

CHAPTER I STUDY AUTHORITY

This report was prepared as an interim response to the following authorities provided by Congress. It presents the findings of a feasibility study of the Rio Salado Oeste, Salt River, Arizona. The Salt River is a significant tributary to the Gila River in the State of Arizona (Figure I-1).

- The first authority is given by Section 6 of Public Law 761, dated June 28, 1938, known as the Flood Control Act of 1938, which reads in part as follows:

“the Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys...at the following localities: ...Gila River and tributaries, Arizona.”

- The second and most recent authority is provided by a Resolution of the Committee on Public Works and Transportation, U.S. House of Representatives, adopted May 17, 1994 (Docket 2425) (Figure I-2) which states:

“...the Secretary of the Army is requested to review the reports of the Chief of Engineers on the State of Arizona...in the interest of flood damage reduction, environmental protection and restoration, and related purposes.”

The Energy and Water Appropriations Act, 2000, Public Law 106-60 appropriated funds for investigations of civil works project prior to construction. A reconnaissance level review of the Salt River (Rio Salado Oeste) was conducted under that authorization. The results and conclusions of the reconnaissance phase were presented in the *Rio Salado Oeste, Salt River, Phoenix Arizona Section 905(b) Report September 2000*. The recommendation of this report was that there was a Federal interest in proceeding to a second, feasibility phase of the General Investigation. The Corps of Engineers Headquarters certified the reconnaissance report on November 8, 2000, giving the Los Angeles District authority to move into the feasibility phase.



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 Project Study Area



December 2004

VICINITY MAP



Rio Salado Oeste

Figure I-1



US Army Corps of Engineers®

Figure I-2: HR 2425

U.S. House of Representatives
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
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 WASHINGTON, DC 20515
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COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
U.S. HOUSE OF REPRESENTATIVES
 WASHINGTON, D.C.

RESOLUTION

State of Arizona
Docket 2425

Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, That, the Secretary of the Army is requested to review the reports of the Chief of Engineers on the State of Arizona, published as House Document 331, Eighty-first Congress, First Session; Senate Document 116, Eighty-seventh Congress, Second Session; Senate Document 127, Eighty-Seventh Congress, Second Session; House Document 625, Seventy-Eighth Congress, Second Session, House Document 648, Seventy-Eighth Congress, Second Session; Senate Document 63, Eighty-eighth Congress, Second Session; and other pertinent reports, to determine whether modifications of the recommendations contained therein are advisable at the present time, in the interest of flood damage reduction, environmental protection and restoration, and related purposes.

Adopted: May 17, 1994

ATTEST: 
 NORMAN Y. MINETA, Chair

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CHAPTER II

STUDY INFORMATION

2.1 STUDY PURPOSE AND STUDY SCOPE

The Rio Salado Oeste Study is being conducted by the U.S. Army Corps of Engineers (USACE), Los Angeles District and the City of Phoenix, with the cooperation of the Flood Control District of Maricopa County (FCDMC). The purpose of this study is to identify whether there is a Federal interest in implementing a project along the Salt River from 19th to 83rd Avenues in Phoenix. This study is to identify feasible flood damage reduction and ecosystem restoration alternatives that are technically feasible, economically practicable, sound with respect to environmental considerations, and publicly acceptable. The City of Phoenix, as the non-Federal sponsor, supports the proposed project purpose to provide flood damage reduction, ecosystem restoration, passive recreation, and other related outputs.

This report describes the existing conditions in the project area, the future without-project condition, and the future with-project condition. Conditions that exist at the time of the study are collectively called the existing condition. The without-project condition is the same as the “no action” alternative, and describes what is expected to happen in the absence of Federal action. The future with-project condition describes, for each alternative, what is expected to happen if that alternative plan is implemented. The significant natural, economic, and social resources described in the existing and future without-project condition are compared to the future with-project condition in order to identify differences between alternatives.

Alternative plans are being developed and evaluated to meet the objectives stated above. This report is intended to ultimately be a complete decision document that presents the results of the feasibility phase of the General Investigation effort. Specifically, this feasibility report will:

- Provide a complete presentation of study results and findings, so that readers can reach independent conclusions regarding the reasonableness of recommendations
- Assure compliance with applicable statutes, Executive orders, and policies, in accordance with budgetary priorities

- Provide a sound and documented basis for decision-makers at all levels to judge the need and justification for the recommended solution(s)

2.2 NEED FOR THE PROJECT/PROPOSED ACTION

The City of Phoenix and the Corps of Engineers together are conducting the feasibility study to identify and define environmental degradation, flooding, and related land and water resource problems, and to develop solutions to restore the environment.

The primary problem is the severe degradation and loss of riparian habitat along the Salt River since the early 20th century. The Salt River once flowed perennially and supported substantial growth of cottonwoods, willows, and mesquites. The river channel carried abundant water that supported early irrigation projects. Increasing appropriation of surface and groundwater to support expansion of agriculture and growing urban populations resulted in the transformation of the Salt River to a dry river that flows only ephemerally in response to storm runoff and effluent discharge.

As a result of this change, stands of native riparian habitat are rare in the study area. Loss of riparian habitat is extremely significant in the arid southwest. Historically comprising a mere three percent of the landscape, over 95 percent has already been lost in Arizona. This type of river-connected riparian and fringe habitat is of an extremely high value due to its rarity. The Nature Conservancy lists desert riparian woodland as a very rare although significantly important cover type and describes restoration of riparian systems in the Sonoran Desert as critical. (Marshall et al 2000).

It has been estimated that 75 to 90 percent of all wildlife in the arid southwest is riparian dependent during some part of its life cycle. As a direct consequence of the extent of the lost or degraded riparian habitat, the area has experienced a major reduction in species diversity and in the populations of remaining species. In addition, destruction of native riparian habitat facilitates an increase in invasive plant species that are more tolerant of disturbed conditions. Such plants consume more water than do native vegetation because of their ability to occupy a greater areal extent on the landscape, placing additional strains on limited water supply.

Presently, there is land available for restoration. As long as these conditions remain unchanged, there is opportunity to accomplish significant restoration in the study area. Restoration options have the potential to increase riparian habitat acreage and quality thereby expanding wildlife diversity and quantity, controlling invasive plant species, and providing an ecological resource that is significant and valuable to the region. In addition to restoration there are opportunities to reduce future flood damages and improve recreation opportunities associated with the restored floodplain.

