

**Chapter 3I. Affected Environment and Environmental
Consequences - Land Use and Agriculture**

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SUMMARY

This chapter discusses impacts of the DW project alternatives on land use and agriculture in the vicinity of the DW project islands. Agriculture is the primary use of the DW project islands and would be affected by DW project implementation. Potential land use impacts of the DW project alternatives include displacement of residences and structures, conflicts with adjacent land uses, effects on Williamson Act contracts, inconsistency with local zoning and land use plans and policies, and inconsistency with general plan principles. Potential agriculture impacts include conversion of prime agricultural lands and conversion of substantial acreages of nonprime agricultural lands to nonagricultural uses.

Implementation of Alternative 1, 2, or 3 would result in two significant and unavoidable land use and agriculture impacts. Conversion of 6,300 acres of prime agricultural land on Webb and Holland Tracts to water storage and habitat, respectively, would be inconsistent with Contra Costa County agricultural principles to preserve prime agricultural lands for agricultural production and promote a competitive economy and would therefore be a significant and unavoidable land use impact. Direct conversion of approximately 16,180 acres of agricultural land on the four DW project islands under Alternative 1 or 2, or of 20,345 acres under Alternative 3, including harvested cropland and pasture, short-term fallowed land, and long-term idled lands, is considered to be a significant and unavoidable agriculture impact. Implementation of Alternative 1, 2, or 3 would contribute to the significant and unavoidable cumulative impact of cumulative conversion of prime agricultural land in the Delta.

Implementing Alternative 1, 2, or 3 would result in the less-than-significant land use impact of displacement of residences and structures on reservoir islands. An additional less-than-significant impact, displacement of property owners on habitat islands, would result from implementation of Alternative 1 or 2.

Implementation of the No-Project Alternative would result in an increase in cultivated acreage and agricultural production on the DW islands. Under the No-Project Alternative, there would be no change in the status of onsite structures, Williamson Act contracts, consistency with zoning and general plan designations, or consistency with relevant general plan policies.

INTRODUCTION

Potential land use issues related to DW project implementation are effects on Williamson Act contracts, displacement of existing dwelling units, and consistency with local zoning and land use plans and policies. Potential agriculture impacts are related to changes in the use of agricultural lands considered to have high production capabilities and changes in regional or statewide crop production.

AFFECTED ENVIRONMENT

This section describes land use and agricultural conditions on the DW project islands. Land use information is based in part on information collected for the 1990 draft EIR/EIS and has been updated to current conditions where these changes would affect the impact analysis. Since 1988, both Contra Costa and San Joaquin County have updated their general plan policies and designations. This section therefore uses this updated policy information to represent baseline land use conditions.

Land management decisions made since 1990 have resulted in some changes in agricultural land use on the DW project islands. Some of these changes were made in response to annual fluctuations in agricultural market conditions; others were made in anticipation of DW implementation. For example, changes in agricultural management on Holland and Webb Tracts have resulted in previously fallowed lands being brought into grain production. On Bacon Island, uncertainty concerning the project has led tenant farmers to replace old asparagus stands with wheat and corn crops. Because some of these changes have resulted from project-related actions and influences, information from the 1990 draft EIR/EIS (based on 1988 conditions) provides the most reliable description of typical preproject agricultural land use on the DW project islands for assessing the impacts of the DW alternatives.

The four project islands are located in San Joaquin and Contra Costa Counties (Figure 3I-1). Bacon and Bouldin Islands are in San Joaquin County, and Holland and Webb Tracts are in Contra Costa County.

Sources of Information

Land Use

Current land use plans for San Joaquin County and Contra Costa County were reviewed for information on planned land uses in the DW project area. Site visits and aerial photographs were used to determine existing land uses. The plans and policies reviewed for the land use discussion are briefly summarized below.

San Joaquin County General Plan. The San Joaquin County General Plan (SJC GP) (San Joaquin County Community Development Department 1992) contains principles that guide the use of land for residential, commercial, and industrial development and provides limitations and priorities for the use of recreation and agricultural land on Bacon and Bouldin Islands. The plan includes principles that limit development in hazardous areas and that preserve and enhance the county's natural resources.

The SJC GP identifies as priorities the preservation of agricultural resources and retention of agricultural land in areas of periodic flooding. Fragmentation of agricultural land is discouraged outside areas designated for rural residential development. Recreation principles encourage developing recreation facilities to serve regional and statewide residents, protecting the recreation potential of rivers and other natural features, providing public

access, and exploring multiple uses of open space. Natural resource principles encourage preserving Delta resources by adhering to water quality standards, supporting programs to improve water quality, retaining riparian vegetation along waterways, prohibiting all actions that would adversely affect the Delta, and designating conservation areas to remain in open space.

Contra Costa County General Plan. Land use on Holland and Webb Tracts is governed by the Contra Costa County General Plan (CCCGP). The CCCGP (Contra Costa County Community Development Department 1991) contains policies that encourage preservation of prime agricultural soils and other resources associated with agriculture. The CCCGP also guides the location and general characteristics of planned communities, industry, and recreational land uses. Water reclamation is encouraged, and recreational uses that are compatible with an area's carrying capacities and environmental constraints are encouraged. CCCGP policies for islands and lowlands of the Sacramento-San Joaquin Delta in Contra Costa County balance the recreation opportunities of the Delta area against the need to allow only low-intensity uses that will not subject large numbers of residents or visitors to flooding.

The county is currently revising its zoning ordinance to bring it into conformance with the general plan (Aime and Fleming pers. comms.).

Delta Protection Commission Resource Management Plan. The Delta Protection Commission was established by the Delta Protection Act of 1992. The commission was created to develop a long-term management plan for the Delta Primary Zone (Figure 3I-1). As stated in the act, the goals of this regional plan are to "protect, maintain and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities". All local general plans within the Delta Primary Zone are required to be consistent with the Delta Protection Commission's regional plan.

The Delta Protection Commission prepared eight background reports for the regional plan on the following issues: utilities and infrastructure, water, land use and ownership, environment, recreation and access, agriculture, levees, and plan implementation. After public review of the background reports, the regional plan was completed in July 1994 and adopted in February 1995. Additionally, the commission recommended that the water reservoirs that are consistent with other uses in the Delta should be permitted (Aramburu pers. comm.).

Williamson Act Contracts. The California Land Conservation Act of 1965 (commonly known as the Williamson Act) established a voluntary tax incentive program for preserving agricultural land and open-space lands. A property owner enters into a 10-year contract with a county, which places restrictions on the land in exchange for tax savings. The property is taxed according to the income it is capable of generating from agriculture and other compatible uses, rather than its full market value.

Compatible uses under the Williamson Act are determined by the city or county that has jurisdiction. The Williamson Act identifies compatible uses as agricultural production, recreation, and open space. The act also defines "agricultural land" to include land that is:

- devoted to recreational use,
- within a scenic highway corridor,
- a wildlife habitat area,
- a saltpond,
- a managed wetland area, or
- a submerged area.

The San Joaquin County Zoning Code Section 9-2352 (December 20, 1988) states that uses of agricultural land under Williamson Act contracts are limited to "outdoor recreational activities which can be carried out in conjunction with continued agricultural usage of the land" and "[a]ll other uses similar to, comparable to, or no more intensive than, those uses enumerated in subsection (a) which are, in the opinion of the Board [of Supervisors], distinctly and exclusively agricultural based". Section 9-4005.1(c)(11) of the zoning code (December 20, 1988) states that hunting and fishing clubs are allowed in the General Agriculture (AG) zone with a development plan. Finally, Section 9-4005.2(a)(14) states that water storage facilities are allowed in the AG zone as an "accessory use".

In San Joaquin County, a project is considered consistent with Williamson Act contracts if the county board of supervisors agrees that:

- the recreation portion of the project can be carried out in conjunction with continued agricultural use of the land;
- the proposed uses are similar to, comparable to, or no more intensive than permitted uses of the site and are exclusively agricultural based; and
- a proposed water storage facility would be an accessory use of agricultural land.

In situations in which the land use proposed is not clearly consistent or inconsistent, the Williamson Act provides that compatible uses will be determined by the county or city administering the preserve.

Contra Costa County integrates agricultural land conservation, under the Williamson Act, and zoning. Upon entering into an conservation agreement with a landowner, the county will zone the parcel of land A-4, Agricultural Preserve District. The county describes the production of food and fiber as compatible uses, in addition to other compatible uses consistent with the intent and purpose of the Williamson Act (Drake pers. comm.).

Agriculture

Soil Surveys. Information on soils was obtained from soil surveys prepared by the SCS (now called the Natural Resources Conservation Service [NRCS]). Acreages by soil units on each island were estimated based on planimeter measurements of SCS soil survey maps made by JSA. Soil qualities and limitations are described based on information contained in the soil surveys for Contra Costa and San Joaquin Counties.

Agricultural Land Production Capabilities. Agricultural land production capabilities were assessed using the NRCS land capability classification (LCC) system and California Department of Conservation's (CDC's) important farmland mapping (IFM) system. Information provided by these two systems was supplemented by farmland information contained in the SJCGP open space/conservation element.

The LCC system places soils into eight classes (I-VIII), depending on the limitations to agricultural use imposed by 13 specific soil and climatic criteria. The higher the class, the more restrictive the limitation. Classes I through IV are generally considered lands suitable for cultivation. Class I and II soils are often combined as one definition of prime farmland.

CDC's IFM system identifies four farmland categories: prime land, additional farmland of statewide importance, unique farmland, and additional farmland of local importance. Land must meet 10 specific soil and climatic criteria to qualify for the prime or statewide classes, with the prime class requiring the best of these conditions for agricultural usage. Unique farmland is land that does not qualify for the prime or statewide classes, but because of climatic or other factors, grows one of the top 40 California crops. Farmland of local

importance is other farmland that holds economic value for the local economy (CDC 1987).

Crop History and Yields. Crop history information for the DW project islands was generally provided by farmers and farm managers with operations on the islands. Crop acreages were estimated based on land use maps prepared by DWR for 1982 and 1987 crop years and on a field survey conducted by JSA in 1988. Crop yields were estimated using countywide yield data from the San Joaquin and Contra Costa County crop reports produced by the counties' agricultural commissioner's offices. Countywide per-unit estimates for individual crops were modified based on information provided by island farmers and farm managers.

Land Use Conditions

The four DW project islands are used primarily for perennial and annual agricultural production, with some hunting and fishing recreational uses. Bacon and Bouldin Islands are currently used primarily (approximately 80%) for agricultural production or grazing and small portions of these islands are not used (Table 3I-1). In contrast, only about one-half of Holland and Webb Tracts are used for agricultural production and grazing, with a relatively large amount of land unused or fallow (Table 3I-1). The DW project islands are almost entirely designated in local land use plans for agricultural use or uses compatible with agricultural operations (Figure 3I-2).

Bacon Island

Existing Uses and Ownerships. Approximately 80% of Bacon Island is used for agriculture and produced crops such as corn, milo, potato, sunflower, asparagus, and grapes (Table 3I-1). Approximately 20 farmsteads or rural residences are located on the island near the perimeter levees. An additional five or six barracks for migrant farmworkers are also occupied seasonally. Agricultural structures and equipment complexes are located in the northern, central, and southern portions of the island. An airstrip for crop dusting flights is located on the eastern portion of the island.

DW now owns all of Bacon Island, which was previously owned by nine different entities.

Zoning and General Plan Designations. The San Joaquin County zoning designation for Bacon Island is General Agriculture with a 40-acre parcel minimum (AG-40). Uses allowed under this zoning include single-

family dwellings, crop production, packing plants, livestock grazing, and other limited agriculture- and livestock-related activities. Development plan approval is required for gas or oil drilling, hunting and fishing clubs, farm worker dwellings, produce stands, poultry operations, nurseries and greenhouses, and labor camps. Other uses may be permitted subject to site approval. Conditional use permits are required for marinas and uses ancillary to marinas, resource recovery operations, and power generating facilities.

The SJCGP designation for Bacon Island is AG. The designation for land along sloughs and rivers surrounding Bacon Island is Open Space/Resource Conservation (Figure 3I-2). Table 3I-2 defines general plan designations.

Williamson Act Contracts. Approximately 4,662 acres of Bacon Island are currently under Williamson Act contracts. As shown in Figure 3I-3, only two parcels on Bacon Island are not under Williamson Act contracts.

Land Uses near Bacon Island. Land on islands surrounding Bacon Island is used primarily for agriculture. Scattered agricultural structures, equipment complexes, and a few rural residences are interspersed throughout the vicinity. San Joaquin County has designated land north, south, and east of Bacon Island on Mandeville Island, Woodward Island, and Lower Jones Tract as AG (Figure 3I-2). Mandeville Island is under Williamson Act contracts. With the exception of Mildred Island, which was flooded in 1983 as the result of a levee breach, Delta land east and south of Bacon Island is also entirely under Williamson Act contracts (Figure 3I-3).

Webb Tract

Existing Uses and Ownerships. Approximately 50% of Webb Tract is in agricultural use, producing mainly corn and wheat crops (Table 3I-1). A small number of agricultural structures and equipment complexes are located on the island, mainly near the perimeter levees. Occupied residences on the island include two trailers located along the northern shore and adjacent to the northern levee, one trailer located in the island interior, and a residence (semipermanently occupied) on the southern portion of the island. A clubhouse is located on high ground at the extreme eastern tip of the island. Webb Tract is entirely owned by DW.

Zoning and General Plan Designations. The Contra Costa County zoning designation for most of Webb Tract is Agriculture (A-2), and the 139.2-acre False River Farms parcel is zoned as Agricultural

Preserve District (A-4). This A-4-zoned parcel is under a Williamson Act contract. The Contra Costa County A-2 zoning (5-acre minimum parcel size) allows a variety of agricultural uses, as well as incidental sheds, warehouses, production facilities, produce stands, one single-family detached unit, and other uses allowable by code or use permit. Refuse disposal sites are also allowed in areas zoned A-2 by use permit only. Land uses under A-4 zoning include commercial agricultural production and other uses specifically agreed on by the county and the landowner at the time the zoning was established. Uses allowed by use permit include agriculture-related structures, fruit and vegetable stands, owner or lessee residences, oil and gas drilling, and a variety of other agriculture- and livestock-related uses.

The 1991 CCCGP designation for all of Webb Tract is Delta Recreation and Resources (Figure 3I-2). The CCCGP identifies agriculture and wildlife habitat as the most appropriate uses in this area. Under the CCCGP Delta Recreation and Resources designation, residential density is limited to one unit permitted per 20 acres, and marinas, shooting ranges, duck and other hunting clubs, campgrounds, and other outdoor recreation complexes are allowed through issuance of a land use permit.

Williamson Act Contracts. Webb Tract currently has one parcel under a Williamson Act contract: False River Farms, a 139.2-acre parcel located along the southern portion of Webb Tract (Figure 3I-3).

