DWR's Delta Conveyance Project
Consistency Appeal (Cert. ID C20257)
January 2, 2026

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1. Introduction

This supplemental brief is submitted in support of the appeal filed on behalf of Steamboat Resort. This supplemental brief supports the appeal filed by Steamboat Resort regarding the California Department of Water Resources' ("DWR") Final Draft Delta Conveyance Project Certification of Consistency with the Delta Plan (Certification, [DCP.AA1.2.00001]). The supporting documents referenced in this brief are appropriate for notice by the Delta Stewardship Council ("Council"). (Cal. Code Regs., tit. 23, § 5032 [records subject to judicial notice].) Table 1, below, provides the basis for notice of the supporting documents identified in this supplemental brief.

Steamboat Resort represents water-dependent recreational uses in the Delta and the historic use of Steamboat Slough as an anchorage and recreational boating area within the Sacramento–San Joaquin Delta. Like other Delta marinas, resorts, and recreational facilities, Steamboat Resort relies on navigable waterways, safe and reliable vessel access, quiet-water conditions, and a rural recreational setting to operate. As described below, the Final Environmental Impact Report ("FEIR") and related planning documents demonstrate that the Delta Conveyance Project will introduce prolonged in-water construction, industrial-scale facilities, sustained vessel and barge traffic, access disruptions, and long-term noise impacts that materially impair navigability and recreation at Steamboat Slough and other Delta waterways along the project alignment. The Certification of Consistency does not evaluate these impacts under applicable Delta Plan policies.

2. Delta Plan Regulatory Policy ER-P1 / Cal. Code Regs., tit. 23, § 5005 – Delta Flow Objectives

Delta Plan Policy ER-P1 requires covered actions to be consistent with Delta flow objectives and to avoid impairing beneficial uses dependent on Delta hydrodynamics, including navigation and recreation.

The FEIR describes extensive in-water construction activities associated with intake construction, barge operations, cofferdams, marine equipment staging, and material delivery occurring over an approximately 13-year construction period (FEIR Chapter 3, Project Description, pp. 3-19, 3-131). The FEIR further identifies sustained barge and vessel traffic associated with intake construction and material transport throughout the Delta (FEIR Chapter 3, Project Description, pp. 3-120–3-123; FEIR Chapter 20, Transportation, pp. 20-52–20-62).

While the FEIR evaluates hydrodynamic and water quality conditions at a regional scale (FEIR Chapter 9, Hydrology and Water Quality), it does not evaluate site-specific navigability impacts at Steamboat Slough, including effects on low-tide access, vessel maneuverability, navigational

safety, or recreational boating conditions relied upon by Steamboat Resort and other nearby recreational users. Neither Chapter 9 nor Chapter 20 evaluates how prolonged in-water construction activities and sustained barge traffic may affect safe vessel passage within narrow Delta sloughs such as Steamboat Slough.

The Delta Conveyance Design and Construction Authority's Barge Transportation Study Technical Memorandum further confirms that Delta waterways are subject to navigational constraints, including shallow depths, narrow channel widths, bridge opening delays, tidal limitations, and seasonal operational restrictions (Barge Transportation Study Technical Memorandum, pp. 2–4). The Technical Memorandum acknowledges the presence of more than 130 Delta marinas and the need to coordinate barge operations to protect recreational vessel navigation (id. at pp. 3–4). While the Technical Memorandum evaluates navigability at a programmatic level, neither it nor the FEIR evaluates site-specific navigational impacts to Steamboat Slough, supporting the appeal under ER-P1.

Adopted Delta planning documents further establish that navigable waterways and water-based recreation are core Delta uses. The Land Use and Resource Management Plan for the Primary Zone of the Delta identifies boating, fishing, and water-based recreation as fundamental functions of Delta waterways, and the Delta Economic Sustainability Plan recognizes navigation and water-dependent recreation as essential components of the Delta economy. The Certification of Consistency does not evaluate whether prolonged in-water construction and vessel activity are consistent with these uses.

3. Delta Plan Regulatory Policy DP-P1 / Cal. Code Regs., tit. 23, § 5010 – Locate New Urban Development Wisely

Delta Plan Policy DP-P1 is intended to protect the rural and recreational character of the Delta from incompatible urban or industrial development.

The FEIR characterizes multiple Delta Conveyance Project components as industrial in nature, including intake facilities, sediment basins, access roads, fencing, buildings, substations, and other large-scale conveyance infrastructure (FEIR Chapter 18, Aesthetics and Visual Resources, pp. 18-8–18-11). Chapter 18 identifies industrial development as a distinct visual landscape type and explains that such facilities introduce dominant built elements whose mass, scale, lighting, and activity levels contrast strongly with surrounding agricultural and waterway landscapes and can substantially alter visual character (FEIR Chapter 18, p. 18-11).

The FEIR further acknowledges significant and unavoidable impacts to the visual character of nonurbanized Delta areas, including rural agricultural lands and Delta waterways, due to the introduction of visible permanent facilities and prolonged construction activity (FEIR Chapter 18, pp. 18-1–18-2). Chapter 3 identifies an extended construction duration of approximately 13 years, during which phased and overlapping construction activities would occur throughout the Delta (FEIR Chapter 3, Project Description, pp. 3-19, 3-131).

Steamboat Resort, like other Delta marinas and recreational facilities, operates within a rural recreational setting that depends on scenic quality, quiet-water conditions, and compatibility with

surrounding land uses. The Land Use and Resource Management Plan and the Delta Economic Sustainability Plan both emphasize preservation of rural character and recreation as defining elements of the Delta. The Certification of Consistency does not evaluate whether long-term industrial facilities and activity adjacent to Steamboat Slough are compatible with these adopted land-use objectives, demonstrating inconsistency with DP-P1.

4. Delta Plan Regulatory Policy DP-P2 / Cal. Code Regs., tit. 23, § 5011 – Respect Local Land Use When Siting Water or Flood Facilities or Restoring Habitats

Delta Plan Policy DP-P2 requires covered actions to respect existing local land uses, including recreation, navigation, and access.

The FEIR documents sustained construction traffic, barge movements, and vessel activity affecting Delta waterways and access corridors during construction of the Delta Conveyance Project (FEIR Chapter 20, Transportation, pp. 20-52–20-54, 20-59–20-62). These impacts affect both land-based access routes and water-based recreational corridors relied upon by marinas, resorts, and tourism-related uses throughout the Delta.

Noise impacts compound these effects. The FEIR acknowledges significant and unavoidable construction noise impacts affecting rural Delta areas for a duration of approximately 12 to 14 years (FEIR Chapter 24, Noise, pp. 24-1–24-2). Chapter 24 explains that the Delta is characterized by low ambient noise levels typical of rural agricultural and recreational environments, where marinas, waterways, and recreational uses are particularly sensitive to increases in construction noise (FEIR Chapter 24, pp. 24-9–24-17). Construction activities associated with pile driving, heavy equipment operation, haul trucks, and barge activity would repeatedly exceed applicable noise thresholds at sensitive receptors throughout the construction period (FEIR Chapter 24, Tables 24-0 and 24-1).

The Certification of Consistency does not evaluate how sustained noise impacts, combined with access disruption and increased vessel activity, will impair existing water-dependent recreational uses such as Steamboat Resort or other Delta tourism and recreation facilities. Adopted planning documents identify navigation and recreation as protected Delta uses dependent on access, calm-water conditions, and compatibility with surrounding land uses. The Certification's failure to evaluate these foreseeable impacts supports the appeal under DP-P2.

5. Documents Submitted for Notice and Incorporated by Reference

Table 1. Documents Submitted for Notice by the Delta Stewardship Council

Exhibit No.	Document	Basis for Notice
1	Sacramento County General Plan – Delta Protection Element (Adopted September 26, 2017)	Official local land-use policy document adopted by a public agency; admissible under Evidence Code section 452(c) (official acts of legislative and executive bodies) and 23 Cal. Code Regs., tit. 23, § 5032(c)(3)(B).
2	Delta Economic Sustainability Plan for the Sacramento-San Joaquin Delta, January 19, 2012, Chapters 1, 8, and 11, pp. 17–18, 147–170, 195–199, 273–275.	Regional economic and planning document addressing Delta recreation, navigation, and water-dependent economic activity; admissible under Evidence Code section 452(h) (facts and propositions that are not reasonably subject to dispute and are capable of immediate and accurate determination by resort to sources of reasonably indisputable accuracy) and 23 California Code of Regulations, title 23, section 5032(c)(3)(B).
3	Delta Conveyance Design and Construction Authority, Barge Transportation Study Technical Memorandum (Final Draft, December 23, 2021) pp. 1-4, 10	Technical memorandum prepared for the California Department of Water Resources as part of the Delta Conveyance Project planning process; admissible under Evidence Code section 452(c) (official acts of the executive branch) and 23 Cal. Code Regs., tit. 23, § 5032(c)(3)(B).
4	Delta Protection Commission Land Use and Resource Management Plan for the Primary Zone of the Delta (2010)	Official land use and resource management plan adopted by the Delta Protection Commission pursuant to state law; admissible under Evidence Code section 452(c) (official acts of the legislative and executive branches) and 23 California Code of Regulations, title 23, section 5032(c)(3)(B).

Exhibit 1 – Sacramento County General Plan, Delta Protection Element (2017)

This document establishes that the Delta is intended to remain predominantly rural and that navigation, water-based recreation, tourism, and preservation of rural character are protected land uses. It demonstrates that Steamboat Resort and similar Delta recreational facilities are consistent with adopted local land-use policy and that industrial-scale facilities, prolonged construction activity, and access disruptions are incompatible with these designated uses, supporting the appeal under Delta Plan Policies DP-P1 and DP-P2.

Exhibit 2 – Delta Economic Sustainability Plan

This regional planning document identifies water-dependent recreation, marinas, boating, and tourism as essential components of the Delta's economic sustainability. It establishes that continued navigability, reliable access, and compatibility with recreational uses are necessary to maintain the Delta's economic base. The document supports the appeal by demonstrating that prolonged in-water construction, sustained vessel activity, and industrial operations associated with the Delta Conveyance Project threaten recreation and tourism in a manner not evaluated in the Certification of Consistency, supporting inconsistency with DP-P2 and ER-P1.

Exhibit 3 – Delta Conveyance Design and Construction Authority, Barge Transportation Study Technical Memorandum

This Technical Memorandum documents existing navigational constraints throughout Delta waterways, including shallow depths, narrow channels, tidal limitations, bridge opening delays, and the need to coordinate barge operations to protect recreational navigation due to the presence of more than 130 Delta marinas. The Memorandum confirms that Delta waterways already operate under constrained navigational conditions and that prolonged barge operations would directly compete with recreational boating and marina access. The absence of site-specific analysis of these impacts at Steamboat Slough in the FEIR and Certification supports the appeal under ER-P1 and DP-P2.

Exhibit 4 – Delta Protection Commission Land Use and Resource Management Plan for the Primary Zone of the Delta (2010)

This exhibit establishes that navigable waterways, boating, private marinas, and water-based recreation are protected and fundamental Delta uses within the Primary Zone of the Delta. The Plan recognizes that private marinas provide essential public access to Delta waterways and that continued navigability, safe access, and compatibility with surrounding rural land uses are necessary to sustain Delta recreation and tourism. The Certification of Consistency does not evaluate whether prolonged in-water construction, increased barge traffic, and access disruptions associated with the Delta Conveyance Project are consistent with these adopted land-use policies, supporting the appeal under Delta Plan Policies ER-P1, DP-P1, and DP-P2.

5. Conclusion

The Delta Reform Act provides that any person who claims that a proposed covered action is inconsistent with the Delta Plan and, as a result of that inconsistency, will have a significant adverse impact on the achievement of one or both of the coequal goals may file an appeal with the Council. (Wat. Code, § 85225.10, subd. (a).)

The coequal goals require protection of Delta recreation, agriculture, and Delta communities as fundamental components of the Delta's economic and cultural landscape. (Wat. Code, § 85054.) Steamboat Resort is a longstanding, water-dependent recreational use that relies on navigable waterways, safe vessel access, rural character, and quiet-water conditions within the Delta.

As demonstrated by the FEIR and the adopted Delta planning documents cited herein, the Delta Conveyance Project will introduce prolonged in-water construction, industrial facilities, access disruptions, and long-term noise impacts that materially impair navigability and recreation at Steamboat Slough and other Delta waterways. The Certification of Consistency does not evaluate these impacts under Delta Plan Policies ER-P1, DP-P1, or DP-P2. Accordingly, the Certification lacks substantial evidence of consistency with the Delta Plan and should be remanded to DWR for further consideration.

General Plan

Delta Protection Element

Adapted from Land Use and Resource Management Plan for the Primary Zone of the Delta
(Adopted by the Delta Protection Commission on February 25, 2010)

Adopted May 28, 2014
Amended September 26, 2017

County of Sacramento
Office of Planning and Environmental Review

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SACRAMENTO COUNTY GENERAL PLAN

DELTA PROTECTION ELEMENT

INTRODUCTION

Application of Delta Protection Element Policies

The policies contained in the Delta Protection Element apply only to the Primary Zone of the Delta within Sacramento County, unless specifically noted otherwise. Figure 1 is a map of the Primary and Secondary Zones of the Delta.

Basis of Delta Protection Element Policies

This Delta Protection Element (DP Element) is based on the (2010) Delta Protection Commission's Land Use and Resource Management Plan for the Primary Zone of the Delta (DPC Plan), as required by Public Resources Code Section 29725. To the extent possible, the DP element uses language from the DCP Plan verbatim. There are numerous modifications, however, to make the language of the DP Element more consistent with the rest of the General Plan and in several instances the DPC Plan language was modified to better reflect that the policy is the County's and not the DPC's.

Background

The Delta Protection Act of 1992 (Act) established the Delta Protection Commission, a State entity to plan for and guide the conservation and enhancement of the natural resources of the Delta, while sustaining agriculture and meeting increased recreational demand. The Act defines a Primary Zone, which comprises the principal jurisdiction of the Delta Protection Commission. The Secondary Zone is the area outside the Primary Zone and within the "Legal Delta"; the Secondary Zone is not within the planning area of the Delta Protection Commission. (See Figure 1 on last page of this element.) The Act requires the Commission to prepare and adopt a Land Use and Resource Management Plan (Plan) for the Primary Zone of the Delta, which must meet specific goals. Sacramento County has adapted the Delta Protection Commission's Plan (adopted February 25, 2010) to create this Delta Protection Element (Element) of the Sacramento County General Plan.

The Delta Protection Act (Public Resources Code Section 29760 et. seq.) requires the Commission to prepare and adopt and thereafter review and maintain a comprehensive long-term resource management plan for land uses within the Primary Zone of the Delta ("Resource Management Plan"). The resource management plan is to set forth a description of the needs and goals for the Delta and a statement of the policies, standards, and elements of the Resource Management Plan. Within 180 days of the adoption of the Resource Management Plan or any amendments by the Commission, all local governments, as defined in Public Resources Code Section 29725 and including Sacramento County, shall submit to the Commission proposed amendments to their general plans. The amendments shall cause the general plans to be consistent with the criteria in Public Resources Code Section 29763.5 with respect to land located within the Primary Zone. Those criteria include a requirement that the general plan be

consistent with the Resources Management Plan (Plan). This introduction and the following policies of the element constitute the regulatory portion of the element.

The Primary Zone of the Sacramento-San Joaquin Delta (Delta) includes approximately 500,000 acres of waterways, levees and farmed lands extending over portions of five counties: Solano, Yolo, Sacramento, San Joaquin and Contra Costa. The rich peat soil in the central Delta and the mineral soils in the higher elevations support a strong agricultural economy. The Delta lands have access to the 1,000 miles of rivers and sloughs lacing the region. These waterways provide habitat for many aquatic species and the uplands provide year-round and seasonal habitat for amphibians, reptiles, mammals, and birds, including several rare and endangered species. The area is extremely popular for many types of recreation including fishing, boating, hunting, wildlife viewing, water-skiing, swimming, hiking, and biking.

The goals of the Plan as set out in the Delta Protection Act are to "protect, maintain, and where possible, enhance and restore the overall quality of the Delta environment, including but not limited to agriculture, wildlife habitat, and recreational activities; assure orderly, balanced conservation and development of Delta land resources and improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety."

As specified in the Delta Protection Act, the Delta Protection Commission is not authorized to exercise any jurisdiction over matters within the jurisdiction of, or to carry out its powers and duties in conflict with, the powers and duties of any other State agency. The Plan also provides guidance to State agencies undertaking activities in the Primary Zone. The Plan, therefore, applies to development subject to approval by the Delta counties (Contra Costa, Sacramento, San Joaquin, Yolo and Solano). Should Cities propose to expand into the Delta Primary Zone, or acquire land in the Primary Zone for utility or infrastructure facility development, those actions are to be carried out in conformity with the Delta Protection Act of 1992.

Each section of this Element includes an introductory discussion that provides the context for the section’s goals and policies. It is important to note, however, that in the implementation of both the goals and policies of the Plan, the Delta Protection Act specifically prohibits the exercise of the power of eminent domain unless requested by the landowner.

The term "shall" in these regulations is mandatory; the terms "may", "should", and "can" are advisory.

This document should be considered in its entirety.

SACRAMENTO COUNTY GENERAL PLAN
DELTA PROTECTION ELEMENT

LAND USE

GOALS: **Protect the unique character and qualities of the Primary Zone by preserving the cultural heritage and strong agricultural/economic base, unique recreational resources, and biological diversity of the Primary Zone. Direct new non-agriculturally oriented non- farmworker residential development within the existing unincorporated towns in Sacramento County (Walnut Grove, Courtland, Hood, Locke, and Ryde).**

Encourage a critical mass of farms, agriculturally-related businesses and supporting infrastructure to support the economic vitality of agriculture within the Delta.

Overview

The patterns of settlement in the Delta reflect the history of immigration into the State in the late 19th century. The settlement pattern was historically, and remains to this day, closely associated with the rivers, sloughs, and waterways of the Delta, and with the configurations of agricultural lands. One incorporated city, Isleton, and portions of other incorporated cities including Stockton, Antioch, Oakley, Sacramento, West Sacramento, Elk Grove, Tracy, Lathrop and Pittsburg, are located within or just outside of the Secondary Zone; and Rio Vista is located partially within the Primary Zone, but not within the Secondary Zone. Unincorporated towns lying along the Sacramento River in the Primary Zone include Clarksburg, Courtland, Hood, Locke, Walnut Grove and Ryde. These towns serve as social and service centers for the surrounding farms and historically served as shipping sites for products. These rural communities reflect the diverse heritage of the Delta.

The five Delta counties (Solano, Yolo, Sacramento, San Joaquin, and Contra Costa) designate Primary Zone lands for agriculture or special Delta resources in their respective general plans. The zoning codes for the five Delta counties allow a variety of uses in the Primary Zone including agriculture and agriculturally-oriented uses; outdoor recreation; wildlife habitat; public facilities; and limited areas for commercial, industrial, and rural residential development.

The two Delta ports, Sacramento and Stockton, own hundreds of acres of land along their respective shipping channels. Some of these lands are used for dredge material disposal and some have been or will be used for habitat mitigation sites.

Sherman Island, Twitchell Island, Staten Island, portions of the Yolo Bypass (e.g., Vic Fazio Wildlife Area) and McCormack-Williamson Tract are held as conservation lands and are currently operated as farmlands. A number of conservation easements and mitigation banks will also be created under local Habitat Conservation Plans and Natural Communities Conservation Plans. Since 1990, urban and other land uses in the Secondary Zone have gained substantial acreage while agricultural land use has declined. Other land uses within the Secondary Zone

include conservation areas, low-density rural developments, natural areas not suitable for livestock grazing, and other non-agricultural areas.

The periphery of the Delta is undergoing rapid urbanization associated with substantial population growth. Current and future population growth increases the demand for developable land, particularly in areas near the Bay Area, Stockton, and Sacramento. This demand results in the conversion of open space, primarily agricultural land, to residential and commercial uses. Increasing concern exists regarding the potential for urbanization and projects in the secondary zone to impact the Primary Zone.

In addition to numerous local, national and international factors affecting the profitability of farming in the Delta, the acquisition of farmed land and subsequent retirement of that land affects the economic base for farm support industries; the economic base for community businesses that rely on patronage from citizens working in farm or farm support industries; the tax and assessment base for special districts, counties, and the State; and the existing wildlife use patterns that have adapted to agricultural land use patterns.

Policies:

DP-1. The rich cultural heritage, strong agricultural/economic base, unique recreational resources, and biological diversity of the Delta shall be preserved and recognized in public/private facilities, such as museums, recreational trails, community parks, farm stands, community centers, and water access facilities within the Delta

DP-2. Promote and facilitate agriculture and agriculturally-supporting commercial and industrial uses as the primary land uses in the Primary Zone; recreation and natural resources land uses shall be supported in appropriate locations and where conflicts with agricultural land uses or other beneficial uses can be minimized.

DP-3. Proponents of new non- agriculturally oriented residential, recreational, commercial, habitat, restoration or industrial development shall provide appropriate buffer areas to prevent conflicts between any proposed use and existing adjacent agricultural parcels. Buffers shall adequately protect integrity of land for existing and future agricultural uses and shall not include uses that conflict with agricultural operations on adjacent agricultural lands. Appropriate buffer setbacks shall be determined in consultation with local Agricultural commissioners, and shall be based on any applicable general plan policies and criteria included in the Right-to-Farm Ordinance.

DP-4. Direct new non-agriculturally oriented non-farmworker residential development within the existing unincorporated towns (Walnut Grove, Courtland, Hood, Locke, and Ryde).

DP-5. Address criteria under which general plan amendments in the Primary Zone will be evaluated under Public Resources Code Section 29763.5. Proposed amendments that apply to areas in the Primary Zone shall be evaluated in terms of consistency of the overall goals and program of the Delta Protection Commission's Land Use and Resource Management Plan for the Primary Zone of the Delta.

DP-6. Subsidence control shall be a key factor in evaluating land use proposals. Encourage agricultural, land management, recreational, and wildlife management practices that minimize subsidence of peat soils. The County should utilize studies of agricultural and land management methods that minimize subsidence and should assist in educating landowners and managers as to the value of utilizing these methods.

DP-7. New structures shall be set back from levees and areas that may be needed for future levee expansion consistent with local reclamation district regulations, and, upon adoption, with the requirements to be identified in the California Department of Water Resources Central Valley Flood control Plan.

DP-8. The County may approve mitigation of adverse environmental impacts under the California Environmental Quality Act beyond county boundaries if the action: 1) is consistent with other General Plan policies on mitigating outside of the County, 2) is acceptable to reviewing fish and wildlife agencies and 3) has the approval of the recipient jurisdiction. Mitigation in the Primary Zone for loss of agricultural lands in the Secondary Zone may be appropriate if the mitigation program supports continued farming in the Primary Zone. California Government code Section 51256.3 (Assembly Bill 797) specifically allows an agricultural conservation easement located within the Primary or Secondary Zone of the Delta to be related to Williamson Act contract rescissions in any other portion of the secondary zone without respect to County boundary limitations.

DP-9. The implementation of the policies contained in the resource management plan shall not be achieved through the exercise of the power of eminent domain unless requested by the landowner.

DP-10. Maintain sites for the storage of dredged material from channels within the Delta and discourage the conversion of existing sites to other uses, as appropriate. Soil that is suitable for levee rehabilitation and raising Delta lowlands should remain within the Delta.

DP-11. Consider developing programs to permit clustering of residential units that allow property owners to engage in limited property development in order to ensure the efficient use and conservation of agricultural lands, support open space values, and protect sensitive environmental areas in the Primary Zone. Clustered development occurs when contiguous or non-contiguous parcels are developed to cluster lots for residential use. The purpose of clustered development is to provide a mechanism to preserve agricultural land and open space, to locate housing in areas that can readily be served by public services and utilities, and provide the agricultural community an alternative to transfer of development rights. Clustered development programs shall ensure that the number of clustered lots created does not exceed the allowable density requirement for the zoning of the sum of the parcels. Clustered development may only be used one time. Neither the clustered lots nor the remainder lots may be further subdivided. Residential development shall be consistent with Sacramento County General Plan policies and zoning regulations and standards.

DP-12. Consider developing transfer of development rights (TDR) programs that allow land owners to transfer the development right from one parcel of land to another. The purpose of these TDR programs would be to provide the efficient use and conservation of agricultural lands, to support open space values, and to protect sensitive environmental areas within the Primary Zone. This purpose would be achieved by relocating development rights within the Primary Zone to more suitable areas such as adjacent to or within existing urban areas within or outside of the Primary Zone, or to provide expanded opportunities for affordable farm worker housing. TDR programs shall ensure that the transferred development density does not exceed the development density identified for the zoning for the sending parcel, and that any farm worker housing is restricted and regulated for that purpose. The land upon which the development rights are transferred from would be restricted with a permanent conservation easement. Receiving areas must have the infrastructure capacity, public services and utilities to absorb the new development.

DP-13. Support the implementation of appropriately located agricultural labor camps and housing that serve agricultural operations, which are constructed and sited consistent with Sections 17021.5 and 17021.6 of the California Health and Safety Code and consistent with the requirements of local building codes.

DP-14. The conversion of an agricultural parcel, parcels, and/or an agricultural island for water impoundment, including reservoirs, water conveyance or wetland development may not result in the seepage of water onto or under the adjacent parcel, parcels, and/or island. These conversions shall mitigate the risks and adverse effects associated with seepage, levee stability, subsidence, and levee erosion, and shall be consistent with the goals of this element.

DP-15. Support regional efforts to address issues related to urban development, habitat conservation and agricultural protection through participating in the South Sacramento Habitat Conservation Plan

SACRAMENTO COUNTY GENERAL PLAN
DELTA PROTECTION ELEMENT

AGRICULTURE

GOALS: **To support long-term viability of commercial agriculture and to discourage inappropriate development of agricultural lands.**

Support the continued capability for agricultural operations to diversify and remain flexible to meet changing market demands and crop production technology. Promote the ability for agriculture operations to change the crops or commodities produced to whatever is most economically viable at the time. Support the use of new crop production technologies that keep Delta agricultural operations competitive and economically sustainable.

The priority land use of areas in the Primary Zone shall be oriented toward agriculture and open space. If agriculture is no longer appropriate, land uses that protect other beneficial uses of Delta resources and that would not adversely affect agriculture on surrounding lands or the viability or cost of levee maintenance, may be permitted. If temporarily taken out of agriculture production due to lack of adequate water supply or water quality, the land shall remain reinstateable to agriculturally-oriented uses for the future.

Overview

Delta agricultural lands were "reclaimed" through construction of levees and drainage of the marshy islands of the area. In less than 100 years, from 1850 to 1930, hundreds of thousands of acres of land went into agricultural production due in large part to the high productivity of the peat soils in the central Delta and the mineral soils in the higher elevations. The farmers and landowners represented a cross section of the new Americans-- Slavs, Dutch, German, English, and others. Many groups of immigrants first labored in the fields, then went on to become landowners or tenant farmers including Portuguese, Chinese, Japanese, Filipinos, and Hindus.

Early crops were grains, fruits and vegetables marketed in the nearby cities. Early specialty crops included wheat, barley, beans, and potatoes. Later asparagus, sugar beets, tomatoes, and celery grew in popularity. Currently, the Delta counties raise a variety of crops including grains, fruits, field crops, nuts, seeds, pasture and alfalfa, wine grapes, vegetables, olives and blueberries.