2.3 STUDY AREA

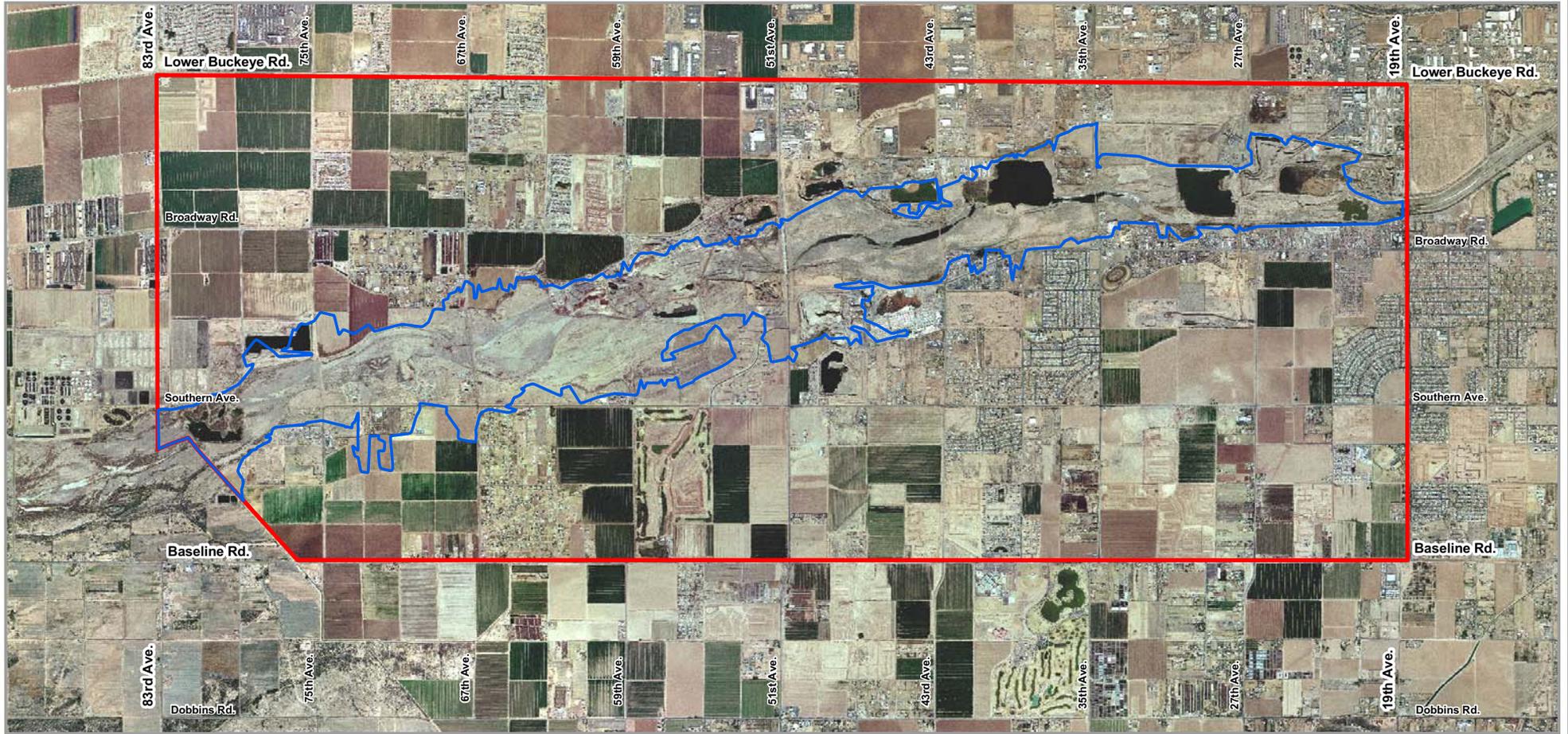
The study area is geographically located in Maricopa County, Arizona, and is entirely within the City of Phoenix (see Figure I-1). The study area is approximately 8 miles long extending from 19th Avenue on the east to 83rd Avenue on the west, and from Lower Buckeye Road on the north to approximately Baseline Road on the south. While this is a large study area extending beyond the riverbanks, any implementation of project features would be associated with the river floodplain. Alternatives considered within the study are all within that implementation area. The project implementation area extends from 19th Avenue on the east and 83rd Avenue on the west, and is the area within the 100-year floodplain of the Salt River. The study area is approximately 4 miles wide and consists of approximately 20,480 acres. The project implementation area is, on average, approximately 1 mile wide and consists of approximately 3,315 acres. Figure II-1 displays the study area and project implementation areas.

The Rio Salado Oeste Project is one of four ecosystem restoration projects that are in various stages of progress, from the planning phase to construction. The projects are being conducted by the Corps and various local sponsors along the Salt River, downstream of Granite Reef Dam. Figure III-1 depicts the locations of these projects with respect to the Rio Salado Oeste Project. Additional description of those projects will follow in Chapter III.

2.4 HISTORY OF THE INVESTIGATION

In response to the study authority, the reconnaissance phase of the study was completed in 2000. This reconnaissance phase resulted in the finding that there was a Federal interest in continuing

to a feasibility phase. The Feasibility Cost Share Agreement (FCSA) with the City of Phoenix was signed in June 2001 and the feasibility phase was initiated.



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Legend

- Project Study Area
- Project Implementation Area

March 2006

PROJECT STUDY AREA AND PROJECT IMPLEMENTATION AREA

Rio Salado Oeste

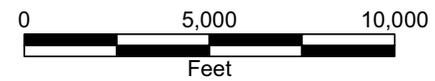


Figure II-1



2.5 PLANNING PROCESS AND REPORT ORGANIZATION

The Corps planning process consists of six steps defined in the Principles and Guidelines (P&G) for Water and Related Land Resources Implementation Studies established in 1983. The process identifies and responds to problems and opportunities associated with the study objectives and specific Federal, State, and local concerns. The planning process culminates in the selection of a recommended plan. The process involves a systematic approach to making determinations at each step so that the interested public and decision-makers are fully aware of the basic assumptions employed. The data and information analyzed, the areas of risk and uncertainty, the reasons and rationales used, and the significant implications of each alternative plan are all exposed through this process. The six steps listed below are addressed in this report and are contained in the chapters shown. These steps are further described in Chapter V, Plan Formulation.

1. Specify water and related land resources problems and opportunities (Chapter V)
2. Inventory, forecast, and analyze water and related land resources conditions within the study area (Chapter IV)
3. Formulate alternative plans (Chapter V)
4. Evaluate the effects of the alternative plans (Chapter V)
5. Compare the alternative plans (Chapter V)
6. Select the recommended plan based upon the comparison of the alternative plans (Chapter V and VI)

The final product of this feasibility study is a Feasibility Report and Environmental Impact Statement (EIS) that will serve as the basis for obtaining Congressional authorization of the plan components determined to be feasible and cost-effective.

