REPORT OF THE ENGINEER ADVISERS
TO THE RIO GRANDE COMPACT COMMISSION
FOR CALENDAR YEAR 2023
April 1, 2024

The Engineer Advisers to the Rio Grande Compact Commission met in person from February 26 to March 1, 2024, to:

- Receive reports;
- Prepare the 2023 Compact water accounting;
- Discuss continuing and new issues in preparation for the 2024 annual meeting of the Rio Grande Compact Commission (Commission); and
- Prepare the Engineer Advisers' report.

The Engineer Advisers received the participation of the U.S. Geological Survey (USGS), the U.S. Bureau of Reclamation (Reclamation), the U.S. Army Corps of Engineers (Corps), the U.S. Bureau of Indian Affairs (BIA), the International Boundary and Water Commission (IBWC), and the U.S. Fish and Wildlife Service (Service) at the meetings. The agencies each presented information about their specific water-related activities in the basin during calendar year 2023.

2023 COMPACT ACCOUNTING

The Engineer Advisers reviewed the streamflow and reservoir storage records and other pertinent data for the Upper Rio Grande Basin during calendar year 2023 and reached a consensus on the accounting. As determined by the Engineer Advisers, scheduled and actual deliveries, release of Usable Water for the year 2023, and balances as of January 1, 2024, are as follows:

(a) Deliveries by Colorado at the State Line:	
Balance as of January 1, 2023	200 acre-feet
Scheduled delivery from Conejos River	199,000 acre-feet
Scheduled delivery from Rio Grande	207,300 acre-feet
Actual delivery at Lobatos plus 10,000 acre-feet	405,000 acre-feet
Accrued balance (debit) January 1, 2024	-1,100 acre-feet
(b) Deliveries by New Mexico at Elephant Butte Dam:	
Balance as of January 1, 2023	-93,000 acre-feet
Scheduled delivery	774,900 acre-feet
Actual delivery	745,700 acre-feet
Accrued balance (debit) January 1, 2024	-121,500 acre-feet
(c) Project Storage and Releases:	
Accrued departure (credit) as of January 1, 2023	2,915,800 acre-feet
Actual release of Usable Water	549,200 acre-feet
Normal release for year	790,000 acre-feet
Under Release in excess of 150,000 acre-feet	90,800 acre-feet
Accrued departure (credit) as of January 1, 2024	3,065,800 acre-feet

For calendar year 2023, New Mexico carried an Accrued Debit of 93,000 acre-feet. Article VI of the Rio Grande Compact states in part that, "Within the physical limitations of storage capacity of such reservoirs, New Mexico shall retain water in storage at all times to the extent of its accrued debit." During construction activities at El Vado Reservoir (El Vado), the NMISC was asked to retain 2,500 acre-feet of debit water in El Vado to maintain a minimum pool. Compact debit water was retained beginning June 1, was evacuated by November 13, and incurred 692 acre-feet of net evaporative losses.

The Engineer Advisers jointly prepared the Compact accounting based on information provided and presented by state and federal agencies, which is the best available information at the time of report preparation. The Engineer Advisers' report is considered final upon signature by the three Engineer Advisers.

RIO GRANDE BASIN CONDITIONS

After a slow start, the snowpack and snow-water equivalent (SWE) amounts for most of the headwater areas in both Colorado and New Mexico peaked at above their average maximum values. This resulted in significantly above-average streamflows during the spring and early summer. Below-average precipitation during the summer months, as well as hot and windy conditions, caused the late summer streamflows to drop to below-normal levels. However, the total annual streamflow amounts in most areas remained above the long-term average.

Due to the high snowpack, Platoro Reservoir almost completely filled to the flood pool elevation in late June, which has not happened in many years.

Usable Water in Rio Grande Project (Project) Storage was below the Article VII trigger of 400,000 acre-feet from January 1 to April 14, 2023. Usable Water was above the Article VII trigger from April 15 to September 7, 2023. Usable Water then fell below the Article VII trigger from September 8 until December 9, 2023. Article VII restrictions were not in effect for the remainder of the calendar year.

CONTINUING ISSUES

This section of the report summarizes new information about issues previously addressed by the Engineer Advisers. It reflects information obtained by the Engineer Advisers prior to the writing of the Engineer Advisers' report, including information obtained from the reports of the federal agencies at the 2023 Engineer Advisers' meetings or otherwise reported. The terms "reported" and "indicated" herein reflect information provided by various entities without analysis or approval by the Engineer Advisers.

Middle Rio Grande Endangered Species Collaborative Program

The Middle Rio Grande Endangered Species Collaborative Program (Collaborative Program) was authorized by the Omnibus Appropriations Act of 2009 (P.L. 111-8). The Collaborative Program continues to seek innovative and collaborative ways to support Endangered Species Act (ESA) compliance for listed species while protecting water uses in the Middle Rio Grande (MRG). Reclamation reported that their federal appropriations in the federal fiscal year (FY) 2023 were $3 million for Collaborative Program activities. Reclamation's FY

2023 funding was spent on projects such as captive propagation of Rio Grande silvery minnow (RGSM), annual monitoring of endangered species, ongoing genetic studies of RGSM, and RGSM rescue and salvage efforts. The Corps reported its FY 2023 collaborative program budget was $1.98 million, which funded water quality and ecosystem projects, monitoring and adaptive management projects, and program management projects.