In the recent past, thousands of acres of agricultural lands were developed for residential and other urban uses. Between 1990 and 2004, approximately 39,000 acres of agricultural land was converted to urban and other uses in the larger Delta-Suisun Marsh area (*Status and Trends of Delta-Suisun Service*, California Department of Water Resources, May 2007). New markets to sell crops and new crops, including crops to burn as energy sources, will continue to keep agriculture an important land use in the Delta and California.

Agricultural lands within the Delta are highly productive and well suited for ongoing agricultural operations. Sacramento County recognizes the value of the agriculture economy and has designated Delta lands for long-term agricultural use and protects them through several mechanism including the Agricultural Element in the General Plan, the Urban Service Boundary, the establishment of buffers between agriculture and other approved uses, the Right-to-Farm ordinances, full support of the Williamson Act programs, the control of land subdivision and land use types allowed within agricultural areas, the establishment of minimum agricultural parcel sizes, and the establishment of limits on General Plan land use designation changes. Also pursuant to the Delta Protection Act, to the extent that any of the requirements specified in this element are in conflict, nothing in this Element shall deny the right of the landowner to continue the agricultural use of the land.

Some agricultural lands provide rich seasonal wildlife habitat. Thousands of acres of agricultural lands are flooded after harvest and provide feeding and resting areas for resident and migratory birds and other wildlife. This practice of seasonal flooding helps maximize the wildlife values of agricultural areas and lessen opportunities for agricultural pests.

Policies:

DP-16. Support and Encourage agriculture in the Delta as a key element in the State's economy and in providing the food supply needed to sustain the increasing population of the State, the Nation, and the world.

DP-17. Conversion of land to non-agriculturally-oriented uses should occur first where productivity and agricultural values are lowest.

DP-18. Promote recognition of the Delta as a place by educating individuals about the rich agricultural heritage, the unique recreational resources, the biological diversity, and the ongoing value of maintaining a healthy agricultural economy in the Delta

DP-19. Support agricultural programs that maintain economic viability and increase agricultural income in accordance with market demands, including but not limited to wildlife-friendly farming, conservation tillage and non-tillage.

DP-20. Encourage implementation of the necessary plans and ordinances to: maximize agricultural parcel size; reduce subdivision of agricultural lands; protect agricultural and related activities; protect agricultural land from conversion to non-agriculturally oriented uses. An optimum package of regulatory and incentive programs would include: (1) an urban limit line; (2) minimum parcel size consistent with local agricultural practices and needs; (3) strict regulations regarding subdivision of agricultural lands intended to ensure that subdivided lands will continue to contain agriculturally-oriented land uses; (4)-adequate buffers between agricultural and non-agricultural land uses particularly residential development outside but adjacent to the Primary Zone; (5) an agriculture element of the general plan; (6) a right-to-farm ordinance; and (7) a conservation easement program.

DP-21. Encourage acquisition of agricultural conservation easements from willing sellers as mitigation for projects within each county. Promote use of environmental mitigation

in agricultural areas only when it is consistent and compatible with ongoing agricultural operations and when developed in appropriate locations designated on a countywide or Deltawide habitat management plan.

DP-22. Encourage management of agricultural lands which maximize wildlife habitat seasonally and year-round, through techniques such as fall and winter flooding, leaving crop residue, creation of mosaic of small grains and flooded areas, wildlife friendly farming, controlling predators, controlling poaching, controlling public access, and others.

DP-23. Encourage the protection of agricultural areas, recreational resources and sensitive biological habitats, and the reclamation of those areas from the destruction caused by inundation.

DP-24. Support agricultural tourism and value-added agricultural production as a means of maintaining the agricultural economy of the Delta.

SACRAMENTO COUNTY GENERAL PLAN
DELTA PROTECTION ELEMENT

NATURAL RESOURCES

GOAL: Preserve and protect the natural resources of the Delta. Promote protection of remnants of riparian habitat and aquatic habitat. Encourage compatibility between agricultural practices and wildlife habitat.

Overview

The Delta is a unique geographic area in the State of California, a low-lying region of rich mineral and peat soils, composed of islands created largely by humans, as they diked and drained the prehistoric marshes of the region.

The peat soils of the central and western Delta have oxidized, resulting in subsidence of land surfaces of up to 20 feet. Original peat soil depths varied substantially from area to area and even within a given island. Subsidence has slowed to about one-third of an inch a year in many areas.

Flood threats are compounded by the low elevations of the Delta and by subsidence. Twice in each approximately 25-hour period the elevation of the Sacramento River rises and falls about three feet due to the tidal cycle. The threat of flooding is generally associated with periods of high winter rainfall and periods of rapid spring snow melt in the watersheds draining into the Delta. The most critical conditions occur when upstream dams are full and the resulting high rates of river flow combine with high tides and strong winds.

The lush wetland habitats surrounded by riparian woodlands have been replaced by agricultural lands including cultivated and irrigated croplands as well as irrigated and non-irrigated pasture lands. Remnants of natural habitat are located largely along some sloughs and rivers and on small channel islands. Pockets of wooded or wetland habitat exist on some islands.

The aquatic habitats historically ranged from fresh to brackish and were home to both resident and migratory fish. Modern aquatic habitats are affected by flows released from upstream dams, seasonal drainage from agricultural lands, and year-round drainage from sources outside the Primary Zone, such as sewage treatment plants. Several large, freshwater lakes are located on the eastern edge of the Delta, providing year-round wetland habitat.

Species native to the Delta evolved within an ecosystem that was much different than today. Many of the indigenous species have declined because of ecosystem changes over the past 150 years including:

- Loss of habitat.
- Loss of access to upstream habitat for anadromous fish from construction of dams.
- Diking and draining of Delta lands to convert marshes to farms.
- Urbanization.
- Changes in river flows.
- Construction of levees that separate rivers from their floodplains thereby eliminating channel meander and riparian habitat.

- Invasion by non-native species.
- Alterations in hydrology, particularly the elimination of variability in seasonal flow patterns.
- Reduction in seasonal and annual variability in salinity.
- Introduction of numerous toxic substances.
- Export pumping in the South Delta.

Flow patterns in the Delta are governed by inflows, large water diversions, and tidal flows. The relative importance of these flows varies with season and location. Net—tidally averaged—flows depend on inflows from the rivers and export pumping in the southern Delta. Sometimes the combination of inflows and exports causes "reverse flow," or a situation when flow moves upstream rather than downstream. These flows can cause young fish, including eggs and larvae, to be entrained at the pumping facilities of the State Water Project and the Central Valley Project.

The Delta provides substantial habitat for resident and migratory waterfowl and shorebirds. The abundance of these birds declined precipitously in the Delta because of land reclamation, although subsequent changes in cropping patterns have allowed populations of some species to increase.

The Delta supports hundreds of fish, plants, mammals, amphibians, reptiles, and invertebrates. Many of the native species have declined in abundance and in range, leading to the listing of several species under the California and/or federal Endangered Species Acts. Early species declines were caused by loss or isolation of physical habitat when the Delta islands were drained. However, due to the information collected as a result of monitoring activities that occurred in the 1960's through the 1980's, it is clear that species declined due to a variety of causes including changing climate; effects of toxic substances; alteration of habitat; introduction of non-native species that consume, compete with, or alter the habitat of native species; water diversions/exports; and changes in hydrology.

In the past few years, the abundance of several pelagic (open water) fish species inhabiting the Delta, such as delta smelt and longfin smelt, have declined to record-low levels. The reasons for this pelagic organism decline are multiple and are the subject of intense investigation. The loss of pelagic species in the Delta seems to be a function of poor conditions for food conditions, invasive species, degraded water quality, losses to export pumping, and other potential negative influences, such as toxins. The populations of salmon that migrate through the Delta and are dependent on Delta resources have also experienced precipitous declines, which have adversely affected the fishing industry.

Long-term trends for the ecosystem depend on the severity of climate change and the future physical structure and salinity of the Delta. Large mammals, such as bear and elk, which historically lived in and around the Delta have either been eliminated or reduced to extremely low numbers. Aquatic mammals, including beaver and otter still remain. Some resident and migratory birds have adapted to the agricultural practices in the Delta, particularly the small grain fields which are flooded in fall and winter months. Migratory birds include ducks, geese, swans, cranes, and shorebirds. Hawks and eagles forage in the Delta fields. The Primary Zone, with its large open expanses of farmland, mosaic of small grain crop residues and shallow flooded fields, permit wildlife to feed and rest, thereby providing high quality wildlife habitat.

It is recognized that Habitat Conservation Plans and Natural Community Conservation Planning (HCP/NCCP) efforts within the Delta, including the CALFED Ecosystem Restoration Program Plan (ERPP) 4, must be acknowledged in the administration of the policies of the Element as these programs include agreements and/or contracts that have long-term provisions to sustain a durable program**.**

Policies:

DP-25. Preserve and protect the natural resources of the Delta. Promote protection of remnants of riparian and aquatic habitat. Encourage compatibility between agricultural practices, recreational uses and wildlife habitat. Partner with Sacramento Regional County Sanitation District and other partners to promote and encourage the use of recycled water for agricultural, habitat and water conservation purposes where feasible.

DP-26. Encourage farmers to implement management practices to maximize habitat values for migratory birds and other wildlife. Appropriate incentives, such as the purchase of conservation easements from willing sellers or other actions, should be encouraged.

DP-27. Lands managed primarily for wildlife habitat should be managed to maximize ecological values. Appropriate programs, such as "Coordinated Resource Management and Planning" (Public Resources Code Section 9408(c)) should ensure full participation by local government and property owner representatives.

DP-28. Support the non-native invasive species control measures being implemented by the California Department of Fish and Wildlife, the California Department of Boating and Waterways, the California Emergency Management Agency, the California Department of Food and Agriculture, the State Water Resources Control Board, the Central Valley and San Francisco Bay Regional Water Quality Control Boards, and the Agricultural Commissioners for the five Delta Counties (Yolo, Solano, Sacramento, San Joaquin, and Contra Costa), which include controlling the arrival of new species into the Delta.

DP-29. Preserve and protect the viability of agricultural areas by including an adequate financial mechanism in any planned conversion of agricultural lands to wildlife habitat for conservation purposes. The financial mechanism shall specifically offset the loss of local government and special district revenues necessary to support public services and infrastructure.

DP-30. Support the implementation of appropriate buffers, management plans and/or good neighbor policies (e.g. safe harbor agreements) that among other things, limit liability for incidental take associated with adjacent agricultural and recreational activities within lands converted to wildlife habitat to avoid or minimize negative effects on the ongoing agricultural and recreational operations adjacent to the converted lands.

DP-31. Incorporate, to the maximum extent feasible, suitable and appropriate wildlife protection, restoration and enhancement on publicly-owned land as part of a Delta-wide plan for habitat management.

DP-32. Promote ecological, recreational and agricultural tourism in order to preserve the cultural values and economic vitality that reflect the history, natural heritage and human resources of the Delta including the establishment of National Heritage Area designations.

DP-33. Protect and restore ecosystems and adaptively manage them to minimize impacts from climate change and other threats and support their ability to adapt in the face of stress.

DP-34. Support the design, construction, and management of any flooding program to provide seasonal wildlife and aquatic habitat on agricultural lands, duck club lands and additional seasonal and tidal wetlands, shall incorporate "best management practices" to minimize vectors including mosquito breeding opportunities, and shall be coordinated with the local vector control districts., (Each of the four vector control districts in the Delta provides specific wetland/mosquito management criteria to landowners within their district.)

SACRAMENTO COUNTY GENERAL PLAN
DELTA PROTECTION ELEMENT

RECREATION AND ACCESS

Including Marine Patrol, Boater Education, and Safety Programs

GOAL: To promote continued recreational use of the land and waters of the Delta; to promote facilities that support the construction, maintenance and supervision of recreational uses; to protect landowners from unauthorized recreational uses on private lands; and to maximize dwindling public funds for recreation by promoting public-private partnerships and multiple use of Delta lands.

Overview

The Delta is a unique geographic region that provides exceptional recreational opportunities including boating, fishing, hunting, hiking, biking, camping, and wildlife viewing. Recreational users originate from both within and outside of the Delta. Many of the visitors value the wide expanses of open land, interlaced waterways, historic towns, and the feeling of a slower pace of life within the Delta.

Navigable waterways in the Delta-Suisun area are publicly accessible and currently constitute the majority of the recreational opportunities within the Delta. Boating use totals more than 6.4 million visitor days annually, composed of 2.13 million annual boat trips in the larger Delta-Suisun area (*Status and Trends of Delta-Suisun Service, California Department of Water Resources, May 2007*). The Aquatic Recreation Component of the Delta Recreation Strategy Plan prepared by the Delta Protection Commission forecasts demand for boating recreation through 2020 and identifies a deficit of facilities.

Most of the recreational facilities within the Delta are provided through private marinas. Several thousand boat berths are located in the Primary Zone, almost equally divided between Contra Costa, Sacramento, and San Joaquin Counties. Private facilities also provide launching facilities, Recreational Vehicle and tent camping, picnicking, restaurants, and bait and tackle shops. Waterskiing and riding [1]Personal Water Craft (PWC) are popular water-oriented activities.

The majority of the land within the Delta is privately owned, which reduces the availability of land-based recreation. Five fishing access/launching facilities owned by the California Department of Fish and Wildlife and managed by Sacramento and Yolo counties are located within the Delta. San Joaquin County provides land and water access at Westgate Park. Brannan Island State Recreation Area provides boat launching, camping, swimming, nature interpretation, and wind surfing. Hunting occurs mainly on private lands; although some hunting is allowed on State- and federally-owned lands and waterways.

[1] *"(Personal Water Craft" (PWC) is the general term for a broad range of small, powered boats that typically carry one or two persons, and are popularly known by registered tradenames such as Jet Ski, Ski Doo, etc.*[1]

Concerns regarding existing and future recreational activities within the Delta include compatibility with agricultural operations and other private property uses, funding availability for the long-term maintenance and supervision of existing recreational facilities and for the development of new recreational facilities, compatibility with wildlife uses and levee maintenance requirements, overuse of existing facilities and popular waterways, the abandonment of vessels and other debris within Delta waterways, and increased demands on law enforcement and other emergency response providers.

Opportunities are available for new recreational facilities to be provided within the Delta on publicly-owned land. Examples include pedestrian access on publicly-owned levees adjacent to Brannan Island State Recreation Area; construction of new visitor facilities, interpretative facilities and trails at the Stone Lakes National Wildlife Refuge; and pedestrian trails, visitor facilities, and water access facilities at State Park's Delta Meadows Project.

In addition, Senate Bill 1556, signed by the Governor in September 2006, creates a California Delta Trail and requires the Delta Protection Commission to create a plan for designing, constructing, and maintaining this trail. The California Delta Trail is planned to be a bike, pedestrian and equine trail system and recreation corridor along more than 1,000 miles of Delta waterfront that will connect with the 450-mile San Francisco Bay Trail.

Policies:

DP-35. Support appropriate planning, development and funding for expansion, ongoing maintenance and supervision of existing public recreation areas and access areas.

DP-36. Encourage expansion of existing privately -owned water-oriented recreation and access facilities that are consistent with local General Plans, zoning regulations and standards

DP-37. Assess the need for new regional public and private recreation and access facilities to meet increasing public need, and prioritize, develop, maintain and supervise them consistently with local, state, and federal laws and regulations. Support adequate public services for all existing, new, and improved recreation and access facilities.

DP-38. Encourage new regional recreational opportunities, such as Delta-wide trails, which take into consideration environmental, agricultural, infrastructure, and law enforcement needs, and private property boundaries. Also, encourage opportunities for water, hiking, and biking trails.

DP-39. Encourage provision of publicly funded amenities such as picnic tables and boat-in destinations in or adjacent to and complimentary to private facilities, particularly if the private facility will agree to supervise and manage such amenities, thus lowering the long-term cost to the public.

DP-40. Support multiple uses of Delta agricultural lands, such as seasonal use for hunting and provision of wildlife habitat.

DP-41. Support improved access for bank fishing along State highways, county roads and other appropriate areas where safe and adequate parking, law enforcement, waste management and sanitation facilities, and emergency response can be provided and where proper rights-of-access have been acquired.

DP-42. Consider, for the sake of the environment and water quality, the provision of appropriate restroom, pump-out and other sanitation and waste management facilities at new and existing recreation sites, including marinas; encourage the provision of amenities including but not limited to picnic tables and boat-in destinations.

DP-43. Encourage the development of funding and implementation strategies by appropriate governing bodies for the surrender and/or removal of water-borne debris and dilapidated, unseaworthy and abandoned vessels from waterways, to minimize navigational and environmental hazards.

DP-44. Promote and encourage Delta-wide communication, coordination, and collaboration on boating and waterway-related programs including but not limited to marine patrols, removal of debris and abandoned vessels, invasive species control and containment, clean and safe boating education and enforcement, maintenance of existing anchorage, mooring and berthing areas, and emergency response in the Delta.

DP-45. Recognizing existing laws, encourage establishment of Delta-wide law enforcement protocols on local public nuisance and safety issues, such as trespassing, littering, and theft.

DP-46. Support and encourage programs for waterways that provide opportunities for safe boating and recreation, including removal of floating and sunken debris and abandoned vessels from Delta waterways in collaboration with appropriate agencies.

DP-47. Support the development of a strategic plan, in consultation with all law enforcement agencies having jurisdiction in the Delta, to improve law enforcement and the use of available resources to provide an adequate level of public safety. The strategic plan shall identify resources to implement the plan.

WATER

GOAL: Protect and enhance long-term water quality in the Delta for agriculture, municipal, industrial, water-contact recreation, and fish and wildlife habitat uses, as well as all other beneficial uses.

Overview

In California, rainfall runoff and snowmelt are captured in reservoirs to redistribute to urban and agricultural customers while meeting environmental requirements. About 75 percent of the State's water originates north of the Delta; and about 75 percent of the State's water needs occur south of the Delta.

Water bound for distribution through both the State Water Project (SWP) and the federal Central Valley Project (CVP) is taken from the south Delta. The CVP has contracts to divert 3.3 million acre feet per year, which supplies primarily agricultural land south of the Delta but also supplies urban areas and wildlife refuges. In addition, water to serve some Bay Area urban users is taken from the Delta. The SWP has contracts to divert 4.2 million acre feet per year from the Delta, which supplies primarily urban uses but also supplies agricultural uses south of the Delta. On average, the projects export a total of about 5 million acre feet annually.

About two-thirds of the State's population gets at least a portion of its drinking water from the Delta. In addition, Delta farmers and irrigation districts have rights to irrigate with water taken directly from Delta sloughs and channels.

Because the Delta drains the Sacramento River and San Joaquin River watersheds, urban stormwater runoff and waste discharges from upstream and adjacent areas enter Delta waterways and may contribute to and cause water quality problems. Low-flow years generally carry higher concentrations of waste discharges and agricultural runoff and drainage than do wet years.

Some treated municipal and industrial wastewater, untreated urban storm water, and agricultural runoff and drainage enter the Delta directly. Other urban and agricultural discharges from upstream in the watershed enter the Delta along with the river flows. Seepage onto Delta islands from adjacent channels and drainage from the agricultural lands are released back to the Delta channels at hundreds of locations.

The Central Valley Regional Water Quality Control Board (Board) has identified the Delta as impaired by a number of pollutants, including some pesticides, low dissolved oxygen, electrical conductivity (salinity), and mercury (naturally occurring in the Cache Creek watershed, as well as a legacy of the large-scale hydraulic mining of the Sierra Nevada in the late 1800s).

Designation as an impaired water body by the Board, relevant to certain water quality criteria or other stressors, is variable depending on portions of the watershed within the Delta. Some Delta fish have elevated levels of methylmercury, which poses a risk to humans and wildlife that eat

the fish on a regular basis. As of 2009, the Board has adopted a threshold called a total maximum daily load (TMDL) for dissolved oxygen and as of 2010 is developing a TMDL for methylmercury in the Delta.

The daily tidal cycles and the San Joaquin River contribute most of the salinity to the Delta. During periods of high Delta inflows, salinity is low; during periods of low Delta inflows, the salinity level rises. Salinity in the Delta is managed by a mix of releases from upstream reservoirs, Cross Channel Gate operations, Delta outflow, and exports from the Delta. The combination of organic matter (decaying vegetation), bromide in the seawater, and disinfectants used in water treatment plants produce disinfection byproducts that may pose health risks.

The State Water Resources Control Board and the Regional Boards designate beneficial uses of the State's waters. In the Delta, beneficial uses include: municipal and domestic supply; agriculture; industry; groundwater recharge; navigation; recreation; wildlife habitat; fish migration and spawning; and preservation of rare and endangered species. Delta water quality is governed through standards that are protective of beneficial uses for municipal and industrial uses, agricultural uses, and fish and wildlife, all of which are currently under review by the State Water Resources Control Board.

Policies:

DP-48. Preserve and protect the water quality of the Delta both for designated beneficial uses.

DP-49. Respect and protect Delta water rights and water contracts, including area of origin water rights and riparian water rights.

LEVEES

GOALS: **Support the improvement, emergency repair, and long-term maintenance of Delta levees and channels**

Promote levee rehabilitation and maintenance to preserve the land areas and channel configurations in the Delta as consistent with the objectives of the Delta Protection Act.

Overview

The Delta is the natural drain for a watershed that includes the Central Valley and the western slope of the Sierra Nevada from Fresno to Mount Shasta. Existing flood management and water supply facilities (dams, levees, and bypasses) throughout the watershed influence floodflows to the Delta. Settlers began to farm the rich lands of the Delta by the 1850s. They built low levees to allow land to be drained for farming. Few of these levees were built using modern engineering techniques, and many rest on peat foundations that have settled with the added weight.

The main flood management facilities in the Delta include the approximately 1,100 miles of levees and the Yolo Bypass. The Yolo Bypass, with about 500,000 cubic feet per second (cfs) capacity, was designed to flood occasionally to relieve high water stages on the Sacramento River. Easements held by the Central Valley Flood Protection Board provide the right to inundate the land, including some islands such as Liberty Island, with floodwaters. The lower Sacramento ship channel and the Stockton ship channel provide some flood-carrying capability. Dredging to enlarge and clean Delta channels use to be an important element of flood management.

Levees can fail for various reasons including the burrowing activities of animals, erosion, overtopping, deferred maintenance, seepage through sand layers underlying levee foundations, slope stability and other causes.

Delta levees face risk of high water overtopping during the wet season (winter and spring), particularly when large storms coincide with high tides. Storms contribute to the levee overtopping risk by increasing water levels in the rivers and creating wind-induced waves. In addition, the low barometric pressures associated with large storms raise water surface levels in Delta and Suisun Marsh channels. In many cases, the flooding of the islands has been costly to local residents and farmers and to the state as a whole. Damage to levees could also occur due to sea level rise and other aspects of climate change.

Policies:

DP-50. Regulate new construction within flood hazard areas to protect public health, safety, and welfare consistently with applicable regulations concerning the Delta, as well as

the statutory language contained in the Delta Protection Act of 1992. Increased flood protection shall not result in residential designations or densities beyond those allowed under zoning and general plan designations in place on January 1, 1992, for lands in the Primary Zone.

DP-51. Support programs for emergency levee repairs and encourage coordination between local, State, and federal governments. The programs may include but are not limited to: interagency agreements and coordination; definition of an emergency; designation of emergency funds; emergency contracting procedures; emergency permitting procedures; and other necessary elements.

DP-52. Support efforts to address levee encroachments that are detrimental to levee maintenance.

DP-53. Support funding assistance for existing unincorporated towns within the Delta to improve levees up to a 200-year flood protection level.

DP-54. Support stockpiling rock in the Delta for levee emergency response.

DP-55. Support a multi-year funding commitment to maintain and restore both project and non-project levees in the Delta.

DP-56. Encourage the beneficial reuse of dredged material, as appropriate, for levee maintenance and rehabilitation, and the maintenance of instream flows. Support and advocate for the Delta Long-Term Management Strategy (LTMS).

DP-57. Seek funding for and support programs to make cost-effective levee investments in order to preserve the economy and character of the Delta.

DP-58. Support a minimum Delta-specific levee design standard as established by state and federal regulations.

SACRAMENTO COUNTY GENERAL PLAN
DELTA PROTECTION ELEMENT

UTILITIES AND INFRASTRUCTURE

GOAL: Support construction of new utilities and infrastructure facilities appropriate to the Delta which avoid, minimize and mitigate the impacts of such new construction on the integrity of levees, wildlife, recreation, agriculture.

Overview

Due to the Delta's location between major population areas, its unique resources, especially water and natural gas, and its flat terrain and general lack of development, the Delta has high value as a utility and transportation corridor.

Utilities located in the Delta include: radio, cellular telephone and television transmission towers; electrical transmission lines including Pacific Gas and Electric (PG&E), Sacramento Municipal Utility District, and Western Area Power Administration lines; natural gas pipelines, serving local gas fields and regional pipelines; petroleum transportation pipelines; and water transportation canals and pipelines transporting water from the Delta to regional users and to the State and federal water projects.

Local governments regulate the utilities that serve Delta residents and visitors including potable water, sewage disposal, and solid waste disposal. Most potable water is obtained from groundwater through local wells. Most wastewater from homes and businesses is treated in on-site septic tanks. Some of the larger communities and developments have self-contained wastewater treatment facilities. Communities outside the Primary Zone are currently anticipated to continue to release treated wastewater into Delta waterways (through wastewater discharge requirements issued by the regional water board), onto constructed wetlands, or onto agricultural lands. Most solid waste generated in the Delta is disposed of at facilities outside the area.

Transportation systems traversing around and through the Delta include several railroads and freeways, state highways, and county roads. Three interstate freeways (Interstate 5, Interstate 80, and Interstate 580) provide major transportation and trucking routes that pass the periphery of the Delta. The three major state highways in the Delta (State Routes 4, 12, and 160) are typically two lanes, sometimes built on top of levees. Originally meant for lower traffic volumes at moderate speeds, the state highways are now heavily used for regional trucking, recreational access, and commuting. More than 50 bridges, including approximately 30 drawbridges span the navigable channels of the Delta.

Regional rail traffic between the Bay Area and the Central Valley passes through the Delta. The Amtrak San Joaquin route from Bakersfield to Sacramento/Oakland, which crosses through the Delta, had nearly 800,000 riders in 2006. In addition, companies such as the Sierra Northern Railway use existing short-line tracks for inter-regional freight and passenger services.

Two major ports lie north and east of the Primary Zone, the Ports of Sacramento and Stockton, respectively. The Stockton and Sacramento Deep Water Ship channels traversing the Delta were

constructed in 1933 and 1963, respectively. The Stockton channel is 35 feet deep and can handle 55,000-ton class vessels with full loads. More than 300 ships and barges used the channel in 2005. The Sacramento ship channel is 30 feet deep with plans underway to increase its depth to 35 feet. Both ports are likely to expand in the future, which would result in an increase in ship and barge traffic through the Delta. Several million tons of diversified products are shipped through the Delta each year.

Airports in the Primary Zone of the Delta are limited to small facilities serving individual land-owners, agriculture-serving businesses, and small air operations.

Policies:

DP-59. Impacts associated with construction of transmission lines and utilities can be mitigated by locating new construction in existing utility or transportation corridors, or along property lines, and by minimizing construction impacts. Before new transmission lines are constructed, the utility should determine if an existing line has available capacity. To minimize impacts on agricultural practices, utility lines shall follow edges of fields. Pipelines in utility corridors or existing rights-of-way shall be buried to avoid adverse impacts to terrestrial wildlife. Pipelines crossing agricultural areas shall be buried deep enough to avoid conflicts with normal agricultural or construction activities. Utilities shall be designed and constructed to minimize any detrimental effect on levee integrity or maintenance, agricultural uses and wildlife within the Delta. Utilities shall consult with communities early in the planning process for the purpose of creating an appropriate buffer from residences, schools, churches, public facilities and inhabited marinas.

