EXHIBIT 1

COMMENTS ON CALFED DEIS/R BY THE NATIONAL AUDUBON SOCIETY
JULY 1, 1998

C-016040

Summary of Evidentiary Testimony to be Presented to the
State Water Resources Control Board

BAY-DELTA ESTUARY HEARING, PHASE I

Topic -- Bay-Delta Estuary Use: Wildlife
Dates -- September 8-10, 1987

Witness: Stephen L. Granholm, Ph.D.
Representing: Bay Area Audubon Council

Submitted July 7, 1987

KEY POINTS

- The remaining tidal brackish marshes surrounding Suisun Bay are a valuable natural resource because they represent the predominant natural wetland ecosystem of the Suisun Marsh, one of the largest and most important wetland wildlife habitats in California.

- Reductions in freshwater inflows would cause further degradation of these tidal brackish marshes and a corresponding decline in wildlife habitat value of the Suisun Marsh as a whole.

SUMMARY OF TESTIMONY

1. Study area. Wetland habitats surrounding Suisun Bay and its islands, from Benicia and Martinez on the west to Collinsville and Winter Island on the east. This is the largest brackish wetland system in the western United States. It consists of a unique diversity of habitats, including tidal wetlands, freshwater and riparian systems, seasonal wetlands, and lowland grasslands. Included within this wetland system are approximately 44,000 acres of managed wetlands (primarily managed for waterfowl) and 10,000 acres of brackish tidal marsh. The focus of our testimony is on this tidal marsh.

2. Mapping methods. We delineated the existing tidal marsh areas, based on U.S. Fish and Wildlife Service (FWS) National Wetland Inventory (NWI) maps and the FWS wetlands definitions (Cowardin et al. 1979). We corrected the NWI mapping of selected areas, based on observations and photographs (Exhibit 3) made during an overflight of the study area on June 24, 1987. We then calculated acreages for two categories of marsh:

   A. "Protected" tidal marsh refers to areas that would be

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protected by salinity standards established in Decision 1485 (as later modified to remove the S-36 standard). This includes most of the tidal areas adjacent to Montezuma and Suisun Sloughs and north of these sloughs.

B. "Unprotected" tidal marsh refers to areas that would not be protected by these standards, namely the tidal marshes bordering Grizzly Bay, Honker Bay, and other portions of Suisun Bay, including the southern end of Joice Island and the whole south shore of Suisun Bay.

3. Mapping results. Tidal marsh in the study area is almost exclusively brackish marsh; it includes several extensive marshes as well as many smaller remnant wetlands along sloughs and channels (see Exhibit 1). Acreages are as follows:

Unprotected marsh:	6,819 acres
Protected marsh:	3,265 acres
Total:	10,084 acres of tidal marsh

4. Tidal marsh vegetation. These brackish marshes consist primarily of tules and cattails, but significant portions of the higher marsh consist of pickleweed and saltgrass, probably due to increasing salinity in Suisun Marsh (Williams and Josselyn 1987).

5. Impacts on vegetation. Williams and Fishbain (1987) analyzed the Department of Water Resources (DWR) projections of future water diversions. Based on this analysis, Williams and Josselyn (1987) concluded that increasing salinity would lower the productivity of brackish tidal marsh species in Suisun Bay. In addition, the intertidal distribution of tules would be reduced, because higher salinity would lower their tolerance to submergence and their ability to grow in the higher intertidal elevations. At least 5,000 acres of unprotected tidal marsh would be adversely affected, primarily in western Suisun Bay, where salinities would be the greatest.

6. Impacts on wildlife: methods. I characterized existing wildlife use of the brackish tidal marshes, based on a literature review and discussions with local observers. I then assessed impacts on wildlife due to the projected changes in salinity and brackish marsh vegetation (see paragraph 5). The impact assessment was hampered by a lack of data on wildlife of the tidal marshes; most research on Suisun Bay wildlife has been in the managed marshes.

