Chapter 3E. Affected Environment and Environmental Consequences - Utilities and Highways

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SUMMARY

This chapter discusses the effects of construction and operation of the DW project alternatives on existing utility infrastructure, public services, highways, county roads, and ferry services on the DW project islands.

Impacts on utilities and highways were analyzed in the 1995 DEIR/EIS. A new evaluation of project effects on natural gas pipelines and facilities was subsequently performed for the 2000 REIR/EIS, and additional impacts and mitigation measures were identified.

The results of these analyses indicated that implementation of Alternative 1, 2, or 3 would result in significant impacts on the natural gas pipelines that cross Bacon Island. Levee improvements and island inundation could adversely affect the pipelines and Pacific Gas & Electric Company's (PG&E's) ability to inspect the pipelines. Mitigation is recommended to reduce these impacts to less-than-significant levels. Implementation of Alternative 1, 2, or 3 would result in significant impacts on electrical utilities and emergency services. Existing PG&E overhead electrical distribution lines would be inundated on reservoir islands during water storage operations and would need to be extended on Webb Tract, Bouldin Island, and Holland Tract to serve proposed siphon, pump, and recreation facilities. Operation of the recreation facilities on the DW project islands would increase demand for police and fire services on the DW project islands and in adjacent waterways. These impacts are considered significant. To mitigate impacts on electrical utilities to a less-than-significant level, DW, in coordination with PG&E, would permanently relocate the affected electrical lines on reservoir islands to the improved perimeter levees during project construction and would extend the existing electrical lines on the DW project islands to serve new facilities. DW would also incorporate adequate lighting, security services, and fire protection features into design and operation of the recreation facilities to reduce impacts on police and fire services. As described in Chapter 2, "Delta Wetlands Project Alternatives", DW has removed construction of recreation facilities from its CWA permit applications; nevertheless, this chapter provides the analysis of impacts on utilities and services associated with construction and operation of these facilities. Also, under Alternative 3, fog hazard along SR 12 on Bouldin Island could increase and result in a significant and unavoidable impact on traffic safety; no mitigation is available to reduce this impact to a less-than-significant level. Implementing Alternative 1, 2, or 3 is not expected to result in any significant cumulative impacts.

Implementation of Alternative 1, 2, or 3 would result in less-than-significant impacts on ferry service operations to Webb Tract and on water supply, sewage, and solid waste facilities and services. Additionally, implementation of Alternative 3 would result a less-than-significant impact on the structural integrity of SR 12.

Beneficial impacts on utilities and roadways are associated with improvement of existing levees under Alternative 1, 2, or 3. Utilities and county roads on levees would benefit from levee improvements on the DW project islands.

Implementation of the No-Project Alternative would increase the subsidence rate of DW project island soils and, consequently, would increase the risk of failure of roads associated with DW island levees and maintenance requirements for gas lines on Bacon Island.

CHANGES MADE TO THIS CHAPTER FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT

The analysis of project effects on natural gas pipelines and facilities was updated in the 2000 REIR/EIS. This chapter consists of the 1995 analysis of project effects on utilities and highways followed by the updated analysis of project effects on natural gas pipelines and facilities. Additionally, minor changes were made to update information regarding the existing utility infrastructure in response to comments received on the 1995 DEIR/EIS and 2000 REIR/EIS.

AFFECTED ENVIRONMENT

This section describes the utility and roadway infrastructure on the DW project islands. Information on utilities and roadways is based, in part, on information collected for the 1990 draft EIR/EIS. Where conditions have not changed, this information has been used to describe current conditions. The description of utilities and roadway conditions has been updated, however, to reflect changes in public access on Holland Tract Road, reconstruction of Bacon Island Bridge, and electrical utility line mapping and information on ferry service for Webb Tract. More information on existing use of roads is given in Chapter 3L, "Traffic and Navigation". Information about the gas facilities and transmission pipelines on Bacon Island has been updated and is discussed below in the section from the 2000 REIR/EIS entitled "Affected Environment: Updated Information Presented in the 2000 Revised Draft EIR/EIS".

Sources of Information

Information on utilities, services, and highways on the DW project islands was collected from current maps and communication with the affected public utility or service agency, county, or state agency. The DWR 1993 Delta atlas (DWR 1993) provided baseline mapping information.

Information used to prepare the analysis of project effects on natural gas facilities and transmission pipelines for the 2000 REIR/EIS was taken from comments on the 1995 DEIR/EIS and from evidence in testimony provided by PG&E and Delta Wetlands at the 1997 water right hearings. In addition, data from the U.S. Department of Transportation (DOT), Office of Pipeline Safety (U.S. Department of Transportation 1999), were used in the 2000 REIR/EIS analysis.

Highways, County Roads, and Ferry Service

Figure 3E-1 shows the highways and county roads in the project vicinity.

Bacon Island

A county road provides limited access to portions of Bacon Island (Figure 3E-1). Bacon Island Road enters Bacon Island near its southeast corner and runs northward on the eastern perimeter levee to a private bridge to Mandeville Island; the road provides access to the Bullfrog Landing Marina and agricultural properties on Bacon Island.

As part of the San Joaquin County Regional Transportation Improvement Program, realignment and reconstruction of the Bacon Island Bridge between Bacon Island and Mandeville Island began in April 1994 (Vidad pers. comm.) and was completed after the 1995 DEIR/EIS was issued. The new bridge is located approximately 300 feet north of the existing bridge.

Webb Tract

No county roads exist on Webb Tract; the Delta Ferry Authority provides ferry service to Webb Tract from Jersey Island (Figure 3E-1). The ferry operates from 8:00 a.m. to 5:00 p.m., Monday through Friday during fall, winter, and spring and Friday through Tuesday during summer. A total of 21,938 passengers used the ferry system in Contra Costa County in fiscal year 1998–1999 (California Office of the Controller 2000). Based on this figure, year-round average daily use is estimated at 85 passengers. The ferry system is funded through the Delta Ferry Authority. The Delta Ferry Authority is composed of Contra Costa County, Webb Tract Reclamation District, and Bradford Reclamation District. Each reclamation district

provides approximately $50,000 per year in funding for the ferry service (Heringer pers. comm.), while Contra Costa County collects approximately $15,000 per year in local funds to support the ferry service (Cutler pers. comm.). The Delta Ferry Authority collects these monies to fund operation of the ferry.

The DW project and Bradford Island have a mutual need for the use of the ferry system. DW anticipates the ferry system would be used by recreationists and staff workers that are employed at the recreation facilities on Webb Tract. DW does not foresee the withdrawal of funding or discontinuing the ferry service (Forkel pers. comm.).

Bouldin Island

SR 12, a two-lane highway between Lodi on the east side of the Delta and Rio Vista on the west side of the Delta, crosses Bouldin Island (Figure 3E-1). SR 12 runs along the bottom of Bouldin Island at 10-15 feet below water levels in exterior channels. At the east end of the island, SR 12 crosses Little Potato Slough on a swing bridge, and at the west end of the island it crosses the Mokelumne River, also on a swing bridge. No county roads exist on Bouldin Island.

Holland Tract

Holland Tract Road, a county road, enters the southwest corner of Holland Tract (Figure 3E-1). Since 1991, access northward on the western perimeter levee has been blocked by a locked gate. This county road also runs eastward on the south levee to the Holland Tract Marina at the southeast corner of the island, where it also ends at a locked gate. In 1993, the Contra Costa County Department of Public Works abandoned those sections of Holland Tract Road on the west and east perimeter levees past the locked gates (Badst pers. comm.).

Gas Facilities and Transmission Pipelines

The Delta is generally a fertile area for natural gas exploration, and exploratory wells are continually being drilled throughout the area. Known underground gas fields and storage areas in the project vicinity are shown in Figure 3E-2. It is possible that gas wells may be drilled on the project islands by third-party mineral right holders. Gas wells could be drilled on the reservoir islands during drawdown periods. The compatibility of gas drilling with water storage or wildlife habitat management of the islands would be reviewed by the lead agencies or oversight management team for the habitat islands; the administering county; and the California Department of Conservation, Division of Oil and Gas, prior to granting an oil or gas well permit for gas exploration on the islands. The county would be the lead agency under CEQA for permitting gas wells.

Implementation of the DW project would not affect the likelihood of gas exploration on DW project islands; mineral rights would not change under the DW project from current conditions, and future proposals to drill on the islands would be subject to environmental review by the county and by the California Department of Conservation under an oil or gas well permit. Assumptions regarding the future locations and timing of gas well drilling on the project islands would be speculative, and these issues are not addressed in this document.

Bacon Island

The 1995 DEIR/EIS included information about PG&E's gas facilities and transmission pipelines across Bacon Island. This information has been superseded by updated information presented in the 2000 REIR/EIS and has therefore been removed from this section. The revised information is presented in the section from the 2000 REIR/EIS below entitled "Affected Environment: Updated Information Presented in the 2000 Revised Draft EIR/EIS".

Webb Tract

Presently, two wells are producing natural gas and two more wells have been approved for future drilling on Webb Tract. Additionally, there are several previously plugged and abandoned gas extraction wells on Webb Tract (Marshall pers. comm.).

Bouldin Island and Holland Tract

No gas facilities or transmission pipelines exist on Bouldin Island or Holland Tract.

Electrical Distribution Lines

PG&E operates 12-kilovolt (kV) electrical distribution lines on all four project islands to serve residences and farm operations (Figure 3E-3). These lines typically run on wooden utility poles.

Police and Fire Protection Services

Bacon Island and Bouldin Island

Police protection for Bacon Island and Bouldin Island is provided by the San Joaquin County Sheriff's Department. The department's main headquarters is in French Camp, California. The San Joaquin County Sheriff's department marine patrol division provides water patrol services to approximately 600 square miles of waterways in the Delta area. The marine patrol unit is staffed by four deputy officers and one supervisor; reserve officers are also used during major events and holidays. The marine patrol division substation, located at Steven's Anchorage in Stockton, responds to emergencies on Bouldin Island and Bacon Island. Through a mutual aid agreement with San Joaquin County, the Sacramento County Sheriff's Department, the Contra Costa County Sheriff's Department, and the U.S. Coast Guard also provide emergency services to Bacon and Bouldin Islands if needed. The San Joaquin County Sheriff's Department is responsible for law enforcement and investigation in the area regarding, but not limited to, drownings, boat accidents, drunkenness, theft, vandalism, property crimes, trespassing, disturbances, and enforcement of boat speed limits. (Bohnak pers. comm.)

