

**Chapter 3J. Affected Environment and Environmental
Consequences - Recreation and Visual
Resources**

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SUMMARY

The demand for recreation opportunities in the Delta is expected to increase, primarily as a result of growth of major population centers such as Sacramento, Stockton, Tracy, Pittsburg, and the Bay Area. This chapter discusses the changes in recreational hunting, fishing, and boating in the Delta and the changes in visual resources that could result from implementing the DW project alternatives.

Hunting recreation use-days in the Delta would increase by approximately 21% with implementation of Alternative 1 or 2 or by approximately 13% with implementation of Alternative 3. All three alternatives would increase boating recreation use-days in the Delta by approximately 5%. All three alternatives also would increase recreation use-days for other recreational uses in the Delta. These impacts are considered beneficial. All three alternatives would also contribute to the beneficial cumulative impacts of an increase in recreation opportunities in the Delta and enhancement of waterfowl populations and increased hunter success in the Delta. Enhancement of waterfowl habitat on the DW habitat islands under Alternatives 1 and 2 could result in the less-than-significant impact of decreased hunter success outside the project area.

Implementation of Alternative 1, 2, or 3 would increase boat use in Delta channels and alter boating conditions (e.g., necessitate speed restrictions) on waterways adjacent to the DW project islands. These factors could detract from the quality of the recreation experience for boaters and anglers in the project vicinity. This impact is considered significant and unavoidable. However, if the project description were modified to reduce the number of recreation facilities built on the DW project islands, this impact could be less than significant. Chapter 3L, "Traffic", describes issues related to waterway traffic and safety in more detail.

Under the No-Project Alternative, an intensive for-fee hunting program would be operated on the DW project islands. This program would generate approximately 12,000 additional recreation use-days, resulting in a 17% increase over the existing hunting recreation use-days in the Delta. Implementation of the No-Project Alternative would also contribute to a cumulative increase in recreation opportunities in the Delta and enhancement of waterfowl populations and increased hunter success.

Visual resource issues include potential changes in the visual quality of the DW project islands and potential conflicts with local visual resource policies and designations that would result from DW project implementation. Under Alternatives 1, 2, and 3, introducing pumps, siphons, and recreation facilities into the existing landscape; removing vegetation; and placing rock revetment on levees around the reservoir islands would result in a significant and unavoidable impact on the quality of views of Bacon Island and Webb Tract from adjacent waterways and from the Santa Fe rail line along the south side of Bacon Island. Under Alternative 3, these project features would also result in a significant and unavoidable impact on the quality of views of Bouldin Island and Holland Tract from adjacent waterways. Mitigation measures of partially screening pump and siphon stations and designing project features to blend with the surrounding environment would reduce these impacts, but not to a less-than-significant level. Under Alternative 1 or 2, the reduction in the quality of views of Bouldin Island and Holland Tract from adjacent waterways would be a significant impact, but implementing the mitigation measures listed above would reduce this impact to a less-than-significant level. No significant cumulative impacts on visual resources are expected to result from implementation of any DW project alternative.

The management of DW islands as wildlife habitat under Alternative 1 or 2 would enhance views of Bouldin Island from SR 12 and would increase the visual quality of views of island interiors and the DW project vicinity for recreationists using the DW project islands. These impacts are considered beneficial.

Implementation of Alternative 1, 2, or 3 could result also in a reduction of the visual quality of views of the Bacon Island and Webb Tract interiors from island levees and a potential conflict with the Bacon Island Road scenic designation. These impacts are considered less than significant. Additional less-than-significant impacts would result from implementation of Alternative 3: the views south of SR 12 would be altered because of construction of a new levee parallel to the highway, and the quality of views of Holland Tract from the island levees would be reduced.

Views of the islands would not substantially change under the No-Project Alternative.

AFFECTED ENVIRONMENT

Sources of Information

Recreation

Regional information on existing Delta recreation was obtained from reference materials of DWR and the California State Lands Commission (SLC). Information on existing recreation use of the DW project islands was collected from project island property owners and managers.

Maximum recreation use estimates for hunting on habitat islands under the DW project were derived from California hunting regulations (i.e., the lengths of the hunting seasons) and the HMP hunting program described in Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands". Estimates of hunter participation on habitat islands were determined based on hunter use data obtained from state and federal refuges in or near the Delta. Information on the hunting program on reservoir islands under the DW project was provided by DW. Information on the hunting program for the No-Project Alternative was also obtained from DW.

Estimates of recreational boating associated with the DW project were based on the potential use of recreation facilities at project buildout. Each recreation facility would include a maximum of 30 boat slips in the adjacent Delta channel to accommodate temporary and permanent boat docking for private guests. Temporary boat docking includes use of a boat berth on a daily or weekly basis, whereas permanent boat docking applies to use of a boat berth over a long period of time, usually more than 12 months (Burkes pers. comm.). Boater use estimates were obtained from the California Department of Boating and Waterways, a marina and harbors organization, and commercial marina operators in the Delta.

Visual Resources

The visual resources in the Delta region and on the DW project islands were evaluated based on site assessment and aerial photographs. The relevant county general plans were reviewed for applicable policies and guidelines for visual resource management.

Recreation Conditions

The primary unit of measurement of recreation use is the recreation use-day, which represents participation by one individual in a recreational activity during any portion of a 24-hour period. Participation in hunting, fishing, or boating by one individual during a 24-hour period represents one recreation use-day. Participation in all three activities during a 24-hour period represents 3 recreation use-days.

Recreational Uses in the Region

The Delta is generally bounded by the cities of Sacramento, Stockton, Tracy, and Pittsburg. Delta recreation is supported by these major population centers and the Bay Area in general. Recreation use in the Delta exceeds 12 million user days annually (SLC 1991; DWR 1990a, 1993; DWR and Reclamation 1990). Boating is the most popular recreation activity in the Delta, accounting for approximately 2,016,000 annual recreation visits (Table 3J-1). Fishing (not including boating) is the next most popular activity, attracting an estimated 1,800,000 recreation visits. Hunting accounts for approximately 72,000 recreation visits. (DWR 1990a.)

The demand for recreation opportunities in the Delta is expected to increase primarily as a result of increased population. Higher incomes, increased numbers of retirees, and shorter workweeks will probably also

influence the demand for new recreation opportunities. (DWR 1990a.)

Public recreation opportunities in the Delta are limited because facilities are insufficient; the demand for parking, boat launch ramps, camp units, and picnic areas exceeds the supply. Other difficulties related to Delta recreation include limited access to recreation sites and minimal coordination between recreational jurisdictions. (DWR 1990a, SLC 1991.)

Approximately 120 commercial recreation facilities exist in the Delta, including at least 100 marinas (Figure 3J-1). Delta marinas provide services to regional boaters that include temporary and permanent boat berthing, mooring, and dry storage (Nunes pers. comm.). Most marinas operate at 50%-90% capacity. Other commercial facilities include resorts, restaurants with guest docks, and recreational vehicle parks (DWR 1990a, 1993). Also in the Delta are approximately 23 public recreation facilities that include areas or facilities for boat launching, camping, fishing access, swimming, and picnicking (SLC 1991). Brannan Island State Park is one of the largest public recreation areas in the Delta. Attendance records show that the park is usually full during May-September with numerous people being turned away. (DWR 1990a.)

Some hunting in public areas in the Delta is conducted from boats in waterways and on small unnamed Delta islands (Weinstein pers. comm.). The state owns 15,000 acres in Suisun Marsh at the western edge of the Delta, including approximately 6,000 acres of public hunting areas at Grizzly Island Wildlife Area. The state also owns the Lower Sherman Island Wildlife Area north of Antioch near the confluence of the Sacramento and San Joaquin Rivers, which has 3,300 acres open to hunting. No other state-managed or federally managed wildlife areas for hunting exist in the Delta but DFG may create a hunting program on Twitchell Island (Chapin pers. comm.).

On many privately owned Delta islands, owners and their guests hunt waterfowl on agricultural lands (Winther pers. comm.). Most of the private hunting clubs in the Delta are small, accommodating between eight and 16 hunters on a typical shoot day. At least one club occasionally has 30 hunters in a day. (Dennis, Luckey, Zuckerman pers. comms.) Landowners manage private hunting clubs on Delta islands that in some cases are no longer in agricultural production (Zuckerman pers. comm.). Approximately 200 people have private memberships with Delta hunting clubs (Weinstein pers. comm.).

Existing Recreational Uses on the DW Project Islands

This section describes the existing recreational uses on the DW project islands. Recreational use information, in part, is based on information collected for the 1990 draft EIR/EIS and has been updated to current conditions where these changes would affect the impact analysis.

Bacon Island

Hunting. No waterfowl hunting takes place on Bacon Island. Pheasant hunting is permitted by invitation only and is limited primarily to onsite workers and their families. No fees are charged. Pheasant hunting is allowed daily during a 3-week hunting period, typically from mid-November to mid-December. The California Fish and Game Commission annually establishes pheasant hunting season, so the specific dates change annually. On opening day, typically 30-35 hunters use Bacon Island, but for the rest of the season hunting participation declines to three or four hunters per day. The total number of hunting recreation use-days per season is estimated at 100 (Table 3J-2). (Shimasaki pers. comm.)

Hunters on Bacon Island are primarily San Joaquin County residents, and most of the remaining hunters come from Contra Costa and Santa Barbara Counties (Shimasaki pers. comm.).

Fishing and Boating. Approximately 90% of the fishing on Bacon Island takes place adjacent to the county road, which is the only means of public access. Approximately 65% of the anglers fish from levees and 35% use boats. Fishing from the levees is limited to relatives and employees of property owners. Anglers originate primarily from San Joaquin County and the East Bay. (Shimasaki pers. comm.)

On average over the year, approximately 20 anglers per day fish on weekends and about four per day fish on weekdays. Total fishing activity is estimated at 3,120 recreation use-days per year on Bacon Island (Table 3J-2). Boats do not originate from or dock on the island. (Shimasaki pers. comm.)

Webb Tract

Hunting. No public hunting takes place on Webb Tract; hunting is limited to family and friends of the owners and no hunting fees are charged. Waterfowl hunting is allowed on Wednesdays, Saturdays, and Sundays in December and January following the corn harvest. Use averages between 10 and 15 hunters per day.

Waterfowl hunting use is estimated at 320 recreation use-days per season. (Dinelli pers. comm.)

There is some private pheasant hunting, limited to friends and family of property owners, with no fees charged. Pheasant hunting is allowed daily from November 12 through December 1. An average of 15 hunters participate per day, for a total of about 320 recreation use-days per season. Estimated hunting recreation use-days on Webb Tract total 640 (Table 3J-2). Most hunters come from Contra Costa County. (Dinelli pers. comm.)

Fishing and Boating. Written permission from the property owners is required for fishing on Webb Tract. Anglers occasionally fish the northern blowout pond on Webb Tract. Fishing activity on Webb Tract totals approximately 90 recreation use-days per year (Table 3J-2). All anglers on Webb Tract live in Contra Costa County. No boating activity originates from Webb Tract. (Dinelli pers. comm.)

Bouldin Island

Hunting. Waterfowl hunting on Bouldin Island is limited to invited guests, and no hunting fees are charged. Most waterfowl hunting is for ducks; some geese are also hunted. Waterfowl hunting is permitted over a 59-day period, which typically occurs from the third week of October to mid-January. Waterfowl seasons are established annually by the Pacific Flyway Committee, so specific dates vary among years. Hunting is allowed on Wednesdays, Saturdays, and Sundays on Bouldin Island, with approximately six people hunting per day, for a total of approximately 150 hunting recreation use-days per season. Hunting facilities on the island consist of a building used to store waterfowl hunting equipment. (Wilkerson pers. comm.)

Pheasant hunting on Bouldin Island is also limited to invited guests, with no fees charged. Hunting is permitted on Wednesdays, Saturdays, and Sundays over a 30-day period. Approximately six people hunt per day, for a total of about 60 hunting recreation use-days per season. Total hunting recreation use-days on Bouldin Island are estimated at 210 (Table 3J-2). (Wilkerson pers. comm.)

Approximately 90% of the hunters on Bouldin Island are residents of San Joaquin County that make day trips to the area (Wilkerson pers. comm.).

Fishing and Boating. Onsite workers who fish from levees account for most of the fishing on Bouldin Island. Written permission is needed for others visiting the island. Most fishing occurs from October to March

on weekends and weekday afternoons. Fishing activity averages two anglers per day, for a total of about 360 fishing recreation use-days per season. All anglers are San Joaquin County residents. No boating originates from Bouldin Island. (Wilkerson pers. comm.)

Holland Tract

Hunting. One ownership on Holland Tract accommodates for-fee hunting, which constitutes approximately 80% of the waterfowl hunting on this property. The remainder consists of hunting by friends and family of the landowner. Waterfowl hunting is permitted at two hunting clubs on Wednesdays, Saturdays, and Sundays during the waterfowl season. Approximately two people hunt per day, for a total of about 50 hunting recreation use-days per season for waterfowl. (Frelier pers. comm.)

Other property owners on Holland Tract either do not allow hunting or allow only limited hunting to members of their immediate families. Total waterfowl hunting per season on these properties totals about 10-15 recreation use-days. (Lindquist pers. comm.)

Pheasant hunting takes place primarily on the west side of Holland Tract. Hunters are charged a fee to visit the island. Approximately 20% of all hunting is nonfee hunting that is limited to friends and family of the landowner. The island generates approximately 30 hunting recreation use-days per season for pheasant. Total hunting recreation use-days on Holland Tract are estimated at 95 (Table 3J-2). (Frelier pers. comm.)

Most hunters on Holland Tract originate from the Bay Area. An estimated 80% of the hunters make day trips, and approximately 20% stay overnight in the local area. Approximately half the overnight users stay in hotels, and the other half stay in campgrounds. (Frelier pers. comm.) Hunting facilities on Holland Tract consist of a building used as a clubhouse (Cochrell pers. comm.).

Fishing and Boating. Most fishing on Holland Tract originates from two marinas on the south end of the island. Marina tenants generate an estimated 4,000 fishing recreation use-days per year. Fishing activities associated with the launch ramp (day-use boaters) account for another 4,500-7,700 fishing recreation use-days annually. Fishing from the levees accounts for approximately 200 fishing recreation use-days per year. Total fishing on Holland Tract thus ranges from 8,700 to 11,900 recreation use-days annually (Table 3J-2). Bay Area anglers account for approximately 75% of this activity. (Cochrell pers. comm.)

Two marinas located on Holland Tract presently support recreational boating near the island. The larger marina, located on the southeastern corner of the island, accommodates 235 boats more than 26 feet long and 100 boats less than 20 feet long. Boat slip occupancy at this marina averages approximately 85%, with the summer months being especially busy (Cochrell pers. comm.). Boat slips account for an estimated 24,100 boating recreation use-days per season.

The larger marina also has other facilities, including a fuel dock, a snack shack, a launch ramp, and a 500-foot guest dock. The launch ramp is used by day-use boaters. From May 1 through October 1, approximately 100-150 boats are launched per weekend day. During midweek, 25-50 boats are launched per day. The launch ramp generates an estimated additional 22,750-38,500 boating recreation use-days per season at Holland Tract. (Cochrell pers. comm.)

Most launch ramp use is related to waterskiing, which accounts for 18,200-30,800 recreation use-days per season. To avoid double counting, these waterskiing days are not included in Table 3J-2. Approximately 20% of the launch ramp boating activity is related to fishing (Cochrell pers. comm.).

The other marina on Holland Tract, located on the south shore, has a 21-berth capacity. Total boating generated by this facility is estimated at 1,500 recreation use-days per season. (Cochrell pers. comm.)