7. Special-status wildlife. Exhibit 4 lists 13 special-status wildlife species that are thought to occur regularly in tidal marshes of the study area. (The occurrence of one other, the salt marsh yellowthroat, is undetermined, due to uncertainty

about its subspecies identity.) These are species that are listed by the state or federal government as threatened, endangered, or of some other special status, due to their rarity or sensitivity to human disturbance.

8. Other typical wildlife species. Exhibit 5 lists 14 representative bird and mammal species of the tule- and cattail-dominated brackish tidal marshes of the study area.

9. Impacts on special-status species. Negative impacts on Suisun song sparrow and river otter are considered likely (see Exhibit 4). In addition, if further research demonstrates that snowy egrets, black-crowned night-herons, or salt marsh yellowthroats do breed in the tidal marshes, there would probably be adverse impacts. There could be positive impacts on salt marsh harvest mouse, Suisun shrew, and California black rail.

10. Impacts on typical wildlife. Negative impacts are considered likely for 8 species (Exhibit 5). If the other 6 species (indicated by a "?") breed in the tidal marshes, there would probably be adverse impacts.

11. Location of impacts. Impacts would be most severe in the unprotected marshes, but would also be felt in the protected marshes if the D1485 standards are relaxed or not enforced.

12. Recommendations

    a. The brackish tidal marshes of Suisun Bay are valuable wildlife habitats in their own right, and they also contribute significantly to the great habitat diversity of the Suisun Marsh complex. Because they represent the natural marsh ecosystem and have already been severely depleted, no more tidal marshes should be converted to managed marsh, salt marsh, or other uses in Suisun Bay.

    b. Salinity standards should be implemented to fully protect these brackish tidal marshes, as well as the managed marshes. To do so, the original D1485 salinity standards should be reinstated immediately and new salinity standards should be enacted at Martinez, as described by Williams and Josselyn (1987).

    c. Plans for monitoring the success of Suisun Marsh protection measures should include monitoring of tidal marshes. Indicator species (if used) should include representative plants and/or animals of the brackish tidal marshes.

    d. Potential benefits to certain salt marsh species do not justify negative impacts on a wide range of brackish marsh species. The management goal should be, to the

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degree possible, to return brackish tidal marshes to their pristine condition, or at least to prevent further degradation toward salt marsh habitat. Benefits to salt marsh species are best achieved in areas of historic salt marsh, within the species historic range, not by replacing tidal brackish marsh.

e. Further research should be funded to determine the wildlife habitat values of Suisun Bay tidal marshes, including their value to breeding waterfowl, Suisun song sparrows, and salt marsh yellowthroats. In addition, more research is needed on methods for restoring and maintaining the natural habitat values of these marshes.