DP-60. New houses built in the Delta agricultural areas but outside of the Delta's unincorporated towns shall continue to be served by independent potable water and wastewater treatment facilities and/or septic systems. Agricultural uses that require wastewater treatment shall provide adequate infrastructure improvements or pay to expand existing facilities, and not overburden the existing limited community resources. The appropriate governing body shall ensure that new or expanded construction of agriculturally-oriented wastewater disposal systems meet the appropriate standards/conditions and are not residentially growth inducing. Independent treatment facilities should be monitored to ensure no cumulative adverse impact to groundwater supplies.

DP-61. New municipal sewage treatment facilities (including storage ponds) that support development or business outside of the Delta Primary Zone shall not be located within the Delta Primary Zone. The Rio Vista project, as described in the adopted Final Environmental Impact Report for such project, and the Ironhouse Sanitary District use of Jersey Island for disposal of treated wastewater and biosolids are exempt from this policy.

DP-62. Encourage recycling programs for metals, glass, paper, cardboard, and organic materials in order to minimize waste generation. Recycling facilities for these materials should be suitably located to serve Delta residents, visitors, and businesses.

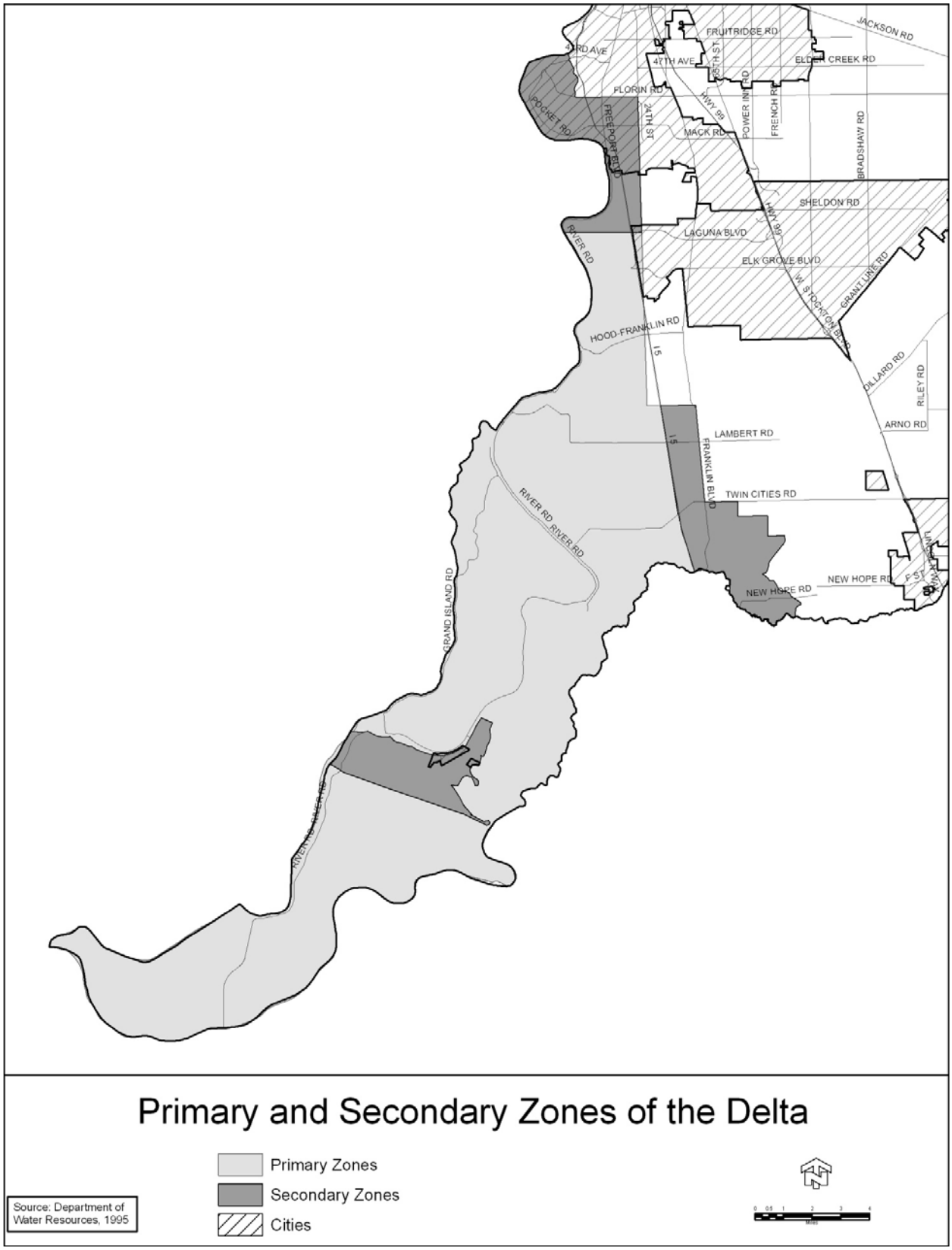
High groundwater tables and subsiding soil make the Delta an inappropriate location for solid waste disposal.

DP-63. Roads within the Delta shall be maintained to serve the existing agricultural uses and supporting commercial uses, recreational users, and Delta residents. Promote the maintenance and enhancement of major thoroughfares already used as cross-Delta corridors.

DP-64. Allow air transportation in the Delta to continue to serve Delta residents and agriculture-related businesses. Due to subsidence, transmission lines, high winds, fog, and high raptor and waterfowl use, the Primary Zone is not an appropriate location for new or expanded general aviation airports.

DP-65. Encourage the provision of infrastructure for new water, recycled water and recreational and scientific research facilities.

FIGURE 1: Primary and Secondary Zones of the Delta



Chapter 1: Introduction

The Sacramento-San Joaquin River Delta is a unique place of economic, environmental, historic, and cultural significance. The land and water resources of the Delta support significant agricultural and recreation economies, and the Delta also has an important role as an infrastructure hub for water, energy, and transportation. The region's rich history boasts of bustling, river-based commerce before the automobile age, and its cultural uniqueness includes the only rural town in America build by early Chinese immigrants. As the largest estuary on the west coast of the Americas, the Delta also is a place of striking natural beauty and ecological significance that is struggling with serious environmental degradation problems. Although surrounded by growing cities, the Delta remains a highly-productive agricultural area with rural charms, landscapes, and waterscapes not found elsewhere in California.

In recent years, there has been great concern over increasing environmental degradation in the Delta and over court decisions that reduced the quantity of water delivered to southern California through the state and federal water project intakes in the south Delta to protect endangered fish. Combined with additional concerns about the stability of the Delta's levee system, these concerns led the California legislature to pass the Delta Reform Act of 2009. The Act created the Delta Stewardship Council and charged it with developing a Delta Plan to achieve the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem."

Recognizing the potential impact of the Delta Plan on the people and economy of the Delta, the Delta Reform Act stated that the coequal goals of water supply reliability and restoring the Delta ecosystem "shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place." Among the measures to address this goal, the Delta Protection Commission was tasked with developing this Economic Sustainability Plan to inform the Delta Stewardship Council's development of the Delta Plan.

The Legislature established the following guidelines for the Economic Sustainability Plan in the Delta Reform Act of 2009.

The economic sustainability plan shall include information and recommendations that inform the Delta Stewardship Council's policies regarding the socioeconomic sustainability of the Delta region. (b) The economic sustainability plan shall include, but not be limited to, all of the following:

1) Public safety recommendations, such as flood protection recommendations.
2) The economic goals, policies, and objectives in local general plans and other local economic efforts, including recommendations on continued socioeconomic sustainability of agriculture and its infrastructure and legacy communities in the Delta.
3) Comments and recommendations to the Department of Water Resources concerning its periodic update of the flood management plan for the Delta.
4) Identification of ways to encourage recreational investment along the key river corridors, as appropriate.

Since a key purpose of this Economic Sustainability Plan is to inform the Delta Plan under development by the Delta Stewardship Council, this report analyzes the impact of key policies being considered for the plan on the economic sustainability of the Delta. Many of the most significant proposals for the Delta are being developed in the Bay Delta Conservation Plan

(BDCP). The policy proposals can be grouped into four categories: 1) water conveyance, 2) habitat creation, 3) levees, and 4) land use regulation. The report also considers many aspects of economic sustainability in the Delta that are unrelated to these water policy proposals including economic development recommendations in the 2008 Delta Vision Strategic Plan.

Thus, in addition to the goals stated in legislation, the following goals have also been established as critical to developing information and recommendations to support economic sustainability in the Delta.

- Provide a thorough analysis of the baseline and trends for key sectors of the Delta economy.
- Identify the linkages between the Delta economy and the regional and state economy.
- Provide the most complete available assessment of the condition of Delta levees.
- Develop a vision for economic sustainability of Delta Legacy Communities.
- Create a detailed model of the effects of water policy proposals on Delta agriculture.
- Assess the effect of water policy proposals on the recreation and tourism economy, other economic sectors, and key Delta infrastructure.
- Integrate the findings into a general set of economic sustainability recommendations and strategies for the Delta.
- Integrate the findings into a specific set of recommendations on the issues under consideration by the Delta Stewardship Council for inclusion in the Delta Plan.

Many of these goals involve new research and analysis to support Delta decision making. The last two goals integrate these findings into specific recommendations for policy and economic development and make up the Economic Sustainability Plan.

In order to be adopted into the Stewardship Council's Delta Plan, the recommendations in the Economic Sustainability Plan must be consistent with the coequal goals of improving water supply reliability and protecting, restoring, and enhancing the Delta ecosystem. The legislature also stated that the "coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place." Thus, the Economic Sustainability Plan can provide important guidance on evaluating the degree to which proposed actions to address the coequal goals support or conflict with the objective of protecting and enhancing the Delta.

The concept of economic sustainability and the objective to "protect and enhance the unique cultural, recreational, natural resources, and agricultural values of the California Delta as an evolving place" can be interpreted in different ways. In economic terms, there was consensus among Delta Protection Commission Stakeholders that a minimum requirement is to maintain the economic value of the entire Delta economy in the future. The Fifth Staff Draft of the Delta Stewardship Council's Delta Plan uses a stronger definition of economic sustainability where growth in one sector is not a substitute for deterioration in another area. Specifically, the Fifth Staff Draft Delta Plan defines performance measures for economic sustainability as maintaining or increasing gross revenues in each of three key sectors: agriculture, recreation, and ecotourism/agritourism. The peer review panel for the ESP found this to be too strong and recommended that sustainability should allow for the growth in one sector to substitute for decline in another sector. The ESP follows these guidelines and considers the potential for substitution between sectors in developing recommendations. In addition, there is broad agreement that this objective requires the protection of the cultural and historical heritage and the long-term economic viability of the Delta's historical Legacy Communities.

Chapter 8: Recreation and Tourism

8.1 Overview and Key Findings

- Recreation is an integral part of the Delta, complementing its multiple resources and contributing to the economic vitality of the region. Residents of nearby areas visit virtually every day, generating a total of roughly 12 million visitor days of use annually and a direct economic impact of more than a quarter of a billion dollars in spending.
- The Sacramento-San Joaquin Delta is an area where a diversity of recreation experiences is evident, from boating in open water or through winding tree-covered channels, to hunting or wildlife viewing, studying local California history, or tasting award-winning local wines.
- Several physical and operational constraints have an impact on current facilities and recreation access, including sediment accumulation, water gates, screens, and barriers, invasive species, waterway obstructions, water quality, lack of boat-in destinations and access points, user group conflicts, private land trespass, and complex regulations.
- While a percentage of visitors to the Delta come from elsewhere, the majority of visitors are from Northern California. These visitors represent the focal market for Delta recreation growth opportunities in the future, and their places of origin define the Market Area for this study. The total Market Area had a population estimate of approximately 11.9 million in 2010, with projections of 17.6 million by 2050.
- Recreation visitation for 2010 is estimated to be approximately 8 million *resource-related* (e.g., boating and fishing) visitor days of use per year, 2 million *urban parks-related* (e.g., golf, picnic, and turf sports), and 2 million *right-of-way-related* (e.g., bicycling and driving for pleasure) recreation visitors/year. The total number of activity days is conservatively estimated at approximately 12 million/year.[133]
- An up-to-date visitor survey with new primary data, particularly on non-boating and non-fishing recreation, is needed to better document existing recreation visitation and spending.
- Employment within the Primary Zone in recreation-related economic sectors—including marinas, water craft rental, boat dealers, and boat building and repair—has been relatively flat over the past 20 years.
- The principle changes and trends that could affect the present recreation use and demand over the next 50–90 years are: physical changes to the Delta due to water conveyance management changes and rising sea levels, increasing population and development growth, increasing agritourism, non-consumptive resources-based recreation, habitat-related recreation, and the likely desire for closer-to-home recreation.
- The current direct spending in the Delta region from *resource-related* and *right-of-way/tourism-related* trips and related non-trip spending is estimated at roughly $312 million inside the Delta (in 2011 dollars). Additional economic impacts associated with urban recreation are not quantified, but are likely significant.
- Delta recreation and tourism supports over 3,000 jobs in the five Delta counties. These jobs provide about $100 million in labor income and a total of $175 million in value added to the regional economy.
- Delta recreation and tourism supports over 5,300 jobs across all of California, and contributes about $353 million in value added.

[133] Estimates are based on limited data combined with professional judgment.

- State Parks' *Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh* offers a strong framework for needs and opportunities for the provision of recreation and tourism in the Delta by state agencies.
- When attracting visitors and expanding recreation access to waterways and landside recreation improvements, potential negative impacts on agriculture from increased tourism and recreation can be minimized by focusing recreation uses and activities through expansion of existing recreation sites, development in Legacy Communities, creating buffer areas adjacent to agriculture, and increasing public safety enforcement.
- Growth of recreation in the Delta can be fostered through five location-based strategies, which would emphasize increased public access and related private development:
  - Delta waterways, specialized by boating type;
  - Dispersed, small points of interest and activity areas such as marinas, farmer's markets, wineries, restaurants;
  - Focal point complexes such as Legacy Communities or Bethel Island/Jersey Island/Big Break;
  - Natural habitat areas; and
  - The edges of existing and emerging urban areas that surround the Delta such as Stockton, Tracy, Rio Vista, and Lathrop.
- If resource quality and recreational facilities are maintained such that the Delta retains its current level of competitiveness as a recreation destination, baseline forecasts for visitation show increases of 3.4 million visitor days, or about 35 percent, over 40 years. If this Plan is implemented, recreation visitation in the Delta (including resource-related recreation, right-of-way recreation, and tourism) would increase over baseline.
- Assuming that current visitor spending patterns remain unchanged and Delta business growth accommodates recreation-related spending increases, baseline visitation growth is estimated to increase spending in the Delta roughly $78 million (2011$) to about $329 million (2011$) by 2050. Plan implementation could increase the economic impact of recreation over the baseline.
- Possible policy scenarios are qualitatively evaluated as to their primary elements and their potential positive and negative impacts on recreation.
  - Scenarios evaluated may affect recreation visitation by either decreasing visitation or increasing visitation over the baseline scenario, with the expected largest potential for negative impacts from increased regulatory changes or the six-island flooding and the largest potential for positive impacts from the habitat conservation scenario.
  - Visitation changes would also affect recreation-related spending in the Delta, as compared with the baseline forecast. It is anticipated that the magnitude of these potential changes is smaller in magnitude than the potential economic impacts to the agricultural economy.
  - The largest anticipated potential negative impacts would result from regulation changes, six-island flooding, salinity increases in the central and south Delta, large tidal marsh creation in the south Delta, and intake and pumping stations near Clarksburg and Courtland.
  - Positive impacts could result overall through project enhancements to fishing, wildlife viewing and nature study, and Delta-as-a-Place.
- A significant operational constraint for future growth in recreation demand is that there currently exists no Delta brand, overall marketing strategy, or significant-scale focal point area. An existing organization should be designated as a Delta recreation and tourism marketing and economic development facilitator.

- Recommended Implementation Strategies include consistency planning and regulation refinement, public/private coordination and partnerships, multi-agency coordination, strategic levee protection, Delta-wide marketing, and financing.

8.2 Introduction

The Delta is a significant natural place in California—a mixture of meandering rivers, sloughs, back bays, shipping channels, small communities, historic sites, and agricultural islands with farm markets and wineries. It is a vast area, covering over half a million acres, with about 60 larger tracts and islands and over 650 linear miles of waterways and channels.

The Delta links California's Central Valley with the San Francisco Bay. It is surrounded by cities (some of which have historic roots) and urbanizing areas at the edge of the Delta, and its two primary rivers, the Sacramento and the San Joaquin.

Approximately 12 million people live within close proximity of the Delta, yet most do not see it as a vital water source for the state, as a rich biological resource, or as an important agricultural production area, although it is all of these. For most, the Delta is best known for the recreation opportunities found there.

The Delta gives visitors a place to slow down and relax, to taste earth's bounty, and to leave the urban areas behind. It is called California's boating paradise, and is one of the state's most important fishing and waterfowl hunting resources, a place with natural habitats for bird watching and nature study, and a scenic place to meander and explore by boat or car.

Recreation is an integral part of the Delta, complementing its multiple resources and contributing to the economic vitality and livability of the region. Residents of nearby areas visit virtually every day, generating a total of roughly 12 million visitor days of use annually and a direct economic impact of more than a quarter of a billion dollars in spending.

8.3 Current Status and Trends

8.3.1 Understanding 'Delta as a Place' Today

The Delta is difficult to characterize as both a region and, likewise, a recreation destination. Unlike well-known water recreation destinations such as Lake Tahoe or Shasta Lake, the Delta is not a single entity and cannot easily be conceived in its entirety. It has highly varied physical attributes and covers a vast and varied landscape that can be viewed and accessed from activity points that are so disparate, it is possible to repeatedly visit the Delta and still have little understanding of exactly what the Delta is or how large it is.

Extending more than 50 miles from north to south, the Delta is sometimes centered on a wide river, though more often it is a network of narrow channels, sloughs, and islands. It presents itself from two distinct vantage points, each of which represents a completely different character. One view is from the water, where the landscape typically lies, unseen, behind tall levees and riparian vegetation, with only distant mountains visible. From the perspective of thicket-edged sloughs, narrow rock-faced channels, or spreading, open waterways, there is little landside context. The other view of the Delta, the landside perspective, largely precludes the water environment, which can be glimpsed primarily from levee-top roads and bridges. The predominant visual character landside is the agricultural landscape, which is as varied as the waterscape hidden on the other side of the levees.

This setting creates a place of paradox; it is a region that can be unapproachable and unapparent to visitors. For those who do not already know and visit the Delta, it can be a place that exists in name alone. Many people drive through the Delta without a clear sense of being in it and less notion of where it begins and where it ends.

Defining the Delta for visitors and recreation users is a necessary and yet difficult task. Because of the scope of the disparate environment, recreation destinations appear as a network of smaller recreation locations, each one suited to a different type of activity. To windsurfers, the open and windy waters of the larger channels flowing along the western side of Sherman Island might define the Delta. Sailors coming up from San Francisco Bay would define the Delta as offering protected deeper channels and coves. Water skiers and wake boarders might define the Delta by its protected narrower and straighter channels to the south, near Discovery Bay. Fishermen will be attracted to other aspects of the Delta, with differing characteristics, as varied as the fish they are seeking. So, too, kayakers, canoeists, pleasure cruisers, house-boaters, birders, hunters, and others, each seeking an aspect of the Delta specific to their interests and pursuits, will define the Delta in their own specific terms.

Recreationists from the landside may see a completely different Delta. Shoreline fishermen share the environment seen by those on the water and from the few recreation sites on land such as campgrounds and picnic areas. Hunters working fields and the edges of sloughs might never see open waterways as they seek game. For the vast majority of visitors to the Delta who never reach the water's edge, the landscape will be essentially one of agricultural fields, levee roads with river views, wineries and produce outlets, and sometimes, a Legacy Community's historical or cultural landmarks.

8.3.2 Existing Physical Conditions

8.3.2.1 Resource and Facility Analysis

Existing Facilities

In the Delta, people seeking recreation experiences primarily go to private enterprises, including marinas, restaurants, retail establishments, wineries, and farm stands. Public recreation facilities exist, but they are limited and many are natural resources-based, restricted-use areas such as the Department of Fish and Game's Wildlife Areas and Stone Lakes National Wildlife Refuge. Private nonprofit organizations such as The Nature Conservancy, Yolo Basin Foundation, and Solano Land Trust also provide recreation opportunities, which generally are related to habitat areas.

Private Facilities

Marinas are a common Delta access point for water recreation. Of the 95 marinas surveyed in 2001 as part of *The 2002 Sacramento-San Joaquin Delta Boating Needs Assessment,*[134] 92 were private and three were public facilities. Of the 92 private facilities, 87 were open to the public and five were private membership-based yacht clubs. These 92 private marinas provided a number of facilities to the Delta boater, including boat slips, launch ramps, parking, restrooms, restaurants, picnic facilities, camping sites, pumpouts, used oil collection centers, recycling centers, and fuel stations. Current data regarding business establishments in the Delta indicate that the number of marinas has not changed significantly since the early 2000s. Figure 27 provides a map of recreation zones and Figure 28 shows recreation facilities. Table 23 summarizes all facilities, as of 2002, by recreation zone with additional information about these zones.

[134] DBW 2002

Table 23 Summary of Facilities and Resources by Recreation Zone

	Recreation Zones						
	Northern Delta Gateway (North)	Bypass (Northwest)	Delta Hub (Central)	Delta Breezeway (West)	San Joaquin Delta Corridor (East)	Southern Delta Reaches (South)	Total
Linear Miles of Contiguous Waterways	61	58	132	152	122	110	635
Number of Marinas	8	1	12	56	13	5	95
Boat Slips	988	76	1,271	5,990	2,786	563	11,674
Transient Tie-Ups	20	18	69	115	69	18	309
Launch Ramps	3	1	9	27	11	4	55
Marina Parking Spaces	522	38	918	4,826	1,989	432	8,725
Day-Use Picnic Sites	40	0	52	183	26	23	324
Camp/RV Sites	54	0	247	1,501	327	53	2,182
Fuel Stations[135]	3	0	7	28	12	6	56
Source: DBW 2002, Table 2-1, Page 2-5							

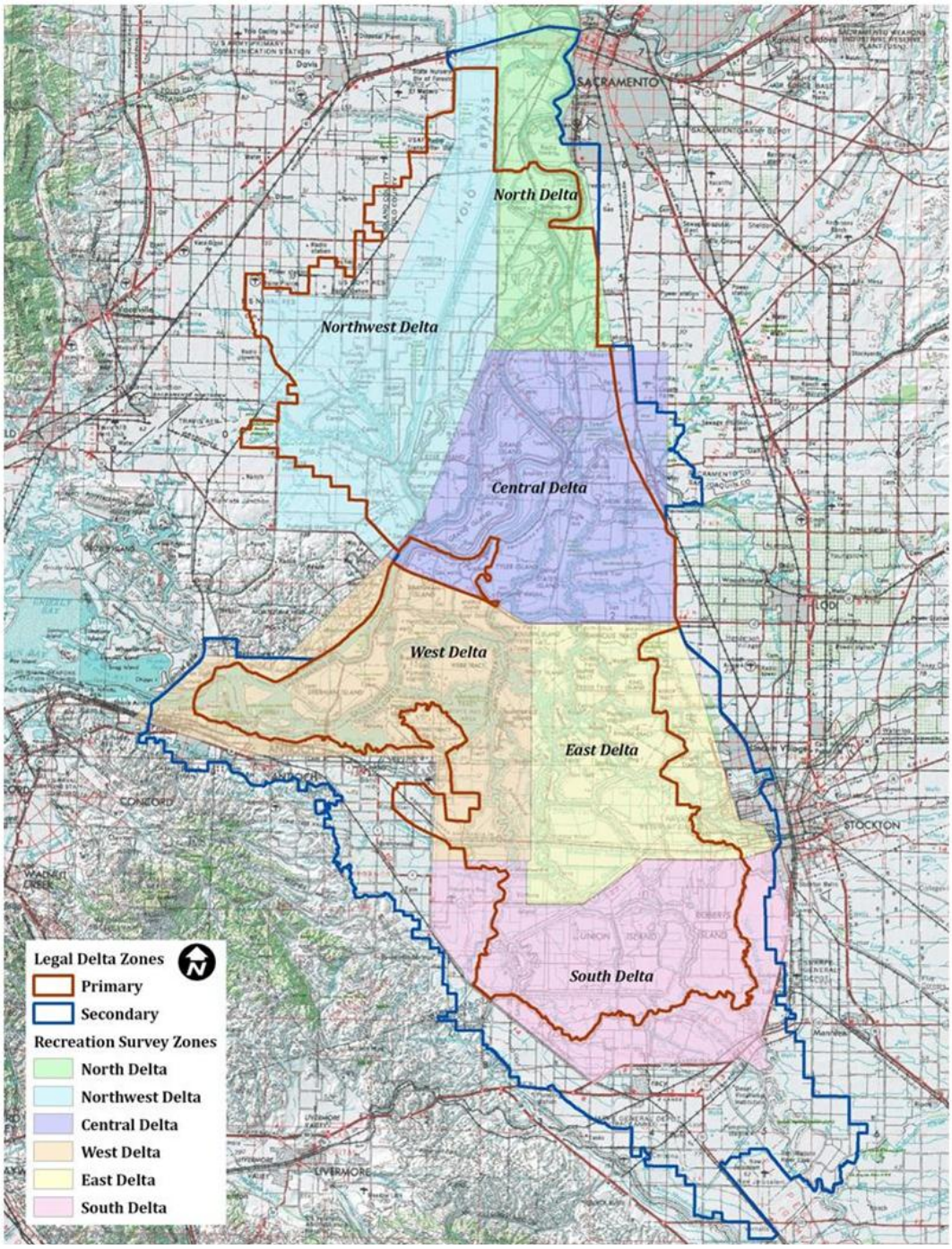
The Delta's other major private recreation facilities are the numerous private hunting clubs, which typically are associated with agricultural lands. Very little information exists on the number of these facilities or the number of hunters who utilize them. In a 1997 survey, the Delta Protection Commission identified 23 private hunting facilities, most in Yolo County. Conversations with hunters indicate that many additional formal and informal hunting clubs are located throughout the Delta.

Private nonprofit organizations such as The Nature Conservancy and the Solano Land Trust also provide for some public recreation on facilities that they manage. The Cosumnes River Preserve includes lands owned by both public and not-for-profit organizations such as Bureau of Land Management, Department of Fish and Game (DFG), Department of Water Resources (DWR), The Nature Conservancy (TNC), Ducks Unlimited, Sacramento County, and the State Lands Commission. The preserve has a visitor center with picnic areas, interpretive displays, restrooms, and three designated hiking trails and allows bird watching, photography, hiking, and paddling.

[135] A phone and internet survey was completed as part of this project to update the total number of marinas, camping facilities, fuel stations, and other facility numbers. Section 8.3.2.1 and Appendix I include details about those facility numbers. However, the numbers in Table 23 are left as is, as those were taken directly from the DBW 2002 survey, still provide a general magnitude of totals, are broken down by recreation zones, and all numbers have not been updated.