Total boating activity generated by all facilities on Holland Tract is approximately 56,225 recreation use-days (Table 3J-2). Approximately 80% of the boaters on Holland Tract come from the Bay Area, about 10% from Contra Costa County, and about 10% from other areas in the Delta (Cochrell pers. comm.).

Visual Resources

Visual quality can be described as the overall impression that is retained after one drives through, walks through, or flies over an area (U.S. Bureau of Land Management [BLM] 1980). Both natural and human-made features that make up a landscape contribute to its perceived image and visual quality. Visual quality is influenced by a wide range of landscape characteristics, including geologic, hydrologic, botanical, wildlife, recreational, and urban features.

Judgments of visual quality must be made in the context of a regional frame of reference (SCS 1978). The

same landform or visual resource appearing in different geographic areas could have a different visual quality and sensitivity in each setting. For example, a small hill may be an important visual element on a flat landscape but have little importance in mountainous terrain.

Visual resource sensitivity is determined by the extent of the public's concern for a particular view or landscape, the number of viewers, and the frequency and duration of views. Visual sensitivity is higher for views seen by people who are driving for pleasure, people engaged in recreational activities, and homeowners; visual sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (USFS 1974, Federal Highway Administration 1983, SCS 1978).

Terminology and Standards for Visual Resource Analyses

The visual character and quality in the vicinity of the DW project islands are evaluated using criteria established by the Federal Highway Administration (1983) for visual landscape relationships. These criteria are intactness, vividness, and unity. They are defined as follows:

- **Intactness** is the visual integrity of the natural and constructed landscape and its freedom from encroaching elements. This factor can be present in well-kept urban and rural landscapes as well as natural settings.
- **Vividness** is the visual power or memorability of landscape components that combine in striking or distinctive visual patterns.
- **Unity** is the visual coherence, composition, and harmony of the landscape considered as a whole. It frequently attests to the careful design of individual components in the landscape. (Unity is most frequently used to describe the cohesiveness of built elements in an urban environment.)

The appearance of the landscape is described in this chapter using these criteria and descriptions of the dominance of elements of form, line, color, and texture. These elements are the basic components used to describe visual character and quality for most visual assessments. The criteria for identifying importance of views are related in part to the position of the viewer relative to the resource. An area of the landscape that is visible from a particular location (e.g., an overlook) or series of points

(e.g., a road, trail, or waterway) is defined as a viewshed. (USFS 1974, Federal Highway Administration 1983.)

Relevant Policies on Visual Resources

Contra Costa County Visual Resource Policies.

Preserving the scenic resources of Contra Costa County is an important general plan goal. The scenic vistas are major contributors to the perception that the county is a desirable place to live and work. Preserving the quality of visually sensitive features of the landscape reinforces the rural landscape character and balances the effects of development. (Contra Costa County Community Development Department [CCCCDD] 1991.)

The open space element of the county general plan identifies goals for preserving and protecting areas of high scenic value, including scenic qualities of the shorelines and other elements of the Bay and Delta systems, and scenic ridges, hillsides, and rock outcroppings. The transportation and circulation element of the county general plan designates scenic routes that have rural and natural scenic qualities that should be protected. The land use element identifies goals and policies for development and project design that reinforce the aesthetic character of the county, encourage the uniqueness of its communities, and enhance scenic quality.

San Joaquin County Visual Resource Policies.

The river corridors, groves of valley oak trees, wetlands in the Delta, and sloping foothills and ridges of the Diablo Range and the Sierra Nevada are the key visual resources in the San Joaquin County landscape. The Delta waterways and marshlands are considered important visual features because they provide a contrasting visual element to the large tracts of agricultural land that are common in the county. (San Joaquin County Community Development Department [SJCCDD] 1992.)

San Joaquin County has designated as scenic routes roads that lead to recreation areas, exhibit scenery with agricultural or rural values or topographic interest, provide access to historical sites, or offer views of waterways (SJCCDD 1992). The general plan also identifies some Delta waterways as Significant Recreation Resource Areas; protection and maintenance of these areas for high-quality recreation is an important general plan goal (Figure 3J-2).

The land use element and open space and recreation element of the general plan include several policies for protecting, enhancing, and mitigating effects of development on visual resources in the county, including Delta waterways (SJCCDD 1992).

Visual Resources in the Delta Region

The Delta is an extensive, largely agricultural region linking the Central Valley and the Bay Area. Views in the Delta are dominated by flat, open agricultural land and sloughs and rivers that are bordered by levees. Scattered trees occasionally break the horizon, but typical views encompass agricultural fields. The Delta waterways are important visual features because they contribute to the visual character of the region by enhancing the vividness of views in the Delta. Because few roads traverse the Delta islands, the unique Delta landscape is accessible primarily by boat.

The visual resources associated with the four DW project islands are typical of the region. Views of the project islands from levee roads have some variety in form, line, color, and texture but are not unique to the region. The sensitivity of the visual resources of the four islands varies from island to island based on the wide variability in access to and travel patterns on the islands. The character of the views changes with the season, time of day, and weather, but the quality of the views is relatively uniform.

Bacon Island. Bacon Island is accessible only on its eastern side by a local levee road, Bacon Island Road. Views from the road toward the Bacon Island interior are dominated by intensely farmed agricultural open space with scattered woody vegetation, farm buildings, and rural residences. Mt. Diablo can be seen to the west from Bacon Island Road, providing a background visual element that enhances the vividness of the viewshed from Bacon Island Road. Except for the utility lines that run along the perimeter of Bacon Island, the views of the island from the road are generally intact. The views are not vivid, however, and are common for the region. The overall visual quality of the island bottom from Bacon Island Road is considered moderate.

San Joaquin County has designated Bacon Island Road as a scenic route because of its recreational access and use characteristics and its visual relationship to the adjacent waterway (Figure 3J-2) (SJCCDD 1992). The road carries a low volume of traffic, and the remainder of the island is largely inaccessible to the public. The visual resources on this island as viewed from Bacon Island Road are considered moderately sensitive because of the small number of visitors traveling the designated scenic route and the inaccessibility of the rest of the island interior.

Views of the Bacon Island levees from adjacent waterways consist of a variety of forms and colors created by changing elevations between the water level and the

levee and by textural differences between the water, the marsh, and the riparian vegetation along the water side of the levees. The views from the waterways are vivid and relatively intact but are common to the region. The overall visual quality of the island viewsheds from the water is considered moderate.

A portion of Middle River along the east side of Bacon Island and a portion of Connection Slough bordering the island to the north are considered "significant resource areas for recreation" by San Joaquin County and are frequently used by boaters and anglers (Figure 3J-2) (SJCCDD 1992). Views of the island perimeter levees from these waterways are therefore considered highly sensitive.

The Santa Fe Railways Amtrak line immediately south of Bacon Island runs eight passenger trains per day between Stockton and Richmond, California (Colbert pers. comm.). Views of the Bacon Island southern exterior levee from the train are similar to views of the levee from the adjacent waterway along the south side of Bacon Island (Santa Fe Cut). Views of Bacon Island from the railway are considered highly sensitive.

Webb Tract. Interior views of Webb Tract are dominated by agriculture, but the intensity of agricultural production on this island is low compared with that of Bacon Island. Webb Tract has more natural vegetation and high visual variability because of the scattered woody vegetation and blowout ponds. Views of the island bottom from the levee tops are vivid and intact because the visual resources vary and present a natural setting free from encroaching elements. The overall visual quality of resources on Webb Tract is therefore considered high.

Public access is more limited on Webb Tract than on any of the other project islands. No bridges provide access to the island; it is accessible only by ferry. The number of visitors to the island is low; thus, the visual sensitivity of the Webb Tract landscape as viewed from perimeter levees and other parts of the island interior is considered low.

Views of Webb Tract from adjacent waterways are similar to those described above for Bacon Island. The views are generally intact and vivid, but are common to the region. The overall visual quality of the landscape from the waterways is moderate.

Contra Costa County has designated all the waterways surrounding Webb Tract as scenic waterways (Figure 3J-2) (CCCCDD 1991). The general plan policies include maintenance or protection of the marshes and riparian vegetation along the shorelines and Delta levees,

consistent with safety and other general plan policies. The Webb Tract perimeter levees as viewed from these waterways are therefore considered a highly sensitive visual resource.

Bouldin Island. Public access to the interior of Bouldin Island is limited to travelers crossing the island on SR 12. Views from SR 12 toward the interior of Bouldin Island are dominated by intensely farmed agricultural open space with scattered woody vegetation, farm buildings, and rural residential units. Utility lines cross the highway, detracting from the intactness of views of the island. The overall visual quality of Bouldin Island is considered moderate because the visual resources are somewhat intact but are not especially vivid, and because the views are common to the region.

Because Bouldin Island is visible to people from SR 12 and many of the viewers are recreationists in the Delta, visual sensitivity for part of the viewer group could be high. The duration of views for viewers along SR 12 is brief, however, because there are no vista points or rest areas on Bouldin Island from which to prolong the views. Therefore, the overall visual sensitivity is considered moderate for views of the island along SR 12.

A study by Caltrans found that the visual resources along the Bouldin Island section of SR 12 did not qualify this road section for eligibility for State Scenic Highway designation (Hatfield pers. comm., Caltrans 1992). Similarly, SR 12 on Bouldin Island has not been designated as a scenic roadway by San Joaquin County (SJCCDD 1992). Figure 3J-3 shows a typical view along SR 12 on Bouldin Island. The views of Bouldin Island are not especially vivid and are common to the region, and SR 12 across the island is not considered eligible for designation as a scenic route. Therefore, the overall visual quality of Bouldin Island is considered moderate for views from SR 12.

Views of Bouldin Island from adjacent waterways are similar to those described above for Bacon Island. The overall visual quality of the landscape from the waterways is moderate; these views are generally intact and vivid but are common to the region. Potato Slough south of Bouldin Island is considered a resource area for recreation (SJCCDD 1992), so the south perimeter levee is commonly viewed by boaters and anglers. The Bouldin Island east perimeter levee is visible from marina facilities across Little Potato Slough on Terminous Tract, both north and south of SR 12. Views of these perimeter levees from the waterways are considered highly sensitive because many recreationists use these waterways.

Holland Tract. Public access to Holland Tract is limited to Holland Tract Road along the south levee. Views of Holland Tract from the road consist of agriculture fields and some fallow areas with established woody vegetation along the levee and toward the center of the island (Figure 3J-4). This vegetation adds somewhat to the variety and texture of views and generally enhances the vividness of views of the island. The overall visual quality of resources on Holland Tract is considered moderate because the views are generally common to the region.

One small bridge at the southwest corner of Holland Tract provides access across Rock Slough to the marinas located on the southern levee; other parts of Holland Tract are inaccessible to the public. Furthermore, Holland Tract Road has no special local or state scenic corridor designation. Visual sensitivity of the Holland Tract landscape from the road is therefore considered moderate.

Views of Holland Tract from adjacent waterways include developed marina facilities on the southern and eastern side of the island and vegetated levees in other areas. The marina facilities that border Holland Tract for about 2/3 mile include covered and uncovered boat berths. Small ancillary buildings and covered berths are constructed partly using wood siding. Wood pilings in the water adjacent to one of the marinas are connected by a low narrow ridge of automobile tires. Because these view components generally disrupt the intactness and unity of views in marina areas, visual quality is low along the water side of the levees in the marina areas.

Views of Holland Tract from adjacent waterways away from the marinas are similar to those described above for the other DW project islands. The views are generally intact and somewhat vivid but are common to the region; therefore, the overall visual quality of the landscape from the waterways is moderate.

Old River, which borders the eastern side of Holland Tract, and Roosevelt Cut and the flooded Franks Tract waters north of Holland Tract are designated as scenic waterways by Contra Costa County (Figure 3J-2) (CCCCDD 1991). The county general plan policies include maintenance or protection of the marshes and riparian vegetation along the shorelines and Delta levees, consistent with safety and other general plan policies. Furthermore, these waters are frequented by boaters and anglers. The view of Holland Tract levees from these waterways is therefore considered highly sensitive.

IMPACT ASSESSMENT METHODOLOGY

Analytical Approach and Impact Mechanisms

Assessment of Recreation Impacts

The DW project is expected to increase opportunities for recreation in the Delta. Recreation impacts were evaluated through comparison of changes in hunting, fishing, and boating use that would occur under the DW project alternatives with the point-of-reference conditions described above under "Affected Environment". Estimates of existing recreation use in the Delta (Table 3J-2) also provided a point of comparison to use in assessing the significance of changes in hunting, fishing, and boating that would occur under the DW project alternatives.

The hunting schedule on the DW project islands is based partially on California hunting regulations that determine the length of the hunting seasons (DFG 1993). Since the late 1980s, DFG has implemented changes to the hunting regulations that have resulted in a split duck-hunting season. No proposals currently exist to change current hunting regulations. It is therefore assumed that existing regulations would persist in future years.

Assessment of Visual Resource Impacts

Visual resource impacts were determined through evaluation of the effects a project alternative would have on views and potential viewer groups. These evaluations were based on the visual sensitivity of a site and the changes to visual quality of a viewshed that would result from implementation of a project alternative.

Criteria for Determining Impact Significance

Recreation Criteria

This analysis is based on the assumption that increased recreation opportunities in the Delta constitute beneficial impacts. An alternative is considered to have a beneficial impact on recreation if it would provide facilities for recreational use, create habitat for hunting use, or otherwise facilitate greater recreational use. An alternative is considered to have a significant impact on recreation if it would result in a decrease in recreation

use-days in the Delta or a reduction in the quality of existing recreation experiences in the Delta.

Impacts on fisheries, wildlife, traffic, public health, and air quality that may result from increased recreation use are addressed, respectively, in the following chapters:

- Chapter 3F, "Fishery Resources";
- Chapter 3H, "Wildlife";
- Chapter 3L, "Traffic";
- Chapter 3N, "Mosquitos and Public Health"; and
- Chapter 3O, "Air Quality".

Changes in economic conditions that may occur as a result of increased recreation use are addressed in Chapter 3K, "Economic Conditions and Effects".

Visual Resource Criteria

According to Appendix G of the State CEQA Guidelines, visual resource impacts are considered significant if the project will "have a substantial, demonstrable negative aesthetic effect" or if it will "conflict with adopted environmental plans and goals of the community where it is located". Based on these guidelines and professional standards and practices, a project alternative is considered to have a significant impact on visual resources if it would:

- substantially reduce the vividness, intactness, or unity of high-quality or highly sensitive views;
- substantially reduce the visual quality of highly sensitive views from designated scenic roads or waterways; or
- conflict with adopted visual resource policies identified from the general plans for Contra Costa and San Joaquin Counties or with scenic resource designations by other public agencies.

A project is considered to have a beneficial impact on visual resources if it would improve the visual quality of views or if it would provide new viewing opportunities in the project area.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 1

Alternative 1 involves storage of water on Bacon Island and Webb Tract (reservoir islands) and man-

agement of Bouldin Island and Holland Tract (habitat islands) primarily for wildlife habitat. Reservoir islands would be managed primarily for water storage, with wildlife habitat and recreation constituting secondary uses.

Changes in Recreation Conditions

Overview of Recreation Associated with the DW Project

Implementation of Alternative 1 would include development of recreation facilities along the four DW project island perimeter levees. (Figures 2-7 and 2-8 in Appendix 2, "Supplemental Description of the Delta Wetlands Project Alternatives", depict a conceptual recreation facility.) These facilities would be run as a private operation and would provide year-round recreation opportunities at the DW project islands.