Fire protection for Bouldin Island is provided by the San Joaquin County Delta Fire Protection District, Station 1. The Delta Fire Protection District's service area encompasses approximately 95 square miles and provides fire protection and emergency services to Bouldin Island. Station 1 is located in Lodi and is staffed by two full-time firefighters. Volunteer firefighters are also available to respond to fire emergencies as needed. Station 1 is equipped with four engines, including Type 1, 2, and 3 engines; one rescue unit; and two fire boats. The fire boats are launched at Tower Park Marina and Paradise Marina. Response time from Station 1 to Bouldin Island is approximately 2-3 minutes. The district has a Class VI Fire Department Insurance Service Office Rating and operates under a mutual aid agreement with other fire departments within San Joaquin County. (Davidson pers. comm.)

Bacon Island is not currently in a fire protection district. Fire protection services are the responsibility of the landowners.

Webb Tract and Holland Tract

The Contra Costa County Sheriff's Department provides law enforcement services for Webb and Holland Tracts. The department's headquarters is in Martinez. The Contra Costa County Sheriff's Department Delta marine patrol division provides emergency service to Webb and Holland Tracts through its substation in Oakley. The marine patrol is staffed by two deputy officers year round; an additional deputy officer is available during the peak summer season (Memorial Day through Labor Day). Contra Costa County has a statewide mutual aid agreement with the San Joaquin County Sheriff's Department and the U.S. Coast Guard to respond to emergency situations in the Delta. Typical crimes reported to the sheriff's department in the Delta area include disturbances, thefts, and vandalism of property. (Hunt pers. comm.)

The Contra Costa County Fire Protection District provides fire protection for Holland Tract. The district is staffed by approximately 480 full-time firefighters, and the district service area encompasses approximately 350 square miles. Knightsen Station 94, located in Knightsen, provides emergency services to Holland Tract and is staffed by volunteer firefighters. Response time from Station 94 to Holland Tract is less than 7 minutes. The district has a Class III Fire Department Insurance Service Office Rating and operates under a statewide mutual aid agreement with other fire agencies in and around San Joaquin County. (Bell pers. comm.)

Similar to Bacon Island, Webb Tract is not currently in a fire protection district. Fire protection is the responsibility of the landowners.

Water Supply Facilities and Sewage Disposal Service

Existing water supply and sewage treatment facilities support farmsteads, rural residences, and seasonal barracks on Bacon Island; trailers, a residence, and a clubhouse on Webb Tract; rural residences and

farmsteads mostly north of SR 12 on Bouldin Island; and rural residences, a trailer, and two marinas on Holland Tract. See Chapter 3I, "Land Use and Agriculture", for more information on existing structures and land uses on the DW project islands. Agricultural water supply under existing conditions is described in Chapters 3A, "Water Supply and Water Project Operations", and 3C, "Water Quality".

Water supply for existing buildings and facilities on the DW project islands is provided by wells on the islands, water pumped from nearby channels, and bottled water service. Well water and pumped water are treated on the islands. Treatments include pretreatment reverse osmosis systems and filtering systems. All water services are privately managed; no public facilities are available on the DW project islands.

Septic systems are primarily used for sewage disposal at existing buildings and facilities on the DW project islands. A lagoon treatment system on Holland Tract serves a marina. Waste is transported to a "lagoon" lined with material to prevent seepage into the ground and is treated through evaporation and aerobic decomposition.

Solid Waste Service

Solid waste collection and disposal service for the DW project islands is provided by private waste collection service(s) authorized to operate in Contra Costa and San Joaquin Counties. The waste is collected and transported to the appropriate county landfills in compliance with county and state regulations governing solid waste disposal.

The Marine Plastic Pollution Research and Control Act of 1987 (33 U.S.C. 1901 et seq.) requires that all ports, terminals, and marinas provide adequate reception facilities for disposal of garbage from vessels with which they conduct commerce. This act sets performance standards to ensure that garbage is removed from the vessels and processed in accordance with U.S. Coast Guard and U.S. Department of Agriculture (USDA) regulations. However, the installation of equipment to handle garbage is not a requirement. Waste collection and disposal activities are also subject to regulations stated in the California Administrative Code, Title 14, Division 7. (California State Lands Commission 1994.)

Other Utility Facilities

PG&E and Western Area Power Administration Transmission Lines

Two major electrical transmission lines cross Hotchkiss Tract and Veale Tract to the west and southwest of Holland Tract: PG&E's 500-kV Table Mountain-to-Tesla line and Western Area Power Administration's 230-kV Intertie line.

Santa Fe Railroad

Santa Fe Railroad's Stockton-to-Richmond rail line crosses the Delta in an east-west direction immediately south of the south end of Bacon Island (Figure 3E-1). The single-track line traverses a narrow linear causeway within Santa Fe Cut, which separates Bacon Island from Woodward Island to the south. Santa Fe Cut between the south edge of the island and the railroad causeway is approximately 400 feet wide along its entire length. Nineteen freight trains and eight passenger trains use the Richmond-Stockton line daily (Colbert pers. comm.).

Mokelumne Aqueduct

East Bay Municipal Utility District (EBMUD) owns and operates the Mokelumne Aqueduct, which crosses the Delta immediately south of the Santa Fe rail line (Figure 3E-1). The aqueduct, consisting of three above-ground steel and concrete pipelines, crosses Woodward Island south of Bacon Island, approximately 800 feet south of the rail line. Siphons connect the pipelines beneath Old River and Middle River west and east of Woodward Island. The aqueduct provides water to over 1 million people in the east Bay Area.

IMPACT ASSESSMENT METHODOLOGY

Analytical Approach and Impact Mechanisms

Impacts on utilities, services, and highways were assessed based on how construction and operation of the DW project alternatives would benefit or adversely

affect the existing utility infrastructure or service. Effects of the project alternatives on highways and county roads were evaluated based on how the project operation could affect the integrity of the roadway levees through wave erosion and differential settlement; these effects are based on the assessment of levee stability described in Chapter 3D, "Flood Control". Potential changes in operation of the ferry system to Webb Tract were evaluated through discussions with the Delta Ferry Authority and estimation of changes in passenger travel during project operation. Effects of the project alternatives on gas and electrical lines and facilities on the DW project islands were determined through discussions with the affected utility agency and estimation of alterations to the existing infrastructure and any changes in existing operation of the facilities that would be needed during project operation. Increased risk to facilities on adjacent islands was assessed using estimated changes in risk of levee failure during construction and operation of the DW project alternatives. Potential effects of the DW project alternatives on emergency services and public utilities were evaluated based on how project operation would affect the ability of the service agencies and existing facilities to adequately serve the DW project islands.

There is a potential of some level of continuing subsidence on the DW project islands even with the cessation of farming activities. As a result, the water storage capacity of the reservoir islands could increase in future years. The rate of subsidence, however, would be substantially less than under existing conditions. Reduced rates of subsidence and increased water storage capacity on reservoir islands would not be expected to substantially increase or decrease utility and roadway effects analyzed in this chapter.

Criteria for Determining Impact Significance

In the 1995 DEIR/EIS analysis, an alternative was considered to have a significant impact on utilities and highways if it would:

- # increase risk of structural failure of existing railways and roadways, gas facilities and pipelines, electrical transmission or distribution lines, and water distribution facilities;
- # result in a need for new systems, or substantial alterations to or increased maintenance of power or natural gas facilities, communication systems, water infrastructure, sewer lines, septic tanks, or solid waste services;
- # result in increased demand for existing emergency services beyond their current capacity; or
- # increase traffic hazards to motor vehicles, bicyclists, or pedestrians by degrading the existing infrastructure.

An alternative was considered to have a beneficial impact on utilities and highways if it would improve the existing utility or roadway infrastructure.

Similar criteria were developed to evaluate specific impacts on the natural gas facilities and transmission pipelines on Bacon Island. These criteria are described below in the section from the 2000 REIR/EIS entitled "Impact Assessment Methodology for the 2000 Revised Draft EIR/EIS".

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 1

Alternative 1 involves storage of water on Bacon Island and Webb Tract (reservoir islands), with Bouldin Island and Holland Tract (habitat islands) managed primarily as wildlife habitat. Reservoir islands would be managed primarily for water storage, with wildlife habitat and recreation constituting secondary uses. The impacts of Alternative 1 on utilities and highways in the project area are described below. Most of the impacts on utilities and highways under Alternative 1 are considered less than significant; mitigation is recommended for impacts that are considered significant.

Highways, County Roads, and Ferry Service

Bacon Island

Under Alternative 1, Bacon Island Road, the existing county road, would remain along the east side of Bacon Island to the private bridge to Mandeville Island. Implementation of Alternative 1 would

improve the eastern perimeter levee on Bacon Island, thereby improving the structural integrity of Bacon Island Road.

Construction of Alternative 1 would not conflict with reconstruction of the Bacon Island Bridge. Public access to Bacon Island will be maintained during construction, and flooding of the island is not anticipated to conflict with construction access for Bacon Island Bridge reconstruction. DW would coordinate with San Joaquin County and the California Department of Transportation (Caltrans) during DW construction scheduling to plan levee construction work on Bacon Island in conjunction with the Bacon Island Bridge reconstruction.Therefore, implementation of Alternative 1 would not affect Bacon Island Bridge reconstruction.

Chapter 3D, "Flood Control", discusses the topic of levee reliability with regard to wave erosion and settlement, and Chapter 3L, "Traffic and Navigation", addresses any construction-related safety and traffic impacts on Bacon Island Road.

Webb Tract

Implementation of Alternative 1 would reduce ferry traffic from Jersey Island to Webb Tract as farming operations on Webb Tract cease. However, the ferry would be used by DW workers and by recreationists to reach the island during project operation. Based on estimated recreation use-days under Alternative 1 (see Chapter 3J, "Recreation and Visual Resources"), the number of ferry passengers is expected to decline to approximately 55% of existing use during hunting season (October-January). Ferry use during spring and summer could also decline substantially. However, the current operation schedule for the ferry is not proposed to change during project operation. Because revenues for the ferry are not generated by passenger fees, funding for the ferry system would not be affected by reduced use during project operation, and the likelihood of service failure would not increase due to financial constraints. The operation and maintenance cost of running the ferry may decline as ferry traffic, especially heavy grain truck traffic, is reduced after project implementation.

Bouldin Island

Water storage levels during operation of the proposed project would not differ significantly from existing storage levels during agriculture production, so the risk of levee failure or traffic hazards (e.g., fog) along SR 12 would not change under Alternative 1. Therefore, implementation of Alternative 1 would not affect SR 12.

Holland Tract

As on Bouldin Island, projected water storage levels on Holland Tract under Alternative 1 would not exceed current water storage levels. Holland Tract Road would not be adversely affected by management of the island for wildlife habitat; the road would benefit from levee erosion control measures (i.e., levee revegetation) under Alternative 1.

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-1: Increase in the Structural Integrity of County Roads. Implementation of Alternative 1 would result in levees surrounding reservoir islands being raised and widened. Erosion-resistant facing would be placed on the interior slopes of the levees. These levee improvement activities would increase the structural integrity of Bacon Island Road on the eastern perimeter levee of Bacon Island.

