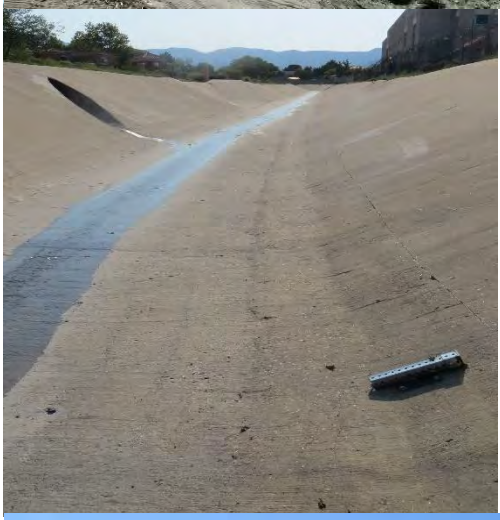
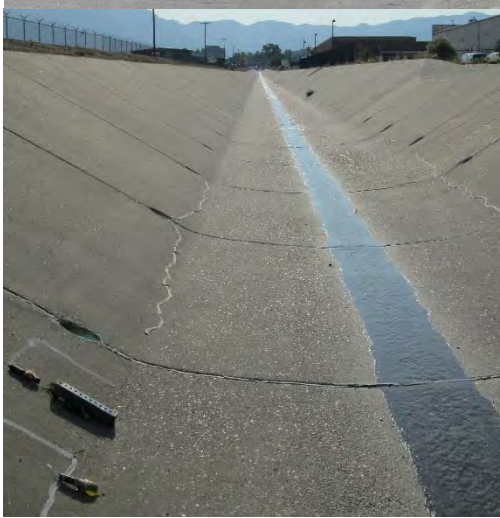
# LEVELOGGER REPORT FOR NOVEMBER 2022 – FEBRUARY 2023





## MARCH 29, 2023

**Prepared for:**

**AMAFCA**
**2600 Prospect Avenue NE**
**Albuquerque, NM 87107**

**Prepared by:**

Bohannan Huston
Engineering
Spatial Data
Advanced Technologies

# LEVELOGGER REPORT

# FOR

# NOVEMBER 2022 – FEBRUARY 2023

**MARCH 29, 2023**

Prepared for:

**AMAFCA**

**2600 PROSPECT AVENUE NE**

**ALBUQUERQUE, NM 87107**

Prepared by:

**BOHANNAN HUSTON, INC.**

**7500 JEFFERSON STREET NE**

**ALBUQUERQUE, NM 87109**

Prepared by:

Sarah Ganley, P.E., ENV-SP Date 3/29/23

Savannah Maynard Date 03/29/2023

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## I. EXECUTIVE SUMMARY

Six storm events were recorded by the Leveloggers and analyzed for this report during the four-month period between November 2022 – February 2023. During this report period, Albuquerque recorded 1.41 inches of rain and 1.9 inches of snow for the first half of the dry season. According to the monthly briefings on Weather.gov (December 2022 (weather.gov)), the precipitation observed during the report period was slightly below average; although the month of February recorded about 1.8 inches of snow compared to Albuquerque's average snowfall of 1.5 inches. No illicit discharge indicators were detected during the AMAFCA site visits to the Levelogger locations during this reporting period.

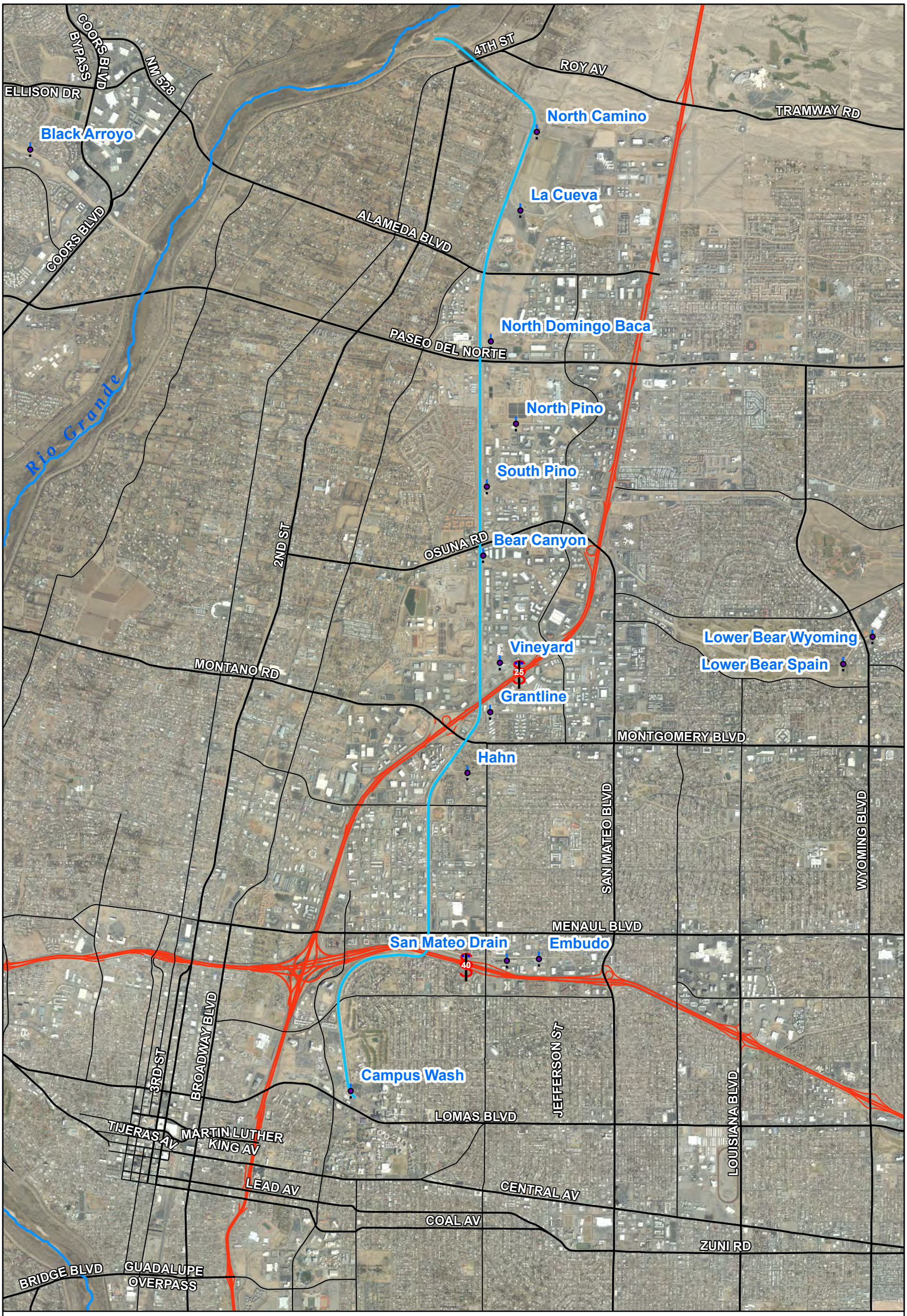
## II. OVERVIEW OF LEVELOGGER COLLECTION PROGRAM

Bohannan Huston, Inc. (BHI) completed data analysis of AMAFCA Leveloggers installed in 15 channels throughout Albuquerque. This report summarizes the Levelogger analysis results for data collected in fiscal year (FY) 2023 from November 2022 to February 2023. This report covers the first half of the FY 2023 annual dry season period; the annual dry season is November 1 through June 30.

The Leveloggers analyzed and reported include, from north to south (see locations in Figure 1):

1. Black Arroyo
2. North Camino Arroyo
3. La Cueva Arroyo
4. North Domingo Baca
5. North Pino Arroyo
6. South Pino Arroyo
7. Bear Canyon Arroyo
8. Vineyard Arroyo
9. Grantline Arroyo
10. Hahn Arroyo
11. Embudo Arroyo
12. San Mateo Storm Drain Outfall to Embudo
13. Campus Wash
14. Lower Bear – Upstream (Wyoming)
15. Lower Bear – Downstream (Spain)

AMAFCA provided BHI with the compensated Levelogger data for each of the four (4) months discussed in this report. BHI applied the relevant rating curves to the compensated Levelogger data to calculate flow rates and volumes of stormwater runoff recorded at each Levelogger location during storm events. The rating curves for the Levelogger locations were determined in the *North Diversion Channel Inlets – Hydraulic Analysis* (BHI, 2016), and a separate rating curve analysis related to the Lower Bear locations. The Black Arroyo was recently added as a westside location and channel flow was calculated using manning's equation for the concrete channel.




\\a-abq-fs2\Projects\20230235\WRARCGIS\Maps\Leveloggers Maps\Leveloggers - Figures2-8.aprx
Author: mcrooks

# A. LEVELOGGER DATA COLLECTION SUMMARY FOR NOVEMBER 2022 – FEBRUARY 2023

## 1. LEVELOGGER MONTHLY SITE VISITS

AMAFCA visited each Levelogger location monthly to download collected flow depth data and to replace the deployed instruments with newly maintained Leveloggers. During the Levelogger visits, AMAFCA visually screened each channel for general maintenance needs and signs of illicit discharge. Staining in the channel, oil sheens, presence of foam, and/or dumped debris are typical indicators of potential illicit discharge. Small nuisance flows within the channels are normal and routinely observed within AMAFCA channels and are not considered indicative of an illicit discharge.

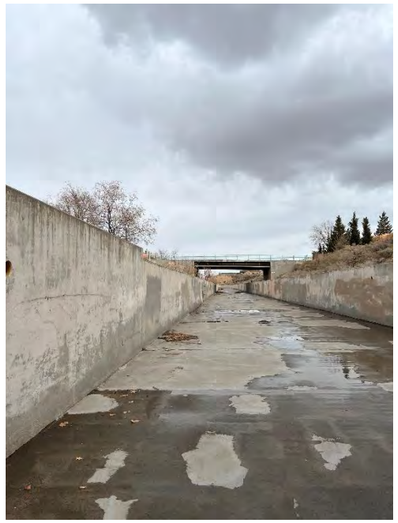
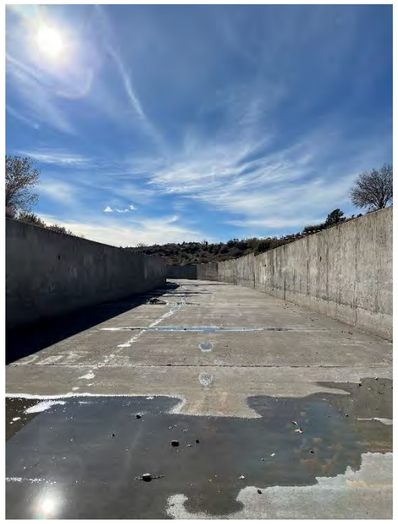
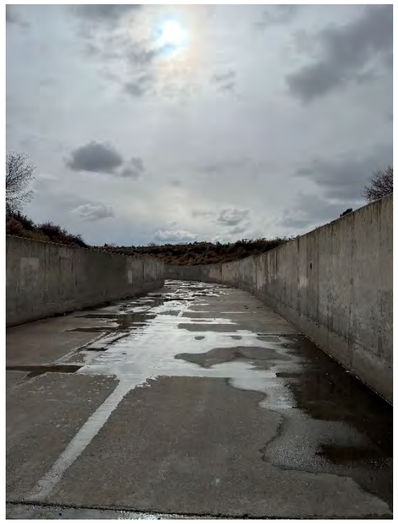
No signs of illicit discharge were observed during the November 2022 to February 2023 Levelogger collection period site visits. AMAFCA obtained and provided site photos looking upstream and downstream of each Levelogger to document the visual screening and appearance of the channels. All acquired photos are provided by month, see pages 5 – 19, for each Levelogger location covered in this report. Table 1 provides a summary of the number of visual screenings conducted and the number of potential illicit discharge indicators observed at each AMAFCA Levelogger site location for this reporting period, as well as the cumulative total of each for the complete FY 2023 (July 2022 – June 2023) time period, to date.

**Table 1: Summary of Visual Screenings and Potential Illicit Discharges Detected**

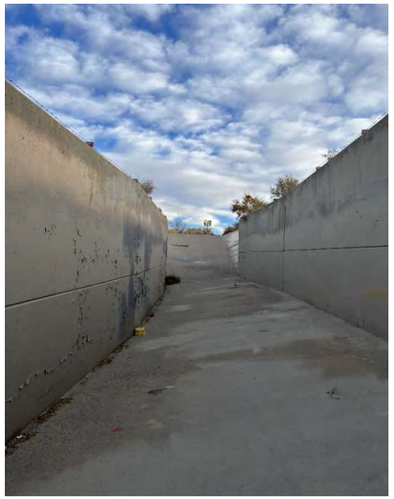
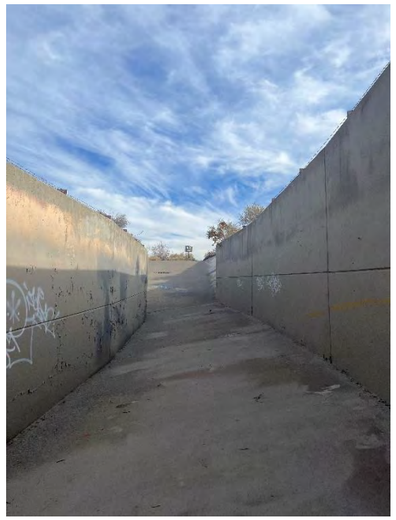
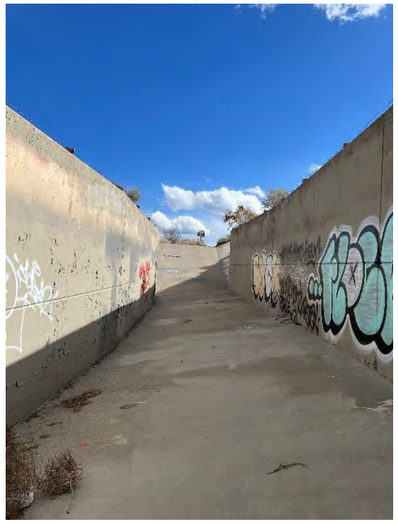
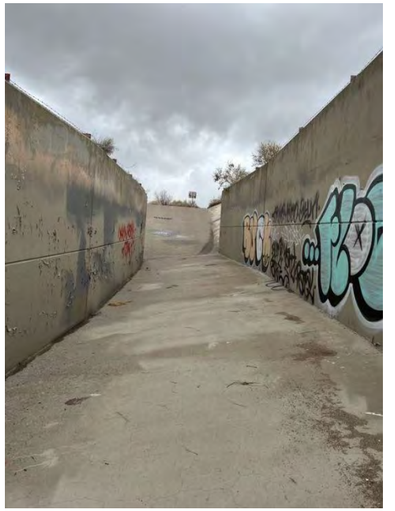
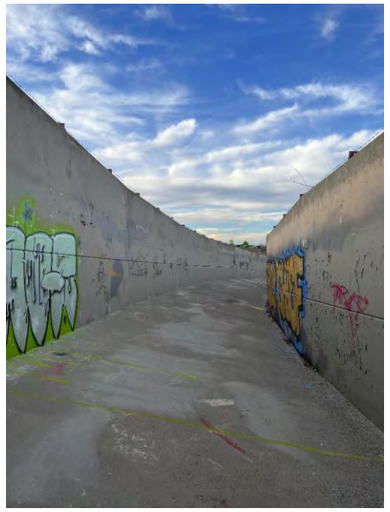
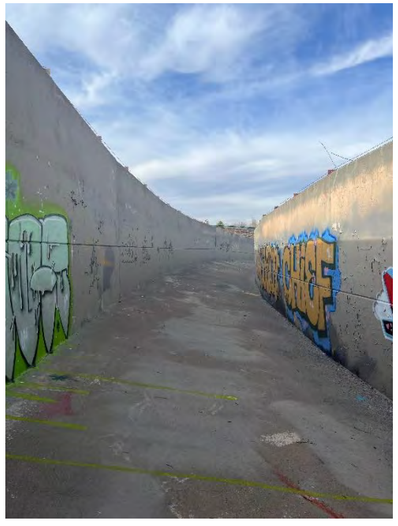
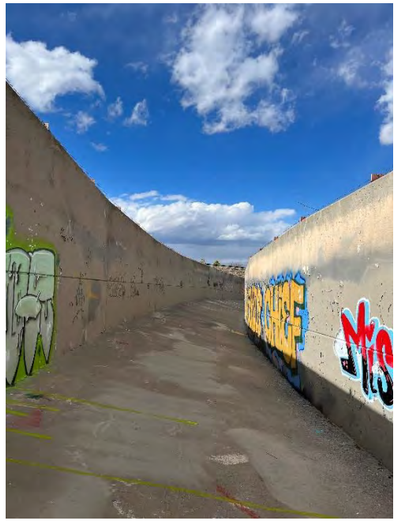
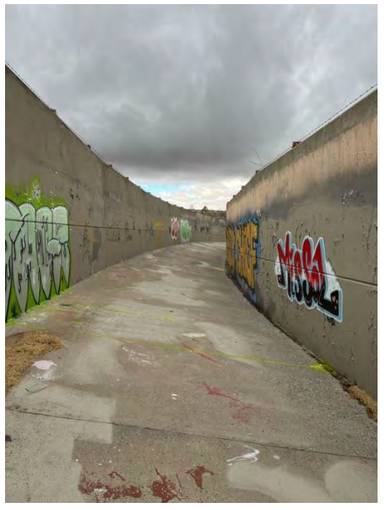
| AMAFCA/City of Albuquerque Facility - Levelogger Data Location | Number of Visual Screenings July 2022 – July 2023 | | | | | | | | | | | | | Cumulative Total of Visual Screenings Completed | Number of Potential Illicit Discharge Indicators Detected July 2022 – July 2023 | | | Cumulative Total of Illicit Discharge Indicators Detected |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | July 2022 | August 2022 | September 2022 | October 2022 | November 2022 | December 2022 | January 2023 | February 2023 | March 2023 | April 2023 | May 2023 | June 2023 | July 2023 | | Aug. – Nov. 2022 | Dec. 2022 – March 2023 | April – July 2023 | |
| Black Arroyo | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | | | | | **7** | 0 | 0 | 0 | **0** |
| North Camino Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| La Cueva | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| North Domingo Baca | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| North Pino Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| South Pino Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| Bear Canyon Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| Vineyard Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| Grantline Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | | | | | **7** | 0 | 0 | 0 | **0** |
| Hahn Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| Embudo Arroyo | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| San Mateo Drain | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| Campus Wash | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| Lower Bear – Upstream (Wyoming) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |
| Lower Bear – Downstream (Spain) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | **9** | 0 | 0 | 0 | **0** |

Months associated with site visits to collect the Levelogger data summarized in this report. Site visits retrieve data for the prior month – for example, the March 2023 site visit retrieved the February 2023 Levelogger data.

