

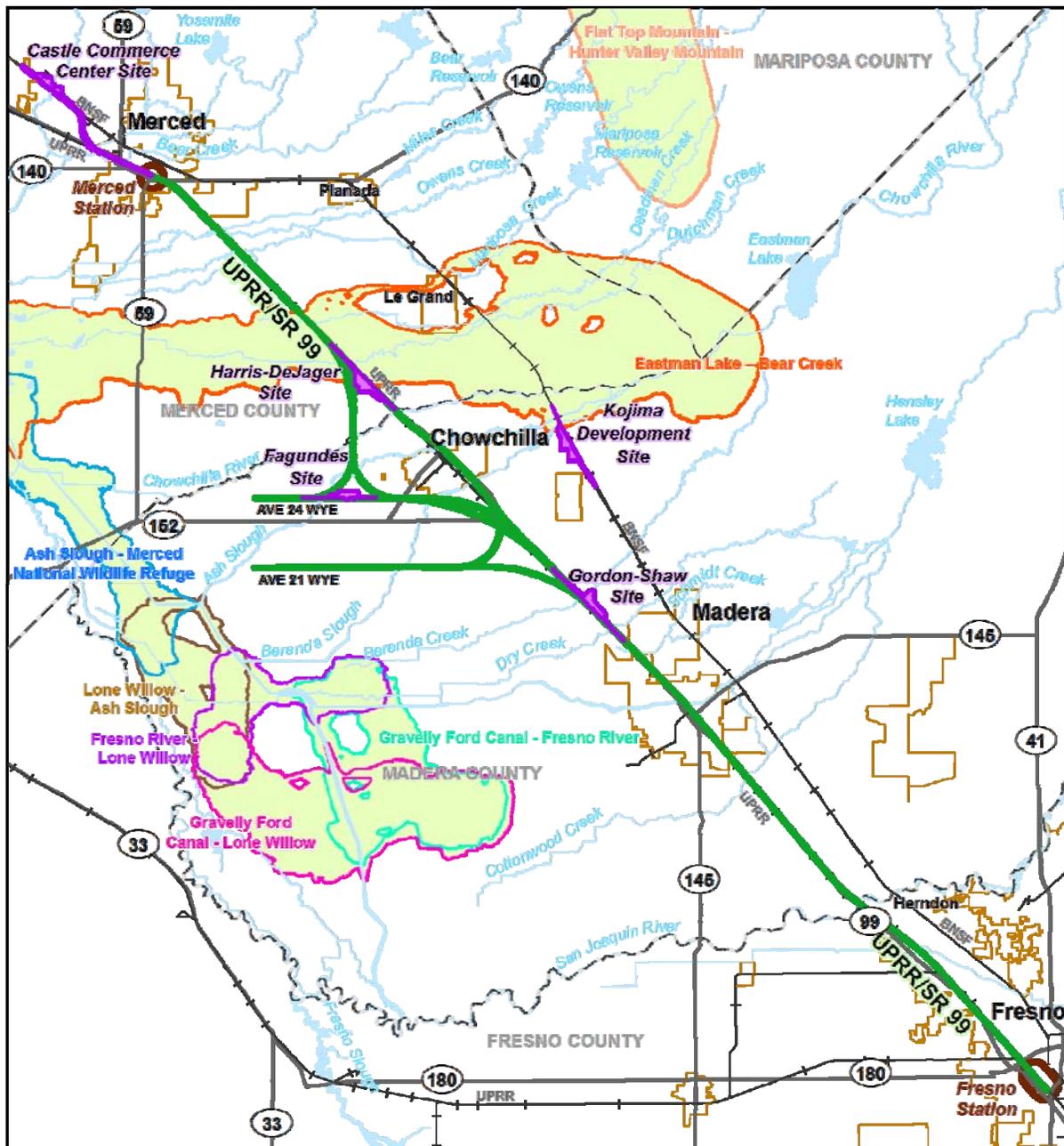
**Figures for the HST Merced to Fresno Section,
Aquatic Sites and Waters of the United States
Potentially Affected by Alternatives Considered**

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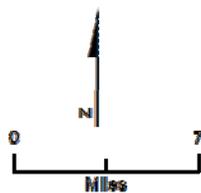
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** Note that these figures are provided under separate cover.*