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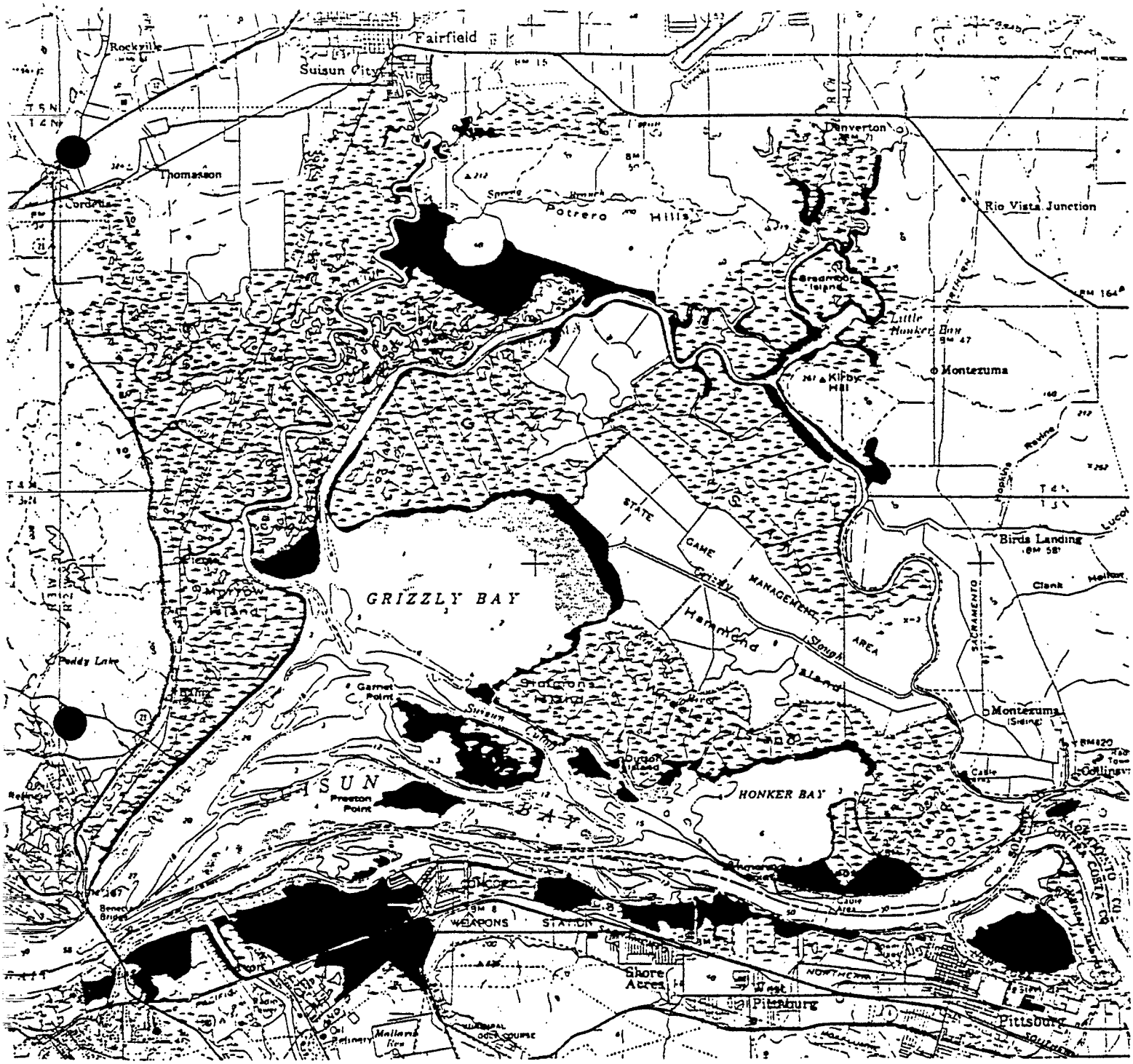

Exhibit 1. Tidal Wetlands of the Suisun Bay Study Area.

Tidal wetlands are shown in black. This map is based on U.S. Fish and Wildlife Service National Wetlands Inventory maps (1985 edition), but includes corrections where errors had occurred in interpreting the presence or absence of tidal marsh. Mapping by Dianne Kopec and Michael Josselyn.

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EXHIBIT 2

TABLE OF TIDAL WETLAND ACREAGES BY TOPOGRAPHIC QUAD MAP. FROM US FISH AND WILDLIFE SERVICE WETLAND INVENTORY MAPPING (1985) AND AS REVISED AND VERIFIED BY AERIAL PHOTOGRAPHY IN 1987 BY BAY AREA AUDUBON SOCIETIES. PROTECTED REFERS TO SALINITY STANDARDS ESTABLISHED BY D-1485 (AS LATER MODIFIED TO REMOVE S-36 STANDARD) WHICH WOULD PROVIDE INCIDENTAL PROTECTION OF CURRENT BENEFICIAL USES WITHIN TIDAL WETLANDS.

QUAD MAP	TOTAL ACREAGE OF TIDAL MARSH	PROTECTED BY BY D-1485	UNPROTECTED BY D-1485
Port Chicago	3848	0	3848
Honker Bay	2021	0	2021
Antioch	715	0	715
Denverton	1463	1463	0
Fairfield South	2037	1802	235
Total	10,084	3,265	6,819

SOURCE: DIANNE KOPEC AND MICHAEL JOSSELYN, JULY 1986

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Exhibit 4. Special-Status Wildlife Species of the Suisun Bay Tidal Marshes, and Expected Impacts of Reduced Freshwater Inflows.

