



Subregional Long-Term Wastewater Project

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# STREAM CROSSINGS ASSESSMENT

## SANTA ROSA SUBREGIONAL LONG-TERM WASTEWATER PROJECT

*Prepared for*

**City of Santa Rosa  
and  
U.S. Army Corps of Engineers**

**April 1996**

*Prepared by:*

**Merritt Smith Consulting  
Environmental Science and Communication**  
*3675 Mt. Diablo Blvd. #120 Lafayette, CA 94549*

*For*

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**HARLAND BARTHOLOMEW & ASSOCIATES, INC.**

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# AUTHORS

This report was prepared by Richard W. Maddox.

## 1.0 PURPOSE

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The purpose of this report is to characterize the streams that would be crossed by storage transmission and irrigation distribution pipelines for the current five project alternatives of the Santa Rosa Long-Term Wastewater Project (the Project). This characterization provides the basis for a later evaluation of the potential impacts of construction, maintenance and pipeline ruptures on the water quality and aquatic biology at stream crossings (see *Water Quality Impact Analysis Report*, and *Aquatic Biological Resources Impacts Assessment* technical reports, both Merritt Smith Consulting 1996). Results of the impacts analyses, developed from information in this report, appear in the EIR/EIS (Section 4.6, Surface Water Quality, and Section 4.9 Aquatic Biological Resources).

## 2.0 RESULTS

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### 2.1 STUDY AREA

The stream crossings study area is shown in Figure 1 (see Appendix 1). This map set provides a manageable scale for review of the Project area, and includes the pipeline alignments and the locations of the stream crossings surveyed. Table 1 lists the location identifiers for each of the stream crossings that appear in the map set.

The streams and their aquatic habitat are described below for six affected environments of the Project. The affected environments include: 1) West County, 2) South County, 3) Sebastopol, 4) Bayflats, 5) Geysers, and 6) Santa Rosa Plain/Russian River. Separating the streams into these affected environments is somewhat arbitrary; many of the streams could be considered to be in more than one environment. Small pipelines that convey irrigation water from distribution lines to individual properties are not included in this report, nor is an evaluation of stream crossings for existing pipelines for the no project environment.

### 2.2 METHODOLOGY

All stream crossings along the proposed pipeline alignments were surveyed for their aquatic habitat quality. Surveys were conducted from June 12 through August 3, 1995 at the end of a wet winter with record rainfall. Many streams still had flow, which is probably characteristic of the high antecedent rainfall. A data collection form was completed at all proposed crossings for streams with suitable habitat and flow to support aquatic life. Completed forms appear in Appendix 2. Small seasonal streams without suitable habitat and flow to support aquatic life were surveyed, but a form was not completed for them.

The surveys were conducted without entering the streams to avoid entering private property and the survey forms were developed to describe the aquatic habitat at pipeline crossings with this constraint in mind. In most cases, the surveys were conducted from the bridge crossing the streams, and estimates of habitat and potential species presence were made for a minimum of 50 feet upstream and downstream of the crossing. Information collected on the forms (e.g., type of substrate, embeddedness, and percent canopy) using this method for characterizing aquatic habitat was effective, given the restrictions of access.

#### 2.2.1 Survey Stream Characteristics

A summary of the stream characteristics for the surveyed crossings appears in Table 1. The table provides a method for comparing selected characteristics for each pipeline crossing and evaluating aquatic habitat. Stream names and a cross-street are given for all crossings where a form was completed. Project maps are referenced (with the dates the

maps were created) and the stream crossings are grouped by six affected environments for the Project.

Table 1.

