

4.0 Performance Summary

This section summarizes the findings of the most recent (April 2010 through March 2011) assessment of the floodplain and terrace groundwater remediation systems at the Shiprock site, marking the end of the eighth year of active groundwater remediation.

- Groundwater in the floodplain system is currently being extracted from two wells (wells 1089 and 1104) adjacent to the San Juan River north of the disposal cell, two collection trenches (Trench 1 and Trench 2), and a seep collection sump. Approximately 8.6 million gallons of groundwater were extracted from the floodplain aquifer system during this performance period, yielding a cumulative total of about 74 million gallons extracted from the floodplain since March 2003.
- Groundwater in the terrace system is currently being extracted from two drainage trenches (in Bob Lee and Many Devils Washes) and nine wells. From April 2010 through March 2011, approximately 5.2 million gallons of groundwater were extracted from the terrace system, yielding a total cumulative volume (extracted since March 2003) of about 26.6 million gallons. The cumulative volume removed from both terrace and floodplain combined (as of April 1, 2011) is approximately 101 million gallons.
- Terrace-wide, groundwater levels in the majority of alluvial wells sampled during this performance period declined relative to the baseline (2000–2003) period (Figure 30); average and maximum decreases were 2.5 ft and 7.2 ft, respectively. Five alluvial west terrace wells were dry during the March 2011 sampling event. Decreases in some far west terrace wells could be partly or even largely attributable to the previous phasing out of irrigation in the area (circa 2003–2004). Nonetheless, declines in groundwater elevations are widespread, and many seeps on the west terrace have been dry for the last several years (in 2010–2011, all but one seep west of the high school were dry).
- Contaminated groundwater that could potentially discharge to the San Juan River is being intercepted by the remediation system. This contaminated groundwater is pumped to the evaporation pond on the terrace just south of the disposal cell. The estimated masses of sulfate, nitrate, and uranium removed from the floodplain and terrace well fields during this performance period were 734,000 pounds, 33,000 pounds, and 50 pounds, respectively.
- As observed for the last several years, marked decreases in contaminant concentrations are evident in selected floodplain wells—most notably in the Trench 1 and well 1089 areas, but this is also generally the case floodplain-wide. COC concentrations in easternmost Trench 2 area wells (closest to the San Juan River) are still lower than those nearer the escarpment, demonstrating the effectiveness of the Trench 2 system. Finally, COC concentrations in samples collected from the San Juan River samples are still well below established benchmarks and are comparable to upstream (background) results.
- A more detailed assessment of floodplain remediation system performance is documented in the recently issued preliminary evaluation of the Trench 1 collection drain area (DOE 2011d). This analysis is the precursor to a more extensive evaluation of flow and transport processes in the floodplain alluvial aquifer (in progress).
- As shown in Figure 2, the sampling network at the Shiprock site is dense—for this reporting period, 115 monitoring wells were sampled (59 on the floodplain and 56 on the terrace). However, contaminant trends evaluated in this and previous reports indicate that at some locations on both the terrace and the floodplain (and for some constituents in particular), no

trending is apparent. Therefore, DOE recently initiated a detailed evaluation of the current sampling program to assess potential temporal and spatial redundancies in order to optimize the efficiency of the sampling program (work in progress, scheduled for submittal by early 2012).

- In addition to the preliminary Trench 1 evaluation referenced above, DOE issued two other reports in early 2011—*Natural Contamination in the Mancos Shale* (DOE 2011b) and *Geology and Groundwater Investigation at Many Devils Wash* (DOE 2011c). These investigations lay the groundwork for ongoing technical evaluations of potential contributions from natural sources, particularly in Many Devils Wash.
- As has been the case for the last several years, pumping from Trench 2 was shut down periodically during 2010–2011 (mostly during spring runoff) to minimize the loss of available pond capacity. The water level in the pond filled to approximately 2 feet below capacity in early 2011. A drip line was installed to enhance evaporation.