

Arkansas River Basin



US Army Corps
of Engineers®
Albuquerque District

Report of Civil Works Activities for 2017

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1. General

During water year 2017, activities of the U.S. Army Corps of Engineers (USACE), Albuquerque District, in the Arkansas River Basin consisted of reservoir regulation, flood control related studies, floodplain management services, regulation under Section 404 of the Clean Water Act, and emergency assistance.

2. Dam Safety

A Table Top Exercise was conducted from July 24 to July 26 to evaluate the Dam Safety Emergency Action Plan (EAP), current emergency response plans (Evacuation Plans, Continuity of Operations Plans, etc.) and to test internal and external capabilities to respond to emergency and flood scenarios at both John Martin and Trinidad Dams. The exercise was a facilitator/moderator-led event designed to present realistic problems arranged sequentially in a simulated environment.

The objectives of the exercise were to identify priorities and responsibilities of key decision makers, reorder priorities as necessary based on new information and unexpected events, assess warning procedures as described in each EAP, exercise communication and coordination with State and local Emergency Management Agencies in response to this event, assess personnel's familiarity with each EAP, and determine potential areas of inundation and evacuation. The EAPs will be updated with the information obtained at the exercise.

3. Water Control Operations

In 2017, the Arkansas Basin snowmelt runoff was above normal throughout the entire basin. As of the May 1st, the basin wide snowpack was above average at 115% of median with the Upper Arkansas Basin reporting 130% of median and the Purgatoire River Basin reporting 110% of median. At Trinidad Dam, storage peaked at 44,424 acre-feet (elevation of 6211 ft) on 11 May and the maximum release was about 2,000 cfs during 11-15 May 2017. At John Martin Dam, storage peaked at 265,939 acre-feet (elevation of 3,845 ft) on 27 June, and the maximum release was about 1,478 cfs on 16 June. USACE did not operate for flood control at Trinidad, John Martin, or Pueblo Reservoirs in 2017.



Trinidad Lake, 2017. USACE photograph.

a. Trinidad Lake

The Trinidad Water Control Manual indicates that flood damages begin to occur when flows exceed 5,000 cfs, although there is evidence that impacts to agricultural areas begins as low as 3,000 cfs. USACE did operate for high releases at Trinidad due to a series of thunderstorms that occurred in southern Colorado from May 8 through May 11 that increased the stream flow levels of the Purgatoire River and tributaries. On May 10th, precipitation recorded at Trinidad Project Office was 1.74 inches. The peak at Madrid gage upstream of Trinidad Dam was approximately 5,250 cfs on 9 May 2017.

On May 10 the State of Colorado Department of Water Resources (DWR) requested a release of 2,000 cfs from Trinidad to evacuate approximately 6,900 acre-feet of stormwater storage that accumulated in Trinidad Reservoir. Since this would be the highest release in Trinidad Dam history (previously 1,200 cfs) and because the Water Control Manual limits rate of release increases, the release rate was increased in steps and downstream channel conditions were monitored after each increase in release. The releases from May 8th through May 15th are provided in the table below.

Date	Computed Inflows (cfs)	Time	Releases (cfs)	Storage (acre-feet)	Elevation (feet)	Stage (ft)	Precip (inches)
8-May	200.88	0700	0	35,633	6202.42	3.98	0.00
9-May	2696.01	0700	0	36,173	6202.98	3.98	0.61
10-May	2233.66	0000	0	41,269	6208.06	4.01	1.74
10-May	-	0700	0	43,232	6209.92	4.01	-
10-May	-	1115	418	44,024	6210.64	6.83	-
10-May	-	1145	620	44,113	6210.72	7.35	-
10-May	-	1230	914	44,146	6210.75	7.76	-
10-May	-	1600	1176	44,146	6210.75	7.94	-
10-May	-	1630	1660	44,280	6210.87	9.72	-
11-May	1825.77	0000	1660	44,280	6210.87	9.72	0.42
11-May	-	0700	1660	44,280	6210.87	9.72	-
11-May	-	1500	2005	44,424	6211.00	11.51	-
12-May	1038.30	0000	2005	44,335	6210.92	11.51	0.19
12-May	-	0700	2005	43,979	6210.60	11.51	-
13-May	940.49	0000	2005	42,395	6209.14	11.51	0.00
13-May	-	0700	2005	41,766	6208.54	11.51	-
14-May	965.90	0000	2005	40,262	6207.08	11.51	0.00
14-May	-	0700	2005	39,651	6206.48	11.51	-
15-May	648.92	0000	2005	38,180	6205.02	11.51	0.00
15-May	-	0700	2005	37,583	6204.42	11.51	-
15-May	-	0900	779	37,366	6204.20	7.66	-
15-May	-	1000	412	37,346	6204.18	6.81	-
15-May	-	1255	0	37,346	6204.18	3.99	-
15-May	-	1445	337	37,356	6204.19	6.54	-