The requirements identified in this report may change as project features are further refined during the Pre-construction Engineering and Design (PED) Phase of the project. The project features including actual lands required, and estates to be acquired in those lands may change after approval of the feasibility report. As project features are further refined in subsequent

implementation efforts, the Corps will review the siting determination for the various project features set out in the report in accordance with established policies. This review may result in changes in design or land requirements for specific project features, while maintaining the overall benefit levels presented in the recommended plan. If there are substantive changes in the recommended plan and/or the requirements of this project based on more detailed analysis, then the Los Angeles District will prepare necessary documentation.

2.5.1 Environmental Operating Principles

The Corps of Engineers has reaffirmed its commitment to the environment by formalizing a set of "Environmental Operating Principles" applicable to all its decision-making and programs. These principles foster unity of purpose on environmental issues, reflect a new tone and direction for dialogue on environmental matters, and ensure that employees consider conservation, environmental preservation, and restoration in all Corps activities. By implementing these principles, the Corps will continue its efforts to develop the scientific, economic, and sociological measures to judge the effects of its projects on the environment and to seek better ways of achieving environmentally sustainable solutions. The principles are described in Engineering Circular 1105-2-404, "Planning Civil Work Projects under the Environmental Operating Principles," 1 May 2003.

- **Achieve Environmental Sustainability.** An environment maintained in a healthy, diverse, and sustainable condition is necessary to support life.
- **Consider Environmental Consequences.** Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.
- **Seek Balance and Synergy.** Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
- **Accept Responsibility.** Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that affect human health and welfare and the continued viability of natural systems.

- Mitigate Effects. Seek ways and means to assess and mitigate cumulative effects to the environment; bring systems approaches to the full life cycle of our processes and work.
- Understand the Environment. Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and effects of our work.
- Respect Other Views. Respect views of individuals and groups interested in Corps activities; actively listen, and learn from their perspective in the search to find innovative win-win solutions to the nation's problems, solutions that also protect and enhance the environment.

CHAPTER III PRIOR STUDIES, REPORTS, AND EXISTING WATER PROJECTS

The Resolution of the Committee on Public Works and Transportation adopted May 17, 1994 (Figure I-2) requested review of reports of the Chief of Engineers on the State of Arizona “in the interest of flood damage reduction, environmental protection and restoration, and related purposes.” Although six specific reports are listed none are relevant to this study area, those include:

- House Document 331, 81st Congress. Gila River and Tributaries Below Gillespie Dam, Ariz.
- Senate Document 116, 87th Congress. Gila River and Tributaries in the Vicinity of Tucson, Arizona.
- Senate Document 127, 87th Congress. Gila River, Arizona, Camelback Reservoir
- House Document 625, 78th Congress. Bill Williams River and Tributaries, Arizona
- House Document 648, 78th Congress. Little Colorado River, Arizona and New Mexico.
- Senate Document 63, 88th Congress. Little Colorado River, Winslow, Arizona.

Other pertinent reports, however, are described below. Prior to the beginning of this feasibility study, many efforts had been conducted to identify, quantify, and seek funding to implement solutions to help alleviate flooding and improve environmental quality in the Salt River ecosystem. This chapter discusses these studies and reports that have been prepared on issues relating to the Salt River study area, and identifies existing projects and structures located within the area.

3.1 PRIOR STUDIES AND REPORTS

The Salt River has been extensively utilized for irrigation since prehistoric times. In the 1800s, settlers reestablished many historical irrigation canals. Since then, the Phoenix metropolitan area has established itself around the river. The Salt River has presented many opportunities and challenges, and has been studied extensively.

Various agencies and engineering consulting firms have conducted or published over 50 studies and reports on the Salt River since 1980. The topics of the reports or studies include water resources, flood control, recreation and urban development, and environmental assessment. A sample of the prior studies and reports is presented by topic below, and in effect provide a history of water resources studies in the area. The findings in these reports and the chronology of change within the Salt River corridor are important and essential in describing the changes over time and in outlining the importance of this project.

3.1.1 Water Resources Studies or Reports

The Maricopa Association of Governments (MAG) completed an overall conceptual plan for a Salt River redevelopment in 1974. The plan outlined water use and implementation recommendations and called for specific plans for two demonstration projects.

In 1978, the Corps of Engineers conducted a study that extended along the Salt River from the Gila River confluence to Granite Reef Dam. The study evaluated problems and alternative possibilities related to flood control, wastewater, floodwater conservation, and fish and wildlife recreation. The study focused especially on the 16-mile reach between 27th Avenue in Phoenix and Country Club Drive in Mesa.

In 1981, the Corps of Engineers investigated water and related land resources issues in the Phoenix Metropolitan area, including issues of water quality, flood control, water conservation, and fish and wildlife enhancement. At that time, none of the projects proposed by local agencies were found to warrant Federal interest, with the exception of flood control along the Salt and Gila Rivers.

The Rio Salado Development District was created in the late 1970s and early 1980s. Their function was to investigate and implement a regional redevelopment of the Salt River. Maricopa County voters defeated the resolution to create a tax authority for the District. However, the District did conduct several studies. A published memorandum in 1982 provides a basis for the determination of a source of water for the redevelopment project. The memo identifies potential sources, gives general background on these sources, and provides a preliminary analysis of each.

In 1982, Water Resources Associates, a private engineering consulting firm, conducted a study that evaluated the potential water sources and flood control options for a regional redevelopment of the Salt River. Sources for domestic water include obtaining Central Arizona Project (CAP) allotment, and obtaining water rights from surface and groundwater from lands within the district. The source identified for aesthetic and recreational water was poor-quality groundwater. Flood management plans were based on an existing condition scenario and on an upstream flood control design condition.

Carr, Lynch Associates, a private engineering consulting firm, also conducted a study in 1982, which evaluated the potential water sources and flood control options for a regional project within the Salt River. This study included discussion on the physical structure of the project and its surroundings, the social structure, the economic situation, and water supply and flood control.

In 1992, the Corps of Engineers completed the *Central Maricopa County Reconnaissance Study*. This study describes and analyzes flooding problems and water resource opportunities within the Phoenix metropolitan area to develop a wide range of alternatives that would reduce the severity of, or totally eliminate, these problems. Twenty-three flooding problems were identified within Central Maricopa County. Two areas determined to be of Federal interest were a flood control project on the Dysart Drain near Luke Air Force Base, and a water quality and environmental restoration project on the Salt River near 91st Avenue. That project (Tres Rios) was not recommended to proceed at that time.