Each recreation facility would include living quarters for as many as 80 people. Parking lots would be constructed at each facility along levee roads to allow for vehicle access. A floating boat dock and gangway adjacent to each facility would provide boat access to island interiors along a network of ditches and canals. A similarly sized floating boat dock would be constructed on the slough or river side of the island levees to provide temporary and permanent boat berthing for members who would likely boat, waterski, and fish in Delta channels beyond the DW project islands.

A general schedule of recreation facility use can be determined based on various factors. Boating and water-skiing in Delta channels would be expected to occur primarily during the warmer months of the year (mid-May to mid-September). Participation in sport fishing can be predicted to occur primarily during February-November based on the expected presence of different fish species in the Delta. Participation in waterfowl and upland game hunting on the DW project islands would take place mostly during October-January based on California hunting regulations (DFG 1993). There would be some hunting during the first half of September for mourning dove. Figure 3J-5 depicts the expected schedule of participation in fishing and hunting at and near the DW project islands. The figure shows that recreation facility members and their guests would have reasons and opportunities to use the facilities throughout the year.

Other recreation activities at the DW project islands could include but would not be limited to birdwatching, photography, skeet and trap shooting, relaxing, walking,

nature study, windsurfing, swimming, and canoeing. Recreationists could participate in these activities for a fee or at the invitation of DW. Many of these activities could take place throughout the year, weather permitting. Participation in these activities may result in incremental increases in existing regional recreation use-days (Table 3J-1). It is also possible that implementation of the DW project would cause local shifts of people who currently participate in these secondary recreation activities in other parts of the Delta.

Recreation Program for Alternative 1

Bacon Island and Webb Tract. Bacon Island and Webb Tract could each have a maximum of 11 recreation facilities under Alternative 1 (Figures 2-2 and 2-3 in Chapter 2, "Delta Wetlands Project Alternatives").

During years when water is not stored on reservoir islands during the growing season, Bacon Island and/or Webb Tract could be managed to create shallow-water habitats to attract waterfowl (Chapter 3H, "Wildlife", and Appendix G2, "Prediction of Vegetation on the Delta Wetlands Reservoir Islands"). In years when shallow-water habitats are created, the reservoir islands would be available for waterfowl hunting during October-January until appropriate water becomes available in the Delta for diversion onto reservoir islands. Unless reservoir islands were seeded to create forage for waterfowl, the shallow-water habitats created on Bacon Island and Webb Tract would probably have marginal quality as foraging habitat and would not be expected to provide an exceptional hunting experience (see Chapter 3H, "Wildlife").

During years when appropriate water is available in the Delta for storage on reservoir islands, Bacon Island and/or Webb Tract would be managed as a water storage facility. Waterfowl hunting would be conducted from boats, floating blinds, and on foot from perimeter levees. During water storage, the reservoirs would provide resting habitat for some waterfowl, but the foraging habitat would be extremely limited. The reservoir islands would not be expected to attract large numbers of waterfowl; consequently, hunter participation would be low. (Appendix G2 provides further detail on storage condition classes.) Because of the uncertainty of waterfowl habitat availability, the recreation facilities on reservoir islands would likely be used more by members who enjoy boating and fishing and less by members who hunt.

The reservoir islands could also be used for temporary storage of water owned by parties other than DW. The water storage could occur as a result of water trans-

fers and water banking. These storage occurrences could increase the uncertainty of availability of shallow-water wetlands for wintering waterfowl and therefore increase the uncertainty of recreational uses. Actions taken by other parties to use the DW reservoir islands for water storage, however, are speculative and beyond the scope of this EIR/EIS.

As described above, other recreation activities would be expected to occur on the DW project islands; the reservoir island interiors could be used for canoeing, windsurfing, and swimming during deep-water storage periods.

Bouldin Island and Holland Tract. Habitat islands would be managed primarily to provide wildlife habitat to compensate for habitat losses on the four DW project islands. Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands", describes the HMP under which the habitat islands would be managed. Bouldin Island and Holland Tract could have a maximum of 10 and six recreation facilities, respectively, under Alternative 1 (Figures 2-7 and 2-8 in Chapter 2, "Delta Wetlands Project Alternatives").

Implementation of the HMP as part of Alternative 1 would result in the creation of high-quality wintering waterfowl foraging habitat on the habitat islands that would be managed primarily to enhance the value of waterfowl habitat in the Delta. HMP implementation would provide 3,055 acres of spaced-blind hunting areas and 3,743 acres of free-roam hunting areas on habitat islands (Table 20 in Appendix G3). The hunting program under the HMP would allow hunting on Wednesdays, Saturdays, and Sundays during the hunting seasons prescribed by DFG (1993) (Figure 3J-5). Two additional hunting days would be allowed during the waterfowl seasons to compensate for hunting days that may fall on holidays.

The Bouldin Island airstrip will be available for use by hunters and other recreationists to fly to the island. Restrictions have been placed on fixed-wing and helicopter use of the airstrip during the waterfowl season to reduce disturbances to wildlife (see Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands").

Recreation facilities on habitat islands would also be expected to provide opportunities for recreationists to participate in the full range of other recreation activities described above.

Hunting

Bacon Island and Webb Tract. As described above, hunting would occur on the reservoir islands during shallow-water wetland and storage periods.

A total of 3,694 acres on Bacon Island and 3,836 acres on Webb Tract could be managed as shallow-water wetlands during nonstorage periods (Table 3J-3) (JSA 1993). This acreage could be hunted for waterfowl every day of the week during the hunting seasons at estimated densities up to one hunter per 30 acres. (JSA 1993, DFG 1993, Forkel pers. comm.)

The quality of the hunting would depend on the availability of foraging habitat for waterfowl. Unless DW seeds the islands during nonstorage periods, the availability of waterfowl forage plants would diminish over time. Large numbers of waterfowl would not be expected to visit the reservoir islands unless forage were available.

Predicting when the islands would be available for hunting during shallow-water wetland periods is difficult because DW may fill reservoir islands in a sequence that changes each year to maximize the opportunity for creating shallow-water wetlands. However, DW may divert water simultaneously and at the same rate onto each island, minimizing the frequency with which shallow-water wetlands would be created. (Chapter 3N, "Mosquitoes and Public Health", and Appendix G2, "Prediction of Vegetation on the Delta Wetlands Reservoir Islands", describe each management regime and the expected changes in vegetation conditions.) The selected management regime would also influence the frequency of occurrence of storage condition classes. This analysis is based on the assumption that either management regime could occur; consequently, the percentages of project years when islands would be in a shallow-water wetland condition or a storage condition represent an average of the two regimes (Tables 3J-3 and 3J-4). (Methods used to derive percentages are described in Chapter 3N and Appendix G2.) The values shown for annual maximum hunter use-days in Tables 3J-3 and 3J-4 therefore are adjusted to account for unpredictable year-to-year storage conditions under Alternative 1.

Waterfowl Hunting under the Shallow-Water Wetland Condition. Table 3J-3 shows that Bacon Island and Webb Tract could support 4,119 and 4,729 maximum hunter use-days, respectively. The maximum hunter use-days calculated in Table 3J-3 for the shallow-water wetland condition are adjusted to account for the possible marginal quality of wetlands on reservoir islands and the low hunter attendance that would result from probable low numbers of waterfowl.

Therefore, it is assumed that hunter participation would average 30% of capacity during the hunting seasons on reservoir islands. Under Alternative 1, Bacon Island and Webb Tract may support a total of approximately 2,660 annual recreation use-days for waterfowl hunting under the shallow-water wetland condition during any project year (Table 3J-3).

Waterfowl Hunting under Water Storage Conditions. All of Bacon Island and Webb Tract would be managed for full, partial, or shallow storage in some years. Totals of 5,539 acres on Bacon Island and 5,470 acres on Webb Tract could be hunted for waterfowl every day of the week during water storage periods during the hunting seasons at densities of up to one hunter per 30 acres (Table 3J-4) (JSA 1993, DFG 1993).

Because Clifton Court Forebay is a large open-water area, hunter use data for the forebay provide an indicator of the level of hunting that could be expected at the DW reservoir islands. Waterfowl hunting season use reports were obtained for the Clifton Court Forebay Waterfowl Public Shoot Area for four waterfowl hunting seasons during the middle 1970s and early 1980s. The reports provide data on total acreages, maximum quotas of hunters allowed, numbers and types of waterfowl killed per shoot day, and total attendance per day during the waterfowl hunting season. Average attendance at the Clifton Court Forebay Public Shoot Area during the four hunting seasons was 27% of capacity. Results of the hunting reports are summarized in Table 3J-5.

Clifton Court Forebay is operated as a public shooting area, whereas access to the privately owned recreation facilities on the DW reservoir islands would be limited to members and their guests. Hunter participation at public waterfowl hunting areas such as Clifton Court Forebay would be expected to exceed participation on the DW reservoir islands under water storage conditions.

Furthermore, the DW reservoir islands might not support the level of participation in waterfowl hunting that has occurred in the past at Clifton Court Forebay. Hunter use data (Table 3J-5) may represent the high level of waterfowl hunting in California during the 1970s, when the number of waterfowl hunting permits issued statewide was much higher than during any subsequent period. The level of participation in waterfowl hunting in California is less than half that of the 1970s, and waterfowl hunting is not expected to approach the levels seen during the 1970s. (Becker pers. comm.)

As described previously, waterfowl would congregate to rest on the open water during storage periods. Waterfowl hunting would occur during storage periods

from boats with blinds, scull boats, and floating blinds and on foot from perimeter levees. (A scull boat is a small boat that can be maneuvered by one passenger using a single oar.) Most hunting would likely occur from motorized boats with blinds (camouflage). Scull boating requires special equipment and skills, and few hunters participate. Stationary floating blinds would provide the least desirable opportunities for hunting on open water because they cannot be moved to better hunting areas. (Wernette pers. comm.) Overall, the specialized nature of open-water hunting would lead to low levels of hunting on the DW reservoir islands during storage periods.

Table 3J-4 shows that Bacon Island and Webb Tract could support a maximum of 9,038 and 8,299 hunter use-days, respectively. The maximum numbers of hunter use-days calculated in Table 3J-4 have been adjusted to account for the predicted low levels of hunting on reservoir islands during storage periods. As described above, low hunter attendance would be expected because of the unpredictable schedule of water storage periods and because the hunting areas at the DW reservoir islands would be private rather than public. Furthermore, hunter participation at the DW reservoir islands would probably not approach the level of hunting documented at Clifton Court Forebay during the late 1970s. The specialized nature of open water hunting would also contribute to low hunting levels. Therefore, it is assumed that hunter participation during storage periods would average 15% of capacity during the hunting seasons on reservoir islands. This percentage was applied to the maximum numbers of hunter use-days for Bacon Island and Webb Tract, leading to the estimate that approximately 2,600 annual recreation use-days for waterfowl hunting may result from operation of Alternative 1 during storage periods during any project year (Table 3J-4).

Upland Game Hunting. Herbaceous habitats could become established on exposed island bottoms during periods when reservoir islands are managed to provide shallow-water habitat; these habitats could provide forage for mourning dove and possible nesting opportunities for ring-necked pheasant during some years. Habitat for these upland game species, however, would be nonexistent on reservoir islands under full storage conditions, and water storage on the islands would limit establishment of breeding habitat for doves or pheasants. (See Chapter 3H, "Wildlife", for more detail on predicted changes to upland game habitat.) Incidental hunting for these upland game species may occur on reservoir islands during September, before the start of the waterfowl hunting seasons (Figure 3J-5). The numbers of recreation use-days associated with this

activity would be very low and would not alter this impact analysis; therefore, they were not included.

Incidental upland game hunting could also occur during November-December, concurrent with part of the waterfowl hunting seasons. No assumptions were made regarding numbers of hunters who may participate in upland game hunting to avoid double counting of hunters who would likely also be hunting waterfowl.

Bouldin Island and Holland Tract. A total of 2,122 acres on Bouldin Island and 933 acres on Holland Tract would be managed as spaced-blind hunting zones under the HMP for hunting waterfowl (Table 3J-6). The blinds occupied by hunters would be at a maximum density of one blind per 50 acres, and each blind could accommodate four hunters at a time; therefore, maximum hunter density would be one hunter per 12.5 acres. Hunting would occur on Wednesdays, Saturdays, and Sundays during the hunting seasons (Figure 3J-5) (DFG 1993).

A total of 2,331 acres on Bouldin Island and 1,308 acres on Holland Tract would be managed as free-roam hunting zones under the HMP for hunting waterfowl and upland game during the October-January hunting seasons (Table 3J-6). Maximum hunter density would be one hunter per 60 acres, and hunting could occur on Wednesdays, Saturdays, and Sundays during the hunting seasons (Figure 3J-5) (DFG 1993).

An additional 104 acres are designated only for upland game hunting on Bouldin Island; when these are added to the 2,331 free-roam acres, a total of 2,435 free-roam acres are available for mourning dove hunting during September (Figure 3J-5). The 104 free-roam acres were deleted from Table 3J-6 for October-January to avoid double counting of hunters who would probably also hunt waterfowl. (See Tables 19, 20, and 21 in Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands", for more detail on the HMP hunting program.)

Table 3J-6 shows that Bouldin Island and Holland Tract could support a maximum of 8,632 and 4,011 hunter use-days, respectively. Contacts with private hunting club owners and public refuge managers were made to determine the average hunter participation as a percentage of capacity. As described previously under "Recreational Uses in the Region", private hunting clubs in the Delta are small and participation is generally limited to landowners and their guests. Participants hunt frequently and attendance patterns are different from those at large refuges. Furthermore, maximum density cannot be calculated because the clubs generally operate

on hundreds of acres that could accommodate many more hunters. (Zuckerman pers. comm.)

Although the DW hunting program would be private, information obtained from managers of public refuges located in the Sacramento Valley, Butte Basin, and west of the Delta at Grizzly Island is assumed to provide a reasonable indication of the level of hunting participation anticipated on Bouldin Island and Holland Tract. This assumption is based on the fact that Alternative 1 would create high-quality wintering waterfowl foraging habitat in the Delta at a scale comparable to that of the public refuges. The waterfowl habitat at the DW habitat islands would be expected to attract an abundance of several waterfowl game species; therefore, hunter participation would likely be similar to that on the inland public refuges.

Waterfowl hunting season reports were obtained from five public refuges for the 1993-1994 hunting season. Hunting season reports are not maintained for Lower Sherman Island Wildlife Area. The reports did not provide data on upland game hunting. Results of the hunting reports are summarized in Table 3J-7.

The values that are over 100% in Table 3J-7 indicate that as hunters checked out during shoot days in October and January when the demand for hunting was high, other hunters entered the refuges. Average attendance at the public refuges during the 1993-1994 hunting season was 86% of capacity. This figure was applied to the maximum hunter use-days for Bouldin Island and Holland Tract in Table 3J-6 to show that approximately 10,870 total annual recreation use-days for hunting would be generated during any project year under Alternative 1.

Fishing and Boating

Implementation of Alternative 1 would increase recreation use-days related to fishing and boating in the Delta. Each private recreation facility would include a 30-berth boat dock constructed on the channel side of the project island perimeter levees to accommodate temporary and permanent boat docking for private guests (see Appendix 2, "Supplemental Description of the Delta Wetlands Project Alternatives", for conceptual design of the recreation facilities). As described previously under "Recreation Program for Alternative 1", a total of 38 recreation facilities could be constructed at the DW project islands over the life of the project. The recreation facilities would provide overnight accommodations for boaters and other recreationists. If there is low demand for facilities, DW may construct fewer facilities and/or smaller facilities.