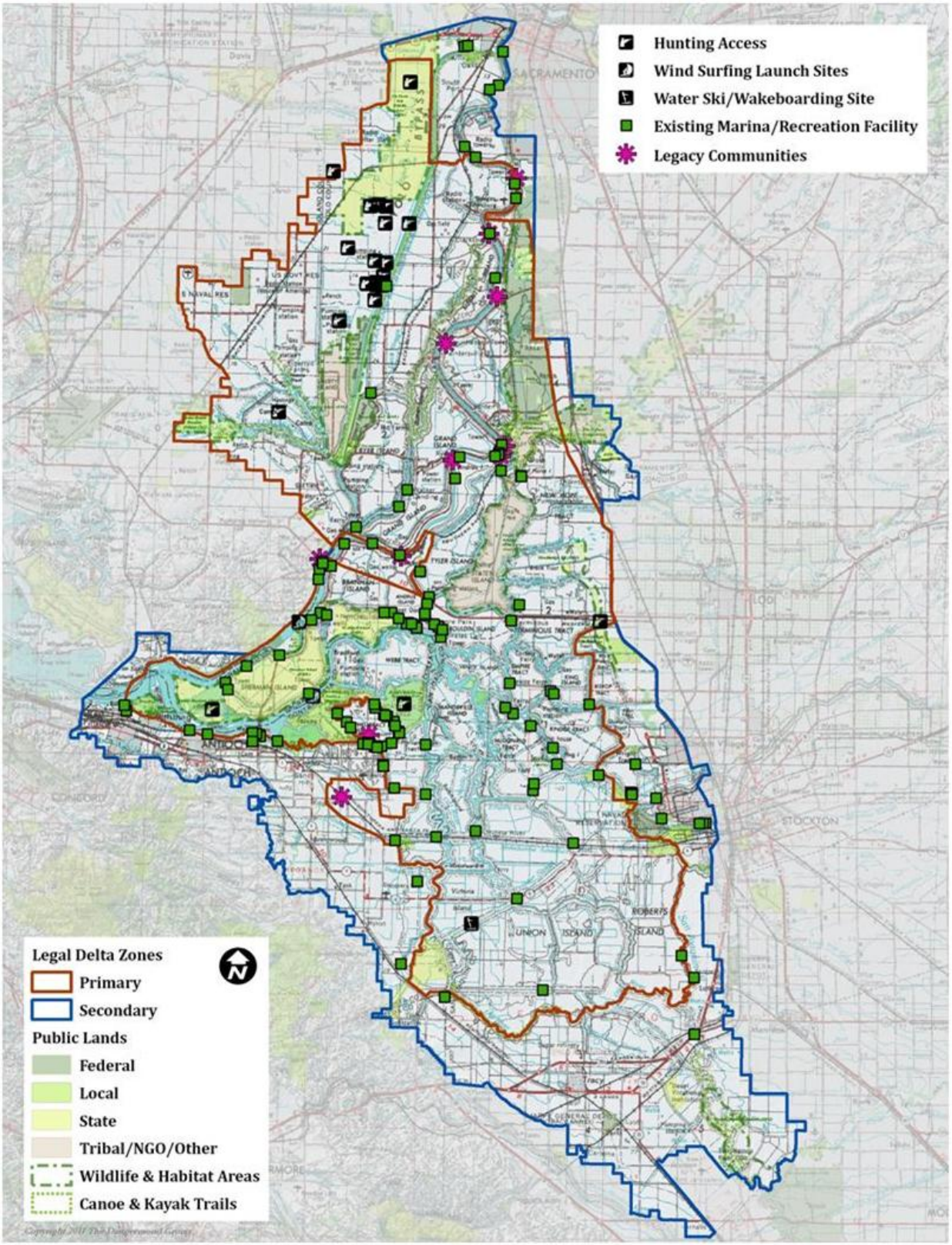
Additional private facilities include those catering to Delta-as-a-Place recreationists and tourists, including restaurants, agricultural stands, and wineries. A recent study found 25 attractions/historic places, 17 farmers markets, and nine wineries/tasting rooms (Figure 29).

Figure 27 Delta Recreation Zones[136]



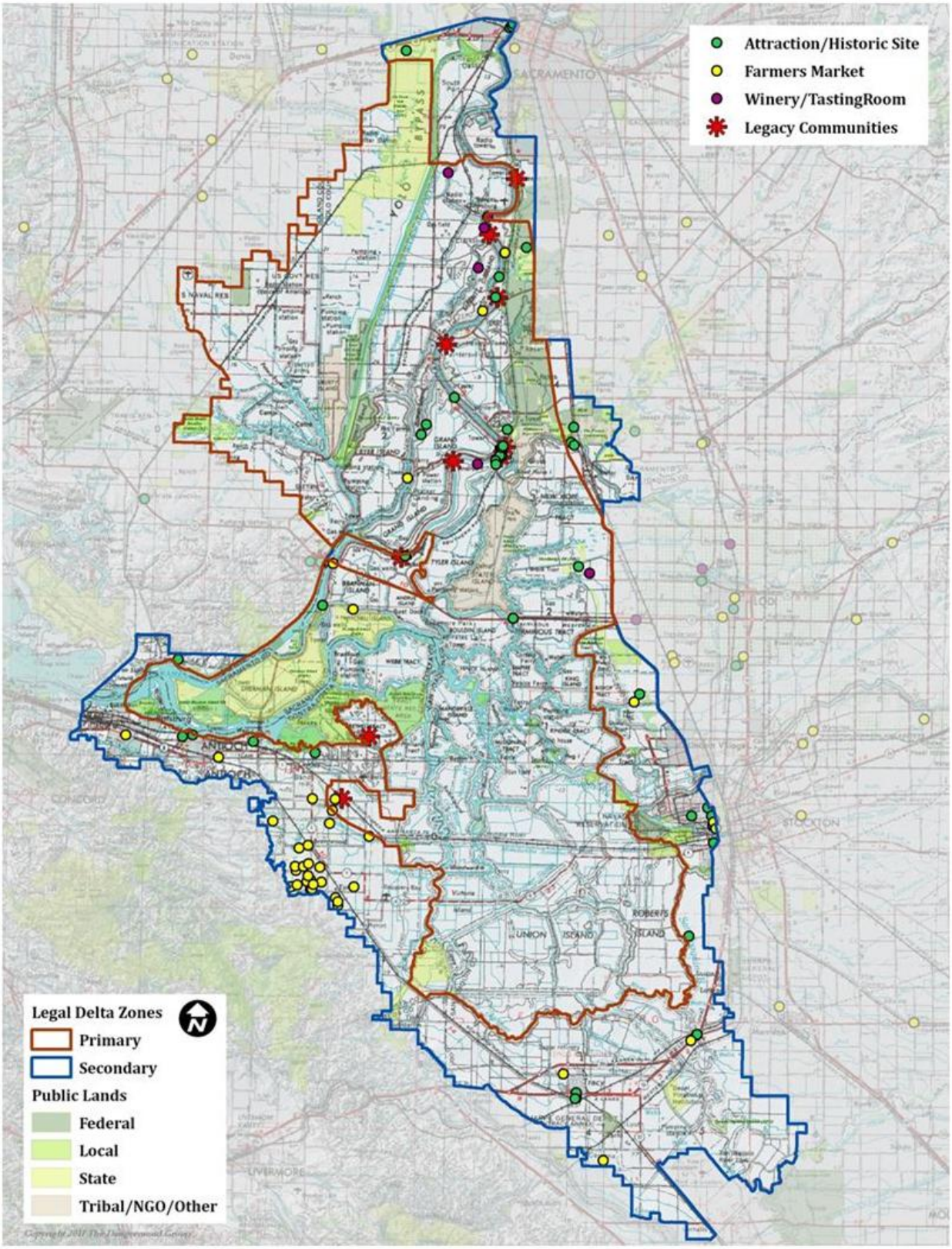
[136] For high resolution image see http://forecast.pacific.edu/desp-figs.html

Figure 28 Delta Recreation Facilities[137]



[137] For high resolution image see http://forecast.pacific.edu/desp-figs.html

Figure 29 Delta Tourism Facilities[138]



[138] For high resolution image see http://forecast.pacific.edu/desp-figs.html

was once a levee-protected island and now, although flooded, is shallow and obstructed by submerged levees and vegetation debris.

Snags, debris, floating logs, and abandoned vessels in the river and sloughs are very dangerous to boaters throughout the Delta. Until about 20 years ago, U.S. Army Corps of Engineers was responsible for keeping the waterways clear but no longer provides that service. The responsibility has fallen to local county sheriffs' departments, which lack the manpower, proper equipment, and funding to adequately provide obstruction-removal services and to remove the seasonal "crop" of flotsam that follows winter high-water flows. Some local assistance funding for the removal of abandoned recreational vessels and other navigational hazards is provided through the Department of Boating and Waterways' Abandoned Watercraft Abatement Fund (AWAF) grant program, though needs exceed funding availability.

Water Quality

Surveys of boaters utilizing the Delta have frequently revealed water quality as the top or one of the top-mentioned concerns or issues. In a survey conducted as part of the S*acramento-San Joaquin Delta Boating Needs Assessement,*[149] 74 percent of large-boat owners and 79 percent of small-boat owners identified water quality as an attribute of concern in the Delta. Concerns associated with water quality included risks or perceived risks related to body contact, possible sewage contamination, aquatic weeds, and water clarity. Boater perceptions of water quality may also differ from water quality best suited for native fish species (i.e., turbidity). In a 2009 study, 70 percent of boaters were concerned about water quality for drinking while 63 percent of boaters were concerned about water quality for swimming.[150]

Boating Destinations

Surveys of boaters also have found a high desire for more boat-in destinations within the Delta.[151] These requests tend to take three different forms.

1. Major boat-in, mooring, and camping attractions such as the Delta Meadows.
2. Numerous smaller day-use areas with restrooms, picnic, and beach facilities.
3. Additional convenience docks adjacent to Legacy Communities such as that established adjacent to Walnut Grove.

These facilities can create problems for adjacent agricultural interests. If development of such new areas is contemplated, they should be placed adjacent to public lands or in areas that avoid the risk of trespass, vandalism, and other conflicts.

Highly Sensitive Habitat Areas

There are several existing proposals (e.g., Delta Plan, Ecosystem Restoration Program) to expand and enhance habitat areas in certain waterways and islands. Conflicts can occur between recreational boating and habitat interests, depending on the boating activity, speed, motor, seasons, and frequency. Additionally, conflicts may result if the public is precluded from recreational access in these proposed restored-habitat areas.

8.3.3 Existing Operations Conditions

There are several operations-condition issues and constraints that were also described in *The Aquatic Recreation Component of the Delta Recreation Strategy Plan.*[152] A summary of the

[149] DBW 2002, p. 4-23
[150] DBW 2009, p. 134
[151] DBW 2002, p. 3-12 – 3-14
[152] DPC 2006, pp. 56-69

potential operational constraints discussed include user group conflicts, water management related constraints, and regulation and law enforcement issues. Most of these issues are compounded by the lack of an overall responsible agency throughout the Delta, due to the overlapping jurisdictions of several counties and cities.

User Group Conflicts

The diversity of boating activities in the Delta, from high-speed wakeboarding and personal watercraft (PWC) usage to fishing and non-motorized craft (e.g., canoe, kayak) results in conflicts between some user groups. Such conflicts are normally just a lack of common courtesy, rather than citable offenses. However, when one responsible entity manages water recreation use, basic rules and regulations can be established to avoid conflicts. A single responsible entity or common set of regulations does not generally exist in the Delta, with the exception of "No Wake Zones" adjacent to marinas. In addition, marine patrol is fractured between ten different agencies over five counties. Safety laws are the primary concern, along with enforcement of pollution laws, speed violations, negligent operators, equipment violations, lack of life jackets, alcohol consumption, and poaching.

Private Lands/Agriculture-Recreation Conflicts

Another serious and common problem is trespass on private property. Frequently, trespass violations stem from recreationists' misunderstanding of what property is public and what is private. Clear signage, however, does not deter some who desire to use a specific area.

Water Management

The lack of jurisdictional coordination, with no single agency ultimately responsible for management, has left an absence of adequate, coordinated waterway maintenance and security in order to enforce regulations and control user group conflicts. Additionally, there is a lack of information sources about the Delta to assist recreation users who are unfamiliar with the Delta.

Regulation

The regulatory structure in the Delta is complex, with local, state, and federal regulatory agencies imposing many overlapping layers of law on private businesses. Many of these policies and plans are summarized in Chapter 4. In many cases, regulations that are created to protect the Delta environment also inhibit the functioning of recreation-related businesses, or the development of new businesses. One example is the number of agencies that have input into the permitting process required to dredge a marina. Those can include up to three federal agencies, seven state agencies, and three local agencies; the process can take upwards of two years.[153]

Other issues

Other primary issues and operational risks that affect recreation and its economic potential include aging marinas and other infrastructure, lack of dredging, threatened public parks closures, continued lack of adequate levels of public funding for law enforcement and operations and maintenance of public facilities, development encroachment, flood and earthquake risk, rising sea level, water conveyance management changes, and increasing traffic.

[153] DPC 2006, p. 59

8.3.4 Visitation and Demand

8.3.4.1 Defining Market Area

In order to describe the economic impact of recreation on the Delta economy, the market area for Delta recreationists needs to be defined. Planners need to understand what percentage of users come from which areas, such as Delta counties, surrounding counties, Southern California, the western region of the United States, and beyond national borders.

In *The Sacramento-San Joaquin Delta Boating Needs Assessment,* the concepts of the Delta Primary and Secondary Market Areas were introduced.[154] A survey of statewide registered boat owners found that 77 percent of respondents who reported they had recently boated in the Delta resided within approximately 75 miles of the Delta.[155] This area was designated as the Primary Market Area for the Delta and included the counties of Alameda, Calaveras, Contra Costa, Marin, Napa, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, and Stanislaus. The study further defined a Secondary Market Area which represented the point of origin of another 8 percent of all Delta boating trips. The Secondary Market Area includes the counties of Amador, Colusa, El Dorado, Lake, Mariposa, Mendocino, Merced, Monterey, Placer, San Benito, Sonoma, Sutter, Tuolumne, and Yolo. Combined, the Primary and Secondary Market Areas represent approximately 85 percent of all Delta boating visitors (Figure 30).

Although this concept was developed for boating recreation, it is applicable to Delta recreation as a whole. While some visitors to the Delta do come from Southern California, out-of-state, and international locations, the majority of visitors are from Northern California. These visitors represent the focal market for Delta recreation growth opportunities in the future. Population statistics and trends for the Market Area are presented in Table 27. Activity participation numbers and demand models will focus on this area. In summary, the total Market Area had a population estimate of approximately 12 million in 2010, with projections of 17.6 million by 2050.

Table 27 Population Projections for the Primary and Secondary Market Areas

	2010	2020	2030	2040	2050
Market Area Population (millions)	11.9	13.4	14.9	16.3	17.6
Growth Rate		12.7%	10.8%	9.3%	7.9%
Source: Global Insight Forecast, 2010 Census Results					

Within the Market Area for Delta recreation, other recreation areas actively compete for participants and their dollars. Residents of the Market Area have several different natural resource-oriented destinations within Northern California that they could visit. Boaters can visit several reservoirs throughout Northern California, including Shasta Lake, Lake Oroville, and Folsom Lake, or can recreate on the San Francisco Bay. Anglers can fish in the numerous reservoirs, but also in the streams and rivers feeding those lakes and reservoirs, such as the Feather River, American River, and Sacramento River. People visiting historic or cultural areas can also visit Old Sacramento, Gold Country, or San Francisco. Wine tourists can visit Napa,

[154] DBW 2002, p. 6-4 - 6-6

[155] A more recent statewide survey of boaters supports this overall Market Area conclusion, noting that boaters from the Central Valley, Sacramento Basin, and San Francisco Bay Area boated more days per year on the Delta than boaters from other regions of the state (DBW et. al 2011, p. 86-87).

Sonoma, or the Sierra foothills. Other recreation and tourist destinations in Northern California include the Monterey Bay area, San Francisco Bay area, the Sierras, and north coast redwoods.

Figure 30 Delta Market Area and Competing Regions[156]

8.3.4.2 Statewide Recreation Survey/Study Summaries

In order to present an update on the current status and overall trends of recreation and tourism in the Delta, a multitude of sources is reviewed, ranging from U.S. Fish and Wildlife Service to Delta Protection Commission publications. Unfortunately, no one study or survey presents a complete picture of current recreation and tourism visitation and economic impact in the Delta. Summary information from relevant studies is presented below.

[156] For high resolution image see http://forecast.pacific.edu/desp-figs.html

State Parks Surveys Recreation Demand Overview

State Parks completes a *Survey on Public Opinions and Attitudes on Outdoor Recreation in California* approximately every five years to comply with federal grant regulations and to "provide a comprehensive view of the outdoor recreation patterns and preferences of Californians."[157] This survey instrument represents the best, most recently available data on recreation preferences of Californians. Statewide demand and participation rates for a sample of specific recreation activities that occur in the Delta are listed in Table 28.

Table 28 Summary of 2008 Survey of Public Opinions on Outdoor Recreation in California Demand and Participation Rates for Selected Activities Statewide in California

Activity Type	Participation Rate	Average Annual Participation in Days
Walking for fitness or pleasure	74%	73
Bicycling on paved surfaces	36 %	38
Wildlife viewing, bird watching, viewing natural scenery	46%	27
Outdoor Photography	33%	26
Driving for pleasure, sightseeing, driving through natural scenery	60%	22
Bicycling on unpaved surfaces and trails	16%	20
Hunting	4%	17
Day hiking on trails	47%	16
Sail boating	6%	14
Fishing – freshwater	21%	13
Swimming in freshwater lakes, rivers and/or streams	31%	10
RV/trailer camping with hookups	11%	9
Motor boating, personal watercraft	15%	9
Visiting historic or cultural sites	55%	8
Picnicking in picnic areas	67%	7
Attending outdoor cultural events	56%	7
Camping in developed sites with facilities	39%	7
Visiting outdoor nature museums, zoos, gardens, or arboretums	58%	6
Paddle sports	15%	5
Source: State Parks		

The most popular activities by participation rates are walking for fitness and pleasure, picnicking, and driving for pleasure, followed by visiting outdoor nature museums, attending outdoor cultural events, and visiting historic or cultural sites. The activities which enjoy the highest participation rates (i.e., people who participate tend to participate more often) are walking for fitness or pleasure, bicycling on paved surfaces, wildlife viewing, outdoor photography, driving for pleasure, and bicycling on unpaved surfaces and trails. State Parks also breaks down participation rates by region, but these regions do not overlap well with the defined Market Area. Thus, only statewide data is reported.

[157] State Parks 2009

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) *2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation–California* presents findings from a survey completed every five years to measure the importance of wildlife-based recreation. The survey indicates that in 2006, approximately 7 percent of the total population in California participated in either hunting or fishing activities, while 21 percent of the population participated in wildlife watching. The results of the survey are summarized in Table 29. Both participation rates and average annual days of participation per year are lower than in the State Parks survey, which may be due to differing methodologies. USFWS also collects information on average trip expenditures.

Table 29 Summary of 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Activities in California by Residents and Nonresidents

Activity Type	Participation Rate	Average Annual Days of Participation	Average Trip Expenditures Per Day Per Participant (2006$)
Fishing (Anglers)	6%	11	$62
Hunting (Hunters)	1%	12	$68
Wildlife Watching (Away From Home Participants)	21%	16	$44

Department of Boating and Waterways

The Department of Boating and Waterways (DBW) *2007-2009 California Boater Survey* reports on a statewide assessment of boating habits and environmental awareness of boaters. The survey reported that in 2007, 17.8 percent of boat owners surveyed boated in the Sacramento-San Joaquin Delta as least once a year, using their boats on average 20.9 days in that location.[158] Comparatively, in 2009, 26.8 percent of those surveyed boated in the Delta, using their boats on average 25.4 days per year.[159] The report does not discuss any reasons for the discrepancies in numbers, or any conclusions as to whether the increase in 2009 rates represents an increase in Delta recreation, or is a reflection of sampling differences.[160] However, the participation rates reported in these surveys are of comparable magnitude to the 23 percent participation of boaters statewide that reported recreating in the Delta in a 1997 survey (see *Sacramento-San Joaquin Delta Recreation Survey* in Section 8.3.4.3). The average number of days of participation, however, is much higher than those reported on statewide or national surveys (see above) for fishing or boating.

State Registration and License Numbers

Another way to assess potential recreation demand is through an analysis of state registration and license numbers. These numbers represent actual numbers, rather than estimates of participation rates, and can help predict potential demand.

Registered Vessels

In California, owners of any sail-powered vessels over eight feet in length and any motor-driven vessel (regardless of length) that is not documented by the U.S. Coast Guard must register their boat with the Department of Motor Vehicles (DMV). Vessels propelled solely by oars or paddles

[158] DBW 2011, p. 24
[159] Ibid, p. 86
[160] The study does, however, point out that surveys were not completed by a random sample of boaters, but rather boaters who were approached on the docks, or at boat shows. The report states, “Thus, all findings are best viewed as particular to the given sample (i.e. those boaters who participated) rather than representative of the entire population of interest (i.e. all California boaters).” DBW 2011, p. 14

(e.g., kayak, canoes) do not have to be registered.[161] In 2010, statewide, DMV reported 810,008 vessel registrations. As registrations are also reported by county, the Primary and Secondary Market Areas can be highlighted. In 2010, there were 214,163 vessels registered within the Primary Market Area and an additional 103,408 within the Secondary Market Area.[162]

Resident Sport Fishing

In 2009, 1,179,312 resident sport fishing licenses statewide were issued by the Department of Fish and Game (DFG).[163] It is difficult to identify licenses by county, as DFG reports figures based on the county in which the license was sold, not by the origin county of the purchaser. However, DFG required all anglers who fished within the tidal influences of the Bay-Delta and downstream of dams within the watershed to purchase a Bay-Delta Sport Fishing Enhancement Stamp from 2004 to 2009. In 2009, 284,641 anglers purchased that stamp. Although a portion of anglers who purchased that stamp may have only fished upstream of the Delta, those numbers seem to provide a general magnitude snapshot of anglers in the Delta (i.e., approximately 275,000 anglers recreated in the Delta in 2009). Using this number, combined with estimates from both USFWS and State Parks that anglers fish, on average, 12 days per year, results in approximately 3.3 million fishing activity days in the Delta in 2010. Note, however, that this number does not differentiate between shore anglers or those who fish from a boat.

Hunting

In 2009, the state issued 1,056,556 game bird hunting licenses and 1,683,445 general hunting licenses, which is approximately 6 percent of the adult California population. The hunting percentage tracks well with demand numbers from State Parks.

8.3.4.3 Delta-Specific Recreation Survey/Study Summaries

There are several Delta-specific surveys that have been completed over the past 20 years regarding recreation, including Sacramento-San Joaquin Delta Outdoor Recreation Survey,[164] North Delta Recreation Use Survey,[165] Sacramento-San Joaquin Delta Boating Needs Assessment,[166] and Sacramento San-Joaquin Delta Recreation Survey.[167] The more recent are summarized below.

Unfortunately, there have been no recent comprehensive visitor surveys within the Delta focused on Delta recreationist's activities and spending patterns. Also, most surveys that have been done have only focused on boaters and anglers, the highest percentage of recreationists in the Delta, but not the only ones. This lack of primary data hampers planning and marketing efforts.

[161] A DBW study estimated a total of over 1.7 million non-motorized boats (a category which includes inflatables, kayaks, canoes, rowing boats, sailboards/kiteboards, small sailboats, and others) in California in 2006 (DBW 2009, p. 2-1 – 2-2).
[162] http://www.dbw.ca.gov/PDF/VesselReg/Vessel10.pdf
[163] http://www.dfg.ca.gov/licensing/
[164] DWR 1980
[165] DWR 1997
[166] DBW 2002
[167] State Parks 1997

Sacramento-San Joaquin Delta Boating Needs Assessment

As part of *The 2002 Sacramento-San Joaquin Delta Boating Needs Assessment,*[168] California boat owners were surveyed regarding their preferences and facility needs for boating in the Delta. The survey group was broken down into owners of large boats (equal to or greater than 26 feet in length) and small boats (less than 26 feet in length). In this statewide survey, 52 percent of all owners of large boats had boated in the Delta, with 68 percent of those having been in the previous two years. Conversely, only 40 percent of all small-boat owners had been boating in the Delta, with 61 percent of those having done so in the two previous years.[169]

Combined with the survey information, the 2002 study also completed a demand forecast analysis of annual boating-related visitor days, estimated at 6.4 to 6.6 million in 2000 with a projected growth to 8 million by 2020.[170] This survey information provides the best estimate of boating-related recreation activity days in the Delta. However, it does not estimate the amount of expenditures for the boaters in the Delta. And, while boating and companion activities (fishing from a boat, swimming from the boat, etc.) represents one of the highest percentage of existing recreation uses in the Delta, it is not a full picture of all recreation.

Sacramento-San Joaquin Delta Recreation Survey

In 1997, State Parks published the *Sacramento-San Joaquin Delta Recreation Survey,* which separately surveyed boat owners and licensed anglers regarding their use of the Delta resources and how much money they spent recreating in the Delta.

The survey found that 23.5 percent of registered boat owners in California recreated in the Delta, spending an average of $11.75 outside the Delta and $17.20 inside the Delta (1996 dollars), a total of $28.95 per day per person. The survey also found 23 percent of licensed anglers in the state fish in the Delta, spending an average of $15.91 outside the Delta and $13.57 inside the Delta (1996 dollars), a total of $29.48 per day per person. The top five other recreation activities that boaters indicated they participated in included (in order of preference) sightseeing, viewing wildlife, fishing from shore, picnicking, and walking for pleasure. The top five non-fishing activities which anglers engaged in while in the Delta were sightseeing, boating, viewing wildlife, swimming, and walking for pleasure.

8.3.4.4 Delta Recreation and Tourism Visitation Estimates

There are few counts of visitor attendance in the Delta. Those that exist are limited and only represent a fraction of what is estimated to be the actual visitor count. Visitation numbers that were reported equal less than one million visitors and are presented in Table 30.

[168] DBW 2002

[169] For large boat owners, 52% of 68% translates to about 35% overall boater participation. For small boat owners, 40% x 61% = 24.4% of overall boaters. While the small boat participation number is similar to that described in State Parks survey (Section 8.3.4.3) and the recent DBW survey (Section 8.3.4.2), the large boater participation rates are higher.

[170] DBW 2002, Table 6-11

Table 30 Summary of Actual Visitation to the Delta

Site	Numbers
Brannon Island SRA (day use, 2009)	88,459
Brannon Island SRA (camping, 2009)	36,069
Delta Meadows State Park (day use, 2009)	18,933
Delta Meadows State Park (camping, 2009)	2,155
Franks Tract SRA	24,305
Stone Lakes National Wildlife Refuge (USFWS) (approx.)	7,000
Cosumnes River Preserve (approx.)	70,000
Lower Sherman Island (DFG) (approx.)	5,000
White Slough Wildlife Area (DFG) (approx.)	12,000
Yolo Basin Wildlife Area (USFWS) (approx., includes student tours)	30,000
Sherman Island (Sacramento County)	25,000
Hogback Island Fishing Access (Sacramento County)	10,800
Clarksburg Boat Launch (Yolo County)	1,713
Belden's Landing (Solano County)	15,642
Sandy Beach Park (Solano County)	100,611
Dos Reis Park (San Joaquin County)	25,815
Mossdale Crossing Regional Park (San Joaquin County)	23,630
Oak Grove Regional Park (San Joaquin County)	84,058
Westgate Landing (San Joaquin County)	10,283
Isleton Crawdad Festival (approx.)	200,000
Rio Vista Bass Derby and Festival (approx.)	12,000
Totals	**796,480**
Sources: State Parks 2010, personal communications	

8.3.4.5 Visitation Estimates by Recreation Activity Types

As actual visitor counts and current visitor survey data are lacking, visitation must be estimated. One way to estimate visitation is by looking at overall participation estimates based on survey data such as that collected by State Parks. These participation estimates can then be related to the Market Area population to derive estimates. However, participation rates vary over time as recreation activities become more or less popular.

