	24.0	coldwater	none
	2018	**21.0**	**18.7**	28.9	24.4	coldwater	7/6 to 7/9

(red outline)	meets warmwater based on Tmax
(green)	meets marginal coldwater based on Tmax and 6T3
(blue)	meets high quality coldwater based on Tmax and 4T3
AWTC	Air Water Temperature Correlation

Table 1: Actual and AWTC-predicted Tmax and 6T3 water quality criteria for Upper Sandia Canyon based on 2014 through 2018 thermograph and meteorological data. Note – this is an updated Table 5 in the UAA.

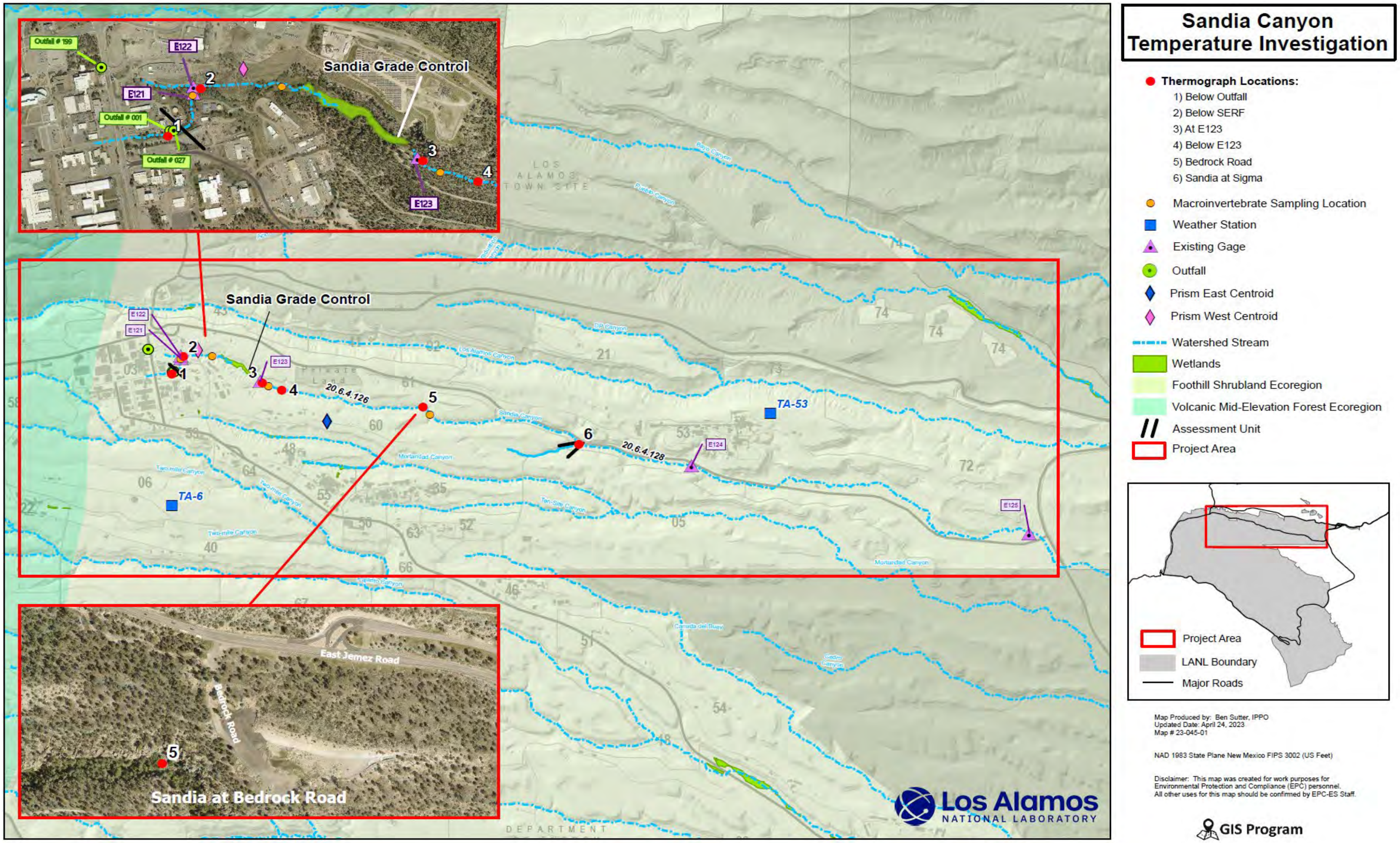


Figure 1: Upper Sandia Canyon assessment unit.

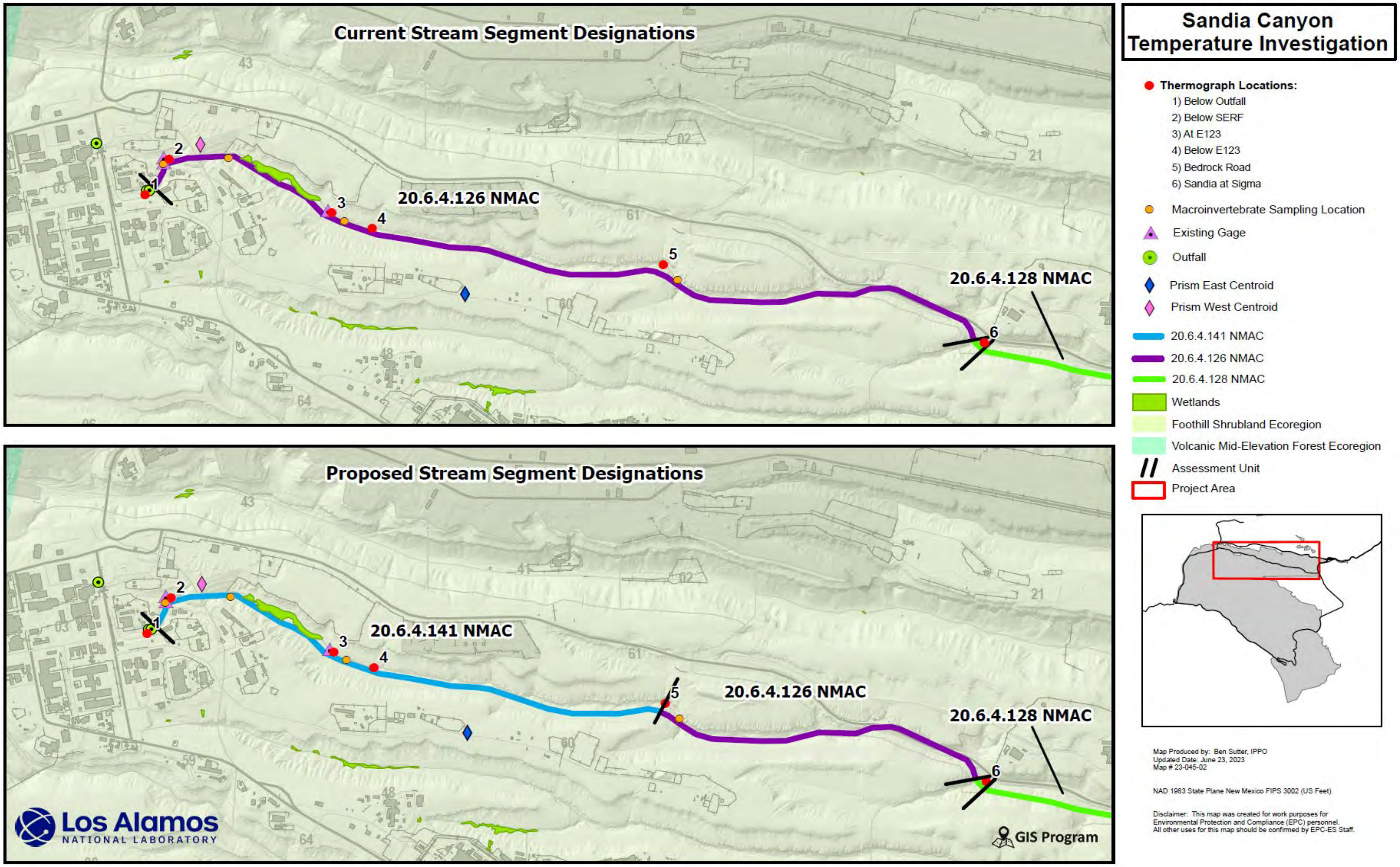


Figure 2: Proposed stream segment designations.

EXHIBIT K

EAST JEMEZ RESOURCES COUNCIL

Meeting Agenda

Los Alamos Nature Center, 2600 Canyon Rd, Los Alamos, NM
May 7th, 12:30 pm – 3:30 pm MST
Join Zoom Meeting
https://us02web.zoom.us/j/83532245750?pwd=bXVzR2Fkd2dLWmdlc1dwVzNJV2E3dz09

12:30-12:40 **Welcome and Introductions – Karla Sartor (Los Alamos National Laboratory)**

12:40-1:00 **Wildland fire season outlook for this summer – Rich Nieto (Los Alamos National Laboratory)** Rich will give us an overview on the fire outlook for this year.

1:00-1:20 **Beaver reintroduction and success stories at Bandelier National Monument – Sarah Milligan (Bandelier National Monument)** One of the primary methods discussed for restoration following the Las Conchas fire and subsequent flooding in Bandelier National Monument was beaver reintroduction. In 2019, six beavers were reintroduced to Frijoles Canyon for the first time in almost 80 years. Currently one family of four beavers has built over ten different dams in Frijoles Canyon with a second family group in the upper areas of the Canyon. Park staff has also been planting native trees along the stream and reintroducing native fish back into the system.

1:20-1:35 **Break**

1:35-1:55 **Cerro Seco Forest Restoration: a seven-year study to look at the effects of Rx fire and thinning on understory vegetation – Sarah Hall (Valles Caldera National Preserve)** At Valles Caldera National Preserve, a combination of thinning and prescribed fire was utilized to reduce canopy closure and create healthy open stands inter-mixed with meadow patches. During this seven-year study we were able to track successional vegetation changes over time and the plant communities' response to multi-faceted forest management. We found that utilizing thinning followed by prescribed fire creates healthy forest openings that are both beneficial to wildlife and forest structure alike.

1:55-2:15 **Sandia UAA – Tim Goering and Matt Segura (Los Alamos National Laboratory)** The updated and revised Use Attainability Analysis (UAA) for Upper Sandia Canyon will be discussed. The analysis aims to determine the most protective aquatic life use attainable. Coolwater aquatic life use is identified as attainable and proposed as the most protective use for the upper segment; coldwater aquatic life use remains attainable in the lower portion. This UAA, conducted in accordance with regulatory requirements, provides robust data supporting the proposed changes, and emphasizes the need for a balanced approach to address environmental concerns while aligning with LANL's sustainability objectives.

2:15-2:30 **Break**

2:30-2:50 **Los Alamos County Bee City Resolution – Dana Ecelberger (Pajarito Environmental Education Center)** The Bee City Los Alamos Coordinator, Dana Ecelberger, will offer a short presentation on the recently passed Los Alamos Bee City Resolution and affiliation status, how it came about and why it's important, who our host organization is, and exciting plans for our first year.

2:50-3:30 **Round Table Discussion – ALL (In Person Only)** Council discussion of past accomplishments or future resources management activities planned in the East Jemez area.

EXHIBIT L1

Other Charges against Naranjo Were Dropped

Continued from A1

state Supreme Court.

"To me, that's a strange decision she made," he said.

DeVargas, through his attorney Richard Rosenstock, presented evidence during a four-hour probable cause hearing March 19 in front of Albuquerque Judge Marie Ward. Rosenstock and Naranjo's attorney, Cody Rogers, then submitted written closing statements to the judge on April 12. DeVargas is running against incumbent Moises Morales for his District 3 county commission seat in the June 4 election.

Ward found the decision to place the Juan de Oñate statue at the county complex on Industrial Park Road was made "outside of an open, public meeting" and that Naranjo was "acting in concert with others to do so."

'Lacking credibility'

Ward wrote that she was unconvinced by County Manager Jeremy Maestas' testimony, where he tried to contradict, in court, what he wrote to people in email, about who was responsible for having the statue put at the county complex.

Maestas called his emails a "bad choice of words," where he wrote to multiple people that the county commissioners were the ones who decided to put the statue back up. It was a decision that was opposed by Sheriff Billy Merrifield, who feared violence if it went back up. In emails to Merrifield, Maestas also wrote that it was the commission's decision, not his own, to put up the statue.

The decision to cancel the statue installation was the subject of a public meeting, unlike the decision to install it, and Naranjo opposed the cancellation, Ward wrote.

"Commissioner Naranjo argues there is a failure of proof and that the only evidence presented — the testimony of Mr. Maestas — established that Mr. Maestas made the decision," she wrote. "The Court finds the testimony lacking credibility and contrary to Mr. Maestas' contemporary communications."

Naranjo denies violation

Naranjo said he is only one commissioner and it takes two to make a decision.

"I understand micromanagement," he said. "I had no control over that."

He said he is waiting to see what happens after his lawyer files an appeal.

Other charges

Ward dismissed the other charges levied against Naranjo, including dereliction of duty related to the decision to place the statue despite knowing it would cause an uproar, "as a matter of law."

The dereliction of duty charges, along with claims of incompetence and negligence, are not grounds for a recall under the state constitution, she wrote.

Conduct in Naranjo's capacity on the North Central Solid Waste Authority is also not "related" to his job as county commissioner, she wrote, even though he is on the Authority's board in his capacity as a county commissioner.

Among the other counts listed, which Ward dismissed, was a perjury charge brought by the investigative grand jury DeVargas got enough signatures to empanel, which investigated the North Central Solid Waste Authority and charged Naranjo with perjury.

A special prosecutor dismissed that criminal charge on technical grounds. Ward wrote there was not enough evidence presented to her to support a perjury charge.

Circulating a petition

DeVargas said he is circulating the recall petition to try to get the estimated 1,200 signatures needed from registered voters in Naranjo's county commission district, but he is aiming for 1,500 to 1,800 to have a buffer when some signatures are thrown out, for voters outside the district, unregistered voters and other issues.

The recall petition states signatures are valid for 90 days, so DeVargas said he is treating it like a 90-day deadline.

"I started handing it out to different people who wanted to sign and to start circulating it," he said.

Getting enough signatures will be rough as DeVargas is campaigning at the same time.

Naranjo only won his primary election by six votes and the Oñate statue has been incredibly divisive, so he should be able to get a decent number of signatures, DeVargas said.

"It's going to be a tough row to hoe, to say the least," he said. "It is what it is."

While many people say they have been upset by the Oñate statue placement and other issues, often, it's just talk, he said.

If DeVargas has just 90 days to collect signatures, he has until the beginning of August to get them.

"I feel pretty good about it," DeVargas said. "It's a steep hill to climb."

Pets of the Week

Bun Buns is a big Mastiff marshmallow wrinklepiglet of love. She's 8 years old and 108 lbs. of weighted blanket — this big beaut could laze around all day on the couch or a spot of sun, and sniff the afternoon away in your yard. She would like it best of she were to be the queen of your castle without anyone else to steal her thunder. Bun Buns is heartworm positive, but we have started treating her and we will continue treatment at no cost to her adopter. Española Humae is open from 11 a.m. to 4:30 p.m. Monday through Saturday.

Jito is personality plus! This 2-year-old, 13 lb. tabby keeps all of us entertained — he dislikes being closed in his lobby kennel, so he makes himself at home in everyone's offices and greets customers at the front desk. He keeps us all entertained with his antics! Española Humae is open from 11 a.m. to 4:30 p.m. Monday through Saturday. His adoption fee is waived and he goes home neutered, vaccinated, and microchipped.

Do you have news tips?

Do you have a news tip or a photo you'd like to submit to be considered for publication? If so, email Managing Editor Jennifer Garcia at jgarcia@riograndesun.com

Newspaper Management Will be under Richard Connor

Continued from A1

readers and advertisers throughout the years and thank our employees for their dedication and hard work."

Yates emphasized that the primary focus of the newspapers will be local news and local opinion. He also said that over time the success of a local newspaper is dependent on the support of readers and advertisers. El Rito management, he said, is eager to meet with local community residents and leaders to discuss the best way forward for the newspapers.

Management of the additional newspapers will be the responsibility of Richard L. Connor. He will serve as editor and publisher of all five El Rito newspapers. Connor hopes to employ local community members to assist with reporting and local newspaper management.

Frank Leto is chief revenue officer for El Rito's newspapers and will assist Connor by serving as general manager while focusing on sales.

"We're fortunate to have Frank Leto," said Connor. "He once served as publisher of the Las Cruces Sun-News and had group publishing responsibilities for the three additional newspapers we are acquiring."

Personnel will be added to the three newspapers and interviews will begin immediately for additional editors, reporters, and sales and marketing executives.

PUBLIC NOTICE

20.6.4.15 NMAC –*Use Attainability Analysis*

NOTICE

The Department of Energy, National Nuclear Security Administration (DOE/NNSA) and Triad National Security, LLC (Triad) announce the availability of the Public Comment Draft of the ***Upper Sandia Canyon Use Assessment Unit NM-9000.A_047 Use Attainability Analysis***, Revision 1 (Upper Sandia Canyon UAA, Rev.1). Triad manages and operates the Los Alamos National Laboratory (LANL) on behalf of DOE/NNSA. DOE/NNSA and Triad seek public comment on this document. Public comments will be accepted for a period of 30 days, from May 13, 2024 through June 12, 2024. A copy of the Upper Sandia Canyon UAA, Rev. 1, is available via LANL's Electronic Public Reading Room: https://eprr.lanl.gov/. A copy has also been placed in the LANL Public Reading Room located in Pojoaque, New Mexico.

A Use Attainability Analysis (UAA) is a scientific study conducted to determine the most protective attainable aquatic life and/or contact uses for a stream segment. New Mexico's UAA procedure is outlined in 20.6.4.15 New Mexico Administrative Code (NMAC). The Upper Sandia Canyon UAA was conducted in accordance with a work plan approved by the New Mexico Environment Department (NMED) to determine the most appropriate and protective aquatic life uses for the Upper Sandia Canyon Water Quality assessment unit NM9000.A (Upper Sandia Canyon Assessment Unit (AU)). The Upper Sandia Canyon AU is classified under Section 20.6.4.126 NMAC of the New Mexico Water Quality Standards and includes the perennial portion of Sandia Canyon from Sigma Canyon upstream to LANL's National Pollutant Discharge Elimination System (NPDES) Outfall 001.

The Upper Sandia Canyon UAA, Rev. 1, determined that the highest attainable use for the upper portion of the AU from Sandia Canyon at Bedrock Road (formerly Sandia Canyon at Crossing) to Outfall 001 is the coolwater aquatic life use with a segment-specific 6T3 criterion of 25 °C. Coldwater aquatic life use, the current designation for the Upper Sandia Canyon AU, is not attainable because water temperatures resulting from ambient air temperatures prevent the attainment of the coldwater aquatic life use (40 CFR 131.10(g)(1)). DOE/NNSA and Triad recommend that the coldwater aquatic life use be retained for the lower portion of the AU, from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road.

Comments should be directed to: sandiacanyonuaa@lanl.gov. DOE/NNSA and Triad will evaluate comments and incorporate responses into the final Upper Sandia Canyon UAA, Rev. 1, as appropriate. DOE/NNSA and Triad intend to file a petition with the New Mexico Water Quality Control Commission seeking a change in the aquatic life use for the upper portion of the Upper Sandia Canyon AU from coldwater aquatic life to coolwater aquatic life, in accordance with the findings and recommendations contained in the Upper Sandia Canyon UAA, Rev.1.

If you have any questions about the Upper Sandia Canyon UAA, you may also contact Tim Goering or Matthew Segura:

Tim Goering
Los Alamos National Laboratory
P.O. Box 1663 Mail Stop: K490

LA-UR-24-23436

EXHIBIT L2

NEWS

MRA

Continued from page A1

properties on the north side of Central Avenue and commercial properties on the southeast side of Trinity Drive, including a retainment pond next to the Smith's. The area encompasses about 29 acres.

"This is an economic development tool made available by the state under the MainStreet program to catalyze projects and allow additional options for the developer to pursue," Community Development Department Director Paul Andrus said. "It doesn't affect the existing zoning in the area." Nor does it affect land use.

County Manager Anne Laurent also emphasized that an MRA "doesn't circumvent anti-donation, what it does is allow us to define an area that … through public/private partnerships and these other tools, the county could contribute (to the development project) and put it through this ... public process."

According to a presentation to council by groundworkstudio, the contractor hired to address this project, an MRA-allows for the contribution of public resources to private projects. These resources include a fund, a board or agency, a tax increment financing district, public/private partnerships and development incentives. MRA Designation does not raise taxes and it does not impact property taxes, according to the presentation. The criteria for having an MRA include aged infrastructure, low occupancy rates and conditions of blight. This isn't Los Alamos' first MRA. White Rock has an MRA and so far, its success is limited. Council learned during the presentation only one development plan has been approved. Still, it was reported that the White Rock MRA plan will be used as a template for Los Alamos' designation. Councilor Melanee Hand made the motion to approve the MRA boundaries. She pointed out that this has been extensively discussed, adding that she feels the MRA is a "good thing".

Throughout the discussions, Hand said that issues were raised. "Some of these concerns probably can be resolved with a little more information about how it works because it's really a benefit to all of the owners of properties in that MRA boundary," she said. "It doesn't necessarily mean that just because you are taking care of properties … that somehow it is not a blighted property … this allows for more opportunities for resources and partnerships so that you can do more enhancements of the properties."

Vice Chair Theresa Cull seconded the motion. She explained that "there's enough safeguards in the process and there's still a lot of opportunity in the process to define this …" She did express that including residential properties in the MRA did cause her some concern. "I don't want to see relatively affordable housing go away, but I also think this could be a good thing for those property owners …," Cull added.

Chair Denise Derkacs clarified that inclusion within the MRA boundaries does not require property owners to do anything, but offers access to the tools available under the MRA designation. In his opposition to the MRA, Reagor pointed out that most of the public comments made Tuesday night were against the MRA.

"We can't find a single person who showed up who is inside this boundary and advocate for it," Reagor said.

Several homeowners who live in the boundaries of the MRA raised concerns about its impacts on them and if it would eliminate any affordable housing in the area. Lisa Shin, who owns an optometrist office in one of the commercial properties inside the proposed MRA, said it wasn't necessary for the property since it has a homeowners' association. With the boundaries approved, the next step is to create an MRA plan. To do this, public engagement will be solicited, and community workshops will be held. Once the plan is developed and if adopted, the next step would be implementation.

CARROLL

Continued from page A1

caring that goes beyond the responsibilities of her position," Stratton said. "There are many examples and times when Jacqui has gone above and beyond to care for staff members in times of need. Jacqui's reputation in the facility is strong. She is known as a resource staff trust and will go to when problems arise."

After the tragic death of an employee last year, Jacqui brought food to the department, provided resources and general sympathy. She also assisted in the planning of the employee's memorial and helped his mother with the myriad aspects in dealing with his death. More recently, her actions during a very difficult situation resulted in the opening of a visitor's room for the families of ED patients to stay during extreme circumstances. These examples show Jacqui's boundless compassion, caring and ability to make deep-rooted connections.

Outside the walls of the hospital, her community work also illustrates her compassion to help those in need. She has served on the Board of the Casa Mesita Group Home, a residential facility that provides habilitation services and treatment to children diagnosed with mental health illness and intellectual disabilities.

Jacqui has also volunteered for Self Help, Inc., an organization dedicated to supporting those in need, and she also is currently a member of the Booster Club for the Odyssey of the Mind team at Aspen Elementary School, a program that helps children become college, career and citizenship ready through hands-on creative problem solving, teamwork and grit.

Also nominated and celebrated at Los Alamos Medical Center were Erika Cordova, RT, Pulmonary Clinic; Sara Sena, RN, Inpatient Services Supervisor; and Claudette Cordova, US/RVT Tech, Imaging.

Each facility winner, including Jacqui, will be considered for Lifepoint's 2024 companywide Mercy Award.

The companywide winner will be announced this summer and honored during a ceremony in Nashville, Tenn., in August.

Los Alamos NATIONAL LABORATORY

PUBLIC NOTICE
20.6.4.15 NMAC –Use Attainability Analysis NOTICE

The Department of Energy, National Nuclear Security Administration (DOE/NNSA) and Triad National Security, LLC (Triad) announce the availability of the Public Comment Draft of the Upper Sandia Canyon Use Assessment Unit NM-9000.A_047 Use Attainability Analysis, Revision 1 (Upper Sandia Canyon UAA, Rev.1).

Triad manages and operates the Los Alamos National Laboratory (LANL) on behalf of DOE/NNSA.

DOE/NNSA and Triad seek public comment on this document. Public comments will be accepted for a period of 30 days, from May 13, 2024 through June 12, 2024. A copy of the Upper Sandia Canyon UAA, Rev. 1, is available via LANL's Electronic Public Reading Room: https://eprr.lanl.gov/. A copy has also been placed in the LANL Public Reading Room located in Pojoaque, New Mexico.

A Use Attainability Analysis (UAA) is a scientific study conducted to determine the most protective attainable aquatic life and/or contact uses for a stream segment. New Mexico's UAA procedure is outlined in 20.6.4.15 New Mexico Administrative Code (NMAC). The Upper Sandia Canyon UAA was conducted in accordance with a work plan approved by the New Mexico Environment Department (NMED) to determine the most appropriate and protective aquatic life uses for the Upper Sandia Canyon Water Quality assessment unit NM 9000.A (Upper Sandia Canyon Assessment Unit (AU)). The Upper Sandia Canyon AU is classified under Section 20.6.4.126 NMAC of the New Mexico Water Quality Standards and includes the perennial portion of Sandia Canyon from Sigma Canyon upstream to LANL's National Pollutant Discharge Elimination System (NPDES) Outfall 001.

The Upper Sandia Canyon UAA, Rev. 1, determined that the highest attainable use for the upper portion of the AU from Sandia Canyon at Bedrock Road (formerly Sandia Canyon at Crossing) to Outfall 001 is the coolwater aquatic life use with a segment-specific 6T3 criterion of 25 °C. Coldwater aquatic life use, the current designation for the Upper Sandia Canyon AU, is not attainable because water temperatures resulting from ambient air temperatures prevent the attainment of the coldwater aquatic life use (40 CFR 131.10(g)(1)).

DOE/NNSA and Triad recommend that the coldwater aquatic life use be retained for the lower portion of the AU, from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road.

Comments should be directed to: sandiacanyonuaa@lanl.gov. DOE/NNSA and Triad will evaluate comments and incorporate responses into the final Upper Sandia Canyon UAA, Rev. 1, as appropriate. DOE/NNSA and Triad intend to file a petition with the New Mexico Water Quality Control Commission seeking a change in the aquatic life use for the upper portion of the Upper Sandia Canyon AU from coldwater aquatic life to coolwater aquatic life, in accordance with the findings and recommendations contained in the Upper Sandia Canyon UAA, Rev.1.

