UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 Elm Street, SUITE 500
DALLAS, TEXAS 75270

April 9, 2020

Ms. Jennifer Pruett, Chair
New Mexico Water Quality Control Commission
1190 St. Francis Drive, Suite S-2102
Santa Fe, New Mexico 87505
Santa Fe, NM 87502-5469

Dear Ms. Pruett:

The Environmental Protection Agency (EPA) has completed its review of the amendments to the *Standards for Interstate and Intrastate Surface Waters 20.6.4 NMAC*. The revisions to state's water quality standards were adopted by the New Mexico Water Quality Control Commission (WQCC) on October 8, 2019 and became effective as state law on December 17, 2019. The EPA received both the WQCC's submission and the New Mexico Attorney General's certification letters dated January 3, 2020 on January 13, 2020.

The revisions to the New Mexico *Standards for Interstate and Intrastate Surface Waters 20.6.4 NMAC* were brought to the WQCC through a third-party proposal by Peabody Natural Resources Company (Peabody). The proposal included the revision to the designated use for waters within Peabody's Lee Ranch Mine boundary in the San Isidro Arroyo watershed that were not previously revised as part of New Mexico's 2013 triennial revisions previously approved by EPA. Based on a review of the supporting Use Attainability Analysis evaluating the extent of the natural low-flow conditions, as described in the enclosed technical support document EPA has determined that the revised designated uses described in *20.6.4.97 NMAC* are approved. This approval applies to Doctor Arroyo, including unnamed tributaries to Doctor Arroyo, from San Isidro Arroyo upstream to its headwaters, excluding Doctor Spring and Doctor Arroyo from the spring to its confluence with the unnamed tributary approximately one-half mile downstream of the spring. These revisions are effective for Clean Water Act purposes.

The approval of new and revised water quality standards is subject to the results of consultation under section 7(a)(2) of the Endangered Species Act (ESA). Section 7(a)(2) of the ESA requires that federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), as appropriate, to ensure that actions they take, fund, or authorize are not likely to jeopardize the continued existence of listed species or result in the adverse modification or destruction of habitat. EPA identified five species under USFWS jurisdiction that are present in a broadly defined action area. Section 7(a)(2) of the ESA requires that all federal agencies engage in consultation to ensure their actions are not likely to jeopardize the continued existence of any threatened or endangered species or result in adverse modification of designated critical habitat. Based on that consultation EPA has determined that approval of these amendments will have no effect on federally listed threatened and endangered species or on critical habitat in the action area.

I appreciate the WQCC's and NMED's effort in the development of these revised provisions of the state's standards. If you have any questions or concerns, please contact me at (214) 665-7101, or contact Russell Nelson at (214) 665-6646 or nelson.russell@epa.gov.

Sincerely,

Charles Maguire

Charles W. Maguire
Director
Water Division

Enclosure

cc:
Jennifer Fullam, Standards, Planning & Reporting Team Leader, New Mexico Environment Department (via email to jennider.fullam@state.nm.us)
Pam Castaneda, Administrator for Boards and Commissions, New Mexico Environment Department (via email to pam.castaneda@state.nm.us)
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TECHNICAL SUPPORT DOCUMENT

EPA Technical Review of
Use Attainability Analyses Supporting Amendments
To the
New Mexico's Standards For
Interstate and Intrastate Surface Waters
20.6.4 NMAC

Peabody Energy Company/Lee Ranch Mine
Mulatto Canyon, Arroyo Tinaja, San Isidro Arroyo, Doctor Arroyo

U.S. EPA REGION 6
WATER QUALITY PROTECTION DIVISION

April 8, 2020

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I. Introduction

Background

The purpose of this Technical Support Document (TSD) is to provide the results of the EPA Region 6 review of the revisions to the New Mexico's Standards for Interstate and Intrastate Waters (20.6.4 NMAC). These revisions are based on a 3rd-party rulemaking by Peabody Natural Resource Company (Peabody)/Lee Ranch Mine (LRM) following the performance-based process described in the New Mexico Water Quality Standards (WQS) at 20.6.4.15 NMAC. The Peabody/LRM is an active surface coal mine operating under a Surface Mining Permit (No. 19-2P) issued by the New Mexico Mining and Minerals Division. The waters within the Peabody/LRM permit boundary include Mulatto Canyon, Tinaja Arroyo, San Isidro Arroyo, Doctor Arroyo.

Surface waters in New Mexico that are not included in 20.6.4.101-899 NMAC of the New Mexico WQS are "unclassified" waters of the State (20.6.4.97-99 NMAC). Unclassified waters are presumed to be able to support CWA §101(a)(2) uses like the marginal warm water and primary contact uses and associated criteria found in §20.6.4.98 NMAC. If a Use Attainability Analysis (UAA) confirms that Clean Water Act (CWA) uses cannot be supported consistent with one of the factors in 40 CFR 131.10(g), these waters may be placed in 20.6.4.97 NMAC. Springs are separate hydrological features and are not included with any specific water listed in 20.6.4.97 NMAC. The waters within the Peabody/LRM site are defined as unclassified.

Consistent with the provisions in 20.6.4.15 NMAC, Peabody/LRM developed workplans in 2015 and 2017 that were reviewed by both the New Mexico Surface Water Quality Bureau (SWQB) and the Environmental Protection Agency Region 6 (EPA) regarding the development of a UAA to support revisions to the designated aquatic life use for waters associated with the Lee Ranch Mine site. Provisions regarding UAAs in the New Mexico WQS are found at 20.6.4.15 NMAC. These provisions provide for entities other than the New Mexico Environment Department (NMED) to conduct a UAA and for UAAs based on the Surface Water Quality Bureau's (SWQB) *Hydrology Protocol* (2011).

The performance-based processes outlined in 20.6.4.15 NMAC are generally consistent with EPA's regulations at 40 CFR 131.3(g) which define a UAA and EPA guidance and recommendations for developing UAAs. Specifically, 20.6.4.15. B. NMAC refers to a requirement that a UAA "shall assess the physical, chemical, biological, economic or other factors affecting the attainment of the use" and that the analysis "shall rely on scientifically defensible methods…" The provision refers to both NMED/SWQB and EPA guidance regarding UAAs, including the SWQB's *Hydrology Protocol* (2011), EPA's Interim Economic Guidance for Water Quality Standards – Workbook, March 1995 and EPA's *Technical Support Manual: Waterbody Surveys and Assessments for Conducting a Use Attainability Analyses* (1983). The SWQB's *Hydrology Protocol* (HP) itself is a methodology that can be used to distinguish among ephemeral, intermittent, and perennial streams and rivers in New Mexico; and can be used to support a UAA when a designated use is not attainable because of "natural ephemeral, intermittent, or low flow conditions prevent the attainment of the use…" (See 40 CFR 131.10(g)(2)).