Because subsidence rates on habitat islands would decrease under Alternative 1, the stability of levees surrounding Bouldin Island and Holland Tract would increase. DW would undertake levee rehabilitation on the habitat islands as needed consistent with the state standards described in DWR Bulletin 192-82 (DWR 1982), which would strengthen the levees. Holland Tract Road would benefit from the increased levee stability and the probable reduction of road maintenance activities. (See Chapter 3D, "Flood Control", for more detailed information regarding subsidence and erosion control.) This impact is therefore considered beneficial.

Mitigation. No mitigation is required.

Impact E-2: Reduction in Ferry Traffic from Jersey Island to Webb Tract. Implementation of Alternative 1 would cause cessation of farming operations on Webb Tract, and ferry traffic from Jersey Island to Webb tract would decline. Alternative 1 could generate approximately 15 passengers per hunting day (3 hunting days per week during the October-January season) for recreation access to Webb

Tract, resulting in a decline of ferry use from the existing average of 40 passengers per day. The current ferry schedule (5 days per week) would not change during project operation. The ferry would provide transportation for DW workers year round. A projected net decline in ferry use during project operation would not result in a need for a new system or adversely affect operation and maintenance of the existing system. Reductions in traffic on the ferry, especially heavy grain truck traffic during harvest, could result in reduced operations and maintenance costs. Therefore, this impact is considered less than significant.

Mitigation. No mitigation is required.

Gas Facilities and Transmission Pipelines

Bacon Island

The 1995 DEIR/EIS discussion of project effects on gas facilities and transmission pipelines across Bacon Island has been superseded by the updated information presented in the 2000 REIR/EIS and has therefore been removed from this section. The revised discussion is presented below in the section from the 2000 REIR/EIS entitled "Environmental Consequences". The impact and mitigation statements below have been revised to reflect the conclusions in that section.

Webb Tract

Storage of water on Webb Tract would not preclude future natural gas exploration; however, existing wells might have to be abandoned. During the final design of the proposed project, DW would need to consult with the Department of Conservation, Division of Oil and Gas, and with existing mineral rights holders to determine whether producing wells located on Webb Tract need to be abandoned and whether previously abandoned wells need to be reabandoned (Marshall pers. comm.).

Bouldin Island and Holland Tract

As stated previously, no gas facilities or transmission pipelines exist on Bouldin Island or Holland Tract.

Summary of Project Impacts and Recommended Mitigation Measures

The impacts and mitigation measures summarized below include the two impacts on natural gas facilities identified in the 1995 DEIR/EIS and the additional impacts and mitigation measures identified in the 2000 REIR/EIS. A detailed description of these impacts and mitigation measures is provided in the section from the 2000 REIR/EIS below entitled "Environmental Consequences".

Impact E-3: Increase in the Risk to Gas Lines Crossing Exterior Levees on Bacon Island Resulting from Levee Improvements. Implementation of Alternative 1 could cause settlement issues or increased loads on the pipelines at the levee crossings and may require corrective measures during levee construction and settlement. This impact, which is described below under "Risk of Pipeline Leak or Rupture Resulting from Levee Improvements", is considered significant.

Implementation of Mitigation Measures RE-1 and RE-2 would reduce Impact E-3 to a less-than-significant level.

Mitigation Measure RE-1: Monitor Locations Where Gas Pipelines Cross Bacon Island Levees during and after Levee Construction. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Levee Improvements".

Mitigation Measure RE-2: Implement Corrective Measures to Reduce Risk of Pipeline Failure during Levee Construction. This mitigation measures is described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Levee Improvements".

Impact E-4: Increase in PG&E Response Time to Repair a Gas Line Failure on Bacon Island. Implementation of Alternative 1 would delay and complicate repairs to PG&E pipeline facilities. However, the risk of a pipeline leak or rupture on Bacon Island is very low, and such a leak or rupture would be equally likely under dry or wet conditions. The potential impact on PG&E's operation is economic in nature. Because economic effects are not considered environmental impacts under CEQA and NEPA, no significance conclusion is made and no mitigation is identified. This impact is explained in greater detail in the section from the 2000 REIR/EIS below entitled

"Potential Delay in Emergency Repairs and Unscheduled Interruption of Service".

Impact RE-1: Increase in the Risk to Line 57-A from Island Inundation. Although the long-term risk of pipeline leak or rupture would not increase under proposed project operations, the currently unused pipeline (Line 57-A) on Bacon Island may need additional weighting before the island is flooded to prevent the line from floating. This impact is described below in the section from the 2000 REIR/EIS entitled "Risk of Pipeline Leak or Rupture Resulting from Island Inundation". The need to weight the pipeline is considered a substantial alteration to the existing system and a significant impact.

Implementing Mitigation Measure RE-3 would reduce Impact RE-1 to a less-than-significant level.

Mitigation Measure RE-3: Securely Anchor Line 57-A before Bacon Island Flooding. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Island Inundation".

Impact RE-2: Potential Interference with Pipeline Inspection Procedures. This impact is described in the section from the 2000 REIR/EIS below entitled "Potential Interference with Pipeline Inspection Procedures". The impact on access for pipeline inspections and on monitoring facilities is considered significant.

Implementation of Mitigation Measures RE-4 and RE-5 would reduce this impact to a less-than-significant level.

Mitigation Measure RE-4: Provide Adequate Facilities on Bacon Island for Annual Pipeline Inspection. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Potential Interference with Pipeline Inspection Procedures".

Mitigation Measure RE-5: Relocate Cathodic Protection Test Stations before Bacon Island Flooding. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Potential Interference with Pipeline Inspection Procedures".

Electrical Distribution Lines

Bacon Island

PG&E may provide electrical service for the discharge pump stations on the reservoir islands under Alternative 1. This would require adding capacity to the existing distribution lines but would not require new distribution easements or structures on Bacon Island. Therefore, Alternative 1 would not substantially change the existing electrical infrastructure by increasing capacity on the lines.

Electrical lines along Bacon Island's perimeter levees would be modified as needed during project construction and levee improvements. DW would negotiate with PG&E regarding necessary arrangements for the needed work. Modifications to existing lines during levee construction would not substantially alter the existing system on Bacon Island. Before temporary or permanent modification or relocation of existing electrical lines, DW would conduct special-status plant surveys in areas that could be affected by the proposed modifications. If threatened or endangered plant species are found, DW will avoid disturbing those plants when making changes to existing electrical lines.

Webb Tract

As stated previously, PG&E may provide electrical service for discharge pump stations on the reservoir islands. If provision of electrical service is required, PG&E would add capacity to the existing distribution lines. Adding capacity would not require new distribution easements or structures, as described above for Bacon Island.

Some distribution lines are located on Webb Tract on the perimeter levees, and one line traverses the island. Consequently, inundation of Webb Tract would alter the existing system. The PG&E overhead distribution line that crosses the bottom of Webb Tract and connects to Bradford Island and Mandeville Island distribution lines (Figure 3E-3) would need to be relocated during construction. This would substantially affect the existing infrastructure on Webb Tract. Before temporary or permanent modification or relocation of existing electrical lines, DW would conduct special-status plant surveys in areas that could be affected by the proposed modifications. If threatened or endangered plant species are found, DW

will avoid disturbing those plants when making changes to existing electrical lines.

Bouldin Island and Holland Tract

Wildlife habitat management on Bouldin Island and Holland Tract would be compatible with operation of PG&E electrical facilities. Some existing distribution lines that serve farming operations would no longer be needed. Infrastructure stability may be enhanced and maintenance needs reduced under Alternative 1 conditions because subsidence rates will be lower with wildlife management uses than under existing agriculture management. Chapter 3D, "Flood Control", discusses subsidence rates under existing and project conditions. Wildlife habitat management would not affect existing electrical utility lines on Holland Tract and Bouldin Island.

Recreation Facilities

As described in Chapter 2, "Delta Wetlands Project Alternatives", DW has removed construction of recreation facilities from its CWA permit applications, and USACE will not include the construction of such facilities in permits issued for the project at this time. Nevertheless, the analysis of impacts on electrical distribution utilities presented below assumes that the recreation facilities would be constructed and operated. This information provides readers with a complete record of the environmental analysis; it may be used in any subsequent environmental assessment of the recreation facilities.

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-5: Inundation of Electrical Distribution Utilities on the Reservoir Islands. Implementation of Alternative 1 would cause inundation of existing PG&E overhead distribution lines on Webb Tract during water storage operations. Maintenance of electrical service between Bradford Island and Mandeville Island would require raising or relocating the distribution lines. This impact is considered significant.

Implementing Mitigation Measure E-1 would reduce Impact E-5 to a less-than-significant level.

Mitigation Measure E-1: Relocate Electrical Distribution Lines to the Perimeter Levee around Webb Tract. DW, in coordination with PG&E, shall permanently relocate the existing electrical distribution lines on Webb Tract to the improved perimeter levees during project construction. The new or relocated distribution lines would be located along perimeter levees and would be installed overhead near the toe of the new slopes, similar to existing installations. Before temporarily or permanently modifying or relocating existing electrical lines, DW would conduct special-status plant surveys in areas that could be affected by the proposed modifications. If threatened or endangered plant species are found, DW will avoid disturbing those plants when making changes to existing electrical lines.

Impact E-6: Possible Need to Increase Capacity of the Existing Electrical Distribution Lines on the DW Project Islands. Implementation of Alternative 1 may require PG&E to provide electrical service for discharge pump stations, siphon stations, and recreation facilities on the DW project islands. If electrical service is required, PG&E would add capacity to the existing distribution lines. The proposed locations for some pump and siphon stations and recreation facilities (see Chapter 2, Figures 2-2 and 2-3) are adjacent to or within existing electrical line easements. Increasing capacity of existing distribution lines would not require new distribution easements or structures on the islands. Therefore, this impact is considered less than significant.

It may also be necessary to relocate or upgrade electrical lines and substation facilities to serve new project facilities; any relocation or upgrade of electrical substation facilities (50,000 volts and above) may require formal approval from the California Public Utilities Commission (CPUC). If, when specific design details are submitted, the CPUC determines that the NEPA and CEQA documentation already completed for the DW project does not cover site- specific environmental impacts in enough detail, it may require additional environmental documentation before it provides approvals.

Mitigation. No mitigation is required.

Impact E-7: Possible Need to Expand the Existing Electrical Distribution Lines on Webb Tract, Bouldin Island, and Holland Tract to Serve a Proposed Siphon Station and Recreation Facilities. Implementation of Alternative 1 may require PG&E to provide electrical service to a siphon

station on the northeast end of Webb Tract and to recreation facilities along the perimeters of Webb Tract, Bouldin Island, and Holland Tract that would not easily be serviced by existing lines. Because service to these facilities would require an extension of existing service lines, this impact is considered significant.

Implementing Mitigation Measure E-2 would reduce Impact E-7 to a less-than-significant level.