WildEarth Guardian's Litigation over the 2016 Biological Opinion

On November 30, 2022, WildEarth Guardians filed a lawsuit in U.S. District Court against the Service and Reclamation regarding the 2016 Middle Rio Grande Biological Opinion (2016 BO). The lawsuit claims that the 2016 BO is invalid under the ESA and arbitrary under the Administrative Procedure Act. Numerous stays have been granted for ongoing settlement negotiations. The most recent stay of the lawsuit is granted until March 15, 2024.

Upper Rio Grande Water Operations Model

The Upper Rio Grande Water Operations Model (URGWOM) is a computational model developed through an interagency effort led by the Corps, Reclamation, and the New Mexico Interstate Stream Commission (NMISC). The effort includes regular meetings to discuss modeling outputs for daily water operations and accounting procedures. The Corps reported that during 2023, URGWOM activities included:

- Updating the basin-wide annual operating plan (AOP) in collaboration with USBR and NMISC;
- Updating the database to include data for years up to 2022;
- Developing, calibrating, and implementing aquifer objects into the model;
- Updating the Five-Year Plan;
- Developing/updating the URGWOM documentation;
- Developing a script for modeling Realtime Forecast using National Weather Service (NWS) forecast data (10-Day Forecast); and
- Adding a web map as a base map in the model.

Key objectives for 2024 include:

- Continuing to update the database with available data through 2023;
- Refinement of rulesets/methods for physical and accounting models;

- Script and windowing enhancements (including reservoir operations scripts) and web-map views;
- Updates to master documentation; and
- Investigations into using the NWS' Ensemble Streamflow Prediction (ESP) traces and snowmelt forecasts for AOP forecasting and the Short-term forecast products (10-day forecasts) for real-time modeling.

Compliance by Federal and State Agencies with State Water Law

The NMISC continues to track habitat restoration projects implemented by various federal and state agencies, and to account and report on related depletions in the MRG. The agency coordinates with the New Mexico Office of the State Engineer (NMOSE) to determine if a permit is needed and to ensure any new depletions are offset by the projects' sponsors. The NMISC reported that it continues to coordinate with the Corps on several habitat restoration projects to ensure that those depletions are offset. The NMISC also coordinates with Reclamation in using the State's Strategic Water Reserve for ESA-related water management, including offsetting depletions associated with habitat restoration and river augmentation activities. Above-average snowmelt runoff in 2023 resulted in approximately 250 acre-feet of depletions for habitat restoration projects in the MRG that were offset by New Mexico's Strategic Water Reserve.

Elephant Butte Delta Channel Project

During the 2023 snowmelt runoff, flows in the Elephant Butte Delta Channel (Delta Channel) exceeded the design capacity, resulting in overbanking and erosion of spoil berms. Several breaches in the project spoil berms occurred during the snowmelt runoff and a significant plug formed when the runoff receded. Due to the expected release of flood water from Abiquiu Reservoir in the fall, Reclamation's construction crews provided rapid response to remove the 1.2-mile-long sediment plug, as well as engineering services, environmental compliance, and construction inspection as needed.

Beginning in September of 2023, the NMISC construction contractor conducted regular maintenance on the Delta Channel including five breach repairs, road and berm maintenance,

assisting with the sediment plug removal, in-channel debris removal, and island and bar removal. The above-average flows that occurred both during spring runoff and in the fall of 2023 required maintenance activities in the Delta Channel to continue through the end of the calendar year. New Mexico continues to fund construction and maintenance of the Delta Channel and partners with Reclamation, which provides engineering support, environmental compliance, access-road work, and primary maintenance for the project.

Relinquishment Update

The total amount of Accrued Credit relinquished by Colorado since 2013 is 3,000 acre-feet. Colorado did not store any relinquishment credit water in 2023. Between 2013 and 2023, Colorado stored a total of 2,885 acre-feet of relinquishment credit water in Platoro Reservoir, which leaves a balance of 115 acre-feet in Colorado's relinquishment account.

The total amount of Accrued Credit relinquished by New Mexico since 2003 is 380,500 acre-feet. The total amount of relinquishment credit water stored in New Mexico reservoirs during the 2023 calendar year was 1,921 acre-feet. Relinquishment credit water storage to date totals 290,649 acre-feet, leaving a balance of 89,851 acre-feet available to be stored in future years when Article VII storage restrictions are in effect.

Gaging Station and Reservoir Stage Review

The Colorado USGS reviewed the Colorado Division of Water Resources (CDWR) gaging station records for the seven Colorado Compact gages and approved the records for 2023.

For the Compact gages in New Mexico, the USGS reported the following:

- The USGS made a total of 13 measurements at the Rio Grande near Otowi streamflow gage (#08313000) in 2023.
- The USGS made a total of 17 measurements at the Rio Grande below Elephant Butte streamflow gage (#08361000). Aquatic vegetation growth on the streambed at the USGS gaging station section continues to cause a low bias in gaged flow during certain months, with the shift getting as large as -1.65 feet. For this reason, most measurements were made just below the dam in 2023. USGS also reported that the

lower bubbler sensor was replaced due to a malfunction.

