

**Pecos River - Santa Rosa Lake, New Mexico,
to the Confluence of the Pecos River
and the Rio Grande, Texas
Section 729
Initial Watershed Assessment**

April 2012



**US Army Corps
of Engineers** ®
Albuquerque District

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1. Study Authority

- (a) This Initial Watershed Assessment (IWA) (reconnaissance report) analysis was prepared as an initial response to the authority contained in Section 729 of the Water Resources Development Act (WRDA) of 1986, as amended, which reads in part:

The Secretary, in coordination with the Secretary of the Interior and in consultation with appropriate Federal, State, and local agencies, is authorized to study the water resources needs of river basins and regions of the United States.

- (b) Funds in the amount of \$300,000 were appropriated for the Corps in Fiscal Year 2012 to conduct studies under the Section 729 authority. A portion of the funds was used to conduct the Pecos River Initial Watershed Assessment, which was initiated on August 18, 2011.

The watershed planning guidance contained in Engineering Circular 1105-2-411, *Watershed Plans*, also applies.

2. Study Purpose

- (c) The assessment of watersheds proceeds in two phases: the IWA phase and the Watershed Assessment (WA) phase. This IWA report will be the basis for making the decision to proceed, or not to proceed, with the WA.

Overall, the IWA phase is intended to accomplish the following tasks:

- Identify the non-Federal sponsor;
- Determine if water and related land resources problems warrant Federal participation in a WA. If so, a more comprehensive review and analysis of the problems will be conducted during the WA;
- Define the Corps' interest based upon a preliminary appraisal of identified potential problems and opportunities;
- Complete the IWA report;
- Prepare a Watershed Assessment Project Management Plan (WAPMP), which includes a Watershed Assessment Review Plan (WARP) section;

- Assess the level of interest and support from the non-Federal sponsor in the cost sharing of a WA;
- Negotiate and execute a Watershed Assessment Cost Sharing Agreement (WACSA).

The Pecos River study area lacks a comprehensive watershed management plan, which prevents coordinated land management efforts. A number of short term measures have been implemented, with varying success, to address the various water resource problems. Without a comprehensive WA, integration of the various measures will not occur and potential alternatives may be overlooked.

Water resources data needed to make informed decisions are lacking for much of this area. Without a comprehensive WA, various agencies along the Pecos River would continue to gather data for specific or localized issues but would not likely have the resources to combine the data into a comprehensive data set. Further, data gaps would remain.

In response to the study authority, the IWA phase was first initiated 18 Aug 2011. The purpose of this IWA is to document the basis for establishing the Federal interest for participating in a WA and to establish the scope of the WA. As the document that establishes the scope of the WA, the IWA will become an appendix of the WAPMP.

3. Study Location, Non-Federal Sponsor and Congressional Districts

The study area is the Pecos River watershed (HUC Codes 130600 and 130700) from Santa Rosa Lake at Santa Rosa, New Mexico, to the Pecos River – Rio Grande confluence in Texas, including Lake Amistad, and is shown in the Study Area Map (Enclosure A). The Pecos River drainage basin is approximately 44,300 square miles (115,000 km²) in area. The headwaters of the Pecos River are located north of Pecos, New Mexico, at an elevation of over 12,000 feet on the western slope of the Sangre de Cristo mountain range in Mora County. The river flows for 926 miles (1,490 km) through the high plains of eastern New Mexico and neighboring arid west Texas before emptying into the Rio Grande near Del Rio, TX. The Pecos River joins the Rio Grande immediately above, and contributes flows to, Amistad Reservoir, which is an international water resource managed jointly by the governments of the United States and Mexico through the International Boundary and Water Commission (IBWC).

The Pecos River basin encompasses at least portions of several counties in New Mexico, listed from north to south: Mora, Santa Fe, San Miguel, Guadalupe, Quay, Torrance, Curry, De Baca, Roosevelt, Lincoln, Chaves, Lea, Otero, and Eddy Counties, as well as several counties in Texas, also listed in order from north to south: Loving,

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Culberson, Winkler, Ector, Ward, Crane, Upton, Reeves, Pecos, Jeff Davis, Crocket, Terrell, Presidio, Brewster, and Val Verde Counties.