Delta boating use attributable to the DW project would originate from the recreation facility boat docks. Assuming 70% occupancy of the boat slips, implementing Alternative 1 would provide permanent boat docking in Delta waterways for 798 boats. Contra Costa County and San Joaquin County have 38,330 and 22,870 registered boats, respectively (Nunes pers. comm.). If none of the boats docked at the DW project facilities are existing registered boats, the DW project could add approximately 800 registered boats to the two-county area. This would represent a 1%-2% increase over the existing number of boats in the area. Recreational boat use would be highest during summer weekends and lowest during winter. Table 3J-8 shows the average weekend and weekday boat use by season estimated for Alternative 1. Based on an estimate of three boaters per boat, it is estimated that an annual increase of 100,620 boater recreation use-days would be generated by Alternative 1 (Table 3J-9). This represents a 5% increase over the 2,016,000 existing boater recreation use-days in the Delta (Table 3J-2).

It is possible that some anglers and boaters in the Delta are limited by the lack of public facilities with boat launch areas. (The shortage of public recreation facilities in the Delta is described under "Recreational Uses in the Region".) As described previously in this section, the DW project recreation facilities would be private and would provide mooring for members with boats. It is assumed that implementation of the DW project would not contribute to relieving the demands on public recreation facilities for access to Delta waterways.

Other Recreational Uses

Implementation of Alternative 1 would likely increase participation of recreationists on the DW project islands in recreational uses other than hunting, fishing, and boating. The proposed recreation facilities would accommodate recreationists interested in birdwatching, photography, nature study, walking, relaxing, skeet and trap shooting, swimming, and other activities. The reservoir island interiors could be used for canoeing, windsurfing, and swimming during deep-water storage periods. Other recreational uses would occur year round but most frequently during summer. Estimated recreation use-days for these other uses generated by the DW project are shown in Table 3J-10. Other recreational use was estimated as a relative percentage of boater use-days by season. Implementation of Alternative 1 would generate approximately 38,560 recreation use-days related to these other uses.

Summary of Project Impacts and Recommended Mitigation Measures

Impact J-1: Increase in Recreation Use-Days for Hunting in the Delta. Implementation of Alternative 1 would result in the creation of 7,530 acres of low- to medium-quality shallow-water wetland waterfowl habitat on reservoir islands during some years (JSA 1993). The quality of the wetland habitat for waterfowl on reservoir islands would be dependent on forage availability. All the reservoir island acreage, approximately 11,000 acres, would be in a water-storage condition in some years; waterfowl would rest on the open water and possibly forage in shallow areas around the storage pool edges.

A total of 8,219 acres of high-quality wintering waterfowl compensation habitat would be created on the habitat islands (Table 15 in Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands"). Some of the waterfowl habitat would also support upland game. The combined habitats for waterfowl and upland game would support approximately 16,130 annual hunting recreation use-days in the Delta (Table 3J-11). This figure represents a net increase of approximately 15,080 hunter use-days over existing conditions on the DW project islands (Tables 3J-2 and 3J-11).

The net increase of 15,080 hunter use-days generated by Alternative 1 represents a 21% increase over the 72,000 existing hunting recreation use-days in the Delta (Tables 3J-2 and 3J-11).

The increase in number of hunters in the project vicinity could detract from the quality of the recreation experience for some people; however, most other recreational uses (e.g., boating and fishing) occur primarily during summer and would not be affected by increases in hunting on the DW project islands during the hunting season. Also, the benefits of having new areas in the Delta for hunting use outweigh possible annoyances that could result from hunters being concentrated in the project area during hunting season.

This impact is considered beneficial.

Mitigation. No mitigation is required.

Impact J-2: Change in Regional Hunter Success outside the Project Area. Implementation of Alternative 1 would include establishment of 8,219 acres of wintering waterfowl compensation habitat on the habitat islands (Table 15 in Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands"). As described in Chapter 3H, "Wildlife", establishment of these wetland areas is expected to result in some redistribution

of regional waterfowl populations to the habitat islands. This redistribution may cause a decrease in hunter success outside the project area. This scenario may occur especially in areas where wintering waterfowl habitat management and waterfowl hunting are secondary to other uses; the resultant waterfowl foraging habitat may be less than optimal.

However, during hunt days on the habitat islands, waterfowl would disperse to other areas in the Delta where they could be hunted. Waterfowl may also disperse to forage in adjacent areas as the food source diminishes during winter on habitat islands. Therefore, potentially decreased hunter success in some areas would likely be offset by increased hunter success in hunted areas relatively close to the DW project islands. Additionally, implementation of the HMP as part of Alternative 1 would include establishment of waterfowl breeding habitat that would be expected to increase numbers of waterfowl in the region. (Appendix G3 includes details on the proposed waterfowl habitats.)

This impact is considered less than significant.

Mitigation. No mitigation is required.

Impact J-3: Increase in Recreation Use-Days for Boating in the Delta. Implementation of Alternative 1 would result in a net increase of 100,620 annual boater use-days at project build out. This increase represents a 5% increase over existing boater use-days in the Delta. Sport fishing would occur primarily during February-November (Figure 3J-4), and most boating would occur during the warmer months (Table 3J-8). Although the DW project would not contribute to relieving demands for public access to Delta waterways, implementing Alternative 1 would facilitate greater boating and fishing use in the Delta. Therefore, this impact is considered beneficial.

Mitigation. No mitigation is required.

Impact J-4: Change in the Quality of the Recreational Boating Experience in Delta Channels. Implementation of Alternative 1 would increase boat use in Delta channels and alter existing boating conditions on waterways adjacent to the DW project islands. The State Division of Boating and Waterways requires that boats traveling within 200 yards upstream or downstream of boat docks maintain speeds of less than 5 mph. If DW recreation facilities were all constructed in waterways that do not have existing speed restrictions, the presence of the facilities would necessitate speed restrictions being established on more than 8 miles of Delta waterways. Because recreational uses such as waterskiing require

higher boat speeds, introducing boat speed restrictions in Delta waterways could reduce the availability of areas that support those uses. Also, the increase in the number of boaters in the project vicinity could detract from the quality of the recreation experience for some people (see Chapter 3L, "Traffic", for more information on waterway traffic and boater safety).

This impact is considered significant and unavoidable.

Mitigation. No mitigation is available to reduce this impact to a less-than-significant level. However, if the project description were modified to reduce the number of recreation facilities built on the DW project islands, this impact could be less than significant.

Impact J-5: Increase in Recreation Use-Days for Other Recreational Uses in the Delta. Implementation of Alternative 1 would increase participation in Delta recreational activities other than hunting, fishing, and boating. Because the DW project facilities would be private, they would not contribute to meeting public demands for facilities to support these activities. However, implementing Alternative 1 would support approximately 38,560 recreation use-days for other recreational activities in the Delta and would provide accommodations to support these activities. This figure represents an increase of less than 1% over the existing 5,136,000 recreation use-days for relaxing, sightseeing, camping, picnicking, photography, and bicycling in the Delta (Table 3J-1). This impact is considered beneficial.

Mitigation. No mitigation is required.

Changes in Visual Resources

Alternative 1 would introduce recreation facilities and ancillary boat docks, pump and siphon stations, levee improvement material, and wetland habitat into the viewsheds of the four project islands. The dominant visual character on the four islands would change from agricultural open space to open water or a combination of upland, riparian, and wetland vegetation. Implementation of the DW project would provide new opportunities for members of recreation facilities on the DW project islands to view habitat island interiors and other areas in the project vicinity. The impacts for each DW project island are described below.

Bacon Island

Implementation of Alternative 1 would result in the conversion of land in agricultural use on Bacon Island to water storage. Intake siphons and discharge pumps and recreation facilities would encroach on the existing visual features on the interior and exterior levee slopes and would be visible from Bacon Island Road. Perimeter levees around Bacon Island would be strengthened and improved. Vegetation would be removed from levee slopes and replaced with rock revetment. These changes would reduce the vividness and intactness of views of the levee slopes from the road.

The existing visual quality on Bacon Island is considered moderate, however, because the agricultural landscape is common to the region, and the visual sensitivity is considered moderate because access to the island interior is limited to a few viewers who use Bacon Island Road.

As described above under "Visual Resources in the Delta Region", Bacon Island Road is designated as a scenic route because of its recreational access and its visual relationship to the adjacent waterway (Figure 3J-2) (SJCCDD 1992). Bacon Island Road would be reconstructed on the improved levee on the east side of the island and one new intake siphon and up to four new recreation facilities would be constructed adjacent to the designated scenic roadway. Vegetation on the levee would be removed and replaced with rock revetment during levee improvement. Built elements introduced into the viewshed would encroach on the designated scenic corridor and would reduce the intactness and unity of views of Bacon Island from Bacon Island Road. The road would, however, continue to provide access to recreation areas and views of the adjacent waterway; therefore, implementation of Alternative 1 would not be expected to conflict with the scenic corridor designation.

Implementation of Alternative 1 would not likely change views from the road of Middle River, flooded Mildred Island, and Lower Jones Tract; furthermore, viewing opportunities may be slightly enhanced as a result of improvements being made to the Bacon Island Road levee.

Views of the island from adjacent waterways would be affected by improvements to perimeter levees, construction of the siphon and pump stations, and construction of boat docks for the proposed recreation facilities. During project construction, existing vegetation would be removed from the perimeter levees, the levees would be raised, and rock revetment would be placed along the exterior slopes. The levees would be kept clear of most

vegetation during project operation to facilitate levee inspections. These changes to the levees would be highly visible to boaters and anglers on adjacent waterways.

As described previously, two significant resource areas for recreation are designated along the Bacon Island eastern and northern perimeter levees (Figure 3J-2) (SJCCDD 1992). The DW project would change the character of the levee slopes from vegetated to unvegetated with the addition of rock revetment. The project would also introduce recreation facilities (e.g., boat docks and access ramps) along the exterior levee slopes in the designated resource areas. These resource areas are considered visually sensitive by San Joaquin County, as indicated in the county general plan. Implementing Alternative 1 would substantially reduce the vividness, intactness, and unity of views from the waterways adjacent to Bacon Island.

Many Amtrak passengers have a northward view from the south side of Bacon Island across the tops of the levees. As described above, implementing Alternative 1 would reduce the quality of views of the levee slopes by introducing recreation facilities and altering levee materials and design in the viewshed. A discharge pump station would also be constructed along the south side island levee. Views from the Santa Fe rail line would therefore be substantially altered under Alternative 1.

Webb Tract

Implementing Alternative 1 would change the land use of the island floor of Webb Tract from agriculture to open water or wetland vegetation. As described for Bacon Island, the island levee slopes would be modified and siphon and pump stations and recreation facilities would be constructed around the levee perimeters. Introduction of these elements would reduce the vividness and intactness of views of the island interior from perimeter levees, affecting the overall visual quality of the Webb Tract viewshed. However, access to the interior of Webb Tract is limited and few people view the island interior. Therefore, changes to the aesthetic conditions on Webb Tract would be relatively inconsequential.

Webb Tract is surrounded by waterways designated as scenic by Contra Costa County (Figure 3J-2). Strengthening and improving perimeter levees and constructing boat docks for recreation facilities would introduce built elements into this generally intact landscape. Vegetation would be removed and replaced with rock revetment. The siphon and pump stations would also be highly visible to boaters and anglers. These changes to the existing levees would not be easily absorbed into the natural land-

scape. The visual quality of views of Webb Tract from the designated scenic waterways surrounding the island would be substantially reduced.

Bouldin Island

Implementation of Alternative 1 would change the land use of island floor of Bouldin Island from agricultural production to wildlife habitat. The habitat elements would generally improve the vividness of views of the island from SR 12, the only access route on Bouldin Island. (See Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands", for detailed descriptions of habitats.)

Potato Slough, bordering the south side of Bouldin Island, is designated as a significant resource area for recreation by the county (Figure 3J-2) (SJCCDD 1992). Construction of boat docks associated with the proposed recreation facilities on the south side of the island would be visible from the slough. Introduction of these built elements into the viewshed from the waterway would reduce the intactness of those views. The island perimeter levees would otherwise be maintained in a manner similar to existing practices.

Holland Tract

Changes to visual resources on Holland Tract would be similar to those described for Bouldin Island. Views of the island interior from the county road would likely improve in vividness because the variety of landscapes on the island bottom would increase in areas managed for habitat. Although the island perimeter levees would not be substantially altered under Alternative 1, boat docks constructed for recreation facilities in designated scenic waterways on the north and east sides of Holland Tract would encroach on the existing views from the waterways (Figure 3J-2).

Summary of Project Impacts and Recommended Mitigation Measures

Impact J-6: Reduction in the Quality of Views of the Reservoir Island Interiors from Island Levees. Implementation of Alternative 1 would result in the conversion of the Bacon Island and Webb Tract interiors from agricultural use to open water or shallow-water wetland vegetation. Levee improvements would include replacing vegetation on interior levee slopes with rock revetment. DW project facilities along levees would include recreation facilities and intake siphons and

discharge pumps. These project features would reduce the vividness and intactness of interior island views from existing island roads. However, views of the island interiors are not highly sensitive because low numbers of viewers are present on the reservoir islands. Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact J-7: Potential Conflict with the Scenic Designation for Bacon Island Road. Implementation of Alternative 1 would include introduction of recreation facilities and a siphon station facility into the Bacon Island Road viewshed, which would change the views from the designated scenic corridor. Levee improvements would include removal of vegetation and placement of rock revetment on levee slopes. However, Bacon Island Road would continue to provide access to recreation areas and views of the adjacent waterway, and these criteria are the basis for the Bacon Island Road scenic designation. Levee improvements and the introduction of project facilities into the roadway scenic corridor would not affect the county designation. Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact J-8: Reduction in the Quality of Views of the Reservoir Islands from Adjacent Waterways and from the Santa Fe Railways Amtrak Line. Implementation of Alternative 1 would result in construction of recreation facilities and siphon and pump stations along Bacon Island and Webb Tract levees. Perimeter levees would be strengthened and improved and vegetation would be removed and replaced with rock revetment. These changes would substantially reduce the intactness and unity of highly sensitive views of these island levees from adjacent waterways, including waterways around Bacon Island and Webb Tract that are designated as scenic. Views from the Santa Fe rail line along the south side of Bacon Island would be similarly affected. Although facility design features described below under Mitigation Measures J-1 and J-2 would reduce the intensity of this impact, these features would not restore the quality of views of exterior island levees. Therefore, this impact is considered significant and unavoidable.

Implementing Mitigation Measures J-1 and J-2 would reduce Impact J-8, but not to a less-than-significant level.

Mitigation Measure J-1: Partially Screen Proposed Recreation Facilities and Pump and Siphon Stations from Important Viewing Areas. Concurrent with implementation of Alternative 1, DW shall, consis-

tent with flood control and levee or facility maintenance requirements, establish screening that could consist of native trees, shrubs, landscape berms, and ground covers between the project facilities and designated scenic waterways. Landscape berms near structures will provide partial screening and will better connect the buildings visually to the site and the area. Screening vegetation shall be planted in locations and at a density that would provide at least a 50% visual screen after 5 years.

Mitigation Measure J-2: Design Levee Improvements, Siphon and Pump Stations, and Recreation Facilities and Boat Docks to Be Consistent with the Surrounding Landscape. DW shall require that pump and siphon station structures and recreation facilities be painted in earth tones to blend with the surrounding landscape. Rock revetment material shall be selected to blend with the surrounding landscape and minimize glare. DW shall limit structure heights and emphasize horizontal features in its design. Boat docks and related structures shall be constructed of natural-appearing materials with subdued, earth-tone colors to blend in with the surrounding environment.

Impact J-9: Enhanced Views of Bouldin Island from SR 12. Implementation of Alternative 1 would involve management of Bouldin Island for wildlife habitat, which would enhance the vividness of views from SR 12. This impact is considered beneficial.

Mitigation. No mitigation is required.

