

**Attachment 2**

**Adaptive Management Plan**

**Adaptive Management Plan for the  
Taiban Constant Alternative**

**Carlsbad Project Water Operations and Water Supply  
Conservation Environmental Impact Statement**

January 2006

**U.S Department of the Interior  
Bureau of Reclamation  
Albuquerque, New Mexico**

**New Mexico Office of the State Engineer  
Interstate Stream Commission  
Santa Fe, New Mexico**

## **Adaptive Management Plan – Carlsbad Project Water Operations: Taiban Constant Alternative**

The Adaptive Management Plan (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 Adaptive Management Plan that is focused on the Taiban Constant alternative. 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 (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.

Communication for this Adaptive Management Plan will be carried out primarily through conference calls among the Pecos River Stakeholder Group and preparation of an Annual Adaptive Management Report. Members of the Pecos River Stakeholder Group include the Service, Reclamation, Carlsbad Irrigation District (CID), Fort Sumner Irrigation District (FSID), New Mexico Department of Game and Fish (NMDGF), New Mexico Office of the State Engineer, New Mexico Interstate Stream Commission (NMISC), U.S. Army Corps of Engineers (Corps), and interested environmental advocacy groups. Other stakeholders, such as the U.S. Geological Survey (USGS), will be contacted when specific information or input is needed. During the irrigation season, Reclamation will prepare weekly logs of the conference calls.

### **Roles and Responsibilities**

Reclamation would implement the adaptive management plan within the context of the existing Pecos River water management working group, consisting of federal, state, and local agency managers and representatives, researchers, and water users. Reclamation's authority for participating in this group is described below. A successful adaptive management strategy will include interagency cooperation, long-term commitments, regular communications, and additional meetings as needed. Pecos River stakeholders have different interests, legal rights, and responsibilities with regard to river management. Likewise, there can be disagreement on flow and habitat needs and the effects of management actions. The adaptive management plan will provide a structure for making decisions based on changing environmental conditions and offers a forum to stakeholders for developing a consensus.

## **Attachment 2**

### **Communication Process**

Reclamation will take the lead role in communication. During the irrigation season (March through October), Reclamation will coordinate weekly conference calls on flows and river operations and distribute weekly logs to the stakeholders. The conference calls will be the primary means of responding to changing conditions along the Pecos River. Key adaptive management indicators such as gage measurements, flows, and intermittency will be discussed regularly. Other criteria will likely be discussed as appropriate.

During the year, the indicators will be monitored regularly to keep the Reclamation river operations manager informed of changing conditions in the river. The Reclamation river operations manager will be informed as soon as possible (within 24 hours) whenever a key trigger (Indicator 1 or 2) has been activated. The response process will then be followed.

Reclamation will prepare an Annual Adaptive Management Report after the end of the calendar year. An annual meeting of the Pecos River Stakeholder Group will be held to discuss the status of the adaptive management plan. The focus of the meeting will be on the review of the Annual Adaptive Management Report. The status of the indicators will be discussed and needed changes to monitoring will be identified.

### **Documentation and Reporting**

Reclamation will manage the documentation and reporting process for the adaptive management plan. Monitoring results will be incorporated into the Annual Adaptive Management Report. The report will describe the previous calendar year – January 1 through December 31. Monitoring results for each indicator will be incorporated into the report. In addition, the report will analyze trend data for indicators to determine if responses are needed to long-term changing conditions. The report will include recommendations for monitoring and river management for the next year. The annual report will be coordinated with the annual accounting process. When a trigger has been activated, it will be logged, and the response process will be initiated.

### **Actions Available to Reclamation**

This adaptive management plan is designed to ensure compliance with the Biological Opinion and the Record of Decision (ROD) for the Carlsbad Project Water Operations and Water Supply Conservation EIS. Actions available to Reclamation to change water flows in the Pecos River include (not listed in any priority order): (a) releasing bypass water; (b) releasing Fish Conservation Pool (FCP) water to prevent intermittency 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. Such actions will be initiated by Reclamation according to this adaptive management plan in conformance with the Biological Opinion and ROD.

### **Criteria, Triggers, Monitoring, and Response**

The core components of the Adaptive Management Plan 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 bypass;
5. Block releases;
6. Life stage of shiner;
7. CID Status; and
8. Aquifer storage and base inflows from the Roswell Basin.

This page intentionally left blank.

**Indicator 1: Intermittency**

**Criteria**

Weekly Pecos River Stakeholder Group conference calls have been conducted in recent years to discuss conditions on the Pecos River and coordinate water operations. River intermittency will be a key indicator for river operations monitoring. The primary objective is to avoid intermittency on the river and always keep the critical habitat wet.

**Trigger**

The intermittency trigger is activated when critical habitat is dry or is at risk of drying (this event is highly unlikely) or when other river reaches are dry or are at risk of drying. A minimum target of 5 cfs at the Acme gage is specified in the Biological Opinion as an indicator of the risk of intermittency.

Intermittency	Monitoring and Response
Monitoring Responsibility	The USGS operates and maintains the Taiban and Acme gages. Reclamation may provide funds to USGS or take other river monitoring measures. Reclamation is responsible for assessing river intermittency risk and duration. Reclamation is responsible for conducting the response process.
Response Process if it is determined that critical habitat is at risk of drying.	<ol style="list-style-type: none"> <li>1. Reclamation will coordinate response via Pecos River Stakeholder Group conference calls.</li> <li>2. Reclamation will: (a) release bypass water, (b) release FCP water, (c) obtain water using CPWA or AWA options, (d) coordinate with CID for block releases, or (e) initiate other similar actions within Reclamation’s authority.</li> <li>3. If the above responses are inadequate, Reclamation will notify the Pecos River Stakeholder Group and seek input on implementing another solution.</li> </ol>
Response Process if critical habitat has dried.	<ol style="list-style-type: none"> <li>1. Reclamation will document river drying.</li> <li>2. Reclamation will consider Carlsbad Project storage, drought, and shiner life stage when deciding how to respond.</li> <li>3. Reclamation will assess the following water sources as a means to reconnect the river: (a) release bypass water, (b) release FCP water, (c) obtain water from CPWA or AWA options, (d) coordinate with CID for block releases, or (e) initiate other similar actions within Reclamation’s authority.</li> <li>4. Reclamation will weigh the positive and negative aspects of responding to reconnect the river and make a decision.</li> </ol>