In 1993, the U.S. Bureau of Reclamation (USBR) completed the Conceptual Design for the Tres Rios Demonstration Wetlands. The design was completed in cooperation with the City of Phoenix, Arizona Game and Fish Department (AGFD), Arizona Department of Environmental Quality, Maricopa County Parks and Recreation, FCDMC, and the U.S. Environmental Protection Agency (EPA). The study evaluates methods for reclaiming water from sewage effluent from the 91st Avenue Regional Wastewater Treatment Plant (WWTP) and develops plans for using the reclaimed water directly or through exchange mechanisms. The report presents a conceptual design for a constructed wetland demonstration project designed to improve the quality of treated effluent currently being discharged to the Salt River.

In 1994, Arizona State University completed a geomorphic assessment of the Salt River for the Corps. The assessment supports a reconnaissance-level geomorphologic evaluation of the Lower Salt River and a portion of the Gila River. The study discusses environmental history, hydrologic system, geomorphic system, and engineering features of the Salt River.

The City of Phoenix completed a report in 1994 that summarizes resulting problems and issues that are part of the setting of the present river as it passes through the city. The report includes resources and activities that will be the basis of the area's restoration.

In 1995, the Corps completed the reconnaissance phase of the Rio Salado, Salt River, Arizona Project. The report included an assessment of the problems and opportunities and an evaluation of alternatives for a 33-mile portion of the Salt River. A preliminary environmental assessment and a detailed habitat evaluation of the study reach were included.

In April 1998, the Corps completed the feasibility report and EIS for the Rio Salado, Salt River, Arizona Project. The report identified plans that would provide environmental restoration benefits and serve the public interest. The project is currently in the final phase of construction with anticipated completion in 2006/2007.

In April 2000, the Corps completed a feasibility report and EIS for the Tres Rios, Arizona Project. The study examined a portion of the Salt River and Gila River from 83rd Avenue downstream to the Agua Fria River, and selected a plan that includes environmental restoration and flood control components. The project is currently in the design phase.

3.1.2 Flood Control Studies or Reports

In 1981, the Corps prepared a document as a result of severe flooding along the Salt and Gila Rivers. The flood damage reduction measures presented include discussion on flood proofing, relocation, floodplain regulations, preparedness planning, channel excavation, and evaluation of hydraulic structures.

In 1989, Simons, Li & Associates, Inc., a private engineering consulting firm, prepared a report on the channelization of the Salt River through Tempe, Arizona. The study addresses issues related to channel design, determines appropriate hydraulic design criteria, and presents several alternative design concepts. The engineering analysis includes the evaluation of alternative river

sections, alignments, and profiles. In addition, the study identifies potential impacts due to the proposed changes.

The Corps of Engineers completed the Salt-Gila Reconnaissance Report in 1989. The study focuses on the flooding problems and associated solutions downstream from the confluence of the Verde and Salt Rivers to Gillispie Dam. It was determined that no analyzed solution was economically justified; therefore, the study did not proceed to the feasibility phase.

In 1994, the Corps completed a bank-stabilization study on the Salt River. The study focused on that portion of the Salt River located entirely within the Salt River Pima-Maricopa Indian Community, east of Scottsdale and within Maricopa County. Flood events in 1992 and 1993 caused erosion of landfill material into the Salt River. Several flood protection measures and alternatives were considered. The study concluded there was no Federal interest in participating in installation of bank stabilization at this location. With Federal Emergency Management Agency (FEMA) funding, the Salt River Pima-Maricopa Indian Community initiated construction of bank stabilization of two of the landfill sites, which were studied.

The FCDMC completed a land use and structures inventory in 1994. The inventory was published in a report that listed the various structures, utilities, and land use conditions along the Salt and Gila Rivers from Granite Reef Dam to Gillespie Dam.

In 1996, the Corps, in cooperation with the USBR, completed an analysis of various release plans for the operation of the modified Roosevelt Dam. As a result of this effort, new hydrology for the lower Salt and Gila Rivers was developed, which showed significant reductions in discharges downstream.

The FCDMC has teamed up with the Cities of Phoenix, Tolleson, and Avondale to prepare an area drainage master plan (ADMP) for the southwest valley area of Maricopa County. The Durango ADMP quantifies the extent of flooding problems and develops a solution. The plan addresses much of the land to the north of the project area and the potential for flooding problems due to interior drainage (<http://www.fcd.maricopa.gov/Projects/DurangoADMP/>).

The FCDMC has also completed the Laveen ADMP. The study area is in the southwestern portion of the metropolitan Phoenix area within Maricopa County, Arizona, and comprises 39

square miles in the city of Phoenix and unincorporated Maricopa County. The focus area for this portion of the ADMP is the 16 square miles west of 43rd Avenue. The entire area bounded by the Salt River on the north, 7th Avenue on the east, South Mountain Park on the south, and the Gila River Indian Community boundary on the west is the contributing area for the hydrology. The project has been completed and components of it are in planning and pre-design. (<http://www.laveenadmp.com/>)

3.1.3 Recreation and Urban Development Studies or Reports

In 1983, the Rio Salado Development District completed an economic analysis of the impacts that a redeveloped Salt River would have on the economy of metropolitan Phoenix. The study quantifies, on an annual basis, new public dollar revenues derived from increased property and sales tax revenues and income generated by a redevelopment project from the sale and/or lease of publicly owned land in the project area. Conclusions from this study indicated that over a fifty-year period, redevelopment of the Salt River corridor would provide \$7.6 billion in public revenues and \$2.4 billion in private benefits to the metropolitan region and the State of Arizona.

In 1985, Carr, Lynch Associates completed a master plan for a regional redevelopment of the Salt River corridor. The master plan involves a major reclamation of nearly 10,000 acres of land, including transformation of the present riverbed into a regional park, development of its banks, and cultural and educational uses. This master plan was never implemented.

In 1989, the City of Phoenix completed the South Village Redevelopment Plan. The plan established that redevelopment activities in this area of Phoenix must begin with rehabilitation and redevelopment of the Salt River as it passes through Phoenix.

In 1991, the City of Phoenix Planning Department completed an estimate of what the City would be like in the year 2015. The estimate included discussion of the future role of the Salt River.