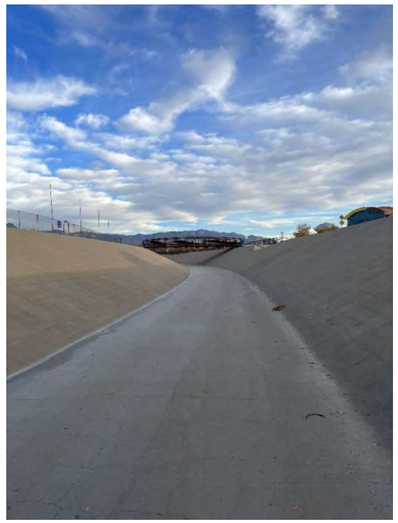
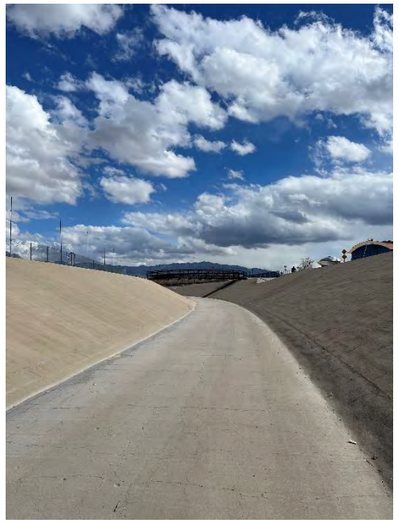
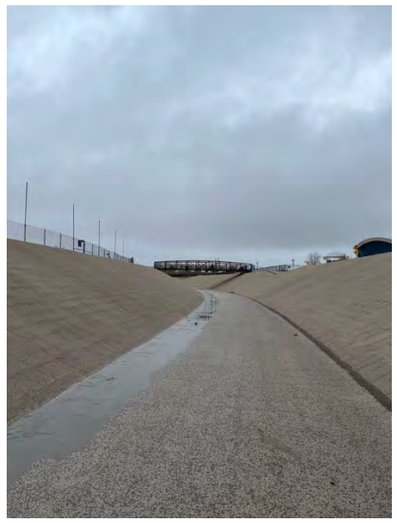
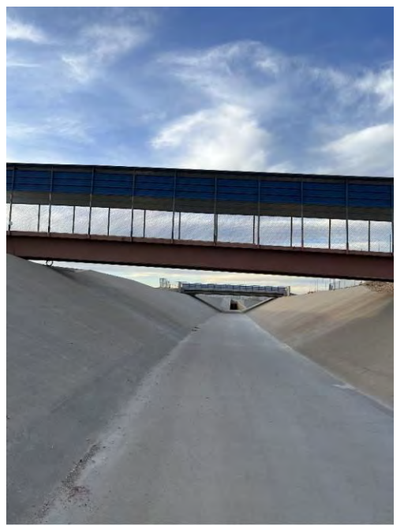
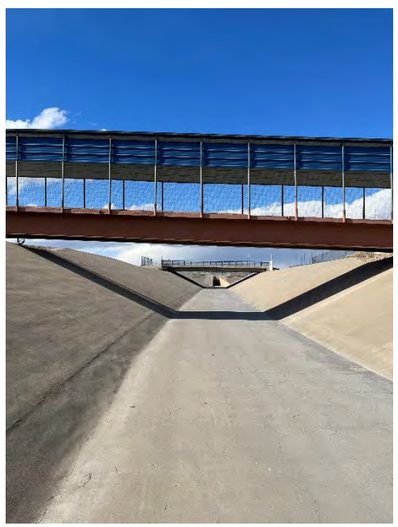
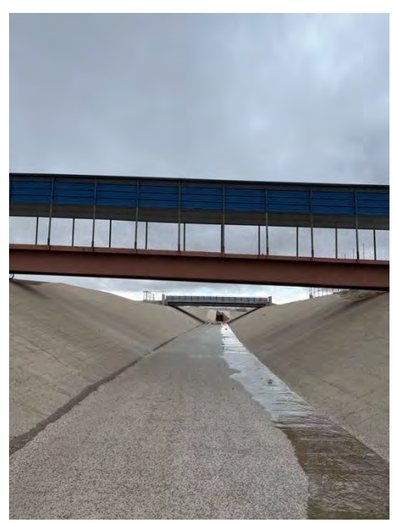
**Black Arroyo**

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
| **NO PHOTO AVAILABLE** |  |  | **NO PHOTO AVAILABLE** |
| **Photo 1: Black Arroyo – Looking Upstream** | **Photo 2: Black Arroyo – Looking Upstream** | **Photo 3: Black Arroyo – Looking Upstream** | **Photo 4: Black Arroyo – Looking Upstream** |
| **NO PHOTO AVAILABLE** |  |  | **NO PHOTO AVAILABLE** |
| **Photo 5: Black Arroyo – Looking Downstream** | **Photo 6: Black Arroyo – Looking Downstream** | **Photo 7: Black Arroyo – Looking Downstream** | **Photo 8: Black Arroyo – Looking Downstream** |

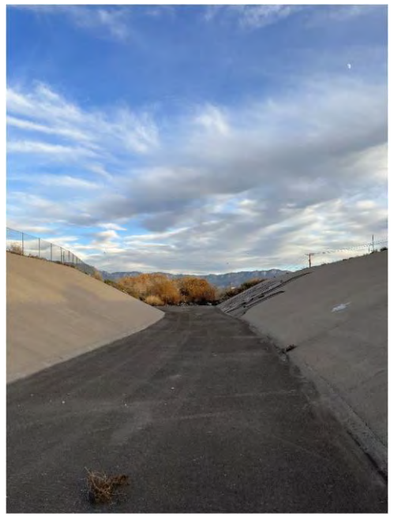
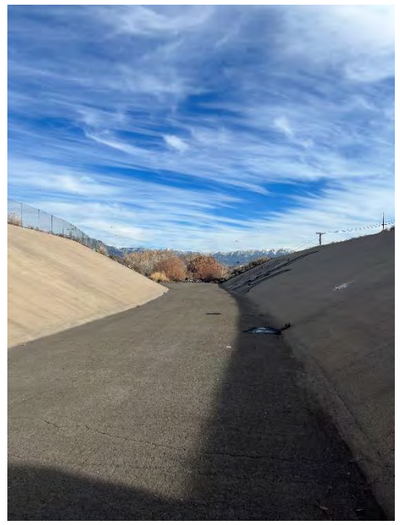
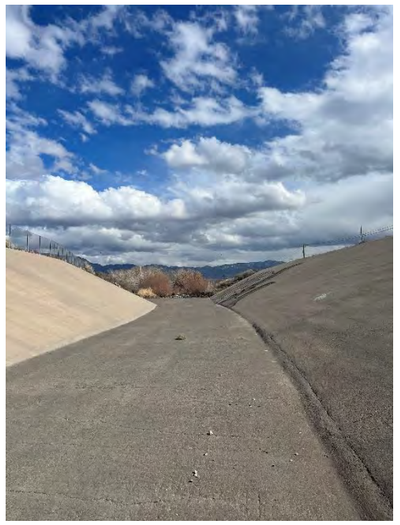
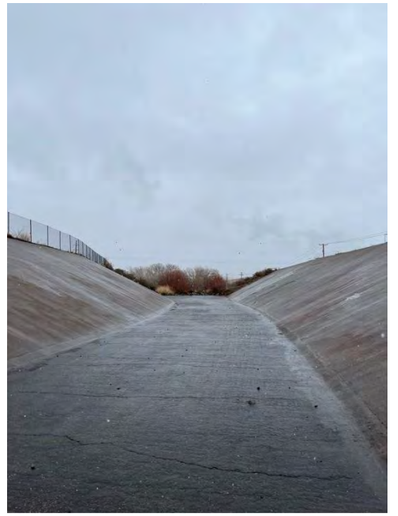
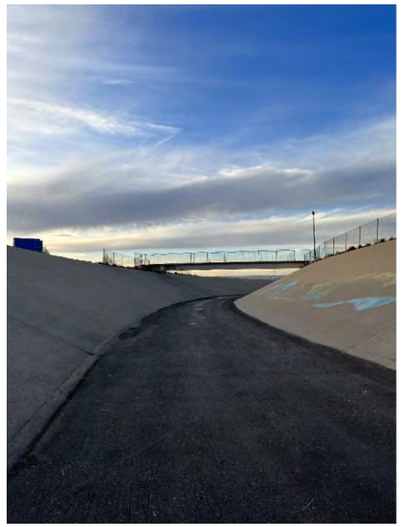
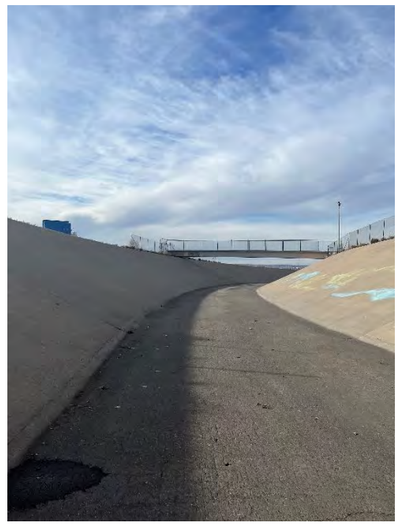
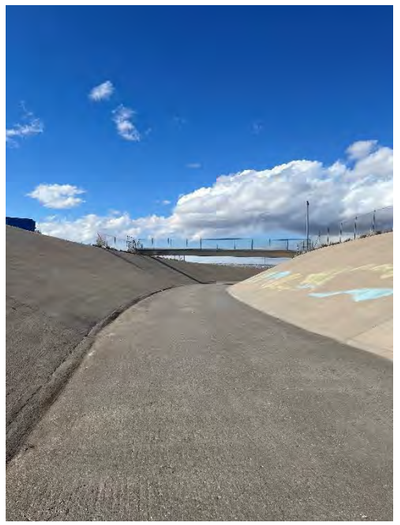
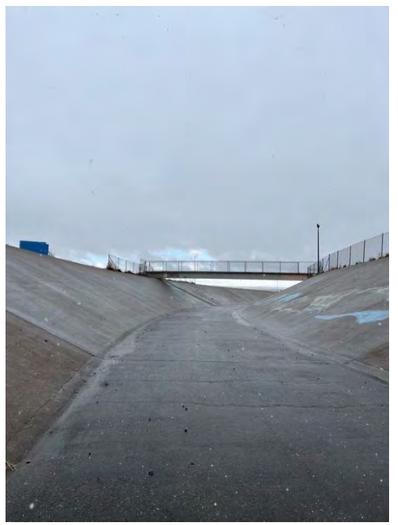
## North Camino Arroyo

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 9: North Camino Arroyo – Looking Upstream** | **Photo 10: North Camino Arroyo – Looking Upstream** | **Photo 11: North Camino Arroyo – Looking Upstream** | **Photo 12: North Camino Arroyo – Looking Upstream** |
|  |  |  |  |
| **Photo 13: North Camino Arroyo – Looking Downstream** | **Photo 14: North Camino Arroyo – Looking Downstream** | **Photo 15: North Camino Arroyo – Looking Downstream** | **Photo 16: North Camino Arroyo – Looking Downstream** |

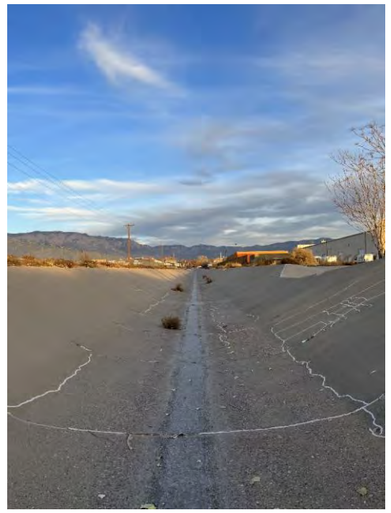
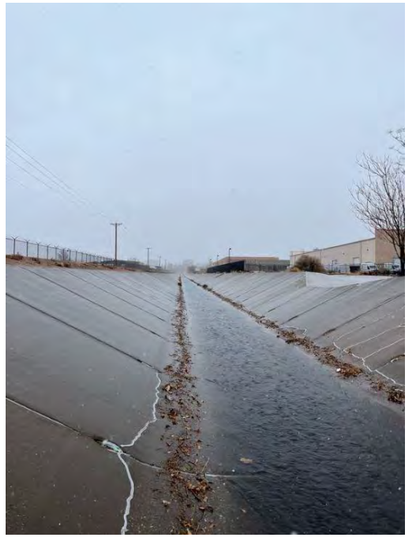
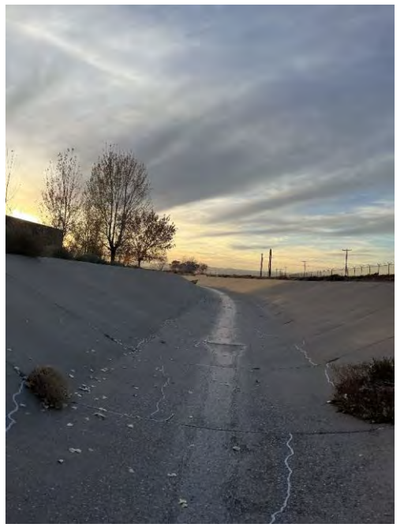
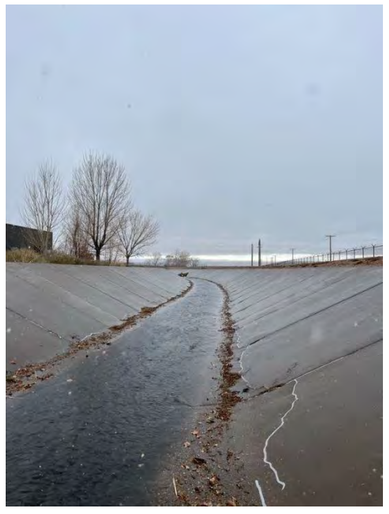
## La Cueva Arroyo

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  | **NO PHOTO AVAILABLE** |  |  |
| **Photo 17: La Cueva Arroyo – Looking Upstream** | **Photo 18: La Cueva Arroyo – Looking Upstream** | **Photo 19: La Cueva Arroyo – Looking Upstream** | **Photo 20: La Cueva Arroyo – Looking Upstream** |
|  | **NO PHOTO AVAILABLE** |  |  |
| **Photo 21: La Cueva Arroyo – Looking Downstream** | **Photo 22: La Cueva Arroyo – Looking Downstream** | **Photo 23: La Cueva Arroyo – Looking Downstream** | **Photo 24: La Cueva Arroyo – Looking Downstream** |

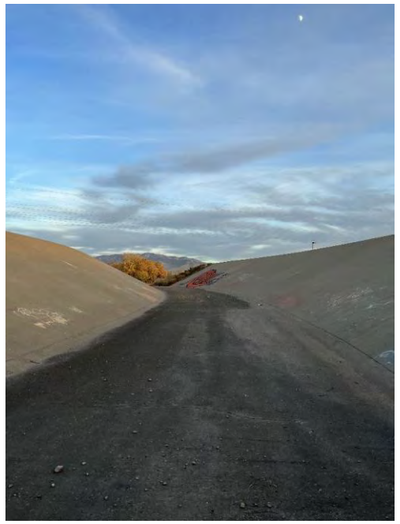
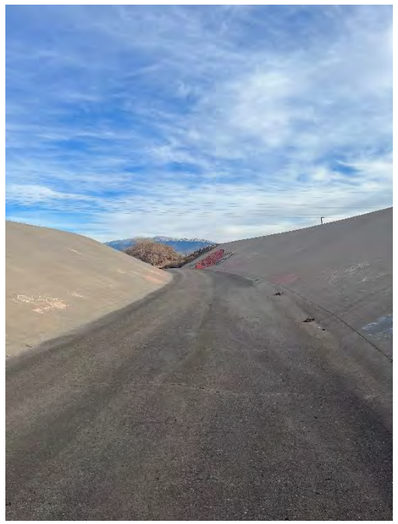
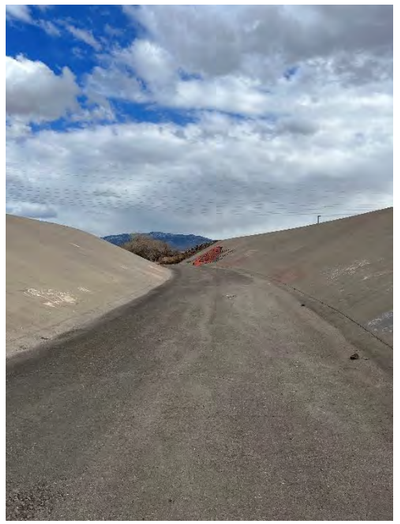
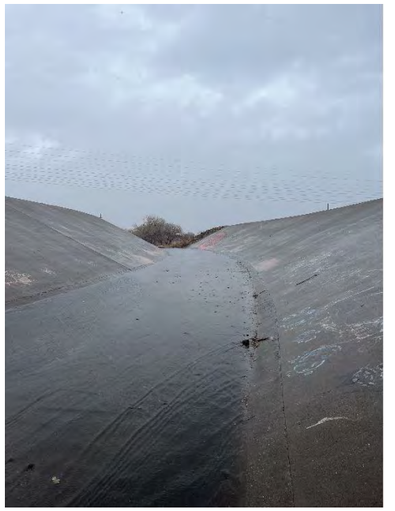
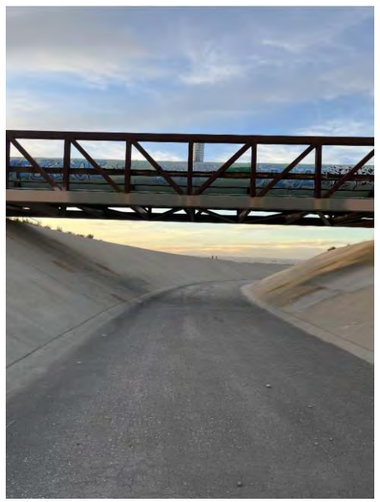
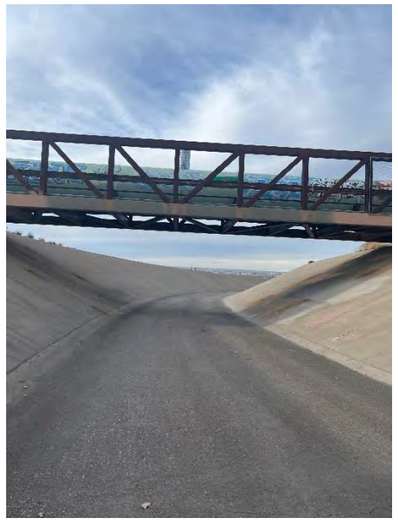
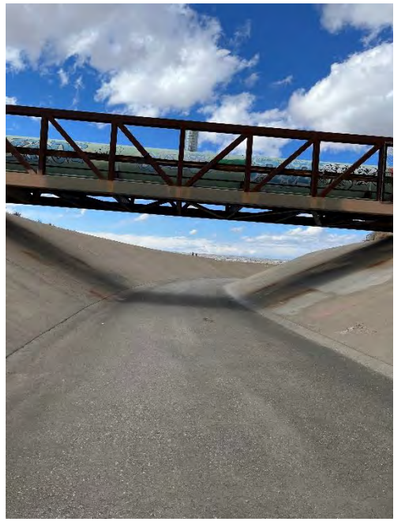
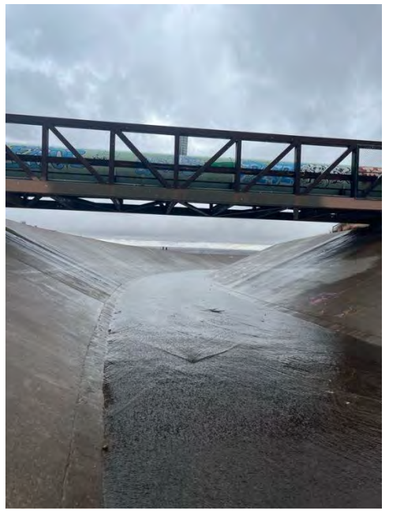
## North Domingo Baca

