Attachment F

Hydrologic Data

Attachment F to the ALP Project Final Supplemental Environmental Impact Statement (FSEIS) includes plots of flow at key locations in the ALP Project system as well as other supporting materials related to Section 3.2, Hydrology and Water Resources, of the FSEIS.

Attachment F
Typical San Juan River Basin Hydrographs

The Department of the Interior (Interior), through the Bureau of Reclamation (Reclamation), and in cooperation with the United States Environmental Protection Agency (EPA) and the Ute Mountain Ute Tribe and the Southern Ute Indian Tribe (Colorado Ute Tribes), has prepared a Final Supplemental Environmental Impact Statement (FSEIS) for the Animas-La Plata Project (ALP Project). This attachment describes hydrologic data associated with the project. %

The following graphs depict typical wet, average, and dry year conditions for the Animas River at Durango and Farmington, the La Plata River at Farmington, and the San Juan River at Four Corners, comparing the flows resulting from implementation of the Preferred Alternative (Refined Alternative 4) to the future condition without project development. The graphs were developed from model simulations of the system for the two conditions. In each case, two years were chosen to represent each of the conditions. The two dry years were selected from the lowest 10 percent of the years, the average years from the middle 10 percent (near median condition) and the wet years from the wettest 10 percent. %

The La Plata River graphs demonstrate the effect of the model more markedly than the other plots. The stepped nature of the flow, especially in dry years, is a result of the monthly basis of the model. The flows were computed in monthly time steps in the model and then converted to daily values through post-processing, using the historical flow pattern. In the case of the La Plata River, the flows were so heavily depleted that the stepped nature of the monthly demands heavily influences the conversion to daily values. %

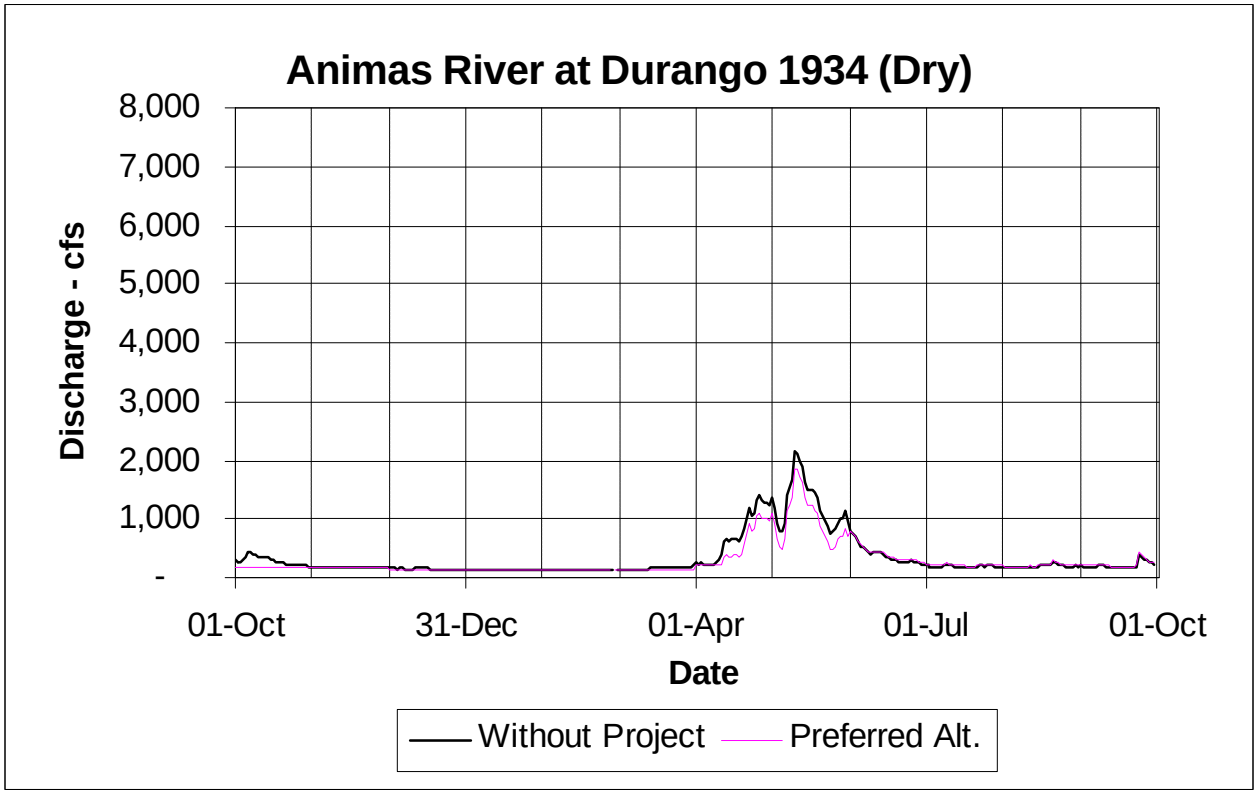
The Animas River projected flows at Farmington are shown compared to the historic flows as well. While the flows for the future condition without project are somewhat reduced from the historic condition, the change is rather small for the Animas River. It is difficult to see the difference on these daily time step graphs.

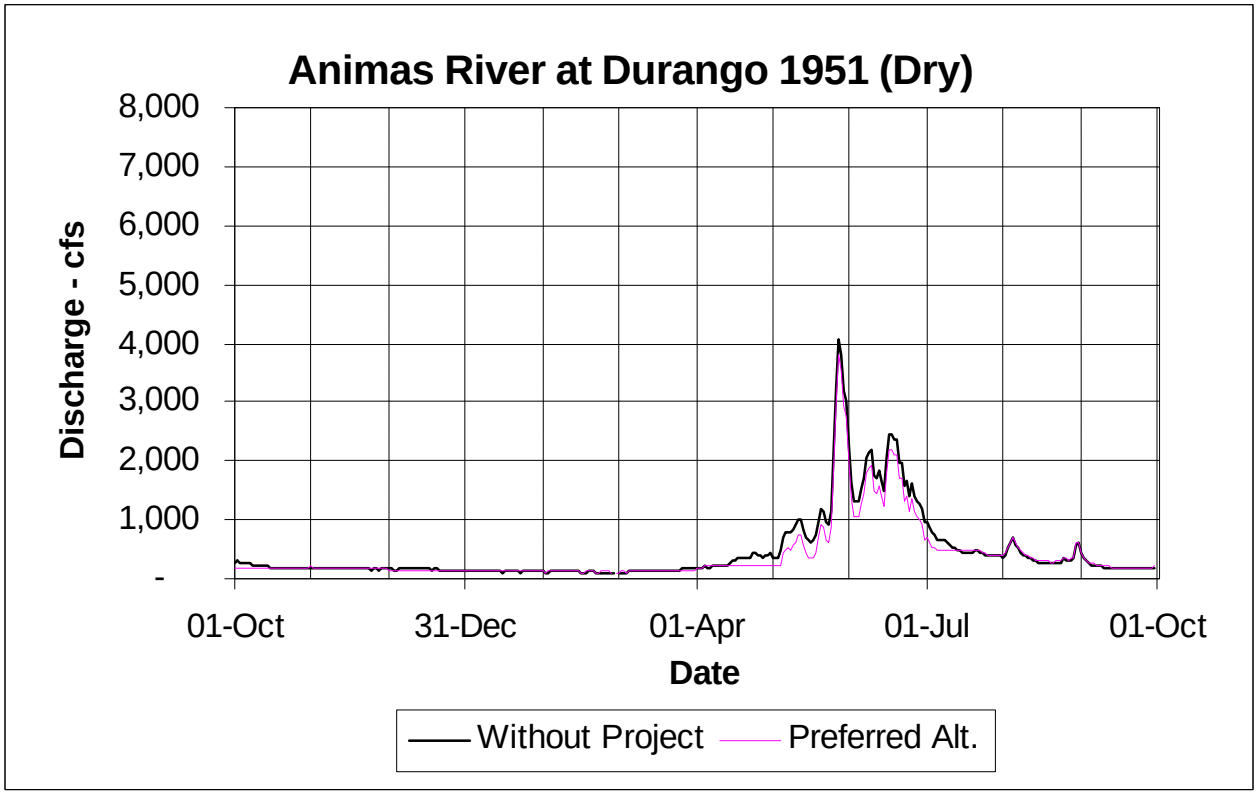
Plots of projected flows for the Preferred Alternative against the historical condition for the San Juan River are also shown for typical pre-dam and post-dam conditions. The large differences between the historical flows and the future without project flows result from operation of Navajo Dam to meet flow recommendations for endangered fish. This operating scenario is applicable to the future without project as well as the Preferred Alternative.

Also shown are the end-of-month contents for Ridges Basin Reservoir for the modeled period of 1929 to 1993. The output shows the impact of controlling pumping to Ridges Basin Reservoir to meet flow recommendations for endangered fish. The years of greatest drawdown in the reservoir result from turning off the pumps in June of selected years to allow increases in flow downstream in the San Juan River needed to meet endangered fish flow recommendations. %

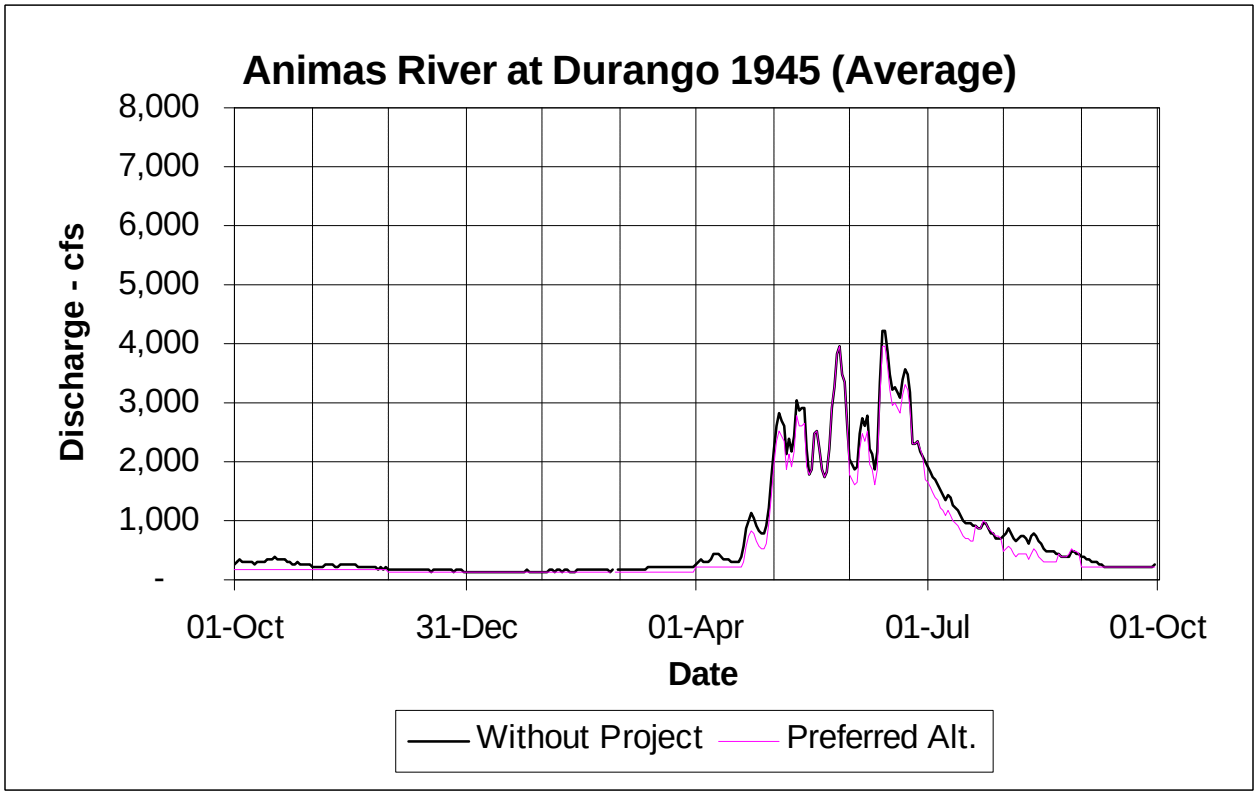
The final set of graphs show the Navajo Reservoir end-of-month content for future conditions without the project compared to the Preferred Alternative.

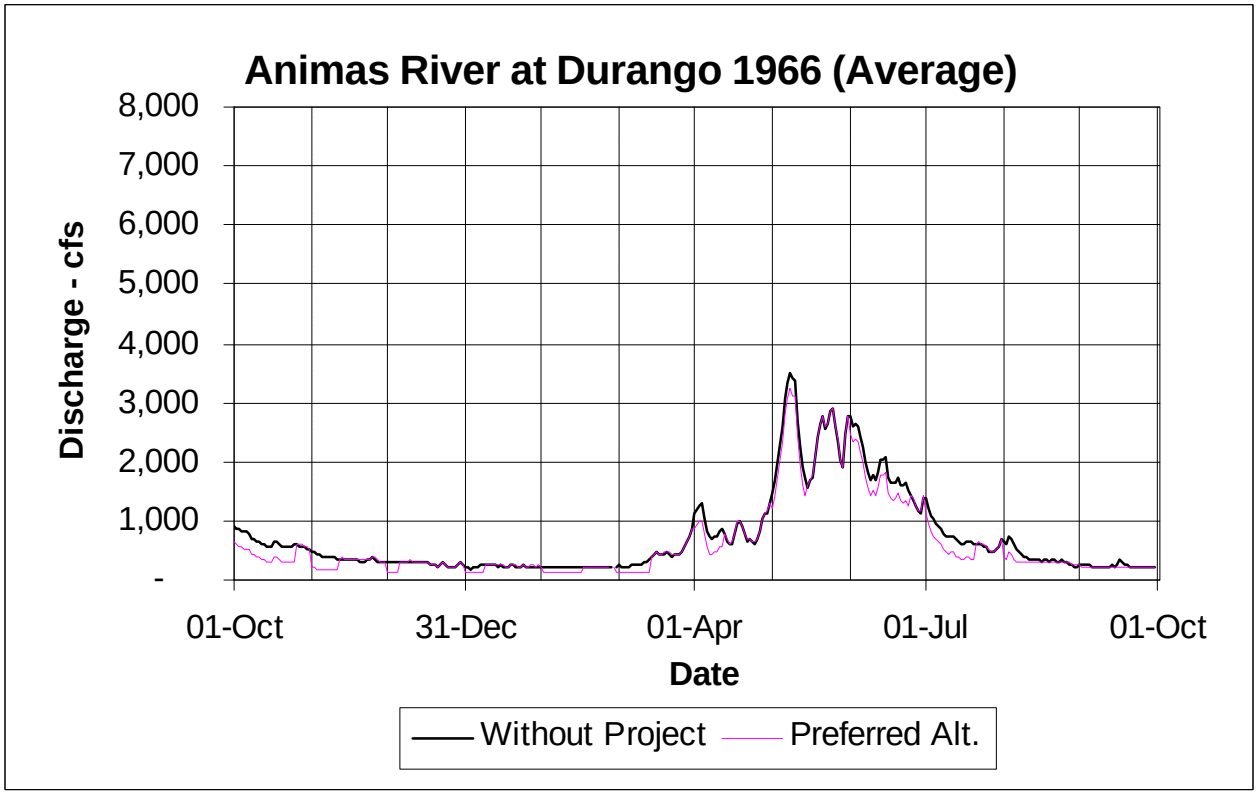
Animas River at Durango Comparing the Preferred Alternative to the Future Without Project
Typical Dry Years



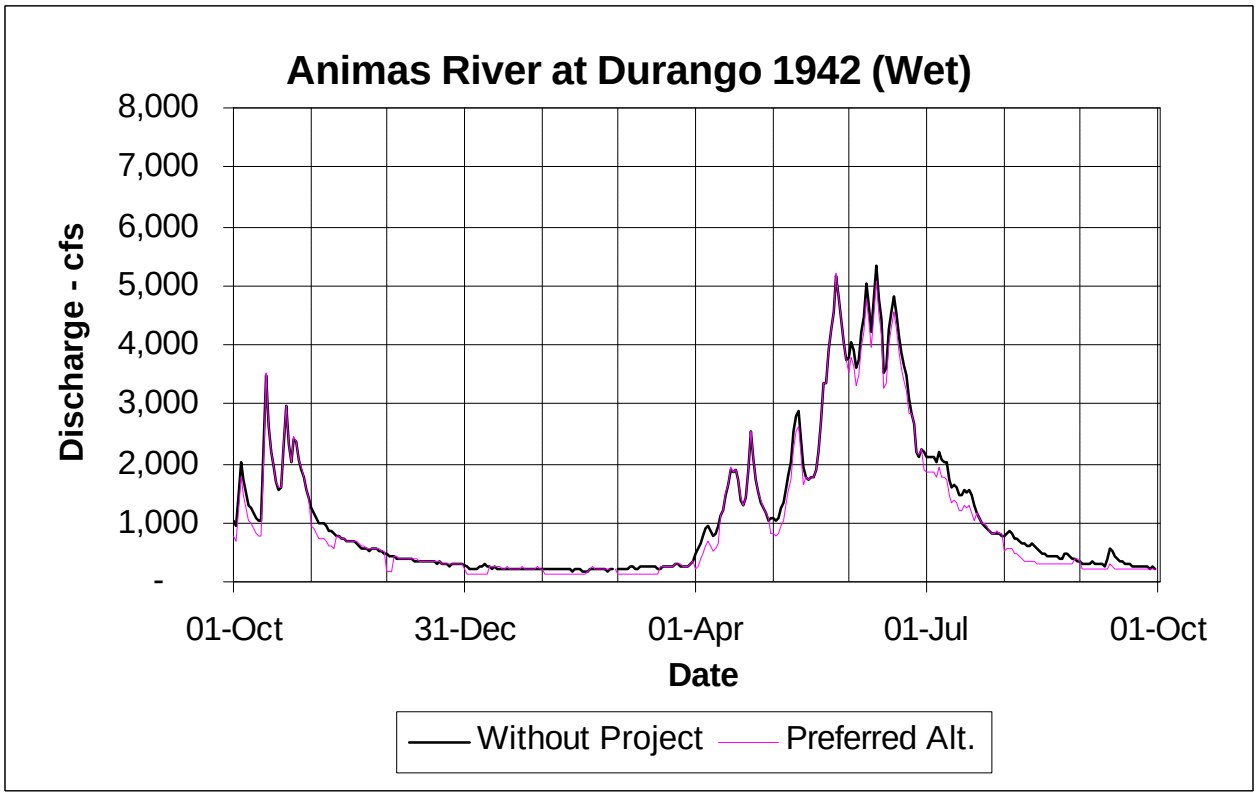


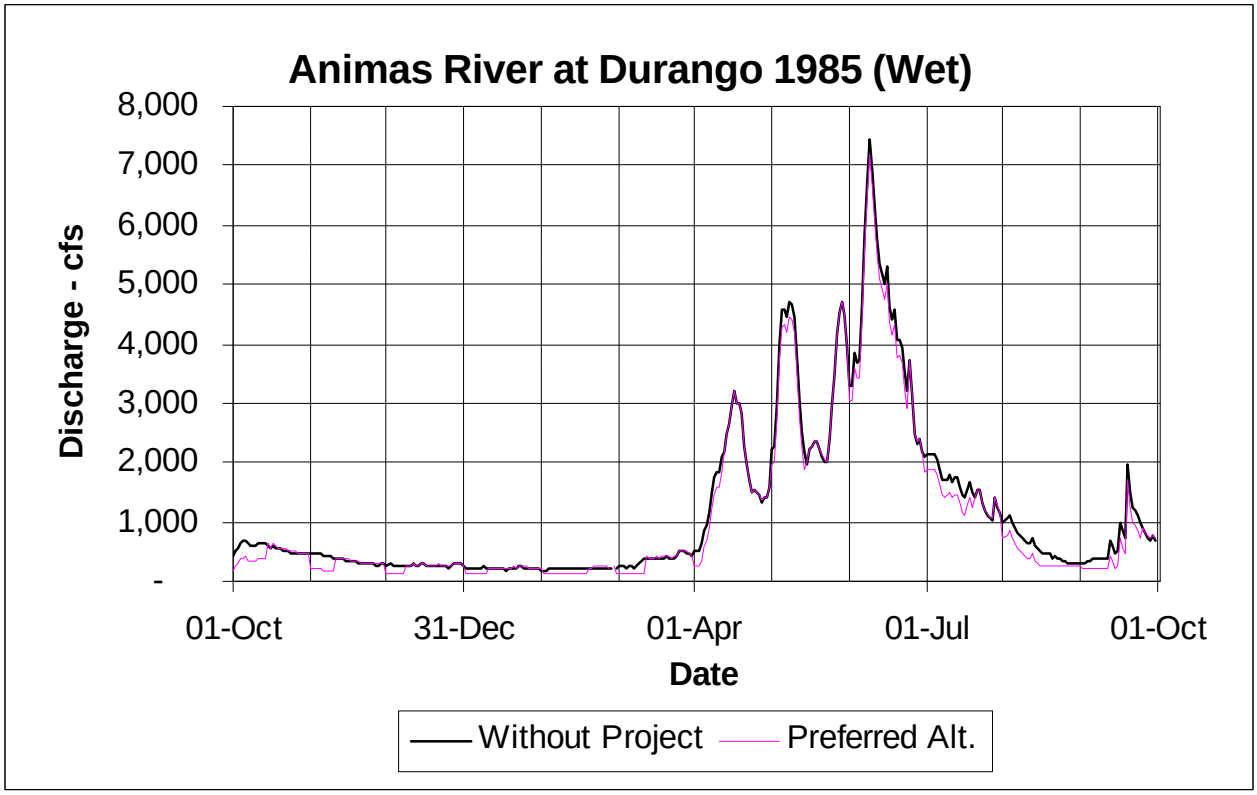
Animas River at Durango Comparing the Preferred Alternative to the Future Without Project
Typical Average Years