If you have any questions about the Upper Sandia Canyon UAA, you may also contact Tim Goering or Matthew Segura:

Tim Goering
Los Alamos National Laboratory
P.O. Box 1663
Mail Stop: K490
LA-UR-24-23436
Los Alamos, NM 87545
1-505-412-9963
goering@lanl.gov

Matthew Segura
Los Alamos National Laboratory
P.O. Box 1663
Mail Stop: K490
Los Alamos, NM 87545
1-505-479-0080
msegura@lanl.gov
LA-UR-24-23436

LOS ALAMOS DAILY POST

**1247 Central Ave.
Los Alamos, NM 87544
ladailypost.com**

Carol A. Clark
Publisher/Editor
caclark@ladailypost.com
505.490.0938

Kirsten Laskey
Government Reporter
kirsten@ladailypost.com

Christopher Clark
Social Media Editor
chris@ladailypost.com

John McHale
Photographer
photojx@me.com

Nate Limback
Videographer/photographer
nlimback@gmail.com

KayLinda Crawford
Advertising Manager
kaylinda@ladailypost.com

Los Alamos Daily Post ID Statement:

The Los Alamos Daily Post ©2016, by the Los Alamos Daily Post LLC, is published weekly by Carol A. Clark at 1247 Central Ave., Los **Alamos, NM 87544. Business and Editorial Offices and Accounting and Circulation Offices: 1247 Central Ave. Los Alamos NM 87544. Call 505.490.0938 to subscribe. Periodicals postage paid at Los Alamos, NM 87544. USPS No. 18420. POSTMASTER: Send address changes to** Los Alamos Daily Post, 1247 Central Ave., Los Alamos, NM 87544.

EXHIBIT L3

Honoring veterans over airwaves

Continued from Page A-6

Cemetery and interview their surviving relatives and friends about their lives.

The radio show is an outreach component of those programs, Dettelbach said.

Past guests included those who work for state agencies that serve veterans, including Theresa Figueroa, who until her retirement last week, ran the women veterans program for the state Department of Veterans Services.

Brig. Gen. Jamison Herrera, department secretary, wrote in an email Tuesday veterans are eligible to apply for benefits "that can improve those post-service lives and those of their family members."

Thank You For Your Service provides "an opportunity for Northern New Mexico's veterans and their families to keep informed about any changes to existing benefits or learn of new programs and benefits introduced by the state and the VA," he added.

The show may remind some of the late Chuck Zobac's radio show, *Calling All Veterans*, which ran on KVSF 101.5 FM for years until it ended during the coronavirus pandemic. For Ortiz, an Oklahoma-born teacher and historian who came to Santa Fe in the mid-1960s, *Thank You For Your Service* provides a resource for the community.

Radio, she said, "keeps the community alive, and this program does that, too."

LUIS SÁNCHEZ SATURNO/THE NEW MEXICAN

Estevan Gonzales, left, one of the owners of KSWV radio, leaves a radio booth with Eleanor Ortiz, of the Stephen Watts Kearny Chapter of the Daughters of the American Revolution, after broadcasting his show *Thank You for Your Service* on Tuesday.

Council passes Mideast cease-fire resolution

Continued from Page A-6

qualified to vote on complicated matters of foreign policy. While he agrees with that, "this is about humanity," Webber said.

Cassutt voiced similar sentiments, saying that while "the actual decision is way above our pay grade," it was important for the council to respond to the many people in the community who have been calling on them to take a stand.

"Everybody [on the council] agrees that what is happening right now is a travesty," she said.

The resolution calls on New Mexico's congressional delegation to advocate for an "immediate cease-fire and an end to violence in Gaza and Israel" and for the "immediate return of all innocent hostages and unjustly held prisoners."

It also calls for an increase in humanitarian aid to Gaza; decries Islamophobic, antisemitic, anti-Palestinian and anti-Israeli bigotry; expresses sorrow over the loss of lives and suffering endured by civilians in Gaza and Israel; extends sympathy to Santa Feans who have been directly impacted by the conflict and encourages residents to "seek, invite, and practice civil discourse."

Garcia's amendment would have added language calling for the U.S. to immediately resume funding for the UNWRA, the U.N.'s main aid agency in Gaza. Funding to the agency was cut by Congress until March 2025 following an Israeli report stating some employees of the agency participated in the Oct. 7 attacks.

A number of countries subsequently pulled their funding to UNWRA but some have since reinstated it following an independent review commissioned by the U.N., which was released last month.

The review did not address the allegations but said Israel had provided no evidence for its claims.

Some of the resolution's other sponsors said they had carefully considered the language of the resolution and were not comfortable with adding additional components.

Faulkner said she was concerned entertaining amendments would put the council back at square one because there are so many other things that could be said about the conflict.

While she said she saw the value in the amendment, she said she had made a commitment to not support any amendments and could not go back on her word.

"We cannot negotiate in bad faith with one another," she said.

Cassutt voiced similar concerns, and said even without the amendment, the original resolution still has "a very strong call" for humanitarian aid, whether than comes from UNWRA or somewhere else. A number of people in the audience made the thumbs-down sign while she spoke.

"I see you all putting your thumbs down at me and that's fine, I'm used to worse," she said.

New Mexico's four managed care organizations under Turquoise Care will be Blue Cross and Blue Shield of New Mexico, Molina Healthcare of New Mexico, Presbyterian Turquoise Care and United Healthcare Community Plan of New Mexico.

Lawmakers urged to ensure N.M. hospitals receive funds

Continued from Page A-6

of food and housing initiatives alongside health care.

Chenier cited another change: Presbyterian Healthcare Services, one of four managed care organizations contracting with the state, will be the exclusive insurer for children in state custody through the New Mexico Children, Youth, and Families Department.

Sen. Antoinette Sedillo Lopez, D-Albuquerque, questioned whether that will be a headache for people providing care to foster kids, some of whom may have to switch their Medicaid enrollment.

"For foster parents, getting these children to health care is one of the biggest hassles they have, and so to have to deal with insurance and changing all of their doctors and everything all over again, seems problematic," she said.

Ortiz y Pino said his understanding is the goal is to avoid having to reenroll children in different managed care organizations when children move to different homes.

He said he thinks the larger problem isn't which insurer children in state care are enrolled with, but with the providers they're allowed to see as a result.

"It shouldn't be a big problem, except that we still … allow each individual MCO to have their own list of providers instead of saying, 'Look, you're a Medicaid provider; you gotta take any Medicaid patient that comes to you,' " Ortiz y Pino said. "I've never understood why we have separate lists."

New Mexico's four managed care organizations under Turquoise Care will be Blue Cross and Blue Shield of New Mexico, Molina Healthcare of New Mexico, Presbyterian Turquoise Care and United Healthcare Community Plan of New Mexico.

In an interview after the meeting, Ortiz y Pino said down the line, he'd like to see a "different way of handling" managed care.

"What lot of us are leaning toward would be to contract with a single MCO the state would pay a flat fee to for managing the paperwork," he said. "But the state would be the ones to set the policies and decide … who gets credentialed as a provider, and the state would be responsible for making adequate provisions for a network."

PUBLIC NOTICE

20.6.4.15 NMAC –Use Attainability Analysis

NOTICE

The Department of Energy, National Nuclear Security Administration (DOE/NNSA) and Triad National Security, LLC (Triad) announce the availability of the Public Comment Draft of the *Upper Sandia Canyon Use Assessment Unit NM-9000.A_047 Use Attainability Analysis*, Revision 1 (Upper Sandia Canyon UAA, Rev.1). Triad manages and operates the Los Alamos National Laboratory (LANL) on behalf of DOE/NNSA. DOE/NNSA and Triad seek public comment on this document. Public comments will be accepted for a period of 30 days, from May 13, 2024 through June 12, 2024. A copy of the Upper Sandia Canyon UAA, Rev. 1, is available via LANL's Electronic Public Reading Room: https://eprr.lanl.gov/. A copy has also been placed in the LANL Public Reading Room located in Pojoaque, New Mexico.

A Use Attainability Analysis (UAA) is a scientific study conducted to determine the most protective attainable aquatic life and/or contact uses for a stream segment. New Mexico's UAA procedure is outlined in 20.6.4.15 New Mexico Administrative Code (NMAC). The Upper Sandia Canyon UAA was conducted in accordance with a work plan approved by the New Mexico Environment Department (NMED) to determine the most appropriate and protective aquatic life uses for the Upper Sandia Canyon Water Quality assessment unit NM-9000.A (Upper Sandia Canyon Assessment Unit (AU)). The Upper Sandia Canyon AU is classified under Section 20.6.4.126 NMAC of the New Mexico Water Quality Standards and includes the perennial portion of Sandia Canyon from Sigma Canyon upstream to LANL's National Pollutant Discharge Elimination System (NPDES) Outfall 001.

The Upper Sandia Canyon UAA, Rev. 1, determined that the highest attainable use for the upper portion of the AU from Sandia Canyon at Bedrock Road (formerly Sandia Canyon at Crossing) to Outfall 001 is the coolwater aquatic life use with a segment-specific 6T3 criterion of 25 °C. Coldwater aquatic life use, the current designation for the Upper Sandia Canyon AU, is not attainable because water temperatures resulting from ambient air temperatures prevent the attainment of the coldwater aquatic life use (40 CFR 131.10(g)(1)). DOE/NNSA and Triad recommend that the coldwater aquatic life use be retained for the lower portion of the AU, from Sandia Canyon at Sigma Canyon to Sandia Canyon at Bedrock Road.

Comments should be directed to: sandiacanyonuaa@lanl.gov. DOE/NNSA and Triad will evaluate comments and incorporate responses into the final Upper Sandia Canyon UAA, Rev. 1, as appropriate. DOE/NNSA and Triad intend to file a petition with the New Mexico Water Quality Control Commission seeking a change in the aquatic life use for the upper portion of the Upper Sandia Canyon AU from coldwater aquatic life to coolwater aquatic life, in accordance with the findings and recommendations contained in the Upper Sandia Canyon UAA, Rev.1.

If you have any questions about the Upper Sandia Canyon UAA, you may also contact Tim Goering or Matthew Segura:

Tim Goering
Los Alamos National Laboratory
P.O. Box 1663
Mail Stop: K490

LA-UR-24-23436

Los Alamos, NM 87545
1-505-412-9963
goering@lanl.gov

Matthew Segura
Los Alamos National Laboratory
P.O. Box 1663
Mail Stop: K490
Los Alamos, NM 87545
1-505-479-0080
msegura@lanl.gov

LANL UAA_0198

EXHIBIT L4

From: Los Alamos National Laboratory <lanl@service.govdelivery.com>
Sent: Tuesday, May 7, 2024 4:02 AM
To: [redacted]
Subject: [EXTERNAL] New documents added to Electronic Public Reading Room

Per regulatory requirements, this e-mail is to notify you that the following documents have been added to the Los Alamos National Laboratory Electronic Reading Room. The document(s) have been submitted to fulfill one or more requirements of the Los Alamos National Laboratory.

Use Attainability Analysis for Upper Sandia Canyon, Revision 1

LANL TA 55-0560 RLUOB Tank Removal, Remediation and Closure Final Report

You may view these documents and many others at LANL's Electronic Public Reading Room.

If you have questions, please contact us.

[redacted]
Los Alamos National Laboratory
Communications and Public Outreach
P.O. Box 1663
MS S020
Los Alamos, NM 87545
[redacted]

EXHIBIT L5

From: Los Alamos National Laboratory <lanl@service.govdelivery.com>
Date: Thursday, May 9, 2024 at 12:13 PM
To: [redacted]
Subject: [EXTERNAL] Courtesy Copy: Notice of Public Availability and Request for Comment: Upper Sandia Canyon Use Attainability Analysis, Revision 1

This is a courtesy copy of an email bulletin sent by [redacted]

This bulletin was sent to the following groups of people:

Subscribers of Hazardous waste permit document submittals, Regulatory Documents, or Stormwater Individual Permit submittals (7370 recipients)

Notice of Public Availability and Request for Comment: Upper Sandia Canyon Use Attainability Analysis, Revision 1

The Department of Energy, National Nuclear Security Administration (DOE/NNSA) and Triad National Security, LLC (Triad) announce the availability of the Public Comment Draft of the *Upper Sandia Canyon Use Assessment Unit NM-9000.A_047 Use Attainability Analysis*, Revision 1 (Upper Sandia Canyon UAA, Rev.1). Triad manages and operates Los Alamos National Laboratory (LANL) on behalf of DOE/NNSA. DOE/NNSA and Triad seek public comment on the Upper Sandia Canyon UAA, Rev.1. Public comments will be accepted for a period of 30 days, from May 13, 2024 through June 12, 2024.

Comments should be directed to: sandiacanyonuaa@lanl.gov. DOE/NNSA and Triad will evaluate comments and incorporate responses into the final Upper Sandia Canyon UAA, Rev. 1, as appropriate. DOE/NNSA and Triad intend to file a petition with the New Mexico Water Quality Control Commission seeking a change in the aquatic life use for the upper portion of the Upper Sandia Canyon AU from coldwater aquatic life to coolwater aquatic life, in accordance with the findings and recommendations contained in the Upper Sandia Canyon UAA, Rev. 1.

An electronic copy of the Upper Sandia Canyon UAA, Rev. 1, is available via LANL's Electronic Public Reading Room. A hard copy has also been placed in the LANL Public Reading Room:

94 Cities of Gold Road

Pojoaque, NM

EXHIBIT M

Use Attainability Analysis for Upper Sandia Canyon, Revision 1
Los Alamos National Laboratory
Errata and Clarifications Summary Document

Note: *These are proposed changes to the document since submission for public comment. Changes are either corrections of typographical errors and minor mistakes or notes added for clarification. They do not change conclusions or recommendations presented in the UAA Report.*

1) Proposed language should be updated as follows:
   - In 20.6.4.126, full language of current rule rather is used (ellipses removed)
   - In 20.6.4.141, the introductory clause, "Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL)," has been removed.
2) Figure 1, p. 4 (Attached) – updated to include scale, north arrow, and clarify labeling
3) Figure 2, p. 5 (Attached) – updated to include scale, north arrow, and clarify labeling
4) Footnote 6, "Flow from Outfall 027 has been diverted to Outfall 001 since mid-2016," should be added for clarification, p. 8
5) Correction of typographical error: first sentence of first full paragraph on p. 11 (Section 4.1) should read, "…however, when we look at Table 3 using NMED 6T3 calculations, we see that the 6T3 criterion for coldwater was not exceeded at Sandia Canyon *at* Sigma Canyon between 2016 and 2018, nor at Sandia Canyon at E123 in 2017," rather than "…Sandia Canyon *or* Sigma Canyon…".
6) Note should be added to Figure 3 caption, p. 13: "Note that the coldwater 6T3 threshold is presented for reference only (thermograph data is from instantaneous measurements and Figure 3 does not represent attainment or non-attainment of the calculated coldwater 6T3 criterion)."
7) Footnote *c* should be added to Table 3, column header (Designated Use Attained) for clarification: "Designated use determined from actual TMAX and actual 6T3 measurements from thermographs."
8) First sentence after equations on p. 17 should be amended to read, "To calculate MWAT values for the six monitoring locations (listed in Table 4), 15-minute thermograph measurements were averaged over each day, and then 7-day rolling averages were calculated over each monitoring *season*." The word "season" replaces the word "year."
9) The following corrections should be made to Table 4, p. 18:
   a) Predicted Attainable Use for Sandia Canyon below E123, 2018, should be *coldwater*.
   b) Footnote c, at column header for Predicted Attainable Use, should be inserted for clarification: "Predicted Attainable Use is based on predicted values for both 6T3 and TMAX criteria."
10) Second sentence in paragraph after Table 4 should be corrected to reflect changes in #9 above, to read, "Analysis of the MWAT data suggests that the coolwater ALU is attainable for the upper Sandia Canyon AU *with the exceptions of Sandia Canyon below E123 and* Sandia Canyon at Sigma Canyon in 2017 (Table 4)."

11) Final paragraph on p. 36 should include references to Table 7 for each instance mentioning Table 3.

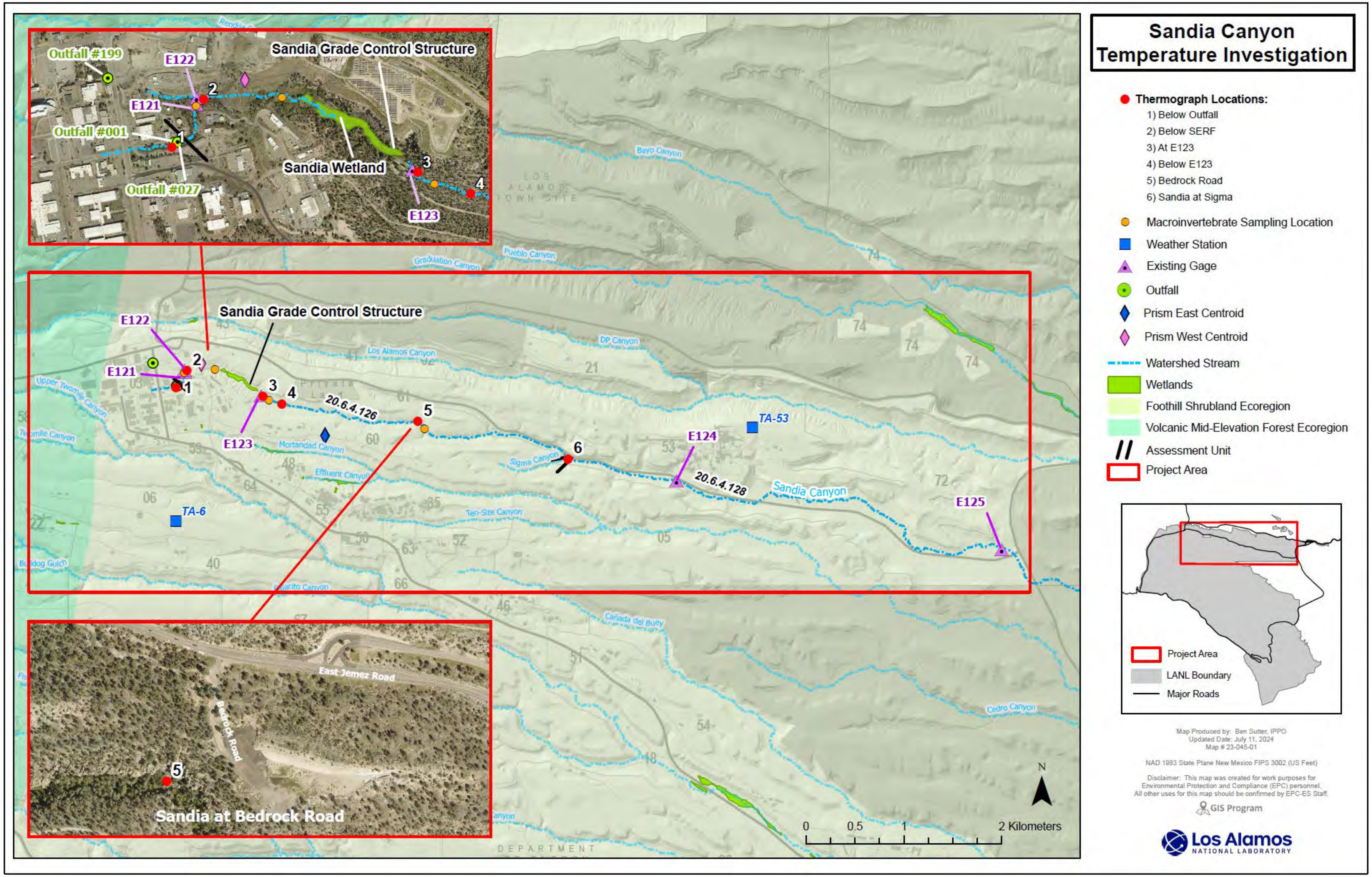


Figure 1. Upper Sandia Canyon assessment unit. GPS coordinates are provided in Appendix B.

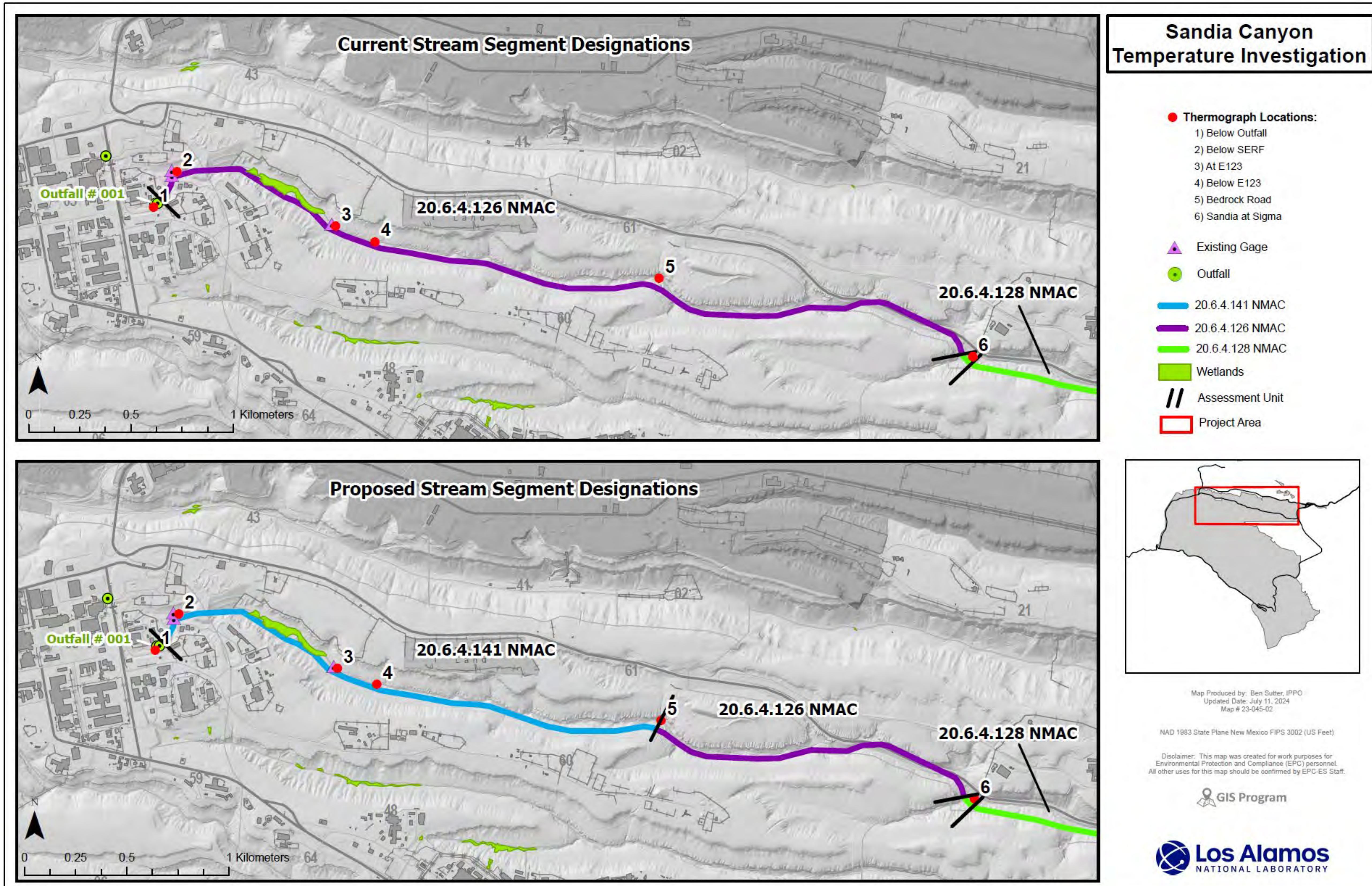


Figure 2. Proposed stream segment designations.

EXHIBIT N

TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 4 STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS

20.6.4.1 ISSUING AGENCY: Water Quality Control commission.
[20.6.4.1 NMAC - Rp 20 NMAC 6.1.1001, 10/12/2000]

20.6.4.2 SCOPE: Except as otherwise provided by statute or regulation of the water quality control commission, this part governs all surface waters of the state of New Mexico, which are subject to the New Mexico Water Quality Act, Sections 74-6-1 through 74-6-17 NMSA 1978.
[20.6.4.2 NMAC - Rp 20 NMAC 6.1.1002, 10/12/2000; A, 5/23/2005]

20.6.4.3 STATUTORY AUTHORITY: This part is adopted by the water quality control commission pursuant to Subsection C of Section 74-6-4 NMSA 1978.
[20.6.4.3 NMAC - Rp 20 NMAC 6.1.1003, 10/12/2000]

20.6.4.4 DURATION: Permanent.
[20.6.4.4 NMAC - Rp 20 NMAC 6.1.1004, 10/12/2000]

20.6.4.5 EFFECTIVE DATE: October 12, 2000, unless a later date is indicated in the history note at the end of a section.
[20.6.4.5 NMAC - Rp 20 NMAC 6.1.1005, 10/12/2000]

20.6.4.6 OBJECTIVE:

A. The purpose of this part is to establish water quality standards that consist of the designated use or uses of surface waters of the state, the water quality criteria necessary to protect the use or uses and an antidegradation policy.

B. The state of New Mexico is required under the New Mexico Water Quality Act (Subsection C of Section 74-6-4 NMSA 1978) and the federal Clean Water Act, as amended (33 U.S.C. Section 1251 *et seq*.) to adopt water quality standards that protect the public health or welfare, enhance the quality of water and are consistent with and serve the purposes of the New Mexico Water Quality Act and the federal Clean Water Act. It is the objective of the federal Clean Water Act to restore and maintain the chemical, physical and biological integrity of the nation's waters, including those in New Mexico. This part is consistent with Section 101(a)(2) of the federal Clean Water Act, which declares that it is the national goal that wherever attainable, an interim goal of water quality that provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water be achieved by July 1, 1983. Agricultural, municipal, domestic and industrial water supply are other essential uses of New Mexico's surface water; however, water contaminants resulting from these activities will not be permitted to lower the quality of surface waters of the state below that required for protection and propagation of fish, shellfish and wildlife and recreation in and on the water, where practicable.

C. Pursuant to Subsection A of Section 74-6-12 NMSA 1978, this part does not grant to the water quality control commission or to any other entity the power to take away or modify property rights in water.

D. These surface water quality standards serve to respond to the inherent threats of climate change and provide resiliency for the continued protection and enhancement of water quality.
[20.6.4.6 NMAC - Rp 20 NMAC 6.1.1006, 10/12/2000; A, 5/23/2005; A, 4/23/2022]

20.6.4.7 DEFINITIONS: Terms defined in the New Mexico Water Quality Act, but not defined in this part will have the meaning given in the Water Quality Act.

A. Terms beginning with numerals or the letter "A," and abbreviations for units.

(1) "4Q3" means the critical low flow as determined by the minimum average flow over four consecutive days that occurs with a frequency of once in three years.

(2) "4T3 temperature" means the temperature not to be exceeded for four or more consecutive hours in a 24-hour period on more than three consecutive days.

(3) "6T3 temperature" means the temperature not to be exceeded for six or more consecutive hours in a 24-hour period on more than three consecutive days.