Attachment 2

Intermittency	Monitoring and Response
	<ol style="list-style-type: none"> <li>5. Reclamation will notify the Service and request reconsultation if necessary.</li> <li>6. If Reclamation decides that it is unable to provide water for a continuous river, then the Pecos River Stakeholder Group may implement another solution. Reclamation will document river drying.</li> </ol>
<p>Response Process if it is determined that a portion of the Pecos River <u>not</u> designated as critical habitat is at risk of drying.</p>	<ol style="list-style-type: none"> <li>1. Reclamation will coordinate response via Pecos River Stakeholder Group conference calls.</li> <li>2. Reclamation will consider Carlsbad Project storage, drought, and shiner life stage when deciding how to respond.</li> <li>3. Reclamation will assess the following water sources as a means to avoid intermittency: (a) release bypass water, (b) obtain water from CPWA or AWA options, (c) coordinate with CID for block releases, or (d) initiate other similar actions within Reclamation's authority.</li> <li>4. Reclamation will weigh the positive and negative aspects of responding to avoid intermittency and make a decision.</li> <li>5. If the above responses are inadequate, Reclamation will notify the Pecos River Stakeholder Group and seek input on implementing another solution.</li> </ol>
<p>Response Process if a portion of the Pecos River <u>not</u> designated as critical habitat has dried.</p>	<ol style="list-style-type: none"> <li>1. Reclamation will coordinate response via Pecos River Stakeholder Group conference calls.</li> <li>2. Reclamation will consider Carlsbad Project storage, drought, and shiner life stage when deciding how to respond.</li> <li>3. Reclamation will assess the following water sources as a means to avoid intermittency: (a) release bypass water, (b) obtain water from CPWA or AWA options, (c) coordinate with CID for block releases, or (d) initiate other similar actions within Reclamation's authority.</li> <li>4. Reclamation will weigh the positive and negative aspects of responding to reconnect the river and make a decision.</li> <li>5. If the above responses are inadequate, Reclamation will notify the Pecos River Stakeholder Group and seek input on implementing another solution.</li> <li>6. Reclamation will document river drying.</li> </ol>

**Indicator 2: Target River Flows**

**Criteria**

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

**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 ROD.

River Flows	Monitoring and Response
Monitoring Responsibility	The USGS operates and maintains the Taiban and Acme gages. Reclamation may provide funds to USGS or take other river monitoring measures. Reclamation is responsible for conducting the response process.
Response Process	<ol style="list-style-type: none"> <li>1. If the gages indicate that the flow has dropped below the specified levels, then Reclamation will determine whether the gages are functioning properly or low flows are actually occurring.</li> <li>2. Reclamation will determine whether the reach between the Taiban and Acme gages is gaining water, regardless of the flow at the Taiban gage (see Indicator 2a).</li> <li>3. If it is determined that flows are below the target level and the reach between the Taiban and Acme gages is not gaining water, Reclamation will consider: (a) releasing bypass water, (b) releasing FCP water, (c) obtaining water from CPWA or AWA options, (d) coordinating with CID for block releases, or (e) initiating other similar actions within Reclamation's authority.</li> <li>4. If intermittency occurs, Indicator 1 is triggered, and the response process will be followed.</li> <li>5. If the above responses are inadequate, Reclamation will notify the Pecos River Stakeholder Group and seek input on implementing another solution.</li> <li>6. Reclamation will document the period that the target is not met.</li> </ol>

**Indicator 2a: Gaining River Below Taiban**

***Criteria***

On rare occasions, the Taiban gage can experience low flows (below 35 cfs) while the reach between the Taiban and Acme gages is gaining water from base inflows. In such situations, the low gage readings at the Taiban gage may not be a true indicator of river conditions. This measure is used to conserve water for future use.

***Trigger***

The river flows trigger is activated when the flow level measured at the Taiban gage is below the target level specified in the ROD, but flow levels at the Dunlap or Acme gage exceed the Taiban gage.

Gaining River Flows	Monitoring and Response
Monitoring Responsibility	The USGS is responsible for the operation and maintenance of the Taiban, Dunlap, and Acme gages. USGS takes measurements at the gage and posts results on their web site. Reclamation is responsible for conducting the response process.
Response Process	<ol style="list-style-type: none"> <li>1. When the Taiban Gage is below 35 cfs, Reclamation will verify that the Dunlap or Acme gages exceed the Taiban gage reading.</li> <li>2. Reclamation will verify that intermittency is not occurring (see Indicator 1).</li> <li>3. Reclamation will verify that all gages are working properly (see Indicator 3).</li> <li>4. If the above conditions are met, Reclamation will not release additional water into the river in order to increase flows at the Taiban Gage since the reach between the Taiban and Acme gages is gaining water.</li> <li>5. Reclamation will continue to monitor river conditions to ensure that intermittency does not occur under the gaining river conditions.</li> </ol>

**Indicator 3: Flow Monitoring**

***Criteria***

Correctly operating gages are important to river management. The USGS is responsible for measurements 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, or Acme gage is malfunctioning or non-operational.

Gages	Monitoring and Response
Monitoring Responsibility at the Taiban, Dunlap, and Acme Gage	USGS is responsible for their gages. USGS generally measures and maintains their gages at least once a month. Reclamation and NMISC will implement other flow monitoring methods as needed.
Response Process	If a gage is malfunctioning or non-operational then: <ol style="list-style-type: none"> <li>1. Reclamation or NMISC will notify the USGS.</li> <li>2. Reclamation or NMISC may use a surrogate method for estimating flow at the affected location(s).</li> <li>3. Reclamation will determine whether independent flow measurements are appropriate.</li> </ol>

**Indicator 4: 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’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 are activated when it is determined by NMOSE that incoming available flows do not exceed FSID’s senior diversion right.