Although UAAs based on the SWQB's HP focus on hydrology, the HP appropriately states the information generated by its application is used to provide technical support but *cannot be used in place of a UAA*. In reviewing a UAA proposing a modification of a CWA 101(a)(2) use, EPA generally relies on its guidance, its *Technical Support Manual: Waterbody Surveys and Assessments for Conducting a Use Attainability Analyses* (1983) which considers the factors described above. The Peabody/LRM UAA did not include a discussion and/or analysis of some of the main components that should be considered in UAA. However, EPA recognizes that the conditions in in semiarid or arid landscapes will affect the extent of that discussion and/or analysis in those instances where hydrology is the primary factor. However, given that ephemeral streams exist in very wet to arid landscapes, EPA strongly recommends that these UAAs not only address physical conditions, but chemical and biological factors as well.

The provisions in 20.6.4.15. D. NMAC require the proponent to develop a work plan to conduct a UAA and submit the work plan to NMED and EPA Region 6 for review and comment (although there is no federal requirement to do so unless EPA conducts the project directly, or funds the project under a grant, contract, or other agreement). The Peabody/LRM *Use Attainability Analysis Sampling Plan* (2015) described the hydrologic, biological, and geomorphic data that was collected to classify the drainages within and adjacent to the LRM permit area. EPA Region 6 provided comments to the NMED on the proposed workplans in both 2015 and 2017. Actual field work was carried out at the LRM site based on the sampling plan in 2017, although the workplan was not formally approved by the SWQB until 2018.

The Peabody/LRM UAA (2018) was based on the NMED/SWQB HP to determine the hydraulic regime of Mulatto Canyon, Arroyo Tinaja, San Isidro Arroyo, Doctor Arroyo, their tributaries and their ability to support the presumed marginal warm water and primary contact uses and associated criteria found in 20.6.4.98 NMAC or if these waters are limited to the uses and criteria described in 20.6.4.97 NMAC. The UAA describes the results of LRM's application of the SWQB's HP to the Mulatto Canyon drainage within the LRM permit boundary.

A public hearing was held on October 8, 2018, where Peabody/LRM and the NMED presented technical testimony in support of the proposed rulemaking before the New Mexico Water Quality Control Commission (Commission). The Commission adopted the revisions to 20.6.4 NMAC for San Isidro Arroyo, Mulatto Canyon, Arroyo Tinaja and Doctor Arroyo on the same day of the hearing. These revisions became effective as state law on December 17, 2019. The NMED submitted these revisions to EPA for action by letter dated January 3, 2020 which was received on January 9, 2020.

II. Region 6 Analysis of the LRM UAA

Introduction

The Commission submitted designated use changes for Mulatto Canyon and a portion of San Isidro Arroyo based on the SWQB's HP-based UAA (NMED 2012). The EPA approved those revisions in its June 8, 2017 action. The previous amendments did not include the tributaries within and adjacent to the LRM that flow to Arroyo Tinaja, Doctor Arroyo, and San Isidro Arroyo. The Peabody/LRM HP-UAA states that the results of NMED's 2012 HP-UAA,

noting that the results indicated that Mulatto Canyon and a portion of San Isidro Arroyo are ephemeral but said that these designated use determinations remain uncertain.

The Peabody/LRM HP-UAA is intended to reassess the Mulatto Canyon drainage within the LRM permit boundary to address this uncertainty regarding the hydrology (i.e., perennial, intermittent, or ephemeral) and the appropriate designated uses for these waters. The Peabody/LRM HP-UAA relied on field data to evaluate and confirm homogeneity throughout the individual stream reaches to determine the applicability of the results considering the "hydrological, geomorphic and biological indicators that identify where water is persistent." This stated approach is generally consistent with federal regulations at 40 CFR 131.10 and 20 and EPA's *Technical Support Manual: Waterbody Surveys and Assessments for Conducting a Use Attainability Analyses* (1983). The following analysis discusses the pertinent aspects of the Peabody/LRM HP-UAA and its conclusions.

Lee Ranch Mine Site Setting

The LRM is in a semiarid region of southwestern New Mexico, characterized by low humidity, limited seasonal rains and wide ranges in daily and annual temperatures. The LRM HP-UAA identifies two Level IV Ecoregions (Griffith, 2006) present within the San Isidro Arroyo Watershed. The headwaters of the watershed fall within the Semiarid Tablelands (22j) classification while the remainder of the watershed is characterized as the San Juan/Chaco Tablelands and Mesas Level IV Ecoregion (22i). The detailed narrative in the HP-UAA provides a description in the variation between these two ecoregions. The mean annual precipitation ranges for the Semiarid Tablelands (22j), which range from 10-15 inches per year and for the San Juan/Chaco Tablelands and Mesas (22i). ranging from 6-10 inches per year.

