

## APPENDIX A RIVER MANAGEMENT UNIT DESCRIPTION

The Rio Grande Canalization Project was divided into seven distinct geographic reaches identified as river management units (RMUs). A summary of each RMU is presented below.

### *Upper Rincon RMU*

*Description-* The RMU is a 16.5-mile stretch of river located south of Percha Dam. This is the least populated segment of the river, with large tracts of ROW lands and adjacent BLM lands on the east and west sides of the river. Includes more than 2,830 acres inside the right of way (ROW).

*Structures* - There are no constructed levees north of the Doña Ana County line. A 7-mile long levee on the east side extends from Doña Ana County line south to the end of the RMU boundary. Armored (rip-rap) is present to varying degrees along the channel. Eight aquatic in-stream mitigation sites are present. Structures include the Arrey and Garfield bridges.

*Land Use* - The Upper Rincon above Doña Ana County line is currently managed by USIBWC as a no-mow zone. The RMU is bounded on the east and west sides by agricultural lands within upper portion. On the leveed portion (lower 9.5 mile area) the east side levee separates contiguous agricultural lands with the west side dominated extensively by BLM tracts. USIBWC uplands right of way is leased for grazing.

*Hydrology* -The highest flow rates of the Canalization Project are found below Percha Dam during water delivery periods. The RMU contains 7 tributaries; Trujillo Arroyo, Montoya Arroyo, Tierra Blanca Arroyo, Sibley Arroyo, Green Arroyo, Berrenda Creek, Jaralosa Arroyo, Cuervo Arroyo, and McLeod Draw.

*Erosion and Sedimentation* - Sedimentation occurs at the mouths of the arroyos. This tends to divert the river flow against the opposite bank, which is subject to erosion if not armored. Erosion may also occur on the same bank but downstream from the arroyo as the flow deflects back across the river.

*Vegetation* - Remnant riparian vegetation exists in pockets adjacent to arroyo confluence concentrated in the northern end of the RMU adjacent to Percha Dam State Park. Fringes of vegetation are established in many mowed areas providing bank stabilization.

*Channel Processes* - The riverbanks are generally elevated above the water surface by 5 to 10 feet. Significant sedimentation occurs in this reach due to contributions from large arroyo watersheds. This material has been periodically removed for water conveyance purposes. Sediment disposal outside of the ROW has historically been an issue due to the lack of available space.

*Corridor and ROW Dimension* - The width of the USIBWC ROW varies from 250 feet to about 1,250 feet until Jaralosa Arroyo where extensive uplands are included within the ROW. A second large upland tract is located within the Crow Canyon arroyo on the west side of the river.

*Potential* - The RMU includes old meanders within the ROW, which were cut off by canalization during construction. The large amount of area contained within the ROW's large floodway, while numerous arroyos provide potential for numerous site-specific restoration measures. Seasonal peak flows have a potential to inundate over 200 acres of floodway.

### ***Lower Rincon RMU***

*Description* – The RMU is a 18-mile stretch dominated by agricultural (primarily row crops) on either side of the river. The RMU is considered marginal for restoration due to potential levee deficiencies, water delivery structures and extensive amount of private lands. The RMU Includes more than 598 acres of potential enhancement sites inside the ROW and 256 acres outside the ROW.

*Structures* – Rincon Siphon, Hatch Siphon, and 31 miles of levees characterize the RMU. Five mitigation sites are present in the RMU. The RMU includes Salem, Hatch (US85 and NM26), Atchison, Topeka and Santa Fe Railroad, Hatch-Rincon (NM140 and HWY 154), and new Rincon Bridge.

*Land Use* – The entire RMU is mowed. Agriculture dominates the landscape with a few areas changing into the BLM tracts. Narrow bands of agriculture separate BLM tracks from the ROW along the unleveed lower west side. Angostura Arroyo provides some connectivity between uplands, arroyo habitat and the river corridor.

*Hydrology* – The RMU contains seven contributing arroyos: Placitas Arroyo, Spring Canyon, Ralph Arroyo, Rincon Arroyo, Angostura Arroyo, Reed Arroyo and Bignell Arroyo. Extensive flooding of agriculture lands is possible along the southerly unleveed west bank, unleveed west bank north of Rincon bridge, and in the east side of Garfield Drain.

*Erosion and Sedimentation* – The arroyos contribute extensive amounts of sediment into the river. Integrity of the siphons due to erosion is a major concern.

*Vegetation* - Remnant riparian vegetation exists on private lands adjacent to the ROW. The majority of the ROW is dominated by upland and riparian herbaceous communities. Mowing has suppressed the majority of salt cedar from dominating the entire area between the channel and levee. A diversity of vegetation can be found along the Angostura Arroyo, Reed Arroyo and Bignell Arroyo.