Land Uses near Webb Tract. Webb Tract is bordered by the San Joaquin River to the north and east, False River and the flooded Franks Tract to the south, and Fishermans Cut to the west. Land use west of Webb Tract on Bradford Island is mainly agriculture with associated farmsteads and structures related to agricultural production. Boating facilities are located on the eastern shoreline of Bradford Island, facing toward Webb Tract. The CCCGP designation for all of Bradford Island is Delta Recreation and Resources (Figure 3I-2).

Land north of Webb Tract across the San Joaquin River is located in Sacramento County. This area has some shoreline development, but most land is in agricultural use with scattered farmsteads and other agriculture-related structures. Land use designations for this area are Recreational and Agricultural Cropland (Figure 3I-2).

Franks Tract, south of Webb Tract across False River, is a state recreation area. The flooded portion of Franks Tract is designated on the CCCGP map as a scenic waterway and the designation for land areas is Recreational. Franks Tract is used primarily for boating

and other water-oriented recreation and has no extensively developed areas.

Bradford Island to the west has two parcels under Williamson Act contract totaling approximately 444.4 acres. As described previously, Mandeville Island southeast of Webb Tract is also under Williamson Act contract (Figure 3I-3).

Bouldin Island

Existing Uses and Ownerships. Approximately 76% of Bouldin Island is used for agriculture and produces mainly corn and wheat crops (Table 3I-1). Scattered agricultural structures and equipment complexes are located in the northern, central, and southern portions of the island. Several residences and associated farmstead structures are located north of SR 12. Two residences, one of which is currently occupied, are located south of SR 12 on the eastern side of the island. An airstrip used by crop-dusting operators is located west of these residences. An oil drilling pad is also located in this area. The island also has an old duck club that is unoccupied and is currently used for decoy storage and other similar uses. Bouldin Island is entirely owned by DW.

Zoning and General Plan Designations. The San Joaquin County zoning designation for Bouldin Island is AG-40. Permitted uses under AG-40 zoning are described above under "Bacon Island". As with Bacon Island, the SJCGP map shows the designation for Bouldin Island as AG (Figure 3I-2). The designation for land along sloughs and rivers is Open Space/Resource Conservation.

Williamson Act Contracts. The entire land area of Bouldin Island is under Williamson Act contracts, as shown in Figure 3I-3.

Land Uses near Bouldin Island. The Mokelumne River bounds Bouldin Island to the north and west, and Potato Slough bounds the island to the east and south. Land on islands surrounding Bouldin Island is used primarily for agricultural production. Scattered agricultural structures, equipment complexes, and a few rural residences are also interspersed throughout the vicinity.

Islands surrounding Bouldin Island are designated on the SJCGP map as AG. Land west and northwest of Bouldin Island and the Mokelumne River on Andrus and Tyler Islands is in Sacramento County. General plan designations for those lands in Sacramento County are Recreational and Agricultural Cropland (Figure 3I-2).

Staten and Venice Islands, located north and south of Bouldin Island, respectively, are under Williamson Act contracts. Most parcels east of Bouldin Island are also under Williamson Act contracts (Figure 3I-3).

Holland Tract

Existing Uses and Ownership. Approximately 50% of Holland Tract is used for agriculture and produces mainly corn and wheat crops (Table 3I-1). Agricultural structures and equipment complexes are scattered along the southern and western perimeter levees. Onsite residences include a temporary trailer located in the northeast portion of the island near the levee bordering Holland Cut and two residences on the Solomon property in the western portion of the island. An abandoned hog feeding area is located east of the Solomon property residences. This area includes several structures ancillary to hog farming and untilled open space.

Two marinas are located at the southern boundary of Holland Tract on Rock Slough. The Lindquist Landing Marina on the southern boundary features boat docks and other structures ancillary to marina uses. The Holland Riverside Marina, at the southeastern corner of the island, is a large facility with numerous boat docks, covered slips, and ancillary marina uses.

DW owns the majority of Holland Tract parcels. DW does not own the Solomon parcel (857 acres) in the southwestern corner of the site, several small parcels adjacent to the Solomon parcel in the southwestern corner of the island, and the marina parcels along the southeastern perimeter of the island. The marina parcels, the Solomon parcel, and other small parcels would be excluded from Alternatives 1 and 2 (Figure 2-8).

Zoning and General Plan Designations. The Contra Costa County zoning designations for Holland Tract are General Agricultural District (A-2) and Heavy Agricultural District (A-3). Uses allowed under A-2 zoning were discussed above for Webb Tract. The A-3 zone allows uses that are similar to the uses allowed in A-2 zones, with the exception that parcels must consist of at least 10 acres. This designation specifically allows only owners or lessees to reside on the site.

The CCCGP designation for all of Holland Tract is Delta Recreation and Resources (Figure 3I-2).

Williamson Act Contracts. Holland Tract has no parcels under Williamson Act contracts (Figure 3I-3).

Land Uses near Holland Tract. Bethel Island northwest of Holland Tract has extensive shoreline development, consisting mainly of boat docks, marinas, single-family residences, and some retail businesses. General plan designations for this developed area are mainly Single-Family Residential High-Density, with a small amount of Commercial and Multifamily Residential uses permitted. Similar shoreline land uses exist on Hotchkiss Tract, on the western shore of Sand Mound Slough west of Holland Tract. Inland use of these adjacent islands is primarily for agriculture, with a limited amount of rural residential development.

Franks Tract State Recreation Area is north of Holland Tract. Land uses and designations on Franks Tract are discussed above under "Webb Tract" (Figure 3I-2).

Land uses south of Holland Tract on Veale and Palm Tracts are generally agricultural with some farmsteads and agricultural structures. Veale Tract is within the urban limit line for Contra Costa County, so urban development will likely occur on Veale Tract in the next 20 years. The designation for most land southwest of Holland Tract is Delta Recreation and Resources (Figure 3I-2).

Palm Tract (approximately 2,554 acres), located south of Holland Tract, is entirely under Williamson Act contracts. As described previously, most of Bacon Island west of Holland Tract is also under contract (Figure 3I-3).

Agriculture Conditions

Bacon Island

Soils. Bacon Island soil types, as identified by the SCS soil survey for San Joaquin County, are presented in Table 3I-3.

Two soils compose an estimated 73% of Bacon Island, according to planimeter measurements of SCS preliminary soils maps. Rindge muck, partially drained with 0-2% slopes, is the dominant soil on Bacon Island, accounting for an estimated 2,547 acres, or 47% of total acreage. Kingile muck, partially drained with 0-2% slopes, accounts for an estimated 1,429 acres, or 26% of total acreage. Both soils have SCS land capability classifications of III, as do all soils on Bacon Island.

Major limitations of the Bacon Island soils include subsidence, a high water table, and slow permeability.

Drainage and careful irrigation practices are required for the production of irrigated row and field crops on Bacon Island soils. Fields are irrigated through application of water through siphon pipes from sloughs and channels to a network of canals and ditches on the island. Drainage water is pumped out continually to prevent flooding by the rising water table that is caused by the constant hydrostatic pressure of the water outside the island levees. The shallow water table, in combination with the organic peat soils, creates a soil condition favorable to the outbreak of plant pathogens and destructive nematodes.

Land Production Capabilities. The soils on Bacon Island have been categorized by NRCS as Class III soils because of the limitations imposed by subsidence and high water table. Class III soils can be categorized by NRCS as prime if the soil limitations are easily solved by agricultural practices, as is often the case with drainage systems for Delta soils (Yoha pers. comm.). Virtually all of Bacon Island's soils have been classified as prime because of drainage practices implemented on the island. An estimated 125 acres of Itano silty clay loam have not been classified as prime (Table 3I-3).

CDC's draft IFM map for San Joaquin County indicates that virtually all the soils on Bacon Island are considered to represent prime farmland. Approximately 125 acres have been designated farmland of statewide importance (Table 3I-4).

San Joaquin County prepared its own prime farmland map as part of the open space/conservation element of its general plan (San Joaquin County Community Development Department 1992). San Joaquin County included all lands with SCS Class I and II ratings, as well as lands with Class III ratings and capability units of w2 and w10 (Table 3I-3), within its classification of prime farmlands. According to this definition, all lands on Bacon Island are considered by the county to be prime farmlands.

Crop History and Production Levels. Bacon Island is intensively managed as an agricultural operation by three major growers. A field survey in 1988 found the levees, roads, fields, and ditches to be well maintained. Natural and native vegetation is virtually absent, and virtually all tillable land is in crop production.

Over the past 30 years, a variety of crops have been grown on Bacon Island, including lettuce, corn, celery, carrots, potatoes, milo, asparagus, wheat, barley, onions, grapes, and sunflowers (Gianelli pers. comm.). Estimates of planted acreage are shown in Table 3I-5. As shown, potatoes, asparagus, and corn are the dominant crops produced on Bacon Island. Together, these three crops

account for an estimated 78% of the 4,678 acres in agricultural use (including 347 acres of fallow land) on Bacon Island.

Table 3I-6 shows typical yield and production levels for the primary crops grown on Bacon Island based on planted acreage estimates for 1988. Crop acreages vary from year to year, depending on market conditions, the status of federal "set-aside" programs, and pest management concerns. Similarly, per-acre yields vary from season to season based on management practices and weather and pest conditions. The production estimates shown in Table 3I-6 indicate that Bacon Island typically produces the following percentages of the crops produced in San Joaquin County, based on 1987 countywide production levels in tons: corn, 1.3%; sunflower, 3.5%; asparagus (fresh), 7.6%; commercial potatoes, 91.9%; seed potatoes, 52.5%; and grapes (wine), 0.9% (San Joaquin County Office of the Agricultural Commissioner 1988).

Webb Tract

Soils. According to the Soil Survey of Contra Costa County (SCS 1977), Rindge muck is the dominant soil on Webb Tract, accounting for an estimated 4,415 acres (85%) of the island's 5,162 acres (Table 3I-3); Ryde silt loam is the second most common soil found on Webb Tract, accounting for 328 acres. All but an estimated 250 acres (5%) of the island's soils are categorized as Class III soils. Major limitations of the Webb Tract soils include a high water table, rapid permeability, and a moderate soil-blowing hazard. As on the other project islands, careful drainage and irrigation practices are required for the production of irrigated row and field crops.

Land Capabilities. NRCS has identified two Webb Tract soils as prime: Rindge muck and Ryde silt loam. Together, these two soils represent an estimated 4,743 acres (almost 92%) of the island's soils. The CDC IFM system has designated an estimated 4,725 acres on Webb Tract as prime farmland, 130 acres as farmland of statewide importance, and 294 acres as unique farmland (Table 3I-4).

Crop History and Production Levels. Webb Tract was primarily farmed by three growers in 1988. Similar to Holland Tract, and unlike Bacon and Bouldin Islands, Webb Tract has sand hills and upland habitat in its western half. In addition, two blowout ponds are found on Webb Tract, totaling an estimated 106 acres. An estimated 49% of the island is used for crop production,

excluding 58 acres of pasture and 611 acres of fallow land.

Crops grown in recent years on Webb Tract include wheat, safflower, corn, and grain sorghum (DWR 1987). Only two crops, wheat and corn, were grown on Webb Tract in 1988 (Table 3I-5); corn was the largest crop grown on Webb Tract, occupying 2,128 acres, an estimated 65% of the island's agricultural acreage. In 1988, wheat was being grown on an estimated 426 acres (13%).

Table 3I-6 shows typical yields and production levels for the primary crops grown on Webb Tract based on planted acreage estimates for 1988. The production estimates shown in Table 3I-6 indicate that Webb Tract typically produces the following percentages of the crops produced in Contra Costa County, based on 1987 county-wide production levels in tons: wheat (12.0%) and corn (60.1%) (Contra Costa County Department of Agriculture 1988).

Bouldin Island

Soils. Soils on Bouldin Island, as identified by the preliminary NRCS soil survey of San Joaquin County, are presented in Table 3I-3. Three soils account for an estimated 72% of the soils on Bouldin Island. Similar to Bacon Island, Rindge muck, partially drained, 0-2% slopes, is the dominant soil on Bouldin Island, accounting for an estimated 2,187 acres (38%) of the total acreage of Bouldin Island. Rindge mucky silt loam (0-2% slopes) and Retryde-Peltier complex (0-2% slopes) account for an estimated 19% and 15% of total acreage, respectively. All three soils have NRCS land capability classifications of III.

Major limitations of the Bouldin Island soils are similar to those found on Bacon Island, including subsidence, a high water table, and slow permeability. The discussion of Bacon Island soils describes necessary drainage practices for crop production on Bouldin Island.

Land Capabilities. All but 30 acres of Bouldin Island have been classified by NRCS as Class III soils. Class III soils are usually not considered prime by NRCS or CDC; however, appropriate drainage and irrigation practices may significantly reduce the limitations of the soil and lead to prime designations for some Class III soils. NRCS and CDC have classified all but 50 acres of Bouldin Island's farmlands as prime. An estimated 30 acres of Dello loamy sand have been designated as farmland of statewide importance (Table 3I-3).

The San Joaquin County prime farmlands map, discussed previously for Bacon Island, designates virtually all the soils located on Bouldin Island as prime.

Crop History and Production Levels. Similar to Bacon Island, Bouldin Island is intensively farmed and has well-maintained levees, roads, and ditches; however, adequate drainage is lacking in some areas of the island. Crops grown on Bouldin Island in recent years include wheat, safflower, corn, beans, sunflower, and tomatoes (DWR 1984). As shown in Table 3I-5, corn and wheat are the dominant crops grown on Bouldin Island. These two crops accounted for an estimated 69% of the island's agricultural acreage in 1988. Sunflowers accounted for an estimated 17% of the island's agricultural acreage in 1988.

Table 3I-6 shows typical yields and production levels for the primary crops grown on Bouldin Island based on planted acreage estimates for 1988. The production estimates shown in Table 3I-6 indicate that Bouldin Island typically produces the following percentages of the crops produced in San Joaquin County, based on 1987 countywide production levels in tons: wheat, 2.8%; corn, 4.7%; and sunflower, 16.2% (San Joaquin County Office of the Agricultural Commissioner 1988).

Holland Tract

Soils. Holland Tract soils, as identified by the Soil Survey of Contra Costa County (SCS 1977), are presented in Table 3I-3. Three soils account for an estimated 85% of Holland Tract's 4,031 acres: Rindge muck (34%), Piper loamy sand (28%), and Shima muck (23%). Unlike Bacon Island, Webb Tract, and Bouldin Island, Holland Tract has large areas of Class IV soils, including an estimated 1,108 acres of Piper loamy sand and 420 acres of Piper fine sandy loam. The remaining soils on Holland Tract are categorized as Class III soils. Major limitations of Holland Tract soils include a high water table, low available water capacity, rapid permeability, and moderate soil blowing.