The subsection: *State Parks Surveys Recreation Demand Overview* in Section 8.3.4.2 presented information regarding participation in selected activities that occur in the Delta from the most recent State Parks *Survey on Public Opinions and Attitudes on Outdoor Recreation in California.* As this survey has been taken approximately every five years, it is also a useful tool in looking at activity participation rate changes over time. In general, the activity types in which Californians participate and the level of participation have varied over time in specific activities, including freshwater fishing, backpacking, wildlife viewing, sports, swimming in a pool, etc. Over various surveys, State Parks has changed certain categories, listing 42 activity categories in 1992, to 55 in 2002, and 39 in 2008. It is difficult to track trends in individual activity categories due to changes in survey methodologies and questions. However, the percentage breakdown between three broad clusters of recreation activities has tended to remain relatively constant.

Resource-related recreation includes that which occurs in resource-related areas, including state and national parks, forest service lands, nature areas, reservoirs, rivers, the ocean, mountains, etc. Types of resource-related recreation include wildlife viewing, hunting, fishing, boating, beach activities, camping, skiing, snowboarding, and swimming in lakes, rivers, and the

ocean. Since 1992, approximately 25–30 percent of all recreation has been resource related in California.

Urban Parks-related recreation includes those activities that generally take place in developed parks, such as using play equipment, swimming in a pool, using open turf areas, golf, tennis, and team sports. Since 1992, urban parks-related recreation has represented approximately 16–23 percent of all recreation activity days.

Right of Way/Tourism-related recreation represents the largest levels of participation over time and includes hiking, jogging, walking, bicycling on paved surfaces, driving for pleasure, off-highway vehicle use, and other road- and trail-based recreation. Since 1992, this type of recreation has represented approximately 48–58 percent of all activity days in California, with walking for fitness and pleasure generally the highest ranked activity, by both percentage of participants and number of days of participation.

In the Delta, there is some level of use in each of the three recreation categories: Resource-related, urban parks-related, and right-of-way/tourism-related. As one of the more unique resource attraction areas in the state, it is only logical that primary uses would be resource-related activities. These include all variety of boating, camping, nature study/bird watching, hunting, and fishing. As described above, an estimate of 6.4 million boating visitor days per year (including fishing from a boat) was completed in 2000.[171] As part of the study, projections were made that this use would grow by 1 percent a year, but with the recent recession's impact, on motor boating in particular, as well as the overall lack of investment in facilities and upgrades over the past 20 years, the 2000 count likely reflects today's usage level. None of the remaining activities has had Delta-only surveys or counts, but from review of known visitation to specific sites, data regarding permits and licenses, it is estimated that these remaining uses account for roughly 1.5 million visitor days of use annually. When combined with boating, this gives a total of approximately 8 million resource-related visitor days of use per year.

The cities bordering the Delta have taken advantage of the Delta's waterways and scenic resources by locating both resource-related facilities and standard city parks on the edges of the Delta. For instance, Sacramento's Garcia Bend Park, on the Sacramento River, combines boat launching, bank fishing, and levee-top trails with organized sports, children's play, and informal park day uses. Stockton has located its largest city park and a major recreation-related redevelopment area adjacent to Delta waterways. There are approximately 300 acres of urban park and recreation areas bordering Delta resources located in the various communities which surround the Delta. On average throughout California, urban parks receive approximately 10,000 visits per acre per year.[172] Estimated conservatively, 2 million visitor days of urban parks-related use occurs within the Primary and Secondary Zones.

Driving for pleasure in the Delta is very popular and is a prime example of the right of way/tourism-related recreation use. This recreation category also includes bicycling, hiking, and walking. The winding roadways, interesting bridges, scenic views of waterways and agricultural areas, Legacy Communities, and historic structures all contribute to its visual appeal. The ability to buy fresh fruits and vegetables straight from the grower, visit a winery and sample their product, stop and pick up a freshly made deli sandwich or an ice cream at a 50-year-old grocery store all deepen the Delta experience. To many, the resources are part of the charm—the

[171] DBW 2002
[172] Dangermond 1993, Table 15.2, p. 219

historical town of Locke, the wildlife preserves, or even the beautiful oak tree canopies shading the roadway.

There have not been any use-participation estimates or surveys for this recreation activity in the Delta. However, the total participation in driving for pleasure in the Market Area can be estimated at 160 million annual participation days[173] (note that driving for pleasure is frequently combined with other recreation activities). As discussed above, the Market Area has a number of competing destinations including Monterey/Santa Cruz, Bay Area, Coast, Redwoods, Wine Country, Gold Country, and the Sierra Nevada. Assuming the Delta is able to capture 1–2 percent of that overall market, driving for pleasure and associated activities (e.g., visiting historic sites and farm stands, etc.) in the Delta generates significant visitation. Using these estimates, right-of-way-related recreation is approximately 2 million visitor days per year.

Combining the above estimates (8 million resource-related and 2 million right-of-way-related) would result in a total of 10 million annual visits in the Delta, plus 2 million in urban parks around the edge. In the 1990s, State Parks estimated an annual use of 12 million days in the Delta. Since that time, population in the Market Area has increased; however, there have been limited investments in new facilities or upgrades to existing facilities. The constraints outlined in Sections 8.3.2 and 8.3.3 above have not been resolved, and in some cases have been only exacerbated over time (e.g., lack of dredging, water quality). Additionally, the recession of 2007-2009 has negatively affected recreation and tourism, as well as boat registrations. Absent new research, this 12 million visits per year estimate seems to be a reasonable, conservative working number until additional primary data collection is performed.

8.3.4.6 Market Demand-Based Delta Visitation Estimates

Visitor estimations can be tested based on calculations of demand generated from population numbers using participation rates and frequencies. In summary, first, participation rates for various Delta activities were determined. Using these participation rates and estimates for activity days of participation (described above) and adjusting for multiple activities in a day, demand numbers (expressed as visitor days) for the Market Area can be estimated. Following that, a determination of what percentage of market demand the Delta will capture versus other recreation opportunity areas available to the Market Area is made. These estimates result in a range of 8.2–15.2 million recreation visitor activity days per year in 2010. In Appendix H, the model for demand-based participation is presented.

These recreation activities can also be broken down into the categories described above: Resource-related, urban parks-related, and right-of-way/tourism-related. The urban parks-related category was not included in these estimates, which was previously estimated to be another 2 million activity days per year. Resource-related activities result in a range of 4.5–10.7 million activity days per year, while right-of-way/tourism-related activities result in a range of 1.7–2.5 million activity days per year. These ranges are similar in magnitude to those discussed above and are summarized in Table 31.

[173] 12 million population x 60 percent participation x 22 average days (taken from Table 28)

Table 31 Summary of Visitation Estimates to the Delta

Type	Estimate of Visitor Days (2010) (millions)		
Activity Type Estimates		**Estimate**	
Resource Related		8.0	
Right-of-Way Related		2.0	
Urban Parks Related		2.0	
Total		12.0	
Demand Based Estimates	**Low Estimate**	**Medium Estimate**	**High Estimate**
Resource Related	4.5	7.6	10.7
Right-of-Way Related	1.7	2.1	2.5
Urban Parks Related*	N/A	2.0	N/A
Totals	8.2	11.7	15.2
Sources: U.S. Census, State Parks 2009, The Dangermond Group, EPS * Demand for urban parks is not estimated by the visitor market analysis.			

These estimates are based on limited available data and profession judgment of the planning team. New primary data from an up-to-date visitor survey is needed to better document existing recreation visitation and spending, including non-boating and non-fishing recreationists, and should be undertaken as a first step in future Delta recreation planning and marketing efforts.

8.3.5 Economic Impact/Benefits

8.3.5.1 Current Economic Impact Model

The economic impact of Delta recreation is first assessed based on estimated medium visitation levels and trip-related spending, with non-trip spending added subsequently. As described in Section 8.3.4, it is estimated that the Delta currently receives approximately 7.6 million resource-related visitor days and 2.1 million right-of-way/tourism days (market demand-based estimates). This analysis estimates that average per-day expenditures for the resource-related and right-of-way/tourism recreation activities range from about $27 to $76 (2011$) depending on the activity type, of which about $13 to $34 is spent in the Delta. Based on these per-day spending levels and the estimated Delta visitation, direct spending in the Delta economy attributable to resource-related and right-of-way/tourism recreation is estimated at approximately $251 million (2011$).

This visitation-based economic impact estimate focuses on resource-related recreation, including boating, fishing, hunting, and other activities (e.g., wildlife viewing), and right-of-way/tourism activities, including hiking, biking, driving for pleasure, and cultural activities. The analysis does not account for activities at the urban fringe, including urban park recreation (e.g., team sports). Resource-related and right-of-way/tourism activities are believed to account for the majority of economic impacts of recreation occurring in the Delta.

Table 32 Estimated Resource-Related and Right-of-Way/Tourism Visitation to the Delta by Activity

Activity	**Visitor Days**	Percent of Total
Boating, Fishing, and Camping	6.4 Million	66%
Hunting	500,000	5%
Other Resource-Related and ROW Activities	900,000	9%
Driving for Pleasure and Tourism	1.9 Million	20%
Total Delta	9.7 Million	100%
Sources: Sacramento-San Joaquin Delta Boating Needs Assessment (2000); The Dangermond Group *Note: Activity categories reflect similarities in economic spending patterns.*		

- Focal point complexes such as Legacy Communities or Bethel Island/Jersey Island/Big Break;
- Natural habitat areas; and
- The edges of existing and emerging urban areas that surround the Delta such as Stockton, Tracy, Rio Vista, and Lathrop.

- If resource quality and recreational facilities are maintained such that the Delta retains its current level of competitiveness as a recreation destination, baseline forecasts for visitation show increases of 3.4 million visitor days, or about 35 percent, over 40 years. If this Plan is implemented, recreation visitation in the Delta could increase beyond baseline.
- Assuming that current visitor spending patterns remain unchanged and Delta business growth accommodates recreation-related spending increases, baseline visitation growth is estimated to increase spending in the Delta roughly $78 million (2011$) to about $329 million (2011$) by 2050. Plan implementation could increase the economic impact of recreation over the baseline.

8.5 Impact of Policy Scenarios

Four possible policy scenarios are qualitatively evaluated as to their primary elements and their potential positive and negative influences on recreation for purposes of discovering major areas of potential concern.

8.5.1 Policy Scenarios Influences on Recreation Potential

8.5.1.1 Assumptions Under All Scenarios

In Chapter 6, different policy scenarios were presented on which to base analysis for future economic impacts. Although not explicitly discussed, it is assumed that the purpose of any of the scenarios other than the baseline is to achieve the stated purpose of the Delta Reform Act and that the policies would achieve the coequal goals of water conveyance and habitat protection. Thus, under all scenarios, it is assumed explicitly as follows.

- Water quality in the Delta will improve overall (though salinity intrusion may still be a factor).
- Fisheries will be improved.
- Any project will be mitigated appropriately (suggestions to follow in later sections) for potential significant impacts to recreation, the Legacy Communities, and the economic sustainability of the Delta.
- Water exports from the Delta will continue.

8.5.1.2 Isolated Conveyance Scenario

In Chapter 6, the Isolated Conveyance Scenario was described and included the following features.

Five new water intakes would be built along the Sacramento River between Clarksburg and Courtland.

A new forebay would be constructed near Courtland where water from the five intakes would be collected and then pumped into an isolated conveyance pipeline under the Delta, extending to a new afterbay near the Clifton Court Forebay.

Land would be removed from agriculture uses for the intake-pumping stations and the forebay and afterbay.

Approximately 8,000 acres of agricultural land would be utilized in Sacramento and San Joaquin counties.

This scenario would affect existing and future recreation uses in a number of ways, some potentially positive and others negative, including the following.

- Since the water intakes would be upstream from the confluence of the Sacramento and San Joaquin rivers, it is expected that salinity in the water at the confluence of the two rivers and further south will increase. Water quality would decrease in the resulting relative stagnant waterways. This change in water salinity and quality will likely affect fishing, boating, and hunting in the lower Delta.
- The pumping intake stations will introduce an "industrial" quality along approximately five to ten miles of the Sacramento River, creating significant visual impacts to this rural, scenic stretch of river. In addition, the sound and night lighting related to these facilities will change the setting of the existing Legacy Communities. Together these features will reduce the Delta-as-a-Place character and the value of the Delta as a tourism destination.
- Moving the intake of fresh water to the north will likely have a beneficial effect on fisheries by allowing a more natural outflow of the remaining water out to sea. This move could improve fishing in parts of the Delta.
- It is unknown how the loss of agricultural lands would affect hunting opportunities, based upon long-term land use of the lands needed for construction.

8.5.1.3 Habitat Conservation Scenario

The habitat conservation scenario was described in Chapter 6 with changes resulting from the following project elements.

- More frequent flooding and improved fish passage along 22,000 to 48,000 acres in the Yolo Bypass with the intention to improve fisheries
- Creating approximately 10,000 acres of new floodplain along the San Joaquin River using setback levees
- Restoring tidal marsh habitat on up to 65,000 acres in agricultural land throughout the Delta
- Natural Communities Protection, including converting 8,000 acres of rangeland to natural grasslands, restricting 32,000 acres of agriculture to "wildlife friendly" practices, and converting 700 acres of rangeland to vernal pools and alkali wetlands
- Restoring approximately 20 miles of channel margin along North Delta waterways through setback levees and shallow water habitat

The number of potential influences on future recreation from this scenario may include any of the following.

- Creating the larger acreage (50,000± acres) of tidal marsh at the south end of the Delta could have devastating effects on salinity in the South Delta, as well as create strong currents in the channels leading to this area. Both would have significant impacts on boating and fishing. In addition, likely changes to agriculture lands could reduce hunting opportunities.
- Specifics regarding channel margin improvements are not described. Most of these impacts can be avoided or mitigated through appropriate design. Potential conflicts could arise from reducing or eliminating windsurfer access, creating use restrictions on other forms of boating, eliminating state and county park facilities with access to the river, and restricting shore fishing.
- The conversion of agricultural lands to habitat could decrease hunting opportunities if farmland conversions are of lands also used for hunting.
- Details regarding the San Joaquin River floodway are not described. If adequate in width, it could accommodate natural vegetation, trails, and recreation opportunities similar to the American River Parkway. If limited in carrying capacity, it could be restrictive regarding these recreation elements as is the Yolo bypass between Davis and West Sacramento.

- Wildlife viewing/photography and paddle sports and other nature-associated recreation will likely be positively influenced, if restored habitat areas also include public access facilities.
- Yolo Bypass fisheries amendments may negatively impact existing hunting clubs in the area.
- Increased fishing will likely occur due to better fisheries.
- Boating overall could increase with increased habitat and water quality.
- Camping would increase to support increasing nature-related recreation, if new sites and successful synergies can be established.

8.5.1.4 Flood Control Scenario

The flood control scenario was described in Chapter 6, with two general possibilities:

1. Flooding six central Delta islands: Webb, Venice, Empire, Mandeville, Medford, and Quimby, and leaving them in open water
2. Increasing levee upgrades, including levee upgrades around the Legacy Communities

The number of potential influences on future recreation from the flooded-island scenario may include the considerations listed below.

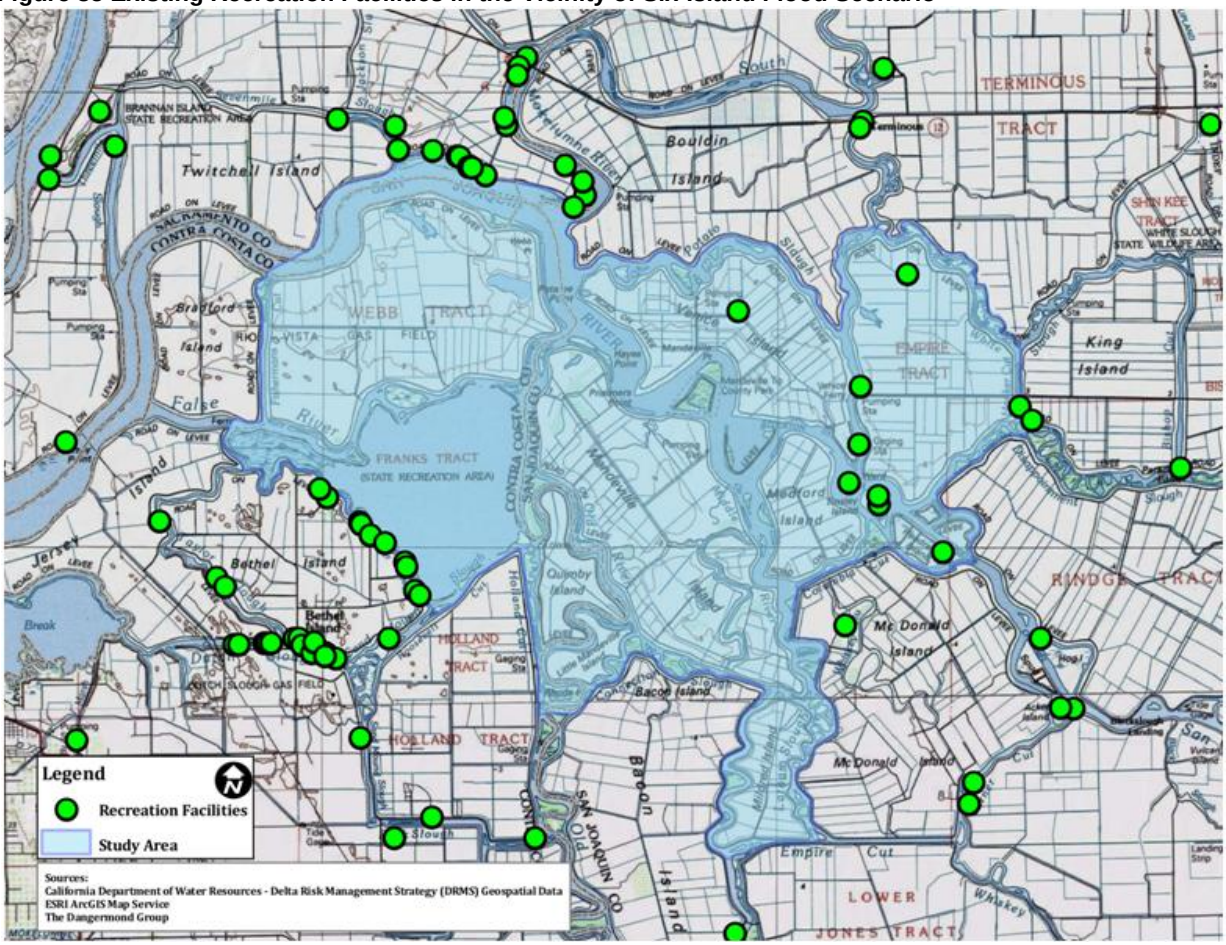
- The winding, protected, freshwater channels and waterways are the primary appeal of the Delta to boaters. Substituting a large open body of water at this proposed location will severely affect the existing boating use, and have very little offsetting use. The existing uses in this area are fishing, water skiing, personal watercraft use, speed boating, house-boating, cruising, and, to a limited degree, windsurfing.
- While a large open body of water would have severe negative effects on all these users, the open water area could arguably be more conducive to sailing. There are a number of factors, however, that will minimize sailing as a potential substitute use.
    - The flooded islands, if similar to existing flooded islands, will have water hazards, snags, and partially-submerged debris, making them dangerous to less knowledgeable boaters.
    - Most Delta boaters are from the Bay area, where sailing is far superior and closer with many adequate local marinas which, at present, are not fully occupied.
    - Those boaters in the Sacramento metropolitan area who enjoy sailing are primarily berthed at Folsom Lake, which has more favorable winds and higher water quality than found in the six-island area.
    - Sail boat densities on the water are lower than motor boat densities.

Approximately 40 percent of all the marinas in the Delta are clustered around or near this potential area and another 5 percent are along the San Joaquin River from Pittsburg to Antioch. These marinas are also, on average, larger than those in other parts of the Delta. The resulting negative impact to the largest single recreation activity in the Delta could be very severe. See Figure 35 which overlays existing marinas and recreation facilities over the six-island flood scenario.
This open water will have unknown changes to fisheries, which will affect anglers.
The elimination of hunt clubs on those islands will reduce hunting.

The increased levee upgrade scenario may have a number of potential influences on future recreation, including the following impacts.

- Better protection of marinas, allowing investment in facilities
- Increased protection of Legacy Communities, resulting in more right-of-way/tourism activity
- Unknown changes to fisheries

Figure 35 Existing Recreation Facilities in the Vicinity of Six-Island Flood Scenario[207]



8.5.1.5 Regulatory Changes Scenario

Proposed regulatory changes are not known at this time. The following potentials could have a negative effect on recreation.

Increased Regulation

- Regulations against water, sewer, and building developments would make it difficult for both existing and new enterprises to locate within the Delta or to respond to changing market demands. These restrictions could adversely affect park expansions, marinas and related resorts, Legacy Communities, wineries, and direct sale of agriculture products, most likely creating further stagnation in recreation and tourism visitation.
- Blanket prohibitions against further development within the Secondary Zone could have an unfavorable influence on the park and recreation values around the edges of the Delta.
- Continuing and/or increasing restrictions and regulations on dredging and vegetation controls in and around marinas could have severe negative influences on such recreation providers.

Decreased Regulation

- The reduction or removal of land use, historic preservation and agriculture protection regulations could affect the scenic values of the Delta and subsequent tourism use.

[207] For high resolution image see http://forecast.pacific.edu/desp-figs.html

8.5.1.6 Policy Scenarios Influences Summary

Table 39 presents a summary of predicted potential influences to recreation and tourism by the policy scenarios described above, with range estimates of potential impacts to visitation in 2050, as compared to the baseline scenario presented in Section 8.4. These predictions reflect a combination of data and professional judgment of the researchers, and are intended to provide a general sense of the expected scale of the impact relative to current levels. Note that these impacts are presented in relationship to population growth, so a "Flat" trend would keep pace with population growth, while "Increase" would grow faster than population. "Decrease" would grow slower than population and may or may not represent an actual decrease in raw numbers of visitor days.

Table 39 Predicted Trends in Major Recreation Categories under Policy Scenarios Conditions

	Policy Scenarios				
Activity Type	**Isolated Conveyance**	**Habitat Conservation**	**Flood Control – Six Islands**	**Flood Control – Increased Levees**	**Regulatory Changes**
Resource Related					
Boating	Decrease	Increase	Decrease	Flat	Decrease
Fishing	Flat	Increase	Decrease	Flat	Decrease
Hunting	Decrease	Flat/Decrease	Decrease	Flat	Flat
Wildlife Viewing/Outdoor Photography	Flat	Increase	Flat	Flat	Flat
Camping	Decrease	Increase	Decrease	Flat	Flat
Right-of-Way/Tourism Related	Decrease	Flat	Flat	Increase	Decrease
Urban Parks Related	Flat	Flat	Flat	Flat	Decrease
Overall	Decrease	Increase	Decrease	Flat	Decrease

- The isolated conveyance scenario could lower recreation spending in the Delta.
- The habitat conservation scenario could increase recreation spending in the Delta.
- The six-island open water scenario could lower recreation spending in the Delta.
- The increased levee scenario could increase recreation spending in the Delta.
- The increased land use restrictions scenario could lower recreation spending in the Delta.

The probable future condition of the Delta will not, however, occur as a result of a single policy scenario, but of necessity, will be a combination solution. Among these various scenarios, there is an opportunity to avoid the largest potential negative impacts and to emphasize positive solutions.

8.5.2 Impact Analysis

This report has analyzed existing recreation uses and projected a baseline forward to 2050. It also has analyzed the negative and positive influences to the baseline from various elements of proposed scenarios. Analysis has also been made of actions that could be taken to increase recreation visitation over the baseline, or to mitigate for some unavoidable impacts. The Recreation Enhancement Plan outlined in this report describes such actions. The following summarizes the largest potentially negative future impacts and the possible positive influences to economic sustainability for recreation in the Delta.

8.5.2.1 Negative Impacts

Of all the potential negative impacts, our analysis indicates that the following five items are the most significant. They are listed in order of magnitude. These major items are most likely

11.2 Integrated Issue 2: Levees and Economic Sustainability

Since the early 20th century, the current-day Delta levee system provides flood control that allows productive agricultural and urban uses of land, channels water for urban and agricultural uses, protects critical infrastructure, and creates a desirable setting for boating and water-based recreation in an environment unique in California. The levee system is the foundation on which the entire Delta economy is built. Therefore, a sustainable Delta economy requires a sustainable levee system.

It has been the goal of the state and the federal government, working through the Department of Water Resources (DWR), the U.S. Army Corps of Engineers (USACE), and the local reclamation districts, to meet the PL 84-99 standard since 1982 when DWR and USACE produced a joint report on the Delta levees which recommended the basis for this standard. If effectively used, funds currently in the pipeline should bring the Delta levees close to achieving this goal. When these funds have been expended, more than $698 million will have been invested in improvements to the Delta levees since 1973. These improvements have created significantly improved Delta levees through modern engineering and construction, making obsolete the historic data that is still sometimes used for planning or predicting rates of levee failure.

Three approaches can help all jurisdictions and planners further reduce the risks resulting from the failure of the Delta levees. These approaches are: (1) build even more robust levees, (2) improve both regular maintenance and monitoring and flood-fighting and emergency response following earthquakes, and (3) improve preparedness for dealing with failures after they occur. With regard to the first approach, the big question is not whether they should be improved to the Delta-specific PL 84-99 standard. Instead, the key question is whether in order to support and enhance various in-Delta, regional, state, and federal interests they should be improved to a higher standard in order to address hazards posed by not only floods, but also earthquakes and sea-level rise. Our conclusion is that these improvements would be advantageous not only for flood control and protection against earthquakes and sea-level rise, but because they also would allow for planting vegetation on the water side of the levees—an essential component of Delta ecosystem repair. These further-improved levees would have wider crowns to provide for two-way traffic and could easily be further widened at selected locations to allow the construction of new tourist and recreational facilities out of the statutory floodplain.

Improvement of most Delta lowland levees and selected other levees to this higher standard would cost $1 to $2 billion in base construction costs over the cost of reaching the PL 84-99 standard. Including vegetation and habitat enhancement, total program costs might be in the order of $4 billion, similar to the cost projected by the PPIC (2007) in their “Fortress Delta” alternative. While the billions of dollars required to build levees to this higher standard is an enormous investment, it is a cost-effective joint solution that simultaneously reduces risk to all Delta infrastructure. While a $12 billion investment in isolated conveyance may allow for somewhat larger water exports, it doesn’t protect other critical infrastructure and billions in additional investments would still be required to protect highways, energy, and other water and transportation infrastructure. Just as a species by species approach is an inefficient and ineffective way to protect ecosystems, a system by system approach is an inefficient and ineffective way to protect the state’s infrastructure.