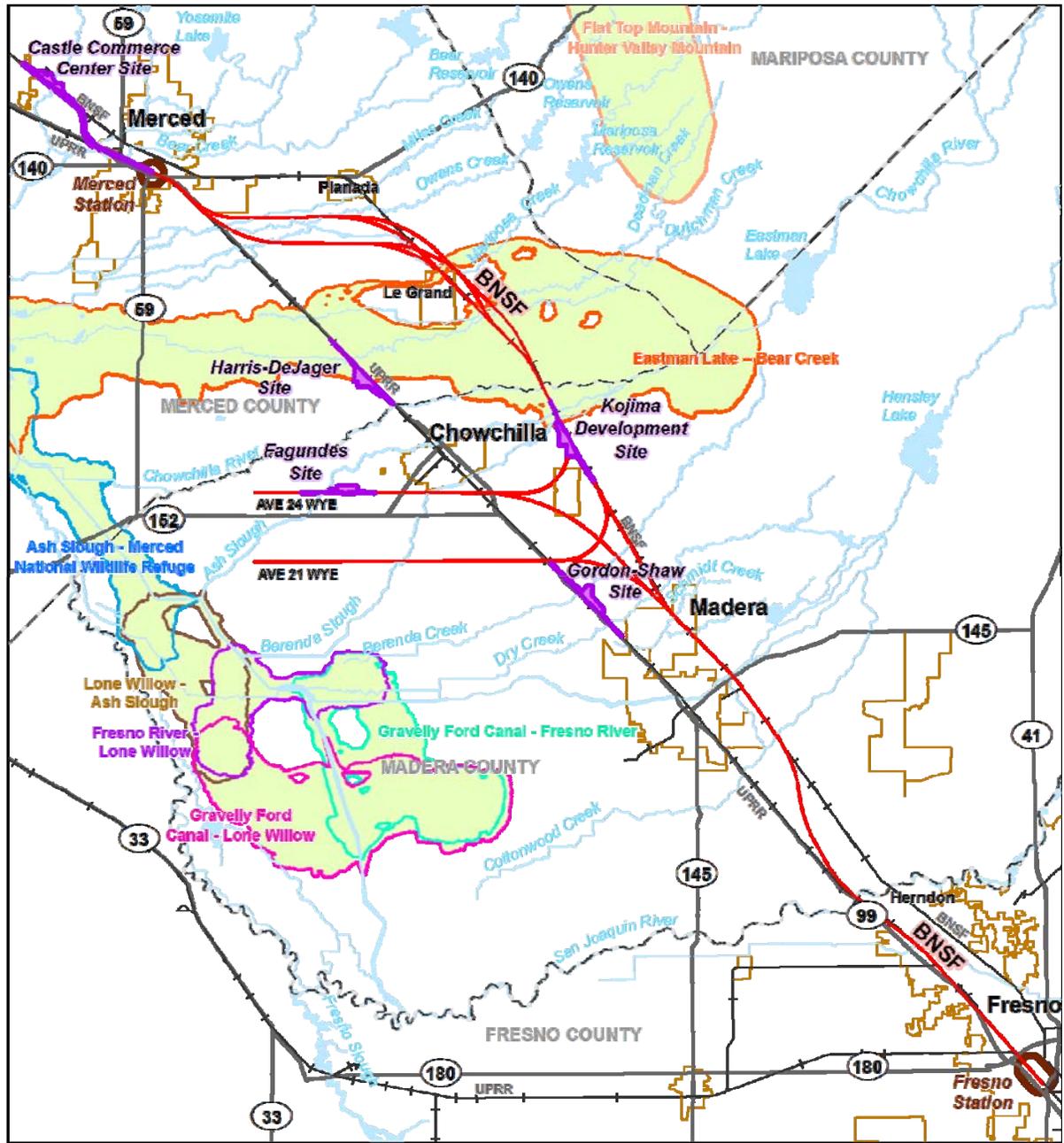
Source: Spencer et al. (2010).

MF_Permit_CP-B_05_UPRR March 24, 2011



- | | |
|--------------------------------------|--|
| UPRR/SR 99 Alternative | Essential Connectivity Area |
| Station Study Area | Ash Slough - Merced National Wildlife Refuge |
| Potential Heavy Maintenance Facility | Eastman Lake - Bear Creek |
| City Limit | Fresno River - Lone Willow |
| County Boundary | Gravelly Ford Canal - Fresno River |
| Railroad | Gravelly Ford Canal - Lone Willow |
| | Lone Willow - Ash Slough |
| | Flat Top Mountain - Hunter Valley Mountain |