Mitigation Measure E-2: Extend Electrical Distribution Lines to Serve New Siphon and Pump Stations and Recreation Facilities. DW, in coordination with PG&E, shall extend existing electrical distribution lines on the reservoir islands where needed to serve new siphon and pump stations and recreation facilities. Before modifying existing electrical lines, DW would conduct special-status plant surveys in areas that could be affected by the proposed modifications. If threatened or endangered plant species are found, DW will avoid disturbing those plants when making changes to existing electrical lines.

Police and Fire Protection Services

Implementation of Alternative 1 would result in an incremental increase in demand for police and fire protection services on the DW project islands. Construction and operation of the proposed recreation facilities on the DW project islands would result in the following conditions that would contribute to the need for emergency services:

- construction of new buildings,
- an increase in the number of people visiting the DW project islands,
- an increase in boating use on waterways adjacent to the DW project islands, and
- establishment of boat facilities, which commonly attract criminal activities (e.g., vandalism and theft).

Therefore, operation of the recreation facilities under Alternative 1 would increase the need for emergency services on the DW project islands. As described above, DW has removed construction of recreation facilities from its CWA permit applications. Nevertheless, the analysis of impacts on police and fire protection services presented below assumes that the recreation facilities would be constructed and operated.

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-8: Increase in Demand for Police Services on the DW Project Islands. Implementation of Alternative 1 would increase demands on police service during project operation. Construction of the recreation facilities would increase recreation activity in the Delta and could attract criminal activity, which is currently very low on the DW project islands. This impact is considered significant.

Implementing Mitigation Measures E-3 and E-4 would reduce Impact E-8 to a less-than-significant level.

Mitigation Measure E-3: Provide Adequate Lighting in and around Buildings, Walkways, Parking Areas, and Boat Berths. DW should provide illumination, in compliance with the recommendations of the Contra Costa County Sheriff's Department and the San Joaquin County Sheriff's Department, in and around recreation facilities, walkways, parking areas, and boat berths on all the DW project islands. Also, DW should consult with both sheriff's departments for building design recommendations in order to avoid features that may promote criminal activity.

Mitigation Measure E-4: Provide Private Security Services for Recreation Facilities and Boat Docks. DW should provide 24-hour onsite private security for the recreation facilities and boat docks on all four DW project islands. The security service will assist the San Joaquin County Sheriff's Department and Contra Costa County Sheriff's Department by deterring criminal activity.

Impact E-9: Increase in Demand for Fire Protection Services on the DW Project Islands. Implementation of Alternative 1 would increase demands on fire protection services during project operation. Construction of the recreation facilities would increase the number of people recreating on the DW project islands. Also, two of the DW project islands (Webb Tract and Bacon Island) are not currently serviced by a fire protection district. This impact is considered significant.

Implementing Mitigation Measures E-5 and E-6 would reduce Impact E-9 to a less-than-significant level.

Mitigation Measure E-5: Incorporate Fire Protection Features into Recreation Facility Design. DW should incorporate the required design features identified in the Uniform Building Codes and the Uniform Fire Codes into the design of the recreation facilities and boat docks.

Mitigation Measure E-6: Provide Fire Protection Services to Webb Tract and Bacon Island. DW, in coordination with the county and the local agency formation commission (LAFCO), should incorporate Webb Tract and Bacon Island into an existing fire protection district or create a new fire protection district to serve these islands. In addition, as part of the operation of the proposed recreation facilities, caretaker staff would be available 24 hours a day, trained, and certified to serve as volunteer firefighters. DW would acquire firefighting equipment necessary to provide adequate fire protection services on Webb Tract.

Water Supply Facilities and Sewage Disposal Service

Implementation of Alternative 1 would require the provision of water and sewage services to the proposed recreation facilities on the DW project islands. DW would need to provide new water sources and supply infrastructure for the recreation facilities. The recreation facilities would use gray water wherever possible to reduce the need for potable water consistent with county policies. To support recreation facilities, DW would need to increase bottled-water delivery service, drill and maintain new wells, and construct water treatment facilities as necessary to supply water at the recreation facilities.

DW would need to install sewage disposal systems that meet San Joaquin County and Contra Costa County requirements and standards for sewage disposal systems and design at the proposed recreation facilities. Facilities on the habitat islands would most likely be served by septic systems, and facilities on the reservoir islands would be served by a dual treatment system whereby gray water is treated to a tertiary level and released and black water is held in the system for offsite disposal.

DW will need to obtain the appropriate state and local permits for these facilities. Design of sewage disposal and water supply facilities would be site specific for each recreation facility, and the governing county would approve the final designs before issuing building or encroachment permits.

Implementation of Alternative 1 would also increase boating use and demand for boating-related sewage treatment and pumpout facilities. Pumpout stations would not be constructed at the recreation facility boat docks for sewage disposal. Boaters docked at the DW project facilities would use pumpout stations open to the public on Andrus Island, Empire Tract, Terminous Tract, or other pumpout stations in the Delta (Figure 3E-4). Water quality issues associated with boat use and sewage disposal are addressed in Appendix C6, "Assessment of Potential Water Contaminants on the Delta Wetlands Project Islands".

As described above, DW has removed construction of recreation facilities from its CWA permit applications, and USACE will not include the construction of such facilities in permits issued for the project at this time. Nevertheless, the analysis of impacts on water supply and sewage disposal presented below assumes that the recreation facilities would be constructed and operated. This information provides readers with a complete record of the environmental analysis; it may be used in any subsequent environmental assessment of the recreation facilities.

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-10: Increase in Demand for Water Supply Services. Implementation of Alternative 1 would increase the need for potable water on the DW project islands. As part of the recreation facility design, DW will increase bottled-water delivery service, drill new wells, and incorporate water purification techniques as necessary to increase water supply at the recreation facilities. New services would need to be consistent with county policies. Therefore, this impact is considered less than significant.

Measures that would minimize the effects of this impact have been incorporated into the project description. However, implementing Mitigation Measure E-7 would monitor the effectiveness of those measures.

Mitigation Measure E-7: Obtain Appropriate Local and State Permits for Recreation Facility Services and Utilities. Before construction of the proposed recreation facilities, DW should demonstrate to the Corps and SWRCB that it has obtained all required permits and approvals from local and state agencies for the design and construction of utilities and services including, but not limited to, water supply, sewage disposal, and solid waste disposal on the DW project islands.

In order to obtain a sewage permit in San Joaquin County, DW would be required to submit an application along with a work plan for the recreation facilities to the San Joaquin County Environmental Health Department. The work plan would then be reviewed by the Environmental Health Department to ensure compliance with all county requirements, and a permit would be issued or denied based on the findings of the review (Borgman pers. comm.).

Contra Costa County Environmental Health Division issues sewage permits in Contra Costa County. As with San Joaquin County, DW would be required to submit an application. In addition, DW would be required to submit three sets of plans for the recreation facilities along with a site map depicting existing structures and resources on the islands, and a safety plan. Issuance of the permit would be based upon compliance with all county requirements, review of the application, and site visit information obtained by the health inspector (Fung pers. comm.).

If, when specific design details are submitted to the appropriate regulating agencies, the agency determines that site-specific environmental impacts are not covered in enough detail by the NEPA and CEQA documentation already completed for the DW project, additional environmental documentation may be required prior to approval of permits, entitlements, or alternative treatment methods.

Impact E-11: Increase in Demand for Sewage Disposal Services. Implementation of Alternative 1 would result in an increased need for sewage disposal at the proposed recreation facilities. As part of the recreation facility design, DW will install a new sewage disposal system at each facility consistent with San Joaquin County and Contra Costa County requirements for sewage disposal systems and design. Therefore, this impact is considered less than significant.

Measures that would minimize the effects of this impact have been incorporated into the project description. However, implementing Mitigation Measure E-7 (described above) would monitor the effectiveness of those measures.

Mitigation Measure E-7: Obtain Appropriate Local and State Permits for Recreation Facility Services and Utilities

Solid Waste

Under Alternative 1, use of the recreation facilities would increase demand for solid waste removal services on the DW project islands. DW would need to contract with a private waste collection and disposal service authorized to operate in Contra Costa County and San Joaquin County to serve the recreation facilities. As described above, DW has removed construction of recreation facilities from its CWA permit applications. Nevertheless, the analysis of impacts on solid waste services presented below assumes that the recreation facilities would be constructed and operated.

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-12: Increase in Demand for Solid Waste Removal Implementation of Alternative 1 would result in the need for solid waste removal at the recreation facilities. DW will contract with a private waste collection and disposal service to respond to the need for removal of solid waste from the recreation facilities. The amount of solid waste generated at the recreation facilities would not likely exceed capacity of the collection service or local landfills. Therefore, this impact is considered less than significant.

Measures that would minimize the effects of this impact have been incorporated into the project description. However, implementing Mitigation Measure E-7 (described above) would monitor the effectiveness of those measures.

Mitigation Measure E-7: Obtain Appropriate Local and State Permits for Recreation Facility Services and Utilities

Infrastructure Facilities on Adjacent Islands

Infrastructure on adjacent islands includes transportation and water conveyance facilities (Figure 3E-1), underground gas fields and storage areas (Figure 3E-2), and gas and electrical lines (Figure 3E-3). Increased risk of levee failure and seepage to adjacent islands caused by proposed water storage on Bacon Island and Webb Tract could threaten the reliability of these facilities and increase maintenance and repair costs; however, DW has made a commitment to improve levees around DW islands, which would increase the reliability of the DW island levees. DW would also mitigate any seepage problems beyond existing seepage levels by installing an interceptor well system around the project island levees (see Appendix D2, "Levee Design and Maintenance Measures", for more information on seepage control). Project features would maintain potential levee stability and seepage impacts at existing levels or better, so implementation of Alternative 1 would not increase the risk to adjacent utilities. Adjacent utilities would not be affected by Alternative 1.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 2

Impacts and mitigation measures under this alternative are the same as under Alternative 1.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 3

Alternative 3 involves storage of water on Bacon Island, Webb Tract, Bouldin Island, and Holland Tract, with secondary uses for wildlife habitat and recreation. The portion of Bouldin Island north of SR 12 would be managed as a wildlife habitat area and would not be used for water storage. The impacts of Alternative 3 on utilities and highways in the project area are described below. Most of the impacts on utilities and highways are considered less than significant; mitigation is recommended for one impact that is considered significant, and no mitigation is available for one impact that is considered significant.

Highways, County Roads, and Ferry Service

Bacon Island

The effect of implementation of Alternative 3 on the structural integrity of Bacon Island Road would be identical to that described above under "Impacts and Mitigation Measures of Alternative 1". Reconstruction of the bridge connecting Bacon Island to Mandeville Island would not be affected under Alternative 3.

Webb Tract

The effect of implementation of Alternative 3 on ferry traffic from Jersey Island to Webb Tract would be identical to that described above under "Impacts and Mitigation Measures of Alternative 1".