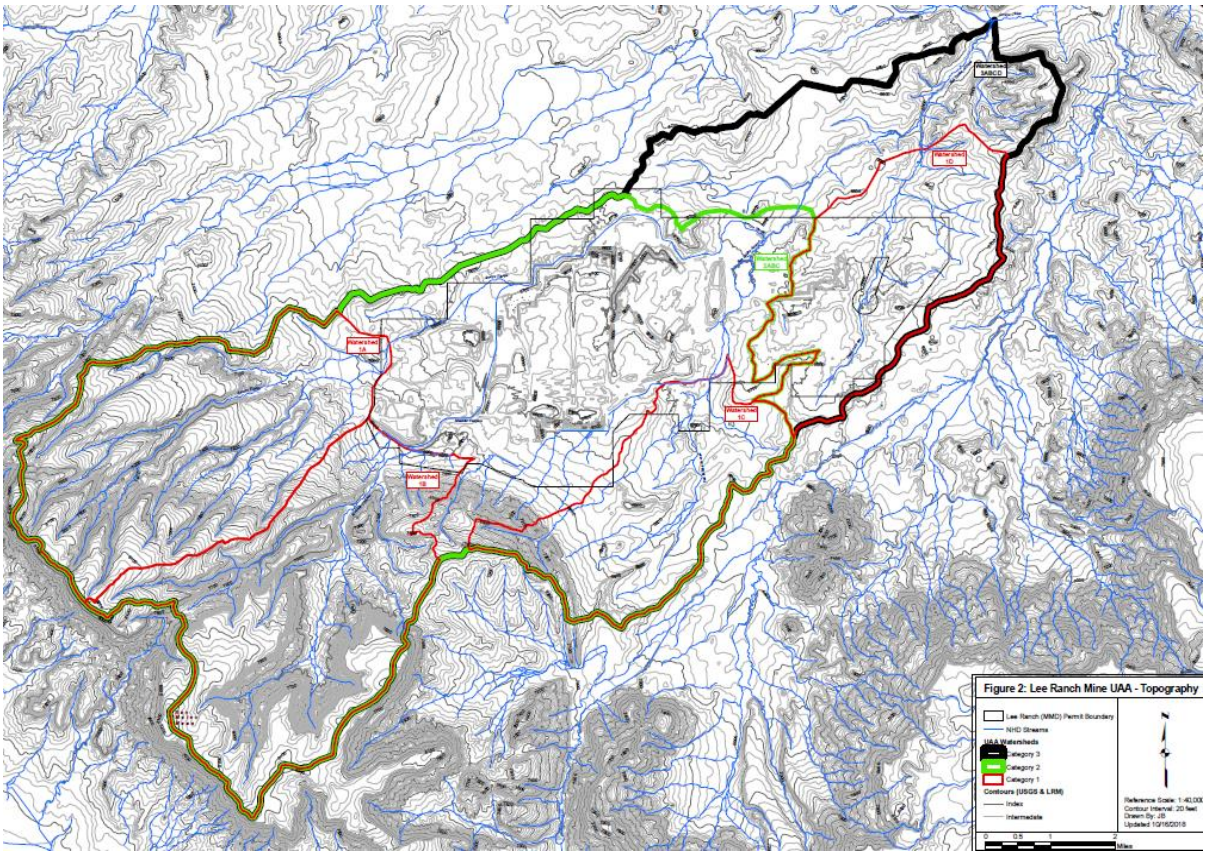
The LRM permit boundary covers 15,656 acres (24.5 mi^2) with approximately 8,470 acres (13.2 mi^2) of land that has been disturbed by surface coal mining processing facilities within these ecoregion boundaries. The LRM is located within the central portion of the San Isidro Arroyo watershed (LRM Figure 2). This watershed is bound by the San Mateo Mesa located south-southwest of the LRM permit area and drains to the northeast towards the Arroyo Chico. The headwaters originate in steep, incised canyons near the San Mateo Mesa at 8,200 ft. which rapidly drop approximately 1,800 ft. in elevation to the lower portion of the watershed and the San Isidro Arroyo confluence with Arroyo Chico.

The western portion of the watershed is drained by Arroyo Tinaja and Mulatto Canyon and the eastern portion is drained by San Isidro Arroyo and Doctor Arroyo. Arroyo Tinaja, Mulatto Canyon, San Isidro Arroyo, and Doctor Arroyo originate upgradient of the LRM, and flow across the mine permit boundary. No description of the elevation was provided, but the HP-UAA did note that dikes and diversions have been used to route upgradient drainage around the active areas of the mine.

It is important to understand that the temperature and differing moisture regimes for the two ecoregions are significant with regard to the HP assessment and a potential designated use support determination. Given that the San Juan/Chaco Tablelands and Mesas and Semiarid Tablelands ecoregions are characterized by high evapotranspiration rates that are estimated to be approximately 32 inches/year at the LRM site, assuming an average annual precipitation of 11

inches the annual moisture deficit would be approximately 21 inches a year. Thus, appropriate conditions are a critical factor during a HP assessment. The conditions during the site assessment were discussed in more detail later in the UAA.

Figure 1 – Topographic Map



Surface Waters

Surface water flow within the San Isidro Arroyo watershed are described as irregular, occurring in direct response to precipitation events. Typical of this region of New Mexico, a storm event can occur in an isolated portion of a given watershed, moving across an area with the volume of rainfall depending on the rate of movement, duration and intensity of the storm itself. These events are flashy, characterized by rapid peaks and relatively short durations and limited sustained flow rates. Given the variation in rainfall across the Peabody/LRM site, surface water monitoring was focused within Mulatto Canyon, Arroyo Tinaja, and San Isidro Arroyo during flow events that produced sufficient volumes of water for sample collection. There was a variation in sampling from 1-10 events per year with a mean of 4 events per year. The majority of these sampling events occurred during the summer monsoon season.

The nearest U.S. Geological Survey (USGS) gauging station to the LRM is at Arroyo Chico, 35 miles downstream. This station was described as only receiving a small percentage of the flow from the waters on the Peabody/LRM site. As a result, the data from this USGS station

didn't provide a useful direct comparison to flow in the LRM waters. But EPA agrees that the data is useful as a general comparison for the duration of days with and without flow and the intensity of flow when it occurs. Not surprisingly, the highest mean daily flows typically occur during the intense seasonal storms within the drainage basin with the exception of June 2017 when no events were recorded. The HP-UAA relied on U.S. Department of Agriculture's Soil Conservation Service (USDA-SCS, 1971) procedures to estimate flow depths for 10-yr, 24-hr events. These events were reported as generally less than two feet in depth with monthly sampling after a storm event.

Groundwater

As may be expected given that the LRM HP-UAA was developed for an active mine site, there was significant detail regarding the geologic structure and lithological influence on the movement and occurrence of groundwater at the site. The HP-UAA explains in detail that groundwater flow within the bedrock is dependent on the structural dip of the lithologic units and is modified locally by the type and degree of fracturing. Groundwater flow is partially controlled by the San Mateo and San Miguel Creek domes located to the south and northeast of the LRM site, with groundwater flow in the vicinity of the LRM site moving in a north-northeasterly direction. Recharge of the shallower formations occurs in and around fractures in the sandstone outcrops located to the south and southeast of the LRM site. The assessment explains that impermeable shales limit groundwater flow to the north, limiting connectivity with the base of the drainage channels.

