RECLAMATION

Managing Water in the West

2006 Annual Adaptive Management Report for the Carlsbad Project Water Operations and Water Supply Conservation Environmental Impact Statement

Pecos River, New Mexico

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

March 2007

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.

2006 Annual Adaptive Management Report for the Carlsbad Project Water Operations and Water Supply Conservation Environmental Impact Statement

Carlsbad, New Mexico

Prepared by

AAO Bureau of Reclamation

Contents

Cover photograph: Acme Gage on the Pecos River

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Introduction

This report covers the period August 1, 2006 (when the Record of Decision was signed) through the end of the calendar year December 31, 2006 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 indicators:

(1) Intermittency;
(2) EIS Target river flows
    (2a) Gaining River flows below Taiban;
(3) Flow monitoring
(4) Incoming flows available for by pass
(5) Block Releases
(6) Life stage of Pecos bluntnose shiner
(7) CID Status; and
(8) Aquifer storage and base inflows from the Roswell Basin.

This report describes the actions taken in the calendar year from the date of the BiOp and the ROD, August 1, 2006 through December 31, 2006 and future recommendations which are in the AMP report for monitoring and river management for 2007.


Pecos River in November 2006 by Acme Gage

Pecos River by pumping locations -November 2006

Pecos River by Acme Gage – November 2006

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

1) Indicator: Intermittency

Criteria

Weekly Pecos River conference calls have been conducted in recent years to discuss conditions on the Pecos River and coordinate water operations for management purposes. Under Taiban constant without additional supplemental water, intermittency would be a key indicator for river operations monitoring. The primary objective, under Taiban constant alone would be to avoid intermittency on the river and always keep the critical habitat wet.

Reclamation's goal is to now keep the river continuous. The Record of Decision (ROD) specified that under the Taiban Constant Alternative, Reclamation would, "…operate the Carlsbad Project to (1) divert to storage only when flows at the Taiban gage are greater than 35 cfs in order to prevent intermittency of flows and (2) deliver from storage Carlsbad Project water as contracted for irrigation consistent with applicable Federal and state laws. The decision includes implementation of an AMP as provided in the Final EIS, maintenance of a fish conservation pool, commitments to pursue additional water for the Carlsbad Project, supplemental water to prevent river intermittency, and implementation of measures identified in the Service's *Biological Opinion for the Bureau of Reclamation's Proposed Carlsbad Project Water Operations and Water Supply Conservation*, 2006-2016 (May 18, 2006)."

The above proposed operations were designed to maintain flows that will conserve the shiner while minimizing impacts to the Carlsbad Project water supply and the amount of additional water that would need to be acquired. It provides Reclamation operational flexibility and safeguards to avoid intermittency.

Trigger

The river flows trigger is activated when the flow level measured at either the Taiban or Acme gages is below the target level specified in the BO or ROD. **(changed from original AMP)**

Actions taken:

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. In July 2006, the trigger was activated by low flows. Reclamation initiated the steps required in the BO to maintain a constant flow throughout the entire reach from Sumner Dam to Brantley Reservoir.

2) Indicator: Target River Flows (Gages)

Criteria

As described in the Carlsbad Project Water Operations and Water Supply conservation EIS (and ROD) the Taiban Constant alternative targets a flow of 35 cfs at the Taiban gage. A minimum target of 5 cfs at the Acme gage is specified in the BO as an indicator of a risk of intermittency. Meeting the flow targets will be a key criterion for river operations monitoring and satisfying the ROD.

Trigger

The river flow trigger is activated when the flow level measured at either the Taiban or Acme gages is below the target level specified in the ROD/BO.

Actions taken:

Reclamation coordinates weekly conference calls on flows and river operations and distributes weekly logs to the stakeholders.

There were two instances during the time period covered by this report when USGS gage 08385522, Pecos River below Taiban Creek near Fort Sumner, NM impacted Pecos River water operations due to the gage malfunctioning or reporting inaccurate flow rates. In both of these instances, the inaccuracy was likely the result of changing river channel morphology impacting the calculation of the reported flow rate. These inaccuracies are commonly corrected when USGS makes a field measurement at the site and then applies the appropriate gage shift to the flow calculation.