Stream Crossings Characteristics

Map ID	Stream and Location	Map Reference & Date	Affected Environment	Sensitive Species <sup>a</sup>	Habitat Type <sup>b</sup>	Permanence <sup>c</sup>	Canopy (%) <sup>d</sup>	Primary Substrate <sup>e</sup>	Secondary Substrate <sup>e</sup>	In-Stream Shelter <sup>f</sup>	Embeddedness (%) <sup>g</sup>
W-1	Blucher at Lone Pine Rd	F-2C-P, 4/13/95	West County	CA red-legged frog, CA freshwater shrimp, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Pool 40% Riffle 30% Glide 30%	seasonal	80	silt	sand	emergents	>50
W-2	Blucher at Bloomfield Rd	F-2C-P, 4/13/95	West County	CA red-legged frog, CA freshwater shrimp, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Pool 70% Glide 30%	seasonal	80	silt	sand	emergents, root wads	>50
W-3	Unnamed Cr at Bloomfield Rd	F-3D-P, 4/13/95	West County	Northwestern pond turtle, Tidewater goby, CA red-legged frog	Pool 20% Riffle 80%	seasonal	1	silt	silt	none	>50
W-4	Gossage Cr at Petersen Rd	F-2C-P, 4/13/95	West County	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Pool 80% Riffle 20%	seasonal	70	silt	sand	boulders	>50
W-5	Americano Cr at Roblar Rd	G-3B-P, 4/14/95	West County	CA red-legged frog, Northwestern pond turtle, Tidewater goby	Pool 20% Riffle 80%	seasonal	90	sand	silt	emergents	>50



**Table 1.**

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Map ID	Stream and Location	Map Reference & Date	Affected Environment	Sensitive Species <sup>a</sup>	Habitat Type <sup>b</sup>	Permanence <sup>c</sup>	Canopy (%) <sup>d</sup>	Primary Substrate <sup>e</sup>	Secondary Substrate <sup>e</sup>	In-Stream Shelter <sup>f</sup>	Embeddedness (%) <sup>g</sup>
W-6	Americano Cr at Hwy 1	F-3D-P, 7/19/95	West County	CA red-legged frog, Northwestern pond turtle, Tidewater goby, CA Brackish-water snail	Pool 100%	perennial	20	silt	silt	emergents	>50
W-7	Unnamed Cr at Estero Ln	G-3A-P, 6/20/95	West County	CA red-legged frog, Northwestern pond turtle, Tidewater goby, CA Brackish-water snail	Pool 100%	seasonal	0	silt	silt	none	>50
W-8	Unnamed Cr at Valley Ford Rd	G-3B-P, 4/14/95	West County	CA red-legged frog, Northwestern pond turtle, Tidewater goby	Riffle 50% Glide 50%	seasonal	0	sand	sand	emergents	>50
W-9	Washoe Cr at Stony Pt Rd	F-2C-P, 7/19/95	West County	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Pool 100%	seasonal	10	silt	silt	emergents	>50
W-10	Gossage Cr at Stony Pt Rd	F-2C-P, 7/19/95	West County	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Riffle 50% Pool 50%	seasonal	20	silt	silt	emergents, submergents	>50
W-11	Unnamed Cr at Walker Rd	G-2A-P, 7/19/95	West County	CA red-legged frog, Northwestern pond turtle, Tidewater goby, CA Brackish-water snail, CA freshwater shrimp	Pool 100%	seasonal	0	silt	silt	emergents	>50

**Table 1.**

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W-12	Stemple at Petaluma-Valley Ford Rd	G-2A-P, 7/19/95	West County	CA red-legged frog, Northwestern pond turtle, Tidewater goby, CA Brackish-water snail, CA freshwater shrimp	Pool 100%	seasonal	0	silt	silt	none	>50
S-1	Copeland Cr at Petaluma Hill Rd	F-2D-P, 7/19/95	South County	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch	none	seasonal	70	sand	gravel	none	>50
S-2	Crane Cr at Petaluma Hill Rd	F-2D-P, 7/19/95	South County	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch	Pool 100%	seasonal	80	silt	cobble	boulders	>50
S-3	Hinebaugh Cr at Petaluma Hill Rd	F-2D-P, 7/19/95	South County	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch	Pool 100%	seasonal	50	silt	cobble	emergents	>50
S-4	Unnamed Cr at Petaluma Hill Rd	F-2D-P, 7/19/95	South County	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch	none	seasonal	50	sand	gravel	none	>50