Incoming Flows Available for Bypass	Monitoring and Response
Monitoring Responsibility	The NMOSE will continue to determine incoming flows available for FSID diversion. Reclamation will use the NMOSE calculations to determine available bypass.
Response Process if no bypass is available.	Reclamation will coordinate response via the Pecos River Stakeholder Group conference calls. <ol style="list-style-type: none"> <li>1. Reclamation will verify and document that no bypass is available.</li> <li>2. Reclamation will assess the status of flows at the Taiban gage, within critical habitat, and at the Acme gage.</li> <li>3. If it is determined that flows are below the target level and the reach between the Taiban and Acme gages is not gaining water, Reclamation will consider: (a) releasing FCP water, (b) obtaining water from CPWA or AWA options, (c) coordinating with CID for block releases, or (d) initiating other similar actions within Reclamation’s authority.</li> </ol>

**Indicator 5: 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 the 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; (3) block releases should be avoided during the 6-week period centered on August 1; or (4) the cumulative duration of block releases from Sumner Dam exceeds 65 days. Block release data is based on information from CID and gage data will need to be compiled and include in the Annual Adaptive Management 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; (3) a block release is expected in the 6-week period centered on August 1; or (4) the cumulative duration of block releases from Sumner Dam exceeds 65 days.

Block Releases	Monitoring and Response
Monitoring Responsibility	Reclamation personnel will examine gage data as measured at the Below Sumner Dam gage to ensure that block releases do not exceed 15 days. Following a block release, Reclamation personnel will also monitor gage data as measured at the Below Sumner Dam gage to ensure that a subsequent block release is not made within the next 14 days. Reclamation will also monitor the Below Sumner Dam gage to ensure that block releases are avoided for 6 weeks centered on August 1 and that the cumulative duration of block releases from Sumner Dam exceeds 65 days.
Response Process	<ol style="list-style-type: none"> <li>1. Reclamation will coordinate response via Pecos River Stakeholder Group conference calls.</li> <li>2. If there is less than 14 days between block releases, Reclamation will notify the Service, NMDGF, and NMISC.</li> <li>3. If it appears there will be a need for a block release within the 6 weeks centered on August 1, Reclamation will discuss options with the Service, CID, NMDGF, and NMISC in order to minimize harm to the shiner.</li> <li>4. If block releases are not in compliance with the above criteria, Reclamation will notify CID to correct the activity.</li> <li>5. Reclamation will follow-up to ensure that the activity has been corrected.</li> </ol>

**Attachment 2**

<b>Block Releases</b>	<b>Monitoring and Response</b>
	6. Dates and flow levels of block releases will be included in the Annual Adaptive Management Report.

**Indicator 6: Life Stage of Pecos Bluntnose 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 life stage in its water management decisions.

***Trigger***

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

<b>Pecos Bluntnose Shiner Life Stage</b>	<b>Monitoring and Response</b>
Monitoring Responsibility	Reclamation in conjunction with the Service and NMDGF will review data and determine expected life stage at various times throughout the year. New data will be considered as available.
Response Process	<ol style="list-style-type: none"> <li>1. The Service, Reclamation, NMDGF, and NMISC will continue to collect, analyze, and provide data on shiner populations and life stages.</li> <li>2. Reclamation will solicit advice from the Service regarding shiner life stage and potential benefits/impacts of water operations issues as they arise.</li> </ol>

**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.

<b>Carlsbad Project Water Supply Status</b>	<b>Monitoring and Response</b>
Monitoring Responsibility	Reclamation will determine through the annual accounting process whether Carlsbad Project water supply is being conserved. Conserving the Carlsbad Project water supply means delivering the amount of water that would otherwise be available but for changes to operations. Water diversion data from CID, reservoir storage, water acquisition data, and other pertinent hydrologic information will need to be collected and compiled.
Response Process	<ol style="list-style-type: none"> <li>1. The surplus / shortage to the Carlsbad Project water supply will be determined by the annual accounting methodology. The surplus / shortfall will be tabulated and provided to CID in a timely fashion.</li> <li>2. If an annual surplus occurs, then Reclamation would consider that in making water operations and water acquisition decisions for the subsequent year.</li> <li>3. If a surplus persists, then Reclamation would consider that in making long-term water operations and water acquisition decisions.</li> <li>4. If an annual shortage occurs, then Reclamation would consider acquiring additional water for the subsequent year.</li> <li>5. If a shortage persists, then Reclamation would reevaluate the long-term water acquisition strategy.</li> </ol>

**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 ground-water 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 ground-water 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 the Annual Adaptive Management Report.

**Trigger**

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

Aquifer Storage and Base Inflows From the Roswell Basin	Monitoring and Response
Monitoring Responsibility	NMOSE and NMISC will monitor aquifer storage, which could be used for base inflows calculations into the Pecos River, to better understand changes that may affect CID's long-term supply and deliveries at the State line.
Response Process	<ol style="list-style-type: none"> <li>1. NMOSE and NMISC will compile data and provide information to stakeholders (through occasional meetings or reports) in order to mitigate possible problems with the long-term water supply due to changes in this aquifer.</li> <li>2. The Pecos River Stakeholder Group will review aquifer storage and base inflow data annually.</li> <li>3. The compiled data will be documented in the Annual Adaptive Management Report.</li> </ol>

## **Attachment 2**

### **Acronyms**

**AMP** – Adaptive Management Plan

**AWA** – Additional Water Acquisitions

**cfs** – cubic feet per second

**CID** – Carlsbad Irrigation District

**CPWA** – Carlsbad Project Water Acquisitions

**Corps** – U.S. Army Corps of Engineers

**EIS** – Environmental Impact Statement

**FCP** – Fish Conservation Pool

**FSID** – Fort Sumner Irrigation District

**NM** – New Mexico

**NMDGF** – New Mexico Department of Game and Fish

**NMISC** – New Mexico Interstate Stream Commission

**NMOSE** – New Mexico Office of the State Engineer

**Reclamation** – Bureau of Reclamation

**ROD** – Record of Decision

**Service** – U.S. Fish and Wildlife Service

**USGS** – U.S. Geological Survey

## Glossary

**Adaptive Management Plan (AMP):** The AMP outlines a procedure for monitoring indicators and modifying river operations when needed. It is a means to address uncertainty by monitoring Carlsbad Operations EIS targets, addressing actions to be taken for targets that are in jeopardy, and addressing changing conditions in the future management of river operations by modifying operations within established parameters.