FIGURE 3
 Essential Connectivity Areas-UPRR/SR 99 (A1) Alternative

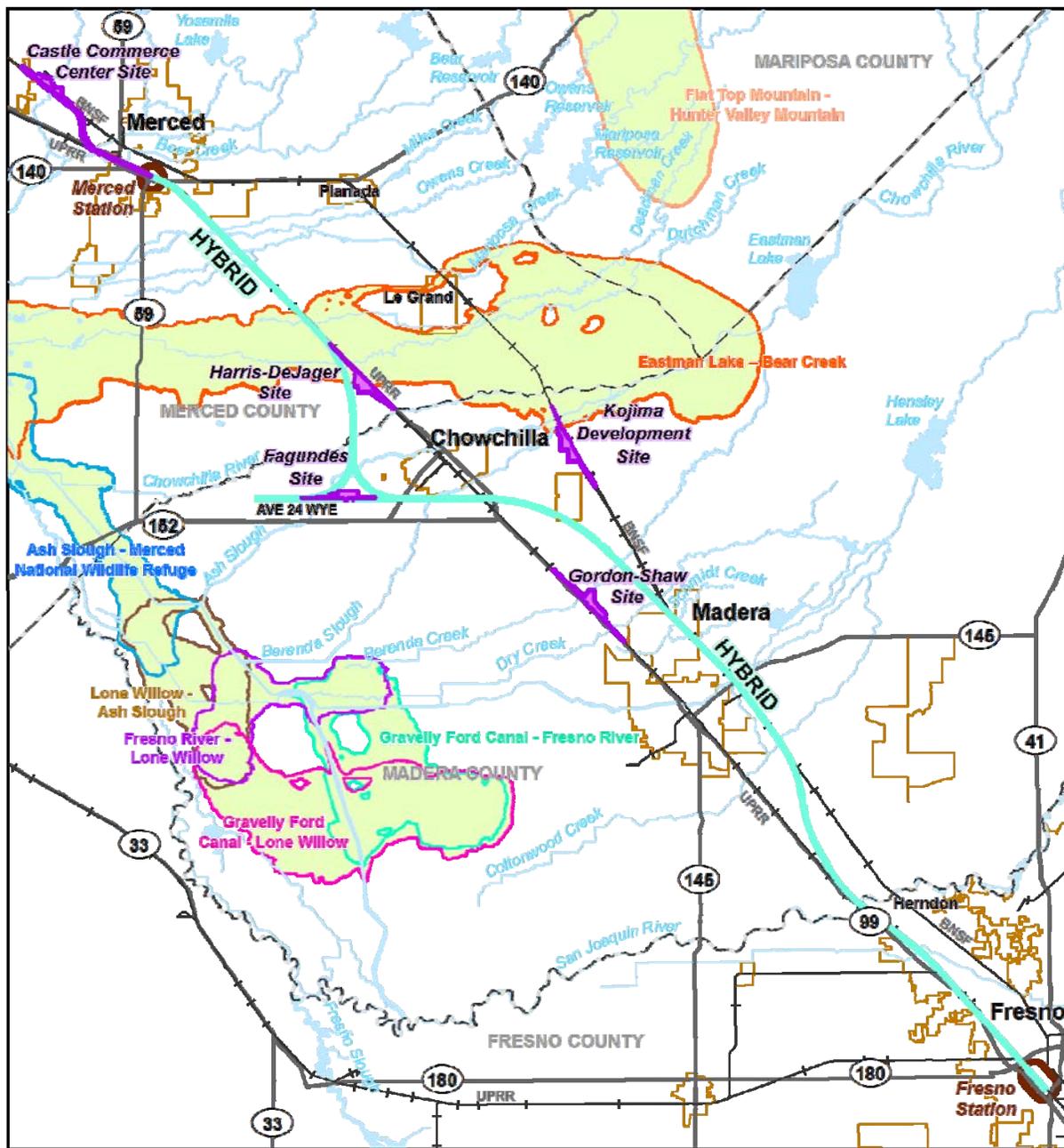


Source: Spencer et al. (2010).

MF_Permit_CP-B_06_BNSF March 24, 2011



FIGURE 4
 Essential Connectivity Areas-BNSF (A2) Alternative



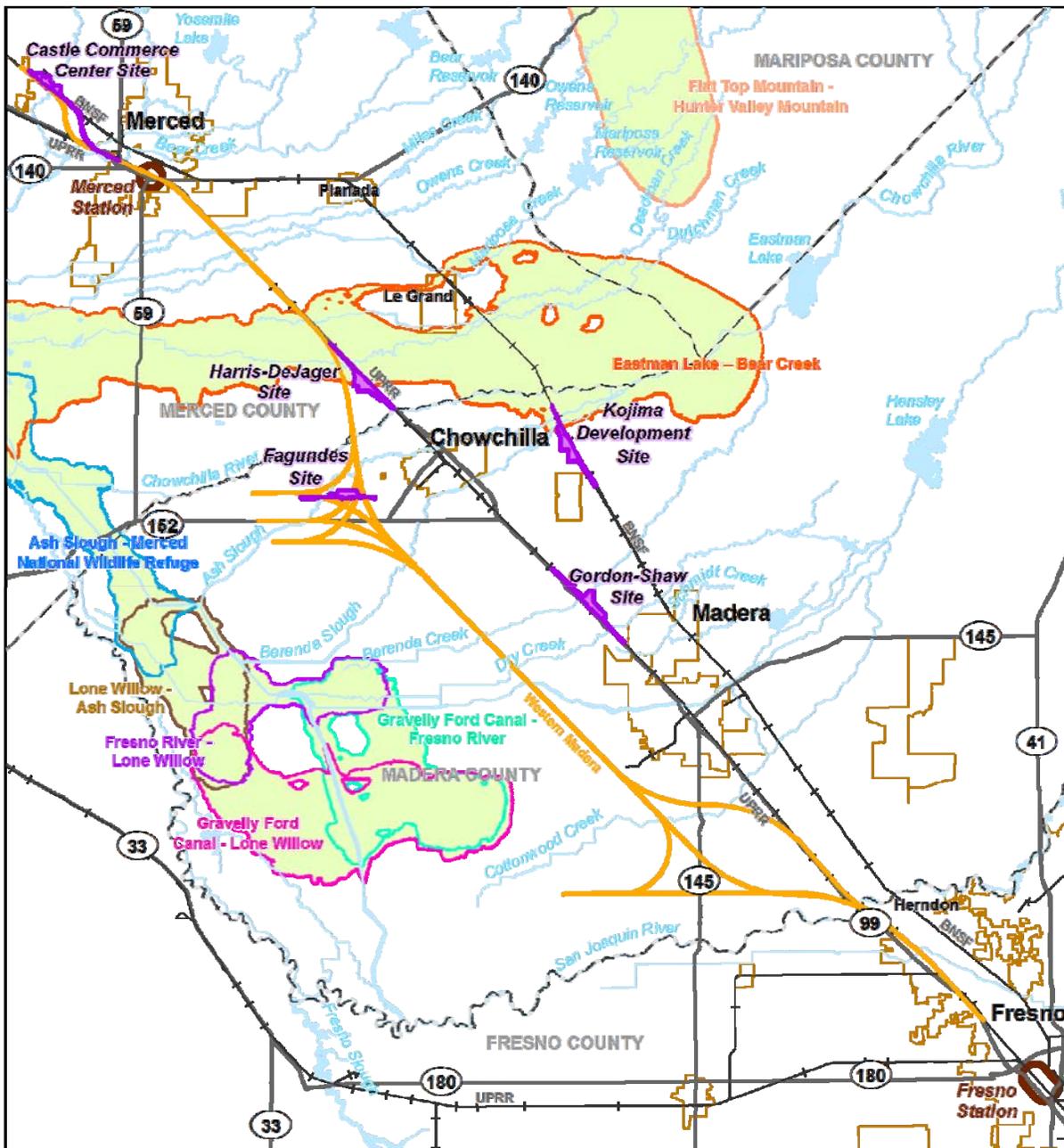
Source: Spencer et al. (2010).