Land Capabilities. NRCS has identified four of Holland Tract's soils as prime: Rindge muck, Ryde silt loam, Egbert mucky clay loam, and Webile muck. Together, these soils represent an estimated 1,556 acres (39%) of the island's soils. The CDC IFM system has designated a similar number of acres as prime on Holland Tract. As shown in Table 3I-4, under the IFM system an estimated 1,575 acres are designated as prime farmland; 2,031 acres are designated as farmland of statewide importance; and 426 acres are designated as unique

farmland. Among the four DW project islands, Holland Tract contains the smallest amount of prime farmland.

Crop History and Production Levels. Holland Tract is the least intensively managed island of the four DW project islands. Island flooding, bankruptcies, and land ownership changes have led to neglect and poor agricultural practices on some parcels. In 1988, only 36% of the island was used for crop production, excluding 542 acres of pasture located primarily in the south-west corner of the island, where a year-round grazing operation is located.

Crops grown in recent years on Holland Tract include wheat, safflower, sugar beets, corn, grain sorghums, sunflower, and asparagus (DWR 1987). As shown in Table 3I-5, only three crops were grown on Holland Tract in 1988: wheat, corn, and asparagus. Wheat was the largest crop grown on Holland Tract, representing an estimated 30% of the island's agricultural acreage.

Table 3I-6 shows typical yields and production levels for the primary crops grown on Holland Tract based on planted acreage estimates for 1988. Holland Tract typically produces the following percentages of the crops produced in Contra Costa County, based on 1987 countywide production levels in tons: wheat, 23.5%; corn, 15.4%; and asparagus, 26.6% (Contra Costa County Department of Agriculture 1988).

IMPACT ASSESSMENT METHODOLOGY

Analytical Approach and Impact Mechanisms

Assessment of Land Use Impacts

Land use impacts were assessed based on how construction and operation of the DW project alternatives would benefit or adversely affect existing residences and structures, adjacent land uses, and existing land uses. The DW project alternatives were also evaluated for their consistency with land use designations and policies of the county general plans and zoning ordinances, Delta Protection Commission regional policies, and Williamson Act contracts.

Local agencies were contacted to review potential land use conflicts or inconsistencies. Results of those communications are presented in the sections below on

impacts and mitigation measures of the DW project alternatives.

Assessment of Agriculture Impacts

The agricultural resources impact analysis focuses on the conversion of agricultural land and related changes in agricultural production, employment, and income. Findings of significance were made only for the land conversion impacts; the resulting economic effects were evaluated to help determine the significance of the loss of agricultural land. The methodology used to assess agricultural economic effects is described in Chapter 3K, "Economic Conditions and Effects".

Agricultural land conversion impacts were evaluated through comparison between conditions under the DW project alternatives and point-of-reference conditions described in the "Affected Environment" section. Impacts of the DW project alternatives on agricultural resources were determined through estimation of the amount of agricultural land that would be converted to other uses with project implementation and through evaluation of the quality and productive capacity of the converted land, based on the LCC and IFM classification systems and crop yield estimates.

The extent of agricultural land conversion impacts depends on the amount of land on the DW project islands that would be converted to nonagricultural uses. Conversion impacts would begin during construction of project facilities and would continue during the life of the project, which is assumed to be 50 years.

The direct conversion of agricultural land caused by project implementation would not be irreversible. Most project lands could, at some time, be brought back into agricultural production through draining of the islands and clearing of riparian habitat that would be established under the DW project (Simpson pers. comm.). However, once the project is implemented, it may be difficult to return the land to its original state because of the establishment of riparian habitat on the reservoir islands during dry years and on the habitat islands year round (Elliott pers. comm.). Some lands converted for borrow sites and placement of permanent structures (e.g., siphons and pumps) may not be able to be reclaimed for agricultural use. For example, up to 385 acres may be used for borrow areas on the DW project islands over the life of the DW project. No plans are included in the DW project, however, to return DW project lands to agricultural production in the future.

The impact analysis prepared for this chapter evaluated a worst-case scenario by assuming that agricultural lands would be permanently removed from production by implementation of the DW project. This analysis also assumes as a "worst case" that the existing agricultural production conditions could continue indefinitely. In fact, most soils on the DW project islands are limited by subsidence and blowing hazards according to NRCS (SCS 1990, Simpson pers. comm.) (Table 3I-3). Continued subsidence of the island bottoms may eventually make agricultural production on these islands infeasible (DWR 1990) (see Chapter 3D, "Flood Control", for more detail on subsidence).

Criteria for Determining Impact Significance

The criteria used for determining significance of a land use or agricultural impact are based on the State CEQA Guidelines and professional standards. These criteria are described below.

Land Use Criteria

An alternative is considered to have a significant impact on land use if it would:

- displace existing residences and structures in areas where replacement housing is unavailable and landowners are not willing sellers,
- be incompatible with existing adjacent land uses,
- convert existing land use that involves an extreme change from one land use to a more intensive use,
- cause incompatibilities with existing Williamson Act contracts, or
- conflict with adopted and proposed plans and policies in the project area.

Impacts are considered less than significant if they do not meet any of the criteria listed above.

Agriculture Criteria

Under CEQA, a project will normally have a significant effect on the environment if it will convert prime

agricultural land to nonagricultural use or impair the agricultural productivity of prime agricultural land. Appendix G of the State CEQA Guidelines and CEQA, however, do not contain a provision requiring a lead agency to determine whether conversion of nonprime agricultural land is a significant impact.

CEQA allows for economic and social impact discussions in an EIR when the severity of a related physical impact is being measured (i.e., when the physical impact's significance is being determined). By themselves, the economic effects resulting from farmland conversion are not considered significant impacts, and mitigation is not required for economic effects (Chapter 3K, "Economic Conditions and Effects"). Changes in agriculture-related employment and farm income were used only to evaluate the significance of conversion of both prime and nonprime farmlands located on the DW project islands.

Although an estimated 85% of the farmland on the DW project islands has been designated by NRCS and CDC as prime farmland, disagreement exists concerning the quality of island soils. According to the NRCS district conservationist in Stockton (Simpson pers. comm.):

[The] conclusion is accurate [that the loss of prime agricultural land on the project islands is a significant adverse impact, based on] a strict interpretation of the criteria for prime farmland. However, soil scientists will debate whether peat soils truly fit the theme of the definition of prime farmland since the criteria [do] not specifically address a unique characteristic [of peat soils] - oxidation . . . it is my opinion that the project does not cause a significant impact to the loss of prime agricultural land as stated.

This opinion, however, does not consider the indirect economic effects that could result from the conversion of DW project island farmlands.

Evaluation of the significance of the farmland conversion impact is further complicated by the fact that the conversion may not be irreversible and that subsidence would continue to impair the productivity of these lands if agricultural uses were to resume in the future.

Although these factors may reduce the severity of the conversion impacts, the conversion of agricultural lands on the DW project islands would be considered a significant impact if:

- agricultural lands on the islands would be retired from production on a long-term basis;

- the conversion of prime and nonprime farmlands on the project islands would result in a substantial loss of jobs and income in agriculture-dependent industries in San Joaquin and Contra Costa Counties; and
- the amount of agricultural land converted by the project, at least temporarily, would be substantial.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 1

Alternative 1 involves storage of water on Bacon Island and Webb Tract (reservoir islands) and management of Bouldin Island and Holland Tract (habitat islands) primarily for wetlands and wildlife habitat. The reservoir islands would be managed primarily for water storage, with wildlife habitat and recreation constituting secondary uses.

Changes in Land Use Conditions

Bacon Island

Displacement of Residences and Structures. Implementation of Alternative 1 would convert onsite agricultural land uses to water storage operations. This change would require removal or relocation of existing onsite structures and farmsteads on Bacon Island. The major agricultural structures and rural residences on the site are located near the perimeter levees. The structures below the high water level would need to be moved or demolished. Major alteration of the levee interiors could also warrant removal of all agricultural structures and residences adjacent to or on the levees.

For the elimination or relocation of approximately 20 residences, six farm worker barracks, and other agricultural structures, the affected landowners have been or would be compensated for their property as willing sellers. Housing opportunities in the local area are considered sufficient for those affected to be housed.

Conflicts with Adjacent Land Uses. Storage of water and associated recreational uses on Bacon Island would not adversely affect adjacent land uses because the island is buffered by levees and surrounding waterways (see Chapter 3D, "Flood Control", for more detail on levee structure). Thus, implementation of Alternative 1

is not expected to create nuisances that could affect or impair offsite agricultural or nonagricultural land uses.

Implementation of Alternative 1 without appropriate remedial measures could result in flooding of adjacent lands due to seepage from Bacon Island onto surrounding islands. However, DW proposes seepage control measures, including interceptor wells, as part of Alternative 1. As addressed in Chapter 3D, "Flood Control", Alternative 1 will result in less-than-significant seepage impacts on neighboring islands.

Effect on Williamson Act Contracts. San Joaquin County has preliminarily determined that Alternative 1 is consistent with the goals of the Williamson Act (Davisson pers. comm.). Submerged areas are considered "agricultural lands" in San Joaquin County under the Williamson Act. Therefore, Alternative 1 would not result in impacts on Williamson Act contract lands on Bacon Island.

Consistency with Zoning and General Plan Designations. Implementation of Alternative 1 would require a development plan for construction of recreation facilities in the AG-40 zone on Bacon Island. The San Joaquin County Department of Planning and Building Inspection staff members could approve the permit if they determine, after reviewing the site and building floor plans, that recreational use of the site is consistent with continued agricultural use (Davisson pers. comm.).

For Alternative 1 to be allowed under the current zoning, the board of supervisors must determine that water storage on Bacon Island is consistent with uses allowed in the AG-40 zone and consistent with uses permitted under zoning ordinance Sections 9-2352 and 9-4005.1. San Joaquin County has preliminarily determined that because Alternative 1 is consistent with the open space and conservation policies of the general plan, the project would be permitted in the AG-40 zone. (Davisson pers. comm.) Therefore, Alternative 1 would not result in impacts on existing zoning and general plan designations.

All four DW project islands are located in the "primary zone" as defined in the Delta Protection Act (Figure 3I-1). The proposed water storage on Bacon Island is consistent with the intent of the Delta Protection Act; Section 29760(b) of the Delta Protection Act directs that the regional plan accomplish the following:

Permit water reservoir and habitat development that is compatible with other uses.

Preserve and protect riparian and wetlands habitat, and promote and encourage a net increase in both the acreage and values of the resources on public lands and through voluntary cooperative arrangements with private property owners.

Preserve and protect open-space and outdoor recreational opportunities.

Therefore, Alternative 1 is consistent with the Delta Protection Act.

Consistency with General Plan Principles. San Joaquin County's conservation principles encourage protecting and utilizing agricultural resources, supporting intensive agricultural uses, prohibiting fragmentation of agricultural land outside urban expansion areas, and encouraging the implementation of Williamson Act land conservation programs.

San Joaquin County has preliminarily determined that Alternative 1 is consistent with the open space/conservation element of the SJCGP because the project would provide open space, water storage, water supply, and wetlands and fish and wildlife habitat in the county. The SJCGP open space/conservation element is implemented through the AG land use designation. Alternative 1 is considered consistent with the SJCGP principles (Table 3I-7). (Davisson pers. comm.)

Webb Tract

Displacement of Residences and Structures. Implementation of Alternative 1 would require relocation or removal of two trailers in the northern portion of Webb Tract, one trailer in the island interior, and the Dinelli residence in the southern portion of the island. The need for removal of residences and structures would result from the proposed reservoir uses or from the proposed levee improvements. The clubhouse on the eastern tip of the island is sited above the proposed high water level and could remain onsite. The affected landowners have been compensated for their property as willing sellers. Housing opportunities in the local area are considered sufficient for those affected to be housed.

Conflicts with Adjacent Land Uses. Storage of water and associated recreational uses on Webb Tract would not adversely affect adjacent land uses because the island is buffered by levees and surrounding waterways (see Chapter 3D, "Flood Control", for more detail on levee structure). Thus, as with Bacon Island, the Webb

Tract portion of Alternative 1 would not affect or impair offsite agricultural or nonagricultural land uses.

Implementation of Alternative 1 without appropriate remedial measures could result in flooding of adjacent lands due to seepage from Webb Tract onto surrounding islands. However, DW proposes seepage control measures, including interceptor wells, as part of Alternative 1. As addressed in Chapter 3D, "Flood Control", implementation of Alternative 1 will result in less-than-significant seepage impacts on neighboring islands.

Effect on Williamson Act Contracts. Contra Costa County has preliminarily determined that the water component of Alternative 1 is consistent with the current Williamson Act contract and the existing agricultural use (Drake pers. comm.). Water storage is a compatible use under the Williamson Act. Therefore, Alternative 1 would be compatible with the existing Williamson Act contract on Webb Tract.

Consistency with Zoning and General Plan Designations. Alternative 1 would be consistent with the CCCGP Delta Recreation and Resource land use designation that allows for wildlife habitat and limited recreation. DW would likely need to obtain a land use permit prior to project implementation to construct recreation facilities. Contra Costa County has not completed rezoning the property in this area and would possibly, in cooperation with DW, rezone the property to P-1, public use. P-1 zoning would be consistent with the general plan and with the uses proposed under Alternative 1 (Drake pers. comm.). Further P-1 rezoning would be related solely to the construction and use of the recreation facilities. Lands zoned A-4 would remain in this district as Williamson Act lands. Therefore, water storage on Webb Tract would be consistent with the zoning and general plan designations on the island.

Webb Tract is in the Delta Protection Act "primary zone". The proposed water storage on Webb Tract would be consistent with the intent of the Delta Protection Act to permit water reservoir and habitat development that is compatible with other uses, as described above for Bacon Island.

Consistency with General Plan Principles. Implementation of Alternative 1 would be consistent with the open space and wildlife goals and policies of the CCCGP. However, Alternative 1 is not consistent with the county's agriculture goals to preserve prime agricultural lands for agricultural production and promote a competitive agricultural economy (Table 3I-7). Although the inherent agricultural productivity of the islands would not significantly change as a result of the use of prime agricultural

land for water storage (see "Changes in Agriculture Conditions" below), the proposed use is not consistent with these general plan goals.

Bouldin Island

Displacement of Residences and Structures. Implementation of Alternative 1 would not require removal or relocation of existing onsite structures and farmsteads on Bouldin Island. Structures would not be removed under the HMP, but current property owners would be displaced by the change in land use on the island from agriculture to habitat management. The affected landowners have been or will be compensated for their property as willing sellers.

Conflicts with Adjacent Land Uses. Habitat management on Bouldin Island and associated recreational uses would not adversely affect adjacent land uses because the island is buffered by levees and surrounding waterways. Thus, Alternative 1 is not expected to create substantial nuisances that could affect or impair offsite agricultural or nonagricultural land uses.