Reclamation reported that they reviewed their own streamflow record for the Rio Grande Below Caballo streamflow gage (#08362500) for 2023. Reclamation stated that the reason for this change from having the USGS conduct the review was that the Las Cruces office of the USGS did not have the resources to do the review, and the belief by Reclamation that they had sufficient in-house expertise to do the review. Reclamation did not solicit guidance from the Engineer Advisers prior to making this decision, nor did they reach out to other USGS offices to see if those offices could review the streamflow record.

The Engineer Advisers reviewed the Rules and Regulations for the Administration of the Rio Grande Compact for guidance as to the required method of review of Compact gaging station records. The Rules and Regulations state that "The stream flow records for each compact stream gaging station shall be reviewed annually by the U.S. Geological Survey to ensure accuracy." Therefore, the internal review by Reclamation of its own streamflow record does not meet the requirements of the Commission, nor does it provide the needed level of assurance that the record meets the required accuracy standards.

After discussion of this issue, the Engineer Advisers decided to go forward with the use of the Below Caballo gaging station streamflow record for the 2023 calendar year, as submitted by Reclamation. However, for future years this record must be reviewed by the USGS in order to ensure accuracy and to comply with the Compact Rules and Regulations.

The NMISC continued its survey of water-level elevations in Elephant Butte and Caballo reservoirs. NMISC's surveyor performed surveys alongside Reclamation staff in June 2023 and December 2023. Results from both NMISC surveys indicated that Reclamation's reservoir stage elevations were within the agreed-upon threshold criteria of 0.05 feet difference between the surveyed elevation and the stage-discharge recorder (SDR). Reclamation performed routine stage elevation surveys throughout 2023 and adjusted the SDR as needed if the threshold criteria was exceeded. At the end of October, Reclamation noticed some discrepancies in the reported Elephant Butte Reservoir elevation. Field surveys found that the SDR was reading about 0.05 feet less than the surveyed water surface elevation. Staff at Elephant Butte flushed the stilling well on November 8, 2023, resurveyed, and found that the SDR was within the 0.05-foot threshold criteria.

In 2023, Reclamation continued to measure Elephant Butte Reservoir elevations via the SDR and a bubbler. The bubbler, which is maintained in conjunction with the USGS, shows more scatter, but in general, it more accurately reflects observed elevation when the reservoir is low. NMISC and Reclamation will continue to perform side-by-side surveys at select times during 2024 to ensure the accuracy of the reservoir elevation data.

Gaging Station Costs

The Engineer Advisers and Compact Commissioners continue to express concern, as they have in past years, over the large differences in costs between what Reclamation charges to operate the gage below Caballo Reservoir, as compared to what CDWR and USGS charge for other Compact gages. The three Compact states split the costs of their operations in support of the Compact equally, including operation and maintenance of the Compact gaging stations. Therefore, this high cost from Reclamation affects all three states.

At last year's Commission meeting, the Commissioners directed the Engineer Advisers to investigate the costs submitted by Reclamation for the annual operation and maintenance of the Rio Grande Below Caballo Reservoir gaging station, and whether a different method can or should be used to determine the cost for this gage.

During the Engineer Advisers' meeting, the Engineer Advisers reviewed the past and current charges for the operation and maintenance of the Below Caballo gaging station and discussed this issue with Reclamation. The Engineer Advisers found that the average cost submitted for Compact purposes over the last five years for the operation of this gage was much in excess of the cost charged by either the USGS or the CDWR, with the average charge being 190% of the USGS cost per gage.

Reclamation stated that it was difficult to predict an accurate budget amount because the charge was based upon the number of measurements needed at the gage in a specific year. This difficulty is evidenced by the fact that the actual charges are sometimes much different than the budgeted charges submitted to the Commission.

The Engineer Advisers evaluated alternative methods of determining the cost to be submitted to the Commission for this gage. It was ultimately decided that the Engineer Advisers

would use the proposed charge submitted by Reclamation for the fiscal year 2025 budget. This was due mainly to the fact that there will likely be significant changes to the budget in the near future if the Consent Decree is put into place and the El Paso gage is used for Compact purposes. Additional changes to the charges for the Below Caballo gage may be evaluated in the future as part of that larger budget change.

Colorado Groundwater Regulations

The Colorado State Engineer's Rules and Regulations concerning the use of groundwater in the Upper Rio Grande Basin in Colorado went into effect in 2021. As an integral part of these rules, the Rio Grande Decision Support System Model (RGDSS) has been developed, and Phase 7 of that model is nearing completion. This model captures the interaction between surface and groundwater, showing the effect that wells have on senior surface water rights, and is used in the development of response functions for groundwater depletions. Owners of non-exempt wells are required to mitigate those injurious depletions and regulate the use of the confined and unconfined aquifers to maintain a sustainable water supply in each aquifer system. Currently, there are seven groundwater user subdistricts and multiple individual augmentation plans that have been developed as a way for the well owners to comply with the rules. Difficulty meeting the aquifer sustainability requirements in Subdistrict No. 1 led to the development of a new Plan of Water Management (PWM) for that subdistrict. Subdistrict No. 1's new PWM was approved by the Colorado State Engineer in early 2023, but several water user groups objected to that PWM in Water Court. A five-week trial on this PWM is set to begin in January 2025. An individual Plan of Augmentation for the Sustainable Water Augmentation Group (SWAG) has been modified from its first unsuccessful attempt, has received protests by several different water user groups, and is awaiting a trial date.

