The Engineer Advisers to the Rio Grande Compact Commission met in Albuquerque, New Mexico on January 14, 2019 and between March 4 and March 7, 2019 to:

- Receive reports
- Prepare the 2018 Rio Grande Compact (Compact) water accounting
- Discuss continuing and new issues in preparation for the 2019 annual meeting of the Rio Grande Compact Commission (Commission)
- 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 these meetings. The agencies each presented information about their specific water-related activities in the basin during 2018.

COMPACT ACCOUNTING

The Engineer Advisers reviewed the streamflow and reservoir storage records and other pertinent data for the Upper Rio Grande Basin for calendar year 2018 and are unable to reach a unanimous consensus on the Compact accounting. The lack of unanimous consensus arises from a disagreement that began in 2011 amongst the Texas Engineer Adviser and New Mexico and Colorado Engineer Advisers on the release of credit water by Reclamation from Elephant Butte Reservoir in late summer 2011. As a result, the Engineer Advisers have not reached unanimous consensus on how to finalize the 2011 through 2018 Compact Delivery Tables for Colorado and New Mexico and the Release and Spill from Project Storage Table. For 2018, as in previous years, each of the Engineer Advisers developed accounting procedures described in the addenda to this report. At the 2018 meeting, the Commission did not approve any of the proposed accounting scenarios. In 2019, the Engineer Advisers used the accounting scenarios they
individually prepared to carry forward Compact accounting for the 2018 calendar year. As described in the New Mexico Engineer Adviser’s addenda in previous years, the use of accounting methods 1 and 2 has had an impact on the timing of Article VII storage restrictions and upstream storage operations. In 2018, Article VII timing was different for both accounting methods. By method 1 (Texas), Article VII restrictions went into effect on May 20, 2018, and by method 2 (New Mexico and Colorado), Article VII restrictions went into effect on May 23, 2018.

**RIO GRANDE BASIN CONDITIONS**

Snowpack and snow-water equivalent amounts were well below average for the winter of 2017-2018. As a result, snowmelt runoff levels in 2018 were near historic lows across the basin in Colorado and in New Mexico.

Summer monsoon precipitation was generally considered average across the basin in Colorado and New Mexico in 2018. Platoro Reservoir reached a high of approximately 47 percent of capacity during May of 2018. Usable Water in Rio Grande Project Storage was above the Article VII trigger of 400,000 acre-feet until late May when Usable Water dropped below the 400,000 acre-feet threshold and again put post-Compact reservoirs under the Article VII storage restrictions, where it remained throughout the rest of the year.

**CONTINUING ISSUES**

This section of the report summarizes updated information about issues previously addressed by the Engineer Advisers. It reflects information obtained by the Engineer Advisers prior to the 2019 Commission annual meeting, including information obtained from the reports of the federal agencies at meetings with the Engineer Advisers or otherwise reported at the 2019 Engineer Adviser meetings. The terms “reported” and “indicated” herein reflect information provided by various entities without analysis 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. In federal fiscal year 2018, Reclamation reported that their federal appropriations were $3,433,733 for Collaborative Program activities, including funding and contracting for:

- Captive propagation of Rio Grande silvery minnow (silvery minnow) at three facilities
- Annual monitoring of silvery minnow reproduction and population trends
- Genetics study of the silvery minnow including the addition of newer, more cost effective technologies
- Silvery minnow rescue and salvage efforts during river drying
- Annual monitoring of Southwestern willow flycatcher (flycatcher) population and nests
- Program management, assessment, reporting, and outreach activities

The Corps received $2,200,000 in 2018 to support administrative and technical staff for engagement with the Collaborative Program. The Corps reported that the appropriation was also used for development of an upgraded database through the USGS, avian monitoring, habitat restoration monitoring, sediment data collection, climate change evaluations, water quality monitoring, and tamarisk-leaf beetle monitoring.

The Collaborative Program nonfederal signatories have exceeded their required cost share contribution of 25 percent cash and in-kind services with the majority of the cost share from the State of New Mexico. Limited federal funding for Collaborative Program activities is expected to continue.

Update on WildEarth Guardian’s Litigation over the 2003 Biological Opinion

In 2014, the WildEarth Guardians filed a lawsuit in Federal District Court against Reclamation and the Corps. The Middle Rio Grande Conservancy District (MRGCD) intervened in the case. The WildEarth Guardians alleged that Reclamation had made arbitrary and
capricious decisions that departed from certain aspects of 2003 Biological Opinion (BO) for Middle Rio Grande operations and that the scope of Reclamation’s then on-going ESA consultation was improper and too narrow. On March 1, 2017, the parties to the case voluntarily agreed to dismiss all claims against Reclamation. In June, 2014, after completion of a thorough reassessment of all its Middle Rio Grande Operations, the Corps determined there was no activity currently proposed or undertaken which required ESA consultation. WildEarth Guardians claims against the Corps were generally related to this determination. The Federal District Court provided a final decision in August, 2018. The Federal District Court fully upheld the Corps’ decision regarding its reassessment determinations. WildEarth Guardians has subsequently appealed that decision to the 10th Circuit Court of Appeals, and a briefing schedule has been issued in that case.

