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Application of the Hydrology Protocol to STSIU Drainages

Chino Mines, Vanadium, New Mexico

October 2014

ARCADIS

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Acronyms and Abbreviations

AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
cfs	cubic feet per second
Chino	Freeport-McMoRan Chino Mines Company
CPP	Continuing Planning Process
CWA	Clean Water Act
ERA	Ecological Risk Assessment
EPA	Environmental Protection Agency
FS	Feasibility Study
GWQB	Ground Water Quality Bureau
HP	Hydrology Protocol
IU	Investigation Unit
NDMC	National Drought Mitigation Center
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
OPCZ	Open Pit Capture Zone
RAC	Remedial Action Criteria
RI	Remedial Investigation
SPI	Standardized Precipitation Index
STSIU	Smelter Tailings Soil Investigation Unit
SWQB	Surface Water Quality Bureau
UAA	Use Attainability Analysis
USGS	United States Geological Survey
WP	Workplan
WQMP	Water Quality Management Plan
WRCC	Western Regional Climate Center

1. Introduction and Background

On December 23, 1994 Freeport-McMoRan Chino Mines Company (Chino) and the New Mexico Environment Department (NMED) entered into an Administrative Order on Consent (AOC) to address the possible environmental impacts within the Chino Mine Investigation Area, Grant County, New Mexico (the Site). The Smelter Tailing Soils Investigation Unit (STSIU) is one of the investigation units addressed under the AOC. Surface water in STSIU has been determined to be a media of concern for consideration under the Feasibility Study (FS). NMED selected the Pre-FS Remedial Action Criteria (RAC) for surface water based upon the State of New Mexico Standards for Interstate and Intrastate Surface Waters (§20.6.4 NMAC) for risk to aquatic life. The Pre-FS RAC for all constituents are based on §20.6.4 NMAC, including all approaches and tools listed in the Code which provide options for site-specific application. These pre-FS RAC are considered as Applicable or Relevant and Appropriate Requirements (ARARs) for the purposes of the FS and subsequent remedial actions for the Site, subject to adjustment in the Record of Decision.

Surface water drainages in STSIU are not included in a classified Water Quality Standards segment (§20.6.4.101-899 NMAC) and are therefore considered unclassified waters of the State (§20.6.4.98 NMAC) with the following presumed designated uses: livestock watering, wildlife habitat, marginal warmwater aquatic life, and primary contact. Because water quality standards for unclassified waters vary depending on hydrology, it is important to determine the correct hydrologic regime (e.g., ephemeral, intermittent or perennial) to assure that the appropriate uses and corresponding use-specific criteria are applied to a particular water body.

To facilitate evaluations of hydrologic regime for the purpose of supporting Use Attainability Analyses (UAA), NMED's Surface Water Quality Bureau (SWQB) developed a Hydrology Protocol (HP) (NMED, (2011). The HP was approved as an appendix to NMED's Water Quality Management Plan and Continuing Planning Process (WQMP/CPP) by the New Mexico Water Quality Control Commission on May 10, 2011. The WQMP/CPP, including the HP, was submitted to the Environmental Protection Agency (EPA) for review and approval, and EPA's approval was issued on December 23, 2011.

ARCADIS, on behalf of Chino, prepared a work plan (WP) titled *Application of the Hydrology Protocol to Smelter Tailings Soils Investigation Unit Drainages* that was submitted to NMED with a letter dated May 20, 2011. The WP described a study plan for application of the HP to STSIU sub-drainages. Chino received NMED comments to

this WP on June 8, 2011, and submitted a revised WP that incorporated these comments in July 2011. Results from the application of this WP are described herein.

2. Purpose and Objectives

This report describes results from the Level 1 application of NMED HP as described in the above referenced WP. Information obtained from this effort is intended to support determinations regarding the appropriate hydrologic classification of surface waters and associated designated uses through an UAA process, as described in section §20.6.4.15 (2) NMAC.

As unclassified surface waters of the state (i.e., not identified in 20.6.4.101 through 20.6.4.899), the STSIU surface waters evaluated in this study are presumed to support the uses specified in Section 101(a)(2) of the federal Clean Water Act (the "fishable and swimmable" uses), and therefore subject to 20.6.4.98 NMAC if non-perennial or subject to 20.6.4.99 NMAC if perennial. Accordingly, the purpose of this study is to perform a UAA to assess whether attainment of Section 101(a)(2) CWA uses are feasible in STSIU drainages based on their natural hydrology. That is, the 40 CFR 131.10(g) factor evaluated in this UAA study as affecting use-attainment is: *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.*

Specific objectives of this study include:

1. Determine appropriate hydrologic regime for STSIU surface waters based on application of the HP;

2. Propose hydrologic classifications through a UAA for STSIU drainages where sufficient information supports a hydrologic classification and associated designated use classification.

3. Site Setting

The STSIU area is located in an arid region of southwestern New Mexico, with a climate that is characterized by low humidity and wide ranges in daily and annual temperatures (NMED 2008; Chino 2008). The average annual precipitation is 17.5 inches per year (WRCC, 2004), with most of the rainfall occurring during the monsoon

season (July through September) as brief thunderstorms, sometimes of high intensity. Annual potential evaporation is estimated to range from 53 to 70 inches per year (DBS&A, 1996, Golder, 2008). Annual evaporation that exceeds precipitation is the predominant hydrologic characteristic of this semi-arid region and is the primary factor that accounts for widespread non-perennial surface water systems throughout the region.

Portions of STSIU are relatively flat with a lower elevation of approximately 5,700 feet above sea level. The STSIU is partially located within the San Vicente Basin, a sub-drainage within the Mimbres watershed. The San Vicente basin is a broad lowland area characterized by dry washes and gullies with sandy bottoms (NMED 2008). The San Vicente Arroyo, a prominent drainage feature in the San Vicente basin located approximately 3.5 miles from the western side of the STSIU area, was recently approved for inclusion in 20.6.4.97 C.NMAC as an ephemeral water based on application of the HP (NMED, 2013; EPA, 2013). Areas east of Whitewater Creek, also within the San Vicente basin, increase in topographic relief, rising to an elevation of approximately 7,000 feet above sea level. Numerous high-gradient drainages originate within this mountainous area and flow into Whitewater Creek or Lampbright Draw. Previous Site investigations have concluded that the majority of STSIU surface waters are ephemeral based on direct observations of water persistence and lack of aquatic habitat within STSIU drainages (Newfields 2006, Newfields 2008, ARCADIS and SRK 2008). Consequently, aquatic communities in these drainages are limited, and typical of ephemeral aquatic habitats in the desert southwest (Newfields, 2008). Therefore, as described in Section 2, the hydrology of STSIU drainages evaluated in this study likely is the factor that limits that attainment of full aquatic life uses.

The STSIU is one of several IUs designated under the Chino Site AOC, and is generally centered around the former copper smelter, ancillary facilities, tailings disposal facilities, and includes land potentially affected by historical smelter emissions and wind-blown tailing. The STSIU does not include areas located in the Hurley Soils IU, Hanover and Whitewater Creek IU (i.e., does not include the Hanover/Whitewater Creek drainage), Lampbright IU, or any mine operational areas (Newfields 2007).

The majority of Chino-owned land in the STSIU is currently leased for livestock grazing (Golder, 2008). The STSIU conceptual site model identified historical smelter stack and fugitive dust emissions from historical mineral processing activities as the primary source of potential contamination to the STSIU area (SRK, 2008). Smelter operations were shut down permanently in 2001 and the smelter facility was demolished and the site reclaimed in 2007 (SRK, 2008). All historical and non-operational tailing

impoundments were also closed and reclaimed by 2014 (Chino 2014). Potential water quality impacts to STSIU surface waters are being addressed under other investigations, including ecological risk assessments (ERA) (Newfields 2006; Newfields 2008); an RI study (SRK 2008), and an ongoing feasibility study. No reclamation or remediation activities have been performed to date in the STSIU that could have an impact on the natural hydrologic regime of the drainages evaluated in this study. The potential influence of current or historical mining activities on the natural hydrologic regime of STSIU drainages is discussed in more detail below (Section 4.1.5).

4. Overview of Study

Application of the HP was conducted in accordance with the approved WP and NMED guidance (NMED 2011). As described by NMED (2011), the protocol is comprised of hydrological, geomorphic, and biological indicators of the persistence of water and is organized into two levels of evaluations. This study employed the Level 1 evaluation that is required for the UAA process described in 20.6.4.15.C NMAC. Level 1 evaluations include office procedures and field application of the HP. Office procedures were conducted during the first quarter of 2011, and field work was conducted from June 12 – 15, 2011.

The original HP results summary report was submitted to NMED in February 2012. NMED comments regarding the original HP report were received by Chino in April 2012. Additional office based assessment was conducted during the second quarter of 2012 in response to the NMED comments, and Chino submitted a response to comments on August 17, 2012. Chino submitted a draft UAA HP report to NMED in November 2012 which was revised in response to these comments. In accordance with Subsection C, Section 20.6.4.15 NMAC, NMED released the report for a 30-day public review period, which ended on February 14, 2013. NMED staff from the Ground Water Quality Bureau (GWQB) Silver City Field Office conducted field reconnaissance of select STSIU drainage areas in September and November 2012; and March 2013. Based on observations made during reconnaissance, NMED recommended additional reaches be excluded from an ephemeral classification. A summary of these observations and a revised description of ephemeral and non-ephemeral drainage areas based on NMED recommendations are provided in this final HP UAA report in Section 6.

4.1 Level 1 Office Procedures

Level 1 office procedures were conducted prior to initiating field evaluations with the objective to gather as much physical and geographic information about the drainages and region prior to beginning field work. Many of these reviews were discussed in the WP and are presented in this report, including:

- Aerial photographs for each sub-watershed are presented in Appendices A through G. These were used to aid in sample reach selection by evaluating any potential differences in topographic or landscape features within a sub-watershed, vegetation gradients along drainage channels, location of tributaries, and channel sinuosity.

- Drainage profiles for each sub-watershed are presented in Appendices A through G. These were also used to aid in sample reach selection by evaluating changes in basin slope for each channel. Many sample reaches were placed immediately downstream of significant changes in basin slope where there is a greater potential for seeps or pools.

- Previous Site investigations were reviewed for information that could be pertinent to this study, including historical observations of aquatic habitat and hydrologic conditions within the STSIU area and potential mining-related impacts to STSIU hydrology.

- Flow gages are not available for STSIU drainages. However, the nearest United States Geological Survey (USGS) flow gage was evaluated as an additional source of information to interpret regional drought and stream flow conditions during the field application of the HP.

- Precipitation data from nearby precipitation gages were used to assess drought conditions. Additionally, the 12-month Standardized Precipitation Index (SPI) was used as the primary basis to interpret local drought conditions, based on recommendations in the NMED HP (NMED, 2011). The 12-month SPI was assessed immediately prior to beginning the field work; this information is discussed in Section 4.1.2.

4.1.1 Sample Reach Selection

The above information, in conjunction with knowledge about geomorphic, hydrologic and mine operation features from local environmental staff at Chino and ARCADIS consultants, was used to target general locations of sample reaches, as described in the referenced WP. In addition, the NMED review and comments received on the WP was utilized in the identification of appropriate survey locations. As noted above, NMED also conducted field reconnaissance of select STSIU drainage areas as well. In total, 21 locations in nine subwatershed drainages were identified for HP application in the revised WP. Three additional locations were added to select drainages during field application of the HP based on observations made in the field for a total of 24 locations assessed in this study (**Table 1**). Decisions to add sample locations in the field are documented in the HP field forms, and included observations of a channel diversion in Sub-watershed B (Appendix B), observations of pools in Rustler Canyon (Appendix G), and observations of pools in the western tributary of Rustler Canyon (Appendix G).The number of individual reaches within a particular drainage varied according to drainage length and local watershed features to capture potential geomorphic or hydrologic gradients within drainages.

4.1.2 Drought Conditions

Local weather and precipitation data were reviewed to assure severe drought conditions were not occurring during field application of the HP. As described in the NMED HP guidance, "the 12-month SPI was chosen for use in the Hydrology Protocol because SPIs of this time-scale can be linked to groundwater-surface water fluctuations and reservoir storage, it can provide an early warning of drought, and it can help assess drought severity" (NMED 2011). For HP purposes, drought conditions are defined as any time the SPI is less than -1.5, indicating severely to extremely dry conditions (National Drought Mitigation Center [NDMC] 1995 as cited in NMED 2011). The SPI is "an index based on the probability of recording a given amount of precipitation, and the probabilities are standardized so that an index of zero indicates the median precipitation amount" (cited from http://lwf.ncdc.noaa.gov/oa/climate/research/prelim/drought/spi.html).

During the field application of the HP (June 2011), the 12-month SPI value for the Site area was -1.1 (**Figure 1**), indicating dry conditions but within the SPI range recommended by NMED (2011) for HP application (i.e., the SPI was not less than -1.5). Figure 1 presents two sources of information on SPI conditions: the NDMC and the Western Regional Climate Center (WRCC). The regional 12-month SPI map

presented in Figure 1 was obtained from the NDMC (available at http://drought.unl.edu/MonitoringTools/DailyGriddedSPI.aspx). Based on the location of Chino Mines Site shown on the map presented in Figure 1, the 12-month SPI score was 0 to -1, indicating the 12-month SPI score was within the recommended range specified in the HP guidance (NMED 2011) for conducting Level 1 field evaluations. Furthermore, the NDMC 12-month SPI score was less than -1.5 for only one 12-month period (6/1/2005 – 5/31/2006) during the past 9 years (i.e., since 2003, which is the earliest 12-month SPI record available from NDMC at the time of this revised report). This finding provides an indication that longer-term drought conditions did not persist for the near decade period preceding this study.

Using SPI data published by the WRCC (available at http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?spi12), a specific 12-month SPI score of -1.1 was obtained for the 12-month period preceding Level 1 field application of the HP. These data are shown in the graph of SPI scores versus time presented in Figure 1. The 12-month SPI value of -1.1 was obtained by accessing the above website, selecting the climate division that includes the Site area (i.e., the Southwestern Mountains Division, New Mexico, Climate Division 04), and selecting the "tabular data" option associated with the graph of SPI scores versus time. This result also demonstrates the 12-month SPI score was within the HP guidance-recommended range. Therefore, the HP Level 1 field evaluations presented in this report are considered reliable and within the appropriate drought-condition range.

Additional review of precipitation at the Fort Bayard climatic station (USC00293265) was also conducted to assess the long-term historical precipitation conditions and the potential implication on the hydrologic regimes of the STISU drainage basins being assessed. The Fort Bayard station is located approximately 5 miles from STISU drainage basins, and monthly precipitation data are available on a near continuous basis from the late 1800s through early 2011 (**Figure 2**). This long-term precipitation data was initially assessed to aid interpretation of historical reference to the area from Paige (1916) because the Fort Bayard station included precipitation data from the early 1900's. This precipitation station is also the closest to the STSIU area from other available stations, and therefore provides relevant information about historical precipitation trends, despite the termination of this station in April 2011 (two months prior to the application of the HP).

It should be noted from **Figure 2** that the recent period since about 1980 has had generally greater than average precipitation compared to the period of record at the climatic station, and it has had significantly greater precipitation than the middle

decades of the 20th century. The 12-month period preceding the development of the HP had lower than average precipitation, but precipitation remained greater than 35 percent of the other years on record for the station. Therefore, the precipitation and flow regime observations made at the time of the HP assessment in 2011 are at least representative of the general precipitation conditions observed over the last century. These conditions are also possibly reflective of wetter conditions considering that base flows and regional groundwater conditions are impacted by multi-year precipitation trends.

4.1.3 Recent Precipitation at the Time of the Study

Prior to initiating field evaluations, ARCADIS verified with local Chino staff and through precipitation records that no major rainfall events occurred within at least 48 hours.

4.1.4 Flow Gauges

Historical and recent flow data from a regional USGS flow gauge, located on the Mimbres River in Grant County, NM approximately 20 km northeast of the STSIU watersheds, was evaluated to provide additional background information on regional flow and drought conditions during field surveys. Although the STSIU drainage basins being assessed in the HP do not flow directly to this gaging station, it is the only source of USGS flow monitoring data in the Mimbres River basin (the basin that includes the STSIU area). Because of its proximity to the STSIU study area, flow records from this station are relevant to assessing drought conditions for this HP study, considering that the 12-month SPI scores presented above encompass the location of this station and the Site area.

During field evaluations in June 2011, the average daily flow on the Mimbres River was 3.5 cubic feet per second (cfs). This flow rate falls within lower flow ranges historically observed. In particular, 15% of average daily flows from 1978 to present were less than 3.5 cfs, and 85% of average daily flows during this timeframe were greater than 3.5 cfs (**Figure 3**). Thus, while baseflow conditions were low during the field survey, they were not historically anomalous, and are consistent with the precipitation findings described in Section 4.2.1.

4.1.5 Mine Influence on Hydrologic Regimes

The potential for influence from mining activities on the hydrologic regime of the STSIU drainages was investigated and concluded that the existing hydrologic characteristics of the drainages are representative of the historic conditions and not the result of mining activities. The possible exception to this conclusion is Rustler Canyon as described below.

Mine Pit Groundwater Influence

The nature and extent of the shallow groundwater system and the deep regional aquifer associated with the OPCZ, and the direction of groundwater flow around the Santa Rita Pit have been studied extensively to support closure planning and reclamation activities at Chino Mines Site, under Discharge Permit 1340. The Santa Rita open pit groundwater capture zone (OPCZ) was clearly delineated as part of Chino Mines Stage 1 Abatement Investigations under New Mexico Discharge Permit 1340 (Golder 2005; Golder 2008). The OPCZ delineation is the result of an extensive hydrogeologic investigation and has been previously accepted by NMED. A review of the OPCZ is provided below to demonstrate the lack of influence of the pit on the hydrology of the STSIU drainages evaluated in this study that are proposed for ephemeral classification. A comprehensive description of the groundwater data and modeling approach used to develop the OPCZ is provided in other studies (Golder 2005, 2008).

As described by Golder (2008), the OPCZ is defined as the area over which groundwater recharged from the land surface flows towards and discharges into the pit. The lateral extent of the OPCZ was determined from an analysis of the groundwater flow modeling results and empirical groundwater-elevation data collected from monitoring wells near the pit (Golder 2008). The model was developed using an upgraded version of Modflow software (Modflow-Surfact); calibration of the model was performed following American Society of Testing and Materials (ASTM) guidelines. Groundwater-elevation data from over 150 wells were incorporated into that calibration (Golder 2005).

The area modeled to develop the OPCZ is centered around the Santa Rita pit, but extends a sufficient distance away from the pit to determine the lateral extent that groundwater is no longer influenced by the pit drawdown. Groundwater-elevation data from wells located within and outside of the OPCZ provide empirical evidence of the extent of the OPCZ. For example, groundwater-elevation data presented in Golder

(2008) shows that groundwater elevations south of the OPCZ (towards the direction of STSIU drainages) are lower than groundwater elevations to the north within the OPCZ.

Separate and distinct from the deeper regional aquifer and the associated OPCZ is the shallow groundwater flow system, which overlays the deeper system. This shallow system is observed in the STSIU drainages including Rustler Canyon, Martin Canyon, the upper reaches of Lampbright Draw as well as the C and D series drainages. Shallow groundwater flow in this area is dominated by local, small groundwater flow systems that coincide with the local surface watersheds. Within these surface watersheds, groundwater recharges along the upland margins (ridges), and discharges to the local drainages. In effect, they function as independent hydrologic cells, or independent hydrologic systems where all of the recharge remains within the cells, discharging only to the respective drainages and in the downstream direction. The dominance of local shallow groundwater flow systems is clearly demonstrated by the numerous monitoring wells outside of the OPCZ. Groundwater elevations measured in the monitoring wells show that groundwater elevations are highest beneath the local ridges and lowest along the local drainages.

Figure 4 presents a map that depicts this open pit capture zone and the delineated subwatershed drainages that were assessed as part of the Chino STSIU HP study. As indicated by the OPCZ boundary and subwatershed boundaries shown in **Figure 4**, Rustler Canyon is the only STSIU subwatershed that could be influenced by the pit groundwater capture. This HP study, however, is not recommending a formal classification or re-classification for Rustler Canyon drainages as explained in Section 5.1 of this report. In addition, this HP study is not recommending a formal classification or re-classification for Martin Canyon, the next-closest STSIU subwatershed to the OPCZ.

Outside of the OPCZ, groundwater flow is controlled by the natural hydrogeological characteristics of the area. Golder (2005) stated that, because of the relatively steep, low-permeability mountainous terrain of the area, groundwater-flow directions outside the OPCZ largely follow surface topography and subwatershed divides. Modeled shallow groundwater contours at distance from the pit from Golder (2008) closely mirror the surface topography of local watersheds and indicate that the groundwater divides between the localized shallow groundwater flow systems remain closely aligned with boundaries of the surface watersheds (**Figure 5**). The modeled groundwater velocity vectors shown on Figure 5 (from Golder 2008) indicate the direction of shallow groundwater flow and demonstrate that at these distances from the pit, shallow groundwater is unaffected by the pit and is still dominated by local recharge

and discharge systems that coincide with the local surface watersheds. Consequently, the groundwater balance of the subject watersheds are shown by the modeling results to be unaffected by the open pit.

The finding that groundwater associated with STSIU drainages is not influenced outside of the OPCZ is important when considering potential mine influences on STSIU hydrology, because baseflow in a stream is derived from groundwater recharge. Therefore, the delineated open pit capture zone provides evidence that the hydrology of the drainages outside of Rustler Canyon is not impacted by mining activities because the Santa Rita Pit represents the primary source of potential historical or active mining impacts that could affect the natural hydrologic regime of STSIU drainages. The STSIU drainages evaluated in this study and proposed for an ephemeral classification (Section 6) are predominately located in a natural landscape where the primary land-use is cattle grazing and is without mining-related impacts. Importantly, except for groundwater-sustained baseflow, flow sources to a stream can include storm and/or snowmelt runoff, discharge contributions from upstream tributaries, contributions from point-source discharges, and irrigation return flows (NMED, 2011). Land-use or drainage modifications that could affect snowmelt and/or storm-flow runoff to STSIU drainages are not present in the STSIU subwatersheds. Additionally, point-source discharge sources or irrigation return flows capable of supporting intermittent flow in the naturally ephemeral drainages do not exist in STSIU drainages. Aerial maps and photographs of STSIU drainages provided in Appendices A through G also document the lack of mining influence on STSIU hydrology.

Regional Springs

Historic references of springs in both the STSIU drainage basins and the surrounding area were reviewed to further assess possible influence from mining activities on the local groundwater (**Figure 4**), which could indicate hydrologic influence from mining in the STSIU drainages. Recent observations of springs and review of historical references from Paige (1916) and Sivinski and Tonne (2011), do not indicate that mining activities have influenced the presence or disappearance of springs in the STSIU drainages. Springs have been observed presently and historically in STSIU drainages including Drainage D (Brown Spring), Drainage C (Bolton Spring) and Drainage B (Ash Spring), and continue to express water indicating they have not been impacted by mining activities. Additionally, annually-reoccurring pools of water in Martin Canyon and Rustler Canyon likely indicate the presence of seeps or springs, indicating these drainage areas have not been impacted by mining activities. Because of the lack of mine influence on STSIU hydrology described above (i.e., the finding that

the pit groundwater capture zone does not impact groundwater in STSIU drainages and other potential sources of mining influence are absent in the STSIU drainages), springs located in the STSIU area are unaffected by mining activities.

The springs referenced by Sivinski and Tonne (2011) (Apache Tejo Spring, Cold Spring, Kennecott Warm Spring, and Kennecott Cold Spring) are not located within STSIU drainages that were assessed in this HP study. Cold Spring is a well, locally referred to as Cold Spring 2 well, and is located within the 2C cattle ranch near Faywood Hot Springs, approximately 6 miles south of the STSIU area. Kennecott Warm Spring is located approximately 5 miles south of the STSIU area (**Figure 4**). Apache Tejo Warm Spring is located within the STSIU area but is outside of any STSIU drainages assessed during the HP study (**Figure 4**). All hydrologic designations proposed based on the results of this HP study apply to drainages that are at a significantly higher elevation and that are not hydrologically connected to these springs. Springs are, by definition, isolated areas of groundwater emergence and are not characteristic of regional groundwater conditions, especially the groundwater conditions at distances of miles away from the springs themselves. However, STSIU drainages containing Brown Spring, Bolton Spring, and Ash Spring are not proposed in this report for ephemeral classification.

4.2 Level 1 Field Evaluations

ARCADIS applied the HP to STSIU drainages during June 12 – 15, 2011, following NMED review and comments on the WP. NMED recommendations, including additional survey locations, were incorporated into a revised WP and into Level 1 field evaluations. This field evaluation timeframe is consistent with NMED recommendations and was selected to avoid the monsoonal season, which typically occurs during mid - July through early September in this region.

The HP was applied to STSIU drainages by field crews consisting of a minimum of two staff members. Staff from NMED also participated in field evaluations at sample reaches located in Rustler Canyon. Additionally, Chino staff provided navigational assistance for accessing drainages and Site knowledge regarding local watershed features, recent weather and historical presence of water. In total, the HP was applied to 24 sample reaches across 9 sub-watersheds (**Figure 4**). As described in the work plan, and in Section 5.1.3 below, the field crew performed one field replicate at a pre-determined reach location, consistent with recommendations in NMED SWQB's Quality Assurance Project Plan.