11.3 Integrated Issue 3: Relative Roles of Agriculture, Recreation and Tourism, and Economic Sustainability

Agriculture is the main economic driver in the Delta. As seen in Table 55 below, agriculture generates three to five times the regional economic impact of recreation and tourism. On average, a dollar of crop production in the Delta has more regional employment and income impact than a dollar of recreation and tourism spending in the Delta. This result is important for economic sustainability since many proposals to change the Delta would reduce agricultural production with hopes of increasing recreation and tourism. However, the growth of the recreation and agriculture economies is not necessarily in conflict. For example, flood control investments and improved water quality are critical to the future of both the recreation and agriculture economies. In addition, continuing growth in Delta wineries and agritourism will generate income for both sectors.

Table 55 Total Economic Impacts of Delta Agriculture and Recreation and Tourism[324]

Sector	Employment	Labor Income	Value Added	Output	Source Table
5-County Impacts					
Agriculture	13,179	$593,975,736	$1,059,453,520	$2,647,124,544	Table 13 p.125
Recreation & Tourism	3,064	$104,320,642	$175,862,370	$329,229,232	Table 36 p.174
California Impacts					
Agriculture	25,125	$1,252,216,824	$2,135,095,400	$5,372,014,752	Table 14 p.126
Recreation & Tourism	5,317	$208,104,490	$353,312,020	$654,415,364	Table 37 p.174

While recreation trips to the Delta are a significant contributor to the Delta economy and are expected to increase, increasing the economic impact of tourism spending requires increasing spending per trip to the Delta and the local economic impact of spending that does occur. The lower economic impact of recreation and tourism spending is because fuel and retail purchases dominate expenditures for the types of recreation and tourism that are currently available in the Delta. Although these are local expenditures, the goods are typically produced elsewhere have relatively low multiplier effects on the regional economy.

This requires diversification through new investment in high value-added, land-based tourist services that generate more local income and jobs than retail and fuel expenditures. A successful strategy would require significant new investment in hospitality enterprises within the Delta, and also stimulate investments needed to sustain and enhance the large existing economy associated with Delta boating. Increasing day trips for wildlife viewing and other ecologically-based activities is unlikely to generate significant increases to in-Delta economic activity, especially without new investment in services that encourage longer visits and overnight stays. This is a difficult challenge given the market and regulatory constraints of operating in the Delta. Chapters 8 and 10 provide some visions of more successful recreation and tourism focal points in the Delta that could occur if investment is encouraged and coordinated.

When it comes to agriculture, the prospects for Delta agriculture are good. If land and water resources are protected in the Delta, the plan projects about a 5 percent shift of land towards higher-value vineyards and truck crops, while the corn and alfalfa remaining steady at roughly

[324] For additional details on economic impacts see the listed source tables and associated discussions.

half of Delta agricultural land with prices remaining strong in the future. If urban encroachment is limited to existing sphere of influence of cities as we recommend, Delta agriculture will lose roughly 26,000 acres and $44 million in annual output to urbanization at current prices. The Delta could likely absorb a similar loss of agricultural land to habitat through 2050, and still meet the goal of maintaining and enhancing the value of Delta agriculture that will remain a solid, sustainable foundation for the Delta economy.

The Delta Stewardship Council and others are very interested in the potential for gains in the recreation economy to offset potential losses in agriculture. It is important to be realistic about this potential and understand current trends. Over the past twenty years, the trend for recreation in the Delta has been flat despite rapid population growth in the surrounding region. Delta agriculture has grown in value, and shares many of the same strong prospects as the nation's agriculture. This is in strong contrast to the 1980s when agriculture was a struggling industry and boating was growing fast. In the 1980s, one might have reasonably projected these trends would continue and recreation would supplant agriculture as the economic driver in the Delta. As discussed in the ESP, this transition did not occur over the past 20 years. Given the history of the past 20 years and current economic and demographic trends, a transition to a recreation economy should be viewed as far less likely today than it was 25 years ago. Thus, it would be irresponsible to develop Delta plans that count on a reversal of this pattern and dramatic growth in recreation and tourism.

Despite these cautions, it is important to note that this plan does show that there is significant potential to grow and enhance the Delta's recreation and tourism sectors. Improving recreation assets can not only provide economic benefits, but also enhance the quality of life in the Delta and people outside the Delta who could take advantage of these opportunities. However, growing recreation and tourism requires strategic investment and reinvestment in facilities, improved flood control, and scaling back some of the water supply and habitat proposals that conflicts with recreation and tourism.

11.4 Integrated Issue 4: The Coequal Goals and Economic Sustainability

The Delta Reform Act of 2009 states:

> Coequal goals means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. (Water Code section 85054)

The Delta Reform Act does not endorse any specific actions to achieve the coequal goals, and there are many options for both water supply reliability and protecting, restoring, and enhancing the Delta ecosystem. It does not precisely define terms such as water supply reliability. Reliability clearly means reducing the risk of catastrophic interruptions and uncertainty over supplies, but it is not clear whether it means an increasing supply of water deliveries. The BDCP alone is evaluating at least five water conveyance options, and it is not evaluating all options, including the investment in a seismically-resistant levee system as described in this plan. Similarly, the BDCP includes 18 non-conveyance habitat strategies and is also not exhaustive of all the options to improve the Delta ecosystem.

The presence of the second sentence acknowledges that the coequal goals could conflict with protecting and enhancing the Delta. While the coequal goals must be satisfied, it expresses a

Subject:	**Barge Transportation Study (Final Draft)**
Project feature:	Site Development / Logistics
Prepared for:	California Department of Water Resources (DWR) / Delta Conveyance Office (DCO)
Prepared by:	Delta Conveyance Design and Construction Authority (DCA
Copies to:	File
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Reference no.:	EDM_SD_CE_TMO_Barge-Transportation-Study_000970_V03_FD_20211223

1. Organization

This technical memorandum (TM) includes the following eight sections.

- Introduction
- Executive Summary
- Tug and Barge Characteristics
- Primary Waterway Navigability
- Maps for Waterway Navigability and Landing Site Availability
- Operational Constraints
- Document History and Quality Assurance
- Appendixes

2. Introduction

2.1 Background

California DWR is conducting an environmental review and planning process for a single-tunnel Delta Conveyance. Construction of the single-tunnel solution would require moving labor, equipment, and material resources within the Delta, potentially using waterborne transportation systems. This report analyzes the logistics required to support this project by using the rivers and watercourses existing in the Delta.

2.2 Scope and Objective

This TM evaluates the potential tunnel alignments' accessibility by barges. It discusses the Sacramento – San Joaquin River Delta (Delta) waterways' navigability and landing site availability near potential tunnel shaft locations. The following aspects of barge transportation logistics and waterway navigability are discussed in this TM:

- Channel description based on bathymetry, width of waterways, and other applicable limitations
- Physical restrictions, including bridges
- Barge sizes in terms of length, width, capacity, and draft
- Potential tow configurations

- Potential supply and demand for barge services given the potential volumes associated with this project
- Potential barge-landing areas near intake shaft sites
- Operational constraints
- Effect of tidal currents on navigation
- Effect of seasonal variations in water levels and flooding in winter months
- Impacts to others pertaining to navigation
- Environmental restrictions and fish seasons

This study is based on the preliminary tunnel corridor maps. The maps, which were developed on a preliminary basis to provide a basis for this analysis, show potential tunnel alignments, shaft locations, and intake locations.

2.3 Executive Summary

Constructing tunnel launch shaft sites requires deliveries of tunnel boring machine components, equipment, tunnel liner precast concrete segments, aggregate, cement, and other building materials. These deliveries would otherwise result in a large number of truck trips during the construction period. The use of barges reduces the number of truck trips on highways and local roadways, which could also result in reduced costs for improving current roads and bridges. The barges could also be used to transfer reusable tunnel material (RTM) to other locations for reuse. Materials could be delivered by barge from existing ports near the Delta, including Port of Stockton, Port of Pittsburg, and Port of West Sacramento as well as commercial mooring facilities (for example, a facility in Rio Vista used to load barges with rock). Barge landings could be constructed near the tunnel launch facilities to facilitate off-loading tunnel liner pre-cast concrete segments and loading RTM. This TM analyzes the logistics required to support material transport in the Delta's rivers and watercourses.

2.3.1 Tug and Barge Characteristics

Equipment characteristics for tug and barge equipment working on the Delta waterways were evaluated based upon equipment and configurations that experienced contractors have historically used for on-the-water work in the Delta. For barges, the ideal size would be 200 feet long by 50 feet wide, with a draft less than 12 feet and a hauling capacity of 2,000 tons. The ideal tug for the Delta would be 1,500 horsepower with drafts of 9 feet or less. Because of the width of many of the smaller waterways, the preferred towing configuration would be a single barge being pushed by a single tug. In some locations, a second tug would be needed to assist at tight turns. Barges also could need to be light-loaded to be able to navigate through shallow areas. Also, site-dependent variations could dictate whether smaller or larger tugs and barges (from the ideal specifications cited previously) are used because of the different site conditions.

2.3.2 Primary Waterway Characteristics

The waterways that could be used to haul materials and equipment were analyzed for depth, width, and bridge restrictions. The primary waterways evaluated included the Sacramento River, Sacramento River Deep Water Ship Channel (SRDWSC), Three Mile Slough, Mokelumne River Complex, San Joaquin River and Stockton Deep Water Ship Channel (SDWSC), Old River Complex, Connection Slough, Railroad Cut,

Woodward Canal/North Victoria Canal, Potato Slough Complex, and Middle River Complex. The SRDWSC and SDWSC have enough depth and width to transport materials. Most of the watercourses have enough width to transport materials, but there are some areas of concern where the water depth is less than 12 feet during low tide throughout the year. These areas could require light-loaded barges that draft less than 10 feet or for barging to be scheduled during higher tides to provide depth to transport over the shallow areas. Opening bridges on these waterways could also affect the barge schedule. Waterway characteristic are summarized as follows:

- SRDWSC has adequate widths and depths; however, delays could occur for travel from Port of West Sacramento at the Rio Vista Bridge.
- Lower Sacramento River between Rio Vista and Clarksburg includes several shallow areas, and delays could occur at the Walnut Grove, Paintersville, and Isleton Bridges.
- Three Mile Slough includes several shallow areas, and delays could occur at the Three Mile Slough Bridge.
- North Fork Mokelumne River includes several shallow areas, and delays could occur at the Millers Ferry Swing Bridge.
- South Fork Mokelumne River includes several shallow areas, and delays could occur at the Mokelumne River Bridge along State Route 12.
- San Joaquin River and SDWSC have adequate widths and depths.
- Old River includes shallow and narrow areas, and delays could occur at the Orwood Bascule and Old River Railroad Bridges.
- Connection Slough includes shallow areas, and delays could occur at the Connection Slough Swing Bridge.
- Railroad Cut has adequate widths and depths for barges.
- Woodward Canal/North Victoria Canal includes shallow areas, and delays could occur at the new bridge between Woodward Island and Jones Tract.
- Potato Slough includes shallow depths and tight turns.
- Middle River Complex, including Columbia Cut, Empire Cut, Turner Cut, and Whiskey Slough, includes several shallow and narrow areas, and delays could occur at the Bacon Island Swing Bridge.

2.3.3 Operational Constraints

The ability to effectively use the water access routes would be periodically limited by tidal cycles, weather, and environmental constraints. Storm events cause higher currents from December through April. Higher flows reduce the speeds of tugs and loaded barges going upstream and increase speeds of empty barges going downstream. Tule fog in the Delta can shut down barging operations for 1 to 2 days per month on average during the winter months. Wind speeds and gusts affect tug and barge operations in the summer and fall months; however, these effects are not anticipated to be substantial.

Environmental constraints could affect the ability to operate barges or construct barge landings in some months or at night. The SRDWSC and SDWSC have enough width to accommodate passing oceangoing vessels and barges, and therefore, barge operations would not interrupt commercial vessel navigation. However, the Delta has over 130 marinas with multiple slips for recreational boaters; therefore, barge

operations would require coordination with navigation regulatory agencies to protect recreational vessel navigation.

2.3.4 Recommendations

Tunnel launch shaft sites on Bouldin and Lower Roberts islands could be located near waterways that could be accessed by multiple barges. The tunnel launch shaft site on Bouldin Island could be accessed along a barge route on SDWSC and Potato Slough. The tunnel launch shaft site on Lower Roberts Island could be accessed along the adjacent SDWSC to the east of an existing Port of Stockton barge landing and Windmill Cove. These barge landings would be connected to the tunnel launch shaft sites by a combination of conveyors, roads, or rails.

Barges could directly access Bouldin Island and Lower Roberts Island barge landings from the Port of Stockton and ports in the San Francisco Bay Area. Barges from the Port of West Sacramento would navigate along the Sacramento Deep Water Ship Channel to the Sacramento River; and continue under two moveable bridges: one at Rio Vista along the Sacramento River and one at the confluence of the Sacramento River and Three Mile Slough. Navigation under the moveable bridges could result in delays. Some barge operations could be utilized at other locations such as water-based support of pile driving, rock slope placement and levee construction. These types of operations do not typically require extensive land-based support infrastructure.

Other work locations such as the intakes and Southern Complex are not recommended due to combinations of the constraints included above.

Major barge operations at the intakes are not recommended for the following reasons:

- Multiple Barge Landings or increased hauling on roadways would be needed
- Materials would be delivered on the opposite side of State Route 160 from the majority of the work that could be effectively supported by barge operations, requiring traffic interruptions.
- Multiple operable bridges would need to be passed on the inbound and outbound legs, effecting roadway traffic patterns.

Major barge operations at the Southern Complex are not recommended for the following reasons:

- Width and depth of waterways would limit barge speed and ability to pass.
- Passing the BNSF Railroad operable bridge would cause delays due to the number of trains that utilize this route.

3. Tug and Barge Characteristics

The key to successfully implementing waterborne equipment in the Delta is appropriate vessel width and draft for navigation within Delta waterways. The Delta has two major waterways—the Sacramento River Deep Water Ship Channel (SRDWSC) and the Stockton Deep Water Ship Channel (SDWSC)—both of which have ample width and draft to accommodate multiple barges pushed by a single tow or tug boat. By comparison, the Sacramento River and the other watercourses and canals that are examined in this study are limited in width and draft. This is due to bridge, marina, and draft restrictions.

The following subsections summarize information on barges, tugs and workboats, and deck barge sizes and capacities.

1960). The California Department of Transportation routinely performs maintenance on the bridge, but it does not stop the bridge from operating. Every 9 months, the bridge is closed for 2 hours to replace the oil in the gearboxes. Single lanes on the bridge could close from time to time for roadway maintenance that does not involve major construction. As of 2018, the bridge is currently undergoing a major renovation program consisting of painting and deck replacement, which would be ongoing for the next 4 years. The bridge requires 4 hours' notice to open for marine traffic (Johnson, pers. comms. 2019).

Image © 2019 Google Street View

Figure 4. Rio Vista Bridge

Summary: With an average channel width of 450 to 650 feet and a depth of 30 feet, there are no barge restrictions on the channel. Multi-barge tows can be accommodated. However, there could be periodic schedule constraints because of bridge operations and water stages.

4.2 Lower Sacramento River

Ships enter the Lower Sacramento River from San Francisco Bay through Suisun Bay to the confluence with the San Joaquin River near Collinsville. The Sacramento River extends from Collinsville to upstream of Shasta Lake near Redding. For this study, the Lower Sacramento River's navigability is considered between a location approximately 2 miles north of Rio Vista to Walnut Grove and between Walnut Grove to Clarksburg. The reach between Rio Vista and Walnut Grove includes the confluence of the Sacramento River and SRDWSC immediately upstream of Rio Vista.

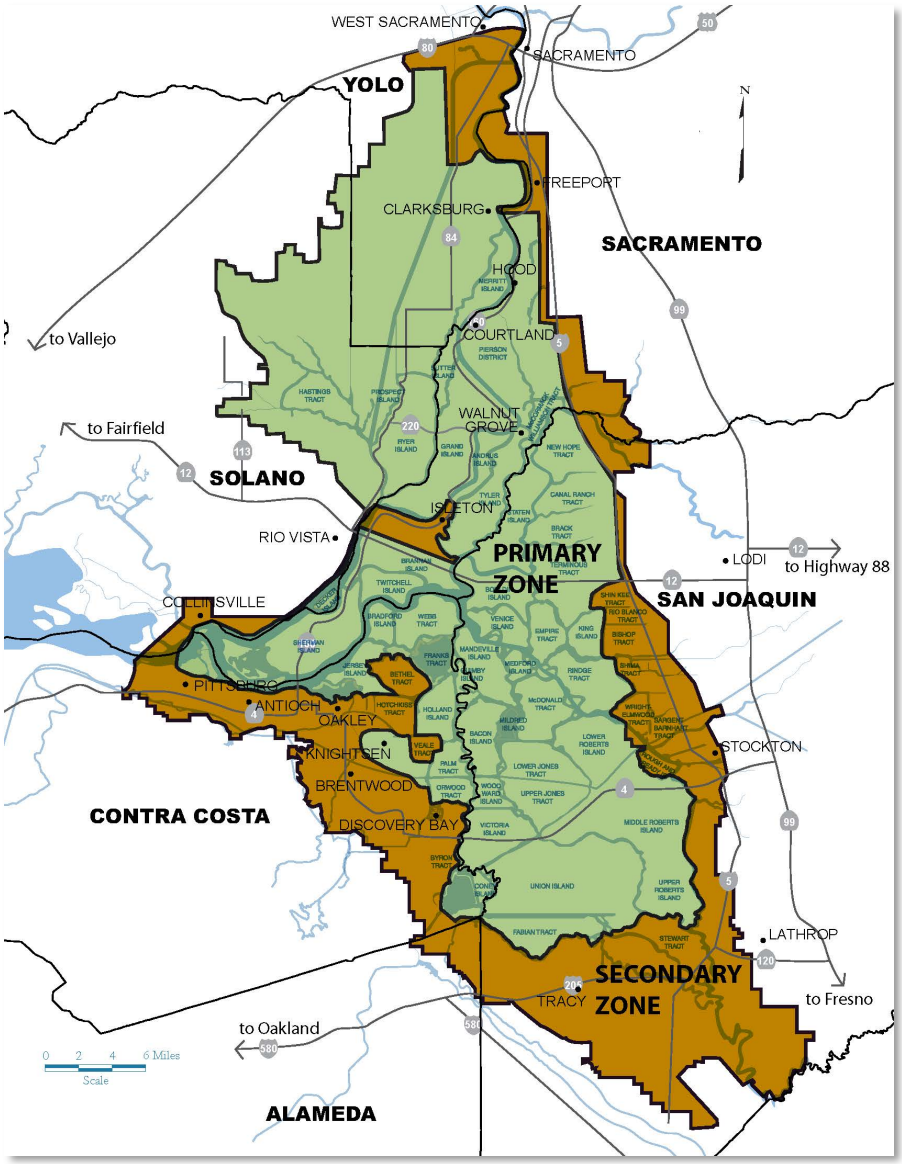
4.2.1 Vessel Operations and Restrictions on the Channel

On the Sacramento River between Rio Vista and Walnut Grove, shown on Figure 5, the channel's average depth is 13.8 feet, and its average width is 402 feet. There are five areas of concern (highlighted in red on the Figure 5). Three of these areas have reduced width because of the exiting waterside facilities, and two of them have shallow locations where the water depth is as low as 7 to 8 feet. These depths were determined by soundings at MLLW. Note that these data were published in 2009 and are 10 years old. Shoaling and infill in certain areas have likely occurred during this period. Before considering project-related navigation on this portion of the river, new soundings should be taken to identify current depths. Because of the depth concerns and the narrow width of the Sacramento River channel between Rio Vista and Walnut Grove, the tow configuration would require a tug pushing a single barge. It could be necessary to light-load the barge to navigate the 7-foot draft near the restricted channel entrance. As an option, tugs and barges could need to wait for higher tides on this portion of the Sacramento River to navigate over the shallow areas.

DELTA PROTECTION COMMISSION

Land Use and Resource Management Plan for the Primary Zone of the Delta

Adopted February 25, 2010



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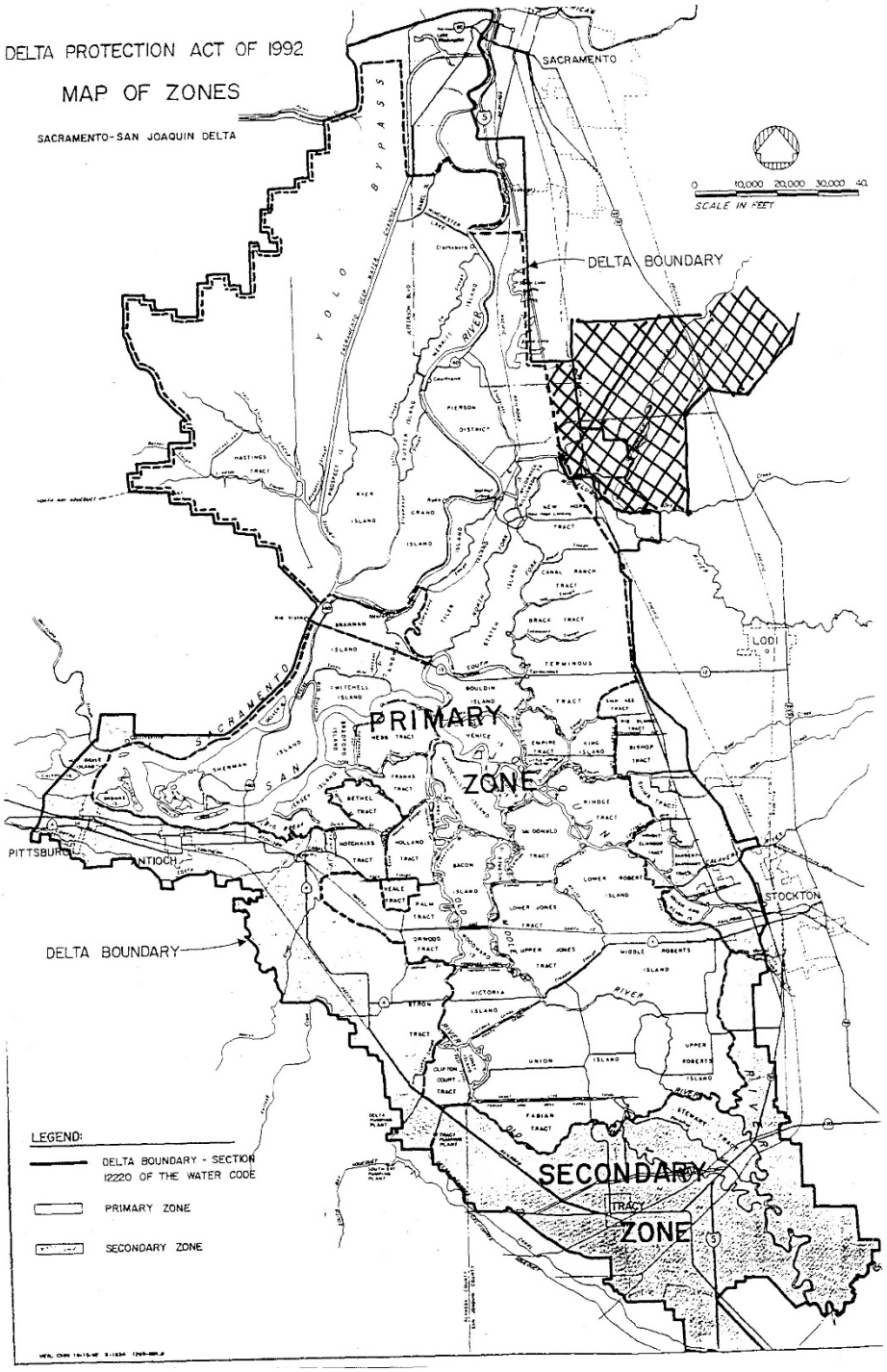
Map of the Primary and Secondary Zones of the Sacramento- San Joaquin Delta adopted under the Delta Protection Act



Introduction

Introduction

The Delta Protection Act of 1992 (Act) established the Delta Protection Commission, a State entity to plan for and guide the conservation and enhancement of the natural resources of the Delta, while sustaining agriculture and meeting increased recreational demand. The Act defines a Primary Zone, which comprises the principal jurisdiction of the Delta Protection Commission. The Secondary Zone is the area outside the Primary Zone and within the "Legal Delta"; the Secondary Zone is not within the planning area of the Delta Protection Commission. The Act requires the Commission to prepare and adopt a Land Use and Resource Management Plan for the Primary Zone of the Delta, which must meet specific goals. This document constitutes the Land Use and Resource Management Plan for the Primary Zone of the Delta (Plan), as adopted in 1995 and will be updated in 2010.

The Act (Public Resources Code Section 29760 et. seq.) requires the Commission to prepare and adopt and thereafter review and maintain a comprehensive long-term Resource Management Plan for land uses within the Primary Zone of the Delta ("Resource Management Plan"). The Resource Management Plan is to set forth a description of the needs and goals for the Delta and a statement of the policies, standards, and elements of the Resource Management Plan. Within 180 days of the adoption of the Resource Management Plan or any amendments by the Commission, all local governments, as defined in Public Resources Code Section 29725, shall submit to the Commission proposed amendments to their general plans. The amendments shall cause the general plans to be consistent with the criteria in Public Resources Code Section 29763.5 with respect to land located within the Primary Zone. Those criteria include a requirement that the general plan be consistent with the Resource Management Plan (Plan). This introduction and the following policies of the Plan constitute the regulatory portion of the Plan.

The Primary Zone of the Sacramento-San Joaquin Delta (Delta) includes approximately 500,000 acres of waterways, levees and farmed lands extending over portions of five counties: Solano, Yolo, Sacramento, San Joaquin and Contra Costa. The rich peat soil in the central Delta and the mineral soils in the higher elevations support a strong agricultural economy. The Delta lands currently have access to the 1,000 miles of rivers and sloughs lacing the region. These waterways provide habitat for many aquatic species and the uplands provide year-round and seasonal habitat for amphibians, reptiles, mammals, and birds, including several rare and endangered species. The area is extremely popular for many types of recreation including fishing, boating, hunting, wildlife viewing, water-skiing, swimming, hiking, and biking.

The goals of the Plan, as set out in the Act, are to "protect, maintain, and where possible, enhance and restore the overall quality of the Delta environment, including but not limited to agriculture, wildlife habitat, and recreational activities; assure orderly, balanced conservation and development of Delta land resources and improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety."

As specified in the Act, the Delta Protection Commission is not authorized to exercise any jurisdiction over matters within the jurisdiction of, or to carry out its powers and duties in conflict with, the powers and duties of any other State agency. The Plan also provides guidance to State agencies undertaking activities in the Primary Zone. The Plan, therefore, applies to development subject to approval by the Delta counties (Contra Costa, Sacramento, San Joaquin, Yolo and Solano). Should Cities propose to expand into the Delta Primary Zone, or acquire land in the Primary Zone for utility or infrastructure facility development, those actions are to be carried out in conformity with the Delta Protection Act of 1992.

The Plan consists of three sections. Part I, the Introduction, describes the planning program and the Plan objectives. Part II includes the Plan's individual elements. Part III describes the program for implementing the Plan. A map that shows the boundary of the Primary and Secondary Zones of the Delta is attached.