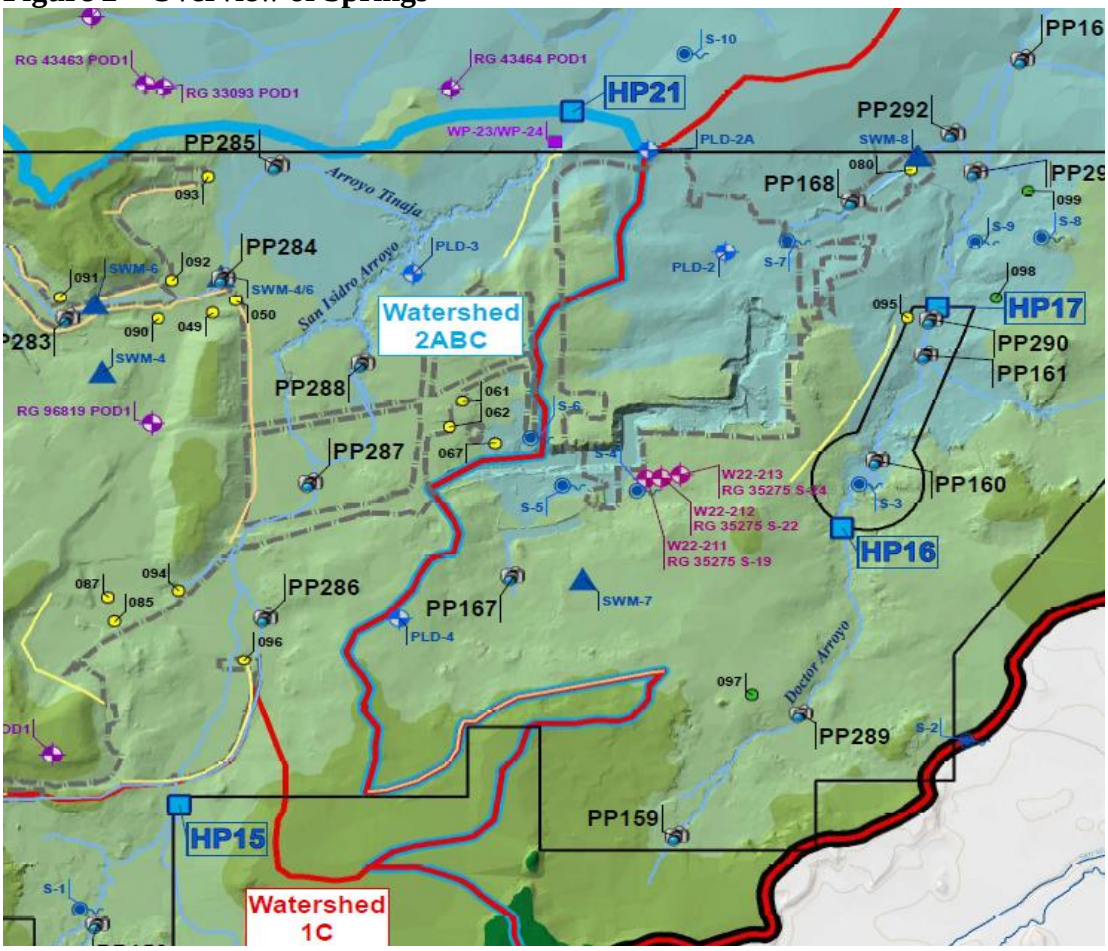
The significance here is the discussion indicating that natural groundwater discharge is limited to low discharge springs predominately found in the eastern portion of the LRM site. Although some discharge occurs from wells used for livestock water, both the springs and livestock well discharges are typically diffuse, limited in quantity and evaporates or soaks into the ground within very short distances due to the semi-arid climatic conditions. These springs are discussed in the next section in more detail.

Springs

The LRM HP-UAA identified thirteen springs in and around the Peabody/LRM boundary as part of the New Mexico Mining and Minerals Division (MMD) Permit. Ten of these springs are within the HP-UAA study area (S-1 – S10). Springs S-1, S-6, and S-10 are within the San Isidro Arroyo drainage area and springs S-2 through S-5 and S-7 through S-9 are located within the Doctor Arroyo drainage area and unnamed spring (S-2) and the Pena Spring (S-10) are located outside of the MMD permit boundary as seen in **Figure 2** below. Burro Spring (S-7), D/600 (S-6), Montano Spring (S-4), Ojo Redondo Spring (S-5), and San Isidro Spring (S-1) were described as having been or as expected to be mined through. Impacts to these springs are to be addressed through the mitigation requirements of the Army Corp of Engineers (USACE) Clean Water Act Section 404 permit (Action No. NM-97-00200) and MMD Permit 19-2P as required by the State of New Mexico in the SWQB's May 1999 letter to the Lee Ranch Coal Company. Although the LRM HP-UAA did not provide details regarding mitigation, the USACE's November 30, 2018 letter stated that it had determined that the required compensatory mitigation has been successfully completed.

The EPA shares the concern expressed by the SWQB regarding the filling and obliterating natural drainages that contain seep springs. Wetlands are keystone ecosystems in arid environments and comprise only approximately 0.3% of the surface area of the arid Southwest (Cowardin et al. 1979). Arid-land springs and particularly those associated with ciénegas like Doctor Arroyo (S-3) are a special class of inland wetlands and are well-known for their biological importance. The EPA supports the protection of Doctor Springs, the ciénega and the downstream flow through an exclusion area.