4.2.1 Sample Reach Selection

Before selecting a reach for the survey, local watershed features were noted while driving to the site to verify that the selected reach was representative of the drainage being characterized. This provided an overview of the collective watershed and potential geomorphic or hydrologic gradients within the drainage. This information aided in determining how uniform, or representative, reaches were of the collective watershed.

After arriving to each of the 21 pre-determined reach locations, the field crew walked a distance of the channel generally greater than, or equal to, 300 meters to confirm that significant geomorphic or hydrologic gradients do not occur in order to meet the hydrology protocol requirements for representative sample reaches (i.e., 40 times the average stream width or 150 meters, whichever is larger). Prior to applying the HP at each sample reach, reach homogeneity was verified by evaluating basin slope, presence of significant tributary inflows, potential changes in substrate type (e.g., sand, gravel, cobble, boulders and bedrock), compositional shifts in vegetation, gradients in vegetation density, anthropogenic influences such as road crossings or diversions, and various biological indicators included in the field form. Overall, locations selected *a priori* were judged as adequately representative of the corresponding drainages. As described above, however, three additional locations (one in Sub-watershed B and two in Rustler Canyon) were added in the field based on observations, as described in Section 4.1.1.

5. Results

Documentation for Level 1 HP Evaluations consists of a Cover Sheet, Drainage Profile and Plan View, Field Sheet and photographs for each sample reach evaluated. These are provided in Appendices A - G, and are organized by each sub-watershed evaluated. A brief description of each level of documentation is provided below.

1. *Cover Sheet*: Contains documentation of information collected through application of the HP. As described by NMED (2011), “the cover sheet is necessary for the UAA process and is designed to explain how the supporting documentation from the Level 1 Evaluation is consistent with the UAA conclusion, namely that the stream is ephemeral and the attainment of Clean Water Act Section 101(a)(2) aquatic life and recreational uses is not feasible due to the factor identified in 40 CFR 131.10(g)(2): *natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the*

use." For this assessment, all reaches within an identified sub-watershed are included in a single cover sheet and appendix.

2. *Drainage Profile and Plan View*: Aerial photographs of each drainage depicting the location of each sample reach, delineation of sub-watershed boundaries, and drainage profiles.

3. *Hydrology Determination Field Sheet:* Contains scores for each attribute (or indicator) and a total numeric score for each sample reach evaluated. Other general information including date, project, evaluators, Site, assessment unit, 12-month SPI value, and field coordinates of the sample reach is also recorded on Field Sheets. NMED guidance provides a four-tiered weighted scale for evaluating and scoring each attribute; general definitions, as provided in NMED (2011), are described below:

   Strong: The characteristic is easily observable (i.e., observed within less than one minute of searching).

   Moderate: The characteristic is present and observable with minimal (i.e., one or two minutes) searching.

   Weak: The characteristic is present but you have to search intensely (i.e., ten or more minutes) to find it.

   Poor: The characteristic is not observed.

4. *Photo-Documentation:* Photographs of each sample reach and watershed were taken, as appropriate, to document the rationale behind scoring of attributes and subsequent hydrologic determinations.

5.1 Summary of Level 1 Field Evaluation Scoring

The drainages evaluated during Level 1 field evaluations were scored as ephemeral (except Rustler Canyon, as described below) based on the HP indicators, including the absence of water, lack of aquatic habitat and evidence of prolonged dryness, as determined by the NMED HP scoring criteria used to assess hydrology (Appendices A-G). **Table 2** provides a summary of all HP scoring attributes for the drainages evaluated.

Rustler Canyon Reaches

Drainages within Rustler Canyon were the only STSIU reaches where water and aquatic life uses were observed during field application of the HP. Although the majority of streambeds within Rustler Canyon did not contain water, and flow was not observed, water was present as isolated pools in portions of the bedrock channels. Periphyton, filamentous algae and riparian vegetation (e.g., cat tails) were observed in these pools along with macroinvertebrates (e.g., snails) and minnows (between RC-14B and RC-15), indicating a hydrologic classification of at least intermittent according to NMED (2011). These isolated pools, and associated aquatic life uses, were not observed in all Rustler Canyon reaches, as described in Appendix G, reflecting the localized persistence of water within this sub-watershed. This is reflected by an HP score of 2 in an upper reach of the west fork of Rustler (RC2-22; **Figure 4**). Given the extent of water observed during the dry season, coupled with the hydrologic and biological indicators described above, it appears that these pools persist for extended periods of time consistent with an intermittent classification. Based on these observations, formal classification and/or re-classification of surface water reaches in Rustler Canyon are not proposed at this time.

5.1.1 Sub-Watershed Drainages Scored as Ephemeral during Level 1 Field Evaluations

During field application of the HP, an ephemeral classification was reached for most drainages after scoring the first 6 indicators (water in channel, fish, benthic macroinvertebrates, filamentous algae/periphyton, differences in vegetation and absence of rooted upland plants in streambed). In accordance with NMED (2011), if the evaluated drainage has a score of less than or equal to 2 after the first six indicators are scored, the drainage is determined to be ephemeral, therefore, further evaluation of additional indicators is unnecessary. Of the 24 reaches evaluated, 17 reaches were determined as ephemeral after the first six indicators were evaluated and scored (three additional reaches were determined as ephemeral based on evaluation and scoring of all Level 1 HP indicators). The following provides a general description of how these 6 indicators were evaluated during field application of the HP.

Indicator 1.1 – Water in Channel

With the exception of reaches in Rustler Canyon, as described above, water was not observed in channels during field evaluations. As described by NMED (2011), a good rule of thumb for differentiating between ephemeral and intermittent is if they have any water in them during the dry season or during a drought. No evidence of recent base

flows or high flows (e.g., sediment/soil moisture or drift lines in the bank or floodplain) or standing pools of water were observed in drainages (except Rustler Canyon). Areas of depressions within channels, typically associated with pool habitats, were devoid of water in all drainages except Rustler.

Indicator 1.2 – Fish

Fish were not observed in any sample reach evaluated but were observed in a pool between sample reaches RC-14B and RC-15 in Rustler Canyon.

Indicator 1.3 – Benthic Macroinvertebrates

With the exception of reaches in Rustler Canyon, benthic macroinvertebrates, or physical evidence of benthic macroinvertebrates, were not observed during HP application. The dry channels were searched for potential mussels and aquatic snail shells (in sandy channel margins), caddisfly casings (under cobbles [when cobble was present]) and mayfly or stonefly casings (on cobble and channel-side vegetation). During macroinvertebrate searches, it was also noted that soil/sediment moisture was absent with the exception of select reaches in Rustler Canyon. Benthic macroinvertebrates were observed, however, in surface water pools within Drainage C during the NMED September and November 2012 field reconnaissance, which occurred following the recent monsoon season.

Indicator 1.4 – Presence of Filamentous Algae and Periphyton

Similar to the above indicators, filamentous algae and periphyton were not observed in drainages outside of Rustler Canyon during HP application. This includes no observations of desiccated periphyton or algae outside of Rustler Canyon. However, desiccated algae/periphyton was observed in Drainage C during the NMED September and November 2012 field reconnaissance following the recent monsoon season.

Indicator 1.5 – Differences in Vegetation

Differences in vegetation were generally attributed to vegetation densities rather than compositional differences in vegetation, with the exception of Rustler Canyon where a few compositional differences were observed. Species of oak, cat claw, juniper, bunch grass, mesquite, agave, prickly pear cactus and cholla cactus were occasionally observed in greater densities on, and around, banks of some reaches relative to surrounding upland areas. Vegetation species growing in upland areas of surveyed

watersheds were noted and compared to species growing along the banks and within channels to determine potential compositional differences. Additionally, NMED observed slight vegetation differences in Bolton Canyon during their September and November field reconnaissance; one small strand of cattails and willow trees were observed in Bolton Canyon.

Indicator 1.6 – Absence of Rooted Upland Plants in Streambed

As described by NMED (2011), the absence of rooted plants in a streambed can be related to flow regime since flow can deter plant establishment by scouring available substrate and removing seeds or preventing aeration to roots. However, NMED (2011) also notes that the presence of rooted vegetation in a streambed can be limited by local watershed features such as high gradient sand bedded streams located within flashy watersheds. In these flashy systems, rooted vegetation may be limited by highly erosive flows and/or depth of scour in response to substantial rainfall events (NMED 2011). Such conditions distinguished the majority of STSIU drainages. In addition, bedrock- and boulder-dominated streambeds were routinely observed in upper reaches of drainages. This streambed type can also limit the presence of rooted plants as a result of a lack of substrate necessary for plant growth. These limitations were considered when scoring Indicator 1.6 during field evaluations, and are described in Appendices A – G through field notes and photo-documentation.

5.1.2 Other Scoring Considerations

It was determined, after visiting a number of bedrock and boulder formed channels, that the application and evaluation of the “entrenchment ratio” was inappropriate at such locations. In channels flowing through material that is transported by the river itself, the channel geometry can be viewed as self-formed. That is, sediment transport in alluvial rivers builds and maintains a dynamically stable channel geometry and floodplain that reflects both the quantity and timing of water and the volume and caliber of sediment delivered from the watershed (Leopold et al. 1964; Emmett and Wolman 2001). Accordingly, Leopold (1994) describes alluvial rivers as the architect of their own geometry. In these alluvial situations the measurement of an “entrenchment ratio” is reflective of the relative supply and magnitude of the sediments from upstream versus the capacity of the channel to transport that sediment.

In many situations observed during the application of the HP, however, the channel was not an alluvial river and the bed and banks were not formed of sediments supplied and transport under the current hydrologic environment but rather were composed of

bedrock and large boulders. In bedrock and boulder formed channels where it was necessary to proceed beyond Indicators 1.1 to 1.6, the "entrenchment ratio" indicator was not included in the total score.

5.1.3 Quality Control (QC)

Consistent with recommendations in SWQB's Quality Assurance Project Plan, one field replicate was included in the current study to evaluate potential variability in HP evaluations conducted by different field crew. The field replicate was applied at a pre-determined study reach (D1-2) by different field crew at separate times. Overall, scores for each HP indicator were identical between the two evaluations, indicating consistency in the interpretation of HP scoring criteria.

5.2 Critical Habitat Considerations

Critical habitat for the Chiricahua leopard frog (CLF) has been officially designated or has been observed in some of the drainages that scored as ephemeral during the Level 1 field observations described above. Based on these habitat observations, formal classification and/or re-classification of these surface water reaches are not proposed at this time. This includes portions of Subwatershed D, Subwatershed C, Subwatershed B, and all of Martin Canyon.

5.2.1 Subwatershed B and Subwatershed C Exclusions

Bolton Spring (Subwatershed C) and Ash Spring (Subwatershed B) and the associated migration pathway between them (**Figure 4**) have been designated as critical habitat for the Chiricahua leopard frog (CLF) by the USFWS (Federal Register Vol. 77, No. 54, Tuesday, March 20, 2012). As described by the USFWS, the primary constituent elements of CLF critical habitat consist of breeding, habitats, and dispersal habitats (USFWS 2012).

Based on the USFWS description of CLF critical habitat and observations, it is appropriate to exclude Bolton and Ash Springs from an ephemeral designation because these areas are designated as breeding habitat that typically hold areas of isolated surface water and thus function as potential breeding habitat.

An ephemeral designation for drainage areas that are not hydrologically connected to Bolton or Ash Springs outside of storm events could be appropriate for the non-breeding dispersal habitat based on the USFWS description. Specifically, USFWS states the dispersal and non-breeding habitat can consist of upland or ephemeral

areas that can provide a corridor for movement of frogs between breeding sites (i.e., the two springs). Accordingly, designation of a section of drainage as critical habitat does not preclude an ephemeral designation because the critical habitat can, by definition, consist of ephemeral drainage channels.

As described below in Section 5.3, NMED staff conducted field reconnaissance of select STSIU drainage areas (including the designated CLF critical habitat) following application of the Level I HP and after the official designation of critical habitat. Observations made by NMED during these reconnaissance trips supplemented results from the June 2011 HP study and were considered for final hydrologic classifications described below in Section 6.

5.2.2 Martin Canyon

Based on comments received from NMED, CLF tadpoles have been historically documented in pools along portions of the Martin Canyon drainage, although no official USFWS habitat designation has been made for any portion of Martin Canyon, and CLF frogs have not been documented in any portion of Martin Canyon during more recent surveys (Jennings, 2007). Evidence of pools were not observed during the Level 1 field evaluation; however, based on comments received from NMED regarding historic observations of CLF in Martin Canyon, a formal classification or re-classification of Martin Canyon is not currently proposed.

5.3 NMED Field Reconnaissance

NMED staff conducted field reconnaissance of select STSIU drainage areas during September and November 2012 and during March 2013. The field reconnaissance consisted of visual observations and some photo-documentation of drainage areas in Subwatersheds C and D. Application of the HP was not performed during any of the field reconnaissance trips. Based on observations made by NMED during these site visits (e.g., isolated pools, aquatic invertebrates and tadpoles), a formal classification and/or re-classification of drainage areas within and upgradient to the CLF critical habitat transect shown in **Figure 4** is not proposed at this time. This includes reaches upstream of the CLF critical habitat in Bolton Canyon north of Bolton Springs, the unnamed tributary northeast of Bolton Canyon, the tributary on CLF critical habitat transect line, and drainage areas upstream of the tributary on the transect (**Figure 4**).

NMED additionally observed water in Brown Spring and evidence of water pooling (indicated by staining on the rocks) in the southeastern branch of Subwatershed

drainage D1 that contains Brown Spring **(Figure 4**). Although this area has not been designated by USFWS as CLF critical habitat, an ephemeral designation is not currently proposed for this reach based on NMED observations made during field reconnaissance.

6. Conclusions and Hydrologic Classification Recommendations

Based on the Level 1 hydrology determinations described above and in Appendices A – G and information from NMED field reconnaissance, adequate information is available to support ephemeral hydrologic classifications for most of the STSIU drainages evaluated, with the exception of Rustler Canyon (and tributaries), Martin Canyon (and tributaries), and portions of Subwatersheds B and C and D.

Presently, an ephemeral classification is not supported for the Rustler Canyon drainages due to the presence of water and associated aquatic life uses observed during the Level 1 field evaluations. Based on NMED comments and observations from reconnaissance, an ephemeral classification is not proposed at this time for the following reaches (in addition to all of Rustler Canyon):

- All of Martin Canyon and tributaries thereof;
- The southeast tributary of Drainage D1 that contains Brown Springs;
- Upper portions of Subwatershed C that include CLF critical habitat in Bolton Canyon drainage from below the HP site C-4 (confluence) and upstream on the main north tributary (Bolton Canyon); from C-4 upstream on the northeast tributary to above HP site C-19; all CLF critical habitat transect on drainage areas and the upstream tributary to the drainage on transect (see **Figure 4**);
- The northwest tributary in the upper portion of Subwatershed B that contains Ash Springs.

In drainages outside of those areas described above, an ephemeral hydrologic classification was determined by the Level 1 HP procedures, which are based on evaluating the hydrologic, geomorphic, and biological indicators of water persistence, as well the absence of impact of mining activities on the natural hydrologic regime of the drainages. It can be concluded from these results that flow only occurs in these STSIU drainages in direct response to significant precipitation events. This finding is consistent with direct observations reported by other site investigations (Section 3). Accordingly, an ephemeral classification reflects the hydrologic regime of these

drainages and corresponds to the limited aquatic life uses that can be expected to occur during short periods of water persistence. This report also finds that significant hydrologic alterations are not present that could impact the natural hydrologic regime of these ephemeral drainages.

As indicated in **Figure 4**, the STISU drainages where an ephemeral classification is appropriate include:

- Subwatershed Drainage A and tributaries thereof;
- Subwatershed Drainage B and tributaries thereof (excluding the northwest tributary containing Ash Spring);Subwatershed Drainage C and tributaries thereof (excluding reaches containing Bolton Spring, the CLF critical habitat transect, and all reaches in Subwatershed C that are upstream of the CLF 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);
- Subwatershed Drainage E and tributaries thereof (Drainages E-1, E-2 and E-3).

As indicated in **Figure 4**, ephemeral designations determined for these STSIU drainages also apply to associated tributary drainages (except exclusion areas described above) because reaches assessed during the HP study were determined to be representative of the collective subwatershed. As described in the approved WP, the primary drainage channel within each subwatershed was selected for the HP assessment, which provides a strong indication of hydrologic conditions of lower order, hydrologically-connected tributary drainages that have the same or less flow persistence as the downgradient primary drainage channel given the absence of springs.

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TABLE 1
Summary of Sample Locations by Sub-Watershed

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU HYDROLOGY PROTOCOL

Sub -Watershed	Number of Sample locations	Rationale
Sub-Watershed C	4	Upstream sample location placed at change in basin slope near the 4,600 feet downstream maker. Second sample location placed at change in basin slop immediately downstream from tributary inflow. Third sample location placed downstream from second large tributary inflow. Downstream sample placed to capture entire basin drainage area.
Martin Canyon	3	Upstream sample location placed at change in basin slope near the headwaters at 2,900 feet downstream marker. Middle sample location placed in flatter gradient section with more prominent vegetation. Downstream sample placed to capture entire basin drainage area.
Sub-Watershed A	2	Upstream sample location placed immediately downstream from larger tributary inflow at location with more prominent vegetation. Downstream sample placed to capture entire basin drainage area. No significant variation in basin slope.
Sub-Watershed B	3	Upstream sample location placed downgradient of change in average basin slope. Middle sample location placed downstream of channel diversion (observed during field survey). Downstream sample placed to capture entire basin drainage area.
Sub-Watershed D1	2	Upstream sample location placed downgradient of change in average basin slope. Downstream sample placed to capture entire basin drainage area.
Rustler Canyon	3	Upstream sample location placed downgradient of change in average basin slope and immediately downstream from large tributary inflow. Middle sample location selected to capture pools observed during field survey. Downstream sample placed to capture entire basin drainage area.
Rustler Canyon 2	2	Upstream sample location placed in un-named tributary west of Rustler Canyon at the 7,000 feet downstream marker. Downstream sample location selected in field based on observations of standing water.
Sub-Watershed D2	1	Sample location placed at downstream end of basin to capture entire watershed. Also placed near change in average basin slope.
Sub-Watershed D3	1	Sample location placed at downstream end of basin to capture entire watershed. Also placed near change in average basin slope.
Sub-Watershed E1	1	Average basin slope consistent throughout reach. Sample location placed at northern end of basin near Hurley and areas of interest.
Sub-Watershed E2	1	Average basin slope consistent throughout reach. Sample location placed at northern end of basin near Hurley and areas of interest. Also located downstream from tributary inflow.
Sub-Watershed E3	1	Average basin slope consistent throughout reach. Sample location placed at northern end of basin near Hurley and areas of interest.

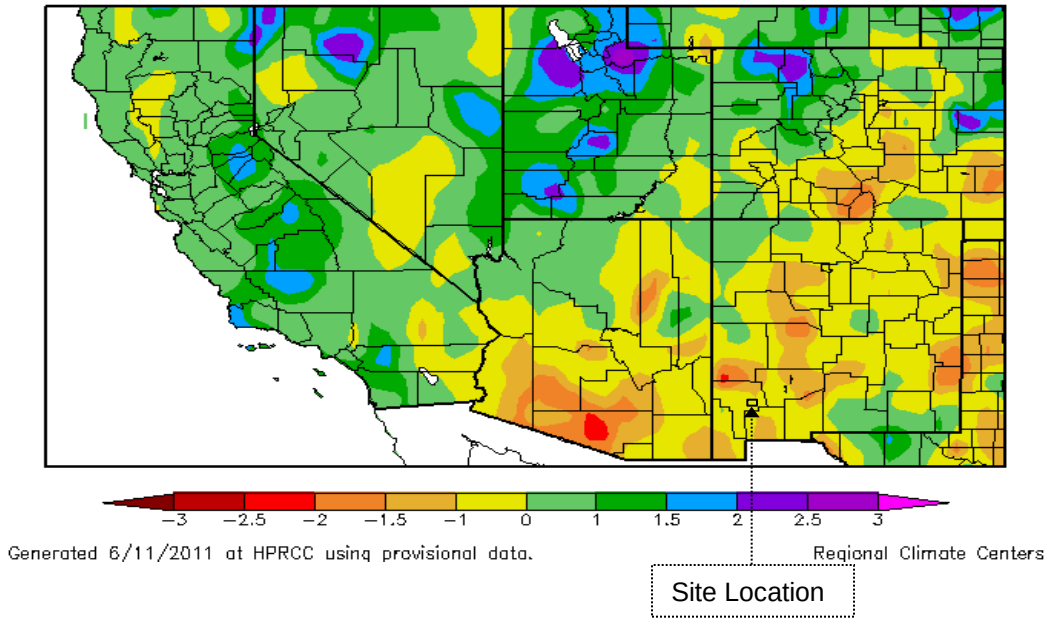
TABLE 2
LEVEL 1 HYDROLOGY PROTOCOL TOTAL SCORES

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU HYDROLOGY PROTOCOL

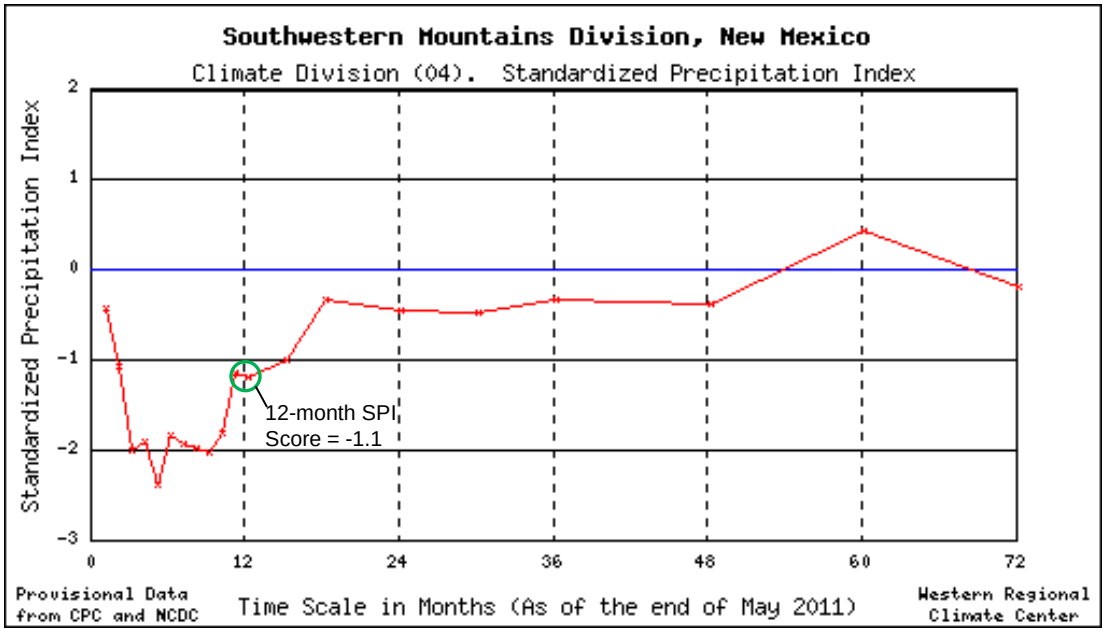
	Level 1 Indicators															Supplemental Indicators		
HP Sample Locations	1.1 Water in Channel	1.2 Fish	1.3 Benthic Macroinvertebrates	1.4 Filamentous Algae/ Periphyton	1.5 Differences in Vegetation	1.6 Absence of Rooted Upland Plants in Streambed	Subtotal (#1.1 - #1.6)	1.7 Sinuosity	1.8 Floodplain and Channel Dimensions	1.9 In-Channel Structure: Riffle-Pool Sequence	Subtotal (#1.1 - #1.9)	1.10 Particle Size or Stream Substate Sorting	1.11 Hydric Soils	1.12 Sediment on Plants and Debris	Total Point (#1.1 - #1.12)	1.13 Seeps and Springs	1.14 Iron Oxidizing Bacteria/Fungi	Total plus Supplemental Points (#1.1 - #1.14)
A-Drainage (A-10)	0	0	0	0	0	2	2	--	--	--	2	--	--	--	2	--	--	2
A-Drainage (A-9)	0	0	0	0	1	0	1	--	--	--	1	--	--	--	1	--	--	1
B-Drainage (B-7)	0	0	0	0	1	1	2	--	--	--	2	--	--	--	2	--	--	2
B-Drainage (B-7-DS)	0	0	0	0	1	1	2	--	--	--	2	--	--	--	2	--	--	2
B-Drainage (B-8)	0	0	0	0	1	2	3	1	1.5	0	5.5	1.5	Absent = 0	0	7	Absent = 0	Absent = 0	7
C-Drainage (HC-19)	0	0	0	0	1	1	2	--	--	--	2	--	--	--	2	--	--	2
C-Drainage (HC-4)	0	0	0	0	1	2	3	0	1.5	0	4.5	1.5	Absent = 0	0	6	Absent = 0	Absent = 0	6
C-Drainage (HC-5)	0	0	0	0	0	2	2	--	--	--	2	--	--	--	2	--	--	2
C-Drainage (HC-6)	0	0	0	0	1	2	3	1	1.5	0	5.5	1.5	Absent = 0	0	7	Absent = 0	Absent = 0	7
D1-Drainage (D1-1)	0	0	0	0	0	1	1	--	--	--	1	--	--	--	1	--	--	1
D1-Drainage (D1-2)	0	0	0	0	1	0	1	--	--	--	1	--	--	--	1	--	--	1
D2-Drainage (D2-3)	0	0	0	0	0	2	2	--	--	--	2	--	--	--	2	--	--	2
D3-Drainage (D3-23)	0	0	0	0	0	2	2	--	--	--	2	--	--	--	2	--	--	2
E1-Drainage (E1-16)	0	0	0	0	0	0	0	--	--	--	0	--	--	--	0	--	--	0
E2 Drainage (E2-17)	0	0	0	0	0	1	1	--	--	--	1	--	--	--	1	--	--	1
E3-Drainage (E3-18)	0	0	0	0	0	0	0	--	--	--	0	--	--	--	0	--	--	0
Martin Canyon (MC-11)	0	0	0	0	1	1	2	--	--	--	2	--	--	--	2	--	--	2
Martin Canyon (MC-12)	0	0	0	0	1	1	2	--	--	--	2	--	--	--	2	--	--	2
Martin Canyon (MC-13)	0	0	0	0	1	1	2	--	--	--	2	--	--	--	2	--	--	2
Rustler Canyon (HRC-14A)	2	0	1	1	1	2	7	0	N.A.	1	8	0	Present = 3	0	11	Present = 1.5	Absent = 0	12.5
Rustler Canyon (HRC-14B)	2	0	2	2	2	2	10	0	N.A.	1	11	0	Present = 3	0	14	Present = 1.5	Absent = 0	15.5
Rustler Canyon (HRC2-22)	0	0	0	0	1	1	2	--	--	--	2	--	--	--	2	--	--	2
Rustler Canyon (HRC2-22B)	2	0	2	2	0	2	8	1	N.A.	0	9	0	Absent = 0	0	9	Absent = 0	Absent = 0	9
Rustler Canyon (HRC-15)	0	0	0	1	2	2	5	1	1.5	1	8.5	3	Absent = 0	0.5	12	Absent = 0	Absent = 0	12

Notes
-- indicators not scored based on subtotal

12-Month SPI: 6/1/2010 – 5/31/2011



12-month SPI Map Source: National Drought Mitigation Center (NDMC) website available at: http://drought.unl.edu/MonitoringTools/DailyGriddedSPI.aspx



Source: Western Regional Climate Center (WRCC) website available at: http://www.wrcc.dri.edu/spi-products/

Notes: Each point on the graph represents the SPI for the Southwestern Mountains Division, New Mexico (Climate Division 4) for the number of months shown on the horizontal axis. For example, the value at 12 indicates the SPI for the past 12 months (i.e., the 12-month SPI).