*Channel Processes* – There appears to be little modification in channel sinuosity since project construction. No bends or meanders appear to have been straightened during construction.

*Corridor Dimension* – The width of the ROW varies from about 300 feet to 800 feet. The ROW becomes significantly wider at the confluence of the Angostura Arroyo and extends from the corridor at Reed Arroyo and Bignell Arroyo.

*Potential* - The Lower Rincon has riparian and aquatic enhancement opportunities for improving the riparian corridor between the Upper Rincon and Seldon Canyon and connecting upland habitat with the riparian corridor. Seasonal peak flows potential to inundate over 300 acres of floodway.

### ***Seldon Canyon RMU***

*Description* - The Seldon Canyon RMU is a 9-mile section bounded by Seldon Canyon ending at Leasburg Dam State Park. The RMU is currently managed as a no-mow zone. The RMU is adjacent to southwestern willow flycatcher habitat on private property. The very limited ROW restricts options outside of the channel proper, and as a result, restoration options although listed as a potential goal are largely limited.

*Structures* – Tonuco bridge is the only listed structure.

*Land Use* – Extensive undeveloped lands (BLM, New Mexico State University and private) buttress the river corridor. Considerable topographic relief has restricted agriculture conversion of the area. The RMU is managed as a no-mow zone.

*Hydrology* – The RMU contains 3 major arroyos, Broad Canyon, Foster Canyon and Faulkner Canyon.

*Erosion and Sedimentation* – Sedimentation at Leasburg Dam has widened the river and created extensive islands even at high flows. The process of sediment accumulation followed by vegetation of islands is readily apparent north and west of Leasburg Dam.

*Vegetation* - Extensive and mature salt cedar woodlands are found along the Broad Canyon confluence with the river. The majority of non-uplands property is privately held.

*Channel Processes* - Increasing elevation changes through the canyon result in high flow rates. Increased flows in conjunction with channel blockage can present potential flood management problems north of the canyon.

*Corridor Dimension* – The river corridor ranges between 300 feet and 1500 feet in width. The riparian zone is clearly visible in aerial photographs by the sharp contrast between salt cedar dominated communities and upland shrub scrub areas.

*Potential* - The USIBWC has a limited ROW within the canyon; extensive private lands are adjacent to the river. There is possible habitat for southwestern willow flycatcher located adjacent to the floodway.

### ***Upper Mesilla RMU***

*Description* - The Upper Mesilla RMU is a 12-mile stretch extending from Leasburg Dam State Park to the outskirts of Las Cruces at Shalem Colony Bridge. Levees on the east side and extensive BLM holdings on the west define the RMU. Sites include a total of 214 acres within the ROW and 56 acres of potential acquisitions.

*Structures* – The east side of the river has over 9-miles of maintained levees. Structures include Leasburg Bridge.

*Land Use* – The entire east side of the river is in agriculture. Extensive pecan orchards dominate the agricultural areas.

*Hydrology* – Other than upstream water flows, the RMU is influenced by Apache Canyon and two spillways (identified as WW 2 and WW 2A).

*Erosion and Sedimentation* – Water velocities are less than in the northern RMU, having been reduced through attenuation and water diversions at Leasburg Dam. The RMU begins a significant departure from previous RMUs which contain numerous arroyos contributing sediment.

*Vegetation* - The majority of the east ROW is dominated by upland and riparian herbaceous communities. Mowing has suppressed the majority of salt cedar from dominating the entire area between the channel and levee. Vegetation on the west side ROW has been grazed and appears to be partially mowed along the level flood plain. Several large dense salt cedar bosques are found on the west side with mature and declining cottonwoods found within the bosques. There is little indication of cottonwood re-growth. Pole plantings have been attempted on the east side near spillway WW 2A and across the river from a channel cut site.

*Channel Processes* - The major modification of channel sinuosity is a 0.8 mile meander straightened during project construction.

*Corridor Dimension* - The river corridor ranges between 800 feet and 1500 feet in width.

*Potential* – The most significant attribute of the RMU is the uninterrupted connectivity between BLM lands and the west side of the river corridor. In addition, hydraulic analyses (HEC-RAS modeling) showed no potential deficiencies in the east side levees. This provides restoration opportunities for a previous channel cut (0.8 miles in length) on the west side. In addition, modifying grazing practices along with salt cedar control on the west side could improve wildlife habitat and terrestrial/riverine ecotone. Interagency agreements concerning grazing along the west side would be required. West side ROW provides a unique opportunity to improve the river corridor and uplands connectivity by altering to a large extent grazing and mowing. The west side of the river contains several remnant bosques, mostly dominated by salt cedar but with occasional mature cottonwoods and cottonwood snags.

