

***EXCERPTS FROM***

**MARIN COUNTY STREAM CROSSING INVENTORY AND FISH PASSAGE  
EVALUATION**

**FINAL REPORT**

**Prepared for the County of Marin – Department of Public Works**

**By**

**Ross Taylor and Associates**

**July 2003**

The report introduction states:

The inventory and fish passage evaluation of county-maintained stream crossings within the County of Marin was conducted between May, 2002 and June 2003. The primary objective was to assess passage of juvenile and adult salmonids and develop a project-scheduling document to prioritize corrective treatments to provide unimpeded fish passage at road/stream intersections. The inventory was focused primarily on County-maintained crossings within anadromous stream reaches within Marin County watersheds known to historically and/or currently support runs of coho salmon (*Oncorhynchus kisutch*) and/or steelhead (*O. mykiss irideus*). However, a number of city and state-maintained crossings were also evaluated.

**Excerpt from Table 3.** Site ID numbers for 90 Marin County stream crossings.

<b>SITE ID #</b>	<b>STREAM NAME</b>	<b>ROAD NAME</b>	<b>ROAD ID#</b>
<b>MR-078</b>	San Anselmo Creek #1	Saunders Avenue	San Anselmo
<b>MR-079</b>	San Anselmo Creek #2	Pastori Avenue	Fairfax
<b>MR-080</b>	Fairfax Creek	Bolinas Avenue	Fairfax
<b>MR-081</b>	Sleepy Hollow Creek #1	Deer Hollow Road	SF 010
<b>MR-082</b>	Sleepy Hollow Creek #2	Fawn Drive	SF 012
<b>MR-083</b>	Sleepy Hollow Creek #3	Butterfield Road	ASF 002

**Excerpt from Table 4.** Hydraulic capacities of 90 Marin County stream crossings. Capacity is expressed as both a discharge (cfs) and a return-interval (years) for flows overtopping culvert inlet (HW/D=1) and overtopping road prism (HW/F=1).

<b>Site ID #</b>	<b>Stream Name</b>	<b>Road Name</b>	<b>Capacity at HW/D=1 (cfs)</b>	<b>Capacity at HW/F=1 (cfs)</b>	<b>Return Interval to Overtop Culvert (years)</b>	<b>Return Interval to Overtop Road Prism (years)</b>
<b>MR-078</b>	San Anselmo Creek #1	Saunders Avenue	6,401.0	6,600.0	>250	>250
<b>MR-079</b>	San Anselmo Creek #2	Pastori Avenue	4,551.0	7,030.0	>250	>250
<b>MR-080</b>	Fairfax Creek	Bolinas Avenue	465.3	742.5	6	29
<b>MR-081</b>	Sleepy Hollow Creek #1	Deer Hollow Road	1,560.0	1,690.0	>250	>250
<b>MR-082</b>	Sleepy Hollow Creek #2	Fawn Drive	985.5	1,620.0	>250	>250
<b>MR-083</b>	Sleepy Hollow Creek #3	Butterfield Road	542.8	1,180.0	96	>250

Excerpt from Table 5. Ranked list of 90 Marin County stream crossings located in anadromous-bearing stream reaches.