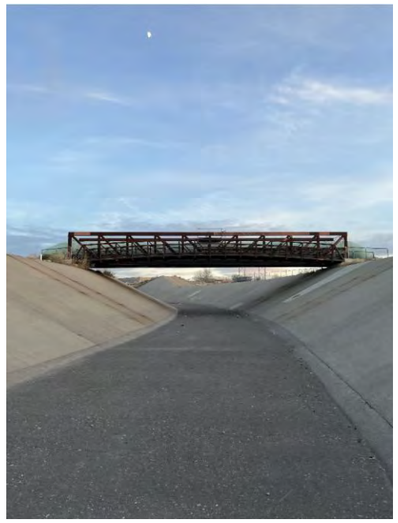
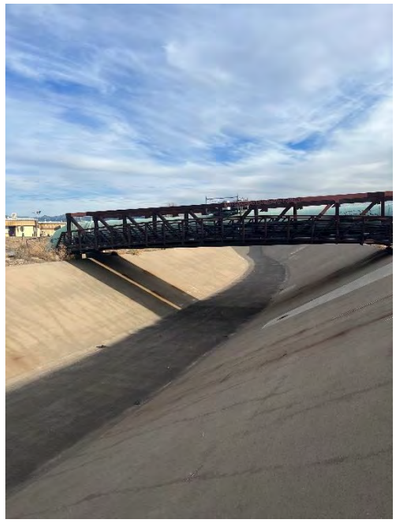
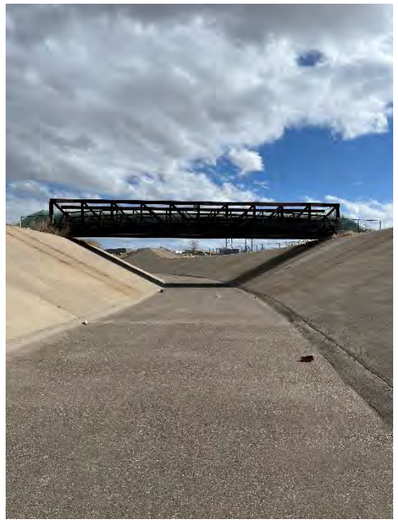
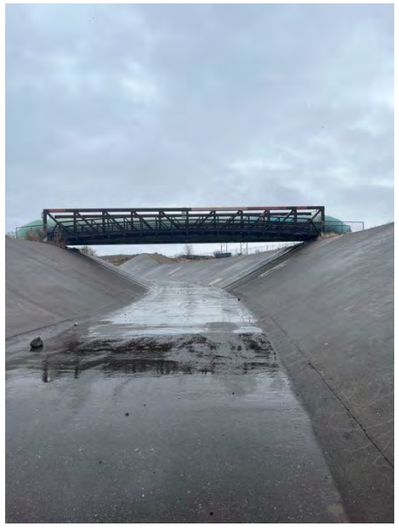
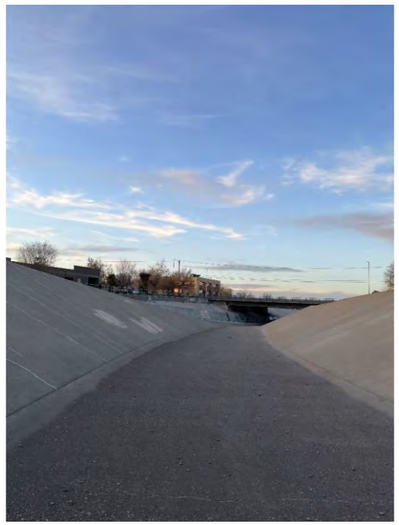
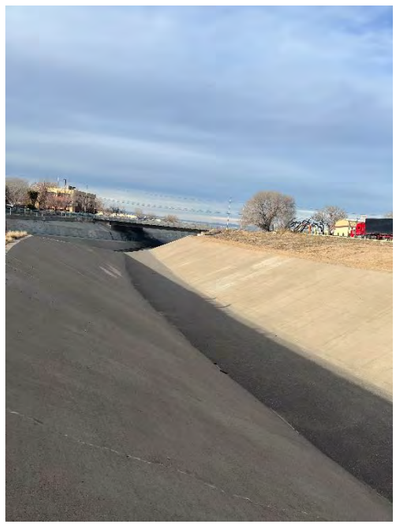
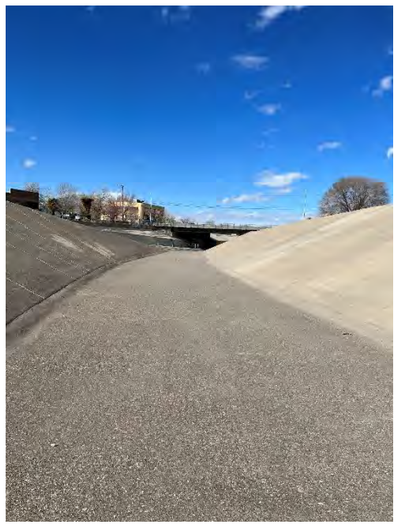
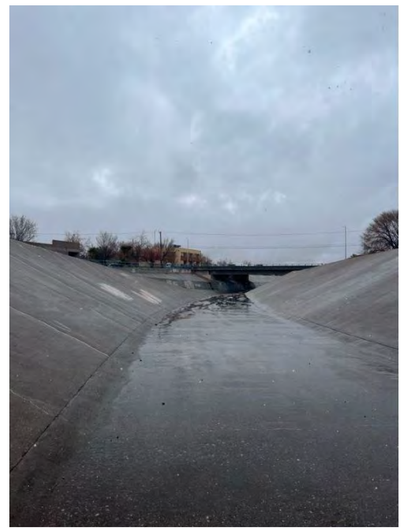
| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 25: North Domingo Baca – Looking Upstream** | **Photo 26: North Domingo Baca – Looking Upstream** | **Photo 27: North Domingo Baca – Looking Upstream** | **Photo 28: North Domingo Baca – Looking Upstream** |
|  |  |  |  |
| **Photo 29: North Domingo Baca – Looking Downstream** | **Photo 30: North Domingo Baca – Looking Downstream** | **Photo 31: North Domingo Baca – Looking Downstream** | **Photo 32: North Domingo Baca – Looking Downstream** |

## North Pino Arroyo

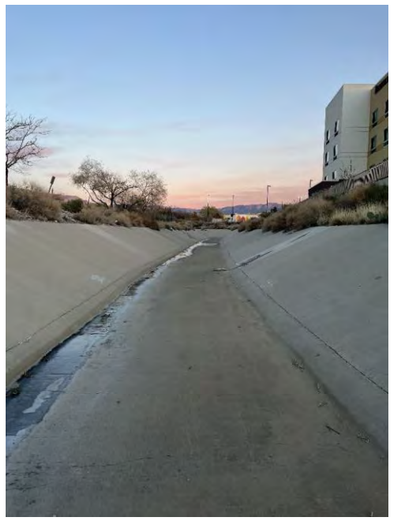
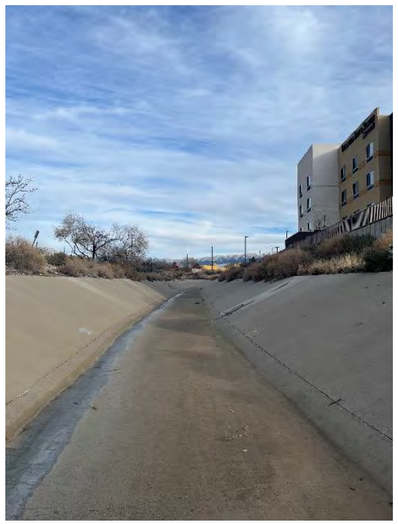
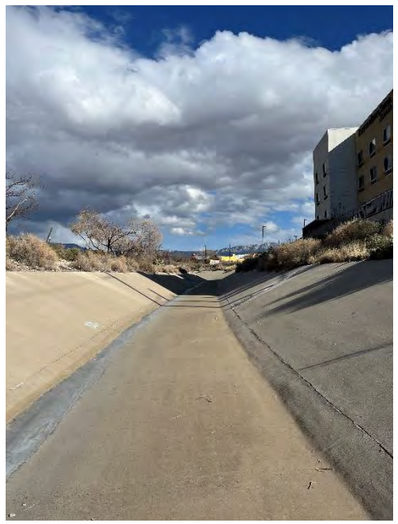
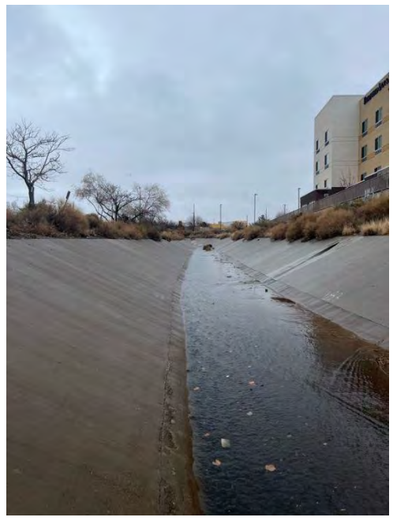
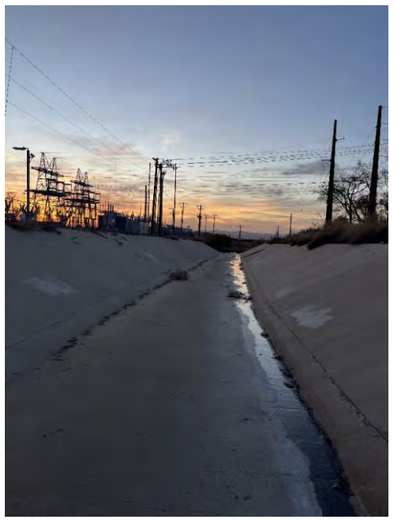
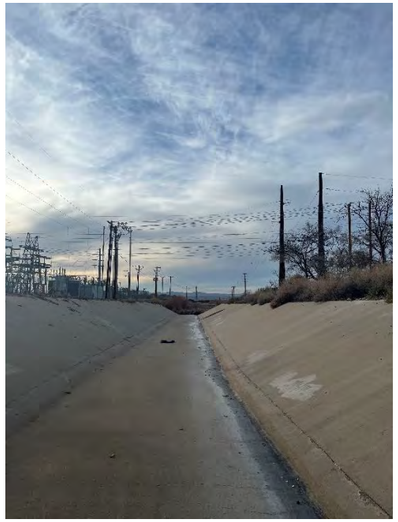
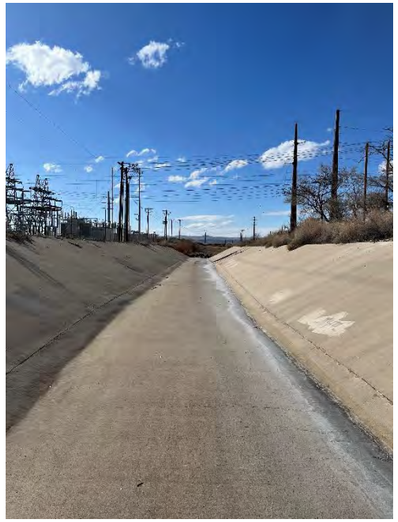
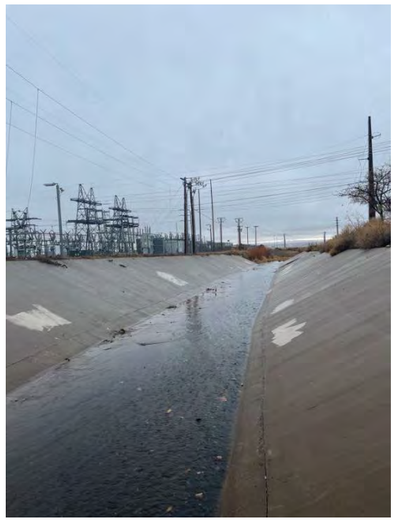
| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 33: North Pino Arroyo – Looking Upstream** | **Photo 34: North Pino Arroyo – Looking Upstream** | **Photo 35: North Pino Arroyo – Looking Upstream** | **Photo 36: North Pino Arroyo – Looking Upstream** |
|  |  |  |  |
| **Photo 37: North Pino Arroyo – Looking Downstream** | **Photo 38: North Pino Arroyo – Looking Downstream** | **Photo 39: North Pino Arroyo – Looking Downstream** | **Photo 40: North Pino Arroyo – Looking Downstream** |

## South Pino Arroyo

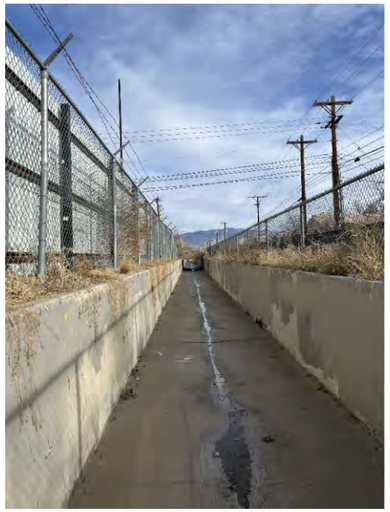
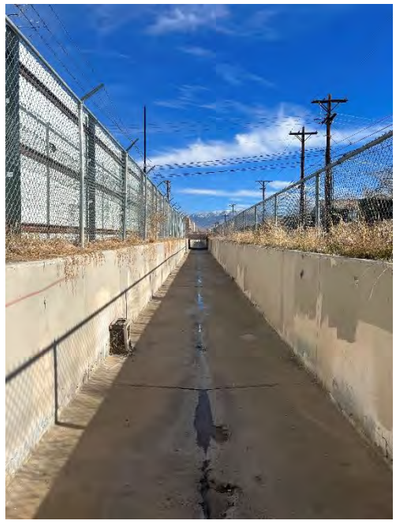
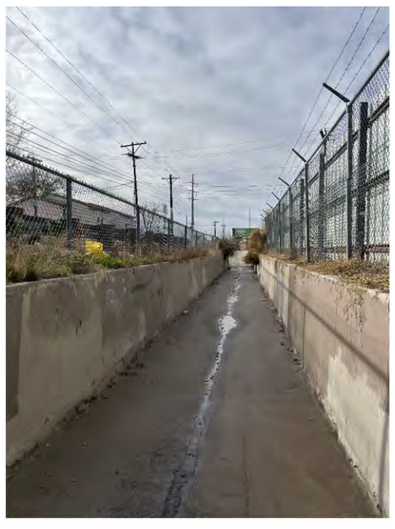
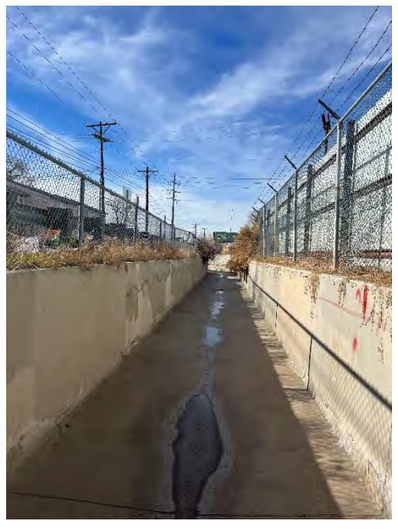
| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 41: South Pino Arroyo – Looking Upstream** | **Photo 42: South Pino Arroyo – Looking Upstream** | **Photo 43: South Pino Arroyo – Looking Upstream** | **Photo 44: South Pino Arroyo – Looking Upstream** |
|  |  |  |  |
| **Photo 45: South Pino Arroyo – Looking Downstream** | **Photo 46: South Pino Arroyo – Looking Downstream** | **Photo 47: South Pino Arroyo – Looking Downstream** | **Photo 48: South Pino Arroyo – Looking Downstream** |

| Bear Canyon Arroyo | December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|---|
| |  |  |  |  |
| | **Photo 49: Bear Canyon Arroyo – Looking Upstream** | **Photo 50: Bear Canyon Arroyo – Looking Upstream** | **Photo 51: Bear Canyon Arroyo – Looking Upstream** | **Photo 52: Bear Canyon Arroyo – Looking Upstream** |
| |  |  |  |  |
| | **Photo 53: Bear Canyon Arroyo– Looking Downstream** | **Photo 54: Bear Canyon Arroyo– Looking Downstream** | **Photo 55: Bear Canyon Arroyo– Looking Downstream** | **Photo 56: Bear Canyon Arroyo– Looking Downstream** |

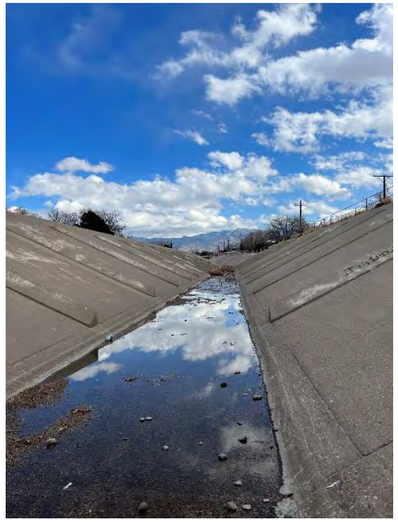
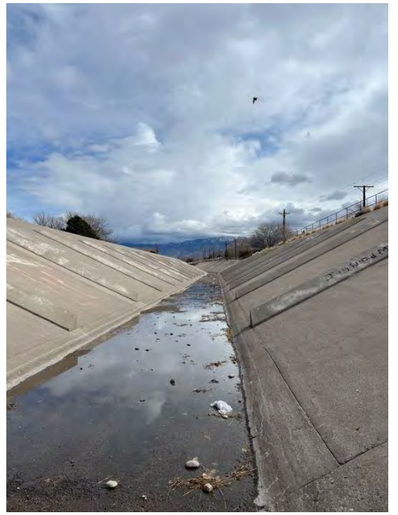
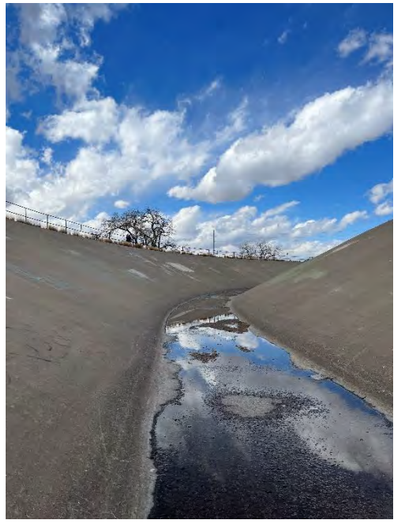
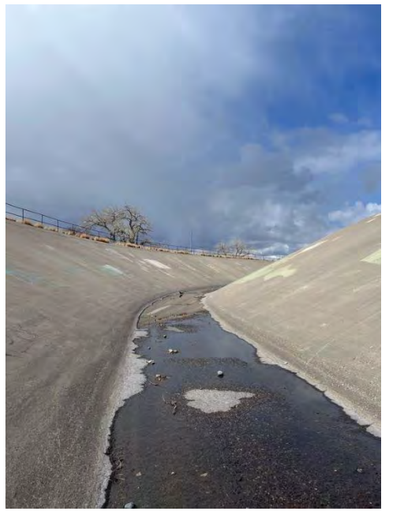
## Vineyard Arroyo

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 57: Vineyard Arroyo – Looking Upstream** | **Photo 58: Vineyard Arroyo – Looking Upstream** | **Photo 59: Vineyard Arroyo – Looking Upstream** | **Photo 60: Vineyard Arroyo – Looking Upstream** |
|  |  |  |  |
| **Photo 61: Vineyard Arroyo – Looking Downstream** | **Photo 62: Vineyard Arroyo – Looking Downstream** | **Photo 63: Vineyard Arroyo – Looking Downstream** | **Photo 64: Vineyard Arroyo – Looking Downstream** |

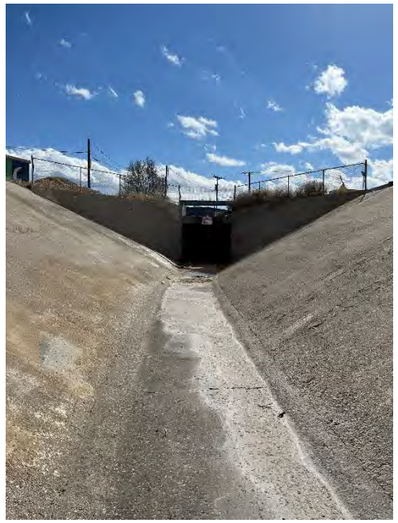
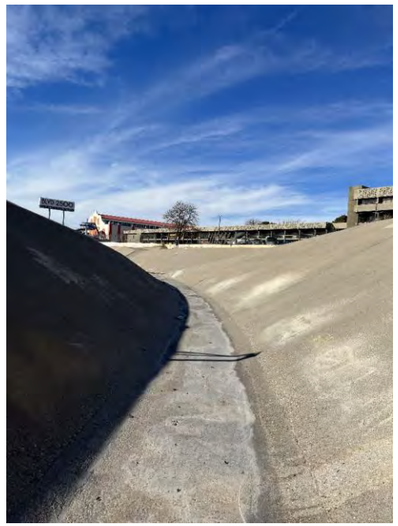
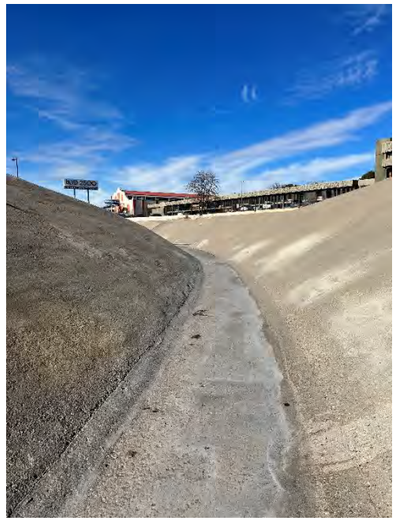
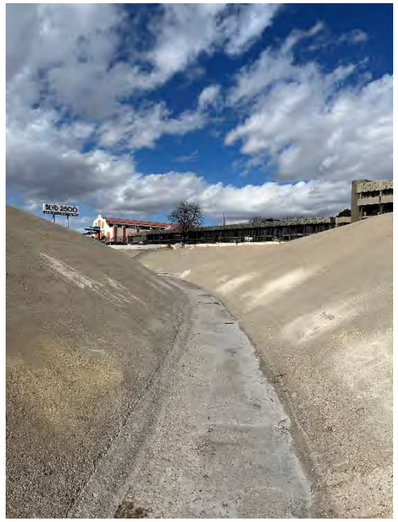
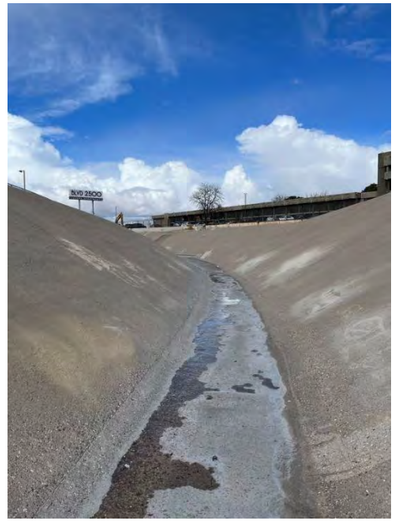
**Grantline Arroyo**