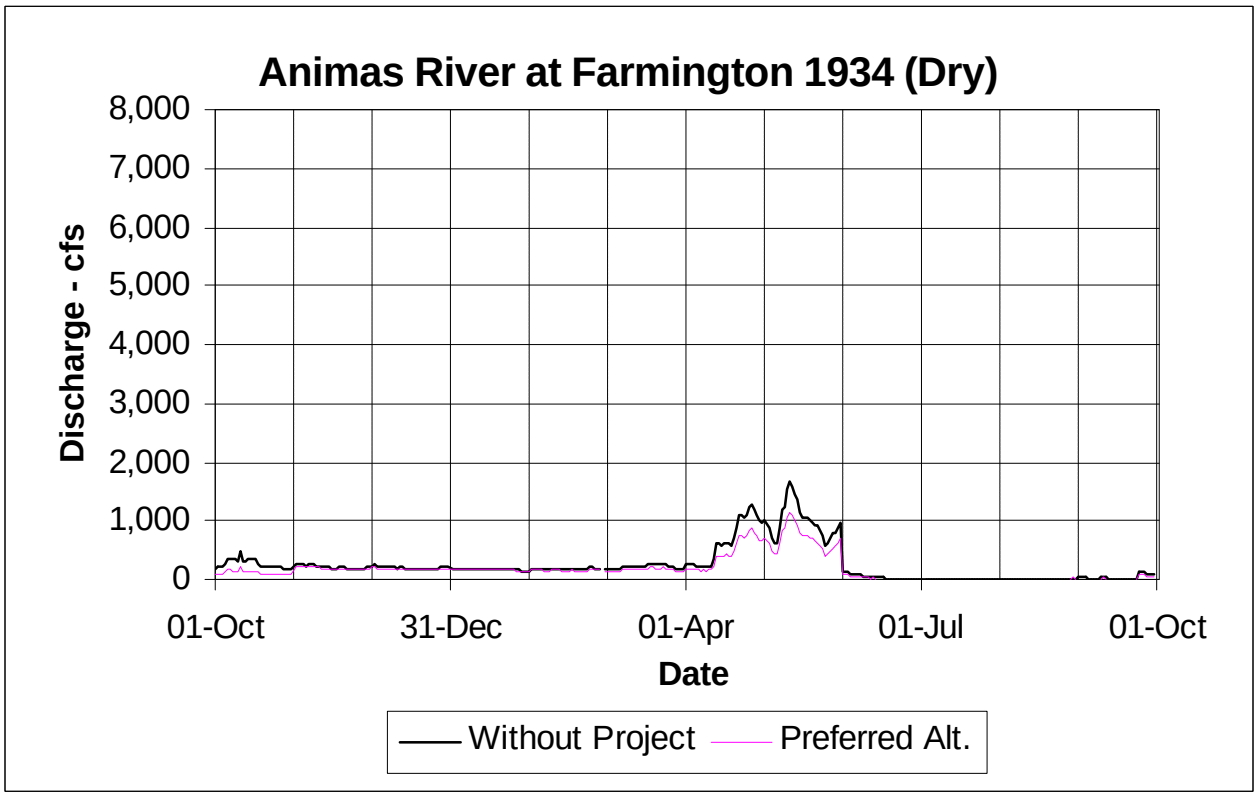


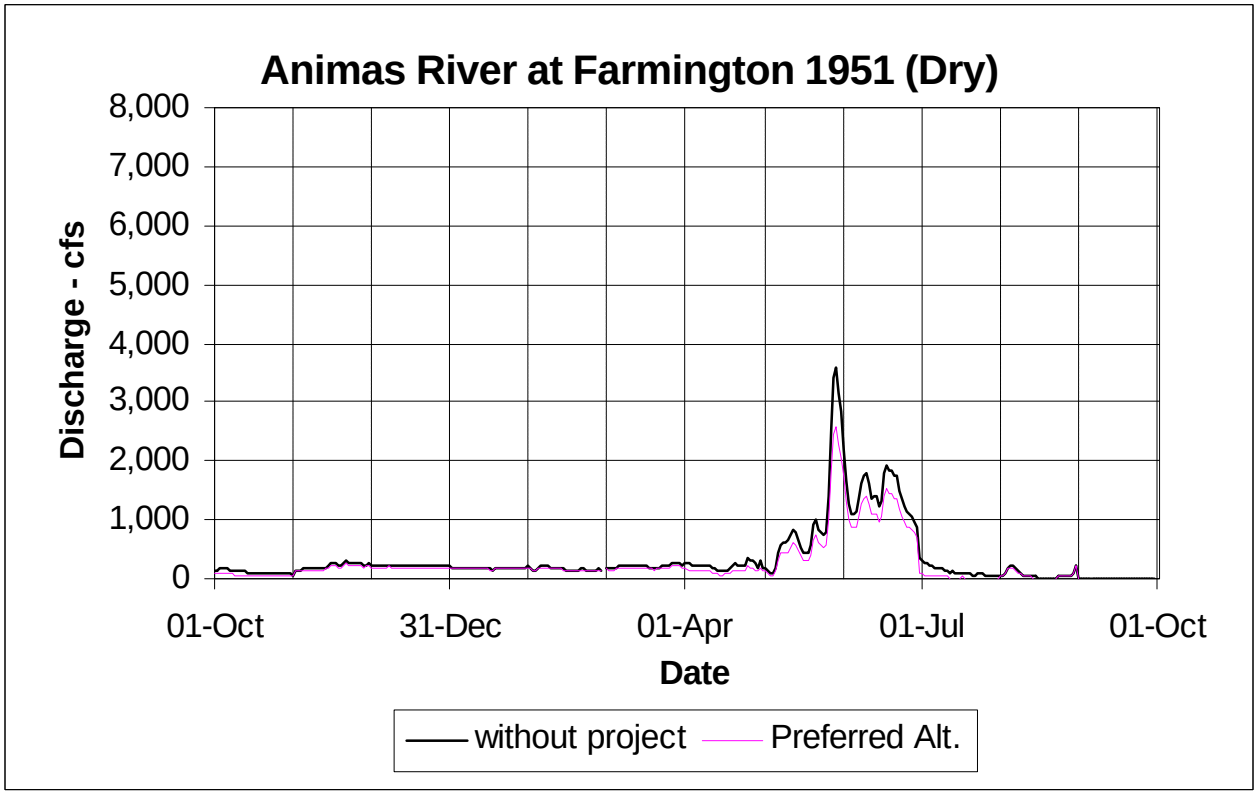
Animas River at Durango Comparing the Preferred Alternative to the Future Without Project
Typical Wet Years



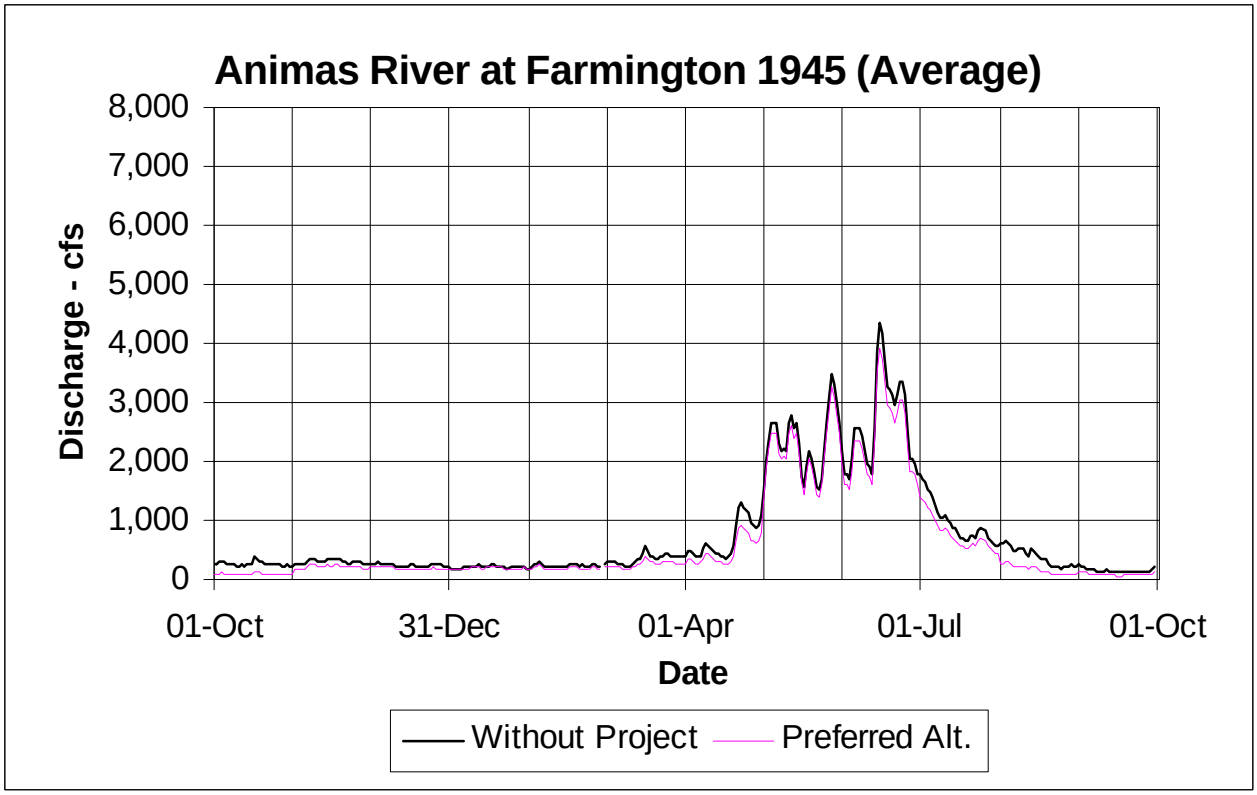


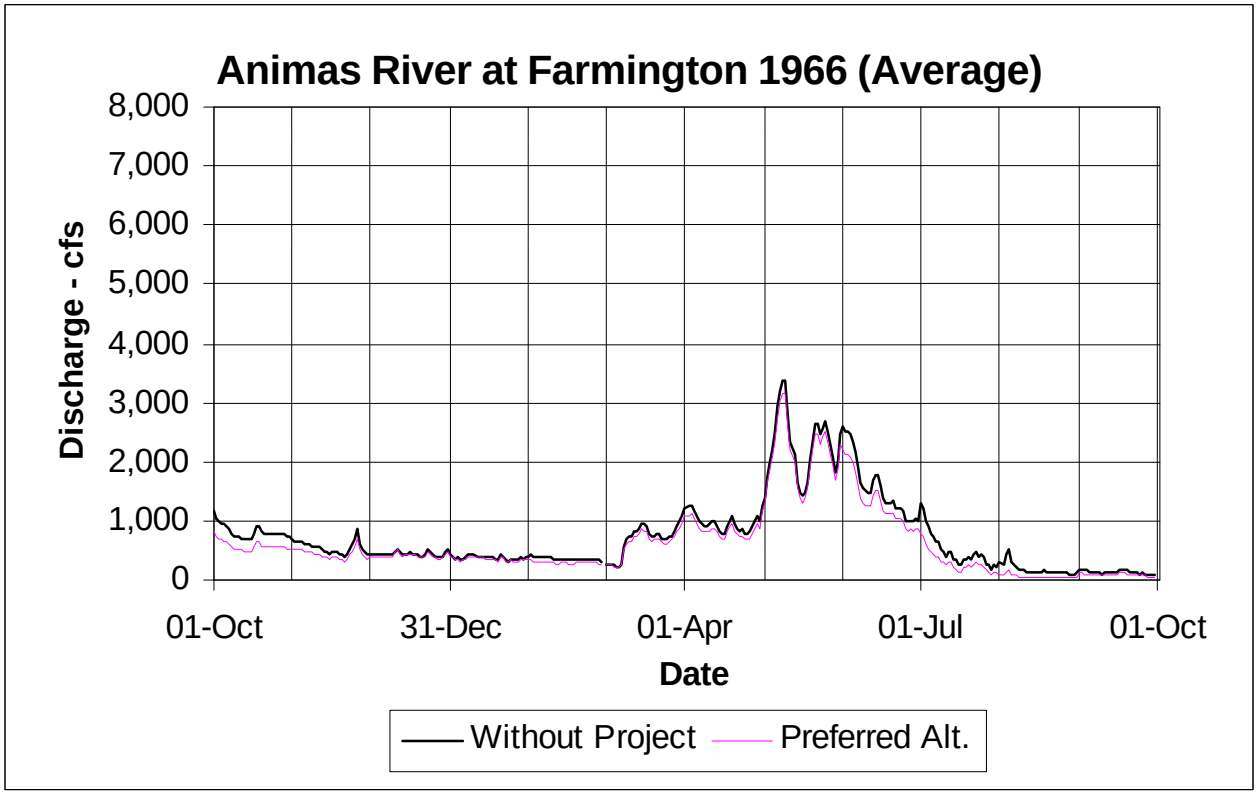
Animas River at Farmington Comparing the Preferred Alternative to the Future Without Project
Typical Dry Years



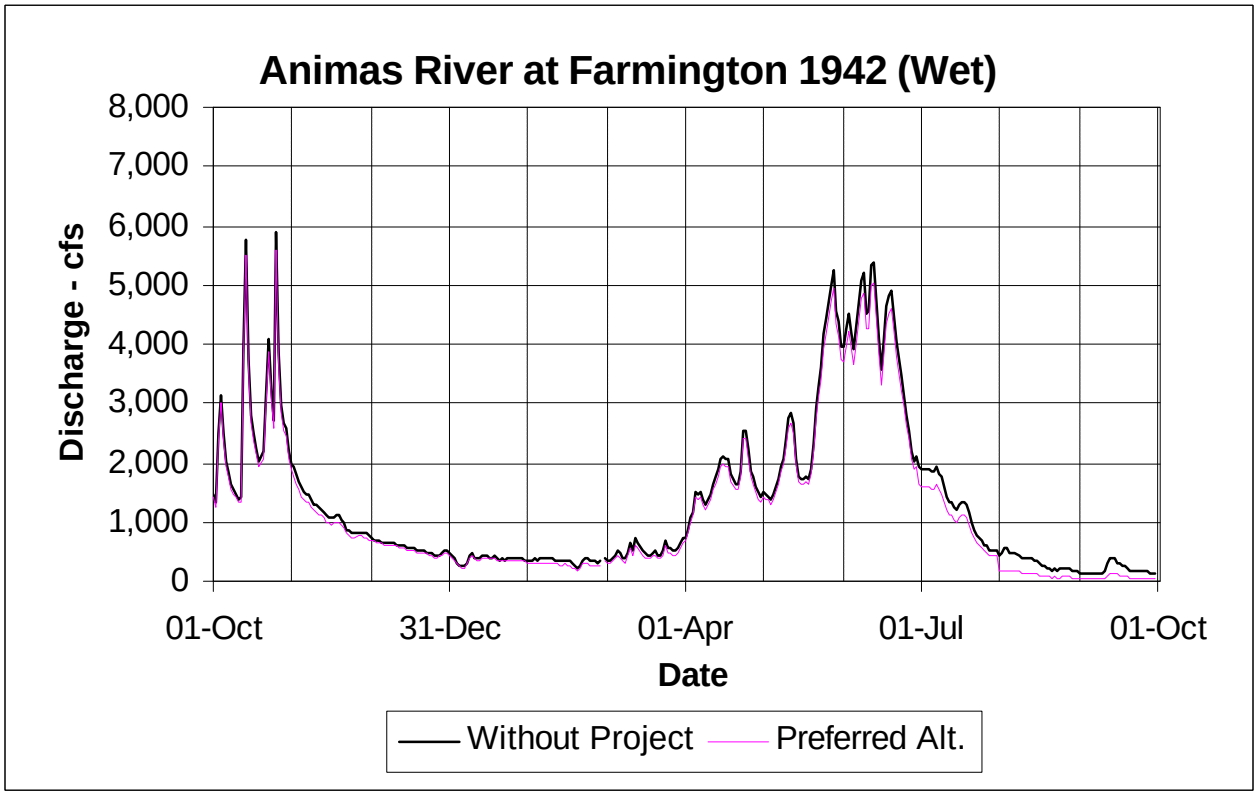


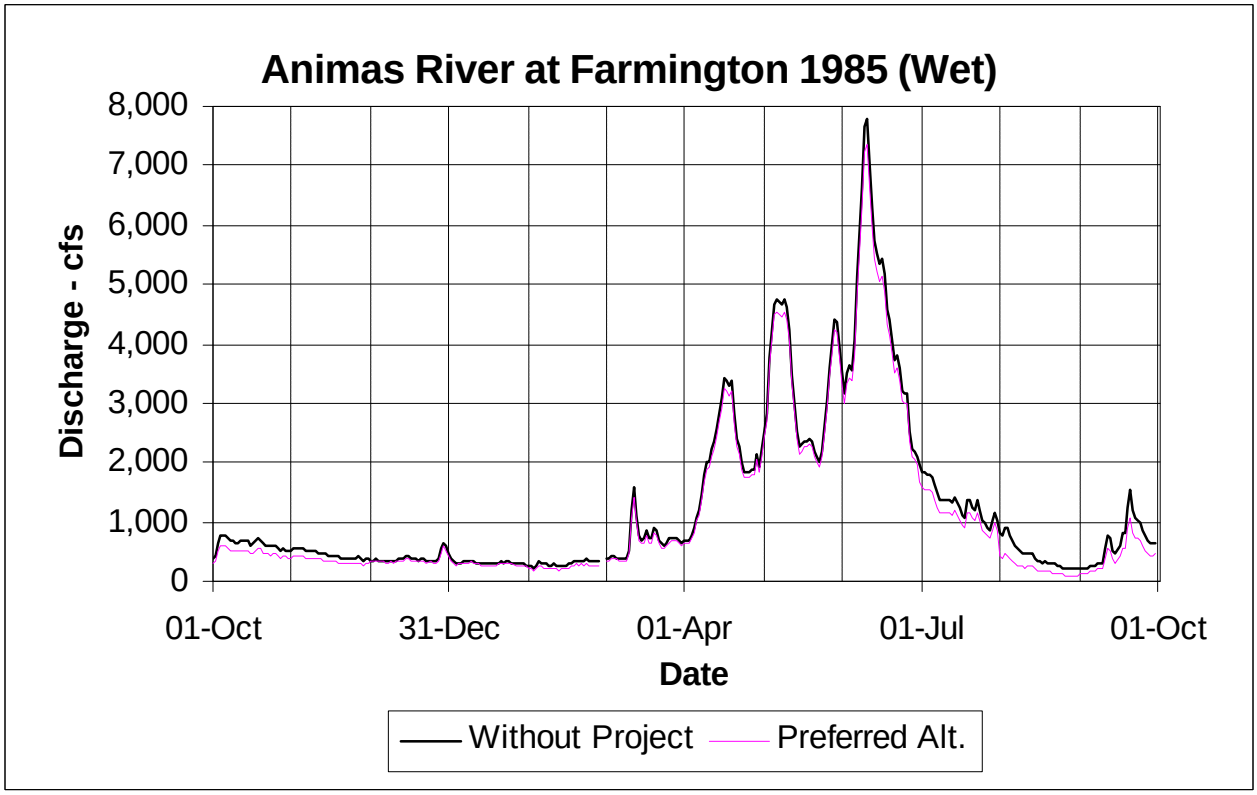
Animas River at Farmington Comparing the Preferred Alternative to the Future Without Project
Typical Average Years



