

4.10.2.1 Criterion SWH-1 – USGS Blue line Stream Crossings

Crossings of streams by transportation alternatives may directly affect surface water hydrology and other environmental factors and stream functions. USGS blue line streams are higher order streams that are mapped based on topographic continuity, level of discharge, and sustainability of discharge.

Regulatory Concerns. Crossing of USGS blue line streams by transportation alternatives may result in the following effects to surface water hydrology:

- C Effects to the hydrologic integrity of the stream system in the area of the crossing, or downstream
- C Effects to higher order streams that may provide continuity of riverine habitat in the affected area
- C Constriction or blockage of natural streamflow
- C Constriction or blockage of natural streambed migration across the floodplain in response to upstream precipitation and runoff events
- C Modification of downstream natural flooding regime due to reduced flow volumes or channel constriction
- C Reduction in downstream transport of sediment and nutrients due to reduced flow volumes runoff patterns
- C Reduction in downstream shallow/bank groundwater storage due to reduced flow volumes, changes in flooding patterns, or channel constriction

Evaluation Approach. The extent of constriction of natural streamflows by the proposed alternatives cannot be completely quantified at the program level of detail. However, tabulation and comparison of the number of USGS blue line streams crossed by each alternative provide a quantitative comparison of the potential for these types of impacts. The alternative crossings may affect the surface water hydrology of downstream stream segments; the evaluation seeks to identify the alternative with the minimum number of blue line streams potentially affected.

Impacts of Alternatives. Figure 4.10.4 presents the potential impacts of the HCLE alternatives on USGS blue line streams in each HSA crossed by these alternatives. The number and combined area of the HSAs crossed by each alternative are presented in Table 4.10.G. In general, the number of USGS blue line stream crossings by each alternative is in direct proportion to the overall length of the alternative, and is reflected in the number of HSAs crossed. Alternative 1b is expected to have the greatest potential to affect the hydrologic integrity of the stream system in the project area, disrupt the continuity of riverine habitat, block natural streamflows or streambed migration, reduce downstream shallow/bank groundwater storage, modify the existing downstream natural flooding regime, and reduce the downstream transport of sediment and nutrients. Alternatives 6a and 6b are expected to have the least potential to affect these parameters (Table 4.10.F).

The HSAs crossed by Alternative 1b do not have an apparent higher density of blue

line streams (Figure 4.10.4). The alternative is not very long, and crosses seven HSAs. The position of Alternatives 6a and 6b in the midsection of the relatively flat Menifee HSA greatly reduces the number of USGS blue line streams crossed, since the USGS blue line stream coverage captures primarily higher order streams – first and second order streams are generally not captured and mapped, and areas of little elevation change do not generate large numbers of larger streams.

4.10.2.2 Criterion SWH-2 – Total Potential Stream Crossings

Total potential stream crossings reflect the addition of existing USGS blue line streams (Criterion SWH-1) and crossings of other potential waters of the U.S. determined by examination of aerial photographs and field verification in the alternative bandwidth, to determine the total number of potential crossings of waters affected by the proposed alternatives (Table 4.10.G). These other potential waters are generally first or second order streams that do not meet the physical characteristics of USGS blue line streams discussed in Section 4.10.2.1. These other potential waters were determined for the preparation of the Biological Resources Technical Report (LSA, 2002).

Regulatory Concerns. Regulatory concerns are similar to those identified for potential crossings of USGS blue line streams (Criterion SWH-1).

Evaluation Approach. The alternative crossings may affect the surface water hydrology of downstream stream segments; the evaluation seeks to identify the alternative with the minimum number of streams potentially affected.

Impacts of Alternatives. The number and combined area of the HSAs crossed by each alternative are presented in Table 4.10.F. The Biological Resources Technical Report (LSA, 2002), Appendix A presents the potential impacts of the HCLE alternatives on total potential streams in each HSA crossed by these alternatives. The number of potential stream crossings by each alternative is not apparently in direct proportion to the overall length of the alternative, or reflected in the number of HSAs crossed. Alternative 5b is expected to have the greatest potential to affect the hydrologic integrity and other criteria factors of the stream system in the project area. Alternative 6a is expected to have the least potential to affect these parameters (Table 4.10.G).

Water resources in the HCLE project area have already experienced a substantial amount of alteration as a result of existing development activities. The existing roadway network has affected the watersheds crossed by the proposed alternatives (roadways included are “secondary” and larger, encompassing facilities of at least four lanes of travel). The number of existing roadways observed in the HSAs affected by the HCLE alternatives are generally in direct proportion to the length of the alternatives (Table 4.10.I). The position of the alternative in the affected watersheds also affects the relationship to the alternative; alternatives located higher in the watersheds crossed have most of the roadways located downstream of their position. All of the existing railroad crossings and dams located in these watersheds are positioned upstream of the proposed alternatives (Table 4.10.I).