Aamodt Settlement and Pojoaque Basin Regional Water System

The Aamodt Water Rights Settlement Agreement (Aamodt Settlement) was developed through multi-party negotiations, which began in 2000 between the Pueblos of Nambé, Pojoaque, Tesuque and San Ildefonso, the State of New Mexico, the United States of America, City of Santa Fe, Santa Fe County, and representatives of non-Pueblo water users, to settle the Pueblos' water right claims in the Pojoaque Basin. The Aamodt Settlement provides for the

funding and construction of the Pojoaque Basin Regional Water System to supply treated water to Pueblo and non-Pueblo parties. As expressly stated in the Aamodt Settlement, "Nothing in this agreement shall be construed to limit the authority of the State Engineer to…ensure compliance with the Rio Grande Compact," (Section 6.6.1.6). The Engineer Advisers will continue to evaluate the project as it moves forward, including evaluating potential impacts to the Otowi Index Supply.

Phase 1 of construction started in 2020 and continued through 2023 with work at the intake structure and at the Water Treatment Plant (WTP). In 2024, the schedule includes continuing work at the intake and WTP and expanding to other tank sites and transmission pipelines. Designs for Phase 2 were completed in 2023 and prepared for bidding.

Reclamation's Lower San Acacia Reach Improvements Project

Reclamation reported on their Lower San Acacia Reach Improvements Project (LSARI), which focuses on evaluation of river management options for the lower section of the San Acacia Reach, from Highway 380 bridge to the Elephant Butte Reservoir 'Narrows' area. Deliveries of water and transport of sediment through this area have been historically difficult and costly to address. As delivery efficiencies continue to decline, Reclamation has renewed evaluation of engineering options for this river section. Since 2021, Reclamation has initiated a Value Planning Study, begun an Environmental Impact Statement (EIS) and feasibility study, issued a Notice of Intent (NOI), and conducted public scoping meetings. The draft EIS is expected to be available for review in 2024. By 2026 Reclamation expects to begin phased construction.

The EIS will evaluate two alternatives involving conversion from a two-channel system, consisting of the river channel and Low Flow Conveyance Channel (LFCC), to a single channel.

YEAR 2023 OPERATIONS

Closed Basin Project

The total production of the Closed Basin Project in calendar year 2023 was 10,990 acre-feet. This total includes water that was exchanged for Colorado Parks and Wildlife water to be delivered to the Blanca Wildlife Habitat Area, the Alamosa National Wildlife Refuge, and the San Luis Lakes State Wildlife Area. The amount creditable for Compact purposes from direct

delivery and exchange was 7,602 acre-feet. The remainder of the water was delivered to various federal lands along the project to be used as mitigation for the project footprint. All of the water delivered to the Rio Grande in 2023 was of sufficient quality to qualify for credit under the Compact.

The Closed Basin Operating Committee continues to monitor groundwater levels and groundwater production and to adjust project operations pursuant to the enabling legislation.

Reclamation's Middle Rio Grande Supplemental Water Program

Reclamation's supplemental water program is intended to provide additional water, primarily obtained through the voluntary leasing of San Juan Chama Project (SJCP) water, for endangered species' needs and compliance with the 2016 BO. The program originally included water acquisition, reservoir storage, and release of water to support river flows. From 2001 to 2020, it also included operation of a pumping network in the San Acacia Reach to pump water from the LFCC to the river.

In 2023, a total of 14,787 acre-feet of supplemental water was released for endangered species purposes. Of that volume, 5,227 acre-feet was water that Reclamation leased from 2022 SJCP contractor allocations, and 9,560 acre-feet came from 2023 leases. Reclamation reported that the release of supplemental water began on July 13 and continued through October 30.

Reclamation ended 2023 with 2,346 acre-feet of supplemental water in storage: 1,331 acre-feet of water in Heron Reservoir and 1,015 acre-feet of water in Abiquiu Reservoir, all leased from 2023 SJCP contractor allocations. Reclamation is negotiating leases of up to 12,000 acre-feet from SJCP contractor allocations for 2024.

In addition to the water released by Reclamation, four other sources of water were reportedly used to support ESA needs, including New Mexico's Strategic Water Reserve, SJCP water leased by Audubon New Mexico, a May 2019 Settlement and Cooperative Water Agreement, MRGCD's Environmental Water Leasing Program, which is a fallowing program funded by Reclamation.

The Neil Cupp pumping site, now owned and operated by MRGCD, pumped a total of 262 acre-feet to the river in 2023 to maintain river connectivity.

Six Middle Rio Grande Pueblos Prior and Paramount Operations

In 2022, the Commission agreed to allow the Corps to store up to 20,000 acre-feet in Abiquiu Reservoir for Prior and Paramount (P&P) operations due to the repair operations at El Vado Dam. The agreement will be in effect through December 2024.

P&P storage began on January 1, 2023. A total of 14,500 acre-feet of native Rio Grande water was stored in Abiquiu Reservoir for the P&P operations. The irrigation season for the Six Middle Rio Grande Pueblos was defined as March 1 through November 15 based on the updated Operations and Maintenance Agreement between BIA and MRGCD, which was signed on October 26, 2023.