In 1994, the City of Phoenix conducted an economic analysis that included a listing of development activities necessary to initiate and sustain economic development within the Salt River area of Phoenix. The analysis determined that the key to redevelopment outside of the river corridor was redevelopment of the river itself.

As required by State law, Maricopa County prepared a comprehensive plan “to conserve the natural resources of the County, to ensure efficient expenditure of public funds, and to promote the health, safety, convenience, and general welfare of the public” (Maricopa County, 1997). The plan provides a guide for decisions made by the planning and zoning commission and the board of supervisors concerning growth and development. The Salt River itself is identified as “Proposed Open Space” on the land use map. This designation recognizes that natural resources and open spaces are important to the quality of life in the county and, if acquired, are intended to be planned and managed to protect, maintain, and enhance their intrinsic value for recreational, aesthetic, and biological purposes.

The Rio Salado Beyond the Banks Area Plan was completed by the City of Phoenix and became effective December 17, 2003. The plan is a policy document for future investment in and revitalization of the area. The plan boundaries are Interstate 17/Interstate 10 (I-17/I-10) freeways on the north, Broadway Road on the south, 19th Avenue on the west, and 32nd Street on the east. The area is being revitalized to realize its full potential from its proximity to Rio Salado, Downtown Phoenix, Sky Harbor International Airport, other job centers, and regional transportation linkages. It connects to the restored Rio Salado as an attractive recreational and environmental amenity; provides an attractive mix of land uses abutting the Rio Salado; builds on existing neighborhoods, area history, and cultural identity; provides infill housing to support seven city employment centers; employs a growing and increasingly skilled workforce; and creates a vibrant place that attracts area residents and visitors to a wide variety of recreational, environmental, and commercial activities

The Estrella Planning Area land use plan (Maricopa County, 1992a) regulates planning and development activities within its jurisdiction of unincorporated Maricopa County. Within the study area, this includes the land uses extending north from and including the Salt River. There are also islands of land incorporated within the city throughout portions of the Estrella Planning Area. The Estrella Planning Area is currently very rural in character and is an island of farming activity surrounded by more urban-type development. The area along the north of the Salt River is occupied by agricultural, agribusiness, gravel mining, and vacant land uses, with isolated industrial and residential development.

3.1.4 Environmental Assessment Studies or Reports

In 1987, Dames & Moore, a private engineering consulting firm, completed an investigation of the waste sites within the Salt River bed. The study was performed for the Rio Salado Development District. The study area extended completely through the Phoenix metropolitan area. The study recommends a plan for the complete investigation and remediation of waste sites and provides an order-of-magnitude cost estimate for the implementation of the plan. Sixty-three landfills or dumpsites were identified. The projected costs for investigation and remediation of waste sites range from \$49,500,000 to \$90,800,000.

In 1994, as a part of the Rio Salado Reconnaissance Study, the Corps of Engineers completed an environmental evaluation. The evaluation presents a brief synthesis of present conditions, active and passive location of landfill sites, potential mitigation of upper aquifer contamination, preservation and/or reconstruction of ecological habitats, and potential opportunities for water resources recreation based on demand and economic feasibility. The study area covered 33 miles of the Salt River through the metropolitan Phoenix area. Included in the evaluation was a field reconnaissance conducted to determine the present habitat values of the vegetation within the Salt River. A total of 29 sites were assessed during the field study.

In 1998, the Corps of Engineers completed an EIS for the Rio Salado Environmental Restoration Project. The EIS and feasibility report were prepared for an ongoing project on the Salt River immediately upstream from the study area.

In 2000, the Corps of Engineers prepared an EIS for the Tres Rios Feasibility Study, another ongoing project on the Salt River. The EIS evaluated the effects of a proposed environmental restoration and flood control project immediately downstream on the Salt River.

In 1997, CH2MHILL prepared the “Salt-Gila River Baseline Ecological Characterization” for the City of Phoenix in their effort to implement a full-scale constructed treatment wetland system at the 91st Avenue WWTP. The characterization includes information for the Salt River area between 75th Avenue to the east and Buckeye Diversion Dam to the west.

The Laveen Planning Area land use plan (Maricopa County, 1992b) regulates planning and development activities for approximately 30 square miles of unincorporated Maricopa County south of the banks of the Salt River. The area is generally characterized by rural ranchettes, cultivated farmland, and dairy farms, with a small urban area within the city in the northeastern portion of the planning area. The area, along the south banks of the Salt River, is currently vacant, with a minor amount of developed land and agricultural land uses nearby. Currently, industrial development and a considerable number of auto-wrecking and salvage operations are located in the northeast quadrant closest to the City boundaries (primarily along Broadway) and have had an influence on development in the area. The properties in the area are zoned for Rural Residential, Industrial, and Special Use.

The City of Phoenix General Plan (City of Phoenix, 2001) regulates planning and development activities within incorporated areas of the city in the vicinity of the study area. Additionally, the General Plan considers areas currently outside the jurisdictional political boundaries (unincorporated county lands) for potential future annexation. Through goals, policies and recommendations, the General Plan provides a short- (within the next 10 years) and long-range (10 to 20 years) comprehensive direction for the growth, conservation, and redevelopment of all physical aspects of the city.

As part of the strategic growth concepts adopted by the City of Phoenix, the Estrella and Laveen areas are two of the major target growth areas identified in the General Plan, and are within the study area. The Rio Montana Plan (2000), prepared for the eastern portion of Laveen, identifies “encouraging development and redevelopment along the Rio Salado that will be compatible with the Rio Salado Habitat Restoration Project” as one of the major issues that is unique to the area. Additionally, the Estrella Plan (1999) identifies “encouraging development along the Rio Salado that will be compatible with the new residential character village” as one of the major issues that is unique within the area (City of Phoenix, 2001).

The City of Phoenix recently completed the Rio Salado Pathway feasibility study evaluating the linkage between 28th Street in Phoenix and Priest Drive in Tempe. The pathway is an accessible, shared-use path on the south bank of the river along the 4-mile stretch adjacent to Phoenix Sky Harbor Airport. The long-term vision is of an established linear park that would provide connectivity between various projects on the river corridor.

3.1.5 Studies/Projects Currently Underway

3.1.5.1 South Mountain Corridor Study

The Arizona Department of Transportation (ADOT) is currently conducting the South Mountain Corridor Study (<http://www.dot.state.az.us/ROADS/SouthMtn>). The South Mountain Freeway was included in the Regional Freeway System Plan that was approved by Maricopa County voters in 1985. The EIS will first consider whether there is a purpose and need for a project, and if so, will examine the potential social, economic, and environmental impacts of each reasonable alternative, along with ways to lessen those impacts. Currently, several alternatives have been advanced for further study. Several remaining alternatives include crossing the river and project area somewhere between 59th and 91st Avenues. It is assumed that there is potential for a future freeway to cross the project area at some point in the future but that crossing should not adversely affect the Rio Salado Oeste Project. Construction funding for the project is included in the Regional Transportation Plan for 2009-2015.