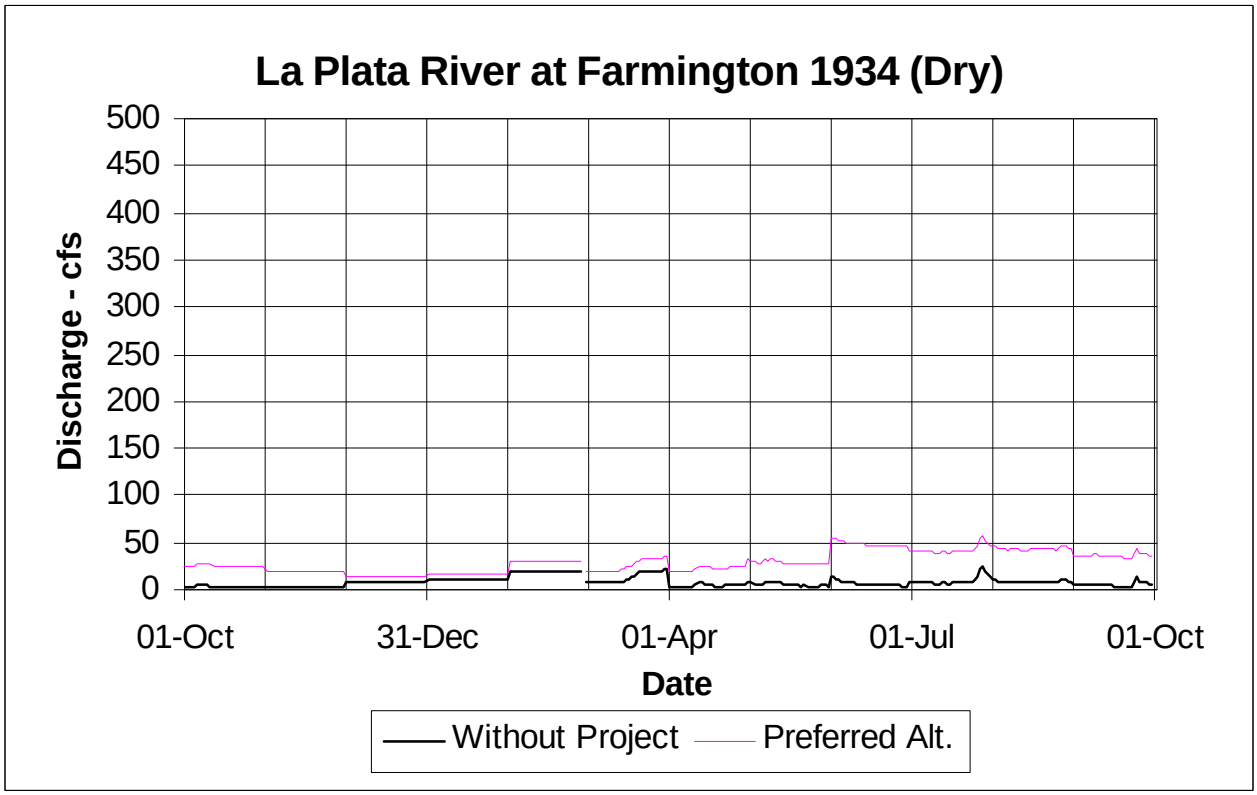


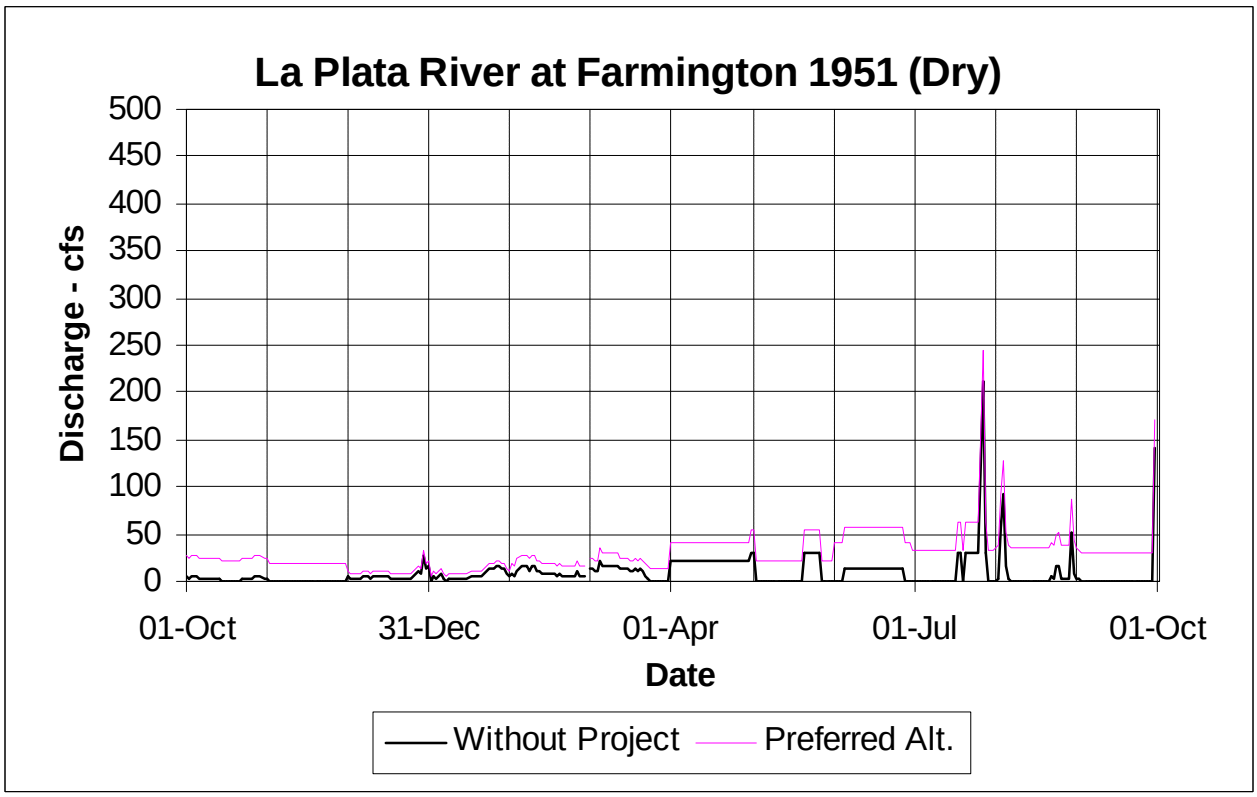
Animas River at Farmington Comparing the Preferred Alternative to the Future Without Project
Typical Wet Years



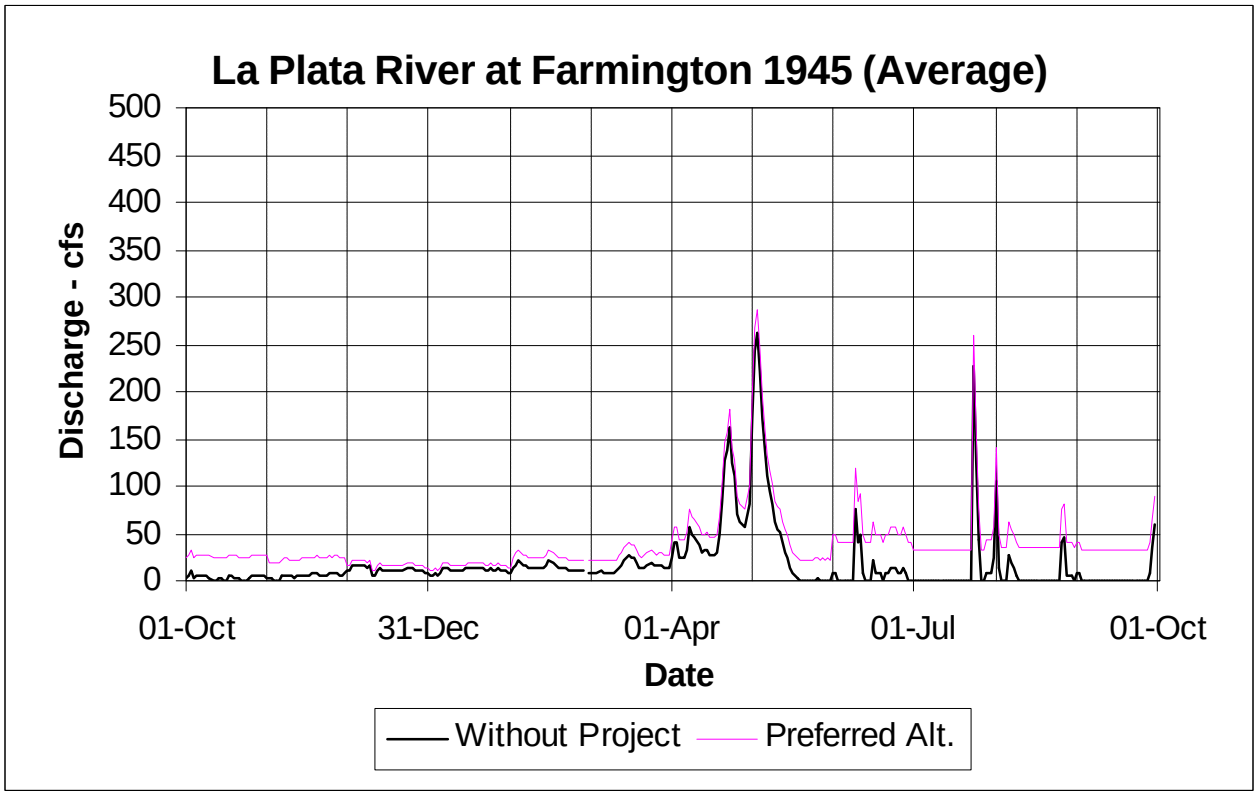


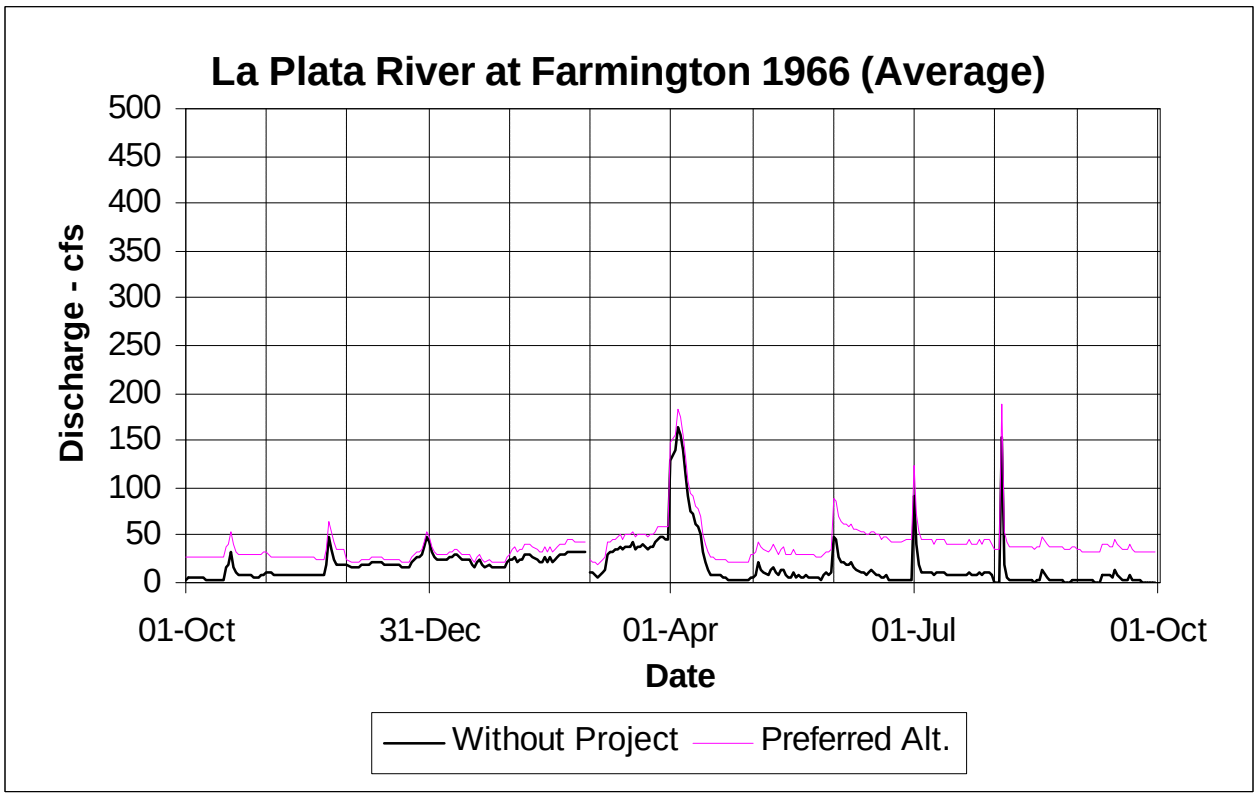
La Plata River at Farmington Comparing the Preferred Alternative to the Future Without Project
Typical Dry Years



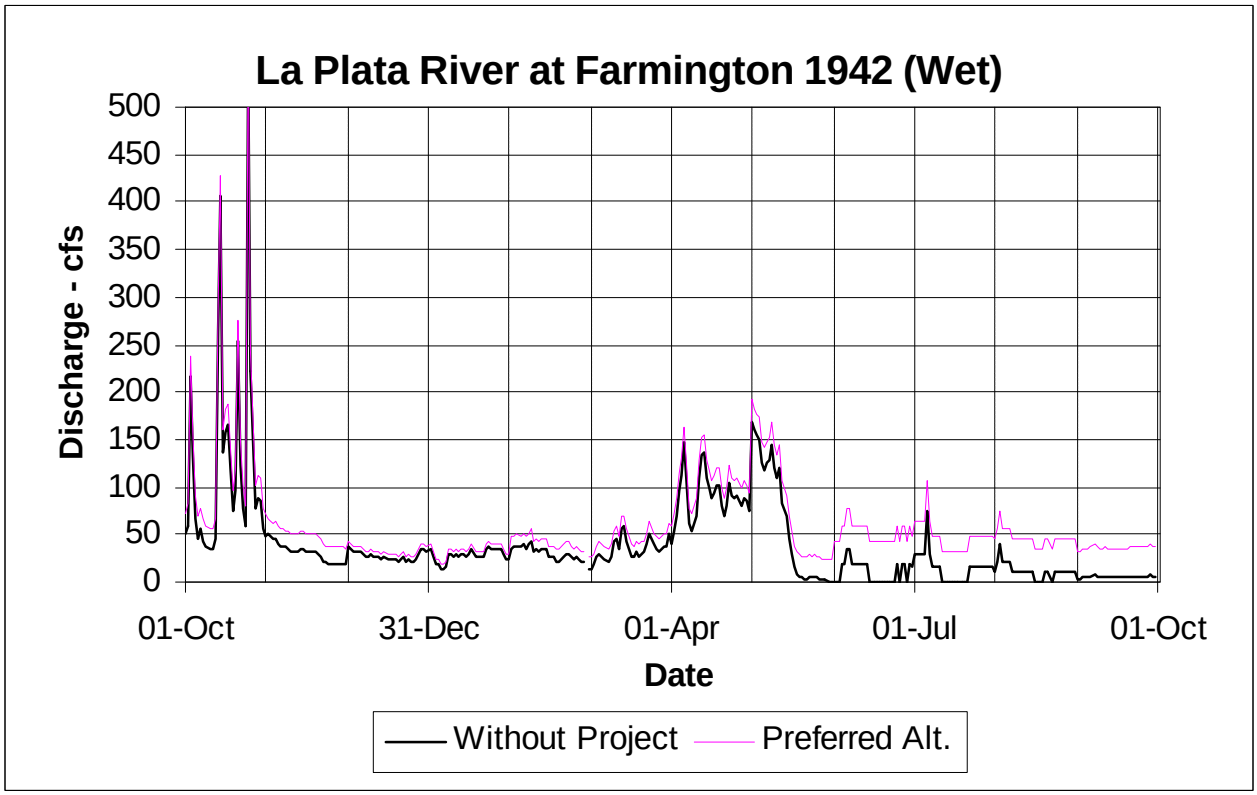


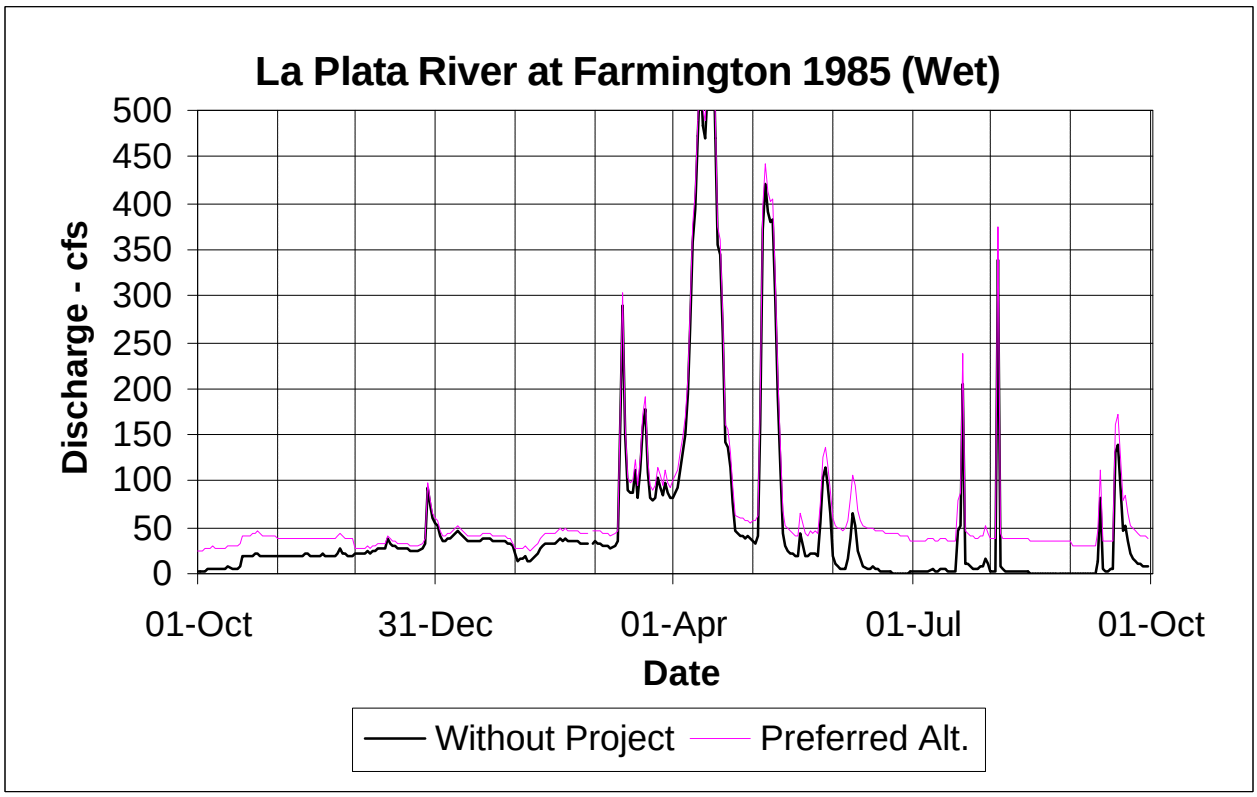
La Plata River at Farmington Comparing the Preferred Alternative to the Future Without Project
Typical Average Years