<u>Instance No. 1:</u>

On November 13, Taiban flow dropped to 40 cfs as reported on the USGS website. Reclamation documented that the flow had reached 40 cfs, and began increased monitoring of river conditions using website readings and monitoring of the Pecos web-camera. River flow at the Dunlap and Acme gages were being reported by USGS at 32 cfs and 30 cfs respectively.

On November 15, USGS applied a correction to the Taiban gage based on a USGS November 14 field measurement of flow. An instantaneous flow of 27 cfs at the Taiban gage was reported by USGS on the morning of November 15. Reclamation instructed CID to begin a 20 cfs release from Sumner Reservoir out of the remaining fish conservation pool. FSID called Reclamation to request that the release end until FSID was able to complete the application of an epoxy coating on recent repairs made to the FSID Diversion Dam gates. CID terminated the release late on the morning of November 15. Reclamation instructed its flow measurement contractor to measure flows at Dunlap and Acme.

On November 16, Reclamation's contractor measured 18.2 cfs at Acme (USGS reported 29 cfs during the same time period). Reclamation's contractor measured 19.7 cfs at Dunlap (USGS was reporting 28 cfs) on November 17. Reclamation instructed CID to resume the 20 cfs release/bypass as soon as FSID reported that their work was complete. CID resumed the Sumner release on the afternoon of November 17. Reclamation arranged to have a flight contractor available if a Pecos fly-over became warranted.

On November 20, Reclamation's contractor measured the flow at Taiban to be 20 cfs around at the same time that USGS was reporting 27 cfs on their website. The Sumner release/bypass had not yet reached Taiban at the time that Reclamation's contractor was making this measurement. USGS was reporting 28 cfs at Dunlap and 29 cfs at Acme at this time.

On November 21, the Sumner release arrived at Taiban. USGS reported improved flows of 38 cfs on their website. Reclamation's contractor measured Acme to have 15.6 cfs on the morning of November 22.

On November 26, flows at the Taiban gage as reported by the USGS website flattened out at 40 cfs. CID began to cut back Sumner bypass from 20 cfs to around 18 cfs to try to achieve the 35 cfs target at Taiban based on the flows reported on the USGS website.

On November 27, Reclamation's contractor measured 37.2 cfs at Taiban (USGS was reporting 40 cfs at the time).

Instance No. 2:
On December 11, USGS measured 30.4 cfs at Taiban at the same time that their website was reporting 39 cfs at the same location. Reclamation received notice of this field measurement on the afternoon of December 12. Reclamation contacted CID to increase the Sumner bypass by 5 cfs, for a total bypass of 21 cfs, on December 13.

USGS applied the appropriate shift to their flow calculations, and the USGS website began showing these corrected flows on December 14.

2a) Indicator: Losing River below Taiban (change from original AMP)

Criteria

On rare occasions, the Taiban gage can experience low flows (below 35 cfs). The river reach between Taiban and Acme is made up of smaller gaining and losing segments, but the overall condition of this reach is losing water from base inflows. The low gage reading at the Taiban gage is not a true indicator of the river condition throughout the reach. However, modeling has identified that the target flow (35 cfs) at Taiban gage serves as a threshold for continuous flow at the Acme gage. Localized weather conditions occurring between Sumner Dam and Acme can often affect river flows independent of Reclamation operations.

Trigger

The river flow trigger is activated when the Taiban Gage approaches 40 cfs and/or Acme Gage approaches 10 cfs and/or there are other non-operational factors which cause concern over river flows.

Actions taken:

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 surveys, flights to monitor river connectivity, monitoring the video field camera, or other technology as it became available. Reclamation verified, as soon as sudden changes in flows in the range of the above levels occurred and/or when flows approach the levels described.

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.

3) Indicator: Flow Monitoring

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 shiner, the three most important gages are Taiban, Dunlap, and Acme, although other gages are used for operations. These three USGS gages provide data on intermittency and flow targets.