3.1.5.2 Va Shly'ay Akimel Salt River Feasibility Study

USACE is currently partnering with the Salt River Maricopa Indian Community and City of Mesa in a feasibility study upstream on the Salt River. The study area encompasses a 14-mile reach of the Salt River extending from immediately downstream of the Granite Reef Dam to the Pima Freeway State Route 101 (SR101). The study efforts are directed toward improving and increasing fish and wildlife habitat values and diversity for threatened and endangered species with potential incidental benefits associated with flood damage reduction, recreation, and water quality and supply. The feasibility study was completed in late 2004 and the Chief's Report was submitted in January 2005. A design agreement and plan are being developed and design on the project is expected to begin in 2006.

3.1.5.3 35th Avenue Bridge Improvements

The City of Phoenix has designed and is planning improvements to the 35th Avenue Bridge crossing the Salt River within the study area. The purpose is to improve the safety and operation of traffic along 35th Avenue between Broadway Road and Lower Buckeye Road and to provide an all-weather crossing over the Salt River. The existing 35th Avenue Bridge across the Salt

River was built in 1983 as an emergency repair project to replace a bridge that was washed out by flooding. It was built as a half-bridge and designed to accommodate the 35-year flow event, and was planned to be widened and lengthened in the future.

Currently a design for widening is in progress. The proposed work includes construction of a new 5-lane, 8-pier, 9-span precast concrete I-girder bridge with cast-in-place concrete deck slab to replace the existing two-lane bridge. The bridge will be constructed upstream of the current bridge, which will be demolished after traffic is rerouted onto the new bridge. Old fill material on the north and south sides of the river will be excavated and replaced by the new bridge abutments. Rock protection will be placed at the bridge abutments to protect the new bridge. Additional fill will be removed from the river bed to allow the new bridge to convey the 100-year discharge.

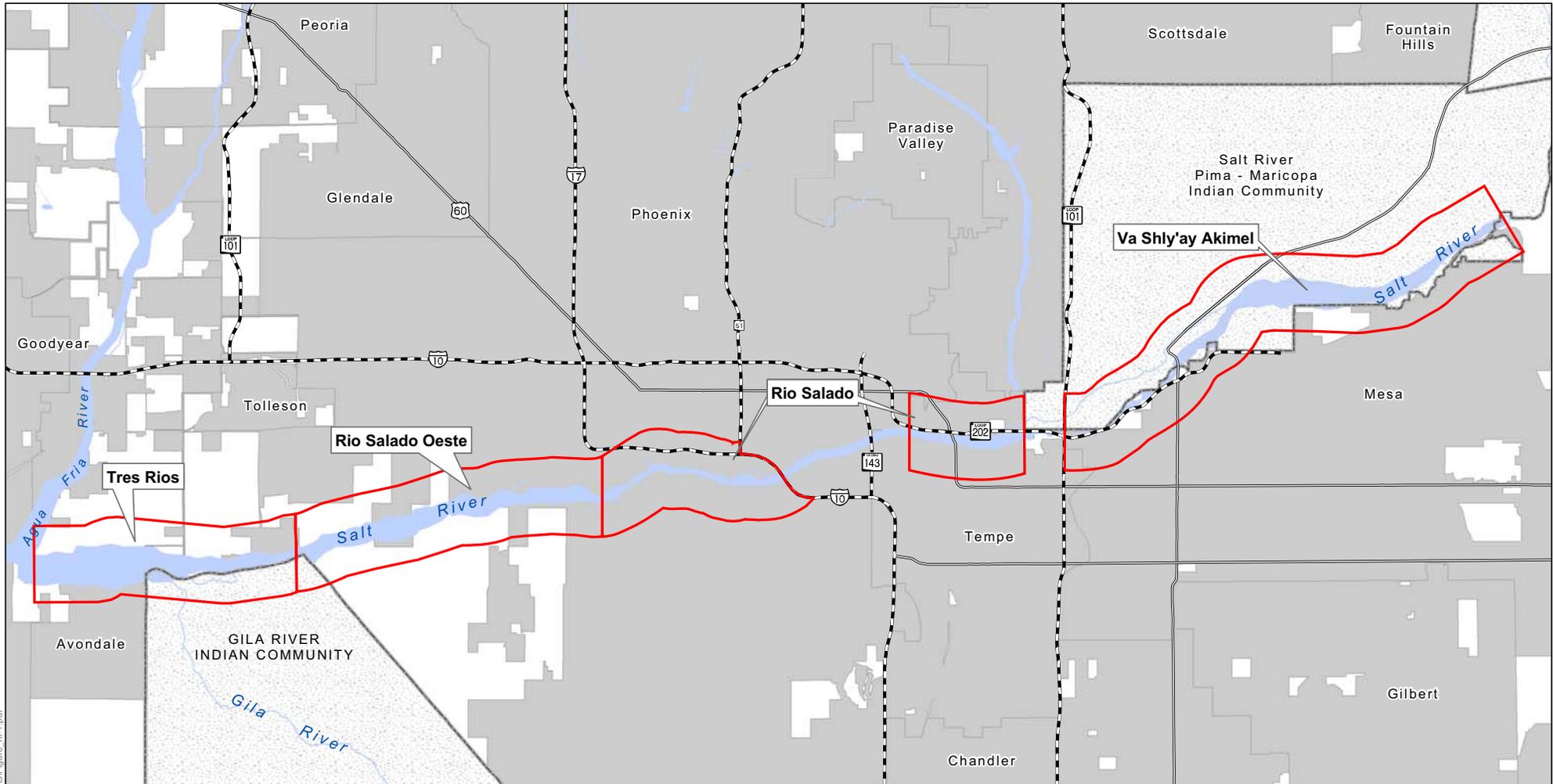
Modifications to this bridge have been considered as part of the future without- and future with-project conditions in planning for the Rio Salado Oeste Project. The new structure would likely be in place prior to construction of any proposal resulting from this feasibility study.

