

Appendix E – Economics Appendix

Recreation Analysis

The population of the Bay Area has grown significantly over the past 50 years. Table 1 presents the population growth for the 9-county Bay Area region

County	1950	1960	1970	1980	1990	2000
Alameda	740,315	908,209	1,071,446	1,105,379	1,276,702	1,443,741
Contra Costa	298,984	409,030	556,116	656,331	803,732	948,816
Marin	85,619	146,820	208,652	222,592	230,096	247,289
Napa	46,603	65,890	79,140	99,199	110,765	124,279
SF	775,357	740,316	715,674	678,974	723,959	776,733
San Mateo	235,659	444,387	557,361	587,329	649,623	707,161
Santa Clara	290,547	642,315	1,065,313	1,295,071	1,497,577	1,682,585
Solano	104,833	134,597	171,989	235,203	339,471	394,542
Sonoma	103,405	147,375	204,885	299,681	388,222	458,614
Bay Area	2,681,322	3,638,939	4,630,576	5,179,759	6,022,137	6,783,700
California	10,586,223	15,717,204	19,953,134	23,667,902	29,760,021	33,871,648

whereas Table 2 shows the regional projections. With the exploding population and relatively high wealth, there has been a concomitant increase in the demands for specialized nature recreation, particularly as the amount of wetlands continues to decline.

Table 1: Population Trend

Table 2: Regional Projections

	2000	2005	2010	2015	2020	2025	2030
Population	6,783,762	7,193,900	7,527,500	7,840,200	8,168,300	8,457,800	8,780,300
Mean Household Income	\$92,500	\$92,500	\$97,100	\$102,000	\$107,200	\$112,600	\$118,200

Source: Association of Bay Area Governments

Several counties have published formal Recreation Plans, which call attention to the shrinking availability of recreational space. The National Recreation and Park Association has a current standard of 2.0 acres per 1000 population; in the Bay Area, the current ratio is 1.4 acres/1000. This represents unmet demand and the need for more regional parks in addition to specialized recreation that the wetlands provide.

Determination of Recreational Benefits

The national economic development (NED) benefits evaluation procedures contained in ER 1105-2-100 (22 April 2000), Appendix E, Section VII, present three methods of evaluating the beneficial and adverse NED effects of project recreation: travel cost method (TCM), contingent valuation method (CVM) and unit day value method (UDV).

The Unit Day Value Method (UDV) relies on informed opinion and judgment to approximate the average willingness to pay of users of Federal or Federally assisted recreation resources. By applying a carefully thought-out and adjusted unit day “score” for five published criteria, planners can derive dollar estimates of a project’s recreation benefits. The list of criteria includes quality, relative scarcity, ease of access and aesthetic features.

Two categories of outdoor recreation days, general and specialized, were differentiated for evaluation purposes. “General” refers to a recreation day involving primarily those activities that are attractive to the majority of outdoor users and that generally require the development and maintenance of convenient access and adequate facilities. This category comprises the great majority of all recreation activities associated with water projects, including swimming, picnicking, boating, and most warm water fishing.

“Specialized” refers to a recreation day involving those activities for which opportunities in general are limited, intensity of use is low, and a high degree of skill, knowledge, and appreciation of the activity of the user may often be involved. Specialized activities are those less often associated with water projects and include big game hunting and salmon fishing.

We selected the “Specialized category” since many of the activities will take on a specialized nature--birdwatching, nature photography, and fishing, plus unique "wilderness" experiences for kayaking and canoeing in the Bay Area, particularly increasing once the marshes are restored. There have been tremendous losses in wetlands over the past 100 years with very little remaining along with continued deterioration due to agricultural practices and runoff. The Bay Area also places a deep value on the outdoors and the environment in relation to other parts of the United States. According to the California Department of Fish and Game, “the Economics Benefits of Watchable Wildlife Recreation” there were 3.8 million visitors (non-residents) who traveled to parks, deserts, beaches and preserves to watch wildlife in California. The most popular wildlife subject was bird watching with almost 70 percent of all participants. In addition, 6.1 million residents of California participated in watching wildlife within a mile of their homes. The economic impacts of bird and wildlife watching are estimated to total \$2.1 billion statewide. Popular private and public bird watching areas within Sonoma and Napa Counties operated by Fish and Game and privately through organizations such as “Ducks Unlimited”. There are also a small number of specialized recreation days involving activities for which the intensity of the use is low, and a high degree of skill, knowledge and appreciation of the activity is required. According to the California Department of Fish and Game, an estimated 600 public hunters are expected to hunt in the project area once the restoration is complete.

