



Final 2009 Annual Adaptive Management Report for the Carlsbad Project Water Operations and Water Supply Conservation Environmental Impact Statement

**U.S. Department of the Interior
Bureau of Reclamation
Albuquerque Area Office**

April 2010

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

2009 Annual Adaptive Management Report for the Carlsbad Project Water Operations and Water Supply Conservation Environmental Impact Statement

Prepared by

AAO Bureau of Reclamation

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Cover photograph: Pecos River near Artesia



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Introduction

This report covers the period January 1, 2009 through the end of the calendar year December 31, 2009 as stated in the Carlsbad Project Water Operations and Water Supply Conservation Environmental Impact Statement (EIS), June 1, 2006. This report describes the actual Adaptive Management Plan (AMP) as published in the EIS, including the criteria, triggers, monitoring and responses, then the actions taken this calendar year. The final portion of this report will describe the changes required in the AMP, establishing new procedures for monitoring the results of management action and integrating this new knowledge into future policy and management actions.

Adaptive Management Plan (AMP) The AMP outlines a procedure for monitoring indicators (which serve as signs or symptoms) and modifying river operations when needed. It is a means to address uncertainty by monitoring Carlsbad Operations EIS targets, identifying actions to be taken for targets that are in jeopardy, and applying lessons learned in the future management of river operations by modifying operations within established parameters.

The AMP was designed to ensure compliance with the Biological Opinion (BiOp) and the Record of Decision (ROD) for the Carlsbad Project Water Operations and Water Supply Conservation EIS, completed August 2006.

Adaptive Management – Carlsbad Project Water Operations: Taiban Constant Alternative

The AMP developed for the Carlsbad Water Operations and Water Supply Conservation EIS appropriately addressed the range of alternatives under consideration. Since the Bureau of Reclamation (Reclamation) has identified the Taiban Constant as its preferred alternative and consulted with the U.S. Fish and Wildlife Service (Service) regarding the effects of Taiban Constant on endangered species, it is meaningful to reformulate an AMP that is focused on the Taiban Constant alternative. In fact, to better determine potential future effects on Pecos bluntnose shiner, it is necessary. Seven objectives were identified for the development of adaptive management guidelines specifically for the Taiban Constant alternative:

1. Develop a monitoring, decision-making, and response program for the long-term management of the Pecos River flows;
2. Identify agency responsibilities for monitoring and response;
3. Conserve populations of the Pecos bluntnose shiner;
4. Conserve the Carlsbad Project water supply;
5. Assure critical habitat remains wetted;
6. Meet flow criteria at the Taiban gage as specified in the EIS, and;
7. Minimize river intermittency in reaches not designated as critical habitat.

The AMP provides structure for making decisions based on changing environmental and hydrological conditions and offers a forum to stakeholders for developing consensus. Communications for the AMP are carried out throughout the year primarily through conference calls among the Pecos River Stakeholder Group and the preparation of the Annual AMP report. Members of the Pecos River Stakeholder Group include the Service, Reclamation, Carlsbad Irrigation District (CID), Ft Sumner Irrigation District (FSID), New Mexico Department of Game and Fish, New Mexico Office of the State Engineer (NMOSE), New Mexico Interstate Stream Commission (NMISC), US Army Corps of Engineers and interested environmental groups.

Criteria, Triggers, Monitoring, and Response

The core components of the AMP for the Taiban Constant alternative are criteria, triggers, monitoring, and response. These four components are described for the following eight indicators for 2009:

- (1) Continuous River Flows
- (2) Flow Monitoring at Taiban and Acme Gages
- (3) Incoming Flows Available for Bypass
- (4) Block Releases
- (5) Density for the Pecos Bluntnose Shiner (Shiner)
- (6) Density for the Interior Least Tern (Tern)
- (7) Carlsbad Project Water Supply Status
- (8) Aquifer storage and base inflows from the Roswell Basin.

This report describes the actions taken in the calendar year January 1, 2009 through December 31, 2009 and future recommendations which are in the AMP report for monitoring and river management for CY2010.