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  | **NO PHOTO AVAILABLE – LEVELOGGER AT GRANTINE WAS NOT DEPLOYED DUE TO MAINTENANCE** | **NO PHOTO AVAILABLE – LEVELOGGER AT GRANTINE WAS NOT DEPLOYED DUE TO MAINTENANCE** |
| **Photo 65: Grantline Arroyo – Looking Upstream** | **Photo 66: Grantline Arroyo – Looking Upstream** | **Photo 67: Grantline Arroyo – Looking Upstream** | **Photo 68: Grantline Arroyo – Looking Upstream** |
|  |  | **NO PHOTO AVAILABLE – LEVELOGGER AT GRANTINE WAS NOT DEPLOYED DUE TO MAINTENANCE** | **NO PHOTO AVAILABLE – LEVELOGGER AT GRANTINE WAS NOT DEPLOYED DUE TO MAINTENANCE** |
| **Photo 69: Grantline Arroyo – Looking Downstream** | **Photo 70: Grantline Arroyo – Looking Downstream** | **Photo 71: Grantline Arroyo – Looking Downstream** | **Photo 72: Grantline Arroyo – Looking Downstream** |

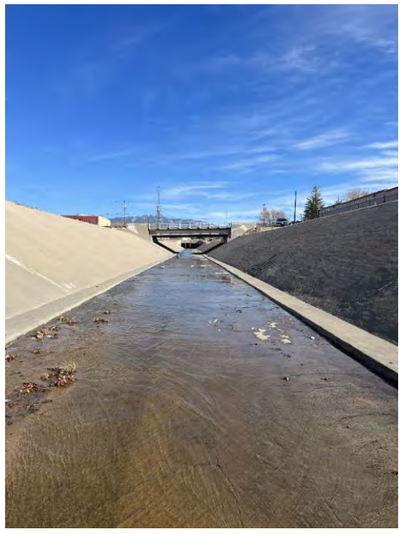
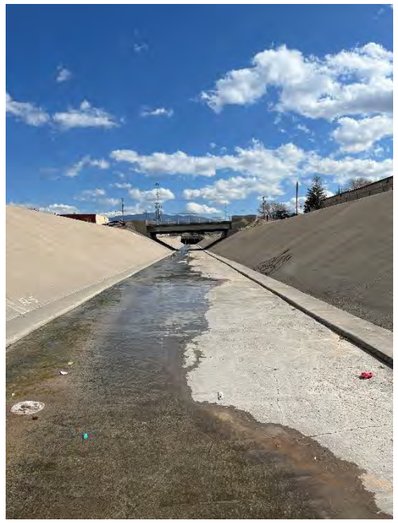
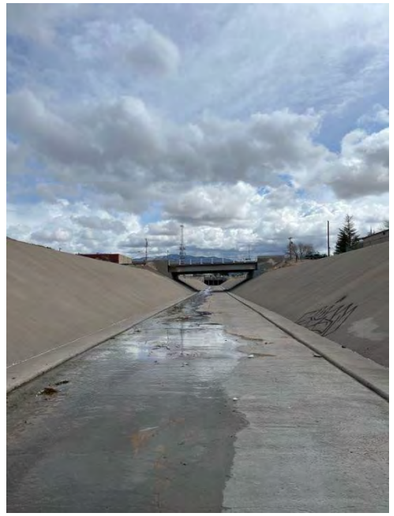
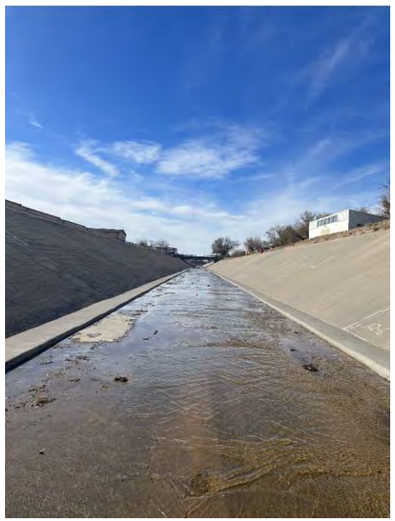
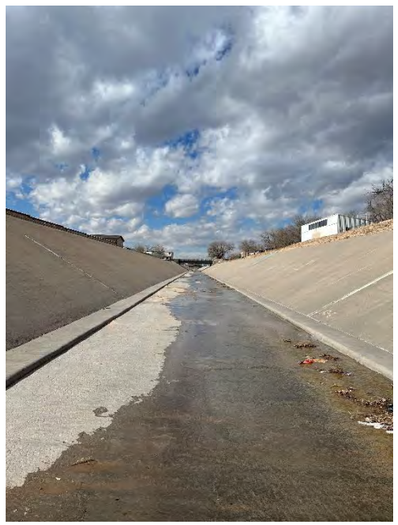
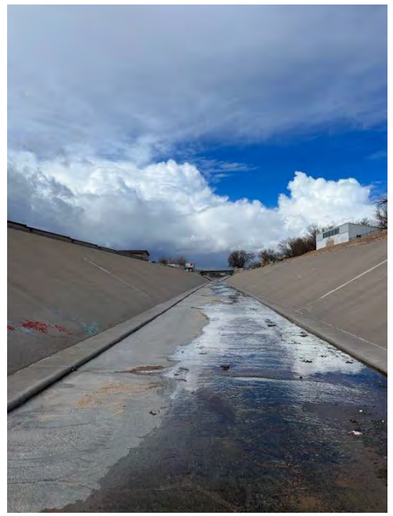
## Hahn Arroyo

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 73: Hahn Arroyo – Looking Upstream** | **Photo 74: Hahn Arroyo – Looking Upstream** | **Photo 75: Hahn Arroyo – Looking Upstream** | **Photo 76: Hahn Arroyo – Looking Upstream** |
|  |  |  |  |
| **Photo 77: Hahn Arroyo – Looking Downstream** | **Photo 78: Hahn Arroyo – Looking Downstream** | **Photo 79: Hahn Arroyo – Looking Downstream** | **Photo 80: Hahn Arroyo – Looking Downstream** |

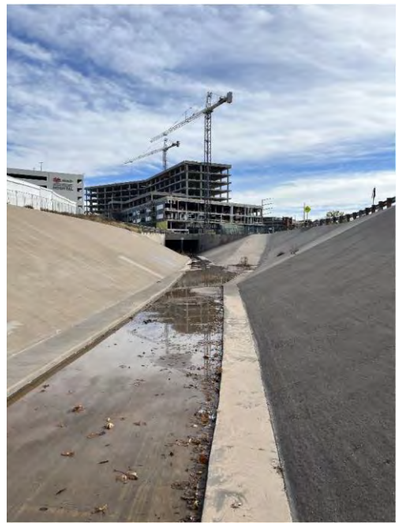
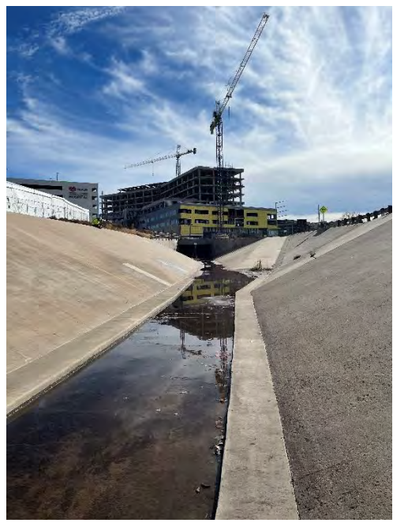
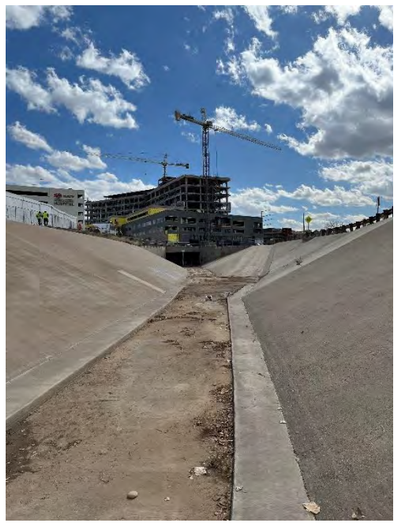
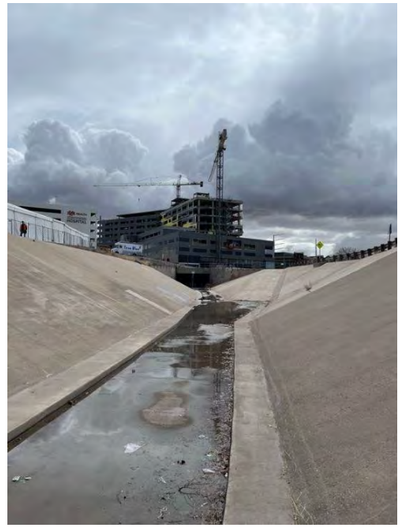
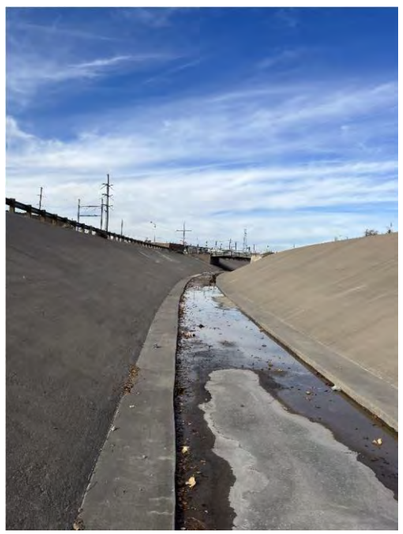
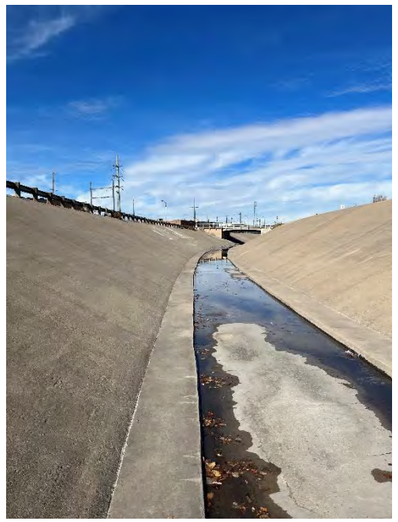
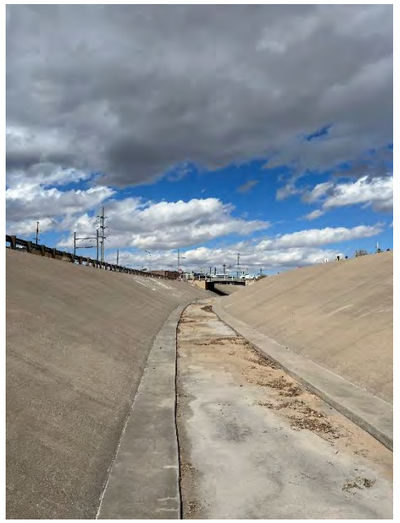
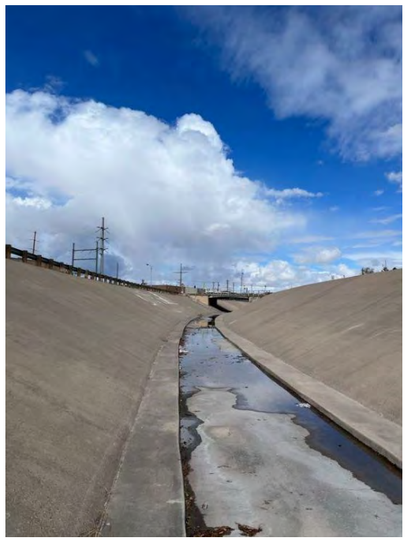
## San Mateo Storm Drain

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 81: San Mateo Storm Drain – Looking Upstream** | **Photo 82: San Mateo Storm Drain – Looking Upstream** | **Photo 83: San Mateo Storm Drain – Looking Upstream** | **Photo 84: San Mateo Storm Drain – Looking Upstream** |
|  |  |  |  |
| **Photo 85: San Mateo Storm Drain – Looking Downstream** | **Photo 86: San Mateo Storm Drain – Looking Downstream** | **Photo 87: San Mateo Storm Drain – Looking Downstream** | **Photo 88: San Mateo Storm Drain – Looking Downstream** |

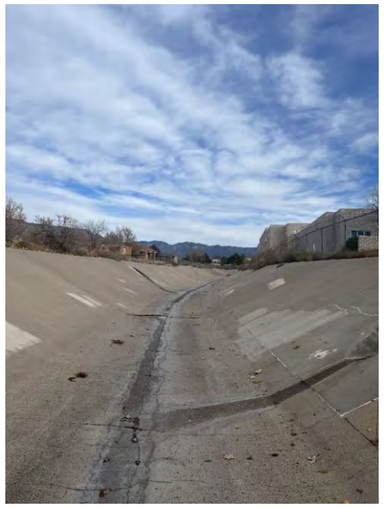
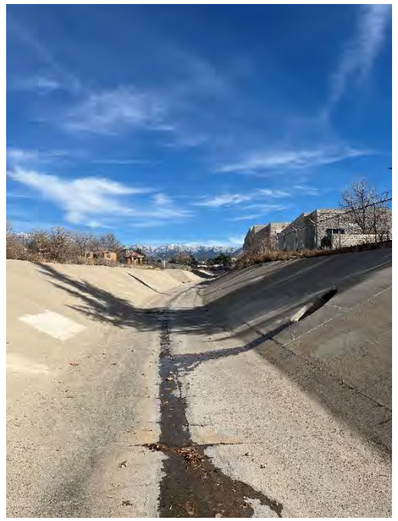
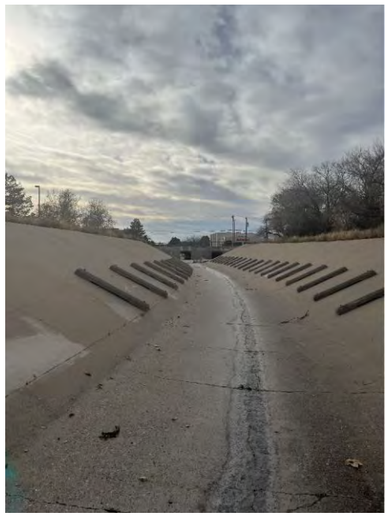
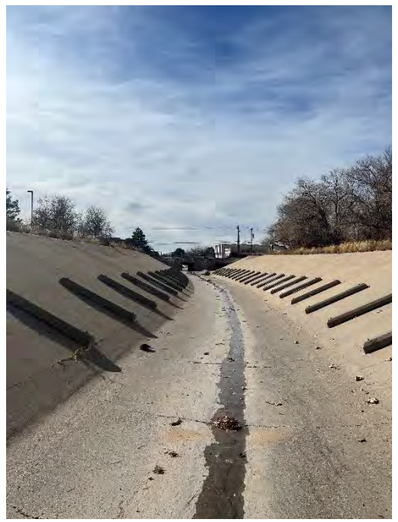
## Embudo Arroyo

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 89: Embudo Arroyo – Looking Upstream** | **Photo 90: Embudo Arroyo – Looking Upstream** | **Photo 91: Embudo Arroyo – Looking Upstream** | **Photo 92: Embudo Arroyo – Looking Upstream** |
|  |  |  |  |
| **Photo 93: Embudo Arroyo – Looking Downstream** | **Photo 94: Embudo Arroyo – Looking Downstream** | **Photo 95: Embudo Arroyo – Looking Downstream** | **Photo 96: Embudo Arroyo – Looking Downstream** |

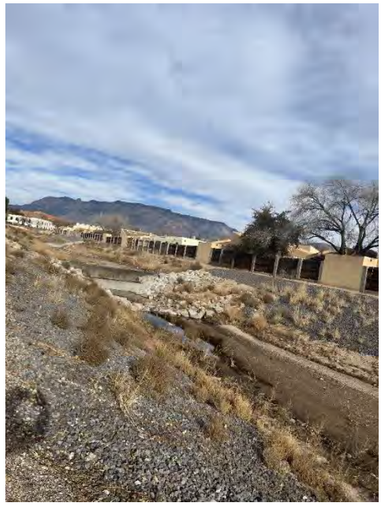
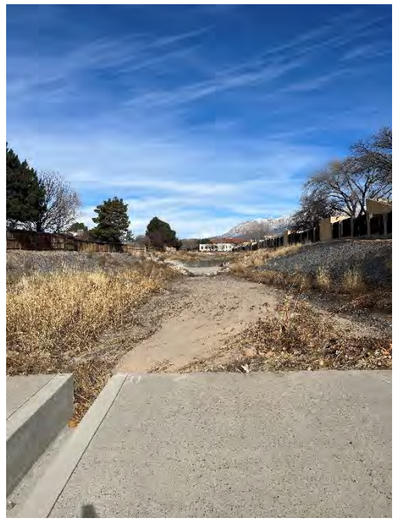
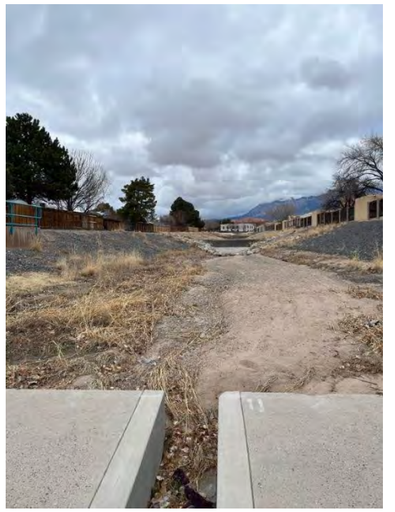
## Campus Wash

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 97: Campus Wash – Looking Upstream** | **Photo 98: Campus Wash – Looking Upstream** | **Photo 99: Campus Wash – Looking Upstream** | **Photo 100: Campus Wash – Looking Upstream** |
|  |  |  |  |
| **Photo 101: Campus Wash – Looking Downstream** | **Photo 102: Campus Wash – Looking Downstream** | **Photo 103: Campus Wash – Looking Downstream** | **Photo 104: Campus Wash – Looking Downstream** |

## Lower Bear – Wyoming (Upstream)

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 105: Lower Bear (Wyoming) – Looking Upstream** | **Photo 106: Lower Bear (Wyoming) – Looking Upstream** | **Photo 107: Lower Bear (Wyoming) – Looking Upstream** | **Photo 108: Lower Bear (Wyoming) – Looking Upstream** |
|  |  |  |  |
| **Photo 109: Lower Bear (Wyoming) – Looking Downstream** | **Photo 110: Lower Bear (Wyoming) – Looking Downstream** | **Photo 111: Lower Bear (Wyoming) – Looking Downstream** | **Photo 112: Lower Bear (Wyoming) – Looking Downstream** |

## Lower Bear – Spain (Downstream)

| December 1, 2022 | January 5, 2023 | February 6, 2023 | March 2, 2023 |
|---|---|---|---|
|  |  |  |  |
| **Photo 113: Lower Bear (Spain) – Looking Upstream** | **Photo 114: Lower Bear (Spain) – Looking Upstream** | **Photo 115: Lower Bear (Spain) – Looking Upstream** | **Photo 116: Lower Bear (Spain) – Looking Upstream** |
|  |  |  |  |
| **Photo 117: Lower Bear (Spain) – Looking Downstream** | **Photo 118: Lower Bear (Spain) – Looking Downstream** | **Photo 119: Lower Bear (Spain) – Looking Downstream** | **Photo 120: Lower Bear (Spain) – Looking Downstream** |

## 2. ANALYSIS APPROACH

All compensated data from the Leveloggers was analyzed and converted to flow data using the relevant rating curves for storm events that occurred from November 2022 through February 2023 within each basin.

From July 2017 through June 2022, the Community Collaborative Rain, Hail, & Snow Network (CoCoRaHS) gage total precipitation data near or in each respective basin was used in the Levelogger analysis to determine when storm events occurred and the rainfall amount in each basin. Starting with this FY 2023 report, storm events were determined and mapped using the National Oceanic and Atmospheric Administration (NOAA) Next Generation Radar (NEXRAD) weather data. The NEXRAD weather data is a public network of radar stations that detect precipitation, wind, and more. The radar data is collected 24-hours daily and updated every 5 minutes. The Storm Total Precipitation Accumulation data was used for this analysis, where the accumulation of datasets resets after a 1-hour break in precipitation. Thus, NEXRAD data presented in this report's rainfall maps represent total precipitation accumulation of a storm event with data being collected every 5 minutes of that particular storm event.