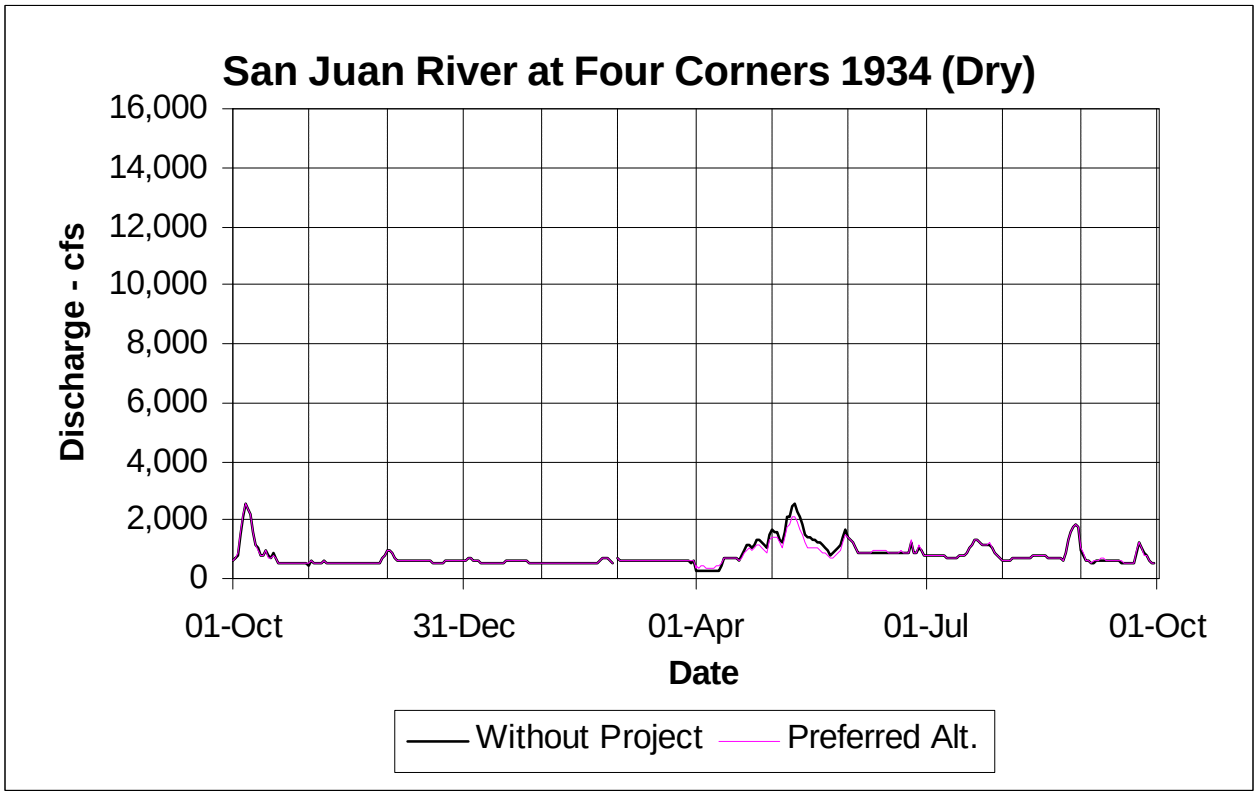


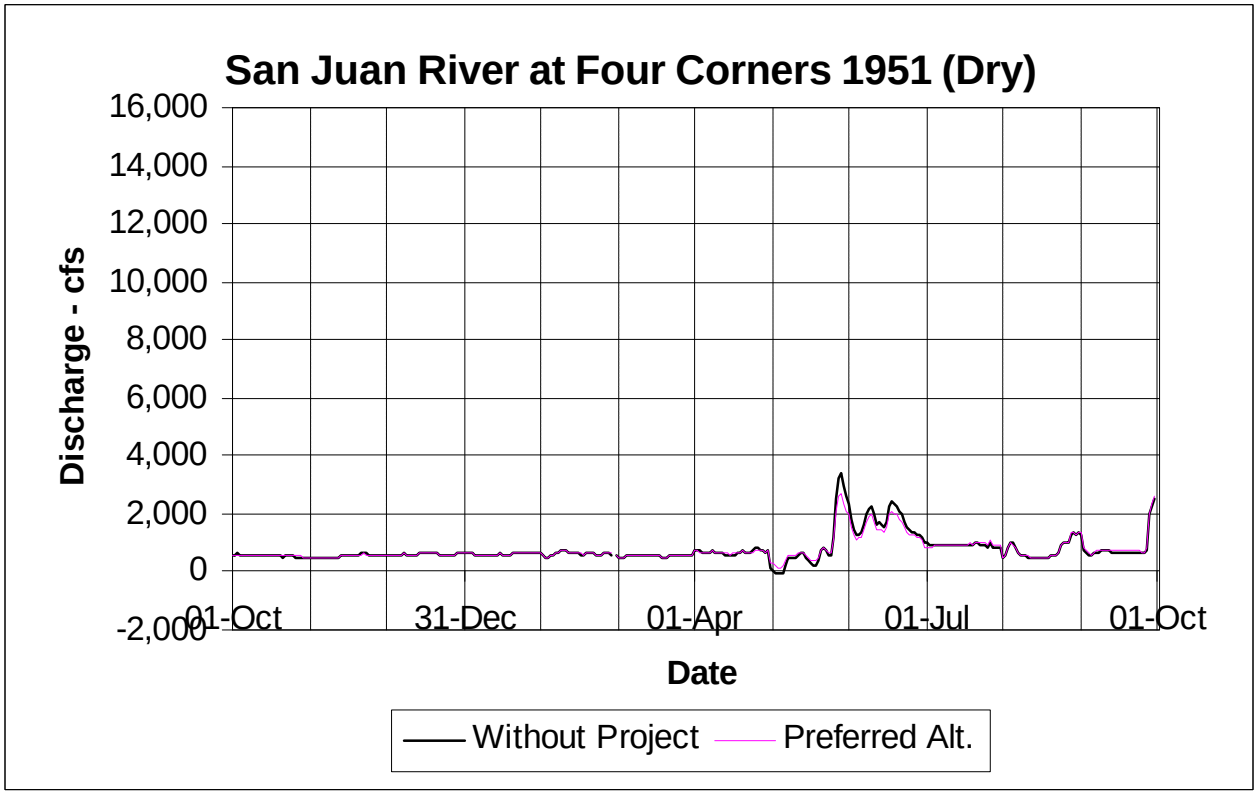
La Plata River at Farmington Comparing the Preferred Alternative to the Future Without Project
Typical Wet Years



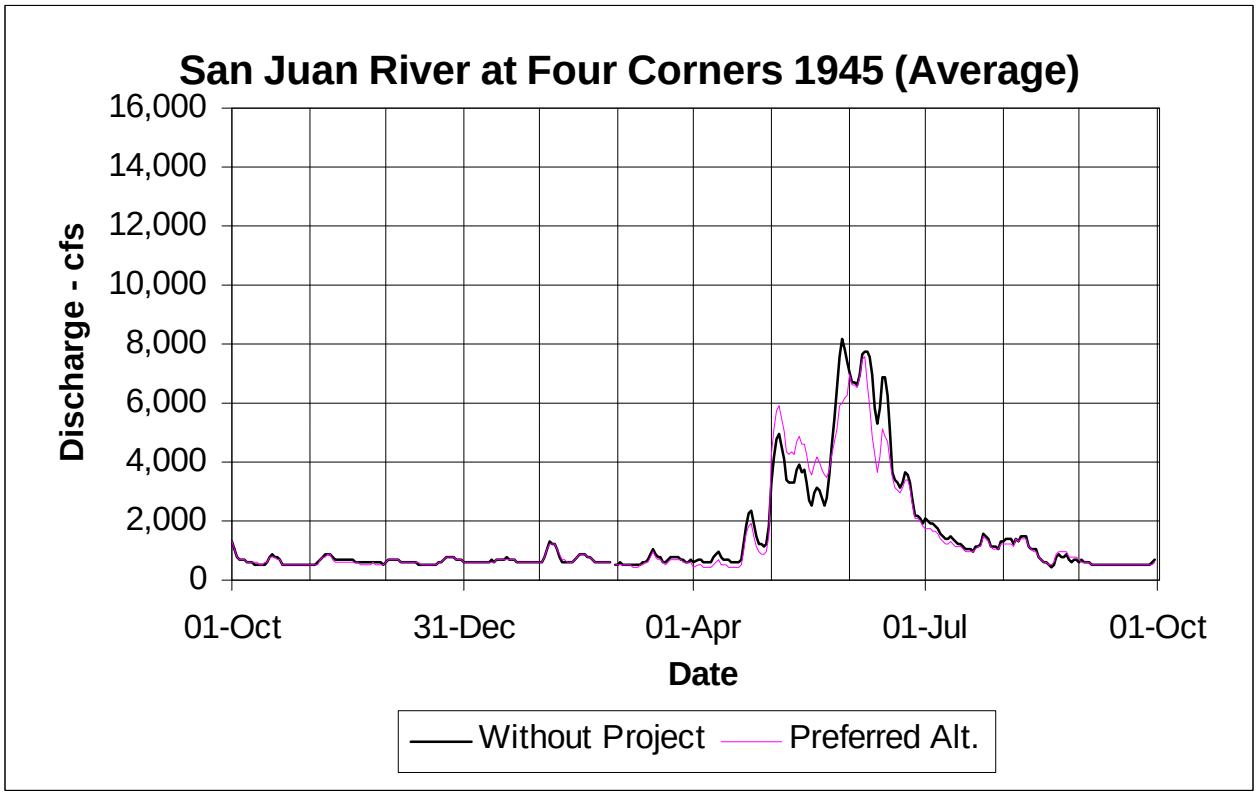


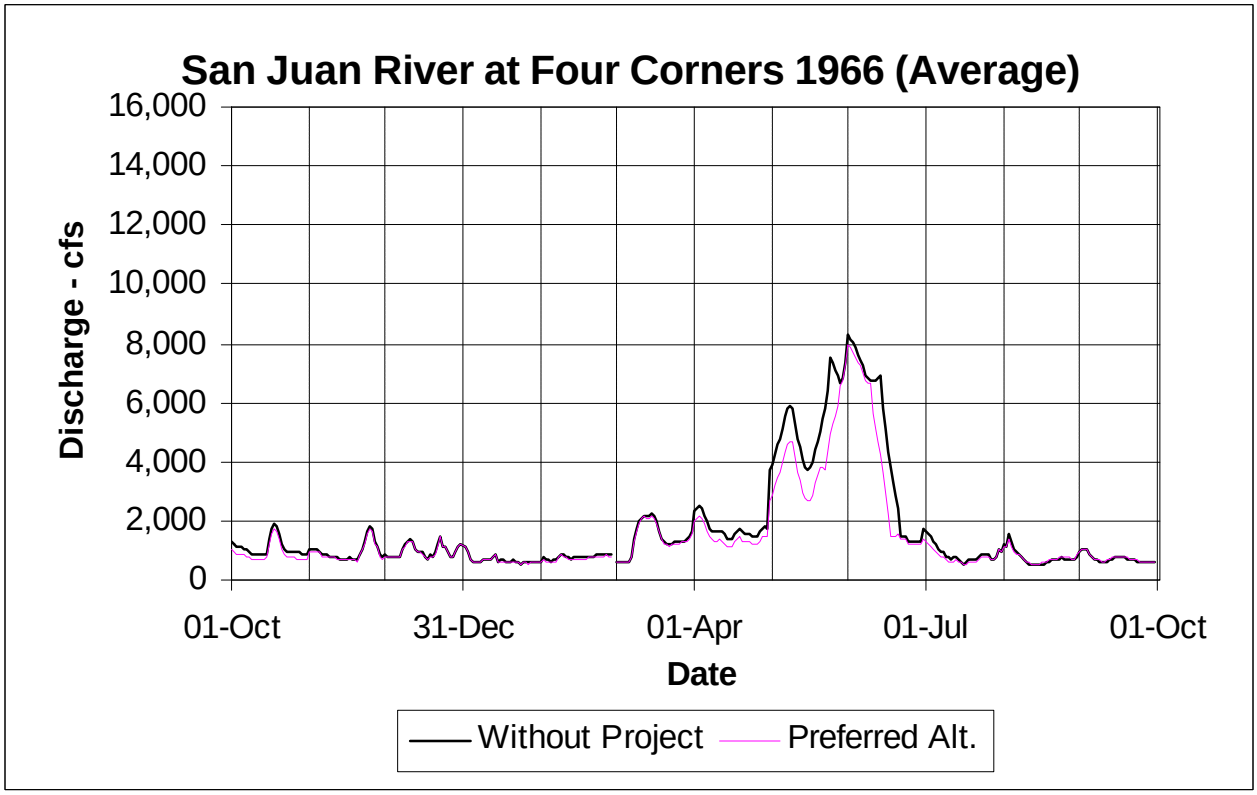
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Future Without Project Typical Dry Years



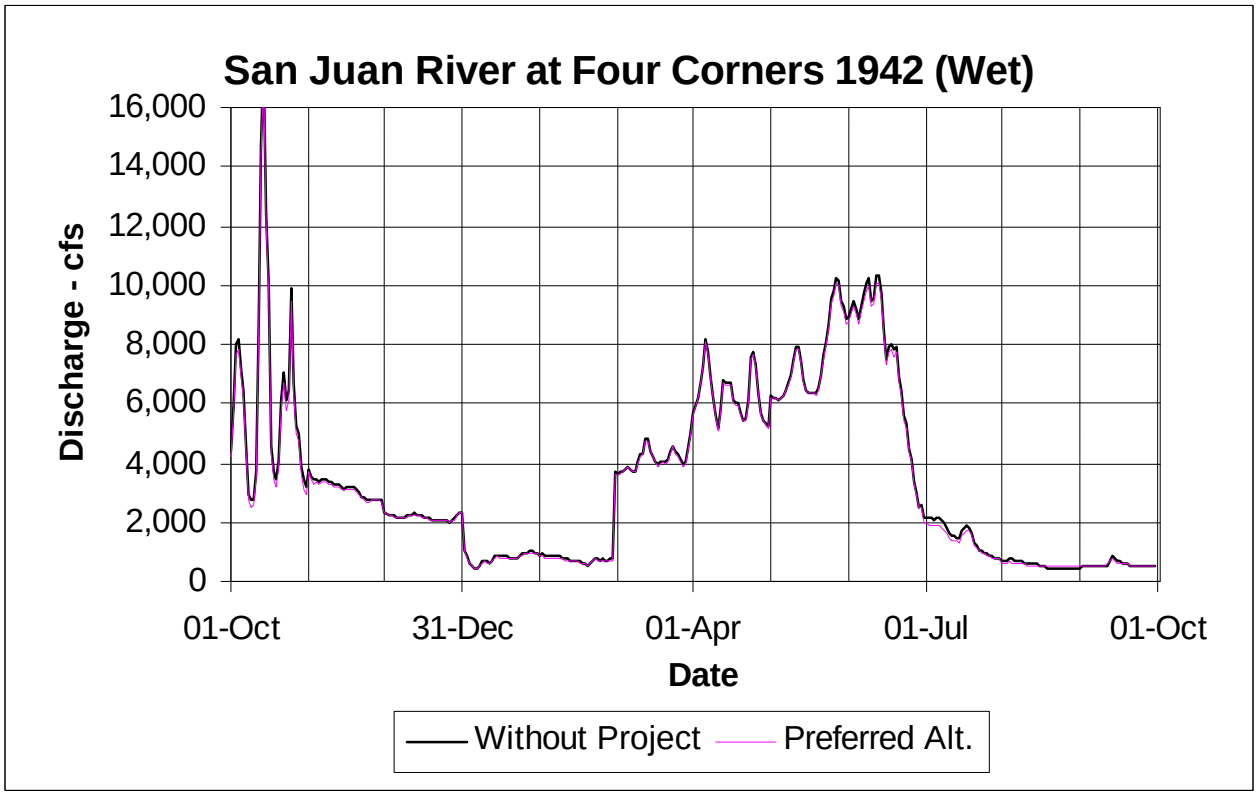


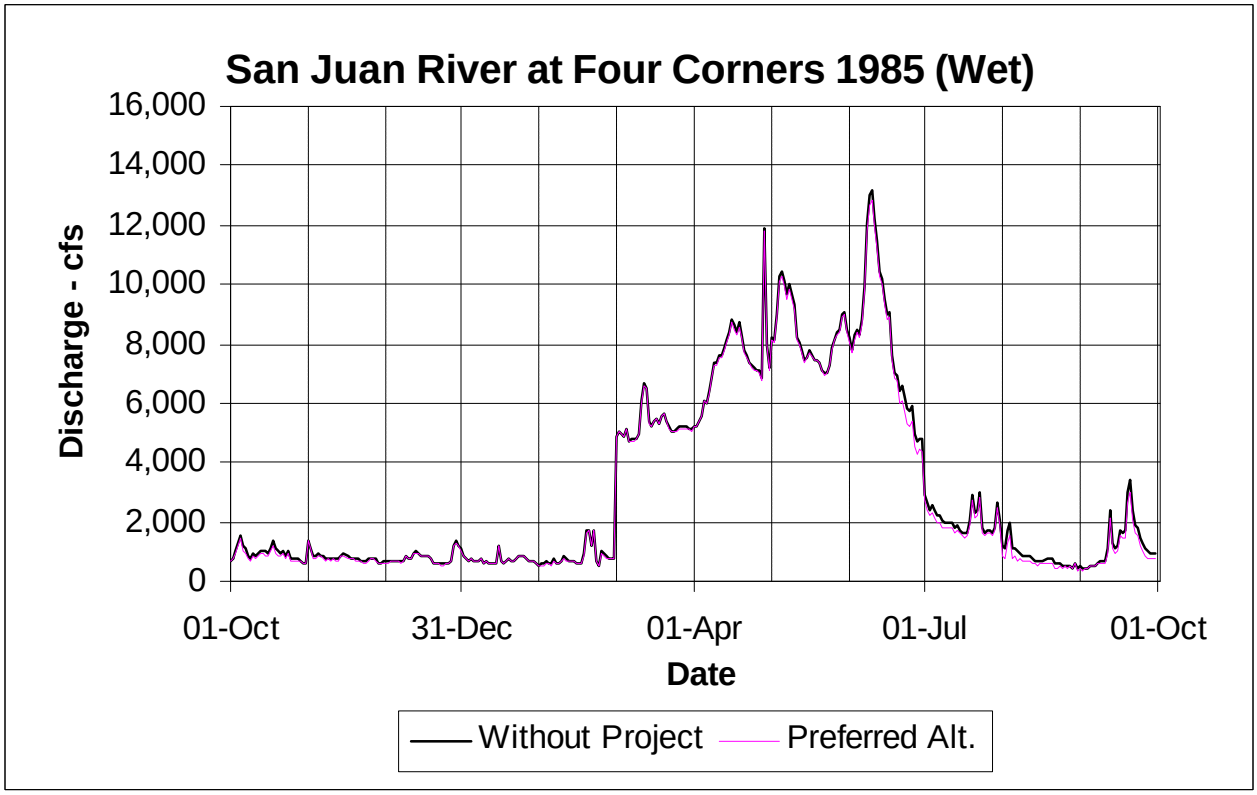
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Future Without Project Typical Average Years