Due to sufficient spring runoff, none of the water stored for P&P operations in 2023 was released for irrigation purposes. The P&P water stored in Abiquiu Reservoir incurred 1,066 acre-feet of evaporative losses, and the remaining 13,434 acre-feet was released downstream by the Corps to Elephant Butte Reservoir from November 1 through 15, 2023.

The required amount of P&P storage is determined by the BIA each year between March and early May. The final P&P storage amount will be the lesser of the calculated May 1 forecast or the Abiquiu 20,000 acre-feet limit. For the 2024 P&P operations, storage began January 1, and as of February 21, 2024, a total of 5,318 acre-feet of native Rio Grande water had been stored in Abiquiu Reservoir. Compact Article VII restrictions were not in place during this time.

The BIA provides funding to the Pueblos to upgrade their irrigation systems. The BIA also provides funds to the MRGCD to perform maintenance work on the systems which serve Pueblo lands. Examples include improvements to enable the Pueblos to irrigate one acre per hour, to schedule irrigation, and to coordinate with Pueblo farmers for delivery of an adequate water supply.

2023 Rio Chama Water Supply Conditions

Snowpack conditions in the Rio Chama basin were well above average during the late winter and spring of 2023. The March through July native inflow into El Vado Reservoir was 328,595 acre-feet, or approximately 177% of the 30-year median.

From July 2023 to August 2023, flows were sufficient to meet the direct flow irrigation

needs of the Rio Chama Acequia Association (RCAA). Beginning in mid-August, flows on the Rio Chama were insufficient to meet the standard RCAA summer demand. RCAA represents 18 acequias on the Rio Chama between Abiquiu Reservoir and the confluence with the Rio Grande that have direct surface flow diversion rights. With insufficient native flows to meet their needs and the absence of sufficient leased SJCP water, the NMOSE curtailed RCAA diversions to the available flow of the river from mid-August to mid-October of 2023.

San Juan Chama Water Loss Rates

In 2023, approximately 11,000 acre-feet of SJCP water was moved from Abiquiu Reservoir to Elephant Butte Reservoir in early November. The Engineer Advisers determined that the river conditions at the time did not meet the guidelines set forth in the Commission-approved resolution for using a pre-determined fixed loss rate. Therefore, a case-specific loss, rather than a fixed-loss rate, was assigned to the movement of the block of SJCP water. The URGWOM was used to determine the actual incremental increased loss that resulted from the block release.

Additionally, it is becoming apparent that the existing Commission-approved fixed-loss rates for SJCP water released from Heron Reservoir into the Rio Chama may be too low when native water flow is low. This may result in native Rio Grande water being impacted. The Engineer Advisers are evaluating the need to reanalyze the fixed-loss rates.

Rio Grande Project Operations

The 2023 Rio Grande Project (Project) water accounting amounts were approved by the respective district boards and Reclamation prior to the 2024 Engineer Advisers' meeting. All accounting information reported by Reclamation for the Project is based on the URGWOM computer model.

On January 1, 2023, there was 277,327 acre-feet of Usable Water in Project Storage (Elephant Butte and Caballo reservoirs combined) which was also the low for Project Storage. Usable Water ended the year at 468,094 acre-feet on December 31, 2023, down from its high of 618,283 acre-feet on July 1.

Mexico was provided a final in-season allocation in May 2023 of 60,000 acre-feet, which is a full allocation. The final Project allocation was 734,125 acre-feet, including Mexico's allocation. The final calculated charges were: 225,495 acre-feet to EP No. 1; 189,551 acre-feet to EBID; and 46,119 acre-feet to Mexico. A total of 461,165 acre-feet of water deliveries were charged to the Project water users.

Reclamation reported that the final 2023 allocation balances carried over to 2024 were 175,801 acre-feet and 83,277 acre-feet for EP No. 1 and EBID, respectively.

Reclamation reported final 2023 releases from Caballo Reservoir for Project accounting during the irrigation season of 547,721 acre-feet for all three Project water users: EP No. 1, EBID, and Mexico. Releases from Caballo Reservoir began on May 1 and ended on October 13, 2023. EP No. 1 and Mexico began the irrigation season with coordinated orders and diversions on May 12. EBID ended their surface water diversions on August 19, Mexico ended on September 30, and EP No. 1 ended diversions on October 17.

During 2023, Reclamation's report indicates drainage flows into Hudspeth County Conservation and Reclamation District No. 1 (HCCRD) during March through September were 22,500 acre-feet. The calendar year total flow data for HCCRD was 35,191 acre-feet. Additionally, 1,146 acre-feet were delivered from Caballo Reservoir through the Bonita Lateral during calendar year 2023. The Texas Engineer Adviser is concerned that any water taken from Caballo Reservoir for the Bonita Lateral is not a delivery of Compact water to Texas because Bonita water is delivered to lands outside the Rio Grande Project.

The USGS reported that the total flow volume at the gage below Elephant Butte Dam was 511,487 acre-feet during the release season from May 1 through October 11. There was a total of 548,082 acre-feet measured at the Below Caballo gage, which is the amount used in Compact accounting for the calendar year.