Bouldin Island

Increased Flood Risk on SR 12. Under Alternative 3, DW proposes to construct levees along SR 12 to protect the highway and the NBHA north of the highway from the water storage operations on the south side of SR 12.

To retain water and protect the existing highway, a dam would be required along the south side of SR 12 across Bouldin Island. The dam, Wilkerson Dam, would be constructed according to standards of DWR's DSOD because water would be impounded within the Bouldin Island reservoir to a maximum pool elevation of +6 feet. Design features for Wilkerson Dam include measures to control settlement, seepage, and wave erosion. Extensive geotechnical studies have been conducted for the dam, and design specifications have been developed and submitted to DSOD for review and approval (HLA 1992, 1993). Appendix E1, "Design and Construction of Wilkerson Dam South of SR 12 on Bouldin Island", presents detailed information on the dam design, construction staging and monitoring, and results of geotechnical studies for Wilkerson Dam. Levee reliability is described in Chapter 3D, "Flood Control", based on preliminary technical analyses and design specifications (HLA 1989, 1992, 1993) and Moffatt & Nichol (1988).

Implementation of Alternative 3 could increase the risk of structural failure of SR 12 by increasing the risk of flood damage from the reservoir south of the high-

way. Appendix E1 describes dam design features that would minimize the risk of failure. The proposed dam would be protected from wind and wave erosion on the water side with a high-density polyethylene surface or riprap or cement soil, the toe of the proposed dam would be set back from the highway to protect the roadbed from mud heave or settlement problems caused by the new levee, and seepage through the dam would be monitored and controlled by a drainage system. Therefore, water storage operations south of SR 12 would not affect SR 12 roadway stability.

The levee along the north side of SR 12 would hold back water present year round within the NBHA. The entire habitat area would be regraded during project construction to achieve a desired mix of habitats, including year-round water in ditches and interconnecting ponds. The regrading design for the NBHA should be reviewed by Caltrans to verify that the probability of adverse flooding impacts on SR 12 would be negligible. As proposed, the water level in the NBHA would not differ substantially from current water levels during agricultural production. Therefore, the levee on the north side of SR 12 would not require DSOD's approval, and operation of the NBHA would not affect the structural integrity of SR 12.

Highway Safety. Low-lying winter fog is an existing traffic hazard on SR 12 and in the project area. Because implementing Alternative 3 would increase the amount of water surface area adjacent to SR 12, the amount of fog produced on Bouldin Island could increase and affect traffic conditions on SR 12 (Costa pers. comm.). Constructing reservoirs on DW project islands would not substantially increase regional fog hazards in the Delta but may create patches of fog on each island. Because SR 12 is a regional transportation route, increasing fog on Bouldin Island may increase traffic hazards. The reservoir will be constructed 240-370 feet from the existing highway right-of-way (HLA 1992), and the highway is currently raised +4 feet above adjacent fields, which may alleviate some fog hazard problems. Increased potential for fog to rise from the surface of reservoirs under Alternative 3 cannot be avoided, however, and is assumed to increase traffic hazards along SR 12.

Wind conditions on SR 12 would not substantially change from existing conditions under Alternative 3. Construction of levees or soundwalls along roadways does not generally affect wind conditions on the road, and the levees would be set back 240-370 feet from the existing highway right-of-way. Therefore, construction and operation of Alternative 3 would not increase wind hazards on SR 12.

Visibility on the roadway could be adversely affected if the levee on the north side of SR 12 obstructed westbound views of the road along the curved portion of the highway; however, SR 12 is a raised roadway and the curve in the road is gradual. The levee would be constructed to approximately 6 feet in height and will be set back from the roadway at least 50 feet. Based on existing roadway conditions and proposed levee design, visibility on SR 12 for westbound traffic is not expected to substantially change from existing conditions. Therefore, construction of a levee along the north side of SR 12 would not affect visibility or traffic safety.

Holland Tract

Under Alternative 3, Holland Tract Road would remain along the southern levee of Holland Tract. Implementation of Alternative 3 would include improving the perimeter levee, thereby improving the structural integrity of Holland Tract Road.

Chapter 3D, "Flood Control", addresses levee reliability with regard to erosion and settlement, and Chapter 3L, "Traffic and Navigation", addresses construction-related safety and traffic impacts on Holland Tract Road.

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-13: Increase in the Structural Integrity of County Roads. Implementation of Alternative 3 would result in levees surrounding the reservoirs on the DW project islands being raised and widened. Erosion-resistant facing would be placed on the interior slopes of the levees. These levee improvements would increase the structural integrity of Bacon Island Road on the eastern levee of Bacon Island and Holland Tract Road on the southern levee of Holland Tract. Therefore, this impact is considered beneficial.

Mitigation. No mitigation is required.

Impact E-14: Increase in the Risk of Structural Failure of SR 12. Implementation of Alternative 3 could cause the proposed Wilkerson Dam along SR 12 to fail, which would result in the structural failure and inundation of SR 12. Because the design of Wilkerson

Dam would minimize seepage, settlement, and erosion, adverse impacts on the structural integrity of SR 12 caused by levee failure and flooding would have a low probability of occurring (see Appendix E1). The final levee design would also address Caltrans' concerns and must be reviewed for structural stability and approved by DSOD.

As part of Alternative 3, DW, in coordination with Caltrans, will review the regrading design for the NBHA to verify that the probability of adverse flooding impacts along the north side of SR 12 would be negligible. Therefore, this impact is considered less than significant.

Measures that would minimize the effects of this impact have been incorporated into the project description. However, implementing Mitigation Measure E-8 would monitor the effectiveness of those measures.

Mitigation Measure E-8: Coordinate Design and Construction of Wilkerson Dam with Caltrans and DSOD. Prior to project construction, DW shall demonstrate to the Corps and SWRCB that it has consulted with and obtained all required permits and approvals from Caltrans and DSOD for the design and construction of Wilkerson Dam.

Impact E-15: Increase in the Fog Hazard on SR 12. Implementation of Alternative 3 could increase the amount of fog produced along SR 12 on Bouldin Island by increasing the water surface area adjacent to the roadway. Fog on the roadway would increase existing traffic hazards on SR 12. This impact is considered significant and unavoidable.

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

Impact E-16: Reduction in Ferry Traffic from Jersey Island to Webb Tract. This impact is described above under Impact E-2. This impact is considered less than significant.

Mitigation. No mitigation is required.

Gas Facilities and Transmission Pipelines

Bacon Island

As explained above under "Impacts and Mitigation Measures of Alternative 1", the 1995 DEIR/EIS discussion of project effects on gas facilities and transmission pipelines across Bacon Island has been superseded by the updated information presented in the 2000 REIR/EIS. The revised discussion is presented in the section from the 2000 REIR/EIS below entitled "Environmental Consequences". The impact and mitigation statements below have been revised to reflect the conclusions in that section.

Webb Tract

As explained above under "Impacts and Mitigation Measures of Alternative 1", storage of water on Webb Tract would not preclude future natural gas exploration, but existing wells might have to be abandoned. During the final design of the project, DW would need to consult with the Department of Conservation, Division of Oil and Gas, and with existing mineral right holders to determine whether producing wells on Webb Tract would need to be abandoned and whether previously abandoned wells need to be reabandoned.

Bouldin Island and Holland Tract

As stated previously, no gas facilities or transmission pipelines exist on Bouldin Island or Holland Tract.

Summary of Project Impacts and Recommended Mitigation Measures

The impacts and mitigation measures summarized below include the two impacts on natural gas facilities identified in the 1995 DEIR/EIS and the additional impacts and mitigation measures identified in the 2000 REIR/EIS. A detailed description of these impacts and mitigation measures is provided in the section from the 2000 REIR/EIS below entitled "Environmental Consequences".

Impact E-17: Increase in the Risk to Gas Lines Crossing Exterior Levees on Bacon Island Resulting from Levee Improvements. This impact is the same as Impact E-3. This impact is considered significant.

Implementation of Mitigation Measures RE-1 and RE-2 would reduce Impact E-17 to a less-than-significant level.

Mitigation Measure RE-1: Monitor Locations Where Gas Pipelines Cross Bacon Island Levees during and after Levee Construction. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Levee Improvements".

Mitigation Measure RE-2: Implement Corrective Measures to Reduce Risk of Pipeline Failure during Levee Construction. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Levee Improvements".

Impact E-18: Increase in PG&E Response Time to Repair a Gas Line Failure on Bacon Island. This impact is described above under Impact E-4. The potential impact on PG&E's operation is economic in nature. Because economic effects are not considered environmental impacts under CEQA and NEPA, no significance conclusion is made and no mitigation is identified. This impact is explained in greater detail in the section from the 2000 REIR/EIS below entitled "Potential Delay in Emergency Repairs and Unscheduled Interruption of Service".

Impact RE-3: Increase in the Risk to Line 57-A from Island Inundation. This impact, which is summarized above under Alternative 1 and is described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Island Inundation", is considered significant.

Implementing Mitigation Measure RE-3 would reduce Impact RE-3 to a less-than-significant level.

Mitigation Measure RE-3: Securely Anchor Line 57-A before Bacon Island Flooding. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Island Inundation".

Impact RE-4: Potential Interference with Pipeline Inspection Procedures. This impact is summarized above under Alternative 1 and is described in the section from the 2000 REIR/EIS below entitled "Potential Interference with Pipeline Inspection Procedures". The impact on access for pipeline inspections and on monitoring facilities is considered significant.

Implementation of the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure RE-4: Provide Adequate Facilities on Bacon Island for Annual Pipeline Inspection. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Potential Interference with Pipeline Inspection Procedures".

Mitigation Measure RE-5: Relocate Cathodic Protection Test Stations before Bacon Island Flooding. This mitigation measure is described in the section from the 2000 REIR/EIS below entitled "Potential Interference with Pipeline Inspection Procedures".

Electrical Distribution Lines

Bacon Island

As explained above under "Impacts and Mitigation Measures of Alternative 1", PG&E may provide electrical service for the proposed discharge pump stations on reservoir islands. This would require adding capacity to the existing distribution lines on Bacon Island but would not require new distribution easements or structures.

Webb Tract

The effects of flooding existing electrical distribution facilities that are located on Webb Tract off the perimeter levees are described above under "Impacts and Mitigation Measures of Alternative 1".

Bouldin Island and Holland Tract

Electrical distribution lines that traverse Holland Tract and Bouldin Island would be inundated during

water storage operations and would require substantial alteration for existing services to be maintained on the islands. PG&E overhead distribution lines that cross the bottoms of the islands (Figure 3E-3) would need to be raised or relocated during construction. Before temporarily or permanently modifying or relocating existing electrical lines, DW would conduct special-status plant surveys in areas that could be affected by the proposed modifications. If threatened or endangered plant species are found, DW will avoid disturbing those plants when making changes to existing electrical lines.