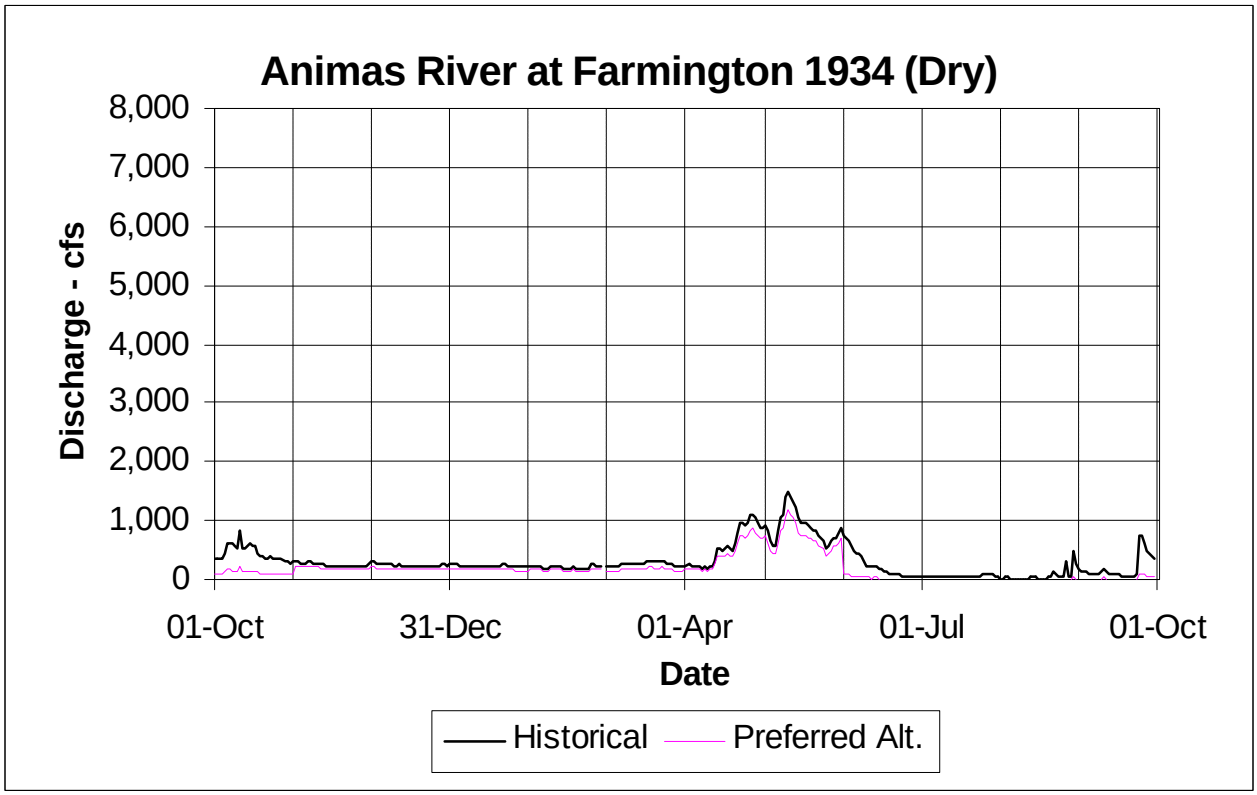


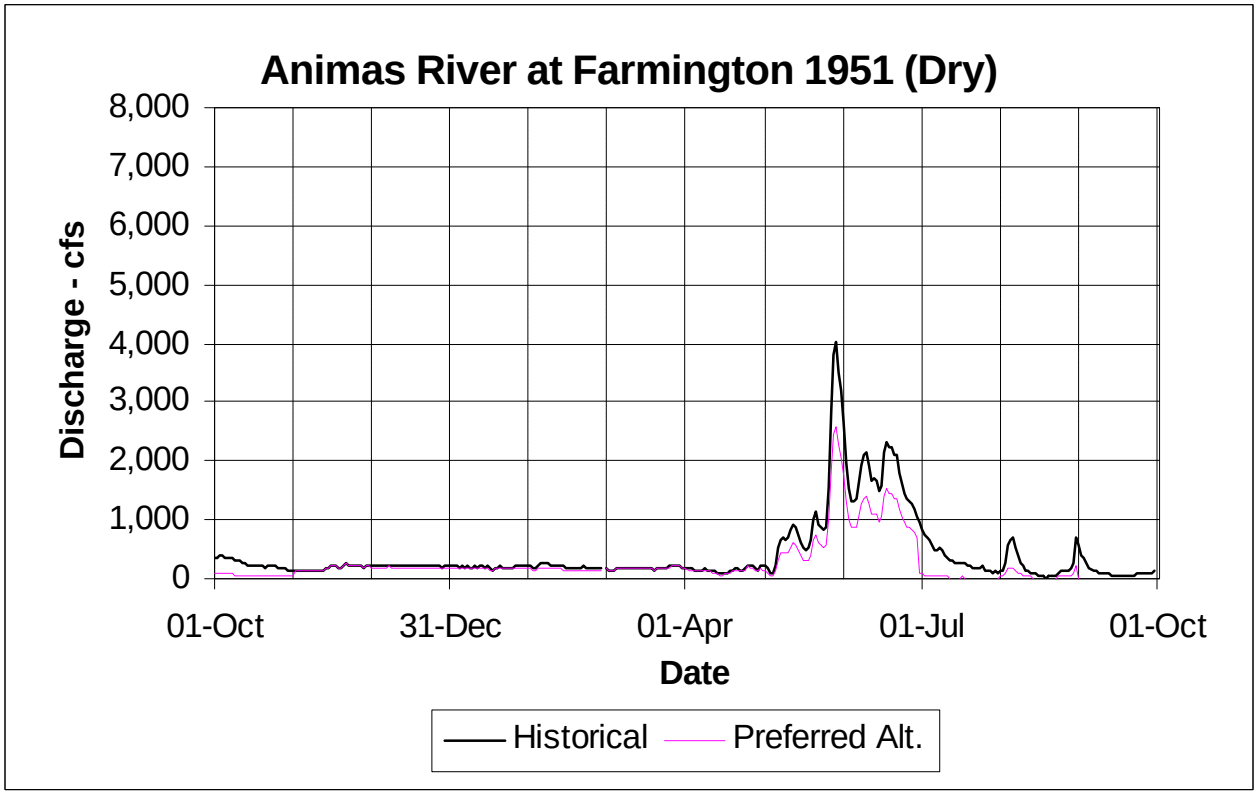
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Future Without Project Typical Wet Years



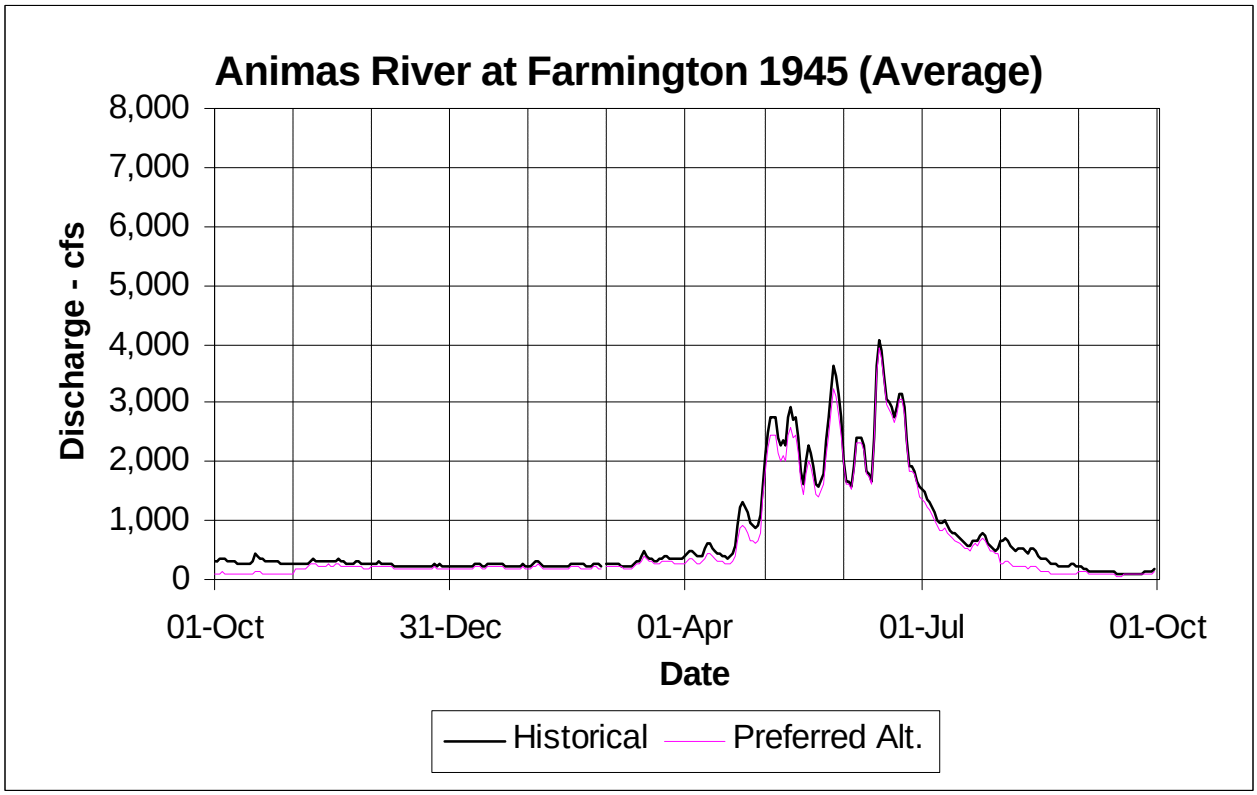


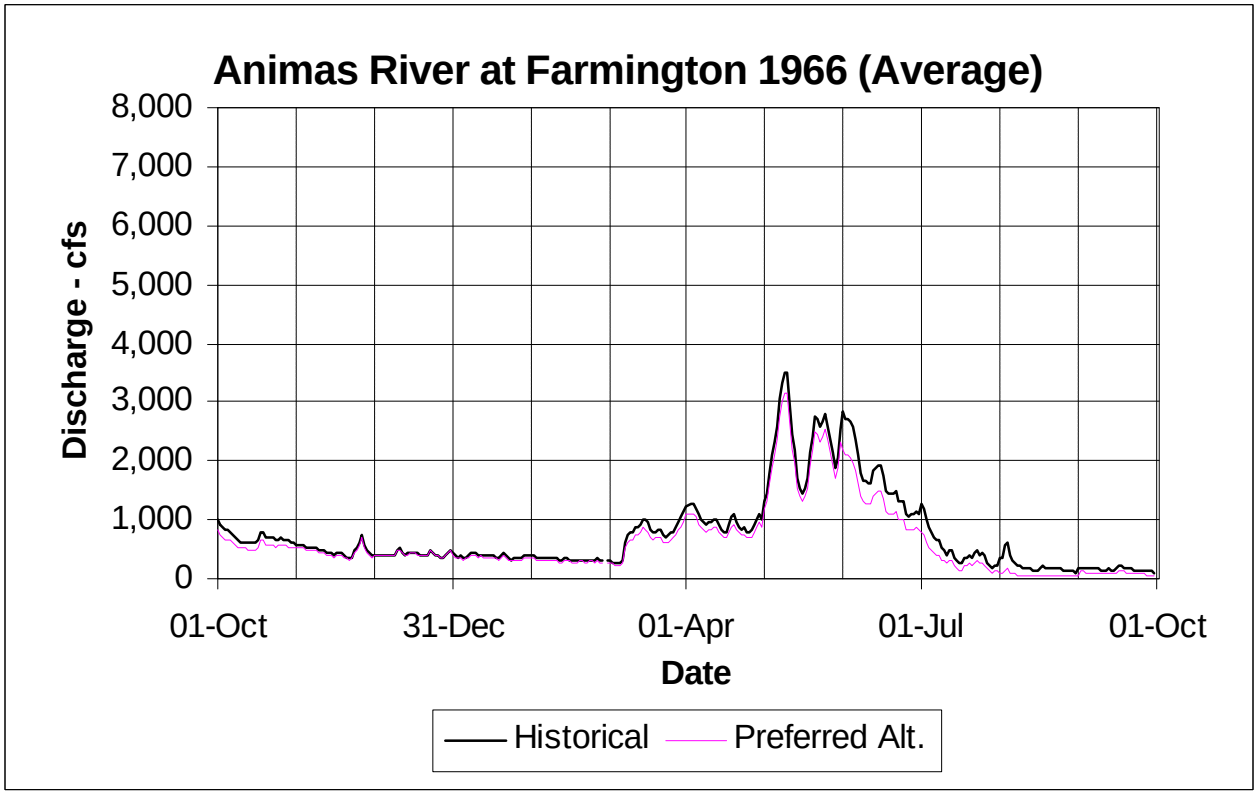
Animas River at Farmington Comparing the Preferred Alternative to the Historical Condition
Typical Dry Years



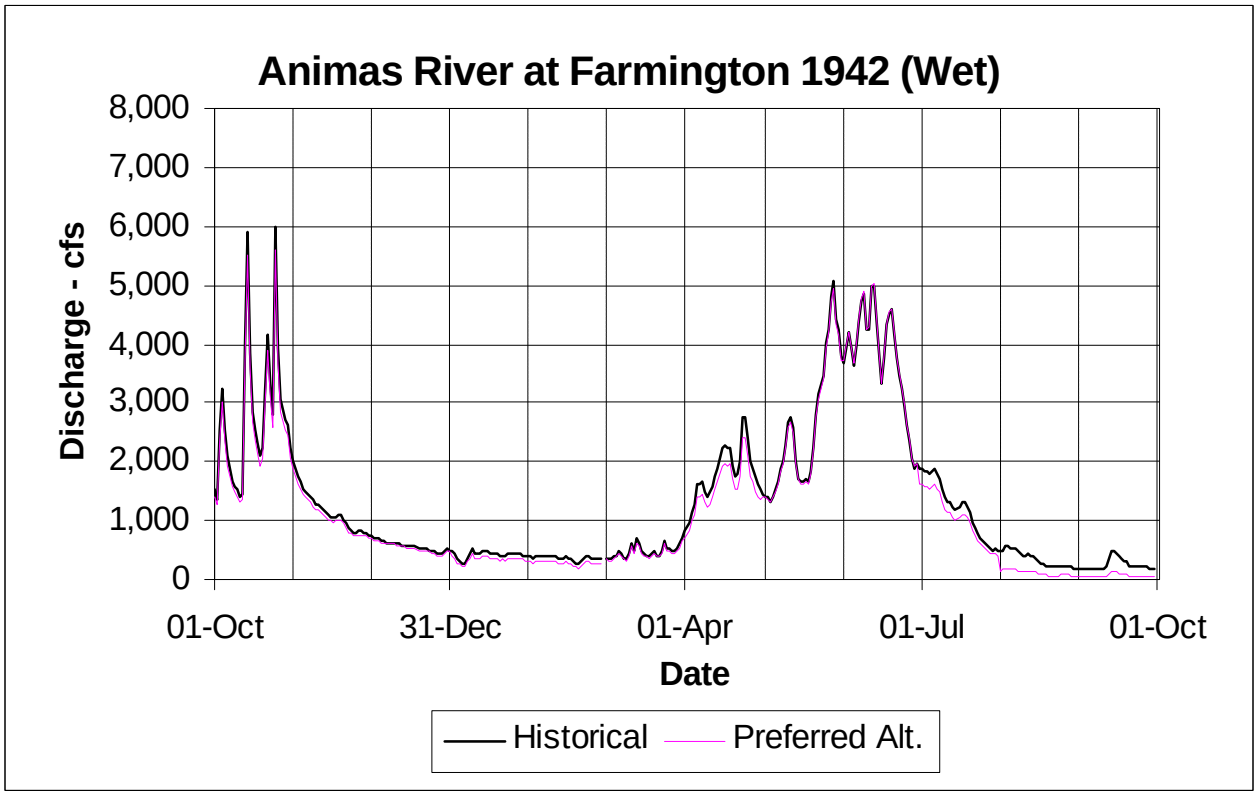


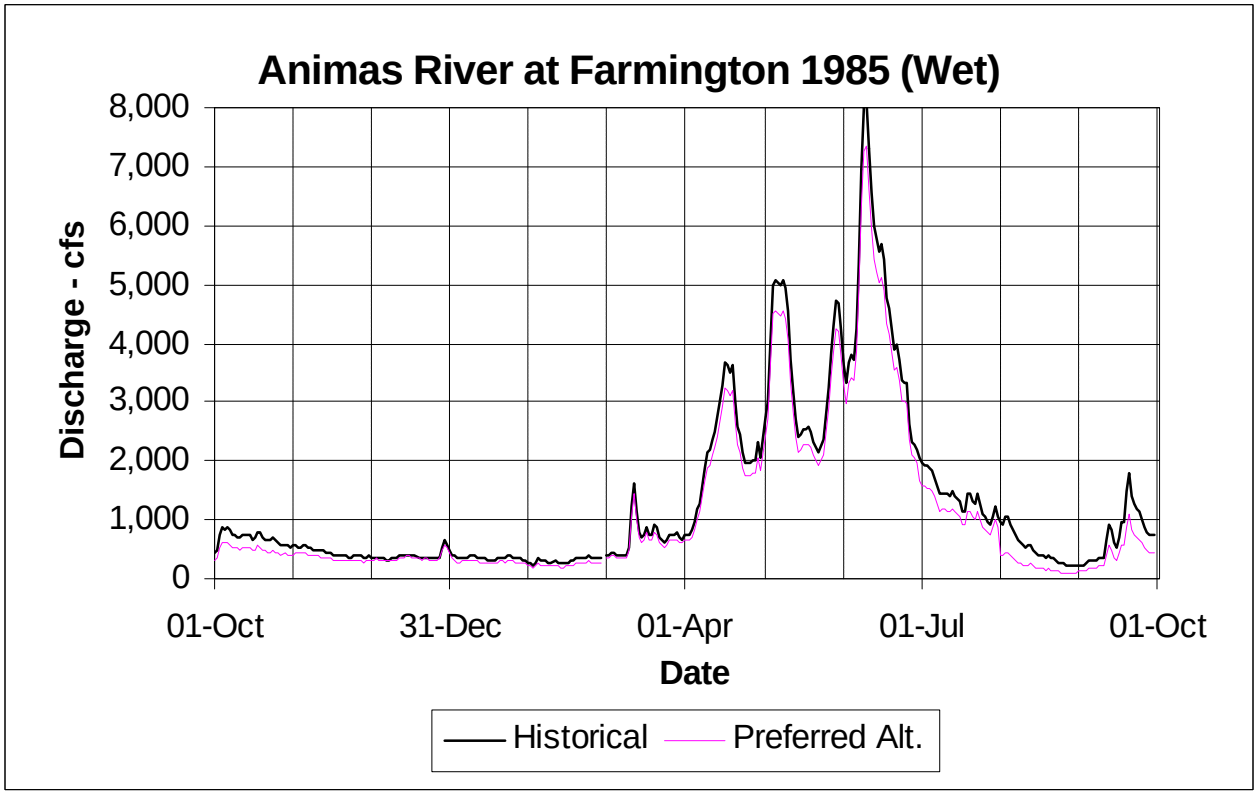
Animas River at Farmington Comparing the Preferred Alternative to the Historical Condition
Typical Average Years