Impact J-10: Reduction in the Quality of Views of the Habitat Islands from Adjacent Waterways. Implementation of Alternative 1 would not include removal of vegetation from exterior levee slopes on the habitat islands, and the changes in the visual quality would be considerably less severe than for the reservoir islands. Construction of boat docks and related structures associated with the proposed recreation facilities, however, would reduce the quality of views of island levees from designated scenic and significant waterways. Constructing the boat docks and related structures would reduce the unity and intactness of the highly sensitive views from adjacent channels by introducing a built element into a generally intact landscape. Therefore, this impact is considered significant.

Implementing Mitigation Measures J-1 and J-2 would reduce Impact J-10 to a less-than-significant level.

Mitigation Measure J-1: Partially Screen Proposed Recreation Facilities and Pump and Siphon Stations from Important Viewing Areas. This mitigation measure is described above.

Mitigation Measure J-2: Design Levee Improvements, Siphon and Pump Stations, and Recreation Facilities and Boat Docks to Be Consistent with the Surrounding Landscape. This mitigation measure is described above.

Impact J-11: Increase in Viewing Opportunities and the Quality of Views of Island Interiors and the DW Project Vicinity for Recreation Facility Members. Implementation of Alternative 1 would provide increased access to the DW project area. Recreation facilities on reservoir islands would provide opportunities for members to view open water and wetland areas at or near reservoir islands while they relax or enjoy recreation activities such as boating or fishing in the Delta.

A complex mosaic of wildlife habitats would be established within the interiors of the habitat islands, which would greatly enhance the vividness of views of the island interiors from the surrounding levees. (See Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands", for detailed descriptions of habitats.) Recreation facility members would benefit from these enhanced views.

This impact is considered beneficial.

Mitigation. No mitigation is required.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 2

Changes in Recreation Conditions

The recreation program under this alternative is the same as under Alternative 1. Hunter use-days under Alternative 2 for the habitat islands are the same as for Alternative 1, as shown in Table 3J-6. Hunter use-days under Alternative 2 for the shallow-water wetland condition and for water storage conditions on reservoir islands are shown in Tables 3J-12 and 3J-13, respectively. Implementation of Alternative 2 would result in a net increase of approximately 15,150 total annual hunting recreation use-days in the Delta (Tables 3J-2 and 3J-11). The slight variation in hunter use-days between this alternative and Alternative 1 is attributable to minor variations in the flooding regimes for the reservoir islands. Boater and other recreation use-days under Alternative 2 are the same as for Alternative 1, as shown in Tables 3J-9 and 3J-10. Impacts and mitigation measures under this alternative are the same as under Alternative 1.

Changes in Visual Resources

Impacts on visual resources and mitigation measures under this alternative are the same as under 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.

Changes in Recreation Conditions

Recreation Program for Alternative 3

Although the DW project islands would be used for water storage under this alternative, the NBHA north of SR 12 on Bouldin Island would be managed as a wildlife habitat area and would not be used for water storage. The NBHA encompasses 875 acres, most of which would be available for waterfowl and upland game hunting during the hunting seasons. (Appendix G2, "Prediction of Vegetation on the Delta Wetlands Reservoir Islands", includes proposed acres by habitat type for the NBHA.)

Under Alternative 3 the four islands could have a total maximum of 40 recreation facilities. (Figures 2-10 and 2-11 in Chapter 2 depict DW project facilities on Bouldin Island and Holland Tract for Alternative 3.) The recreation program for the DW project islands under Alternative 3, except for the NBHA, would be the same as that described for Bacon Island and Webb Tract under Alternative 1.

Hunting

Bacon Island, Webb Tract, Bouldin Island (south of SR 12), and Holland Tract may support approximately 9,700 annual recreation use-days for waterfowl hunting during any project year under Alternative 3 (Tables 3J-14 and 3J-15).

The NBHA (north of SR 12) would provide 808 acres of habitat for mourning dove hunting during September (Figure 3J-5, Table 3J-14). This acreage includes 325 acres of riparian woodland, annual grassland, and fallow levee slope habitats that are considered suitable for upland game but not for waterfowl.

During October-January, 550 acres of habitat would be available for waterfowl hunting (Table 3J-14); some of this acreage would also be available for pheasant and dove hunting. The 550 acres do not include the 325 acres of habitat that is suitable only for upland game because inclusion may result in double counting of hunters who would probably also hunt waterfowl.

Hunting would take place at the NBHA on Wednesdays, Saturdays, and Sundays during the hunting seasons at a density of one hunter per 30 acres (JSA 1993, DFG 1993, Forkel pers. comm.). The NBHA could support 909 maximum hunter use-days. If hunter attendance averaged 86% of capacity during the hunting seasons, the NBHA would support approximately 780 annual hunter use-days (Table 3J-14). Addition of these days to the 9,700 hunter use-days for reservoir islands results in approximately 10,480 annual recreation use-days for hunting generated during any project year under Alternative 3 (Table 3J-11).

Implementation of this alternative would require implementation of an offsite mitigation plan (Chapter 3G, "Vegetation and Wetlands"). If a hunting program is implemented at any offsite areas, the number of hunter use-days could be greater than the number predicted for Alternative 3.

Fishing and Boating

Implementation of Alternative 3 would increase recreation use-days related to fishing and boating in the Delta. As described previously under "Recreation Program for Alternative 3", a total of 40 recreation facilities could be constructed at the DW project islands over the life of the project. The boating facilities at these recreation facilities would be the same as those described under Alternative 1.

Delta boating use attributable to the DW project would originate from the recreation facility boat docks. Assuming 70% occupancy of the boat slips, implementing Alternative 3 would provide permanent boat docking in Delta waterways for 840 boats. Table 3J-8 shows the average weekend and weekday boat use by season estimated for Alternative 3. Based on an estimate of three boaters per boat, it is estimated that an annual increase of approximately 105,820 boater recreation use-days would be generated by Alternative 1 (Table 3J-9). This represents a 5% increase over the 2,016,000 existing boater recreation use-days in the Delta (Table 3J-2).

Other Recreational Uses

Implementation of Alternative 3 would likely increase recreationists' participation in recreational uses other than hunting, fishing, and boating. The proposed recreation facilities would accommodate these recreationists as described under Alternative 1. Estimated recreation use-days for these other uses generated by the DW project are shown in Table 3J-10. Implementation of Alternative 3 would generate approximately 40,590 recreation use-days related to these other uses.

Summary of Project Impacts and Recommended Mitigation Measures

Impact J-12: Increase in Recreation Use-Days for Hunting in the Delta. Implementation of Alternative 3 would result in the creation of 13,662 acres of shallow-water wetland habitat on the four DW project islands in some operating years (Table 3J-14) (JSA 1993). This habitat would provide low- to medium-quality waterfowl foraging habitat, the quality depending on forage availability. A total of 550 acres of high-quality wintering waterfowl foraging habitat in the NBHA would be available for hunting. A total of 20,280 acres on the four DW project islands would be used for water storage in some years (Table 3J-15); waterfowl would rest on the open water and possibly forage in shallow areas around the storage pool edges.

The DW project islands could support approximately 10,480 annual recreation use-days in the Delta for waterfowl and upland game hunting (Table 3J-11). This figure represents a net increase of approximately 9,440 hunter use-days over existing conditions on the DW project islands (Tables 3J-2 and 3J-11).

The net increase of 9,440 hunter use-days generated by Alternative 3 represents a 13% increase over the 72,000 existing hunting recreation use-days in the Delta (Table 3J-2).

This impact is considered beneficial.

Mitigation. No mitigation is required.

Impact J-13: Increase in Recreation Use-Days for Boating in the Delta. Implementation of Alternative 3 would result in a net increase of 105,816 annual

boater use-days at project build out. This increase represents a 5% increase over existing boating use-days in the Delta.

This impact is considered beneficial.

Mitigation. No mitigation is required.

Impact J-14: Change in the Quality of the Recreational Boating Experience in Delta Channels. Implementation of Alternative 3 would increase boat use in Delta channels and alter existing boating conditions on waterways adjacent to the DW project islands. This impact is described above under Impact J-4. This impact is considered significant and unavoidable.

Mitigation. No mitigation is available to reduce this impact to a less-than-significant level. However, if the project description were modified to reduce the number of recreation facilities built on the DW project islands, this impact could be less than significant.

Impact J-15: Increase in Recreation Use-Days for Other Recreational Uses in the Delta. Implementation of Alternative 3 would increase participation in other recreational activities in the Delta. Implementing Alternative 3 would support approximately 40,590 recreation use-days for other recreational activities in the Delta and would provide accommodations to support these activities. This impact is considered beneficial.

Mitigation. No mitigation is required.

Changes in Visual Resources

Bacon Island and Webb Tract

Impacts on visual resources of Bacon Island and Webb Tract and mitigation measures under this alternative are the same as under Alternative 1.

Bouldin Island

Under Alternative 3, the southern viewshed from SR 12 as it crosses Bouldin Island would be substantially altered by construction of a new levee parallel to the south side of the highway. The proposed levee would be approximately 10-12 feet higher than the roadway and would greatly restrict southern views from the highway in much the same way a soundwall does along highways in urban settings. Woody trees or shrubs would not be permitted to grow on the levee; DSOD levee safety standards

require that the levee slopes be maintained in herbaceous vegetation to allow levee inspections to be conducted. A viewer traveling along SR 12 with a viewing height of 5 feet or more above the roadway would be able to see the top several hundred feet of Mt. Diablo, approximately 25 miles southwest of Bouldin Island.

The existing visual quality on Bouldin Island is considered moderate, however, because the visual resources are somewhat intact but the agricultural landscape is common to the region. The visual sensitivity is considered moderate because the views for recreationists along this section of SR 12 are brief in duration.

North of SR 12, agricultural open space would be replaced by a mosaic of woody riparian vegetation and freshwater marsh as wildlife habitat. This riparian vegetation would partially enclose the northern views from the highway but would add variation to the visual sequence observed by viewers traveling along the highway.

The Bouldin Island perimeter levees south of SR 12 would be strengthened and improved as described previously for Bacon Island and Webb Tract under Alternative 1. Intake siphons and discharge pumps would be constructed on the levees that would be visible from adjacent waterways. Recreation facilities would also be constructed along the levees. These changes would degrade existing views by introducing built elements and removing vegetation from a generally intact landscape.

As described previously, access to views of the interior of Bouldin Island is limited to SR 12 across the island. Under Alternative 3, members of private recreation facilities on Bouldin Island would have new opportunities to view areas of open water and wetlands within the island interior and in the Delta in the vicinity of the project islands. Although the quality of views of open water and wetland habitat would generally be comparable to existing views of agricultural open space, the increased accessibility of the island for recreation and relaxation is considered a beneficial aspect of Alternative 3.

San Joaquin County has designated Potato Slough along the southern perimeter of the island as a significant resource area for recreation (Figure 3J-2) (SJCCDD 1992). The Bouldin Island northeastern perimeter levee is also visible from a marina on Terminous Tract. Views of Bouldin Island from these recreation areas and waterways are considered highly sensitive. Implementing Alternative 3 would substantially reduce the vividness, intactness, and unity of views from designated waterways adjacent to Bouldin Island.

Holland Tract

Visual impacts of Alternative 3 on Holland Tract are similar to those described for Bacon Island and Webb Tract under Alternative 1. Views of the island floor from levee roads would change as land use changes from agriculture to open water or wetland vegetation, levee slopes are modified, and siphon and pump stations are constructed. Access to the interior of Holland Tract is limited to a levee road along the south edge of the island and views of the island interior from the road are moderate. As described for Bouldin Island, private recreation facilities on Holland Tract would provide new opportunities for members of facilities to view open water and wetland areas within the island interior and in the Delta in the vicinity of the project islands.

Waterways north and east of Holland Tract are designated as scenic by Contra Costa County (Figure 3J-2) (CCCCDD 1991). As described above for Bouldin Island, improvement of the perimeter levees and construction of boat docks for recreation facilities would alter views of Holland Tract from adjacent waterways. The siphon and pump stations would be highly visible to boaters and anglers. These changes to the existing levees would not be easily absorbed into the natural landscape and would substantially reduce the visual quality of sensitive views of Holland Tract from surrounding designated scenic waterways.

Summary of Project Impacts and Recommended Mitigation Measures

Impact J-16: Reduction in the Quality of Views of Bacon Island and Webb Tract Interiors from Island Levees. This impact is described above under Impact J-6. This impact is considered less than significant.

Mitigation. No mitigation is required.

Impact J-17: Potential Conflict with the Scenic Designation for Bacon Island Road. This impact is described above under Impact J-7. This impact is considered less than significant.

Mitigation. No mitigation is required.

Impact J-18: Reduction in the Quality of Views of Bacon Island and Webb Tract from Adjacent Waterways and from the Santa Fe Railways Amtrak Line. This impact is described above under Impact J-8. This impact is considered significant and unavoidable.

Implementing Mitigation Measures J-1 and J-2 would reduce Impact J-18, but not to a less-than-significant level.

Mitigation Measure J-1: Partially Screen Proposed Recreation Facilities and Pump and Siphon Stations from Important Viewing Areas. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Mitigation Measure J-2: Design Levee Improvements, Siphon and Pump Stations, and Recreation Facilities and Boat Docks to Be Consistent with the Surrounding Landscape. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Impact J-19: Change in Views Southward from SR 12. Implementation of Alternative 3 would substantially alter the viewshed south from SR 12 as it crosses Bouldin Island as a result of construction of a new levee parallel to the highway. The views along this section of SR 12 are common to the region and the visual quality and the view sensitivity are considered moderate.

As described previously, Caltrans determined that the visual resources along the Bouldin Island section of SR 12 did not render it eligible for State Scenic Highway designation (Caltrans 1992, Hatfield pers. comm.). Neither has San Joaquin County designated this portion of SR 12 as scenic.

Furthermore, enhancement of habitat north of SR 12 would increase the vividness of views north of the highway.

Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact J-20: Reduction in the Quality of Views of Holland Tract from the Island Levee. Implementation of Alternative 3 would result in the conversion of land use of the island floor from agriculture to open water or wetland vegetation. Perimeter levees would be improved and composition of interior slope materials would change as a result of removal of vegetation and placement of rock revetment.

Project facilities would include recreation facilities and intake siphons and discharge pumps, which would combine to reduce the vividness and intactness of interior island views from Holland Tract Road. Because the agricultural nature of Holland Tract is common to the region,

the visual quality is considered moderate. The visual sensitivity is moderate because of limited access along the south side of the island. Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact J-21: Reduction in the Quality of Views of Bouldin Island and Holland Tract from Adjacent Waterways. Implementation of Alternative 3 would include construction of recreation facilities and siphon and pump stations along Bouldin Island and Holland Tract levees. Vegetation on levee slopes would be replaced with rock revetment. These changes would substantially reduce the high quality of views from adjacent waterways and other recreation areas that are designated as scenic and sensitive by San Joaquin and Contra Costa Counties. Although facility design features are available to reduce the intensity of this impact, these features would not restore the quality of views of exterior island levees. Therefore, this impact is considered significant and unavoidable.

Implementing Mitigation Measures J-1 and J-2 would reduce Impact J-21, but not to a less-than-significant level.

Mitigation Measure J-1: Partially Screen Proposed Recreation Facilities and Pump and Siphon Stations from Important Viewing Areas. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Mitigation Measure J-2: Design Levee Improvements, Siphon and Pump Stations, and Recreation Facilities and Boat Docks to Be Consistent with the Surrounding Landscape. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Impact J-22: Increase in Opportunities for Recreation Facility Members to View Reservoir Island Interiors and Other Areas in the DW Project Vicinity. Implementation of Alternative 3 would provide increased access to the DW project area. Recreation facilities on the project islands would provide opportunities for members to view open water and wetland areas at or near the islands while they relax or enjoy recreation activities such as boating or fishing in the Delta. Members of recreation facilities located in the NBHA would benefit from the increased variation of habitat types created in this area. This impact is considered beneficial.