3.1.5.4 Rio Salado Marsh

The City of Phoenix purchased approximately 250 acres of riverbed between 35th and 51st Avenues and is developing a plan to allow the removal of overburden (river soils and aggregate) in a manner that allows aggregate to be removed while leaving a river cross section suitable for restoration. It is anticipated that conditions conducive to marsh land formation will occur as well as improvements to flood control. The assumed future condition of this reach will include removal of approximately 5.03 million tons of material and an active channel of varying width from 300 to 600 feet. The channel will match the elevation of the existing thalweg through the reach, and will be bordered by terraces approximately 500 feet in width. Effects of this on the water surface elevations will be discussed later in this report.

3.2 EXISTING AND ONGOING WATER PROJECTS

The following projects and structures are located within the Salt River watershed. Figure III-1 shows the location of the Rio Salado Oeste Project relative to these other projects.



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Legend

- US Army Corps of Engineer Projects
- Cities
- Indian Community
- Freeway
- US Highway

LOCATION OF OTHER CORPS PROJECTS

Rio Salado Oeste

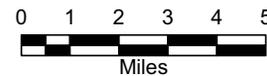


Figure III-1



**US Army Corps
of Engineers**

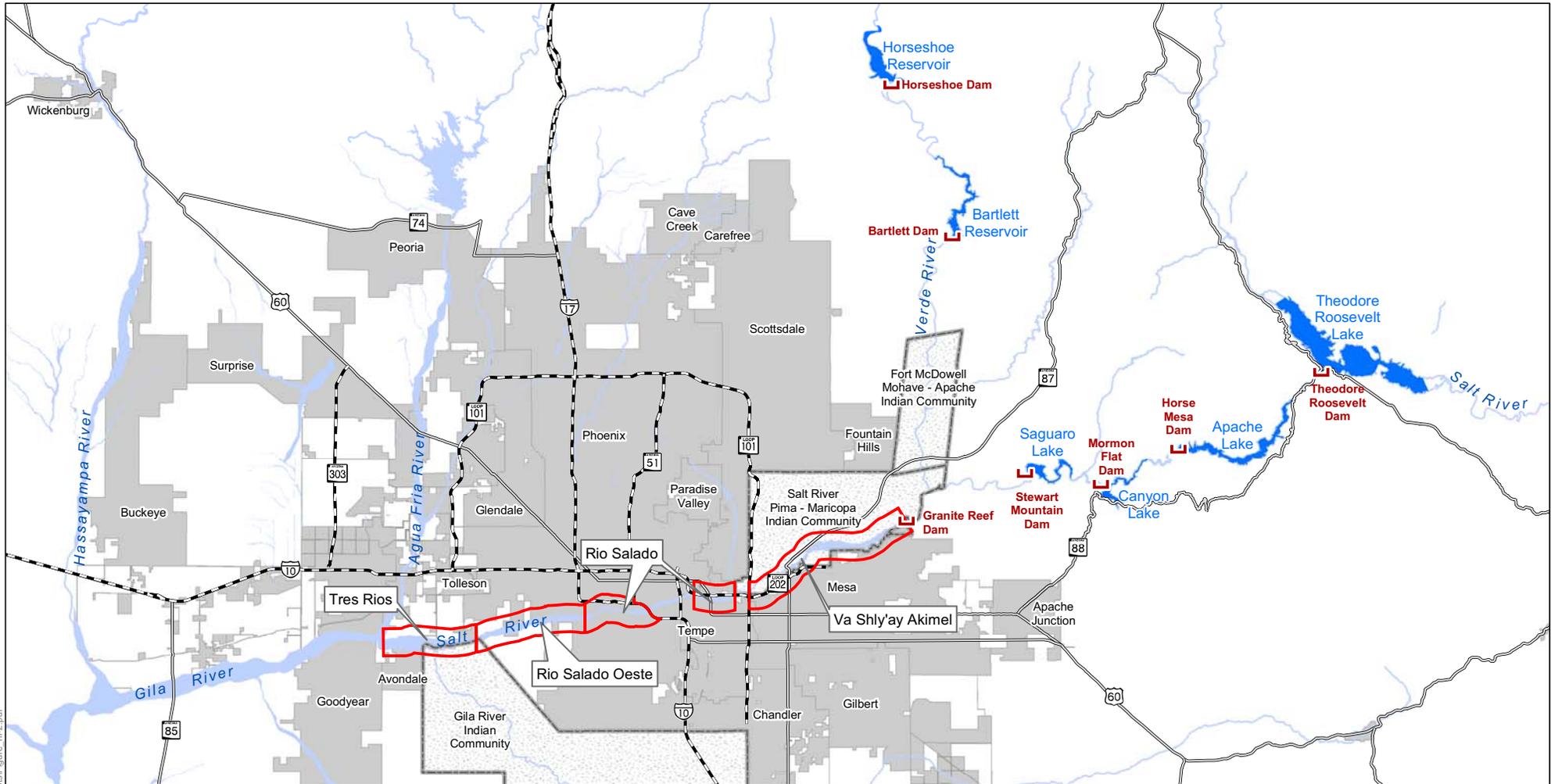
3.2.1 Salt River Project System

Flows in the Salt River are controlled by a series of upstream dams built by USBR and operated by the Salt River Project (SRP) (Figure III-2). The SRP system comprises six reservoirs and seven dams on the Salt and Verde Rivers. The dams include Roosevelt Dam, Horse Mesa Dam, Mormon Flat Dam, Stewart Mountain Dam, and Granite Reef Dam on the Salt River. On the Verde River, the dams are Horseshoe Dam and Bartlett Dam. The reservoirs receive runoff from a combined watershed of more than 12,600 square miles.

Roosevelt Dam is the oldest and largest in the SRP system. Congress originally authorized it in 1903 for water supply and power generation. The construction of the dam was completed in 1911. In 1978, Congress authorized the modification of Roosevelt Dam. The modifications were to include a new storage allocation for flood control. The modifications to the dam began in 1989 and were completed in 1996. The dam has been operated under a new Water Control Manual since 1997.

3.2.2 Tres Rios Demonstration Project

The Phoenix Metropolitan area is serviced by a regional WWTP located at 91st Avenue and the Salt River. The plant discharges approximately 154 million gallons per day (mgd) of effluent to the Salt River. The treatment plant is operated by the City of Phoenix on behalf of the Multi-City Sub-regional Operating Group (SROG). SROG represents a consortium of cities including Phoenix, Mesa, Glendale, Tempe, Scottsdale, and Youngtown. In 1992, USBR was authorized by Sections 1605 and 1608 of Public Law 102-575 to participate in the development of a demonstrations wetlands project at the 91st Avenue plant. In 1995, the SROG and the USBR built the Tres Rios Demonstration Project within the floodway of the Salt River below the 91st Avenue plant. The project provides final treatment of approximately 2 mgd of effluent within 10 acres of constructed wetlands. This project is immediately downstream of the Rio Oeste study area.