**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. During 2018, URGWOM activities included:

- Basin-wide annual operating plans provided by the Corps
- Extending the database to include historical data from years 2016-2018
- Developing new groundwater objects to represent the deep groundwater system
- Developing a script to generate unregulated flow data
- Making operations rules improvements
- Conducting one URGWOM training session
- Developing a real-time operation model by linking URGWOM to the Corps Water Management System
- Improving the URGWOM’s ability to estimate Colorado deliveries at the Lobatos gage
- Improving the accounting and the allocation procedures for the Lower Rio Grande portion of the URGWOM
- Updating the five-year plan and model documentation
Software updates including implementation of RiverWISE into RiverWare

Compliance by Federal and State Agencies with New Mexico State Water Law

The NMISC continues to track habitat restoration projects implemented by various federal and state agencies within the Middle Rio Grande and accounts and reports depletions related to these projects. NMISC coordinates with the New Mexico Office of the State Engineer (NMOSE) to determine if a permit is needed and to ensure any increase in depletions is offset by the project sponsors. The NMISC reported that it continues to coordinate with the Corps on several recently implemented habitat restoration projects to ensure the Corps project’s 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. Well-below average spring snowmelt runoff flows in 2018 resulted in small depletions for 2018, which were offset by NMISC’s Strategic Water Reserve.

Elephant Butte Delta Channel Project

The Delta Channel project was successful in conveying the below-average 2018 snowmelt runoff into the active reservoir pool at Elephant Butte Reservoir. Monsoonal precipitation and corresponding summer river flows during 2018 were about average in the Middle Rio Grande, and the Delta Channel successfully conveyed all flow into Elephant Butte Reservoir during 2018. During January, February and March of 2018, Reclamation work crews, funded by the NMISC, conducted in-channel maintenance, sandbar de-vegetation and access road grading throughout the Delta Channel Project area. Since 2003, New Mexico has spent nearly $18 million to construct and maintain the Delta Channel.

Relinquishment Update

The total amount of Accrued Credit relinquished by Colorado since 2013 is 3,000 acre-feet. Between 2013 and 2018, Colorado stored a total of 2,068 acre-feet of relinquished water in Platoro Reservoir. Colorado did not store any relinquished water in 2018, which leaves a balance of 932 acre-feet in Colorado’s relinquishment account.
The total amount of Accrued Credit relinquished by New Mexico since 2003 is 380,500 acre-feet. Forty-seven acre-feet of relinquished water was stored in New Mexico by the City of Santa Fe during 2018. Relinquishment water storage to date totals 288,328 acre-feet, leaving a balance of 92,172 acre-feet available to be stored in future years when Article VII storage restrictions are in effect.

For 2019, Reclamation reported that the MRGCD has requested that Reclamation store approximately 40,000 acre-feet of their relinquishment allocation in El Vado Reservoir, if conditions permit. Reclamation reported that they do not foresee storing any of their own relinquishment allocation for use in their supplemental water program during 2019. The New Mexico Engineer Adviser anticipates requesting that Reclamation store a portion of New Mexico’s allocation of relinquishment credit in 2019, if conditions permit.

Gaging Station Review

For the Rio Grande near Otowi gage (#08313000), the USGS reported they utilized a single rating (#39) for all of 2018. The USGS made a total of 20 measurements at the Otowi gage in 2018, with 14 rated good, 4 rated fair, and 2 rated poor. For 2018, the USGS utilized redundant sensors (radar and pressure transducer) as well as redundant primary reference gages (wire weight gage and staff gage) for gage height readings. The USGS reported that the Rio Grande above Buckman gage (#08313150), installed by the USGS upstream of the City of Santa Fe’s Buckman Direct Diversion Project in 2017, continues to help improve the Otowi gage record and used rating #1 until July 2018 when rating #2 provisionally went into effect. During 2018, the NMISC performed routine flow measurements at the Otowi gage under an access agreement with the San Ildefonso Pueblo. The NMISC provided three measurements to the USGS. The USGS stated that they believe these measurements from NMISC are accurate and therefore were included in the database.

The USGS reported that during the 2018 calendar year, 34 streamflow measurements were collected at the Rio Grande below Elephant Butte gage (#08361000). Of the 34 measurements, 16 were rated good, 16 were rated fair, and 2 were rated poor. Aquatic vegetation growth on the streambed at the USGS gaging station section continues to cause a low bias in gaged flow during certain months. This issue has occurred for an undetermined period of
time but began to be addressed in 2016 by utilizing an alternate section which is not impacted by vegetation growth during certain months. The gage records for 2016, 2017, and 2018 reflect improved precision, and the NMISC will continue to coordinate with the USGS to provide more accurate gage records in the future.

The USGS also reported that they reviewed and approved the 2018 Rio Grande below Caballo Reservoir gage (#08362500) flow records developed by Reclamation, and that all necessary documentation was provided. The USGS reported that the record accuracy looked good, in large part due to the high number of measurements (59 in total). In 2018, Reclamation was able to utilize the Acoustic Doppler Velocity Meter (ADVM) to collect data for approximately six months. However, this data was not used in the development of the records because Reclamation is continuing to evaluate quality control methods for the ADVM data. The USGS stated that once the quality control issues have been resolved, measurement quantity could be reduced by fully utilizing the ADVM installed at the site.

At the 2019 Engineer Advisers’ meeting, Reclamation proposed relocating the Rio Grande below Caballo Reservoir gage (#08362500) to the opposite side of the river and approximately 100 feet upstream. Reclamation stated that the change in elevation between the two gage locations will be 0.008 feet, and they will run the gages concurrently to compare the discharge records for the two gage locations. Reclamation is currently coordinating with the USGS and is anticipating that relocation work will be completed prior to the 2019 irrigation season. Reclamation also reported that they would be installing flow meters in the outlets of Caballo Reservoir near the end of 2019.

The Colorado USGS reviewed gaging station records for the Colorado Compact gages. These records were reviewed and approved for 2018.

Reclamation reported that they conducted 95 elevation surveys of Elephant Butte Reservoir in 2018. Of these surveys, 55 exceeded the threshold criteria (<0.05 feet) for the Stage Discharge Recorder (SDR). Reclamation also performed 33 surveys of a new bubbler system installed by the USGS in October 2018. Of these surveys, 24 exceeded the threshold criteria.