Figure 2 – Overview of Springs

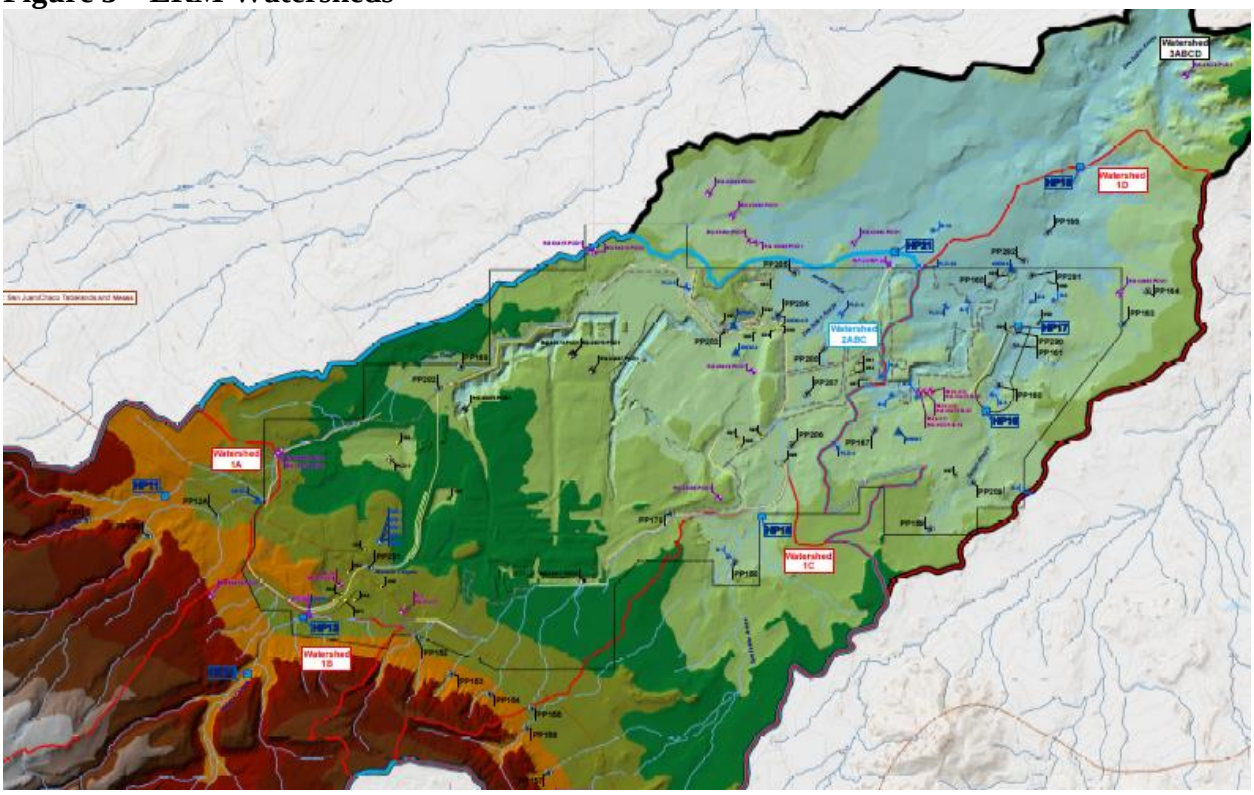


Survey and Analysis

The Peabody/LRM HP-UAA relied on the SWQB's HP (2012) to determine the hydrologic flow regime in order to evaluate whether aquatic life and recreational uses can be supported within the San Isidro Arroyo watershed. The LRM HP-UAA refers to the use of a watershed approach was utilized to establish similar types of drainages that would further enhance the applicability of the HP analysis locations in determining the hydrologic regime of the San Isidro Arroyo and its three principal tributaries; Arroyo Tinaja, Mulatto Canyon, and Doctor Arroyo. This entailed identifying representative reaches near the downstream end of each subwatershed to ensure all upstream runoff processes were included. The potential fault with this approach is that storm events can occur in an isolated portion of a watershed, moving across an area with the volume of rainfall depending on the rate of movement, duration and intensity of the

storm itself. Depending on the volume of a given event, the flow may or may not produce a sufficient volume of water to flow to the downstream end of a subwatershed, obscuring what conditions exit throughout the waterbody.

Figure 3 – LRM Watersheds



Watershed Approach

The watershed approach categorizes the waters within the San Isidro Arroyo from low order headwaters to higher order streams. The lower order headwaters from the canyons (1A and 1B), and those moving through rolling plains (1C and 1D) downstream to encompass Arroyo Tinaja, Mulatto Canyon, and San Isidro Arroyo (watershed 2ABC). Located furthest downstream encompasses the San Isidro Arroyo prior to its confluence with Arroyo Chico watershed (3ABCD). This approach is also useful in characterizing the boundary between the Level IV Ecoregions, with headwaters (1A and 1B) being located within the Semiarid Tablelands Level IV Ecoregion and all other watersheds being located within the San Juan/Chaco Tablelands and Mesas Level IV Ecoregion discussed earlier. These locations of these watersheds can be seen in **Figure 3** below. The approach for sample site locations was appropriate, using the initial 2015 field reconnaissance based on direct knowledge of the site waters and by using other sources of information, including USGS and other topographic maps, aerial photography.

Weather

<u>Drought Conditions</u>

Weather conditions prior to sampling are an important consideration in any use support assessment or UAA and is particularly critical in a semi-arid to arid regions. The SWQB's HP recognizes that spatial and temporal variations in flow that can occur in an individual stream or

stream systems are related to seasonal precipitation and evapotranspiration patterns resulting from recent weather and climate variability on a longer temporal scale. The EPA considers the Palmer Drought Severity Index (PDSI), the Standardized Precipitation Index (SPI) and the Palmer Z index to be valuable tools in determining appropriate conditions for HP assessment. Although all these indices have strengths and weaknesses, the PDSI is particularly useful in localized HP assessments because it accounts for evapotranspiration and can capture the effect of increased temperatures on moisture demand and availability.

The Peabody/LRM UAA utilized data from all three of these indices. The PDSI data for northwestern New Mexico obtained from the National Oceanic and Atmospheric Administration (NOAA) website (NOAA, 2018c) gave a of -1.99 to +1.99, indicating normal conditions. The SPI was obtained through the High Plains Regional Climate Center (HPRCC) Climate Maps website (HPRCC, 2018). The a 12-month value was reported as between 0 and -1 for the eastern half of the study area indicating below-average precipitation conditions. However, assessments under these conditions are appropriate. In the western half of the study are, a 12-month range between 1 and 0 indicated above-average precipitation conditions during June of 2017. There had not been a precipitation event at the LRM site in 48-hours prior to the field evaluations carried out during the June 19 through 21, 2017 timeframe. The most recent event was reported has having occurred a month previous, on May 19, 2017 (0.13 in). Data for the Palmer Z-index was obtained through the NOAA website (NOAA, 2018b) indicated a range of -1.24 and +0.99 in June 2017, representing normal conditions for northwestern New Mexico.