Pecos River work at BLNWR June 2009

Methods - All methods are discussed in detail in the final AMP available on the web site: <http://www.usbr.gov/uc/albuq/library/eis/carlsbad/carlsbad.html>

Indicator 1 - Continuous River Flows

Criteria: During the irrigation season or other periods of time when FSID is entitled to their direct diversion right from the Pecos, water will only be diverted into storage in Sumner and/or Santa Rosa Reservoirs when the following three conditions are all being met:

1. there is available reservoir inflow in excess of FSID's flow entitlement as calculated on a two-week basis by the New Mexico Office of the State Engineer
2. the 35 cfs river flow target at Taiban Gage is being met
3. there is no risk of river intermittency

During the non-irrigation season or other times when FSID is not entitled to utilize their direct diversion right from the Pecos, water will only be diverted into storage in Sumner and/or Santa Rosa Reservoirs when the following two conditions are being met:

1. the 35 cfs river flow target at Taiban Gage is being met
2. there is no risk of river intermittency

Trigger: The river flow trigger is activated when the flow rate measured and reported by USGS at Taiban is 40 cfs or less, or the flow rate measured and reported by USGS at Acme is 10 cfs or less.

Monitoring: River flow and reservoir elevation data are collected electronically every four hours from gage sites and relayed, via satellite links, to US Geological Survey and Army Corps websites. Reclamation staff monitors these sites daily. During the irrigation season, Reclamation holds weekly conference calls. Gage data is collected and recorded on logs and discussed on the calls at the beginning of each week. Participation from all Pecos Stakeholders is encouraged on these weekly operation management conference calls. These weekly conference call logs are available from Reclamation staff upon request and available online, Reclamation Albuquerque Area Office webpage.

Response: When the trigger is activated by reaching the target point at either gage, Reclamation initiates additional monitoring (i.e. flow measurements, observation flights, video camera observations, or other methods) to establish the accuracy of the gage data. Depending on the accuracy of the data, Reclamation may initiate corrective actions.

If bypass water is available, Reclamation will begin bypassing inflow to target 35 cfs at Taiban and/or keep the river continuous. If bypass water is not available and the Vaughan Conservation pipeline is operational and available for use, Reclamation will order the operation of the Vaughan Conservation pipeline at a rate needed to keep the river continuous. If bypass water is unavailable and the Vaughan Conservation pipeline is unavailable, Reclamation will release Fish Conversation Pool (FCP) water at a rate needed to avoid intermittency. Reclamation has on-going water leases for artesian groundwater on the Pecos River, which is also used.

Actions taken in CY 2009:

Reclamation acquired supplemental water, and entered into agreements with FSID and CID to provide the operational ability to release water out of Sumner Lake and/or Santa Rosa Reservoir, in order to meet a target flow of 35 cubic feet per second (cfs) at the Taiban Gage and to keep the river continuous, while also ensuring that the Carlsbad Project is kept whole. The primary supplemental water source would be through a ten-year contract agreement between Reclamation and FSID. Under the contract, FSID will provide 25,000 af of water to Reclamation over a 10-year period. If 25,000 af is not delivered within the 10-year period, then the agreement would be extended for enough time to provide the full delivery. While there are no fixed minimum annual amounts that FSID would have to provide, it is expected that FSID

would annually provide up to 2,500 af of water to Reclamation. The supplemental water and agreements with FSID and CID will allow Reclamation the flexibility to meet target flows and keep the Pecos River continuous consistent with Reclamation's 2006 Record of Decision (ROD) for the Carlsbad Project Water Operations and Water Supply Conservation EIS, (US Bureau of Reclamation 2006a) June 2006 and the 2006-2016 BiOp for the federally threatened Pecos bluntnose shiner (*Notropis simus pecosensis*) (shiner). Based on the analysis, a Finding of No Significant Impact was signed August 2009.

During the irrigation season, Reclamation prepared weekly logs of the conference calls. These are available on the Reclamation website, www.usbr.gov/uc/albuq/water.Pecos/PecosRiv-WeeklyLog/index.html or from Reclamation staff upon request.

No drying occurred between Sumner Dam and Brantley Dam on the Pecos River during the time period covered by this report. The trigger for Indicator 1 was activated on eight occasions throughout the year. Only five of these incidents required action. The other three instances Taiban flow was still above 35 cfs and Acme was well above 10 cfs.