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Legend

- US Army Corps of Engineer Projects
- SRP System Dams
- SRP System Lakes/Reservoirs
- Other Rivers/Lakes
- Cities
- Indian Community
- Freeway
- US Highway

SALT RIVER PROJECT SYSTEM

Rio Salado Oeste

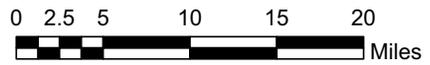


Figure III-2



3.2.3 Salt River Channelization

In 1996, ADOT and the FCDMC completed channelization of the Salt River from 48th Street to Price Road, a distance of approximately 7.5 miles. The channelization included soil cement and gabion bank protection with grade control and drop structures. The channelization is designed to convey floodwaters and eliminate erosion and channel migration. The design capacity is 250,000 cubic feet per second (cfs) with one foot of freeboard at Rural (Scottsdale) Road Bridge. The construction also included a construction of a defined confluence with Indian Bend Wash.

3.2.4 Tempe Town Lake

The City of Tempe, together with private developers, constructed Tempe Town Lake on the Salt River. The project includes two inflatable dams within the Salt River bed. The dams are located approximately 2 miles apart at the Center Parkway alignment and just upstream of the confluence with Indian Bend Wash. The lake contains approximately 3,500 acre-feet (ac-ft) of water. The project features also include an extensive seepage control system, which consists of multiple groundwater pumps. As the lake infiltrates into the riverbed, the pumps recover the water and place it back into the lake.

3.2.5 Rio Salado Project

Upstream of the Rio Salado Oeste Project on the Salt River is the Rio Salado Project. It is a Corps and City of Phoenix project currently under construction. The project area is broken into two reaches, Tempe and Phoenix. The Tempe reach includes a section of Indian Bend Wash and the confluence with the Salt River and restoration of approximately 150 acres of various habitat types. The Phoenix Reach extends from 28th Street west to the 19th Avenue Bridge, which is the upstream extend of the Rio Salado Oeste study area. The Phoenix reach includes restoration of approximately 550 acres. It includes construction of a low-flow channel in the river bottom, and establishment of open water, wetland marsh, cottonwood/willow, open edges, and mesquite habitat on the river bottom and over banks. The recreational elements associated with this project include trails, scenic overlooks, interpretive centers, gathering areas, parking, restrooms, and shade structures. At the time of writing this document most of the Phoenix reach is completed with the last phase of construction anticipated in 2006/2007.

3.2.6 Tres Rios Project

Immediately downstream of the study area is another Corps and City of Phoenix ecosystem restoration and flood damage reduction project. The project extends approximately 9 miles from the 91st Avenue WWTP to the confluence of the Gila and Agua Fria Rivers. This project is currently in design with the levee under construction.

The recommended plan is characterized by:

- A regulating wetland to even out diurnal variations in treatment-plant discharge
- Constructed wetlands arranged linearly along the north bank of the river
- A pipeline from the overbank wetland leading to riparian corridors west of El Mirage Road
- Open water/marsh areas within the channel west of El Mirage Road
- Distribution of dewatering well water from the treatment plant to large open water/marsh creation areas along the south side of the river
- Flood control levees

3.2.7 Laveen Area Drain Conveyance Corridor

The Laveen Area Drain Conveyance Corridor is part of the Laveen Area Drainage Master Plan and enters the project area at approximately 83rd Avenue. This is a joint project between the FCDMC, City of Phoenix, Maricopa County Department of Transportation, and SRP.

The project includes the design and construction of a conveyance channel capable of containing a 100-year flood event in the vicinity of the existing Maricopa Drain, which runs from 43rd Avenue to the Salt River for a length of approximately 5.8 miles. A flood detention basin at 43rd Avenue and Southern Avenue will mitigate peak flood flows getting to the conveyance channel. The peak discharge at the outfall of the channel for the 100-year storm event is estimated to be 2800 cfs.

Based on previous evaluations of flood hazards within this area, significant floodwater from large storm events ponds along the existing Maricopa Drain. This project will eliminate the potential flood hazard and reduce and/or eliminate potential flood damages. This project consists of channel excavation, road crossings, grade-control structures, tiling and filling in portions of the existing Maricopa Drain, and construction of an earthen low-flow channel. The channel and

basin will be grass-lined to reduce and/or eliminate erosion and sediment transport and to provide landscaping and aesthetics for multiple uses. The project is in construction and is expected to be completed in 2006.

3.2.8 43rd Avenue/Southern Avenue Basin

The 43rd Avenue and Southern Avenue Detention Basin was originally included as part of the South Phoenix Drainage Improvement Project. The detention basin has been designed by the FCDMC. The detention basin site has been acquired by the FCDMC, and is located at the southeast corner of 43rd Avenue and Southern Avenue. The basin includes an inlet structure, an inlet spillway, an outlet spillway, and an outlet structure, which will carry flood water to the existing 43rd Avenue storm drain, which outfalls to the Salt River. The basin was constructed as part of the Laveen Area Conveyance Channel Project. Construction was cost-shared between the FCDMC, City of Phoenix, and Maricopa County Department of Transportation.

The basin has 5:1 side slopes and is surfaced with grass for erosion control and aesthetic purposes. The City of Phoenix plans to use the basin as a park facility. The city will own, operate, and maintain the basin upon completion of construction. This project is scheduled to complete construction in the summer of 2006.

3.2.9 Durango Regional Conveyance Channel and 75th Avenue Storm Drain

The Durango Regional Conveyance Channel (DRCC) and 75th Avenue Storm Drain Project includes the construction of a storm drain along 75th Avenue from Interstate 10 to the Salt River, construction of a detention basin, construction of approximately 1 mile of channel, and construction of a first flush basin. The DRCC was identified in the Durango ADMP. The City of Phoenix and the FCDMC combined two projects, allowing downsizing of the DRCC project features. The City is the lead for design of the project. The City will be the lead for construction of the storm drain and the FCDMC will be the lead for construction of the DRCC. The storm drain is being designed to convey the 10-year flood, and the DRCC is being designed for the 100-year flood. The combined project will reduce flooding along 75th Avenue and in the area north of the railroad. The detention basin will also serve as a City park. Portions of this project are in construction with others scheduled to begin construction in the Spring of 2006.