Trigger

The gage trigger is activated when the Taiban, Dunlap, and Acme the Taiban or Acme is malfunctioning or non-operational.

Actions taken:

Reclamation coordinates weekly conference calls on flows and river operations and distributes weekly logs to the stakeholders.

4) Indicator: Incoming Flows Available for Bypass

Criteria

Information collected by the NMOSE on flows 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 would be used to assess whether there is available Carlsbad Project supply to bypass through Santa Rosa and Sumner dams. FSID is entitled to the natural river flow up to 100 cfs as measured at the Puerto de Luna gage plus the above Santa Rosa gage upstream from Sumner Lake. FSID's entitlement is set every 2 weeks based on NMOSE computations. Reclamation can divert to storage or bypass any inflows in excess of FSID's maximum water right (100 cfs). Data needed is obtained from the NMOSE Pecos Water Master in the Roswell district office.

Trigger

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

Actions taken: During the time period covered by this report, inflows did not exceed FSID's senior diversion right from August 1 through August 20, and from October 2 through October 31. 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 bypass for meeting instream flow targets.

Reclamation had sufficient fish conservation pool water available in Sumner Reservoir to achieve target flows during those periods when there was no Sumner bypass available. Throughout the period covered by this report, Reclamation's Facilities and Lands Division actively pursued and negotiated agreements for additional water that be released out of Sumner in lieu of bypass water.

5) Indicator: Block Releases

Criteria

A block release is defined as moving water efficiently from Sumner Lake to Brantley Reservoir for the purpose of irrigation. 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 Dan exceeds 65 days. **Block release data is based on information from CID and gage data will need to be compiled and included in this report.**

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.

Actions taken: No Sumner block releases occurred during the period of time covered by this report. The block release trigger was not activated for any of the three conditions.

6) Indicator: Life Stage of Pecos bluntnose shiner (shiner)

Criteria

Life stages of the shiner have different requirements. Eggs, larvae, young-of-year, and adults could each be affected differently by water operations. Life stage varies by month and also varies longitudinally in the Pecos River. At any given time during the summer months, the shiner population would be comprised of all life stages. During the non-irrigation season, the shiner population would be comprised of only young-of-year and adult fish. Reclamation will consider shiner life stages in its water management decisions.

Trigger

The life stage of the Pecos bluntnose shiner is used as an indicator and does not include a trigger.

Actions taken:

All life stages of the Pecos bluntnose shiner, from young-of-year to adult, have been sampled each year since 1992. Reclamation funded these efforts until 2003 and the Army Corps of Engineers funded it through 2006, with supplemental funding coming from Reclamation in 2005 and 2006. Status of the shiner has typically been made available in April of the following year to each sampling year. Sampling for 2006 has been completed; however, the final report will not be complete till April of 2007. All preliminary indications of shiner abundance and density in 2006 are anticipated to be up from the 2005 reported numbers.

7) Indicator: Carlsbad Project Water Supply Status

Criteria

One of the purposes of the EIS is to conserve Carlsbad Project water supply. Reoperation 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.