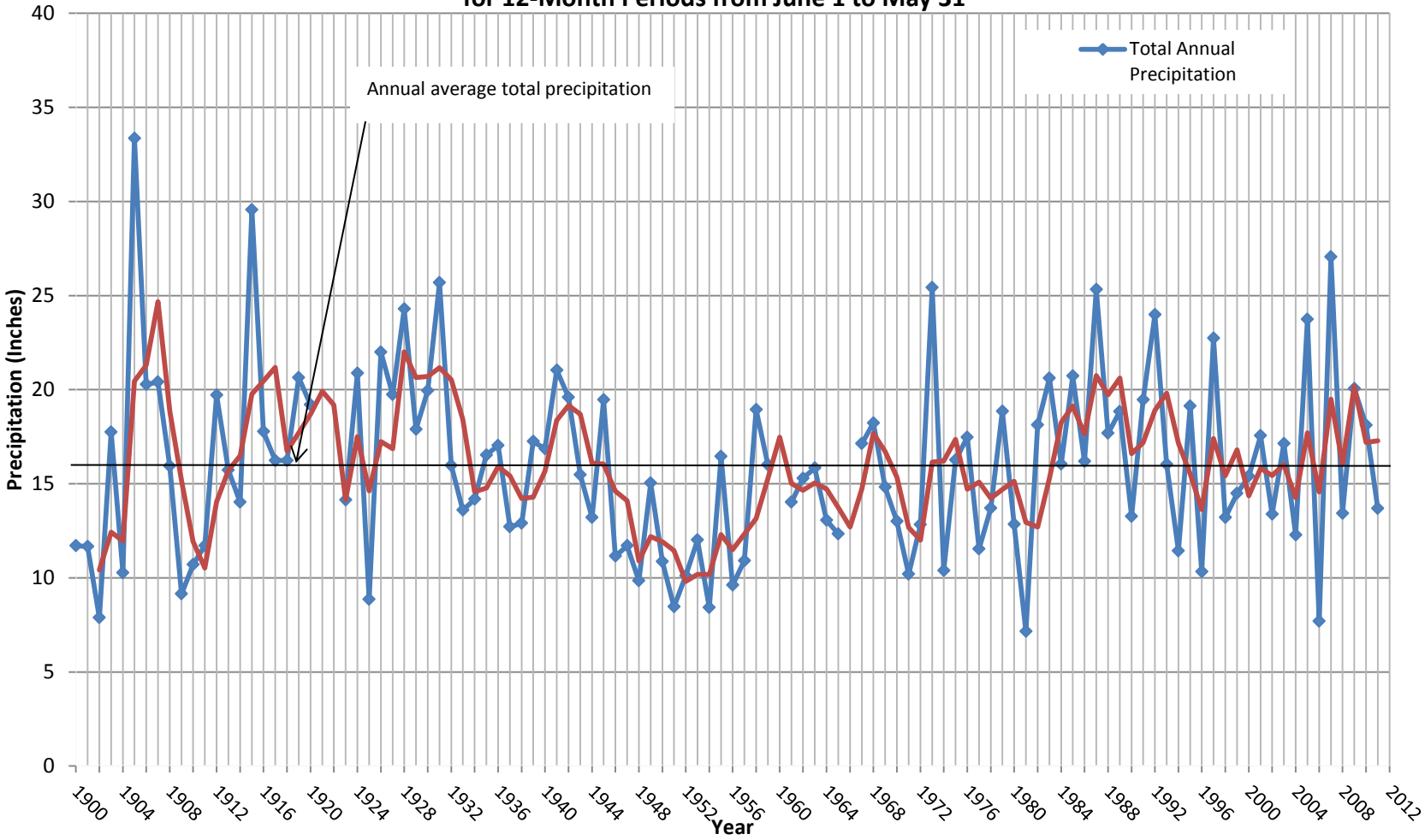
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NM
Application of Hydrology Protocol to STSIU Drainages

12-MONTH STANDARDIZED PRECIPITATION INDEX (SPI) OBSERVED DURING HP APPLICATION

ARCADIS

FIGURE
1

Figure 2
12-Month Total Precipitation Fort Bayard (USC00293265)
for 12-Month Periods from June 1 to May 31



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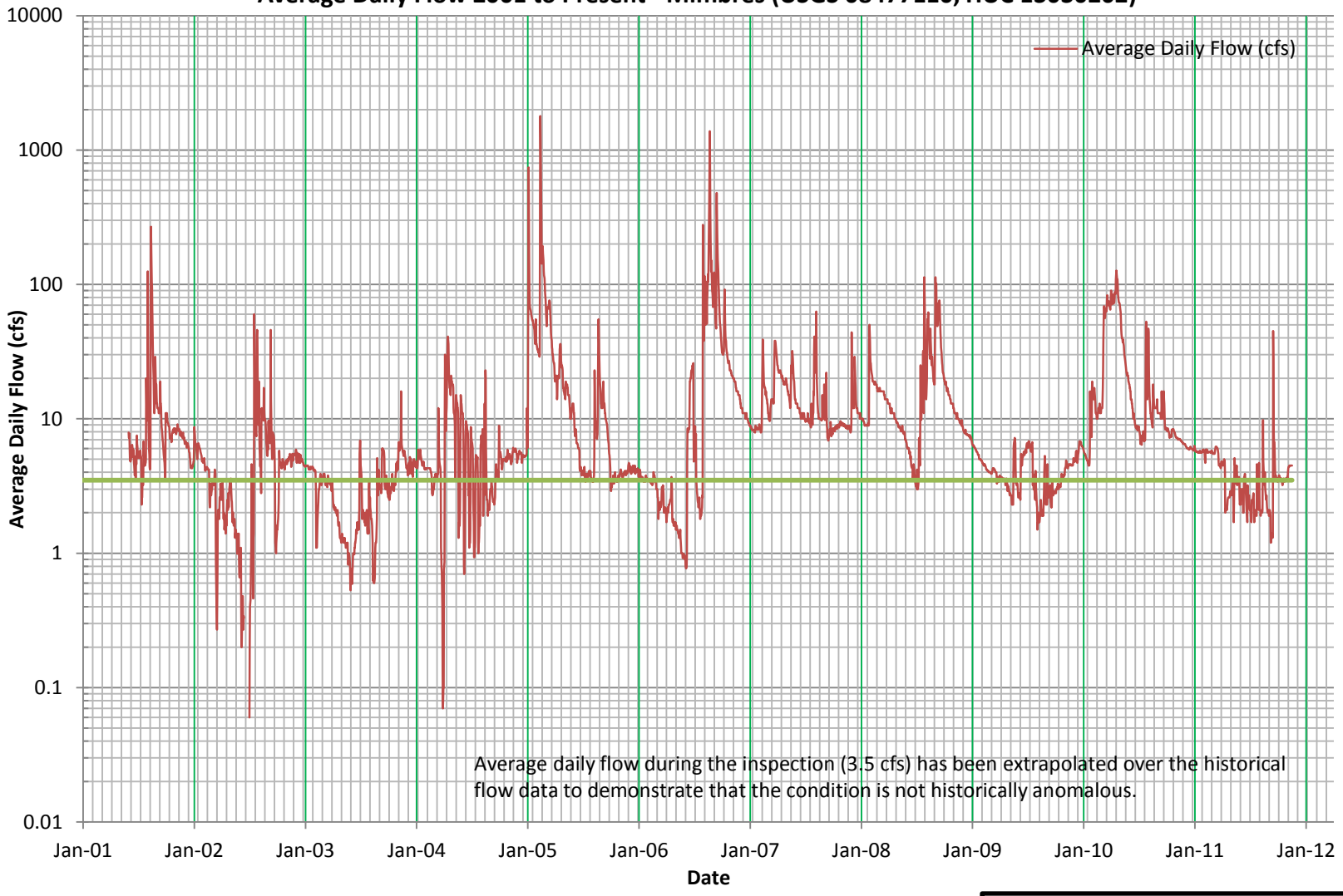
Application of Hydrology Protocol to STSIU Drainages

HISTORICAL ANNUAL AVERAGE PRECIPITATION MEASURED AT FORT BAYARD, NM CLIMACTIC STATION

ARCADIS

FIGURE
2



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VANADIUM, NM

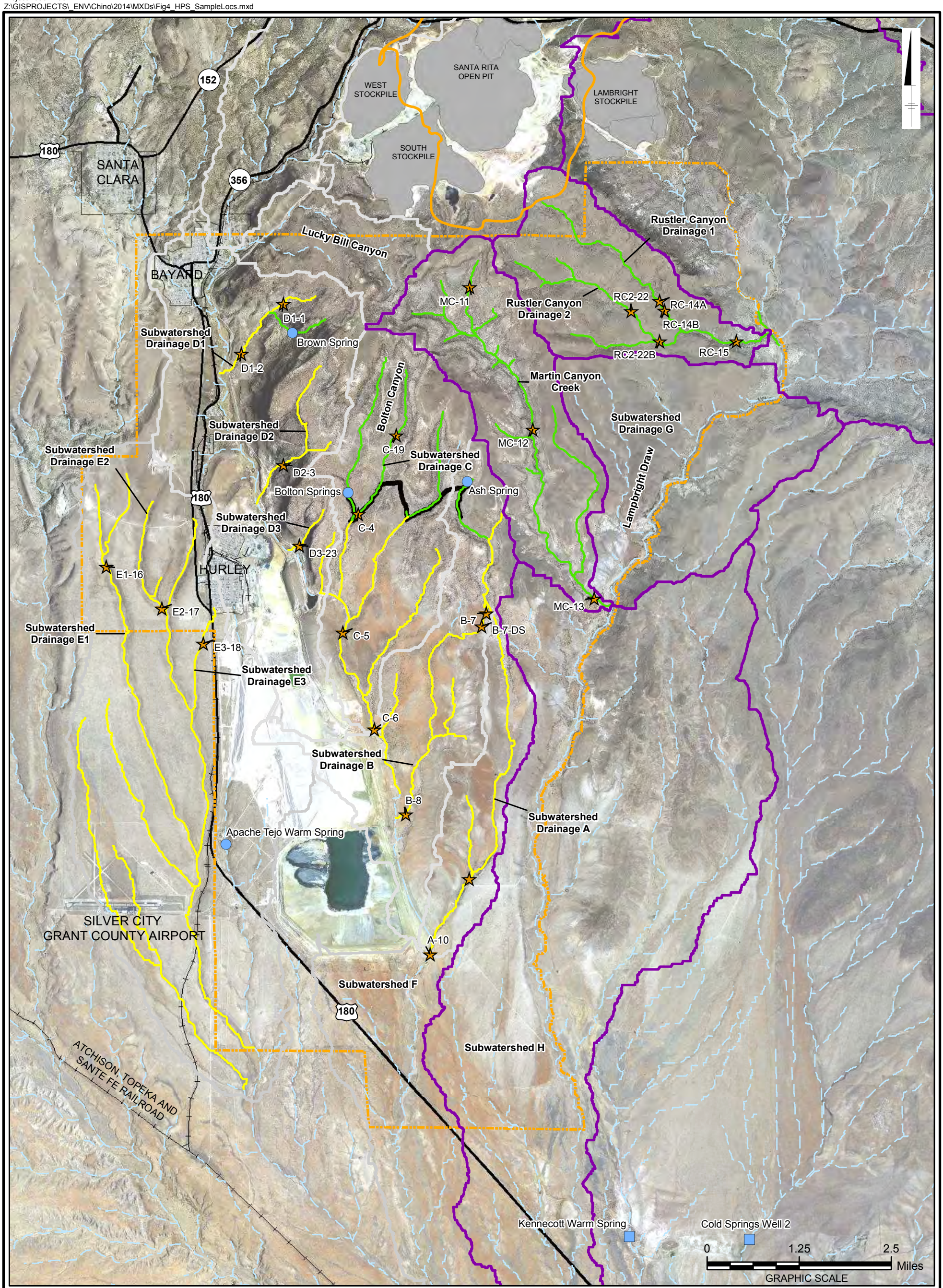
Application of Hydrology Protocol to STSIU Drainages

HISTORICAL AVERAGE DAILY FLOW FOR MIMBRES RIVER IN MIMBRES, NM

ARCADIS

FIGURE
3

CITY: Lakewood DIV/GROUP: IM DB: MLM LD: PIC: PM: TM: TR:
Project #63524.001
Z:\GISPROJECTS_ENV\Chino\2014\MXDs\Fig4_HPS_SampleLocs.mxd



LEGEND:

- 2011 Hydrology Protocol Sample Location
- Pit Capture Zone from Golder (2008)
- Ephemeral Drainages
- Non-Ephemeral Drainages
- Other Drainages
- USFWS Critical Habitat Transect
- Lampbright Subwatershed Boundaries
- Hanover-Whitewater Subwatershed Boundaries
- STSIU Study Boundary
- Stockpiles
- Highway
- Railroad
- Town Roads
- Springs Inside STSIU Area
- Springs Outside STSIU Area

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU

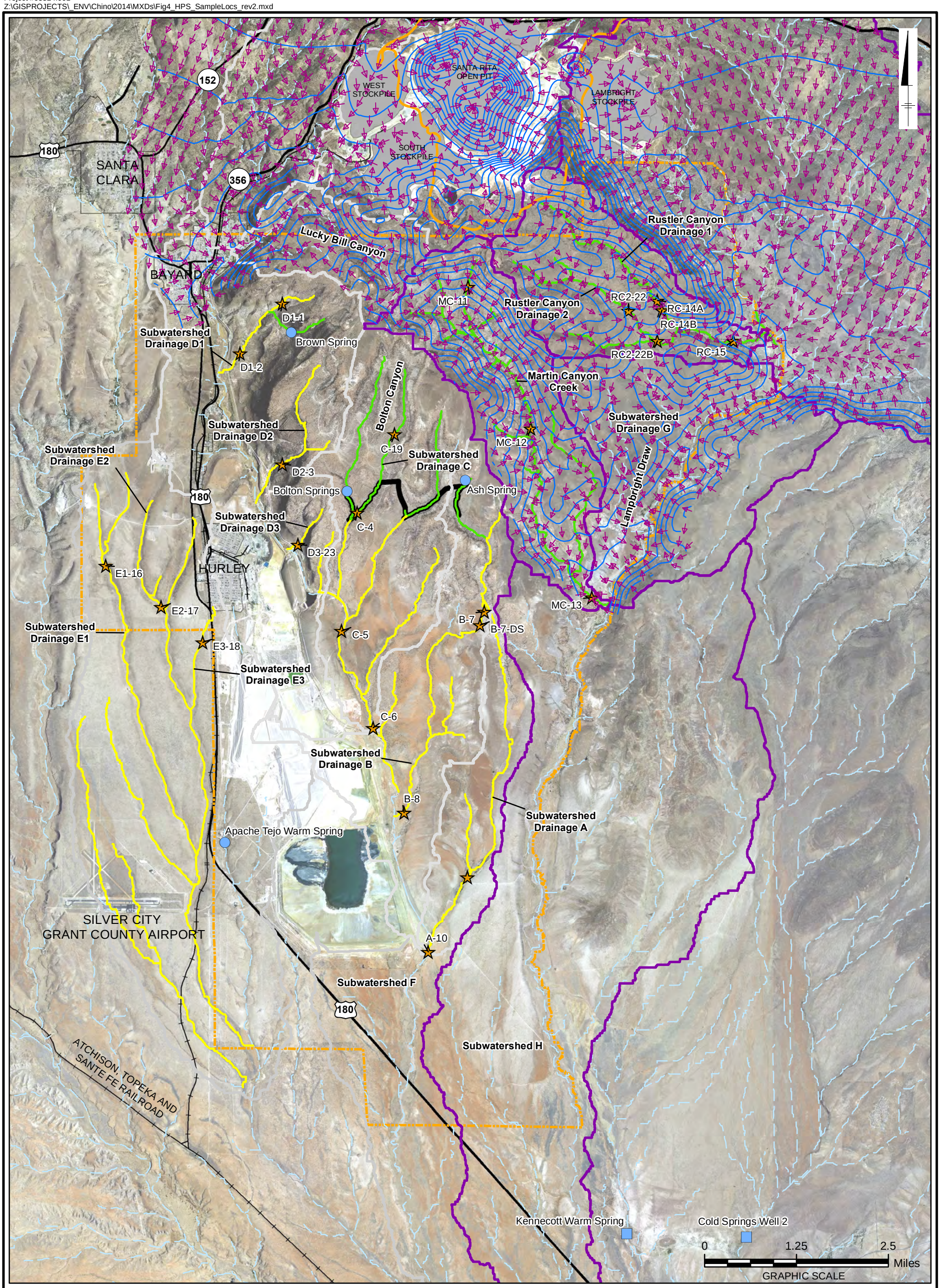
HYDROLOGY PROTOCOL SAMPLE LOCATIONS

ARCADIS

FIGURE 4

Service Layer Credits: APFO

CITY: Lakewood DIV/GROUP: IM DB: MLM LD: PIC: PM: TM: TR:
Project #63524.001
Z:\GISPROJECTS_ENV\Chino\2014\MXDs\Fig4_HPS_SampleLocs_rev2.mxd



LEGEND:

- 2011 Hydrology Protocol Sample Location
- Pit Capture Zone from Golder (2008)
- Ephemeral Drainages
- Non-Ephemeral Drainages
- Other Drainages
- USFWS Critical Habitat Transect
- Lampbright Subwatershed Boundaries
- Hanover-Whitewater Subwatershed Boundaries
- STSIU Study Boundary
- Stockpiles
- Highway
- Railroad
- Town Roads
- Springs Inside STSIU Area
- Springs Outside STSIU Area
- Velocity Vectors (modeled)
- Groundwater Elevation (modeled)

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU

2008 CHINO NORTH AREA MODEL SHALLOW GROUNDWATER CONTOURS AND VELOCITY VECTORS (FROM GOLDER 2008)

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FIGURE 5

Service Layer Credits: APFO

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Appendix A

Level 1 Hydrology Protocol Results for A Drainage

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
A-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.63755/-108.07108	32.62274/-108.08092
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		A-9, A-10

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
A-9 (lat/long): 32.63755/-108.07108	☒ eph ☐ int ☐ per	Final score: 1, see field form and photos for additional information
A-10 (lat/long): 32.62274/-108.08092	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☒ yes ☐ no	A-10 – is a natural drainage that was dredged and developed as part of the Whitewater Creek Diversion.
Channelization/roads	☒ yes ☐ no	A-9 – upgradient of dirt road crossing.
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications		If "yes" please describe.
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime: Through application of the HP and reconnaissance above, within, and below this diversion, it was established that an ephemeral designation applied to the whole reach.		

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:

Two assessment units were identified within sub-watershed A (Figure A-1 below). Starting at the upstream end, these assessment units are identified as A-9 and A-10. The most upstream assessment unit (A-9) was selected due to its location immediately downstream from a larger tributary inflow in an area with more prominent vegetation. The lower downstream assessment unit (A-10) was selected to capture the entire basin drainage area and is a natural drainage that was historically dredged and developed as part of the Whitewater Creek Diversion.

As shown in the plan and profile plot presented below, the basin slope gradually decreases, as expected, in the downstream direction. The upstream reach of sub-watershed A (A-9) is densely vegetated with upland species including grasses and cat claw (Photos A9-1 and A9-3) whereas the downstream assessment unit (A-10) is a mixture of mostly cobble with unconsolidated sand (Photos A10-1 and A10-3), reflecting riverine processes. No dramatic compositional differences were observed between vegetation growing along the streambed and the adjacent upland areas in either of the A-drainage reaches. The scarcity of rooted plants within the A-10 reach was attributed to substrate limitations (e.g., unconsolidated granular sand lacking moisture) rather than flow. The weight of evidence clearly indicates that sub-watershed A is an ephemeral channel that flows only in direct response to significant rainfall events.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be

applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by: Signed: _____	Date: _10/31/2012_____
Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____	Date: _____
EPA Region 6 technical approval granted. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____	Date: _____

Q:\FCX\Chino\2011\MXD\HydrologyProtocol\FinalFigures\Profile_DrainageA_C_v3.mxd

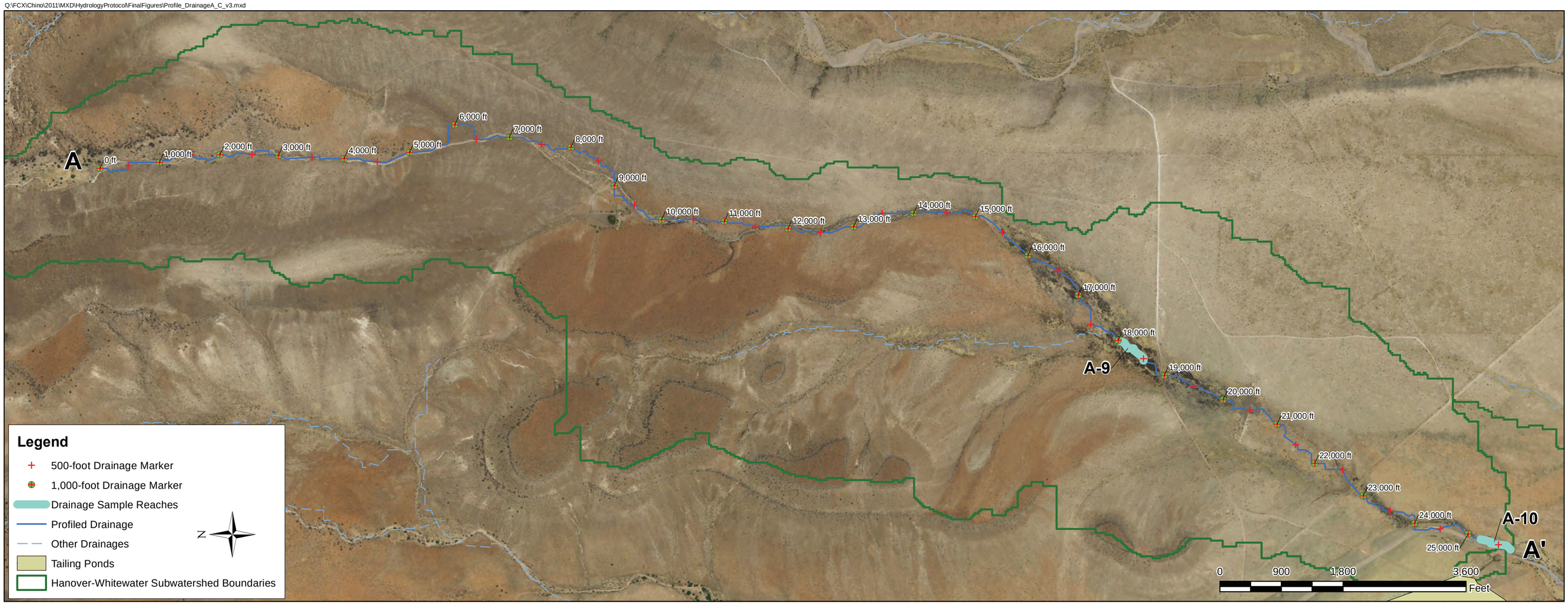
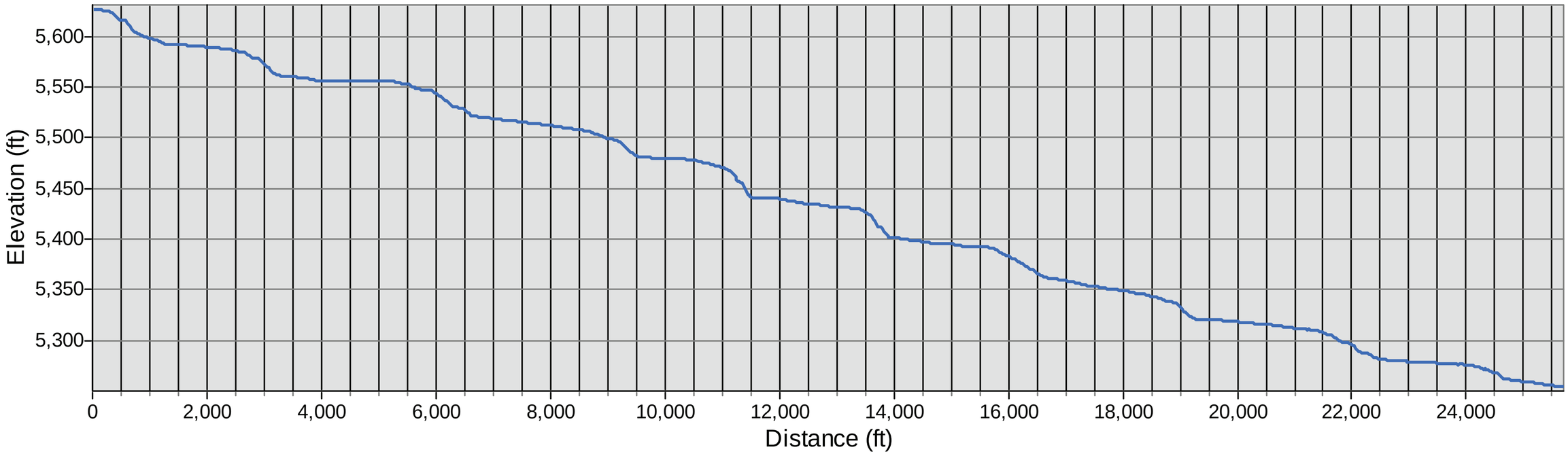


FIGURE A-1: DRAINAGE PROFILE FOR SUBWATERSHED A



A Drainage Photographs (A-9 Reach) – Total HP score of 1 (ephemeral stream)

A9-1: Photographic reference for indicators 1.1 through 1.6. Photograph of channel area. Typical densely rooted vegetation within the channel. No water or biotic indicators of water observed along survey reach. Indicator 1.6 scored as 0 - rooted upland plants prevalent in streambed.