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-19: Inundation of Electrical Distribution Utilities on the Reservoir Islands. Implementation of Alternative 3 would cause inundation of existing PG&E overhead distribution lines on the bottoms of Webb Tract, Holland Tract, and Bouldin Island during water storage operations. To maintain existing service, the lines would need to be relocated. This impact is considered significant.

Implementing Mitigation Measure E-9 would reduce Impact E-19 to a less-than-significant level.

Mitigation Measure E-9: Relocate Electrical Distribution Lines to the Perimeter Levees around Webb and Holland Tracts and Bouldin Island. DW, in coordination with PG&E, shall permanently relocate the existing electrical distribution lines on Webb and Holland Tracts and Bouldin Island to the improved perimeter levees during project construction. The new or relocated distribution lines would be located along perimeter levees and would be installed overhead near the toes of the new slopes, similar to existing installations. Before temporarily or permanently modifying or relocating existing electrical lines, DW would conduct special-status plant surveys in areas that could be affected by the proposed modifications. If threatened or endangered plant species are found, DW will avoid disturbing those plants when making changes to existing electrical lines.

Impact E-20: Possible Need to Increase Capacity of the Existing Electrical Distribution Lines on the Reservoir Islands. Implementation of Alternative 3 may require PG&E to provide electrical service for discharge pump stations, siphon stations, and recreation facilities on the DW project islands. PG&E would add capacity to the existing distribution lines, which would not require new easements or structures on the islands. Therefore, this impact is considered less than significant.

It may also be necessary to relocate or upgrade electrical lines and substation facilities to serve new project facilities; any relocation or upgrade of electrical substation facilities (50,000 volts and above) may require formal approval from the CPUC. If, when specific design details are submitted, the CPUC determines that the NEPA and CEQA documentation already completed for the DW project does not cover site-specific environmental impacts in enough detail, it may require additional environmental documentation before it provides approvals.

Mitigation. No mitigation is required.

Impact E-21: Possible Need to Expand the Existing Electrical Distribution Lines on Webb Tract, Bouldin Island, and Holland Tract to Serve Proposed Siphon and Pump Stations and Recreation Facilities. Implementation of Alternative 3 may require PG&E to provide electrical service to siphon stations, a pump station, and recreation facilities that would not easily be serviced by existing lines. The following proposed pump station and siphon stations (as shown in Chapter 2, Figures 2-3, 2-10, and 2-11) would not be located adjacent to existing electrical line corridors: a siphon station in the northeastern corner of Webb Tract, a discharge pump station and a siphon station on the eastern side of Bouldin Island, and a siphon station near the northernmost point of Holland Tract. Recreation facilities would also be located along the perimeter levees in areas not serviced by electrical lines. Because electrical service to those facilities would require an extension of existing service lines, this impact is considered significant.

Implementing Mitigation Measure E-2 would reduce Impact E-21to a less-than-significant level.

Mitigation Measure E-2: Extend Electrical Distribution Lines to Serve New Siphon and Pump Stations and Recreation Facilities. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Police and Fire Protection Services

The effects on emergency services that would result from constructing and operating recreation facilities are described above under "Impacts and Mitigation Measures of Alternative 1".

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-22: Increase in Demand for Police Services on the DW Project Islands. This impact is described above under Impact E-8. This impact is considered significant.

Implementing Mitigation Measures E-3 and E-4 would reduce Impact E-22 to a less-than-significant level.

Mitigation Measure E-3: Provide Adequate Lighting in and around Buildings, Walkways, Parking Areas, and Boat Berths. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Mitigation Measure E-4: Provide Private Security Services for Recreation Facilities and Boat Docks. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Impact E-23: Increase in Demand for Fire Protection Services on the DW Project Islands. This impact is described above under Impact E-9. This impact is considered significant.

Implementing Mitigation Measures E-5 and E-6 would reduce Impact E-23 to a less-than-significant level.

Mitigation Measure E-5: Incorporate Fire Protection Features into Recreation Facility Design. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Mitigation Measure E-6: Provide Fire Protection Services to Webb Tract and Bacon Island. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Water Supply Facilities and Sewage Disposal Service

The effects on water supply and sewage disposal services that would result from constructing and operating recreation facilities are described above under "Impacts and Mitigation Measures of Alternative 1".

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-24: Increase in Demand for Water Supply Services. This impact is described above under Impact E-10. This impact is considered less than significant.

Measures that would minimize the effects of this impact have been incorporated into the project description. However, implementing Mitigation Measure E-7 would monitor the effectiveness of those measures."

Mitigation Measure E-7: Obtain Appropriate Local and State Permits for Recreation Facility Services and Utilities. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Impact E-25: Increase in Demand for Sewage Disposal Services. This impact is described above under Impact E-11. This impact is considered less than significant.

Measures that would minimize the effects of this impact have been incorporated into the project description. However, implementing Mitigation Measure E-7 would monitor the effectiveness of those measures.

Mitigation Measure E-7: Obtain Appropriate Local and State Permits for Recreation Facility Services and Utilities. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Solid Waste

The effects on solid waste disposal services that would result from constructing and operating recreation facilities are described above under "Impacts and Mitigation Measures of Alternative 1".

Summary of Project Impacts and Recommended Mitigation Measures

Impact E-26: Increase in Demand for Solid Waste Removal. This impact is described above under Impact E-12. This impact is considered less than significant.

Measures that would minimize the effects of this impact have been incorporated into the project description. However, implementing Mitigation Measure E-7 would monitor the effectiveness of those measures.

Mitigation Measure E-7: Obtain Appropriate Local and State Permits for Recreation Facility Services and Utilities. This mitigation measure is described above under "Impacts and Mitigation Measures of Alternative 1".

Infrastructure Facilities on Adjacent Islands

Under Alternative 3, potential seepage from project islands would be similar to that described for Alternative 1. As part of Alternative 3, DW would install an interceptor well system in the exterior levees of the project islands to control seepage onto adjacent islands, as described in Appendix D2, "Levee Design and Maintenance Measures". Design features and proposed seepage control measures would keep potential adverse seepage problems at existing levels or better, and there would be no change in the risk to facilities on adjacent islands. Adjacent utilities would not be affected by implementation of Alternative 3.

IMPACTS AND MITIGATION MEASURES OF THE NO-PROJECT ALTERNATIVE

Implementation of the No-Project Alternative would cause an increase in the rate of subsidence on the island interiors due to continued tillage of areas now in production and increased tillage of areas now fallow. Subsidence gradually increases levee instability, seepage, and threats to utility and highway facilities on the project islands and the risk of a cumulative levee failure on adjacent islands. By increasing the rate of subsidence, implementation of the No-Project Alternative would speed the rate at which these effects begin to occur on the DW project islands.

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

Highways, County Roads, and Ferry Service

Bacon Island

Subsidence on Bacon Island would increase the risk of structural failure of the levees. Because Bacon Island Road traverses an existing levee, subsidence would result in increased risk of road failure and higher maintenance and repair needs over time. The levees would eventually have to be rehabilitated as a result of levee degradation.

Webb Tract

Ferry traffic to Webb Tract from Jersey Island would continue to operate at or above existing levels as farming operations increased. Therefore, implementation of the No-Project Alternative would not affect ferry operations.

Bouldin Island

Because SR 12 is a raised roadway, subsidence resulting from continued agricultural production would increase the risk of structural failure and increase maintenance needs for the highway.

Holland Tract

Similar to effects on Bacon Island Road described above, subsidence under the No-Project Alternative would result in increased risk of levee and road failure and higher maintenance and repair needs on Holland Tract Road over time.

Summary of Project Impacts and Recommended Mitigation Measures

Increase in the Risk of Road Failure and Maintenance and Repair Needs. Implementation of the No-Project Alternative would result in increased subsidence rates on DW project islands, which would increase the risk of structural failure of levees and associated roadways on Bacon Island, Holland Tract, and Bouldin Island. More roadway maintenance and repair would be required over time. The perimeter levees eventually would have to be rehabilitated.

Implementing the following measure described in Chapter 3D, "Flood Control", would reduce this effect of the No-Project Alternative.

Buttress Perimeter Levees. The perimeter levees of the DW project islands could be substantially buttressed to increase levee stability under the No-Project Alternative. The need for improvements to these levees over time would be evaluated by the local reclamation districts.

Gas Facilities and Transmission Pipelines

Bacon Island

Continued subsidence resulting from increased agricultural uses would bring gas transmission lines on Bacon Island increasingly closer to the ground surface, requiring frequent restoration of the lines to new depths. Therefore, the No-Project Alternative would increase current maintenance requirements for the gas lines. The change in utility maintenance over time would be substantial.

Under the No-Project Alternative, Bacon Island levees eventually would have to be rehabilitated. As for Alternative 1, levee buttressing could cause differential settlement where the gas lines penetrate the levee. It is reasonable to assume that a monitoring system and corrective measures would be implemented during levee rehabilitation under the No-Project Alternative, as for Alternative 1. The potential effects of levee improvements on gas lines and corrective measures to reduce effects are described in the section from the 2000 REIR/EIS below entitled "Risk of Pipeline Leak or Rupture Resulting from Levee Improvements".

Webb Tract

Existing wells on Webb Tract that are producing gas, future gas wells, and wells that have been plugged and abandoned would not be affected by increased agricultural production over time.

Bouldin Island and Holland Tract

As stated previously, no gas facilities or transmission pipelines exist on Bouldin Island or Holland Tract.

Summary of Project Impacts and Recommended Mitigation Measures

Increase in Maintenance Requirements for Gas Lines on Bacon Island. Implementation of the No-Project Alternative would result in subsidence from increased agricultural uses that would bring gas transmission lines on Bacon Island increasingly closer to the ground surface, requiring increased maintenance and restoration of the lines over time.

Electrical Distribution Lines

Bacon Island, Webb Tract, Bouldin Island, and Holland Tract

Continued subsidence from increased agricultural uses under the No-Project Alternative would increase the risk of instability and failure of perimeter levees surrounding the DW project islands. Electrical distribution facilities located on perimeter levees would subsequently be subject to increased maintenance and risk of structural failure. Electrical facilities located on the interior of the DW project islands would also be disturbed by the effects of subsidence.

Summary of Project Impacts and Recommended Mitigation Measures

Increase in the Risk of Structural Failure and Increase in Maintenance Requirements for Existing Distribution Utilities. Implementation of the No-Project Alternative would result in an increased rate of subsidence, which would result in levee instability and increased maintenance and risk of structural failure of

existing electrical utility lines on the DW project islands.

Implementing the following measure would reduce this effect of the No-Project Alternative.

Buttress Perimeter Levees. This measure is described above.

Other Public Services

Implementation of the No-Project Alternative would not increase demands on police, fire, water supply, sewage, or solid waste services on the DW project islands. No new recreation facilities would be constructed, and increases in recreational use of the DW project islands would not result in a substantial demand for emergency services. Therefore, implementing the No-Project Alternative would not affect existing emergency or public services.