(4) Abbreviations used to indicate units are defined as follows:

(a) **"cfu/100 mL"** means colony-forming units per 100 milliliters; the results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN), depending on the analytical method used;

(b) **"cfs"** means cubic feet per second;

(c) **"µg/L"** means micrograms per liter, equivalent to parts per billion when the specific gravity of the solution equals 1.0;

(d) **"µS/cm"** means microsiemens per centimeter; one µS/cm is equal to one µmho/cm;

(e) **"mg/kg"** means milligrams per kilogram, equivalent to parts per million;

(f) **"mg/L"** means milligrams per liter, equivalent to parts per million when the specific gravity of the solution equals 1.0;

(g) **"MPN/100 mL"** means most probable number per 100 milliliters; the results for *E. coli* may be reported as either CFU or MPN, depending on the analytical method used;

(h) **"NTU"** means nephelometric turbidity unit;

(i) **"pCi/L"** means picocuries per liter;

(j) **"pH"** means the measure of the acidity or alkalinity and is expressed in standard units (su).

(5) **"Acute toxicity"** means toxicity involving a stimulus severe enough to induce a response in 96 hours of exposure or less. Acute toxicity is not always measured in terms of lethality, but may include other toxic effects that occur within a short time period.

(6) **"Adjusted gross alpha"** means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample, including radium-226, but excluding radon-222 and uranium. Also excluded are source, special nuclear and by-product material as defined by the Atomic Energy Act of 1954.

(7) **"Aquatic life"** means any plant or animal life that uses surface water as primary habitat for at least a portion of its life cycle, but does not include avian or mammalian species.

(8) **"Attainable Use"** means a use that is achievable by the imposition of effluent limits required under sections 301(b) and 306 of the federal Clean Water Act and implementation of cost-effective and reasonable best management practices for nonpoint source control. An attainable use may or may not have criteria as stringent as the criteria for the designated use.

B. Terms beginning with the letter "B".

(1) **"Best management practices" or "BMPs":**

(a) for national pollutant discharge elimination system (NPDES) permitting purposes means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of "waters of the United States;" BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage; or

(b) for nonpoint source pollution control purposes means methods, measures or practices selected by an agency to meet its nonpoint source control needs; BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures; BMPS can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters; BMPs for nonpoint source pollution control purposes shall not be mandatory except as required by state or federal law.

(2) **"Bioaccumulation"** refers to the uptake and retention of a substance by an organism from its surrounding medium and food.

(3) **"Bioaccumulation factor"** is the ratio of a substance's concentration in tissue versus its concentration in ambient water, in situations where the organism and the food chain are exposed.

(4) **"Biomonitoring"** means the use of living organisms to test the suitability of effluents for discharge into receiving waters or to test the quality of surface waters of the state.

C. Terms beginning with the letter "C".

(1) **"CAS number"** means an assigned number by chemical abstract service (CAS) to identify a substance. CAS numbers index information published in chemical abstracts by the American chemical society.

(2) **"Chronic toxicity"** means toxicity involving a stimulus that lingers or continues for a relatively long period relative to the life span of an organism. Chronic effects include, but are not limited to, lethality, growth impairment, behavioral modifications, disease and reduced reproduction.

(3) **"Classified water of the state"** means a surface water of the state, or reach of a surface water of the state, for which the commission has adopted a segment description and has designated a use or uses and applicable water quality criteria in 20.6.4.101 through 20.6.4.899 NMAC.

(4) **"Climate change"** refers to any significant change in the measures of climate lasting for an extended period of time, typically decades or longer, and includes major changes in temperature, precipitation, wind patterns or other weather-related effects.

(5) **"Closed basin"** is a basin where topography prevents the surface outflow of water and water escapes by evapotranspiration or percolation.

(6) **"Coldwater"** in reference to an aquatic life use means a surface water of the state where the water temperature and other characteristics are suitable for the support or propagation or both of coldwater aquatic life.

(7) **"Coolwater"** in reference to an aquatic life use means the water temperature and other characteristics are suitable for the support or propagation of aquatic life whose physiological tolerances are intermediate between and may overlap those of warm and coldwater aquatic life.

(8) **"Commission"** means the New Mexico water quality control commission.

(9) **"Criteria"** are elements of state water quality standards, expressed as constituent concentrations, levels or narrative statements, representing a quality of water that supports a use. When criteria are met, water quality will protect the designated use.

D. **Terms beginning with the letter "D".**

(1) **"DDT and derivatives"** means 4,4'-DDT (CAS number 50293), 4,4'-DDE (CAS number 72559) and 4,4'-DDD (CAS number 72548).

(2) **"Department"** means the New Mexico environment department.

(3) **"Designated use"** means a use specified in 20.6.4.97 through 20.6.4.899 NMAC for a surface water of the state whether or not it is being attained.

(4) **"Dissolved"** refers to the fraction of a constituent of a water sample that passes through a 0.45-micrometer pore-size filter. The "dissolved" fraction is also termed "filterable residue."

(5) **"Domestic water supply"** means a surface water of the state that could be used for drinking or culinary purposes after disinfection.

E. **Terms beginning with the letter "E".**

(1) **"E. coli"** means the bacteria Escherichia coli.

(2) **"Emerging contaminants"** refer to water contaminants that may cause significant ecological or human health effects at low concentrations. Emerging contaminants are generally chemical compounds recognized as having deleterious effects at environmental concentrations whose negative impacts have not been fully quantified and may not have regulatory numeric criteria.

(3) **"Ephemeral"** when used to describe a surface water of the state means the water body contains water briefly only in direct response to precipitation; its bed is always above the water table of the adjacent region.

(4) **"Existing use"** means a use actually attained in a surface water of the state on or after November 28, 1975, whether or not it is a designated use.

F. **Terms beginning with the letter "F".**

(1) **"Fish culture"** means production of coldwater or warmwater fishes in a hatchery or rearing station.

(2) **"Fish early life stages"** means the egg and larval stages of development of fish ending when the fish has its full complement of fin rays and loses larval characteristics.

G. **Terms beginning with the letter "G"** [**RESERVED**]

H. **Terms beginning with the letter "H".**

(1) **"Hardness"** means the measure of dissolved calcium and magnesium salts in water expressed in units of dissolved calcium carbonate ($CaCO_3$) concentration unless otherwise noted.

(2) **"Harmonic mean flow"** is the number of daily flow measurements divided by the sum of the reciprocals of the flows; that is, it is the reciprocal of the arithmetic mean of reciprocal daily flow measurements consistent with the equations in Paragraph (1) of Subsection B of 20.6.4.11 NMAC.

(3) **"High quality coldwater"** in reference to an aquatic life use means a perennial surface water of the state in a minimally disturbed condition with considerable aesthetic value and superior coldwater aquatic life habitat. A surface water of the state to be so categorized must have water quality, stream bed characteristics and other attributes of habitat sufficient to protect and maintain a propagating coldwater aquatic life population.

(4) **“Human health-organism only”** means the health of humans who ingest fish or other aquatic organisms from waters that contain pollutants.

I. **Terms beginning with the letter “I”.**

(1) **“Industrial water supply”** means the use or storage of water by a facility for process operations unless the water is supplied by a public water system. Industrial water supply does not include irrigation or other agricultural uses.

(2) **“Intermittent”** when used to describe a surface water of the state means the water body contains water for extended periods only at certain times of the year, such as when it receives seasonal flow from springs or melting snow.

(3) **“Interstate waters”** means all surface waters of the state that cross or form a part of the border between states.

(4) **“Intrastate waters”** means all surface waters of the state that are not interstate waters.

(5) **“Irrigation”** means application of water to land areas to supply the water needs of beneficial plants.

(6) **“Irrigation storage”** means storage of water to supply the needs of beneficial plants.

J. **Terms beginning with the letter “J”.** [**RESERVED**]

K. **Terms beginning with the letter “K”.** [**RESERVED**]

L. **Terms beginning with the letter “L”.**

(1) **“LC-50”** means the concentration of a substance that is lethal to fifty percent of the test organisms within a defined time period. The length of the time period, which may vary from 24 hours to one week or more, depends on the test method selected to yield the information desired.

(2) **“Limited aquatic life”** as a designated use, means the surface water is capable of supporting only a limited community of aquatic life. This subcategory includes surface waters that support aquatic species selectively adapted to take advantage of naturally occurring rapid environmental changes, low-flow, high turbidity, fluctuating temperature, low dissolved oxygen content or unique chemical characteristics.

(3) **“Livestock watering”** means the use of a surface water of the state as a supply of water for consumption by livestock.

M. **Terms beginning with the letter “M”.**

(1) **“Marginal coldwater”** in reference to an aquatic life use means that natural habitat conditions severely limit maintenance of a coldwater aquatic life population during at least some portion of the year or historical data indicate that the temperature of the surface water of the state may exceed that which could continually support aquatic life adapted to coldwater.

(2) **“Marginal warmwater”** in reference to an aquatic life use means natural intermittent or low flow or other natural habitat conditions severely limit the ability of the surface water of the state to sustain a natural aquatic life population on a continuous annual basis; or historical data indicate that natural water temperature routinely exceeds 32.2°C (90°F).

(3) **“Maximum temperature”** means the instantaneous temperature not to be exceeded at any time.

(4) **“Minimum quantification level”** means the minimum quantification level for a constituent determined by official published documents of the United States environmental protection agency.

N. **Terms beginning with the letter “N”.**

(1) **“Natural background”** means that portion of a pollutant load in a surface water resulting only from non-anthropogenic sources. Natural background does not include impacts resulting from historic or existing human activities.

(2) **“Natural causes”** means those causal agents that would affect water quality and the effect is not caused by human activity but is due to naturally occurring conditions.

(3) **“Nonpoint source”** means any source of pollutants not regulated as a point source that degrades the quality or adversely affects the biological, chemical or physical integrity of surface waters of the state.

O. **Terms beginning with the letter “O”.**

(1) **“Organoleptic”** means the capability to produce a detectable sensory stimulus such as odor or taste.

(2) **“Oversight agency”** means a state or federal agency, such as the United States department of agriculture forest service, that is responsible for land use or water quality management decisions affecting nonpoint source discharges where an outstanding national resource water is located.

P. **Terms beginning with the letter “P”.**

(1) **“Playa”** means a shallow closed basin lake typically found in the high plains and deserts.

(2) **"Perennial"** when used to describe a surface water of the state means the water body typically contains water throughout the year and rarely experiences dry periods.

(3) **"Persistent toxic pollutants"** means pollutants, generally organic, that are resistant to environmental degradation through chemical, biological and photolytic processes and can bioaccumulate in organisms, causing adverse impacts on human health and aquatic life.

(4) **"Point source"** means any discernible, confined and discrete conveyance from which pollutants are or may be discharged into a surface water of the state, but does not include return flows from irrigated agriculture.

(5) **"Practicable"** means that which may be done, practiced or accomplished; that which is performable, feasible, possible.

(6) **"Primary contact"** means any recreational or other water use in which there is prolonged and intimate human contact with the water, such as swimming and water skiing, involving considerable risk of ingesting water in quantities sufficient to pose a significant health hazard. Primary contact also means any use of surface waters of the state for cultural, religious or ceremonial purposes in which there is intimate human contact with the water, including but not limited to ingestion or immersion, that could pose a significant health hazard.

(7) **"Public water supply"** means the use or storage of water to supply a public water system as defined by New Mexico's Drinking Water Regulations, 20.7.10 NMAC. Water provided by a public water system may need to undergo treatment to achieve drinking water quality.

Q. Terms beginning with the letter "Q". [**RESERVED**]

R. Terms beginning with the letter "R". [**RESERVED**]

S. Terms beginning with the letter "S".

(1) **"Secondary contact"** means any recreational or other water use in which human contact with the water may occur and in which the probability of ingesting appreciable quantities of water is minimal, such as fishing, wading, commercial and recreational boating and any limited seasonal contact.

(2) **"Segment"** means a classified water of the state described in 20.6.4.101 through 20.6.4.899 NMAC. The water within a segment should have the same uses, similar hydrologic characteristics or flow regimes, and natural physical, chemical and biological characteristics and exhibit similar reactions to external stresses, such as the discharge of pollutants.

(3) **"Specific conductance"** is a measure of the ability of a water solution to conduct an electrical current.

(4) **"State"** means the state of New Mexico.

(5) **"Surface water(s) of the state"**

(a) means all surface waters situated wholly or partly within or bordering upon the state, including the following:

(i) lakes;
(ii) rivers;
(iii) streams (including intermittent and ephemeral streams);
(iv) mudflats;
(v) sandflats;
(vi) wetlands;
(vii) sloughs;
(viii) prairie potholes;
(ix) wet meadows;
(x) playa lakes;
(xi) reservoirs; and
(xii) natural ponds.

(b) also means all tributaries of such waters, including adjacent wetlands, any manmade bodies of water that were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state, and any "waters of the United States" as defined under the Clean Water Act that are not included in the preceding description.

(c) does not include private waters that do not combine with other surface or subsurface water or any water under tribal regulatory jurisdiction pursuant to Section 518 of the Clean Water Act. Waste treatment systems, including treatment ponds or lagoons designed and actively used to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR Part 423.11(m) that also meet the criteria of this definition), are not surface waters of the state, unless they were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state.

T. Terms beginning with the letter "T".

(1) **"TDS"** means total dissolved solids, also termed "total filterable residue."

(2) **"Toxic pollutant"** means those pollutants, or combination of pollutants, including disease-causing agents, that after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will cause death, shortened life spans, disease, adverse behavioral changes, reproductive or physiological impairment or physical deformations in such organisms or their offspring.

(3) **"Tributary"** means a perennial, intermittent or ephemeral waterbody that flows into a larger waterbody, and includes a tributary of a tributary.

(4) **"Turbidity"** is an expression of the optical property in water that causes incident light to be scattered or absorbed rather than transmitted in straight lines.

U. Terms beginning with the letter "U".

(1) **"Unclassified waters of the state"** means those surface waters of the state not identified in 20.6.4.101 through 20.6.4.899 NMAC.

(2) **"Use attainability analysis"** means a scientific study conducted for the purpose of assessing the factors affecting the attainment of a use.

V. Terms beginning with the letter "V" [**RESERVED**]

W. Terms beginning with the letter "W".

(1) **"Warmwater"** with reference to an aquatic life use means that water temperature and other characteristics are suitable for the support or propagation or both of warmwater aquatic life.

(2) **"Water contaminant"** means any substance that could alter if discharged or spilled the physical, chemical, biological or radiological qualities of water. "Water contaminant" does not mean source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, but may include all other radioactive materials, including but not limited to radium and accelerator-produced isotopes.

(3) **"Water pollutant"** means a water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or to unreasonably interfere with the public welfare or the use of property.

(4) **"Wetlands"** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions in New Mexico. Wetlands that are constructed outside of a surface water of the state for the purpose of providing wastewater treatment and that do not impound a surface water of the state are not included in this definition.

(5) **"Wildlife habitat"** means a surface water of the state used by plants and animals not considered as pathogens, vectors for pathogens or intermediate hosts for pathogens for humans or domesticated livestock and plants.

X. Terms beginning with the letters "X" through "Z". [**RESERVED**]

[20.6.4.7 NMAC - Rp 20 NMAC 6.1.1007, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 7/17/2005; A, 8/1/2007; A, 12/1/2010; A, 1/14/2011; A, 3/2/2017; A, 4/23/2022]

20.6.4.8 ANTIDEGRADATION POLICY AND IMPLEMENTATION PLAN:

A. Antidegradation Policy: This antidegradation policy applies to all surface waters of the state.

(1) Existing uses, as defined in Paragraph (4) of Subsection E of 20.6.4.7 NMAC, and the level of water quality necessary to protect the existing uses shall be maintained and protected in all surface waters of the state.

(2) Where the quality of a surface water of the state exceeds levels necessary to support the propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the commission finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic and social development in the area in which the water is located. In allowing such degradation or lower water quality, the state shall assure water quality adequate to protect existing uses fully. Further, the state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source control. Additionally, the state shall encourage the use of watershed planning as a further means to protect surface waters of the state.

(3) No degradation shall be allowed in waters designated by the commission as outstanding national resource waters (ONRWs), except as provided in Subparagraphs (a) through (e) of this paragraph and in Paragraph (4) of this Subsection A.

(a) After providing a minimum 30-day public review and comment period, the commission determines that allowing temporary and short-term degradation of water quality is necessary to accommodate public health or safety activities in the area in which the ONRW is located. Examples of public health or safety activities include but are not limited to replacement or repair of a water or sewer pipeline or a roadway bridge. In making its decision, the commission shall consider whether the activity will interfere with activities implemented to restore or maintain the chemical, physical or biological integrity of the water. In approving the activity, the commission shall require that:

(i) the degradation shall be limited to the shortest possible time and shall not exceed six months;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate; all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized;

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use in the ONRW; and

(iv) the degradation shall not alter the essential character or special use that makes the water an ONRW.

(b) Prior to the commission making a determination, the department or appropriate oversight agency shall provide a written recommendation to the commission. If the commission approves the activity, the department or appropriate oversight agency shall oversee implementation of the activity.

(c) Where an emergency response action that may result in temporary and short-term degradation to an ONRW is necessary to mitigate an immediate threat to public health or safety, the emergency response action may proceed prior to providing notification required by Subparagraph (a) of this paragraph in accordance with the following:

(i) only actions that mitigate an immediate threat to public health or safety may be undertaken pursuant to this provision; non-emergency portions of the action shall comply with the requirements of Subparagraph (a) of this paragraph;

(ii) the discharger shall make best efforts to comply with requirements (i) through (iv) of Subparagraph (a) of this paragraph;

(iii) the discharger shall notify the department of the emergency response action in writing within seven days of initiation of the action;

(iv) within 30 days of initiation of the emergency response action, the discharger shall provide a summary of the action taken, including all actions taken to comply with requirements (i) through (iv) of Subparagraph (a) of this paragraph.

(d) Preexisting land-use activities, including grazing, allowed by federal or state law prior to designation as an ONRW, and controlled by best management practices (BMPs), shall be allowed to continue so long as there are no new or increased discharges resulting from the activity after designation of the ONRW.

(e) Acequia operation, maintenance, and repairs are not subject to new requirements because of ONRW designation. However, the use of BMPs to minimize or eliminate the introduction of pollutants into receiving waters is strongly encouraged.

(4) This antidegradation policy does not prohibit activities that may result in degradation in surface waters of the state when such activities will result in restoration or maintenance of the chemical, physical or biological integrity of the water.

(a) For ONRWs, the department or appropriate oversight agency shall review on a case-by-case basis discharges that may result in degradation from restoration or maintenance activities, and may approve such activities in accordance with the following:

(i) the degradation shall be limited to the shortest possible time;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate, and all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized;

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use of the surface water; and

(iv) the degradation shall not alter the essential character or special use that makes the water an ONRW.

(b) For surface waters of the state other than ONRWs, the department shall review on a case-by-case basis discharges that may result in degradation from restoration or maintenance activities, and may approve such activities in accordance with the following:

(i) the degradation shall be limited to the shortest possible time;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate, and all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized; and

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use of the surface water.

(5) In those cases where potential water quality impairment associated with a thermal discharge is involved, this antidegradation policy and implementing method shall be consistent with Section 316 of the federal Clean Water Act.

(6) In implementing this section, the commission through the appropriate regional offices of the United States environmental protection agency will keep the administrator advised and provided with such information concerning the surface waters of the state as he or she will need to discharge his or her responsibilities under the federal Clean Water Act.

B. Implementation Plan: The department, acting under authority delegated by the commission, implements the water quality standards, including the antidegradation policy, by describing specific methods and procedures in the continuing planning process and by establishing and maintaining controls on the discharge of pollutants to surface waters of the state. The steps summarized in the following paragraphs, which may not all be applicable in every water pollution control action, list the implementation activities of the department. These implementation activities are supplemented by detailed antidegradation review procedures developed under the state's continuing planning process. The department:

(1) obtains information pertinent to the impact of the effluent on the receiving water and advises the prospective discharger of requirements for obtaining a permit to discharge;

(2) reviews the adequacy of existing data and conducts a water quality survey of the receiving water in accordance with an annually reviewed, ranked priority list of surface waters of the state requiring total maximum daily loads pursuant to Section 303(d) of the federal Clean Water Act;

(3) assesses the probable impact of the effluent on the receiving water relative to its attainable or designated uses and numeric and narrative criteria;

(4) requires the highest and best degree of wastewater treatment practicable and commensurate with protecting and maintaining the designated uses and existing water quality of surface waters of the state;

(5) develops water quality based effluent limitations and comments on technology based effluent limitations, as appropriate, for inclusion in any federal permit issued to a discharger pursuant to Section 402 of the federal Clean Water Act;

(6) requires that these effluent limitations be included in any such permit as a condition for state certification pursuant to Section 401 of the federal Clean Water Act;

(7) coordinates its water pollution control activities with other constituent agencies of the commission, and with local, state and federal agencies, as appropriate;

(8) develops and pursues inspection and enforcement programs to ensure that dischargers comply with state regulations and standards, and complements EPA's enforcement of federal permits;

(9) ensures that the provisions for public participation required by the New Mexico Water Quality Act and the federal Clean Water Act are followed;

(10) provides continuing technical training for wastewater treatment facility operators through the utility operators training and certification programs;

(11) provides funds to assist the construction of publicly owned wastewater treatment facilities through the wastewater construction program authorized by Section 601 of the federal Clean Water Act, and through funds appropriated by the New Mexico legislature;

(12) conducts water quality surveillance of the surface waters of the state to assess the effectiveness of water pollution controls, determines whether water quality standards are being attained, and proposes amendments to improve water quality standards;

(13) encourages, in conjunction with other state agencies, implementation of the best management practices set forth in the New Mexico statewide water quality management plan and the nonpoint source management program, such implementation shall not be mandatory except as provided by federal or state law;

(14) evaluates the effectiveness of BMPs selected to prevent, reduce or abate sources of water pollutants;

(15) develops procedures for assessing use attainment as required by 20.6.4.15 NMAC and establishing site-specific standards; and

(16) develops list of surface waters of the state not attaining designated uses, pursuant to Sections 305(b) and 303(d) of the federal Clean Water Act.

[20.6.4.8 NMAC - Rp 20 NMAC 6.1.1101, 10/12/2000; A, 5/23/2005; A, 8/1/2007; A, 1/14/2011; A, 4/23/2022]

20.6.4.9 OUTSTANDING NATIONAL RESOURCE WATERS:

A. Procedures for nominating an ONRW: Any person may nominate a surface water of the state for designation as an ONRW by filing a petition with the commission pursuant to 20.1.6 NMAC, Rulemaking Procedures - Water Quality Control Commission. A petition to designate a surface water of the state as an ONRW shall include:

(1) a map of the surface water of the state, including the location and proposed upstream and downstream boundaries;

(2) a written statement and evidence based on scientific principles in support of the nomination, including specific reference to one or more of the applicable ONRW criteria listed in Subsection B of this section;

(3) water quality data including chemical, physical or biological parameters, if available, to establish a baseline condition for the proposed ONRW;

(4) a discussion of activities that might contribute to the reduction of water quality in the proposed ONRW;

(5) any additional evidence to substantiate such a designation, including a discussion of the economic impact of the designation on the local and regional economy within the state of New Mexico and the benefit to the state; and

(6) affidavit of publication of notice of the petition in a newspaper of general circulation in the affected counties and in a newspaper of general statewide circulation.

B. Criteria for ONRWs: A surface water of the state, or a portion of a surface water of the state, may be designated as an ONRW where the commission determines that the designation is beneficial to the state of New Mexico, and:

(1) the water is a significant attribute of a state special trout water, national or state park, national or state monument, national or state wildlife refuge or designated wilderness area, or is part of a designated wild river under the federal Wild and Scenic Rivers Act; or

(2) the water has exceptional recreational or ecological significance; or

(3) the existing water quality is equal to or better than the numeric criteria for protection of aquatic life and contact uses and the human health-organism only criteria, and the water has not been significantly modified by human activities in a manner that substantially detracts from its value as a natural resource.

C. Pursuant to a petition filed under Subsection A of this section, the commission may classify a surface water of the state or a portion of a surface water of the state as an ONRW if the criteria set out in Subsection B of this section are met.

D. Waters classified as ONRWs: The following waters are classified as ONRWs:

(1) Rio Santa Barbara, including the west, middle and east forks from their headwaters downstream to the boundary of the Pecos Wilderness; and

(2) the waters within the United States forest service Valle Vidal special management unit including:

(a) Rio Costilla, including Comanche, La Cueva, Fernandez, Chuckwagon, Little Costilla, Powderhouse, Holman, Gold, Grassy, LaBelle and Vidal creeks, from their headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit;

(b) Middle Ponil creek, including the waters of Greenwood Canyon, from their headwaters downstream to the boundary of the Elliott S. Barker wildlife management area;

(c) Shuree lakes;

(d) North Ponil creek, including McCrystal and Seally Canyon creeks, from their headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit; and

(e) Leandro creek from its headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit.

(3) the named perennial surface waters of the state, identified in Subparagraph (a) below, located within United States department of agriculture forest service wilderness. Wilderness are those lands designated by the United States congress as wilderness pursuant to the Wilderness Act. Wilderness areas included in this designation are the Aldo Leopold wilderness, Apache Kid wilderness, Blue Range wilderness, Chama River Canyon wilderness, Cruces Basin wilderness, Dome wilderness, Gila wilderness, Latir Peak wilderness, Pecos wilderness, San Pedro Parks wilderness, Wheeler Peak wilderness, and White Mountain wilderness.

(a) The following waters are designated in the Rio Grande basin:

(i) in the Aldo Leopold wilderness: Byers Run, Circle Seven creek, Flower canyon, Holden Prong, Indian canyon, Las Animas creek, Mud Spring canyon, North Fork Palomas creek, North Seco creek, Pretty canyon, Sids Prong, South Animas canyon, Victorio Park canyon, Water canyon;

(ii) in the Apache Kid wilderness Indian creek and Smith canyon;

(iii) in the Chama River Canyon wilderness: Chavez canyon, Ojitos canyon, Rio Chama;

(iv) in the Cruces Basin wilderness: Beaver creek, Cruces creek, Diablo creek, Escondido creek, Lobo creek, Osha creek;

(v) in the Dome wilderness: Capulin creek, Medio creek, Sanchez canyon/creek;

(vi) in the Latir Peak wilderness: Bull creek, Bull Creek lake, Heart lake, Lagunitas Fork, Lake Fork creek, Rito del Medio, Rito Primero, West Latir creek;

(vii) in the Pecos wilderness: Agua Sarca, Hidden lake, Horseshoe lake (Alamitos), Jose Vigil lake, Nambe lake, Nat lake IV, No Fish lake, North Fork Rio Quemado, Rinconada, Rio Capulin, Rio de las Trampas (Trampas creek), Rio de Truchas, Rio Frijoles, Rio Medio, Rio Molino, Rio Nambe, Rio San Leonardo, Rito con Agua, Rito Gallina, Rito Jaroso, Rito Quemado, San Leonardo lake, Santa Fe lake, Santa Fe river, Serpent lake, South Fork Rio Quemado, Trampas lake (East), Trampas lake (West);

(viii) in the San Pedro Parks wilderness: Agua Sarca, Cañon Madera, Cave creek, Cecilia Canyon creek, Clear creek (North SPP), Clear creek (South SPP), Corralitos creek, Dove creek, Jose Miguel creek, La Jara creek, Oso creek, Rio Capulin, Rio de las Vacas, Rio Gallina, Rio Puerco de Chama, Rito Anastacio East, Rito Anastacio West, Rito de las Palomas, Rito de las Perchas, Rito de los Pinos, Rito de los Utes, Rito Leche, Rito Redondo, Rito Resumidero, San Gregorio lake;

(ix) in the Wheeler Peak wilderness: Black Copper canyon, East Fork Red river, Elk lake, Horseshoe lake, Lost lake, Sawmill creek, South Fork lake, South Fork Rio Hondo, Williams lake.