Hydrologic Evaluations

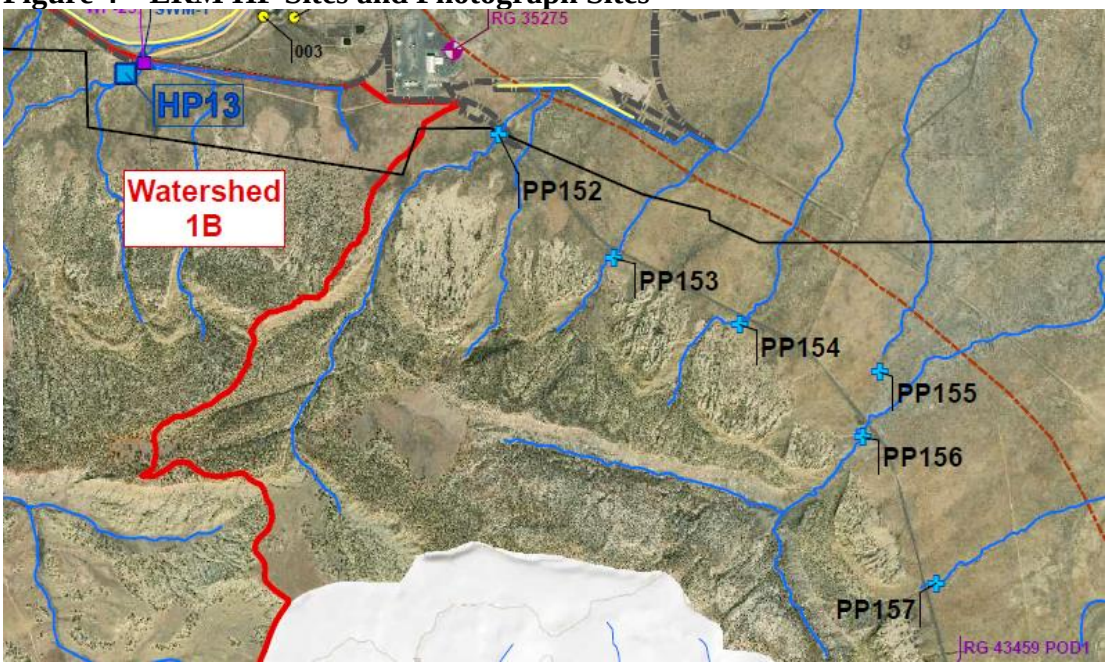
The SWQB's HP outlines structured hydrologic evaluations using multiple attributes to assign a numeric score on a tiered, weighted scale. The final determination of whether a stream is ephemeral, intermittent, or perennial is based on the total attribute score, supporting information, and professional judgment. These assessments are based on the results of Level 1 and Level 2 Evaluations described in the SWQB's HP. In most instances, a Level 1 evaluation will provide enough information to accurately distinguish between ephemeral, intermittent, and perennial systems recognizing that there is some inherent variability in these assessments. Level 2 evaluations may be conducted when Level-1 Evaluations are inconclusive. The scoring system is shown in **Table 1** below.

Table 1. Summary of Level 1 Score Interpretation

Waterbody Type	Level 1 Total Score	Hydrology Determination
Ephemeral	**Less than 9.0***	**Stream is ephemeral**
	≥ 9.0 and < 12.0	Stream is recognized as intermittent until further analysis indicates that the stream is ephemeral
Intermittent	**≥ 12.0 and ≤ 19.0**	**Stream is intermittent**
	> 19.0 and ≤ 22.0	Stream is recognized as perennial until further analysis indicates that the stream is intermittent
Perennial	**Greater than 22.0**	**Stream is perennial**

Hydrologic determinations at each site document the score for each Level 1 indicator and included field notes and photos from the assessment sites. These evaluations tend to be detailed and included upstream/downstream photographs to document physical and larger landscape characteristics. Drainage profiles for the primary drainage channels are based on the photographic sites. **Figure 4** below provides some context to the HP monitoring and photographic (PP) sites.

Figure 4 – LRM HP Sites and Photograph Sites



One area of concern with the Level 1 analyses in what may be ephemeral waters is the benthic macroinvertebrate assessments. The SWQB's HP indicates that these assessment are based on quantitative observations at the margins of a channel for tell-tale signs of macroinvertebrates, including caddisfly or stoneflies casings, mussel and aquatic snail shells along with other indicators. The defined quantitative indicators are appropriate, but we find it unusual that there were no indications of macroinvertebrates since cryptobiotic species are common to ephemeral streams. This raises the question of whether the assessment followed the HP in looking for remnants of macroinvertebrates at the margins of streams at the assessment sites.

Tier 1 Subwatershed

Subwatersheds 1A and 1B

The Tier 1 Subwatersheds 1A and 1B are low order headwater streams in steep canyons in the uppermost headwaters of Mulatto Canyon and Arroyo Tinaja. Both are located within the Semiarid Tablelands Ecoregion (22j) which transitions from mesas and canyons with bedrock outcrops to alluvial valleys (Griffith et al., 2006). Although the rough terrain limited access an assessment site (HP14) was located near the eastern downstream edge of the canyons on the largest drainage channel in the upper canyons in Subwatershed 1B. This assessment site is located along the eastern, downstream edge of the canyons, declining to rolling plains. Although

this assessment site is had the highest potential to support intermittent flow, the limited drainage area, incision in the canyons and limited vegetation along the channel resulted in Level 1 Evaluation score at HP14 is 6.5, indicating an ephemeral flow regime.

Two additional assessment sites were established for these subwatersheds. HP11 was located near the Level IV Ecoregion boundary and outlet of Subwatershed 1A, and HP13 was located at the outlet of Subwatershed 1B. A third site that was initially included (HP12) in the site Sampling Plan for Subwatershed 1A but was dropped and replaced by photo sites because of the absence of a defined stream channel. This location was considered to be a depositional segment where sheetflow typically spreads out across the channel fan or floodout zone. The photographic documentation supported eliminating this site.

Both HP11 and HP13 are located northeast of the canyons where rolling topography transitions to the lower plain seen throughout the rest of the study area. These two sites were at or very close to the subwatershed outlet in the stream channels with the largest contributing drainage area. This gives these sites the highest potential to support intermittent within their respective subwatersheds. Although there have not been any modifications to the channels or the, there have been groundwater withdrawals from the LRM production wells are from the Gallup Aquifer located approximately 1000 ft below the surface. This aquifer is confined and does not have a direct connection with any of the drainages within the study area and could not have affect the results of the evaluation.

The Level 1 score for both HP11 (5) and HP13 (7.5) indicate that these headwaters are ephemeral. Although the evaluations for these three sites may have underestimated the presence of cryptobiotic macroinvertebrates to some degree, it is unlikely that the overall scores would alter the determination that these waters are ephemeral.

Subwatersheds 1C and 1D

Subwatersheds 1C and 1D are the headwaters of San Isidro Arroyo and Doctor Arroyo. These subwatersheds are located predominately within the San Juan/ Chaco Tablelands and Mesas (22i) Level IV Ecoregion, with the remaining area in canyons within the Semiarid Tablelands Level IV Ecoregion (22j) (Griffith et al., 2006). These subwatersheds are characterized by the rolling topography of the lower plain with plateaus, valleys, and canyons with a mix of desert shrub, semi-desert-shrub-steppe, and semi-desert grasslands.