Infrastructure Facilities on Adjacent Islands

Under the No-Project Alternative, seepage to adjacent islands would be similar to existing seepage conditions because water would not be stored on the islands in amounts above those needed for intensified agricultural use. The No-Project Alternative would not affect facilities on adjacent islands.

CUMULATIVE IMPACTS

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

Cumulative Impacts, Including Impacts of Alternative 1

Chapter 3D, "Flood Control", discusses the issue of levee failure on the DW project islands leading cumulatively to levee failures on other Delta islands. Risk of levee failure directly affects risk to roadway and utility stability, so cumulative levee failure would result in cumulative utility structural failure. As discussed in Chapter 3D, implementation of flood control programs such as DWR's Delta water management programs and levee maintenance programs would improve the regional flood control system and reduce flood-related risks to adjacent utilities and roads. Therefore, the cumulative risk of levee failure would be less than the current risk, and a beneficial effect on utility facilities is predicted.

Impact E-27: Cumulative Decrease in the Risk of Structural Failure of Roadways and Utilities. Implementation of planned levee improvements throughout the Delta, combined with levee improvements on the DW project islands, would decrease the cumulative risk of levee failure on Delta islands. Furthermore, increased levee stability in the vicinity of the DW project islands would reduce the cumulative risk of structural failure of roadways and utilities in the area. This impact is considered beneficial.

Mitigation. No mitigation is required.

Cumulative Impacts, Including Impacts of Alternative 2

The cumulative impact of this alternative is the same as that described for Alternative 1.

Cumulative Impacts, Including Impacts of Alternative 3

The cumulative impact of this alternative is the same as that described for Alternative 1.

Cumulative Impacts, Including Impacts of the No-Project Alternative

Although levee reliability on the DW project islands would decline over time under the No-Project Alternative, implementation of planned levee improvements throughout the Delta would likely result in a cumulative improvement in levee conditions.

ANALYSIS OF NATURAL GAS FACILITIES AND TRANSMISSION PIPELINES FROM THE 2000 REVISED DRAFT EIR/EIS

The remainder of this chapter includes the analysis of natural gas facilities and transmission pipelines on Bacon Island that was conducted for the 2000 REIR/EIS. This information, which was presented as Chapter 7, "Natural Gas Facilities and Transmission Pipelines", in the 2000 REIR/EIS, has been modified slightly from the 2000 REIR/EIS version in response to comments received on the 2000 REIR/EIS. However, those minor changes do not change the conclusions of the analysis.

FOCUS OF THE 2000 REVISED DRAFT EIR/EIS ANALYSIS

The remainder of this chapter updates the 1995 DEIR/EIS assessment of Delta Wetlands Project effects on PG&E natural gas facilities and transmission pipelines. During the Delta Wetlands water right hearing, PG&E presented testimony regarding its easements and natural gas pipelines that cross Bacon Island. The testimony focused on the ways in which proposed Delta Wetlands water storage operations could:

- adversely affect PG&E's ability to use its easements,
- decrease the useful life of the pipelines,
- require additional pipeline maintenance,
- increase the threat of pipeline damage,
- reduce or inhibit pipeline access for routine or emergency repairs, and
- interrupt gas supply.

The future use of PG&E's easement is a private property rights dispute. The real property issues are not addressed in this REIR/EIS. Issues related to the operation and maintenance of the pipeline on Bacon Island and the possibility of impacts on regional natural gas service are considered potential environmental effects that require explanation and analysis. The remainder of this chapter updates and supplements the discussions of the Bacon Island pipeline issues originally described in the 1995 DEIR/EIS.

Summary of Issues Addressed in This Analysis

This analysis addresses the following questions:

- What effect will reservoir operations have on the integrity, operation, and maintenance of PG&E's natural gas pipelines across Bacon Island?

- What effect will reservoir operations have on emergency access to the pipeline?

Sources of Information

The information used to prepare the following analysis is taken from comments on the 1995 DEIR/EIS and 2000 REIR/EIS and from evidence and testimony provided by PG&E and

Delta Wetlands at the water right hearing. In addition, data from the DOT, Office of Pipeline Safety (U.S. Department of Transportation 1999), were used in this assessment.

Definition of Terms

The discussion of gas facilities and pipelines in this chapter includes some terms that may not be familiar to all readers. The following are definitions of these terms as they are used in this chapter:

Anticorrosion Coating: The coating of pipelines with paint, epoxy, or other materials to prevent contact of dissimilar metals. The barrier prevents establishment of a corrosion current and corrosion of the pipe.

Bending Load: The result when the opposite ends of an item are forced together (as when a sheet of paper is folded). Pipelines can be subject to this type of load.

Cathodic Protection System: A process used to prevent pipeline corrosion by passing an electric current through the pipe. When dissimilar metals (the pipeline and soil minerals) are placed in solution together, a corrosion current is established. The cathodic protection system creates an opposite current to minimize corrosion.

Firm Storage Capacity: An amount equivalent to guaranteed storage capacity. Utility rates usually vary based on guarantee of service. The first priority is to meet firm demands; consequently, this demand is most expensive. Demands that can be met with less reliability are less expensive.

Internal Inspection: The process of evaluating pipeline stresses from within the pipeline. A robotic device commonly called a "pig" is sent along the inside of the pipeline. The pig measures the shape of the pipeline, noting where the pipeline shape is abnormal (i.e., oval instead of round) and where the pipeline has ripples that indicate that the pipeline is bent or stressed.

Pipeline Balancing: The process that gas utilities use to balance the customer loads (demands) with the available supplies of natural gas. Inflows to the system must be continuously balanced against outflows from the system.

Shear Load: The result when force is applied perpendicular to or on opposite sides of an item (as when a sheet of paper is cut with scissors). Pipelines can be subject to this type of load.

Third Party: An entity that affects a property, but is not the owner of the property (first party) or an agent of the owner (second party).

Unbundled Rates: The individual rates for separate service components of a particular utility. For example, natural gas utilities can be broken down into separate service components such as gas procurement, transportation, storage, and delivery, with distinct rate schedules for each service. Deregulation of the utility industry has allowed this unbundling of services to promote market competition.

AFFECTED ENVIRONMENT: UPDATED INFORMATION PRESENTED IN THE 2000 REVISED DRAFT EIR/EIS

PG&E owns two high-pressure gas transmission pipelines that cross Bacon Island (Figure 3E-5). Line 57-B, constructed in 1974, serves as an input and output conduit for gas stored in the McDonald Island Storage Field; Line 57-A has been removed from operation and has been capped. However, Line 57-A could be used in the future.

Natural Gas Service

Line 57-B connects PG&E's interstate and intrastate gas transmission and distribution system to the utility's underground natural gas storage facility under McDonald Island (Figure 3E-2). The McDonald Island Storage Field has been used primarily to supply gas to the Bay Area and Sacramento/Stockton market centers when other resources, such as gas production fields in Canada and the southwestern United States, are inadequate to meet instantaneous (i.e., peak) demands. The McDonald Island storage facility has supplied gas for up to one-third of PG&E's customers during peak demand periods (Stoutamore pers. comm.).

In 1996, PG&E and other natural gas industry representatives adopted the Gas Accord Settlement. This settlement is the result of an extensive negotiation process that PG&E initiated several years ago. The settlement parties, representing a diverse cross-section of natural gas industry participants, have achieved a far-reaching and comprehensive settlement that restructures PG&E's natural gas services, redefines its role in the gas market, and establishes guaranteed transmission rates. The Gas Accord significantly increases competition and economic efficiency in the Northern California gas industry. It enables customers and marketers to participate fully in the increasingly deregulated, inter-regional natural gas markets, with the goal of achieving lower energy prices through increased competition and customer choice. The accord provides for guaranteed, unbundled, cost-based transmission rates.

The Gas Accord allows continued operational integration of PG&E's gas storage and transmission facilities. PG&E will reserve firm storage capacity for pipeline balancing services. PG&E's Core Procurement Department will contract for a portion of the utility's firm storage capacity on behalf of the core (PG&E's customers). The remaining storage capacity will be marketed in an unbundled storage program that requires PG&E to provide storage to third parties. The McDonald Island Storage Field is PG&E's largest underground natural gas storage facility, and Line 57-B is the only link between the storage field and the PG&E distribution system. Under the new Gas Accord, PG&E's role as a storer of natural gas has increased; consequently, PG&E's use of the McDonald Island Storage Field and reliance on Line 57-B has also increased. The McDonald Island storage facility is used year-round by various marketers and shippers to inject and withdraw gas based on dynamic market conditions resulting from adoption of the Gas Accord.

Pipeline Design Criteria

The DOT Office of Pipeline Safety comprehensively regulates the design, construction, testing, operation, and maintenance of natural gas pipelines and associated facilities in accordance with 49 CFR 192. The following general requirements govern the use of natural gas pipelines:

The materials for the pipe and components for use in pipelines must maintain structural integrity under temperature and other environmental conditions that may be anticipated. They must be chemically compatible with any gas that they transport.

The pipe must be designed with sufficient wall thickness or installed with adequate protection to withstand anticipated external pressures or loads.

Each pipeline component must be able to withstand operating pressures and other anticipated loadings without impairment of its serviceability.

The pipeline must be protected from external corrosion by an external protective coating and a cathodic protection system.

Before a new, repaired, or relocated pipeline can be placed into service, it must be tested to substantiate its maximum allowable operating pressure and to confirm that each leak has been located and eliminated.

The operator shall prepare and follow a manual of written procedures for conducting operations and maintenance activities, responding to emergencies, and handling abnormal conditions.

The operator shall have a patrol program to observe surface conditions on and adjacent to the pipeline right-of-way for indications of leaks, construction activity, and other factors affecting safety and operation.

A pipeline that is abandoned in place or deactivated must be disconnected from all gas sources, purged of gas, and sealed at the ends.

Line 57-A is 18 inches in diameter and Line 57-B has a diameter of 22 inches. Both pipelines are buried as they cross Bacon Island and are designed to operate under temporarily flooded conditions or in saturated soils. The pipelines as constructed are engineered and built to withstand more than the external pressure that would be applied by the load, or weight, of water under full reservoir conditions. Normal operation or integrity of a pipeline would not be impaired by the pressure of overlying water in a full reservoir. According to PG&E's easements, Line 57-A is buried at a minimum of 4 feet and as much as 8 feet below the ground surface; Line 57-B is buried at a minimum of 3.5 feet below the ground surface. Line 57-A has concrete weights, except along approximately 900 feet on the west side of the island, where the pipeline is concrete coated. Line 57-B is entirely concrete coated. Concrete coating and weighting prevents the pipeline from floating out of the trench when inundated or when saturated soils would not have the strength to resist the pipeline's buoyancy. Line 57-B is currently rated for pressures up to 2,160 pounds per square inch (psi) and can convey approximately 1.25 billion cubic feet per day (Bcf/day). As mentioned previously, Line 57-A has been removed from operation and has been capped.