Mitigation. No mitigation is required.

IMPACTS AND MITIGATION MEASURES OF THE NO-PROJECT ALTERNATIVE

The No-Project Alternative would result in the conversion of nonagricultural lands to agricultural uses and changes in the types of crops farmed on the DW project islands. Impacts on vegetation under this alternative are described in Appendix G2, "Prediction of Vegetation on the Delta Wetlands Reservoir Islands". The cropping scenario for this alternative is summarized in Table 3I-10 in Chapter 3I, "Land Use and Agriculture".

The agriculture production projections for this alternative may be valid only for the short term. Over the long term, intensively cultivated agriculture could cease on the project islands because of continued island subsidence and increased threats to Delta water quality (DWR 1990b). Under the No-Project Alternative, the DW island interiors could subside an additional 6-10 feet over the next 40 years (HLA 1989). (See Chapter 3D, "Flood Control", for more details on subsidence and levee stability.)

Changes in Recreation Conditions

Hunting

Under the No-Project Alternative, an intensive for-fee hunting program would be operated on the DW project islands. Acres of habitat referenced in this section are summarized in Table G2-10 in Appendix G2.

A total of 20,526 acres of habitat would be available for mourning dove hunting during September on the DW project islands (Table 3J-16, Figure 3J-5). This acreage includes 112 acres of riparian woodland that is considered suitable for upland game but not for waterfowl. During October-January, 20,878 acres of habitat would be available for waterfowl hunting; some of this acreage would also provide suitable upland game habitat. The 112 acres of riparian woodland are excluded from the 20,878 acres to avoid double counting of hunters who would probably also hunt waterfowl.

Upland game or waterfowl could be hunted on Wednesdays, Saturdays, and Sundays during the hunting seasons at a density of one hunter per 45 acres (DFG 1993; Forkel and Winther pers. comms.). The DW project islands could support 21,745 annual maximum hunter use-days (Table 3J-16). Attendance is expected to average 60% of capacity during the hunting seasons (Forkel and Winther pers. comms.). The DW project islands

could support approximately 13,050 annual recreation use-days for hunting of upland game and waterfowl (Tables 3J-11 and 3J-16).

Waterfowl would continue to forage in agricultural fields on the DW project islands; the No-Project Alternative would not, however, include enhancement or management of habitat areas specifically to benefit wintering waterfowl. Therefore, the No-Project Alternative is not expected to result in any discernible or actual redistribution of regional waterfowl populations to the DW project islands, and hunter success elsewhere in the Delta would not be affected.

Fishing and Boating

Fishing and boating access and use under this alternative are the same as described above under "Existing Recreational Uses on the DW Project Islands".

Under the No-Project Alternative, no new boat docks or other recreation facilities would be constructed. Therefore, no new boat use would be generated from the DW project islands. Fishing and boating access and use would not substantially change under the No-Project Alternative.

Summary of Project Impacts and Recommended Mitigation Measures

Increase in Recreation Use-Days for Hunting in the Delta. Implementation of the No-Project Alternative would result in the conversion of nonagricultural lands to agricultural uses on the DW project islands. DW would secondarily manage the islands for hunting. The DW project islands could temporarily support approximately 13,050 annual recreation use-days in the Delta for hunting of waterfowl and upland game (Tables 3J-11 and 3J-16). This level of hunting could be sustained until subsidence of island interiors required removal of land from agricultural production sometime during the next several decades.

The approximate 12,000 additional recreation use-days generated under the No-Project Alternative represent a 17% increase over the 72,000 existing hunting recreation use-days in the Delta during the period when this level of hunting could be sustained (Table 3J-2).

Changes in Visual Resources

Implementation of the No-Project Alternative would generally result in the continuation of existing land uses; agricultural intensity on the islands would increase as areas that are currently fallow are converted to agricultural use. Views of the islands (interior and exterior) would not substantially change under the No-Project Alternative. Increasing agricultural use on Holland and Webb Tracts could reduce the vividness of interior island views, but because of the low number of viewers on Holland and Webb Tracts, these changes are considered inconsequential.

CUMULATIVE IMPACTS

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 impacts that may contribute cumulatively to impacts on recreation and visual resources in the vicinity of the DW project islands.

Cumulative Impacts, Including Impacts of Alternative 1

Changes in Recreation Conditions

Agricultural Land Conversion Projects and DWR Programs. Agricultural lands are being acquired in the Delta by various government agencies and other groups for conversion to nonagricultural uses (Table 3J-17). Most of these projects involve management of wetland habitat. These projects are being planned independent of one another and are at different stages in the environmental review process. (Delta Protection Commission 1994.) Implementation of these wetland enhancement projects concurrent with the DW project would reduce the amount of waste grain available for waterfowl forage. Projects that convert agricultural land, however, would be expected to maintain or augment wetland habitat for waterfowl in the Delta, including areas for forage. (See Chapter 3H, "Wildlife", for further details.)

It is unknown what recreation opportunities would be created by the cumulative implementation of agricultural land conversion projects. It can be assumed that the government agencies purchasing land in the Delta would promote project objectives that involve man-

agement of public land for recreation. Acquisition of Sherman Island as part of the DWR West Delta Water Management Program would include among its objectives provisions for additional recreation opportunities (DWR and Reclamation 1990). DFG may implement a hunting program on Twitchell Island (Chapin pers. comm.). Implementation of agency projects that involve conversion of agricultural land would probably result in an overall enhancement of recreation opportunities for activities such as birdwatching, nature study, relaxing, and hiking. Opportunities for fishing and boating would likely be enhanced if new boat launch areas are provided.

Other recreation development projects in the Delta are approved for construction. Tower Park Marina near SR 12 between Bouldin Island and Terminous Tract has planned 1,000 new recreational vehicle campsites to be built over 10 years. A new marina has been planned at Walnut Grove. (Delta Protection Commission 1994.)

DWR is preparing an interim north Delta water management program that will address a variety of project alternatives that would increase Delta channel capacity to improve flows, thereby reducing flooding. The water management program will include among its objectives plans to reduce fishery impacts, enhance recreation opportunities, and enhance wildlife habitat. The DWR interim program will be a revision of its North Delta Program published over 3 years ago. (Roberts pers. comm.)

DWR is also preparing the EIR/EIS for the South Delta Water Management Program, which will include among its objectives plans to improve water flows, increase recreation opportunities, and reduce fishery impacts. This document will be a revision of the South Delta Water Management Program prepared 4 years ago (DWR and Reclamation 1990). A draft document may be completed by midyear 1995. (Roberts pers. comm.)

Changes in Waterfowl Use Patterns and Waterfowl Populations in the Delta. As described previously under "Impacts and Mitigation Measures of Alternative 1", Alternative 1 would be expected to result in some redistribution of regional waterfowl populations in the Delta to the DW habitat islands, which could result in localized decreases in hunter success. However, the hunting program on the DW project islands would encourage dispersal of waterfowl to other areas in the Delta on hunt days at the DW project islands. Additionally, the staggered schedule for flooding agricultural fields and seasonal wetland habitat on the DW habitat islands in winter would reduce habitat availability in some periods. (See Chapter 3H, "Wildlife", for further details.)

Other projects in the Delta that convert agricultural land to wetland habitat could provide improved habitat conditions for waterfowl. It is unknown whether increased breeding habitat would be created outside the DW project islands. As described in Chapter 3H (and Table 3J-17), some Delta projects would augment or replace waterfowl forage areas, thereby attracting waterfowl to areas outside the DW project islands. Hunter success would likely be maintained and could improve throughout the Delta.

Changes in Reservoir Island Storage Conditions. DWR recently installed four additional pumping units at SWP's Banks Pumping Plant near Clifton Court Forebay, increasing total SWP pumping capacity from 6,400 cfs to 10,300 cfs. If SWP export pumping is increased to full capacity in future years, the frequency with which each storage class would occur on the DW project islands would change. In most months the frequency with which full-, partial-, and shallow-storage conditions would occur would be reduced and the occurrence of nonstorage conditions and the opportunity to create shallow-water wetland conditions would be increased. Tables in Chapter 3N, "Mosquitos and Public Health", and Appendix G2, "Prediction of Vegetation on the Delta Wetlands Reservoir Islands", show the frequency with which each storage class would occur based on the 70-year hydrologic record for the Delta.

The potential increase in SWP export pumping would have a minor effect on estimated annual hunter use-days shown in Table 3J-11 for Alternatives 1, 2, and 3. Hunter use-days would increase by 1.22% for Alternative 1, would decrease by 0.18% for Alternative 2, and would increase by 1.78% for Alternative 3. These magnitudes of change would be negligible and would not affect the impact analyses in this chapter.

Offsite Reservoir Management Effects. Water stored in the Delta under the DW project may be purchased by the SWP or CVP and used to substitute for water otherwise to be released from upstream reservoirs such as Folsom, Oroville, or Shasta Lakes, or from San Luis Reservoir, south of the Delta. It is possible that use of DW water by the SWP or CVP could result in different reservoir storage patterns at these or other reservoirs and higher reservoir pool elevations during the recreation season. Higher pool elevations could support higher recreational use levels or improved recreational experiences at these reservoirs. Because of the uncertainty about the identity of water purchasers and their use of DW water, it is not possible at this time to predict which upstream reservoir might be affected or the extent of effects. Furthermore, instream flow requirements would

likely result in protection of river-based recreation downstream of these reservoirs.

Impact J-23: Increase in Recreation Opportunities in the Delta. Implementation of Alternative 1 concurrent with other agricultural conversion projects and the DWR water management programs may result in an increase in recreation opportunities throughout the Delta. Although the schedule of the North Delta Water Management Program EIR/EIS is unknown and the alternatives have yet to be determined, the document would include objectives to enhance Delta recreation as an ancillary effect.

Implementation of agricultural conversion projects by state and federal agencies would be expected to include provisions for public access and new opportunities for recreation in the Delta. Implementation of Alternative 1 would provide waterfowl habitat of varying quality and new recreation facilities for use by hunters, anglers, boaters, and other recreationists.

The proposed DWR water management programs would include channel and levee improvements that may improve access for boaters and anglers. Implementation of these water management programs may also improve fishery conditions and support increased fishing in the Delta.

This impact is considered beneficial.

Mitigation. No mitigation is required.

Impact J-24: Enhancement of Waterfowl Populations and Increased Hunter Success in the Delta. Implementation of Alternative 1 concurrent with other proposed agricultural conversion projects throughout the Delta would be expected to reduce available waste grain for waterfowl foraging habitat. Projects that result in the conversion of agricultural land used by waterfowl for foraging would be required to compensate for the loss of wintering waterfowl foraging habitat. Twitchell and Sherman Islands, for examples, will be managed as habitat islands to compensate for DWR projects that remove agricultural land from production. (See Chapter 3H, "Wildlife", for further details.) The overall effect of proposed projects in the Delta, including the DW project, would be beneficial for waterfowl foraging habitat. This analysis assumes that adverse impacts of agricultural conversion projects would be mitigated or otherwise offset through implementation of other beneficial projects. Because Delta projects are expected to enhance or maintain habitat values overall, waterfowl would be expected to continue to use the Delta. Hunter success, therefore,

may increase throughout the Delta. This impact is considered beneficial.

Mitigation. No mitigation is required.

Changes in Visual Resources

The visual character of the Delta is changing as conversion of farmland to wetland habitat or urban uses increases throughout the Delta region. Implementation of Alternative 1 would involve changing the visual character of the DW project islands as a result of the land use conversion to wetland habitat. However, the visual changes to Delta islands, including the DW project islands, would not result in substantial changes to existing regional visual quality, and these changes could increase the vividness of views in the Delta by providing landscapes more varied than those of existing agriculture lands. Alternative 1 would therefore not contribute to cumulative impacts on visual resources in the Delta.

Cumulative Impacts, Including Impacts of Alternative 2

The cumulative impacts associated with this alternative would be the same as those described for Alternative 1.

Cumulative Impacts, Including Impacts of Alternative 3

The cumulative impacts associated with this alternative would be the same as those described for Alternative 1.

Cumulative Impacts, Including Impacts of the No-Project Alternative

Similar to cumulative impacts of Alternative 1, implementation of the No-Project Alternative would contribute to increased recreation opportunities and an increase in potential waterfowl foraging habitat in the Delta and would not contribute to any cumulative visual impacts. The contribution of the No-Project Alternative to recreation opportunities in the Delta, however, would be less than that described for Alternative 1.

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Table 3J-1. Annual Participation in Delta Recreational Activities

Activity	Percent Participation by Visitation	Total Participation by Visitation
Boating	16.9	2,016,000
Fishing	15.1	1,800,000
Relaxing	12.1	1,440,000
Driving for pleasure	12.0	1,440,000
Sightseeing	11.0	1,320,000
Overnight camping	8.0	960,000
Picnicking	7.0	840,000
Swimming	7.0	840,000
Waterskiing	5.0	600,000
Photography	3.0	360,000
Bicycling	1.0	120,000
Dirt biking	0.8	96,000
Hunting	0.6	72,000
Flying	<u>0.3</u>	<u>36,000</u>
Total	100.0	11,940,000

Note: Boating includes motorboating, sailing, canoeing, kayaking, and rowing. Motorboating separately accounts for approximately 15% of total visitation.

Source: DWR 1990a.

Table 3J-2. Annual Estimated Number of Recreation Use-Days
on the DW Project Islands and in the Delta

	Hunting	Fishing ^f	Boating ^f	Total
DW Project Islands				
Bacon Island ^a	100	3,120	0	3,220
Webb Tract ^b	640	90	0	730
Bouldin Island ^c	210	360	0	570
Holland Tract ^d	<u>95</u>	<u>10,300</u>	<u>56,225</u>	<u>66,620</u>
Total	1,045	13,870	56,225	71,140
Delta Region^e	72,000	1,800,000	2,016,000	3,888,000

^a Shimasaki pers. comm.

^b Dinelli pers. comm.

^c Wilkerson pers. comm.

^d Frelier, Lindquist, and Cochrell pers. comms.

^e DWR 1990a.

^f The fishing and boating recreation use-days on Holland Tract consist of recreation originating from existing marinas. These facilities would not be included in the project boundaries and would not be directly affected by the project.

Table 3J-3. Estimated Maximum Number of Hunter Use-Days for the Shallow-Water Wetland Condition on the Reservoir Islands under Alternative 1

	Acres of Shallow-Water Wetlands ^a	Hunter Density (acres per hunter) ^b	Maximum Number of Hunters	Maximum Allowable Hunting Days ^c	Average Percent Frequency of Shallow-Water Wetland Condition ^d	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^e	Estimated Annual Hunter Use-Days ^f
Bacon Island								
October	3,694	30	123	9	47	521		
November	3,694	30	123	30	49	1,810		
December	3,694	30	123	31	36	1,374		
January	3,694	30	123	16	21	<u>414</u>		
Subtotal						4,119	30	1,236
Webb Tract								
October	3,836	30	128	9	57	656		
November	3,836	30	128	30	52	1,995		
December	3,836	30	128	31	39	1,546		
January	3,836	30	128	16	26	<u>532</u>		
Subtotal						4,729	30	<u>1,419</u>
Total								2,655

^a JSA 1993 (also see Chapter 3N, "Mosquitos and Public Health", for a description of the shallow-water wetland condition on reservoir islands).

^b JSA 1993, Forkel pers. comm.

^c DFG 1993 (Figure 3J-4).