Albuquerque area U.S. Geological Survey (USGS) gages were also used to view storm event runoff results in nearby locations and to compare to Levelogger results. The "USGS 08329900 North Floodway Channel near Alameda" gage is used to identify and compare storm events and event timing for the North Diversion Channel watershed Leveloggers. The "USGS 08329700 Campus Wash at Albuquerque" and "USGS 08329840 Hahn Arroyo in Albuquerque" gages were utilized to review and compare storm event runoff for the Campus Wash and Hahn Arroyo Leveloggers, respectively.

## 3. NOTIFICATION OF NON-STORMWATER FLOWS FROM ALBUQUERQUE BERNALILLO COUNTY WATER UTILITY AUTHORITY (ABCWUA)

Albuquerque Bernalillo County Water Utility Authority (ABCWUA) regularly notifies AMAFCA of planned non-stormwater flows into AMAFCA channels (for example, from well maintenance releases). In addition, AMAFCA receives monthly Discharge Monitoring Reports (DMRs) of Sanitary Sewer Overflows (SSOs) from ABCWUA. The notifications from ABCWUA related to the Leveloggers runoff data were reviewed to ensure that non-stormwater flow within AMAFCA channels was not analyzed as stormwater runoff. During this reporting period, the ABCWUA discharged non-stormwater flows intermittently from the Volandia Well into the Hahn Arroyo starting the week of January 18, 2023. This discharge

was recorded by the Hahn Levelogger and was not analyzed as a storm event. The ABCWUA also discharged non-stormwater flows intermittently, starting the week of January 24, 2023, from the Thomas Well #6 into the Hahn Arroyo. This discharge was not recorded by the Hahn Levelogger and was not analyzed as a storm event.

## III. RAINFALL RUNOFF RESPONSE TO STORM EVENTS

The Levelogger and rainfall data were viewed on a long-term basis, not just at an individual storm event level, and are presented in this report using GIS figures. This geospatial analysis and presentation were completed to improve the understanding of storm event rainfall runoff response for the Levelogger monitored basins.

Figure 2 shows the average peak discharge in cubic feet per second (cfs) for all storm events measured by the Leveloggers for the four months reported, November 2022 to February 2023, which provides a view of the relative peak flows monitored for storms in each contributing basin. During this reporting period, six (6) storms were recorded by the Leveloggers. Figure 3 shows the average peak discharge measured by the Leveloggers for all storm events during the annual dry season period of November 1 through June 30 from November 2016 to February 2023, which includes 85 storm events and provides a long-term analysis of the relative peak flows monitored for storms during the dry season in each contributing basin. Note that the Black Arroyo basin was recently added, and information shown in Figure 3 is only from November 2022 to February 2023.

Next, the total peak discharge values divided by the total area of each basin in acres (ac) was calculated. Figure 4 shows the discharge per acre (cfs/ac) for the six (6) storm events measured by the Leveloggers for the four (4) dry season months reported – November 2022 to February 2023. Figure 5 shows this same comparison measured by the Leveloggers for all storm events during the annual dry season period of November 1 through June 30 from November 2016 to February 2023. Note that the Black Arroyo basin was recently added, and information shown in Figure 5 is only from November 2022 to February 2023.

The third geospatial analysis shows the summation of the total runoff volume values from the analyzed storm events. Figure 6 provides an overall view of stormwater runoff volume per basin in acre-feet (ac-ft) for the six (6) storm events during the four (4) dry season months reported, November 2022 to February 2023, and Figure 7 shows these values measured by the Leveloggers for all storm events during the annual dry season period of November 1 through June 30 from November 2016 to February 2023. The existing

detention facilities within each basin are included in each of these figures to provide an understanding of stormwater volume storage available within each basin. Note that the Black Arroyo basin was recently added, and information shown in Figure 7 is only from November 2022 to February 2023.

Analysis was completed to relate the measured total runoff volume from the analyzed storm events in acre-feet (ac-ft) to the amount of precipitation received (as reported at the Albuquerque Sunport). Figure 8 shows the total runoff volume per inch of rainfall (ac-ft/in) for the six (6) storm events measured by the Leveloggers for the four (4) dry season months reported, November 2022 to February 2023, for each basin. Figure 9 shows the total runoff volume per inch of rainfall (ac-ft/in) measured by the Leveloggers for all storm events during the annual dry season period of November 1 through June 30 from November 2016 to February 2023. The figures also include the existing detention facilities within each basin to provide an understanding of stormwater volume storage available within each basin. Note that the Black Arroyo basin was recently added, and information shown in Figure 9 is only from November 2022 to February 2023.

# Average Peak Discharge (cfs)

*Measured by Leveloggers per Basin Over 4 Dry Season Months (November 2022 - February 2023)*

**Figure 2**

- Levelogger Sites
- NDC Levelogger Sites
- North Diversion Channel
- Basin

## Average Peak Runoff (cfs)

- 0 - 30
- 31 - 60
- 61 - 100
- 101 - 200
- > 200

N

0 5,000 10,000 20,000 Feet

AMAFCA

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Author: mcrooks

# Average Peak Discharge (cfs)

*Measured by Leveloggers per Basin During Dry Season Months (November - February) November 2016 - February 2023*

**Figure 3**

- Levelogger Sites
- NDC Levelogger Sites
- North Diversion Channel
- Basin

## Average Peak Runoff (cfs)

- 0 - 30
- 30 - 50
- 50 - 65
- 65 - 110
- > 110

N

0 5,000 10,000 20,000 Feet

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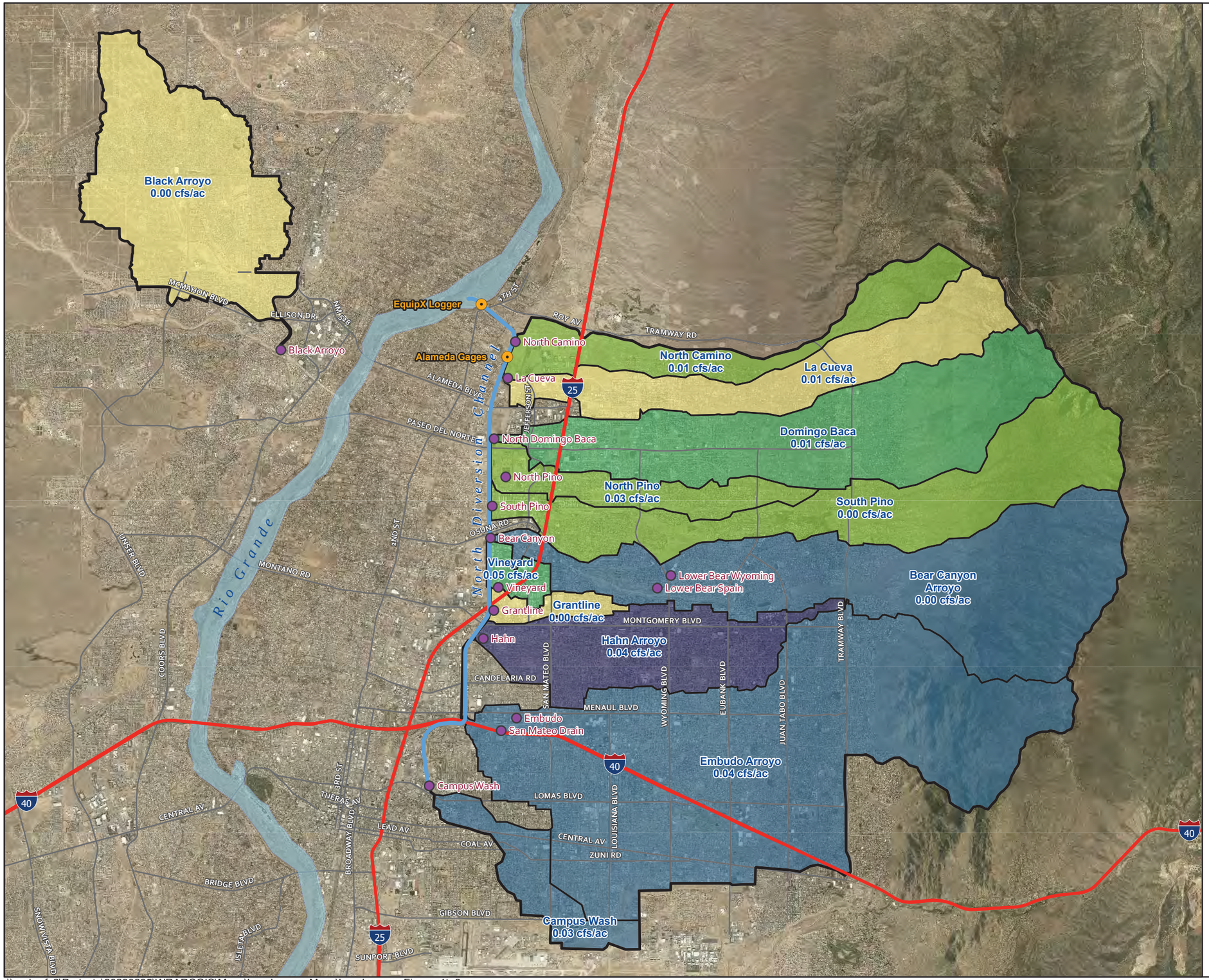
Author: mcrooks

# Total Peak Discharge per Acre (cfs/ac)

*Measured by Leveloggers per Basin Over 4 Dry Season Months (November 2022 - February 2023)*

**Figure 4**




Levelogger Sites
NDC Levelogger Sites
North Diversion Channel
Basin

**Total Peak Discharge per Acre (cfs/ac)**

- 0.0
- 0.0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- > 0.3

N

0 5,000 10,000 20,000 Feet

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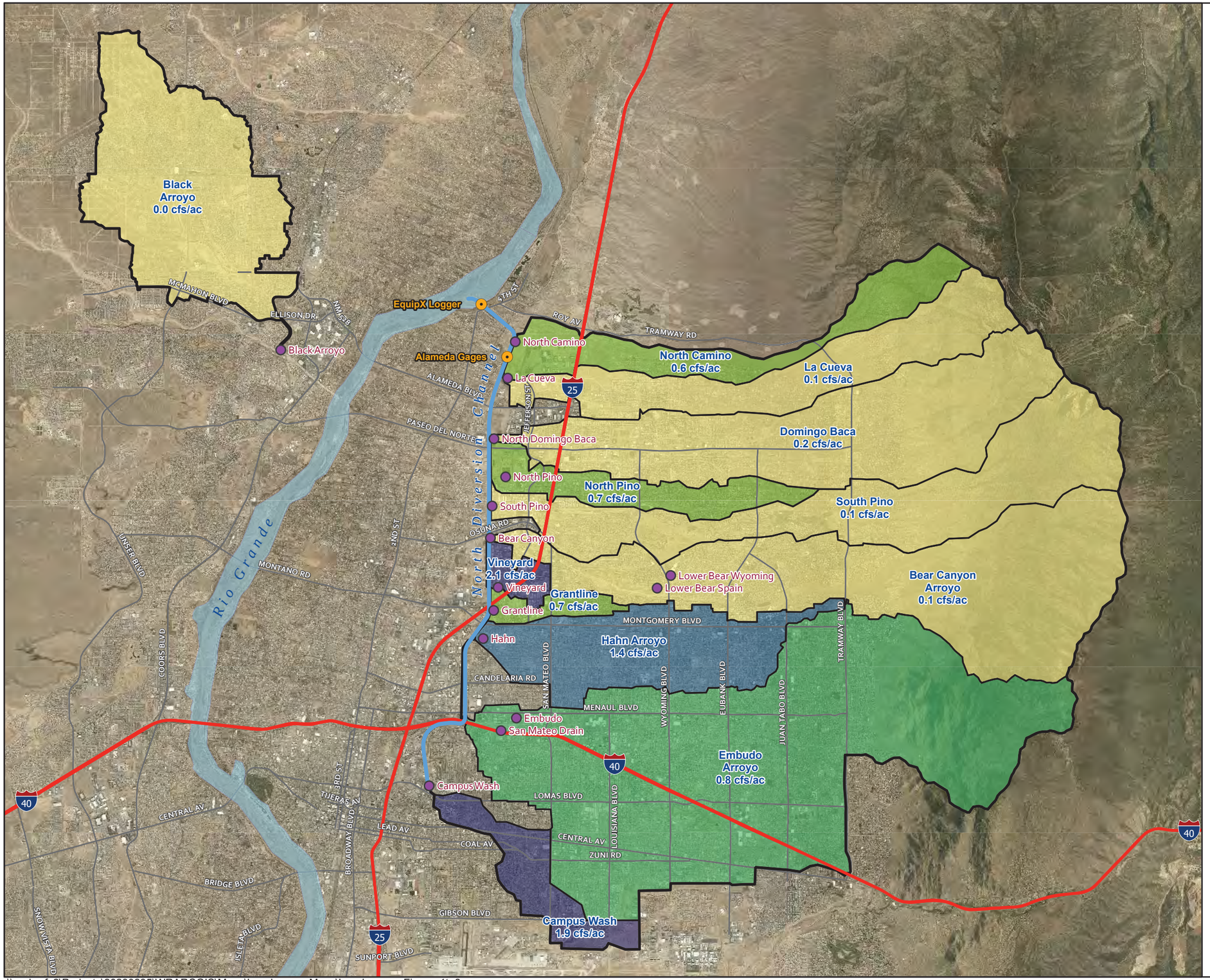
Author: mcrooks

# Total Peak Discharge per Acre (cfs/ac)

*Measured by Leveloggers per Basin During Dry Season Months (November - February) November 2016 - February 2023*

**Figure 5**




**Total Peak Discharge per Acre (cfs/ac)**

- 0.0 - 0.2
- 0.2 - 0.7
- 0.7 - 0.9
- 0.9 - 1.5
- > 1.5

- Levelogger Sites
- NDC Levelogger Sites
- North Diversion Channel
- Basin

N

0 5,000 10,000 20,000 Feet

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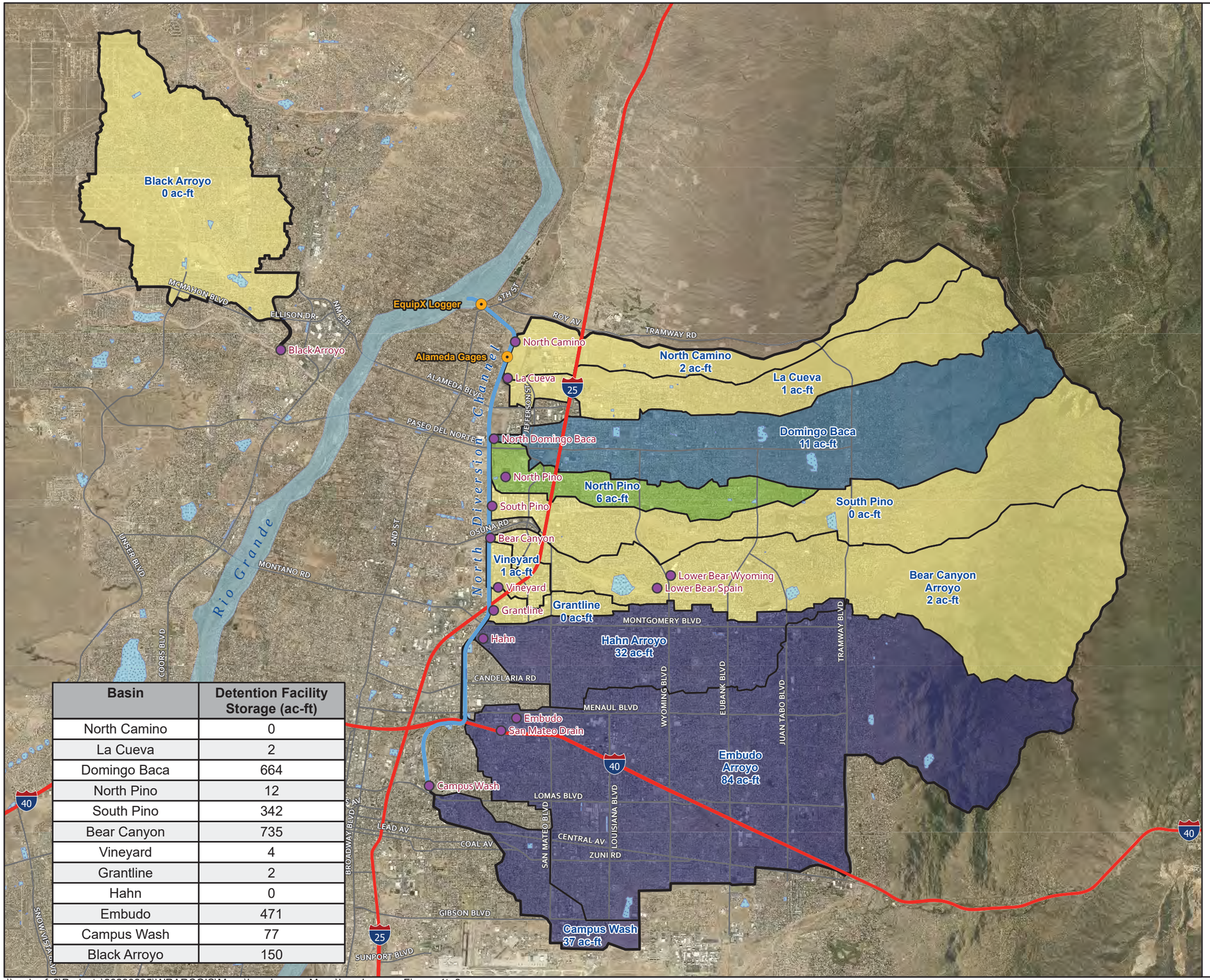
Author: mcrooks

# Total Runoff Volume (ac-ft)

*Measured by Leveloggers per Basin Over 4 Dry Season Months (November 2022 - February 2023)*

**Figure 6**




| Basin | Detention Facility Storage (ac-ft) |
|---|---|
| North Camino | 0 |
| La Cueva | 2 |
| Domingo Baca | 664 |
| North Pino | 12 |
| South Pino | 342 |
| Bear Canyon | 735 |
| Vineyard | 4 |
| Grantline | 2 |
| Hahn | 0 |
| Embudo | 471 |
| Campus Wash | 77 |
| Black Arroyo | 150 |

Detention Facilities
Levelogger Sites
NDC Levelogger Sites
North Diversion Channel
Basin

**Total Runoff Volume (ac-ft)**

- 0 - 2
- 2 - 8
- 8 - 10
- 10 - 24
- > 24

N

0 5,000 10,000 20,000 Feet

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Author: mcrooks

# Total Runoff Volume (ac-ft)

*Measured by Leveloggers per Basin During Dry Season Months (November - February) November 2016 - February 2023*

**Figure 7**

Black Arroyo
0 ac-ft

North Camino
93 ac-ft

La Cueva
25 ac-ft

Domingo Baca
172 ac-ft

North Pino
61 ac-ft

South Pino
102 ac-ft

Bear Canyon
Arroyo
242 ac-ft

Vineyard
125 ac-ft

Grantline
19 ac-ft

Hahn Arroyo
537 ac-ft

Embudo
Arroyo
341 ac-ft

Campus
Wash
289 ac-ft

EquipX Logger
Alameda Gages
Black Arroyo
North Camino
La Cueva
North Domingo Baca
North Pino
South Pino
Bear Canyon
Vineyard
Grantline
Hahn
Embudo
San Mateo Drain
Campus Wash
Lower Bear Wyoming
Lower Bear Spain

North Diversion Channel
Rio Grande

MCMAHON BLVD
ELLISON DR
NM 528
ALAMEDA BLVD
PASEO DEL NORTE
OSUNA RD
MONTANO RD
UNSER BLVD
COORS BLVD
2ND ST
ROY AV
TRAMWAY RD
JEFFERSON ST
MONTGOMERY BLVD
CANDELARIA RD
MENAUL BLVD
SAN MATEO BLVD
WYOMING BLVD
EUBANK BLVD
JUAN TABO BLVD
TRAMWAY BLVD
LOMAS BLVD
LOUISIANA BLVD
CENTRAL AV
ZUNI RD
LEAD AV
COAL AV
BROADWAY BLVD SE
GIBSON BLVD
SUNPORT BLVD
SNOWVISTA BLVD

| Basin | Detention Facility Storage (ac-ft) |
|---|---|
| North Camino | 0 |
| La Cueva | 2 |
| Domingo Baca | 664 |
| North Pino | 12 |
| South Pino | 342 |
| Bear Canyon | 735 |
| Vineyard | 4 |
| Grantline | 2 |
| Hahn | 0 |
| Embudo | 471 |
| Campus Wash | 77 |
| Black Arroyo | 150 |