Rank	Site ID#	Stream Name	Road Name	Presumed Species Diversity	Barrier Score	Length of Upstream Habitat (ft)	TOTAL SCORE	Comments Regarding Site and any Adjustments made to Final Rank
<b>Tied for #12</b>	MR-078	San Anselmo Creek #1	Saunders Avenue	Steelhead, coho?	15	47,100	22.0	High-priority due to length of potential habitat – more than eight miles. The current fish ladder appears ineffective and should be replaced. A literature review conducted by Taylor and Associates confirmed that the current structure fails to meet Denil fish ladder specifications. The narrow concrete channel downstream of the fish ladder is also an impediment to fish migration. A replacement structure needs to address the downstream concrete channel too. The City of San Anselmo Public Works should consult with CDFG and NOAA hydraulic engineers for design assistance.
<b>Tied for #14</b>	MR-080	Fairfax Creek	Bolinas Avenue	Steelhead	15	9,600	21.4	<b>NOTE:</b> drop in order of treatment scheduling because of high-cost to implement the recommended treatment option (replacement). The current box culvert is 458 feet long and its outlet is perched 4.2 feet. Treatment options at this site are problematic because of several factors. A retrofit is probably not feasible because the box culvert is undersized and the inlet overtops on less than a 10-year storm flow, thus further reduction of capacity by baffles or weirs within the culvert is not recommended. The crossing's outlet is within 25 feet of the confluence of Fairfax Creek and San Anselmo Creek, thus there is insufficient room for a series of downstream boulder weirs to raise tail-water elevation. A full replacement may be cost-prohibitive due to the length of the existing crossing. The City of Fairfax's Public Works Department should consult with CDFG and NOAA hydraulic engineers for design assistance.
<b>Tied for #17</b>	MR-079	San Anselmo Creek #2	Pastori Avenue	Steelhead, coho?	14	43,000	21.0	The current fish ladder appears ineffective and should be replaced. A literature review conducted by Taylor and Associates confirmed that the current structure fails to meet Denil fish ladder specifications. The City of San Anselmo Public Works should consult with CDFG and NOAA hydraulic engineers for design assistance.
<b>Tied for #22</b>	MR-081	Sleepy Hollow Creek #1	Deer Hollow Road	Steelhead	15	16,800	20.0	Outlet is perched 5.8 ft and spills over bedrock/concrete drop. Because the current box culvert is properly sized, a retrofit is recommended to improve conditions for fish passage. At least five to six boulder weirs are probably required to sufficiently raise the tail-water elevation and corner baffles within the culvert will increase depths and decrease velocities. Consider feasibility of constructing a concrete fish ladder onto the bedrock outcrop at the culvert outlet – especially if a series of boulder weirs is not feasible due to lack-of-access across private property for construction. A series of sloped, concrete weirs with low-flows notches through the box culvert would increase depths. Recommend consulting with CDFG and NOAA hydraulic engineers for design assistance. <b>NOTE:</b> this crossing seriously impedes upstream passage and should be treated prior to the removal of the Raven Dam (located approximately 5,000' upstream). Also recommend a thorough assessment of additional stream crossings that were not addressed in this initial project.

Marin County Stream Crossing Inventory and Fish Passage Evaluation

**Table 5 (continued).** Ranked list of 90 Marin County stream crossings located in anadromous-bearing stream reaches.

Rank	Site ID#	Stream Name	Road Name	Presumed Species Diversity	Barrier Score	Length of Upstream Habitat (ft)	TOTAL SCORE	Comments Regarding Site and any Adjustments made to Final Rank
<b>Tied for #26</b>	MR-082	Sleepy Hollow Creek #2	Fawn Drive	Steelhead	15	16,000	19.5	<b>NOTE:</b> site should be lowered in project scheduling because site is probably allows some passage and current available habitat is only 4,200 feet (up to Raven Dam). For adult salmonids, FishXing indicated a lack-of-depth violation up to 30cfs, then excess velocities. From site photographs, the crossing appears partially passable for adults. Fish passage could be cost-effectively improved by installing fully-spanning, sloped concrete weirs within the box culvert, a notched outlet beam, and possibly a single downstream boulder weir. Recommend consulting with CDFG and NOAA hydraulic engineers for design assistance.
<b>#34</b>	MR-083	Sleepy Hollow Creek #3	Butterfield Road	Steelhead	13	13,100	18.0	When the crossing was re-evaluated by FishXing with the more rigorous swimming ability criteria and a shallower minimum depth, this site dropped one point in extent-of-barrier score for adults. Fish passage could be cost-effectively improved by installing fully-spanning, slope concrete weirs within the box culvert, a notched outlet beam, and possibly a single downstream boulder weir. Recommend consulting with CDFG and NOAA hydraulic engineers for design assistance. <b>Note:</b> only 1,300 feet of available habitat up to Raven Dam.