For 2024 Project operations, Reclamation determined that the initial 2024 allocation to Mexico is 21,993 acre-feet (37% of full) based on the December 1, 2023, data. Reclamation provided the initial 2024 allocation to EBID and EP No. 1 using data from January 15, 2024. Including the carryover from 2023, the current allocation to EBID and EP No. 1 is 104,662 acre-

feet and 267,780 acre-feet, respectively. Reclamation will continue to evaluate and update the allocations monthly as water is delivered to Elephant Butte Reservoir.

The 2024 irrigation releases from Caballo Reservoir are set to begin on March 8 and end around October for EP No. 1 and Mexico. Releases for EBID are expected to begin in early May and last until August. The length of the irrigation season will depend on the snowpack and runoff conditions.

ADDITIONAL FEDERAL AGENCY REPORTED INFORMATION

Representatives for Reclamation, Corps, USGS, Service, and IBWC presented additional information to the Engineer Advisers as summarized below:

U. S. Geological Survey

The Engineer Advisers received reports from the USGS on their Rio Grande Basin studies. The USGS, in cooperation with Reclamation, has developed a model of the transboundary aquifers and interconnected surface waters of the Palomas and Mesilla basins in New Mexico and Texas and the Conejos-Médanos Basin of northern Mexico, known as the Rio Grande Transboundary Integrated Hydrologic Model (RGTIHM). An updated Scientific Investigations Report was published in 2022. The USGS is currently extending the simulation period of the historical calibration through 2023 and incorporating processes to allow dynamic simulation of Rio Grande Project operations, data from OpenET, and state databases. The USGS also reported on the Rio San Jose Integrated Hydrologic Model, turbidity monitoring in the upper Rio Grande, and a new project for Bosque del Apache National Wildlife Refuge to estimate their groundwater return flows and general water balance.

The USGS listed, but did not give details on, many other New Mexico Water Science Center projects and activities in the Rio Grande Basin, such as the Transboundary Aquifer Assessment Program, the Mesilla Basin Monitoring Program, URGWOM support, and other groundwater and surface water monitoring programs.

U.S. Army Corps of Engineers Civil Works Projects

The Corps reported on the status of Civil Works projects under the Water Resources Development Act of 2020 (WRDA 2020), which provided reauthorization for the Rio Grande Environmental Management Program in Colorado, New Mexico, and Texas. Authorization for this program was extended through federal FY 2029. Current projects undergoing either a feasibility study, higher-level planning, or construction include: Acequia Irrigation System Rehabilitation, Española Valley Ecosystem Restoration, Hatch Dam, Abiquiu Reservoir legislation, Bernalillo to Belen Levee Project, and Sandia to Isleta ecosystem restoration.

Legislation related to Abiquiu Reservoir in WRDA 2020 changed the storage limit of SJCP and native Rio Grande water in Abiquiu Reservoir from a total volume of 200,000 acre-feet to an elevation of 6,230 feet MSL (229,199 acre-feet) and to allow concurrent storage of Rio Grande and SJCP water in Abiquiu Reservoir. This would not impact flood control operations at Abiquiu Reservoir. Therefore, the Water Control Manual must be updated and environmental compliance completed, with a target date of Spring 2024. Additionally, future storage easements must be acquired. The Texas Engineer Adviser continues to be concerned about the increase in storage of native Rio Grande water in Abiquiu Reservoir without unanimous consent of the Commission. The Texas Commissioner has also objected to additional storage of native Rio Grande water in Abiquiu Reservoir without consent of the Commission per Section 337(f)(1) of WRDA 2020.

The Española Valley Ecosystem Restoration design agreements were signed in November 2022, and the design completion is scheduled for 2027. The Bernalillo to Belen Levees project reached a design agreement signed in June 2023, with the first phase of construction set to be the Mountain View segment. The Hatch Dam feasibility phase was completed, the design phase is in progress, and construction is contingent on funding.

The Tribal Partnership Program is currently underway for San Felipe, Santa Ana, Zia, and Santo Domingo pueblos. These projects include watershed assessments, drought resilience planning, and feasibility studies for irrigation infrastructure. Five watershed assessments have been completed. The Pueblo of Santo Domingo's drought resiliency plan was completed in 2023.

Rio Grande Silvery Minnow

The Service reported on the 2023 monitoring results for the endangered Rio Grande silvery minnow (RGSM) using the October Catch per Unit Effort (CPUE) data used to report long-term trends in relative abundance.

The Service has adopted the use of 30 sites for evaluating RGSM take instead of the standard 20 sites. The 2023 October fish monitoring estimated an RGSM density of 5.0 fish/100 square meters (m^2) for 30 sites, compared to 0.17 fish/100 m^2 in 2022. High spring runoff years in 2017 and 2019 resulted in October RGSM densities of 23.2 and 3.4 fish/100 m^2.

Hydrologic conditions in 2023 resulted in a successful spawn, but RGSM egg collection to supply the three propagation facilities was limited because of high runoff conditions. However, some larval fish were collected by the Service. The Service reported that in November of 2023, 46,484 hatchery-reared RGSM were augmented to the MRG, as compared with 129,497 in 2022, 208,772 in 2021, and 310,634 in 2020. Fish were provided by the City of Albuquerque's BioPark, the Service's Southwestern Native Aquatic Resources and Recovery Center located in Dexter, New Mexico, and the NMISC's Los Lunas Silvery Minnow Refugium.