**Total Runoff Volume (ac-ft)**

- 0 - 20
- 20 - 100
- 100 - 200
- 200 - 350
- > 350

Detention Facilities
Levelogger Sites
NDC Levelogger Sites
North Diversion Channel
Basin

N

0 5,000 10,000 20,000 Feet

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Author: mcrooks

# Total Runoff Volume per Inch of Rainfall (ac-ft/in Rainfall)

*Measured by Leveloggers per Basin Over 4 Dry Season Months (November 2022 - February 2023)*

**Figure 8**

Detention Facilities
Levelogger Sites
NDC Levelogger Sites
North Diversion Channel
Basin

**Total Runoff Volume Per Inch Rainfall (ac-ft/in)**

- 0 - 5
- 5 - 10
- 10 - 20
- 20 - 40
- > 40

N

0 5,000 10,000 20,000 Feet

| Basin | Detention Facility Storage (ac-ft) |
|---|---|
| North Camino | 0 |
| La Cueva | 2 |
| Domingo Baca | 664 |
| North Pino | 12 |
| South Pino | 342 |
| Bear Canyon | 735 |
| Vineyard | 4 |
| Grantline | 2 |
| Hahn | 0 |
| Embudo | 471 |
| Campus Wash | 77 |
| Black Arroyo | 150 |

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Author: mcrooks

# Total Runoff Volume per Inch of Rainfall (ac-ft/in Rainfall)

*Measured by Leveloggers per Basin During Dry Season Months (November - February) November 2016 - February 2023*

**Figure 9**

Black Arroyo
0 ac-ft/in

North Camino
6 ac-ft/in

La Cueva
2 ac-ft/in

Domingo Baca
11 ac-ft/in

North Pino
4 ac-ft/in

South Pino
7 ac-ft/in

Bear Canyon
Arroyo
15 ac-ft/in

Vineyard
8 ac-ft/in

Grantline
1 ac-ft/in

Hahn Arroyo
34 ac-ft/in

Embudo Arroyo
22 ac-ft/in

Campus Wash
18 ac-ft/in

EquipX Logger
Alameda Gages
Black Arroyo
North Camino
La Cueva
North Domingo Baca
North Pino
South Pino
Bear Canyon
Vineyard
Lower Bear Wyoming
Lower Bear Spain
Grantline
Hahn
Embudo
San Mateo Drain
Campus Wash

McMAHON BLVD
ELLISON DR.
NM 528
ALAMEDA BLVD
PASEO DEL NORTE
OSUNA RD
MONTANO RD
UNSER BLVD
COORS BLVD
2ND ST
ROY AV
TRAMWAY RD
4TH ST
JEFFERSON ST
MONTGOMERY BLVD
CANDELARIA RD
MENAUL BLVD
LOMAS BLVD
LEAD AV
COAL AV
CENTRAL AV
ZUNI RD
GIBSON BLVD
SUNPORT BLVD
SAN MATEO BLVD
WYOMING BLVD
EUBANK BLVD
JUAN TABO BLVD
LOUISIANA BLVD
BROADWAY/BLVD AV
SOUTHWEST RD
TRAMWAY BLVD

Rio Grande

North Diversion Channel

| Basin | Detention Facility Storage (ac-ft) |
|---|---|
| North Camino | 0 |
| La Cueva | 2 |
| Domingo Baca | 664 |
| North Pino | 12 |
| South Pino | 342 |
| Bear Canyon | 735 |
| Vineyard | 4 |
| Grantline | 2 |
| Hahn | 0 |
| Embudo | 471 |
| Campus Wash | 77 |
| Black Arroyo | 150 |

Detention Facilities
Levelogger Sites
NDC Levelogger Sites
North Diversion Channel
Basin

**Total Runoff Volume Per Inch Rainfall (ac-ft/in)**

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 25
- > 25

N

0 5,000 10,000 20,000 Feet

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Author: mcrooks

## IV. NOVEMBER 2022 COLLECTION PERIOD DATA

One (1) storm event was recorded by the Leveloggers during the November collection period; this storm occurred on November 13, 2022. Information for this storm event is presented below and includes NEXRAD rainfall data, Levelogger measured peak flow rates and runoff volume data, and a spatially represented map of the NEXRAD data, as well as peak flows reported for each Levelogger.

Table 3 summarizes the monitored runoff volume and peak flow for the storm event for each Levelogger for the November collection period.

### A. NOVEMBER 13, 2022

On November 13, 2022, a storm event occurred overnight through the morning of November 14th. Table 2 presents the average NEXRAD data for this storm event for all basins with Leveloggers. The bar chart in Figure 10 graphically shows the recorded Levelogger peak flow rates and runoff volume data for the Levelogger locations. The NEXRAD data for this storm event was added into ArcGIS; the data is presented spatially related to the underlying basins in Figure 11.

**Table 2: November 13, 2022 Storm Event NEXRAD Storm Total Precipitation Accumulation**

| **Average NEXRAD Storm Precipitation: 0.19 inches<br>Sunport Rainfall Gage (NOAA): 0.01 inches** | |
|---|---|
| **Basin** | **Average of NEXRAD Precipitation Data (inches)** |
| Black Arroyo | 0.23 |
| North Camino Arroyo | 0.15 |
| La Cueva Arroyo | 0.13 |
| North Domingo Baca | 0.15 |
| North Pino Arroyo | 0.20 |
| South Pino Arroyo | 0.22 |
| **Bear Canyon Arroyo | 0.21 |
| Vineyard Arroyo | 0.28 |
| Grantline Arroyo | 0.24 |
| Hahn Arroyo | 0.29 |
| *Embudo Arroyo | 0.22 |
| *San Mateo Drain | 0.22 |
| Campus Wash | 0.24 |
| **Lower Bear – Upstream (Wyoming) | 0.21 |
| **Lower Bear – Downstream (Spain) | 0.21 |

**Embudo and San Mateo are located in the same basin as delineated by AMAFCA in GIS.*

***Bear Canyon and the Lower Bear Leveloggers are located in the same basin.*

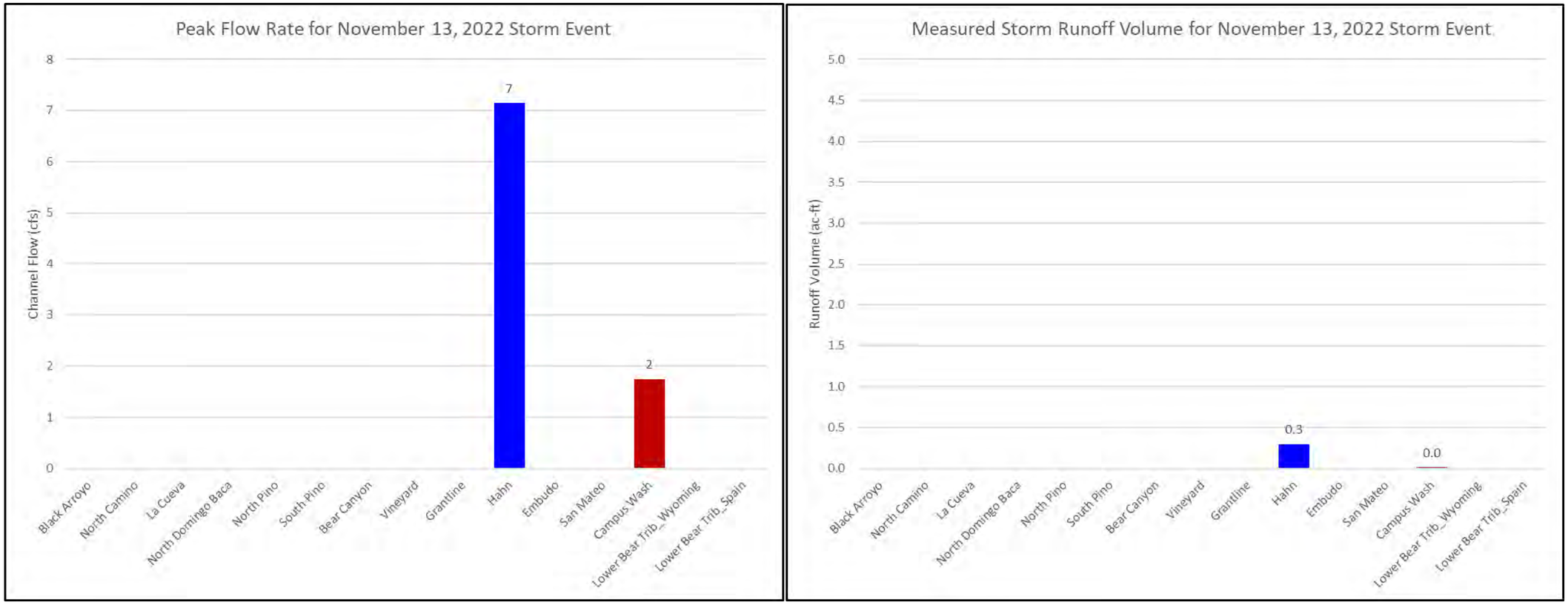


**Figure 10: November 13, 2022 Storm Event, Peak Flow Rates and Runoff Volume**

# AMAFCA
# Levelogger Runoff and NOAA NEXRAD Rainfall

*November 13, 2022 Storm Event*

**Figure 11**

**Flow Rate (cfs)**

- Not Recorded
- 0.1- 25.0
- 25.1 - 50.0
- 50.1 - 100.0
- 100.1- 150.0
- 150.1 - 200.0
- 200.1 - 500.0
- >500.0

**Rainfall (in.)**

- Trace - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1.0 - 1.2
- > 1.2

***0.XX = average rainfall within basin (in.)***

**Average rainfall across all basins shown: 0.19 in.**

N

0 5,000 10,000 20,000 Feet

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Author: mcrooks

**Table 3: November 2022 Collection Period Runoff Measured at Levelogger Locations**

| Storm Event Date | November 13 |
|---|---|
| **Location** | **Runoff Volume (ac-ft)** |
| Black Arroyo | -- |
| North Camino Arroyo | -- |
| La Cueva Arroyo | -- |
| North Domingo Baca | -- |
| North Pino Arroyo | -- |
| South Pino Arroyo | -- |
| Bear Canyon Arroyo | -- |
| Vineyard Arroyo | -- |
| Grantline Arroyo | -- |
| Hahn Arroyo | 0.3 |
| Embudo Arroyo | -- |
| San Mateo Drain | -- |
| Campus Wash | 0.01 |
| Lower Bear – Upstream (Wyoming) | -- |
| Lower Bear – Downstream (Spain) | -- |
| **Location** | **Peak Flow (cfs)** |
| Black Arroyo | -- |
| North Camino Arroyo | -- |
| La Cueva Arroyo | -- |
| North Domingo Baca | -- |
| North Pino Arroyo | -- |
| South Pino Arroyo | -- |
| Bear Canyon Arroyo | -- |
| Vineyard Arroyo | -- |
| Grantline Arroyo | -- |
| Hahn Arroyo | 7 |
| Embudo Arroyo | -- |
| San Mateo Drain | -- |
| Campus Wash | 2 |
| Lower Bear – Upstream (Wyoming) | -- |
| Lower Bear – Downstream (Spain) | -- |

## V. DECEMBER 2022 COLLECTION PERIOD DATA

Two (2) storm events were documented during the December collection period for this analysis of the Leveloggers; these storms occurred on December 3, 2022 and January 1, 2023. Information for these storm events are presented below and includes NEXRAD rainfall data, Levelogger measured peak flow rates and runoff volume data, and a spatially represented map of the NEXRAD data, as well as peak flows reported for each Levelogger.

Table 6 summarizes the monitored runoff volume and peak flow for the storm events for each Levelogger for the December collection period. AMAFCA reported that the Grantline Levelogger was offline during the December collection period; therefore the December analysis does not include data for the Grantline Levelogger.

### A. DECEMBER 3, 2022

On December 3, 2022, a storm event occurred. Table 4 presents the NEXRAD average data for this storm event for all basins with Leveloggers. The bar chart in Figure 12 graphically shows the recorded Levelogger peak flow rates and runoff volume data for the Levelogger locations. The NEXRAD data for this storm event was added into ArcGIS; the data is presented spatially related to the underlying basins in Figure 13.

**Table 4: December 3, 2022 Storm Event NEXRAD Storm Total Precipitation Accumulation**

| **Average NEXRAD Precipitation: 0.33 inches<br>Sunport Rainfall Gage (NOAA): 0.48 inches** | |
|---|---|
| **Basin** | **Average of NEXRAD Precipitation Data (inches)** |
| Black Arroyo | 0.20 |
| North Camino Arroyo | 0.21 |
| La Cueva Arroyo | 0.20 |
| North Domingo Baca | 0.26 |
| North Pino Arroyo | 0.23 |
| South Pino Arroyo | 0.37 |
| **Bear Canyon Arroyo | 0.44 |
| Vineyard Arroyo | 0.24 |
| Grantline Arroyo | 0.24 |
| Hahn Arroyo | 0.28 |
| *Embudo Arroyo | 0.42 |
| *San Mateo Drain | 0.42 |
| Campus Wash | 0.31 |
| **Lower Bear – Upstream (Wyoming) | 0.44 |
| **Lower Bear – Downstream (Spain) | 0.44 |

**Embudo and San Mateo are located in the same basin as delineated by AMAFCA in GIS.*

***Bear Canyon and the Lower Bear Leveloggers are located in the same basin.*

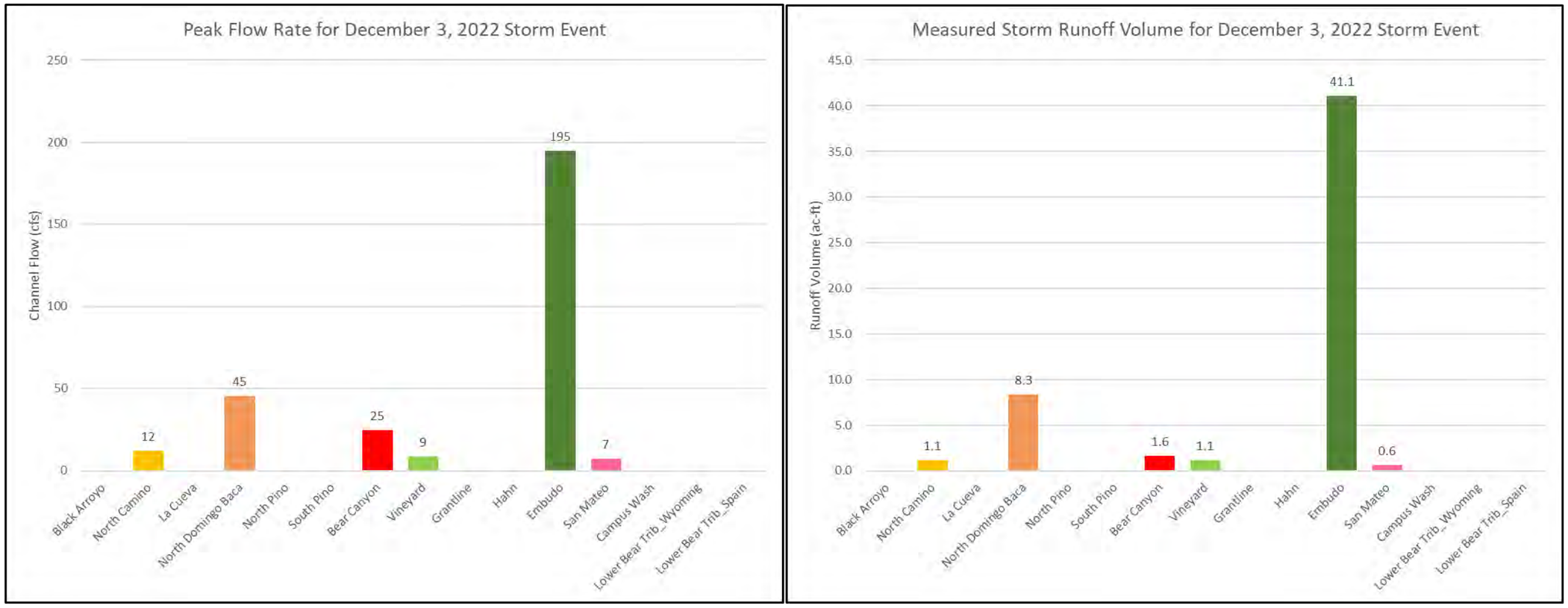
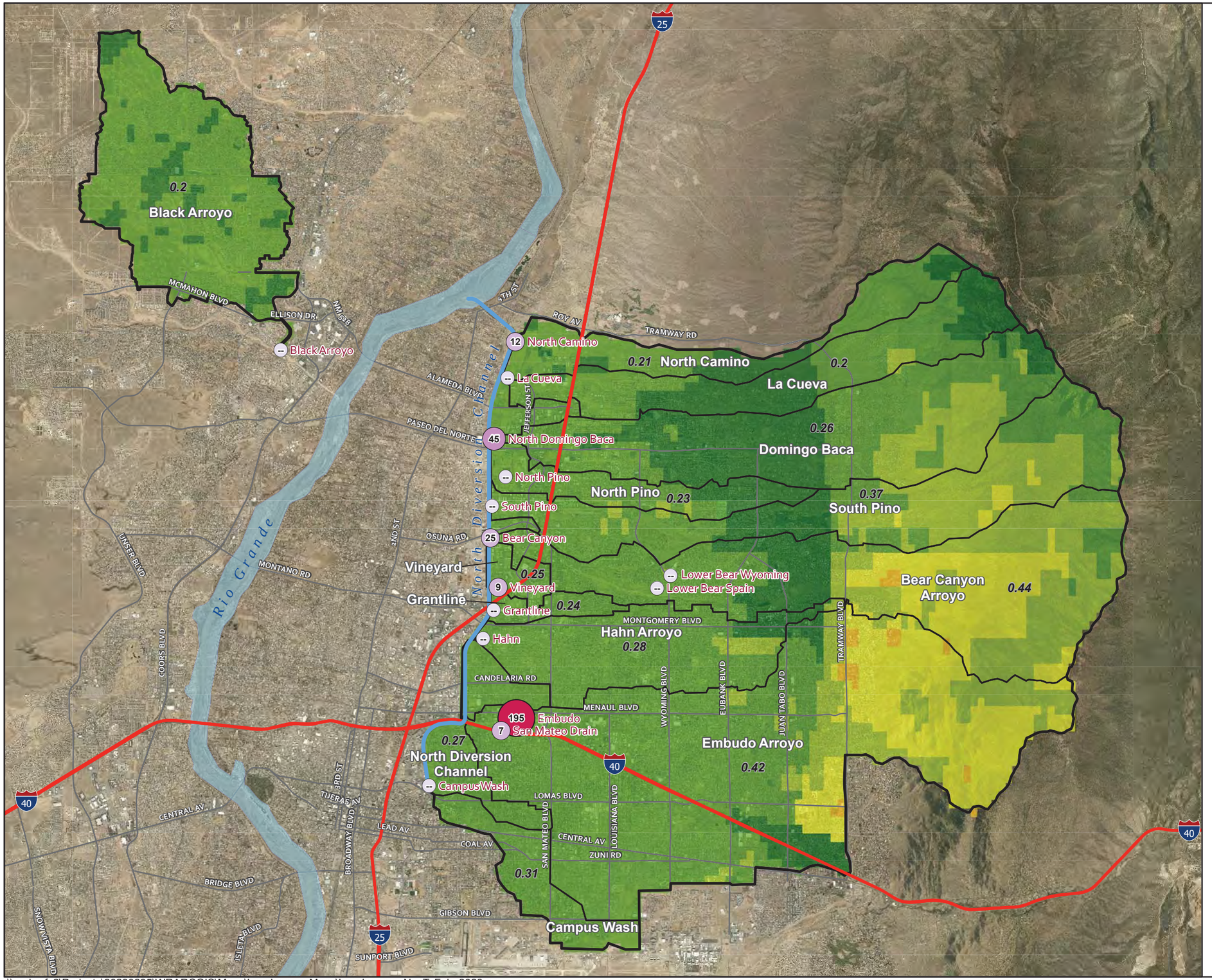



**Figure 12: December 3, 2022 Storm Event, Peak Flow Rates and Runoff Volume**

# AMAFCA
# Levelogger Runoff and NOAA NEXRAD Rainfall

*December 3, 2022 Storm Event*

**Figure 13**




**Flow Rate (cfs)**

- Not Recorded
- 0.1- 25.0
- 25.1 - 50.0
- 50.1 - 100.0
- 100.1- 150.0
- 150.1 - 200.0
- 200.1 - 500.0
- >500.0

**Rainfall (in.)**

- Trace - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1.0 - 1.2
- > 1.2

***0.XX = average rainfall within basin (in.)***

**Average rainfall across all basins shown: 0.33 in.**

N

0 5,000 10,000 20,000 Feet

AMAFCA

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Author: mcrooks

## B. JANUARY 1, 2023

On January 1, 2023, a storm event occurred. Table 5 presents the average NEXRAD data for this storm event for all basins with Leveloggers. The bar chart in Figure 14 graphically shows the recorded Levelogger peak flow rates and runoff volume data for the Levelogger locations. The NEXRAD data for this storm event was added into ArcGIS; the data is presented spatially related to the underlying basins in Figure 15.