Effect on Williamson Act Contracts. Based on a preliminary evaluation by San Joaquin County, Alternative 1 would be consistent with the open space preservation goals of the Williamson Act and is consistent with the SJCGP open space/conservation element and AG land use designation (Davisson pers. comm.). Therefore, Alternative 1 would have no effect on Williamson Act contracts.

Consistency with Zoning and General Plan Designations. San Joaquin County preliminarily determined that open space retention and habitat management on Bouldin Island are consistent with the SJCGP open space/conservation element and the AG land use designation. The County also determined that although not specifically mentioned under the AG-40 zoning definition, the open space value of implementing the HMP is consistent with the intent of the agricultural zoning and would be permitted in the AG-40 zone. (Davisson pers. comm.). Therefore, Alternative 1 is considered consistent with zoning and general plan designations.

Bouldin Island is in the Delta Protection Act "primary zone" (Figure 3I-1). The proposed habitat management on Bouldin Island is consistent with the intent of the Delta Protection Act to permit water reservoir and habitat development that is compatible with other uses, preserves and protects riparian and wetlands habitat, and preserves and protects open space and outdoor recreation opportunities.

Consistency with General Plan Principles. San Joaquin County has preliminarily determined that Alternative 1 is consistent with the open space/conservation element of the SJCGP, which is implemented through the AG land use designation, because it retains valuable open space values and encourages the multiple uses of open space (Davisson pers. comm.). Therefore, Alternative 1 is considered consistent with the SJCGP principles (Table 3I-7).

Holland Tract

Displacement of Residences and Structures. Implementation of Alternative 1 would not require relocation or removal of existing structures on Holland Tract. Some existing structures would be used for maintenance and operation facilities. Some current property owners within the project area on Holland Tract would be displaced by the change in use of the island from agriculture to habitat management. Lindquist Landing Marina, the Holland Riverside Marina, and the land on the southwest portion of the island would not be within the project area. Any affected landowners have been or will be compensated for their property as willing sellers.

Conflicts with Adjacent Land Uses. Habitat management on Holland Tract and associated recreation uses would not adversely affect adjacent land uses because the island is buffered by levees and surrounding waterways. Thus, Alternative 1 is not expected to create nuisances that could affect or impair offsite agricultural or urban land uses.

Consistency with Zoning and General Plan Designations. The habitat management aspect of Alternative 1 is consistent with the CCCGP Delta Recreation and Resources land use designation. A land use permit for construction of the proposed recreation facilities would be required prior to project implementation. Alternative 1 is considered consistent with the agricultural zoning on Holland Tract because the project would provide uses compatible with agriculture. However, further review and interpretation by the county staff would be required when an application is submitted by DW (Drake pers. comm.). Preliminary evaluation of the land use designations indicates that Alternative 1 would be consistent with current designations. The project would also be consistent with the proposed P-1 zoning as described above for Webb Tract.

Holland Tract is located in the Delta Protection Act "primary zone" (Figure 3I-1). The proposed habitat management on Holland Tract is consistent with the intent of the Delta Protection Act to permit water

reservoir and habitat development that is compatible with other uses, preserves and protects riparian and wetlands habitat, and preserves and protects open space and outdoor recreation opportunities.

Consistency with General Plan Principles. Implementation of Alternative 1 would be consistent with agriculture and open space policies of the CCCGP because Holland Tract would be managed for wildlife habitat (Table 3I-7). However, this alternative is not consistent with the county's agriculture goals to preserve prime agricultural lands for agricultural production and promote a competitive agricultural economy (Table 3I-7). Although the inherent agricultural productivity of the islands would not be significantly changed by the use prime agricultural land for habitat management (see "Changes in Agriculture Conditions" below), the proposed use is not consistent with these general plan goals.

Summary of Project Impacts and Recommended Mitigation Measures

Impact I-1: Displacement of Residences and Structures on Reservoir Islands. Implementation of Alternative 1 would convert onsite agricultural land uses to water storage operations on Webb Tract and Bacon Island. This change would require removal or relocation of existing onsite structures and farmsteads on Bacon Island and Webb Tract. The affected landowners have been or will be compensated for their property as willing sellers, and housing opportunities in the local area are considered sufficient for those affected to be housed. Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact I-2: Displacement of Property Owners on Habitat Islands. Implementation of Alternative 1 would not remove structures under the HMP for Bouldin Island and Holland Tract, but current property owners would be displaced by the change in use of the island from agriculture to habitat management. The affected landowners have been or will be compensated for their property as willing sellers. Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact I-3: Inconsistency with Contra Costa County General Plan Agricultural Principles. Implementation of Alternative 1 would convert 6,300 acres of prime agricultural land on Webb and Holland Tracts to water storage and habitat uses, respectively. This conversion is not consistent with the county's agricultural

principles to preserve prime agricultural lands for agricultural production and promote a competitive agricultural economy (Table 3I-7). Although the inherent agricultural productivity of the islands would not be significantly changed by use of prime agricultural land for water storage or habitat management, the proposed use is not consistent with these general plan principles. Therefore, this impact is considered significant and unavoidable.

Mitigation. No mitigation is available to reduce this impact to a less-than-significant level.

Changes in Agriculture Conditions

Bacon Island

Implementation of Alternative 1 would convert an estimated 5,403 acres of Class III soils on Bacon Island to nonagricultural use (Table 3I-4). NRCS and CDC have designated all but 125 acres of soil on Bacon Island as prime farmland. An estimated 4,331 acres, excluding 347 acres of short-term fallow land (land that is included as part of a crop rotation plan) were in agricultural use on Bacon Island in 1988. This land represented an estimated 0.7% of harvested acreage in San Joaquin County in 1987 (San Joaquin County Office of the Agricultural Commissioner 1988). Over the long term, agricultural production on the island may become infeasible even without DW project implementation because of subsidence and resulting increased likelihood of levee failure (DWR 1988).

Agricultural land conversion on Bacon Island would result in the loss of agricultural production on Bacon Island. Estimated crop production on Bacon Island, based on planted acreage in 1988, is shown in Table 3I-6. (See Chapter 3K, "Economic Conditions and Effects", for a discussion of the value of the island's agricultural production.)

As discussed in the "Affected Environment" section, Bacon Island produced virtually all of San Joaquin County's commercial potato crop (91.9%, based on countywide production levels), as well as large percentages of its seed potato (52.5%) and asparagus (7.6%) crops in 1987. The loss of Bacon Island's agricultural production would substantially reduce the countywide production of these crops.

Webb Tract

Implementation of Alternative 1 would convert an estimated 4,912 acres of Class III soils and 250 acres of Class IV soils on Webb Tract to nonagricultural uses. Under the CDC IFM system, an estimated 4,725 acres on Webb Tract are designated as prime farmland (Table 3I-4). In addition, 130 acres have been designated as farmland of statewide importance, and 294 acres have been designated as unique farmland. Implementation of Alternative 1 would convert these lands to nonagricultural uses.

An estimated 2,638 acres, excluding 611 acres of short-term fallow land, were in agricultural use on Webb Tract in 1988. This land represented an estimated 1.3% of acreage harvested in Contra Costa County in 1987 (Contra Costa County Department of Agriculture 1988).

DWR (1988) has identified Holland and Webb Tracts as critical for Delta water quality protection and seeks to reduce agricultural production on these and six other west Delta islands to minimize further subsidence and island flooding hazards. Thus, from the flooding hazard perspective, reduction of cultivated agricultural land on Webb and Holland Tracts may be considered a benefit over the long term. DWR (1990) has judged that loss of cultivated agriculture is inevitable on nearby Sherman Island because of island subsidence and that such loss is more than offset by flood control and wildlife benefits of slowing the rate of subsidence (see Chapter 3D, "Flood Control", for more detail on subsidence and flood control).

Agricultural land conversion would result in the loss of agricultural production on Webb Tract. In 1987, Webb Tract produced 60.1% of Contra Costa County's corn crop and 12.0% of the county's wheat crop. The loss of Webb Tract's agricultural production would substantially reduce the countywide production of these crops.

Bouldin Island

Implementation of Alternative 1 would convert much of Bouldin Island to nonagricultural uses (i.e., wildlife habitat). An estimated 3,864 acres of Class III soils and 30 acres of Class IV soils on Bouldin Island would be converted to nonagricultural uses. (The remaining 1,867 acres of farmland on Bouldin Island would be kept in agricultural use, as described below.) The 3,864 acres of Class III soils that would be converted under Alternative 1 are considered prime farmland by NRCS and CDC.

An estimated 4,395 acres, excluding 685 acres of short-term fallow land, are currently in agricultural use on Bouldin Island. Implementation of Alternative 1 would preempt agricultural production on 3,213 acres (including an estimated 2,780 planted acres and 433 fallowed acres). Under Alternative 1, some portions of Bouldin Island would be planted in grain crops to enhance wildlife habitat. As shown in Table 3I-8, an estimated 1,867 acres would be planted in corn, wheat, barley, and pasture for wildlife habitat, with an estimated 1,195 acres harvested for sale (see Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands").

The sale of grain crops planted for wildlife habitat would partially offset the loss of agricultural production on Bouldin Island; however, crop production on the island would be reduced by implementation of Alternative 1. The effect of this alternative on crop production on Bouldin Island includes the net loss of an estimated 2,506 tons of wheat, 7,435 tons of corn, and 770 tons of sunflowers, and the net gain of an estimated 27 tons of barley and 119 acres of harvested pasture. The crop reductions represent 16.2% of San Joaquin County's sunflower crop (based on 1987 countywide production levels), 3.1% of the county's corn crop, and 2.2% of the county's wheat crop. The crop gains would represent a 1.8% increase in the county's barley crop and a 0.4% increase in the county's supply of irrigated pasture.

Holland Tract

Under Alternative 1, portions of Holland Tract would be excluded from the project. Nonproject areas on Holland Tract would include marina properties, the 857-acre Solomon parcel, 263 acres of irrigated pasture, and several small parcels along the levee held by outside interests. An estimated 1,179 acres on Holland Tract within the project area would be planted in grain crops to enhance wildlife habitat, with an estimated 741 acres would be harvested for sale (Table 3I-8).

Implementation of Alternative 1 would convert an estimated 1,733 acres of agricultural soils to nonagricultural uses (excluding 1,120 nonproject acres and 1,179 acres planted in habitat crops). An estimated 1,162 acres of land designated as prime farmland in the CDC IFM system would be converted to nonagricultural uses on Holland Tract under Alternative 1. Additionally, an estimated 357 acres of farmland of statewide importance and 214 acres of unique farmland would be converted under Alternative 1.

An estimated 2,005 acres, excluding 745 acres of short-term fallow land, were used for agriculture on

Holland Tract in 1988. An estimated 1,120 of these acres are in the nonproject portion of Holland Tract. Implementation of Alternative 1 would preempt agricultural production on 451 acres (including an estimated 316 planted acres and 135 fallowed acres) and change cropping patterns on much of the remaining farmland within the project area on Holland Tract. As on Bouldin Island, some portions of Holland Tract would be planted in grain crops to enhance wildlife habitat. As shown in Table 3I-8, an estimated 1,179 acres would be planted in corn, wheat, barley, and pasture for wildlife habitat, with an estimated 741 acres harvested for sale.

The harvest and sale of grain crops planted for wildlife habitat would partially offset the loss of agricultural production on Holland Tract; however, crop production on the island would be reduced by implementation of Alternative 1. The effect of this alternative on crop production on Holland Tract includes the net loss of an estimated 374 tons of wheat, 396 tons of asparagus, and 118 acres of harvested pasture, and the net gain of 132 tons of corn and 40 tons of barley. The crop reductions represent 5.3% of Contra Costa County's wheat crop (based on 1987 countywide production levels), 14.7% of the county's asparagus crop, and 2.2% of the county's irrigated pasture. The crop gains would represent a 1.0% increase in the county's corn crop and a 5.2% increase in the county's barley crop.

As described above for Webb Tract, reducing the amount of cultivated agricultural land on Holland Tract may be considered a long-term benefit from a flooding hazard perspective in the west Delta.

Summary of Project Impacts and Recommended Mitigation Measures

Impact I-4: Direct Conversion of Agricultural Land. Implementation of Alternative 1 would convert approximately 16,180 acres of agricultural land, including an estimated 10,065 acres of harvested cropland and pasture, 1,525 acres of short-term fallowed land, and 4,590 acres of long-term idled lands, to nonagricultural uses on the four DW project islands combined. (This total excludes 1,120 acres of nonproject land on Holland Tract and 3,046 acres that would be planted in grains on Bouldin Island and Holland Tract for wildlife habitat.) This impact is considered significant and unavoidable based on the following considerations:

- The conversion of 10,065 harvested acres of agricultural land represents approximately 1.9% of the 535,800 harvested acres (excluding

nonirrigated grazing lands) in Contra Costa and San Joaquin Counties in 1987.

- Based on current conditions and management practices, an estimated 15,029 of the 16,180 converted acres have been designated as prime farmland by CDC. This acreage represents 3.1% of the estimated 480,600 acres of prime farmland within the two counties in 1990 (CDC 1992). Additionally, the converted acreage includes an estimated 642 acres designated as farmland of statewide importance and 508 acres designated as unique farmland by CDC.

This conversion of Delta islands to noncultivated uses may be viewed as a benefit because it slows rate of soil loss by reducing the rate of peat oxidation and subsidence problems on reservoir islands over the life of the project; however, under the project, agricultural lands would be retired from production for at least 50 years and there is no certainty that the project islands would be returned to agricultural production at the end of the project.

- Alternative 1 would eliminate significant proportions of countywide production of certain agricultural crops in San Joaquin and Contra Costa Counties. On Bacon Island, the project would eliminate 92% of countywide potato production and 53% of countywide seed potato production (based on 1987 production levels) in San Joaquin County. On Bouldin Island, the project would eliminate 16% of San Joaquin County's sunflower crop. On Holland and Webb Tracts in Contra Costa County, Alternative 1 would eliminate the following percentages (net) of countywide production of three crops (based on 1987 production levels): corn, 59%; wheat, 17%; and asparagus, 15%. Although specific effects on individual businesses have not been evaluated as part of this analysis, the proportional extent of these reductions indicates that agricultural service providers may be affected by production reductions related to project implementation.
- Implementation of Alternative 1 would substantially reduce statewide production of two crops, as shown in Table 3I-9. Percentages of sunflower seed for human consumption (31.8%) and seed potatoes (41.2%) grown on the DW islands in 1988 were substantial and would be reduced by project implementation. DW island contributions of the other crops grown on the

island were less than 4% of statewide production. For all crops, yields per acre were less on the four project islands in 1988 than the statewide averages.