(b) The following waters are designated in the Pecos River basin:

(i) in the Pecos wilderness: Albright creek, Bear creek, Beatty creek, Beaver creek, Carpenter creek, Cascade canyon, Cave creek, El Porvenir creek, Hollinger creek, Holy Ghost creek, Horsethief creek, Jack's creek, Jarosa canyon/creek, Johnson lake, Lake Katherine, Lost Bear lake, Noisy brook, Panchuela creek, Pecos Baldy lake, Pecos river, Rio Mora, Rio Valdez, Rito Azul, Rito de los Chimayosos, Rito de los Esteros, Rito del Oso, Rito del Padre, Rito las Trampas, Rito Maestas, Rito Oscuro, Rito Perro, Rito Sebadilloses, South Fork Bear creek, South Fork Rito Azul, Spirit lake, Stewart lake, Truchas lake (North), Truchas lake (South), Winsor creek;

(ii) in the White Mountain wilderness: Argentina creek, Aspen creek, Bonito creek, Little Bonito creek, Mills canyon/creek, Rodamaker creek, South Fork Rio Bonito, Turkey canyon/creek.

(c) The following waters are designated in the Gila River basin:

(i) in the Aldo Leopold wilderness: Aspen canyon, Black Canyon creek, Bonner canyon, Burnt canyon, Diamond creek, Falls canyon, Fisherman canyon, Running Water canyon, South Diamond creek;

(ii) in the Gila wilderness: Apache creek, Black Canyon creek, Brush canyon, Canyon creek, Chicken Coop canyon, Clear creek, Cooper canyon, Cow creek, Cub creek, Diamond creek, East Fork Gila river, Gila river, Gilita creek, Indian creek, Iron creek, Langstroth canyon, Lilley canyon, Little creek, Little Turkey creek, Lookout canyon, McKenna creek, Middle Fork Gila river, Miller Spring canyon, Mogollon creek, Panther canyon, Prior creek, Rain creek, Raw Meat creek, Rocky canyon, Sacaton creek, Sapillo creek, Sheep Corral canyon, Skeleton canyon, Squaw creek, Sycamore canyon, Trail canyon, Trail creek, Trout creek, Turkey creek, Turkey Feather creek, Turnbo canyon, West Fork Gila river, West Fork Mogollon creek, White creek, Willow creek, Woodrow canyon.

(d) The following waters are designated in the Canadian River basin: in the Pecos wilderness Daily creek, Johns canyon, Middle Fork Lake of Rio de la Casa, Middle Fork Rio de la Casa, North Fork Lake of Rio de la Casa, Rito de Gascon, Rito San Jose, Sapello river, South Fork Rio de la Casa, Sparks creek (Manuelitas creek).

(e) The following waters are designated in the San Francisco River basin:

(i) in the Blue Range wilderness: Pueblo creek;

(ii) in the Gila wilderness: Big Dry creek, Lipsey canyon, Little Dry creek, Little Whitewater creek, South Fork Whitewater creek, Spider creek, Spruce creek, Whitewater creek.

(f) The following waters are designated in the Mimbres Closed basin: in the Aldo Leopold wilderness Corral canyon, Mimbres river, North Fork Mimbres river, South Fork Mimbres river.

(g) The following waters are designated in the Tularosa Closed basin: in the White Mountain wilderness Indian creek, Nogal Arroyo, Three Rivers.

(h) The wetlands designated are identified on the *Maps and List of Wetlands Within United States Forest Service Wilderness Areas Designated as Outstanding National Resource Waters* published at the New Mexico state library and available on the department's website.

(4) The following waters are designated in the headwaters Pecos river watershed:

(a) The Pecos river from Dalton Canyon creek to the Pecos wilderness boundary;

(b) In the Dry Gulch-Pecos river subwatershed, Dalton Canyon creek from the Pecos river upstream to the headwaters, Wild Horse creek from Dalton Canyon creek upstream to the headwaters, Macho Canyon creek from the Pecos river upstream to the headwaters and Sawyer creek from the Pecos river upstream to the headwaters;

(c) In the Indian creek-Pecos river subwatershed, Indian creek from the Pecos river upstream to the headwaters, Holy Ghost creek from the Pecos river upstream to the Pecos wilderness boundary, Doctor creek from Holy Ghost creek upstream to the headwaters, Davis creek from the Pecos river upstream to the headwaters and Willow creek from the Pecos river upstream to the headwaters;

(d) In the Rio Mora subwatershed, Rio Mora from the Pecos river upstream to the Pecos wilderness boundary and Bear creek from the Rio Mora upstream to the Pecos wilderness boundary;

(e) In the Rio Mora-Pecos river subwatershed, Carpenter creek from the Pecos river upstream to the Pecos wilderness boundary, Winsor creek from the Pecos river upstream to the Pecos wilderness boundary and Jack's creek from the Pecos river upstream to the Pecos wilderness boundary; and,

(f) In the Panchuela creek subwatershed, Panchuela creek from the Pecos river upstream to the Pecos wilderness boundary;

(g) Unnamed tributaries to waters in Subparagraphs (a) through (f), Paragraph (4) of this Subsection (D) as identified in the *Maps and Lists for Unnamed Tributaries to Perennial Waters and Wetlands in the Headwaters Pecos River Watershed,* published at the New Mexico state library and available on the department's website.

(h) Unnamed wetlands adjacent to waters in Subparagraphs (a) through (f), Paragraph (4) of this Subsection (D) as identified in the *Maps and Lists for Unnamed Tributaries to Perennial Waters and Wetlands in the Headwaters Pecos River Watershed*, published at the New Mexico state library and available on the department's website.

(5) the Rio Grande from directly above the Rio Pueblo de Taos to the New Mexico-Colorado state border.

(6) the Rio Hondo from the Carson National Forest boundary to its headwaters; and Lake Fork creek from the Rio Hondo to its headwaters.

(7) the East Fork Jemez river from San Antonio creek to its headwaters; San Antonio creek from the East Fork Jemez river to its headwaters; and Redondo creek from Sulphur creek to its headwaters.

[20.6.4.9 NMAC - Rn, Subsections B, C and D of 20.6.4.8 NMAC, 5/23/2005; A, 5/23/2005; A, 7/17/2005; A, 2/16/2006; A, 12/1/2010; A, 1/14/2011; A, 4/23/2022; A, 09/24/2022]

20.6.4.10 REVIEW OF STANDARDS; NEED FOR ADDITIONAL STUDIES:

A. Section 303(c)(1) of the federal Clean Water Act requires that the state hold public hearings at least once every three years for the purpose of reviewing water quality standards and proposing, as appropriate, necessary revisions to water quality standards.

B. In accordance with 40 CFR 131.10(i), when an existing use, as defined under 20.6.4.7 NMAC, is higher quality water than prescribed by the designated use and supporting evidence demonstrates the presence of that use, the designated use shall be amended accordingly to have criteria no less stringent than the existing use.

C. It is recognized that, in some cases, numeric criteria for a particular designated use may not adequately reflect the local conditions or the aquatic communities adapted to those localized conditions. In these cases, a water quality criterion may be modified to reflect the natural condition of a specific waterbody. The modification of the criterion does not change the designated use; the modification only changes the criterion for that specific waterbody When justified by sufficient data and information, a numeric water quality criterion may be adopted or modified in accordance with Subsection F of 20.6.4.10 and Subsection G of 20.6.4.10 NMAC, to protect the attainable uses of the waterbody.

D. The removal or amendment of a designated use to a designated use with less stringent criteria can only be done through a use attainability analysis in accordance with 20.6.4.15 NMAC.

E. It is also recognized that contributions of water contaminants by diffuse nonpoint sources of water pollution may make attainment of certain criteria difficult. Revision of these criteria may be necessary as new information is obtained on nonpoint sources and other problems unique to semi-arid regions.

F. Site-specific criteria.

(1) 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 such as:

(a) actual species at a site are more or less sensitive than those used in the national criteria data set;

(b) physical or chemical characteristics at a site such as pH or hardness alter the biological availability and/or toxicity of the chemical;

(c) physical, biological or chemical factors alter the bioaccumulation potential of a chemical;

(d) the concentration resulting from natural background exceeds numeric criteria for aquatic life, wildlife habitat or other uses if consistent with Subsection G of 20.6.4.10 NMAC; or

(e) other factors or combination of factors that upon review of the commission may warrant modification of the default criteria, subject to EPA review and approval.

(2) Site-specific criteria must fully protect the designated use to which they apply. In the case of human health-organism only criteria, site-specific criteria must fully protect human health when organisms are consumed from waters containing pollutants.

(3) Any person may petition the commission to adopt site-specific criteria. A petition for the adoption of site-specific criteria shall:

(a) identify the specific waters to which the site-specific criteria would apply;

(b) explain the rationale for proposing the site-specific criteria;

(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 criteria.

(4) 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 for 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 water-effect ratio 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-822-R-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 G of 20.6.4.10 NMAC.

G. Site-specific criteria based on natural background. The commission may adopt site-specific criteria equal to the concentration resulting from natural background where that concentration protects the designated use. The concentration resulting from natural background supports the level of aquatic life and wildlife habitat expected to occur naturally at the site absent any interference by humans. Domestic water supply, primary or secondary contact, or human health-organism only criteria shall not be modified based on natural background. A determination of natural background shall:

(1) consider natural spatial and seasonal to interannual variability as appropriate;

(2) document the presence of natural sources of the pollutant;

(3) document the absence of human sources of the pollutant or quantify the human contribution; and

(4) rely on analytical, statistical or modeling methodologies to quantify the natural background.

H. Temporary standards.

(1) Any person may petition the commission to adopt a temporary standard applicable to all or part of a surface water of the state as provided for in this section and applicable sections in 40 CFR Part 131, Water Quality Standards; specifically, Section 131.14. The commission may adopt a proposed temporary standard if the petitioner demonstrates that:

(a) attainment of the associated designated use may not be feasible in the short term due to one or more of the factors listed in 40 CFR 131.10(g), or due to the implementation of actions necessary to facilitate restoration such as through dam removal or other significant wetland or water body reconfiguration activities as demonstrated by the petition and supporting work plan requirements in Paragraphs (4) and (5) of Subsection H of 20.6.4.10 NMAC;

(b) the proposed temporary standard represents the highest degree of protection feasible in the short term, limits the degradation of water quality to the minimum necessary to achieve the original standard by the expiration date of the temporary standard, and adoption will not cause the further impairment or loss of an existing use;

(c) for point sources, existing or proposed discharge control technologies will comply with applicable technology-based limitations and feasible technological controls and other management alternatives, such as a pollution prevention program; and

(d) for restoration activities, nonpoint source or other control technologies shall limit downstream impacts, and if applicable, existing or proposed discharge control technologies shall be in place consistent with Subparagraph (c) of Paragraph (1) of Subsection H of 20.6.4.10 NMAC.

(2) A temporary standard shall apply to specific designated use(s), pollutant(s), or permittee(s), and to specific water body segment(s). The adoption of a temporary standard does not exempt dischargers from complying with all other applicable water quality standards or control technologies.

(3) Designated use attainment as reported in the federal Clean Water Act, Section 305(b)/303(d) Integrated Report shall be based on the original standard and not on a temporary standard.

(4) A petition for a temporary standard shall:

(a) identify the currently applicable standard(s), the proposed temporary standard for the specific pollutant(s), the permittee(s), and the specific surface water body segment(s) of the state to which the temporary standard would apply;

(b) include the basis for any factor(s) specific to the applicability of the temporary standard (for example critical flow under Subsection B of 20.6.4.11 NMAC);

(c) demonstrate that the proposed temporary standard meets the requirements in this subsection;

(d) present a work plan with timetable of proposed actions for achieving compliance with the original standard in accordance with Paragraph (5) of Subsection H of 20.6.4.10 NMAC;

(e) include any other information necessary to support the petition.

(5) As a condition of a petition for a temporary standard, in addition to meeting the requirements in this Subsection, the petitioner shall prepare a work plan in accordance with Paragraph (4) of Subsection H of 20.6.4.10 NMAC and submit the work plan to the department for review and comment. The work plan shall identify the factor(s) listed in 40 CFR 131.10(g) or Subparagraph (a) of Paragraph (1) of Subsection H of 20.6.4.10 NMAC affecting attainment of the standard that will be analyzed and the timeline for proposed actions to be taken to achieve the uses attainable over the term of the temporary standard, including baseline water quality, and any investigations, projects, facility modifications, monitoring, or other measures necessary to achieve compliance with the original standard. The work plan shall include provisions for review of progress in accordance with Paragraph (8) of Subsection H of 20.6.4.10 NMAC, public notice and consultation with appropriate state, tribal, local and federal agencies.

(6) The commission may condition the approval of a temporary standard by requiring additional monitoring, relevant analyses, the completion of specified projects, submittal of information, or any other actions.

(7) Temporary standards may be implemented only after a public hearing before the commission, commission approval and adoption pursuant to Subsection H of 20.6.4.10 NMAC for all state purposes, and the federal Clean Water Act Section 303 (c) approval for any federal action.

(8) All temporary standards are subject to a required review during each succeeding review of water quality standards conducted in accordance with Subsection A of 20.6.4.10 NMAC. The petitioner shall provide a written report to the commission documenting the progress of proposed actions, pursuant to a reporting schedule stipulated in the approved temporary standard. The purpose of the review is to determine progress consistent with the original conditions of the petition for the duration of the temporary standard. If the petitioner cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard.

(9) The commission may consider a petition to extend a temporary standard. The effective period of a temporary standard shall be extended only if demonstrated to the commission that the factors precluding attainment of the underlying standard still apply, that the petitioner is meeting the conditions required for approval of the temporary standard, and that reasonable progress towards meeting the underlying standard is being achieved.

(10) A temporary standard shall expire no later than the date specified in the approval of the temporary standard. Upon expiration of a temporary standard, the original standard becomes applicable.

(11) Temporary standards shall be identified in 20.6.4.97-899 NMAC as appropriate for the surface water affected.

(12) "Temporary standard" means a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the temporary standard.

[20.6.4.10 NMAC - Rp 20 NMAC 6.1.1102, 10/12/2000; Rn, 20.6.4.9 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 4/23/2022]

20.6.4.11 APPLICABILITY OF WATER QUALITY STANDARDS:

A. [**RESERVED**]

B. Critical low flow: The critical low flow of a stream at a particular site shall be used in developing point source discharge permit requirements to meet numeric criteria set in 20.6.4.97 through 20.6.4.900 NMAC and Subsection F of 20.6.4.13 NMAC.

(1) For human health-organism only criteria, the critical low flow is the harmonic mean flow. For ephemeral waters the calculation shall be based upon the nonzero flow intervals and modified by including a factor to adjust for the proportion of intervals with zero flow. The equations are as follows:

$$\text{Harmonic Mean} = \frac{n}{\sum 1/Q}$$

where n = number of flow values
and Q = flow value

$$\text{Modified Harmonic Mean} = \left[\frac{\sum_{i=1}^{Nt-N_0} \frac{1}{Qi}}{Nt - N_0} \right]^{-1} x \left[\frac{Nt - N_0}{Nt} \right]$$

where Qi = nonzero flow
Nt = total number of flow values
and N_0 = number of zero flow values

(2) For all other narrative and numeric criteria, the critical low flow is the minimum average four consecutive day flow that occurs with a frequency of once in three years (4Q3). The critical low flow may be determined on an annual, a seasonal or a monthly basis, as appropriate, after due consideration of site-specific conditions.

C. Guaranteed minimum flow: The commission may allow the use of a contractually guaranteed minimum streamflow in lieu of a critical low flow determined under Subsection B of this section on a case-by-case basis and upon consultation with the interstate stream commission. Should drought, litigation or any other reason interrupt or interfere with minimum flows under a guaranteed minimum flow contract for a period of at least 30 consecutive days, such permission, at the sole discretion of the commission, may then be revoked. Any minimum flow specified under such revoked permission shall be superseded by a critical low flow determined under Subsection B of this section. A public notice of the request for a guaranteed minimum flow shall be published in a newspaper of general circulation by the department at least 30 days prior to scheduled action by the commission. These water quality standards do not grant to the commission or any other entity the power to create, take away or modify property rights in water.

D. Mixing zones: A limited mixing zone, contiguous to a point source wastewater discharge, may be allowed in any stream receiving such a discharge. Mixing zones serve as regions of initial dilution that allow the application of a dilution factor in calculations of effluent limitations. Effluent limitations shall be developed that will protect the most sensitive existing, designated or attainable use of the receiving water.

E. Mixing zone limitations: Wastewater mixing zones, in which the numeric criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC or 20.6.4.900 NMAC may be exceeded, shall be subject to the following limitations:

(1) Mixing zones are not allowed for discharges to lakes, reservoirs, or playas; these effluents shall meet all applicable criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC and 20.6.4.900 NMAC at the point of discharge.

(2) The acute aquatic life criteria, as set out in Subsection I, Subsection J, and Subsection K of 20.6.4.900 NMAC, shall be attained at the point of discharge for any discharge to a surface water of the state with a designated aquatic life use.

(3) The general criteria set out in Subsections A, B, C, D, E, G, H and J of 20.6.4.13 NMAC, and the provision set out in Subsection D of 20.6.4.14 NMAC are applicable within mixing zones.

(4) The areal extent and concentration isopleths of a particular mixing zone will depend on site-specific conditions including, but not limited to, wastewater flow, receiving water critical low flow, outfall design, channel characteristics and climatic conditions and, if needed, shall be determined on a case-by-case basis. When the physical boundaries or other characteristics of a particular mixing zone must be known, the methods presented in Section 4.4.5, "Ambient-induced mixing," in "Technical support document for water quality-based toxics control" (March 1991, EPA/505/2-90-001) shall be used.

(5) All applicable water quality criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC and 20.6.4.900 NMAC shall be attained at the boundaries of mixing zones. A continuous zone of passage through or around the mixing zone shall be maintained in which the water quality meets all applicable criteria and allows the migration of aquatic life presently common in surface waters of the state with no effect on their populations.

F. Multiple uses: When a surface water of the state has more than a single designated use, the applicable numeric criteria shall be the most stringent of those established for such water.

G. Human health-organism only criteria in Subsection J of 20.6.4.900 NMAC apply to those waters with a designated, existing or attainable aquatic life use. When limited aquatic life is a designated use, the human health-organism only criteria apply only if adopted on a segment-specific basis. The human health-organism only criteria for persistent toxic pollutants, as identified in Subsection J of 20.6.4.900 NMAC, also apply to all tributaries of waters with a designated, existing or attainable aquatic life use.

H. Unclassified waters of the state: An unclassified surface water of the state is presumed to support the uses specified in Section 101(a)(2) of the federal Clean Water Act. As such, it is subject to 20.6.4.98 NMAC if nonperennial or subject to 20.6.4.99 NMAC if perennial. The commission may include an ephemeral unclassified surface water of the state under 20.6.4.97 NMAC only if a use attainability analysis demonstrates pursuant to 20.6.4.15 NMAC that attainment of Section 101(a)(2) uses is not feasible.

I. Exceptions: Numeric criteria for temperature, dissolved solids, dissolved oxygen, sediment or turbidity adopted under the Water Quality Act do not apply when changes in temperature, dissolved solids, dissolved oxygen, sediment or turbidity in a surface water of the state are attributable to:

(1) natural causes (discharges from municipal separate storm sewers are not covered by this exception.); or

(2) the reasonable operation of irrigation and flood control facilities that are not subject to federal or state water pollution control permitting; major reconstruction of storage dams or diversion dams except for emergency actions necessary to protect health and safety of the public are not covered by this exception.

[20.6.4.11 NMAC - Rp 20 NMAC 6.1.1103, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.10 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.12 COMPLIANCE WITH WATER QUALITY STANDARDS: The following provisions apply to determining compliance for enforcement purposes; they do not apply for purposes of determining attainment of uses. The department has developed assessment protocols for the purpose of determining attainment of uses that are available for review from the department's surface water quality bureau.

A. Compliance with acute water quality criteria shall be determined from the analytical results of a single grab sample. Acute criteria shall not be exceeded.

B. Compliance with chronic water quality criteria shall be determined from the arithmetic mean of the analytical results of samples collected using applicable protocols. Chronic criteria shall not be exceeded more than once every three years.

C. Compliance with water quality standards for total ammonia shall be determined by performing the biomonitoring procedures set out in Subsections D and E of 20.6.4.14 NMAC, or by attainment of applicable ammonia criteria set out in Subsections K, L and M of 20.6.4.900 NMAC.

D. Compliance with the human health-organism only criteria shall be determined from the analytical results of representative grab samples, as defined in the water quality management plan. Human health-organism only criteria shall not be exceeded.

E. The commission may establish a numeric water quality criterion at a concentration that is below the minimum quantification level. In such cases, the water quality standard is enforceable at the minimum quantification level.

F. For compliance with hardness-dependent numeric criteria, hardness (as mg $CaCO_3$/L) shall be determined from a sample taken at the same time that the sample for the contaminant is taken.

G. **Compliance schedules:** The commission may allow the inclusion of a schedule of compliance in a NPDES permit issued to an existing facility on a case-by-case basis. Such schedule of compliance will be for the purpose of providing a permittee with adequate time to make treatment facility modifications necessary to comply with water quality based permit limitations determined to be necessary to implement new or revised water quality standards or wasteload allocation. Compliance schedules may be included in NPDES permits at the time of permit renewal or modification and shall be written to require compliance at the earliest practicable time. Compliance schedules shall also specify milestone dates so as to measure progress towards final project completion (e.g., design completion, construction start, construction completion, date of compliance).

H. It is a policy of the commission to allow a temporary standard approved and adopted pursuant to Subsection H of 20.6.4.10 NMAC to be included in the applicable federal Clean Water Act permit as enforceable limits and conditions. The temporary standard and any schedule of actions may be included at the earliest practicable time, and shall specify milestone dates so as to measure progress towards meeting the original standard.

[20.6.4.12 NMAC - Rp 20 NMAC 6.1.1104, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.11 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 4/23/2022]

20.6.4.13 GENERAL CRITERIA: General criteria are established to sustain and protect existing or attainable uses of surface waters of the state. These general criteria apply to all surface waters of the state at all times, unless a specified criterion is provided elsewhere in this part. Surface waters of the state shall be free of any water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or unreasonably interfere with the public welfare or the use of property.

A. **Bottom deposits and suspended or settleable solids:**

(1) Surface waters of the state shall be free of water contaminants including fine sediment particles (less than two millimeters in diameter), precipitates or organic or inorganic solids from other than natural causes that have settled to form layers on or fill the interstices of the natural or dominant substrate in quantities that damage or impair the normal growth, function or reproduction of aquatic life or significantly alter the physical or chemical properties of the bottom.

(2) Suspended or settleable solids from other than natural causes shall not be present in surface waters of the state in quantities that damage or impair the normal growth, function or reproduction of aquatic life or adversely affect other designated uses.

B. **Floating solids, oil and grease:** Surface waters of the state shall be free of oils, scum, grease and other floating materials resulting from other than natural causes that would cause the formation of a visible sheen or visible deposits on the bottom or shoreline, or would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life.

C. **Color:** Color-producing materials resulting from other than natural causes shall not create an aesthetically undesirable condition nor shall color impair the use of the water by desirable aquatic life presently common in surface waters of the state.

D. **Organoleptic quality:**

(1) Flavor of fish: Water contaminants from other than natural causes shall be limited to concentrations that will not impart unpalatable flavor to fish.

(2) Odor and taste of water: Water contaminants from other than natural causes shall be limited to concentrations that will not result in offensive odor or taste arising in a surface water of the state or otherwise interfere with the reasonable use of the water.

E. Plant nutrients: Plant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.

F. Toxic pollutants:

(1) Except as provided in 20.6.4.16 NMAC, surface waters of the state shall be free of toxic pollutants from other than natural causes in amounts, duration, concentrations, or combinations that affect the propagation of fish or that are toxic to humans, livestock or other animals, fish or other aquatic organisms, wildlife using aquatic environments for habitation or aquatic organisms for food, or that will or can reasonably be expected to bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels that will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic organisms.

(2) Pursuant to this section, the human health-organism only criteria shall be as set out in 20.6.4.900 NMAC. When a human health-organism only criterion is not listed in 20.6.4.900 NMAC, the following provisions shall be applied in accordance with 20.6.4.11, 20.6.4.12 and 20.6.4.14 NMAC.

(a) The human health-organism only criterion shall be the recommended human health criterion for "consumption of organisms only" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act. In determining such criterion for a cancer-causing toxic pollutant, a cancer risk of 10^{-5} (one cancer per 100,000 exposed persons) shall be used.

(b) When a numeric criterion for the protection of human health for the consumption of organism only has not been published by the U.S. environmental protection agency, a quantifiable criterion may be derived from data available in the U.S. environmental protection agency's Integrated Risk Information System (IRIS) using the appropriate formula specified in *Methodology for Deriving Ambient Water Quality Criteria for The Protection Of Human Health (2000)*, EPA-822-B-00-004.

(3) Pursuant to this section, the chronic aquatic life criteria shall be as set out in 20.6.4.900 NMAC. When a chronic aquatic life criterion is not listed in 20.6.4.900 NMAC, the following provisions shall be applied in sequential order in accordance with 20.6.4.11, 20.6.4.12 and 20.6.4.14 NMAC.

(a) The chronic aquatic life criterion shall be the "freshwater criterion continuous concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act;

(b) If the U.S. environmental protection agency has not published a chronic aquatic life criterion, a geometric mean LC-50 value shall be calculated for the particular species, genus or group that is representative of the form of life to be preserved, using the results of toxicological studies published in scientific journals.

(i) The chronic aquatic life criterion for a toxic pollutant that does not bioaccumulate shall be ten percent of the calculated geometric mean LC-50 value; and

(ii) The chronic aquatic life criterion for a toxic pollutant that does bioaccumulate shall be: the calculated geometric mean LC-50 adjusted by a bioaccumulation factor for the particular species, genus or group representative of the form of life to be preserved, but when such bioaccumulation factor has not been published, the criterion shall be one percent of the calculated geometric mean LC-50 value.

(4) Pursuant to this section, the acute aquatic life criteria shall be as set out in 20.6.4.900 NMAC. When an acute aquatic life criterion is not listed in 20.6.4.900 NMAC, the acute aquatic life criterion shall be the "freshwater criterion maximum concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act.