During 2018, the NMISC continued its survey of water level elevations in Elephant Butte and Caballo reservoirs. The results from NMISC’s November 2018 survey indicated that Reclamation’s reservoir stage elevations were not within the agreed upon threshold criteria. However, during the December 2018 reservoir survey, NMISC’s survey indicated improvement
in the difference between the shoreline survey and that being reported by Reclamation’s SDR encoder system (-0.06 ft) in the stilling well for Elephant Butte Reservoir. Reclamation continued to perform verification surveys and also worked extensively with the USGS to install a new SDR to get more reliable stage data for Elephant Butte. Reclamation noted that low reservoir levels and resulting sedimentation in stilling well orifices contributed to difficulties in data reliability. Reclamation reset the SDR during 2018 based on survey results and will continue to work to improve Elephant Butte stage recording.

At their 2018 meeting, the Engineer Advisers requested that Reclamation prepare a report on the cause of discrepancies between lake elevation surveys and the SDR and stressed the critical nature of this issue. Reclamation has not yet provided the requested report since they are still evaluating the issue. NMISC and Reclamation will continue to perform side by side surveys at select times during 2019 to ensure the accuracy of the reservoir elevation data.

**Mass Balance Review**

The NMISC conducted a mass balance analysis for the Rio Grande between the Elephant Butte and Caballo gages for calendar year 2018. The mass balance analysis indicated that the reach gained water in eight out of twelve months, with a total calculated gain of 9,185 acre-feet. A significant portion of the gain occurred during the June through October rainy period.

**Gaging Station Operating Costs**

In recent years, the Engineer Advisers and Rio Grande Compact Commissioners (Compact Commissioners) have expressed concern over the large difference in costs between what Reclamation charges to operate the gage below Caballo Reservoir, as compared to what the Colorado Division of Water Resources (CDWR) and USGS charge on average for other Compact gages. The three Compact states equally split the costs of their operations in support of the Compact, including operation and maintenance of the Compact gaging stations. The Compact gaging stations are operated by the CDWR, USGS and Reclamation.

In the last few years, Reclamation has decreased their amount charged for the gage below Caballo Reservoir. The Engineer Advisers note that costs have been reduced and urge
Reclamation to continue to seek ways to further reduce costs associated with the gage below Caballo. One method to reduce costs would be to better utilize the ADVM.

**Review of Compact Accounting Data**

The document, titled “Schedule for Review and Approval of the Rio Grande Compact Accounting Records for the Previous Year,” authorized at the 2016 RGCC meeting, outlines a process and schedule for development, evaluation, and approval of required RGCC accounting records. For calendar year 2018, city, state, and federal agencies for the most part followed the schedule. However, the Rio Grande below Caballo gage, Caballo Reservoir, and Bonita Lateral records were not received within the agreed upon schedule. The Federal government’s partial shutdown of 2018/2019 also resulted in some minor delays of other Compact accounting records.

**YEAR 2018 OPERATIONS**

**Snowmelt Runoff Forecasting**

As has been reported in previous Engineer Advisers’ reports, Colorado and New Mexico rely heavily on accurate streamflow and snowmelt forecasts to estimate their Compact obligations on a yearly basis. Some recent forecasts have lacked the accuracy and reliability needed to effectively administer the Rio Grande for Compact purposes, particularly in the Colorado area. The States are looking for ways to increase the accuracy of the Natural Resources Conservation Service (NRCS) forecasts and potentially use new forecasts and forecasting techniques developed by other federal agencies.

As part of this ongoing effort to increase the accuracy and reliability of the forecasts, unique solutions have been developed. In Colorado, a Doppler radar unit is being installed at the Alamosa airport. The main purpose of this radar unit is to capture the snow water equivalent (SWE) precipitation that falls in the upper basin of Colorado in the winter. By using the traditional SNOTEL gaging stations as ground truth stations, this radar should be able to better track the winter precipitation that occurs throughout the basin, and in turn increase the accuracy of the forecasting models. This radar should be operational by early spring of 2019, and be used
for the first time for winter precipitation accounting during the winter of 2019/2020.

A second Doppler radar unit is planned to be installed at the Durango airport later this year. While not specifically being installed for winter precipitation purposes, this radar data should enhance the ability of water administrators to see winter storms approaching the Rio Grande Basin from the west, and increase the ability to determine the location and effects of those storms.

**Closed Basin Project**

The total production of the Closed Basin Project in calendar year 2018 was 10,209 acre-feet. This total includes water that was exchanged for Colorado Parks and Wildlife water to be delivered to the Blanca Wildlife Habitat Area and to Head Lake. The amount creditable to the Rio Grande for Compact purposes from direct delivery and exchange was 6,808 acre-feet. The remainder of the water produced 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 2018 was of sufficient quality to qualify for credit under the Compact.

Reclamation continues to address problems of biofouling in the production wells of the Closed Basin Project. Reclamation replaced four wells in 2018 that were most affected by iron bacteria and rehabilitated twenty-four other wells. These new replacement wells were constructed using a glass bead (round silica) filter pack with a stainless-steel casing to assist in the mitigation of biofouling issues. Wells will continue to be replaced as budgetary constraints allow in an effort to help maintain production of the project. The Closed Basin Operating Committee continues to monitor groundwater levels and groundwater production and adjust project operations pursuant to the enabling legislation.

**Platoro Reservoir**

Colorado stored water in Platoro Reservoir in 2018 to the extent of its accrued debit of 400 acre-feet, as is required under Article VI of the Rio Grande Compact. Computation of evaporation on the debit water stored in Platoro Reservoir resulted in an annual evaporative loss of approximately 15 acre-feet. Compact accounting numbers are typically rounded to the nearest 100 acre-feet. Therefore, this amount rounds to zero and is entered into the summary of debits.
and credits calculated on the Colorado accounting sheet on line C5: “Reduction of debits a/c Evaporation.”