A9-2: Photographic reference for indicator 1.5. Photograph of upslope and overbank area. Vegetation within, and adjacent to channel, occurred at slightly greater densities but was consistent with vegetation growing in adjacent upland areas (mostly bunch grass and cat claw).

A Drainage Photographs (A-9 Reach) – Total HP score of 1 (ephemeral stream)

A9-3: Photographic reference for indicators 1.5 and 1.6. Photographs of vegetation. Typical densely rooted vegetation within the channel. No compositional differences were observed between vegetation growing around the channel and adjacent uplands, but upland species did occur at greater densities within and around the channel.

A-Drainage Photographs (A-10 reach) – Total HP score of 2 (ephemeral stream)

A10-1: Photographic reference for indicators 1.1 through 1.6. Typical view of stream bed and banks. Indicators 1.1 through 1.4 scores of 0 - no water or biotic indicators of water observed along survey reach.

A10-2: Photographic reference for indicator 1.5. Photograph of typical stream bank and over bank vegetation (also observed in other photos provided). No significant compositional or density differences between bank and adjacent uplands and no riparian zone present. Indicator 1.5 score of 0 - no vegetative differences between banks and uplands.

A-Drainage Photographs (A-10 reach) – Total HP score of 2 (ephemeral stream)

A10-3: Photographic reference for indicator 1.6. Most of the streambed is relatively devoid of vegetation most likely as a result of flow regime and bed material (course sands, gravel and boulders). Indicator 1.6 scored as 2 -- a few upland rooted plants were observed growing within the channel (see below pictures), although they were mostly (but not entirely) absent presumably as a result of substrate limitations.

A-Drainage Photographs (A-10 reach) – Total HP score of 2 (ephemeral stream)

A10-4: Photographic reference for indicators 1.5 and 1.6. Photographs of in stream rooted plants and overbank/upland areas. Typical rooted vegetation noted within the channel. No significant compositional or density differences between bank and adjacent uplands.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/15/2011	**Stream Name: A-9**	**Latitude: N 32.63755**
Evaluator(s): Fulton/Donohoe	**Site ID: A-9**	**Longitude: W 108.07108**
TOTAL POINTS: 1 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: A Drainage (A-9)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications _X__ YES ___ NO** **Diversions ___ YES ___X_ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**1**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**1**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**1**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**1**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
A9-1	View downstream	
A9-2	View of upslope left bank	
A9-3	View of in stream rooted plants and overbank/upland areas	

NOTES:

Dirt road crossing below sample reach has resulted in slight impoundment of channel; upgradient of this road crossing, the channel is poorly defined.
The channel is densely vegetated with grass and cat claws – these species were observed in adjacent upland areas, but were observed in greater densities within and around channel.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/15/2011	**Stream Name: A-10**	**Latitude: N 32.62274**
Evaluator(s): Fulton/Donohoe	**Site ID: A-10**	**Longitude: W 108.08092**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: A Drainage (A-10)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications _X__ YES ___ NO** **Diversions __X_ YES ___ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are <u>not</u> found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. <u>If the indicator is present</u> record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
A10-1	View upstream	
A10-2	View of upslope right bank	
A10-3	View downstream	
A10-4	View of in stream rooted plants and overbank/upland areas	

NOTES:

A-10 is in a natural drainage that has been dredged and developed as part of the Whitewater Creek
Diversion. The channel was mostly cobble with unconsolidated sand in dry pool area.
Tumble weeds were observed in the channel, and along the left and right bank.
Grass and mesquite were observed on the banks with tumble weed.

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Appendix B

Level 1 Hydrology Protocol Results for B Drainage

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
B-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.690012/-108.067308	32.65044/-108.08595
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		B-7, B-7 DS, B-8

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
B-7 (lat/long): 32.690012/-108.067308	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
B-7 DS (lat/long): 32.68733/-108.0683	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
B-8 (lat/long): 32.65044/-108.08595	☒ eph ☐ int ☐ per	Final score: 7, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☒ yes ☐ no	B-7 has a cut across and part of the stream now drains into A Drainage.
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications		If "yes" please describe.
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime: Through application of HP and reconnaissance above, within, and below this diversion, it was established that an ephemeral designation applied to the whole reach.		

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:

Three assessment units were identified within sub-watershed B (Figure B-1 below). Starting at the upstream end, these assessment units are identified as B-7, B-7 DS and B-8. The most upstream assessment unit (B-7) was selected due to its location downgradient of change in the average basin slope. During HP application, a diversion was observed adjacent to the B-7 assessment unit that diverts water from the upper reaches of the B-drainage into the adjacent A-drainage. Reconnaissance was done above, within, and below this diversion and it was established that an ephemeral designation applied to this section. To determine hydrologic conditions downgradient of this diversion, an additional assessment unit (B-7 DS) was established downstream of this diversion. The lower downstream assessment unit (B-8) was selected to capture the entire basin drainage area.

As shown in the plan and profile plot presented below, the basin slope gradually decreases, as expected, in the downstream direction beginning at the 6,000 ft marker. At all the assessment units, we observed that rooted upland plants occurred, with varying degrees of density, throughout the stream channel. The upstream reaches of sub-watershed B (B-7 and B-7 DS) are predominately cobble and unconsolidated sand with infrequent boulders (Photos B7-1, B7-3, B7 DS-1 and B7 DS-3) whereas the downstream assessment unit (B-8) is mostly unconsolidated sand (Photos B8-1, B8-2, and B8-3). This likely reflects a transition from colluvial to alluvial processes. As a result, differences in the extent of vegetation growing within the channel varied, with greater densities observed in the upstream reaches and sparse in-stream vegetation within the downstream, reach likely a result of the substrate limitations (e.g., unconsolidated, dry sand). The weight of evidence clearly indicates that sub-watershed B is an ephemeral channel that flows only in direct response to significant rainfall events.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by:

Signed: _____ Date: 10/31/2012

Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No

If no, see attached reasons.

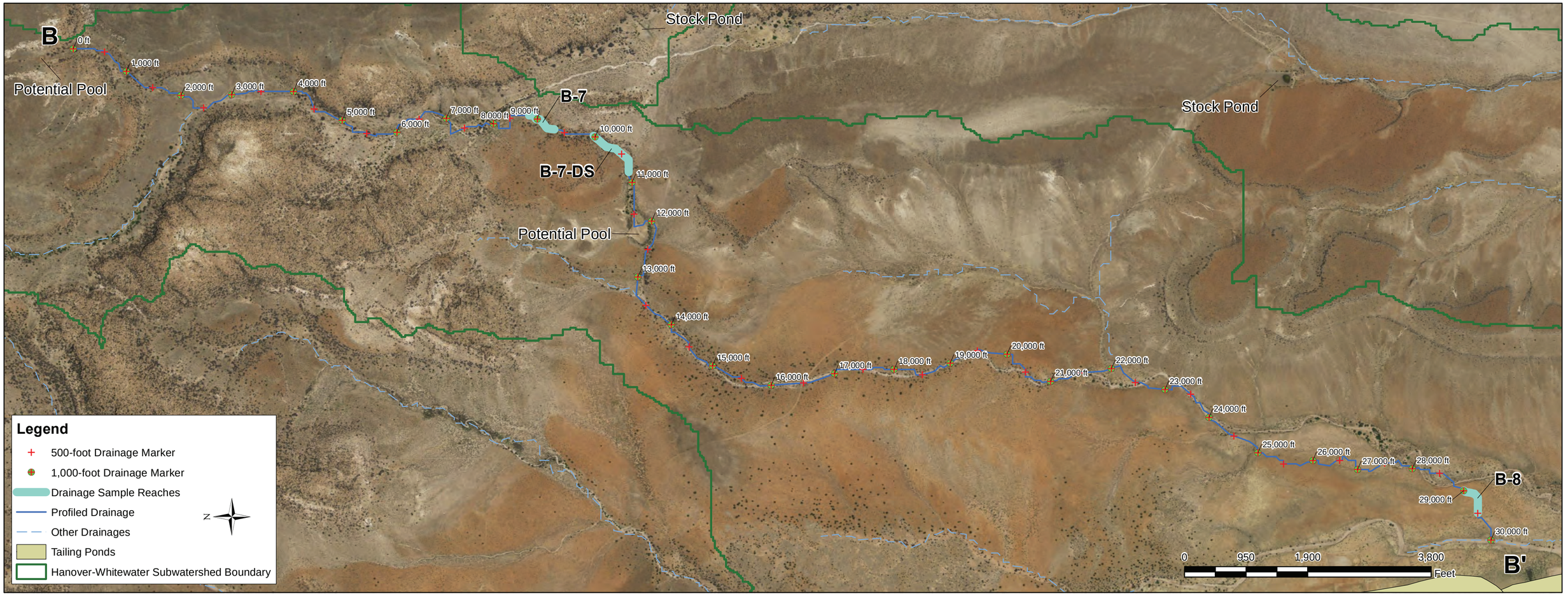
Signed: _____ Date: _____

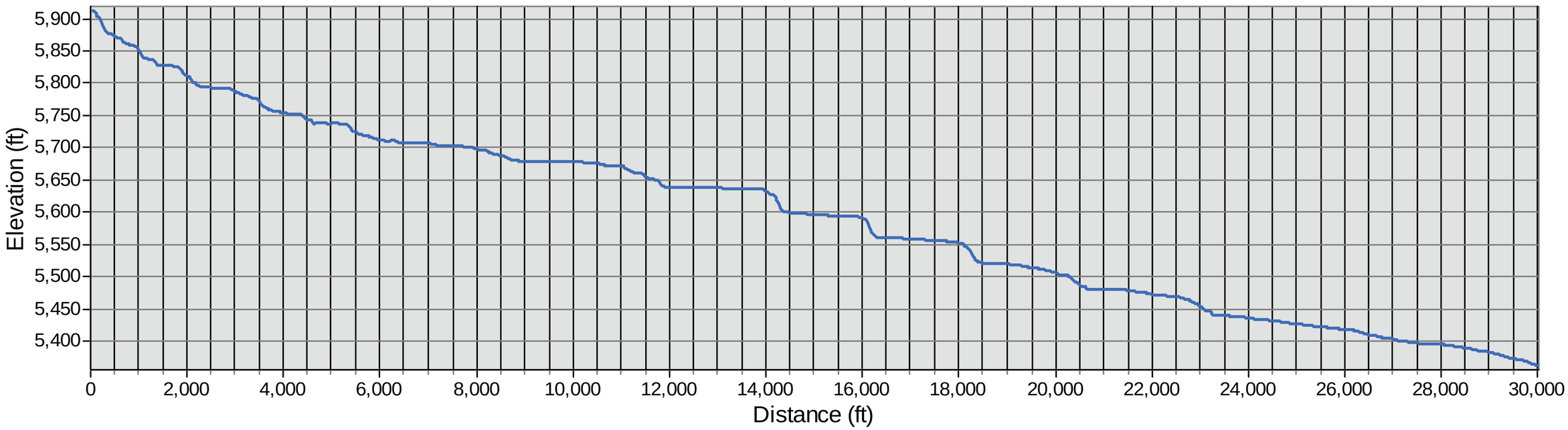
EPA Region 6 technical approval granted. ☐ Yes ☐ No

If no, see attached reasons.

Signed: _____ Date: _____

Q:\FCX\Chino\2011\MXD\HydrologyProtocol\FinalFigures\Profile_DrainageB_C_v3.mxd





B-Drainage Photographs (B-7 Reach) – Total HP score of 2 (ephemeral stream)

B7-1: Photographic reference for indicators 1.1 through 1.6. Photograph of stream bed. Typical rooted vegetation across channel and banks relatively consistently dispersed throughout channel length. Indicator 1.6 scored as 1 - rooted upland plants consistently dispersed in streambed. No water or biotic indicators of water observed along survey reach.

B7-2: Photographic reference for indicator 1.5. Photograph of bank and upland area. Indicator 1.5 scored as 1 - evident variation in vegetative density but no dramatic difference in composition. No distinct riparian zone observed.

B-Drainage Photographs (B-7 Reach) – Total HP score of 2 (ephemeral stream)

B7-3: Photographic reference for indicators 1.5 and 1.6. Photographs of bank/upland area and rooted in channel vegetation. There is a variation in vegetative density but no dramatic difference in composition. Rooted vegetation consistent across channel and banks.

B Drainage Photographs Downstream (B-7-DS Reach) – Total HP score of 2 (ephemeral stream)

B7 DS-1: Photographic reference for indicator 1.1 through 1.6. Indicator 1.6 scored as 1 - rooted vegetation along the stream bed is consistently dispersed. No water or biotic indicators of water observed along survey reach.

B7 DS-2: Photographic reference for indicator 1.5. Photograph of the overbank area and uplands. Indicator 1.5 scored as 1 - evident variation in vegetative density but no dramatic difference in composition. No distinct riparian zone observed.

B Drainage Photographs Downstream (B-7-DS Reach) – Total HP score of 2 (ephemeral stream)

B7 DS-3: Photographic reference for indicators 1.5 and 1.6. Photographs of in stream rooted plants and overbank/upland areas. Evident variation in vegetative density but no dramatic difference in composition and rooted vegetation along the stream bed is consistently dispersed.

B-Drainage Photographs (B-8 Reach) – Total HP score of 7 (ephemeral stream)

B8-1: Photographic reference for indicator 1.1 through 1.6. Photograph of typical channel bed and channel banks. Indicator 1.6 scored as 2 - rooted vegetation inconsistently present in stream bed. No water or biotic indicators of water observed along survey reach.

B8-2: Photographic reference for indicator 1.5. Photograph of bank and upland area. No dramatic differences between channel bank vegetation and upland vegetation. Indicator 1.5 scored as 1 - evident variation in vegetative density but no dramatic difference in composition. No distinct riparian zone present.

B-Drainage Photographs (B-8 Reach) – Total HP score of 7 (ephemeral stream)

B8-3: Photographic reference for indicator 1.6 and 1.9. Portions of the stream bed along the reach are devoid of vegetation while other portions are vegetated (see previous photograph). Lack of vegetation is likely the result of the flow regime and the bed material rather than an indicator of water persistence. Indicator 1.6 scored as 2 - few rooted upland plants present along streambed.

Indicator 1.9 scored as 0 - no riffle-pool sequence observable.

B-Drainage Photographs (B-8 Reach) – Total HP score of 7 (ephemeral stream)

B8-4: Photographic reference for indicator 1.8 and 1.10. Photograph of the cross-section for measurement of the floodplain and channel dimensions. Indicator 1.8 scored 1.5 based on measurements taken - moderate confinement and presence of inactive floodplain.

Indicator 1.10 scored as 1.5. Channel bed material is medium to course sand, which is consistent but noticeably courser than the bank and over bank area. Little to no substrate sorting is observable.

B-Drainage Photographs (B-8 Reach) – Total HP score of 7 (ephemeral stream)

B8-5: Photographic reference for indicators 1.5 and 1.6. Photographs of bank/upland area and rooted in channel vegetation. There is a variation in vegetative density but no dramatic difference in composition. Rooted vegetation inconsistent across channel and banks.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: B-7**	**Latitude: N 32.69021**
Evaluator(s): Fulton/Donohoe	**Site ID: B-7**	**Longitude: W 108.06734**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: B Drainage (B-7)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications ___ YES _X__ NO** **Diversions _X__ YES __ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
B7-1	View downstream	
B7-2	View of upslope left bank	
B7-3	View of in stream rooted plants and overbank/upland areas	

NOTES:

Scoring metric 1.5 HP
Observed trees in greater densities along stream corridor. The only compositional difference
observed was a willow growing in the channel but not in the upland area.
Therefore we did not consider that a dramatic compositional difference.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: B-7 DS**	**Latitude: N 32.68575**
Evaluator(s): Fulton/Donohoe	**Site ID: B-7 DS**	**Longitude: W 108.07005**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit:** **B Drainage (B-7-DS)**	**Drought Index (12-mo. SPI Value):** **-1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications ___ YES _X__ NO** **Diversions ___ YES _X_ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are <u>not</u> found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. <u>If the indicator is present</u> record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
B7 DS-1	View downstream	
B7 DS-2	View of upslope right bank	
B7 DS-3	View of in stream rooted plants and overbank/upland areas	

NOTES:

The channel was predominately unconsolidated sand with cobble.
In stream vegetation observed was primarily grass with occasional oak species.
Riparian vegetation was primarily yucca, juniper and oak. Willow species were not observed in the stream bed.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: B-8**	**Latitude: N 32.65222**
Evaluator(s): Barry	**Site ID: B-8**	**Longitude: W 108.08502**
TOTAL POINTS: 7 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: B Drainage (B-8)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications ___ YES _X__ NO** **Diversions ___ YES _X_ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**(1)**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**3**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	(1)	0
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	(1.5)	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	(0)
SUBTOTAL (#1.1 – #1.9)				**5.5**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	(1.5)	0	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		(Absent = 0)	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	(0)
TOTAL POINTS (#1.1 – #1.12)				**7**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	(Absent = 0)
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	(Absent = 0)
TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)		**7**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
B8-1	View upstream extent of assessment unit looking downstream	
B8-2	View downstream along assessment unit at left bank riparian vegetation	
B8-3	View of lower portion of assessment unit – note lack of in channel vegetation	
B8-4	View of entrenchment survey transect	
B8-5	View of in stream rooted plants and overbank/upland areas	

NOTES:

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Appendix C

Level 1 Hydrology Protocol Results for C Drainage

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
C-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.72488/-108.0883	32.66566/-108.0928
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		C-19, C-4, C-5, C-6,

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
C-19 (lat/long): 32.72488/-108.0883	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
C-4 (lat/long): 32.70919/-108.0975	☒ eph ☐ int ☐ per	Final score: 6, see field form and photos for additional information
C-5 (lat/long): 32.68615/-108.10046	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
C-6 (lat/long): 32.66566/-108.0928	☒ eph ☐ int ☐ per	Final score: 7, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications		If "yes" please describe.
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:		

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:

Four assessment units were identified within sub-watershed C (Figure C-1 below). Starting at the upstream end, these assessment units are identified as C-19, C-4, C-5, and C-6. The most upstream assessment unit (C-19) was selected to represent the headwater portions of this, and other, sub-watersheds within this portion of the AOC. Assessment unit C-4 was located at a significant change in basin slope downstream of tributary inflow. The lower two assessment units (C-5 and C-6) are located within the downstream portions of sub-watershed C intended to represent hydrologic processes of larger watersheds within this portion of the AOC.

As shown in the plan and profile plots presented below the basin slope progressively decreases, as expected, in the downstream direction. Similarly, the degree of valley confinement decreases in the downstream direction. These trends in channel slope and confinement are typical and represent the relative dominance of colluvial versus alluvial channel forming processes and are reflected in the composition of the channel bed itself. That is, the upstream reaches of sub-watershed C (C-19 and C-4) are bedrock and cobble dominated stream channels indicative hill slope processes (Photos C19-1 and C4-2) whereas the downstream assessment units (C-5 and C-6) are a mixture of sand/gravel/cobble (Photos C5-1 and C6-3) and reflect the dominance of riverine processes. However, despite the influence of riverine processes within the lower assessment units we find throughout sub-watershed C that the channel is dominated by sand, cobbles and bedrock with very little difference between the "riparian" and upland vegetation. Furthermore, at all assessment units we observed that rooted upland plants occurred, with varying degrees of density, throughout the stream channel. The weight of evidence clearly indicates that sub-watershed C is an ephemeral channel that flows only in direct response to significant rainfall events.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by:

Signed: _____ Date: 10/31/2012

Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No

If no, see attached reasons.

Signed: _____ Date: _____

EPA Region 6 technical approval granted. ☐ Yes ☐ No

If no, see attached reasons.

Signed: _____ Date: _____

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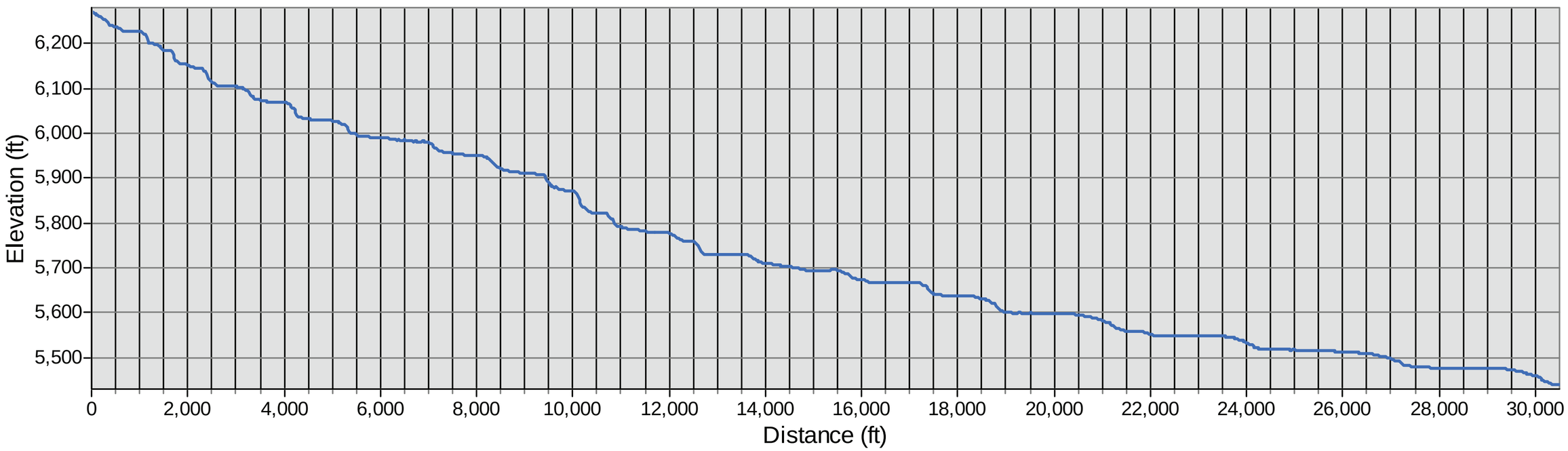
FIGURE C-1: DRAINAGE PROFILE FOR SUBWATERSHED C



C Drainage Photographs (C-19 Reach) – Total HP score of 2 (ephemeral stream)

C19-1: Photographic reference to representative channel bottom characteristics.

