Rio Grande in the Los Lunas Habitat Restoration Area
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By: Tamara Massong and Dwight Slaugh
River Analysis Team, Bureau of Reclamation, Albuquerque, NM
tmassong@uc.usbr.gov

Historic Channel Conditions

The Rio Grande through the Los Lunas Area has usually been described as a moderately wide channel, with a sand-bed that is low-flow braided. Historic maps and photos (digitized by Jan Oliver, USBR, Denver Office) show that the channel width prior to 1935 ranged between 700 ft and 1,500 ft with an average near 1,000 ft. Although the channel's width was decreasing between 1935 and 1962, channelization between 1962 and 1972 narrowed the channel to a relatively uniform 550 ft (Figure 1). Along with the channel modifications/re-alignments, Kellner jetty jacks were installed along the perimeters of the modified channel (Chapman et al., 1952), essentially locking the channel banks in place; the active channel width has not changed significantly since the 1970's. Although significant maintenances affected the active channel, the bed material remained sand and the channel pattern was still low-flow braided into the 1990's.

With the building of numerous upstream sediment retention structures on the Rio Grande and it tributaries, the supply of sand sized sediment has been reduced drastically. Prior to 1977, the average concentration of suspended sediment, as measured at the USGS Rio Grande gage at Bernardo, was approximately 2,700 mg/l. Since 1977, the average concentration is only about 27% of historic levels (~700 mg/l). Historic cross section data (USBR aggradational-degradation photo interpreted cross section data) dating to 1962 indicates that this reach aggraded between 1962 and 1972, and then degraded between 1972 and 1992 (Massong et al., 2002, Figure 2).

Data from the USGS Rio Grande gage at Bernardo indicates that peak flows have decreased over time, but that volume has increased. Gage data indicate that the last large peak flow occurred in 1958 at over 11,000 cfs while the largest flow recorded was over 19,000 cfs in 1942 (Richard et al., 2001). Opposite to the peak discharge trends, the volume of water has increased since the 1970's (Massong et al., in prep.) according to the USGS gage data.

Current Channel Conditions

The channel's appearance/planform has changed rapidly in the1990's with the emergence of vegetated islands, however, the sediment size on the channel bed and the channel bank locations appear to be relatively stable. Figure 3, an aerial photo taken in June 2002 shows both vegetation removal work at the Los Lunas Habitat Restoration site and numerous islands in the main channel adjacent to the restoration site. The growth of these islands is likely due to the abnormally low flows of the last few years. Among the vegetation are tree species such as Russian olive, saltcedar, willow and cottonwood, indicating that these islands may persist through higher flows. With a continued low flow regime, the islands will likely become more stable and persistent. Due to these islands splitting the flow, the planform appears to have changed from braided to anastamosing at moderate to low flows. The size of sediment on the channel bed is still sand, although, the size has actually increasing slightly (Mussetter and Harvey, in prep.). Current field observations indicate that bank erosion in this reach is minimal indicating that the bank locations are still stable.

Los Lunas Restoration

In response to the Final Programmatic Biological Assessment for the Bureau of Reclamation and Corps of Engineers, submitted in June 2001, US Fish and Wildlife Service issued a Biological Opinion which required both agencies to perform restoration activities on the Middle Rio Grande. The site selected at Los Lunas is the first of these projects, and is a joint

project between Bureau of Reclamation and the Corps of Engineers. Corps of Engineers is responsible for: 1) the environmental assessments and permitting, 2) jetty jack removal in the designated project area, and 3) fill stabilization through re-vegetation of the lowered floodplain. The Bureau of Reclamation is responsible for: 1) collection of baseline hydrographic data, 2) removing the existing riparian vegetation, both dead and live vegetation, 3) planning, engineering, and executing the mechanical lowering of the existing floodplain, 4) building a riverside berm, 5) re-enforcing the existing levee with the excavation spoils, and 5) creation of several small wetlands between the lowered floodplain and the existing levee. Other participants are MRGCD (helping remove downed timber), and US Forest Service-Rocky Mountain Research Station (monitoring).

The Los Lunas project area is located at approximately river mile 157, on the west side of the river, and covers approximately 40 acres between the current channel bank and the west-side levee. The project is entirely contained within a burned area of the bosque; the fire occurred in the spring of 2000. The overall goal of the project, as presented in the Final Environmental Assessment (2002) is "to produce inundation of the project area at flows of greater than or equal to 2,500 cfs. For flows below 2,500 cfs, a variety of substrate elevations would be incorporated into the project design, which would allow for the inundation, to a lesser degree, of certain regions within the project area."

Steps for the Restoration project:

1. Preliminary survey work-baseline data collection
2. Jetty jack removal
3. Riparian vegetation removal
4. Overbank excavation/lowering
5. Berm construction
6. Levee re-enforcement
7. Fill stabilization and riparian improvements
8. Monitoring

References:

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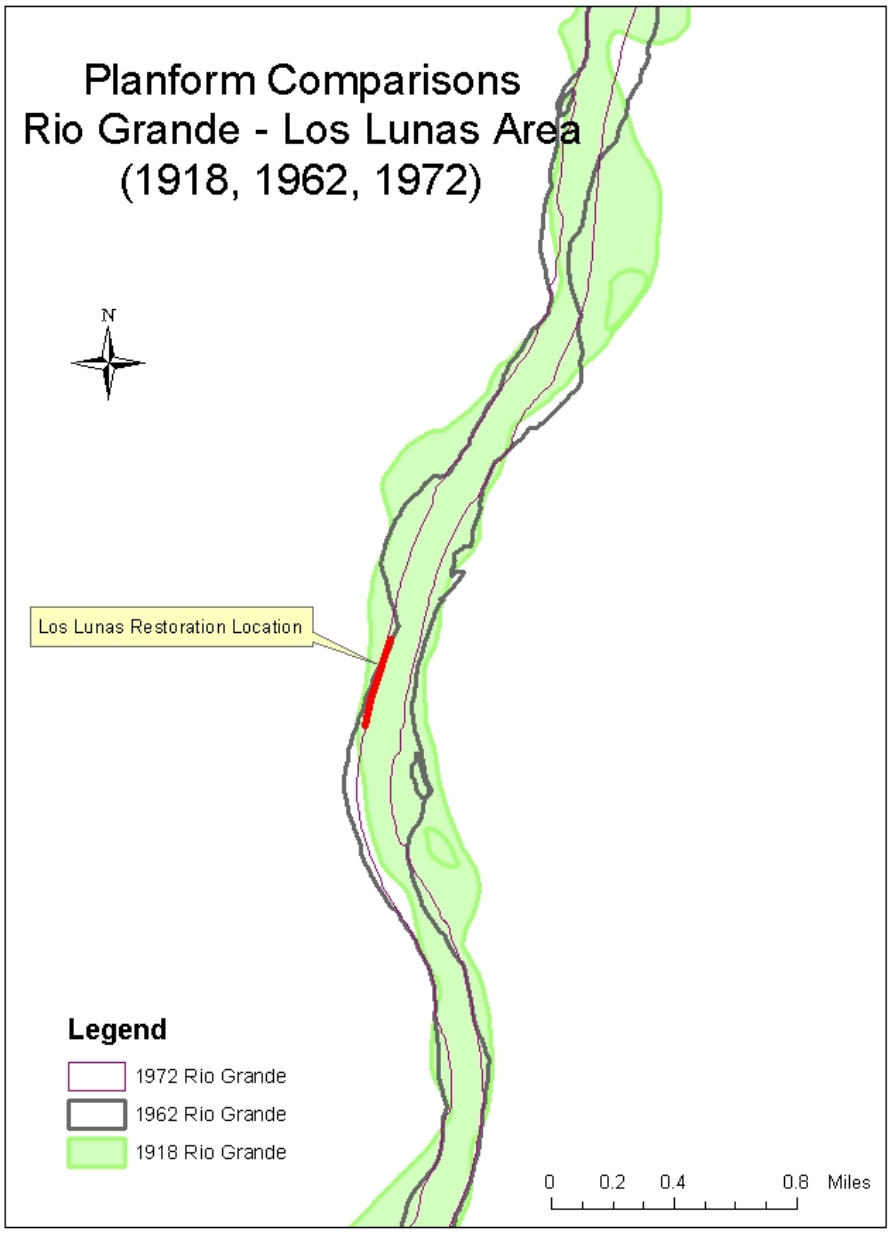

Figure 1: Historic non-vegetated channel boundaries for 1918, 1962 and 1972.

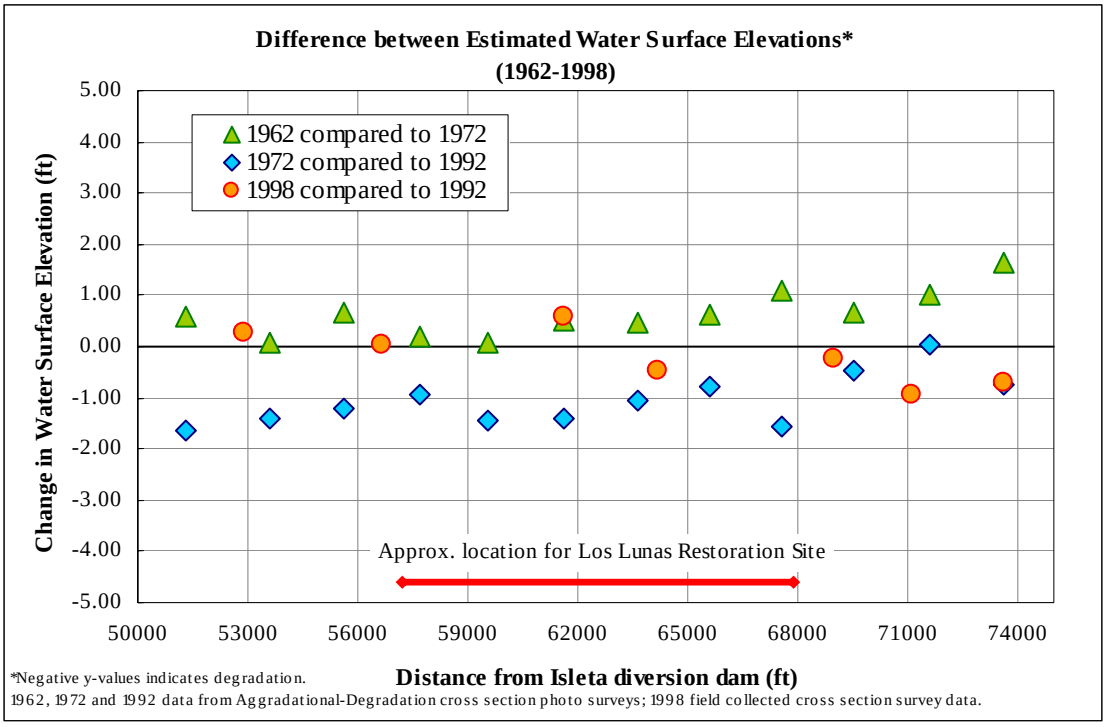

Figure 2: Aggradation and degradation trends for the Rio Grande near the USBR/USACE Los Lunas Restoration Site. Figure reproduced in part from Massong et al., 2002.

Figure 3: Aerial photograph of the Los Lunas Restoration Site and the adjoining Rio Grande, June 2002.