- Loss of production on the four project islands would reduce agricultural employment and income in Contra Costa and San Joaquin Counties, as described in Chapter 3K, "Economic Conditions and Effects". An estimated 290 direct and secondary jobs would be lost in the two counties as a result of project implementation. Most of these jobs would be in the agricultural production and services and food processing sectors. Although the jobs lost would represent a small fraction of the 443,900 jobs in Contra Costa and San Joaquin Counties in 1988, the displaced employment would represent an estimated 1.6% of the agricultural production and service jobs in the two counties in 1988 (California Employment Development Department 1991). Although project construction, operations, and maintenance employment generated by the project would offset this loss, most of the project-related job losses would be in the agricultural sector and in sectors that supply agricultural goods and services. Project-related job growth probably would not offset losses in these specific sectors.

Even though DW project islands could conceivably be returned to agricultural production, the assumed 50-year disruption of production would likely result in permanent effects on employees and industries currently providing services to the project islands. These businesses include agricultural chemical dealers and pesticide applicators, and irrigation equipment and maintenance businesses (Hudson pers. comm.). CEQA and NEPA allow economic effects to be considered when the significance of physical impacts, such as the conversion of agricultural land, is considered (see Chapter 3K).

Mitigation. No reasonable mitigation is available to reduce this impact to a less-than-significant level. It is extremely unlikely that a similar amount of land in the region with similar qualities and productivity could be brought into production to mitigate the effects resulting from the loss of agricultural use of lands on the DW project islands discussed above. Counties in the region of the project are generally losing farmland faster than new land is being brought into production. For example, between 1986 and 1988, approximately 2,600 acres of cropland in Contra Costa County were converted to urban and other uses, while 450 acres of grazing lands and other nonagricultural lands were converted to cropland

(CDC 1990). Reclaiming DW project lands to agricultural uses at the conclusion of the project would reduce the long-term impacts on agricultural land and production but would not reduce short-term losses of agricultural production, employment, and income occurring over the 50-year life of the project.

Although DW would not control the use of water discharged from the project islands once it is sold, one of the potential uses of the exported water is for agriculture elsewhere in the state. Also, water from DW project operations sold for urban and environmental uses could reduce or delay losses of water from the agricultural sector that would otherwise be used to fulfill those urban and environmental water needs. These general benefits of Alternative 1 to the agricultural sector, however, would not be guaranteed or continuous. Therefore, intermittent benefits such as these are not a viable mitigation and would not offset the impact of converting agricultural lands on the DW project islands.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 2

Changes in Land Use Conditions

Impacts on land use, including effects on Williamson Act contracts, displacement of existing dwelling units, and consistency with relevant plans and policies, and mitigation measures of Alternative 2 are the same as those of Alternative 1.

Changes in Agriculture Conditions

Impacts on agricultural resources, including agricultural land conversion, production losses, and economic effects, and mitigation measures of Alternative 2 are the same as those of Alternative 1.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 3

Alternative 3 involves storage of water on Bacon Island, Webb Tract, Bouldin Island, and Holland Tract, with secondary uses for wildlife habitat and recreation. The portion of Bouldin Island north of SR 12 would be

managed as a wildlife habitat area and would not be used for water storage.

Changes in Land Use Conditions

Bacon Island and Webb Tract

The effect of implementation of Alternative 3 on land use for Bacon Island and Webb Tract is the same as that of Alternative 1.

Bouldin Island and Holland Tract

Displacement of Residences and Structures. Flooding Bouldin Island and Holland Tract under Alternative 3 would result in the displacement of residences and structures on those islands. This impact is similar to that described above for Bacon Island and Webb Tract under Alternative 1. The affected landowners have been or would be compensated for their property as willing sellers. Housing opportunities in the local area are considered sufficient for those affected to be housed.

Conflicts with Adjacent Land Uses. Water storage on Holland Tract and water storage and habitat management on Bouldin Island would not adversely affect adjacent land uses as described for Bacon Island and Webb Tract under Alternative 1.

Effect on Williamson Act Contracts. Williamson Act contracts on Bouldin Island would not be affected by water storage use on the south side of SR 12 as described for Bacon Island and Webb Tract under Alternative 1. As described for habitat management on Bouldin Island for Alternative 1, the NBHA north of SR 12 under Alternative 3 would not affect Williamson Act contracts.

Consistency with Zoning and General Plan Designations and Principles. As described for Bacon Island and Webb Tract, water storage on Bouldin Island and Holland Tract would be considered consistent with zoning and general plan designations in San Joaquin and Contra Costa Counties. Habitat management on Bouldin Island north of SR 12 would be consistent with plans and policies as described under Alternative 1.

Water storage on Bouldin Island and Holland Tract would be consistent with the Delta Protection Act. Water storage on Bouldin Island would be consistent with the SJCGP principles as described for Bacon Island. Conversion of prime agricultural land to water storage on

Holland Tract would be inconsistent with CCCGP agricultural goals.

Summary of Project Impacts and Recommended Mitigation Measures

Impact I-5: Displacement of Residences and Structures on Reservoir Islands. Implementation of Alternative 3 would convert onsite agricultural land uses to water storage operations on all four DW project islands. This change would require removal or relocation of existing onsite structures and farmsteads. The affected landowners have been or would be compensated for their property as willing sellers, and housing opportunities in the local area are considered sufficient for those affected to be housed. Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact I-6: Inconsistency with Contra Costa County General Plan Agricultural Principles. Implementation of Alternative 3 would convert 6,300 acres of prime agricultural land on Webb and Holland Tracts to water storage use. This conversion is not consistent with the county's agricultural principles to preserve prime agricultural lands for agricultural production and promote a competitive agricultural economy (Table 3I-7). Although the inherent agricultural productivity of the islands would not be significantly changed by use of prime agricultural land for water storage, the proposed use is not consistent with these general plan principles. Therefore, this impact is considered significant and unavoidable.

Mitigation. No mitigation is available to reduce this impact to a less-than-significant level.

Changes in Agriculture Conditions

Impacts on agricultural resources, including agricultural land conversion, production losses, and economic effects would be greater under this alternative than under Alternative 1. Under Alternative 3, no crops would be planted on Bouldin Island and Holland Tract as part of an HMP; therefore, agricultural resource impacts caused by land conversion on these islands would not be offset by agricultural production associated with habitat management as under Alternative 1. Additionally, the 1,120 acres on Holland Tract excluded from the project under Alternatives 1 and 2 would be converted to water storage uses under Alternative 3.

Agricultural resource impacts of Alternative 3 on Bacon Island and Webb Tract are the same as those described previously for Alternative 1.

Implementation of Alternative 3 would result in conversion to nonagricultural uses of an estimated 5,761 acres of agricultural land on Bouldin Island, including 5,711 acres designated by CDC as prime farmland (Table 3I-4). Conversion of agricultural land would result in the loss of agricultural production from an estimated 4,395 acres under cultivation in 1988 (this total does not include 685 acres of short-term fallow land) (Table 3I-6). Bouldin Island produces 16.2% of San Joaquin County's sunflower crop (based on 1987 countywide production levels), 4.7% of the county's corn crop, and 2.8% of the county's wheat crop. All agricultural production on Bouldin Island would be lost under Alternative 3.

Implementation of Alternative 3 would result in conversion to nonagricultural uses of an estimated 4,032 acres of agricultural soils on Holland Tract, including 1,575 acres designated by CDC as prime farmland (Table 3I-4). Conversion of agricultural land would result in the loss of agricultural production from an estimated 2,005 acres under cultivation in 1988 (this total does not include an estimated 745 acres of short-term fallowed land but includes 1,120 acres of land excluded from project use under Alternatives 1 and 2). The lost agricultural production on Holland Tract would include an estimated 23.5% of Contra Costa County's wheat crop (based on 1987 production levels), 15.4% of the county's corn crop, 26.6% of the county's asparagus crop, and 10.4% of the county's irrigated pasture.

Under Alternative 3, DW may be required to mitigate habitat losses on DW project islands by leasing or purchasing offsite lands for habitat creation or protection. This offsite mitigation could result in the conversion of an unknown amount of agricultural land.

Summary of Project Impacts and Recommended Mitigation Measures

Impact I-7: Direct Conversion of Agricultural Land. Implementation of Alternative 3 would convert to nonagricultural uses an estimated 20,345 acres of agricultural land on the four DW project islands combined, including an estimated 13,369 acres of harvested cropland and pasture, 2,388 acres of short-term fallowed land, and 4,590 acres of long-term idled lands.

The direct conversion of agricultural land on the project islands includes conversion of an estimated 17,414 acres of land designated as prime farmland by

CDC. This acreage represents 3.6% of the estimated 480,600 acres of prime farmland in the two counties in 1990 (CDC 1992). Additionally, the converted acreage includes an estimated 2,211 acres designated as farmland of statewide importance and 720 acres designated as unique farmland by CDC.

The conversion of 13,369 harvested acres of agricultural land represents conversion of approximately 2.5% of the 535,800 harvested acres (excluding nonirrigated grazing lands) in Contra Costa and San Joaquin Counties in 1987. Production losses and economic effects resulting from these production losses, including employment and income effects, would be similar to, but greater than, the effects described previously for Alternative 1.

The direct conversion of agricultural land to nonagricultural uses under Alternative 3 is considered significant and unavoidable based on the above considerations. Although this conversion of Delta islands to noncultivated uses may be viewed as a benefit because it preserves soils with peat oxidation and subsidence problems over the life of the project, project implementation would involve retiring agricultural lands from production for at least 50 years and there is no certainty that the project islands would be returned to agricultural production at the end of the project.

Mitigation. As discussed previously for Alternative 1, no reasonable mitigation is available to reduce this impact to a less-than-significant level. Reclaiming DW project lands to agricultural uses at the conclusion of the project would reduce the long-term impacts on agricultural land and production but would not reduce short-term losses of agricultural production, employment, and income occurring over the 50-year life of the project.

IMPACTS AND MITIGATION MEASURES OF THE NO-PROJECT ALTERNATIVE

The project applicant would not be required to implement mitigation measures if the No-Project Alternative were selected by the lead agencies. However, mitigation measures are presented for impacts of the No-Project Alternative to provide information to the reviewing agencies regarding the measures that would reduce impacts if the project applicant implemented a project that required no federal or state agency approvals. This information would allow the reviewing agencies to make a more realistic comparison of the DW project alterna-

tives, including implementation of recommended mitigation measures, with the No-Project Alternative.

Changes in Land Use Conditions

Under the No-Project Alternative, current use of the four DW project islands would continue as described above under "Affected Environment"; agricultural intensity would increase in currently fallow areas. Implementation of the No-Project Alternative would result in continuation of existing land uses with no change in the status of onsite structures, Williamson Act contracts, or zoning and general plan designations. Land use on the four islands would also continue to be consistent with relevant general plan policies. Therefore, the No-Project Alternative would not result in land use impacts.

Changes in Agriculture Conditions

Under the No-Project Alternative, more intensive agricultural operations would be implemented on the four DW project islands. An agricultural consultant has made general recommendations concerning agricultural practices, land improvements, and cropping patterns that would improve the farming efficiency on the four DW islands (McCarty pers. comm.). Land and drainage improvements under this alternative would be limited to those exempted from regulation under Section 404(f)(1) of the Clean Water Act. No redistribution of soil by grading or blading to fill wetlands would occur.

Based on these recommendations and additional input from DW (Winther pers. comm.), JSA developed a cropping scenario (Table 3I-10) used as the basis for evaluating the impacts of intensified agriculture under the No-Project Alternative. Production projections were prepared based on yield data provided by a variety of sources, as listed at the bottom of Table 3I-10. Average yields for the crops produced on Bacon and Bouldin Islands were assumed to remain the same as existing yields; average yields for the crops produced on Holland and Webb Tracts were assumed to increase because of improvements in drainage and agricultural practices.

The agricultural production projections for this alternative are valid only for the short term. Over the long term, intensive cultivated agriculture would cease on the DW project islands, particularly Holland and Webb Tracts, because of continued subsidence and the threat to Delta water quality (DWR 1990). No information is available concerning the length of time agriculture will

remain physically and economically feasible on the project islands; however, intensified agricultural use of the islands will likely increase existing erosion and subsidence problems.

Bacon Island

Implementation of the No-Project Alternative would retain in agricultural use the estimated 5,403 acres of prime agricultural land on Bacon Island. No additional land would be converted to nonagricultural uses. Cultivated land on Bacon Island would increase from an estimated existing 4,331 acres to a projected 4,960 acres (Tables 3I-6 and 3I-10). Over the long term, intensifying agriculture would increase the rate of subsidence and necessitate additional levee protection on the island. (See Chapter 3D, "Flood Control", for more detail on subsidence and levee stability.)

Under the No-Project Alternative, land currently used to grow corn and sunflower would be planted in potatoes, onions, and asparagus (Winther pers. comm.). In addition, set-aside land that currently supports exotic perennial grassland and exotic marsh habitat (see Chapter 3G, "Vegetation and Wetlands", for information on these habitat types) would be converted to use for growing potatoes, onions, and asparagus. Under the cropping scenario presented in Table 3I-10, these changes would increase Bacon Island's production of commercial potatoes by 41% and asparagus by 58%, reintroduce the production of onions, and maintain the existing production levels of seed potatoes and wine grapes.

Webb Tract

Implementation of the No-Project Alternative would retain in agricultural use the estimated 4,725 acres of prime agricultural land on Webb Tract. No additional land would be converted to nonagricultural uses. In the short term, cultivated land on Webb Tract would increase from an estimated existing 2,638 acres to a projected 4,880 acres (Tables 3I-6 and 3I-10). As described above for Bacon Island, all agricultural land on the island may be eliminated over the long term by flooding as subsidence increases and levee protection becomes more difficult.

Under the No-Project Alternative, the irrigation and drainage system on Webb Tract would be improved so that more of the island could be intensively farmed. Under this alternative, much of the fallow cropland (currently not cultivated because of high water tables) and herbaceous upland habitat on the island would be

converted to the intensive production of feed grain crops (Winther pers. comm.). Habitat surrounding the two blowout ponds and land that could not be cropped without regrading being conducted on the island would be left in its existing condition. Under the cropping scenario presented in Table 3I-10, agricultural operations on Webb Tract would increase the production of wheat by 413% and the production of corn by 68%.

Bouldin Island

Implementation of the No-Project Alternative would retain in agricultural use the estimated 5,711 acres of prime agricultural land on Bouldin Island. No additional land would be converted to nonagricultural uses. Cultivated land on Bouldin Island would increase from an estimated existing 4,395 acres to a projected 5,200 acres (Tables 3I-6 and 3I-10). As described above for Bacon Island, increased subsidence and decreased levee stability over the long term may cause cessation of agricultural production on Bouldin Island.

Under the No-Project Alternative, drainage on Bouldin Island would be improved to make areas currently fallow because of high water tables available for agricultural use. Drainage improvements would make the island suitable for a cropping pattern similar to that of Bacon Island. (Winther pers. comm.) Under the cropping scenario presented in Table 3I-10, agricultural operations on Bouldin Island would shift from the production of wheat, corn, and sunflower to the intensive production of onions, asparagus, potatoes, and wine grapes.