(5) Within 90 days of the issuance of a final NPDES permit containing a numeric criterion selected or calculated pursuant to Paragraph (2), Paragraph (3) or Paragraph (4) of Subsection F of this section, the department shall petition the commission to adopt such criterion into these standards.

G. Radioactivity: The radioactivity of surface waters of the state shall be maintained at the lowest practical level and shall in no case exceed the criteria set forth in the New Mexico Radiation Protection Regulations, 20.3.1 and 20.3.4 NMAC.

H. **Pathogens:** Surface waters of the state shall be free of pathogens from other than natural causes in sufficient quantity to impair public health or the designated, existing or attainable uses of a surface water of the state.

I. **Temperature:** Maximum temperatures for surface waters of the state have been specified in 20.6.4.97 through 20.6.4.900 NMAC. However, the introduction of heat by other than natural causes shall not increase the temperature, as measured from above the point of introduction, by more than 2.7°C (5°F) in a stream, or more than 1.7°C (3°F) in a lake or reservoir. In no case will the introduction of heat be permitted when the maximum temperature specified for the reach would thereby be exceeded. These temperature criteria shall not apply to impoundments constructed offstream for the purpose of heat disposal. High water temperatures caused by unusually high ambient air temperatures are not violations of these criteria.

J. **Turbidity:** Turbidity attributable to other than natural causes shall not reduce light transmission to the point that the normal growth, function or reproduction of aquatic life is impaired or that will cause substantial visible contrast with the natural appearance of the water. Activities or discharges shall not cause turbidity to increase more than 10 NTU over background turbidity when the background turbidity, measured at a point immediately upstream of the activity, is 50 NTU or less, nor to increase more than twenty percent when the background turbidity is more than 50 NTU. However, limited-duration turbidity increases caused by dredging, construction or other similar activities may be allowed provided all practicable turbidity control techniques have been applied and all appropriate permits, certifications and approvals have been obtained.

K. **Total dissolved solids (TDS):** TDS attributable to other than natural causes shall not damage or impair the normal growth, function or reproduction of animal, plant or aquatic life. TDS shall be measured by either the "calculation method" (sum of constituents) or the filterable residue method. Approved test procedures for these determinations are set forth in 20.6.4.14 NMAC.

L. **Dissolved gases:** Surface waters of the state shall be free of nitrogen and other dissolved gases at levels above one hundred ten percent saturation when this supersaturation is attributable to municipal, industrial or other discharges.

M. **Biological integrity:** Surface waters of the state shall support and maintain a balanced and integrated community of aquatic organisms with species composition, diversity and functional organization comparable to those of natural or minimally impacted water bodies of a similar type and region.

[20.6.4.13 NMAC - Rp 20 NMAC 6.1.1105, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.14 SAMPLING AND ANALYSIS:

A. Sampling and analytical techniques shall conform with methods described in the following references unless otherwise specified by the commission pursuant to a petition to amend these standards:

(1) "*Guidelines Establishing Test Procedures For The Analysis Of Pollutants Under The Clean Water Act*," 40 CFR Part 136 or any test procedure approved or accepted by EPA using procedures provided in 40 CFR Parts 136.3(d), 136.4, and 136.5;

(2) *Standard Methods For The Examination Of Water And Wastewater*, latest edition, American public health association;

(3) *Methods For Chemical Analysis Of Water And Waste*, and other methods published by EPA office of research and development or office of water;

(4) *Techniques Of Water Resource Investigations Of The U.S. Geological Survey*;

(5) *Annual Book Of ASTM Standards*: volumes 11.01 and 11.02, water (I) and (II), latest edition, ASTM international;

(6) *Federal Register*, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations;

(7) *National Handbook Of Recommended Methods For Water-Data Acquisition*, latest edition, prepared cooperatively by agencies of the United States government under the sponsorship of the U.S. geological survey; or

(8) *Federal Register*, latest methods published for monitoring pursuant to the Safe Drinking Water Act regulations.

B. **Bacteriological Surveys:** The monthly geometric mean shall be used in assessing attainment of criteria when a minimum of five samples is collected in a 30-day period.

C. **Sampling Procedures:**

(1) Streams: Stream monitoring stations below discharges shall be located a sufficient distance downstream to ensure adequate vertical and lateral mixing.

(2) Lakes: Sampling stations in lakes shall be located at least 250 feet from a discharge.

(3) Lakes: Except for the restriction specified in Paragraph (2) of this subsection, lake sampling stations shall be located at any site where the attainment of a water quality criterion is to be assessed. Water quality measurements taken at intervals in the entire water column at a sampling station shall be averaged for the epilimnion, or in the absence of an epilimnion, for the upper one-third of the water column of the lake to determine attainment of criteria, except that attainment of criteria for toxic pollutants shall be assessed during periods of complete vertical mixing, e.g., during spring or fall turnover, or by taking depth-integrated composite samples of the water column.

D. Acute toxicity of effluent to aquatic life shall be determined using the procedures specified in U.S. environmental protection agency "*Methods for Measuring The Acute Toxicity of Effluents and Receiving Waters To Freshwater and Marine Organisms*" (5th Ed., 2002, EPA 821-R-02-012), or latest edition thereof if adopted by EPA at 40 CFR Part 136, which is incorporated herein by reference. Acute toxicities of substances shall be determined using at least two species tested in whole effluent and a series of effluent dilutions. Acute toxicity due to discharges shall not occur within the wastewater mixing zone in any surface water of the state with an existing or designated aquatic life use.

E. Chronic toxicity of effluent or ambient surface waters of the state to aquatic life shall be determined using the procedures specified in U.S. environmental protection agency "*Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Waters To Freshwater Organisms*" (4th Ed., 2002, EPA 821-R-02-013), or latest edition thereof if adopted by EPA at 40 CFR Part 136, which is incorporated herein by reference. Chronic toxicities of substances shall be determined using at least two species tested in ambient surface water or whole effluent and a series of effluent dilutions. Chronic toxicity due to discharges shall not occur at the critical low flow, or any flow greater than the critical low flow, in any surface water of the state with an existing or designated aquatic life use more than once every three years.

F. Emerging Contaminants Monitoring: The department may require monitoring, analysis and reporting of emerging contaminants as a condition of a federal permit under Section 401 of the federal Clean Water Act.

[20.6.4.14 NMAC - Rp 20 NMAC 6.1.1106, 10/12/2000; Rn, 20.6.4.13 NMAC, 5/23/2005 & A, 5/23/2005; A, 12/1/2010; A 4/23/2022]

20.6.4.15 USE ATTAINABILITY ANALYSIS:

A. **Regulatory requirements for a use attainability analysis.** Whenever a use attainability analysis is conducted, it shall be subject to the requirements and limitations set forth in 40 CFR Part 131, Water Quality Standards; specifically, Subsections 131.3(g), 131.10(g), 131.10(h) and 131.10(j) shall be applicable. In accordance with 40 CFR 131.10(i), and 20.6.4.10 NMAC, the amendment of a designated use, based on an existing use with more stringent criteria, does not require a use attainability analysis.

(1) The commission may remove a designated use, that is not an existing use, specified in Section 101(a)(2) of the federal Clean Water Act or adopt subcategories of a use in Section 101(a)(2) of the federal Clean Water Act requiring less stringent criteria only if a use attainability analysis demonstrates that attaining the use is not feasible because of a factor listed in 40 CFR 131.10(g). Uses in Section 101(a)(2) of the federal Clean Water Act, which refer to the protection and propagation of fish, shellfish and wildlife and recreation in and on the water, are also specified in Subsection B of 20.6.4.6 NMAC.

(2) A designated use cannot be removed if it is an existing use unless a use requiring more stringent criteria is designated.

B. **Methods for developing a use attainability analysis.** A use attainability analysis shall assess the physical, chemical, biological, economic or other factors affecting the attainment of a use. The analysis shall rely on scientifically defensible methods such as the methods described in the following documents:

(1) *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses*, volume I (November 1983) and volume III (November 1984) or latest editions, United States environmental protection agency, office of water, regulations and standards, Washington, D.C., for the evaluation of aquatic life or wildlife uses;

(2) the department's *Hydrology Protocol*, latest edition, approved by the commission, for identifying ephemeral, intermittent, and perennial waters; or

(3) *Interim Economic Guidance For Water Quality Standards - Workbook*, March 1995, United States environmental protection agency, office of water, Washington, D.C. for evaluating economic impacts.

C. **Determining the highest attainable use.** If the use attainability analysis determines that the designated use is not attainable based on one of the factors in 40 CFR 131.10(g), the use attainability analysis shall demonstrate the support for removing the designated use and then determine the highest attainable use, as defined in 40 CFR 131.3(m), for the protection and propagation of fish, shellfish and wildlife and recreation in and on the water based on methods described in Subsection B of this section.

D. Process to amend a designated use through a use attainability analysis.

(1) The process for developing a use attainability analysis and petitioning the commission for removing a designated use and establishing the highest attainable use shall be done in accordance with the State's current *Water Quality Management Plan/Continuing Planning Process*.

(2) If the findings of a use attainability analysis, conducted by the department, in accordance with the department's *Hydrology Protocol* (latest edition) demonstrates that federal Clean Water Act Section 101(a)(2) uses, that are not existing uses, are not feasible in an ephemeral water body due to the factor in 40 CFR 131.10(g)(2), the department may consider proceeding with the expedited use attainability analysis process in accordance with the State's current *Water Quality Management Plan/Continuing Planning Process.* The following elements must be met for the expedited use attainability analysis process to be authorized and implemented:

(a) The department is the primary investigator of the use attainability analysis;

(b) The use attainability analysis determined, through the application of the *Hydrology Protocol*, that the water being investigated is ephemeral and has no effluent discharges of sufficient volume that could compensate for the low-flow;

(c) The use attainability analysis determined that the criteria associated with the existing uses of the water being investigated are not more stringent than those in 20.6.4.97 NMAC;

(d) The designated uses in 20.6.4.97 NMAC have been determined to be the highest attainable uses for the water being analyzed;

(e) The department posted the use attainability analysis on its water quality standards website and notified its interested parties list of a 30-day public comment period;

(f) The department reviewed and responded to any comments received during the 30-day public comment period ; and

(g) The department submitted the use attainability analysis and response to comments to region 6 EPA for technical approval.

If EPA approves the revision under section 303(c) of the Clean Water Act, the water shall be subject to 20.6.4.97 NMAC for federal Clean Water Act purposes. The use attainability analysis, the technical support document, and the applicability of 20.6.4.97 NMAC to the water shall be posted on the department's water quality standards website. The department shall periodically petition the commission to list ephemeral waters under Subsection C of 20.6.4.97 NMAC and to incorporate changes to classified segments as appropriate.

E. Use attainability analysis conducted by an entity other than the department. Any person may submit notice to the department stating their intent to conduct a use attainability analysis.

(1) The proponent shall provide such notice along with a work plan supporting the development of a use attainability analysis to the department and region 6 EPA for review and comment.

(2) Upon approval of the work plan by the department, the proponent shall conduct the use attainability analysis in accordance with the applicable portions of Subsections A through D of this Section and implement public noticing in accordance with the approved work plan.

(3) Work plan elements. The work plan shall identify, at a minimum:

(a) the waterbody of concern and the reasoning for conducting a use attainability analysis;

(b) the source and validity of data to be used to demonstrate whether the current designated use is not attainable;

(c) the factors in 40 CFR 131.10(g) affecting the attainment of that use;

(d) a description of the data being proposed to be used to demonstrate the highest attainable use;

(e) the provisions for consultation with appropriate state and federal agencies;

(f) a description of how stakeholders and potentially affected tribes will be identified and engaged;

(g) a description of the public notice mechanisms to be employed; and

(h) the expected timelines outlining the administrative actions to be taken for a rulemaking petition, pending the outcome of the use attainability analysis.

(4) Upon completion of the use attainability analysis, the proponent shall submit the data, findings and conclusions to the department, and provide public notice of the use attainability analysis in accordance with the approved work plan.

(5) Pending the conclusions of the use attainability analysis and as described in the approved work plan, the department or the proponent may petition the commission to modify the designated use. The cost of such use attainability analysis shall be the responsibility of the proponent. Subsequent costs associated with the administrative rulemaking process shall be the responsibility of the petitioner.
[20.6.4.15 NMAC - Rp 20 NMAC 6.1.1107, 10/12/2000; Rn, 20.6.4.14 NMAC, 5/23/2005; A, 5/23/2005; A, 7/17/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.16 PLANNED USE OF A PISCICIDE: The use of a piscicide registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. Section 136 *et seq*., and under the New Mexico Pesticide Control Act (NMPCA), Section 76-4-1 *et seq*. NMSA 1978 (1973) in a surface water of the state, shall not be a violation of Subsection F of 20.6.4.13 NMAC when such use is covered by a federal national pollutant discharge elimination system (NPDES) permit or has been approved by the commission under procedures provided in this section. The use of a piscicide which is covered by a NPDES permit shall require no further review by the commission and the person whose application is covered by the NPDES permit shall meet the additional notification and monitoring requirements outlined in Subsection G of 20.6.4.16 NMAC. The commission may approve the reasonable use of a piscicide under this section if the proposed use is not covered by a NPDES permit to further a Clean Water Act objective to restore and maintain the physical or biological integrity of surface waters of the state, including restoration of native species.

A. Any person seeking commission approval of the use of a piscicide not covered by a NPDES permit shall file a written petition concurrently with the commission and the surface water bureau of the department. The petition shall contain, at a minimum, the following information:

(1) petitioner's name and address;

(2) identity of the piscicide and the period of time (not to exceed five years) or number of applications for which approval is requested;

(3) documentation of registration under FIFRA and NMPCA and certification that the petitioner intends to use the piscicide according to the label directions, for its intended function;

(4) target and potential non-target species in the treated waters and adjacent riparian area, including threatened or endangered species;

(5) potential environmental consequences to the treated waters and the adjacent riparian area, and protocols for limiting such impacts;

(6) surface water of the state proposed for treatment;

(7) results of pre-treatment survey;

(8) evaluation of available alternatives and justification for selecting piscicide use;

(9) documentation of notice requesting public comment on the proposed use within a 30-day period, including information as described in Paragraphs (1), (2) and (6) of Subsection A of 20.6.4.16 NMAC, provided to:

(a) local political subdivisions;

(b) local water planning entities;

(c) local conservancy and irrigation districts; and

(d) local media outlets, except that the petitioner shall only be required to publish notice in a newspaper of circulation in the locality affected by the proposed use.

(10) copies of public comments received in response to the publication of notice and the petitioner's responses to public comments received;

(11) post-treatment assessment monitoring protocol; and

(12) any other information required by the commission.

B. Within 30 days of receipt of the petition, the department shall review the petition and file a recommendation with the commission to grant, grant with conditions or deny the petition. The recommendation shall include reasons, and a copy shall be sent to the petitioner by certified mail.

C. The commission shall review the petition, the public comments received under Paragraphs (9) and (10) of Subsection A of 20.6.4.16 NMAC, the petitioner's responses to public comments and the department's technical recommendations for the petition. A public hearing shall be held if the commission determines there is substantial public interest. The commission shall notify the petitioner and those commenting on the petition of the decision whether to hold a hearing and the reasons therefore in writing.

D. If the commission determines there is substantial public interest a public hearing shall be held within 90 days of receipt of the department's recommendation in the locality affected by the proposed use in accordance with 20.1.3 NMAC, Adjudicatory Procedures - Water Quality Control Commission. Notice of the hearing shall be given in writing by the petitioner to individuals listed under Subsection A of 20.6.4.16 NMAC as well as to individuals who provided public comment under that subsection at least 30 days prior to the hearing.

E. In a hearing provided for in this section or, if no hearing is held, in a commission meeting, the registration of a piscicide under FIFRA and NMPCA shall provide a rebuttable presumption that the determinations of the EPA Administrator in registering the piscicide, as outlined in 7 U.S.C. Section 136a(c)(5), are valid. For purposes of this Section the rebuttable presumptions regarding the piscicide include:

(1) Its composition is such as to warrant the proposed claims for it;

(2) Its labeling and other material submitted for registration comply with the requirements of FIFRA and NMPCA;

(3) It will perform its intended function without unreasonable adverse effects on the environment; and

(4) When used in accordance with all FIFRA label requirements it will not generally cause unreasonable adverse effects on the environment.

(5) "Unreasonable adverse effects on the environment" has the meaning provided in FIFRA, 7 U.S.C. Section 136(bb): "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."

F. After a public hearing, or commission meeting if no hearing is held, the commission may grant the petition in whole or in part, may grant the petition subject to conditions, or may deny the petition. In granting any petition in whole or part or subject to conditions, the commission shall require the petitioner to implement post-treatment assessment monitoring and provide notice to the public in the immediate and near downstream vicinity of the application prior to and during the application.

G. Any person whose application is covered by a NPDES permit shall provide written notice to local entities as described in Subsection A of 20.6.4.16 NMAC and implement post-treatment assessment monitoring within the application area as described in Subsection F of 20.6.4.16 NMAC.

[20.6.4.16 NMAC - Rn, Paragraph (6) of Subsection F of 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005; A, 3/2/2017]

20.6.4.17 - 20.6.4.49 [**RESERVED**]

20.6.4.50 BASINWIDE PROVISIONS - Special provisions arising from interstate compacts, international treaties or court decrees or that otherwise apply to a basin are contained in 20.6.4.51 through 20.6.4.59 NMAC.

[20.6.4.50 NMAC - N, 5/23/2005]

20.6.4.51 [**RESERVED**]

20.6.4.52 PECOS RIVER BASIN - In order to protect existing and designated uses, it is a goal of the state of New Mexico to prevent increases in TDS in the Pecos river above the following benchmark values, which are expressed as flow-weighted, annual average concentrations, at three USGS gaging stations: at Santa Rosa 500 mg/L; near Artesia 2,700 mg/L; and near Malaga 3,600 mg/L. The benchmark values serve to guide state action. They are adopted pursuant to the New Mexico Water Quality Act, not the Clean Water Act.

[20.6.4.52 NMAC - N, 12/1/2010]

20.6.4.53 [**RESERVED**]

20.6.4.54 COLORADO RIVER BASIN - For the tributaries of the Colorado river system, the state of New Mexico will cooperate with the Colorado river basin states and the federal government to support and implement the salinity policy and program outlined in the most current "review, water quality standards for salinity, Colorado river system" or equivalent report by the Colorado river salinity control forum.

A. Numeric criteria expressed as the flow-weighted annual average concentration for salinity are established at three points in the Colorado river basin as follows: below Hoover dam, 723 mg/L; below Parker dam, 747 mg/L; and at Imperial dam, 879 mg/L.

B. As a part of the program, objectives for New Mexico shall include the elimination of discharges of water containing solids in solution as a result of the use of water to control or convey fly ash from coal-fired electric generators, wherever practicable.

[20.6.4.54 NMAC - Rn, Paragraphs (1) through (3) of Subsection K of 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005]

20.6.4.55 - 20.6.4.96 [**RESERVED**]

20.6.4.97 EPHEMERAL WATERS: Ephemeral surface waters of the state as identified below and additional ephemeral waters as identified on the department's water quality standards website pursuant to Paragraph (2) of Subsection D of 20.6.4.15 NMAC are subject to the designated uses and criteria as specified in this section. Ephemeral waters classified in 20.6.4.101-899 NMAC are subject to the designated uses and criteria as specified in those sections.

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.

C. Waters:

(1) the following waters are designated in the Rio Grande basin:

(a) Cunningham gulch from Santa Fe county road 55 upstream 1.4 miles to a point upstream of the Lac minerals mine, identified as Ortiz mine on U.S. geological survey topographic maps;

(b) an unnamed tributary from Arroyo Hondo upstream 0.4 miles to the Village of Oshara water reclamation facility outfall;

(c) an unnamed tributary from San Pedro creek upstream 0.8 miles to the PAA-KO community sewer outfall;

(d) Inditos draw from the crossing of an unnamed road along a power line one-quarter mile west of McKinley county road 19 upstream to New Mexico highway 509;

(e) an unnamed tributary from the diversion channel connecting Blue canyon and Socorro canyon upstream 0.6 miles to the New Mexico firefighters academy treatment facility outfall;

(f) an unnamed tributary from the Albuquerque metropolitan arroyo flood control authority (AMAFCA) Rio Grande south channel upstream of the crossing of New Mexico highway 47 upstream to I-25;

(g) the south fork of Cañon del Piojo from Cañon del Piojo upstream 1.2 miles to an unnamed tributary;

(h) an unnamed tributary from the south fork of Cañon del Piojo upstream 1 mile to the Resurrection mine outfall;

(i) Arroyo del Puerto from San Mateo creek upstream 6.8 miles to the Ambrosia Lake mine entrance road;

(j) an unnamed tributary from San Mateo creek upstream 1.5 miles to the Roca Honda mine facility outfall;

(k) San Isidro arroyo, including unnamed tributaries to San Isidro arroyo, from Arroyo Chico upstream to its headwaters;

(l) Arroyo Tinaja, including unnamed tributaries to Arroyo Tinaja, from San Isidro arroyo upstream to 2 miles northeast of the Cibola national forest boundary;

(m) Mulatto canyon from Arroyo Tinaja upstream to 1 mile northeast of the Cibola national forest boundary; and

(n) Doctor arroyo, including unnamed tributaries to Doctor arroyo, from San Isidro arroyo upstream to its headwaters, and excluding Doctor Spring and Doctor arroyo from the spring to its confluence with the unnamed tributary approximately one-half mile downstream of the spring.

(2) the following waters are designated in the Pecos river basin:

(a) an unnamed tributary from Hart canyon upstream 1 mile to South Union road;

(b) Aqua Chiquita from Rio Peñasco upstream to McEwan canyon; and

(c) Grindstone canyon upstream of Grindstone reservoir.

(3) the following waters are designated in the Canadian river basin:

(a) Bracket canyon upstream of the Vermejo river;

(b) an unnamed tributary from Bracket canyon upstream 2 miles to the Ancho mine; and

(c) Gachupin canyon from the Vermejo river upstream 2.9 miles to an unnamed west tributary near the Ancho mine outfall.

(4) in the San Juan river basin an unnamed tributary of Kim-me-ni-oli wash upstream of the mine outfall.

(5) the following waters are designated in the Little Colorado river basin:

(a) Defiance draw from County Road 1 to upstream of West Defiance Road; and

(b) an unnamed tributary of Defiance draw from McKinley county road 1 upstream to New Mexico highway 264.

(6) the following waters are designated in the closed basins:

(a) in the Tularosa river closed basin San Andres canyon downstream of South San Andres canyon; and

(b) in the Mimbres river closed basin San Vicente arroyo from the Mimbres river upstream to Maudes canyon.

[20.6.4.97 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 12/17/2019; A, 4/23/2022]

20.6.4.98 INTERMITTENT WATERS: All non-perennial surface waters of the state, except those ephemeral waters included under section 20.6.4.97 NMAC or classified in 20.6.4.101-899 NMAC.

A. Designated uses: livestock watering, wildlife habitat, marginal warmwater aquatic life and primary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.98 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.99 PERENNIAL WATERS: All perennial surface waters of the state except those classified in 20.6.4.101-899 NMAC.

A. Designated uses: Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.99 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.100 [**RESERVED**]

20.6.4.101 RIO GRANDE BASIN: The main stem of the Rio Grande from the international boundary with Mexico upstream to one mile downstream of Percha dam.

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

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.

(2) At mean monthly flows above 350 cfs, the monthly average concentration for: TDS 2,000 mg/L or less, sulfate 500 mg/L or less and chloride 400 mg/L or less.

C. Remarks: sustained flow in the Rio Grande below Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.

[20.6.4.101 NMAC - Rp 20 NMAC 6.1.2101, 10/12/2010; A, 12/15/2001; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.102 RIO GRANDE BASIN: The main stem of the Rio Grande from one mile downstream of Percha dam upstream to Caballo dam.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

C. Remarks: sustained flow in the Rio Grande downstream of Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.

[20.6.4.102 NMAC - Rp 20 NMAC 6.1.2102, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.103 RIO GRANDE BASIN: Perennial reaches of tributaries to the Rio Grande in Sierra and Socorro counties not specifically identified under other sections of 20.6.4 NMAC, excluding waters on tribal lands.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.103 NMAC - Rp 20 NMAC 6.1.2103, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

[**NOTE:** This segment was divided effective 4/23/2022. The standards for the main stem of the Rio Grande from the headwaters of Caballo reservoir upstream to Elephant Butte dam, perennial reaches of Palomas creek, perennial reaches of Rio Salado, perennial reaches of Percha creek, perennial reaches of Alamosa creek, Las Animas creek, and perennial reaches of Abo arroyo are under 20.6.4.112 NMAC.]

20.6.4.104 RIO GRANDE BASIN: Caballo and Elephant Butte reservoir.

A. **Designated uses:** irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.104 NMAC - Rp 20 NMAC 6.1.2104, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.105 RIO GRANDE BASIN: The main stem of the Rio Grande from the headwaters of Elephant Butte reservoir upstream to Alameda bridge (Corrales bridge), excluding waters on Isleta pueblo.

A. **Designated uses:** irrigation, marginal warmwater aquatic life, livestock watering, public water supply, wildlife habitat and primary contact.

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS l,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.105 NMAC - Rp 20 NMAC 6.1.2105, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.106 RIO GRANDE BASIN: The main stem of the Rio Grande from Alameda bridge (Corrales bridge) upstream to the Angostura diversion works, excluding waters on Santa Ana pueblo, and intermittent water in the Jemez river below the Jemez pueblo boundary, excluding waters on Santa Ana and Zia pueblos, that enters the main stem of the Rio Grande. Portions of the Rio Grande in this segment are under the joint jurisdiction of the state and Sandia pueblo.

A. **Designated uses:** irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Grande.

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS 1,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.106 NMAC - Rp 20 NMAC 6.1.2105.1, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.107 RIO GRANDE BASIN: The Jemez river from the Jemez pueblo boundary upstream to Soda dam near the town of Jemez Springs and perennial reaches of Vallecito creek.

A. **Designated uses:** coldwater aquatic life, primary contact, irrigation, livestock watering and wildlife habitat; and public water supply on Vallecito creek.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F).

[20.6.4.107 NMAC - Rp 20 NMAC 6.1.2105.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.108 RIO GRANDE BASIN: Perennial reaches of the Jemez river upstream of Soda dam near the town of Jemez Springs and perennial reaches of tributaries to the Jemez river except those not specifically identified under other sections of 20.6.4 NMAC, and perennial reaches of the Guadalupe river and perennial reaches of tributaries to the Guadalupe river, and Calaveras canyon.

A. **Designated uses:** domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less (800 µS/cm or less on Sulphur creek); the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and pH within the range of 2.0 to 8.8 on Sulphur creek.