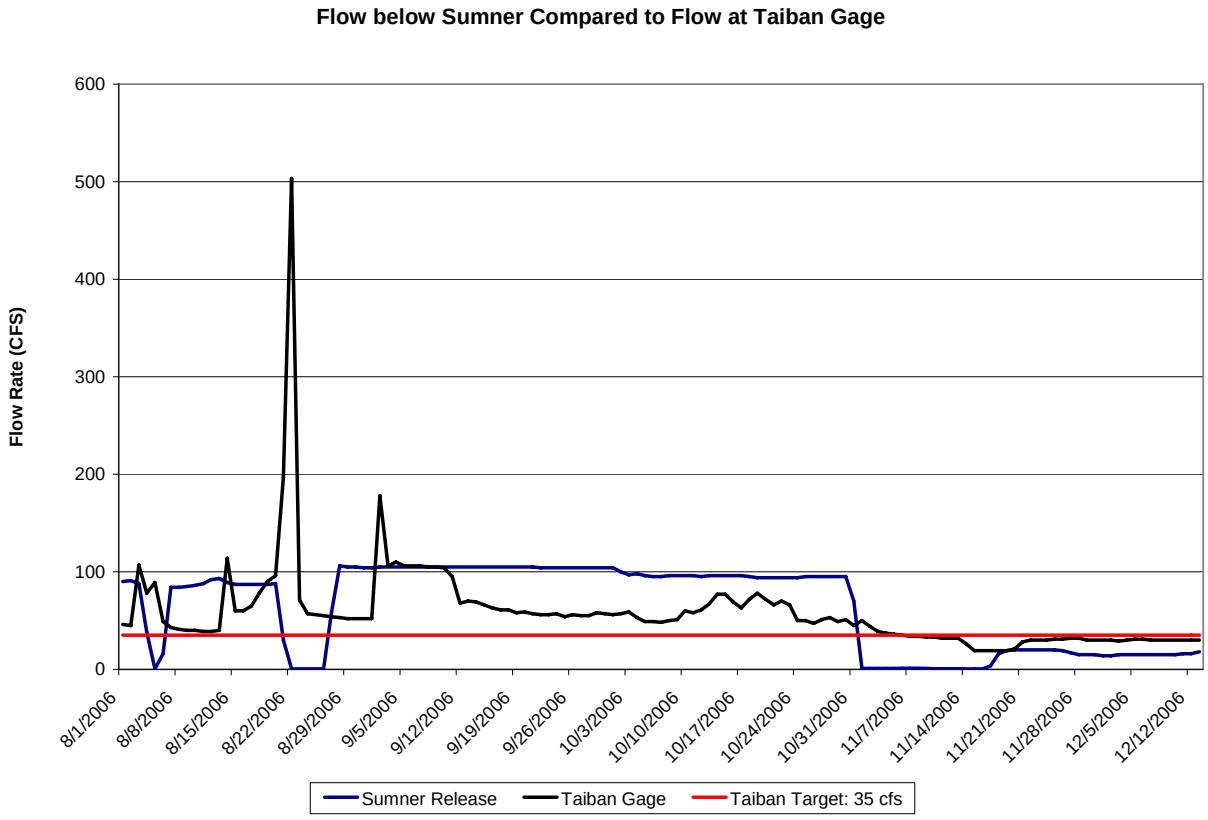
Trigger

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: Although the annual accounting of net depletions to the Carlsbad Project has not been completed for the calendar year covering the reporting period of this report, preliminary estimates indicate that existing Carlsbad Project water acquisitions will greatly exceed the calculated estimated net depletions due to Reclamation's bypass operations to benefit the Pecos bluntnose shiner. The CID Status trigger will not be activated during this reporting period.

The FSID trigger was activated several times during the period covered by this report. These instances are described for each of the three conditions in the following paragraphs. As shown in Figure 1.1, these instances did not negatively impact achieving the 35 cfs flow target at the Taiban gage.

Figure
1.1



Condition 1:
FSID ceased diversions and the Sumner release was stopped due to rainfall from August 4 through August 6, and from August 21 through August 26. Reclamation monitored flows to insure that at least 35 cfs remained at Taiban during these shutdowns. If flows had dropped below 35 cfs. Reclamation could have released water from the fish conservation pool or started a Sumner bypass to supplement flows.

Condition 2:
FSID's pumpback was in operation on a nearly continuous basis during the reporting period until a failed impellor shaft forced FSID to shut the pump down during the week of September 18. FSID hopes to repair their pumpback system prior to the start of their irrigation season in 2007. Taiban flows were maintained at or above 35 cfs during the entire period that the pumpback was in operation.

Condition 3:
FSID delivered all required forbearance water during the reporting period. The FSID Status trigger was not activated as a result of this condition.

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. **The data will need to be compiled on an annual basis and included in this report.**

Trigger

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

Actions taken:

Dry, average, and wet reservoir storage conditions were used only under the Gap Biological Opinion during the period from March 1, 2006 through May 17, 2006. The new 10-year Biological Opinion was initiated on May 18, 2006 and did not include the dry, average, and wet reservoir storage metrics. Reclamations records showed that from the period of March 1 – May 8, 2006, storage volumes using the effective Brantley storage (Palmer Drought Severity Index) were between 94,984 acre-feet (af) and 76,251 af, maintaining an average reservoir storage condition. From May 9-17, 2006, storage volumes were below 75,000 af, which established a dry reservoir storage condition.