C19-2: Photographic reference for indicators 1.1 through 1.6. Photograph from upper extent of survey reach facing downstream. Rooted vegetation present in channel is present but inconsistent (see subsequent photograph). No water or biotic indicators of water observed along survey reach.

C Drainage Photographs (C-19 Reach) – Total HP score of 2 (ephemeral stream)

C19-3: Photographic reference for indicator 1.6. Portions of the survey reach devoid of vegetation as a result of bed material and lack of moisture rather than an indicator of persistence of flow. Indicator 1.6 scored as 1 – few rooted plants present in streambed.

C Drainage Photographs (C-19 Reach) – Total HP score of 2 (ephemeral stream)

C19-4: Photographic reference for indicator 1.5. Photograph of upland area and upland vegetation. Indicator 1.5 scored as 1 - evident variation in vegetative density but no dramatic difference in composition. No distinct riparian zone observed.

C19-5: Photographic reference for indicators 1.5 and 1.6. There is a variation in vegetative density but no dramatic difference in composition. Portions of the survey reach few rooted plants present in streambed as a result of bed rock in channel.

C Drainage Photographs (C-4 Reach) – Total HP score of 6 (ephemeral stream)

C4-1: Photographic reference for indicator 1.1 to 1.6. Streambed is predominantly bedrock. Vegetation present where deposition has occurred. No water or biotic indicators of water observed along survey reach.

C4-2: Photographic reference for indicator 1.6. Indicator 1.6 scored as 2 – few rooted upland plants present in streambed. Lack of vegetation present in streambed likely result of flow regime and presence of bedrock rather than result of persistent water.

C Drainage Photographs (C-4 Reach) – Total HP score of 6 (ephemeral stream)

C4-3: Photographic reference for indicator 1.5. Photograph of bank and upland vegetation. Indicator 1.5 scored as 1 - evident variation in vegetative density but no dramatic difference in composition. No distinct riparian zone observed.

C Drainage Photographs (C-4 Reach) – Total HP score of 6 (ephemeral stream)

C4-4: Photographic reference for indicators 1.8 through 1.10. Photograph of the entrenchment transect location. Indicator 1.8 scored as 1.5 - stream is somewhat confined with an inactive floodplain.

Indicator 1.9 scored as 0 - no riffle-pool sequence observed (also refer to other photos).

Indicator 1.10 scored as 1.5 - particle sizes within the channel are similar to upland material but are noticeably larger (primarily sands and gravels where bedrock is not present).

C Drainage Photographs (C-4 Reach) – Total HP score of 6 (ephemeral stream)

C4-5: Photographic reference for indicator 1.5. Photographs of bank and upland vegetation. Evident variation in vegetative density but no dramatic difference in composition. There is no distinct riparian vegetation corridor.

C Drainage Photographs (C-5 Reach) – Total HP score of 2 (ephemeral stream)

C5-1: Photographic reference for indicators 1.1 through 1.6. Indicator 1.6 scored as 2 – few rooted plants in the streambed. Lack of rooted plants is likely the result of the flow regime and granular bed material present rather than persistence of flow. No water or biotic indicators of water observed.

C5-2: Photographic reference for indicator 1.5. Indicator 1.5 scored as 0. Vegetation along streambank and uplands is sparse but consistent with no compositional or density differences between the two areas observed. Also refer to previous photograph.

C Drainage Photographs (C-5 Reach) – Total HP score of 2 (ephemeral stream)

C5-3: Photographic reference for indicator 1.6. Few rooted plants in the streambed. Lack of rooted plants is likely the result of granular bed material present.

C Drainage Photographs (C-6 Reach) – Total HP Score of 7 (ephemeral stream)

C6-1: Photographic reference for indicators 1.1 through 1.6. Indicator 1.6 scored as 2. Few rooted plants present in the streambed but inconsistently present. Lack of rooted plants is likely the result of the flow regime and granular bed material present rather than persistence of flow. No water or biotic indicators of water observed along survey reach.

C6-2: Photographic reference for indicator 1.5. Indicator 1.5 scored as 1 - evident variation in vegetative density but no dramatic difference in composition. No distinct riparian zone observed.

C Drainage Photographs (C-6 Reach) – Total HP Score of 7 (ephemeral stream)

C6-3: Photographic reference for indicator 1.8. Location of transect shown. Indicator 1.8 scored as 1.5. Stream is somewhat confined with an inactive floodplain.

C6-4: Photographic reference for indicator 1.9 and 1.10. Indicator 1.9 scored as 0 - riffle-pool sequence not observable along survey reach. Indicator 1.10 scored as 1.5 - particle sizes of the channel bed material is primarily course sand and gravel which is similar to but courser than the material of the upland area. Substrate sorting not evident.

C Drainage Photographs (C-6 Reach) – Total HP Score of 7 (ephemeral stream)

C6-5: Photographic reference for indicator 1.6. Few rooted plants present in the streambed but inconsistently present. Lack of rooted plants is likely the result of granular bed material present.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/12/2011	**Stream Name: C Drainage**	**Latitude: N 32.72488**
Evaluator(s): Clifton, Barry, Durham	**Site ID: C-19**	**Longitude: W 108.0883**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: C Drainage (C-19)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** ****Explain in further detail in NOTES section**

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**(1)**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**(1)**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are <u>not</u> found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. <u>If the indicator is present</u> record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
C19-1	View of representative channel bottom characteristics	
C19-2	View upstream extent of assessment unit looking downstream - Note – lack of water in channel and presence of rooted vegetation in channel	
C19-3	View near downstream end of assessment unit – Note – area of no vegetation transitioning to prevalent vegetation. Lake of vegetation due to lack of moisture not duration of flow.	
C19-4	View of riparian and upland vegetation. No distinct riparian vegetation corridor	
C19-5	View of in stream rooted plants and overbank/upland areas.	

NOTES:

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/12/2011	**Stream Name: C Drainage**	**Latitude: N 32.70919**
Evaluator(s): Barry	**Site ID: C-4**	**Longitude: W 108.0975**
TOTAL POINTS: 6 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: C Drainage (C-4)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**(1)**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**3**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	1	(0)
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	(1.5)	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	(0)
SUBTOTAL (#1.1 – #1.9)				**4.5**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.
	3	(1.5)	0
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.
	Present = 3		(**Absent = 0**)
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	(0)
TOTAL POINTS (#1.1 – #1.12)				**6.0**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	(**Absent = 0**)
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	(**Absent = 0**)
TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)		**6**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
C4-1	View from upstream extent of assessment unit looking downstream much of this unit – and this reach- is dominated by bedrock channel bottom	
C4-2	View from downstream extent of assessment unit looking upstream. Note large sand deposit and then bedrock channel further upstream. Lack of vegetation due to lack of water not consistency of flow	
C4-3	View of riparian and upland vegetation. No distinct riparian vegetation corridor	
C4-4	View of entrenchment transect location	
C4-5	View of in stream rooted plants and overbank/upland areas	

NOTES:

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/12/2011	**Stream Name: C Drainage**	**Latitude: N 32.68615**
Evaluator(s): Barry	**Site ID: C-5**	**Longitude: W 108.10046**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: E Drainage (C-5)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
C5-1	View of lack of rooted plants in streambed	
C5-2	View of vegetation along streambank and uplands	
C5-3	View of in stream rooted plants and overbank/upland areas	

NOTES:

C-5 reflects the portion of Bolton that was dredged/cleared and widened for the White Water Creek
Diversion purposes.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/12/2011	**Stream Name: C Drainage**	**Latitude: N 32.66566**
Evaluator(s): Barry	**Site ID: C-6**	**Longitude: W 108.0928**
TOTAL POINTS: 7 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: C Drainage (C-6)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event.** **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**(1)**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**3**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	(1)	0
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	(1.5)	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	(0)
SUBTOTAL (#1.1 – #1.9)				**5.5**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.
	3	(1.5)	0
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.
	Present = 3		(**Absent = 0**)
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	(0)
TOTAL POINTS (#1.1 – #1.12)				**7.0**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	(**Absent = 0**)
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	(**Absent = 0**)
TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)		**7**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
C6-1	View upstream extent of assessment unit looking downstream	
C6-2	View downstream extent of assessment unit looking upstream	
C6-3	View of entrenchment survey location	
C6-4	View lack of pool – riffle sequence	
C6-5	View of in stream rooted plants and overbank/upland areas	

NOTES:

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Appendix D

Level 1 Hydrology Protocol Results for D Drainage

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	**Basin:**	**8-digit HUC:**
D1-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.7506/-108.11491	32.74073/-108.12476
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		D1-1, D1-2

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		**Notes**
D1-1 (lat/long): 32.7506/-108.11491	☒ eph ☐ int ☐ per	Final score: 1, see field form and photos for additional information
D1-2 (lat/long): 32.74073/-108.12476	☒ eph ☐ int ☐ per	Final score: 1, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		**If "yes" please describe.**
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		**If "yes" please describe.**
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications		If "yes" please describe.
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:		

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:

Two assessment units were identified within sub-watershed D1 (Figure D1-1). Starting at the upstream end, these assessment units are identified as D1-1 and D1-2. The most upstream assessment unit (D1-1) was selected to represent the headwater portions of this sub-watershed but also placed downgradient of a significant reduction in basin slope. The downstream assessment unit (D1-2) was located near the outlet of sub-watershed D1 as representative of the hydrologic processes of the entire drainage area.

As shown in the plan and profile plots for sub-watershed D1 (Figure D1-1) the basin slope progressively decreases, as expected, in the downstream direction. Similarly, the degree of valley confinement decreases in the downstream direction. These trends in channel slope and confinement are typical and represent the relative dominance of colluvial versus alluvial channel forming processes and are reflected in the composition of the channel bed itself. That is, the upstream reaches of sub-watershed D1 (D1-1) are bedrock and cobble dominated stream channels indicative hill slope processes (Photos D1-1 and D1-2) whereas the downstream assessment unit (D1-2) are a mixture of sand/gravel/cobble (Photos D1-2-1 and D1-2-2) and reflect the dominance of riverine processes. However, despite the influence of riverine processes within the lower assessment unit we observed very little difference between the "riparian" and upland vegetation. Furthermore, at both assessment units we observed that rooted upland plants occurred, with varying degrees of density, throughout the stream channel. The weight of evidence clearly indicates that sub-watershed D1 is an ephemeral channel that flows only in direct response to significant rainfall events.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40

CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by: Signed: _____	Date: 10/31/2012
Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____	Date: _____
EPA Region 6 technical approval granted. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____	Date: _____

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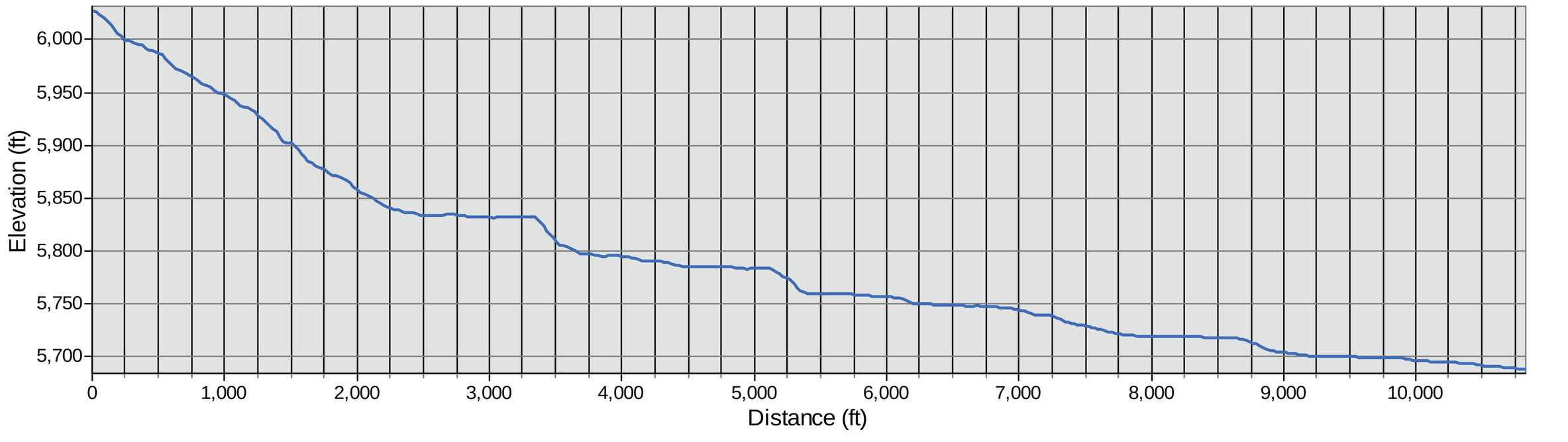
FIGURE D1-1: DRAINAGE PROFILE FOR SUBWATERSHED D(1)



D1 Drainage Photographs (D1-1 Reach) – Total HP Score of 1 (ephemeral stream)

D1-1: Photographic reference of representative channel bottom characteristics. Note large boulders and cobbles in stream channel, similar to those observed on hillside.

D1-2: Photographic reference of representative channel bottom characteristics. Note large boulders and cobbles in stream channel, similar to those observed on hillside.

D1 Drainage Photographs (D1-1 Reach) – Total HP Score of 1 (ephemeral stream)

D1-3 Photographic reference for indicator 1.1 through 1.6. Typical view of stream bed and banks. Indicator 1.6 scored as 1 - rooted plants are prevalent and consistently dispersed in the streambed. No water or biotic indicators of water observed along survey reach.

D1-4: Photographic reference for indicator 1.5. Photograph of typical vegetation in the upland region of the survey reach. Indicator 1.5 scored as 0. Upland vegetation composition and density similar to stream and stream banks shown in previous photograph.

D1 Drainage Photographs (D1-1 Reach) – Total HP Score of 1 (ephemeral stream)

D1-5: Photographic reference for indicators 1.5 and 1.6. Photographs of stream bed, the bank/upland area and rooted in channel vegetation. Upland vegetation composition and density similar to stream and stream banks. Rooted plants are prevalent and consistently dispersed in the streambed.

D1 Drainage Photographs (D1-2 Reach) – Total HP Score of 1 (ephemeral stream)

D1-2-1: Photographic reference for indicator 1.1 through 1.6. Indicator 1.6 scored as 0. Rooted plants present in the channel bed and are prevalent at similar density as the upslope area. No water or biotic indicators of water observed along survey reach.

D1-2-2: Photographic reference of representative channel bottom characteristics. Note sand/gravel channel bottom with prevalent rooted upland plants throughout.

D1 Drainage Photographs (D1-2 Reach) – Total HP Score of 1 (ephemeral stream)

D1-2-3: Photographic reference for indicator 1.5. Photograph of the overbank and upland area. Indicator 1.5 scored as 1 - evident variation in vegetative density but no dramatic difference in composition. No distinct riparian zone observed.

D1 Drainage Photographs (D1-2 Reach) – Total HP Score of 1 (ephemeral stream)

D1-2-4: Photographic reference for indicators 1.5 and 1.6. Photographs of stream bed, the bank/upland area and rooted in channel vegetation. There is an evident variation in vegetative density but no dramatic difference in composition. Rooted plants present in the channel bed and are prevalent at similar density as the upslope area.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: D1**	**Latitude: N 32.75060**
Evaluator(s): Fulton/Barry	**Site ID: D-1**	**Longitude: W 108.11491**
TOTAL POINTS: 1 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: D Drainage (D-1)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications ___ YES _X__ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** ****Explain in further detail in NOTES section**

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**(0)**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**(1)**	**0**
			SUBTOTAL (#1.1 – #1.6)	**1**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**1**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**1**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**1**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
D1-1	View of representative channel bottom characteristics. Note large boulders and cobbles in stream channel, similar to those observed on hillside.	
D1-2	View of representative channel bottom characteristics. Note large boulders and cobbles in stream channel, similar to those observed on hillside.	
D1-3	View middle of assessment unit looking upstream – note in channel vegetation	
D1-4	View middle of assessment unit looking at right overbank/upland vegetation – note lack of compositional difference	
D1-5	View of in stream rooted plants and overbank/upland areas.	

NOTES:

D1-1 and D1-2 Stock tanks were present within the drainage but not within the reaches surveyed.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: D1**	**Latitude: N 32.74073**
Evaluator(s): Barry	**Site ID: D1-2**	**Longitude: W 108.12476**
TOTAL POINTS: 1 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: D Drainage (D1-2)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications ___ YES _ X_ NO** **Diversions ___ YES _ X_ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**1**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**1**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**1**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**1**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
D1-2-1	View upstream extent of assessment unit looking downstream – note prevalent in channel vegetation	
D1-2-2	View of representative channel bottom characteristics. Note sand/gravel channel bottom with prevalent rooted upland plants throughout.	
D1-2-3	View from downstream extent of assessment unit looking to right overbank	
D1-2-4	View of in stream rooted plants and overbank/upland areas.	

NOTES:

D1-1 and D1-2 Stock tanks were present within the drainage but not within the reaches surveyed.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: D1**	**Latitude: N 32.74073**
Evaluator(s): Fulton	**Site ID: D1-2 replicate**	**Longitude: W 108.12476**
TOTAL POINTS: 1 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: D Drainage (D1-2)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event.** **OTHER:** **Stream Modifications ___ YES _ X_ NO** **Diversions ___ YES _ X_ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**1**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**1**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**1**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**1**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
D1-2-1	View upstream extent of assessment unit looking downstream – note prevalent in channel vegetation	
D1-2-2	View of representative channel bottom characteristics. Note sand/gravel channel bottom with prevalent rooted upland plants throughout.	
D1-2-3	View from downstream extent of assessment unit looking to right overbank	
D1-2-4	View of in stream rooted plants and overbank/upland areas.	

NOTES:

D1-1 and D1-2 Stock tanks were present within the drainage but not within the reaches surveyed.

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
D2-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.71882/-108.11478	32.71835/-108.11639
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		D2-3

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
D2-3 (lat/long): 32.71882/-108.11478	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications	If "yes" please describe.
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:	

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:

A single assessment unit was identified within sub-watershed D2 (D2-3) (Figure D2-1). Assessment unit D2-3 was placed near the outlet of sub-watershed D2 downgradient of a significant reduction in basin slope as representative of the hydrologic processes of the entire drainage area. Average basin slope of sub-watershed D2 is relatively steep (approximately 10%) and highly confined with hill slopes in direct contact with the channel and very little riparian or floodplain areas (Photos D2-1and D2-2). Sub-watershed D2 is dominated by colluvial processes with very little difference between vegetation composition and density between the stream banks and hillsides. Furthermore, we observed only a few occurrences of rooted upland plants within the channel bottom; however, this is the result of lack of moisture and deep mineral sandy soils within the stream bottom (Photo D2-5) rather than duration of flowing water. The weight of evidence clearly indicates that sub-watershed D2 is an ephemeral channel that flows only in direct response to significant rainfall events

ATTACHMENTS:

- ☒ Map and Photos (required)
- ☒ Hydrology Protocol Field Sheets for all locations (required)
- ☐ Level 2 Analysis (optional)
- ☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by:

Signed: _____ Date: 10/31/2012

Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____
EPA Region 6 technical approval granted. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____

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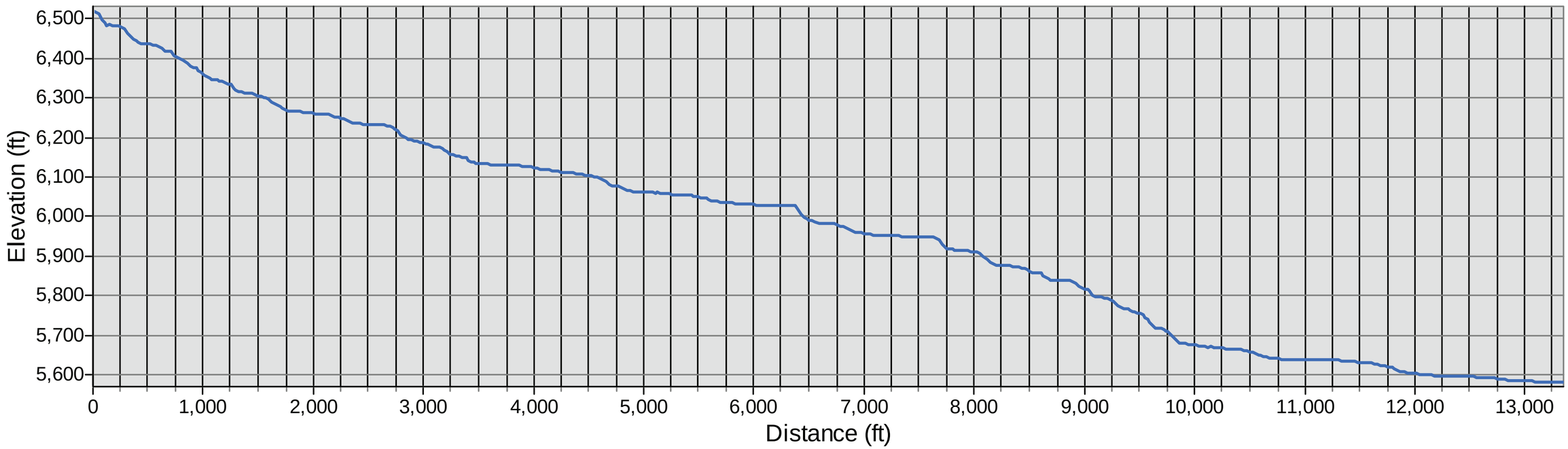
D(2) **FIGURE D2-1: DRAINAGE PROFILE FOR SUBWATERSHED D(2)** D(2)'



D2 Drainage Photographs (D2-3 Reach) – Total HP score of 2 (ephemeral stream)

D2-1: Photographic reference of representative channel bottom characteristics. Note large boulders and cobbles in stream channel, similar to those observed on hillside. Note confining nature of hillsides.

D2-2: Photographic reference of representative channel bottom characteristics. Note large boulders and cobbles in stream channel, similar to those observed on hillside. Note confining nature of hillsides.

D2 Drainage Photographs (D2-3 Reach) – Total HP score of 2 (ephemeral stream)

D2-3: Photographic reference for indicators 1.1 though 1.6. Indicator 1.6 scored as 2 – few rooted plants present in the streambed. Lack of instream vegetation most likely a result of the bed material present (boulders) rather than an indicator of flow persistence. No water or biotic indicators of water observed along survey reach.

D2 Drainage Photographs (D2-3 Reach) – Total HP score of 2 (ephemeral stream)

D2-4: Photographic reference for indicator 1.5. Photograph of bank vegetation (also observable in previous photograph) and the upland vegetation. Indicator 1.5 scored as 0. No vegetative compositional or density differences observed between the banks and the upland area.

D2-5: Photographic reference for indicator 1.6. Lack of instream vegetation indicative of coarse mineral sediments and complete lack of moisture. Assessment unit representative of channel bottom characteristics. Note dry material sand sediments within channel.

D2 Drainage Photographs (D2-3 Reach) – Total HP score of 2 (ephemeral stream)

D2-6: Photographic reference for indicator 1.5. Photographs of stream bed, the bank/upland area and rooted in channel vegetation. There is no composition difference in vegetation between the bank and the upland area.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: D2**	**Latitude: N 32.71882**
Evaluator(s): Fulton/Barry	**Site ID: D2-3**	**Longitude: W 108.11478**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: D Drainage (D2-3)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**(0)**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
D2-1	View of representative channel bottom characteristics. Note large boulders and cobbles in stream channel.	
D2-2	View of representative channel bottom characteristics. Note large boulders and cobbles in stream channel.	
D2-3	View upstream within assessment unit	
D2-4	View of left bank upslope vegetation	
D2-5	View of representative channel bottom, lack of in stream vegetation. Note dry material sand sediments within channel.	
D2-6	View of in stream rooted plants and overbank/upland areas.	