MF_Permit_CP-B_07_HYBRID

March 24, 2011

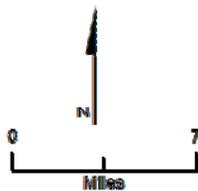


FIGURE 5
 Essential Connectivity Areas-Hybrid Alternative



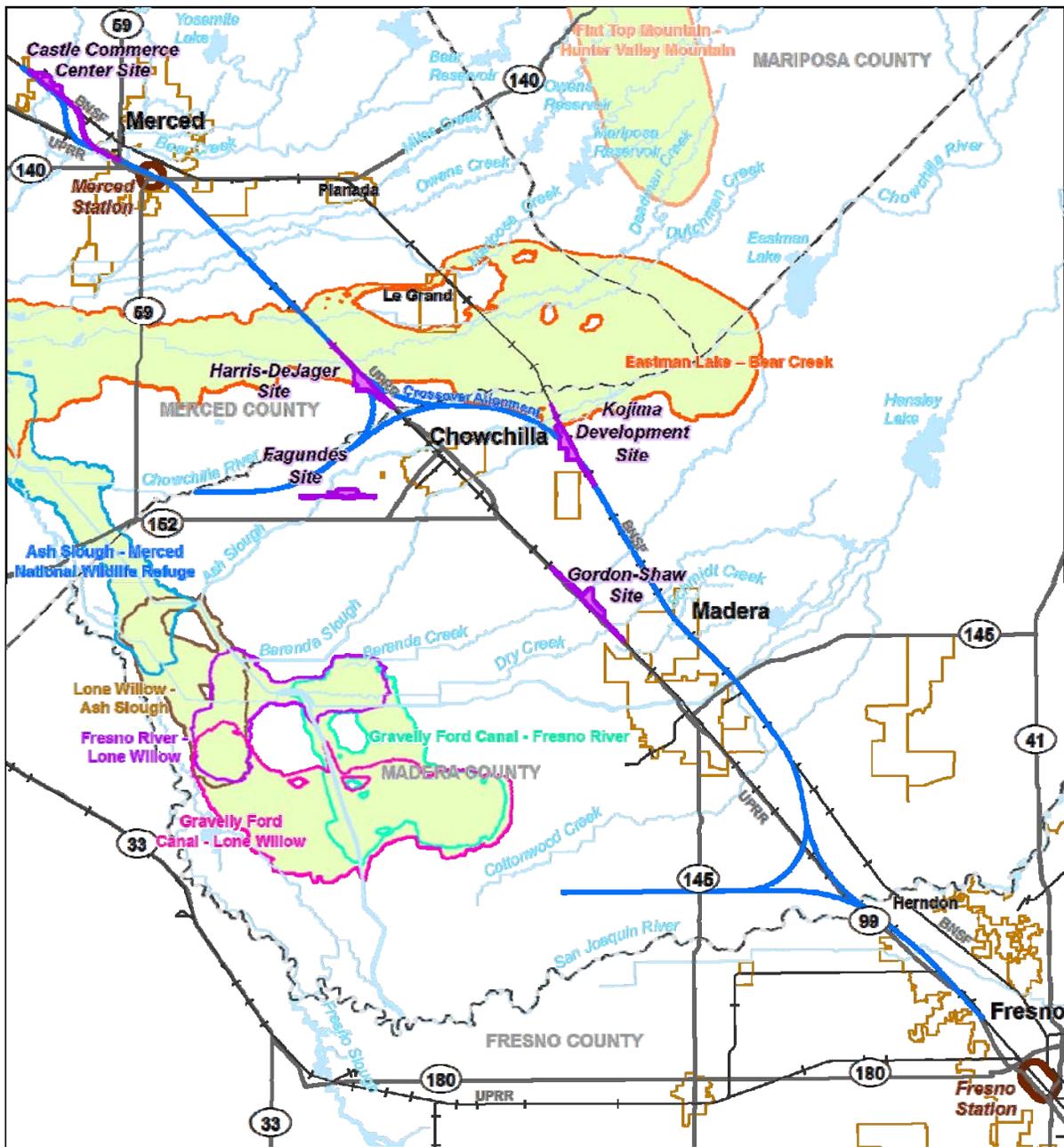
Source: Spencer et al. (2010).

MF_Permit_CP-B_08_A3 March 24, 2011



- | | |
|---|---|
| <ul style="list-style-type: none"> Western Madera Alternative Station Study Area Potential Heavy Maintenance Facility City Limit County Boundary Railroad | <p>Essential Connectivity Area</p> <ul style="list-style-type: none"> Ash Slough - Merced National Wildlife Refuge Eastman Lake - Bear Creek Fresno River - Lone Willow Gravelly Ford Canal - Fresno River Gravelly Ford Canal - Lone Willow Lone Willow - Ash Slough Flat Top Mountain - Hunter Valley Mountain |
|---|---|

FIGURE 6
 Essential Connectivity Areas—Western Madera (A3) Alternative



Source: Spenser et al. (2010).