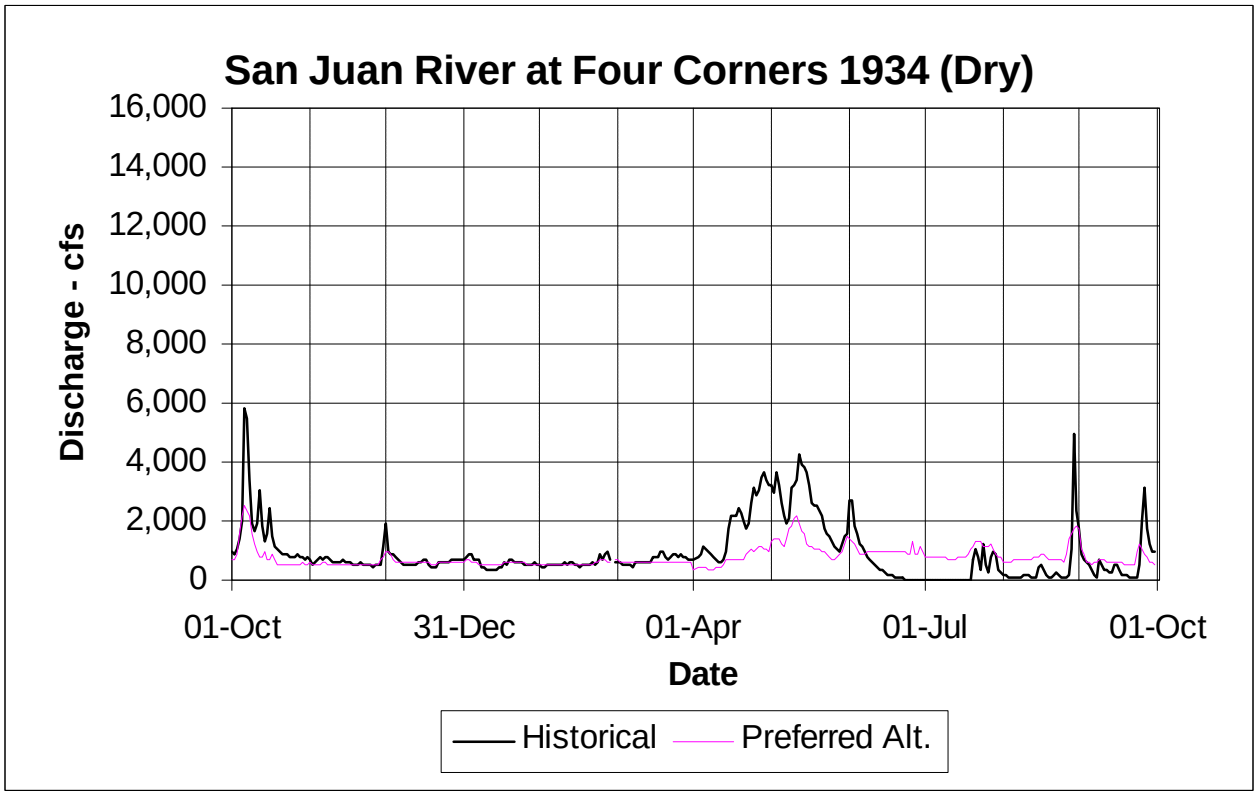


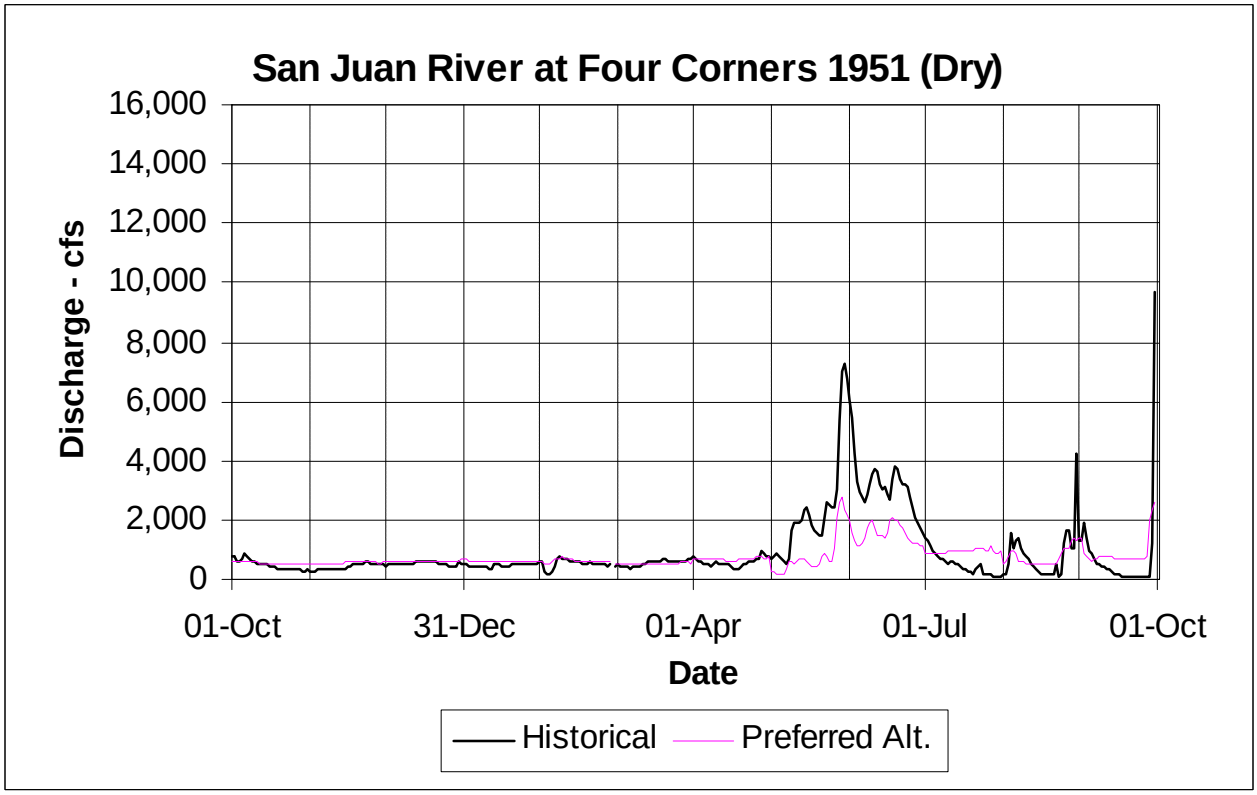
Animas River at Farmington Comparing the Preferred Alternative to the Historical Condition
Typical Wet Years



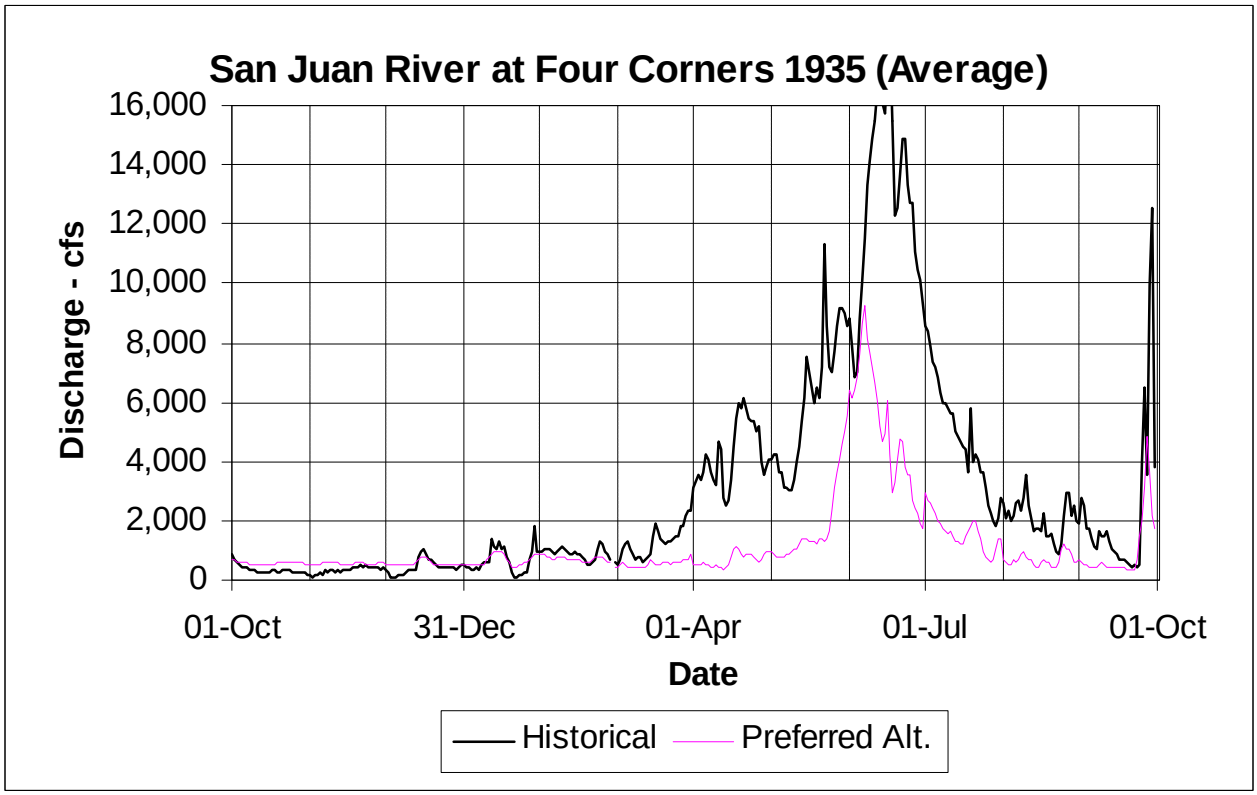


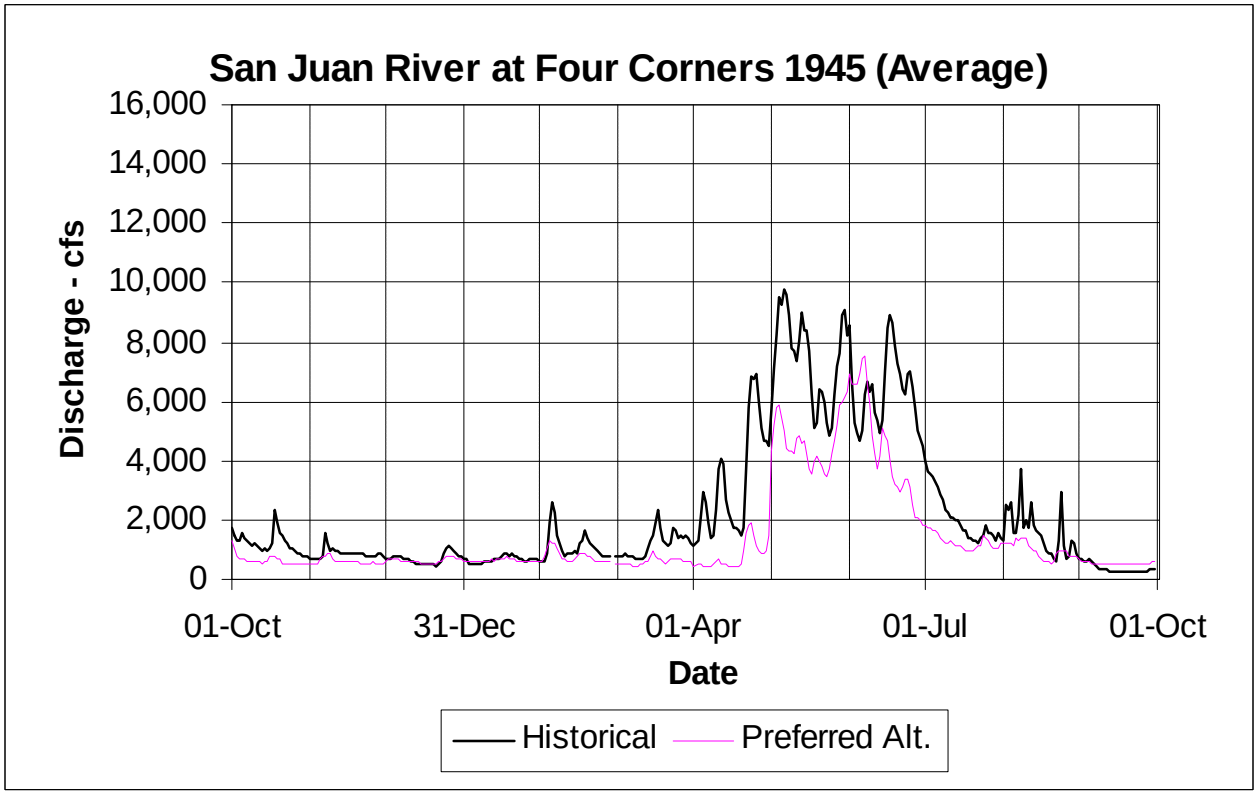
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Historical Pre-dam Condition - Typical Dry Years



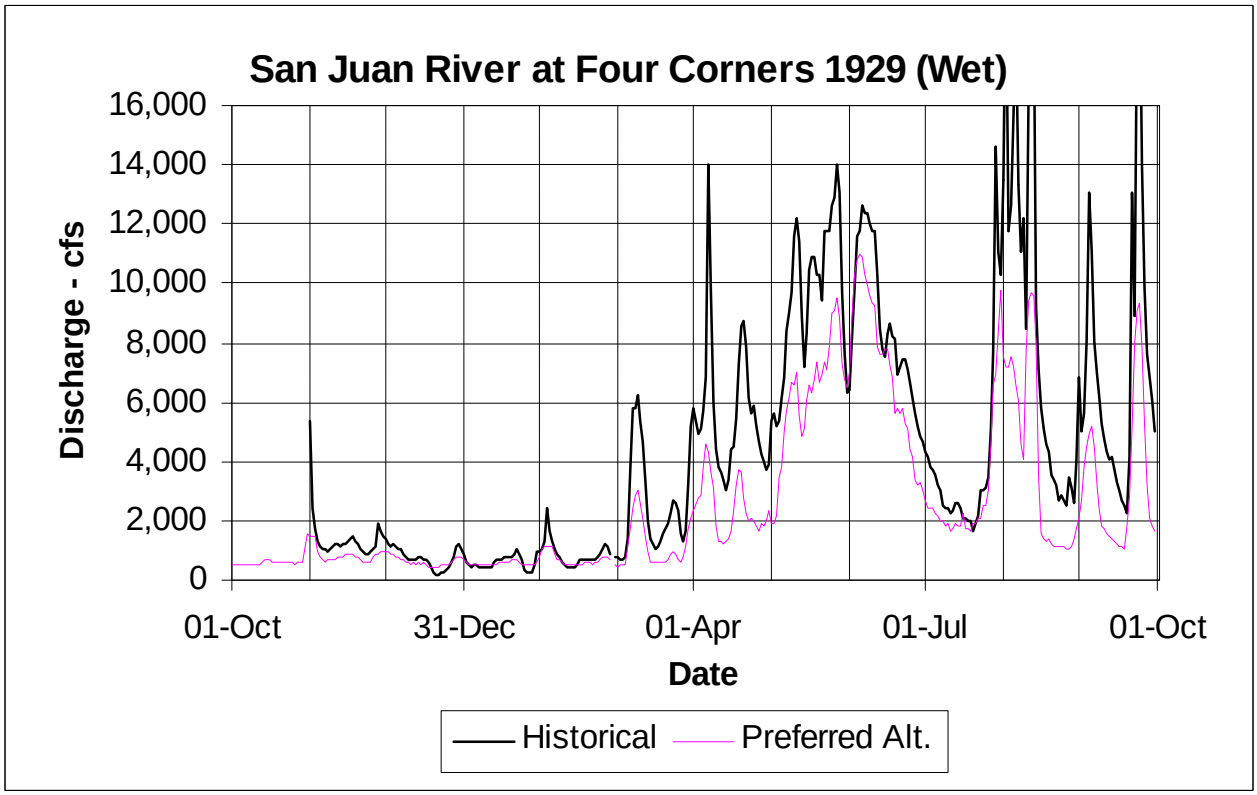


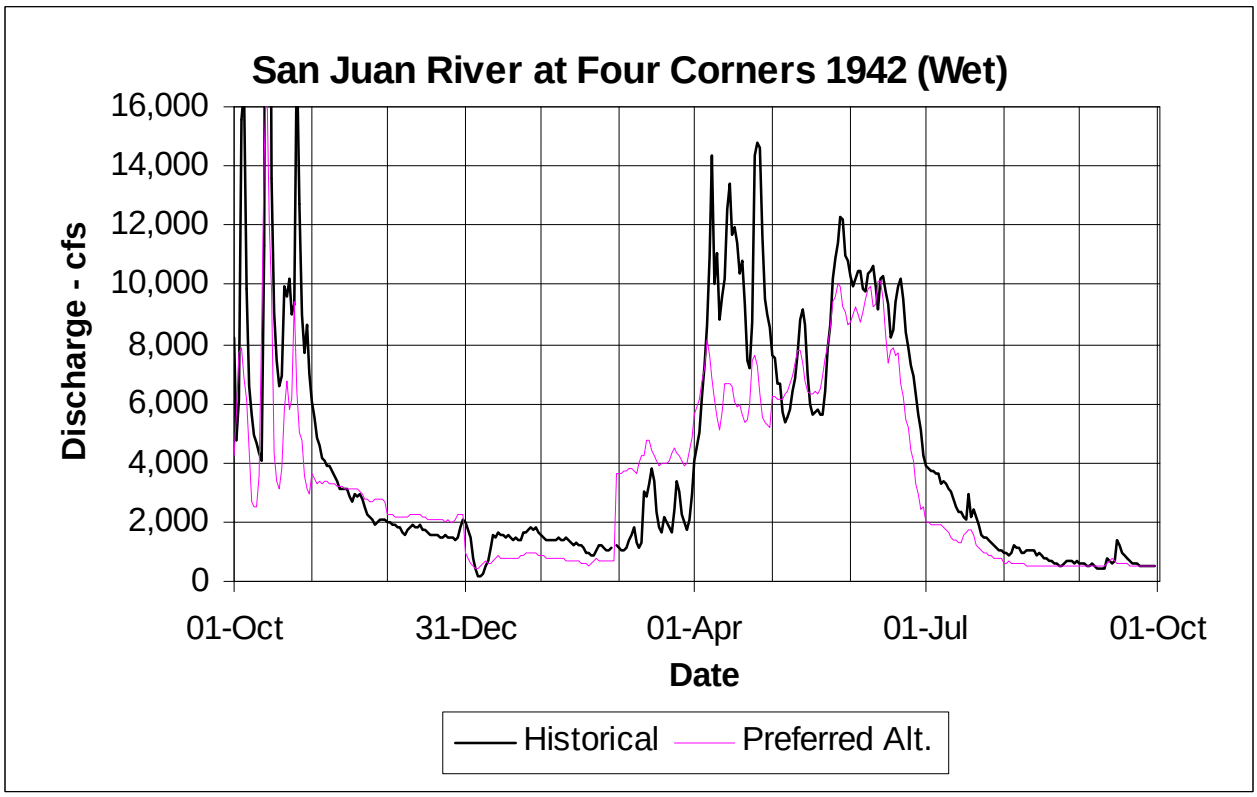
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Historical Pre-dam Condition - Typical Average Years