Action 1: From January 1 through March 11, 2009, Taiban gage measured below 40 cfs. Water was bypassed through Sumner Dam from January 1 through February 26 and Vaughan well field was supplementing the river March 6 through March 19. Acme did not drop below 18 cfs during this time and the average over the time was 24 cfs. With the supplemental water, Taiban did not drop below 31 cfs and averaged 34 cfs during this time.

Action 2: From April 25 through May 16, 2009, Taiban gage measured below 40 cfs. Water from Sumner Dam was used to supplement the river starting May 11 through June 22. Supplemental water was not used from April 25 through May 11 because Taiban average was nearly 35 cfs and Acme was very healthy, 16-57 cfs, averaging 25 cfs.

Action 3: Acme gage dropped below 10 cfs on June 3, 4, and 7. A bypass was already being released from Sumner Dam, see Action 2, but was increased due to the Acme Indicator 1 trigger. The release was increased from 15 cfs average to 40 cfs average.

Action 4: From August 1 through August 10, 2009 the Taiban gage measured less than 40 cfs. The river dropped from 35 cfs on August 3 to 29 cfs on August 4. On August 2 a release was started out of the Fish Conservation Pool and switched to bypass when it became available on August 4. From August 2 to August 9 the release was approximately 15 cfs and increased to approximately 30 cfs on August 10 and gradually decreased through September 9 when it was no longer needed. The August 10 increase brought the Taiban gage out of Trigger 1.

Action 5: The Taiban Indicator 1 was again triggered November 16 through December 28, 2009. The Vaughan well field was already supplementing the river, beginning October 29. A supplemental water release from Sumner Dam was begun on November 20 and lasted throughout the remainder of the year.

Indicator 2 - Flow monitoring at Taiban and Acme Gages

Criteria: Correctly operating gages are important to river management. The USGS is responsible for measurement and maintenance of their gages. For Reclamation's Pecos River operations for the Pecos bluntnose shiner (PBNS), the two most important gages are Taiban and Acme, although other gages are used for operations. These two gages provide data on intermittency and flow targets.

Trigger: The gage trigger is activated when the Taiban or Acme gage is malfunctioning or non-operational.

Monitoring: Monitored by independent contractor as well as USGS. Reclamation funds USGS to operate and maintain the gages along the Pecos River. Inoperable gages are reported to the USGS and Reclamation initiates contracted monitoring as necessary to measure gage sites and report all findings immediately.

Response: Have contractor out during these times to manually measure flows on as often as necessary until gages are repaired.

Actions taken in CY2009:

Reclamation, in coordination with the Service, intensively monitors the river by the best methods available at the time, including website gage readings, field site verification and measurements, flights to monitor river connectivity, monitoring the video field camera, or other technology as it becomes available.

No flights over the Pecos to monitor flows were made in the 2009 irrigation season.

Additionally, Reclamation hosted weekly operation management conference calls throughout the irrigation season on flows and river operations. The Service was a part of the weekly events and the calls served as a condition of consultation, informing the Service of any necessary corrective actions taken or that were expected to be taken as a result of low flows.

Reclamation contacted the contractor in Ft Sumner 13 times to verify gage readings during 2009. Reclamation requested USGS to verify gage readings approximately 30 times during the 2009 irrigation season. These requests were made during the weekly, Monday morning conference calls.

Indicator 3 – Incoming Flows Available for Bypass

Criteria: Fort Sumner Irrigation District (FSID) is entitled to the natural river flow up to 100 cfs as measured at the Puerto de Luna gage upstream from Sumner Lake. FSID's entitlement is calculated every 2 weeks based on the NMOSE computations. Reclamation can divert to storage or bypass any inflows in excess of FSID's maximum water right (100cfs). Flow data are obtained from the NMOSE Pecos Water Master in the Roswell district office. Information collected by the NMOSE on flow entering Santa Rosa Reservoir and Sumner Lake as well as USGS gage data are used to determine the availability of water for bypasses. This information is used to assess whether there is available Carlsbad Project Supply to bypass through Santa Rosa and Sumner dams.

Trigger: The bypass trigger is activated when it is determined by NMOSE that incoming available flows exceed FSID's senior diversion rights.