**Table 1.**

**Stream Crossings Characteristics**

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S-5	Unnamed Cr at Adobe Rd	G-2B-P, 7/19/95	South County	Northwestern pond turtle, Sacramento splittail, CA red-legged frog, Steelhead trout	none	seasonal	80	silt	silt	root wads boulders	>50
S-6	Lichau Cr at Adobe Rd	G-2B-P, 4/14/95	South County	Northwestern pond turtle, Sacramento splittail, CA red-legged frog, Steelhead trout	Pool 60% Riffle 20% Glide 20%	seasonal	0	silt	sand	emergents, boulders	>50
S-7	Lichau Cr at Petaluma Hill Rd	G-2B-P, 7/19/95	South County	Northwestern pond turtle, Sacramento splittail, CA red-legged frog, Steelhead trout	Pool 100%	seasonal	10	silt	gravel	emergents	>50
S-8	Unnamed Cr at Roberts Rd	F-2D-P, 7/19/95	South County	Northwestern pond turtle, Sacramento splittail, CA red-legged frog, Steelhead trout	none	seasonal	1	sand	cobble	none	>50
S-9	Willow Brook Cr at Adobe Rd	G-2B-P, 4/14/95	South County	Northwestern pond turtle, Sacramento splittail, CA red-legged frog, Steelhead trout	Riffle 50% Glide 50%	seasonal	0	silt	sand	none	>50
S-10	Lynch Cr at Adobe Rd	G-2B-P, 4/14/95	South County	CA red-legged frog, Northwestern pond turtle, Sacramento splittail, Steelhead trout	Pool 10% Riffle 90%	seasonal	60	silt	gravel	root wads, boulders	>50
S-11	Unnamed Cr at Ely Rd	G-1C-P, 4/14/95	South County	CA red-legged frog, Northwestern pond turtle, Sacramento splittail, Steelhead trout	Pool 30% Riffle 20% Glide 50%	seasonal	30	silt	cobble	emergents, boulders	>50

**Table 1.**

**Stream Crossings Characteristics**

Map ID	Stream and Location	Map Reference & Date	Affected Environment	Sensitive Species <sup>a</sup>	Habitat Type <sup>b</sup>	Permanence <sup>c</sup>	Canopy (%) <sup>d</sup>	Primary Substrate <sup>e</sup>	Secondary Substrate <sup>e</sup>	In-Stream Shelter <sup>f</sup>	Embeddedness (%) <sup>g</sup>
S-12	Wheat Cr at Lakeville Hwy	G-1C-P, 4/14/95	South County	CA red-legged frog, Northwestern pond turtle, Sacramento splittail, Steelhead trout	Pool 10% Glide 90%	seasonal	0	silt	sand	none	>50
SB-1	Unnamed Cr at Mills Stn Rd	F-3B-P, 7/19/95	Sebastopol	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	seasonal	90	silt	silt	emergents, woody debris	>50
SB-2	Atascadero Cr at Mills Stn Rd	F-3B-P, 7/19/95	Sebastopol	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, CA freshwater shrimp, Navarro roach	Glide 100%	perennial	70	silt	cobble	emergents	>50
SB-3	Unnamed Cr at Watertrough Rd	F-3B-P, 7/19/95	Sebastopol	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, CA freshwater shrimp, Navarro roach	Riffle 50% Glide 50%	seasonal	95	silt	silt	emergents, woody debris, ledge/root wad, boulders	>50

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**Stream Crossings Characteristics**