This Plan will be updated in 2010 following a collaborative planning process. The Delta Protection Commission established a Planning Advisory Committee (Committee) that began meeting in September 2008 which represented a broad spectrum of Delta interests. The Committee met and prepared a Draft Plan in December 2008. The Draft Plan was presented at public workshops throughout the Delta in order to receive input from the public and integrate the public's comments into the Draft Plan. The Draft Plan was presented to the Delta Protection Commission in March 2009 and the Commission held subsequent meetings to consider any updates to the Plan.

A wide variety of reference materials were used in the preparation of this Plan. The primary reference materials used to prepare the introductory sections of the individual elements included the following: *Status and Trends of Delta-Suisun Services* prepared by URS Corporation for the California Department of Water Resources, May 2007; *CALFED Bay-Delta Program Programmatic Record of Decision* August 28, 2000; *Delta Protection Commission Land Use and Resource Management Plan for the Primary Zone of the Delta Update 2008 - Profiles of Ongoing Planning Processes and Planning Documents for Consideration* prepared by the Delta Protection Commission staff, July 24, 2008; *Our Vision for the California Delta* prepared by the Governor's Delta Vision Blue Ribbon Task Force, January 29, 2008 (Second Printing); and the *Delta Vision Strategic Plan* prepared by the Governor's Delta Vision Blue Ribbon Task Force, October 2008.

Each element includes an introductory discussion that provides the context for the element's goals and policies. The introductory discussions provide the framework from which the goals and policies of the individual elements are derived. Policies are the directions for action the local governments must embrace and support through amendments to local General Plans, if necessary. It is important to note, however, that in the implementation of both the goals and policies of this Plan, the Act specifically prohibits the exercise of the power of eminent domain unless requested by the landowner.

The Commission will be required to take into consideration projected climate change effects in their implementation of this Land Use and Resource Management Plan. Many of the assets of the Delta are at risk from climate change. In 2006, the California Climate Change Center published a report that stated a historical rise in sea level of 7 inches and projected an additional rise of 22 to 35 inches by the end of the century. Since that time numerous other studies have published projected ranges of 7 to 23 inches (*The International Panel on Climate Change*, *4th Assessment on Climate Change*, 2007), 20 to 55 inches (Rahmstorf, *Science*, 2007), and 32 to 79 inches (Pfeffer, *Science*, 2008) of sea level rise during this same period, with the differences in these projections attributed to how glacier ice melt is included in the calculation. Damage from sea level rise could be exacerbated by other aspects of climate change, which include an increase in the frequency and intensity of extreme weather events and increased frequency of large wildfires.

The term "shall" in these regulations is mandatory; the terms "may", "should", and "can" are advisory.

This document should be considered in its entirety.

Every five (5) years the Commission will consider revising the Plan.

Land Use

Land Use

Overview

The patterns of settlement in the Delta reflect the history of immigration into the State in the late 19th century. The settlement pattern was historically, and remains to this day, closely associated with the rivers, sloughs, and waterways of the Delta, and with the configuration of agricultural lands. One incorporated city, Isleton, and portions of other incorporated cities including Stockton, Antioch, Oakley, Sacramento, West Sacramento, Elk Grove, Tracy, Lathrop and Pittsburg, are located within or just outside of the Secondary Zone; and Rio Vista is located partially within the Primary Zone, but not within the Secondary Zone. Unincorporated towns lying along the Sacramento River in the Primary Zone include Clarksburg, Courtland, Hood, Locke, Walnut Grove, and Ryde. These towns serve as social and service centers for the surrounding farms and historically served as shipping sites for products. These rural communities reflect the diverse heritage of the Delta.

The five Delta counties (Solano, Yolo, Sacramento, San Joaquin, and Contra Costa) designate Primary Zone lands for agriculture or special Delta resources in their respective general plans. The zoning codes for the five Delta counties allow a variety of uses in the Primary Zone including agriculture and agriculturally-oriented uses; outdoor recreation; wildlife habitat; public facilities; and limited areas for commercial, industrial, and rural residential development.

The two Delta ports, Sacramento and Stockton, own hundreds of acres of land along their respective shipping channels. Some of these lands are used for dredge material disposal and some have been or will be used for habitat mitigation sites.

Sherman Island, Twitchell Island, Staten Island, portions of the Yolo Bypass (e.g., Vic Fazio Wildlife Area) and McCormack-Williamson Tract are held as conservation lands and are currently operated as farmlands. A number of conservation easements and mitigation banks will also be created under local Habitat Conservation Plans and Natural Communities Conservation Plans. Since 1990, urban and other land uses in the Secondary Zone have gained substantial acreage while agricultural land use has declined. Other land uses within the Secondary Zone include conservation areas, low-density rural developments, natural areas not suitable for livestock grazing, and other non-agricultural areas.

The periphery of the Delta is undergoing rapid urbanization associated with substantial population growth. Current and future population growth increases the demand for developable land, particularly in areas near the Bay area, Stockton, and Sacramento. This demand results in the conversion of open space, primarily agricultural land, to residential and commercial uses. Increasing concern exists regarding the potential for urbanization and projects in the secondary zone to impact the Primary Zone.

In addition to numerous local, national and international factors affecting the profitability of farming in the Delta, the acquisition of farmed land and subsequent retirement of that

land affects the economic base for farm support industries; the economic base for community businesses that rely on patronage from citizens working in farm or farm support industries; the tax and assessment base for special districts, counties, and the State; and the existing wildlife use patterns that have adapted to agricultural land use patterns.

Goals

Protect the unique character and qualities of the Primary Zone by preserving the cultural heritage, strong agricultural/economic base, unique recreational resources, and biological diversity of the Primary Zone. Direct new non-agriculturally oriented non-farmworker residential development within the existing unincorporated towns (Walnut Grove, Clarksburg, Courtland, Hood, Locke, and Ryde).

Encourage a critical mass of farms, agriculturally-related businesses and supporting infrastructure to ensure the economic vitality of agriculture within the Delta.

Policies

P-1.

The rich cultural heritage, strong agricultural/economic base, unique recreational resources, and biological diversity of the Delta shall be preserved and recognized in public/private facilities, such as museums, recreational trails, community parks, farm stands, community centers, and water access facilities within the Delta.

P-2.

Local government general plans, as defined in Government Code Section 65300 et seq., and zoning codes shall continue to promote and facilitate agriculture and agriculturally-supporting commercial and industrial uses as the primary land uses in the Primary Zone; recreation and natural resources land uses shall be supported in appropriate locations and where conflicts with agricultural land uses or other beneficial uses can be minimized.

P-3.

New non-agriculturally oriented residential, recreational, commercial, habitat, restoration, or industrial development shall ensure that appropriate buffer areas are provided by those proposing new development to prevent conflicts between any proposed use and existing adjacent agricultural parcels. Buffers shall adequately protect integrity of land for existing and future agricultural uses and shall not include uses that conflict with agricultural operations on adjacent agricultural lands. Appropriate buffer setbacks shall be determined in consultation with local Agricultural Commissioners, and shall be based on applicable general plan policies and criteria included in Right-to-Farm Ordinances adopted by local jurisdictions.

P-4.

Direct new non-agriculturally oriented non-farmworker residential development within the existing unincorporated towns (Walnut Grove, Clarksburg, Courtland, Hood, Locke, and Ryde).

P-5.

Local government general plans shall address criteria under which general plan amendments in the Primary Zone will be evaluated under Public Resources Code Section 29763.5. Proposed amendments to local government general plans for areas in the Primary Zone shall be evaluated in terms of consistency of the overall goals and policies of the Land Use and Resource Management Plan.

P-6.

Subsidence control shall be a key factor in evaluating land use proposals. Encourage agricultural, land management, recreational, and wildlife management practices that minimize subsidence of peat soils. Local governments should utilize studies of agricultural and land management methods that minimize subsidence and should assist in educating landowners and managers as to the value of utilizing these methods.

P-7.

New structures shall be set back from levees and areas that may be needed for future levee expansion consistent with local reclamation district regulations and, upon adoption, with the requirements to be identified in the California Department of Water Resources Central Valley Flood Control Plan.

P-8.

Local government policies regarding mitigation of adverse environmental impacts under the California Environmental Quality Act may allow mitigation beyond county boundaries, if acceptable to reviewing fish and wildlife agencies and with approval of the recipient jurisdiction, for example in approved mitigation banks or in the case of agricultural loss to mitigation. Mitigation in the Primary Zone for loss of agricultural lands in the Secondary Zone may be appropriate if the mitigation program supports continued farming in the Primary Zone. California Government Code Section 51256.3 (Assembly Bill 797) specifically allows an agricultural conservation easement located within the Primary or Secondary Zone of the Delta to be related to Williamson Act contract rescissions in any other portion of the secondary zone without respect to County boundary limitations.

P-9.

The implementation of the policies contained in the resource management plan shall not be achieved through the exercise of the power of eminent domain unless requested by the landowner.

P-10.

Maintain sites for the storage of dredged material from channels within the Delta and discourage the conversion of existing sites to other uses, as appropriate. Soil that is

suitable for levee rehabilitation and raising Delta lowlands should remain within the Delta.

P-11.

Local governments may develop programs to cluster residential units that allow property owners to engage in limited property development in order to ensure the efficient use and conservation of agricultural lands, support open space values, and protect sensitive environmental areas in the Primary Zone. Clustered development occurs when contiguous or non-contiguous parcels are developed to cluster lots for residential use. The purpose of clustered development is to provide a mechanism to preserve agricultural land and open space, to locate housing in areas that can readily be served by public services and utilities, and provide the agricultural community an alternative to transfer of development rights. Clustered development programs shall ensure that the number of clustered lots created does not exceed the allowable density requirement for the zoning of the sum of the parcels. Clustered development may only be used one time. Neither the clustered lots nor the remainder lots may be further subdivided. Residential development shall be consistent with local General Plan policies and zoning regulations and standards.

P-12.

Local governments may develop transfer of development rights (TDR) programs that allow land owners to transfer the development right from one parcel of land to another. The purpose of these TDR programs would be to ensure the efficient use and conservation of agricultural lands, to support open space values, and to protect sensitive environmental areas within the Primary Zone. This purpose would be achieved by relocating development rights within the Primary Zone to more suitable areas such as adjacent to or within existing urban areas within or outside of the Primary Zone, or to provide expanded opportunities for affordable farm worker housing. TDR programs shall ensure that the transferred development density does not exceed the development density identified for the zoning for the sending parcel, and that any farm worker housing is restricted and regulated for that purpose. The land upon which the development rights are transferred from would be restricted with a permanent conservation easement. Receiving areas must have the infrastructure capacity, public services and utilities to absorb the new development.

P-13.

Support the implementation of appropriately located agricultural labor camps and housing that serve agricultural operations, which are constructed and sited consistent with Sections 17021.5 and 17021.6 of the California Health and Safety Code and consistent with the requirements of local building codes.

P-14.

The conversion of an agricultural parcel, parcels, and/or an agricultural island for water impoundment, including reservoirs, water conveyance or wetland development may not result in the seepage of water onto or under the adjacent parcel, parcels, and/or island. These conversions shall mitigate the risks and adverse effects associated with seepage, levee stability, subsidence, and levee erosion, and shall be consistent with the goals of this Plan.

Agriculture

Agriculture

Overview

Delta agricultural lands were "reclaimed" through construction of levees and drainage of the marshy islands of the area. In less than 100 years, from 1850 to 1930, hundreds of thousands of acres of land went into agricultural production due in large part to the high productivity of the peat soils in the central Delta and the mineral soils in the higher elevations. The farmers and landowners represented a cross section of the new Americans-Slavs, Dutch, German, English, and others. Many groups of immigrants first labored in the fields, then went on to become landowners or tenant farmers including Portuguese, Chinese, Japanese, Filipinos, and Hindus.

Early crops were grains, fruits, and vegetables marketed in the nearby cities. Early specialty crops included wheat, barley, beans, and potatoes. Later asparagus, sugar beets, tomatoes, and celery grew in popularity. Currently, the Delta counties raise a variety of crops including grains, fruits, field crops, nuts, seeds, pasture and alfalfa, wine grapes, vegetables, olives and blueberries.

In the recent past, thousands of acres of agricultural lands were developed for residential and other urban uses. Between 1990 and 2004, approximately 39,000 acres of agricultural land was converted to urban and other uses in the larger Delta-Suisun Marsh area (*Status and Trends of Delta-Suisun Service*, California Department of Water Resources, May 2007). New markets to sell crops, including new crop uses such as the conversion to fuel sources, will continue to keep agriculture an important land use in the Delta and California.

Agricultural lands within the Delta are highly productive and well suited for ongoing agricultural operations. Delta counties have recognized the value of the agriculture economy and have clearly delineated Delta lands for long-term agricultural use. Local governments use specific land use tools to protect the agricultural way of life within the Delta. These tools are the inclusion of agricultural elements in their general plans, the adoption of urban limit lines, the establishment of buffers between agriculture and other approved uses, the adoption of Right-to-Farm ordinances, full support of the Williamson Act programs, the control of land subdivision and land use types allowed within agricultural areas, the establishment of minimum agricultural parcel sizes, and the establishment of limits on General Plan land use designation changes. Also pursuant to the Act, to the extent that any of the requirements specified in this Land Use and Resource Management Plan are in conflict, nothing in this Plan shall deny the right of the landowner to continue the agricultural use of the land.

Some agricultural lands provide rich seasonal wildlife habitat. Thousands of acres of agricultural lands are flooded after harvest and provide feeding and resting areas for resident and migratory birds and other wildlife. This practice of seasonal flooding helps maximize the wildlife values of agricultural areas and lessen opportunities for agricultural pests.

Goals

To support long-term viability of agriculture and to discourage inappropriate development of agricultural lands.

Support the continued capability for agricultural operations to diversify and remain flexible to meet changing market demands and crop production technology. Promote the ability for agriculture operations to change the crops or commodities produced to whatever is most economically viable at the time. Support the use of new crop production technologies that keep Delta agricultural operations competitive and economically sustainable.

The priority land use of areas in the Primary Zone shall be oriented toward agriculture and open space. If agriculture is no longer appropriate, land uses that protect other beneficial uses of Delta resources and that would not adversely affect agriculture on surrounding lands or the viability or cost of levee maintenance, may be permitted. If temporarily taken out of agriculture production due to lack of adequate water supply or water quality, the land shall remain reinstateable to agriculturally-oriented uses for the future.

Policies

P-1.
Support and encourage agriculture in the Delta as a key element in the State's economy and in providing the food supply needed to sustain the increasing population of the State, the Nation, and the world.

P-2.
Conversion of land to non-agriculturally-oriented uses should occur first where productivity and agricultural values are lowest.

P-3.
Promote recognition of the Delta as a place by educating individuals about the rich agricultural heritage, the unique recreational resources, the biological diversity, and the ongoing value of maintaining a healthy agricultural economy in the Delta.

P-4.
Support agricultural programs that maintain economic viability and increase agricultural income in accordance with market demands, including but not limited to wildlife-friendly farming, conservation tillage and non-tillage.

P-5.
Local governments shall encourage implementation of the necessary plans and ordinances to: maximize agricultural parcel size; reduce subdivision of agricultural lands; protect agriculture and related activities; protect agricultural land from conversion to non-agriculturally-oriented uses. An optimum package of regulatory and incentive programs

could include: (1) an urban limit line; (2) minimum parcel size consistent with local agricultural practices and needs; (3) strict subdivision regulations regarding subdivision of agricultural lands to ensure that subdivided lands will continue to contain agriculturally-oriented land uses; (4) require adequate buffers between agricultural and non-agricultural land uses particularly residential development outside but adjacent to the Primary Zone; (5) an agriculture element of the general plan; (6) a Right-to-Farm ordinance; and (7) a conservation easement program.

P-6.

Encourage acquisition of agricultural conservation easements from willing sellers as mitigation for projects within each county. Promote use of environmental mitigation in agricultural areas only when it is consistent and compatible with ongoing agricultural operations and when developed in appropriate locations designated on a countywide or Deltawide habitat management plan.

P-7.

Encourage management of agricultural lands which maximize wildlife habitat seasonally and year-round, through techniques such as fall and winter flooding, leaving crop residue, creation of mosaic of small grains and flooded areas, wildlife friendly farming, controlling predators, controlling poaching, controlling public access, and others.

P-8.

Encourage the protection of agricultural areas, recreational resources and sensitive biological habitats, and the reclamation of those areas from the destruction caused by inundation.

P-9.

Support agricultural tourism and value-added agricultural production as a means of maintaining the agricultural economy of the Delta.

Natural Resources

Overview

The Delta is a unique geographic area in the State of California, a low-lying region of rich mineral and peat soils, composed of islands created largely by humans as they diked and drained the prehistoric marshes of the region. The geology of the region created this unique "Delta". Sediments trapped inland of the rocky neck of the Carquinez Straits resulted in the creation of this 1,100 square-mile area. Based on the geological characteristics of the Delta, there is potential for seismic activity in the region.

The peat soils of the central and western Delta have oxidized, resulting in subsidence of land surfaces of up to 20 feet. Original peat soil depths varied substantially from area to area and even within a given island. Subsidence has slowed to about one-third of an inch a year in many areas.

Flood threats are compounded by the low elevations of the Delta and by subsidence. Twice in each approximately 25-hour period the elevation of the Sacramento River rises and falls about three feet due to the tidal cycle. The threat of flooding is generally associated with periods of high winter rainfall and periods of rapid spring snow melt in the watersheds draining into the Delta. The most critical conditions occur when upstream dams are full and the resulting high rates of river flow combine with high tides and strong winds.

The lush wetland habitats surrounded by riparian woodlands have been replaced by agricultural lands including cultivated and irrigated croplands as well as irrigated and non-irrigated pasture lands. Remnants of natural habitat are located largely along some sloughs and rivers and on small channel islands. Pockets of wooded or wetland habitat exist on some islands.

The aquatic habitats historically ranged from fresh to brackish and were home to both resident and migratory fish. Modern aquatic habitats are affected by flows released from upstream dams, seasonal drainage from agricultural lands, and year-round drainage from sources outside the Primary Zone. Several large, freshwater lakes are located on the eastern edge of the Delta, providing year-round wetland habitat.

Species native to the Delta evolved within an ecosystem that was much different than today. Many of the indigenous species have declined because of ecosystem changes over the past 150 years including:

- Loss of habitat.
- Loss of access to upstream habitat for anadromous fish from construction of dams.
- Diking and draining of Delta lands to convert marshes to farms.
- Urbanization.

- Changes in river flows.
- Construction of levees that separate rivers from their floodplains thereby eliminating channel meander and riparian habitat.
- Invasion by non-native species.
- Alterations in hydrology, particularly the elimination of variability in seasonal flow patterns.
- Reduction in seasonal and annual variability in salinity.
- Introduction of numerous toxic substances.
- Export pumping in the South Delta.

Flow patterns in the Delta are governed by inflows, large water diversions, and tidal flows. The relative importance of these flows varies with season and location. Net— tidally averaged— flows depend on inflows from the rivers and export pumping in the southern Delta. Sometimes the combination of inflows and exports causes "reverse flow," or a situation when flow moves upstream rather than downstream. These flows can cause young fish, including eggs and larvae, to be entrained at the pumping facilities of the State Water Project and the Central Valley Project.

The Delta provides substantial habitat for resident and migratory waterfowl and shorebirds. The abundance of these birds declined precipitously in the Delta because of land reclamation, although subsequent changes in cropping patterns have allowed populations of some species to increase.

The Delta supports hundreds of fish, plants, mammals, amphibians, reptiles, and invertebrates. Many of the native species have declined in abundance and in range, leading to the listing of several species under the California and/or federal Endangered Species Acts. Early species declines were caused by loss or isolation of physical habitat when the Delta islands were drained. However, due to the information collected as a result of monitoring activities that occurred in the 1960's through the 1980's, it is clear that species declined due to a variety of causes including changing climate; effects of toxic substances; alteration of habitat; introduction of non-native species that consume, compete with, or alter the habitat of native species; water diversions/exports; and changes in hydrology.

In the past few years, the abundance of several pelagic (open water) fish species inhabiting the Delta, such as delta smelt and longfin smelt, have declined to record-low levels. The reasons for this pelagic organism decline are multiple and are the subject of intense investigation. The loss of pelagic species in the Delta seems to be a function of poor conditions for food conditions, invasive species, degraded water quality, losses to export pumping, and other potential negative influences, such as toxins. The populations

of salmon that migrate through the Delta and are dependent on Delta resources have also experienced precipitous declines, which have adversely affected the fishing industry.

Long-term trends for the ecosystem depend on the severity of climate change and the future physical structure and salinity of the Delta. Large mammals, such as bear and elk, which historically lived in and around the Delta have either been eliminated or reduced to extremely low numbers. Aquatic mammals, including beaver and otter still remain. Some resident and migratory birds have adapted to the agricultural practices in the Delta, particularly the small grain fields which are flooded in fall and winter months. Migratory birds include ducks, geese, swans, cranes, and shorebirds. Hawks and eagles forage in the Delta fields. The Primary Zone, with its large open expanses of farmland, mosaic of small grain crop residues and shallow flooded fields, permit wildlife to feed and rest, thereby providing high quality wildlife habitat.

It is recognized that Habitat Conservation Plans and Natural Community Conservation Planning (HCP/NCCP) efforts within the Delta, including the CALFED Ecosystem Restoration Program Plan (ERPP) 4, must be acknowledged in the administration of the policies of the Plan as these programs include agreements and/or contracts that have long-term provisions to sustain a durable program.

Goals

Preserve and protect the natural resources of the Delta. Promote protection of remnants of riparian and aquatic habitat. Encourage compatibility between agricultural practices and wildlife habitat.

Policies

P-1.
Preserve and protect the natural resources of the Delta. Promote protection of remnants of riparian and aquatic habitat. Encourage compatibility between agricultural practices, recreational uses and wildlife habitat.

P-2.
Encourage farmers to implement management practices to maximize habitat values for migratory birds and other wildlife. Appropriate incentives, such as: purchase of conservation easements from willing sellers or other actions, should be encouraged.

P-3.
Lands managed primarily for wildlife habitat should be managed to maximize ecological values. Appropriate programs, such as "Coordinated Resource Management and Planning" (Public Resources Code Section 9408(c)) should ensure full participation by local government and property owner representatives.

P-4.

Support the non-native invasive species control measures being implemented by the California Department of Fish and Game, the California Department of Boating and Waterways, the California Emergency Management Agency, the California Department of Food and Agriculture, the State Water Resources Control Board, the Central Valley and San Francisco Bay Regional Water Quality Control Boards, and the Agricultural Commissioners for the five Delta Counties (Yolo, Solano, Sacramento, San Joaquin, and Contra Costa), which include controlling the arrival of new species into the Delta.

P-5.

Preserve and protect the viability of agricultural areas by including an adequate financial mechanism in any planned conversion of agricultural lands to wildlife habitat for conservation purposes. The financial mechanism shall specifically offset the loss of local government and special district revenues necessary to support public services and infrastructure.

P-6.

Support the implementation of appropriate buffers, management plans and/or good neighbor policies (e.g. safe harbor agreements) that among other things, limit liability for incidental take associated with adjacent agricultural and recreational activities within lands converted to wildlife habitat to ensure the ongoing agricultural and recreational operations adjacent to the converted lands are not negatively affected.

P-7.

Incorporate, to the maximum extent feasible, suitable and appropriate wildlife protection, restoration and enhancement on publicly-owned land as part of a Delta-wide plan for habitat management.

P-8.

Promote ecological, recreational and agricultural tourism in order to preserve the cultural values and economic vitality that reflect the history, natural heritage and human resources of the Delta including the establishment of National Heritage Area designations.

P-9.

Protect and restore ecosystems and adaptively manage them to minimize impacts from climate change and other threats and support their ability to adapt in the face of stress.

P-10.

Ensure that design, construction, and management of any flooding program to provide seasonal wildlife and aquatic habitat on agricultural lands, duck club lands and additional seasonal and tidal wetlands, shall incorporate "best management practices" to minimize vectors including mosquito breeding opportunities, and shall be coordinated with the local vector control districts, (each of the four vector control districts in the Delta provides specific wetland/mosquito management criteria to landowners within their district.)

Recreation & Access: Including Marine Patrol, Boater Education, and Safety Programs

Recreation & Access: Including Marine Patrol, Boater Education, and Safety Programs

Overview

The Delta is a unique geographic region that provides exceptional recreational opportunities including boating, fishing, hunting, hiking, biking, camping, and wildlife viewing. Recreational users originate from both within and outside of the Delta. Many of the visitors value the wide expanses of open land, interlaced waterways, historic towns, and the feeling of a slower pace of life within the Delta.

Navigable waterways in the Delta-Suisun area are publicly accessible and currently constitute the majority of the recreational opportunities within the Delta. Boating use totals more than 6.4 million visitor days annually, composed of 2.13 million annual boat trips in the larger Delta-Suisun area (*Status and Trends of Delta-Suisun Service,* California Department of Water Resources, May 2007). The Aquatic Recreation Component of the Delta Recreation Strategy Plan prepared by the Delta Protection Commission forecasts demand for boating recreation through 2020 and identifies a deficit of facilities.

Most of the recreational facilities within the Delta are provided through private marinas. Several thousand boat berths are located in the Primary Zone, almost equally allocated among Contra Costa, Sacramento, and San Joaquin counties. Private facilities also provide launching facilities, recreational vehicle and tent camping, picnicking, restaurants, and bait and tackle shops. Waterskiing and riding Personal Water Craft (PWC) 5 are popular water-oriented activities.

The majority of the land within the Delta is privately owned, which reduces the availability of land-based recreation. Five fishing access/launching facilities owned by the California Department of Fish and Game and managed by Sacramento and Yolo counties are located within the Delta. San Joaquin County provides land and water access at Westgate Park. Brannan Island State Recreation Area provides boat launching, camping, swimming, nature interpretation, and wind surfing. Hunting occurs mainly on private lands; although some hunting is allowed on State- and federally-owned lands and waterways.

Concerns regarding existing and future recreational activities within the Delta include compatibility with agricultural operations and other private property uses, funding availability for the long-term maintenance and supervision of existing recreational facilities and for the development of new recreational facilities, compatibility with wildlife uses and levee maintenance requirements, overuse of existing facilities and popular waterways, the abandonment of vessels and other debris within Delta waterways, and increased demands on law enforcement and other emergency response providers.

Opportunities are available for new recreational facilities to be provided within the Delta on publicly-owned land. Examples include pedestrian access on publicly-owned levees adjacent to Brannan Island State Recreation Area; construction of new visitor facilities,

interpretive facilities and trails at the Stone Lake National Wildlife Refuge; and pedestrian trails, visitor facilities, and water access facilities at State Park's Delta Meadows Project.

In addition, Senate Bill 1556, signed by the Governor in September 2006, creates a California Delta Trail and requires the Delta Protection Commission to create a plan for designing, constructing, and maintaining this trail. The California Delta Trail is planned to be a bike, pedestrian and equine trail system and recreation corridor along more than 1,000 miles of Delta waterfront that will connect with the 450-mile San Francisco Bay Trail.

Goals

To promote continued recreational use of the land and waters of the Delta; to ensure that needed facilities that support such uses are constructed, maintained, and supervised; to protect landowners from unauthorized recreational uses on private lands; and to maximize public funds for recreation by promoting public-private partnerships and multiple use of Delta lands.

Policies

P-1.
Ensure appropriate planning, development and funding for expansion, ongoing maintenance and supervision of existing public recreation and access areas.

P-2.
Encourage expansion of existing privately-owned, water-oriented recreation and access facilities that are consistent with local General Plans, zoning regulations and standards.