Monitoring: The State, NMOSE, measures flows at gage sites along the river for compact accounting purposes. These flows are calculated for FSID's senior water right and the results are faxed to Reclamation's staff on a bi-weekly basis. Flows are then calculated for the amount of water available for bypass through Sumner Dam. If flows are not needed to keep the river continuous, water is diverted to storage for Carlsbad Project Supply.

Response: Make incoming available flows exceeding FSID's senior diversion rights available, as needed, for bypass during these time periods. After the end of FSID's irrigation season on October 31, all Sumner inflows will be made available for bypass for meeting in-stream target flows.

Actions taken in CY2009:

During the period covered by this report, inflows did not exceed FSID's senior diversion right from February 16 through April 26, June 22 through August 2, and August 17 through October 31. Reclamation did not make inflows available for Sumner Reservoir bypass during these periods. After the end of FSID's irrigation season on October 31, all Sumner inflows were available for meeting instream flow targets. Reclamation made 3 bypasses totaling 5,695 af during the 2009 calendar year with 3,554 af during the irrigation season.

During the periods when bypasses were not available water was released from the FCP pool to meet instream flow targets. During the irrigation season 837 af of supplemental water was released from the FCP pool. The remaining 163 af of FCP was released in November to meet the flow targets. Beginning November 27 Forbearance water was released to meet the flow targets, a total of 1,248 af were released from this pool.

Indicator 4 – Block Releases

Criteria: A block release is defined as moving water efficiently from Sumner Lake to Brantley Reservoir for the purpose of irrigation. These block releases are a large quantity of water released within a short timeframe so as to avoid evaporation losses. Block releases also occur between Santa Rosa Reservoir and Sumner Lake. The frequency and duration of block releases from Sumner Dam will be recorded as they occur and compiled into this annual report. Four key criteria are: (1) block releases will not exceed 15 days; (2) there will be at least 14 days between block releases; and (3) block releases should not occur during the 6-week period centered on August 1; or (4) the cumulative duration of block release from Sumner Dam shall not exceeds 65 days.

Trigger: The block release trigger is activated by at least one of the following four conditions: (1) the 15-day block release duration is exceeded; (2) there is less than 14 days between releases; or (3) a block release is expected in the 6-week period centered on August 1; or (4) the cumulative duration of block release from Sumner Dam exceeds 65 days.

Monitoring: Plans for future block releases will be compared to the trigger criteria to determine if trigger criteria will be activated. The start, end and duration of block releases will be measured and recorded based on the flows reported at the USGS gage: Pecos River below Sumner Bam, NM, USGS 08384500.

Response: Coordinate all block releases with CID when flows have dropped below specified levels (Acme 10cfs, Taiban 40cfs) to keep the river continuous and meet CID demand. Notify CID and FWS when release time is exceeded, there is less than 24 days between releases, the release occurs in the inappropriate time or last too long.

Actions taken: in CY2009

None of the triggers occurred in 2009.

Three block releases were completed last year:

3/20/2009 through 3/26/2009	16,856 af
6/26/2009 through 7/2/2009	17,487 af
9/10/2009 through 9/15/2009	13,746 af

Indicator 5 - Density for the Pecos Bluntnose Shiner (Shiner)

Criteria: The density of the adult shiner as stated in the BiOp based on a two year running average.

Trigger: If fish densities fall to a low level in one year, then this is a warning that the next year action would need to be taken based upon the likely cause of decline (e.g., intermittency).

Monitoring: Fish monitoring done monthly, year round at specified sites.

Response: Reclamation will give both CID and FSID as much advance notice as possible when there is potential for changes in water operations to benefit the Pecos Bluntnose Shiner.

Actions taken in CY2009:

Reclamation, in collaboration with the Service completed a fish restoration project at Bitter Lake National Wildlife Refuge which included plugging and diverting the river into a historic oxbow (Oxbow 4) in Reach 4, excavating a meandering channel within the oxbow (12 feet wide at the base and 44 feet wide at the top), removing nonnative vegetation, lowering banks, and revegetating. The reconnected channel will replace approximately 3,000 feet of the current channel with approximately 8,200 feet of channel in the historic oxbow. The anticipated amount of reconnected floodplain is expected to total 179 acres. The proposed restoration is expected to have long-term minor to moderate beneficial effects on shiner reproduction, recruitment rates, and survival at all of its life stages. A Finding of No Significant Impact was signed January 14, 2009.