[20.6.4.108 NMAC - Rp 20 NMAC 6.1.2106, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, 4/23/2022]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.124 NMAC. The standards for San Gregorio lake are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.109 RIO GRANDE BASIN: Perennial reaches of Bluewater creek excluding Bluewater lake and waters on tribal lands, Rio Moquino upstream of Laguna pueblo, Seboyeta creek, Rio Paguate upstream of Laguna pueblo, the Rio Puerco upstream of the northern boundary of Cuba, and all other perennial reaches of tributaries to the Rio Puerco, including the Rio San Jose in Cibola county from the USGS gaging station at Correo upstream to Horace springs excluding waters on tribal lands.

A. **Designated uses:** coldwater aquatic life, domestic water supply, fish culture, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on La Jara creek.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.109 NMAC - Rp 20 NMAC 6.1.2107, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

[**NOTE:** The standards for Bluewater lake are in 20.6.4.135 NMAC, effective 7/10/2012]

20.6.4.110 RIO GRANDE BASIN: The main stem of the Rio Grande from Angostura diversion works upstream to Cochiti dam, excluding the reaches on San Felipe, Kewa and Cochiti pueblos.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: pH within the range of 6.6 to 9.0 and temperature 25°C (77°F) or less.

[20.6.4.110 NMAC - Rp 20 NMAC 6.1.2108, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.111 RIO GRANDE BASIN: Perennial reaches of Las Huertas creek from the San Felipe pueblo boundary to the headwaters.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.111 NMAC - Rp 20 NMAC 6.1.2108.5, 10/12/2000; A, 7/25/2001; A, 5/23/2005; A-12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.125 NMAC.]

20.6.4.112 RIO GRANDE BASIN: The main stem of the Rio Grande from the headwaters of Caballo reservoir upstream to Elephant Butte dam, perennial reaches of Palomas creek, perennial reaches of Rio Salado, perennial reaches of Percha creek, perennial reaches of Alamosa creek, Las Animas creek, and perennial reaches of Abo arroyo.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

C. **Remarks:** flow in this reach of the Rio Grande main stem is dependent upon release from Elephant Butte dam.

[20.6.4.112 NMAC - Rp 20 NMAC 6.1.2109, 10/12/2000; A, 5/23/2005; Repealed, 12/1/2010; A, 4/23/2022]

20.6.4.113 RIO GRANDE BASIN: The Santa Fe river and perennial reaches of its tributaries from the Cochiti pueblo boundary upstream to the outfall of the Santa Fe wastewater treatment facility.

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

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.

[20.6.4.113 NMAC - Rp 20 NMAC 6.1.2110, 10/12/2000; A, 10/11/2002; A, 5/23/2005; A, 12/1/2010; A, 2/14/2013]

20.6.4.114 RIO GRANDE BASIN: The main stem of the Rio Grande from the Cochiti pueblo boundary upstream to Rio Pueblo de Taos excluding waters on San Ildefonso, Santa Clara and Ohkay Owingeh pueblos, Embudo creek from its mouth on the Rio Grande upstream to the Picuris Pueblo boundary, the Santa Cruz river from the Santa Clara pueblo boundary upstream to the Santa Cruz dam, the Rio Tesuque except waters on the Tesuque and Pojoaque pueblos, and the Pojoaque river from the San Ildefonso pueblo boundary upstream to the Pojoaque pueblo boundary. Some Rio Grande waters in this segment are under the joint jurisdiction of the state and San Ildefonso pueblo.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, primary contact and warmwater aquatic life; and public water supply on the main stem Rio Grande.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: 6T3 temperature 22°C (71.6°F) and maximum temperature 25°C (78.8°F). In addition, the following criteria based on a 12-month rolling average are applicable to the public water supply use for monitoring and public disclosure purposes only:

Radionuclide	pCi/L
Americium-241	1.9
Cesium-137	6.4
Plutonium-238	1.5
Plutonium-239/240	1.5
Strontium-90	3.5
Tritium	4,000

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS 500 mg/L or less, sulfate 150 mg/L or less and chloride 25 mg/L or less.

[20.6.4.114 NMAC - Rp 20 NMAC 6.1.2111, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.115 RIO GRANDE BASIN: The perennial reaches of Rio Vallecitos, perennial reaches of tributaries to Rio Vallecitos except Hopewell lake, and perennial reaches of Rio del Oso and perennial reaches of El Rito creek above the town of El Rito.

A. Designated uses: domestic water supply, irrigation, high quality coldwater aquatic life, livestock watering, wildlife habitat and primary contact; public water supply on the Rio Vallecitos and El Rito creek.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.115 NMAC - Rp 20 NMAC 6.1.2112, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, 4/23/2022]

[**NOTE:** The standards for Hopewell lake are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.116 RIO GRANDE BASIN: The Rio Chama from its mouth on the Rio Grande upstream to Abiquiu reservoir, perennial reaches of the Rio Tusas, perennial reaches of the Rio Ojo Caliente, perennial reaches of Abiquiu creek and perennial reaches of El Rito creek downstream of the town of El Rito.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 31°C (87.8°F) or less.

[20.6.4.116 NMAC - Rp 20 NMAC 6.1.2113, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 4/23/2022]

20.6.4.117 RIO GRANDE BASIN: Abiquiu reservoir.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.117 NMAC - Rp 20 NMAC 6.1.2114, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.118 RIO GRANDE BASIN: The Rio Chama from the headwaters of Abiquiu reservoir upstream to El Vado reservoir and perennial reaches of the Rio Gallina and Rio Puerco de Chama north of state highway 96. Some Rio Chama waters in this segment are under the joint jurisdiction of the state and the Jicarilla Apache tribe.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 26°C (78.8°F) or less.

[20.6.4.118 NMAC - Rp 20 NMAC 6.1.2115, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.119 RIO GRANDE BASIN: All perennial reaches of tributaries to the Rio Chama above Abiquiu dam, except Canjilon lakes a, c, e and f and the Rio Gallina and Rio Puerco de Chama north of state highway 96 and excluding waters on Jicarilla Apache reservation, and the main stem of the Rio Chama from the headwaters of El Vado reservoir upstream to the New Mexico-Colorado line. Some Cañones creek and Rio Chama waters in this segment are under the joint jurisdiction of the state and the Jicarilla Apache tribe.

A. Designated uses: domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Brazos and Rio Chama.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less (1,000 µS or less for Coyote creek); the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.119 NMAC - Rp 20 NMAC 6.1.2116, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

[**NOTE:** The standards for Canjilon lakes a, c, e and f are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.120 RIO GRANDE BASIN: El Vado and Heron reservoirs.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, public water supply, primary contact and coldwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.120 NMAC - Rp 20 NMAC 6.1.2117, 10/12/2000; A. 5/23/2005; A, 12/1/2010]

20.6.4.121 RIO GRANDE BASIN: Perennial tributaries to the Rio Grande in Bandelier national monument and their headwaters in Sandoval county and all perennial reaches of tributaries to the Rio Grande in Santa Fe county unless included in other segments and excluding waters on tribal lands.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on Little Tesuque creek, the Rio en Medio, and the Santa Fe river.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.121 NMAC - Rp 20 NMAC 6.1.2118, 10/12/2000; A. 5/23/2005; A, 12/1/2010; A, 2/14/2013]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segments are under 20.6.4.126, 20.6.4.127 and 20.6.4.128 NMAC.]

20.6.4.122 RIO GRANDE BASIN: The main stem of the Rio Grande from Rio Pueblo de Taos upstream to the New Mexico-Colorado line, the Red river from its mouth on the Rio Grande upstream to the mouth of Placer creek, and the Rio Pueblo de Taos from its mouth on the Rio Grande upstream to the mouth

of the Rio Grande del Rancho. Some Rio Grande and Rio Pueblo de Taos waters in this segment are under the joint jurisdiction of the state and Taos pueblo.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.122 NMAC - Rp 20 NMAC 6.1.2119, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.123 RIO GRANDE BASIN: Perennial reaches of the Red river upstream of the mouth of Placer creek, all perennial reaches of tributaries to the Red river, and all other perennial reaches of tributaries to the Rio Grande in Taos and Rio Arriba counties unless included in other segments and excluding waters on Santa Clara, Ohkay Owingeh, Picuris and Taos pueblos.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Pueblo and Rio Fernando de Taos.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less (500 µS/cm or less for the Rio Fernando de Taos); the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and phosphorus (unfiltered sample) less than 0.1 mg/L for the Red river.

[20.6.4.123 NMAC - Rp 20 NMAC 6.1.2120, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.129 NMAC.]

20.6.4.124 RIO GRANDE BASIN: Perennial reaches of Sulphur creek from its confluence with Redondo creek upstream to its headwaters.

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

B. Criteria: the use-specific criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: pH within the range of 2.0 to 9.0, maximum temperature 30ºC (86ºF), and the chronic aquatic life criteria of Subsections I and J of 20.6.4.900 NMAC.

[20.6.4.124 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.125 RIO GRANDE BASIN: Perennial reaches of San Pedro creek from the San Felipe pueblo boundary to the headwaters.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.125 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.126 RIO GRANDE BASIN: Perennial waters within lands managed by the U.S. department of energy (DOE) within Los Alamos National Laboratory (LANL), including but not limited to: Cañon de Valle from LANL stream gage E256 upstream to Burning Ground spring, Sandia canyon ~~from Sigma canyon upstream to LANL NPDES outfall 001~~ at Sigma canyon upstream to Sandia canyon at Bedrock Road, Pajarito canyon from 0.5 miles below Arroyo de La Delfe upstream to Homestead spring, Arroyo de la Delfe from Pajarito canyon to Kieling spring, 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 NMAC are applicable to the designated uses.

[20.6.4.126 NMAC - N, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

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 contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.127 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.128 RIO GRANDE BASIN: Ephemeral and intermittent waters 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 identified in 20.6.4.126 NMAC or 20.6.4.140 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 L of 20.6.4.900 NMAC (*Oncorhynchus* spp. absent).

[20.6.4.128 NMAC - N, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

[**NOTE:** This section was divided effective 4/23/2022. The standards for some intermittent waters within LANL are in 20.6.4.140 NMAC.]

20.6.4.129 RIO GRANDE BASIN: Perennial reaches of the Rio Hondo.

A. **Designated uses:** domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less and phosphorus (unfiltered sample) less than 0.1 mg/L.

[20.6.4.129 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.130 RIO GRANDE BASIN: The Rio Puerco from the Rio Grande upstream to Arroyo Chijuilla, excluding the reaches on Isleta, Laguna and Cañoncito Navajo pueblos. Some waters in this segment are under the joint jurisdiction of the state and Isleta, Laguna or Cañoncito Navajo pueblos.

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

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS l,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.130 NMAC - N, 12/1/2010]

20.6.4.131 RIO GRANDE BASIN: The Rio Puerco from the confluence of Arroyo Chijuilla upstream to the northern boundary of Cuba.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.131 NMAC - N, 12/1/2010]

20.6.4.132 RIO GRANDE BASIN: Rio Grande (Klauer) spring

A. **Designated uses:** domestic water supply, wildlife habitat, livestock watering, coldwater aquatic life use and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.132 NMAC - N, 12/1/2010]

20.6.4.133 RIO GRANDE BASIN: Bull Creek lake, Cow lake, Elk lake, Goose lake, Heart lake, Hidden lake (Lake Hazel), Horseshoe lake, Horseshoe (Alamitos) lake, Jose Vigil lake, Lost lake, Middle Fork lake, Nambe lake, Nat II lake, Nat IV lake, No Fish lake, Pioneer lake, San Leonardo lake, Santa Fe lake, Serpent lake, South Fork lake, Trampas lakes (east and west) and Williams lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.133 NMAC - N, 7/10/2012]

20.6.4.134 RIO GRANDE BASIN: Cabresto lake, Canjilon lakes a, c, e and f, Fawn lakes (east and west), Hopewell lake and San Gregorio lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.134 NMAC - N, 7/10/2012]

20.6.4.135 RIO GRANDE BASIN: Bluewater lake.

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

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.135 NMAC - N, 7/10/2012]

20.6.4.136 RIO GRANDE BASIN: The Santa Fe river from the outfall of the Santa Fe wastewater treatment facility to Guadalupe street.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.136 NMAC - N, 2/14/2013]

20.6.4.137 RIO GRANDE BASIN: The Santa Fe river from Guadalupe street to Nichols reservoir.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.137 NMAC - N, 2/14/2013]

20.6.4.138 RIO GRANDE BASIN: Nichols and McClure reservoirs.

A. Designated uses: high quality coldwater aquatic life, wildlife habitat, primary contact, public water supply and irrigation.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.138 NMAC - N, 2/14/2013]

20.6.4.139 RIO GRANDE BASIN: Perennial reaches of Galisteo creek and perennial reaches of its tributaries from Kewa pueblo upstream to 2.2 miles upstream of Lamy.

A. Designated uses: coolwater aquatic life, primary contact, irrigation, livestock watering, domestic water supply and wildlife habitat; and public water supply on Cerrillos reservoir.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.139 NMAC - N, 2/14/2013]

20.6.4.140 RIO GRANDE BASIN: Effluent canyon from Mortandad canyon to its headwaters, intermittent portions of S-Site canyon from monitoring well MSC 16-06293 to Martin spring, and intermittent portions of Twomile canyon from its confluence with Pajarito canyon to Upper Twomile canyon. (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, marginal warmwater aquatic life and secondary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.140 NMAC - N, 4/23/2022]

~~**20.6.4.141 - 20.6.4.200 [RESERVED]**~~

20.6.4.141 RIO GRANDE BASIN: Sandia canyon from Sandia canyon at Bedrock Road upstream to LANL NPDES outfall 001.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following additional segment-specific criterion applies: a 6T3 temperature of 25 °C (77 °F).
[20.6.4.141 NMAC -N, X/XX/XXXX]

20.6.4.201 PECOS RIVER BASIN: The main stem of the Pecos river from the New Mexico-Texas line upstream to the mouth of the Black river (near Loving).

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

B. **Criteria:**

(l) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: dissolved boron for irrigation use 2,000 µg/L or less.

(2) At all flows above 50 cfs: TDS 20,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 10,000 mg/L or less.
[20.6.4.201 NMAC - Rp 20 NMAC 6.1.2201, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.202 PECOS RIVER BASIN: The main stem of the Pecos river from the mouth of the Black river upstream to lower Tansil dam, including perennial reaches of the Black river, the Delaware river and Blue spring.

A. **Designated uses:** industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. **Criteria:**

(l) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.

(2) At all flows above 50 cfs: TDS 8,500 mg/L or less, sulfate 2,500 mg/L or less and chloride 3,500 mg/L or less.

C. **Remarks:** diversion for irrigation frequently limits summer flow in this reach of the main stem Pecos river to that contributed by springs along the watercourse.
[20.6.4.202 NMAC - Rp 20 NMAC 6.1.2202, 10/12/2000; A, 5/23/2005; A, 12/1/2010]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Lower Tansil Lake and Lake Carlsbad are under 20.6.4.218 NMAC.]

20.6.4.203 PECOS RIVER BASIN: The main stem of the Pecos river from the headwaters of Lake Carlsbad upstream to Avalon dam.

A. **Designated uses:** industrial water supply, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 34°C (93.2°F) or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.203 NMAC - Rp 20 NMAC 6.1.2203, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Lower Tansil Lake and Lake Carlsbad are under 20.6.4.218 and for Avalon Reservoir are under 20.6.4.219 NMAC.]

20.6.4.204 PECOS RIVER BASIN: The main stem of the Pecos river from the headwaters of Avalon reservoir upstream to Brantley dam.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.204 NMAC - Rp 20 NMAC 6.1.2204, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Avalon Reservoir are under 20.6.4.219 NMAC.]

20.6.4.205 PECOS RIVER BASIN: Brantley reservoir.

A. **Designated uses:** irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.205 NMAC - Rp 20 NMAC 6.1.2205, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.206 PECOS RIVER BASIN: Perennial reaches of the Rio Felix and perennial reaches of tributaries to the Rio Hondo downstream of Bonney canyon, excluding North Spring river.

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

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 14,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 6,000 mg/L or less.

[20.6.4.206 NMAC - Rp 20 NMAC 6.1.2206, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 4/23/2022]

[**NOTE:** This segment was divided effective 4/23/2022. The standards for the main stem of the Pecos river from the headwaters of Brantley reservoir upstream to Salt creek (near Acme), perennial reaches of the Rio Peñasco downstream from state highway 24 near Dunken, and perennial reaches of the Rio Hondo are under 20.6.4.231 NMAC.]

20.6.4.207 PECOS RIVER BASIN: The main stem of the Pecos river from Salt creek (near Acme) upstream to Sumner dam.

A. **Designated uses:** irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 8,000 mg/L or less, sulfate 2,500 mg/L or less and chloride 4,000 mg/L or less.

[20.6.4.207 NMAC - Rp 20 NMAC 6.1.2207, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.208 PECOS RIVER BASIN: Perennial reaches of the Rio Peñasco above state highway 24 near Dunken, perennial reaches of tributaries to the Rio Peñasco above state highway 24 near Dunken, perennial reaches of Cox canyon, perennial reaches of the Rio Bonito downstream from state highway 48 (near Angus),

the Rio Ruidoso downstream of the U.S. highway 70 bridge near Seeping Springs lakes, perennial reaches of the Rio Hondo upstream from Bonney canyon and perennial reaches of Agua Chiquita.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 30°C (86°F) or less, and phosphorus (unfiltered sample) less than 0.1 mg/L.

[20.6.4.208 NMAC - Rp 20 NMAC 6.1.2208, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.209 PECOS RIVER BASIN: Perennial reaches of Eagle creek upstream of Alto dam to the Mescalero Apache boundary, perennial reaches of the Rio Bonito upstream of state highway 48 (near Angus) excluding Bonito lake, perennial reaches of tributaries to the Rio Bonito upstream of state highway 48 (near Angus), perennial reaches of the Rio Ruidoso upstream of the U.S. highway 70 bridge near Seeping Springs lakes above and below the Mescalero Apache boundary and perennial reaches of tributaries to the Rio Ruidoso upstream of the U.S. highway 70 bridge near Seeping Springs lakes above and below the Mescalero Apache boundary.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 600 µS/cm or less in Eagle creek, 1,100 µS/cm or less in Bonito creek and 1,500 µS/cm or less in the Rio Ruidoso; phosphorus (unfiltered sample) less than 0.1 mg/L; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.209 NMAC - Rp 20 NMAC 6.1.2209, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, 4/23/2022]
[**NOTE:** The standards for Bonito lake are in 20.6.4.223 NMAC, effective 7/10/2012]

20.6.4.210 PECOS RIVER BASIN: Sumner reservoir.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.210 NMAC - Rp 20 NMAC 6.1.2210, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.211 PECOS RIVER BASIN: The main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Tecolote creek excluding Santa Rosa reservoir.

A. Designated uses: fish culture, irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 3,000 mg/L or less, sulfate 2,000 mg/L or less and chloride 400 mg/L or less.

[20.6.4.211 NMAC - Rp 20 NMAC 6.1.2211, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The standards for Santa Rosa reservoir are in 20.6.4.225 NMAC, effective 7/10/2012]

20.6.4.212 PECOS RIVER BASIN: Perennial tributaries to the main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Santa Rosa dam.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.212 NMAC - Rp 20 NMAC 6.1.2211.1, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.213 PECOS RIVER BASIN: McAllister lake.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.213 NMAC - Rp 20 NMAC 6.1.2211.3, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.214 PECOS RIVER BASIN: Storrie lake.

A. **Designated uses:** coldwater aquatic life, warmwater aquatic life, primary contact, livestock watering, wildlife habitat, public water supply and irrigation storage.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.214 NMAC - Rp 20 NMAC 6.1.2211.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.215 PECOS RIVER BASIN: Perennial reaches of the Gallinas river upstream of the diversion for the Las Vegas municipal reservoir, perennial reaches of tributaries to the Gallinas river upstream of the diversion for the Las Vegas municipal reservoir, perennial reaches of Tecolote creek upstream of Blue creek and all perennial reaches of tributaries to Tecolote creek upstream of Blue creek.

A. **Designated uses:** domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, industrial water supply and primary contact; and public water supply on the Gallinas river.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less (450 µS/cm or less in Wright Canyon creek); the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.215 NMAC - Rp 20 NMAC 6.1.2212, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 2/13/2018; A, 4/23/2022]

[**NOTE:** This segment was divided effective 2/13/2018. The standards for Tecolote creek from I-25 to Blue creek are under 20.6.4.230 NMAC.]

20.6.4.216 PECOS RIVER BASIN: The main stem of the Pecos river from Tecolote creek upstream to Cañon de Manzanita.

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

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.

(2) At all flows above 10 cfs: TDS 250 mg/L or less, sulfate 25 mg/L or less and chloride 5 mg/L or less.

[20.6.4.216 NMAC - Rp 20 NMAC 6.1.2213, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.217 PECOS RIVER BASIN: Perennial reaches of Cow creek and all perennial reaches of its tributaries and the main stem of the Pecos river from Cañon de Manzanita upstream to its headwaters, including perennial reaches of all tributaries thereto except lakes identified in 20.6.4.222 NMAC.

A. **Designated uses:** domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the main stem of the Pecos river.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.217 NMAC - Rp 20 NMAC 6.1.2214, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segments are under 20.6.4.220 and 20.6.4.221 NMAC.]

20.6.4.218 PECOS RIVER BASIN: Lower Tansil lake and Lake Carlsbad.

A. **Designated uses:** industrial water supply, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.
[20.6.4.218 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.219 PECOS RIVER BASIN: Avalon reservoir.

A. **Designated uses:** irrigation storage, livestock watering, wildlife habitat, secondary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.219 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.220 PECOS RIVER BASIN: Perennial reaches of the Gallinas river and perennial reaches of tributaries to the Gallinas river from its mouth upstream to the diversion for the Las Vegas municipal reservoir, except Pecos Arroyo.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.
[20.6.4.220 NMAC - N, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.221 PECOS RIVER BASIN: Pecos Arroyo.

A. **Designated uses:** livestock watering, wildlife habitat, warmwater aquatic life and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL, single sample 940 cfu/100 mL.
[20.6.4.221 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.222 PECOS RIVER BASIN: Johnson lake, Katherine lake, Lost Bear lake, Pecos Baldy lake, Spirit lake, Stewart lake and Truchas lakes (north and south).

A. **Designated uses:** high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.222 NMAC - N, 7/10/2012]

20.6.4.223 PECOS RIVER BASIN: Bonito lake.

A. **Designated uses:** high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering, wildlife habitat and public water supply.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 1100 µS/cm or less; phosphorus (unfiltered sample) less than 0.1 mg/L; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.223 NMAC - N, 7/10/2012]

20.6.4.224 PECOS RIVER BASIN: Monastery lake.

A. **Designated uses:** coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.
[20.6.4.224 NMAC - N, 7/10/2012]

20.6.4.225 PECOS RIVER BASIN: Santa Rosa reservoir.

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

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.225 NMAC - N, 7/10/2012]

20.6.4.226 PECOS RIVER BASIN: Perch lake.

A. **Designated uses:** coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.226 NMAC - N, 7/10/2012]

20.6.4.227 PECOS RIVER BASIN: Lea lake.

A. **Designated uses:** warmwater aquatic life, primary contact and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.227 NMAC - N, 7/10/2012]

20.6.4.228 PECOS RIVER BASIN: Cottonwood lake and Devil's Inkwell.

A. **Designated uses:** coolwater aquatic life, primary contact and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.
[20.6.4.228 NMAC - N, 7/10/2012]

20.6.4.229 PECOS RIVER BASIN: Mirror lake.

A. **Designated uses:** warmwater aquatic life, primary contact and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.
[20.6.4.229 NMAC - N, 7/10/2012]

20.6.4.230 PECOS RIVER BASIN: Perennial reaches of Tecolote creek from I-25 to Blue creek.

A. **Designated uses:** domestic water supply, coolwater aquatic life, irrigation, livestock watering, wildlife habitat, and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.230 NMAC - N, 2/13/2018]

20.6.4.231 PECOS RIVER BASIN: The main stem of the Pecos river from the headwaters of Brantley reservoir upstream to Salt creek (near Acme), perennial reaches of the Rio Peñasco downstream from state highway 24 near Dunken, perennial reaches of North Spring river and perennial reaches of the Rio Hondo downstream of Bonney canyon.

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

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 14,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 6,000 mg/L or less.
[20.6.4.231 NMAC - N, 4/23/2022]

20.6.4.232 - 20.6.4.300 [**RESERVED**]

20.6.4.301 CANADIAN RIVER BASIN: The main stem of the Canadian river from the New Mexico-Texas line upstream to Ute dam, and any flow that enters the main stem from Revuelto creek.

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

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 6,500 mg/L or less at flows above 25 cfs.

[20.6.4.301 NMAC - Rp 20 NMAC 6.1.2301, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.302 CANADIAN RIVER BASIN: Ute reservoir.

A. Designated uses: livestock watering, wildlife habitat, public water supply, industrial water supply, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.302 NMAC - Rp 20 NMAC 6.1.2302, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.303 CANADIAN RIVER BASIN: The main stem of the Canadian river from the headwaters of Ute reservoir upstream to Conchas dam, the perennial reaches of Pajarito and Ute creeks and their perennial tributaries.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.303 NMAC - Rp 20 NMAC 6.1.2303, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.304 CANADIAN RIVER BASIN: Conchas reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, public water supply, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.304 NMAC - Rp 20 NMAC 6.1.2304, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.305 CANADIAN RIVER BASIN: The main stem of the Canadian river from the headwaters of Conchas reservoir upstream to the New Mexico-Colorado line, perennial reaches of the Conchas river, the Mora river downstream from the USGS gaging station near Shoemaker, the Vermejo river downstream from Rail canyon and perennial reaches of Raton, Chicorica (except Lake Maloya and Lake Alice) and Uña de Gato creeks.

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

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 3,500 mg/L or less at flows above 10 cfs.

[20.6.4.305 NMAC - Rp 20 NMAC 6.1.2305, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]
[**NOTE:** This segment was divided effective 12/1/2010. The standards for Lake Alice and Lake Maloya are under 20.6.4.311 and 20.6.4.312 NMAC, respectively.]

20.6.4.306 CANADIAN RIVER BASIN: The Cimarron river downstream from state highway 21 in Cimarron to the Canadian river and all perennial reaches of tributaries to the Cimarron river downstream from state highway 21 in Cimarron.

A. Designated uses: irrigation, warmwater aquatic life, livestock watering, wildlife habitat and primary contact; and public water supply on Cimarroncito creek.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 3,500 mg/L or less at flows above 10 cfs.