The table notes the official status of each species on various government lists[a], its occurrence in Suisun Bay tidal marshes, and the expected impact of reduced freshwater inflows to the Bay. The impact analysis assumes that future water diversions will increase as projected by the Department of Water Resources (as described by Williams and Josselyn 1987). The table excludes species for which these tidal marshes are not considered a major use-area.

Species (and Status[a])	Expected Impact[b]	Occurrence in Tidal Marshes and Explanation of Impacts[c]
MAMMALS		
Salt marsh harvest mouse *Reithrodontomys raviventris* (FE, CE, CP, SA)	+	Uncommon resident; strongly prefers high marshes of pickleweed (12), which would probably increase in vigor.
Suisun shrew *Sorex ornatus sinuosus* (SC, SA)	+	Occurs in pickleweed and other low-lying plants of high marsh (31); productivity of suitable habitat thus may increase.
River otter *Lutra canadensis* (PF)	-	Common in slough systems (7); needs fresh or slightly brackish aquatic habitats (15), which would decline in quality, and habitat area.
BIRDS		
Double-crested cormorant *Phalacrocorax auritus* (SC2, SA)	0	Breeds in SM on pilings (26); typically nests in trees and on islands (16).
Great blue heron *Ardea herodias* (SA)	0	Breeds in SM in eucalyptus trees (26), which may not be affected
Great egret *Casmerodius albus* (SA)	0	Breeds in SM in eucalyptus trees (26), which may not be affected

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Exhibit 4 (continued)

Species (and Status[a])	Expected Impact[b]	Occurrence in Tidal Marshes and Explanation of Impacts[c]
Snowy egret Egretta thula (SA)	- (?)	Present year-round in SM and may nest (20); typically nests in dense tule stands (16), which would decline in habitat area and vigor.
Black-crowned night-heron Nycticorax nycticorax (SA)	- (?)	Present year-round in SM and probably nests (26); typically nests in trees and tules (16), which would decline in vigor and habitat area.
Northern harrier Circus cyaneus (SC2, SA)	0	Breeds in SM, including tidal marshes (26); uses both brackish and salt marshes for feeding and nesting.
California black rail Laterallus jamaicensis coturniculus (CT, CP, FC2, SA)	+	Occurs in several tidal sloughs and apparently breeds (21); mainly occupies high marshes of dense pickleweed (21, 16), which would increase in vigor.
California clapper rail Rallus longirostris obsoletus (FE, CE, CP, SA)	0 (?)	Historically absent from SM (14) but now occurs year-round in Cutoff Slough area (12); SM habitat is tidal marsh dominated by tules (12); typically occurs in pickleweed or cordgrass salt marsh (14).
Short-eared owl Asio flammeus (SC2, SA)	0	Breeds in SM (26, 24); uses both brackish and salt marshes for feeding and nesting.
Salt marsh yellowthroat Geothlypis trichas sinuosa (FC2, SA)	?	G. trichas breeds in SM (8), probably including tidal marsh. Subsp. in SM may or may not be sinuosa (17); this subsp. nests commonly in bulrushes in brackish tidal marshes of south S.F. Bay, but seldom uses pickleweed (17); thus, if it nests in SM, it would probably decline due to habitat reduction.

Exhibit 4 (continued)

Species (and Status[a])	Expected Impact[b]	Occurrence in Tidal Marshes and Explanation of Impacts[c]
Suisun song sparrow *Melospiza melodia maxillaris* (SA)	-	Fairly common year-round in brackish tidal marshes of tules and cattails (27, 22); would clearly decline, as it makes little of pickleweed habitat (26).

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[a] CE = California endangered list

CP = California fully protected list

CT = California threatened list

FC2 = Federal candidate species, category 2: listing as threatened or endangered may be warranted, but further data are needed to decide whether to list this species.