In 2009, Pecos bluntnose shiner increased in all abundance metrics. In 2009, Pecos River flows were continuous, and extreme low flows did not occur, as they did in 2008 when flows dropped below 1.0 ft³/sec for nine consecutive days in June. Despite frequent low flows in summer since 2004, Pecos River flows have been continuous, and abundance metrics have increased annually. These consistent flows represent the efforts of water management agencies to provide continuous flows on the Pecos River, and have benefitted Pecos River fishes. Pecos bluntnose shiner catch rates continue to exceed levels stipulated by the USFWS 2006 BiOp incidental take statement.

Table 1. Pecos bluntnose shiner two year catch-rate mean with standard error, and number of samples (N) 2006-2009. Standard error is not required under the 10 year Biological Opinion, but is provided to illustrate variation. Two year running average calculated from site means for the year stated and preceding year (for example in 2006, by calculating mean from all sites for trimester one in 2005 and 2006; same for trimester three).			
Year	Trimester one PBS/100 m ²	Trimester three PBS/100 m ²	Any trimester 2008
2006	3.5 (± 0.75 SE, N = 48)	5.3 (± 0.90 SE, N = 48)	> 2.7 (2.5)
2007	5.0 (± 0.8 SE, N = 53)	9.8 (± 1.8 SE, N = 50)	> 4.0 (2.5)
2008	7.2 (± 1.3 SE, N= 62)	14.3 (± 4.5 SE, N= 59)	> 9.8 (2.5)
2009	11.9 (± 1.9 SE, N= 64)	17.4 (± 3.8 SE, N= 73)	>15.2 (2.5)
2010			

This table is from the Pecos Bluntnose Shiner Monitoring Summary 2009 from the FWS by Stephen Davenport 2010.

Indicator 6 - Density for the Interior Least Tern (Tern)

Criteria: The density of the adult interior least tern and activities at created nesting habitat sites.

Trigger: Nesting terns in the conservation pool of Brantley Reservoir

Monitoring: Monitor lake levels and water delivery plans to assess the potential for impact to nesting terns.

Response: Assess potential for take; coordinate with CID and other interested parties on water management to help prevent inundation of nests and/or young. If all other options are exhausted, consider moving nests to avoid rising water. If take is anticipated, coordinate in advance with the Service.

Actions taken in CY2009:

The 2009 Interior Least Tern Cy2009 report was not completed at the time of this report. Once the report is available it will be posted at the same web site as previous reports.

Reclamation’s 2008 Interior Least Tern monitoring report is available on the following web sites: <http://www.usbr.gov/uc/albuq/library/eaba/saltcedar/saltcedar.html> or <http://www.usbr.gov/uc/albuq/library/eis/carlsbad/carlsbad.html> or contact Reclamation’s Albuquerque Area Office for a paper copy.

The 3 least terns observed on the morning of July 24th were possibly observed perched on the buoys surrounding the floating “tern island” on the afternoon of July 23rd, but could not be confirmed.

Although several adults and a juvenile were observed during the summer of 2009, no nesting was documented. It is likely that the juvenile observed on July 24th fledged outside of the immediate area – possibly Bitter Lakes NWR.

To the best of our knowledge there was no incidental take of Least Tern nest during the summer of 2009. A complete 2009 report is in preparation.

Survey Date	Surveyor	Breeding Adult	Sub-Adult	Immature	Total Least Terns	Comments					
May 7- May 8	R. Doster	0	0	0	0	Forster's and Black Terns observed					
May 28- May 29	R. Doster	2	0	0	2	Birds observed foraging and performing courtship flights					
June 10- June 11	R. Doster	0	0	0	0	Black Terns observed					
June 17- June 18	M.Wilber	1	0	0	1						