### ***Las Cruces RMU***

*Description*- Urbanization and heightened need for flood control are the major issues. The RMU begins at Shalem Colony Bridge and extends south for 15 miles to Mesilla Dam. The Las Cruces RMU includes both developed and agricultural lands.

*Structures* – Over 18 miles of levees bound the east and west sides of the river. Bridges include Shalem, Picacho (U.S. 70, 80 and 180), and IH 10.

*Land Use* – Land use is composed of an urbanized/agricultural matrix. The levees are used as recreational areas (e.g. access and parking for fishing jogging, nature walks, etc). The upper 5 miles of the RMU are managed as a no-mow zone.

*Hydrology* – Box Canyon is the primary arroyo entering the river. Spillways WW 4, WW 6 and WW 10 provide some opportunities for enhancement.

*Vegetation* – The majority of the ROW is dominated by upland and riparian herbaceous communities. Mowing has suppressed the majority of salt cedar from dominating the entire area between the channel and levee.

*Channel Processes* – A 0.6-mile meander was straightened on the east side north of WW 39.

*Corridor Dimension* - The river corridor ranges between 700 feet and 1100 feet in width.

*Potential* - Las Cruces RMU provides significant opportunities for managing in a multiple-use manner. Despite urbanization constraints, considerable improvements in the form of recreation areas and selective habitat are possible. Local agency cooperation is required to fully realize potential. Emphasis is on enhancing and creating habitat associated with spillways and connecting sites within the current no-mow zone. Further mowing reduction and green zone management should include salt cedar control.

### ***Lower Mesilla RMU***

*Description* – The Lower Mesilla Valley begins at Mesilla Dam and extends south 19 miles to New Anthony Road. The Lower Mesilla RMU is dominated by agriculture on both sides of the river. The northern portion of the RMU is characterized by extensive pecan orchards and the southern portions are primarily cropped.

*Structures* – Levees bound both sides of the RMU with the exception of a 2-mile stretch located on the west side of the river, north of Mesilla Dam. Bridges include Mesilla, Santo Tomas (NM 28), Mesquite (NM 228), Vado, Berino and Old Anthony Bridge.

*Land Use* – Evidence of overgrazing was observed in several locations within the floodway. A golf course (Anthony Country Club) is located in the floodway. Mowing occurs up to the river bank in several locations.

*Hydrology* – Several spillways feed into the river (WW 104 through WW 115). The water level during irrigation flow is at times less than 1 foot below the incised bank. This is in contrast to water levels in many parts of the northern project area where water levels were observed to be several feet below the bank even at high flows.

*Vegetation* - The majority of the ROW is dominated by upland and riparian herbaceous communities. Mowing has suppressed the majority of salt cedar from dominating the entire area between the channel and levee.

*Channel Processes* - Seven old channels cut off by the canalization are located mostly outside the ROW.

*Corridor Dimension* – The corridor is virtually uniform in width, averaging 650 feet. There is remarkably little variability throughout the RMU in overall dimensions.

*Potential* - With the exception of a NMGF site, opportunities are restricted. Due to private landowner involvement and adjacent state property, the NMGF site presents an opportunity for restoration of bosque and wetlands.

### ***El Paso RMU***

*Description* – The RMU begins at New Anthony Road and extends south 20 miles to American Dam. Urbanization and flood control problems are the major issue.

*Structures* – Levees bound both sides of the river with the exception of a 4.5 mile length on the west side of the river beginning at Anapra Bridge progressing northward. Flood protection is afforded by natural relief along this section.

*Land Use* – Land use is primarily urbanized with a mix of agricultural in the northern section of the RMU. As in the Las Cruces RMU, many of the areas are used as recreational areas. Several bridges in the RMU include, New Anthony, Vinton, Canutillo, Borderland, Artcraft, County Club, Anapra, and Brick Plant.

*Hydrology* – Several spillways (WW 116 through WW 128) provide some opportunities for enhancement.

*Vegetation* - The majority of the ROW is dominated by upland and riparian herbaceous communities. Mowing has suppressed the majority of salt cedar from dominating the entire area between the channel and levee

*Channel Processes* - Some of the most extensive changes to the river have occurred in the El Paso area. The Vinton cutoff, completed several decades before the Canalization Project, significantly straightened the river. The old meander, approximately 3.5 miles in length, is mostly situated on Public Utilities Board land.

*Corridor Dimension* – The channel is similar in dimension to that of the Lower Mesilla Valley rarely exceeding 800 feet in width.

*Potential* - El Paso provides significant opportunities for multiple management. Overriding flood control concerns limit actions which could aggravate flooding. Urbanization adjacent to levees reduce future flood control options to raising levees rather than using levee setbacks. Despite urbanization constraints, considerable improvements in the form of recreation areas are possible. Local agency cooperation is required to fully realize potential. Selective mowing over the years has allowed limited natural regeneration of cottonwood stands.