Map ID	Stream and Location	Map Reference & Date	Affected Environment	Sensitive Species <sup>a</sup>	Habitat Type <sup>b</sup>	Permanence <sup>c</sup>	Canopy (%) <sup>d</sup>	Primary Substrate <sup>e</sup>	Secondary Substrate <sup>e</sup>	In-Stream Shelter <sup>f</sup>	Embeddedness (%) <sup>g</sup>
SB-4	Atascadero Cr at Watertrough Rd	F-3B-P, 7/19/95	Sebastopol	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, CA freshwater shrimp, Navarro roach	Glide 100%	perennial	85	silt	silt	emergents, woody debris	>50
B-1	Tolay Cr at Hwy 128	H-1B-P, 6/20/95	Bay Flats	none	none	seasonal	0	silt	silt	none	>50
G-1	Big Sulphur Cr at Geysers	WW-1, 5/11/95	Geysers	Coho salmon, Steelhead trout, Foothill yellow-legged frog, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Pool 30% Riffle 70%	perennial	70	cobble	gravel	woody debris, boulders	10-50
G-2	Cobb Cr at Geysers	WW-4, 5/11/95	Geysers	Coho salmon, Steelhead trout, Foothill yellow-legged frog, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Pool 20% Riffle 80%	perennial	90	cobble	gravel	woody debris, boulders	10-50
G-3	Squaw Cr (alt route) at Geysers	WW-6, 5/11/95	Geysers	Coho salmon, Steelhead trout, Foothill yellow-legged frog, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Pool 10% Riffle 90%	seasonal	100	cobble	gravel	boulders	<10

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Map ID	Stream and Location	Map Reference & Date	Affected Environment	Sensitive Species <sup>a</sup>	Habitat Type <sup>b</sup>	Permanence <sup>c</sup>	Canopy (%) <sup>d</sup>	Primary Substrate <sup>e</sup>	Secondary Substrate <sup>e</sup>	In-Stream Shelter <sup>f</sup>	Embeddedness (%) <sup>g</sup>
G-4	Squaw Cr (main) at Geysers	WW-9, 5/11/95	Geysers	Coho salmon, Steelhead trout, Foothill yellow-legged frog, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Pool 10% Riffle 90%	perennial	60	gravel	silt	woody debris, boulders	10-50
G-5	Anna Belcher Cr at Pine Flat Rd	PA-1 (1), 5/8/5	Geysers	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Pool 1% Riffle 80% Glide 19%	perennial	0	cobble	sand	emergents, boulders	>50
G-6	Hurley Cr at Pine Flat Rd	PA-1(1), 5/8/95	Geysers	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Pool 5% Riffle 95%	perennial	0	gravel	silt	emergents, boulders	>50
G-7	Little Sulphur Cr at Pine Flat Rd	PA-1(2), 5/8/95	Geysers	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Riffle 100%	perennial	80	gravel	sand	emergents, cobble	>50
G-8	Unnamed Cr at Bear Canyon and Pine Flat Rd	PA-2(1), 3/29/95	Geysers	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Riffle 100%	seasonal	99	bedrock	cobble	boulders	<10

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G-9	Deer Cr at Pine Flat Rd	PA-2(1), 3/29/95	Geysers	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Pool 20% Glide 80%	seasonal	100	cobble	gravel	boulders	10-50
G-10	Sausal Cr at Pine Flat Rd	PA-2(1), 3/29/95	Geysers	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Riffle 30% Glide 70%	perennial	30	sand	silt	none	>50
G-11	Sausal Cr at Hwy 128	PA-2(2), 3/29/95	Geysers	Coho salmon, Steelhead trout, CA red-legged frog, Northwestern pond turtle, Hardhead, Russian River tule perch, Navarro roach	Riffle 30% Glide 70%	perennial	10	sand	silt	cobble	>50
G-12	Hoot Owl Cr at Hwy 128	PA-3(1), 3/31/95	Geysers	Coho salmon, Steelhead trout, Northwestern pond turtle, Hardhead, Russian River tule perch, CA red-legged frog, Navarro roach	Pool 10% Riffle 90%	seasonal	60	sand	gravel	none	>50
G-13	Maacama Cr at Chalk Hill Rd	PA-3(2), 3/3/95	Geysers	CA red-legged frog, Foothill yellow-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Riffle 60% Glide 40%	perennial	20	sand	gravel	ledges, root wads	>50