The largest population center along the river in New Mexico is Roswell (population: 48,366 (2010 Census)) while Pecos (population: 8,780 (2010 Census)) is the largest population center within the study area in Texas.

The non-Federal sponsor for the WA of the study is the Pecos River Compact Commission (sponsor).

The study area lies within the jurisdictions of the following Federal Congressional Districts:

- Congressman Steve Pearce, NM-02.
- Senator Jeff Bingaman, NM.
- Senator Tom Udall, NM.
- Congressman Michael Conaway, TX-11.
- Congressman Francisco Canseco, TX-23.
- Senator John Cornyn, TX.
- Senator Kay Bailey Hutchison, TX.

4. Prior Reports and Existing Projects

(a) The following reports were reviewed as part of this study:

Ashworth, J.B., 1990, Evaluation of groundwater resources in parts of Loving, Pecos, Reeves, Ward, and Winkler Counties, Texas: Texas Water Development Board Report 317, 51 p.

Belzer, W., 2007, Aquatic life and habitat inventory assessment: Texas Water Resources Institute Report TR-305, 60 p.

Belzer, W. and Hart, C., 2007, Identifying and characterizing the volume and quality of tributaries and springs: Texas Water Resources Institute Report TR-302, 14 p.

Clayton, L.A., 2002, Saltcedar management strategies and effects on water quality and quantity of the Pecos River: M.S. Thesis, Department of Rangeland Ecology and Management, Texas A&M University, College Station, 86 p.

Collins, W.D., and Riffenburg, H.B., 1928, Quality of water of Pecos River in Texas: U.S. Geological Survey Water-Supply Paper 596-D, p. 67-88.

Conover, C.S., and others, 1956, Results of spot-discharge measurements and chemical analyses of water along the Pecos River, tributaries, and diversions between Acme and Artesia, New Mexico, January and February 1956: U.S. Geological Survey Open File Report 56-30, 8 p.

Cox, E.R., and Havens, J.S., 1965, A progress report on the Malaga Bend Experimental Salinity Alleviation Project, Eddy County, New Mexico: U.S. Geological Survey Open File Report 65-35, 92 p.

Gregory, L., and Hatler, W., 2008, A watershed protection plan for the Pecos River in Texas: Texas A&M University, 161 p.

Gross, G.W., 1982, Recharge in semiarid mountain environments: New Mexico Water Resources Research Institute Report TR 153, 36 p.

Hart, C.R., White, L.D., McDonald, A., and Sheng, Z., 2005, Saltcedar control and water salvage on the Pecos River, Texas, 1999-2003: Journal of Environmental Management, v. 75, p. 399-409.

Havens, J.S., and Wilkins, D.W., 1979, Experimental salinity alleviation at Malaga Bend of the Pecos River, Eddy County, New Mexico: U.S. Geological Survey Water-Resources Investigations Report 80-4, 65 p.

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Herron, W.H., 1916, Profile surveys in 1915 along the Rio Grande, Pecos River, and Mora River, New Mexico: U.S. Geological Survey Water-Supply Paper 421, 11 p.

Hoagstrom, C.W., 2009, Causes and impacts of salinization in the Lower Pecos River: *Great Plains Research* v. 19, no. 1, p. 27-44.

Howard, C.S., and Love, S.K., 1945, Quality of surface waters of the United States, 1943, with a summary of analyses of streams in Colorado River, Pecos River, and Rio Grande Basins, 1925 to 1943: U.S. Geological Survey Water-Supply Paper 970, 180 p.

Jensen, R., Hatler, W., Mecke, M., and Hart, C., 2006, The influences of human activities on the waters of the Pecos Basin of Texas: A brief overview: Texas Water Resources Institute Special Report 2006-03, 39 p.

McAda, D.P., and Morrison, T.D., 1993, Sources of information and data pertaining to geohydrology in the vicinity of the Roswell Basin in parts of Chaves, Eddy, De Baca, Guadalupe, Lincoln, and Otero counties, New Mexico: U.S. Geological Survey Open File Report 93-144, 78 p.