A single assessment site (HP15) was established in Subwatershed 1C and was described as representative of the lower order tributaries in the upper canyon headwaters and the transitional zone between these canyons and rolling hill topography. It is unclear how HP15, where the majority of the watershed falls within rolling plains topography, would represent and provide a conservative estimate of flow in lower order tributaries upstream in the canyons. Photographic documentation was used to describe this single site as having similar stream channel characteristics as found at assessment points HP14 and HP13 within Subwatershed 1B. It appears that based primarily those photographs, LRM did not complete an HP assessment in Subwatershed 1C despite HP15 having the greatest channel and floodplain width of the locations observed and having the greatest potential to support non-ephemeral flow regime in the lower order upstream tributaries within the subwatershed.

The LRM HP-UAA reported that the Level 1 Evaluation at HP15 result in a HP score of 8.5, supporting a determination that the waters in Subwatershed 1C are ephemeral. It is unclear how much physical assessment was actually done at HP15 and how much of this evaluation was based on photographic evidence to support this score. EPA would have preferred that an actual assessment of this site had been carried out. Although the probability is low for these waters, at higher elevation waters can be intermittent in some reaches with that flow going subsurface downstream – something that would not be known without assessing the headwater streams. Given that HP15 has the greatest channel and floodplain width of the locations observed and the greatest potential to support intermittent flow, but no direct assessment looking for the presence or remnants of cryptobiotic macroinvertebrates could have resulted in an underestimation of the HP score. A score of ≥ 9.0 would have led to Level 2 Evaluation and possibly a different determination for at least HP15, although it may not alter scores in other waters in this subwatershed.

The LRM HP-UAA describes Subwatershed 1D includes most of Doctor Arroyo from its upper headwaters to approximately 3000 ft. upstream of its confluence with San Isidro Arroyo. This portion of the subwatershed covers the eastern end of the MMD permit boundary. The document noted that a mining exclusion area was established in the vicinity of Doctor Springs (S-3) and indicates that there have been no modifications to the trunk of the Doctor Arroyo channel. However, mining along the western end of the subwatershed resulted in the removal of a portion of an unnamed tributary that previously reported to Doctor Arroyo near the northern permit boundary but notes that this drainage will be reconstructed during mine reclamation.

There are NPDES outfalls in this subwatershed. Outfall 080 was built for treating runoff from mining disturbed areas in this unnamed tributary. In addition, a dike along the western end of the exclusion area diverts runoff from mining related disturbance to NPDES outfall 095. The document also describes a diversion in the southwestern headwaters of Doctor Arroyo that redirect drainage away from the mining area to the north that has resulted in a change in the drainage break and directed more water towards the San Isidro Arroyo. Both the NPDES outfalls and the southwestern diversion were described as temporary and as having small drainage areas and as having negligible impact on the quantity of surface runoff to Doctor Arroyo based on their relatively small drainage areas. However, the source of the surface runoff to Doctor Arroyo from these outfalls and diversion is unclear.

Assessment sites HP16 and HP17 were established at the upstream and downstream portion of the mining exclusion area to evaluate potential changes to the flow regime in Doctor Arroyo. An assessment site (HP18) was also placed just upstream of the outlet of the Doctor Arroyo 1D subwatershed. The Level 1 Evaluations score at HP16 was 6.5, indicating that this portion of Doctor Arroyo is ephemeral. The LRM HP-UAA refers to water being in the channel near Doctor Spring (S-3) within the mine exclusion area downstream of HP16. Flow from Doctor Spring reports to a livestock tank, presumably the tank installed by LRM that is also supplied by wells that provide about 0.2 ac-ft per year supplementing livestock watering and supplying additional water to what is described as a small wetland feature. It is unclear what volume of water is contributed to the stream channel from the Doctor Spring. There is concern that the saturated reach adjacent to Doctor Spring is described as not representative of what were

described as the "normal conditions" within the Doctor Arroyo channel. The overflow from the Doctor Spring area subsides or evaporates within a distance of < 900 ft. within the Doctor Arroyo channel. Although HP17 located approximately 4000 ft. downstream of Doctor Springs, the Level 1 Evaluations score at the site was 8.5. Despite the distance downstream, there is some concern that the evaluations for this site may have underestimated the presence of cryptobiotic macroinvertebrates. EPA would have preferred that a Level 2 Evaluation be carried out at this site to confirm that ephemeral conditions exist here. The Level 1 Evaluation score at HP18 of 6.0 upstream of the outlet to this subwatershed indicates that the stream is likely ephemeral at this point.

Tier 2 Subwatershed

Subwatersheds 2ABC

Subwatershed 2ABC is located within the San Isidro Arroyo, which includes Arroyo Tinaja, Mulatto Canyon, and San Isidrio Arroyo encompassing the majority of the LRM site. This includes diversions built to direct runoff from upstream watersheds not affected by mining away from areas disturbed from mining activities. The Arroyo Tinaja flows north where the channel courses into a broad grassy valley with a shallow slope where photopoint (PP) documentation (PP285) shows that it is representative of the channel fan or floodout zone where sediment aggrades as flow dissipates. Although the Arroyo Tinaja channel has several temporary NPDES outfalls near PP284 and PP284, it is unclear what these outfalls convey or how frequently they discharge, the modified portion of the channel (PP169, PP288, PP284) exhibits swale-like characteristics with a broad shallow channel that is densely vegetated and has bed material consisting of silt and fine sand with no rifle-pool structures. Mulatto Canyon was previously mined through in the early years of LRM under MMD Permit 19-2P, drainage from the upstream watersheds 1B has been diverted north through the existing course of the reconstructed Mulatto Canyon channel which now extends from HP13 to PP169 where it connects to Arroyo Tinaja.

Another assessment site (HP21) was established at the outlet of Subwatershed 2ABC below the confluence of Arroyo Tinaja and Mulatto Canyon. This site is located in the stream reach described as having the greatest potential to support non-ephemeral flow within 2ABC and was described as representative of the hydrologic processes in the entire subwatershed.

The Level 1 Evaluation score for HP21 was 8.0, which indicates support for a determination that this site is ephemeral. The LRM HP-UAA also referred to the results of NMED's HP-UAA (2012) as indicating that this reach of the San Isidro Arroyo is ephemeral. However, the NMED HP-UAA did not make a broad determination for San Isidro Arroyo but was specific to an ~8-mile reach of Mulatto Canyon, an unnamed tributary to Kim-me-ni-oli wash and Inditos Draw. In addition, Mulatto Canyon and Arroyo Tinaja have been previously diverted to the north and Mulatto Canyon now wraps around the northern perimeter of the mining area before reconnecting with the native Arroyo Tinaja channel, but there was no discussion of whether this diversion affects the flow regime and the subsequent Level 1 Evaluation score at HP21.