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G-14	Franz Cr at Chalk Hill Rd	PA-3(2), 3/31/95	Geysers	CA red-legged frog, Foothill yellow-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Riffle 20% Glide 80%	perennial	20	sand	gravel	none	>50
G-15	Brooks Cr at Chalk Hill Rd	PA-4(1), 4/3/95	Geysers	CA red-legged frog, Foothill yellow-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Riffle 100%	seasonal	30	sand	cobble	none	>50
G-16	Unnamed Cr at Hembree Rd	PA-5, 4/3/95	Geysers	Hardhead, Russian River tule perch, CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Navarro roach	Pool 70% Glide 30%	seasonal	50	sand	silt	emergents, submergents	> 50
G-17	Pool Cr at Conde Ln	PA-5, 4/3/95	Geysers	Hardhead, Russian River tule perch, CA red-legged frog, WTP, Coho salmon, Steelhead trout, Navarro roach	Pool 80% Glide 20%	seasonal	60	sand	silt	emergents, woody debris	>50
G-18	Mark West Cr at Slusser Rd	PA-6(2), 4/4/95	Geysers	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Pool 30% Riffle 20% Glide 50%	perennial	70	sand	silt	emergents, woody debris, boulders	>50



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SR-1	Matanzas Cr at Farmers Ln	E-2D-P, 6/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Pool 10% Glide 90%	perrenial	80	silt	cobble	emergents boulders	>50
SR-2	Matanzas Cr at Hoen Frontage Rd	E-2D-P, 6/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Riffle 20% Glide 80%	perrenial	90	silt	cobble	boulders	>50
SR-3	Santa Rosa Cr at Willowside Rd	PA-7, 4/4/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	perrenial	0	sand	silt	emergents	>50
SR-4	Santa Rosa Cr at Stony Poit Rd	E-2C-P, 7/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Riffle 10% Glide 90%	perrenial	0	silt	cobble	boulders	>50
SR-5	Flood control at Marlow and West College	E-2C-P, 7/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	seasonal	5	silt	sand	emergents boulders	>50

Table 1.

Stream Crossings Characteristics

Map ID	Stream and Location	Map Reference & Date	Affected Environment	Sensitive Species <sup>a</sup>	Habitat Type <sup>b</sup>	Permanence <sup>c</sup>	Canopy (%) <sup>d</sup>	Primary Substrate <sup>e</sup>	Secondary Substrate <sup>e</sup>	In-Stream Shelter <sup>f</sup>	Embeddedness (%) <sup>g</sup>
SR-6	Flood control at Marlow and Greeneich	E-2C-P, 7/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	seasonal	0	silt	silt	emergents	>50
SR-7	Flood control at Apache St	E-2C-P, 7/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	seasonal	1	silt	cobble	emergents	>50
SR-8	Laguna at Stony Point Rd	F-2C-P, 7/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Pool 50% Glide 50%	perennial	60	silt	silt	emergents	>50
SR-9	Laguna at Delta Pond & Guerneville Bridge	E-3D-P, 7/19/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	perennial	40	silt	silt	emergents	>50
SR-10	Laguna at Trenton-Healdsburg Rd	E-3B-P, 4/13/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	perennial	40	silt	sand	emergents	>50