Miyamoto, S., Yuan, F., and Anand, S., 2006a, Reconnaissance survey of salt sources and loading into the Pecos River: Texas Water Resources Institute Report TR-291, 35 p.

Miyamoto, S., Yuan, F., and Anand, S., 2006b, Influence of tributaries on salinity of Amistad International Reservoir: Texas Water Resources Institute Report TR-292, 22 p.

Miyamoto, S., Yuan, F., and Anand, S., 2007, Water balance, salt loading, and salinity control options of Red Bluff Reservoir, Texas: Texas Water Resources Institute Report TR-298, 40 p.

Miyamoto, S., Anand S., and Hatler, W., 2008, Hydrology, salinity, and salinity control possibilities of the Middle Pecos River: A reconnaissance report: Texas Water Resources Institute Report TR-315, 31 p.

Nagihara, S., and Hart, C.R., 2007, Use of satellite remote sensing in monitoring saltcedar control along the Lower Pecos River, USA: Texas Water Resources Institute Report TR-306, 22 p.

Pecos River Compact, 1948, New Mexico, enacted by Laws 1949, ch. 6, § 1; 1978 Comp., § 72-15-19.

Sass, J.H., 1984, Thermal studies at the Brantley Damsite on the Pecos River near Carlsbad, New Mexico: U.S. Geological Survey Open File Report 84-663, 25 p.

Sheng, Z., McDonald, A.K., Hart, C., Hatler, W., and Villalobos, J., 2007, Quantity and fate of water salvage as a result of saltcedar control on the Pecos River in Texas: Texas Water Resources Institute Report TR-304, 42 p.

Teeple, A.P., McDonald, A.K., Payne, J.D., and Kress, W.H., 2009, Direct-current resistivity profiling at the Pecos River Ecosystem Project Study Site near Mentone, Texas, 2006: U.S. Geological Survey Scientific Investigations Report 2009-5090, 11 p.

Thomas, H.E., 1963, Causes of depletion of the Pecos River in New Mexico: U.S. Geological Survey Water-Supply Paper 1619-G, 14 p.

Villalobos, J., Sheng, Z., and Hart, C., 2007, Geographical information system coverage for characterization of the Pecos River Basin: Texas Water Resources Institute Report TR-300, 56 p.

This study may result in recommendations for potential modifications, either structurally or through changes in operations, to existing projects, facilities, and organizations in the watershed, including but not necessarily limited to:

- U.S. Geological Survey (USGS) water-quality monitors and streamflow gages.
- Salinity control projects at Malaga Bend, Eddy, NM.
- NMISC flow augmentation and river/ecosystem restoration projects.
- Texas State Soil and Water Conservation Board and other brush-management projects.
- Fort Sumner Irrigation District.
- Carlsbad Irrigation District.
- Pecos Valley Artesian Conservancy District.
- Red Bluff Water Power Control District.
- Ward County Irrigation District.
- Santa Rosa Lake, NM (operated by the Corps).
- Lake Sumner, NM (co-operated by the Carlsbad Irrigation District and the U.S. Bureau of Reclamation).

- Brantley Lake, NM (co-operated by the Carlsbad Irrigation District and the U.S. Bureau of Reclamation).
- Red Bluff Reservoir, TX (operated by Red Bluff Water Power Control District).
- Amistad Reservoir, TX (operated by USBR).

See Enclosure A for the locations of the lakes and reservoirs.

5. Plan Formulation

Formulation of alternative plans employs a six step planning process set forth in the Water Resource Council's *Principles and Guidelines for Water and Land Related Resources Implementation Studies*. These steps are carried out in sequence or iteratively to derive a set of alternative solutions, screen the alternatives, and select a recommended plan. The six planning steps are:

1. Specify problems and opportunities.
2. Inventory and forecast conditions.
3. Formulate alternative plans.
4. Evaluate effects of alternative plans.
5. Compare alternative plans.
6. Select the recommended plan.