**Colorado Groundwater Regulations**

In late 2015, the State Engineer of Colorado completed the development of rules and regulations concerning the use of groundwater in the Upper Rio Grande Basin in Colorado. These rules require the owners of non-exempt wells in the Rio Grande Basin in Colorado to sustain the aquifers and augment injurious stream depletions caused by their groundwater withdrawals, either with a plan for augmentation or joining a subdistrict to meet these goals through a groundwater management plan. As an integral part of these rules, the State Engineer of Colorado has also completed the development of Phase 6 of the Rio Grande Decision Support System Model. This model captures the interaction between surface and groundwater and shows the effect that wells have on senior surface water rights. The rules were submitted to the Division 3 Water Court in Alamosa for formal adoption, and a number of water users objected to them. The State Engineer worked diligently with the objectors in attempts to address their concerns and entered into stipulations with most of the objectors, but several of them pushed the case to a 13-day trial concluding on February 14, 2018. As of the writing of this report, a ruling by the Water Judge has not been issued. However, it is anticipated that a ruling will be issued prior to the Compact Commission meeting in early April.

**Aamodt Settlement**

The Aamodt Water Rights Settlement Agreement (Settlement Agreement) was developed through multi-party negotiations begun in 2000 between the Pueblos of Nambé, Pojoaque, Tesuque and San Ildefonso, the State of New Mexico, the United States of America, the 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 Settlement Agreement provides for the funding and construction of a Regional Water System to supply treated water to Pueblo and non-Pueblo parties. The Settlement Agreement relies on three sources of water including Pueblo-reserved rights, transferred agricultural rights, and San Juan Chama Project (SJCP) water. One of the intentions of the Settlement Agreement is that the Compact accounting will not be affected by
the use of these sources of water. As expressly stated in the Settlement Agreement, “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.

Reclamation reported to the Engineer Advisers that the Final EIS was published in the Federal Register in January 2018, and a Record of Decision will be signed by April 2019. Reclamation has completed designs on Phase 1 at the 90 percent level, Phase 2 at the 60 percent level and Phase 3 at the 30 percent level. Construction on Phase 1 is anticipated to begin in August or September of 2019, and Phases 2 and 3 are on hold until agreement is reached with stakeholders on features to be designed and constructed. Associated cost estimates are well above the amount authorized for the project, and negotiations are underway regarding non-federal cost contributions. No diversions of Rio Grande water occurred in 2018.

**Reclamation’s Middle Rio Grande Supplemental Water Program**

Reclamation’s supplemental water program is intended to provide additional water, primarily obtained through voluntary leasing of SJCP water, for endangered species needs and compliance with the 2016 BO. In 2018, Reclamation reported that a total of 35,739 acre-feet of leased SJCP water was released during the period April 1 through October 29.

In addition to the water released by Reclamation, Audubon New Mexico released a total of 962 acre-feet of purchased SJCP water between July 16 and September 14. A total of 294 acre-feet of pre-1907 native water rights owned by Reclamation and permitted to be used for offset via the NMISC’s Strategic Water Reserve were released from drain outfalls from June 21 to 25 and from October 1 to 5.

Reclamation indicated it continued to maintain portable pumping stations at four locations on the Low Flow Conveyance Channel (LFCC) in the San Acacia reach, and that only one of the four were operated during 2018. The pumps at the South Boundary site were operated from March 26 through July 8 and resumed on August 3 through October 24 to pump 19,989 acre-feet from the LFCC to the Rio Grande under a permit issued by the NMOSE.
Six Middle Rio Grande Pueblos Prior and Paramount Operations

BIA requested that Reclamation store 45,495 acre-feet of Rio Grande water in El Vado Reservoir for the Coalition of Six Middle Rio Grande Basin Pueblos’ (Pueblos) Prior and Paramount (P&P) operations in 2018. By mid-May, only 21,493 acre-feet of native water had been stored in El Vado Reservoir for P&P operations due to poor hydrologic conditions. This precipitated a paper water exchange on May 19 between BIA and MRGCD in which 24,002 acre-feet of native water, which had been stored in 2017, was transferred to the P&P account in El Vado Reservoir. This native water was exchanged for SJCP water in Heron Reservoir belonging to MRGCD. All of the transferred water was made available to MRGCD to use for its basic, district-wide water operations, which include P&P lands.

Based on the February 1, 2019, most probable snowmelt runoff forecast, the BIA reported that Reclamation will have a preliminary storage target of approximately 18,522 acre-feet for their P&P operation in 2019. Additional forecasts in March, April and May, as well as discussions between Reclamation and the Pueblos, may change this storage target.

The BIA continues to make funding available to the Pueblos to perform work upgrading their irrigation systems. Most of the funding goes toward water control structures such as turnouts and check structures, mainly in MRGCD ditches, which enable the Pueblos to make better, more efficient use of their water supply. In some cases, BIA money is combined with Reclamation and NRCS funding to complete larger projects, including laser leveling, installation of subsurface pressure pipe systems, and concrete lining of ditches.

The BIA funds the MRGCD to perform work on their systems which serve Pueblo lands. The BIA cooperates with the MRGCD to improve water delivery and efficiency. Examples include working towards the MRGCD’s policy of irrigating a minimum of one acre per hour, scheduling irrigation, and helping coordinate with Pueblo farmers for delivery and an adequate water supply.

The BIA reported that no discussions occurred concerning the carryover storage of P&P water in 2018. The BIA also reported that there were no Executive Orders issued related to BIA and/or P&P operations.