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Map ID	Stream and Location	Map Reference & Date	Affected Environment	Sensitive Species <sup>a</sup>	Habitat Type <sup>b</sup>	Permanence <sup>c</sup>	Canopy (%) <sup>d</sup>	Primary Substrate <sup>e</sup>	Secondary Substrate <sup>e</sup>	In-Stream Shelter <sup>f</sup>	Embeddedness (%) <sup>g</sup>
SR-11	Laguna at River Rd	E-3B-P, 4/13/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	perennial	10	silt	sand	none	>50
SR-12	Laguna at Llano Rd	F-2C-P, 4/13/95	Santa Rosa Plain	CA red-legged frog, Northwestern pond turtle, Coho salmon, Steelhead trout, Hardhead, Russian River tule perch, Navarro roach	Glide 100%	perennial	20	silt	sand	emergents	>50

Source: Merritt Smith Consulting, 1995

<sup>a</sup> Sensitive Species (that project habitat potentially supports): Coho salmon (*Oncorhynchus kisutch*), Steelhead trout (*Oncorhynchus mykiss*), Hardhead (*Mylopharodon conocephalus*), Russian River tule perch (*Heterocarpus traskii*), Sacramento splittail (*Pogonichthys macrolepidotus*), Tidewater goby (*Eucyclogobius newberryi*), California Tiger Salamander (*Ambystoma tigrinum californiensis*), California red-legged frog (*Rana aurora draytoni*), Foothill yellow-legged frog (*Rana boylei*), Northwestern pond turtle (*Clemmys marmorata marmorata*), California Brackish-water snail (*Tryonia imitator*), California freshwater shrimp (*Syncaris pacifica*), Navarro roach (*Lavinia symmetricus navarroensis*), Tomales isopod (*Caecidotea tomalensis*).

<sup>b</sup> Habitat Type (estimated for 50 feet upstream and downstream of the crossing): Pool = deeper water with little or no flow, Glide = low to moderate velocity flow with wide uniform channel bottom, Riffle = swiftly flowing turbulent water with exposed substrate.

<sup>c</sup> Permanence: P = Perennial; continuous surface flow through summer, or subsurface flow sufficient to maintain cool water in intermittent pools during dry season. S = Seasonal; dries completely or nearly so; warm pools or stock ponds may persist, but no cool pools in dry season.

<sup>d</sup> Canopy: the overhead leaves and branches of stream side vegetation.

<sup>e</sup> Substrate: Silt = <0.062 mm, Sand = 0.062-2.0 mm, Gravel = 2.0-64.0 mm, Cobble = 64-256 mm

<sup>f</sup> In-Stream Shelter: areas of shelter in a stream channel that provide aquatic organisms protection from predators or competitors and/or a place in which to rest and conserve energy due to a reduction in the force of the current.

<sup>g</sup> Embeddedness: the degree that larger particles (boulders, cobble, or gravel) are surrounded or covered by fine sediment.

### **2.2.1-1 Physical Parameters**

During the surveys, an assessment of stream habitat was made (using physical parameters of the streams) to determine the ability of the stream to maintain sensitive aquatic species. These sensitive species are protected by state, California Department of Fish & Game (CDFG) or Federal, United States Fish & Wildlife Service (USFWS) regulations. Knowledge of downstream habitat, professional judgment based on the physical characteristics of the streams and input from CDFG (pers. comm., Cox 1995) were used to assess potential for sensitive species presence at each crossing.

Perennial streams with embeddedness less than 10 percent, canopy 75 percent or more, and existing in-stream shelter generally provide the highest quality aquatic habitat in the Project area. Most of these higher quality streams exist along the Geysers alignment (e.g., Big Sulphur Creek, Cobb Creek, and Squaw Creek). As embeddedness increases, protective shelter and shelter for prey decreases. A decrease in the percent canopy reduces the habitat for terrestrial insects (that become prey for aquatic organisms when they fall into the water) and increases water temperatures. Streams with lower habitat quality (high embeddedness, reduced canopy, minimal in-stream shelter) were prevalent in all six affected environments. Those streams along the alignments with particularly poor habitat quality included the Laguna de Santa Rosa, Pool Creek, Gossage Creek, Washoe Creek, Lichau Creek, Willow Brook Creek, Wheat Creek, Tolay Creek and Stemple Creek.