The Service stated that over the last 5 years CPUE hovered around their critical threshold of 0.3 fish/100 m^2 in low-flow years (in 2020, 2021, and 2022) but increased with larger spring flows (in 2019 and 2023). The Service is anticipating a moderately-low year for silvery minnows in 2024 given preliminary runoff projections.

In 2023, fish rescue activities occurred in the 16 miles of unique drying within the San Acacia and Isleta reaches, and 3,621 RGSM were collected and transported to perennial stretches of the river.

El Vado Dam Repairs

Reclamation previously reported that substantial degradation of the steel lining system and service spillway had occurred at El Vado Dam. Corrective action studies determined that construction and repair work need to be conducted at the dam. The El Vado Safety of Dams Project is occurring in two phases: 1) installation of a synthetic liner system across the entire face

plate of the existing dam to reduce embankment seepage, and 2) repair and refurbishment of the spillway.

Reclamation reported that very high runoff delayed the continuation of Phase 1 work until May 2023. During the 2023 construction season, Reclamation and the contractor continued repairs to the steel face plate, to prepare for foundation grouting by installing the grout cap along the left abutment, and continued grouting beneath the face plate. Phase 1 construction is expected to extend beyond the baseline schedule and Reclamation is working with the contractor to ensure completion by the end of 2025.

Reclamation reported that the El Vado Spillway Replacement, Phase 2 final designs are complete. Phase 2 may include repairs to, or replacement of, the El Vado stilling basin.

During both phases of construction, there will be restrictions on storage of water in El Vado Reservoir. The Corps reported that a deviation from the Abiquiu Dam Water Control Plan was needed to store 16,795 acre-feet of Prior and Paramount water in Abiquiu Dam during El Vado Construction in 2023. The deviation from normal operations at Abiquiu Dam was approved by the Commission in 2022 and is valid through the 2024 calendar year. If the El Vado Dam repairs are not complete within that timeframe, and assuming the Abiquiu Dam Water Control Plan has not been updated, an additional deviation request and approval would be required, but no additional regulatory compliance would be necessary.

Middle Rio Grande Project Channel Maintenance

Reclamation's report indicates that it is pursuing work at 17 active priority sites along the Middle Rio Grande Project reach where bank erosion or reduced channel capacity could cause levee failure.

Reclamation reported on adaptive management activities at the Bosque del Apache River Realignment Downstream Phase, formerly the Bosque del Apache National Wildlife Refuge (BDANWR) Pilot Realignment project, which was completed in April 2021. Adaptive maintenance activities in 2023 focused on implementing additional mechanical adjustment of bed slope, which was completed in February 2023. Reclamation reported that the BDA Upper Realignment Project is approaching 90-percent design completion. NEPA work is ongoing with

an expected Environmental Assessment (EA) in April 2024. Construction is planned to start in September 2024.

Reclamation reported that the River Mile 60 Project re-established a more direct outfall to the river channel at the terminus of the LFCC at River Mile 60. This project fulfills one of the 2016 BO conservation measures and has an intended goal of improving water delivery to Elephant Butte Reservoir, while avoiding negative impacts to southwestern willow flycatcher (flycatcher) habitat nearby. Construction was completed in 2023. Experimental operations and adaptive management plans were developed in 2023, and experimental operations began in January 2024. The River Mile 60 Project is being monitored with 10 shallow groundwater wells, 6 discharge measurement locations for monthly data, 10 new surface water loggers, and an additional pond elevation gage.

Reclamation's Los Lunas River Mile 163 Project addresses the increasing water surface elevation from channel narrowing in this reach of the Rio Grande. This project has an intended goal of improving water conveyance through the Los Lunas subreach while improving habitat for silvery minnow. The project will include removing sediment within the new inset floodplain to restore channel capacity. Clean Water Act (CWA) compliance, including wetland mitigation requirements, is pending.

The Lower San Acacia Reach Improvements Project has the intended goals of improving water delivery to Elephant Butte Reservoir, enhancing ecosystem health, and optimizing long-term operation and maintenance activities. The EIS NOI was published, and public scoping was held in 2023. A feasibility-level study will be completed in 2024, and the preferred alternative will be identified. Reclamation plans to draft the EIS in 2025, to plan construction in 2025, to finalize the EIS, Record of Decision (ROD), and CWA compliance in 2026, and to conduct phased construction from 2026 through 2028.

Vegetation Management at Elephant Butte and Caballo Reservoirs

Reclamation reported that it performed vegetation maintenance at Caballo Reservoir during 2023 and cleared approximately 1,000 acres of phreatophytic vegetation.

The Engineer Advisers remain concerned about the lack of vegetation management

activities by Reclamation at Elephant Butte Reservoir. The State of New Mexico would support vegetation management efforts at Elephant Butte Reservoir through the existing Technical Services Agreement and encourages Reclamation to work with staff to implement vegetation management projects at Elephant Butte in 2024.

Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo

Reclamation conducts surveys and nest monitoring for the flycatcher and the western yellow-billed cuckoo (cuckoo) during the spring and summer months south of Albuquerque, New Mexico to El Paso, Texas. In 2023, surveys were concentrated on areas of most concern due to staffing shortages. A total of 467 total flycatcher territories were found, with 363 territories documented in the MRG and 104 territories in the LRG. As usual, most of the flycatcher territories were in the San Marcial and Elephant Butte Reservoir areas. In 2023, greater survey efforts in the Upper Rio Grande and San Luis Valley management units in Colorado resulted in the identification of 43 flycatcher territories. The 5-year species review will be completed in 2025.