**aquifer:** Stratum or zone below the surface of the earth containing water.

**Carlsbad Project:** Reclamation operates the Carlsbad Project to provide water for water users who are members of the Carlsbad Irrigation District (CID). The Secretary of Interior authorized the Carlsbad Project for the purpose of irrigation in 1905. Reclamation owns the Carlsbad Project dams and reservoirs. CID operates the dams and reservoirs. Carlsbad project operations include storage and releasing water to deliver project water to CID water users.

**conserve:** Conserving the Pecos bluntnose shiner means that Reclamation would ensure that any discretionary action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. Reclamation would continue to participate in interagency actions to protect federally-listed species and designated critical habitats, within their legal and discretionary authority.

**criteria:** Conditions that are monitored as part of the AMP.

**critical habitat:** Defined in Section 3(5)(A) of the Endangered Species Act of 1973, as amended (ESA) as:

- (1) The specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical and biological features essential to the conservation of the listed species and which may require special management considerations for protection; and
- (2) Specific area outside the geographical area occupied by a species at the time it is listed upon a determination by the Secretary of the Department of Interior that such areas are essential for the conservation of the species. These areas have been designated via Federal Register notices.

**cubic foot per second (cfs):** As a rate of streamflow, a cubic foot of water passing a reference in section in 1 second of time; 1 cfs = 2 acre-feet per day; 651,702 gallons per day. It is a measure of a moving volume of water (1 cfs = 0.0283 cubic meter per second).

**gage:** Specific location on a stream where systematic observations of hydrologic data are obtained through mechanical or electrical means.

**ground water:** Water beneath the ground, consisting mostly of surface water that has seeped down.

## Attachment 2

**monitoring:** The observation and measurement of changing conditions according to defined criteria.

**response process:** A protocol, usually a series of steps, that is followed when a trigger has been activated in response to changing conditions.

**trigger:** A threshold level of change in the criteria being monitored that requires a response in management activity. When changing conditions pass the threshold level of change, the trigger has been “activated”.

**upper critical habitat:** Upper portion of critical habitat for Pecos bluntnose shiner. The upper end of the reach starts about two-thirds of a mile upstream from the Taiban Creek confluence and extends approximately 64 river miles downstream to the Crockett Draw confluence.

# Index

- 1988 *Texas v. New Mexico* U.S. Supreme Court Amended Decree (see Amended Decree)
- Acme Constant, 2-8, 2-19, 2-39, 4-10, 4-14 to 4-15, 4-17, 4-32 to 4-33, 4-42 to 4-46, 4-48, 4-50 to 4-57, 4-59, 4-65, 4-68 to 4-69, 4-74, 4-76, 4-83 to 4-85, 4-88, 4-90, 4-93, 4-100, 4-103, 4-109, 4-111, 4-119 to 4-134, 4-141 to 4-142
- Acme Variable, 2-8, 2-19, 2-39, 4-10 to 4-11, 4-14 to 4-15, 4-34 to 4-36, 4-40 to 4-43, 4-45 to 4-47, 4-57, 4-59, 4-65 to 4-69, 4-71, 4-74, 4-76, 4-83 to 4-85, 4-88 to 4-91, 4-102 to 4-104, 4-109 to 4-111, 4-119 to 4-134, 4-141 to 4-143
- Active Water Resource Management, 1-22, 5-6, 5-11, 5-21
- Adaptive Management Plan (see AMP)
- additional transmission loss, 4-22, 4-26, 4-28, 4-37, 4-41
- additional water acquisition option (see AWA option)
- additional water needed (see AWN)
- adverse effect/adverse impact, 1-21, 2-17 to 2-18, 2-40, 4-74 to 4-78, 4-130 to 4-132, 4-137, 4-140, 4-145, 4-149
- affected environment, 1-23, 3-1 to 3-86
- agricultural soil and land resources, 2-40, 3-33, 4-73 to 4-78, 4-145, 5-19
- alternative development, 2-2 to 2-3, 6-5
- alternative development workgroup, 6-5
- Amended Decree, 1-5, 1-10, 1-19, 1-21 to 1-22, 3-8, 5-2, 5-5, 5-7, 5-12 to 5-13, 5-16, 5-18, 5-20
- amount available, 4-40, 4-41, 4-45
- AMP, 1-3, 2-12 to 2-14, 2-19, 4-134, 4-149, 6-5
- APE, 3-75 to 3-76, 4-130, 4-134 to 4-135, 6-7
- aquifer, 3-21 to 3-25, 3-32, 4-44, 4-67, 4-147
- Area of Potential Effect (see APE)
- Artesia, 4-125 to 4-126
- Avalon Dam, 3-17
- Avalon Reservoir, 3-5, 3-11, 3-13, 3-70, 4-86, 4-123
- AWA option, 2-6, 2-18, 2-34 to 2-38, 4-19 to 4-20, 4-47 to 4-52, 4-67, 4-71, 4-76 to 4-78, 4-82 to 4-90, 4-95 to 4-96, 4-100 to 4-106, 4-128, 4-134, 4-136, 4-145, 4-149
- AWN, 2-24, 3-7, 3-8, 4-19, 4-55, 4-83, 4-95, 4-100, 4-102, 4-129
- base inflow, 3-9, 3-22 to 3-23, 4-82 to 4-86, 4-89, 4-100, 4-105 to 4-106, 4-132, 4-145
- baseline, 2-21, 4-4 to 4-5, 4-9, 4-127
- pre-1991 baseline, 2-21, 4-4 to 4-5, 4-9, 4-75, 4-84, 4-92 to 4-93, 4-109, to 4-111, 4-119, 4-121, 4-145
- beneficial use, 1-2, 1-18
- biological resource, 2-40 to 2-41, 3-41, 4-7, 4-81 to 4-83, 4-88, 4-105 to 4-107, 4-139, 4-145, 5-16 to 5-18
- biology workgroup, 2-6 to 2-7, 6-5
- Bitter Lake National Wildlife Refuge (see BLNWR)