**Table 5: January 1, 2023 Storm Event NEXRAD Storm Total Precipitation Accumulation**

| **Average NEXRAD Precipitation: 0.24 inches<br>Sunport Rainfall Gage (NOAA): 0.17 inches** | |
|---|---|
| **Basin** | **Average of NEXRAD Precipitation Data (inches)** |
| Black Arroyo | 0.16 |
| North Camino Arroyo | 0.21 |
| La Cueva Arroyo | 0.21 |
| North Domingo Baca | 0.23 |
| North Pino Arroyo | 0.15 |
| South Pino Arroyo | 0.27 |
| **Bear Canyon Arroyo | 0.30 |
| Vineyard Arroyo | 0.19 |
| Grantline Arroyo | 0.13 |
| Hahn Arroyo | 0.22 |
| *Embudo Arroyo | 0.27 |
| *San Mateo Drain | 0.27 |
| Campus Wash | 0.25 |
| **Lower Bear – Upstream (Wyoming) | 0.30 |
| **Lower Bear – Downstream (Spain) | 0.30 |

**Embudo and San Mateo are located in the same basin as delineated by AMAFCA in GIS.*

***Bear Canyon and the Lower Bear Leveloggers are located in the same basin.*

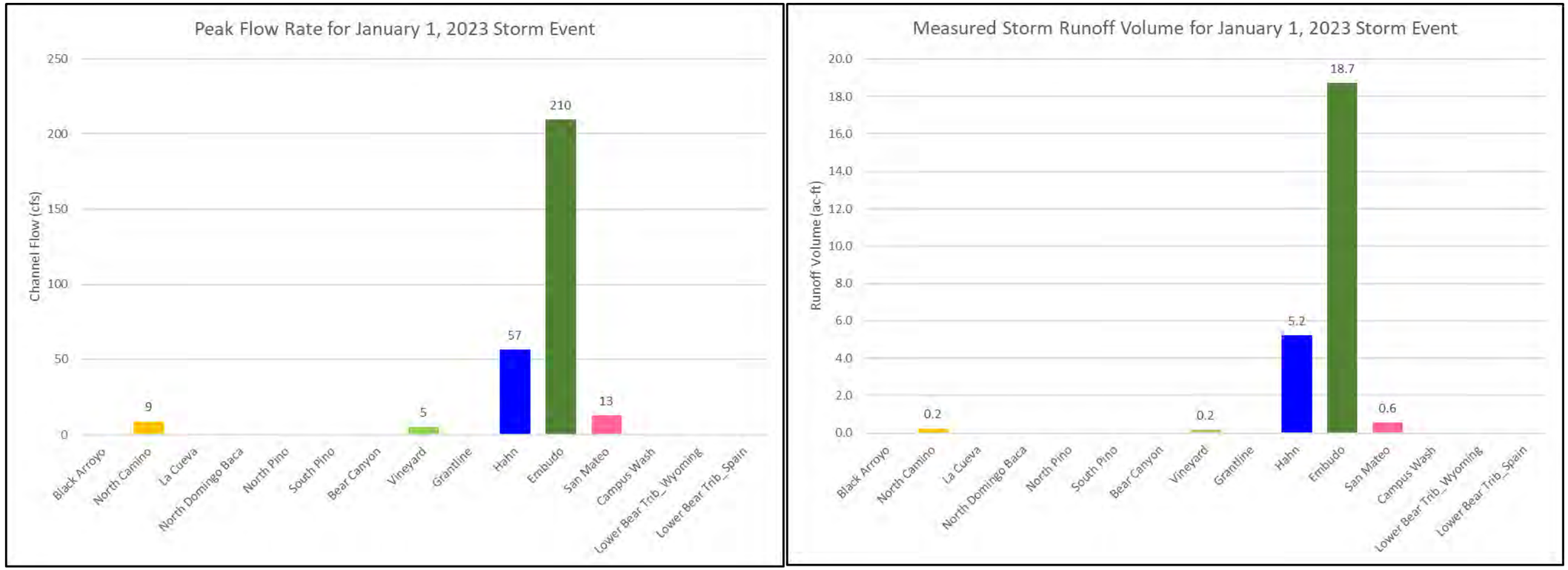
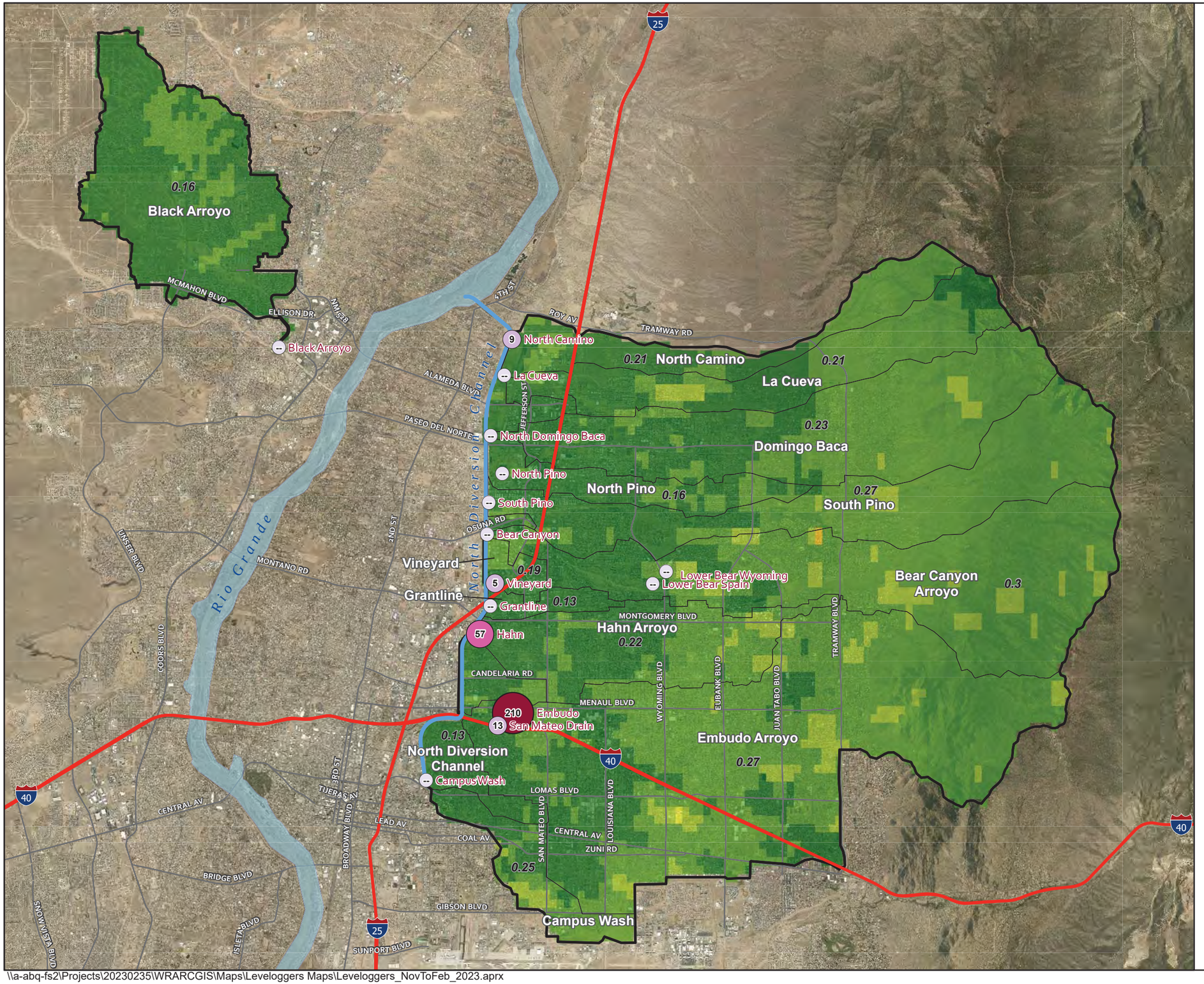



**Figure 14: January 1, 2023 Storm Event, Peak Flow Rates and Runoff Volume**

# AMAFCA
# Levelogger Runoff and NOAA NEXRAD Rainfall

*January 1, 2023 Storm Event*

**Figure 15**




| Flow Rate (cfs) | Rainfall (in.) |
|---|---|
| Not Recorded | Trace - 0.2 |
| 0.1- 25.0 | 0.2 - 0.4 |
| 25.1 - 50.0 | 0.4 - 0.6 |
| 50.1 - 100.0 | 0.6 - 0.8 |
| 100.1- 150.0 | 0.8 - 1 |
| 150.1 - 200.0 | 1.0 - 1.2 |
| 200.1 - 500.0 | > 1.2 |
| >500.0 | |

***0.XX = average rainfall within basin (in.)***

**Average rainfall across all basins shown: 0.24 in.**

N

0 5,000 10,000 20,000 Feet

AMAFCA

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Author: mcrooks

**Table 6: December 2022 Collection Period Runoff Measured at Levelogger Locations**

| Storm Event Date | December 3 | January 1 |
|---|---|---|
| **Location** | **Runoff Volume (ac-ft)** | |
| Black Arroyo | -- | -- |
| North Camino Arroyo | 1.1 | 0.2 |
| La Cueva Arroyo | -- | -- |
| North Domingo Baca | 8.3 | -- |
| North Pino Arroyo | -- | -- |
| South Pino Arroyo | -- | -- |
| Bear Canyon Arroyo | 1.6 | -- |
| Vineyard Arroyo | 1.1 | 0.2 |
| *Grantline Arroyo | -- | -- |
| Hahn Arroyo | -- | 5.2 |
| Embudo Arroyo | 41.1 | 18.7 |
| San Mateo Drain | 0.6 | 0.6 |
| Campus Wash | -- | -- |
| Lower Bear – Upstream (Wyoming) | -- | -- |
| Lower Bear – Downstream (Spain) | -- | -- |
| **Location** | **Peak Flow (cfs)** | |
| Black Arroyo | -- | -- |
| North Camino Arroyo | 12 | 9 |
| La Cueva Arroyo | -- | -- |
| North Domingo Baca | 45 | -- |
| North Pino Arroyo | -- | -- |
| South Pino Arroyo | -- | -- |
| Bear Canyon Arroyo | 25 | -- |
| Vineyard Arroyo | 9 | 5 |
| *Grantline Arroyo | -- | -- |
| Hahn Arroyo | -- | 57 |
| Embudo Arroyo | 195 | 210 |
| San Mateo Drain | 7 | 13 |
| Campus Wash | -- | -- |
| Lower Bear – Upstream (Wyoming) | -- | -- |
| Lower Bear – Downstream (Spain) | -- | -- |

**Grantline Levelogger was offline during the December collection period.*

## VI. JANUARY 2023 COLLECTION PERIOD DATA

One (1) storm event was reported from the Leveloggers during the January collection period for this analysis of the Leveloggers; this storm event occurred on January 17, 2023. Information for this storm event is presented below and includes NEXRAD rainfall data, Levelogger measured peak flow rates and runoff volume data, and a spatially represented map of the NEXRAD rainfall data.

Table 8 summarizes the monitored runoff volume and peak flow for the storm event for each Levelogger for the January collection period. AMAFCA reported that the Grantline Levelogger was offline during the January collection period; therefore the January analysis does not include data for the Grantline Levelogger.

### A. JANUARY 17, 2023

On January 17, 2023, a storm event occurred. Table 7 presents the NEXRAD data for this storm event for all basins with Leveloggers. The bar chart in Figure 16 graphically shows the recorded Levelogger peak flow rates and runoff volume data for the Levelogger locations. The NEXRAD data for this storm event was added into ArcGIS; the data is presented spatially related to the underlying basins in Figure 17.

**Table 7: January 17, 2023 Storm Event NEXRAD Storm Total Precipitation Accumulation**

| **Average NEXRAD Precipitation: 0.20 inches<br>Sunport Rainfall Gage (NOAA): 0.13 inches** | |
|---|---|
| **Basin** | **Average of NEXRAD Precipitation Data (inches)** |
| Black Arroyo | 0.08 |
| North Camino Arroyo | 0.30 |
| La Cueva Arroyo | 0.28 |
| North Domingo Baca | 0.27 |
| North Pino Arroyo | 0.17 |
| South Pino Arroyo | 0.27 |
| **Bear Canyon Arroyo | 0.26 |
| Vineyard Arroyo | 0.17 |
| Grantline Arroyo | 0.14 |
| Hahn Arroyo | 0.17 |
| *Embudo Arroyo | 0.16 |
| *San Mateo Drain | 0.16 |
| Campus Wash | 0.15 |
| **Lower Bear – Upstream (Wyoming) | 0.26 |
| **Lower Bear – Downstream (Spain) | 0.26 |

**Embudo and San Mateo are located in the same basin as delineated by AMAFCA in GIS.*

***Bear Canyon and the Lower Bear Leveloggers are located in the same basin.*

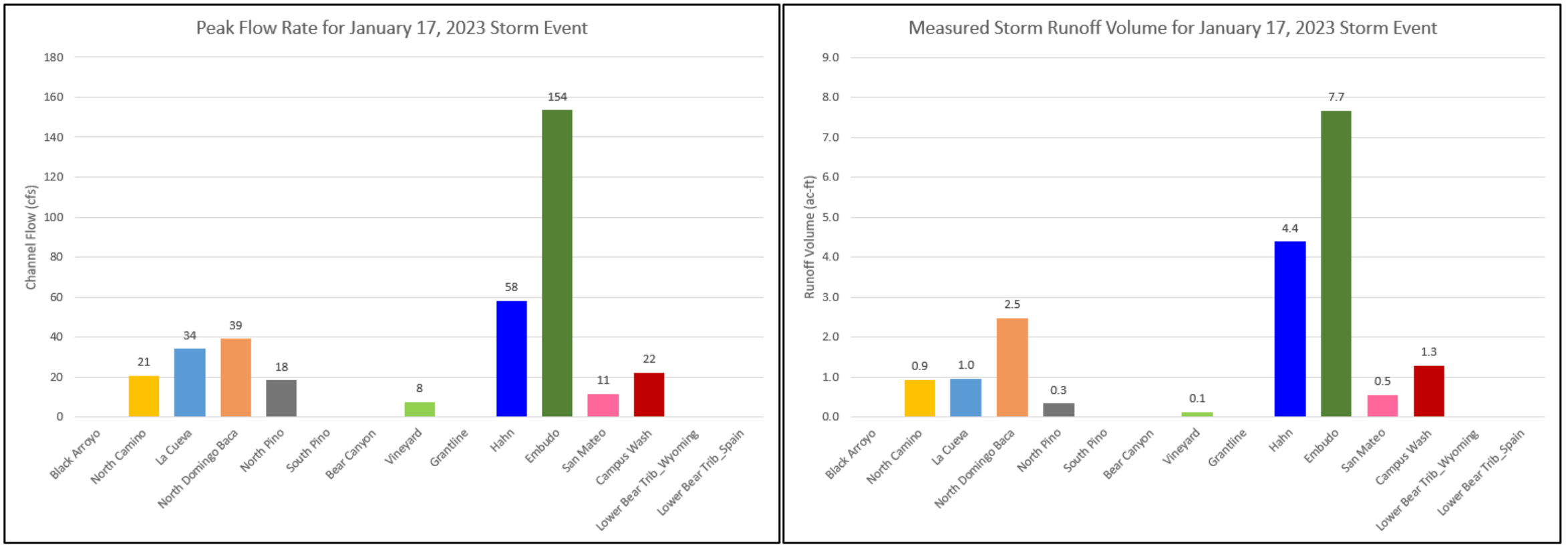
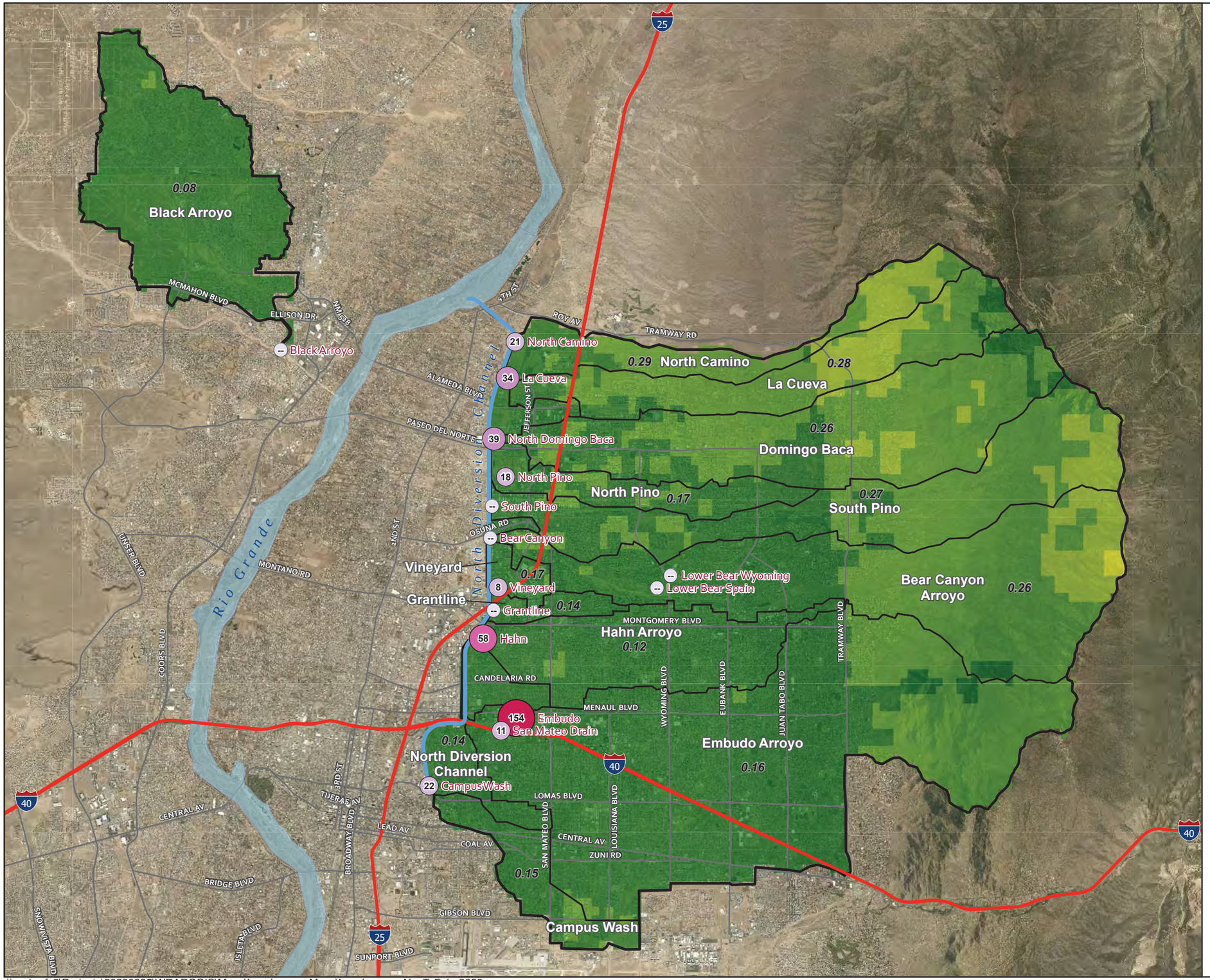



**Figure 16: January 17, 2023 Storm Event, Peak Flow Rates and Runoff Volume**

# AMAFCA
# Levelogger Runoff and NOAA NEXRAD Rainfall

*January 17, 2023 Storm Event*

**Figure 17**




| Flow Rate (cfs) | Rainfall (in.) |
|---|---|
| Not Recorded | Trace - 0.2 |
| 0.1- 25.0 | 0.2 - 0.4 |
| 25.1 - 50.0 | 0.4 - 0.6 |
| 50.1 - 100.0 | 0.6 - 0.8 |
| 100.1- 150.0 | 0.8 - 1 |
| 150.1 - 200.0 | 1.0 - 1.2 |
| 200.1 - 500.0 | > 1.2 |
| >500.0 | |

***0.XX = average rainfall within basin (in.)***

**Average rainfall across all basins shown: 0.20 in.**

N

0 5,000 10,000 20,000 Feet

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Author: mcrooks

**Table 8: January 2023 Collection Period Runoff Measured at Levelogger Locations**

| Storm Event Date | January 17 |
|---|---|
| **Location** | **Runoff Volume (ac-ft)** |
| Bear Arroyo | -- |
| North Camino Arroyo | 0.9 |
| La Cueva Arroyo | 1.0 |
| North Domingo Baca | 2.5 |
| North Pino Arroyo | 0.3 |
| South Pino Arroyo | -- |
| Bear Canyon Arroyo | -- |
| Vineyard Arroyo | 0.1 |
| *Grantline Arroyo | -- |
| Hahn Arroyo | 4.4 |
| Embudo Arroyo | 7.7 |
| San Mateo Drain | 0.5 |
| Campus Wash | 1.3 |
| Lower Bear – Upstream (Wyoming) | -- |
| Lower Bear – Downstream (Spain) | -- |
| **Location** | **Peak Flow (cfs)** |
| Bear Arroyo | -- |
| North Camino Arroyo | 21 |
| La Cueva Arroyo | 34 |
| North Domingo Baca | 39 |
| North Pino Arroyo | 18 |
| South Pino Arroyo | -- |
| Bear Canyon Arroyo | -- |
| Vineyard Arroyo | 8 |
| *Grantline Arroyo | -- |
| Hahn Arroyo | 58 |
| Embudo Arroyo | 154 |
| San Mateo Drain | 11 |
| Campus Wash | 22 |
| Lower Bear – Upstream (Wyoming) | -- |
| Lower Bear – Downstream (Spain) | -- |

**Grantline Levelogger was offline during the December collection period.*

## VII. FEBRUARY 2023 COLLECTION PERIOD DATA

Two (2) storm events were reported by Leveloggers during the February collection period; these storms occurred on February 13, and February 15, 2023. Information for these storm events is presented below and includes NEXRAD rain data, Levelogger measured peak flow rates and runoff volume data, and a spatially represented map of the NEXRAD rainfall data as well as peak flows reported for each Levelogger.