In the early iterations, those conducted during the IWA phase, the step of specifying problems and opportunities is emphasized. A set of conceptual alternatives is presented at this stage that may be used to identify informational needs and outline the scope for future efforts of the study. The sections that follow present the results of the initial iterations of the planning steps that were conducted during this IWA. This information will be refined in future iterations of the planning steps that will be accomplished during the WA.

National Objectives

The National objective of water and related land resources planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to National environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the Nation.

The Corps also contributes to the National objective for ecosystem restoration in response to legislation and administration policy. Ecosystem restoration is one of the primary missions of the Corps' Civil Works program and the objective is to contribute to the Nation's ecosystems through increasing the net quality and/or quantity of desired ecosystem resources. Contributions to National Ecosystem Restoration (NER) are expressed quantitatively in physical units or indexes (not monetary units).

Together, these National objectives provide the context of the WA and result in a comprehensive watershed management plan. This plan, developed during the WA phase, would include formulation of multi-purpose alternatives that (1) alleviate one or more of the problems identified in the watershed, and (2) could be implemented by Federal agencies, Tribal, State, and local entities, and by non-governmental interests. However, the alternatives recommended in the WA would not be at a level that could be implemented by the Corps without a more detailed analysis to identify specific levels of NED/NER outputs. The more detailed analysis, if appropriate, would take place in additional feasibility level studies (i.e., new studies that are based upon findings from the WA phase). This effort would culminate in a decision document that recommends authorization of a Federal project under a specific, Congressionally-authorized program.

Public Concerns

A number of concerns have been identified during the course of this IWA. These concerns fall into the general categories of water quality and quantity; salinity of surface and groundwater; and habitat and species degradation throughout the Pecos Watershed. These concerns are related to the establishment of planning objectives and planning constraints include, but are not limited to:

- High salinity concentrations in surface water and groundwater.
- Low dissolved oxygen (DO) concentrations.
- Elevated nutrient concentrations.
- Toxic blooms of golden algae.
- Potential water-quality impacts of oil and gas production practices, including hydraulic fracturing, on surface water and groundwater.
- Limited water quantity and water availability issues.
- Maintenance of the quantity and quality of baseflows.
- Degradation of natural riparian habitat and biological diversity.
- Lack of a comprehensive, long-range Pecos River watershed management plan.

- Lack of coordination between Federal, State, local, and non-governmental agencies performing studies and projects in the basin.
- Limited funding at Federal, State, and local levels to adequately address issues within the basin.

Due to the size of the assessment area, fiscal limitations, and scheduling issues, these problems and opportunities, along with their exact locations, frequency, size and severity will be more adequately determined during the WA.

Problems and Opportunities

The evaluation of public concerns often reflects a range of needs perceived by the public and local perceptions of adverse changes and imbalances in the study area that have been observed over time. This section describes these concerns in the context of problems and opportunities that can be addressed through water and related land resource management. The WA will evaluate problems and opportunities regardless of agency authority or jurisdiction to implement a solution. Problems and opportunities identified by the Corps and sponsor relate to water quality and quantity issues, and ecosystem restoration and protection. These are discussed below.

Water Quality Issues in Surface Water and Groundwater

- High salinity concentrations in the watershed have decreased the amount of available clean water for storage and delivery in the system for human consumption, and agricultural and livestock uses.
- High-salinity groundwater discharge is contributing to in-stream water quality issues. Surface water-groundwater interaction is not fully understood in the watershed.
- Low DO concentrations have impacted aquatic life.
- Toxic golden algae blooms have led to fish kills.
- Sections of the Pecos River and Red Bluff Reservoir have elevated nutrient concentrations.
- Oil and gas production practices might impact water quality in the basin.

Opportunities exist to improve surface water and groundwater quality, and to understand groundwater-surface water interactions.

Water Quantity Issues

- Water demands are increasing in the arid Pecos River watershed.