Survey Date	Surveyor	Breeding Adult	Sub-Adult	Immature	Total Least Terns	Comments					
June 25- June 26	M.Wilber	0	0	0	0						
July 2- July 3	M.Wilber	0	0	0	0						
July 9- July 10	M.Wilber	0	0	0	0						
July 15- July 16	M.Wilber	0	0	0	0						
July 23- July 24	M.Wilber	2	1	0	3						
July 30- July 31	M.Wilber	0	0	0	0						
August 6-Aug. 7	M.Wilber	0	0	0	0						
<p>Water in Brantley Lake was too high to conduct a quality Least Tern survey after August 7. Due to water level very little suitable habitat remained. (Information provided by Darrell Ahlers, Wildlife Biologist, Denver Technical Center, Reclamation).</p>											



Indicator 7- Carlsbad Project Water Supply Status

Criteria

One of the purposes of the EIS is to conserve Carlsbad Project water supply. Operation of Sumner Dam for the benefit of the shiner could result in reductions to the available Carlsbad Project water supply, potentially impacting the CID. Water acquisition options have been developed to acquire additional water to compensate for net depletions to Carlsbad Project supply.

Trigger

The trigger is activated annually to evaluate whether a shortage or surplus is occurring with respect to the Carlsbad Project water supply. However, informal periodic discussions with CID should occur during the year to monitor the status of irrigation water supply and use.

Actions taken in CY2009:

Reservoir content levels at end of CY2009:

Santa Rosa	24,326 af
Sumner	23,501 af
Brantley	15,533 af
Avalon	2,275 af

Supplemental water management tools generic order of use:

1. Bypass (when available up to depletion volume of water leases plus credit water)
2. Vaughan (until exhausted and meets flow requirement)
3. Vaughan with FCP (until either is exhausted)
4. FCP (if Vaughan is exhausted before FCP)/ Vaughan with Forbearance (if FCP exhausted before Vaughan)
5. Forbearance (can be used to pay for depletions at end of year)

During the CY2009, Reclamation used the following amounts of supplemental water:

Bypass	5,695 af
Vaughan	1,553 af
FCP	1,000 af
<u>Forbearance</u>	<u>1,248 af</u>
Total	9,496 af

Pecos River Basin – Summary of Annual Accounting For Pecos Bluntnose Shiner ByPass Operations

During the irrigation season, which runs from March 1 through October 31, a total of approximately 4,491 af were released from the FCP and bypasses, 836 af and 3,655 af, respectively for ESA related purposes. During the non-irrigation season, between November 1 and December 31, 1,612 af was released for ESA purposes, 1634 af from the FCP and 1,449 af from the FSID Forborne water.

Indicator 8- Aquifer Storage and Base Inflows from the Roswell Basin

Criteria

Surface and ground water resources are interconnected. An increase in ground water supplies in the Roswell and Artesia basins is expected to eventually result in an increase in surface water supplies. Thus, improving groundwater conditions can indirectly benefit the Carlsbad Project, CID and the shiner. In addition, ground water resources can be lost to evapotranspiration as aquifer levels rise. The USGS maintains four monitoring wells in the Roswell and Artesia basins that provide regular data of groundwater depths. NMOSE and NMISC collect and review data on aquifer storage and base inflows.

Trigger

Aquifer storage and base inflows from the Roswell Basin are used as an indicator and do not contain a trigger.

Actions taken in CY2009:

The U.S. Geological Survey (USGS) periodically measures the depth to water in a series of wells in the Roswell Basin. Some of the wells are in Chaves County, and others are located in Eddy County. Within Chaves County, only two wells have been measured in the past few years. Depth to water measurements in these two wells suggests a decrease in aquifer storage in the Roswell Basin between 2008 and 2009. The two wells are close together in a location approximately equidistant between Roswell and Dexter. The first of these wells is designated USGS 331524104245101 and is completed at a depth of 231 feet below ground surface (bgs) in alluvial, bolson, and other surface deposits. Based on seven measurements in 2009, the average depth to water was 111.42 feet bgs. The 2009 average water level is about 5 feet lower than the 2008 average. In 2008 the average of eight measurements was 106.31 feet bgs. In 2009, the water level measurements in this well varied by about 21 feet.