Discussion

Actions available to Reclamation include: a) releasing bypass water; b) releasing Fish Conservation Pool water to keep the river continuous in the shiner upper critical habitat; c) obtaining water from the Carlsbad Project Water Acquisition (CPWA) or Additional Water Acquisition (AWA) options as described in the EIS; d) coordinating with CID for block releases; or e) initiating other similar actions within Reclamation's authority.

Reclamation's current leases include:

Year Entered Lease Program	Lessor/ Lease No.	A/F Water Leased annually	Payment Scheduled
2003	03-WC-49-8780	1170 a/f	2005 2006 2007 2008
2003	03-WC-40-8550	390 af	2004 2005 2006 2007 2008
2000	00-WC-40-R6440	510 af	2005 2006 2007 2008 2009
2000	04-WC-40-8990	1,158 a/f	2005 2006 2007 2008 2009
2000	00-WC-40-R6450	240 af	2005 2006 2007 2008 2009
2001	01-WC-40-6800	773.28 af	2006 2007 2008 2009 2010
2001	01-WC-40-6870	1,180.2	2006 2007 2008 2009 2010
2005		39.9	2006

			2007 2008 2009 2010
2000	FSID		2006: 2nd 1/2 Phase 4 - Due in August 2006: 1st 1/2 Phase 5 - Due in March, April 2007:2nd 1/2 Phase 5 Due in August 2007: 1st 1/2 Phase 6 Due in March, April 2008: 2nd 1/2 Phase 6 Due in August
2006/2007	ISC	1,800 a/f	??
2006		204.75 a/f	2006 2007 2008 2009 2010

Recommendations:

Improved Communication/Coordination

Improvements to communications between CID, FSID, and Reclamation should be incorporated into 2007 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.

Monitoring of the Interior Least Tern

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 2006 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.

New Indicator list with criteria, triggers and monitoring for 2007 AMP:

Proposed change for the AMP Operation 2007

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 Sate 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 week 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 Strategic Water Initiative (SWI) pipeline is operational and available for use, Reclamation will order the operation of the SWI pipeline at a rate needed to keep the river continuous.

If bypass water is unavailable and the SWI pipeline is unavailable, Reclamation will release Fish Conversation Pool water at a rate needed to avoid intermittency.

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.

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). Data needed is 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 would be used to assess whether there is available Carlsbad Project Supply to bypass through Santa Rose and Sumner dams.

Trigger: The incoming flows available for 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.

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.

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.

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.

Indicator 7 – Carlsbad Project Water Supply Status

Criteria: One of the purposes of the EIS is to conserve Carlsbad Project water supply. Reoperation 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.

Monitoring: Use the annual accounting of net depletions to the Carlsbad Project for the calendar year covering the reporting period of this report. These estimates would indicate if existing Carlsbad Project water acquisitions exceed the calculated estimated net depletion's due to Reclamation's bypass operations to benefit the Pecos bluntnose shiner.

Response: If the annual accounting determines that a net depletions occurred by the end of the calendar year, any existing credits will be applied as required to bring the annual balance to zero. Any credit applied to zero out the annual depletions will be deducted from the total accrued credit balance. If there is insufficient credit water available to offset any annual net depletions, Reclamation will concurrently begin discussions with the State of New Mexico while pursuing additional options to offset the annual net depletions.

If the annual accounting determines that a net credit occurred by the end of the calendar year; this credit will be added to Reclamation's accrued credit balance.

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.

Trigger: Aquifer storage and base inflows from the Roswell Basin are used as an indicator, groundwater depths would be used as an indicator of aquifer storage.

Monitoring: 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. This evaporation will occur annually.

Response: If the annual evaluation of groundwater conditions and base inflows indicate a multi-year decline trend, Reclamation will initiate studies to ensure the river will keep a continuous flow.