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- High salinity concentrations have reduced the amount of usable surface water to meet growing water demands.
- Surface water-groundwater interaction is not fully understood, and losing and gaining reaches of the river are coarsely delineated.
- Decreased surface-water availability has increased demands on groundwater to meet human, livestock, and agricultural needs.
- Improper irrigation methods and poor vegetation management are contributing to water availability issues.

The opportunity exists to address concerns over water availability.

Ecosystem Impairments within the Watershed

- Temporal flow changes due to climatic variation and withdrawals for water use have altered the water temperature regime.
- High salinity concentrations in the watershed have led to low DO in the river, since water with a high salt content cannot hold as much dissolved oxygen as less saline water.
- High salinity concentrations in the watershed have impaired aquatic biota resources and ecosystems.
- Ecosystem connectivity is poor and restoration of watershed ecosystems has only occurred in small, isolated areas.
- Non-native species of flora within the watershed, including saltcedar, Russian olive, and giant cane, have decreased functional native riparian ecosystems within the watershed.
- Watershed degradation has decreased available habitat for aquatic biota.

The opportunity exists to restore ecosystem structure and function to the habitats within the watershed.

Lack of Funding and Coordination to Create and Implement Watershed Management Measures

- Projects completed by Federal, State, and local entities within the watershed are not coordinated because there is not a comprehensive watershed management plan or a program where all representatives and entities can pool resources to address issues within the Pecos Basin.

Opportunities exist to improve the coordination and availability of resources within the watershed.

Planning Objectives

The national objectives of NED and NER mentioned above are general statements, and not specific enough for direct use in plan formulation. The water and related land resource problems and opportunities identified in this study are stated as specific planning objectives to provide focus for the formulation of alternatives. These planning objectives reflect local problems and opportunities, and represent desired positive changes in the without-project conditions. The planning objectives are specified as follows:

- Develop a comprehensive and long-range watershed management plan within the WA.
- Improve the understanding of groundwater-surface water interaction within the watershed.
- Address concerns over water quantity and availability.
- Improve the quality of surface water within the watershed supportive of water quality standards.
- Restore structure and function to ecosystems within the watershed.
- Improve the coordination and availability of resources within the watershed.
- Provide a framework for future land and water management planning and decisions.

These objectives will be achieved through the implementation of the WA's recommendations for the watershed. The draft WA will be completed by the end of fiscal year 2014. Implementation of recommendations would occur between 2014 and 2050.

Planning Constraints

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that limit the planning process. Plans should be formulated to meet the study objectives and to avoid violating constraints. The planning constraints identified in this study are as follows:

- Availability of water and/or flow rates is subject to the Pecos River Compact.

- Limited availability of public land within portions the study area upon which projects can be constructed. Limited public land also hampers access to the river for studying and sampling.
- Compliance with all applicable executive orders, Federal statutes, and regulations as well as compliance with state and local laws.

Development of Alternative Plans

Corps policy (ER 1105-2-100) directs that the planning process shall address the Nation's water resources needs in a systems context and explore a full range of alternatives in developing solutions. The policy states that:

Alternative plans shall not be limited to those the Corps could implement directly under current authorities. Plans that could be implemented under the authorities of other Federal agencies, State and local entities, and non-governmental interests should also be considered.

Preliminary alternatives were formulated in consideration of current Federal, State, and local planning and environmental guidance, laws, and policy concerning ecosystem restoration, flood risk management, recreation, water quality, and other related purposes.

The WA will take into account existing laws and policies as well as demographic, natural resource, geomorphic, hydrologic, hydraulic and sediment baseline information throughout the Pecos River Watershed. The WA also evaluates problems and opportunities regardless of agency authority or jurisdiction to implement a solution. Potential Corps projects that may be identified as part of any WA will require a feasibility study and a separate authorization.