On May 10, 2017 when Trinidad release was 1,176 cfs, the gabion baskets started to fail and separate from the embankment. Complete failure of the gabion baskets occurred early on 12 May 2017 when the release was 2000 cfs. Although the gabion baskets were intended to provide channel bank erosion protection and their failure did not compromise the integrity of the outlet structure, the releases were constrained to 2000 cfs to assess the hydraulic performance of the flip bucket. The release of 2,000 cfs was continued through the weekend and reduced on Monday, 15 May 2017 to 337 cfs to bypass reservoir inflows. The Corps is removing the gabion baskets to ensure future releases meet downstream safe channel capacity.

Arkansas River Compact Administration (ARCA) Resolution No. 2014-2 requests that the United States Bureau of Reclamation conduct a 10-year review for the period 2005 through 2014 as it pertains to the Trinidad Operating Principles, Article VI and State of Kansas Condition 4. Previous reviews were completed in 1988, 1996 and 2010. The purpose of the 10-year review is to obtain optimum beneficial use of the water available to the project consistent with the laws and policies of the State of Colorado and the United States including the Arkansas River Compact.

Meetings were held 15 March 2017, 5 May 2017, and 17 October 2017. Contact persons for stockwater accounting, City of Trinidad accounting, permanent fish pool accounting, flood pool operations, irrigated acreage and water use within District, gages and general summary of Trinidad Lake were identified in the 15 March 2017 meeting. The May meeting covered a data review of the 10-year review period, review of the recommendations from the previous 10-year review and the progress made regarding the recommendations. The October meeting focused on the last three years, 2015 through 2017, and presentation of the "Draft 2005-2014 Review of Operating Principles and Project Operations".

In 2017, several projects were completed at Trinidad Lake that focused on extending the life of the facilities. The bulkhead inspection was completed in August and the report was finalized and submitted for review. The primary bulkhead inspection was needed prior to the conduit inspection. A conduit inspection was completed 14 -15 November 2017 which included the conduit and emergency and service gates for both conduits. The 49 year old generator at the control tower was replaced in 2017. The generator is required for making gate changes in the case of power failure. Coordination between the contractor, Purgatory River Irrigation District and Albuquerque District was accomplished so that advance notice could be given when the gates would be down for the installation since the work was completed during irrigation season.

A vegetation removal contract has been planned and budgeted for Fiscal Year 2018. The removal is scheduled for spring 2018. The vegetation on the upstream and downstream sides of the earth embankment dam are significantly overgrown. Vegetation will be removed to avoid any potential structural impacts to the engineered fill of the earth embankment dam. Funds are also available for rip-rap improvement project on Trinidad's earth embankment dam.

The Trinidad Periodic Inspection was completed in 21 March 2017 and the report has been prepared in accordance with ER 1110-2-1156, Safety of Dams – Policy and Procedures, Chapter 11 and Appendix V. Trinidad Dam classifies as a high hazard structure and the purpose of the periodic inspection is to assure its structural stability, safety, and operational adequacy.

USACE periodically reviews reservoir operations to include new hydrologic information. In 2017, the Trinidad Water Control Manual was reviewed and updated to include hydrologic data, operating and reporting procedures, and general project information such as recreation and watershed characteristics. No changes were made to the Water Control Plan. The draft is currently undergoing Agency review, and implementation of the new manual is expected to occur in 2018.

To accurately measure high releases (above 800 cfs) from Trinidad dam, the USGS will install a new auxiliary stream gage about 1000 ft downstream of the current gage (Purgatoire River below Trinidad Lake, CO, 07124410). The current gage will continue to be used for lower releases. The USGS is expecting to complete the installation of the new auxiliary gage by 15 December 2017.