The Engineer Advisers remain concerned about the procedures for quantifying storage, release and delivery of water for the P&P lands of the Pueblos. The Texas Engineer Adviser
remains concerned about the storage of native Rio Grande water in El Vado Reservoir by Reclamation when the storage restrictions of Article VII are in effect.

2018 Rio Chama Water Supply Conditions

Snowpack conditions in the Rio Chama Basin were at or below historic lows during the winter of 2017-2018. The spring 2018 snowmelt runoff was of such low volume that there were significant water supply shortages for native water users. By late June, native storage in El Vado Reservoir was completely exhausted, and native inflow on the Rio Chama, as measured at the USGS stream gage near La Puente (#08284100), was extremely low. Beginning in late June, nearly all of the water flowing in the Rio Chama below El Vado consisted of SJCP water.

The Rio Chama Acequia Association (RCAA) represents 16 acequias on the Rio Chama between Abiquiu Reservoir and the confluence with the Rio Grande that have direct surface flow diversion rights. With native flows on the Rio Chama being insufficient to meet the needs of the direct flow irrigators of the RCAA, agreements were made to allow RCAA to continue to irrigate using SJCP water belonging to others. Relinquishment credit previously allocated to the NMISC was utilized for mitigating the impact to the SJCP water.

Depletions to SJCP water by RCAA for the period June 28, 2018, through October 31, 2018, totaled 1,750 acre-feet. To account for this, the New Mexico Engineer Adviser requested that Reclamation reduce the SJCP water at Otowi gage by 1,750 acre-feet, plus associated transit losses, in Table 8 of their annual Water Accounting Report. The adjustment was made for the months of June through October, resulting in a reduction of SJCP water at Otowi and an increase to the Otowi Index Supply.

Reclamation’s Lower Reach Plan

As part of its requirements in the 2016 BO, Reclamation submitted the Lower Reach Plan to the Service in 2018. The region of the Rio Grande considered in the Lower Reach Plan is from the Isleta Pueblo southern boundary to the headwaters of Elephant Butte Reservoir. Reclamation stated that the Lower Reach Plan includes multiple projects that are intended to improve habitat and enhance flows in the Isleta and San Acacia Reaches, while managing sediment and increasing safe channel capacity. Reclamation stated that the implementation of
the Lower Reach Plan will not increase depletions once the projects come into equilibrium. The New Mexico Engineer Adviser is concerned that some of the projects, as described, may increase depletions within the Lower Reach Plan area. Reclamation has committed to work with NMISC to establish a methodology to quantify depletions. Reclamation committed that they will offset any increased depletions that do occur. The Engineer Advisers support the intent of the Lower Reach Plan but want to ensure that the projects do not impact deliveries of water to Elephant Butte Reservoir.

**Rio Grande Project Operations**

The 2008 Operating Agreement (2008 OA) and its manual provide the procedures used to operate the Rio Grande Project. A January 2017 Record of Decision for the final Environmental Impact Statement allows the 2008 OA to remain in effect through 2050. With the combined Project storage and runoff, Reclamation allotted 475,505 acre-feet, or 60 percent of a full irrigation supply, to Rio Grande Project water users for 2018. Reclamation reported a final 2018 release from Caballo Reservoir during irrigation season of 491,305 acre-feet for all three Rio Grande Project water users: El Paso County Water Improvement District No. 1 (EP No. 1), Elephant Butte Irrigation District (EBID), and Mexico. A total of 444,433 acre-feet of water were delivered to the Rio Grande Project water users. Reclamation reported end of year allocations to EBID at the diversion headings of 123,315 acre-feet (127,487 acre-feet were delivered, resulting in an over-delivery of 6,038 acre-feet), and to EP No.1 of 314,520 acre-feet (279,211 acre-feet were delivered, resulting in an unused allocation of 33,889 acre-feet). During 2018, Mexico’s diversion allocation was 37,670 acre-feet, and 37,735 acre-feet were delivered. Reclamation’s report indicates flows into Hudspeth County Water Conservation and Reclamation District during 2018 were provisionally 39,603 acre-feet, and 1,418 acre-feet were delivered through the Bonita Lateral.

Reclamation reported that Project releases started on March 16, 2018 and continued through September 29, 2018. The USGS reported that the total annual flow at the gage below Elephant Butte dam was 408,431 acre-feet. Elephant Butte Reservoir storage peaked at 483,692 acre-feet on February 27, 2018, and storage at Caballo Reservoir peaked at 65,917 acre-feet on March 15, 2018. Combined end-of-year storage at Elephant Butte and Caballo Reservoirs was 141,607 acre-feet, which is 6 percent of their total capacity, with no SJCP water in storage.
Usable Water in Project storage was above 400,000 acre-feet from January 1, 2018 through May 20, 2018, according to method 1, and through late in the day on May 23, 2018, according to method 2. Usable Water in Project storage remained under 400,000 acre-feet, as calculated by either method 1 or 2, through the remainder of 2018.

An initial allocation for 2019 was made in February, based on provisional data. On January 31, 2019, combined storage in Elephant Butte and Caballo Reservoirs was 170,824 acre-feet. Water available to the Project water users was 164,725 acre-feet. The Natural Resources Conservation Service spring runoff forecast at the San Marcial gaging station was not available for January 2019. Using the National Weather Service predictions for the El Niño Southern Oscillation activity and current hydrologic conditions, Reclamation anticipates that there will be only 30 percent to 60 percent of a full irrigation allocation for the Rio Grande Project during 2019. The first allocation may be deferred to April 2019, with irrigation beginning in early June according to the Reclamation.

The New Mexico Engineer Adviser expressed concern about continued use of the 2008 OA for the Rio Grande Project. These concerns include changes in Reclamation’s reported annual allocation and delivery values since 2008. Additionally, the New Mexico Engineer Adviser expressed concern over operational and administrative changes that have been made under the Operating Manual.