Preliminary Management Measures to Address Identified Planning Objectives

A management measure is a feature or activity that addresses one or more of the planning objectives. Management measures are the building blocks of alternative plans and are categorized as structural and nonstructural. A wide variety of measures were considered, some of which were found to be infeasible due to technical, economic, or environmental constraints. Each measure was assessed, and a determination was made regarding whether it should be retained in the formulation of alternative plans. During the WA, landowners within the study area will be invited to participate in the development of recommendations or watershed management plans of the WA. Descriptions of preliminary management measures considered in this IWA are presented below:

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- No Action: No Action assumes that no project will be implemented by the Corps to achieve the planning objectives. No Action, which is synonymous with the Future Without Project Condition, forms the basis for comparison of alternatives.
- Establish baseline conditions and identify data gaps using *in situ* water quality monitors.
- Investigate surface water-groundwater interaction to constrain salinity sources.
- Control sources of salinity, such as by pumping groundwater to reduce saline groundwater discharge, in order to improve the quality of surface water.
- Increase DO concentrations in surface water in order to improve aquatic habitat.
- Implement nutrient management measures in order to prevent future problems associated with high nutrient loads and Chlorophyll-a concentrations in surface water.
- Improve land management techniques for forestry, agricultural, and grazing activities within the watershed.
- Develop programs offering outreach, incentives, technical assistance, and best management practices in improving water quality.
- Evaluate and develop standards for the role of wetland and riparian areas in the protection of water quality.
- Adopt a public involvement and outreach program within the area that establishes educational and technical assistance programs concerning oil and gas production practices.
- Improve irrigation methods, vegetation management, and alter the timing of water delivery in order to increase water availability.
- Evaluate surface water-groundwater interaction in the basin in order to identify gaining and losing reaches and better understand when and where no-flow reaches occur in the river.
- Adopt a public involvement and outreach program within the watershed that establishes educational and technical assistance programs, incentives, and coordination with other agencies.
- Remove non-native vegetation species, such as saltcedar.
- Reduce the activities that increase non-native species levels along the Pecos River and its tributaries.

- Improve floodplain and wetland habitat.
- Increase habitat values of restored lands.
- Develop programs offering outreach, incentives, technical assistance, and best management practices in restoring habitat.
- Develop an integrated, comprehensive management plan for the basin in order to improve coordination among water resource entities.
- Identify funding sources for projects within the basin.

Due to the size of the study area, fiscal limitations and scheduling issues, these preliminary management measures, along with their exact locations, frequency, size and scale will be more adequately determined during the WA phase of study. The WA will include baseline data collection from known sources.

Preliminary Screening

The preliminary screening indicates that a wide variety of measures are available to address the full array of watershed problems that exist in the Pecos River study area. However, before eliminating or adopting measures for further consideration, a comprehensive WA is necessary to further develop and evaluate measures that will meet the goals and objectives within the watershed.

The recommendations proposed in the IWA form the basis for the next iteration of the planning steps that will be conducted in the WA. Future screening and reformulation will be based on current Corps guidance and regulations, and would address the nation's water resources needs in a systems context by exploring a full range of alternatives in developing solutions. Potential Corps projects that may be identified as part of any watershed plan would require a feasibility level study and separate authorization.

6. Federal Interest

There is a strong Federal interest in performing a WA in the Pecos River basin below Santa Rosa Lake. Implementation of alternatives developed in this WA could be applied in other watersheds in this geographic area. The comprehensive approach to the preparation of WAs includes investigations related to high priority mission areas including flood damage reduction, ecosystem restoration, and water quality, which also have a Federal interest. The primary products of WAs are comprehensive management plans that include the identification of potential future, site-specific, studies that could lead to the implementation of one or more projects. Based on this IWA, there appear to be potential project alternatives that will be consistent with Corps policies, costs, benefit/cost analyses, and the Environmental Operating Principles that could be address by studies under other Corps authorities and the authorities of other Federal,

State, or local programs. WAs do not constitute decision documents for Congressional authorization.

7. Preliminary Financial Analysis

As the local sponsor, the Pecos River Compact Commission understands the statutory requirement that they provide 25 percent of the cost of the WA. Of that 25 percent, all (100 percent) can be work in kind. The study will result in a WA with recommendations and management measures for the study area; therefore, cost share requirements for watershed studies as described in Section 729 of WRDA 1986 apply. The sponsor is also aware of and understands the statutory cost sharing requirements for potential project implementation. A letter of intent from the sponsor requesting that the Corps pursue the WA and stating a willingness to share in its cost and an understanding of the cost sharing that is required for preparation of the watershed plan is included as Enclosure B.