Table 11 summarizes the monitored runoff volume and peak flow per storm event for each Levelogger for the February collection period. AMAFCA reported that the Grantline Levelogger was offline during the February collection period; therefore the February analysis does not include data for the Grantline Levelogger.

### A. FEBRUARY 13, 2023

On February 13, 2023, a storm event occurred. Table 9 presents the NEXRAD data for this storm event for all basins with Leveloggers. The Levelogger results for the Hahn and Campus Wash arroyos were compared with USGS Hahn and USGS Campus Wash gages to ensure the entire storm event was reported. The bar chart in Figure 18 graphically shows the recorded Levelogger peak flow rates and runoff volume data for the Levelogger locations. The NEXRAD data for this storm event was added into ArcGIS; the data is presented spatially related to the underlying basins in Figure 19.

**Table 9: February 13, 2023 Storm Event NEXRAD Storm Total Precipitation Accumulation**

| **Average NEXRAD Precipitation: 0.32 inches<br>Sunport Rainfall Gage (NOAA): 0.12 inches** | |
|---|---|
| **Basin** | **Average of NEXRAD Precipitation Data (inches)** |
| Black Arroyo | 0.21 |
| North Camino Arroyo | 0.32 |
| La Cueva Arroyo | 0.29 |
| North Domingo Baca | 0.28 |
| North Pino Arroyo | 0.34 |
| South Pino Arroyo | 0.31 |
| **Bear Canyon Arroyo | 0.31 |
| Vineyard Arroyo | 0.47 |
| Grantline Arroyo | 0.47 |
| Hahn Arroyo | 0.36 |
| *Embudo Arroyo | 0.34 |
| *San Mateo Drain | 0.34 |
| Campus Wash | 0.44 |
| **Lower Bear – Upstream (Wyoming) | 0.31 |
| **Lower Bear – Downstream (Spain) | 0.31 |

**Embudo and San Mateo are located in the same basin as delineated by AMAFCA in GIS.*

***Bear Canyon and the Lower Bear Leveloggers are located in the same basin.*

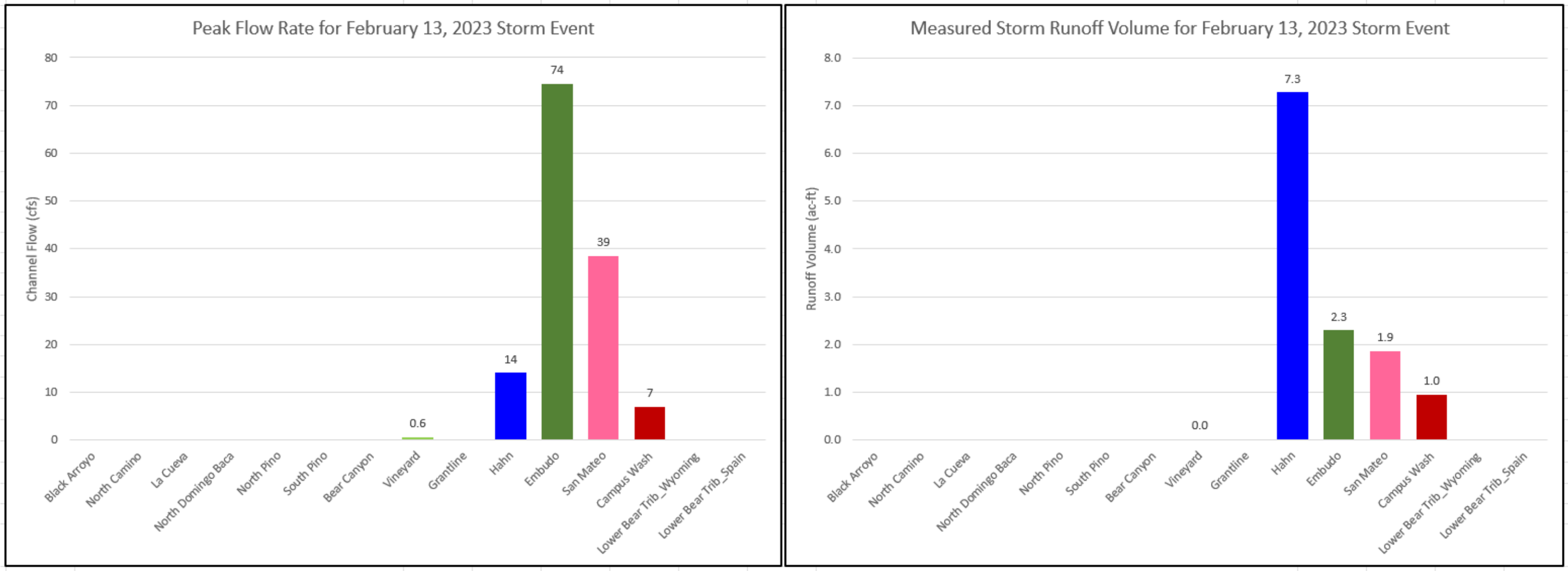
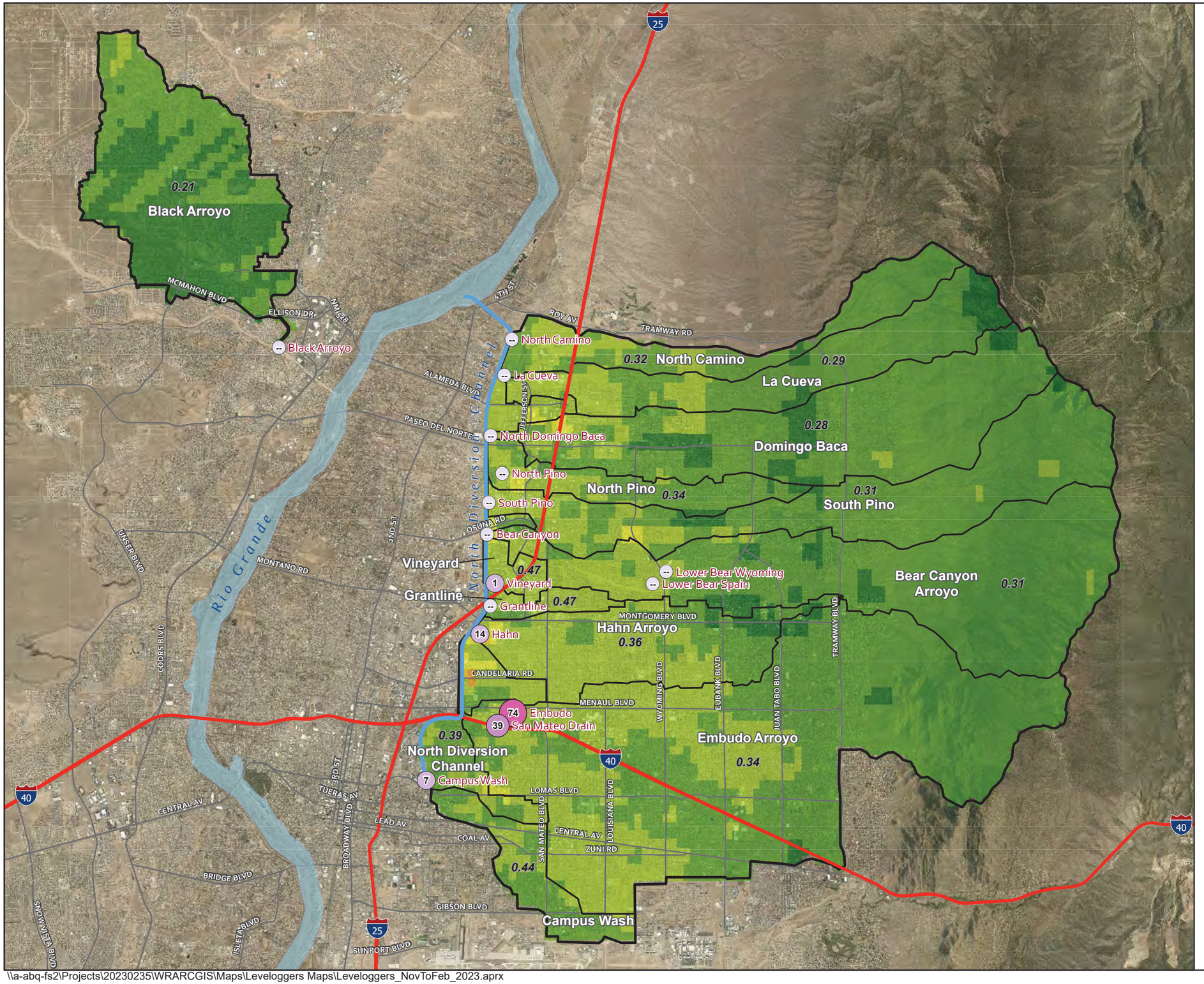



**Figure 18: February 13, 2023 Storm Event, Peak Flow Rates and Runoff Volume**

# AMAFCA
# Levelogger Runoff and NOAA NEXRAD Rainfall

*February 13, 2023 Storm Event*

**Figure 19**




| Flow Rate (cfs) | Rainfall (in.) |
|---|---|
| Not Recorded | Trace - 0.2 |
| 0.1- 25.0 | 0.2 - 0.4 |
| 25.1 - 50.0 | 0.4 - 0.6 |
| 50.1 - 100.0 | 0.6 - 0.8 |
| 100.1- 150.0 | 0.8 - 1 |
| 150.1 - 200.0 | 1.0 - 1.2 |
| 200.1 - 500.0 | > 1.2 |
| >500.0 | |

***0.XX = average rainfall within basin (in.)***

**Average rainfall across all basins shown: 0.32 in.**

N

0 5,000 10,000 20,000 Feet

AMAFCA

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Author: mcrooks

## B. FEBRUARY 15, 2023

On February 15, 2023, a storm event occurred. Table 10 presents the NEXRAD data for this storm event for all basins with Leveloggers. The Levelogger results for the Hahn and Campus Wash arroyos were compared with USGS Hahn and USGS Campus Wash gages to ensure the entire storm event was reported. The bar chart in Figure 20 graphically shows the recorded Levelogger peak flow rates and runoff volume data for the Levelogger locations. The NEXRAD data for this storm event was added into ArcGIS; the data is presented spatially related to the underlying basins in Figure 21.

**Table 10: February 15, 2023 Storm Event NEXRAD Storm Total Precipitation Accumulation**

| **Average NEXRAD Precipitation: 0.25 inches<br>Sunport Rainfall Gage (NOAA): 0.14 inches** | |
|---|---|
| **Basin** | **Average of NEXRAD Precipitation Data (inches)** |
| Black Arroyo | 0.09 |
| North Camino Arroyo | 0.29 |
| La Cueva Arroyo | 0.30 |
| North Domingo Baca | 0.33 |
| North Pino Arroyo | 0.14 |
| South Pino Arroyo | 0.37 |
| **Bear Canyon Arroyo | 0.39 |
| Vineyard Arroyo | 0.12 |
| Grantline Arroyo | 0.13 |
| Hahn Arroyo | 0.14 |
| *Embudo Arroyo | 0.23 |
| *San Mateo Drain | 0.23 |
| Campus Wash | 0.12 |
| **Lower Bear – Upstream (Wyoming) | 0.39 |
| **Lower Bear – Downstream (Spain) | 0.39 |

**Embudo and San Mateo are located in the same basin as delineated by AMAFCA in GIS.*

***Bear Canyon and the Lower Bear Leveloggers are located in the same basin.*

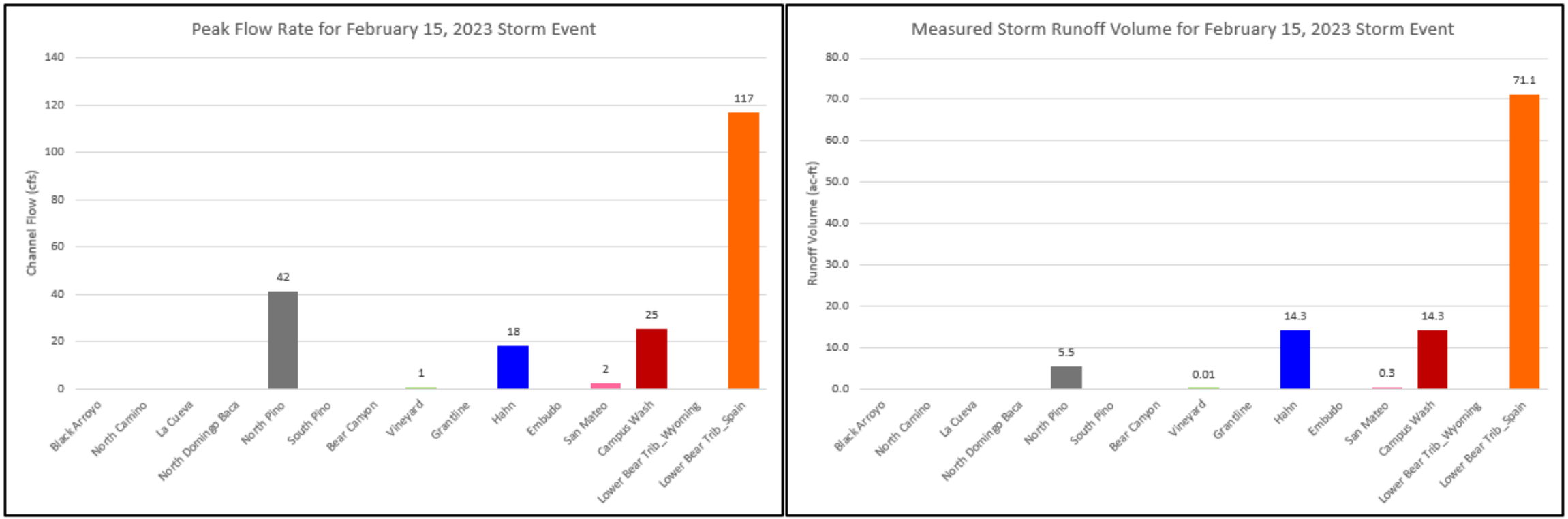


**Figure 20: February 15, 2023 Storm Event, Peak Flow Rates and Runoff Volume**

# AMAFCA
# Levelogger Runoff and NOAA NEXRAD Rainfall

*February 15, 2023 Storm Event*

**Figure 21**

**Flow Rate (cfs)**

- Not Recorded
- 0.1- 25.0
- 25.1 - 50.0
- 50.1 - 100.0
- 100.1- 150.0
- 150.1 - 200.0
- 200.1 - 500.0
- >500.0

**Rainfall (in.)**

- Trace - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1.0 - 1.2
- > 1.2

***0.XX = average rainfall within basin (in.)***

**Average rainfall across all basins shown: 0.25 in.**

N

0 5,000 10,000 20,000 Feet

AMAFCA

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Author: mcrooks

**Table 11: February 2023 Collection Period Runoff Measured at Levelogger Locations**

| Storm Event Date: | February 13 | February 15 |
|---|---|---|
| **Location** | **Runoff Volume (ac-ft)** | |
| Bear Arroyo | -- | -- |
| North Camino Arroyo | -- | -- |
| La Cueva Arroyo | -- | -- |
| North Domingo Baca | -- | -- |
| North Pino Arroyo | -- | 5.5 |
| South Pino Arroyo | -- | -- |
| Bear Canyon Arroyo | -- | -- |
| Vineyard Arroyo | 0.01 | 0.01 |
| *Grantline Arroyo | -- | -- |
| Hahn Arroyo | 7.3 | 14.3 |
| Embudo Arroyo | 2.3 | -- |
| San Mateo Drain | 1.9 | 0.3 |
| Campus Wash | 1.0 | 14.3 |
| Lower Bear – Upstream (Wyoming) | -- | -- |
| Lower Bear – Downstream (Spain) | -- | 71.1 |
| **Location** | **Peak Flow (cfs)** | |
| Bear Arroyo | -- | -- |
| North Camino Arroyo | -- | -- |
| La Cueva Arroyo | -- | -- |
| North Domingo Baca | -- | -- |
| North Pino Arroyo | -- | 42 |
| South Pino Arroyo | -- | -- |
| Bear Canyon Arroyo | -- | -- |
| Vineyard Arroyo | 1 | 1 |
| *Grantline Arroyo | -- | -- |
| Hahn Arroyo | 14 | 18 |
| Embudo Arroyo | 74 | -- |
| San Mateo Drain | 39 | 2 |
| Campus Wash | 7 | 25 |
| Lower Bear – Upstream (Wyoming) | -- | -- |
| Lower Bear – Downstream (Spain) | -- | 117 |

**Grantline Levelogger was offline during the month February.*

## VIII. SUMMARY

This is the second Levelogger program report for FY 2023. This report covers the first four (4) months of the dry season time frame of November 2022 – February 2023. For the 4-month period covered in this report, six (6) storm events were recorded by the Leveloggers and analyzed in this report. During this reporting period, there were no illicit discharge indicators detected during the AMAFCA site visits.

The storm events that were recorded by Leveloggers during this reporting period are summarized below in Table 12 and are compared to the number of storm events recorded by Leveloggers during these same months last year in FY 2022.

**Table 12: Summary of Levelogger Recorded Storm Events**

| Collection Period | Number of Storms Recorded by Leveloggers in FY 2023 | Range of Average Precipitation for Storm Events in FY 2023 (inches) | Number of Storms Recorded by Leveloggers in FY 2022 |
|---|---|---|---|
| November 2022 | 1 | 0.19 | 1 |
| December 2022 | 2 | 0.24 – 0.33 | 1 |
| January 2023 | 1 | 0.20 | 0 |
| February 2023 | 2 | 0.25 – 0.32 | 0 |
| **Total for 4 Months** | **6** | **--** | **2** |

November was a fairly dry month, where two (2) Leveloggers recorded one (1) storm event in the Hahn and Campus Wash area. During the December collection period, Albuquerque had more precipitation than it had in November and there were two (2) storm events, one on December 13, 2022, and one on January 1, 2023. During the January 2023 collection period, one (1) storm event occurred on January 17, 2023. The February collection period had several days with snowfall, which were not detected for runoff by the Leveloggers (no flow was recorded during snow events). The Leveloggers recorded two (2) storm events on February 13 and February 15, 2023.

The Black Arroyo Levelogger was added as a westside location in July 2022. During this report period, the Black Arroyo Levelogger flow recorded had a lot of background noise. This made analysis of the data difficult to interpret whether a storm event had occurred. The Levelogger did not record any flow larger than 2 cfs during this reporting period.