ADDITIONAL FEDERAL AGENCY REPORTED INFORMATION

Representatives of USGS, Reclamation, Corps, 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 projects. The USGS is in the final year of a WaterSmart Focus Area Study to assess water use and availability from the headwaters in southern Colorado to Fort Quitman, Texas. The study is investigating water budget components on the basis of an eight-digit hydrologic unit code (HUC-8). Data on water use, evapotranspiration, snow and watershed processes, groundwater, and surface water will be analyzed and made easily accessible for use by stakeholders. The study is
being conducted by personnel from the USGS Colorado, New Mexico, Utah, and Texas Water Science centers and the USGS Earth Resources Observation and Science Center.

The USGS, in cooperation with Reclamation, has developed an improved 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. The model is operational, and an interim report was published in May of 2018. A Techniques and Methods report is planned to be released by April 2019, and the final report will be released after that. Through the Mesilla Basin Monitoring Program, which is supported by several cooperators, the USGS continues to maintain an observation well network and to monitor salinity in shallow groundwater in the Mesilla Valley. The USGS is also conducting a microgravity pilot study, as well as a seepage investigation, which may aid in understanding surface water and groundwater interactions in the basin. The Engineer Advisers also received a report on review procedures for non-USGS streamflow records in New Mexico and Colorado.

**Corps Rio Grande Environmental Management Program**

The Corps reported on the status of Civil Works projects under the Water Resources Development Act (WRDA) of 2007, which provided authorization for the Rio Grande Environmental Management Program in Colorado, New Mexico and Texas. Authorization for this program was extended in WRDA 2014 through fiscal year 2019, and reauthorization beyond that year is uncertain. The Corps is revising its current processes so that Civil Works projects can be done in a more streamlined manner. Current projects undergoing either feasibility or higher level planning (e.g., Chief Report) include the Española Valley investigation on river restoration and flood risk management, a number of Tribal partnerships for watershed assessment projects, acequia community ditch system improvements (pending), the Middle Rio Grande Restoration Project, Bernalillo to Belen levee rehabilitation assessment, Las Cruces Dam environmental restoration, El Paso Bosque Restoration, and several multi-state assessments. The San Acacia Levee Project Phase 1 section has been completed.

**Zebra Mussels/Quagga Mussels**

The Engineer Advisers continue to be concerned about the possible infestation of Zebra
and Quagga mussels in the Upper Rio Grande basin and their possible spread throughout the entire basin. Reclamation has engaged in public outreach efforts since 2009, which includes printing 41,000 ‘Zap the Zebra’ brochures and 1,000 mussel posters. These brochures and posters have been dispersed throughout New Mexico at the New Mexico State Parks facilities, convenience and sporting good shops and libraries. Permanent signs with the “Stop Aquatic Hitchhikers!” message have been installed at boating docks and other key locations at both Elephant Butte and Navajo Reservoirs. Information is distributed to the public at New Mexico reservoirs where quagga or zebra mussel inspections occur.

Since 2013, aquatic invasive species inspections have increased from two to fifteen waterbodies in New Mexico. The number of watercraft inspections statewide has increased from 9,346 in 2013 to 40,834 in 2018. Reclamation sampled seven of its New Mexico reservoirs under Reclamation’s Detection Laboratory for Exotic Species direction. All tests came back negative for Polymerase Chain Reaction (PCR) and microscopy tests in 2018. Continued vigilance is important, as conditions more suitable to aquatic invasive species establishment may occur in the future.

**Rio Grande Silvery Minnow**

The Service and Reclamation reported on the 2018 monitoring results for the silvery minnow using the October Catch per Unit Effort (CPUE) data typically used to report long-term trends in relative abundance.

The 2018 October CPUE survey for the Middle Rio Grande resulted in an estimated silvery minnow density of 0.09 silvery minnow/100 m². The 2018 October CPUE was a sharp decline in silvery minnow densities from that of 2017, which was one of the highest densities observed in the 24-year history of similar monitoring efforts. The Service indicated the primary cause for the precipitous drop was likely from effects of the drought and low spring runoff, including low success of silvery minnow spawning and survival. The Service acknowledged the impressive efforts in 2018 by water managers to create spawning events in the spring and to reduce the extent of river drying during the summer months.
Extensive coordination and implementation of conservation and recovery actions occurred among many stakeholders in 2018 to minimize the adverse effects of the drought and low flows. The Service reported that captive silvery minnows are maintained and propagated at the City of Albuquerque BioPark, the Service’s Southwestern Native Aquatic Resources and Recovery Center located in Dexter, New Mexico, Uvalde National Fish Hatchery (Texas), and the NMISC’s Los Lunas Silvery Minnow Refugium as part of conservation of the species. The Service, with assistance from BO partners, conducted rescue activities primarily in the San Acacia Reach, moving 70,797 silvery minnows to flowing portions of the river.

Nonfederal involvement in the 2016 BO and Collaborative Program activities continued with over $1,500,000 in contributions from the NMISC, the MRGCD, and the Albuquerque Bernalillo County Water Utility Authority for silvery minnow research and management, habitat restoration monitoring, hydrologic surveys, irrigation return flow management and monitoring of silvery minnow refugia, fish passage investigations and pilot studies, and population monitoring program evaluations.

The Service’s Texas team previously recommended ceasing their stocking and monitoring efforts for the silvery minnow in the Big Bend reach of the Rio Grande until environmental flow requirements can be determined and implemented. In the interim, before an official decision is made, the Service’s Texas team will continue to stock and monitor for silvery minnows within the Big Bend National Park boundaries, not including the canyon reaches.