## Index

- BLNWR, 3-42, 3-70, 4-124, 5-3, 5-9, 5-12, 5-14, 5-17 to 5-18, 5-20
- block release, 1-3, 1-12, 2-11, 2-15, 2-17, 2-21, 2-25, 3-13, 3-15 to 3-16, 4-5, 4-48, 4-53 to 4-55
- Brantley Dam, 1-13, 1-18
- Brantley Reservoir, 1-13, 3-11 to 3-13, 3-31, 3-45, 3-70, 4-38, 4-40, 4-53, 4-57 to 4-58, 4-77, 4-124, 4-126
- Buffalo Valley, 1-6, 2-29, 2-33, 4-44, 4-135, 4-147
- Bureau of Reclamation (see Reclamation)
- bypass flow, 4-18 to 4-19
- CAGW, 4-3
- Cannon Air Force Base, 5-7, 5-11, 5-19
- Capitan Reef Complex, 3-22, 3-24
- Carlsbad (city of), 1-2, 3-5, 3-22, 3-58, 3-65, 4-112, 6-1 to 6-2
- Carlsbad Area Ground Water model (see CAGW)
- Carlsbad basin, 3-8, 3-10, 3-14, 3-21 to 3-22, 3-24, 4-43
- Carlsbad Irrigation District (see CID)
- Carlsbad Project Vegetation Management Program, 1-22, 5-3, 5-8, 5-12, 5-14, 5-17, 5-20
- Carlsbad Project water acquisition option (see CPWA option)
- Carlsbad Project, 1-1, 1-6, 1-8, 1-10, 1-12 to 1-13, 1-18, 2-26, 2-35, 3-5, 3-8 to 3-9, 3-11, 3-13, 4-22, 4-75
- Cascades at Carlsbad, 5-5, 5-11, 5-13, 5-21
- CEQ, 2-20, 5-1
- Chaves County Flood Control District, 1-5, 6-4
- Chaves County, 1-5, 3-58, 3-60 to 3-68, 3-86, 5-3 to 5-4, 6-4
- Cheese processing facility, 5-6, 5-15, 5-19, 5-21
- CID, 1-12, 1-13, 1-21 to 1-22, 2-29 to 2-30, 2-32, 2-35 to 2-37, 3-5, 3-18 to 3-20, 3-32, 3-39, 4-19, 4-39, 4-42, 4-74, 4-77, 4-111, 4-116, 4-118 to 4-120, 4-135 to 4-136, 5-13
- Clean Water Act, 1-19, 1-21, 3-27, 6-6
- Clovis, 3-58, 4-112, 5-7, 5-11, 5-19
- Compact, 1-10, 1-18, 3-8, 3-14, 4-14, 4-16, 5-1, 5-7, 5-12, 5-13, 5-16, 5-18, 5-20
- computer modeling, 4-2, 4-3, 4-5 to 4-8
- conservation pool, 1-12, 3-11, 3-14
- conservation spill, 4-25, 4-27, 4-29 to 4-30, 4-33, 4-35, 4-37 to 4-38, 4-53
- consultation and coordination, 6-1
- Corps, 1-5, 1-6, 1-12, 1-17, 1-21, 3-14
- Council on Environmental Quality (see CEQ)
- CPWA efficiency, 4-40 to 4-46
- CPWA option, 2-6, 2-26 to 2-33, 3-9, 3-15, 4-38 to 4-43, 4-46, 4-57, 4-67, 4-71, 4-77 to 4-78, 4-104 to 4-105, 4-122, 4-128, 4-134 to 4-135, 4-149
- critical habitat, 1-1, 1-3, 2-20, 2-29 to 2-32, 3-42, 3-55, 4-10 to 4-11, 4-14 to 4-15, 4-17, 4-36 to 4-47, 4-57, 4-59, 4-66 to 4-69, 4-74, 4-76, 4-83 to 4-85, 4-88, 4-90 to 4-94, 4-102, 4-104, 4-109 to 4-111, 4-119 to 4-127, 4-129, 4-134, 4-143
- cropping pattern, 2-29 to 2-30, 2-32, 2-35, 2-37, 3-39, 4-39, 4-67, 4-77, 4-104 to 4-105, 4-109 to 4-111, 4-116 to 4-122, 4-128, 4-135 to 4-136
- cultural resources, 2-42, 3-75 to 3-79, 4-129 to 4-139, 5-20 to 5-22, 6-7