8. Assumptions and Exceptions

Watershed Assessment Assumptions

The following critical assumptions provide a basis for the WA:

- Formulation and evaluation of Corps-specific projects identified during the WA will be accomplished via additional studies and projects that are based upon findings from the WA. A separate budget development process is required for any subsequent studies or projects. These may be studies/projects under the General Investigations Program or the Continuing Authorities Program, and they may be initiated during the course of the WA.
- NEPA documentation will not be prepared as part of the WA.
- Recommendations of the WA will be of a conceptual level. Therefore an Independent External Peer Review (IEPR) waiver will be requested. Any subsequent projects will undergo all appropriate levels of review including IEPR.
- The WA should also include:
 - Cooperation and coordination with watershed landowners.
 - Identification of policies, procedures, regulations, and laws that affect water operations.
 - Development of recommendations for water management changes including, but not limited to: lake operations, non-point source regulations, and land management practices.

- Identification of policies, procedures and requirements necessary for the WA sponsor to acquire water rights for ecosystem purposes within the study area.
- Recreation recommendations.
- Identification of funding opportunities for future project implementation.

Policy Exceptions and Streamlining Initiatives

The WA will be conducted in accordance with the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* dated March 10, 1983, as amended and Corps regulations. No exceptions to established guidance have been identified at this time.

Quality Objectives

The WA will meet the following quality objectives:

- Information developed will be adequate for the sponsor to make appropriate water resource planning decisions.
- The potential for initiation of project-specific studies will be identified and pursued only if they are deemed consistent with the WA.

9. Watershed Assessment Milestones

Milestone	Description	Duration (months)	Cumulative (months)
Milestone F1	Initiate Study	0	0
Milestone F2	Public Meeting	3	3
Milestone F3	Feasibility Scoping Meeting	18	21
Milestone F4a	Alternative Formulation Briefing or Issue Resolution Conference	1	22
Milestone F5	Draft WA	12	34
Milestone F6	Final Public Meeting	1	35
Milestone F8	Final Report to SPD	1	36

10. Watershed Assessment Cost Estimate

Technical Specialties	Estimated Cost
Geospatial Mapping & Support	\$40,000
Hydrology and Hydraulics Studies/Report	\$100,000
Geotechnical Studies/Report	\$100,000
Environmental Engineering Studies/Report	\$100,000
General Engineering/Cost	\$100,000
Environmental Resources Studies/Report	\$50,000
Cultural Resources Studies/Report - Consultation	\$20,000
Public Involvement & Documentation	\$50,000
Plan Formulation and Evaluation	\$30,000
Study/Planning Technical Management	\$80,000
Report Preparation	\$150,000
Technical Review	\$30,000
Project Management	\$100,000
Subtotal	\$950,000
Contingencies (5%)	\$47,500
Total	\$997,500

11. Views of Other Resource Agencies

Because of the funding and time constraints of the IWA, only limited and informal coordination has been conducted with other resource agencies. There is no known opposition to this assessment at this time (March 2012).

12. Potential Issues Affecting Initiation of Watershed Assessment

Continuation of this IWA into the cost-shared WA is contingent upon an executed WACSA. Failure to achieve an executed WACSA within 18 months of the approval date of the IWA might result in termination of the assessment. There are no known issues that could impact the initiation of the WA.

The schedule for signing the WACSA is September 2012. Based on the schedule of milestones, completion of the WA Report will be in March 2015.

13. Project Area Map

A map of the Study Area is provided as Enclosure A.

14. Recommendations

It is recommended that the Pecos River IWA proceed into a cost-shared Watershed Assessment to formulate alternatives for providing flood risk management, environmental restoration, and other water resource opportunities, as appropriate.

Date

Jason D. Williams
LTC, EN
Commanding

Enclosure A. Study Area Map

Enclosure B. Letter of Intent