Appendix E – Economics Appendix

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.

Calculating Values

The estimates of annual use are combined with the selected unit day values to get an estimate of 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 Tables 2a & 2b while the conversion table appears below (Table 1). The point values were based on discussions with the California Department of Fish & game as well as the State Coastal Conservancy, experts familiar with the recreational area.

Napa River Salt Marsh Restoration Project
Conversion of Points to Dollar Values
Table 1

Point Values	General Recreation Values	General Fishing and Hunting Values	Specialized Fishing and Hunting Values	Specialized Recreation Values other than Fishing & Hunting
0	$2.90	$4.17	$20.29	$11.77
10	$3.44	$4.71	$20.83	$12.50
20	$3.80	$4.07	$21.19	$13.40
30	$4.35	$5.61	$21.73	$14.49
40	$5.43	$6.16	$22.28	$15.40
50	$6.16	$6.70	$24.45	$17.39
60	$6.70	$7.43	$26.63	$19.20
70	$7.06	$7.79	$28.26	$23.18
80	$7.79	$8.33	$30.43	$26.99
90	$8.33	$8.51	$32.60	$30.79
100	$8.69	$8.69	$34.41	$34.41

Recreation Benefits--General

Table 2a
Guidelines for Assigning Points for "General" Recreation

Criteria	Judgment Factors				
Recreation experience[1] Total Points: 30 Point Value:	Two general activities[2] 0-4	Several general activities 5-10	Several general activities: one high quality value activity[3] 11-16	Several gen'l act: more than one high qual high activity 17-23	Numerous high quality value activities: some general activities 24-30
Availability of Opportunity[4] Total Points: 18 Point Value	Several within 1 hr. travel time: a few within 30 min. travel time 0-3	Several within 1 hr. travel time: none within 30 min. travel time 4-6	One or two within 1 hr. travel time; none within 45 min. travel time 7-10	None within 1 hr. travel time 11-14	None within 2 hr. travel time 15-18
Carrying	Minimum	Basic	Adequate	Optimum	Ultimate

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

[1] Value for water-oriented activities should be adjusted if significant seasonal water level changes occur.
[2] General activities include those that are common to the region and that are usually of normal quality. This includes picnicking, camping, hiking, riding, cycling, and fishing and hunting of normal quality.
[3] High quality value activities includes those that are not common to the region and/or Nation, and that are usually of high quality.
[4] Likelihood of success at fishing and hunting
[5] Value should be adjusted for overuse.
[6] Major aesthetic qualities to be considered include geology and topography, water and vegetation.
[7] Factors to be considered to lowering quality include air and water pollution, pestes, poor climate, and unsightly adjacent areas.

Recreational experience (0-30)- The recreation area is high in the category of several general activities. It contains more than one high quality level activity---hiking and biking would be the most common general activities, specialized nature photography and education regarding ecosystem restoration are the other high quality value activities. Boating and fishing are also popular activities occurring throughout the numerous sloughs in the project area. **A score of 24 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 has excellent access from the road(s) to the site(s). **A score of 18 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 17 was assigned.**

Total: 24+14+10+18+17 = 83 points

Converting the total score of 83 to dollar values (see Table 1), results in a unit day value of $7.95 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 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--General

Multiplying the unit day value of $7.95 by 45,625 annual recreational users yields a total of $362,718.

Recreation Benefits--Specialized

While the majority of the recreational benefits will be attributable to general use, there are 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 (See attached Recreation Use Plan). The following derives the recreation value of public hunting.

Table 2b
Guidelines for Assigning Points for "Specialized" Recreation

Criteria	Judgment Factors				
Recreation experience[1] Total Points: 30 Point Value:	Heavy use or frequent crowding or other interference with use. 0-4	Moderate use, other users evident and likely to interfere with use. 5-10	Moderate use, some evidence of other users and occasional interference with use due to crowding. 11-16	Usually little evidence of other users, rarely if ever crowded. 17-23	Very low evidence of other users, never crowded. 24-30
Availability of Opportunity[2] Total Points: 18 Point Value	Several within 1 hr. travel time: a few within 30 min. travel time 0-3	Several within 1 hr. travel time: none within 30 min. travel time 4-6	One or two within 1 hr. travel time; none within 45 min. travel time 7-10	None within 1 hr. travel time 11-14	None within 2 hr. travel time 15-18
Carrying Capacity[3] Total Points: 14 Point Value:	Minimum facility for development for public safety and health 0-2	Basic facility to conduct activity(ies) 3-5	Adequate facilities to conduct without deterioration of the resource of activity experience 6-8	Optimum faculties to conduct activity at site potential 9-11	Ultimate facilities to achieve intent of selected alternative 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 4-6	Fair access, fair road to site, fair access, good roads within site	Good access, good roads to site; fair access, good roads within	Good access, high standard road to site; good access within site 15-18

Point Value:	0-3		7-10	site 11-14	
Environmental Total Points: 20 Point Value	Low aesthetic factors[4] that significantly lower quality[5] 0-2	Average aesthetic Quality; factors exists that lower quality to minor degree 3-6	Above average aesthetic quality; any limiting factors can be reasonably rectified 7-10	High aesthetic quality; no factors exist that lower quality 11-15	Outstanding aesthetic quality; no factors exist that lower quality 16-20

[1] Value for water-oriented activities should be adjusted if significant seasonal water level changes occur.
[2] Likelihood for success at fishing and hunting.
[3] Value should be adjusted for overuse.
[4] Major aesthetic qualities to be considered include geography 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)- With an annual figure of 600 and an area of 13,700 acres, there is little evidence of overcrowding throughout the project site.
A score of 23 was assigned.

Availability of Opportunity (0-18) There are one or two alternate hunting opportunities in the Bay Area. **A score of 9 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 has excellent access from the road(s) to the site(s) as well as high standards. **A score of 16 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 17 was assigned.**

Total: 23+9+10+16+17 = 75 points
Converting the total score of 75 to dollar values (see Table 1), results in a unit day value of $29.35 for each recreational visitor.

Recreation Value—Specialized

$29.35 x 600 users annually = $17,600

Total Recreation Value = $362,718 + $17,600 = $ 380,318

Maximum "Supportable" Recreation Costs

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 $380,000 (rounded).

The average annual costs are comprised of the annualized first cost of the recreation features plus annual operation and maintenance costs. Assuming that annual operation and maintenance costs are 10% of the costs, the maximum "supportable" costs for recreational features are $6,095,604; the maximum first costs are $5,486,000 while the annual O & M is $38,000.

Capital Recovery Factor, 50 yrs. @5 ⅞% = 0.06234

x = [$380,000/0.06234]
x= $6,095,604 = max. total "supportable" costs
$380,000 x 0.10 = $38,000 estimated annual O & M Cost

(First Cost x 0.06234) + $38,000 = $380,000

First Cost = $5,486,044
($5,486,044 x 0.06234) + $38,000 = $380,000 ✔
$342,000 + $38,000 = $380,000 ✔
Ave. Annual First Cost + O & M = Ave. Annual Total Costs