Holland Tract

Implementation of the No-Project Alternative would retain in agricultural use the estimated 1,575 acres of prime agricultural land on Holland Tract. No additional land would be converted to nonagricultural uses. Cultivated land on Holland Tract would increase in the short term from an estimated existing 2,005 acres in 1988 to a projected 3,680 acres (Tables 3I-6 and 3I-10). As described above for Bacon Island, intensifying agriculture would hasten subsidence and threaten levee protection, eventually causing the loss of all agricultural land on the island.

To implement intensive agriculture under the No-Project Alternative on Holland Tract, a number of physical improvements would be required to improve the island's agricultural efficiency. Many of the island's drainage ditches would require reconditioning to improve irrigation and drainage practices. Existing fallow lands

would be converted to wheat and corn production. In addition, existing areas of annual grassland and exotic perennial grassland would be converted to orchards or vineyards. (Winther pers. comm.) Under the cropping scenario presented in Table 3I-10, agricultural operations on Holland Tract would increase the production of wheat by 136% and corn by 293%, introduce the production of wine grapes, and maintain the existing production of asparagus and pasture.

Summary of Project Impacts and Recommended Mitigation Measures

Increase in Cultivated Acreage and Agricultural Production on the DW Project Islands. Implementing the No-Project Alternative would increase the amount of land in agricultural production on the DW project islands from approximately 13,350 under existing conditions to approximately 18,720 acres. Increasing crop production would contribute to an increase in agricultural employment in Contra Costa and San Joaquin Counties. Also, irrigation and drainage systems would be improved on the DW project islands to provide for long-term agricultural production. Increasing agricultural production on the DW project islands under the No-Project Alternative would benefit agriculture-related industries.

CUMULATIVE IMPACTS

Cumulative Impacts, Including Impacts of Alternative 1

Cumulative impacts are the result of the incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions. The following discussion considers only those project effects that may contribute cumulatively to impacts on land use and agriculture in the project vicinity.

Changes in Land Use Conditions

Implementation of Alternative 1 would not contribute to cumulative impacts on land use, including changes in Williamson Act contracts, a substantial reduction in regional housing supply, or incompatibilities with adjacent land uses. Implementation of Alternative 1 would, however, contribute to the regional conversion of agricultural land as described below. The DW project, in conjunction with other projects that convert agricultural land to other uses (see Appendix 2, "Supplemental

Description of the Delta Wetlands Project Alternatives"), would not be consistent with general plan principles that promote the retention and production of agricultural land as described above under "Impacts and Mitigation Measures of Alternative 1".

Changes in Agriculture Conditions

The list of related projects evaluated for cumulative impacts (Appendix 2) includes a number of projects that would convert agricultural lands to nonagricultural uses. Agricultural land conversions could occur through the urban development of Delta islands, additional water storage projects on Delta islands encouraged by the DW project, levee improvement and flood control projects, or subsidence-reduction programs (DWR 1990). The cumulative amount of agricultural land that would ultimately be converted by related projects is not known but is expected to be relatively large.

DWR's West Delta Water Management Program, DWR's North Delta Flood Control Plan, and CCWD's Los Vaqueros Project are examples of water resource projects that would convert agricultural lands to nonagricultural uses.

Conversion of land from agricultural to managed wildlife habitat on Sherman and Twitchell Islands is the primary focus of the West Delta program. DWR has successfully purchased 5,000 of the 10,000-acre Sherman Island to implement the West Delta mitigation program. By the end of 1995, it is projected that a total of 8,000 acres of Sherman Island will have been purchased (Brown pers. comm.). Purchased lands would be converted from intensive agriculture to slow the rate of subsidence and potentially reduce the likelihood of levee failure; therefore, this conversion could increase protection of Delta water quality (DWR 1990). DWR has purchased approximately 3,000 of the 3,600 acres on Twitchell Island and will convert this land to wetlands and riparian wildlife habitat if mitigation agreements are successfully negotiated with USFWS and DFG (Turner pers. comm.). Virtually all the lands on Sherman and Twitchell Islands have been mapped as prime farmland by CDC.

The Los Vaqueros Project would convert approximately 2,200 acres of agricultural land in dryland farming and grazing to other uses (e.g., reservoir, recreation facilities) (CCWD and Reclamation 1992). The Los Vaqueros project and future developments in the region would have significant cumulative impacts on regional agricultural resources, including the conversion of prime and nonprime agricultural lands to nonagricultural uses.

No mitigation measures are available to the lead agencies (CCWD and Reclamation) to reduce this cumulative impact; mitigation for agricultural land conversion is within the purview and jurisdiction of local land use agencies (CCWD 1993).

Implementation of Alternative 1 would involve direct conversion to nonagricultural uses of an estimated 15,154 acres (9,267 acres in San Joaquin County and 5,887 acres in Contra Costa County) of prime agricultural land. The California Department of Food and Agriculture (DFA) has recently begun monitoring projects that would convert agricultural land to nonagricultural uses. According to DFA (1988), between July 1, 1987, and October 13, 1988, applications were filed in San Joaquin and Contra Costa Counties for projects (including the DW project) that would convert approximately 52,200 acres of agricultural land to nonagricultural uses. The 15,154 acres of prime farmland converted by the DW project would represent approximately 29% of all agricultural land being considered for conversion in the two-county area during the period when applications for the project were first sought.

Impact I-8: Cumulative Conversion of Agricultural Land. The cumulative conversion of prime agricultural land by the DW project and related projects is considered a significant and unavoidable impact on agricultural production. For example, cumulative conversions of the DW project and the possible DWR projects on Sherman and Twitchell Islands could total more than 30,000 acres, or more than 5% of the total agricultural acreage mapped on Delta islands by Madrone Associates (1980). These cumulative conversions would result in similar, but greater, economic effects than those described for conversions under the DW project.

Mitigation. No reasonable mitigation is available to reduce this impact to a less-than-significant level. It is extremely unlikely that a similar amount of land in the region with similar qualities and productivity could be brought into production to mitigate the effects resulting from the cumulative loss of agricultural land. Counties in the DW project region are generally losing farmland faster than new land is being brought into production. For example, between 1986 and 1988, approximately 2,600 acres of cropland in Contra Costa County were converted to urban and other uses, while 450 acres of grazing lands and other nonagricultural lands were converted to cropland (CDC 1988).

Cumulative Impacts, Including Impacts of Alternative 2

Implementation of Alternative 2 would not contribute to any cumulative land use impacts. The contribution of Alternative 2 to cumulative impacts on agriculture would be the same as that described for Alternative 1.

Cumulative Impacts, Including Impacts of Alternative 3

Implementation of Alternative 3 would not contribute to any cumulative land use impacts. The contribution of Alternative 3 to cumulative impacts on agriculture would be the same as that described for Alternative 1.

Cumulative Impacts, Including Impacts of the No-Project Alternative

Implementing the No-Project Alternative would not contribute to cumulative changes in regional land uses and agricultural production.

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Table 3I-1. Generalized Land Use Acreages on the DW Project Islands

Land Use	Bacon Island	Webb Tract	Bouldin Island	Holland Tract
Agricultural land and pastureland	4,439	2,756	4,565	2,112
Fallow agricultural land	355	638	712	785
Agriculture-related structures, farmsteads, and exposed earth (includes marinas on Holland Tract)	86	20	75	243
Sloughs and ditches	92	50	118	45
Other natural or unmanaged land (e.g., fallow agricultural land, open space)	<u>567</u>	<u>2,005</u>	<u>515</u>	<u>1,064</u>
Total	5,539	5,469	5,985	4,249

Notes: Based on habitat map, dated October 24, 1988, by JSA.

Although agricultural production on the DW project islands may have changed since 1988, these conditions were determined to best represent typical preproject agricultural land use.

Table 3I-2. Selected General Plan Designations and Definitions for the DW Project Islands and Vicinity

Designation	Definition
San Joaquin County	
General agriculture	These are areas suitable for agriculture outside areas planned for urban development where the soils are capable of producing a wide variety of crops and/or supporting grazing, parcel sizes are generally large enough to support commercial agricultural activities (20-acre minimum parcel size), and a commitment to commercial agriculture in the form of Williamson Act contracts and/or capital investments exists.
Open space/resource conservation	Open spaces are areas best suited for the continuation of commercial agricultural and productive uses, the enjoyment of scenic beauty and recreation, the protection and use of natural resources, and protection from natural hazards. Open space/resource conservation areas include waterways; riparian habitat and woodlands; wetlands and vernal pools; significant oak groves and other heritage trees; habitat for rare, threatened, or endangered species; substantial groundwater recharge areas; significant mineral resource areas; and floodways.
Contra Costa County	
Delta recreation and resources	These areas include islands and adjacent lowlands of the Sacramento-San Joaquin Delta within the 100-year floodplain appropriate primarily for agriculture and wildlife habitat, with limited recreation uses allowed that do not conflict with the predominant agricultural and habitat uses.
Water	This designation includes water in the Sacramento-San Joaquin estuary; the San Francisco-San Pablo Bay; and all large inland bodies of water, such as reservoirs. Uses allowed in the "water" designation areas include transport facilities associated with adjacent heavy industrial plants, such as ports and wharves, and water-oriented recreation uses, such as boating and fishing.
Parks and recreation	This designation includes all publicly owned city, district, county, regional, and state park facilities. Appropriate uses in the designation are passive and active recreation-oriented activities and ancillary commercial uses, such as snack bars and restaurants.
Single-family residential - high density	This designation includes easily developed land near transportation and shopping facilities (maximum density allowed is five to seven units per acre) and boat harbors, launching facilities, and ancillary uses. This is the designation for land on Bethel Island and along San Mound Slough.
Multifamily residential - low density	This designation includes land near transportation and shopping facilities. This land is a transition between residential and commercial uses, with a suburban atmosphere and landscaped areas at a density of seven to 12 units per acre.

Table 3I-2. Continued

Designation	Definition
Local commercial	This land allows for the continued maintenance of the existing commercial core along Bethel Island Road at both ends of the bridge.
Marina commercial	In the Bethel Island area, commercial uses are tied directly to water-oriented businesses and activities, such as boat sales, repairs, and storage; fishing supplies; and waterskiing.

Sources: San Joaquin County Community Development Department 1991, 1992; Contra Costa County Community Development Department 1991.

Table 31-3. Estimated Acreages of Soil Types on the DW Project Islands

Soils	Land Capability Classes ^a	Soil Limitations	Typical Uses	Bacon Island		Bouldin Island		All Islands	
				Acres	Percent of Total	Acres	Percent of Total	Acres	Percent of Total
San Joaquin County soils									
Peltier mucky clay loam, partially drained, 0 to 2 percent slopes	IIIw-5	Subsidence, high water table, slow permeability	Irrigated row and field crops	0	0.0	12	0.2	12	0.1
Retryde-Peltier complex, 0 to 2 percent slopes	IIIw-2	Subsidence, high water table, slow permeability	Irrigated row and field crops	65	1.2	889	15.4	954	4.7
Venice mucky silt loam, overwash, 0 to 2 percent slopes	IIIw-10	Subsidence, high water table	Irrigated row and field crops	0	0.0	200	3.5	200	1.0
Piper sandy loam, partially drained, 0 to 2 percent slopes	IVw-4	Subsidence, low available water capacity, high water table, weakly cemented substratum	Irrigated row and field crops	0	0.0	30	0.5	30	0.1
Shima muck, partially drained, 0 to 2 percent slopes	IIIw-10	Subsidence, high water table	Irrigated row and field crops	0	0.0	19	0.3	19	0.1
Dello loamy sand, partially drained, 0 to 2 percent slopes	IIIw-4	Low available water capacity, severe hazard of soil blowing, high water table	Irrigated row and field crops	0	0.0	20	0.3	20	0.1
Rindge muck, partially drained, 0 to 2 percent slopes	IIIw-10	Subsidence, high water table	Irrigated row and field crops	2,547	47.1	2,187	38.0	4734	23.3
Kingile muck, partially drained, 0 to 2 percent slopes	IIIw-10	Subsidence, high water table, slow permeability	Irrigated row and field crops	1,429	26.4	157	2.7	1,586	7.8
Kingile-Retryde complex, partially drained, 0 to 2 percent slopes	IIIw-10	Subsidence, high water table, slow permeability	Irrigated row and field crops	459	8.5	0	0.0	459	2.3
Retryde clay loam, partially drained, 0 to 2 percent slopes	IIIw-2	Subsidence, high water table	Irrigated row and field crops	379	7.0	80	1.4	459	2.3
Valdez silt loam, partially drained, 0 to 2 percent slopes	IIIw-2	Subsidence, high water table	Irrigated row and field crops	0	0.0	451	7.8	451	2.2
Rindge mucky silt loam, overwash, 0 to 2 percent slopes	IIIw-10	Subsidence, high water table	Irrigated row and field crops	92	1.7	1,095	19.0	1,187	5.8
Venice muck, partially drained, 0 to 2 percent slopes	IIIw-10	Subsidence, high water table	Irrigated row and field crops	58	1.1	267	4.6	325	1.6
Retryde silty clay loam, organic substratum, 0 to 2 percent slopes	IIIw-2	Subsidence, high water table	Irrigated row and field crops	249	4.6	354	6.1	603	3.0
Itano silty clay loam, partially drained, 0 to 2 percent slopes	IIIw-2	Subsidence, high water table, acidity	Irrigated row and field crops	<u>125</u>	<u>2.3</u>	<u>0</u>	<u>0.0</u>	<u>125</u>	<u>0.6</u>
Subtotal for Bacon and Bouldin Islands				5,403	100.0	5,761	100.0	11,164	54.8

Table 3I-3. Continued

Soils	Land Capability Classes ^a	Soil Limitations	Typical Uses	Webb Tract		Holland Tract		All Islands	
				Acres	Percent of Total	Acres	Percent of Total	Acres	Percent of Total
Contra Costa County soils									
Rindge muck	IIIw-10	High water table, rapid permeability, moderate soil blowing hazard	Irrigated row crops	4,415	85.5	1,370	34.0	5,785	28.4
Piper fine sandy loam	Ive-9	High water table, low available water capacity, rapid permeability, moderate soil blowing hazard	Dryland pasture, small grains, volunteer hay	241	4.7	420	10.4	661	3.2
Piper loamy sand	Ivw-4	High water table, low available water capacity, rapid permeability, moderate soil blowing hazard	Irrigated pasture, alfalfa, row crops	9	0.2	1,108	27.5	1,117	5.5
Ryde silt loam	IIIw-2	High water table	Irrigated row and field crops	328	6.4	59	1.5	387	1.9
Egbert mucky clay loam	IIIw-2	High water table	Irrigated field crops and wildlife habitat	0	0.0	14	0.3	14	0.1
Shima muck	IIIw-10	High water table, moderate soil blowing hazard	Irrigated row and field crops	191	2.0	932	23.1	1,033	5.1
Kingile muck	IIIw-10	High water table, moderate soil blowing hazard	Irrigated row and field crops	38	0.7	15	0.4	53	0.3
Webile muck	IIIw-10	High water table, moderate soil blowing hazard	Irrigated row and field crops	0	0.0	113	2.8	113	0.6
Merritt loam	IIIw-2	High water table	Irrigated row and field crops	<u>30</u>	<u>0.6</u>	<u>0</u>	<u>0.0</u>	<u>30</u>	<u>0.1</u>
Subtotal for Holland and Webb Tracts				5,162	100.0	4,031	100.0	9,193	45.2
Total								20,357	100.0

Note: Acreage totals may not correspond with acreages shown elsewhere in this report because of measurement error, rounding error, and water bodies not surveyed on the islands. Acreages by soil units were estimated based on planimeter measurements performed by JSA.