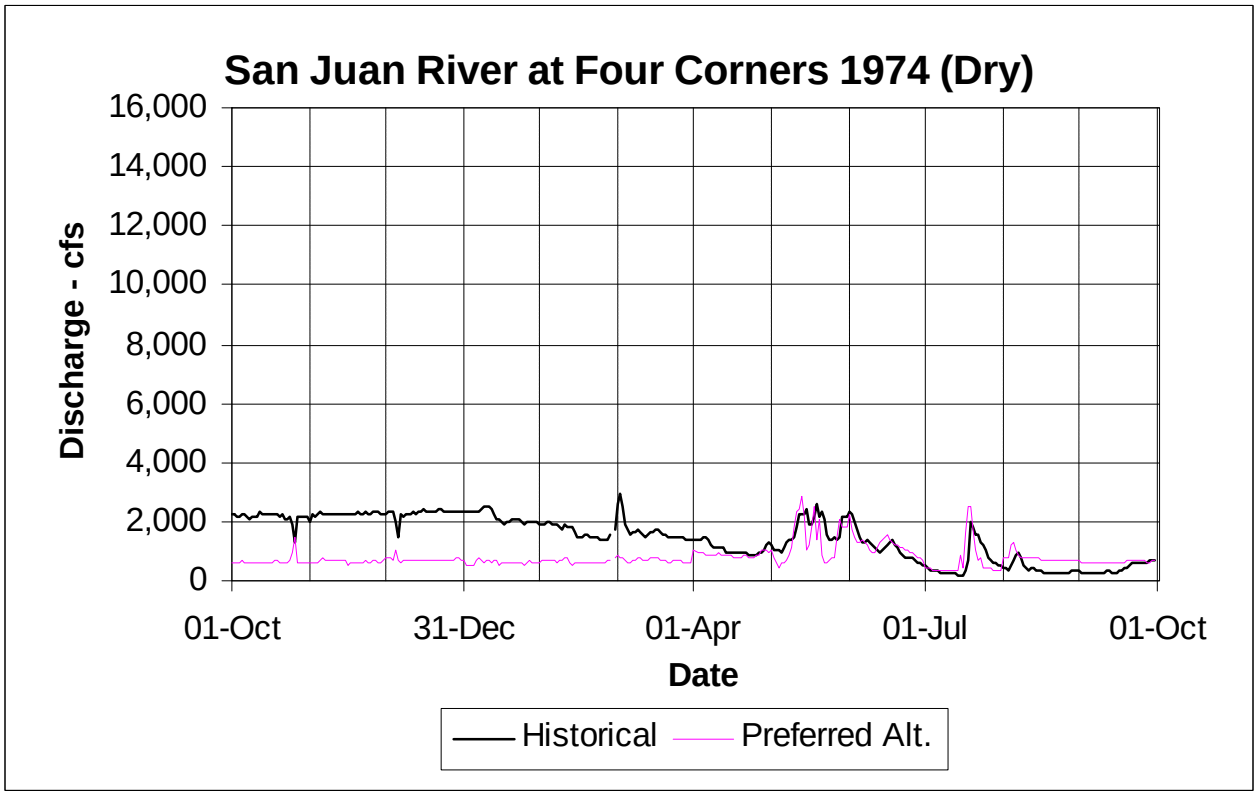


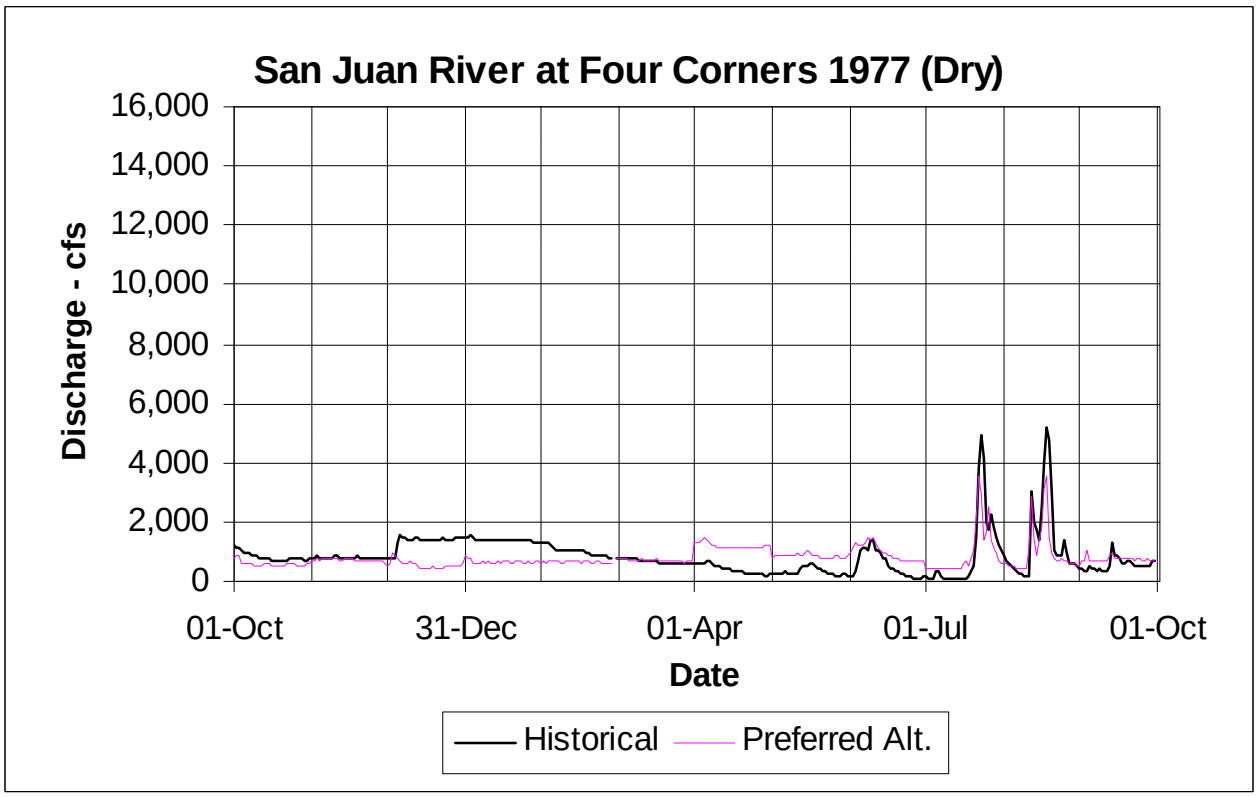
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Historical Pre-dam Condition - Typical Wet Years



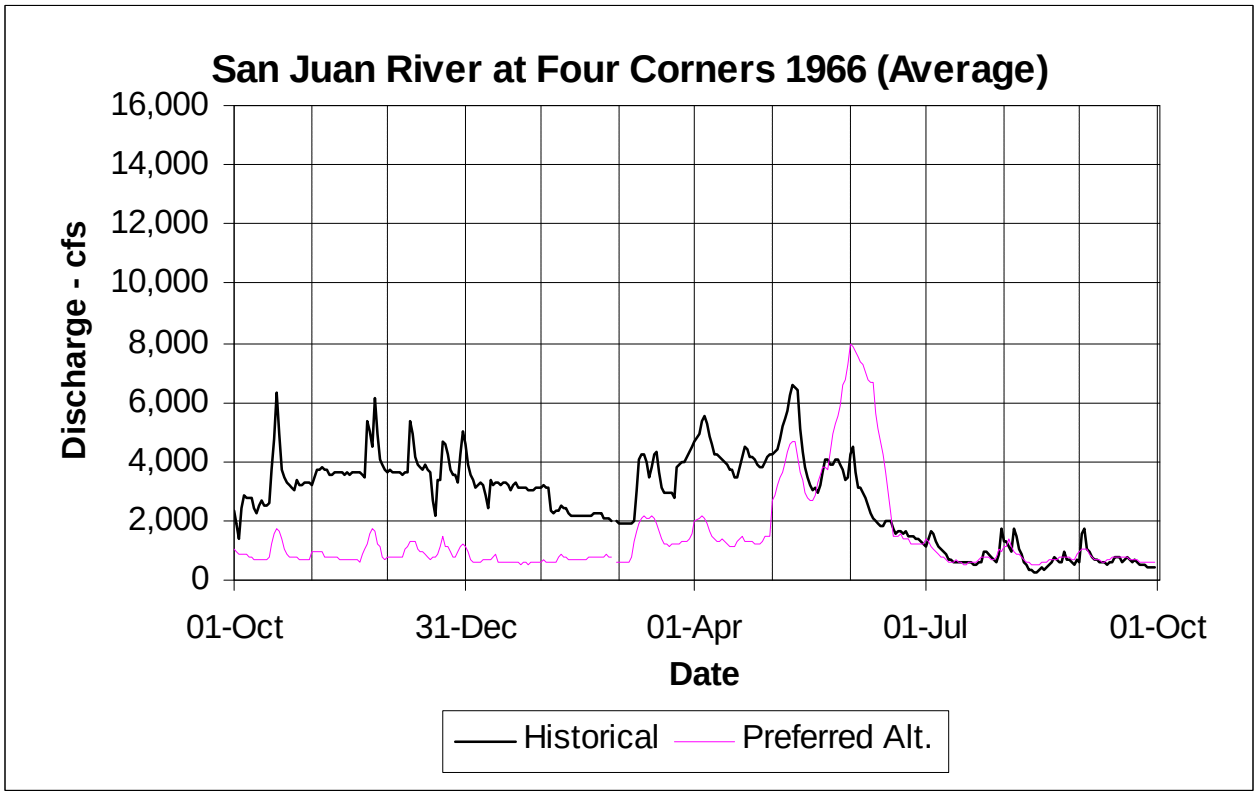


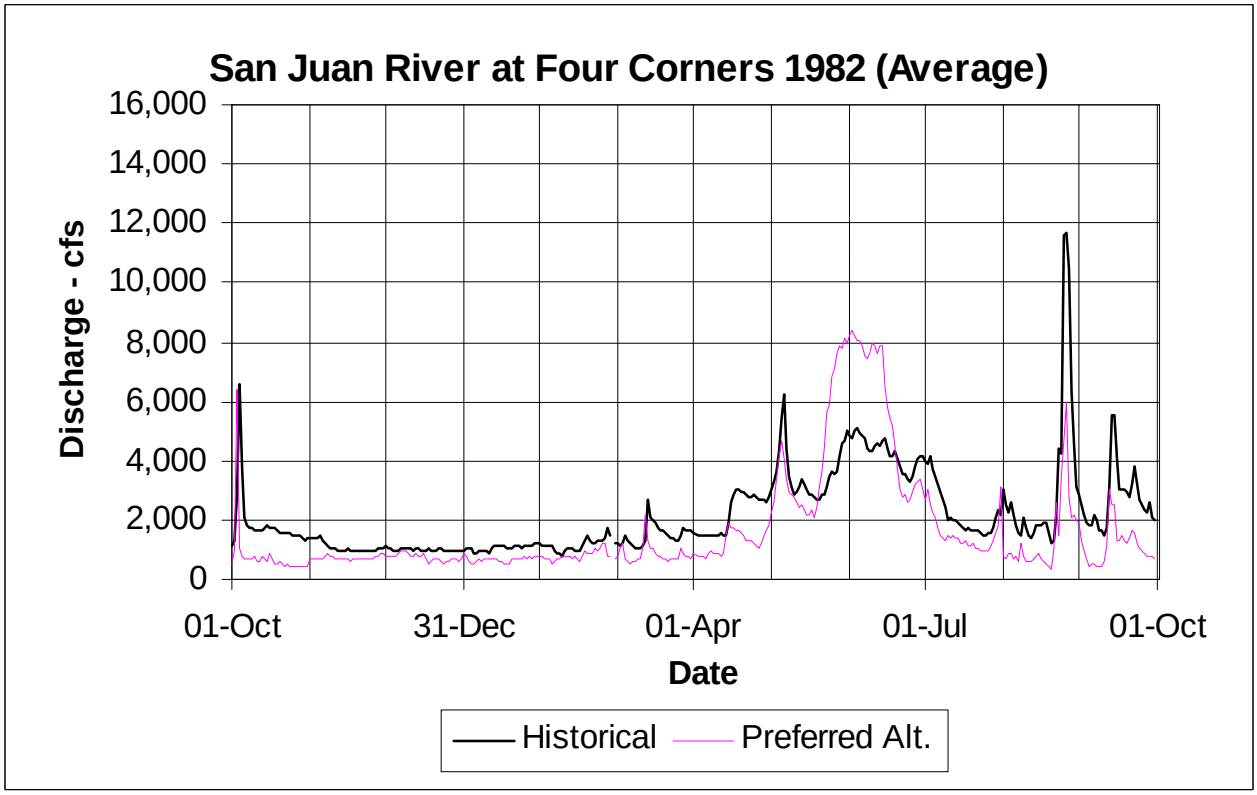
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Historical Post-dam Condition - Typical Dry Years



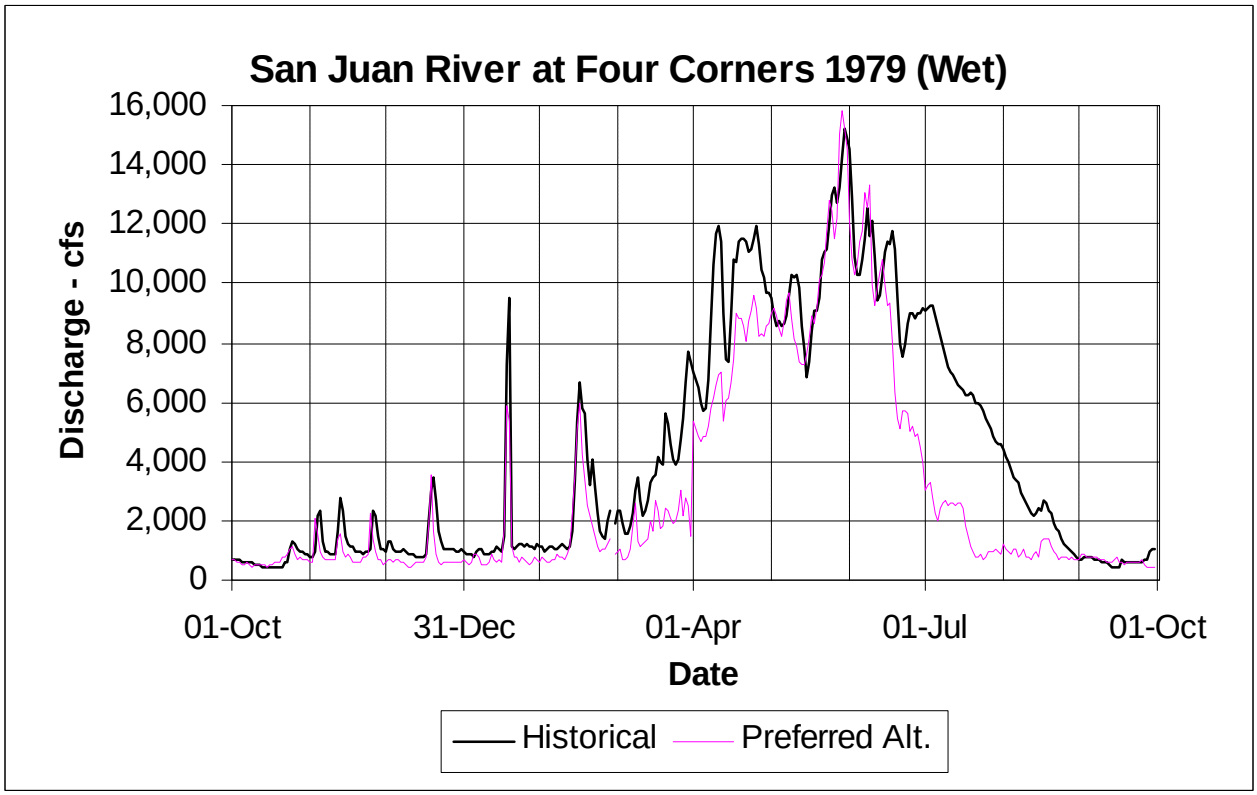


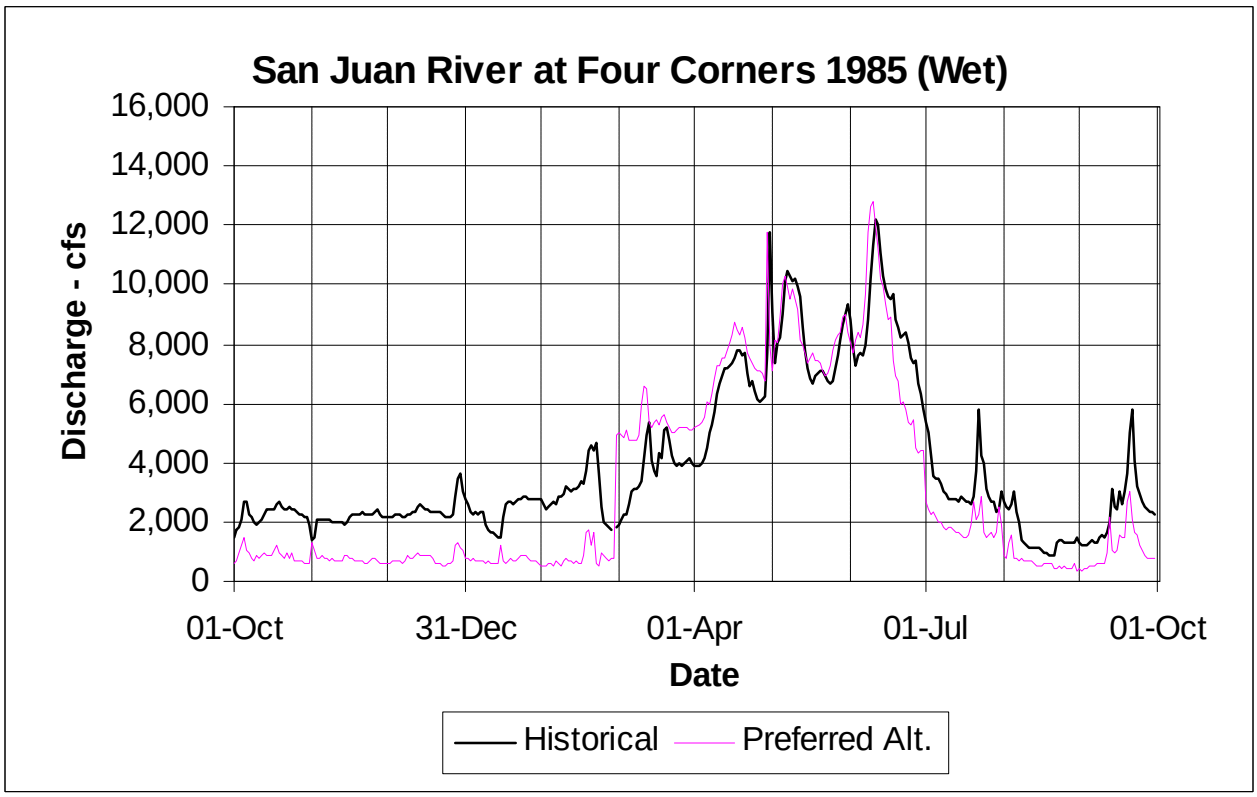
San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Historical Post-dam Condition - Typical Average Years