- cumulative impact, 4-132, 4-140, 5-1 to 5-23
- Curry County, 3-58, 3-60 to 3-63, 3-65 to 3-68, 4-115, 5-6, 5-15 to 5-16, 5-19, 5-21
- dam removal, 2-23
- De Baca County, 3-58, 3-60 to 3-68, 3-86, 6-4
- delivery obligation, 3-8, 4-14 to 4-16, 5-1, 5-7, 5-9
- depletion, 3-8, 3-20, 4-13 to 4-18, 4-54 to 4-55
- discretionary action, 1-3 to 1-4, 1-14, 1-16
- diversion, 1-14, 3-18 to 3-19
- EC, 2-40, 3-27 to 3-32, 3-35, 4-7, 4-57 to 4-71
- Eddy County, 1-5, 3-58, 3-60 to 3-68, 4-116, 6-4
- education, 3-60
- efficiency, 3-40, 4-39 to 4-46, 4-122
- electrical conductivity (see EC)
- endangered species, 1-13, 1-15, 1-21, 3-45 to 3-46, 3-49 to 3-50
- Endangered Species Act of 1973, as amended (see ESA)
- environmental commitment, 1-24, 4-149
- environmental consequences, 4-1 to 4-150
- environmental justice, 3-85, 4-2, 4-5, 4-7, 4-141 to 4-143
- Environmental Quality Incentives Program, 3-40, 5-5, 5-14
- erosion potential, 3-35, 4-73
- ESA, 1-1, 1-4, 1-14, 1-16, 1-21, 3-45, 3-47, 3-55, 4-87, 5-12, 6-6
- EUAC, 2-28, 2-30, 2-35
- evaporation, 3-12, 4-75
- farmland of Statewide importance (see FSI)
- FCP, 2-9, 2-16, 2-18, 3-8 to 3-9, 4-14, 4-20, 4-105 to 4-106
- fish conservation pool (see FCP)
- flood, 1-18, 3-18, 3-40, 4-12, 4-82 to 4-83, 4-88, 4-90, 4-130 to 4-133
- flood frequency, 3-18
- flood plain, 4-81 to 4-82, 4-88
- flow duration, 3-17
- flow exceedance, 3-16, 4-9 to 4-12, 4-17, 4-20, 4-28, 4-31 to 4-32, 4-34, 4-36, 4-93, 4-100 to 4-102, 4-108, 4-126 to 4-127, 4-145
- Fort Sumner, 1-6 to 1-7, 1-18, 1-23, 2-3, 2-33, 2-35, 2-38, 3-58, 3-80, 4-107, 4-112, 4-136, 6-1 to 6-3
- Fort Sumner Irrigation District (see FSID)
- FSI, 3-36 to 3-38, 4-73, 4-75 to 4-78, 5-13 to 5-15
- FSID, 1-7, 1-14, 2-3, 2-16, 2-29 to 2-30, 2-35, 3-5, 4-12, 4-21, 4-111, 4-116, 4-118 to 4-121, 4-128, 4-135 to 4-136, 5-2, 5-18, 5-23
- FSID Diversion Dam, 1-5 to 1-6, 1-11, 1-22, 2-21, 3-18
- gravel pit pumping, 2-30, 2-35, 4-21, 4-45 to 4-47, 4-51 to 4-52, 4-68, 4-77, 4-78, 4-105 to 4-107, 4-128, 4-135 to 4-136
- ground water, 1-8, 1-12, 3-31 to 3-32, 4-70 to 4-71, 4-86
- Guadalupe County, 1-5, 3-58 to 3-68, 4-141, 4-143, 5-23, 6-4
- Hagerman Irrigation Company (see HIC)
- HIC, 1-8, 3-5, 3-18
- Hope Decree, 1-11, 1-18, 3-14

## Index

- hydrologic condition, 2-9 to 2-10, 4-5
- hydrology workgroup, 2-6, 6-5
- impact analysis, 1-23, 2-39 to 2-42, 4-1 to 4-2, 4-21, 4-88, 4-115, 4-124, 4-132, 4-140
- impact area, 3-10 to 3-11, 3-57 to 3-60, 3-63 to 3-65, 3-85, 4-112, 4-118
- impact, 1-23, 2-39 to 2-42, 4-1 to 4-150, 5-1 to 5-23
- implementation, 1-1, 4-1, 5-3, 6-6
- Indian trust and treaty assets (see ITA)
- indicator, 2-13, 3-1, 3-7, 4-9, 4-57, 4-73, 4-81 to 4-82, 4-109, 4-123, 4-129, 4-139, 4-141
- interdisciplinary team, 2-6, 6-4
- interior least tern, 3-49 to 3-50, 4-83, 4-86 to 4-91, 6-6
- intermittency, 1-2 to 1-3, 1-16, 2-10, 2-25, 4-10, 4-12, 4-25, 4-27, 4-29, 4-33, 4-35, 4-37, 4-48 to 4-51, 4-82 to 4-84, 4-89 to 4-104
- intermittent flows (see intermittency)
- irrigation, 1-6 to 1-9, 1-13, 2-19 to 2-20, 3-1, 3-5, 3-15, 3-19, 3-33, 3-38, 3-39, 4-74 to 4-76, 4-116 to 4-117, 4-128, 5-15 to 5-16
- irrigation districts, 1-7, 3-5, 3-14, 3-18
- irrigation return flow, 3-17, 3-19, 4-14
- ITA, 1-23, 3-81 to 3-82, 4-139 to 4-140, 5-23
- Kaiser Channel, 3-21, 3-44
- land fallowing, 2-31 to 2-32, 2-36, 4-114, 5-19
- land retirement, 2-31, 2-36, 2-40, 4-78, 4-109 to 4-117, 4-145, 4-149, 5-15
- lease, 2-32, 2-36 to 2-37, 4-40, 4-42, 4-67, 4-70, 4-77 to 4-78, 4-105, 4-135 to 4-136
- Major Johnson Springs, 1-9, 3-21, 3-24
- McMillan Dam, 1-7 to 1-9, 1-18, 3-21
- McMillan Reservoir, 3-42
- minimum pool, 3-11 to 3-12
- mitigation, 4-71, 4-78, 4-106, 4-122, 4-128, 4-132, 4-136 to 4-137, 4-140, 4-143
- model, 1-15, 3-23, 4-2 to 4-8
- MPEIS, 1-17, 1-22, 5-2, 5-14, 5-17 to 5-18, 5-20
- National Environmental Policy Act (see NEPA)
- National Historic Preservation Act, 1-20 to 1-21, 3-75, 4-130, 5-22, 6-6 to 6-7
- Near Acme gage, 1-3, 2-7, 3-7, 3-17, 3-43, 4-4, 4-11, 4-25 to 4-38, 4-47 to 4-52, 4-82
- Near Dunlap gage, 2-7
- NEPA, 1-1 to 1-2, 1-20, 2-1, 3-82, 5-1, 6-1, 6-4 to 6-7
- net depletion, 2-6, 2-9, 2-28, 2-39, 3-8 to 3-9, 4-9 to 4-10, 4-13 to 4-19, 4-23 to 4-55, 4-75 to 4-76
- New Mexico Department of Game and Fish (see NMDGF)
- New Mexico Interstate Stream Commission (see NMISC)
- New Mexico Office of the State Engineer (see NMOSE)
- New Mexico-Texas State line, 2-41, 3-8, 3-14, 4-14
- NHPA, 3-75 to 3-77, 6-7
- NMDGF, 1-5, 3-30, 3-47, 5-6, 6-6
- NMISC, 1-1, 1-5, 1-21 to 1-22, 2-1, 2-3, 3-15, 3-20, 3-25
- NMOSE, 1-5, 2-11, 3-18, 3-25