^a Soils are categorized by NRCS (formerly SCS) according to eight classes (I-VIII) depending on the limitations to agricultural use imposed by specific soil and climatic criteria. The higher the class, the more restrictive the limitation. Soils in Class III have more limitations and hazards than those in Classes I and II. They require more difficult or complex conservation practices when cultivated. Soils in Class IV have greater limitations and hazards than those in Class III and require more difficult or complex measures when cultivated. Capability classes are divided into subclasses and capability units. Subclass symbols include "w" for wetness and "e" for erosion problems. Capability unit symbols include "2" for wetness problems; "4" for coarse texture, low water-holding capacity; "5" for fine textures, tillage problems; "9" for low fertility, acidity, or toxics problems; and "10" for very coarse textured substratum.

Sources: SCS 1977 and 1988.

Table 3I-4. Estimated Acreages of Soils in Important Farmland Mapping Categories on the DW Project Islands

Land Capability Categories	Bacon Island		Webb Tract		Bouldin Island		Holland Tract		All Islands	
	Acres	Percent of Total	Acres	Percent of Total	Acres	Percent of Total	Acres	Percent of Total	Acres	Percent of Total
San Joaquin County soils										
Prime farmland	5,278	97.7			5,711	99.1			11,114	54.6
Farmland of statewide importance	125	2.3			50	0.9			50	0.2
Contra Costa County soils										
Prime farmland			4,725	91.8			1,575	39.1	6,300	31.0
Farmland of statewide importance			130	2.5			2,031	50.4	2,161	10.6
Unique farmland			294	5.7			426	10.6	720	3.5
Total	5,403	100.0	5,149	100.0	5,761	100.0	4,032	100.0	20,345	100.0

Note: Acreage totals may not correspond to acreages shown in other tables of this report because of measurement error, rounding error, and the presence of water bodies within island perimeters. Acreages were estimated based on planimeter measurements performed by JSA.

Source: CDC 1988 and 1992.

Table 3I-5. Agricultural Land Use on the DW Project Islands

Agricultural Land Use	Bacon Island		Webb Tract		Bouldin Island		Holland Tract*		All Islands	
	Acres	Percentage of Total	Acres	Percentage of Total	Acres	Percentage of Total	Acres	Percentage of Total	Acres	Percentage of Total
Wheat			426	13.1	1,139	22.4	835	30.4	2,400	15.2
Milo	82	1.8							82	0.5
Corn (field)	757	16.2	2,128	65.5	2,368	46.6	226	8.2	5,479	34.8
Sunflower	186	4			855	16.8			1,041	6.6
Asparagus	1,043	22.3					402	14.6	1,445	9.2
Potatoes	1,836	39.2							1,836	11.7
Vineyard	272	5.8							272	1.7
Unknown crops	155	3.3	26	0.8					181	1.1
Pasture			58	1.8	33	0.6	542	19.7	633	4
Fallow (short term)	347	7.4	611	18.8	685	13.5	745	27.1	2,388	15.2
Idle (cropped in past but not at time of survey)									0	0
Total	4,678	100	3,249	100	5,080	100	2,750	100	15,757	100

Notes: Acreages were calculated during JSA's 1988 survey.

Idle land was not identified in the 1988 survey.

Inconsistencies in acreages are the result of rounding.

* Acreage includes 1,120 acres excluded from the project under Alternatives 1 and 2.

Table 31-6. Estimated Crop Production on the DW Project Islands

Crops	Bacon Island			Webb Tract			Bouldin Island			Holland Tract ^a			All Islands		
	Acres Planted in 1988	Yield (tons per acre)	Total Yield (tons)	Acres Planted in 1988	Yield (tons per acre)	Total Yield (tons)	Acres Planted in 1988	Yield (tons per acre)	Total Yield (tons)	Acres Planted in 1988	Yield (tons per acre)	Total Yield (tons)	Acres Planted in 1988	Yield (tons per acre)	Total Yield (tons)
Wheat				426	2.0	852	1,139	2.8	3,189	835	2.0	1,670	2,400	2.4	5,711
Corn (field)	994	3.3	3,280	2,154	1.6	3,446	2,368	4.8	11,366	226	1.5	339	5,742	3.2	18,431
Sunflower	186	0.9	167				855	0.9	770				1,041	0.9	937
Asparagus	1,043	1.5	1,565							402	1.5	603	1,445	1.5	2,168
Potatoes															
Commercial	1,486	15.0	22,290										1,486	15.0	22,290
Seed	350	12.0	4,200										350	12.0	4,200
Vineyard	272	7.0	1,904										272	7.0	1,904
Pasture	—			58	N/A	N/A	33	N/A	N/A	542	N/A	N/A	633	N/A	N/A
Total	4,331			2,638			4,395			2,005			13,369		

Notes: N/A = not applicable.

Acreage planted in milo and unknown crops in 1988 was assumed to be planted in corn for the purposes of this table.

Although the project site's agricultural production may have changed since 1988, these conditions were determined to best represent typical preproject agricultural land use.

^a Acreage and yield includes production of acreage excluded from the project under Alternatives 1 and 2.

Sources: Acreages of planted crops were obtained during JSA's 1988 island survey.

Average yields: San Joaquin County Office of the Agricultural Commissioner 1988; Contra Costa County Department of Agriculture 1988; Shimasaki, Wilkerson, and Winther pers. comms.

Principle/Policy	Consistency
SAN JOAQUIN COUNTY GENERAL PLAN	
Agriculture Principles	
<p>III. To protect agricultural lands needed for the continuation of commercial agricultural enterprises, small-scale farming operations, and the preservation of open space.</p>	<p><u>Consistent:</u> The proposed project would protect agricultural lands for the preservation of open space. Both water storage and habitat management are open space uses.</p>
<p>1. The following agricultural land use categories shall be established to promote a range of agricultural activities and preserve open space: General Agriculture, Limited Agriculture, and Agriculture-Urban Reserve.</p>	<p><u>Consistent:</u> The proposed project would be consistent with the General Agriculture designation on Bouldin and Bacon Islands.</p>
<p>5. Agricultural areas shall be used principally for crop production, ranching, and grazing. All agricultural support activities and nonfarm uses shall be compatible with agricultural operations and shall satisfy the following criteria:</p>	<p><u>Consistent:</u> Water storage and habitat management are both compatible nonfarm uses. Both proposed uses require location in the Delta area, and neither would have a detrimental effect on surrounding agricultural properties or would result in significant air and transportation impacts (see Chapters 3E, "Utilities and Highways"; 3L, "Traffic"; and 3O, "Air Quality").</p>
<p>(a) The use requires a location in an agricultural area because of unusual site area requirements, operational characteristics, resource orientation, or because it is providing a service to the surrounding agricultural area;</p>	
<p>(b) The operational characteristics of the use will not have a detrimental impact on the management or use of surrounding agricultural properties;</p>	
<p>(c) The use will be sited to minimize any disruption to the surrounding agricultural operations; and</p>	
<p>(d) The use will not significantly impact transportation facilities, increase air pollution, or increase fuel consumption.</p>	
<p>6. All lands designated for agricultural uses and those lands designated for nonagricultural use but not needed for development for 10 years shall be placed in an agricultural preserve and shall be eligible for Williamson Act contracts. Parcels eligible for Williamson Act contracts shall be 20 or more acres in size in the case of prime land or 40 or more acres in the case of nonprime land.</p>	<p><u>Consistent:</u> The proposed project would be consistent with existing Williamson Act contracts in San Joaquin County.</p>

Principle/Policy	Consistency
<p>7. There shall be no further fragmentation of land designated for agricultural use, except in the following cases:</p> <ul style="list-style-type: none"> (a) Parcels for homesites may be created, provided that the General Plan density is not exceeded. (b) A parcel may be created for the purpose of separating existing dwellings on a lot, provided the Development Title regulations are met. (c) A parcel may be created for a use granted by a permit in the AG zone, provided that conflicts with surrounding agricultural operations are mitigated. 	<p><u>Consistent:</u> The proposed project would not lead to fragmentation of existing parcels.</p>
<p>Open Space Principles</p>	
<p>I. To preserve open space land for the continuation of commercial agricultural and productive uses, the enjoyment of scenic beauty and recreation, the protection and use of natural resources, and for protection from natural hazards.</p>	<p><u>Consistent:</u> The proposed project would provide recreation opportunities, flood control, and protection of natural resources in the Delta.</p>
<p>4. Areas with serious development constraints, such as the Delta, should be predominantly maintained as open space.</p>	<p><u>Consistent:</u> The proposed project would maintain the islands in water storage and habitat management, consistent with the county's open space definition.</p>
<p>6. The County shall consider waterways, levees, and utility corridors as major elements of the open space network and shall encourage their use for recreation and trails in appropriate areas.</p>	<p><u>Consistent:</u> The proposed project would promote recreational use along levees.</p>
<p>Recreation Principles</p>	
<p>II. To protect the diverse resources upon which recreation is based, such as waterways, marsh lands, wildlife habitats, unique land and scenic features, and historical and cultural sites.</p>	<p><u>Consistent:</u> The proposed project would involve management of the habitat islands to protect and restore wildlife habitat.</p>

Principle/Policy	Consistency
<p>III. To ensure the preservation of the Delta and the opportunity for the public to learn about and enjoy this unique recreation resource.</p>	<p><u>Consistent:</u> The proposed project would provide new recreation opportunities in the Delta. Recreation facilities on the DW project islands may or may not be publicly accessible; however, the proposed project would provide opportunities and improve the setting for waterfowl hunting, bird watching, and other recreation activities in the Delta by enhancing the regional habitat value for wildlife in the Delta (see Chapter 3H, "Wildlife").</p>
<p>7. Natural features shall be preserved in recreation areas, and opportunities to experience natural settings shall be provided.</p>	<p><u>Consistent:</u> Implementation of the proposed project would provide recreation opportunities in resource management areas in the Delta.</p>
<p>15. The recreational values of the Delta, the Mokelumne River, and the Stanislaus River shall be protected.</p>	<p><u>Consistent:</u> Same as above.</p>
<p>19. Development in the Delta islands shall generally be limited to water-dependent uses, recreation, and agricultural uses.</p>	<p><u>Consistent:</u> Under the proposed project, the islands would be managed for recreation, wildlife, and water storage.</p>
<p>Vegetation and Wildlife Principles</p>	
<p>II. To provide undeveloped open space for nature study, protection of endangered species, and preservation of wildlife habitat.</p>	<p><u>Consistent:</u> Habitat management under the proposed project would provide open space for nature study, protection of endangered species, and preservation of wildlife habitat.</p>
<p>1. Resources of significant biological and ecological importance in San Joaquin County shall be protected. These include wetlands; riparian areas; rare, threatened, and endangered species and their habitats as well as potentially rare or commercially important species; vernal pools; significant oak groves; and heritage trees.</p>	<p><u>Consistent:</u> Habitat management under the proposed project would establish and protect wetlands, riparian areas, and habitats for listed species.</p>
<p>7. The County shall support feeding areas and winter habitat for migratory waterfowl.</p>	<p><u>Consistent:</u> Same as above.</p>
<p>14. The County shall support the establishment and maintenance of ecological preserves and accessibility to areas for nature study.</p>	<p><u>Consistent:</u> Same as above.</p>

Principle/Policy

Consistency

CONTRA COSTA COUNTY GENERAL PLAN**Conservation Principles**

- | | | |
|--|----------------------|---|
| 8-2. Areas that are highly suited to prime agricultural production shall be protected and preserved for agriculture, and standards for protecting the viability of agricultural land shall be established. | <u>Inconsistent:</u> | Implementation of the proposed project would remove agricultural land in Contra Costa County from production. The inherent agricultural productivity of the islands would not change because of the use of prime agricultural land for water storage and habitat management. Project implementation would not be consistent with the county's policy of preserving lands for agricultural production. |
| 8-3. Watersheds, natural waterways, and areas important for the maintenance of natural vegetation and wildlife populations shall be preserved and enhanced. | <u>Consistent:</u> | The project would enhance and preserve habitat values on Holland Tract. |

Agriculture Principles

- | | | |
|---|----------------------|--|
| 8-G. To encourage and enhance agriculture, and to maintain and promote a healthy and competitive agricultural economy. | <u>Inconsistent:</u> | Implementation of the proposed project would remove agricultural land in Contra Costa County from production; this is not consistent with the county's goal to promote a competitive agricultural economy. |
| 8-H. To conserve prime productive agricultural land outside the Urban Limit Line exclusively for agriculture. | <u>Inconsistent:</u> | Implementation of the proposed project would remove agricultural land in Contra Costa County from production. The inherent agricultural productivity of the islands would not change because of the use of prime agricultural land for water storage and habitat management. The project is not consistent with the county's policy of preserving lands for agricultural production. |
| 8-38. Agricultural operations shall be protected and enhanced through encouragement of Williamson Act contracts to retain designated areas in agricultural use. | <u>Consistent:</u> | The proposed project will not affect existing Williamson Act contracts on DW islands. |
| 8-39. A full range of agriculturally related uses shall be allowed and encouraged in agricultural areas. | <u>Consistent:</u> | Water storage and habitat management are considered agriculture-related uses. |

Principle/Policy	Consistency
8-45. Efforts to assure an adequate, high quality, and fairly priced water supply to irrigated agricultural areas shall be supported.	<u>Consistent:</u> A purpose of the proposed project is to increase the availability of high-quality water through the Delta.
8-46. Maintenance and reconstruction of Delta levees shall be encouraged to assure the continued availability of valuable agricultural land protected by the existing network of levees and related facilities.	<u>Consistent:</u> The proposed project would enhance the existing levee system on the water storage islands.
Vegetation and Wildlife Principles	
8-D. To protect ecologically significant lands, wetlands, and plant and wildlife habitats.	<u>Consistent:</u> A purpose of the proposed project is to increase the extent and value of wildlife habitat in the Delta.
8-F. To encourage the preservation and restoration of the natural characteristics of the San Francisco Bay/Delta estuary and adjacent lands, and recognize the role of Bay vegetation and water area in maintaining favorable climate, air and water quality, and fisheries and migratory waterfowl.	<u>Consistent:</u> Same as above.
8-17. The ecological value of wetland areas, especially the salt marshes and tidelands of the bay and Delta, shall be recognized. Existing wetlands in the county shall be identified and regulated. Restoration of degraded wetland areas shall be encouraged and supported whenever possible.	<u>Consistent:</u> Same as above.
Open Space Principles	
9-2. Historic and scenic features, watersheds, natural waterways, and areas important for the maintenance of natural vegetation and wildlife populations shall be preserved and enhanced.	<u>Partially inconsistent:</u> The proposed project would affect scenic waterways along the project islands. In other areas, however, the proposed project would enhance wildlife habitat. See Chapters 3J, "Recreation and Visual Resources", and 3G, "Vegetation", for more information on these effects of the proposed project.
9-25. Maintenance of the scenic waterways of the county shall be ensured through public protection of the marshes and riparian vegetation along the shorelines and Delta levees, as otherwise specified in this plan.	<u>Inconsistent:</u> Riparian habitat on Delta levees will be affected by the proposed project. See Chapter 3J, "Recreation and Visual Resources", for an analysis of impacts on scenic waterways.