NOTES:

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
D3-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.70307/-108.11088	32.702662/-108.111866
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		D3-23

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
D3-23 (lat/long): 32.70307/-108.11088	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications		If "yes" please describe.
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:		

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:

A single assessment unit was identified within sub-watershed D3 (D3-23) (Figure D3-1). Assessment unit D3-23 was placed near the outlet of sub-watershed 3 downgradient of a significant reduction in basin slope as representative of the hydrologic processes of the entire drainage area. Similar to sub-watershed D2, average basin slope of sub-watershed D3 is relatively steep (approximately 6%) and highly confined with hill slopes in direct contact with the channel and very little riparian or floodplain areas (Photos D3-1 and D3-2). As with sub-watershed D2, sub-watershed D3 is dominated by colluvial processes with very little difference between vegetation composition and density between the stream banks and hillsides. Furthermore, we observed only a few occurrences of rooted upland plants within the channel bottom; however, this is the result of lack of moisture and deep mineral sandy soils within the stream bottom (Photo D3-3) rather than duration of flowing water. The weight of evidence clearly indicates that sub-watershed D3 is an ephemeral channel that flows only in direct response to significant rainfall events.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by:

Signed: _____ Date: 10/31/2012

Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____
EPA Region 6 technical approval granted. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____

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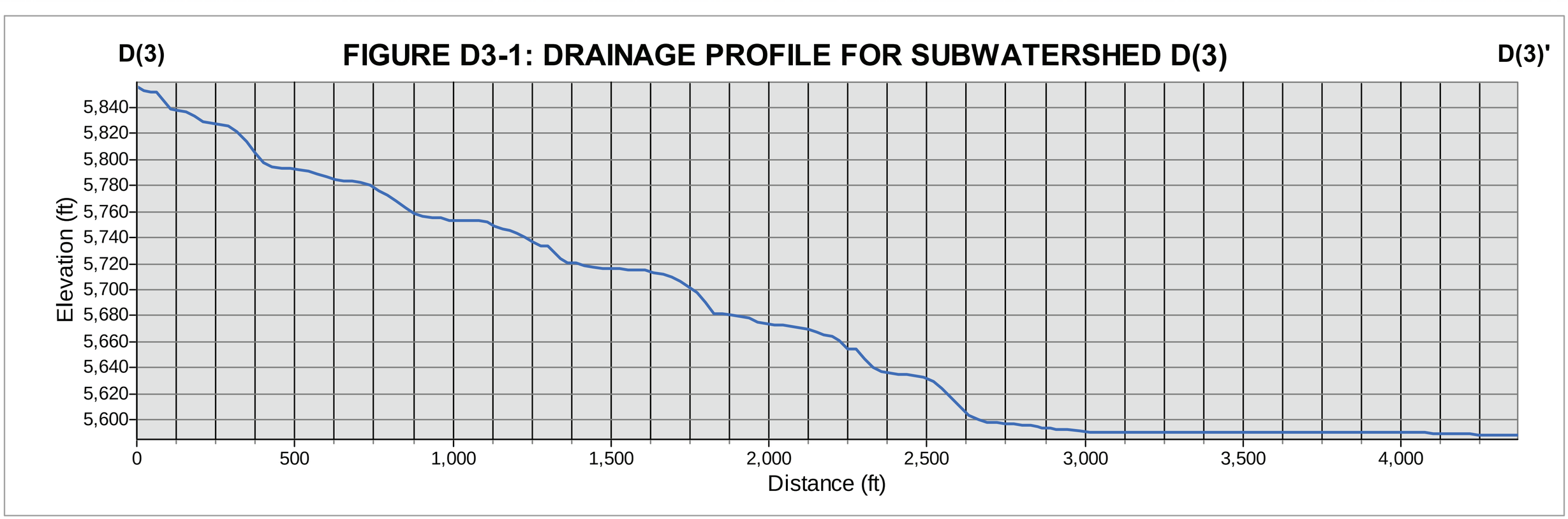

D3 Drainage Photographs (D3-23 Reach) – Total HP score of 2 (ephemeral stream)

D3-1: Photographic reference of representative channel bottom characteristics. Note large boulders and cobbles in stream channel, similar to those observed on hillside. Note confining nature of hillside.

D3-2: Photographic reference for indicator 1.1 through1.6. Photograph of stream bed. Indicator 1.6 scored as 2 – few rooted plants present in the streambed. Lack of instream vegetation most likely a result of the bed material present (boulders) rather than an indicator of flow persistence. No water or biotic indicators of water observed along survey reach.

D3 Drainage Photographs (D3-23 Reach) – Total HP score of 2 (ephemeral stream)

D3-3: Photographic reference for indicator 1.6. Photograph of 7 inch hole excavated in-channel. There is a complete lack of soil structure and moisture. Assessment unit is representative of channel bottom characteristics. Note dry mineral, sand sediments within channel.

D3-4: Photographic reference for indicator 1.5. Photographs of stream bank and upland vegetation. Indicator 1.5 scored as 0. No vegetative compositional or density differences observed between the banks and the upland area.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: D3**	**Latitude: N 32.70307**
Evaluator(s): Fulton/Barry	**Site ID: D3-23**	**Longitude: W 108.11088**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: D Drainage (D3-23)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** ****Explain in further detail in NOTES section**

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**(0)**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
D3-1	View of representative channel bottom characteristics. Note large boulders and cobbles in stream channel similar to those observed on hillside.	
D3-2	View downstream extent of assessment unit looking upstream	
D3-3	View of 7 inch hole excavated in channel. There is a complete lack of soil structure and moisture.	
D3-4	View of left bank riparian and upland vegetation	

NOTES:

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Appendix E

Level 1 Hydrology Protocol Results for E Drainage

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
E1-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.6991/-108.15656	32.6988/-108.15609
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		E1-16

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
E1-16 (lat/long): 32.6991/-108.15656	☒ eph ☐ int ☐ per	Final score: 0, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications	If "yes" please describe.
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:	

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:
A single assessment unit (E1-16) was identified within sub-watershed E1 (Figure E-1 below). As shown in the plan and profile plots presented below (Figure E-1) both the basin slope (approximately 1%) and degree of valley confinement is relatively constant along its entire length. The constant valley slope and complete lack of compositional or density differences between the stream banks and uplands (Photos E1-1 and E1-2) suggest that fluvial processes, including sediment sorting and channel construction, are extremely rare within sub-watershed E1 and that this drainage is appropriately classified as an ephemeral channel.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by:
Signed: _____ Date: 10/31/2012

Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No

If no, see attached reasons.

Signed: _____ Date: _____

EPA Region 6 technical approval granted. ☐ Yes ☐ No

If no, see attached reasons.

Signed: _____ Date: _____

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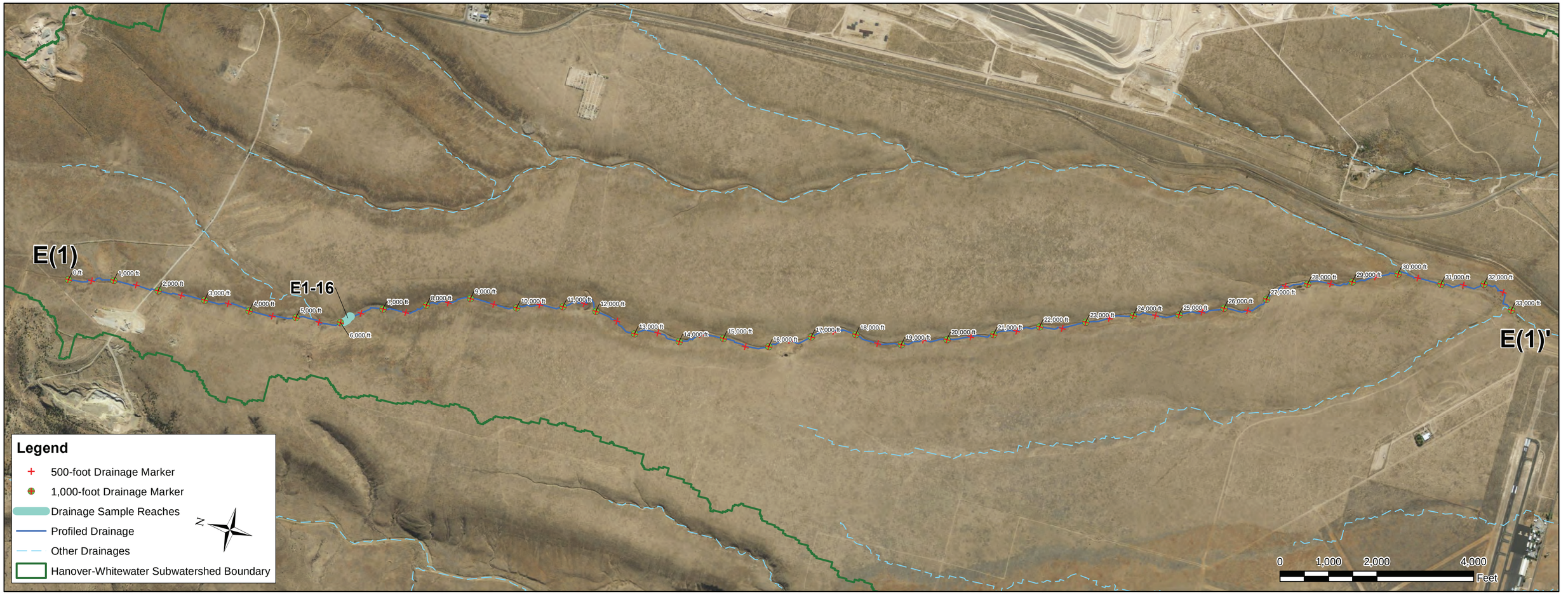

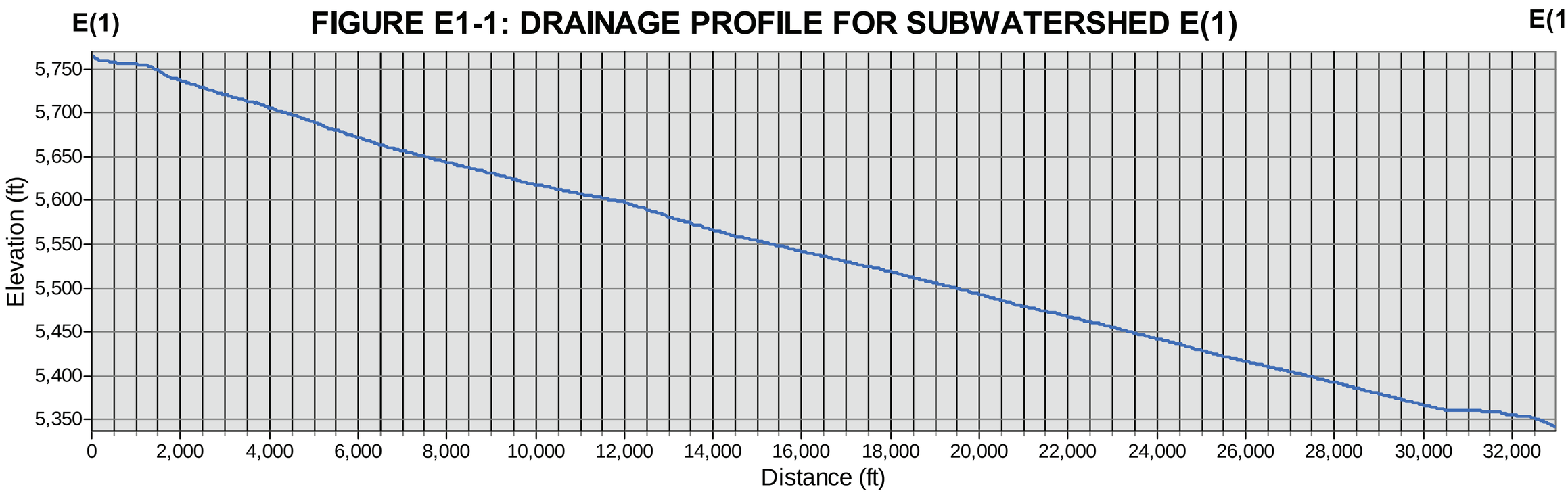

E1 Drainage Photographs (E1-16 Reach) – Total HP score of 0 (ephemeral stream)

E1-1: Photographic reference of representative channel bottom and vegetation characteristics.

E1-2: Photographic reference for indicators 1.1 through1.6. Photograph of stream bed. Indicator 1.6 scored as 0 - vegetation in stream bed is prevalent and consistent with bank and upslope areas. No water or biotic indicators of water observed along survey reach.

E1 Drainage Photographs (E1-16 Reach) – Total HP score of 0 (ephemeral stream)

E1-3: Photographic reference for indicator 1.5. Photograph of the stream bank and upland areas. Indicator 1.5 scored as 0 - no vegetative compositional or density differences observed between the banks and the upland area.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: E1**	**Latitude: N 32.69910**
Evaluator(s): Fulton/Barry	**Site ID: E1-16**	**Longitude: W 108.15656**
TOTAL POINTS: 0 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: E Drainage (E1-16)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**0**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**0**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**0**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**0**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
E1-1	View of representative channel bottom and vegetation characteristics.	
E1-2	View upstream extent of assessment unit looking downstream	
E1-3	View upstream extent of assessment unit looking to left overbank	

NOTES:

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
E2-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.69114/-108.14323	32.689800/-108.142860
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		E2-17

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
E2-17 (lat/long): 32.69114/-108.14323	☒ eph ☐ int ☐ per	Final score: 1, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications	If "yes" please describe.
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:	

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:
Similar to sub-watershed E1, a single assessment unit (E2-17) was identified within sub-watershed E2 (Figure E2-1). As shown in the plan and profile plots presented below (Figure E2-1) both the basin slope (approximately 1.5%) and degree of valley confinement is relatively constant along its entire length. Unlike sub-watersheds E1 and E3, a distinct channel bed can be observed within this assessment unit (Photo E2-1), however, no distinct compositional or density difference was observed between the stream bank and upland vegetation characteristics (Photos E2-1 and E2-2) and rooted vegetation was observed consistently within the channel bottom throughout this assessment unit (Photos E2-3 and E2-4). Based on the observed characteristics of this representative assessment unit, fluvial processes within sub-watershed E2 occur in direct response to rainfall events with enough frequency to have constructed a definable channel bottom and banks but without the necessary duration or magnitude to maintain or construct a complex stream channel free of rooted vegetation. Sub-watershed E2 is appropriately classified as an ephemeral channel.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by:

Signed: _____ Date: 10/31/2012

Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____
EPA Region 6 technical approval granted. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____

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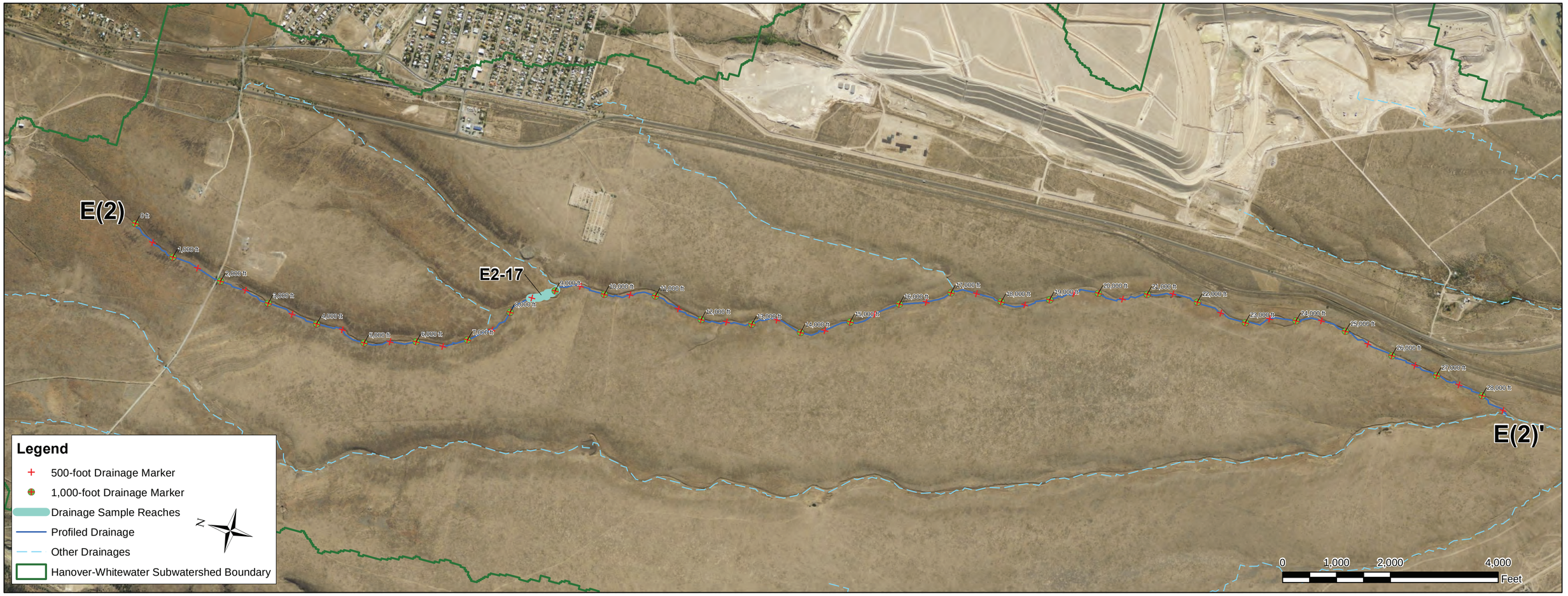
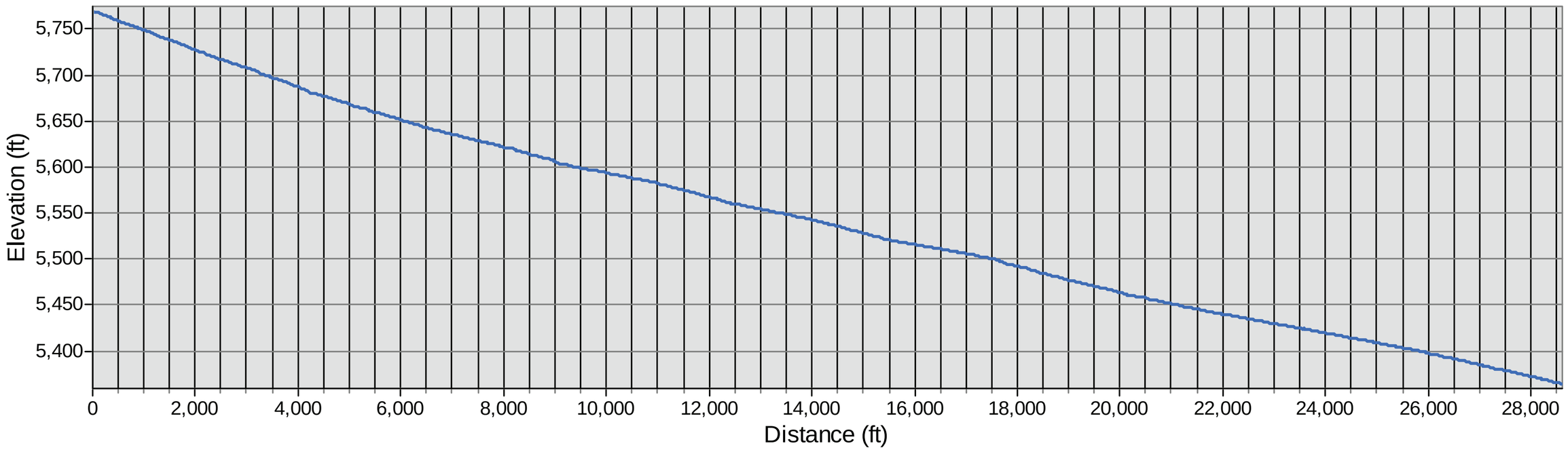


E(2) **FIGURE E2-1: DRAINAGE PROFILE FOR SUBWATERSHED E(2)** E(2)'



E2 Drainage Photographs (E2-17 Reach) – Total HP score of 1 (ephemeral stream)

E2-1: Photographic reference for indicator 1.1 through 1.6. Photograph of the stream channel and the bank and upland areas. Indicator 1.5 scored as 0 - no vegetative compositional or density differences observed between the banks and the upland area. No water or biotic indicators of water observed along survey reach.

E2-2: Photographic reference of channel bed and bank.

E2 Drainage Photographs (E2-17 Reach) – Total HP score of 1 (ephemeral stream)

E2-3: Photographic reference of in-channel vegetation.

E2-4: Photographic reference for indicator 1.6. Indicator 1.6 scored as 1. Rooted upland plants (grasses) are preset in the streambed and consistently dispersed but are not prevalent throughout the channel.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: E2**	**Latitude: N 32.69114**
Evaluator(s): Fulton/Barry	**Site ID: E2-17**	**Longitude: W 108.14323**
TOTAL POINTS: 1 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: E Drainage (E2-17)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**(0)**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**(1)**	**0**
			SUBTOTAL (#1.1 – #1.6)	**1**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**1**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**1**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**1**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
E2-1	View upstream extent of assessment unit looking downstream	
E2-2	View of channel bed and bank	
E2-3	View of in channel vegetation	
E2-4	View of in channel vegetation	

NOTES:

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
E3-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.68408/-108.13315	32.682821/-108.133684
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		E3-18

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
E3-18 (lat/long): 32.68408/-108.13315	☒ eph ☐ int ☐ per	Final score: 0, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications	If "yes" please describe.
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:	

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:
A single assessment unit (E3-18) was identified within sub-watershed E3 (Figure E3-1). The longitudinal profile of sub-watershed E3 shows slightly more variation than either E1 or E2; however much of this variability is in response to impacts associated with the road crossing. Within this assessment unit no defined channel was observed with very little, if any, evidence of fluvial processes (Photos E3-1 and E3-2). This drainage is appropriately classified as an ephemeral channel.

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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.* Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by:
Signed: _____ Date: 10/31/2012

Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No
If no, see attached reasons.
Signed: _____ Date: _____

EPA Region 6 technical approval granted. ☐ Yes ☐ No
If no, see attached reasons.
Signed: _____ Date: _____

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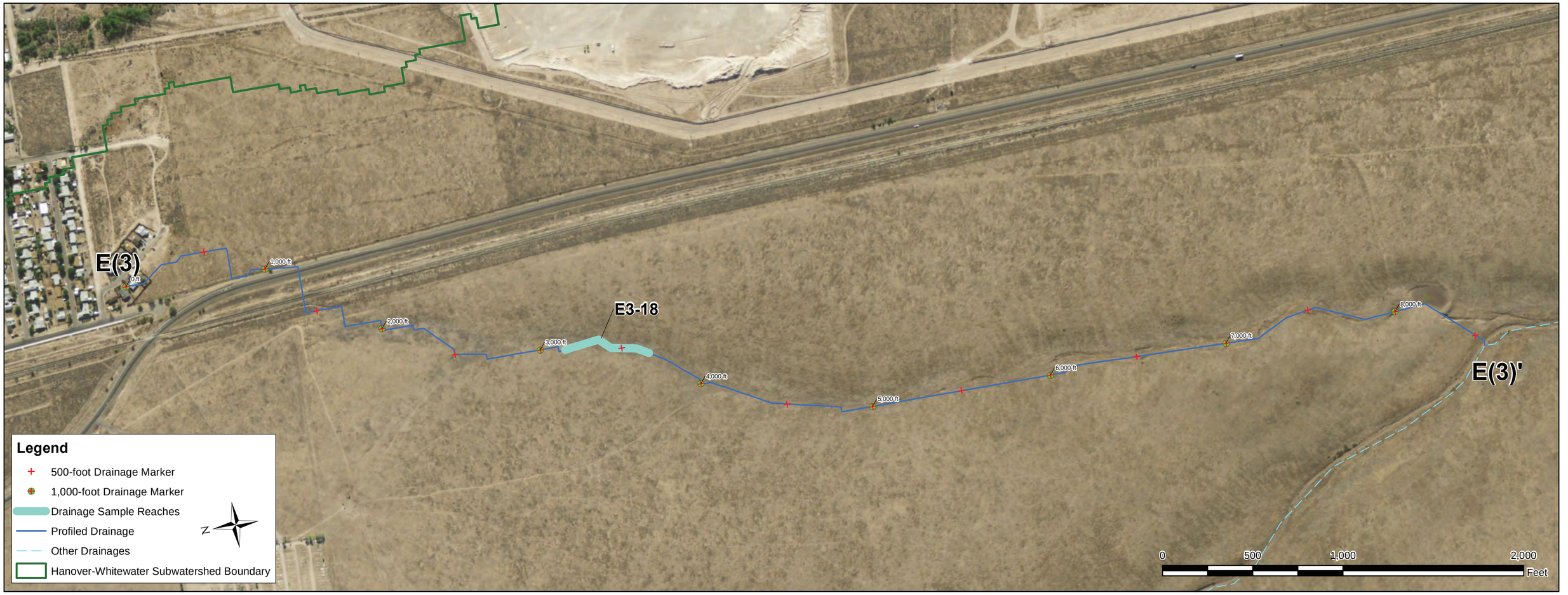

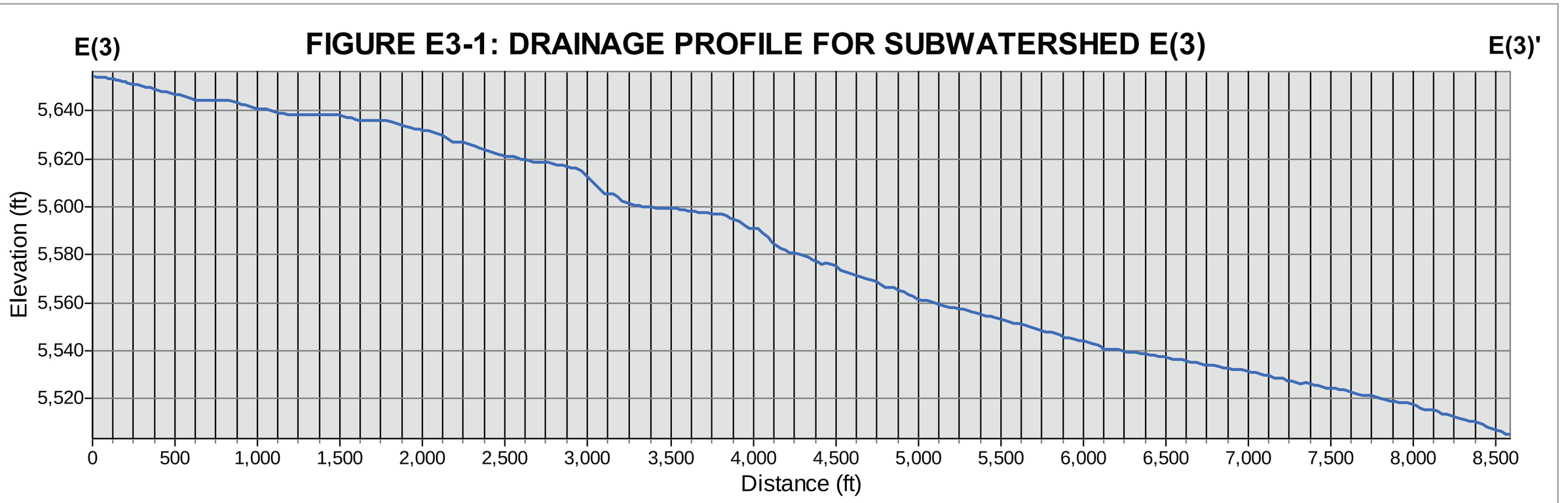

E3 Drainage Photographs (E3-18 Reach) – Total HP score of 0 (ephemeral stream)

E3-1: Photographic reference for indicator 1.1 through 1.6. Photograph of the stream channel/lowland area and the bank and upland areas. Indicator 1.5 scored as 0 - no vegetative compositional or density differences observed between the banks and the upland area. No water or biotic indicators of water observed along survey reach.