Calculating Values

The estimates of annual use are combined with the selected unit day values to compute the annual recreation benefits. The value assigned to each activity (or category of activities) is multiplied by the number of recreation days estimated for that activity. The products are then summed to obtain the estimate of the total value of an alternative.

The guidelines and point schedules appear in Table 4 while the conversion table appears in Table 3. The point values were based on site visits, discussions with the California Department of Fish & game as well as the State Coastal Conservancy, and experts familiar with the recreational area. The final scores were based on consensus from several interested parties. For simplicity, we assumed a without project value of zero (since there is virtually no specialized recreation values at present) and then tallied the point values, which represent the *increase* in recreational experience with a project.

**Napa River Salt Marsh Restoration Project
Conversion of Points to Dollar Values**

Table 3

Point Values	General Recreation Values	General Fishing and Hunting Values	Specialized Fishing and Hunting Values	Specialized Recreation Values other than Fishing & Hunting
0	\$3.00	\$4.32	\$21.02	\$12.20
10	\$3.57	\$4.88	\$21.58	\$12.95
20	\$3.94	\$5.25	\$21.96	\$13.89
30	\$4.50	\$5.82	\$22.52	\$15.01
40	\$5.63	\$6.38	\$23.08	\$15.95
50	\$6.38	\$6.94	\$25.33	\$18.01
60	\$6.94	\$7.69	\$27.59	\$19.89
70	\$7.32	\$8.07	\$29.27	\$24.02
80	\$8.07	\$8.63	\$31.53	\$27.96
90	\$8.63	\$8.82	\$33.78	\$31.90
100	\$9.01	\$9.01	\$35.65	\$35.65

Recreation Benefits--Specialized

**Table 4
Guidelines for Assigning Points for “Specialized” Recreation**

Criteria	Judgment Factors				
Recreation experience ¹	Heavy use or frequent crowding or other interference with use	Moderate use, other users evident and likely to interfere with use	Moderate use, some evidence of other users and occasional interference with use due to crowding	Usually little evidence of other users, rarely if ever crowded	Very low evidence of other users, never crowded
Total Points: 30					
Point Value:	0-4	5-10	11-16	17-23	24-30
Availability of Opportunity ²	Several within 1 hr. travel time: a few within 30 min.	Several within 1 hr. travel time: none within 30	One or two within 1 hr. travel time; none within 45 min.	None within 1 hr. travel time	None within 2 hr. travel time
Total Points: 18					

Criteria	Judgment Factors				
Point Value:	travel time 0-3	min. travel time 4-6	travel time 7-10	11-14	15-18
Carrying Capacity ³ Total Points: 14	Minimum facility for development for public safety and health	Basic facility to conduct activity(ies)	Adequate facilities to conduct without deterioration of the resource of activity experience	Optimum faculties to conduct activity at site potential	Ultimate facilities to achieve intent of selected alternative
Point Value:	0-2	3-5	6-8	9-11	12-14
Accessibility Total Points: 18	Limited access by any means to site or within site	Fair access, poor quality roads to site; limited access within site	Fair access, fair road to site, fair access, good roads within site	Good access, good roads to site; fair access, good roads within site	Good access, high standard road to site; good access within site
Point Value:	0-3	4-6	7-10	11-14	15-18
Environmental Total Points: 20	Low aesthetic factors ⁴ that significantly lower quality ⁵	Average aesthetic Quality; factors exists that lower quality to minor degree	Above average aesthetic quality; any limiting factors can be reasonably rectified	High aesthetic quality; no factors exist that lower quality	Outstanding aesthetic quality; no factors exist that lower quality
Point Value	0-2	3-6	7-10	11-15	16-20

¹ Value for water-oriented activities should be adjusted if significant seasonal water level changes occur.