Principle/Policy	Consistency
9-36. As a unique resource of statewide importance, the Delta shall be developed for recreation use in accordance with the state environmental goals and policies. The recreational value of the Delta shall be protected and enhanced.	<u>Consistent:</u> A purpose of the proposed project is to provide regional recreation opportunities.

Sources: San Joaquin County Community Development Department 1992, Contra Costa County Community Development Department 1991.

Table 3I-8. Projected Crop Production on the DW Project Islands under Alternatives 1 and 2

Crop	Bouldin Island				Holland Tract ^a				Total		
	Acres Planted	Acres Harvested ^b	Yield (tons per acre)	Total Yield (tons)	Acres Planted	Acres Harvested ^b	Yield (tons per acre)	Total Yield (tons)	Acres Planted	Acres Harvested ^b	Total Yield (tons)
Corn	1,222	819	4.8	3,931	716	480	1.5	720	1,938	1,299	4,651
Wheat ^c	487	244	2.8	683	353	177	2.0	354	840	421	1,037
Barley	26	13	2.1	27	38	19	2.1	40	64	32	67
Pasture	<u>132</u>	<u>119</u>	N/A	N/A	<u>72</u>	<u>65</u>	N/A	N/A	<u>204</u>	<u>184</u>	N/A
Total	1,867	1,195			1,179	741			3,046	1,936	

Note: Represents acreages of crops planted for wildlife habitat. No crops would be planted on Bacon Island and Webb Tract.

- ^a Excludes crops grown on 1,120 acres on nonproject Holland Tract lands.
- ^b Represents acreages of crops that would be harvested and sold.
- ^c Includes spring and winter wheat.

Sources: Planted acreage projections: HMP (see Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands"). Average yield projections: Shimasaki, Wilkerson, and Winther pers. comms.; San Joaquin County Office of the Agricultural Commissioner 1988; Contra Costa County Department of Agriculture 1988.

Table 31-9. Estimated Effect of Alternative 1 on Regional and Statewide Crop Production

Crops	Net Loss of Production ^a			Regional Production ^b			Statewide Production ^c			Percentage of Regional Production		Percentage of State Production	
	Acres Harvested	Yield (tons per acre)	Total Yield (tons)	Acres Harvested	Yield (tons per acre)	Total Yield (tons)	Acres Harvested	Yield (tons per acre)	Total Yield (tons)	Acres Harvested	Total Yield	Acres Harvested	Total Yield
Wheat	1,691	2.4	4,098	44,790	2.7	121,090	624,251	2.5	1,563,000	3.8	3.4	0.3	0.3
Corn ^d	4,365	3.1	13,663	54,940	4.7	255,900	193,144	4.4	846,500	7.9	5.3	2.3	1.6
Sunflower, seed ^e	1,041	0.9	937	5,670	0.8	4,740	3,505	0.8	2,950	18.4	19.8	29.7	31.8
Asparagus	1,307	1.5	1,961	19,840	1.5	28,990	37,267	1.7	62,100	6.6	6.8	3.5	3.2
Potatoes ^f				1,990	16.7	33,250				92.3	79.7		
Commercial	1,486	15.0	22,290				46,699	17.1	796,600			3.2	2.8
Seed	350	12.0	4,200				669	15.2	10,200			52.3	41.2
Vineyard ^g	272	7.0	1,904	31,400	6.8	213,000	328,609	7.0	2,307,600	0.9	0.0	0.1	0.1

^a Represents the net decrease (change between preproject production levels and production levels under the HMP) in agricultural production on the four project islands under Alternative 1. Based on planted acreage in 1988.

^b Represents production in Contra Costa and San Joaquin Counties in 1987.

^c Represents statewide production in 1988.

^d Numbers for the project islands and state represent field corn only. Numbers for the region include fresh and field corn.

^e Numbers for the project islands and the state represent sunflower seeds for human consumption. They do not include sunflower planting seed. Regional numbers include sunflowers harvested for all purposes.

^f Regional numbers represent potatoes harvested for all purposes.

^g Number represent vine grapes only.

Sources: Tables 31-6 and 31-8; California Department of Food and Agriculture 1988a; San Joaquin County Office of the Agricultural Commissioner 1988; Contra Costa County Department of Agriculture 1988.

Table 31-10. Projected Crop Production on the DW Project Islands under the No-Project Alternative

Crop	Bacon Island			Webb Tract			Bouldin Island			Holland Tract			All Islands		
	Acres Planted	Yield (tons per acre)	Total Yield (tons)	Acres Planted	Yield (tons per acre)	Total Yield (tons)	Acres Planted	Yield (tons per acres)	Total Yield (tons)	Acres Planted	Yield (tons per acres)	Total Yield (tons)	Acres Planted	Yield (tons per acre)	Total Yield (tons)
Wheat				1,560	2.8	4,368				1,410	2.8	3,948	2,970	2.8	8,316
Com (field)				3,260	4.0	13,040				800	4.0	3,200	4,060	4.0	16,240
Onion	600	24.0	14,400				630	24.0	15,120				1,230	24.0	29,520
Asparagus	1,650	1.5	2,475				1,730	1.5	2,595	400	1.5	600	3,780	1.5	5,670
Potatoes															
Commercial	2,090	15.0	31,350				2,560	15.0	38,400				4,650	15.0	69,750
Seed	350	12.0	4,200					12.0	0				350	12.0	4,200
Vineyard	270	7.0	1,890				280	7.0	1,960	530	7.0	3,710	1,080	7.0	7,560
Pasture	—			60	N/A	N/A	—			540	N/A	N/A	600	N/A	N/A
Total	4,960			4,880			5,200			3,680			18,720		

Note: N/A = not applicable.

Sources: Planted acreage projections: Winther and McCarty pers. comms.

Average yield projections: Shimaski, Wilkerson, and Williams pers. comms.

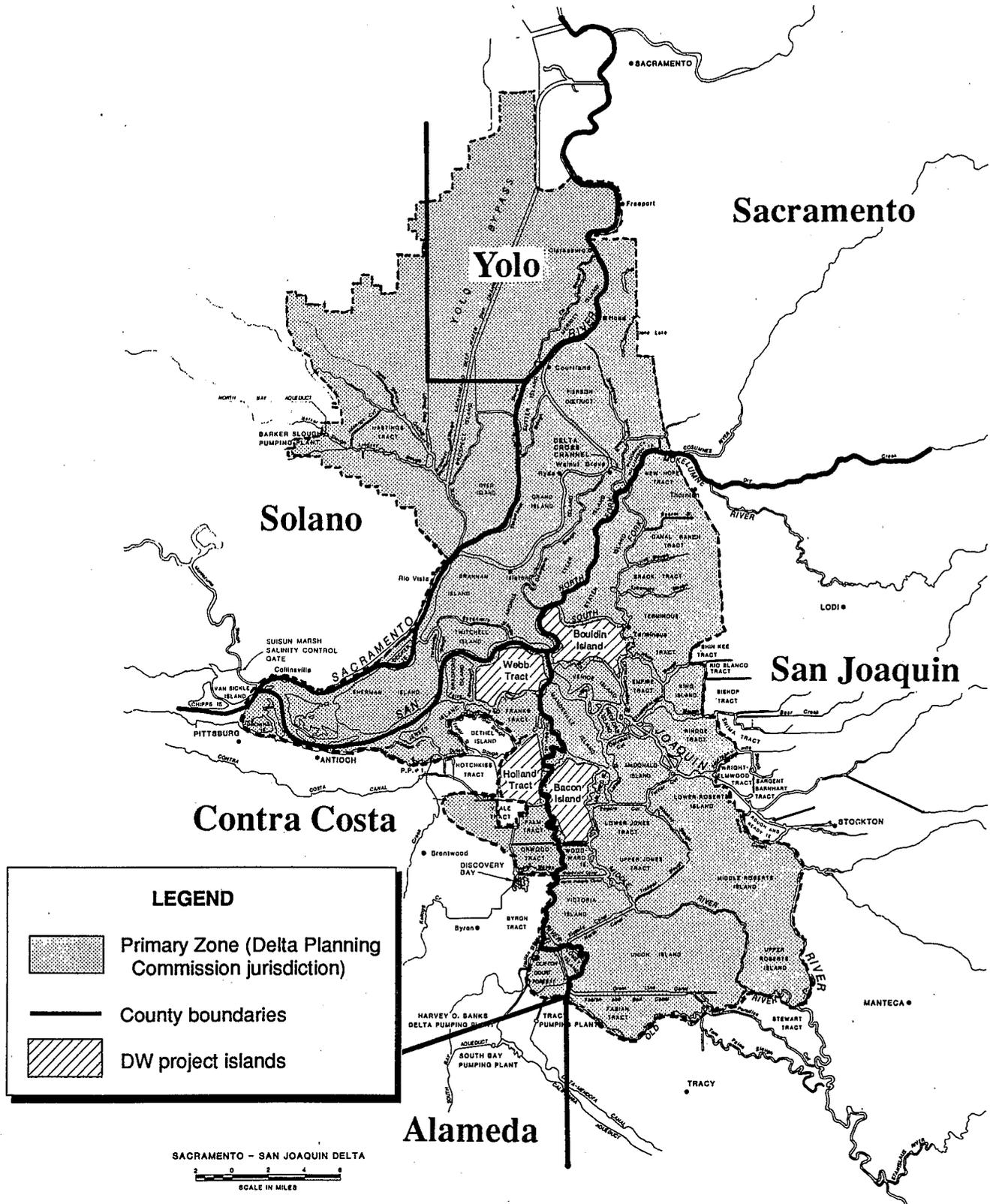


Figure 3I-1.
 Counties of and Delta Planning Commission
 Jurisdiction in the DW Project Region

**DELTA WETLANDS
 PROJECT EIR/EIS**
 Prepared by: Jones & Stokes Associates

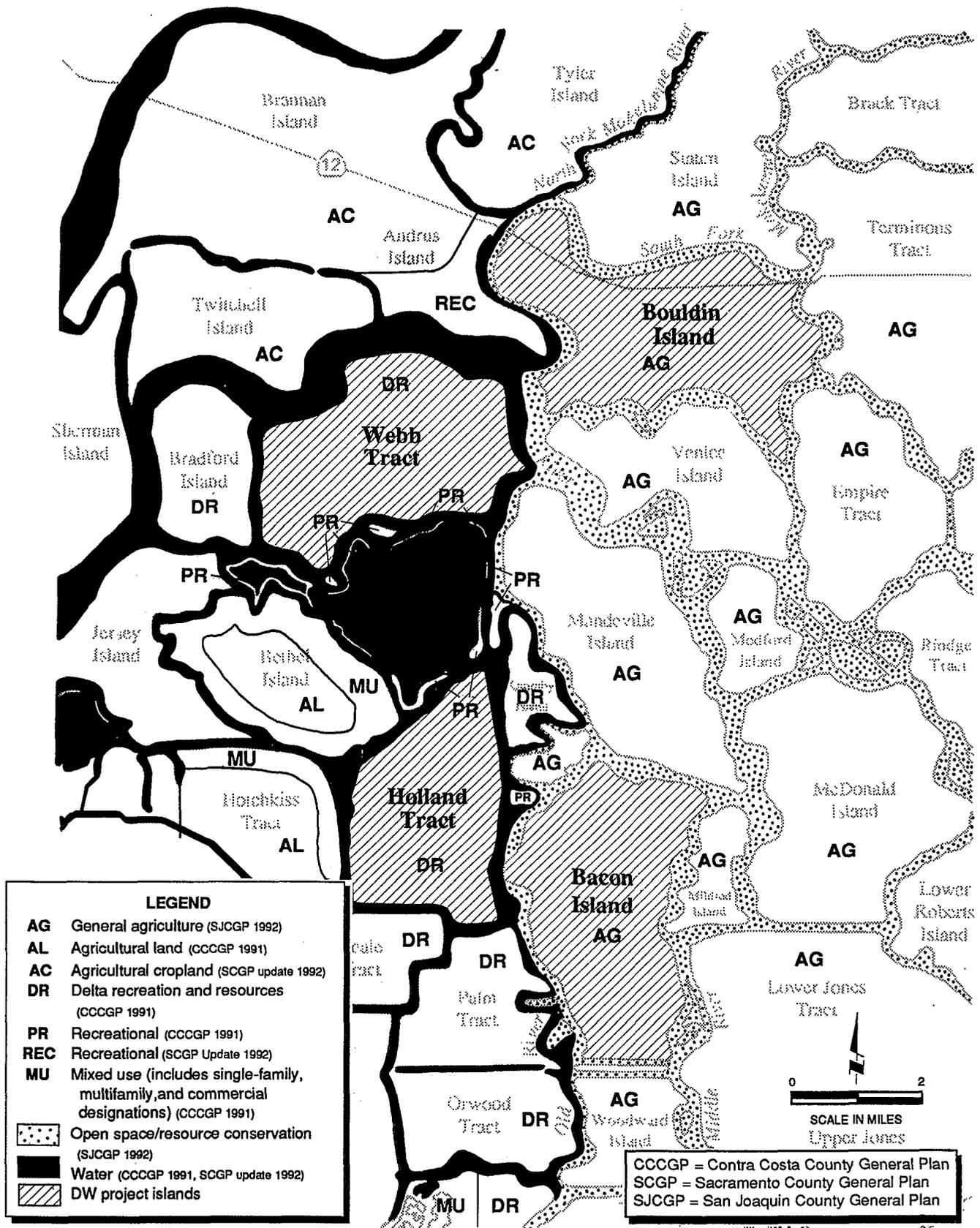


Figure 3I-2.
 County General Plan Designations for the
 DW Project Islands and Vicinity

**DELTA WETLANDS
 PROJECT EIR/EIS**

Prepared by: Jones & Stokes Associates