MF_Permit_CP-B_06_A3 March 24, 2011

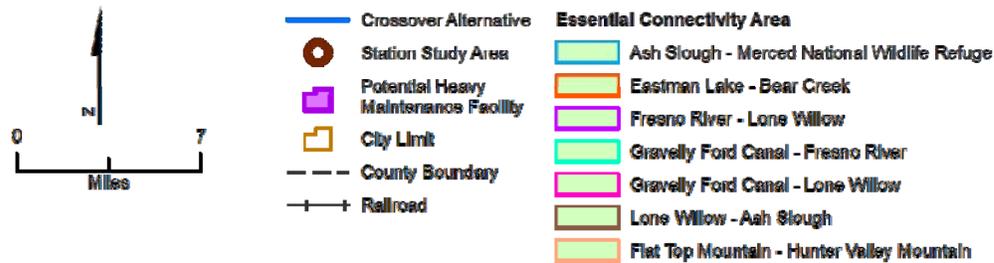


FIGURE 7
 Essential Connectivity Areas-UPRR/BNSF Crossover (A4) Alternative

**Attachment 3 -
Tables for the HST Merced to Fresno Section,
Aquatic Sites and Waters of the United States
Potentially Affected by Alternatives Considered**

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- 1 Summary of Potential Wetlands and Waters Identified by Alternative within the Defined Wetland Study Area (footprint plus 250-foot buffer) (September 2010)
- 2 Summary of Wetlands and Waters Potentially Affected for All Alternatives within the Defined Project Footprint (September 2010)
- 3 Natural Water Body Crossings and Landscape-level Functional Assessment, by Alternative
- 4 Number of Drainage Feature Crossings by Each Alternative, by Drainage Feature Type

TABLE 1
Summary of Potential Wetlands and Waters Identified by Alternative within the Defined Wetland Study Area (footprint plus 250-foot buffer) (September 2010)

Alternative	Vernal Pools and Other Seasonal Wetlands	Coastal and Valley Freshwater Marsh	Fremont Cottonwood Forested Wetlands	Constructed Basin	Constructed Watercourses	Natural Watercourses
Range of Acres by Alternative						
UPRR/SR 99 Alternative (A1) ^a	2.27 to 3.46	1.09 to 3.30	3.55	16.34 to 21.13	33.06 to 37.76	12.03 to 24.14
BNSF Alternative (A2) ^a	21.14 to 29.35	2.87 to 5.66	1.02	17.45 to 27.31	23.64 to 76.34	24.44 to 30.53
Hybrid Alternative	8.40	0.96	3.55	17.51 to 19.24	37.36 to 37.42	30.68
Western Madera Alternative (A3) ^b	0.00	6.70	8.11	3.07	Not available	13.20
UPRR/BNSF Crossover Alternative (A4) ^b	6.00	5.12	8.32	8.75	Not available	14.14
Heavy Maintenance Facility Alternatives						
Castle Commerce Center	0.54	0	0	4.11	5.76	6.18
Harris-DeJager	0	0	0	0	0.86	0.18
Fagundes	0	0	0	0.45	0	0.01
Gordon-Shaw	0	2.69	0	0	0.49	1.78
Kojima Development	0.51	2.13	0	0	0	4.98
Mission Ave.	0.00	0.50	0.00	2.01	Not available	11.34
Harris-Kwan Site	0.00	8.80	0.00	1.47	Not available	0.00
Harris Farms	0.00	0.45	0.00	0.00	Not available	0.00
<p>^a Range reflects each combination of alignment and wye design options.</p> <p>Note: Constructed watercourses and natural watercourses were analyzed together for alignment alternatives A3 and A4, and the three additional HMF sites highlighted in yellow below. This differs from the analysis used for the current three HST alternatives and five HMF sites being considered, thus the blank cells in this table and Table 2.</p> <p>Note: All measurements are rounded to the nearest one-hundredth.</p>						

TABLE 2
Summary of Wetlands and Waters Potentially Affected for All Alternatives within the Defined Project Footprint (September 2010)

Alternative	Vernal Pools and Other Seasonal Wetlands	Coastal and Valley Freshwater Marsh	Fremont Cottonwood Forested Wetlands	Constructed Basin	Constructed Watercourses	Natural Watercourses
Range of Acres by Alternative						
UPRR/SR 99 Alternative (A1) ^a	0.96 to 1.52	0.15 to 0.56	2.64	3.77 to 6.35	12.49 to 17.97	2.60 to 4.92
BNSF Alternative (A2) ^a	4.20 to 5.86	0.51 to 0.94	0	4.73 to 6.25	4.71 to 14.74	5.85 to 7.02
Hybrid Alternative	1.75	0.13	2.64	3.50 to 3.66	12.68 to 12.70	6.99
Western Madera Alternative (A3) ^b	0.00	0.94	2.72	0.75		1.73
UPRR/BNSF Crossover Alternative (A4) ^b	1.96	0.07	2.23	1.07		1.43
Heavy Maintenance Facility Alternatives^c						
Castle Commerce Center	0.40	0	0	1.46	4.68	1.54
Harris-DeJager	0	0	0	0	0	0.11
Fagundes	0	0	0	0.47	0.13	0.12
Gordon-Shaw	0	2.34	0	0	0.22	1.78
Kojima Development	0.75	0.69	0	0.84	0	0.91
Mission Ave	0	0	0	0	0	0
Harris-Kwan Site	0	8.11	0	1.33	0	0
Harris Farms	0	0	0	0	0	0
<p>^a Range reflects each combination of alignment and wye design options.</p> <p>^b Constructed watercourses and natural watercourses were analyzed together for alignment alternatives A3 and A4, and the three additional HMF sites highlighted in yellow below. This differs from the analysis used for the current three HST alternatives and five HMF sites being considered.</p> <p>^c Acreage presented within HMF sites includes proposed impacts associated with rail construction and the potential impact related to HMF construction. HMF impact acreages are higher than those identified within the 250-foot buffer study area as a result of construction prioritization of the rail and HMF sites.</p> <p>Note: All acres are rounded to the nearest one-hundredth.</p>						