² Likelihood of success at fishing and hunting.

³ Value should be adjusted for overuse.

⁴ Major aesthetic qualities to be considered include geology and topography, water, and vegetation.

⁵ Factors to be considered to lowering quality include air and water pollution, pests, poor climate, and unsightly adjacent areas.

Recreational experience (0-30)- The recreation area will have moderate use with some evidence of occasional interference due to its proximity to the

populous Bay Area. There is little seasonal variation, but more presumably more crowding during the summer. **A mid-range score of 15 was assigned.**

Availability of Opportunity (0-18) Apart from the Bay Area's landmarks, there are very few similar sites for education or photography within a 2-hour travel distance. There are other walking and biking opportunities, but not endangered species habitat or educational opportunities of the restoration to the level Napa Salt Marsh provides. **A score of 14 was assigned.**

Carrying capacity (0-14): There are adequate facilities (not outstanding) to accommodate users, to conduct activities at site. **A score of 10 was assigned.**

Accessibility (0-18): The area already has excellent access from the road(s) to the site(s) so the improvement may not be significant. **A score of 8 was assigned.**

Environmental (0-20): The area has a high aesthetic quality (but not outstanding) while no factors exist that lower quality. **A score of 12 was assigned.**

Total: 15+14+10+8+12 = 59 points

Converting the total score of 59 to dollar values (see Table 1), results in a unit day value of \$23.61 for each recreational visitor.

Estimated Use

Without extensive use of surveys, it is difficult to determine the number of additional users of the Napa Salt Marsh project area. Based on conversations with the Coalition for the Outdoor Recreation Plan, Laura Thompson of the San Francisco Bay Trail and information from the Marin County Bicycle and Pedestrian Master Plan completed by Alta Consulting in 2000, portions of the Bay Trail in similar surroundings have an estimated usage of 250,000 per year. The South Bay Wild Refuge receives 300,000 visitors annually but is more accessible and has a slightly higher population base. After further discussion with Larry Wyckoff (California Department of Fish & Game) and the State Coastal Conservancy, it was estimated that the recreation features would generate an additional 125 visitors per day or 45,625 annually. This figure is very reasonable due to (1) its proximity to the populous Bay Area as well as Sacramento; (2) the large number of tourists, schools and science groups; (2) easy accessibility; and (3) the favorable climate and lack of seasonal variation.

Recreation Value

Multiplying the unit day value of \$23.61 by the 45,625 additional recreational users annually yields a total of \$1,077,206.

Net Benefits to Recreational Features

For the recreational features to be economically justified, the average annual costs cannot exceed the average annual benefits. As seen previously, the average annual benefits of the recreational features are \$1,077,206.

The average annual costs are comprised of the annualized first cost of the recreation features plus annual operation and maintenance costs. Also in accordance with Corps policy PGL 36, the level of financial participation in recreation development by the Corps may not increase the Federal cost of the project by more than ten percent. The total first cost of the recommended restoration cost is \$55,090,392. This cost would be cost shared on a 65%/35% basis between the Corps and the local sponsor. Hence, the Corps share of the restoration project cost totals \$35,808,755 ($\$55,090,392 \times 0.65$). Recreation costs are cost shared on a 50%/50% basis between the Corps and the local sponsor. Fifty percent of the first cost of the recreation plan is \$727,812 ($\$1,455,623/2$), which would only increase the level of Federal financial participation by about 2 percent.

Recreation Summary

First Cost, Recreation Components = \$1,455,623

Average Annual Cost, Rec. Components = $\$1,455,623 \times 0.06015 = \$87,556$

Operation and Maintenance Costs (~1% of First Cost) = \$14,556

Total Average Annual Costs = \$102,112

Average Annual Benefits = \$1,077,206

Net Benefits = \$975,064

Benefit-Cost Ratio = 10.6

With net benefits of \$975,064, it appears that the federal investment in the recreational features is economically justified.