Reclamation conducted surveys for the cuckoo from south of Albuquerque, New Mexico to El Paso, Texas. In 2023, 145 cuckoo territories were observed in the surveyed area, with 114 in the MRG and 31 in the LRG. In late 2021, the Service began a Species Status Assessment (SSA), which is still in progress, to inform the future recovery plan. In 2023, there was only one detection in the Upper Rio Grande and San Luis Valley management units in Colorado.

The tamarisk leaf beetle continues to be found in most of the Rio Grande area, and defoliation of salt cedar in occupied territories may result in impacts to nesting success. Although numbers of tamarisk beetles in the MRG have been declining in the past few years, this may be cyclical, and it is uncertain if there is a long-term trend.

Additional Listing Information Provided by the Service

In 2016, the Service found that listing the Rio Grande chub and the Rio Grande sucker may be warranted. A Conservation Agreement was signed in September 2018 between the Service and the states of New Mexico, Colorado, and Texas, the Jicarilla Apache Nation, the Pueblo of Santa Ana, several counties in Colorado, the U.S. Forest Service, BLM, and the

National Park Service to reduce the threats to these fish species. The Service completed an SSA in 2023 and is in the process of conducting a 12-month review, which will be completed by June 15, 2024.

The Service conducts photographic monitoring of the New Mexico meadow jumping mouse (jumping mouse) at BDANWR. Due to limited resources the Service is still processing data from 2023, and they have found seven unique photo detections at six camera locations to date. The total number of detections for 2023 is anticipated to increase once all the data are processed.

International Boundary and Water Commission Activities

The IBWC provided a report of its activities along the Rio Grande in New Mexico and Texas during 2023 and their projected activities for 2024. The items discussed included their canalization levee rehabilitation work and Federal Emergency Management Agency (FEMA) status, the American Canal rehabilitation work, the status of their hydraulic modeling, habitat restoration, environmental water transaction program, participation in the Drought Resilience Team, flood control issues and activities, sediment removal activities, water accounting operations, and border barrier projects.

The canalization levee rehabilitation projects discussed were the revegetation of Sunland Park West Levee, the Sunland Park East Levee rehabilitation project scheduled to be completed in 2025, and the Zaragoza Levee with a completion date in September 2024. Upon construction completion of the levees, the design and as-built construction drawings will be submitted to FEMA for levee accreditation.

A construction contract for the American Canal rehabilitation was awarded in August 2023, with an estimated completion by June 2027. Onsite work is expected to begin at the end of the 2024 irrigation season.

The IBWC reported that the hydraulic models for the reaches between Percha Dam and American Dam achieved the 60% design in April 2022, but that additional model calibration is necessary. Contract modifications are underway to complete the project.

The IBWC habitat restoration work has shifted to long-term monitoring and

maintenance. Under their environmental water transaction program, the IBWC has acquired 47 acres of EBID surface water rights. In 2023, the IBWC conducted 14 irrigation events across all five sites and continued logistical efforts to acquire additional water rights to meet its ROD commitments.

The IBWC participated in stakeholder meetings for the Rio Grande Project Area Drought Resilience Team and stated its commitment to providing technical assistance as needed.

The IBWC reported there were no major issues in the Canalization project area in 2023. The Rectification project area continues to experience saturated floodplains in Hudspeth County. In 2023, IBWC in-house work crews were able to remove about 350,000 cubic yards of sediment. Projects in 2024 will include sediment removal, sediment disposal, and levee repairs at both the Canalization and Rectification project areas.

All resources from the IBWC's three field offices will be focused on sediment removal in the Canalization area until irrigation water releases start in March 2024. The Chamizal Project had 20,000 cubic yards of sediment removed in 2023 and has no work scheduled for 2024. Estimated sediment removal for 2024 is 140,000 cubic yards in the Canalization area and 210,000 cubic yards in the Rectification area.

The IBWC reported that the 2023 allocation to Mexico for the Convention of 1906 was 60,000 acre-feet, which was 100 percent of a full allocation. The final delivery charged to Mexico was 46,119 acre-feet. A preliminary January allocation for 2024 to Mexico was reported to be 31,968 acre-feet, which is 53.3 percent of a full allocation. The irrigation season is scheduled to begin in March.

After being suspended in 2021, work on Customs and Border Protection (CBP) border wall projects resumed in 2022 to remediate the negative impacts from previous CBP and Texas border wall construction.

ENGINEER ADVISER RECOMMENDATIONS

There are no new recommendations proposed by the Engineer Advisers at this time.

BUDGET

The Engineer Advisers reviewed the budgeted cost of operation for the fiscal year ending June 30, 2023, and the budget for the fiscal year ending June 30, 2025.

The Engineer Advisers found that the budgeted costs for gaging stations and administration of the Compact for the year ending June 30, 2023, were $235,187. The U.S. federal government bore $73,468 of this total, with the balance of $161,719 borne equally by the three states.

The Engineer Advisers found that the proposed budget for the fiscal year ending June 30, 2025, indicates that a total of $266,174 will be spent for gaging and administration, with a proposed contribution by the U.S. federal government of $95,443 and the balance of $170,731 borne equally by the three states.

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