Final 2008 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 2009

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.

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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, 2008 through the end of the calendar year December 31, 2008 as stated in the Carlsbad Project Water Operations and Water Supply Conservation 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 Environmental Impact Statement (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, Ft Sumner Irrigation District, 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 2008:

(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, 2008 through December 31, 2008 and future recommendations which are in the AMP report for monitoring and river management for CY2009.

Pecos River by Acme Gage

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.

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 2008:

During the irrigation season, Reclamation prepared weekly logs of the conference calls. These are available 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.

Two near drying events at the Taiban and the Near Acme Gages triggered releases from Sumner Dam to increase and maintain continuous river flows.

Action 1: March 5, 2008 through March 15, 2008, Taiban gage dropped below 40 cfs. A block release was started March 5, 2008 to bring the flows back up.

Action 2: The week of May 24 though June 20, 2008, the gages were not functioning properly. Reclamation preformed a visual inspection of the river at which time it was determined that flows were lower than 10 cfs at the Near Acme Gage. Reclamation requested a 50 cfs release from the FCP to offset the low flows and maintain target flows.

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 CY2008:

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 2008 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 3 times to verify gage readings during the 2008 irrigation season. Reclamation requested USGS to verify gage readings approximately 25 times during the 2008 irrigation season. These requests were made during the weekly, Monday morning conference calls.

Reclamation made 7 bypasses totaling 6,823 af during the 2008 irrigation season.

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 New Mexico Office of State Engineers (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 New Mexico Office of State Engineers 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 CY2008:

During the time period covered by this report, inflows did not exceed FSID's senior diversion right from March 1 through March 31, July 7 through July 20; and from September 29 through October 23. Reclamation did not make inflows available for Sumner Reservoir bypass during these time periods. After the end of FSID's irrigation season on October 31, all Sumner inflows have been available for meeting instream flow targets.

Reclamation had sufficient FCP available in Sumner Reservoir to achieve target flows during those periods when there was insufficient waster for bypass. Throughout the period covered by this report, Reclamation's Facilities and Lands Division actively pursued and negotiated agreements for additional water that could be released out of Sumner when bypass and Vaughan Conservation pipeline water are not available.

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 CY2008

None of the triggers occured in 2008.

Three block releases were completed last year:

3/5/2008 thru 3/15/2008	29,391 af
6/12/2008 thru 6/25/2008	34,506 af
8/22/2008 thru 8/26/2008	10,830 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 CY2008:

Shiner densities improved in 2008 and all terms of the incidental take statement were met. The Service reported that the Pecos bluntnose shiner two-year catch rate average was well above the required standard for all three categories. The numbers for the first trimester were 7.2 shiner/100 m², ±1.3 standard error, which was about 2.5 times the standard catch rate of 2.5 required for that category. For the third trimester the catch rate was 14.3 shiners/100 m², ±4.5 standard error. Numbers for this category exceeded the required catch rate of 4.0 by more than 3-fold. The overall catch rate for any trimester was 9.7, more than three times the required standard for that category.

Incidental Take 2008. Pecos bluntnose shiner two year catch-rate mean with standard error, and number of samples (N). 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.

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	3.5	4	
2010	3.5	5	
2011	3.5	8	

This table is from the Pecos Bluntnose Shiner Status Update 2008 PowerPoint presentation from the FWS by Stephen Davenport 2009.

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 terms.

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 Fish and Wildlife Service.

Actions taken in CY2008:

Six eggs of Least Terns were documented as being taken in late June as a result of rising reservoir levels. This incidental take of nests and eggs was allowable under the Incidental Take Statement of the 2006 Biological Opinion. Approximately five nests were confirmed before inundation. NMDGF and USFWS personnel assisted Reclamation in attempting to move the Least Tern nests in advance of rising water levels, however, this action proved unsuccessful.

Actions for monitoring of the Interior Least Tern at Brantley Lake include:

- Bi-weekly surveys throughout the summer breeding season.
- Nest searching and monitoring.
- Adaptive management activities at created nesting habitat sites, if needed.
- Monitor lake levels and water delivery plans to assess the potential for impacts to nesting terns.

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, Albuquerque Area Office for a paper copy.

7) Indicator: 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 CY2008:

Reservoir content levels at end of CY2008:

Santa Rosa	31,685 af
Sumner	24,520 af
Brantley	21,646 af
Avalon	2,358 af

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 water at a rate needed to avoid intermittency. 4) Supplemental water pumpers (water leases) are used.

Last year 1,000 af of water from the Supplemental Water Acquisition Pool (formerly FCP) was released and used for the Pecos. Reclamation is currently seeking water for lease in the project area and working with stakeholders to ensure the Carlsbad Project Water supply is kept whole. Depletions have been offset:

PECOS RIVER BASIN – SUMMARY OF ANNUAL ACCOUNTING FOR PECOS BLUNTNOSESHINER BYPASS OPERATIONS – Irrigation year: Nov 1, 2007- Oct 31, 2008

Previous Year-end Balance	8,535 af
Depletions from Bypass Operations	2,219 af
Net Replacement water provided	2,452 af
Credit for 2008 Accounting year	233 af

Notes:

1. 6,823 acre-feet of water was bypassed through Sumner in 2008
2. 2008 Replacement water obtained from Hagerman Irrigation Company and River Pumpers (Lynch included in this 233 af)

8) Indicator: 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 CY2008:

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 slight decrease in aquifer storage in the Roswell Basin between 2007 and 2008. 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 2008, the average depth to water was 106.19 feet bgs. The 2008 water level is down slightly from 2007 when the average of twelve measurements was 105.34 feet bgs. The water level measurements in this well do not vary significantly depending on the time of year.

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 2008, the average depth to water was 73.91 feet bgs. The 2008 average water level is somewhat lower than the 2007 average. In 2007, the average of twelve measurements was 67.22 feet bgs. The water level measurements in this well show a dramatic response to irrigation pumping. In 2008, the water level during the irrigation season was more than 100 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 2007 and 2008. 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 2008, the average depth to water was 132.69 feet bgs. The 2008 water level is a little lower than that in 2007 when the average of twelve measurements was 131.15 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 2008, the average depth to water was 124.10 feet bgs. The 2008 average water level is about 10 feet lower that the 2007 average. In 2007, the average of twelve measurements was 114.16 feet bgs. The water levels in this well are about 60 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.

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 2008 will be published at the end of June 2009. During calendar year 2007, the federal river master reported the base inflow was 30,000 acre-feet (af). This amount was less than that reported for calendar year 2006 when the base inflow was 35,200 af. Between 1985 and 2007 the average base inflow was approximately 30,740 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 SWAP) 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 2009 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 2009 AMP:

No proposed changes for the AMP Operation 2009