Temporary Modification of Operations at El Vado Reservoir

At the March 2019 Engineer Advisers’ meeting, Reclamation made a verbal request to conduct a temporary modification of operations at El Vado Reservoir during the spring of 2019. The purpose of this request is to aid in creating a spawning flow for the benefit of the silvery minnow in the Middle Rio Grande while Article VII storage restrictions are in effect. The Engineer Advisers notified Reclamation that a formal, written request of this modification must be made to the Engineer Advisers.
The Engineer Advisers discussed this proposed modification and were concerned if this operation would be inconsistent with Article VII of the Compact. Therefore, the Engineer Advisers have recommended to the Compact Commissioners that the legal committee be directed to review this issue and provide the Commissioners and Engineer Advisers with a determination as to the legality of this operation. Further, the Engineer Advisers requested that the legal committee develop potential solutions to allow the modification while still remaining in compliance with the Compact.

**Middle Rio Grande Project Channel Maintenance**

Reclamation’s report indicates it is pursuing work at 15 active priority sites along the Middle Rio Grande Project reach where bank erosion or reduced channel capacity could cause levee failure. Of the active priority sites, six require an annual review of channel capacity and possible maintenance due to sediment accumulation.

Reclamation reported on and is moving forward with a pilot river realignment project for a three-mile section of river in the San Acacia Reach to address channel perching and sediment plug issues at one active priority site. This pilot project is entirely within the Bosque del Apache boundary, and will be used to assist in the planning of maintenance work on an additional five miles of the priority site upstream from the pilot project area. Reclamation reported that it is waiting on a Clean Water Act 404 permit from the Corps before starting the project.

The New Mexico Engineer Adviser has expressed concern over the impact the pilot project might have on water delivery efficiency into Elephant Butte Reservoir, and Reclamation is in the process of reevaluating their project design to potentially address these concerns.

**Vegetation Management at Elephant Butte and Caballo Reservoirs**

Reclamation continued vegetation management efforts in Caballo Reservoir in 2018 pursuant to a Technical Services Agreement with the NMISC. Reclamation reported that maintenance of vegetation at Caballo Reservoir was performed during 2018, and approximately 794 acres of phreatophytic vegetation was managed utilizing mowers and mulchers. NMISC and Reclamation executed a task order using $70,000 of state funds for vegetation management activities during 2018.
At the 2017 Annual Compact meeting, Reclamation mentioned the cessation of vegetation clearing in Elephant Butte Reservoir in about 2012 because of the listed species and the designation of critical habitat in the reservoir. At that time, Reclamation focused efforts on Caballo Reservoir. At the 2017 Annual Compact Meeting, Reclamation committed to work with the Service, the Compact Commissioners and the Engineer Advisers to conduct vegetation management again in Elephant Butte Reservoir. Reclamation stated that they would visit informally with the Service to discuss potential impacts to endangered species habitat. It appears no such meeting occurred. At their 2018 annual meeting, the Engineer Advisers requested Reclamation complete a draft plan for further vegetative control and discuss the plan with the Service. Reclamation has not provided the Engineer Advisers with a report or plan on this request.

**Southwestern Willow Flycatcher and Yellow-billed Cuckoo**

Reclamation continued to conduct surveys and nest monitoring for the Southwestern willow flycatcher (flycatcher) during the summer along about 250 miles of the Rio Grande between Isleta Pueblo and Elephant Butte Reservoir. Other areas surveyed included above Cochiti Lake and select locations between Caballo Reservoir and El Paso, Texas. In 2018, a total of 780 resident flycatchers were documented. Four hundred twenty-one territories, of which 359 were pairs, were documented in 2018, which is an increase of 14 percent above the 2017 territory numbers. As in previous years, the majority of flycatchers were present in the San Marcial/Elephant Butte Reservoir area (277 territories – 8 percent increase). A 28 percent increase in flycatcher territories from 2017 to 2018 was recorded in the Lower Rio Grande with 73 territories documented (compared to 68 in 2017). Nest success for flycatchers in the Middle Rio Grande also improved to 47 percent, compared to 25 percent in 2017. Nest success in the Lower Rio Grande showed comparable results.

Reclamation conducted surveys in 12 distinct reaches for the Western yellow billed cuckoo (cuckoo) from the southern boundary of Isleta Pueblo to El Paso, Texas. In 2018, an estimated 138 breeding territories, assumed to be pairs, were documented. As with the flycatcher, the San Marcial/Elephant Butte Reservoir pool had the highest concentration of cuckoo territories. Critical habitat for the cuckoo is under review and will be re-proposed for public comments in approximately August 2019. The Service also reported that they are
working on a 12-month finding regarding the 2017 petition to delist the cuckoo, which was based on the petitioners’ opinion that the original listing of the species was in error.

The tamarisk leaf beetle is present in most of the Rio Grande area and defoliation of saltcedar in flycatcher-occupied territories may result in impacts to nesting success. Several large-scale restoration projects are being conducted on Reclamation and Service lands located north of Elephant Butte Reservoir. These areas were primarily monotypic saltcedar and experienced severe wildfires over the past several years. After restoration, these lands are expected to eventually provide suitable habitat for flycatchers and possibly cuckoos.

**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, Bureau of Land Management, and the National Park Service to reduce the threats to these fishes. The goals of the Agreement are to ensure the long-term viability of the chub and the sucker by characterizing populations and habitat and to protect the habitat from the identified threats using coordination, data sharing, outreach, and watershed management.

During June through October 2018, Service staff conducted photographic monitoring of the New Mexico meadow jumping mouse in the Bosque del Apache National Wildlife Refuge. High resolution trail cameras were able to collect continuous data over this period of time. The information gathered using these automated “camera trap” observations are being used to guide management actions and allow for development of a programmatic habitat restoration plan for the jumping mouse. A 5-year plan is in the process of being developed which will outline specific goals and needs to create and restore habitat for the species.