^d Values based on averages of maximum and minimum acreages of available shallow-water wetlands during project years. Methods used to derive percentages are described in Chapter 3N, "Mosquitos and Public Health", and Appendix G2, "Prediction of Vegetation on the Delta Wetlands Reservoir Islands".

^e Estimate of 30% based on possible marginal quality of waterfowl foraging habitat that would attract low numbers of waterfowl; consequently, hunter attendance would be significantly lower than on habitat islands.

^f Annual hunter use-days would increase gradually during a 5- to 15-year buildout period. The values presented here represent the estimated number of days at culmination of the buildout. (Forkel pers. comm.)

Table 3J-4. Estimated Maximum Number of Hunter Use-Days for Full-, Partial-, and Shallow-Storage Conditions on the Reservoir Islands under Alternative 1

	Total Island Acreage	Hunter Density (acres per hunter) ^a	Maximum Number of Hunters	Maximum Allowable Hunting Days ^b	Average Percent Frequency of Full-, Partial-, and Shallow- Storage Conditions ^c	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^d	Estimated Annual Hunter Use-Days ^e
Bacon Island								
October	5,539	30	185	9	32	532		
November	5,539	30	185	30	49	2,714		
December	5,539	30	185	31	63	3,606		
January	5,539	30	185	16	74	<u>2,186</u>		
Subtotal						9,038	15	1,356
Webb Tract								
October	5,470	30	182	9	30	492		
November	5,470	30	182	30	47	2,571		
December	5,470	30	182	31	56	3,165		
January	5,470	30	182	16	71	<u>2,071</u>		
Subtotal						8,299	15	<u>1,245</u>
Total								2,601

^a JSA 1993, Forkel pers. comm.

^b DFG 1993 (Figure 3J-4).

^c Values based on averages of maximum and minimum acreages of available shallow-water wetlands during project years. Methods used to derive percentages are described in Chapter 3N and Appendix G2.

^d Participation in hunting is predicted to be half of that estimated for reservoir islands during shallow-water wetland periods.

^e Annual hunter use-days would increase gradually during a 5- to 15-year buildout period. The values presented here represent the estimated number of days at culmination of the buildout. (Forkel pers. comm.)

Table 3J-5. Hunter Participation as a Percentage of Capacity at Clifton Court Forebay Waterfowl Public Shoot Area for Some Years

	Average Percentage				
	October	November	December	January	October-January
1975-1976	17	22	36	36	28
1978-1979	30	23	36	41	33
1980-1981	30	19	33	34	29
1981-1982	24	17	13	14	17
All years	25	20	30	31	27

Notes: Prior to the 1982-1983 hunting season, hunters would enter and exit the Clifton Court Forebay Public Shoot Area through a check station operated by a DFG employee; use of this check station system ensured accurate reporting of hunter use data. A self-registration system was implemented at Clifton Court Forebay at the beginning of the 1982-1983 hunting season. Implementation of the self-registration system coincided with a sharp reduction in hunter use data that endured during subsequent hunting seasons. The significant drop in hunter use data is assumed to be attributable to hunters failing to register and fill out day-use permits (Gifford pers. comm.). The recreation analysis relies on the accuracy of hunter use data for Clifton Court Forebay collected prior to the 1982-1983 season.

The drop in hunter attendance during the 1981-1982 hunting season corresponds with the beginning of a 12-year drought across the Canadian prairies, which provide breeding habitat for migrating waterfowl during the summer. The drought noticeably affected the size of waterfowl populations, which in turn affected hunter success and attendance during the drought years. The drought abated before the 1993-1994 hunting season and waterfowl populations have been recovering. Hunter participation has increased throughout California during the past 2 years in response to increasing numbers of waterfowl. (Becker pers. comm.)

Source: Gifford pers. comm.

Table 3J-6. Estimated Maximum Number of Hunter Use-Days on the Habitat Islands under Alternative 1

	Spaced-Blind Acres ^a	Spaced-Blind Hunter Density (acres per hunter) ^b	Free-Roam Acres ^a	Free-Roam Hunter Density (acres per hunter) ^b	Maximum Number of Hunters	Maximum Allowable Hunting Days ^c	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^d	Estimated Annual Hunter Use-Days ^e
Bouldin Island									
September	0	0	2,435	60	41	7	287		
October	2,122	12.5	2,331	60	209	5	1,043		
November	2,122	12.5	2,331	60	209	13	2,712		
December	2,122	12.5	2,331	60	209	14	2,921		
January	2,122	12.5	2,331	60	209	8	<u>1,669</u>		
Subtotal							8,632	86	7,424
Holland Tract									
September	0	0	1,308	60	22	7	153		
October	933	12.5	1,308	60	96	5	482		
November	933	12.5	1,308	60	96	13	1,254		
December	933	12.5	1,308	60	96	14	1,350		
January	933	12.5	1,308	60	96	8	<u>772</u>		
Subtotal							4,011	86	<u>3,449</u>
Total									10,873

^a See Table 20 in Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands", for detailed summary of hunting zone acreage by habitat type.

^b From Tables 19 and 21 in Appendix G3.

^c DFG 1993 (Figure 3J-4), also from Table 19 in Appendix G3.

^d Estimate of 86% from Table 3J-7.

^e Annual hunter use-days would increase gradually during a 5- to 15-year buildout period. The values presented here represent the estimated number of days at culmination of the buildout. (Forkel pers. comm.)

Table 3J-7. Hunter Participation as a Percentage of Capacity
at Selected Wildlife Refuges during 1993-1994

	Average Percentage				
	October	November	December	January	October- January
Grizzly Island Wildlife Area ^a	66	47	74	64	63
Sacramento National Wildlife Refuge ^b	109	56	74	106	86
Gray Lodge Wildlife Area ^b	96	18	72	106	73
Delevan National Wildlife Refuge ^b	127	79	94	130	108
Colusa National Wildlife Refuge ^b	115	47	105	136	101
All refuges	103	49	84	108	86

^a Becker pers. comm.

^b Rollins pers. comm.

Table 3J-8. Average Daily Boat Use by Season Estimated for Alternatives 1 and 3
(Boats Used per Day)

	Hunting Season (Nov-Jan)		Winter/Spring (Feb-May)		Summer (Jun-Aug)		Fall (Sep-Oct)	
	Alt. 1	Alt.3	Alt. 1	Alt. 3	Alt. 1	Alt. 3	Alt. 1	Alt. 3
Average Weekend Use								
Bacon Island	12	12	23	23	92	92	58	58
Webb Tract	12	12	23	23	92	92	58	58
Bouldin Island	11	11	21	21	84	84	53	53
Holland Tract	<u>7</u>	<u>8</u>	<u>13</u>	<u>17</u>	<u>51</u>	<u>67</u>	<u>32</u>	<u>42</u>
Total	42	43	80	84	319	335	201	211
Average Weekday Use								
Bacon Island	7	7	12	12	46	46	23	23
Webb Tract	7	7	12	12	46	46	23	23
Bouldin Island	6	6	11	11	42	42	21	21
Holland Tract	<u>4</u>	<u>5</u>	<u>7</u>	<u>8</u>	<u>25</u>	<u>34</u>	<u>13</u>	<u>17</u>
Total	24	25	42	43	159	168	80	84

Notes: Average use estimates are based on conversation with DW, commercial marina operators, and personnel of the State Division of Boating and Waterways.

The figures are for recreational boats used for at least 4 hours in a day.

Table 3J-9. Summary of Estimated Annual Boater Use-Days Generated from the DW Project Islands under Alternatives 1, 2, and 3 and the No-Project Alternative

	Bacon Island	Webb Tract	Bouldin Island	Holland Tract*	Total
Alternative 1	29,178	29,178	26,580	72,155	157,091
Alternative 2	29,178	29,178	26,580	72,155	157,091
Alternative 3	29,178	29,178	26,580	77,351	162,287
No-Project Alternative	0	0	0	56,225	56,225

* Figures for Holland Tract under Alternatives 1, 2, and 3 include the 56,225 existing boating use-days generated by the Holland Tract Marina. This facility would not be affected by implementation of the DW project.

Table 3J-10. Summary of Estimated Annual Use-Days for Other Recreation on the DW Project Islands under Alternatives 1, 2, and 3

	Bacon Island	Webb Tract	Bouldin Island	Holland Tract	Total
Alternative 1	11,137	11,137	10,157	6,098	38,530
Alternative 2	11,137	11,137	10,157	6,098	38,531
Alternative 3	11,137	11,137	10,157	8,118	40,552

Notes: "Other recreation use" refers to recreation activities, other than hunting, fishing, and boating, conducted at the DW project islands. Such activities could include, but are not limited to, birdwatching, photography, skeet and trap shooting, relaxing, walking, nature study, windsurfing, swimming, and canoeing.

No data were available for other recreation uses on the DW project islands under existing conditions or the No-Project Alternative.

Table 3J-11. Summary of Estimated Total Number of Hunter Use-Days on the DW Project Islands under Alternatives 1, 2, and 3 and the No-Project Alternative

	Shallow-Water Wetland Condition ^a	Full-, Partial- and Shallow- Storage Condition ^b	Total Estimated Annual Hunter Use-Days ^c
Alternative 1			
Bacon Island	1,236	1,356	2,592
Webb Tract	1,419	1,245	2,664
Bouldin Island			7,424
Holland Tract			3,449
Total			16,129
Alternative 2			
Bacon Island	1,270	1,356	2,626
Webb Tract	1,446	1,247	2,693
Bouldin Island			7,424
Holland Tract			3,449
Total			16,192
Alternative 3			
Bacon Island	1,257	1,367	2,624
Webb Tract	1,429	1,268	2,697
Bouldin Island (south of SR 12)	1,282	1,096	2,378
Bouldin Island (NBHA)			782
Holland Tract	1,136	862	1,998
Total			10,479
No-Project Alternative			
Bacon Island			3,404
Webb Tract			3,371
Bouldin Island			3,682
Holland Tract			2,590
Total			13,047

^a From Tables 3J-3, 3J-12, and 3J-14.

^b From Tables 3J-4, 3J-13, and 3J-15.

^c Values for habitat islands under Alternatives 1 and 2 from Table 3J-6. Value of 782 for NBHA from Table 3J-14. Values for No-Project Alternative from Table 3J-16.

Table 3J-12. Estimated Maximum Number of Hunter Use-Days for the Shallow-Water Wetland Condition on the Reservoir Islands under Alternative 2

	Acres of Shallow-Water Wetlands ^a	Hunter Density (acres per hunter) ^b	Maximum Number of Hunters	Maximum Allowable Hunting Days ^c	Average Percent Frequency of Shallow-Water Wetland Condition ^d	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^e	Estimated Annual Hunter Use-Days ^f
Bacon Island								
October	3,694	30	123	9	54	598		
November	3,694	30	123	30	50	1,847		
December	3,694	30	123	31	36	1,374		
January	3,694	30	123	16	21	414		
Subtotal						4,233	30	1,270
Webb Tract								
October	3,836	30	128	9	65	748		
November	3,836	30	128	30	52	1,995		
December	3,836	30	128	31	39	1,546		
January	3,836	30	128	16	26	532		
Subtotal						4,821	30	1,446
Total								2,716

^a JSA 1993 (see also Chapter 3N, "Mosquitos and Public Health", for a description of the shallow-water wetland condition on reservoir islands).

^b JSA 1993, Forkel pers. comm.

^c DFG 1993 (Figure 3J-4).

^d Values based on averages of maximum and minimum acreages of available shallow-water wetlands during project years. Methods used to derive percentages are described in Chapter 3N and Appendix G2.

^e Estimate of 30% based on possible marginal quality of waterfowl foraging habitat that would attract low numbers of waterfowl; consequently, hunter attendance would be significantly lower than on habitat islands.

^f Annual hunter use-days would increase gradually during a 5- to 15-year buildout period. The values presented here represent the estimated numbers of days of culmination of the buildout. (Forkel pers. comm.)

Table 3J-13. Estimated Maximum Number of Hunter Use-Days for Full-, Partial-, and Shallow-Storage Conditions on the Reservoir Islands under Alternative 2

	Total Island Acreage	Hunter Density (acres per hunter) ^a	Maximum Number of Hunters	Maximum Allowable Hunting Days ^b	Average Percent Frequency of Full-, Partial-, and Shallow- Storage Conditions ^c	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^d	Estimated Annual Hunter Use-Days ^e
Bacon Island								
October	5,539	30	185	9	32	532		
November	5,539	30	185	30	49	2,714		
December	5,539	30	185	31	62	3,549		
January	5,539	30	185	16	76	<u>2,245</u>		
Subtotal						9,040	15	1,356
Webb Tract								
October	5,470	30	182	9	29	476		
November	5,470	30	182	30	47	2,571		
December	5,470	30	182	31	56	3,165		
January	5,470	30	182	16	72	<u>2,100</u>		
Subtotal						8,312	15	<u>1,247</u>
Total								2,603

^a JSA 1993, Forkel pers. comm.

^b DFG 1993 (Figure 3J-4).

^c Values based on averages of maximum and minimum acreages of available shallow-water wetlands during project years. Methods used to derive percentages are described in Chapter 3N and Appendix G2.

^d Participation in hunting is predicted to be half of that estimated for reservoir islands during shallow-water wetland periods.

^e Annual hunter use-days would increase gradually during a 5- to 15-year buildout period. The values presented here represent the estimated number of days at culmination of the buildout. (Forkel pers. comm.)

Table 3J-14. Estimated Maximum Number of Hunter Use-Days for the Shallow-Water Wetland Condition on the DW Project Islands under Alternative 3

	Acres of Shallow-Water Wetlands ^a	Huntable Acres in NBHA ^b	Hunter Density (acres per hunter) ^c	Maximum Number of Hunters	Maximum Allowable Hunting Days ^d	Average Percent Frequency of Shallow-Water Wetland Condition ^e	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^f	Estimated Annual Hunter Use-Days ^g
Bacon Island									
October	3,694		30	123	9	52	576		
November	3,694		30	123	30	50	1,847		
December	3,694		30	123	31	36	1,374		
January	3,694		30	123	16	20	<u>394</u>		
Subtotal							4,191	30	1,257
Webb Tract									
October	3,836		30	128	9	60	690		
November	3,836		30	128	30	52	1,995		
December	3,836		30	128	31	39	1,546		
January	3,836		30	128	16	26	<u>532</u>		
Subtotal							4,763	30	1,429
Bouldin Island South of SR 12									
October	3,440		30	115	9	64	660		
November	3,440		30	115	30	56	1,926		
December	3,440		30	115	31	33	1,173		
January	3,440		30	115	16	28	<u>514</u>		
Subtotal							4,273	30	1,282
Bouldin Island NBHA									
September		808	30	27	7		189		
October		550	30	18	5		90		
November		550	30	18	13		234		
December		550	30	18	14		252		
January		550	30	18	8		<u>144</u>		
Subtotal							909	86	782
Holland Tract									
October	2,692		30	90	9	66	533		
November	2,692		30	90	30	62	1,669		
December	2,692		30	90	31	42	1,168		
January	2,692		30	90	16	29	<u>416</u>		
Subtotal							3,786	30	<u>1,136</u>
Total									5,886

Table 3J-14. Continued

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- ^a JSA 1993 (see also Chapter 3N, "Mosquitos and Public Health", for a description of the shallow-water wetland condition on reservoir islands).
 - ^b From Appendix G2. The total of 808 acres includes cornfields, riparian woodland, annual grassland, fallow levee slopes, and seasonal managed wetlands. Cornfields and seasonal managed wetlands will not be flooded until after September 15, at the end of mourning dove hunting season in September (Figure 3J-4). The total of 550 acres includes cornfields, perennial ponds, seasonal managed wetlands, and ditches.
 - ^c JSA 1993, Forkel pers. comm.
 - ^d DFG 1993 (Figure 3J-4).
 - ^e Values based on averages of maximum and minimum available shallow-water wetlands during project years. Methods used to derive percentages are described in Chapter 3N and Appendix G2.
 - ^f Estimate of 30% based on possible marginal quality of waterfowl foraging habitat that would attract low numbers of waterfowl; consequently, hunter attendance would be significantly lower than on habitat islands. Estimate of 86% for NBHA based on similarity of this habitat to habitat on Bouldin Island and Holland Tract for Alternatives 1 and 2 (Table 3J-6).
 - ^g Annual hunter use-days would increase gradually during a 5- to 15-year buildout period. The values presented here represent the estimated numbers of days at culmination of the buildout. (Forkel pers. comm.)
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Table 3J-15. Estimated Maximum Number of Hunter Use-Days for Full-, Partial-, and Shallow-Storage Conditions on the DW Project Islands under Alternative 3

	Total Island Acreage	Hunter Density (acres per hunter) ^a	Maximum Number of Hunters	Maximum Allowable Hunting Days ^b	Average Percent Frequency of Full-, Partial-, and Shallow- Storage Conditions ^c	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^d	Estimated Annual Hunter Use-Days ^e
Bacon Island								
October	5,539	30	185	9	31	515		
November	5,539	30	185	30	49	2,714		
December	5,539	30	185	31	63	3,606		
January	5,539	30	185	16	77	<u>2,275</u>		
Subtotal						9,110	15	1,367
Webb Tract								
October	5,470	30	182	9	29	476		
November	5,470	30	182	30	47	2,571		
December	5,470	30	182	31	58	3,278		
January	5,470	30	182	16	73	<u>2,130</u>		
Subtotal						8,455	15	1,268
Bouldin Island South of SR 12								
October	5,023	30	167	9	26	392		
November	5,023	30	167	30	42	2,110		
December	5,023	30	167	31	57	2,959		
January	5,023	30	167	16	69	<u>1,848</u>		
Subtotal						7,309	15	1,096
Holland Tract								
October	4,248	30	142	9	24	306		
November	4,248	30	142	30	36	1,529		
December	4,248	30	142	31	54	2,370		
January	4,248	30	142	16	68	<u>1,541</u>		
Subtotal						5,746	15	862
Total								4,593

^a JSA 1993, Forkel pers. comm.