[20.6.4.306 NMAC - Rp 20 NMAC 6.1.2305.1, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 12/1/2010]

20.6.4.307 CANADIAN RIVER BASIN: Perennial reaches of the Mora river from the USGS gaging station near Shoemaker upstream to the state highway 434 bridge in Mora, all perennial reaches of tributaries to the Mora river downstream from the USGS gaging station at La Cueva in San Miguel and Mora counties except lakes identified in 20.6.4.313 NMAC, perennial reaches of Ocate creek downstream of Ocate, perennial reaches of tributaries to Ocate creek downstream of Ocate, and perennial reaches of Rayado creek downstream of Miami lake diversion in Colfax county.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.307 NMAC - Rp 20 NMAC 6.1.2305.3, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, 4/23/2022]

20.6.4.308 CANADIAN RIVER BASIN: Charette lakes.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.308 NMAC - Rp 20 NMAC 6.1.2305.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.309 CANADIAN RIVER BASIN: The Mora river and perennial reaches of its tributaries upstream from the state highway 434 bridge in Mora except lakes identified in 20.6.4.313 NMAC, all perennial reaches of tributaries to the Mora river upstream from the USGS gaging station at La Cueva, perennial reaches of Coyote creek, perennial reaches of tributaries to Coyote creek, the Cimarron river above state highway 21 in Cimarron, perennial reaches of tributaries to the Cimarron river above state highway 21 in Cimarron except Eagle Nest lake, all perennial reaches of tributaries to the Cimarron river north and northwest of highway 64 except north and south Shuree ponds, perennial reaches of Rayado creek above Miami lake diversion, perennial reaches of tributaries to Rayado creek above Miami lake diversion, Ocate creek and perennial reaches of its tributaries upstream of Ocate, perennial reaches of the Vermejo river upstream from Rail canyon and all other perennial reaches of tributaries to the Canadian river northwest and north of U.S. highway 64 in Colfax county unless included in other segments.

A. Designated uses: domestic water supply, irrigation, high quality coldwater aquatic life, livestock watering, wildlife habitat, and primary contact; and public water supply on the Cimarron river upstream from Cimarron, on perennial reaches of Rayado creek and on perennial reaches of tributaries to Rayado creek.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.309 NMAC - Rp 20 NMAC 6.1.2306, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012; A, 4/23/2022]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.310 NMAC. The standards for Shuree ponds are in 20.6.4.314 NMAC and the standards for Eagle Nest lake are in 20.6.4.315 NMAC, effective 7/10/2012]

20.6.4.310 CANADIAN RIVER BASIN: Perennial reaches of Corrumpa creek.

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

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 25°C (77°F) or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less, chloride 40 mg/L or less.

[20.6.4.310 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.311 CANADIAN RIVER BASIN: Lake Alice.

A. Designated uses: marginal coldwater aquatic life, irrigation, livestock watering, wildlife habitat, primary contact and public water supply.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.311 NMAC - N, 12/1/2010; A, 4/23/2022]

20.6.4.312 CANADIAN RIVER BASIN: Lake Maloya.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.312 NMAC - N, 12/1/2010; A, 4/23/2022]

20.6.4.313 CANADIAN RIVER BASIN: Encantada lake, Maestas lake, Middle Fork lake of Rio de la Casa, North Fork lake of Rio de la Casa and Pacheco lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.313 NMAC - N, 7/10/2012]

20.6.4.314 CANADIAN RIVER BASIN: Shuree ponds (north and south).

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.314 NMAC - N, 7/10/2012]

20.6.4.315 CANADIAN RIVER BASIN: Eagle Nest lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering, wildlife habitat and public water supply.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.315 NMAC - N, 7/10/2012]

20.6.4.316 CANADIAN RIVER BASIN: Clayton lake.

A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.316 NMAC - N, 7/10/2012]

20.6.4.317 CANADIAN RIVER BASIN: Springer lake.

A. Designated uses: coolwater aquatic life, irrigation, primary contact, livestock watering, wildlife habitat, and public water supply.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.317 NMAC - N, 7/10/2012; A, 3/2/2017]

20.6.4.318 CANADIAN RIVER BASIN: Doggett creek.

A. Designated uses: Warm water aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

C. Discharger-specific temporary standard:

(1) Discharger: City of Raton wastewater treatment plant

(2) NPDES permit number: NM0020273, Outfall 001

(3) Receiving waterbody: Doggett creek, 20.6.4.318 NMAC

(4) Discharge latitude/longitude: 36° 52' 13.91" N / 104° 25' 39.18" W

(5) Pollutant(s): nutrients; total nitrogen and total phosphorus

(6) Factor of issuance: substantial and widespread economic and social impacts (40 CFR 131.10(g)(6))

(7) Highest attainable condition: interim effluent condition of 8.0 mg/L total nitrogen and 1.6 mg/L total phosphorus as 30-day averages. The highest attainable condition shall be either the highest attainable condition identified at the time of the adoption, or any higher attainable condition later identified during any reevaluation, whichever is more stringent (40 CFR 131.14(b)(1)(iii)).

(8) Effective date of temporary standard: This temporary standard becomes effective for Clean Water Act purposes on the date of EPA approval.

(9) Expiration date of temporary standard: no later than 20 years from the effective date.

(10) Reevaluation period: at each succeeding review of water quality standards and at least once every five years from the effective date of the temporary standard (Paragraph (8) of Subsection H of 20.6.4.10 NMAC, 40 CFR 131.14(b)(1)(v)). If the discharger cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard. If the reevaluation is not completed at the frequency specified or the Department does not submit the reevaluation to EPA within 30 days of completion, the underlying designated use and criterion will be the applicable water quality standard for Clean Water Act purposes until the Department completes and submits the reevaluation to EPA. Public input on the reevaluation will be invited during NPDES permit renewals or triennial reviews, as applicable, in accordance with the State's most current approved water quality management plan and continuing planning process.

(11) Timeline for proposed actions. Tasks and target completion dates are listed in the most recent, WQCC-approved version of the New Mexico Environment Department, Surface Water Quality Bureau's "Nutrient Temporary Standards for City of Raton Wastewater Treatment Plant, NPDES No. NM0020273 to Doggett Creek."

[20.6.4.318 NMAC - N, 05/22/2020; A, 4/23/2022]

20.6.4.319 - 20.6.4.400 [**RESERVED**]

20.6.4.401 SAN JUAN RIVER BASIN: The main stem of the San Juan river from the Navajo Nation boundary at the Hogback upstream to its confluence with the Animas river. Some waters in this segment are under the joint jurisdiction of the state and the Navajo Nation.

A. Designated uses: public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact, marginal coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.

[20.6.4.401 NMAC - Rp 20 NMAC 6.1.2401, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.408 NMAC.]

20.6.4.402 SAN JUAN RIVER BASIN: La Plata river from its confluence with the San Juan river upstream to the New Mexico-Colorado line.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.

[20.6.4.402 NMAC - Rp 20 NMAC 6.1.2402, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.403 SAN JUAN RIVER BASIN: The Animas river from its confluence with the San Juan river upstream to Estes arroyo.

A. Designated uses: Public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, coolwater aquatic life, and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 29°C (84.2°F) or less.

[20.6.4.403 NMAC - Rp 20 NMAC 6.1.2403, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.404 SAN JUAN RIVER BASIN: The Animas river from Estes arroyo upstream to the Southern Ute Indian tribal boundary.

A. Designated uses: Coolwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: phosphorus (unfiltered sample) 0.l mg/L or less.

[20.6.4.404 NMAC - Rp 20 NMAC 6.1.2404, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.405 SAN JUAN RIVER BASIN: The main stem of the San Juan river from Cañon Largo upstream to the Navajo dam.

A. Designated uses: high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.405 NMAC - Rp 20 NMAC 6.1.2405, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.406 SAN JUAN RIVER BASIN: Navajo reservoir in New Mexico.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, irrigation storage, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.406 NMAC - Rp 20 NMAC 6.1.2406, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.407 SAN JUAN RIVER BASIN: Perennial reaches of the Navajo river from the Jicarilla Apache reservation boundary to the Colorado border and perennial reaches of Los Pinos river in New Mexico.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.407 NMAC - Rp 20 NMAC 6.1.2407, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.408 SAN JUAN RIVER BASIN: The main stem of the San Juan river from its confluence with the Animas river upstream to its confluence with Cañon Largo.

A. Designated uses: public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact, marginal coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.

[20.6.4.408 NMAC - N, 5/23/2005; A, 12/1/2010; A, 4/23/2022]

20.6.4.409 SAN JUAN RIVER BASIN: Lake Farmington.

A. **Designated uses:** public water supply, wildlife habitat, livestock watering, primary contact, coldwater aquatic life and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.409 NMAC - N, 12/1/2010]

20.6.4.410 SAN JUAN RIVER BASIN: Jackson lake.

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

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.410 NMAC - N, 7/10/2012]

20.6.4.411 - 20.6.4.450: [**RESERVED**]

20.6.4.451 LITTLE COLORADO RIVER BASIN: The Rio Nutria upstream of the Zuni pueblo boundary, Tampico draw, Agua Remora, Tampico springs.

A. **Designated uses:** coolwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.451 NMAC - N, 12/1/2010]

20.6.4.452 LITTLE COLORADO RIVER BASIN: Ramah lake.

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

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.452 NMAC - N, 12/1/2010]

20.6.4.453 LITTLE COLORADO RIVER BASIN: Quemado lake.

A. **Designated uses:** coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.453 NMAC - N, 7/10/2012]

20.6.4.454 - 20.6.4.500 [**RESERVED**]

20.6.4.501 GILA RIVER BASIN: The main stem of the Gila river from the New Mexico-Arizona line upstream to Redrock canyon and perennial reaches of streams in Hidalgo county.

A. **Designated uses:** irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.501 NMAC - Rp 20 NMAC 6.1.2501, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.502 GILA RIVER BASIN: The main stem of the Gila river from Redrock canyon upstream to the confluence of the West Fork Gila river and East Fork Gila river and perennial reaches of tributaries to the Gila river downstream of Mogollon creek.

A. **Designated uses:** industrial water supply, irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: 28°C (82.4°F) or less.

[20.6.4.502 NMAC - Rp 20 NMAC 6.1.2502, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.503 GILA RIVER BASIN: All perennial tributaries to the Gila river upstream of and including Mogollon creek.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance of 400 µS/cm or less for all perennial tributaries except West Fork Gila and tributaries thereto, specific conductance of 300 µS/cm or less; 32.2°C (90°F) or less in the east fork of the Gila river and Sapillo creek downstream of Lake Roberts; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.503 NMAC - Rp 20 NMAC 6.1.2503, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.504 GILA RIVER BASIN: Wall lake, Lake Roberts and Snow lake.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: specific conductance 300 µS/cm or less.

[20.6.4.504 NMAC - Rp 20 NMAC 6.1.2504, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.806 NMAC.]

20.6.4.505 GILA RIVER BASIN: Bill Evans lake.

A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.505 NMAC - N, 7/10/2012]

20.6.4.506 - 20.6.4.600 [**RESERVED**]

20.6.4.601 SAN FRANCISCO RIVER BASIN: The main stem of the San Francisco river from the New Mexico-Arizona line upstream to state highway 12 at Reserve and perennial reaches of Mule creek.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.601 NMAC - Rp 20 NMAC 6.1.2601, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.602 SAN FRANCISCO RIVER BASIN: The main stem of the San Francisco river from state highway 12 at Reserve upstream to the New Mexico-Arizona line.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.602 NMAC - Rp 20 NMAC 6.1.2602, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.603 SAN FRANCISCO RIVER BASIN: All perennial reaches of tributaries to the San Francisco river above the confluence of Whitewater creek and including Whitewater creek.

A. Designated uses: domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and temperature 25°C (77°F) or less in Tularosa creek.

[20.6.4.603 NMAC - Rp 20 NMAC 6.1.2603, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.604 - 20.6.4.700 [**RESERVED**]

20.6.4.701 DRY CIMARRON RIVER: Perennial portions of the Dry Cimarron river above Oak creek and perennial reaches of Oak creek.

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

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 25°C (77°F) or less, the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less and chloride 40 mg/L or less.

[20.6.4.701 NMAC - Rp 20 NMAC 6.1.2701, 10/12/2000; A, 5/23/2005 A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.702 NMAC.]

20.6.4.702 DRY CIMARRON RIVER: Perennial portions of the Dry Cimarron river below Oak creek, and perennial portions of Long canyon and Carrizozo creeks.

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

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less and chloride 40 mg/L or less.

[20.6.4.702 NMAC - N, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

20.6.4.703 - 20.6.4.800 [**RESERVED**]

20.6.4.801 CLOSED BASINS: Rio Tularosa upstream of the old U.S. highway 70 bridge crossing east of Tularosa and all perennial tributaries to the Tularosa basin except Three Rivers and Dog Canyon creek, and excluding waters on the Mescalero tribal lands.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.801 NMAC - Rp 20 NMAC 6.1.2801, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 2/13/2018]

[**NOTE:** This segment was divided effective 2/13/2018. The standards for Dog Canyon creek are under 20.6.4.810 NMAC.]

20.6.4.802 CLOSED BASINS: Perennial reaches of Three Rivers.

A. Designated uses: irrigation, domestic water supply, high quality coldwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.802 NMAC - Rp 20 NMAC 6.1.2802, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.803 CLOSED BASINS: Perennial reaches of the Mimbres river downstream of the confluence with Allie canyon and all perennial reaches of tributaries thereto.

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

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less and temperature of 30°C (86°F) or less.

[20.6.4.803 NMAC - Rp 20 NMAC 6.1.2803, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.804 CLOSED BASINS: Perennial reaches of the Mimbres river upstream of the confluence with Allie canyon to Cooney canyon, and all perennial reaches of East Fork Mimbres (McKnight canyon) downstream of the fish barrier, and all perennial reaches thereto.

A. Designated uses: Irrigation, domestic water supply, coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.804 NMAC - Rp 20 NMAC 6.1.2804, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 2/28/2018; A, 3/2/2017]
[**NOTE:** The segment covered by this section was divided effective 3/2/2017. The standards for the additional segment are covered under 20.6.4.807 NMAC.]

20.6.4.805 CLOSED BASINS: Perennial reaches of the Sacramento river (Sacramento-Salt Flat closed basin) and all perennial tributaries thereto.

A. Designated uses: domestic water supply, livestock watering, wildlife habitat, marginal coldwater aquatic life and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.805 NMAC - Rp 20 NMAC 6.1.2805, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.806 CLOSED BASINS: Bear canyon reservoir.

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

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: specific conductance 300 µS/cm or less.

[20.6.4.806 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.807 CLOSED BASINS: Perennial reaches of the Mimbres river upstream of Cooney canyon and all perennial reaches thereto, including perennial reaches of East Fork Mimbres river (McKnight canyon) upstream of the fish barrier.

A. Designated uses: Irrigation, domestic water supply, high quality coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.807 NMAC - N, 3/2/2017]

20.6.4.808 CLOSED BASINS: Perennial and intermittent watercourses within Smelter Tailing Soils Investigation Unit lands at the Chino mines company, excluding those ephemeral waters listed in 20.6.4.809 NMAC and including, but not limited to the mainstem of Lampbright draw, beginning at the confluence of Lampbright Draw with Rustler canyon, all tributaries that originate west of Lampbright draw to the intersection of Lampbright draw with U.S. 180, and all tributaries of Whitewater creek that originate east of Whitewater creek from the confluence of Whitewater creek with Bayard canyon downstream to the intersection of Whitewater creek with U.S. 180.

A. Designated uses: Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute and chronic aquatic life criteria for copper set forth in Subsection I of 20.6.4.900 NMAC shall be determined by multiplying that criteria by the water effect ratio ("WER") adjustment expressed by the following equation:

$$WER = \frac{[10^{0.588+(0.703 \times \log DOC)+(0.395 \times \log Alkalinity)}] \times (\frac{100}{Hardness})^{0.9422}}{19.31}$$

For purposes of this section, dissolved organic carbon (DOC) is expressed in units of milligrams carbon per liter or mg C/L; alkalinity is expressed in units of mg/L as $CaCO_3$, and hardness is expressed in units of mg/L as $CaCO_3$. In

waters that contain alkalinity concentrations greater than 250 mg/L, a value of 250 mg/L shall be used in the equation. In waters that contain DOC concentrations greater than 16 mg C/L, a value of 16 mg C/L shall be used in the equation. In waters that contain hardness concentrations greater than 400 mg/L, a value of 400 mg/L shall be used in the equation. The alkalinity, hardness and DOC concentrations used to calculate the WER value are those measured in the subject water sample.
[20.6.4.808 NMAC - N, 3/2/2017]

20.6.4.809 CLOSED BASINS: Ephemeral watercourses within smelter tailing soils investigation unit lands at the Chino mines company, limited to Chino mines property subwatershed drainage A and tributaries thereof, Chino mines property subwatershed drainage B and tributaries thereof (excluding the northwest tributary containing Ash spring and the Chiricahua leopard frog critical habitat transect); Chino mines property subwatershed drainage C and tributaries thereof (excluding reaches containing Bolton spring, the Chiricahua leopard frog critical habitat transect and all reaches in subwatershed C that are upstream of the Chiricahua leopard frog critical habitat); subwatershed drainage D and tributaries thereof (drainages D-1, D-2 and D-3, excluding the southeast tributary in drainage D1 that contains Brown spring) and subwatershed drainage E and all tributaries thereof (drainages E-1, E-2 and E-3).

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

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute aquatic life criteria for copper set forth in Subsection I of 20.6.4.900 NMAC shall be determined by multiplying that criteria by the water effect ratio (“WER”) adjustment expressed by the following equation:

$$WER = \frac{[10^{0.588+(0.703 \times \log DOC)+(0.395 \times \log Alkalinity)}] \times (\frac{100}{Hardness})^{0.9422}}{19.31}$$

For purposes of this section, dissolved organic carbon (DOC) is expressed in units of milligrams carbon per liter or mg C/L; alkalinity is expressed in units of mg/L as $CaCO_3$, and hardness is expressed in units of mg/L as $CaCO_3$. In waters that contain alkalinity concentrations greater than 250 mg/L, a value of 250 mg/L shall be used in the equation. In waters that contain DOC concentrations greater than 16 mg C/L, a value of 16 mg C/L shall be used in the equation. In waters that contain hardness concentrations greater than 400 mg/L, a value of 400 mg/L shall be used in the equation. The alkalinity, hardness and DOC concentrations used to calculate the WER value are those measured in the subject water sample.
[20.6.4.809 NMAC - N, 3/2/2017]

20.6.4.810 CLOSED BASINS: Perennial reaches of Dog Canyon creek.

A. Designated uses: coolwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.810 NMAC - N, 2/13/2018]

20.6.4.811 - 20.6.4.899 [**RESERVED**]

20.6.4.900 CRITERIA APPLICABLE TO EXISTING, DESIGNATED OR ATTAINABLE USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.97 THROUGH 20.6.4.899 NMAC:

A. Fish culture and water supply: Fish culture, public water supply and industrial water supply are designated uses in particular classified waters of the state where these uses are actually being realized. However, no numeric criteria apply uniquely to these uses. Water quality adequate for these uses is ensured by the general criteria and numeric criteria for bacterial quality, pH and temperature.

B. Domestic water supply: Surface waters of the state designated for use as domestic water supplies shall not contain substances in concentrations that create a lifetime cancer risk of more than one cancer per 100,000 exposed persons. Those criteria listed under domestic water supply in Subsection J of this section apply to this use.

C. Irrigation and irrigation storage: the following numeric criteria and those criteria listed under irrigation in Subsection J of this section apply to this use:

(1) dissolved selenium 0.13 mg/L

(2) dissolved selenium in presence of >500 mg/L SO_4 0.25 mg/L.

D. Primary contact: The monthly geometric mean of E. coli bacteria of 126 cfu/100 mL or MPN/100 ml, a single sample of E. coli bacteria of 410 cfu/100 mL or MPN/100 mL, a single sample of total microcystins of 8 µg/L with no more than three exceedances within a 12-month period and a single sample of cylindrospermopsin of 15 µg/L with no more than three exceedances within a 12-month period, and pH within the range of 6.6 to 9.0 apply to this use. The results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN) depending on the analytical method used.

E. Secondary contact: The monthly geometric mean of E. coli bacteria of 548 cfu/100 mL or MPN/100 mL and single sample of 2507 cfu/100 mL or MPN/100 mL apply to this use. The results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN), depending on the analytical method used.

F. Livestock watering: the criteria listed in Subsection J of this section for livestock watering apply to this use.

G. Wildlife habitat: Wildlife habitat shall be free from any substances at concentrations that are toxic to or will adversely affect plants and animals that use these environments for feeding, drinking, habitat or propagation; can bioaccumulate; or might impair the community of animals in a watershed or the ecological integrity of surface waters of the state. The numeric criteria listed in Subsection J for wildlife habitat apply to this use.

H. Aquatic life: Surface waters of the state with a designated, existing or attainable use of aquatic life shall be free from any substances at concentrations that can impair the community of plants and animals in or the ecological integrity of surface waters of the state. Except as provided in Paragraph (7) of this subsection, the acute and chronic aquatic life criteria set out in Subsections I, J, K and L of this section and the human health-organism only criteria set out in Subsection J of this section are applicable to all aquatic life use subcategories. In addition, the specific criteria for aquatic life subcategories in the following paragraphs apply to waters classified under the respective designations.

(1) High quality coldwater: dissolved oxygen 6.0 mg/L or more, 4T3 temperature 20°C (68°F), maximum temperature 23°C (73°F), pH within the range of 6.6 to 8.8 and specific conductance a segment-specific limit between 300 µS/cm and 1,500 µS/cm depending on the natural background in the particular surface water of the state (the intent of this criterion is to prevent excessive increases in dissolved solids which would result in changes in community structure). Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 4T3 temperature applies.

(2) Coldwater: dissolved oxygen 6.0 mg/L or more, 6T3 temperature 20°C (68°F), maximum temperature 24°C (75°F) and pH within the range of 6.6 to 8.8. Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 6T3 temperature applies.

(3) Marginal coldwater: dissolved oxygen 6 mg/L or more, 6T3 temperature 25°C (77°F), maximum temperature 29°C (84°F) and pH within the range from 6.6 to 9.0. Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 6T3 temperature applies.

(4) Coolwater: dissolved oxygen 5.0 mg/L or more, maximum temperature 29°C (84°F) and pH within the range of 6.6 to 9.0.

(5) Warmwater: dissolved oxygen 5 mg/L or more, maximum temperature 32.2°C (90°F) and pH within the range of 6.6 to 9.0. Where a segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature.

(6) Marginal warmwater: dissolved oxygen 5 mg/L or more, pH within the range of 6.6 to 9.0 and temperatures that may routinely exceed 32.2°C (90°F). Where a segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature.

(7) Limited aquatic life: The acute aquatic life criteria of Subsections I and J of this section apply to this subcategory. Chronic aquatic life criteria do not apply unless adopted on a segment-specific basis. Human health-organism only criteria apply only for persistent toxic pollutants unless adopted on a segment-specific basis.

I. Hardness-dependent acute and chronic aquatic life criteria for metals are calculated using the following equations. The criteria are expressed as a function of hardness (as mg $CaCO_3$/L). With the exception of aluminum, the equations are valid only for hardness concentrations of 0-400 mg/L. For hardness concentrations above 400 mg/L, the criteria for 400 mg/L apply. For aluminum the equations are valid only for hardness concentrations of 0-220 mg/L. For hardness concentrations above 220 mg/L, the aluminum criteria for 220 mg/L apply. Calculated criteria must adhere to the treatment of significant figures and rounding identified in *Standard Methods For The Examination Of Water And Wastewater,* latest edition, American public health association.

(1) Acute aquatic life criteria for metals: The equation to calculate acute criteria in µg/L is $\exp(m_A[\ln(\text{hardness})] + b_A)(CF)$. Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that has a pH between 6.5 and 9.0 and is filtered to minimize mineral phases as specified by the department. The equation parameters are as follows:

Metal	**m_A**	**b_A**	**Conversion factor (CF)**
Aluminum (Al)	1.3695	1.8308	
Cadmium (Cd)	0.9789	-3.866	1.136672-[(ln hardness)(0.041838)]
Chromium (Cr) III	0.8190	3.7256	0.316
Copper (Cu)	0.9422	-1.700	0.960
Lead (Pb)	1.273	-1.460	1.46203-[(ln hardness)(0.145712)]
Manganese (Mn)	0.3331	6.4676	
Nickel (Ni)	0.8460	2.255	0.998
Silver (Ag)	1.72	-6.59	0.85
Zinc (Zn)	0.9094	0.9095	0.978

(2) Chronic aquatic life criteria for metals: The equation to calculate chronic criteria in µg/L is $\exp(m_C[\ln(\text{hardness})] + b_C)(CF)$. Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that has a pH between 6.5 and 9.0 and is filtered to minimize mineral phases as specified by the department. The equation parameters are as follows:

Metal	**m_C**	**b_C**	**Conversion factor (CF)**
Aluminum (Al)	1.3695	0.9161	
Cadmium (Cd)	0.7977	-3.909	1.101672-[(ln hardness)(0.041838)]
Chromium (Cr) III	0.8190	0.6848	0.860
Copper (Cu)	0.8545	-1.702	0.960
Lead (Pb)	1.273	-4.705	1.46203-[(ln hardness)(0.145712)]
Manganese (Mn)	0.3331	5.8743	
Nickel (Ni)	0.8460	0.0584	0.997
Zinc (Zn)	0.9094	0.6235	0.986

(3) Selected values of calculated acute and chronic criteria (µg/L).

Hardness as $CaCO_3$, dissolved (mg/L)		**Al**	**Cd**	**Cr III**	**Cu**	**Pb**	**Mn**	**Ni**	**Ag**	**Zn**
25.0	Acute	512	0.490	183	3.64	13.9	1,880	145	0.30	45.4
	Chronic	205	0.253	23.8	2.74	0.541	1,040	16.1		34.4
30.0	Acute	658	0.581	212	4.32	17.0	2,000	169	0.40	53.5
	Chronic	263	0.290	27.6	3.20	0.664	1,100	18.8		40.5
40.0	Acute	975	0.761	269	5.67	23.5	2,200	216	0.66	69.5
	Chronic	391	0.360	35.0	4.09	0.916	1,220	24.0		52.7
50.0	Acute	1,320	0.938	323	6.99	30.1	2,370	260	0.98	85.2
	Chronic	530	0.426	42.0	4.95	1.17	1,310	28.9		64.5
60.0	Acute	1,700	1.11	375	8.30	36.9	2,520	304	1.3	100
	Chronic	681	0.489	48.8	5.79	1.44	1,390	33.8		76.2
70.0	Acute	2,100	1.28	425	9.60	43.7	2,650	346	1.7	116
	Chronic	841	0.549	55.3	6.60	1.70	1,460	38.5		87.6
80.0	Acute	2,520	1.46	474	10.9	50.6	2,770	388	2.2	131
	Chronic	1,010	0.607	61.7	7.40	1.97	1,530	43.0		98.9

Hardness as $CaCO_3$, dissolved (mg/L)		Al	Cd	Cr III	Cu	Pb	Mn	Ni	Ag	Zn
90.0	Acute	2,960	1.62	523	12.2	57.6	2,880	428	2.7	145
	Chronic	1,190	0.664	68.0	8.18	2.24	1,590	47.6		110
100	Acute	3,420	1.79	570	13.4	64.6	2,980	468	3.2	160
	Chronic	1,370	0.718	74.1	8.96	2.52	1,650	52.0		121
200	Acute	8,840	3.43	1,000	25.8	136	3,760	842	10	300
	Chronic	3,540	1.21	131	16.2	5.30	2,080	93.5		228
220	Acute	10,100	3.74	1,090	28.2	151	3,880	912	12	328
	Chronic	4,030	1.30	141	17.6	5.87	2,140	101		248
300	Acute		5.00	1,400	37.8	208	4,300	1,190	21	434
	Chronic		1.64	182	22.9	8.13	2,380	132		329
400 and above	Acute		6.54	1,770	49.6	281	4,740	1,510	35	564
	Chronic		2.03	231	29.3	10.9	2,620	168		428

J. Use-specific numeric criteria.

(1) Table of numeric criteria: The following table sets forth the numeric criteria applicable to existing, designated and attainable uses. For metals, criteria represent the total sample fraction unless otherwise specified in the table. Additional criteria that are not compatible with this table are found in Subsections A through I, K, and L of this section.