- No Action, 2-8, 2-14 to 2-15, 2-20 to 2-21, 2-39 to 2-42, 4-10 to 4-11, 4-20 to 4-22, 4-60 to 4-111, 4-119 to 4-127, 4-129, 4-132, 4-142, 4-145
- noxious weed, 3-38, 4-73, 4-79, 4-149, 5-14
- oil and gas exploration and development, 5-7, 5-11, 5-19, 5-21
- operational priorities, 3-13 to 3-14
- Pecos bluntnose shiner, 1-3, 2-41, 3-46 to 3-49, 4-81 to 4-83, 4-86, 4-89 to 4-91, 5-3, 6-2
- Pecos River, 1-9 to 1-10, 2-13, 2-31, 3-1 to 3-3, 3-8 to 3-11, 3-16 to 3-21, 3-25 to 3-29, 3-70 to 3-74, 4-18
- Pecos River basin, 1-1, 1-6, 3-1 to 3-3, 3-9 to 3-11, 3-29 to 3-31, 5-1
- Pecos River Basin Water Salvage Project, 5-2, 5-8, 5-12, 5-14, 5-17, 5-20
- Pecos River Compact (see Compact)
- Pecos River Decision Support System (see PRDSS)
- Pecos River Restoration Project, 5-3, 5-9, 5-12, 5-14, 5-17 to 5-18, 5-20
- Pecos River RiverWare surface water model, 3-8, 4-3
- Pecos Valley Artesian Conservancy District, 1-5, 3-5, 5-2, 6-4, 6-6
- Pecos Valley Water Users Organization (see PVACD)
- PF, 3-36 to 3-38, 4-73 to 4-78, 5-13 to 5-15
- population, 3-58 to 3-59, 4-141 to 4-142
- Portales, 3-58, 4-112
- Potash mining, 5-6, 5-11, 5-17, 5-19, 5-21
- poverty, 3-63 to 3-64
- PRDSS, 4-3, 4-5
- preferred alternative, 2-17 to 2-19, 2-23 to 2-26, 6-6
- prime farmland (see PF)
- proposed action, 1-2 to 1-4, 2-3, 2-23, 5-1
- public involvement, 6-1, 6-4
- Puerto de Luna, 1-6, 2-35 to 2-38, 2-55, 2-57 to 2-58, 4-136
- pump-back operation, 1-14, 2-16
- PVACD, 1-5, 1-8, 3-5, 3-25, 4-67, 4-70
- RABGW, 3-23, 4-3, 4-44
- recharge, 4-59 to 4-60, 4-70 to 4-71, 4-78, 4-147
- Reclamation, 1-1 to 1-5, 1-8, 1-15 to 1-19, 1-21, 1-23, 2-1, 2-3, 6-1
- Record of Decision (see ROD)
- recreation, 3-69 to 3-73, 4-123 to 4-128, 5-19
- regional economy, 2-41 to 2-42, 3-57 to 3-68, 4-8, 4-109 to 4-110, 4-124, 4-145, 5-18 to 5-19
  - employment, 2-42, 3-62, 4-109-4-111, 4-113, 4-118 to 4-120, 4-124
  - income, 2-41, 3-60 to 3-61, 4-109 to 4-113, 4-116 to 4-120, 4-122, 4-124, 4-141
- regional water plan, 5-12
- reservoir aquatic ecosystem, 3-45, 4-81, 4-83, 4-86, 4-89
- reservoir evaporation, 3-12, 4-13
- reservoir storage, 3-11, 4-126 to 4-127
- residual impact, 4-71, 4-79, 4-107, 4-122, 4-128, 4-137, 4-140, 4-143
- river drying, 1-14, 4-8, 4-21

