

RIPARIAN AND RELATED VALUES ASSOCIATED WITH FLOOD CONTROL PROJECT ALTERNATIVES AT WILDCAT AND SAN PABLO CREEKS¹

Philip A. Meyer²

Abstract: This analysis will consider Riparian benefits from alternative project designs at Wildcat and San Pablo Creeks. Particular emphasis will be placed on quantification of riparian values and on the relationship of projects benefits for each project alternative to estimated costs of implementation.

Riparian habitat supports a number of economic values that are realized in the market place—production of timber and livestock grazing being two easily recognizable examples. Identification of the value of riparian habitat for recreational or aesthetic pursuits is more difficult to achieve in economic terms, as these benefits are seldom marketed. Concepts underlying economic evaluation of such non-marketed benefits are well developed (Knetsch 1983; Bromley 1986; Hogarth and Reder 1986; Cummings, Brookshire and others 1986; Meyer 1987). Meyer Resources (1982) has applied these techniques explicitly to riparian habitat—and over a range of ecological quality.

Our procedure in this paper will be to update selected recreational/aesthetic values developed for riparian habitat for the Sacramento River in Meyer Resources (1982), to insert them into the evaluative dialogue at Wildcat and San Pablo Creeks, and hence to gain insight into the role riparian values may play in project planning.

Riparian values represented here were developed in Meyer Resources (1982) for Sacramento residents, and focused on the Upper Sacramento River between approximately Colusa and Red Bluff. Values selected for this report were framed under two alternative hypotheses: a "willingness to pay" framework that presumed residents had no particular right to riparian habitat, but would have to compete with alternative uses to maintain it; and a "fair compensation" hypothesis that presumed that residents did have a right to the natural amenities associated with riparian habitat and that compensatory values should be associated with destruction of such habitat. These issues are more fully discussed in Meyer (1987).

Values in the Meyer Resources (1982) survey were also delineated by quality of riparian habitat, specifically: a stream where most riparian habitat has been removed,

and little in the way of fish and wildlife is evident; a thirty foot riparian leave strip on each side of the stream, supporting a variety of fish and wildlife species, and considered by experts in the California Department of Fish and Game and the U.S. Fish and Wildlife Service to be approximately 3 to 4 times more ecologically productive than the prior degraded streamside; and full riparian vegetation for at least 1/4 mile on each side of the stream, considered by the same experts to be approximately 8 to 9 times more supportive of fish and wildlife than the degraded stream. Readers should refer to Meyer Resources (1982) for a more exact description of each alternative stream type.

Results from that survey, updated to 1985 dollars are presented in Table 1. Total values figures are based on a 2 percent discount rate and a 100 year time horizon. The values in parentheses are based on a 6.86 percent discount rate, equivalent to that used in earlier work on Wildcat and San Pablo Creeks by the U.S. Army Corps of Engineers. Increasingly, recent practice has been to use discount rates < 4 percent (eg. Lind 1982; Meyer Resources 1988).

Table 1 -Recreational/aesthetic values for selected riparian acreage.

Riparian Condition:	Willingness to pay to retain riparian habitat		Compensation Required if riparian habitat is lost	
	Annual value	Total value	Annual value	Total value
in 1985 dollars per acre				
Stream banks largely bare	201	8,635 (2,927)	311	13,361 (4,527)
30 foot riparian leave strips	850	36,516 (12,373)	1,879	80,722 (27,352)
1/4 mile or more of riparian habitat on each side of stream	1,328	57,051 (19,331)	4,096	175,965 (59,625)

Options and Prior Analysis at Wildcat and San Pablo Creeks

Wildcat and San Pablo Creeks are urban creeks lying in Contra Costa County, and flowing throughout the City of Richmond to greater San Francisco Bay (U.S. Army Corps of Engineers 1986). The two creeks

¹ Presented at the California Riparian Systems Conference; September 22-24, 1988; Davis, California.

² President, Meyer Resources Inc., Davis, CA.

have been subject to periodic flooding, and a series of progressively more habitat sensitive designs to deal with this problem have been suggested. Two of these plan alternatives are discussed here to facilitate our comparative analysis: a 1985 "selected" plan by the U.S. Army Corps of Engineers (1985); and a "modified" plan put for ward by a citizens group in 1985 (Philip Williams and Associates 1985). Both the 1985 selected plan and the 1986 revised plan display a return of benefits to costs slightly over 1.0, according to the Corps. Details of those plans will not be repeated here, and readers are referred to indicated source documents in that regard. The 1985 Corps selected plan was more adverse for riparian habitat than the 1985 citizen's modified plan. Estimated costs also differed between the two plans, based on U.S. Army Corps of Engineers estimates. AT time of writing, a Corps 1986 "revised" plan has also been developed. It does not provide sufficient data to be analyzed here however. Data required for this analysis has been summarized, and stated in 1985 dollars by Riley (1988). Results are presented in Table 2.

Table 2 - A Summary of comparative impacts on riparian habitat and of cost for two Alternative plans at Wildcat and San Pablo Creeks.

Comparative feature	1984 Corps selected plan	1985 Citizen's modified plan
Cost of the plan (1985 dollars)	\$27.65 million	\$27.96 million
Riparian acres preserved	0.0 acres	13.2 acres
Riparian acres restored	1.8 acres	9.1 acres
Source: Riley (1988), developed from U.S. Army Corps of Engineers (1985) and Philip Williams and Associates (1985).		