The score at HP 21 is very similar to the HP15 score (8.5) recorded at the outlet of Subwatershed 1C, which is also located within the lower plains. The scores observed at assessment points HP11 (5) and HP13 (7.5), located upstream near the outlets of Subwatersheds 1A and 1B at the base of the mesa canyons, and HP14 (6.5) also located upstream within the mesa canyons, also indicate that the flow regime within Subwatershed 2ABC is ephemeral. Although Level 1 Evaluation score similarity and photopoint documentation presented as additional evidence that the flow regime remains consistent throughout the 2ABC sub-watershed, the question regarding underestimation of cryptobiotic macroinvertebrates at individual sites remains. But as noted previously, possible presence would likely not significantly affect the overall scores to drive more than a Level 2 Evaluation at sites like HP21 that approach a score closer to 9.0.

Tier 3 Subwatershed

Subwatersheds 3ABCD

Watershed 3ABCD includes the lower reach of the San Isidro Arroyo just before its confluence with Arroyo Chico and includes the Tier 1 and Tier 2 subwatersheds discussed previously. The hydrologic assessment site HP31, just above its confluence wth Arroyo Chico would be expected to provide an indication of the hydrologic regime within San Isidro Arroyo. The Level 1 Evaluation score for HP31 of 7.0 is similar to scores at the upstream site HP14 (6.5) at the base of the mesa canyons, sites HP11 (5.0) and HP13 (7.5) near the outlets of Subwatersheds 1A and 1B, and HP18 (6.0) and HP21 (8.0) in the lower portion of this drainage basin in Subwatersheds 1D and 2ABC.

In the discussion of the Tier 1 Subwatershed 1D, we noted that the mining exclusion area that encompass Doctor Arroyo about half between its headwaters and its confluence with San Isidro Arroyo. As described, this exclusion area provides protection for the immediate area around Doctor Springs and downstream along Doctor Arroyo. This area is significant because there is water in a Doctor Arroyo emanating from Doctor Springs and also overflow from bedrock wells to the ciénega in the Doctor Springs area. Although this water is quickly lost to the substrate and evapotranspiration within < 900 ft. this area cannot be considered ephemeral, which appears to have been taken into consideration in determining the applicable designated use for Doctor Springs. The EPA agrees that the upstream (HP16) site supports an ephemeral determination upstream of these springs. There is some concern that the Level 1 Evaluation score at the downstream (HP17) site may be low suggesting that a Level 2 Evaluation may be warranted. However, a Level 2 Evaluation would be unlikely to alter an ephemeral determination in the lower reach of Doctor Arroyo.

Expanding on our previous discussion of the Tier 1 Subwatershed 1D, Doctor Springs is identified in NMED/SWQB's Wetland Action Plan (2018) as damaged by draining water for livestock watering. Although salt and alkali tolerant inland saltgrass are often found in ciénegas, the document notes the Parish's alkali grass that was present in Doctor Springs in 1995 was lost by 2002. Although the flow from Doctor Springs is dependent on precipitation and snowmelt for recharge and that volume is limited by the low hydraulic conductivity of the water bearing formations in this landscape, the active mining for groundwater for livestock watering adversely

affects this spring. This water is biologically important as a productive habitat for plants and animals in an otherwise arid landscape. However, we agree that supporting Level 1 HP Evaluations that were completed at representative assessment sites above and below Doctor Springs indicate that the remainder of stream channels within the San Isidro Arroyo watershed are ephemeral.

Threatened and Endangered Species

The EPA initiated informal consultation under Section 7(a)(2) of the Endangered Species Act (ESA) with the U.S. Fish and Wildlife Service (USFWS) concerning the revisions to New Mexico's WQS through an initial February 12, 2020 letter to Susan Millsap, New Mexico Ecological Services Field Office Supervisor. This letter described the proposed action and requested information on threatened and endangered (T/E) species identified within the defined the action area covered by the WQS amendments obtained from the USFWS's Information for Planning and Consultation (IPaC) site and obtained a species.

Table 1. Listed Species within the approximate LRM defined action area.

Avian	**Status**	**Habitat**
Mexican Spotted Owl (*Strix occidentalis lucida***)** Action area outside of critical habitat	Threatened	Critical designated
Southwestern Willow Flycatcher (*Epidonax traillii extimus*)	Endangered	Critical designated
Yellow-billed Cuckoo (*Coccyzuz americanus)*	Threatened	Proposed critical habitat
Fish		
Zuni Bluehead Sucker (*Catostomus discobolus yarrowi)*	Endangered	Critical designated
Flowering Plants	**Status**	**Habitat**
Zuni Fleabane (*Erigeron rhizomatus)*	Threatened	None designated

The EPA evaluated the potential effect to these species resulting from the Agency's approval of the revised New Mexico water quality standards. Based on these evaluations and technical support from USFWS, Melissa Mata-Gonzales, Lead Biologist/Species Lead for this informal consultation and Vicky Ryan, Biologist/Avian Species to evaluate potential effects, EPA has determined that its approval of these revised standards will have no effect on these listed species.

III. REGION 6 DETERMINATION

Conclusion

Based on a review of the supporting LRM HP-UAA, EPA found the watershed approach that was utilized was appropriate in establishing assessment sites that would provide the best opportunity to accurately determine the hydrologic regime in the San Isidro Arroyo and its principal tributaries; Arroyo Tinaja, Mulatto Canyon, and Doctor Arroyo. The Level 1 Evaluations completed at nine hydrologically representative locations throughout the San Isidro Arroyo watershed indicated the majority of the drainages throughout the watershed are ephemeral. The EPA has some concern that the biological assessment scores may be slightly low at two sites and may have warranted Level 2 Evaluations. However, Level 2 Evaluations are unlikely to have significantly change the reported scores or altered the final hydrologic determinations for these waters.

Given the significant ecological importance of water from springs and spring-fed ciénegas in providing refugia in arid and semi-arid landscapes, EPA considers the determination for Doctor Springs to be appropriate. Based on the analysis described above, EPA considers the revised designated uses described in *20.6.4.97 NMAC* to be approvable for Doctor Arroyo, including unnamed tributaries to Doctor Arroyo, from San Isidro Arroyo upstream to its headwaters, excluding Doctor Spring and Doctor Arroyo from the spring to its confluence with the unnamed tributary approximately one-half mile downstream of the spring.

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