E3-2: Photographic reference for indicator 1.5. Photograph of the stream bank and upland area. Indicator 1.6 scored as 0 - vegetation in stream bed is prevalent and consistent with bank and upslope areas.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/13/2011	**Stream Name: E3**	**Latitude: N 32.68408**
Evaluator(s): Fulton/Barry	**Site ID: E3-18**	**Longitude: W 108.13315**
TOTAL POINTS: 0 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: E Drainage (E3-18)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X_ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**0**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**0**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**0**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**0**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
E3-1	View upstream extent of assessment unit looking downstream	
E3-2	View upstream extent of assessment unit looking toward right overbank	

NOTES:

ARCADIS

Appendix F

Level 1 Hydrology Protocol Results
for Martin Canyon Drainage

Cover Sheet
Hydrology Protocol Use Attainability Analysis
for an Ephemeral Stream[1]

Stream Name:	Basin:	8-digit HUC:
Martin Canyon-Drainage	Mimbres	13030202
Reach Description:	**Upstream lat/long:**	**Downstream lat/long:**
See additional comments section	32.75402/-108.07157	32.69267/-108.04256
Current WQS		**Assessment Unit ID:**
☒ Unclassified 20.6.4.98 or 99 NMAC ☐ Classified 20.6.4. _____ NMAC		MC-11, MC-12, MC-13

Reach Evaluation (How homogeneity of reach hydrology was verified)	
Methods Used:	Aerial photos, "ground truthing", drainage profiles, reconnaissance
Reasoning:	Why is the stream homogeneous? See report section 4.2.1

Hydrology Protocol Results		Notes
MC-11 (lat/long): 32.75402/-108.07157	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
MC-12 (lat/long): 32.72621/-108.05658	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
MC-13 (lat/long): 32.69267/-108.04256	☒ eph ☐ int ☐ per	Final score: 2, see field form and photos for additional information
☐ Additional location results attached.		

Hydroclimatic Conditions		If "yes" please describe.
Drought (SPI Value < - 1.5)	☐ yes ☒ no	
Recent Rainfall (within 48 hours)	☐ yes ☒ no	
Gauge data available?	☐ yes ☒ no	
If yes for any of above, please explain why these conditions do not impact the UAA conclusion that *natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use*:		

Hydrologic and Other Modifications		If "yes" please describe.
Dam/diversion	☐ yes ☒ no	
Channelization/roads	☐ yes ☒ no	
Groundwater pumping	☐ yes ☒ no	
Agricultural return flows	☐ yes ☒ no	

[1] This form is designed for the expedited UAA process for ephemeral waters described in Subsection C of 20.6.4.15 NMAC.

Hydrologic and Other Modifications		If "yes" please describe.
Existing point source discharge	☐ yes ☒ no	
Planned point source discharge	☐ yes ☒ no	
Other modifications e.g., land use practices	☐ yes ☒ no	*Please explain hydrologic impact*
If yes for any of above, please explain why these modifications do not alter the uses supported by the natural flow regime:		

Current Uses Observed		If "yes" please describe.
Macroinvertebrates	☐ yes ☒ no	
Fish	☐ yes ☒ no	
Recreation (contact use)	☐ yes ☒ no	
If yes for any of the above, please explain why these observed uses are consistent with the UAA conclusion that 101(a)(2) aquatic life and recreational uses are not feasible:		

Additional Comments:

Three assessment units were identified within the Martin Canyon sub-watershed (Figure F-1 below). Starting at the upstream end, these assessment units are identified as MC-11, MC-12 and MC-13. The most upstream assessment unit (MC-11) was selected to represent the headwater portions of this sub-watershed. Assessment unit (MC-12) was located in a flatter gradient section with more prominent vegetation. The lower downstream assessment unit (MC-12) was selected to capture the entire basin drainage area.

As shown in the plan and profile plot presented below the basin slope progressively decreases, as expected, in the downstream direction. The upstream reaches of the Martin Canyon sub-watershed (MC-11) is a bedrock and cobble dominated stream channel (Photos MC11-1 and MC11-3) whereas the middle assessment unit (MC-12) is predominantly boulders, gravel, and sand (Photos MC12-1 and MC12-3) and the downstream assessment unit (MC-13) is a mixture of cobble and unconsolidated sand (Photos MC13-1 and MC13-3). The downstream assessment units reflect riverine processes. However, despite the influence of riverine processes within the lower assessment units seen throughout the Martin Canyon sub-watershed the channel is dominated by sand and cobble with very little difference between the "riparian" and upland vegetation. At all the assessment units we observed that rooted upland plants occurred, with varying degrees of density, throughout the stream channel. The weight of evidence clearly indicates that the Martin Canyon sub-watershed is an ephemeral channel that flows only in direct response to significant rainfall events.

Based on comments received from NMED, Chiricahua Leopard Frog (CLF) tadpoles have been historically documented in pools along portions of the Martin Canyon drainage, although no official USFWS habitat designation has been made for any portion of Martin Canyon, and CLF frogs have not been documented in any portion of Martin Canyon during more recent surveys (Jennings, 2007). Evidence of pools were not observed during the Level 1 field evaluation; however, based on comments received from NMED regarding historic observations of CLF in Martin Canyon, a formal classification or re-classification of Martin Canyon is not currently proposed

ATTACHMENTS:

☒ Map and Photos (required)
☒ Hydrology Protocol Field Sheets for all locations (required)
☐ Level 2 Analysis (optional)
☒ Additional sites and/or documentation (drainage profile and plan view)

CONCLUSION:

This UAA concludes that the stream reach identified above is ephemeral and that Clean Water Act Section 101(a)(2) aquatic life and recreational uses are neither existing nor attainable due to the factor identified in 40 CFR 131.10(g)(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*. Based on this conclusion, we recommend that the designated uses and criteria identified in 20.6.4.97 NMAC be applied to this stream reach in accordance with the expedited UAA process set forth in Subsection C of 20.6.4.15 NMAC.

Submitted by: Signed: _____ Date: _____
Surface Water Quality Bureau concurs with recommendation. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____
EPA Region 6 technical approval granted. ☐ Yes ☐ No *If no, see attached reasons.* Signed: _____ Date: _____

* Ephemeral classification is not proposed at this time in Martin Canyon because of potential Chiricahua Leopard Frog (CLF) breeding habitat based on comments received from NMED, as described in the additional comments section of this cover letter.

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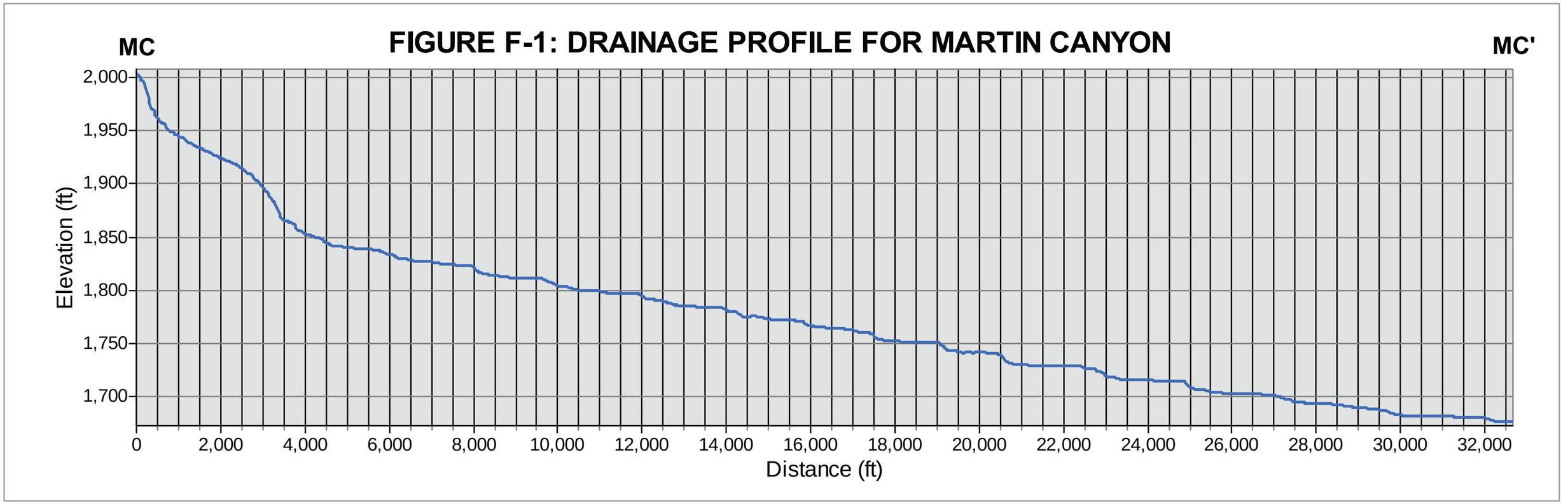

Martin Canyon Photographs (MC-11 Reach) – Total HP score of 2 (ephemeral stream)

MC11-1: Photographic reference for indicators 1.1 through 1.6. Indicator 1.6 scored as 1. Vegetation in the channel bed is consistently dispersed throughout the streambed between the boulders and where deposition of finer grained material has occurred. No water or biotic indicators of water observed along survey reach.

MC11-2: Photographic reference for indicator 1.5. Photograph of the bank and upland area. Indicator 1.5 scored as 1. Vegetation is similar in composition with some slight variation in density between the bank and the upland area.

Martin Canyon Photographs (MC-11 Reach) – Total HP score of 2 (ephemeral stream)

MC11-3: Photographic reference for indicators 1.5 and1.6. Photographs of the bank/upland area and rooted in channel vegetation. Vegetation is similar in composition between the bank and the upland area. Vegetation is consistently dispersed throughout the channel.

Martin Canyon Photographs (MC-12 Reach) – Total HP score of 2 (ephemeral stream)

MC12-1: Photographic reference for indicators 1.1 through 1.6. No water or biotic indicators of water observed along survey reach. Channel bed material is predominantly boulders and sand and gravel.

MC12-2: Photographic reference for indicator 1.6. Instream and bank vegetation shown. Indicator 1.6 scored as 1. Vegetation in channel is predominantly grasses and shrub species and are consistently dispersed throughout the channel.

Martin Canyon Photographs (MC-12 Reach) – Total HP score of 2 (ephemeral stream)

MC12-3: Photographic reference for indicator 1.5. Indicator 1.5 scored as 1. Upland vegetation is similar to what is observable along the banks and within the streambed (previous photograph). Density decrease slightly with distance from the stream but composition is similar.

Martin Canyon Photographs (MC-12 Reach) – Total HP score of 2 (ephemeral stream)

MC12-4: Photographic reference for indicators 1.5 and 1.6. Photographs of the bank/upland area and rooted in channel vegetation. Vegetation is similar in composition between the bank and the upland area. Vegetation is consistently dispersed throughout the channel.

Martin Canyon Photographs (MC-13 Reach) – Total HP score of 2 (ephemeral stream)

MC13-1: Photographic reference for indicator 1.1 through 1.6. Indicator 1.6 scored as 1. Rooted vegetation within the channel consists of grasses which are dispersed throughout the streambed. No water or biotic indicators of water observed along survey reach.

MC13-2: Photographic reference for indicator 1.5. Photograph of the overbank and upslope area. Indicator 1.5 scored as 1. Vegetation in the upslope area is similar to the vegetation along the banks and within the channel observed in the previous photograph. Minimal differences in density are observable. No distinct riparian zone exists.

Martin Canyon Photographs (MC-13 Reach) – Total HP score of 2 (ephemeral stream)

MC13-3: Photographic reference for indicators 1.5 and 1.6. Photographs of the bank/upland area and rooted in channel vegetation. Vegetation is similar in composition between the bank and the upland area. Vegetation is consistently dispersed throughout the channel.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Martin Canyon**	**Latitude: N 32.75572**
Evaluator(s): Fulton/Donohoe	**Site ID: MC-11**	**Longitude: W 108.07136**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit:** **Martin Canyon Drainage (MC-11)**	**Drought Index (12-mo. SPI Value):** **-1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications ___ YES _X__ NO** **Diversions ___ YES _ X _ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**(1)**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**(1)**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
MC11-1	View downstream	
MC11-2	View of upslope right bank	
MC11-3	View of in stream rooted plants and overbank/upland areas.	

NOTES:

The channel was predominately bedrock and dry pools.
Vegetation was considered slightly more dense along the channel but primarily composed of upland species including juniper, agave, and grasses.
Scoring 1.6 – vegetation consistently spread out throughout dry pools but not on bedrock
Scoring 1.5 – didn't observe any hydrophilic plant species in or near (around) stream channel just upland species at greater densities.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Martin Canyon**	**Latitude: N 32.72621**
Evaluator(s): Fulton/Donohoe	**Site ID: MC-12**	**Longitude: W 108.05658**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit:** **Martin Canyon Drainage (MC-12)**	**Drought Index (12-mo. SPI Value):** **-1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications _X__ YES ___ NO** **Diversions ___ YES _X_ NO** **Discharges ___ YES _X__ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**(0)**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**(1)**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**(1)**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
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YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
MC12-1	View downstream extent	
MC12-2	View of in stream vegetation	
MC12-3	View of upslope right bank	
MC12-4	View of in stream rooted plants and overbank/upland areas.	

NOTES:

Scoring metric 1.5 – Observed trees in great densities along stream corridor. The only compositional
difference we saw was a willow going in the channel but not in upland area. Therefore, we did not
consider that a dramatic compositional difference.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Martin Canyon**	**Latitude: N 32.69267**
Evaluator(s): Fulton/Donohoe	**Site ID: MC-13**	**Longitude: W 108.04256**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit:** **Martin Canyon Drainage (MC-13)**	**Drought Index (12-mo. SPI Value):** **-1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications _ __ YES _X__ NO** **Diversions ___ YES _X_ NO** **Discharges ___ YES _X__ NO** ****Explain in further detail in NOTES section**

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are <u>not</u> found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. <u>If the indicator is present</u> record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are <u>not</u> found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
MC13-1	View downstream	
MC13-2	View upslope right bank	
MC13-3	View of in stream rooted plants and overbank/upland areas.	

NOTES:

Left overbank was primarily a flat open valley. The right overbank had a small bedrock outcropping.
Average substrate throughout sample reach was primarily cobble 8%, 15% unconsolidated dirt, and 5% boulders. The 15% unconsolidated dirt was entirely dry after digging a few inches down and the texture was sandy.
Scoring metric 1.5 – Observed trees in great densities along stream corridor. The only compositional difference we saw was a willow going in the channel but not in upland area. Therefore we did not consider that a dramatic compositional difference.

ARCADIS

Appendix G

Level 1 Hydrology Protocol Results
for Rustler Canyon Drainage

Presently, an ephemeral classification is not supported for the Rustler Canyon drainages due to the presence of water and associated aquatic life uses observed during the Level 1 field evaluations.

Stream Name: Rustler Canyon-Drainage

Basin: Mimbres

Upstream lat/long: 32.75136/-108.02737

Downstream lat/long: 32.74339/-108.0093

Assessment Unit ID: RC-14A, RC-14B, RC-15

Hydrology Protocol Results		
RC-14A (lat/long): 32.75136/-108.02737	Intermittent	Final score: 12.5, see field form and photos for additional information
RC-14B (lat/long): 32.74923/-108.02615	Intermittent	Final score: 15.5, see field form and photos for additional information
RC-15 (lat/long): 32.74339/-108.0093	Intermittent	Final score: 12, see field form and photos for additional information

Macroinvertebrates: RC14A (snails, striders) and RC14B (beetles, boatman, and striders)

Additional Comments:

Three assessment units were identified along the mainstem of Rustler Canyon (RC-14A, RC-14B and RC15) (Figure G-1) and two assessment units were identified within the West Branch of Rustler Canyon (RC2-22 and RC2-22B) (Figure G-2).

Starting at the upstream end within Rustler Canyon, these assessment units are identified as RC-14A, RC-14B and RC 15. The most upstream assessment unit (RC-14A) was selected to represent the headwater portions of Rustler Canyon. Assessment unit RC-14B was located up gradient from the confluence West Rustler and Rustler Canyon and selected to capture an observed spring and a series of large pools near this location. The lower most assessment unit within Rustler Canyon (RC-15) is located near the confluence with Lampbright Draw and is representative of the hydrologic processes within the entire drainage basin.

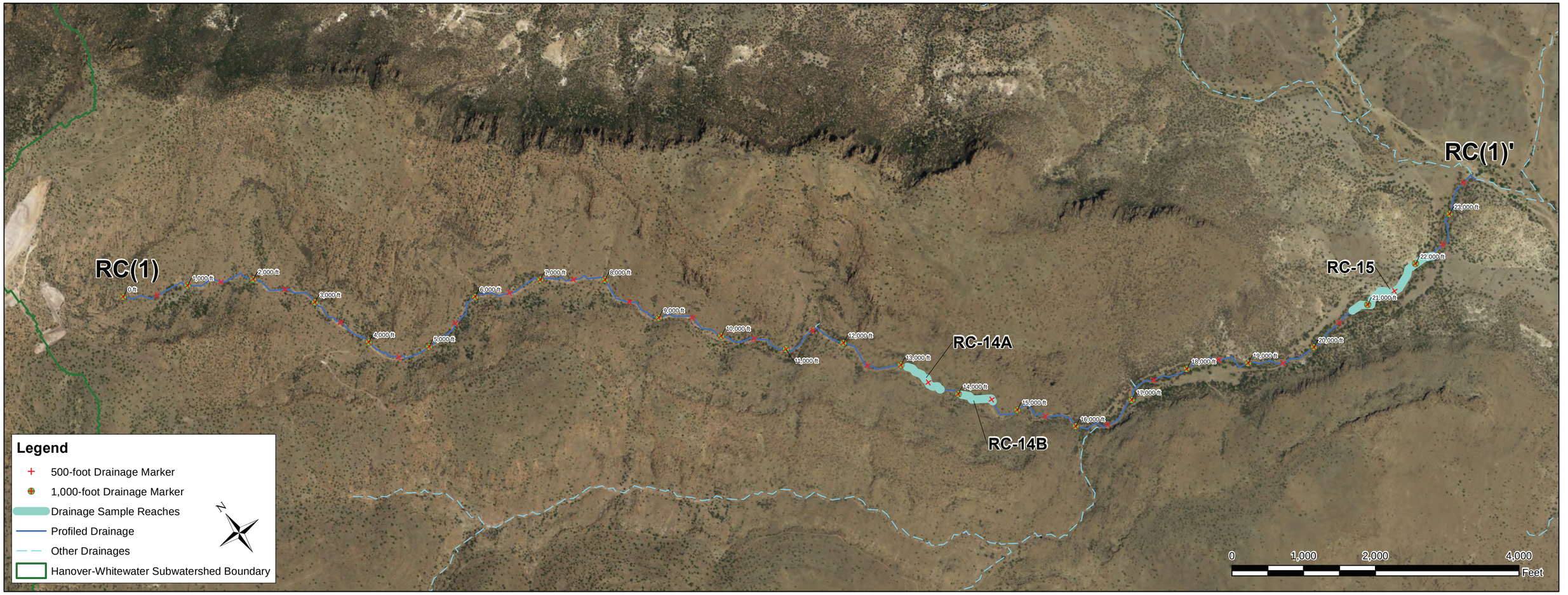
As shown in the plan and profile plots for Rustler Canyon (Figure G-1 and G-2) the basin slope progressively decreases, as expected, in the downstream direction. Similarly, the degree of valley confinement decreases in the downstream direction. These trends in channel slope and confinement are typical and represent the relative dominance of colluvial versus alluvial channel forming processes and are reflected in the composition of the channel bed itself. That is, the upstream reaches of Rustler Canyon (RC-14A and RC-14B) are bedrock and cobble dominated stream channels indicative hill slope processes (Photos RC14A-1 and RC14B-4) whereas the downstream assessment unit (RC-15) is a mixture of sand/gravel/cobble (Photo RC15-1) and reflect the dominance of fluvial processes. Filamentous algae was observed within all three Rustler Canyon assessment units and benthic macro-invertebrates were observed near the pools of standing water near the pools of standing water within assessment units RC-14A and RC-14B, see Photos RC14A-5 and RC14B-5, respectively. Due to the lack of flowing water, or even standing water, throughout the assessment units and the lack of fish all three assessment units within Rustler Canyon can be classified as intermittent. However, upstream of

assessment unit RC-15 but downstream of the confluence with West Branch Rustler Canyon we did identify a single pool of standing water that contained fish. The actual score of assessment unit RC-15 was 12, if the scoring criteria were adjusted to account for the presence of a single pool (i.e., Indicator 1.1 – Water in Channel equal to 2 and Indicator 1.2 – Fish equal to 1) the total score of assessment unit RC-15 would increase to 15 which is still indicative of an intermittent stream channel. The weight of evidence across the three assessment units clearly indicate that Rustler Canyon is correctly classified as an intermittent stream channel.

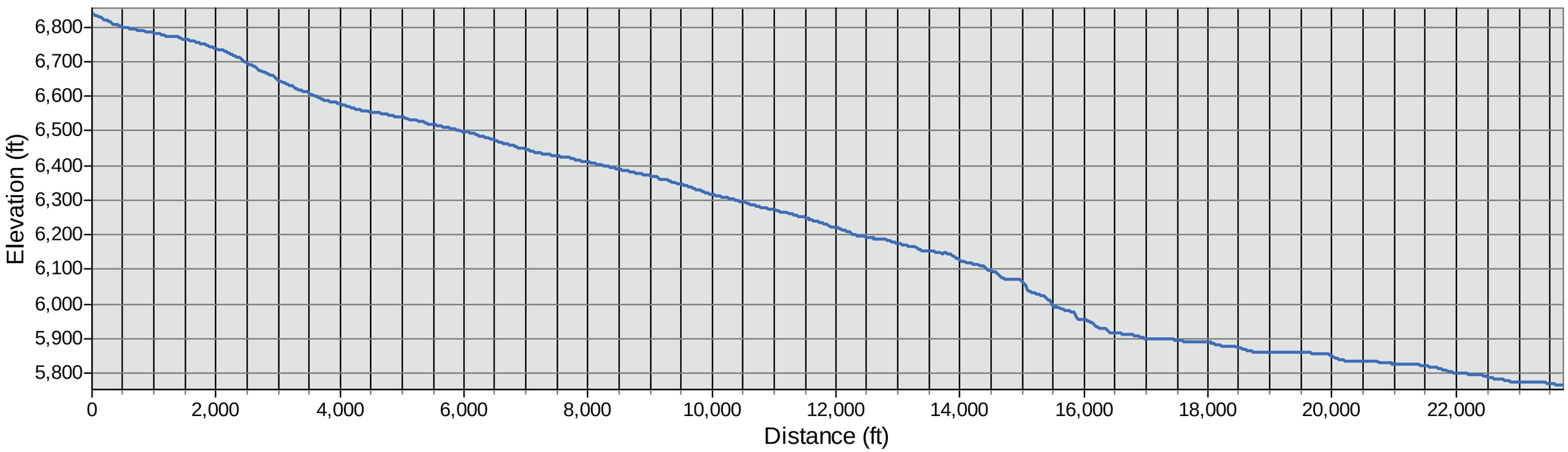
Both assessment units within West Branch Rustler Canyon (RC-22 and RC-22B) represent bedrock controlled stream channels (Photos RC2-22-3 and RC2-22B-4, respectively); however, the location of the downstream assessment unit (RC-22B) was selected to include a number of large standing pools of water (Photos RC2-22B-5 and RC2-22B-6). Based on the presence of standing water and the observed benthic macro-invertebrates within the downstream assessment unit (RC-22B) (Photo RC2-22B-7) the West Branch Rustler Canyon hydrologic classification is indeterminate, assumed to be intermittent until further study indicates ephemeral.

Attachments: Map and photos, hydrology protocol field sheets for all locations, and additional sites and/or documentation (drainage profile and plan view)

Q:\FCX\Chino\2011\MXD\HydrologyProtocol\FinalFigures\Profile_Rustler_Canyon1_C_v2.mxd



RC(1) **FIGURE G-1: DRAINAGE PROFILE FOR RUSTLER CANYON DRAINAGE 1** RC(1)'



Rustler Canyon Photographs (RC-14A Reach) – Total HP score of 12.5 (intermittent stream)

RC14A-1: Photographic reference for indicators 1.1 through 1.6 and 1.9. Water and biotic indicators of water were observed along the reach (see subsequent photos). Channel bed is predominantly bedrock. Note the small dry pool area located in the center right of photograph.