A Comparison of Recreational / Aesthetic Benefits Associated With Riparian Habitat in the 1984 Corps and 1985 Citizens Plans

We are now in a position to compare the benefits associated with riparian habitat under the 1984 Corps Selected Plan and the 1985 Citizens Modified Plan. This comparison is achieved as follows. First, we note that the design configuration of the two plans (U.S. Army Corps of Engineers 1985; Philip Williams and Associates 1985) suggest an expanse of riparian vegetation that may fall somewhere between the "thirty foot riparian leave strip" and the "1/4 mile or more of riparian habitat" utilized by Meyer Resources (1982). We will utilize the more conservative "Thirty foot leave strip" value from Table 1 for this analysis.

Second, as there will be some sort of stream bank under any conceivable scenario, we will employ only

the value differential between values for a "largely bare bank" and a "thirty foot leave strip" (table 1) in our calculations.

Third, for purposes of this illustrative analysis, we presume that no public trust or similar mandate applies to valuation of "existing" riparian habitat, but that such a mandate does apply to "restoration" of riparian habitat. We will consequently use values from the "willingness to pay" column of table 1 to value existing riparian habitat, and values from the "compensation required" column to value riparian habitat that would be restored. These conversions are arbitrary but likely conform to appropriate procedures for a real time analysis. Further, it will be found that they affect the absolute magnitude of values identified but have little effect on the relative value conclusions we will draw.

Proceeding in this manner, we integrate data from tables 1 and 2 to obtain estimates of the value of riparian habitat under the two plans (table 3). Values are presented using the recommended discount rate of 2 percent, and the higher discount rate of 6.86 percent employed by the Corps in their 1985 analysis.

Table 3 - Comparative values of riparian habitat under two alternative plans at Wildcat and San Pablo Creeks

Plan	Value per acre		Total riparian value	
	2% discount	6.86% discount	2% discount	6.86% discount
1. 1984 Corps selected plan				
0.0 acres preserved	27.9	9.4	0.0	0.0
1.8 acres restored	67.4	22.8	121.3	41.0
1.8 total acres			121.3	41.0
2. 1985 Citizen's plan				
13.2 acres preserved	27.9	9.4	368.3	124.1
9.1 acres restored	67.4	22.8	613.3	207.5
22.3 total acres			981.6	331.6
3. Additional benefits of the citizen's plan, relative to the Corps plan				
7.7 acres preserved	27.9	9.4	368.3	124.1
5.9 acres restored	67.4	22.8	492.0	166 .5
13.8 total acres			860.3	290.6

In addition to the riparian values displayed in table 3, about 350 acres of high quality salt marsh may also be affected by outflows from Wildcat and San Pablo Creeks (U.S. Army Corps of Engineers 1986). We do not have data to develop an analysis comparable to that of table 3 for these wetlands. However, Meyer (1987) did identify qualified survey values for essentially undevelopable wetlands around San Francisco Bay. That survey identified rare permitted market sales in the San Francisco Bay wetlands are (eg. for sewage treatment facilities) which brought between \$1,800 and \$5,000 per acre—and asked respondents, on that basis, what preservation of wetlands for fish, wildlife and recreation was worth. Respondents estimated an average wetland value of \$7,201 per acre. The usefulness of these data is limited to the contest in which it was presented to respondents. It provides strong evidence that San Francisco Bay are residents value fish, wildlife and recreational uses of remaining Bay wetlands as a higher priority than their development for other water uses—but the value absolutes provided by the survey would need to be reassessed as market context changes. Applying results from Meyer (1987) to salt marsh acreage potentially affected by Wildcat and San Pablo Creeks provides a value estimate for these wetlands of approximately \$2.5 million. As noted, should these wetlands be considered for actual development, the values reported here would need to be reassessed, and would likely be considerably higher. Finally, as noted, I do not have sufficient data to estimate the differential effects of the two plans on these values.

A Conclusion Respecting Riparian Values, and Effects of Their Inclusion on Planning at Wildcat and San Pablo Creeks

Several conclusions seem apparent from our analysis. First, recreational/aesthetic values associated with riparian habitat can be substantial, even for relatively discrete acreage. This discussion does not address non-user concerns about protecting riparian resources in their own right, regardless of use (existence value), or passing them on to future generations in good condition. (bequest value). Where residents become preoccupied with existence and bequest issues, such values can dominate analysis (Meyer 1987). Even with our relatively conservative user only approach, significant riparian value results can be observed.

Second, for a range of "marginal" projects, failure to adequately consider riparian values may disqualify projects that can produce net benefits for citizens in excess of costs. Further, failure to consider riparian values will unduly favor projects with limited riparian

feature, relative to project alternatives with stronger riparian feature. It is possible that both of these issues have affected the proposed project(s) at Wildcat and San Pablo Creeks.

Third, it is evident from our analysis, that the assumptions built into any economic evaluation of riparian habitat, particularly with respect to discount rate and whether riparian acreage should be valued via "willingness to pay" or "compensation required" technique, will have a significant effect on the level of benefit that will be identified.

Finally, the data provided here are for illustrative purposes. While they provide useful insight respecting improvements available to the Wildcat/San Pablo Creeks planning and project development process, the values we have used are inferred from elsewhere in California, and subsequent refinements have been made to the plans compared here. A more detailed economic assessment specifically designed for the Wildcat and San Pablo Creek areas would consequently provide significant further understanding of riparian benefits potentially associated with urban streams.

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