In 2013, it was found that sediment had collected around the Control Tower making it impossible to read the lake staff gauge at elevations below 6,164 ft. The staff gauge is an important tool for verifying the lake elevation recorded by the instrumentation and data collection platform (DCP) maintained by the U.S. Geological Survey (USGS). In 2017, samples of the sediment were collected from around the tower and tested according to the requirements of the Clean Water Act.

Once the elevation of Trinidad Reservoir is at 6,150 ft or lower, sediment will be removed with an excavator from around the Control Tower to make the staff gage more readable and allow the bubbler to work correctly at low pool elevations. The work will be scheduled after irrigation season ends since the lake will most likely be at its lowest elevation and water operations will not be affected. Excavation should be completed prior to the lake rising from inflow and freezing with the onset of winter temperatures. The side staff gage goes down to elevation 6150 ft. The quantity of sediment that can be removed will depend on lake elevation at the time of the work.

b. John Martin Reservoir

During 2017, several projects were completed on the structure of John Martin Dam. The 16 spillways and the tainter-gates were cleared of vegetation, pressure washed and patched. Areas around the conduits and bath tub ring were pressure washed as well. The equipment needed for the cleaning were purchased, which included a fire pump, 1,000 gallon tank and a trailer for the tank. Maintenance on the gates in the operating gallery was completed along with maintenance on the tainter gate machinery.

Repairs to the Visitor's Center were started in FY17 and will be completed in FY18. The repairs included stabilizing the flooring and installing new wood flooring. Two new windows will be installed at the north and west walls, and a wood sales counter will also be installed.

A bathymetric survey was started on 28 November 2017. The data will be finalized and a new Area-Capacity curve will be developed in 2018. The purpose of the survey is to measure the accumulated sediment in the lake since the last survey completed in 2009.

In 2018, the stilling basin dewatering, dredging and inspection project will be completed. The stilling basin and dam foundation will be inspected for the first time since the dam was constructed, by dredging and dewatering to clear sediment. This project will include removal of sediment upstream of the dam from the vicinity of the bulkhead gates so they can be placed to dewater the conduits and inspect the entire length of the conduits and condition of the gates.

In 2017 USACE continued to work on the update of John Martin Reservoir's Master Plan, which was last updated in 1974. A Master Plan is "the strategic land use management document that guides the comprehensive management and development of all project recreational, natural and cultural resources throughout the life of the water resource development project". In general, it defines "how" the resources will be used by the general public. The Master Plan does not address the technical operational aspects of the lake with respect to flood risk management. The Master Plan focuses on all USACE fee-owned land including easements, licenses, and leases at John Martin Reservoir.

The process started with a Public Meeting held on 27 October 2016 in Lamar, Colorado to describe the Master Plan and its purpose. A second meeting was held on 16 February 2017 to discuss the overall goals for resources, review current and future land classifications and public/agency comments in view of the goals. Once the plan is completed, an Environmental Assessment will be prepared and available for public review.

4. Civil Works Authorities and Programs

a. Continuing Authorities Program

The Continuing Authorities Program (CAP) is a group of nine legislative authorities under which the Secretary of the Army, acting through the Chief of Engineers, is authorized to plan, design, and implement certain types of water resources projects without additional project-specific congressional authorization. USACE had one active CAP project in the Arkansas River Basin in 2017.

1. Section 205

Section 205 of the 1948 Flood Control Act, as amended, provides authority to USACE to plan and construct small flood damage reduction projects that have not been

specifically authorized by Congress. USACE conducted a preliminary investigation along Fountain creek above Manitou springs and Colorado Springs in an area that experiences significant risk of flooding. The investigation concluded that the Section 205 authority was not appropriate due to the magnitude of potential flood risk solutions.

2. Section 206

Section 206 of the Water Resources Development Act (WRDA) 1996 provides authority to USACE for aquatic ecosystem restoration projects in areas unrelated to existing USACE water projects. USACE had no active Section 206 projects in the Arkansas River Basin in 2017.

3. Section 14

Section 14 of the 1946 Flood Control Act, as amended, provides authority for USACE to plan and construct emergency stream bank protection projects to protect endangered highways, highway bridge approaches, public facilities such as water and sewer lines, churches, public and private nonprofit schools and hospitals, and other nonprofit public facilities. USACE and El Paso County are reaching the final approval of a Section 14 project feasibility study along Fountain Creek at US Highway 85/87 Bridge and the Fountain Creek Regional Trail. The project objective is to protect both banks from further erosion. The project is anticipated to proceed to construction in 2018.