**International Boundary and Water Commission Activities**

The IBWC provided a report of its activities along the Rio Grande in New Mexico and Texas during 2018 and their projected activities for 2019. A brief discussion of IBWC’s mission and international treaties was given. This discussion included their flood control mission under
the Convention of 1933, water deliveries under the Convention of 1906, and environmental restoration.

In 2018, the IBWC stated that Mexico was allocated 37,670 acre-feet, or 62.78 percent of a full supply of 60,000 acre-feet under the 1906 Treaty, and was delivered 37,735 acre-feet at Acequia Madre. In 2019, there is projected to be less than a full supply, with allocations in a range of 30 to 60 percent. Mexico has agreed to begin taking water at the same time as EP No. 1. The 2019 release is anticipated to begin May 31, with Mexico taking water around June 5. The monthly binational meetings have been helpful in coordinating irrigation schedules, basin hydrologic conditions, Project storage conditions, as well as operations and maintenance activities.

The IBWC provided updates to the status of their River Management Plan (RMP) which is targeted for release in the spring of 2019. The RMP covers floodplain management, endangered species management, and channel maintenance. The 2009 Record of Decision (ROD) for the IBWC expires in 2019. Therefore, the ROD commitments have been incorporated into the RMP. Requirements from the 2017 Channel Maintenance Plan Biological Opinion (BO) are also incorporated into the RMP. An Environmental Assessment (EA) was initiated in 2018, which along with the RMP, will supersede the ROD. At least six alternatives will be evaluated for feasibility, costs, water availability, offsets, water rights, species benefitted, and maintenance requirements. The alternatives include sediment removal, construction of sediment structures, new recreation opportunities, different and additional restoration, and official protection for restoration areas. The draft EA is scheduled to be delivered for public comment in mid-May 2019.

In the 2009 ROD, the IBWC committed to implement 30 habitat restoration projects under their River Habitat Restoration program. Currently, work is underway at 22 habitat restoration sites, totaling about 500 acres. Under the River Habitat Restoration program, IBWC has installed 55 shallow groundwater monitoring wells, most of which were installed between 2013 and 2014. Data from the wells are being processed and are targeted for release in 2019. According to the IBWC, based on preliminary data, fluctuations in groundwater levels during irrigation season versus non-irrigation season were highly correlated with river flows.

Status updates were also provided for the Environmental Water Transaction Program and Channel Maintenance Plan, which are also included under the 2009 ROD for the Canalization
Project. Between 2013 to 2018 under the Environmental Water Transaction Program, the IBWC acquired additional water rights and is currently working with other entities to obtain sufficient water required to meet 2009 ROD obligations (about 650 acre-feet of offset/supplemental irrigation).

In 2018 under the Channel Maintenance Plan, IBWC contractors transplanted willows from islands in Sunland Park, NM, to nearby restoration sites. Similar work was done in Hatch, NM, for Thurman Arroyo islands to address sediment issues, consistent with the 2009 ROD. For the purposes of the Channel Maintenance Plan BO, IBWC is working with EBID on irrigation infrastructure and anticipates irrigating several restoration sites in 2019.

The IBWC estimated that 450,000 to 490,000 cubic yards of silt are deposited into the Rio Grande Canalization Project reach annually. The Canalization Project reach is defined as 105 river miles from Percha Dam to El Paso, TX. This silt results in sediment plugs, island formations, raised river beds, increased flooding risks and inhibited irrigation return flows.

During FY18, the IBWC removed 182,521 cubic yards of sediment from within the Canalization Project at 13 bridge crossings and the Montana Drain intersection. Another 320,111 cubic yards of sediment were removed from within the Rectification Project (defined as El Paso to Ft Quitman, TX) at Alamo and Guayuco Arroyos, Ft. Quitman and downstream. They also inspected and maintained five New Mexico sediment control dams/basins and conducted levee maintenance throughout the reach.

The IBWC provided brief information and updates on other ongoing channel maintenance projects and projected desilting work in 2019. This work includes the pilot studies for the Thurman arroyo sediment basins, the Hatch Siphon, and Placitas Arroyo. Construction projects in the report include the American Canal Upper Reach (construction phase), American Canal Lower Reach (design phase), Sunland Park (levee design) and Wasteway #2 (construction).

**ENGINEER ADVISER RECOMMENDATIONS**

The Engineer Advisers recommend that the Commissioners direct the legal committee to review the Federal District Court ruling in the WildEarth Guardians v. U.S. Army Corps of Engineers (case no. 1:14-cv-00666-RB-SCY) and provide legal opinions on the implications and impacts, if any, to the Commission and the Compact.
The Engineer Advisers recommend that the Commission direct the legal committee to review Reclamation’s request to temporarily modify storage operations at El Vado Reservoir this spring while under Article VII restrictions. Specifically, the Engineer Advisers request that the legal committee be directed to investigate whether this type of operation can be accomplished in a manner that is in accord with the Article VII provisions. A letter with this request was sent from the Engineer Advisers to the Compact Commission on March 7, 2019.

**BUDGET**

The Engineer Advisers reviewed the cost of operation for the year ending June 30, 2018 and the budget for the fiscal year ending June 30, 2020.

The Engineer Advisers found that the expenses for gaging stations and administration of the Compact for the year ending June 30, 2018 were $208,491. The United States federal government bore $56,033 of this total, with the balance of $152,458 borne equally by the three states.

The Engineer Advisers find that the proposed budget for the fiscal year ending June 30, 2020 indicates a total of $203,868 will be spent for gaging and administration, with a proposed contribution by the United States federal government of $52,733.