^b DFG 1993 (Figure 3J-4).

^c Values based on averages of maximum and minimum acreages of available shallow-water wetlands during project years. Methods used to derive percentages are described in Chapter 3N and Appendix G2.

^d Participation in hunting is predicted to be half that estimated for reservoir islands during shallow-water wetland periods.

^e Annual hunter use-days would increase gradually during a 5- to 15-year buildout period. The values presented here represent the estimated numbers of days at culmination of the buildout. (Forkel pers. comm.)

Table 3J-16. Estimated Maximum Number of Hunter Use-Days on the DW Project Islands under the No-Project Alternative

	Acres of Waterfowl Habitat ^a	Acres of Upland Game Habitat ^a	Hunter Density (acres per hunter) ^b	Maximum Number of Hunters	Maximum Allowable Hunting Days ^{b,c}	Estimated Annual Maximum Hunter Use-Days	Estimated Annual Participation as a Percentage of Capacity ^d	Estimated Annual Hunter Use-Days
Bacon Island								
September		5,359	45	119	7	833		
October	5,451		45	121	5	605		
November	5,451		45	121	13	1,573		
December	5,451		45	121	14	1,694		
January	5,451		45	121	8	<u>968</u>		
Subtotal						5,673	60	3,404
Webb Tract								
September		5,277	45	117	7	819		
October	5,393		45	120	5	600		
November	5,393		45	120	13	1,560		
December	5,393		45	120	14	1,680		
January	5,393		45	120	8	<u>960</u>		
Subtotal						5,619	60	3,371
Bouldin Island								
September		5,782	45	128	7	896		
October	5,902		45	131	5	655		
November	5,902		45	131	13	1,703		
December	5,902		45	131	14	1,834		
January	5,902		45	131	8	<u>1,048</u>		
Subtotal						6,136	60	3,682
Holland Tract								
September		4,108	45	91	7	637		
October	4,132		45	92	5	460		
November	4,132		45	92	13	1,196		
December	4,132		45	92	14	1,288		
January	4,132		45	92	8	<u>736</u>		
Subtotal						4,317	60	<u>2,590</u>
Total								13,047

^a See Table G2-10 in Appendix G2 for a detailed breakdown of habitat types. Waterfowl habitat excludes riparian woodland and developed land. Upland game habitat excludes freshwater marsh, sloughs, ditches, other open water, and developed land.

^b Forkel and Winther pers. comms.

^c DFG 1993 (Figure 3J-4).

^d Forkel and Winther pers. comms.

Table 3J-17. Proposed and Planned Agricultural Land Conversion Projects in the Delta

Project Location or Name	Responsible Agency or Group	Existing Uses	Proposed Uses	Acreage Acquired	Acreage Pending Acquisition	Total
Twitchell Island ^a	DWR	Agriculture, gas wells, one power line, marina	Managed wetland habitat	2,965	588	3,553
Sherman Island ^a	DWR	Agriculture, public boat launch ramp, marinas, residential	Managed wetland habitat	1,037	9,465	10,502
Stone Lakes Wildlife Refuge ^b	USFWS	Agriculture, wildlife habitat	Managed wetland and wildlife habitat, environmental education, wildlife-oriented recreation, hunting		22,000 ^c	22,000
Medford Island ^a	Private	Agriculture	Mitigation bank approved by DFG	1,215		1,215
Prospect Island ^a	Trust for Public Lands, Reclamation, DFG	Agriculture	Managed wetland habitat	1,228		1,228
Palm Tract Mitigation ^a	Western Area Power Administration, Transmission Agency of Northern California	Agriculture	Agriculture and managed wetland habitat	1,213		1,213
Yolo Basin Wetlands ^a	DFG	Agriculture and fallow	Managed wetland and wildlife habitat	3,470		3,470
Port of Sacramento Mitigation Bank ^a	Yolo and Solano Counties	Unknown	Unknown	420		420
Central Valley Habitat Joint Venture Implementation Plan ^{a, d}	USFWS, DFG, Audubon Society, The Nature Conservancy, California Waterfowl Association, Trust for Public Lands, Defenders of Wildlife, Ducks Unlimited	Agriculture	Restored wetland waterfowl habitat, management of agricultural lands for wintering waterfowl		About 20,000	About 20,000
DW habitat islands				9,120		9,120
DW reservoir islands				<u>11,008</u>		<u>11,008</u>
Total				31,676	52,053	83,729

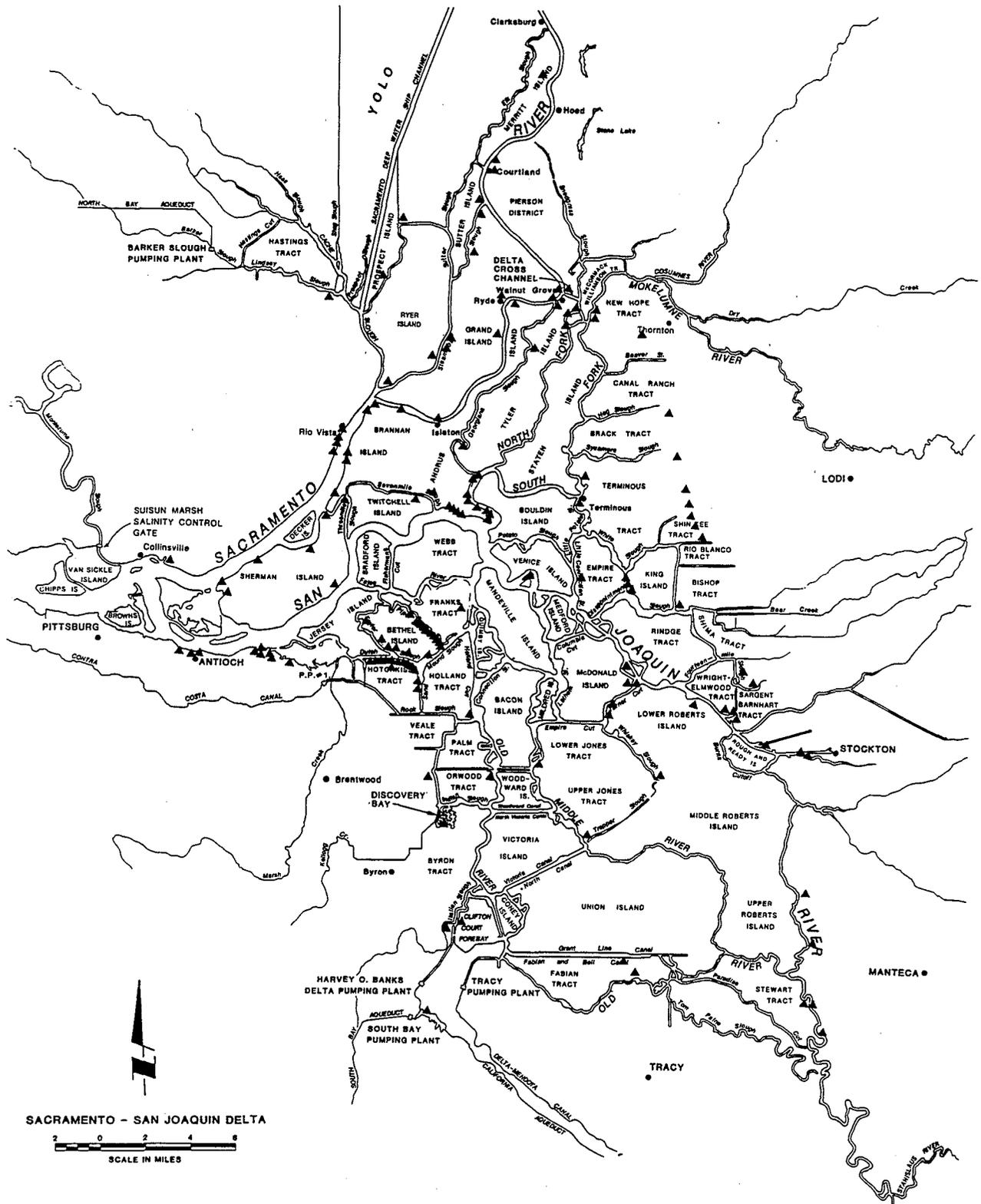
Table 3J-17. Continued

^a Delta Protection Commission 1994.

^b USFWS 1991.

^c Some of this acreage may remain in private landholding.

^d The plan goal is to restore 20,000 acres of former wetlands to permanent wetlands by acquisition of fee title or conservation easements.



Map source: Adapted from California Department of Water Resources 1993.

Figure 3J-1.
 Existing Recreation Facilities in the
 DW Project Vicinity

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Figure 3J-3.
Typical View along SR 12 on Bouldin Island

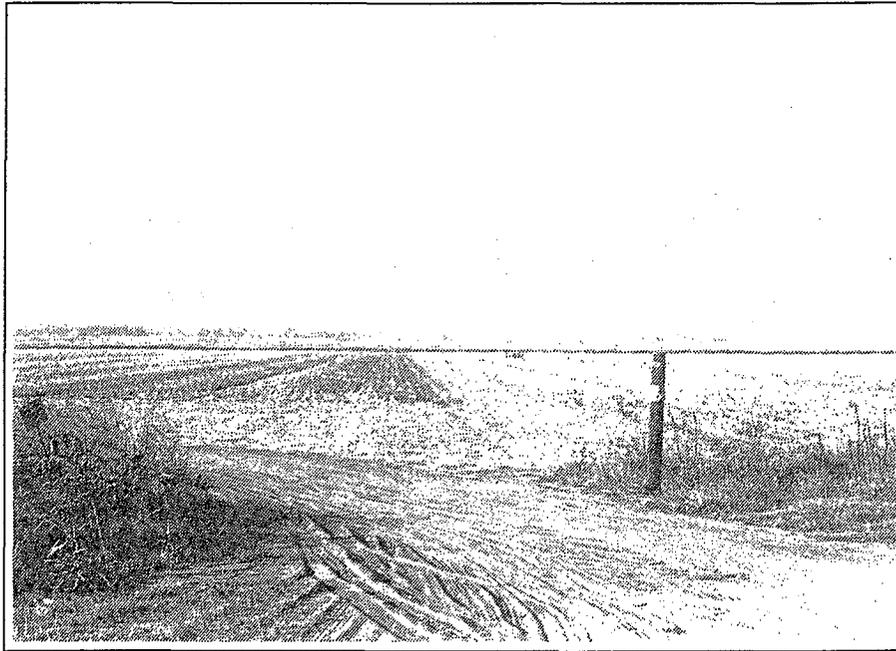
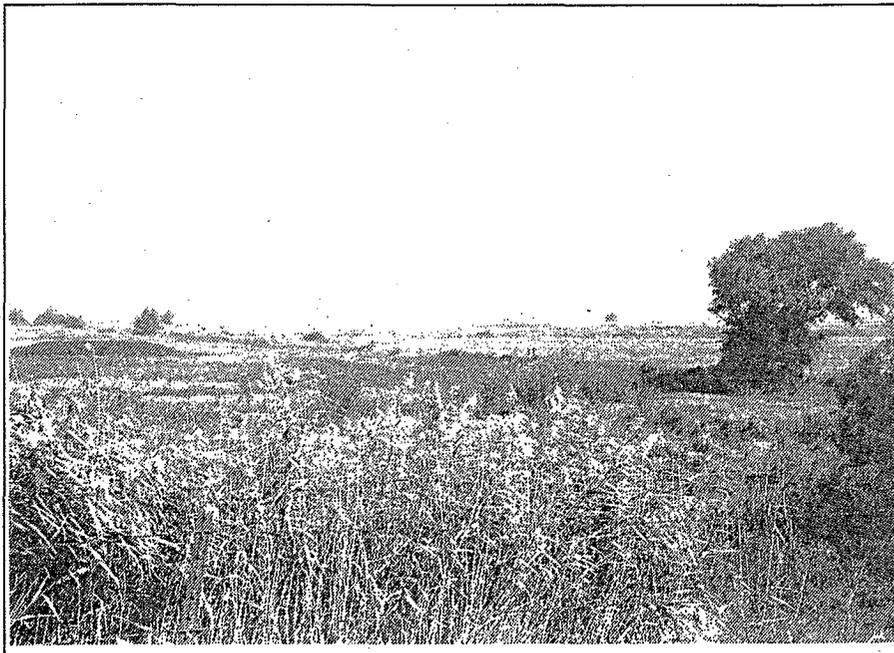


Figure 3J-4.
Typical View of Holland Tract from Holland Tract Road



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General Sport Fishing Schedule in the Delta

	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
Striped bass	█											
White sturgeon		█										
American shad			█									
Large-mouth bass, sunfish, catfish			█									
Chinook salmon								█				

Notes: Minor amounts of fishing occur in the Delta during December-February for resident species, including large-mouth bass, sunfish, and catfish. The schedule is based on the expected presence of different fish species in the Delta.

Selected Hunting Seasons in California

	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
Upland game											
Mourning dove							1 █ 15		13 █ 27		
Ring-necked pheasant									13 █ 12		
Waterfowl											
Ducks								23 █ 13		11 █ 16	
White geese											
Snow goose, Ross' goose								30 █ 16			
Dark geese											
White-fronted goose								30 █ 2			
Canada goose								30 █ 16			

Note: Numbers at ends of bars represent dates in months when the hunting seasons begin and end.

Source: California Department of Fish and Game 1993.

Figure 3J-5.
Expected Schedule of Participation in Fishing and Hunting

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