4. Section 1135

Section 1135 of WRDA 1986, as amended, provides the authority to modify existing USACE projects to restore the environment and construct new projects to restore areas degraded by USACE projects. USACE had no active Section 1135 projects in the Arkansas River Basin in 2017.

b. Investigations Program

The USACE Investigations Program includes specifically authorized studies for comprehensive solutions to large complex problems relating to flooding, ecosystem restoration, loss of land and property, floodplain management, and watershed planning and analysis. The Investigations program consists of two phases: the feasibility study phase, and the pre-construction engineering and design (PED) phase. The feasibility study is used to investigate the Federal interest, engineering feasibility, economic justification and environmental acceptability of a recommended water resources project, and results in a feasibility report. The feasibility report is the document on which congressional authorization for PED and Construction is based. During the pre-construction engineering and design phase, development of the first construction contract bidding package can be completed while waiting for congressional construction authorization. If the project is authorized for construction by Congress, USACE and the project sponsor can move forward with the remaining detailed design and construction. USACE had no active Investigations or Construction projects in the Arkansas River Basin in 2017.

5. Planning Assistance to the States (Section 22) Program

Section 22 of the WRDA of 1974, as amended, provides authority for USACE, under the Planning Assistance to the States (PAS) program, to assist states, local governments, and other non-Federal entities in the preparation of comprehensive plans for the development, use, and conservation of water and related land resources. Section 208 of WRDA 1992 amended WRDA 1974 to include Indian tribes. The studies are cost shared on a 50% Federal/50% non-Federal basis. USACE had no active PAS studies within the Arkansas River Basin in 2017.

6. Flood Plain Management Services Program

The USACE Flood Plain Management Services (FPMS) program authority stems from Section 206 of the Flood Control Act of 1960 (Public Law 86-645), as amended. The objective of the FPMS program is to support comprehensive floodplain management with technical services and planning guidance at all appropriate governmental and community levels. Services available include assistance relating to the interpretation and evaluation of basic flood-hazard data. These services are provided to state, local governments, and Indian tribes at no cost. Section 321 of WRDA 1990 requires recovering the cost of services provided to Federal agencies and to private entities. Flood reports are also authorized under the FPMS Program. Additionally, another authority for developing post flood assessment reports is the Flood Control and Coastal Emergencies (FC&CE) program. The FC&CE program is authorized by Public Law (PL) 84-99, as amended. USACE had no active FPMS projects in 2017 in the Arkansas River Basin.

7. Flood Risk Management Program

USACE established the National Flood Risk Management Program (FRMP) in May 2006 to integrate and synchronize USACE activities, both internally and with counterpart activities of the Department of Homeland Security, Federal Emergency Management Agency (FEMA), other Federal agencies, state organizations, and regional and local partners and stakeholders. In FY17, FRMP was used to support Post-Wildfire Flood Preparedness efforts following the Hayden Pass and Junkins Wildfires in southern Colorado. Support was offered in the form of technical assistance related to hydrology and hydraulics, as well as outreach related to sand-bag training for impacted communities.

One component of the FRMP is the Levee Safety Program. The USACE Levee Safety Program was established by the National Levee Safety Act of 2007, which was authorized in WRDA 2007.

The Inspection of Completed Works/Rehabilitation Program (ICW/RP) is the USACE program that provides for the inspection and rehabilitation of Federal and non-Federal flood risk management projects within the RP. In FY17, USACE ICW assisted Las

Animas with elevated Arkansas River flow issues impacting their levee operations in southeastern Colorado in the Arkansas River Basin.

An additional component of FRMP is the Silver Jackets Program, which is part of the National Flood Risk Management Program. The Silver Jackets Program proposes establishing an interagency team in each state with a representative from FEMA, USACE, the State National Flood Insurance Program Coordination Office, and the State Hazard Mitigation Office as standing members and lead facilitators. The lead FRMP Manager for the formation of the Silver Jackets Program in Colorado and the Arkansas River Basin resides in the USACE Omaha District, and the Albuquerque District performs a support role.

The Colorado Silver Jackets team was officially created in 2013. The team consists of four USACE Districts that include the Sacramento, Albuquerque, Kansas City, and Omaha Districts. The State of Colorado is represented by the Colorado Water Conservation Board as well as the Colorado Department of Homeland Security. FEMA Region 8 is also part of the State team. USACE had no active Silver Jackets projects in 2017 within the Arkansas River Basin.