TABLE 3
Natural Water Body Crossings and Landscape-Level Functional Assessment, by Alternative

Natural Water Body Name	Alternative/Project Component								
	UPRR/SR 99 (A1)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
Bear Creek	1	P	L	L	DEV	N	N	L	N
Miles Creek Overflow	1	I	M	M	AGR	N	N	M	N
Miles Creek	1	I	M	M	AGR	N	N	M	N
Owens Creek	1	E	M	M	AGR/DEV	N	N	M	N
Duck Slough Overflow	1	I	M	M	AGR/DEV	N	N	M	N
Duck Slough	3	I	M	M	AGR/DEV	N	N	M	N
Mariposa Creek	N/A								
Deadman Creek	1	E	M	M	AGR	Y	N	M	N
Dutchman Creek	1 or 2	I	L	L	AGR	Y	N	L	N
Chowchilla River	1 or 2	I/E	M	M	AGR	N	N	M	M
Ash Slough	1 or 4	E	L	L	AGR	N	N	M	N
Berenda Slough	1 or 2	I/E	M	M	DEV	N	N	L	N
Berenda Creek	1 or 2	I	M	M	AGR	N	N	M	N
Dry Creek	1	I	M	L	AGR	N	N	H	N
Schmidt Creek	1	E	L	L	DEV/AGR	N	N	L	N
Fresno River	1	E	L	L	DEV	N	N	L	N
Cottonwood Creek	1	I	M	M	AGR/DEV	N	N	H	N

Natural Water Body Name	Alternative/Project Component								
	UPRR/SR 99 (A1)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
San Joaquin River	1	P	H	M	NAT	N	CP	H	Y
TOTAL	21 to 25								
<p>Sources:</p> <p>Hydrology, Water Quality, Habitat Integrity, and Riparian ranks from Merced to Fresno Section Wetlands Delineation Report and Hydrology and Floodplains Report Attachments (Fact Sheets) (Authority and FRA 2011a,c).</p> <p>Hydrology: P= perennial, I=intermittent, E=ephemeral. WQ: H=high, M=moderate, L=Low functioning. Habitat Integrity: H=relatively undisturbed with intact riparian habitat, M=moderate level of disturbance, L=highly disturbed/maintained. Riparian: H=intact, broad riparian habitat, M=narrow band of riparian habitat, L=little to no riparian habitat present.</p> <p>Land Use, Habitat Connectivity, and Critical Habitat from GIS and NDDDB queries.</p> <p>Land Use: AGR=agriculture, DEV=developed, NAT=natural/relatively undisturbed lands. Habitat Connectivity: Y=feature crossing is within Eastman Lake-Bear Creek ECA, N=not within noted ECA. Critical Habitat: Y= feature crossing location intersects designated federal Critical Habitat, N=feature does not intersect Critical Habitat.</p> <p>Natural Areas from Merced to Fresno Section Draft Environmental Impact Report/Environmental Impact Statement and Biological Resources Technical Report (Authority and FRA 2011b).</p> <p>Natural Areas: N=no water crossings in natural areas, CP=Camp Pashayan.</p> <p>N/A = Not applicable.</p>									

Natural Water Body Name	Alternative/Project Component								
	BNSF (A2)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
Bear Creek	1	P	L	L	DEV	N	N	L	N
Miles Creek Overflow	N/A								
Miles Creek	0 or 1	I	M	M	AGR	N	N	L	N
Owens Creek	1	E	M	M	AGR	N	N	M	N
Duck Slough Overflow	N/A								
Duck Slough	0 or 1	I	M	M	AGR	N	N	L	N
Mariposa Creek	2 or 3	P?	H	H	AGR	Y	LG	M	N
Unnamed Creek	1	I	L	L	AGR	N	N	L	N
Deadman Creek	1	E	M	M	AGR	Y	N	L	Y
Dutchman Creek	1 or 2	I	L	L	AGR	Y	N	L	N
Unnamed Creeks	4 or 5	I	L	L	AGR	N	N	L	N
Chowchilla River	1	I/E	M	M	AGR	Y	N	L	Y
Ash Slough	1 or 2	E	L	L	AGR	Y	N	L	N
Berenda Slough	2	I/E	M	M	AGR	Y	N	L	N
Berenda Creek	2	I	M	M	AGR	N	N	L	N
Dry Creek	2	I	M	L	AGR	N	N	M	N
Schmidt Creek	1	E	L	L	DEV//AGR	N	N	L	N
Fresno River	1	E	L	L	DEV	N	N	L	N
Cottonwood Creek	1	I	M	M	AGR	N	N	L	N