FE = Federal endangered list

PF = Protected furbearer in California (Gould 1977)

SA = Special animal list, maintained by the California Natural Diversity Data Base (CNDDB) at the Department of Fish and Game

SC = California species of special concern (CNDDB 1986)

SC1, SC2, SC3 = California bird species of special concern, highest priority, second priority, and third priority (Remsen 1980)

[b] + = Significant positive impact expected

- = Significant negative impact expected

0 = No significant impact expected

[c] Numbers in parentheses refer to the attached list of literature cited and personal communications. In addition, information on distribution and habitat of various species was drawn from the following exhibits: 7, 8, 10, 12, 16, 18, 19, and 28.

SM = Suisun Bay marshes, including managed and tidal marshes

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Exhibit 5. Expected Impacts of Reduced Freshwater Inflows on Representative Birds and Mammals of the Suisun Bay Tidal Marshes.

The species listed below are typical of tule- and cattail-dominated brackish tidal marshes in the study area (as are some of the special-status species listed in Exhibit 4) . The table describes each species' occurrence in this habitat and assesses impacts of the increased water diversions projected by the Department of Water Resources (as described by Williams and Josselyn 1987). Harvest species are denoted by "HA"; non-native species are omitted.

Species	Expected Impact[a]	Occurrence in Tidal Marshes and Explanation of Impacts[b]
MAMMALS		
Beaver Castor canadensis (HA)	-	Occurs mainly in eastern part of SM, where water is freshest (7); a freshwater species that would probably decline with salt water intrusion.
Mink Mustela vison (HA)	-	Occurs in tidal slough systems of SM (7); a freshwater species that would probably decline with salt water intrusion.
BIRDS[c]		
American bittern	-	Common year-round in SM, and nests there (7, 8); in Calif., nests and feeds mainly in tules and rushes (10, 16), which would decline in vigor and habitat area.
Mallard (HA)	-	These 6 species of ducks (and probably others) nest in SM (6, 8). Extent of waterfowl use of tidal areas is poorly documented (24, 30); some mallards and cinnamon teal nest there (30), and various species may rear broods there (24). Mallard ducklings exhibit moderate mortality with 1% salinity drinking water and 100% mortality with 1.5% salinity (23); increased salt intrusion could thus be detrimental to waterfowl breeding in SM tidal marshes.
Northern pintail (HA)	- (?)	
Cinnamon teal (HA)	-	
Northern shoveler (HA)	- (?)	
Gadwall (HA)	- (?)	
Ruddy duck (HA)	- (?)	

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Exhibit 5 (continued)

Species	Expected Impact[a]	Occurrence in Tidal Marshes and Explanation of Impacts[b]
Virginia rail	-	Both of these rail species nest only in fresh and brackish marshes (13, 16, 19). Both nest at SM (8) and occur year-round, presumably nesting, at Peytonia Marsh (tidal) (20). Nesting would likely decline due to loss of habitat.
Sora	-	
Common moorhen (HA)	- (?)	Uncommon in SM, and nests (8); status in tidal marshes unknown, but nests only in brackish (19) or freshwater marshes, typically in tules (16). Any nesting that does occur in tidal marsh would thus decline.
Marsh wren	-	Abundant year-round in SM, and nests there (8). Nests in fresh or brackish marshes of bulrushes or cattails (16); also nests in lower density in cordgrass (13). Probably nests in tidal parts of SM (20, 26). Would decline due to loss of habitat.
Common yellowthroat[d]	-	Breeds in SM (8), but status in tidal marshes is uncertain. Nests commonly in bulrushes in brackish tidal marshes of south S.F. Bay, but seldom uses pickleweed (17); thus, any nesting that does occur in SM tidal marshes would probably decline due to loss of habitat.

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[a] + = Significant positive impact expected

\- = Significant negative impact expected

0 = No significant impact expected

[b] Numbers in parentheses refer to the attached list of literature and personal communications cited.

SM = Suisun Bay marshes, including managed and tidal marshes.

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Exhibit 5 (continued)

c No scientific names are given, as the common names are standardized, following the Sixth AOU Checklist.

d The subspecies occurring in the study area may be the salt marsh yellowthroat, a special-status species (see Exhibit 4).