8. Regulatory Program

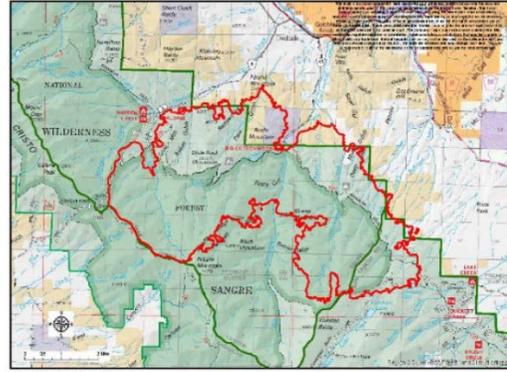
USACE regulates Section 404 of the Clean Water Act for the discharge of dredged or fill materials into waters of the United States, including wetlands. USACE reviewed a total of 142 activities in the basin during Water Year 2017. All activities were authorized by general (Regional or Nationwide) permits. General permits, which typically involve minimal delays and paperwork, are activity-specific permits that are issued for projects that have minimal impact on the aquatic environment. USACE continues to issue permits related to the Waldo Canyon, Hayden Pass, and Junkins Fire/Flooding for sediment and debris removal, stream restoration, bank stabilization, and flood prevention activities in Fountain and Hardscrabble Creeks and the Arkansas River in Custer, El Paso, Fremont, Pueblo, and Teller Counties.

Persons or agencies who are planning to conduct work activities in any waterway in the basin are advised to contact the Southern Colorado Regulatory Office, 200 South Santa Fe Avenue, Suite 301, Pueblo, Colorado 81003 or telephone 719-543-9459. Information, including all public notices, is also available on the USACE Albuquerque District web home page at: <http://www.spa.usace.army.mil/reg>.

9. Emergency Management Coordination

Public Law 84-99 provides USACE with the authority to assist state and local governments before, during, and after flood events. In the Arkansas River Basin, USACE works with the State of Colorado Division of Homeland Security and Emergency Management and the Colorado Water Conservation Board to prepare for flood fight activities in years with significant snowpack and spring snowmelt runoff.

Several large wildland fires occurred within the Arkansas River Basin watershed in 2016. The Hayden Pass, Junkins, and Beulah fires have created new burn scars which will have potential long-term impacts to the watershed. The flood threat potential from the burn scars has been significantly increased from the Pre-fire to Post-fire conditions as a result of the denuded watershed with reduced infiltration and increased runoff. National Flood Risk Management funds were used to support Post-Wildfire Flood Preparedness efforts following the Hayden Pass and Junkins Wildfires in southern Colorado. Support was offered in the form of technical assistance related to hydrology and hydraulics, as well as outreach related to sand-bag training for impacted communities.



Hayden Creek Pass Fire Burned Area, 2016.

The Hayden Pass burn scar (16,800 acres) is approximately 20 miles southeast of Salida, CO. The fire burned within the Pike and San Isabel National Forests and Bureau of Land Management land. Following a series of visits, meetings and follow-up discussions with representatives from the State of Colorado and others, hydrologic watershed modelling was completed by the Albuquerque District's Hydrology and Hydraulics (H&H) group. In addition to the Highway 50 crossing, there are numerous culverts on county roads that will require diligent monitoring and clearing.

Readiness and Contingency Operations Office (RCO) and H&H provided technical assistance to the Colorado Division of Homeland Security and Emergency Management (CDHSEM) relating to the Junkins and Beulah Fires. The burn scars are approximately 30 miles west of Pueblo, Colorado. The flood threat potential within the denuded watershed has been significantly increased, with the potential for sediment and debris flows posing a severe threat to the communities of Greenwood, Wetmore and Beulah. This increased flood threat is anticipated to be a multi-year condition. Highway 387, which provides access to private landowners, may become a critical escape route for Beulah residents in emergencies. Keeping this road open will be a challenge for the impacted counties and U.S. Forest Service over the next 3-5 years.



Junkins Fire: South Hardscrabble Creek

Assistance can be obtained by contacting the U.S. Army Corps of Engineers, Albuquerque District, Readiness and Contingency Operations Office, 4101 Jefferson Plaza NE, Albuquerque, New Mexico 87109-3435 or telephone 505-342-3686 during our normal business hours between 7 am and 4 pm, weekdays.