Natural Water Body Name	Alternative/Project Component								
	BNSF (A2)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
San Joaquin River	1	P	H	M	NAT	N	CP	H	Y
TOTAL	24 to 28								
<p>Sources:</p> <p>Hydrology, Water Quality, Habitat Integrity, and Riparian ranks from Merced to Fresno Section Wetlands Delineation Report and Hydrology and Floodplains Report Attachments (Fact Sheets) (Authority and FRA 2011a,c).</p> <p>Hydrology: P= perennial, I=intermittent, E=ephemeral. WQ: H=high, M=moderate, L=Low functioning. Habitat Integrity: H=relatively undisturbed with intact riparian habitat, M=moderate level of disturbance, L=highly disturbed/maintained. Riparian: H=intact, broad riparian habitat, M=narrow band of riparian habitat, L=little to no riparian habitat present.</p> <p>Land Use, Habitat Connectivity, and Critical Habitat from GIS and NDDDB queries.</p> <p>Land Use: AGR=agriculture, DEV=developed, NAT=natural/relatively undisturbed lands. Habitat Connectivity: Y=feature crossing is within Eastman Lake-Bear Creek ECA, N=not within noted ECA. Critical Habitat: Y= feature crossing location intersects designated federal Critical Habitat, N=feature does not intersect Critical Habitat.</p> <p>Natural Areas from Merced to Fresno Section Draft Environmental Impact Report/Environmental Impact Statement and Biological Resources Technical Report (Authority and FRA 2011b).</p> <p>Natural Areas: N=no water crossings in natural areas, CP=Camp Pashayan, LG=CDFG Le Grand Unit.</p> <p>N/A = Not applicable.</p>									

Natural Water Body Name	Alternative/Project Component								
	Hybrid								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
Bear Creek	1	P	L	L				L	
Miles Creek Overflow	1	I	M	M	AGR	N	N	M	N
Miles Creek	1	I	M	M	AGR	N	N	M	N
Owens Creek	1	E	M	M	AGR/DEV	N	N	M	N
Duck Slough Overflow	N/A								
Duck Slough	3	I	M	M	AGR/DEV	N	N	M	N
Mariposa Creek	N/A								
Deadman Creek	1	E	M	M	AGR	Y	N	M	N
Dutchman Creek	1	I	L	L	AGR	Y	N	L	N
Chowchilla River	1	I/E	M	M	AGR	N	N	M	M
Ash Slough	4	E	L	L	AGR	N	N	M	N
Berenda Slough	1	I/E	M	M	DEV	N	N	L	N
Berenda Creek	1	I	M	M	AGR	N	N	L	N
Dry Creek	1	I	M	L	AGR	N	N	M	N
Schmidt Creek	1	E	L	L	DEV/AGR	N	N	L	N
Unnamed Creek	1	I	L	L	AGR	N	N	L	N
Fresno River	1	E	L	L	DEV	N	N	L	N
Cottonwood Creek	1	I	M	M	AGR	N	N	L	N
San Joaquin River	1	P	H	M	NAT	N	CP	H	Y

Natural Water Body Name	Alternative/Project Component								
	Hybrid								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
TOTAL	22								
<p>Sources:</p> <p>Hydrology, Water Quality, Habitat Integrity, and Riparian ranks from Merced to Fresno Section Wetlands Delineation Report and Hydrology and Floodplains Report Attachments (Fact Sheets) (Authority and FRA 2011a,c).</p> <p>Hydrology: P= perennial, I=intermittent, E=ephemeral. WQ: H=high, M=moderate, L=Low functioning. Habitat Integrity: H=relatively undisturbed with intact riparian habitat, M=moderate level of disturbance, L=highly disturbed/maintained. Riparian: H=intact, broad riparian habitat, M=narrow band of riparian habitat, L=little to no riparian habitat present.</p> <p>Land Use, Habitat Connectivity, and Critical Habitat from GIS and NDDDB queries.</p> <p>Land Use: AGR=agriculture, DEV=developed, NAT=natural/relatively undisturbed lands. Habitat Connectivity: Y=feature crossing is within Eastman Lake-Bear Creek ECA, N=not within noted ECA. Critical Habitat: Y= feature crossing location intersects designated federal Critical Habitat, N=feature does not intersect Critical Habitat.</p> <p>Natural Areas from Merced to Fresno Section Draft Environmental Impact Report/Environmental Impact Statement and Biological Resources Technical Report (Authority and FRA 2011b).</p> <p>Natural Areas: N=no water crossings in natural areas, CP=Camp Pashayan.</p> <p>N/A = Not applicable.</p>									

Natural Water Body Name	Alternative/Project Component								
	Western Madera (A3)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
Bear Creek	1	P	L	L	DEV	N	N	L	N
Miles Creek Overflow	N/A								
Miles Creek	1	I	M	M	AGR	N	N	M	N
Owens Creek	1	E	M	M	AGR/DEV	N	N	M	N
Duck Slough Overflow	1	I	M	M	AGR/DEV	N	N	M	N
Duck Slough	1	I	M	M	AGR/DEV	N	N	M	N
Mariposa Creek	N/A								
Deadman Creek	1	E	M	M	AGR	Y	N	M	N
Dutchman Creek	1	I	M	M	AGR	Y	N	M	N
Chowchilla River	1	I/E	L	L	AGR	Y	N	L	N
Ash Slough	2 to 3	E	L	L	AGR	Y	N	L	N
Berenda Slough	2	I/E	M	M	AGR	Y	N	M	N
Berenda Creek	1	I	L	L	AGR	N	N	L	N
Dry Creek	1	I	L	L	AGR	N	N	L	N
Schmidt Creek	1	E	L	L	DEV/AGR	N	N	L	N
Fresno River	1	E	L	L	AGR	N	N	L	N
Cottonwood Creek	1	I	M	M	AGR	N	N	M	N
San Joaquin River	1	P	H	M	NAT	N	CP	H	Y
Unnamed Creeks	4 to 9	I	L	L	AGR	N	N	L	N