### **2.2.1-2 Affected Species**

Several sensitive aquatic species (those with state or federal status) are known to live within streams in the Project area. In addition, many locations along the pipeline alignments contain habitat suitable for those sensitive species. Table 1 includes a listing of the sensitive aquatic species that either exist at or downstream of the pipeline crossing, or whose habitat is represented at the crossing. Table 2 provides information on the federal and state status of the sensitive species that potentially exist in the project area (including many of the crossings). Life history information for these species appears in *Biological Resources Technical Memorandum, Volume II* (HBA 1996). Habitat information for these species appears in *Aquatic Habitat Survey Results* technical report (MSC 1996).

Table 2.

Project Area Sensitive Species

Sensitive (Special Status) Species	Status	
	State <sup>a</sup>	Federal <sup>b</sup>
Steelhead trout ( <i>Oncorhynchus mykiss</i> ) <sup>c</sup>	--	--
Coho salmon ( <i>Oncorhynchus kisutch</i> )	SCT	FPT
Hardhead ( <i>Mylopharodon conocephalus</i> )	SSC	--
Russian River tule perch ( <i>Hysterocarpus traskii pom</i> )	SSC	--
Tidewater goby ( <i>Eucyclogobius newberryi</i> )	SSC	FE
Sacramento splittail ( <i>Pogonichthys macrolepidotus</i> )	SSC	FPT
River lamprey ( <i>Lampetra ayresii</i> )	SSC	--
Navarro roach ( <i>Lavinia symmetricus navarroensis</i> )	SSC	--
California red-legged frog ( <i>Rana aurora draytoni</i> )	SSC	FPE
Foothill yellow-legged frog ( <i>Rana boylei</i> )	SSC	--
California tiger salamander ( <i>Ambystoma tigrinum californiense</i> )	SSC	FC
Northwestern pond turtle ( <i>Clemmys marmorata marmorata</i> )	SSC	--
California freshwater shrimp ( <i>Syncaris pacifica</i> )	SE	FE

Source: Harland Bartholomew & Associates 1996

<sup>a</sup> **State status:** State status data taken from CDFG documents, Endangered and Threatened Animals of California and Listing Dates (Revised April 1996) and Special Animals (Revised August 1994).

SE = State-listed Endangered, ST = State-listed Threatened, CR = State-listed Rare, SCE = State Candidate Endangered, SCT = State Candidate Threatened, SSC = Species of Special Concern, CFP = State-listed Fully Protected

<sup>b</sup> **Federal Status:** Federal status and probable distribution in Marin and Sonoma counties determined by correspondence with Laurie Simons-USFWS, 9 February 1994.

FE = Federal-listed Endangered, FT = Federal-listed Threatened, FPE = Proposed Endangered, FPT = Proposed Threatened, FC = Candidate for listing under the Endangered Species Act

Note: In a series of federal register notices (50 CFR Part 17, Volume 61, Number 40, 7457-74563 and 7595-7613, February 28, 1996), the USFWS reclassified 96 candidate taxa of plants and animals. The USFWS no longer recognizes a federal candidate category 2 status. There are now 182 plant and 89 animal taxa on a single candidate species list. These taxa are considered by the USFWS as candidates for possible addition to the List of Endangered and Threatened Plants and Animals. As a consequence, the status of many taxa originally included in the analysis has changed, requiring that many taxa be removed from the list of species being considered in this EIR/EIS analysis. See Biological Resources Technical Memorandum, Volume II (HBA 1996) for further information.

<sup>c</sup> While the steelhead has no current state or federal status, both DFG and NMFS are investigating its listing.

### 3.0 REFERENCES

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Appendix 1 Figures showing the Stream Crossing Study Area are located in Biological Resources Vol. 4E (Appendix K-5)

Appendix 2 of this document is filed as Exhibit I-15