The second Chaves County well, designated USGS 331525104245201, is 930 feet deep and is completed in the confined aquifer within the San Andres Limestone. Based on seven measurements in 2009, the average depth to water was 95.81 feet bgs. The 2009 average water level is significantly lower than the 2008 average. In 2008, the average of eight measurements was 69.02 feet bgs. The water level measurements in this well show a dramatic response to irrigation pumping. In 2009, the water level during the irrigation season was more than 115 feet lower than during the non-irrigation season.

Within Eddy County, only two wells have been measured in the past few years. Depth to water measurements in these two wells also suggests a slight decrease in aquifer storage in the Roswell Basin between 2008 and 2009. The two wells are close together in a location south of Artesia. The first of these wells is designated USGS 324620104255101 and is completed at a depth of 246 feet bgs in alluvial, bolson, and other surface deposits. Based on nine measurements in 2009, the average depth to water was 135.40 feet bgs. The 2009 water level is a little lower than that in 2008 when the average of nine measurements was 132.69 feet bgs. The water levels in this well are about 15 feet lower during the irrigation season than during the non-irrigation season.

The second Eddy County well, designated USGS 324620104255001, is 1,008 feet deep and is completed in the confined aquifer within the San Andres Limestone. Based on nine measurements in 2009, the average depth to water was 128.74 feet bgs. The 2009 average water level is about 4 feet lower than the 2008 average. In 2008, the average of nine measurements was 124.10 feet bgs. The water levels in this well are about 55 feet lower during the irrigation season than during the non-irrigation season.

Because this water level data set is very small, these measurements may not be representative of aquifer storage conditions throughout the entire basin. There may be areas of the basin in which water levels are

rising in response to conservation programs, increased recharge, or other factors.

Pecos Valley Artesian Conservancy District (PVACD) monitors water levels three times per month in ten wells in the Roswell Basin. Compared to 2008, the 2009 average water levels were lower in seven of the ten wells. In the three remaining wells, the water level rose in 2009 compared to 2008.

Base Inflows

Beginning in 1985 and every year since then, the federal river master has determined and published base inflows for the Roswell Basin for the reach of the Pecos River between the Acme and Artesia stream gages. The base inflow for calendar year 2009 will be published at the end of June 2010. During calendar year 2008, the federal river master reported the base inflow was 28,600 acre-feet (af). This amount was less than that reported for calendar year 2007 when the base inflow was 30,000 af. Between 1985 and 2008 the average base inflow was approximately 30,900 af.

Discussion

Actions available to Reclamation include: 1) if bypass water is available, Reclamation will begin bypassing inflow to target 35 cfs at Taiban and/or keep the river continuous. 2) If bypass water is not available and the Vaughan Conservation pipeline is operational and available for use, Reclamation will order the operation of the Vaughan Conservation pipeline at a rate needed to keep the river continuous. 3) If bypass water is unavailable and the Vaughan Conservation pipeline is unavailable or not enough, Reclamation will release Fish Conversation Pool or forbearance water at a rate needed to avoid intermittency. 4) Supplemental water pumpers (water leases) are used.

Recommendations:

Improve Communication/Coordination

Improvements to communications between CID, FSID, and Reclamation should be incorporated into 2010 Carlsbad Project water operations. Irrigation districts should provide updates on the progress of repairs and maintenance on facilities critical to water delivery. Reclamation should actively prompt irrigation districts for timely updates or progress reports when maintenance is occurring on facilities that could become critical to Reclamation's operations to benefit the Pecos bluntnose shiner. Specific recommendations include:

1. CID and FSID should promptly inform Reclamation of any potential delays in scheduled or on-going maintenance or repair activities.
2. Reclamation should actively request and obtain at least weekly updates on maintenance and repair activities for on-going work related to structures that could become critical to Reclamation's operations to benefit the Pecos bluntnose shiner.
3. Reclamation should give both CID and FSID as much advance notice as possible when there is the potential for changes in water operations to benefit the Pecos bluntnose shiner or Interior Least Tern.
4. CID/Reclamation improve communications on block releases
 - Water demand in CID
 - Need for river continuity
 - Advance notice to ranchers and Corp of Engineer
 - Status of Tern courtship and nesting

New Indicator list with criteria, triggers and monitoring for 2010 AMP:

No proposed changes for the AMP Operation 2010