## Index

- river pumper retirement, 4-41
- riverine aquatic ecosystem, 3-43, 4-81 to 4-86, 4-89 to 4-104, 4-107
- ROD, 1-4 to 1-5, 2-12, 2-14, 5-2, 6-1
- Roosevelt County, 3-58 to 3-68, 4-116
- Roswell, 1-6, 1-12, 1-23, 2-3, 2-29, 3-58, 4-112, 6-1 to 6-3
- Roswell basin, 3-21 to 3-25, 4-44
- Santa Rosa, 1-23, 2-3, 2-34, 3-58, 4-112, 6-1 to 6-3
- Santa Rosa Dam, 1-6, 1-12, 3-18, 3-23
- Santa Rosa Reservoir, 1-12, 3-11 to 3-18, 3-27 to 3-31, 3-44 to 3-45, 3-69 to 3-72, 3-81, 4-123 to 4-124, 4-126
- scoping, 1-22 to 1-23, 2-1, 2-5, 5-1, 6-1 to 6-2
- section 7 consultation, 1-21, 2-23 to 2-24, 4-149
- Service, 1-1, 1-13, 1-16, 1-21, 2-8, 2-10, 2-18, 2-22 to 2-25, 2-32, 2-34, 2-36, 2-38, 6-4, 6-6
- Settlement Agreement, 1-5, 1-21 to 1-22, 5-2, 5-7, 5-12 to 5-13, 5-16, 5-18, 5-20
- Seven Rivers, 1-6, 2-17, 2-29, 2-33, 4-44, 4-67, 4-135, 4-147
- SHPO, 3-77, 3-79 to 3-80, 4-134, 4-137
- soil, 2-40, 3-33 to 3-40, 4-73 to 4-75, 4-78, 5-13 to 5-16
- soil salinity, 3-34 to 3-35, 4-73 to 4-78, 5-14, 5-15 to 5-16
- special status species, 3-45 to 3-54, 4-81 to 4-83, 4-86 to 4-91
- specific electrical conductance (see EC)
- State Historic Preservation Officer (see SHPO)
- State-line flows, 3-8, 4-10, 4-15 to 4-19, 4-22, 4-24, 4-25, 4-27, 4-33, 4-35, 4-38, 4-42, 4-44, 4-145, 5-7 to 5-11
- State Water Plan, 5-4, 5-12, 5-14, 5-20
- streamflow, 3-10, 3-16 to 3-17
- stream gage, 1-3, 3-2, 4-4, 4-14, 4-82
- study area, 1-6, 3-1 to 3-3
- summary of impacts, 2-39 to 2-42, 4-77, 4-82 to 4-83, 4-105, 4-109, 4-123, 4-129, 4-139, 4-141
- Sumner Dam, 1-12, 1-14 to 1-15, 1-19, 2-11
- Sumner Lake, 1-12, 1-14, 1-15, 3-28, 3-30, 3-69, 3-71, 3-72, 4-123 to 4-124, 4-126, 4-142
- supplemental water, 2-15
- surface water, 1-9 to 1-14, 2-23, 2-42, 2-48 to 2-49, 2-56 to 2-57, 3-10 to 3-19, 4-3, 4-9 to 4-55, 5-7 to 5-11
- Taiban gage, 2-7, 4-48 to 4-52
- Taiban Variable, 2-8, 2-19, 2-39 to 2-42, 4-10 to 4-11, 4-14 to 4-17, 4-28 to 4-32, 4-40 to 4-46, 4-57, 4-59, 4-64 to 4-65, 4-68 to 4-69, 4-76, 4-83 to 4-91, 4-97 to 4-99, 4-109 to 4-111, 4-119 to 4-121, 4-123, 4-125 to 4-127, 4-129, 4-133, 4-142
- target flow, 1-3, 2-8, 2-10, 2-14, 2-17, 2-21, 2-24, 2-39, 4-9, 4-11, 4-13, 4-16, 4-25, 4-30, 4-33, 4-37, 5-21
- TDS, 3-27, 3-29, 4-7, 4-57, 4-58, 5-12
- terrestrial and flood plain ecosystem, 3-42, 3-43, 4-81 to 4-83, 4-88
- threatened species, 1-1, 1-13 to 1-14, 3-46 to 3-47
- total dissolved solids (see TDS)
- U.S. Army Corps of Engineers, 1-5, 3-11, 5-3, 5-9, 5-12, 5-14, 5-17 to 5-18, 5-20, 6-4, 6-6

- U.S. Fish and Wildlife Service (see Service)
- U.S. Geological Survey (see USGS)
- USGS, 2-7, 3-17, 4-4, 4-12
- U.S. Supreme Court Amended Decree (see Amended Decree)
- water acquisition, 1-1, 1-6, 2-1, 2-6 to 2-7, 2-15, 2-18, 2-22, 2-26 to 2-28, 2-34 to 2-38, 4-16, 4-19 to 4-20, 4-38 to 4-52, 4-67, 5-16
- water acquisition option, 2-1, 2-6 to 2-7, 2-15, 2-22, 2-26 to 2-28, 2-34 to 2-38, 4-16, 4-19 to 4-20, 4-38 to 4-52, 4-67, 4-76, 4-122, 4-128, 4-130, 4-135 to 4-136, 4-140, 4-145, 4-149, 5-16
- water offset options group, 2-4, 2-26, 2-28, 2-34
- water operations, 1-12, 1-14, 3-14 to 3-15
- water quality, 2-40, 3-27 to 3-32, 4-57 to 4-71, 5-11 to 5-13
- water resources, 2-39, 3-7 to 3-25, 4-9 to 4-56, 5-7 to 5-11
- Water Resources Conservation Program, 1-22, 5-4, 5-9, 5-13 to 5-14, 5-17 to 5-18
- water right, 1-3, 1-10 to 1-11, 2-16, 2-29 to 2-32, 2-35 to 2-36, 4-40 to 4-43, 4-67, 4-105, 4-135 to 4-136, 4-139, 4-145, 5-2
- water right lease, 2-16, 2-29 to 2-32, 2-35 to 2-36, 4-76 to 4-78, 4-105, 4-122 to 4-128, 4-135 to 4-136
- water right purchase, 2-27, 2-29 to 2-31, 2-35 to 2-36, 4-67, 4-70, 4-76 to 4-78, 4-105, 4-122, 4-128, 4-135 to 4-136, 4-145
- water supply, 2-4, 2-7, 2-15, 2-26, 3-7 to 3-25, 4-10, 4-13 to 4-14, 4-17, 4-25, 4-27, 4-29, 4-33, 4-35, 4-37, 4-40 to 4-42, 4-45 to 4-46, 4-48 to 4-55, 5-7 to 5-11
- well field, 2-29, 2-33, 2-35 to 2-36, 2-38, 4-44 to 4-45, 4-50, 4-77 to 4-78, 4-106, 4-119 to 4-120, 4-122, 4-128, 4-135 to 4-136, 4-147