P-3.
Assess the need for new regional public and private recreation and access facilities to meet increasing public need, and ensure that any new facilities are prioritized, developed, maintained and supervised consistent with local, state, and federal laws and regulations. Ensure that adequate public services are provided for all existing, new, and improved recreation and access facilities.

P-4.
Encourage new regional recreational opportunities, such as Delta-wide trails, which take into consideration environmental, agricultural, infrastructure, and law enforcement needs, and private property boundaries. Also, encourage opportunities for water, hiking, and biking trails.

P-5.
Encourage provision of publicly funded amenities such as picnic tables and boat-in destinations in or adjacent to and complimentary to private facilities, particularly if the private facility will agree to supervise and manage such amenities, thus lowering the long-term cost to the public.

P-6.
Support multiple uses of Delta agricultural lands, such as seasonal use for hunting and provision of wildlife habitat.

P-7.

Support improved access for bank fishing along State highways, county roads, and other appropriate areas where safe and adequate parking, law enforcement, waste management and sanitation facilities, and emergency response can be provided and where proper rights-of-access have been acquired.

P-8.

Ensure, for the sake of the environment and water quality, the provision of appropriate restroom, pump-out and other sanitation and waste management facilities at new and existing recreation sites, including marinas; encourage the provision of amenities including but not limited to picnic tables and boat-in destinations.

P-9.

Encourage the development of funding and implementation strategies by appropriate governing bodies for the surrender and/or removal of water-borne debris and dilapidated, unseaworthy and abandoned vessels from waterways, to minimize navigational and environmental hazards.

P-10.

Promote and encourage Delta-wide communication, coordination, and collaboration on boating and waterway-related programs including but not limited to marine patrols, removal of debris and abandoned vessels, invasive species control and containment, clean and safe boating education and enforcement, maintenance of existing anchorage, mooring and berthing areas, and emergency response in the Delta.

P-11.

Recognizing existing laws, encourage establishment of Delta-wide law enforcement protocols on local public nuisance and safety issues, such as trespassing, littering, and theft.

P-12.

Support and encourage programs for waterways that provide opportunities for safe boating and recreation, including removal of floating and sunken debris and abandoned vessels from Delta waterways in collaboration with appropriate agencies.

P-13.

Support the development of a strategic plan, in consultation with all law enforcement agencies having jurisdiction in the Delta, to improve law enforcement and the use of available resources to ensure an adequate level of public safety. The strategic plan shall identify resources to implement the plan.

Water

Water

Overview

In California, rainfall runoff and snowmelt are captured in reservoirs to redistribute to urban and agricultural customers while meeting environmental requirements. About 75 percent of the State‘s water originates north of the Delta; and about 75 percent of the State's water needs occur south of the Delta.

Water bound for distribution through both the State Water Project (SWP) and the federal Central Valley Project (CVP) is taken from the south Delta. The CVP has contracts to divert 3.3 million acre feet per year, which supplies primarily agricultural land south of the Delta but also supplies urban areas and wildlife refuges. In addition, water to serve some Bay area urban users is taken from the Delta. The SWP has contracts to divert 4.2 million acre feet per year from the Delta, which supplies primarily urban uses but also supplies agricultural uses south of the Delta. On average, the projects export a total of about 5 million acre feet annually.

About two-thirds of the State's population gets at least a portion of its drinking water from the Delta. In addition, Delta farmers and irrigation districts have rights to irrigate with water taken directly from Delta sloughs and channels.

Because the Delta drains the Sacramento River and San Joaquin River watersheds, urban stormwater runoff and waste discharges from upstream and adjacent areas enter Delta waterways and cause water quality problems. Low-flow years generally carry higher concentrations of waste discharges and agricultural runoff and drainage than do wet years.

Some treated municipal and industrial wastewater, untreated urban storm water, and agricultural runoff and drainage enter the Delta directly. Other urban and agricultural discharges from upstream in the watershed enter the Delta along with the river flows. Seepage onto Delta islands from adjacent channels and drainage from the agricultural lands are released back to the Delta channels at hundreds of locations.

The Central Valley Regional Water Quality Control Board (Board) has identified the Delta as impaired by a number of pollutants, including some pesticides, low dissolved oxygen, electrical conductivity (salinity), and mercury (naturally occurring in the Cache Creek watershed, as well as a legacy of the large-scale hydraulic mining of the Sierra Nevada in the late 1800s). Designation as an impaired water body by the Board, relevant to certain water quality criteria or other stressors, is variable depending on portions of the watershed within the Delta. Delta fish have elevated levels of methylmercury, which poses a risk to humans and wildlife that eat the fish on a regular basis. As of 2009, the Board has adopted a threshold called a total maximum daily load (TMDL) for dissolved oxygen and is developing a TMDL for methylmercury in the Delta.

The daily tidal cycles and the San Joaquin River contribute most of the salinity to the Delta. During periods of high Delta inflows, salinity is low; during periods of low Delta

inflows, the salinity level rises. Salinity in the Delta is managed by a mix of releases from upstream reservoirs, Cross Channel Gate operat25io ns, Delta outflow, and exports from the Delta. The Delta is governed by water quality standards for municipal and industrial uses, agricultural uses, and fish and wildlife, all of which are currently under review by the State Water Resources Control Board. The combination of organic matter (decaying vegetation), bromide in the seawater, and disinfectants used in water treatment plants produce disinfection byproducts that may pose heath risks.

The State Water Resources Control Board and the Regional Boards designate beneficial uses of the State's waters. In the Delta, beneficial uses include: municipal and domestic supply; agriculture; industry; groundwater recharge; navigation; recreation; wildlife habitat; fish migration and spawning; and preservation of rare and endangered species.

Goals

Protect and enhance long-term water quality in the Delta for agriculture, municipal, industrial, water-contact recreation, and fish and wildlife habitat uses, as well as all other beneficial uses.

Policies

P-1.

State, federal and local agencies shall be strongly encouraged to preserve and protect the water quality of the Delta both for in-stream purposes and for human use and consumption.

P-2.

Ensure that Delta water rights and water contracts are respected and protected, including area of origin water rights and riparian water rights.

Levees

Levees

Overview

The Delta is the natural drain for a watershed that includes the Central Valley and the western slope of the Sierra Nevada from Fresno to Mount Shasta. Existing flood management and water supply facilities (dams, levees, and bypasses) throughout the watershed influence flood flows to the Delta. Settlers began to farm the rich lands of the Delta by the 1850s. They built low levees to allow land to be drained for farming. Few of these levees were built using modern engineering techniques, and many rest on peat foundations that have settled with the added weight.

The main flood management facilities in the Delta include the approximately 1,100 miles of levees and the Yolo Bypass. The Yolo Bypass, with about 500,000 cubic feet per second (cfs) capacity, was designed to flood occasionally to relieve high water stages on the Sacramento River. Easements held by the Central Valley Flood Protection Board provide the right to inundate the land, including some islands such as Liberty Island, with floodwaters. The lower Sacramento ship channel and the Stockton ship channel provide some flood-carrying capability. Dredging to enlarge and clean Delta channels use to be an important element of flood management.

Levees can fail for various reasons including the burrowing activities of animals, erosion, overtopping, deferred maintenance, seepage through sand layers underlying levee foundations, slope stability and other causes.

Delta levees face risk of high water overtopping during the wet season (winter and spring), particularly when large storms coincide with high tides. Storms contribute to the levee overtopping risk by increasing water levels in the rivers and creating wind-induced waves. In addition, the low barometric pressures associated with large storms raise water surface levels in Delta and Suisun Marsh channels. In many cases, the flooding of the islands has been costly to local residents and farmers and to the state as a whole. Damage to levees could also occur due to sea level rise and other aspects of climate change.

Goals

Support the improvement, emergency repair, and long-term maintenance of Delta levees and channels.

Promote levee maintenance and rehabilitation to preserve the land areas and channel configurations in the Delta as consistent with the objectives of the Act.

Policies

P-1.

Local governments shall carefully and prudently carry out their responsibilities to regulate new construction within flood hazard areas to protect public health, safety, and welfare. These responsibilities shall be carried out consistent with applicable regulations

concerning the Delta, as well as the statutory language contained in the Delta Protection Act of 1992. Increased flood protection shall not result in residential designations or densities beyond those allowed under zoning and general plan designations in place on January 1, 1992, for lands in the Primary Zone.

P-2.

Support programs for emergency levee repairs and encourage coordination between local, State, and federal governments. The programs may include but are not limited to: interagency agreements and coordination; definition of an emergency; designation of emergency funds; emergency contracting procedures; emergency permitting procedures; and other necessary elements.

P-3.

Support efforts to address levee encroachments that are detrimental to levee maintenance.

P-4.

Support funding assistance for existing unincorporated towns within the Delta to improve levees up to a 200-year flood protection level.

P-5.

Support stockpiling rock in the Delta for levee emergency response.

P-6.

Support a multi-year funding commitment to maintain and restore both project and non-project levees in the Delta.

P-7.

Encourage the beneficial reuse of dredged material, as appropriate, for levee maintenance and rehabilitation, and the maintenance of instream flows. Support and advocate for the Delta Long-Term Management Strategy (LTMS).

P-8.

Seek funding for and support programs to make cost-effective levee investments in order to preserve the economy and character of the Delta.

P-9.

Support a minimum Delta-specific levee design standard as established by state and federal regulations.

Utilities & Infrastructure

Utilities & Infrastructure

Overview

Due to the Delta's location between major population areas, its unique resources, especially water and natural gas, and its flat terrain and general lack of development, the Delta has high value as a utility and transportation corridor.

Utilities located in the Delta include: radio, cellular telephone and television transmission towers; electrical transmission lines including Pacific Gas and Electric (PG&E), Sacramento Municipal Utility District, and Western Area Power Administration lines; natural gas pipelines, serving local gas fields and regional pipelines; petroleum transportation pipelines; and water transportation canals and pipelines transporting water from the Delta to regional users and to the State and federal water projects.

The regional electrical transmission lines carry power within California as well as between regions of the western United States. More than 500 miles of transmission lines and more than 60 substations lie within the Delta boundaries. Several electrical peaking plants surrounding the Delta depend on these transmission lines. Within the larger Delta- Suisun Marsh area are approximately 240 operation gas wells. Natural gas pipelines serve local gas fields and regional pipelines. PG&E's underground natural gas storage area under McDonald Island provides up to one-third of the peak natural gas supply for its service area. Pipelines carry gasoline and aviation fuel across the Delta from Bay Area refineries to depots in Sacramento and Stockton for distribution to Northern California and Nevada. They provide approximately 50 percent of the transportation fuel used in that region. The Mokelumne Aqueduct, consisting of three pipelines, is the main municipal water conveyance facility for 1.3 million people in the East Bay Municipal Utility District. The aqueduct crosses five Delta islands/tracts (Orwood Tract, Woodward Island, Jones Tract, Roberts Island, and Sargent-Barnhart Tract) protected by levees.

Local governments regulate the utilities that serve Delta residents and visitors including potable water, sewage disposal, and solid waste disposal. Most potable water is obtained from groundwater through local wells. Most wastewater from homes and businesses is treated in on-site septic tanks. Some of the larger communities and developments have self-contained wastewater treatment facilities. Communities outside the Primary Zone currently are anticipated to continue to release treated wastewater into Delta waterways (though wastewater discharge requirements issued by the regional water board), onto constructed wetlands, or onto agricultural lands. Most solid waste generated in the Delta is disposed of at facilities outside the area.

Transportation systems traversing around and through the Delta include several railroads and freeways, state highways, and county roads. Three interstate freeways (Interstate 5, Interstate 80, and Interstate 580) provide major transportation and trucking routes that pass the periphery of the Delta. The three major state highways in the Delta (State Routes 4, 12, and 160) are typically two lanes, sometimes built on top of levees. Originally meant for lower traffic volumes at moderate speeds, the state highways are now heavily

used for regional trucking, recreational access, and commuting. More than 50 bridges, including approximately 30 drawbridges, span the navigable channels of the Delta. Regional rail traffic between the Bay Area and the Central Valley passes through the Delta. The Amtrak San Joaquin route from Bakersfield to Sacramento/Oakland, which crosses through the Delta, had nearly 800,000 riders in 2006. In addition, companies such as the Sierra Northern Railway use existing short-line tracks for inter-regional freight and passenger services.

Two major ports lie north and east of the Primary Zone, the Ports of Sacramento and Stockton, respectively. The Stockton and Sacramento Deep Water Ship channels traversing the Delta were constructed in 1933 and 1963, respectively. The Stockton channel is 35 feet deep and can handle 55,000-ton class vessels with full loads. More than 300 ships and barges used the channel in 2005. The Sacramento ship channel is 30 feet deep with plans underway to increase its depth to 35 feet. Both ports are likely to expand in the future, which would result in an increase in ship and barge traffic through the Delta. Several million tons of diversified products are shipped through the Delta each year.

Airports in the Primary Zone of the Delta primarily serve individual land-owners, agriculture-serving businesses and small air operations.

Goals

Ensure that the construction of new utility and infrastructure facilities is appropriate and the impacts of such new construction on the integrity of levees, wildlife, recreation, agriculture and Delta communities are avoided, minimized and mitigated.

Policies

P-1.

Impacts associated with construction of transmission lines and utilities can be mitigated by locating new construction in existing utility or transportation corridors, or along property lines, and by minimizing construction impacts. Before new transmission lines are constructed, the utility should determine if an existing line has available capacity. To minimize impacts on agricultural practices, utility lines shall follow edges of fields. Pipelines in utility corridors or existing rights-of-way shall be buried to avoid adverse impacts to terrestrial wildlife. Pipelines crossing agricultural areas shall be buried deep enough to avoid conflicts with normal agricultural or construction activities. Utilities shall be designed and constructed to minimize any detrimental effect on levee integrity or maintenance, agricultural uses and wildlife within the Delta. Utilities shall consult with communities early in the planning process for the purpose of creating an appropriate buffer from residences, schools, churches, public facilities and inhabited marinas.

P-2.

Ensure that new houses built in the Delta agricultural areas but outside of the Delta's unincorporated towns continue to be served by independent potable water and wastewater treatment facilities and/or septic systems. Agricultural uses that require wastewater treatment shall provide adequate infrastructure improvements or pay to expand existing facilities, and not overburden the existing limited community resources. The appropriate governing body shall ensure that new or expanded construction of agriculturally-oriented wastewater disposal systems meet the appropriate standards/conditions and are not residentially growth inducing. Independent treatment facilities should be monitored to ensure no cumulative adverse impact to groundwater supplies.

P-3.

Ensure that new municipal sewage treatment facilities (including storage ponds) that support development or business outside of the Delta Primary Zone are not located within the Delta Primary Zone. The Rio Vista project, as described in the adopted Final Environmental Impact Report for such project, and the Ironhouse Sanitary District use of Jersey Island for disposal of treated wastewater and biosolids are exempt from this policy.

P-4.

Encourage recycling programs for metals, glass, paper, cardboard, and organic materials in order to minimize waste generation. Recycling facilities for these materials should be suitably located to serve Delta residents, visitors, and businesses. High groundwater tables and subsiding soil make the Delta an inappropriate location for solid waste disposal.

P-5.

Maintain roads within the Delta to serve the existing agricultural uses and supporting commercial uses, recreational users, and Delta residents. Promote the maintenance and enhancement of major thoroughfares already used as cross-Delta corridors.

P-6.

Allow air transportation in the Delta to continue to serve Delta residents and agriculture- related businesses. Due to subsidence, transmission lines, high winds, fog, and high raptor and waterfowl use, the Primary Zone is not an appropriate location for new or expanded general aviation airports.

P-7.

Encourage the provision of infrastructure for new water, recreational, and scientific research facilities.

Glossary

Glossary

Act - The Delta Protection Act of 1992.

Agricultural Conservation Easements – A deed restriction landowners voluntarily place on their property to protect agricultural land. The landowner either sells or donates the development rights (some or all) of the property to a qualified conservation organization or public agency to protect the agricultural use of the land in perpetuity.

Agricultural Labor Camps – The Agricultural Labor Camp refers to any living unit occupied by seven (7) or more farm workers and their families occurring exclusively in association with agricultural labor. Typical uses include labor camps and labor supply camps.

Buffer – The area of land which serves to mitigate potential conflicts between different types of land uses.

CALFED Bay-Delta Program – The CALFED Bay-Delta Program was established in May 1995 and includes a consortium of 25 state and federal agencies with management and regulatory responsibilities in the Bay-Delta estuary. The mission of the Program is to develop a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the San Francisco Bay/Sacramento-San Joaquin Delta.

Channel Islands – Unleveed islands within the Delta with riparian habitat that in many cases has not changed in over 150 years and are good examples of original habitat. Sometimes referred to as 'guard levees' as they minimize wake action and flow erosion from affecting the main levees.

Commission – The Delta Protection Commission created by Section 29735 of the California Public Resources Code.

Conservation Easement – A restriction placed on a piece of property to protect its associated resources. The easement is either voluntarily donated or sold by the landowner and constitutes a legally binding agreement that limits certain types of uses or prevents development from taking place on the land in perpetuity while the land remains in private hands.

Critical Mass of Farms – Concept based on idea that economies of scale exist in input and output businesses which are essential to agriculture, meaning that certain quantities of farms are necessary for the farm supply and agricultural related businesses to remain competitive and continue to be low cost producers and service providers.

Delta – The Sacramento-San Joaquin Delta, as defined in Section 12220 of the Water Code, for all provisions of this division, other than Chapter 3 (commencing with Section

29735). For the purposes of Chapter 3, (commencing with Section 29735), "Delta" means the area of the Delta minus the area contained in Alameda County.

Development –

a. "Development" means on, in, over, or under land or water, the placement or erection of any solid material or structure; discharge of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivisions pursuant to the Subdivision Map Act (Division 2 (commencing with Section 66410) of Title 7 of the Government Code), and any other division of land including lot splits, except where the land division is brought about in connection with the purchase of the land by a public agency for public recreational or fish and wildlife uses or preservation; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes.

b. "Development" does not include any of the following:
    1. All farming and ranching activities, as specified in subdivision (e) of Section 3482.5 of the Civil Code.
    2. The maintenance, including the reconstruction of damaged parts, of structures, such as marinas, dikes, dams, levees, riprap (consistent with Chapter 1.5 (commencing with Section 12306) of Part 4.8 of Division 6 of the Water Code, breakwater, causeways, bridges, ferries, bridge abutments, docks, berths, and boat sheds. "Maintenance" includes, for this purpose, the rehabilitation and reconstruction of levees to meet applicable standards of the United States Army Corps of Engineers or the Department of Water Resources.
    3. The construction, repair, or maintenance of farm dwellings, buildings, stock ponds, irrigation or drainage ditches, water wells, or siphons, including those structures and uses permitted under the California Land Conservation Act of 1965 (Chapter 7 (commencing with Section 51200) of Part I of Division I of Title 5 of the Government Code).
    4. The construction or maintenance of farm roads, or temporary roads for moving farm equipment.
    5. The dredging or discharging of dredged materials, including maintenance dredging or removal, as engaged in by any marina, port, or reclamation district, in conjunction with the normal scope of their customary operations, consistent with existing federal, state, and local laws.
    6. The replacement or repair of pilings in marinas, ports, and diversion facilities.
    7. Projects within port districts, including, but not limited to, projects for the movement, grading, and removal of bulk materials for the purpose of activities related to maritime commerce and navigation.

8. The planning, approval, construction, operation, maintenance, reconstruction, alteration, or removal by a state agency or local agency of any water supply facilities or mitigation or enhancement activities undertaken in connection therewith.
9. Construction, reconstruction, demolition, and land divisions within existing zoning entitlements, and development within, or adjacent to, the unincorporated towns of the Delta, as permitted in the Delta Area Community Plan of Sacramento County and the general plan of Yolo County, authorized prior to January 1, 1992.
10. Exploration or extraction of gas and hydrocarbons.
11. The planning, approval, construction, repair, replacement, alteration, reconstruction, operation, maintenance, or removal of oxidation and water treatment facilities owned by the City of Stockton or the City of Lodi, or facilities owned by any local agency within or adjacent to the unincorporated towns of the Delta consistent with the general plan of the County of Sacramento or the County of Yolo, as the case may be.

Farm Worker Housing – "Farm Employee Housing" means any housing accommodation, including single-family dwellings and farm labor mobilehomes, for six (6) or fewer farm employees.

Flood Protection – Methods or structural measures used to mitigate flooding or reduce flooding hazards and risks.

Good Neighbor Policies – Policies which set forth to avoid negative impacts on agricultural land as a result of habitat enhancements. The goals of these policies should be to avoid negative impacts, address and resolve unavoidable impacts, and foster good communication and relationships among neighbors and communities. These policies should apply to all land use changes including changes in land use where habitat is actively developed, where habitat develops naturally, and where habitat is converted to agricultural or other uses. Example policies could include the implementation of Best Management Practices on the converted lands that minimize vectors (e.g., mosquito breeding opportunities), the introduction of invasive species, water quality degradation, and/or the erosion of productive soils. The policies may also include the establishment of safe harbor agreements that among other things, limit liability for incidental take associated with agricultural and recreational activities adjacent to converted wildlife lands.

Habitat Conservation Plans (HCPs) – Planning documents that are required when applying to the U.S. Fish and Wildlife Service for an incidental take permit under the federal Endangered Species Act. An applicant is required to apply for an incidental take permit if a proposed activity would result in the "incidental take" of a listed wildlife species. HCPs describe the anticipated effects of the proposed taking, how those impacts will be minimized or mitigated, and how the HCP is to be funded.

Local Agency – Any local agency, other than a local government, formed pursuant to general law or special act for the local performance of governmental or proprietary functions within limited boundaries or which maintains facilities within the Delta. "Local agency" includes, but is not limited to, a port, water agency, flood control district, county service area, maintenance district or area, improvement district or improvement area, mosquito abatement district, resource conservation district, sanitary or sewer district, or any other zone or area, formed for the purpose of designating an area within which either an assessment or a property tax rate will be levied to pay for a service or improvement benefiting that area or a special function will be carried out within that area.

Local Government – The Counties of Contra Costa, Sacramento, San Joaquin, Solano, and Yolo, and the Cities of Sacramento, Stockton, Tracy, Antioch, Pittsburg, Isleton, Lathrop, Brentwood, Rio Vista, West Sacramento, and Oakley, and any other cities that may be incorporated in the future in the Primary Zone.

Mitigation Banks – A Mitigation Bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources under Section 404 of the federal Clean Water Act or a similar State or local wetland regulation.

National Heritage Area – A place designated by the United States Congress where natural, cultural, historic and recreational resources combine to form a cohesive, nationally-distinctive landscape arising from patterns of human activity shaped by geography. These areas tell nationally important stories about our nation and are representative of the national experience through both the physical features that remain and the traditions that have evolved within them.

Natural Community Conservation Plan – A plan prepared pursuant to a planning agreement entered into in accordance with Section 2810 of the Natural Community Conservation Planning Act (California Fish and Game Code Sections 2800 - 2835) that identifies and provides for the regional or area wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity.

Non-Agriculturally Oriented Non-Farmworker Residential Development – Development of buildings consisting only of dwelling units that are not supporting agricultural operations and are not farm worker housing.

Open Space - As defined in Section 65560 of the Government Code.

Pacific Flyway – The identified migratory bird flight path, including feeding and nesting habitat, as described in the Central Valley Habitat Joint Venture component of the North American Waterfowl Management Plan (NAWMP-1986).

Personal Water Craft – General term for a broad range of small, powered boats that typically carry one or two persons, and are popularly known by registered tradenames such as Jet Ski, Ski Doo, etc.

Plan – Land Use and Resource Management Plan for the Primary Zone of the Delta.

Primary Zone – The Delta land and water area of primary state concern and statewide significance which is situated within the boundaries of the Delta, as described in Section 12220 of the Water Code, but that is not within either the urban limit line or sphere of influence line of any local government's general plan or currently existing studies, as of January 1, 1992. The precise boundary lines of the Primary Zone includes the land and water areas as shown on the map titled "Delta Protection Zones" on file with the State Lands Commission. Where the boundary between the Primary Zone and Secondary Zone is a river, stream, channel, or waterway, the boundary line shall be the middle of that river, stream, channel, or waterway.

Reclamation Districts – A form of special-purpose districts which are responsible for reclaiming and/or maintaining land that is threatened by permanent or temporary flooding for agricultural, residential, commercial, or industrial use. The land is reclaimed by removing and/or preventing water from returning via systems of levees, dikes, drainage ditches, and pumps.

Restoration – Actions which return a degraded or deteriorated area to a level of increased productivity, environmental quality, or beneficial values.

Right-to-Farm-Ordinance – Refers to the concept that conduct of agricultural operations takes precedence over the need to prevent agricultural operations from negatively affecting nearby non-agricultural users.

Secondary Zone – All the Delta land and water area within the boundaries of the Delta not included within the Primary Zone, subject to the land use authority of local government, and that includes the land and water areas as shown on the map titled "Delta Protection Zones" on file with the State Lands Commission.

Special District – A type of district differing from general-purpose districts like municipalities, counties, etc., in that they only serve one or a few specialized services only to those persons who live within them. They possess fiscal and administrative autonomy and often are empowered to tax residents of the district. Examples include emergency services districts, reclamation districts, school districts and vector control districts.

Subsidence – The gradual, local settling or sinking of the earth's surface with little or no horizontal motion. Drainage of Delta plains, results in aeration of soil which leads to oxidation of its organic components, such as peat, and this decomposition process may cause significant land subsidence.

Suisun Marsh – The largest brackish marsh on the west coast of the United States of America. The marsh is immediately west of the Sacramento-San Joaquin Delta as well as part of the San Francisco Bay estuary. It includes the water-covered areas, tidal marsh,

diked-off wetlands, seasonal marshes, lowland grasslands, upland grasslands, and cultivated lands identified in the Suisun Marsh Preservation Act (California Public Resources Code 29000-29612) including both the primary and secondary management areas as shown on the Suisun Marsh Protection Plan Map. It also includes the entire right-of-way of any state highway that is designated as a portion of the boundary of the marsh.

TMDL (total maximum daily load) – A calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

Transfer Development Rights – A type of zoning ordinance that allows owners of property zoned for low-density development or conservation use to sell development rights to other property owners. The development rights purchased permit the landowners to develop their parcels at higher densities than otherwise. The system is designed to provide for low-density uses, such as historic preservation, without unduly penalizing some landowners.

200-year Levee Standards – Levees which are developed to achieve protection from the 200-year flood (the flood event that has a 0.5% chance of occurring in any year).

Unincorporated Towns – The communities of Walnut Grove, Clarksburg, Courtland, Hood, Locke, and Ryde.

Urban – Of, relating to, characteristic of, or constituting a city. Urban areas are generally characterized by moderate and higher density residential development (i.e., three or more dwelling units per acre), commercial development, and industrial development, and the availability of public services required for that development, specifically central water and sewer, an extensive road network, public transit, and other such services (e.g., safety and emergency response). Development not providing such services may be "non-urban" or "rural."

Urban Limit Line – general plan line established and approved by any local government within the Delta which delineates boundaries beyond which urban development is not publicly proposed by local government, as of January 1, 1992.

Water Trail – A stretch of river, a shoreline, or an ocean that has been mapped out with the intent to create an educational, scenic, and challenging experience for recreational canoers and kayakers.

Williamson Act – Also known as the California Land Conservation Act of 1965 which enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the state via the Open Space Subvention Act of 1971.