Indicator 1.9 scored as 1 - channel is partially confined with an inactive floodplain.

Rustler Canyon Photographs (RC-14A Reach) – Total HP score of 12.5 (intermittent stream)

RC14A-2: Photographic reference for indicator 1.5. Indicator 1.5 scored as 1. Vegetation along the reach is compositionally consistent between the bank and the upland area with some differences in density observed. Distinct riparian zone not present.

RC14A-3: Photographic reference for indicator 1.6. Indicator 1.6 scored as 2. A few rooted grasses are present in the streambed but are generally not present because of the bedrock present.

Rustler Canyon Photographs (RC-14A Reach) – Total HP score of 12.5 (intermittent stream)

RC14A-4: Channel is primarily dry with small pools and standing water observed along the stream stretch. Indicator 1.1 scored as 2. No fish were present in the pools but benthic macroinvertebrates and filamentous algae/periphyton were observed after extensive searching. Both indicators 1.3 and 1.4 scored as 1. Seeps were observed to feed the pools; however, the pools are isolated.

Rustler Canyon Photographs (RC-14A Reach) – Total HP score of 12.5 (intermittent stream)

RC14A-5: Channel is primarily dry with small pools and standing water observed along the stream stretch. Filamentous algae/periphyton were observed after extensive searching**.**

Rustler Canyon Photographs (RC-14B Reach) – Total HP score of 15.5 (intermittent stream)

RC14B-1: Photographic reference for indicators 1.1 through 1.6 and 1.9. Biotic indicators of water and water were observed along the reach (see subsequent photos). Multiple isolated pools present along the stretch and springs/seeps observed. Biotic indicators of water found with little difficulty.

Indicator 1.5 scored as 2 - distinct riparian corridor present for parts of the stretch near pools as bank and upland vegetation is noticeably lush.

Indicator 1.9 scored as 1 – pool sequences likely but difficult to discern. Stream morphology is dominated by bedrock features.

Rustler Canyon Photographs (RC-14B Reach) – Total HP score of 15.5 (intermittent stream)

RC14B-2: Photographic reference for indicator 1.5. Photograph is of channel, bank, and upland area. Indicator 1.5 scored as 2 - distinct riparian zone not evident along portions of stream where pools are not present. Area shown in photograph is noticeably lacking riparian vegetation. Indicates that water is only persistent in areas where pools are maintained by bedrock springs.

RC14B-3: Photographic reference for indicator 1.6. Indicator 1.6 scored as 2. Rooted vegetation present in the streambed, but limited by bedrock rather than persistence of flow.

Rustler Canyon Photographs (RC-14B Reach) – Total HP score of 15.5 (intermittent stream)

RC14B-4: Photographic reference of representative channel bottom characteristics.

RC14B-5: Photographic reference of algae and benthic macro-invertebrates located near standing water.

Rustler Canyon Photographs (RC-14B Reach) – Total HP score of 15.5 (intermittent stream)

RC14B-6: Photographic reference for indicators 1.1 through 1.6. Filamentous algae/periphyton was observed along the reach. Multiple isolated pools present along the stretch. Biotic indicators of water found with little difficulty.

Rustler Canyon Photographs (RC-15 Reach) – Total HP score of 12 (intermittent stream)

RC15-1: Photographic reference of representative channel bottom characteristics.

RC15-2: Photographic reference for indicators 1.1 through 1.6. No water observed over survey reach. Indicator 1.6 scored as 2 - few rooted plants along streambed. Vegetation limited by streambed material which is primarily course grain material and boulders.

Rustler Canyon Photographs (RC-15 Reach) – Total HP score of 12 (intermittent stream)

RC15-3: Photographic reference for indicator 1.4. Indicator 1.4 scored as 1. Algae is present in stream but is very isolated.

RC15-4: Photographic reference for indicator 1.5. Photograph of stream bank and upland area. Indicator 1.5 scored as 2. Distinct riparian corridor exists over portions of the reach but are not consistent over the entirety of the reach.

Rustler Canyon Photographs (RC-15 Reach) – Total HP score of 12 (intermittent stream)

RC15-5: Photographic reference for indicator 1.8. Photograph of the general proximity of the stream cross-section transect. Indicator 1.8 scored as 1.5. Stream is moderately confined with an inactive flood plain based on vegetative growth.

RC15-6: Photographic reference for indicator 1.9. Relatively deep pool shown in photograph. Indicator 1.9 scored as 1. Some pools are observable over the extent of the survey reach, but a riffle pool sequence is not evident.

Rustler Canyon Photographs (RC-15 Reach) – Total HP score of 12 (intermittent stream)

RC15-7: Photographic reference for indicator 1.10. Photograph is example of soil in the floodplain. Indicator 1.10 scored as 3. Distinct differences observed between soil outside of the streambed and the soil within the streambed. Streambed distribution of substrate material evident where finer material drops in pools and areas of lower velocity flow, while other portions of the steam bed are courser materials.

Rustler Canyon Photographs (RC-15 Reach) – Total HP score of 12 (intermittent stream)

RC15-8: Photographic reference for indicators 1.5 and 1.6. Photographs of the bank/upland area and rooted in channel vegetation. Distinct riparian corridor exists over portions of the reach. Vegetation is inconsistently dispersed throughout the channel.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Rustler Canyon**	**Latitude: N 32.75136**
Evaluator(s): Barry	**Site ID: RC-14A**	**Longitude: W 108.02737**
TOTAL POINTS: 12.5 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: Rustler Canyon Drainage (RC-14A)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _ X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X __ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X __ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X _ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X __ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**(2)**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**(1)**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**(1)**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**(1)**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**7**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	1	(0)
1.8. Floodplain and Channel Dimensions (N/A)	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	1.5	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	(1)	0
			SUBTOTAL (#1.1 – #1.9)	8

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.
	3	1.5	(0)
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.
	(Present = 3)		Absent = 0
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	(0)
			TOTAL POINTS (#1.1 – #1.12)	11

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	(Present = 1.5)	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	(Absent = 0)
		TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14) 12.5

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
RC14A-1	**View from upstream extent of assessment unit looking downstream**	
RC14A-2	**View of vegetation along the reach is compositionally consistent between the bank and the upland area with some differences in density observed.**	
RC14A-3	**View of in channel vegetation**	
RC14A-4	**View of primarily dry channels with small pools and standing water observed along the stream stretch.**	
RC14A-5	**View of primarily dry channel with small pools and standing water observed along the stream stretch.**	

NOTES:

Based on further review of field notes and site photograph the scores identified on the field forms were revised. This generally resulted in higher total scores.
It was determined, after visiting a number of bedrock and boulder formed channels, that the application and evaluation of the "entrenchment ratio" was inappropriate at such locations. In channels flowing through material that is transport by the river itself the channel geometry can be viewed as self-formed. That is, sediment transport in alluvial rivers builds and maintains a dynamically stable channel geometry and floodplain that reflects both the quantity and timing of water and the volume and caliber of sediment delivered from the watershed (Leopold et al. 1964; Emmett and Wolman 2001). Accordingly, Leopold (1994) describes alluvial rivers as the architect of their own geometry. In these alluvial situations the measurement of an "entrenchment ratio" is reflective of the relative supply and magnitude of the sediments from upstream versus the capacity of the channel to transport that sediment.
However, in many situations observed during the application of the Hydrology Protocol, the channel was not an alluvial river and the bed and banks were not formed of sediments supplied and transport under the current hydrologic environment but rather were composed of bedrock and large boulders. In bedrock and boulder formed channels where it was necessary to proceed beyond Indicators 1.1 to 1.6 the "entrenchment ratio" indicator was not included in the total score.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Rustler Canyon**	**Latitude: N 32.74923**
Evaluator(s): Barry	**Site ID: RC-14B**	**Longitude: W 108.02615**
TOTAL POINTS: 15.5 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: Rustler Canyon Drainage (RC-14B)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _ X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X __ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X __ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X _ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X __ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**(2)**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**(2)**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**(2)**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**(2)**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**10**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	1	(0)
1.8. Floodplain and Channel Dimensions (N/A)	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	1.5	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	(1)	0
SUBTOTAL (#1.1 – #1.9)				**11**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	1.5	(0)	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	(Present = 3)		Absent = 0	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	(0)
TOTAL POINTS (#1.1 – #1.12)				**14**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	(Present = 1.5)	Absent = 0
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	(Absent = 0)
TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)		**15.5**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
RC14B-1	**View of middle of assessment unit looking downstream**	
RC14B-2	**View of channel, bank, and upland area.**	
RC14B-3	**View of rooted vegetation present in the streambed, but limited by bedrock rather than persistence of flow.**	
RC14B-4	**View of representative channel bottom characteristics**	
RC14B-5	**View of algae and benthic macro-invertebrates located near standing water.**	
RC14B-6	**View of Filamentous algae/periphyton along the reach. Multiple isolated pools present along the stretch.**	

NOTES:

Based on further review of field notes and site photograph the scores identified on the field forms were revised. This generally resulted in higher total scores.
It was determined, after visiting a number of bedrock and boulder formed channels, that the application and evaluation of the "entrenchment ratio" was inappropriate at such locations. In channels flowing through material that is transport by the river itself the channel geometry can be viewed as self-formed. That is, sediment transport in alluvial rivers builds and maintains a dynamically stable channel geometry and floodplain that reflects both the quantity and timing of water and the volume and caliber of sediment delivered from the watershed (Leopold et al. 1964; Emmett and Wolman 2001). Accordingly, Leopold (1994) describes alluvial rivers as the architect of their own geometry. In these alluvial situations the measurement of an "entrenchment ratio" is reflective of the relative supply and magnitude of the sediments from upstream versus the capacity of the channel to transport that sediment.
However, in many situations observed during the application of the Hydrology Protocol, the channel was not an alluvial river and the bed and banks were not formed of sediments supplied and transport under the current hydrologic environment but rather were composed of bedrock and large boulders. In bedrock and boulder formed channels where it was necessary to proceed beyond Indicators 1.1 to 1.6 the "entrenchment ratio" indicator was not included in the total score.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Rustler Canyon**	**Latitude: N 32.74329**
Evaluator(s): Barry	**Site ID: RC-15**	**Longitude: W 108.02727**
TOTAL POINTS: 12 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: Rustler Canyon Drainage (RC-15)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _ X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X __ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X __ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _X _ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X __ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**(0)**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**(0)**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**(1)**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**(2)**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**5**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	(1)	0
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	(1.5)	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	(1)	0
SUBTOTAL (#1.1 – #1.9)				**8.5**
If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL. If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL. YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.				
1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	(3)	1.5	0	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		(Absent = 0)	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	(0.5)	0
TOTAL POINTS (#1.1 – #1.12)				**12**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**		
1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	(Absent = 0)
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	(Absent = 0)
TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)		**12**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
RC15-1	View of representative channel bottom characteristics	
RC15-2	View of few rooted plants along streambed. Vegetation limited by streambed material which is primarily course grain material and boulders.	
RC15-3	View of algae in stream but is very isolated	
RC15-4	View of stream bank and upland area	
RC15-5	View of general proximity of the stream cross-section transect	
RC15-6	View of Relatively deep pool	
RC15-7	View of soil in the floodplain.	
RC15-8	View of bank/upland area and rooted in channel vegetation.	

NOTES:

Presently, an ephemeral classification is not supported for the Rustler Canyon drainages due to the presence of water and associated aquatic life uses observed during the Level 1 field evaluations.

Stream Name: Rustler Canyon 2-Drainage

Basin: Mimbres

Upstream lat/long: 32.74936/-108.03393

Downstream lat/long: 32.74339/-108.0093

Assessment Unit ID: RC2-22, RC2-22B

Hydrology Protocol Results		
RC2-22 (lat/long): 32.74936/-108.03393	Ephemeral	Final score: 2, see field form and photos for additional information
RC2-22B (lat/long): 32.74329/-108.02727	Intermittent	Final score: 9, see field form and photos for additional information

Macroinvertebrates: RC22B (snails)

Additional Comments:

Three assessment units were identified along the mainstem of Rustler Canyon (RC-14A, RC-14B and RC15) (Figure G-1) and two assessment units were identified within the West Branch of Rustler Canyon (RC2-22 and RC2-22B) (Figure G-2).

Starting at the upstream end within Rustler Canyon, these assessment units are identified as RC-14A, RC-14B and RC 15. The most upstream assessment unit (RC-14A) was selected to represent the headwater portions of Rustler Canyon. Assessment unit RC-14B was located up gradient from the confluence West Rustler and Rustler Canyon and selected to capture an observed spring and a series of large pools near this location. The lower most assessment unit within Rustler Canyon (RC-15) is located near the confluence with Lampbright Draw and is representative of the hydrologic processes within the entire drainage basin.

As shown in the plan and profile plots for Rustler Canyon (Figure G-1 and G-2) the basin slope progressively decreases, as expected, in the downstream direction. Similarly, the degree of valley confinement decreases in the downstream direction. These trends in channel slope and confinement are typical and represent the relative dominance of colluvial versus alluvial channel forming processes and are reflected in the composition of the channel bed itself. That is, the upstream reaches of Rustler Canyon (RC-14A and RC-14B) are bedrock and cobble dominated stream channels indicative hill slope processes (Photos RC14A-1 and RC14B-4) whereas the downstream assessment unit (RC-15) is a mixture of sand/gravel/cobble (Photo RC15-1) and reflect the dominance of fluvial processes. Filamentous algae was observed within all three Rustler Canyon assessment units and benthic macro-invertebrates were observed near the pools of standing water near the pools of standing water within assessment units RC-14A and RC-14B, see Photos RC14A-5 and RC14B-5, respectively. Due to the lack of flowing water, or even standing water, throughout the assessment units and the lack of fish all three assessment units within Rustler Canyon can be classified as intermittent. However, upstream of assessment unit RC-15 but downstream of the confluence with West Branch Rustler Canyon we did

identify a single pool of standing water that contained fish. The actual score of assessment unit RC-15 was 12, if the scoring criteria were adjusted to account for the presence of a single pool (i.e., Indicator 1.1 – Water in Channel equal to 2 and Indicator 1.2 – Fish equal to 1) the total score of assessment unit RC-15 would increase to 15 which is still indicative of an intermittent stream channel. The weight of evidence across the three assessment units clearly indicate that Rustler Canyon is correctly classified as an intermittent stream channel.

Both assessment units within West Branch Rustler Canyon (RC-22 and RC-22B) represent bedrock controlled stream channels (Photos RC2-22-3 and RC2-22B-4, respectively); however, the location of the downstream assessment unit (RC-22B) was selected to include a number of large standing pools of water (Photos RC2-22B-5 and RC2-22B-6). Based on the presence of standing water and the observed benthic macro-invertebrates within the downstream assessment unit (RC-22B) (Photo RC2-22B-7) the West Branch Rustler Canyon hydrologic classification is indeterminate, assumed to be intermittent until further study indicates ephemeral.

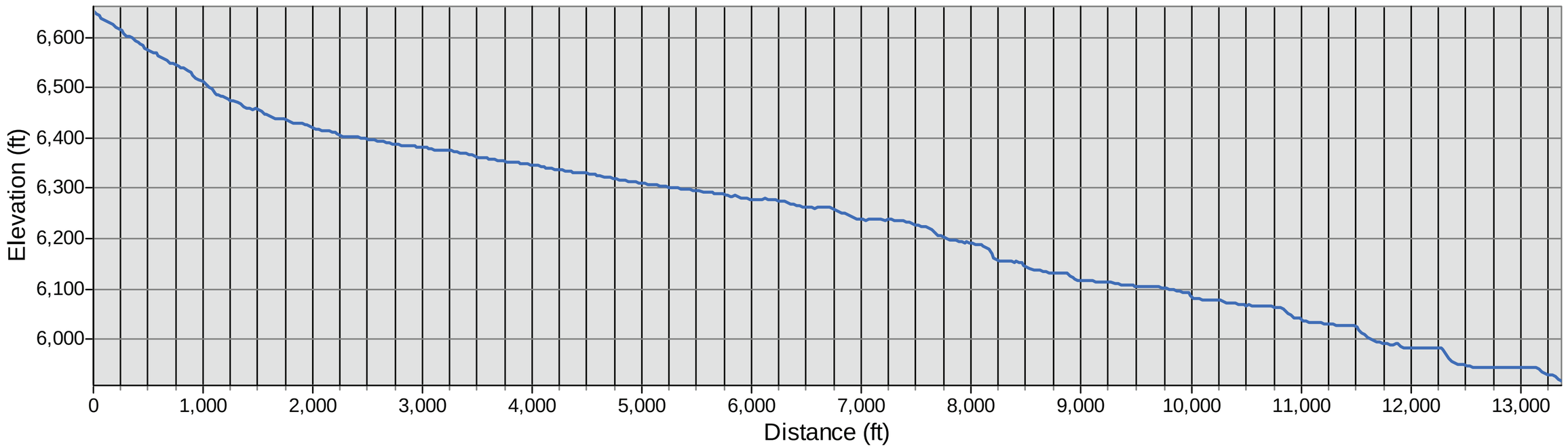
Attachments: Map and photos, hydrology protocol field sheets for all locations, and additional sites and/or documentation (drainage profile and plan view)

Q:\FCX\Chino\2011\MXD\HydrologyProtocol\FinalFigures\Profile_Rustler_Canyon2_C_v3.mxd

RC(2)

FIGURE G-2: DRAINAGE PROFILE FOR RUSTLER CANYON DRAINAGE 2

RC(2)'



Rustler Canyon Photographs (RC2-22 Reach) – Total HP score of 2 (ephemeral stream)

RC2-22-1: Photographic reference for indicators 1.1 through 1.6. Indicator 1.6 scored as 1 – rooted upland plants consistently dispersed throughout streambed. Channel bed is primarily gravel and boulders. No water or biotic indicators of water observed along survey reach.

RC2-22-2: Photographic reference for indicator 1.5. Indicator 1.5 scored as 1. Vegetation along banks of the reach is similar in composition as vegetation in the upland areas. Some density differences were evident.

Rustler Canyon Photographs (RC2-22 Reach) – Total HP score of 2 (ephemeral stream)

RC2-22-3: Photographic reference of bedrock controlled channel.

Rustler Canyon Photographs (RC2-22 Reach) – Total HP score of 2 (ephemeral stream)

RC2-22-4: Photographic reference for indicators 1.5 and 1.6. Photographs of the bank/upland area and rooted in channel vegetation. Vegetation is similar in composition between the bank and the upland area. Vegetation is consistently dispersed throughout the channel.

Rustler Canyon Photographs (RC2-22B Reach) – Total HP score of 9 (intermittent stream)

RC2-22B-1: Photographic reference for indicator 1.1 through 1.5. Small isolated pools are located along the sample reach. Seeps or springs were not observed along the reach. Biotic indicators of persistent water located with little effort but are not consistent throughout the reach. Indicators 1.1, 1.3, and 1.4 scored as 2.

RC2-22B-2: Photographic reference for indicator 1.6. Streambed and geomorphology is dominated by bedrock. Indicator 1.6 scored as 2. Rooted vegetation is present along some portions of the stream reach, but is inconsistent.

Rustler Canyon Photographs (RC2-22B Reach) – Total HP score of 9 (intermittent stream)

RC2-22B-3: Photographic reference for indicator 1.5. Indicator 1.5 scored as 0 - compositional and density differences in vegetation between stream bank and upland area not evident. No distinct riparian zone present.

RC2-22B-4: Photographic reference of bedrock controlled channel.

Rustler Canyon Photographs (RC2-22B Reach) – Total HP score of 9 (intermittent stream)

RC2-22B-5: Photographic reference of standing pool within downstream West Branch Rustler Canyon assessment unit.

RC2-22B-6: Photographic reference of standing pool within downstream West Branch Rustler Canyon assessment unit.

Rustler Canyon Photographs (RC2-22B Reach) – Total HP score of 9 (intermittent stream)

RC2-22B-7: Photographic reference of algae and benthic macro-invertebrates within downstream West Branch Rustler Canyon assessment unit.

RC2-22B-8: Photographic reference for indicators 1.1 through 1.6. Filamentous algae/periphyton was observed along the reach. Multiple isolated pools present along the stretch. Biotic indicators of water found with little difficulty. Vegetation is inconsistently dispersed throughout the channel.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Rustler Canyon**	**Latitude: N 32.74936**
Evaluator(s): Fulton	**Site ID: RC2-22**	**Longitude: W 108.03393**
TOTAL POINTS: 2 *Stream is at least intermittent if ≥ 12*	**Assessment Unit:** **Rustler Canyon Drainage (RC2-22)**	**Drought Index (12-mo. SPI Value):** **-1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _X__ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications ___ YES _ X__ NO** **Diversions ___ YES _X _ NO** **Discharges ___ YES _X __ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**2**

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**2**

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	**Absent = 0**
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	**Absent = 0**
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**2**

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
RC2-22-1	**View of rooted upland plants consistently dispersed throughout streambed.**	
RC2-22-2	**View of vegetation along banks of the reach is similar in composition as vegetation in the upland areas.**	
RC2-22-3	**View of bedrock controlled channel**	
RC2-22-4	**View of bank/upland area and rooted in channel vegetation. Vegetation is similar in composition between the bank and the upland area. Vegetation is consistently dispersed throughout the channel.**	

NOTES:

Based on further review of field notes and site photograph the scores identified on the field forms were revised. This generally resulted in higher total scores.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date: 6/14/2011	**Stream Name: Rustler Canyon**	**Latitude: N 32.74329**
Evaluator(s): Barry	**Site ID: RC2-22B**	**Longitude: W 108.02727**
TOTAL POINTS: 9 *Stream is at least intermittent if ≥ 12*	**Assessment Unit: Rustler Canyon Drainage (RC2-22B)**	**Drought Index (12-mo. SPI Value): -1.1**

WEATHER CONDITIONS	**NOW:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _ __ clear/sunny	**PAST 48 HOURS:** ___ storm (heavy rain) ___ rain (steady rain) ___ showers (intermittent) ___ %cloud cover _ __ clear/sunny	**Has there been a heavy rain in the last 48 hours?** **___ YES _ X__ NO** **Field evaluations should be performed at least 48 hours after the last known major rainfall event. **OTHER:** **Stream Modifications __ YES _ X_ NO** **Diversions ___ YES _X_ NO** **Discharges ___ YES _X _ NO** **Explain in further detail in NOTES section

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**(2)**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**(0)**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**(2)**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**(2)**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**(0)**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**(2)**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**8**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight sections.	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	2	(1)	0
1.8. Floodplain and Channel Dimensions (N/A)	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	1.5	0	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	2	1	(0)
			SUBTOTAL (#1.1 – #1.9)	9

If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.

1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs.	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	1.5	(0)	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		(Absent = 0)	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	1	0.5	(0)
			TOTAL POINTS (#1.1 – #1.12)	9

SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**

1.13. Seeps and Springs	Seeps and springs are found within the study reach.	Seeps and springs are not found within the study reach.
	Present = 1.5	(Absent = 0)
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.	Iron-oxidizing bacteria and/or fungi are not found within the study reach.
	Present = 1.5	(Absent = 0)
	TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	9

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Photo Descriptions and NOTES

Photo #	Description (US, DS, LB, RB, etc.)	Notes
RC2-22B-1	**View of small isolated pools are located along the sample reach**	
RC2-22B-2	**View of rooted vegetation is present along some portions of the stream reach, but is inconsistent.**	
RC2-22B-3	**View of compositional and density differences in vegetation between stream bank and upland area not evident.**	
RC2-22B-4	**View of bedrock controlled channel.**	
RC2-22B-5	**View of standing pool within downstream West Branch Rustler Canyon assessment unit.**	
RC2-22B-6	**View of standing pool within downstream West Branch Rustler Canyon assessment unit.**	
RC2-22B-7	**View of algae and benthic macro-invertebrates within downstream West Branch Rustler Canyon assessment unit.**	
RC2-22B-8	**View of Filamentous algae/periphyton was observed along the reach. Multiple isolated pools present along the stretch. Biotic indicators of water found with little difficulty.**	

NOTES:

Based on further review of field notes and site photograph the scores identified on the field forms were revised. This generally resulted in higher total scores.
It was determined, after visiting a number of bedrock and boulder formed channels, that the application and evaluation of the "entrenchment ratio" was inappropriate at such locations. In channels flowing through material that is transport by the river itself the channel geometry can be viewed as self-formed. That is, sediment transport in alluvial rivers builds and maintains a dynamically stable channel geometry and floodplain that reflects both the quantity and timing of water and the volume and caliber of sediment delivered from the watershed (Leopold et al. 1964; Emmett and Wolman 2001). Accordingly, Leopold (1994) describes alluvial rivers as the architect of their own geometry. In these alluvial situations the measurement of an "entrenchment ratio" is reflective of the relative supply and magnitude of the sediments from upstream versus the capacity of the channel to transport that sediment.
However, in many situations observed during the application of the Hydrology Protocol, the channel was not an alluvial river and the bed and banks were not formed of sediments supplied and transport under the current hydrologic environment but rather were composed of bedrock and large boulders. In bedrock and boulder formed channels where it was necessary to proceed beyond Indicators 1.1 to 1.6 the "entrenchment ratio" indicator was not included in the total score.