Natural Water Body Name	Alternative/Project Component								
	Western Madera (A3)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
TOTAL	22 to 28								
<p>Sources:</p> <p>Hydrology, Water Quality, Habitat Integrity, and Riparian ranks from Merced to Fresno Section Wetlands Delineation Report and Hydrology and Floodplains Report Attachments (Fact Sheets) (Authority and FRA 2011a,c).</p> <p>Hydrology: P= perennial, I=intermittent, E=ephemeral. WQ: H=high, M=moderate, L=Low functioning. Habitat Integrity: H=relatively undisturbed with intact riparian habitat, M=moderate level of disturbance, L=highly disturbed/maintained. Riparian: H=intact, broad riparian habitat, M=narrow band of riparian habitat, L=little to no riparian habitat present.</p> <p>Land Use, Habitat Connectivity, and Critical Habitat from GIS and NDDDB queries.</p> <p>Land Use: AGR=agriculture, DEV=developed, NAT=natural/relatively undisturbed lands. Habitat Connectivity: Y=feature crossing is within Eastman Lake-Bear Creek ECA, N=not within noted ECA. Critical Habitat: Y= feature crossing location intersects designated federal Critical Habitat, N=feature does not intersect Critical Habitat.</p> <p>Natural Areas from Merced to Fresno Section Draft Environmental Impact Report/Environmental Impact Statement and Biological Resources Technical Report (Authority and FRA 2011b).</p> <p>Natural Areas: N=no water crossings in natural areas, CP=Camp Pashayan.</p> <p>N/A = Not applicable.</p>									

Natural Water Body Name	Alternative/Project Component								
	UPRR/BNSF Crossover (A4)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
Bear Creek	1	P	L	L	DEV	N	N	L	N
Miles Creek Overflow	N/A								
Miles Creek	1	I	M	M	AGR	N	N	M	N
Owens Creek	1	E	M	M	AGR/DEV	N	N	M	N
Duck Slough Overflow	1	I	L	L				L	
Duck Slough	1	I	M	M	AGR/DEV	N	N	M	N
Mariposa Creek	N/A								
Deadman Creek	1	E	M	M	AGR	Y	N	M	N
Dutchman Creek	2	I	L	L	AGR	Y	N	L	N
Chowchilla River	3	I/E	L	L	DEV/AGR	Y	N	L	N
Ash Slough	1	E	L	L	AGR	Y	N	L	N
Berenda Slough	1	I/E	L	L	AGR	Y	N	L	N
Berenda Creek	1	I	M	M	AGR	Y	N	L	N
Dry Creek	1	I	M	L	AGR	N	N	M	N
Schmidt Creek	1	E	L	L	DEV/AGR	N	N	L	N
Fresno River	1	E	L	L	DEV/AGR	N	N	L	N
Cottonwood Creek	1	E	L	L	DEV/AGR	N	N	L	N
San Joaquin River	1	P	H	M	NAT	N	CP	H	Y
Unnamed Creeks	7	I	L	L	AGR	N	N	L	N

Natural Water Body Name	Alternative/Project Component								
	UPRR/BNSF Crossover (A4)								
	# Crossings	Hydrology	Water Quality	Habitat Integrity	Land Use	Habitat Connectivity	Natural Areas	Riparian	Crit. Hab./ Spp
TOTAL	26								
<p>Sources:</p> <p>Hydrology, Water Quality, Habitat Integrity, and Riparian ranks from Merced to Fresno Section Wetlands Delineation Report and Hydrology and Floodplains Report Attachments (Fact Sheets) (Authority and FRA 2011a,c).</p> <p>Hydrology: P= perennial, I=intermittent, E=ephemeral. WQ: H=high, M=moderate, L=Low functioning. Habitat Integrity: H=relatively undisturbed with intact riparian habitat, M=moderate level of disturbance, L=highly disturbed/maintained. Riparian: H=intact, broad riparian habitat, M=narrow band of riparian habitat, L=little to no riparian habitat present.</p> <p>Land Use, Habitat Connectivity, and Critical Habitat from GIS and NDDDB queries.</p> <p>Land Use: AGR=agriculture, DEV=developed, NAT=natural/relatively undisturbed lands. Habitat Connectivity: Y=feature crossing is within Eastman Lake-Bear Creek ECA, N=not within noted ECA. Critical Habitat: Y= feature crossing location intersects designated federal Critical Habitat, N=feature does not intersect Critical Habitat.</p> <p>Natural Areas from Merced to Fresno Section Draft Environmental Impact Report/Environmental Impact Statement and Biological Resources Technical Report (Authority and FRA 2011b).</p> <p>Natural Areas: N=no water crossings in natural areas, CP=Camp Pashayan.</p> <p>N/A = Not applicable.</p>									

TABLE 4
 Number of Drainage Features Crossings by Each Alternative, by Drainage Feature Type

Feature Type	BNSF 99 (A1)	UPRR/SR (A2)	Hybrid	A3	A4
Canals and Ditches	58 to 66	38 to 54	54	51 to 59 [59 to 67]*	39 [44]*
Natural Waterbodies	24 to 28	24 to 30	22	21 to 25	25
<p>* A total of 35 canals were added to the National Hydrography Dataset prior to totaling canals and ditches for A1, A2, and the Hybrid. The location and identification of these canals was provided by irrigation districts, and filled in missing data. Because Alternatives A3 and A4 were not included in the Hydraulics and Floodplains Technical Report (Authority and FRA [2011b]), there was no opportunity to identify and include missing canals prior to counting canals and ditches for Alternatives A3 and A4. It is likely, therefore, that the canal counts for those portions of A3 and A4 that do not overlap the other alignments is low. The numbers in brackets are judgment-based corrections.</p>					