San Juan River at Four Corners, NM Comparing the Preferred Alternative to the Historical Post-dam Condition - Typical Wet Years





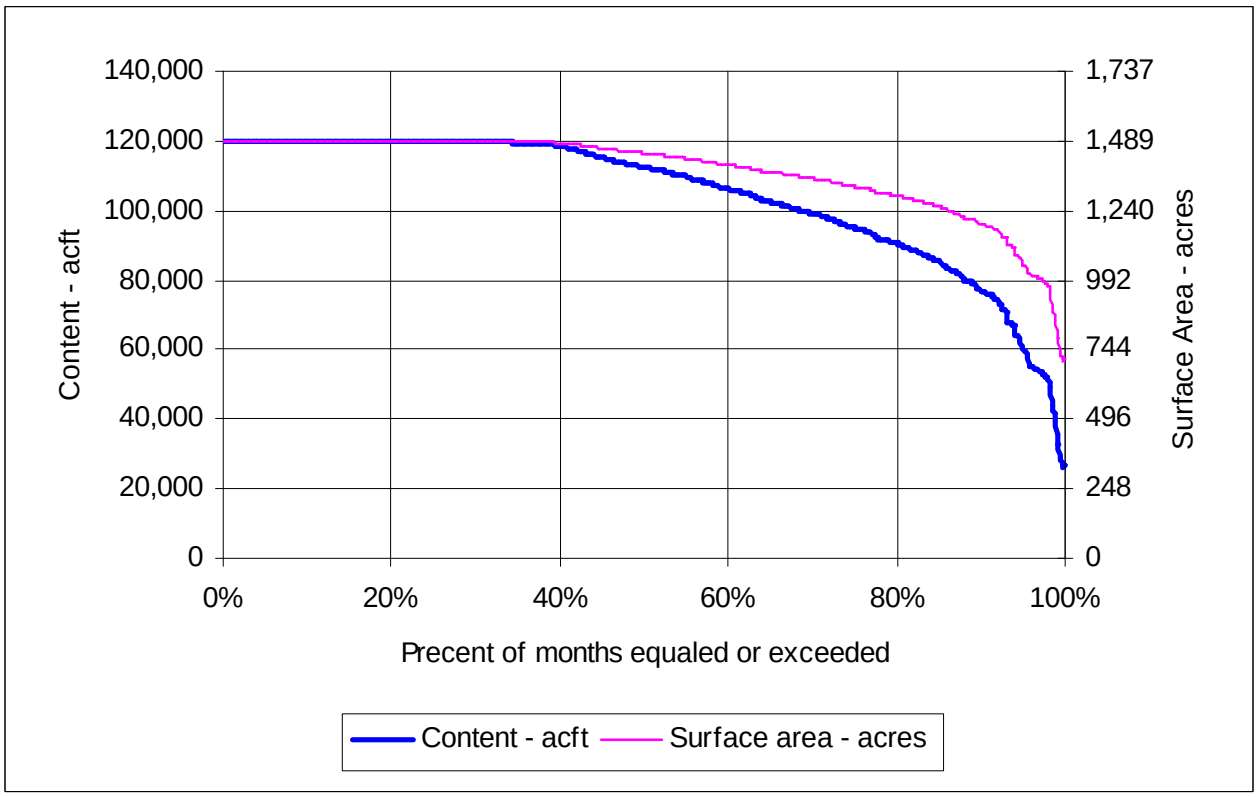


Figure 43. Frequency Distribution of Ridges Basin End-of-month Reservoir Content for the Period 1929-1993 for the Preferred Alternative

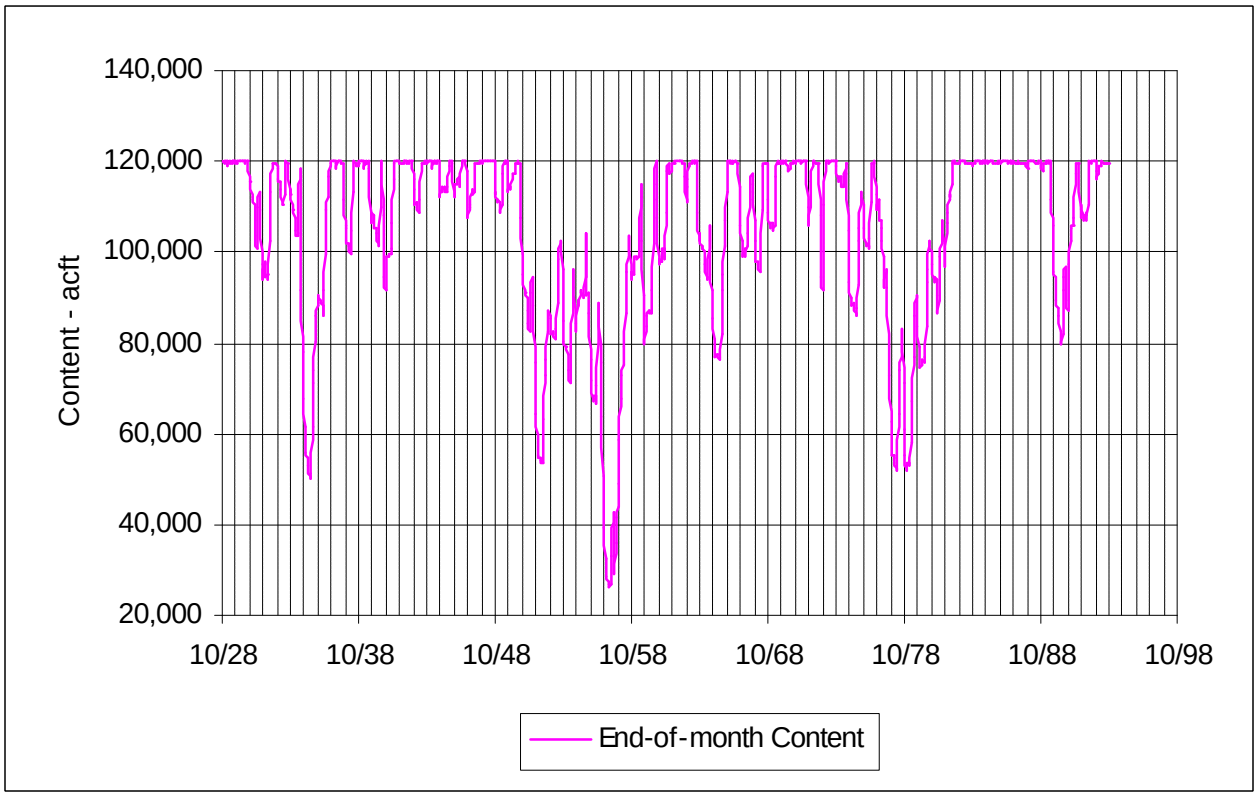


Figure 44. Ridges Basin End-of-month Reservoir Content for the Period 1929-1993 for the Preferred Alternative

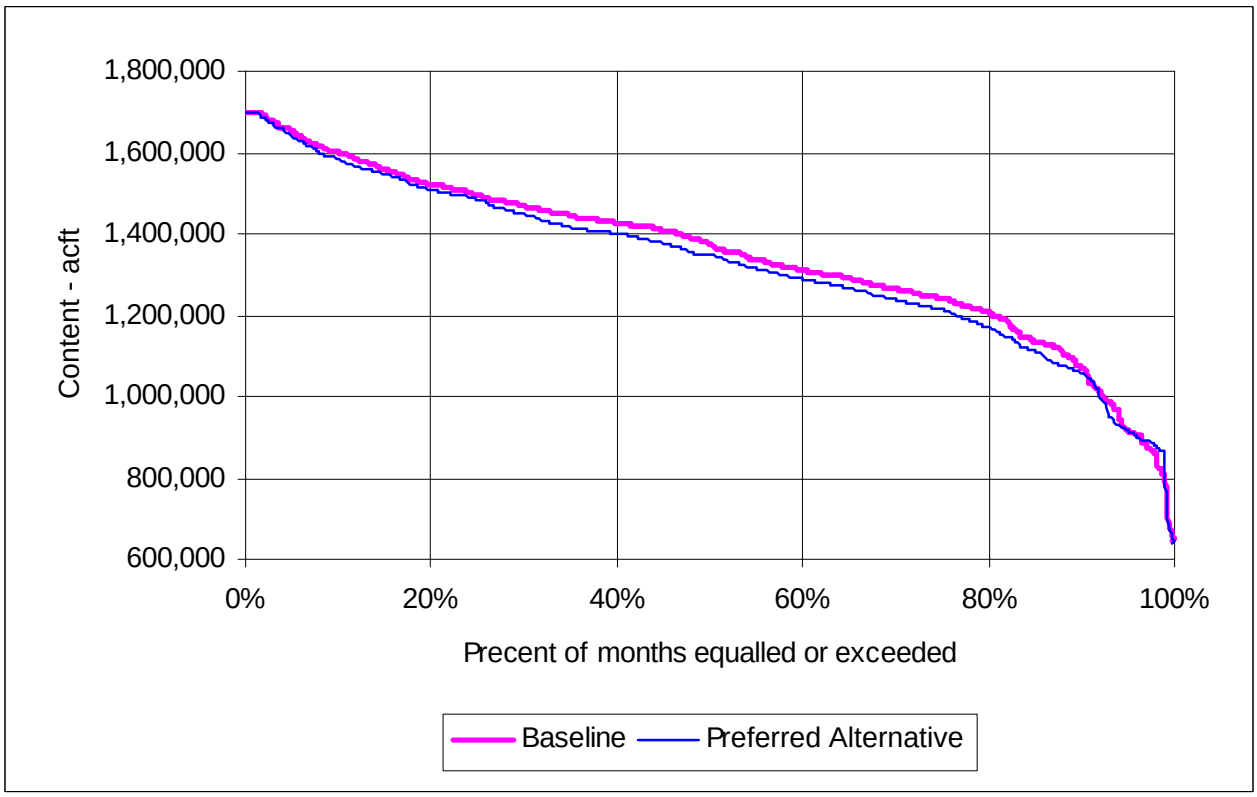


Figure 45. **Frequency Distribution of Navajo Reservoir Content for the Period 1929-1993 under Baseline, and Preferred Alternative Operation**

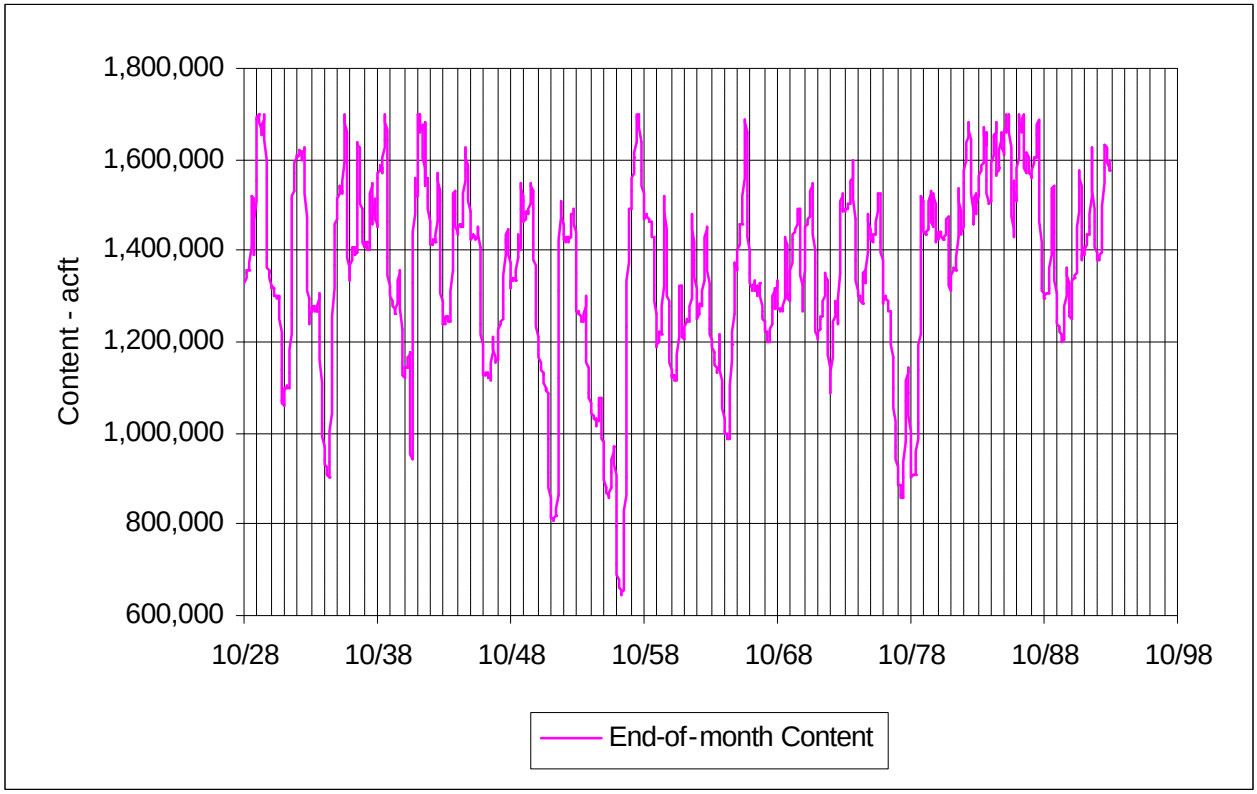


Figure 46. **Navajo Reservoir End-of-month Content for the Period 1929-1993 under Baseline Operating Conditions**

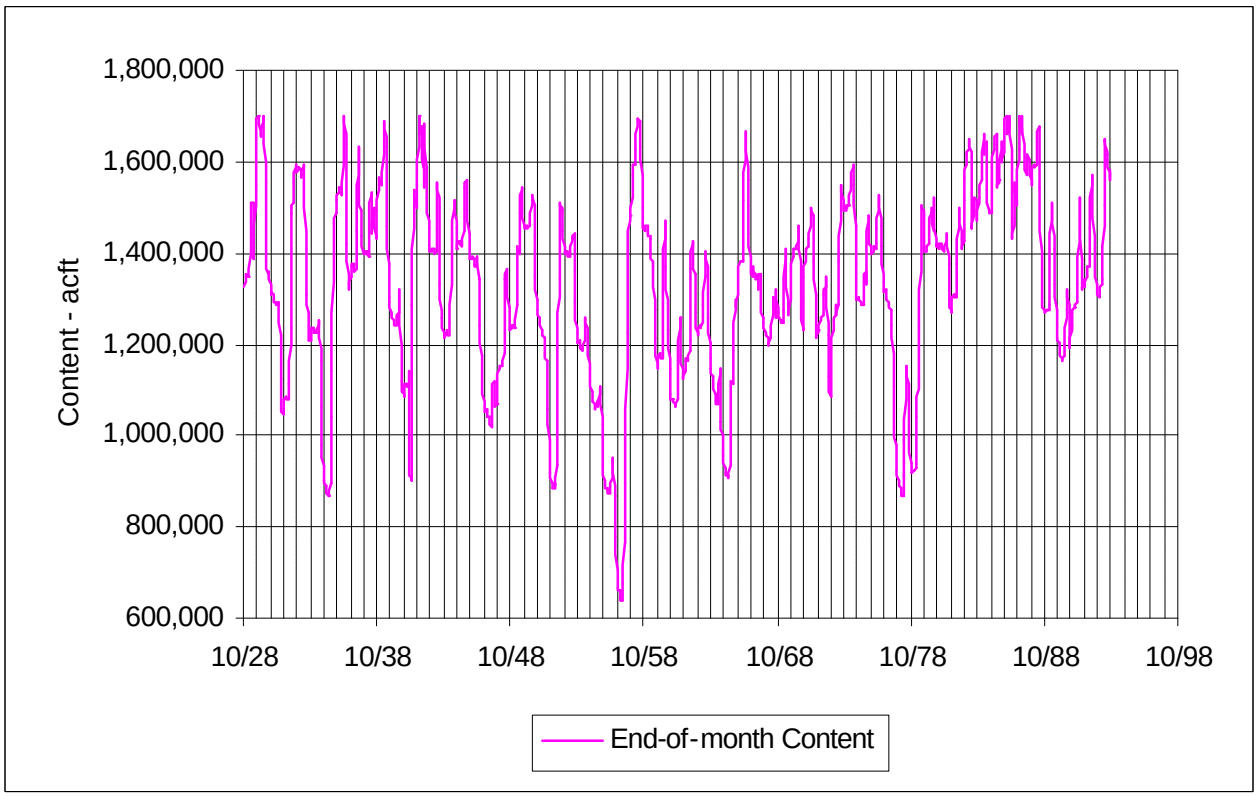


Figure 47. Navajo Reservoir End-of-month Content for the Period 1929-1993 for the Preferred Alternative.