Pollutant	**CAS Number**	**DWS**	**Irr/Irr storage**	**LW**	**WH**	**Aquatic Life**			**Type**
						Acute	Chronic	HH-OO	
Aluminum, dissolved	7429-90-5		5,000			750 i	87 i		
Aluminum, total recoverable	7429-90-5					a	a		
Antimony, dissolved	7440-36-0	6						640	P
Arsenic, dissolved	7440-38-2	10	100	200		340	150	9.0	C,P
Asbestos	1332-21-4	7,000,000 fibers/L							
Barium, dissolved	7440-39-3	2,000							
Beryllium, dissolved	7440-41-7	4							
Boron, dissolved	7440-42-8		750	5,000					
Cadmium, dissolved	7440-43-9	5	10	50		a	a		
Chloride	1688-70-06					860,000	230,000		
Chlorine residual	7782-50-5				11	19	11		
Chromium III, dissolved	16065-83-1					a	a		
Chromium VI, dissolved	18540-29-9					16	11		
Chromium, dissolved	7440-47-3	100	100	1,000					
Cobalt, dissolved	7440-48-4		50	1,000					
Copper, dissolved	7440-50-8	1300	200	500		a	a		
Cyanide, total recoverable	57-12-5	200			5.2	22.0	5.2	400	
Iron	7439-89-6						1,000		
Lead, dissolved	7439-92-1	15	5,000	100		a	a		
Manganese, dissolved	7439-96-5					a	a		
Mercury	7439-97-6	2		10	0.77				
Mercury, dissolved	7439-97-6					1.4	0.77		

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Methylmercury	22967-92-6							0.3 mg/kg in fish tissue	P
Molybdenum, dissolved	7439-98-7		1,000						
Molybdenum, total recoverable	7439-98-7					7,920	1,895		
Nickel, dissolved	7440-02-0	700				a	a	4,600	P
Nitrate as N		10 mg/L							
Nitrite + Nitrate				132 mg/L					
Selenium, dissolved	7782-49-2	50	b	50				4,200	P
Selenium, total recoverable	7782-49-2				5.0	20.0	5.0		
Silver, dissolved	7440-22-4					a			
Thallium, dissolved	7440-28-0	2						0.47	P
Uranium, dissolved	7440-61-1	30							
Vanadium, dissolved	7440-62-2		100	100					
Zinc, dissolved	7440-66-6	10,500	2,000	25,000		a	a	26,000	P
Adjusted gross alpha		15 pCi/L		15 pCi/L					
Radium 226 + Radium 228		5 pCi/L		30.0 pCi/L					
Strontium 90		8 pCi/L							
Tritium		20,000 pCi/L		20,000 pCi/L					
Acenaphthene	83-32-9	2,100						90	
Acrolein	107-02-8	18				3.0	3.0	400	
Acrylonitrile	107-13-1	0.65						70	C
Aldrin	309-00-2	0.021				3.0		0.0000077	C,P
Anthracene	120-12-7	10,500						400	
Benzene	71-43-2	5						160	C
Benzidine	92-87-5	0.0015						0.11	C
Benzo(a)anthracene	56-55-3	0.048						0.013	C
Benzo(a)pyrene	50-32-8	0.2						0.0013	C,P
Benzo(b)fluoranthene	205-99-2	0.048						0.013	C
Benzo(k)fluoranthene	207-08-9	0.048						0.13	C
alpha-BHC	319-84-6	0.056						0.0039	C
beta-BHC	319-85-7	0.091						0.14	C
gamma-BHC (Lindane)	58-89-9	0.20				0.95		4.4	
Bis(2-chloroethyl) ether	111-44-4	0.30						22	C
Bis(2-chloro-1-methylethyl) ether	108-60-1	1,400						4,000	
Bis(2-ethylhexyl) phthalate	117-81-7	6						3.7	C
Bis(chloromethyl) ether	542-88-1							0.17	C
Bromoform	75-25-2	44						1,200	C
Butylbenzyl phthalate	85-68-7	7,000						1	C
Carbaryl	63-25-2					2.1	2.1		
Carbon tetrachloride	56-23-5	5						50	C
Chlordane	57-74-9	2				2.4	0.0043	0.0032	C,P
Chlorobenzene	108-90-7	100						800	

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Chlorodibromomethane	124-48-1	4.2						210	C
Chloroform	67-66-3	57						2,000	
Chlorpyrifos	2921-88-2					0.083	0.041		
2-Chloronaphthalene	91-58-7	2,800						1,000	
2-Chlorophenol	95-57-8	175						800	
Chrysene	218-01-9	0.048						1.3	C
Demeton	8065-48-3						0.1		
Diazinon	333-41-5					0.17	0.17		
2,4-Dichlorophenoxyacetic acid	94-75-7							12,000	
Dichlorodiphenyldichloroethane (DDD)	72-54-8							0.0012	C
Dichlorodiphenyldichloroethylene (DDE)	72-55-9							0.00018	C
Dichlorodiphenyltrichloroethane (DDT)	50-29-3							0.0003	C,P
4,4'-DDT and derivatives		1.0			0.001	1.1	0.001		
Dibenzo(a,h)anthracene	53-70-3	0.048						0.0013	C
Dibutyl phthalate	84-74-2	3,500						30	
1,2-Dichlorobenzene	95-50-1	600						3,000	
1,3-Dichlorobenzene	541-73-1	469						10	
1,4-Dichlorobenzene	106-46-7	75						900	
3,3'-Dichlorobenzidine	91-94-1	0.78						1.5	C
Dichlorobromomethane	75-27-4	5.6						270	C
1,2-Dichloroethane	107-06-2	5						6,500	C
1,1-Dichloroethylene	75-35-4	7						20,000	
2,4-Dichlorophenol	120-83-2	105						60	
1,2-Dichloropropane	78-87-5	5.0						310	C
1,3-Dichloropropene	542-75-6	3.5						120	C
Dieldrin	60-57-1	0.022				0.24	0.056	0.000012	C,P
Diethyl phthalate	84-66-2	28,000						600	
Dimethyl phthalate	131-11-3	350,000						2,000	
2,4-Dimethylphenol	105-67-9	700						3,000	
Dinitrophenols	25550-58-7							1,000	
2,4-Dinitrophenol	51-28-5	70						300	
2,4-Dinitrotoluene	121-14-2	1.1						17	C
Dioxin	1746-01-6	3.0E-05						5.1E-08	C,P
1,2-Diphenylhydrazine	122-66-7	0.44						2.0	C
alpha-Endosulfan	959-98-8	62				0.22	0.056	30	
beta-Endosulfan	33213-65-9	62				0.22	0.056	40	
Endosulfan sulfate	1031-07-8	62						40	
Endrin	72-20-8	2				0.086	0.036	0.03	
Endrin aldehyde	7421-93-4	10.5						1	
Ethylbenzene	100-41-4	700						130	
Fluoranthene	206-44-0	1,400						20	
Fluorene	86-73-7	1,400						70	
Guthion	86-50-0						0.01		
Heptachlor	76-44-8	0.40				0.52	0.0038	0.000059	C
Heptachlor epoxide	1024-57-3	0.20				0.52	0.0038	0.00032	C

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Hexachlorobenzene	118-74-1	1						0.00079	C,P
Hexachlorobutadiene	87-68-3	4.5						0.1	C
Hexachlorocyclohexane (HCH)-Technical	608-73-1							0.1	C
Hexachlorocyclopen-tadiene	77-47-4	50						4	
Hexachloroethane	67-72-1	25						1	C
Ideno(1,2,3-cd)pyrene	193-39-5	0.048						0.013	C
Isophorone	78-59-1	368						18,000	C
Malathion	121-75-5						0.1		
Methoxychlor	72-43-5						0.03	0.02	
Methyl bromide	74-83-9	49						10,000	
3-Methyl-4-chlorophenol	59-50-7							2,000	
2-Methyl-4,6-dinitrophenol	534-52-1	14						30	
Methylene chloride	75-09-2	5						10,000	C
Mirex	2385-85-5						0.001		
Nitrobenzene	98-95-3	18						600	
Nitrosamines	Various							12.4	C
Nitrosodibutylamine	924-16-3							2.2	C
Nitrosodiethylamine	55-18-5							12.4	C
N-Nitrosodimethylamine	62-75-9	0.0069						30	C
N-Nitrosodi-n-propylamine	621-64-7	0.050						5.1	C
N-Nitrosodiphenylamine	86-30-6	71						60	C
N-Nitrosopyrrolidine	930-55-2							340	C
Nonylphenol	84852-15-3					28	6.6		
Parathion	56-38-2					0.065	0.013		
Pentachlorobenzene	608-93-5							0.1	
Pentachlorophenol	87-86-5	1.0				19	15	0.4	C
Phenol	108-95-2	10,500						300,000	
Polychlorinated Biphenyls (PCBs)	1336-36-3	0.50			0.014	2	0.014	0.00064	C,P
Pyrene	129-00-0	1,050						30	
1,2,4,5-Tetrachlorobenzene	95-94-3							0.03	
1,1,2,2-Tetrachloroethane	79-34-5	1.8						30	C
Tetrachloroethylene	127-18-4	5						290	C,P
Toluene	108-88-3	1,000						520	
Toxaphene	8001-35-2	3				0.73	0.0002	0.0071	C
1,2-Trans-dichloroethylene	156-60-5	100						4,000	
Tributyltin (TBT)	Various					0.46	0.072		
1,2,4-Trichlorobenzene	120-82-1	70						0.76	C
1,1,1-Trichloroethane	71-55-6	200						200,000	
1,1,2-Trichloroethane	79-00-5	5						89	C
Trichloroethylene	79-01-6	5						70	C

Pollutant	CAS Number	DWS	Irr/Irr storage	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
2,4,5-Trichlorophenol	95-95-4							600	
2,4,6-Trichlorophenol	88-06-2	32						28	C
2-(2,4,5-Trichlorophenoxy)propionic acid (Silvex)	93-72-1							400	
Vinyl chloride	75-01-4	2						16	C

(2) Notes applicable to the table of numeric criteria in Paragraph (1) of this subsection.

(a) Where the letter “a” is indicated in a cell, the criterion is hardness-based and can be referenced in Subsection I of 20.6.4.900 NMAC.

(b) Where the letter “b” is indicated in a cell, the criterion can be referenced in Subsection C of 20.6.4.900 NMAC.

(c) Criteria are in µg/L unless otherwise indicated.

(d) Abbreviations are as follows: CAS - chemical abstracts service (see definition for “CAS number” in 20.6.4.7 NMAC); DWS - domestic water supply; Irr/Irr storage- irrigation and irrigation storage; LW - livestock watering; WH - wildlife habitat; HH-OO - human health-organism only; C – criteria based on cancer-causing endpoint; P - persistent toxic pollutant.

(e) The criteria are based on analysis of an unfiltered sample unless otherwise indicated. The acute and chronic aquatic life criteria for aluminum are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department.

(f) The criteria listed under human health-organism only (HH-OO) are intended to protect human health when aquatic organisms are consumed from waters containing pollutants. These criteria do not protect the aquatic life itself; rather, they protect the health of humans who ingest fish or other aquatic organisms.

(g) The dioxin criteria apply to the sum of the dioxin toxicity equivalents expressed as 2,3,7,8-TCDD dioxin.

(h) The criteria for polychlorinated biphenyls (PCBs) apply to the sum of all congeners, to the sum of all homologs or to the sum of all aroclors.

(i) The acute and chronic aquatic life criteria for dissolved aluminum only apply when the concurrent pH is less than 6.5 or greater than 9.0 S.U. If the concurrent pH is between 6.5 and 9.0 S.U. then the hardness-dependent total recoverable aluminum criteria in Paragraphs (1) and (2) of Subsection I of 20.6.4.900 NMAC apply.

K. The criteria for total ammonia consider sensitive freshwater mussel species in the family Unionidae, freshwater non-pulmonate snails, and *Oncorhynchus* spp. (a genus of fish in the family Salmonidae), hence further protecting the aquatic community. The total ammonia criteria magnitude is measured as Total Ammonia Nitrogen (TAN) mg/L. TAN is the sum of NH_4^+ and NH_3. TAN mg/L magnitude is derived as a function of pH and temperature (EPA 2013).

L. The acute aquatic life criteria for TAN (mg/L) was derived by the EPA (2013) as the one-hour average concentration of TAN mg/L that shall not be exceeded more than once every three years on average. The EPA acute criterion magnitude was derived using the following equation:

Acute TAN Criterion Magnitude for 1-hour average=

$$\text{MIN}\left(\begin{array}{c}\left(\frac{0.275}{1+10^{7.204-pH}}+\frac{39}{1+10^{pH-7.204}}\right),\\ \left(0.7249\text{x}\left(\frac{0.0114}{1+10^{7.204-pH}}+\frac{1.6181}{1+10^{pH-7.204}}\right)\text{x}\left(23.12\times 10^{0.036(20-T)}\right)\right)\end{array}\right)$$

*T (*temperature C) and *pH* are defined as the paired values associated with the TAN sample.

	Temperature (°C)																				
pH	0-10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	51	48	44	41	37	34	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9

6.6	49	46	42	39	36	33	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	46	44	40	37	34	31	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9
6.8	44	41	38	35	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	41	38	35	32	30	28	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	38	35	33	30	28	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9	7.3
7.1	34	32	30	27	25	23	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	31	29	27	25	23	21	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6
7.3	27	26	24	22	20	18	17	16	14	13	12	11	10	9.5	8.7	8	7.4	6.8	6.3	5.8	5.3
7.4	24	22	21	19	18	16	15	14	13	12	11	9.8	9	8.3	7.7	7	6.5	6	5.5	5.1	4.7
7.5	21	19	18	17	15	14	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4
7.6	18	17	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	15	14	13	12	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	2.9
7.8	13	12	11	10	9.3	8.5	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4	3.7	3.4	3.2	2.9	2.7	2.5
7.9	11	9.9	9.1	8.4	7.7	7.1	6.6	3	5.6	5.1	4.7	4.3	4	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1
8.0	8.8	8.2	7.6	7	6.4	5.9	5.4	5	4.6	4.2	3.9	3.6	3.3	3	2.8	2.6	2.4	2.2	2	1.9	1.7
8.1	7.2	6.8	6.3	5.8	5.3	4.9	4.5	4.1	3.8	3.5	3.2	3	2.7	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4
8.2	6	5.6	5.2	4.8	4.4	4	3.7	3.4	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	4.9	4.6	4.3	3.9	3.6	3.3	3.1	2.8	2.6	2.4	2.2	2	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1	0.96
8.4	4.1	3.8	3.5	3.2	3	2.7	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1	0.93	0.86	0.79
8.5	3.3	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.98	0.9	0.83	0.77	0.71	0.65
8.6	2.8	2.6	2.4	2.2	2	1.9	1.7	1.6	1.5	1.3	1.2	1.1	1	0.96	0.88	0.81	0.75	0.69	0.63	0.58	0.54
8.7	2.3	2.2	2	1.8	1.7	1.6	1.4	1.3	1.2	1.1	1	0.94	0.87	0.8	0.74	0.68	0.62	0.57	0.53	0.49	0.45
8.8	1.9	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37
8.9	1.6	1.5	1.4	1.3	1.2	1.1	1	0.93	0.85	0.79	0.72	0.67	0.61	0.56	0.52	0.48	0.44	0.4	0.37	0.34	0.32
9.0	1.4	1.3	1.2	1.1	1	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.52	0.48	0.44	0.41	0.37	0.34	0.32	0.29	0.27

(1) Temperature and pH-dependent values of the acute TAN criterion magnitude -when *Oncorhynchus* spp. absent.

(2) Temperature and pH-dependent values for the acute TAN criterion magnitude- when *Oncorhynchus* spp. are present.

	Temperature (°C)																
pH	0-14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	33	33	32	29	27	25	23	21	19	18	16	15	14	13	12	11	9.9
6.6	31	31	30	28	26	24	22	20	18	17	16	14	13	12	11	10	9.5
6.7	30	30	29	27	24	22	21	19	18	16	15	14	13	12	11	9.8	9
6.8	28	28	27	25	23	21	20	18	17	15	14	13	12	11	10	9.2	8.5
6.9	26	26	25	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	7.9
7.0	24	24	23	21	20	18	17	15	14	13	12	11	10	9.4	8.6	8	7.3
7.1	22	22	21	20	18	17	15	14	13	12	11	10	9.3	8.5	7.9	7.2	6.7
7.2	20	20	19	18	16	15	14	13	12	11	9.8	9.1	8.3	7.7	7.1	6.5	6
7.3	18	18	17	16	14	13	12	11	10	9.5	8.7	8	7.4	6.8	6.3	5.8	5.3
7.4	15	15	15	14	13	12	11	9.8	9	8.3	7.7	7	6.5	6	5.5	5.1	4.7
7.5	13	13	13	12	11	10	9.2	8.5	7.8	7.2	6.6	6.1	5.6	5.2	4.8	4.4	4
7.6	11	11	11	10	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5
7.7	9.6	9.6	9.3	8.6	7.9	7.3	6.7	6.2	5.7	5.2	4.8	4.4	4.1	3.8	3.5	3.2	3
7.8	8.1	8.1	7.9	7.2	6.7	6.1	5.6	5.2	4.8	4.4	4	3.7	3.4	3.2	2.9	2.7	2.5
7.9	6.8	6.8	6.6	6	5.6	5.1	4.7	4.3	4	3.7	3.4	3.1	2.9	2.6	2.4	2.2	2.1

8.0	5.6	5.6	5.4	5	4.6	4.2	3.9	3.6	3.3	3	2.8	2.6	2.4	2.2	2	1.9	1.7
8.1	4.6	4.6	4.5	4.1	3.8	3.5	3.2	3	2.7	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4
8.2	3.8	3.8	3.7	3.5	3.1	2.9	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2
8.3	3.1	3.1	3.1	2.8	2.6	2.4	2.2	2	1.9	1.7	1.6	1.4	1.3	1.2	1.1	1	1
8.4	2.6	2.6	2.5	2.3	2.1	2	1.8	1.7	1.5	1.4	1.3	1.2	1.1	1	0.9	0.9	0.8
8.5	2.1	2.1	2.1	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	1	0.9	0.8	0.8	0.7	0.7
8.6	1.8	1.8	1.7	1.6	1.5	1.3	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.6	0.6	0.5
8.7	1.5	1.5	1.4	1.3	1.2	1.1	1	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5
8.8	1.2	1.2	1.2	1.1	1	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4
8.9	1	1	1	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3
9.0	0.88	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3

M. The chronic aquatic life criteria for TAN (mg/L) was derived by the EPA (2013) as a thirty-day rolling average concentration of TAN mg/L that shall not be exceeded more than once every three years on average. In addition, the highest four-day average within the 30-day averaging period should not be more than 2.5 times the CCC (e.g., 2.5 x 1.9 mg TAN/L at pH 7 and 20°C, or 4.8 mg TAN/L) more than once in three years on average. The EPA chronic criterion magnitude was derived using the following equation:

Chronic TAN Criterion Magnitude for 30-day average=

$$0.8876 \times \left(\frac{0.0278}{1 + 10^{7.688-pH}} + \frac{1.1994}{1 + 10^{pH-7.688}}\right) \times \left(2.126 \times 10^{0.028\times(20-MAX(T,7))}\right)$$

T (temperature °C) and pH are defined as the paired values associated with the TAN sample.

Temperature and pH-Dependent Values of the Chronic TAN Criterion Magnitude.

	Temperature (°C)																							
pH	0-7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	4.9	4.6	4.3	4.1	3.8	3.6	3.3	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2	1.9	1.8	1.6	1.5	1.5	1.4	1.3	1.2	1.1
6.6	4.8	4.5	4.3	4	3.8	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1
6.7	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1
6.8	4.6	4.4	4.1	3.8	3.6	3.4	3.2	3	2.8	2.6	2.4	2.3	2.1	2	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
6.9	4.5	4.2	4	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1
7.0	4.4	4.1	3.8	3.6	3.4	3.2	3	2.8	2.6	2.4	2.3	2.2	2	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1
7.1	4.2	3.9	3.7	3.5	3.2	3	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1
7.2	4	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1	1	0.9
7.3	3.8	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1	1	0.9	0.9
7.4	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1	1	0.9	0.9	0.8
7.5	3.2	3	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7
7.6	2.9	2.8	2.6	2.4	2.3	2.1	2	1.9	1.8	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7
7.7	2.6	2.4	2.3	2.2	2	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6
7.8	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5
7.9	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5
8.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4
8.1	1.5	1.5	1.4	1.3	1.2	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4
8.2	1.3	1.2	1.2	1.1	1	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3
8.3	1.1	1.1	1	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
8.4	1	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
8.5	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
8.6	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
8.7	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1

8.8	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
8.9	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9.0	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

[20.6.4.900 NMAC - Rp 20 NMAC 6.1.3100, 10/12/2010; A, 10/11/2002; A, 5/23/2005; A, 7/17/2005; A, 12/1/2010; A, 3/2/2017; A, 4/23/2022]

20.6.4.901 PUBLICATION REFERENCES: These documents are intended as guidance and are available for public review during regular business hours at the offices of the surface water quality bureau. Copies of these documents have also been filed with the New Mexico state records center in order to provide greater access to this information.

A. American public health association. 1992. *Standard Methods for The Examination of Water and Wastewater, 18th Edition.* Washington, D.C. 1048 p.

B. American public health association. 1995. *Standard Methods for The Examination of Water and Wastewater, 19th Edition.* Washington, D.C. 1090 p.

C. American public health association. 1998. *Standard Methods for The Examination of Water and Wastewater, 20th Edition.* Washington, D.C. 1112 p.

D. American public health association. 2018. *Standard Methods for The Examination of Water and Wastewater, 23rd Edition.* Washington, D.C. 1796 p.

E. United States geological survey. 1989. *Methods For Determination of Inorganic Substances In Water And Fluvial Sediments, Techniques of Water-Resource Investigations of The United States Geological Survey.* Washington, D.C. 545 p.

F. United States geological survey. 1987. *Methods For The Determination Of Organic Substances In Water And Fluvial Sediments, Techniques Of Water-Resource Investigations Of The United States Geological Survey*. Washington, D.C. 80 p.

G. United States environmental protection agency. 1983. *Methods For Chemical Analysis Of Water And Wastes.* Office of research and development, Washington, DC. (EPA/600/4-79/020). 491 p.

H. New Mexico water quality control commission. 2020. *State Of New Mexico Water Quality Management Plan and Continuing Planning Process*. Santa Fe, New Mexico. 277 p.

I. Colorado river basin salinity control forum. 2020. *2020 Review, Water Quality Standards For Salinity, Colorado River System.* Phoenix, Arizona. 97 p.

J. United States environmental protection agency. 2002. *Methods For Measuring The Acute Toxicity Of Effluents And Receiving Waters To Freshwater And Marine Organisms.* Office of research and development, Washington, D.C. (5th Ed., EPA 821-R-02-012). 293 p.

K. United States environmental protection agency. 2002. *Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Waters To Freshwater Organisms.* Environmental monitoring systems laboratory, Cincinnati, Ohio. (4th Ed., EPA 821-R-02-013). 335 p.

L. United States environmental protection agency. 1991. Ambient-induced mixing, in *Technical Support Document For Water Quality-Based Toxics Control*. Office of water, Washington, D.C. (EPA/505/2-90-001). 335 p.

M. United States environmental protection agency. 1983. *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses, Volume I:*. Office of water, regulations and standards, Washington, D.C. 232 p.

N. United States environmental protection agency. 1984. *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses, Volume III: Lake Systems*. Office of water, regulations and standards, Washington, D.C. 208 p.

[20.6.4.901 NMAC - Rp 20 NMAC 6.1.4000, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 4/23/2022]

HISTORY of 20.6.4 NMAC:

Pre-NMAC History:

Material in the part was derived from that previously filed with the commission of public records - state records center and archives:

WQC 67-1, Water Quality Standards, filed 7/17/1967, effective 8/18/1967

WQC 67-1, Amendment Nos. 1-6, filed 3/21/1968, effective 4/22/1968

WQC 67-1, Amendment No. 7, filed 2/27/1969, effective 3-30/1969

WQC 67-1, Amendment No. 8, filed 7/14/1969, effective 8/15/1969

WQC 70-1, Water Quality Standards for Intrastate Waters and Tributaries to Interstate Streams, filed July 17, 1970;
WQC 67-1, Amendment Nos. 9 and 10, filed 2/12/1971, effective 3/15/1971
WQC 67-1, Amendment No. 11, filed 3/4/1971, effective 4/5/1971
WQC 73-1, New Mexico Water Quality Standards, filed 9/17/1973, effective 10/23/1973
WQC 73-1, Amendment Nos. 1 and 2, filed 10/3/1975, effective 11/4/1975
WQC 73-1, Amendment No. 3, filed 1/19/1976, effective 2/14/1976
WQC 77-2, Amended Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 2/24/1977, effective 3/11/1977
WQC 77-2, Amendment No. 1, filed 3/23/1978, effective 4/24/1978
WQC 77-2, Amendment No. 2, filed 6/12/1979, effective 7/13/1979
WQCC 80-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 8/28/1980, effective 9/28/1980
WQCC 81-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 5/5/1981, effective 6/4/1981
WQCC 81-1, Amendment No. 1, filed 5/19/1982, effective 6/18/1982
WQCC 81-1, Amendment No. 2, filed 6/24/1982, effective 7/26/1982
WQCC 85-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 1/16/1985, effective 2/15/1985
WQCC 85-1, Amendment No. 1, filed 8/28/1987, effective 9/28/1987
WQCC 88-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 3/24/1988, effective 4/25/1988
WQCC 91-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 5/29/1991, effective 6/29/1991
WQCC 91-1, Amendment No. 1, filed 10/11/1991, effective 11/12/1991

History of the Repealed Material:
WQC 67-1, Water Quality Standards, - Superseded, 10/23/1973
WQC 73-1, New Mexico Water Quality Standards, - Superseded, 3/11/1977
WQC 77-2, Amended Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 9/28/1980
WQCC 80-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 6/4/1981
WQCC 81-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 2/15/1985
WQCC 85-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 4/25/1988
WQCC 88-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 6/29/1991
WQCC 91-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 1/23/1995
20 NMAC 6.1, Standards for Interstate and Intrastate Streams, - Repealed, 2/23/2000
20 NMAC 6.1, Standards for Interstate and Intrastate Surface Waters, - Repealed, 10/12/2000