Pipeline Safety

Historically, natural gas transmission and distribution lines and associated facilities have had a very low probability of a full-scale rupture that could lead to an explosion resulting in property damage or fatalities. The most recent data available from the DOT Office of Pipeline Safety for 1985 through 1999 (U.S. Department of Transportation 1999) indicate the following:

Approximately 1.7 million miles of natural gas transmission and distribution pipelines are present in the United States; these lines are subject to DOT jurisdiction. Transmission pipelines include pipelines of similar diameter and operating pressure to the PG&E pipeline crossing Bacon Island. Distribution pipelines are smaller in diameter and operated at a lower pressure than the PG&E pipeline crossing Bacon Island.

During the data collection period, 1,302 reportable incidents (significant leaks) occurred in the nation on natural gas transmission projects similar to the proposed project. The causes of the leaks were identified as follows (totals less than 100% because of rounding):

  – 527 incidents (40%) were related to various construction or operating errors, or to other unspecified causes (e.g., improper welding or maintenance);

  – 368 incidents (28%) were caused by a third party, such as agricultural operations, and 62 of these occurred on pipelines that were unmarked;

  – 300 incidents (23%) were caused by corrosion, and 261 of these were related to uncoated pipelines; and

  – 107 incidents (8%) were caused by natural or geologic forces (8 by subsidence, 4 by flooding, and 3 by channel scour).

Of the 1,302 incidents:

  – 880 (68%) were on projects constructed before the current Minimum Federal Safety Standards (CFR 49 Part 192) were promulgated in 1970 (35 FR 13257), and therefore on pipelines greater than 30 years old.

  – Most leaks were repaired or made safe in less than 1 day:

    C 540 leaks (41%) were repaired or made safe in less than 1 hour;

    C 1,062 leaks (81% inclusive) were repaired or made safe in 3 hours or less; and
    C 36 leaks (less than 3%) took 24 hours or longer to repair or make safe.

  – 35 incidents were reported in California.

From the DOT data presented above, it can be concluded that the transmission pipelines that are least prone to leaks or other accidents are those that have been constructed since 1970 and operated in accordance with minimum federal safety standards, are coated to prevent corrosion, and are well marked. In the Delta region of California, where there is risk of subsidence, flooding, channel scour, and seismic activity, no incidents of pipeline rupture or leak related to natural forces have been reported. In addition, no incidents related to corrosion or outside forces were reported. The only incident reported occurred at an above-ground metering facility where a seal failed on an odorant pump.

IMPACT ASSESSMENT METHODOLOGY FOR THE 2000 REVISED DRAFT EIR/EIS

Analytical Approach and Impact Mechanisms

Impacts on natural gas facilities and service were assessed based on the ways in which construction and operation of the Delta Wetlands Project alternatives would benefit or adversely affect the existing utility infrastructure or service. Effects of the project alternatives on gas transmission lines and facilities on the project islands were determined through correspondence with the affected utility company and other experts. Under the Delta Wetlands Project, Bacon Island, which is now used for agricultural operations, would be used for reservoir storage. The levees around the island would be reinforced and the island would be inundated when water is available for diversion from the Delta. Flooding the island and improving the project levees may affect the conditions under which the existing gas pipeline is operated and maintained.

Criteria for Determining Impact Significance

An alternative is considered to have a significant impact on the gas facilities and services if, when compared to existing conditions, it would:

result in a substantial disruption to existing natural gas service;

increase risk of structural failure of gas facilities and pipelines;

result in a need for substantial alterations to, or increased maintenance of, natural gas facilities; or

result in increased demand for existing emergency services beyond their current capacity.

An alternative is considered to have a beneficial effect if it would improve the existing utility infrastructure when compared to existing conditions.

ENVIRONMENTAL CONSEQUENCES

Flooding of the PG&E easement on Bacon Island under proposed Delta Wetlands Project operations would not increase the risk of structural failure of the operating gas pipeline or cause a physical change in PG&E's ability to supply gas to Bay Area or Sacramento/Stockton market centers. Flooding the island would probably change the manner in which PG&E monitors its pipelines and repairs leaks to the pipeline. These impacts are discussed below; Table 3E-1 provides a comparison between the 1995 EIR/EIS and 2000 REIR/EIS impact conclusions.

Risk of Pipeline Leak or Rupture Resulting from Levee Improvements

The proposed levee buttressing could locally increase the rates of levee settlement or subsidence where the gas pipelines penetrate the Bacon Island exterior levees. Levee settlement or subsidence could increase the shear or bending loads on the pipeline, depending on the location of the pipeline with respect to the compressible levee foundation materials.

Under existing conditions, PG&E is required to maintain these pipelines at levee crossings and to improve or modify the lines in response to ongoing levee repair activities. PG&E designs and installs pipelines in the Delta region with an understanding of internal island subsidence problems (see Chapter 3D for a discussion of subsidence in the central Delta) and of ongoing levee maintenance activities that can increase risks of pipeline failure through differential settlement and line exposure. To monitor the effects of levee settlement on their pipeline, PG&E has installed and maintains tiltmeters on Line 57-B at both the east and west levee crossings of Bacon Island. PG&E commonly practices corrective measures necessary to relieve excessive pipeline stress resulting from levee settlement. The levee improvements proposed by Delta Wetlands are greater than those conducted under ongoing levee maintenance activities. As a result, the need for corrective measures and associated costs may increase during levee construction and settlement when compared to existing pipeline maintenance requirements. The potential for substantial pipeline stress resulting from Delta Wetlands levee improvements is considered a significant impact. The following mitigation measures are recommended.

Mitigation Measure RE-1: Monitor Locations Where Gas Pipelines Cross Bacon Island Levees during and after Levee Construction. During levee strengthening, Delta Wetlands engineers will install equipment to monitor levee settlement and subsidence rates. After levee completion, Delta Wetlands will conduct weekly inspections to check for potential problems at the gas pipeline crossings, including concerns about levee stability, settlement, and subsidence. If the weekly inspection indicates that settlement, erosion, or slumping at the gas pipelines has occurred, Delta Wetlands will notify PG&E and will implement corrective measures to mitigate any decrease in levee stability near the gas lines (see below).

Mitigation Measure RE-2: Implement Corrective Measures to Reduce Risk of Pipeline Failure during Levee Construction. Delta Wetlands shall reimburse PG&E for the incremental increase in maintenance costs associated with installation of new pipeline segments under Bacon Island levees or implementation of other appropriate corrective measures, which would prevent damage to the gas pipeline from increased bending or shear loads at levee crossings during levee construction and settlement.

Risk of Pipeline Leak or Rupture Resulting from Island Inundation

In the long term, the risk of pipeline leak or rupture, which is generally caused by corrosion, ground settlement, or physical damage from ground-disturbing equipment (e.g., farm equipment), would not increase under proposed project operation. The risk of pipeline rupture would decline because implementation of the Delta Wetlands Project would substantially reduce ground-disturbing activities by eliminating agricultural practices such as installation of internal drainage ditches that may cross the pipeline easement on Bacon Island. However, as described in the previous section, risks to the pipeline could increase during Delta Wetlands' construction of levees.

The pipelines across Bacon Island would not require major structural modification for use under the submerged conditions caused by implementation of the proposed project. The operating gas pipeline (Line 57-B) on Bacon Island is concrete coated to prevent it from floating when the land is flooded or when the overlying soils are not strong enough when saturated to overcome pipeline buoyancy. The soils along the easement are already likely to be saturated at the depth of the pipeline because of a high water table.

The currently unused pipeline (Line 57-A) on Bacon Island may need additional weighting before the island is flooded to prevent the line from floating (Grimm pers. comm.). As mentioned previously, Line 57-A has concrete weights or other weighting material, except for approximately 900 feet on the west side of the island where the pipe is concrete coated. PG&E uses concrete saddle weights, drilled chance anchors, and concrete pipe coating to anchor Line 57-A. Under inundated conditions , Line 57-A could float, resulting in unanticipated bending loads that could damage its anticorrosion coating and disrupt the cathodic protection system. Therefore, inundating the island without proper weighting may substantially damage Line 57-A. Although Line 57-A is not used now, PG&E may choose to use it in the future. The need to weight the pipeline is considered a substantial alteration to the existing system. This impact is considered significant and the following mitigation is recommended.

Mitigation Measure RE-3: Securely Anchor Line 57-A before Bacon Island Flooding. Delta Wetlands shall reimburse PG&E for engineering studies, materials, and construction expenses to securely anchor Line 57-A before reservoir operations begin on Bacon Island.

Potential Interference with Pipeline Inspection Procedures

As part of its pipeline operation, inspection, and maintenance procedures required by federal and state regulations (49 CFR 192 and California Public Utilities Commission [CPUC] General Order 112), PG&E conducts annual aerial and walking inspections along the pipeline route to check for small leaks, evidence of internal or external corrosion, or easement encroachment (e.g., new drainage ditches). Valves are also regularly monitored for pressure fluctuations that could be caused by leaks (Grimm pers. comm.). Implementation of the Delta Wetlands Project would not alter PG&E's methods for routine inspection of the pipeline. Walking inspections for minor leaks would have to be scheduled during dry periods, or inspections could be conducted by boat when the island is flooded. To ensure that PG&E has access to the line for annual inspections under wet as well as dry conditions, the following mitigation is recommended.

Mitigation Measure RE-4: Provide Adequate Facilities on Bacon Island for Annual Pipeline Inspection. Delta Wetlands shall provide a suitable ramp and turnaround facilities to launch a boat for regular pipeline inspections, and should provide a suitable staging area for equipment and materials needed for gas pipeline repairs.

PG&E also monitors the pipelines using internal inspection and cathodic protection testing. No valves are located on Bacon Island, and internal inspection ("pigging") could occur regardless of dry or wet conditions. Flooding the island would inundate cathodic protection test stations, rendering them unusable. The cathodic protection test stations would need to be relocated before flooding of Bacon Island. This impact is considered significant and the following mitigation is recommended.

Mitigation Measure RE-5: Relocate Cathodic Protection Test Stations before Bacon Island Flooding. Delta Wetlands shall reimburse PG&E for engineering studies, materials, and construction expenses to relocate cathodic protection test stations to the perimeter levee system, and shall grant PG&E an easement to access the relocated cathodic protection test stations.

Potential Delay in Emergency Repairs and Unscheduled Interruption of Service

As described previously, the risk is very low that a pipeline leak or rupture would occur on Bacon Island, and if a leak or rupture occurred, it is equally likely to occur under dry conditions as under wet (i.e., full or partial-storage) conditions. This conclusion is based on the following considerations:

Pipeline ruptures or leaks on Bacon Island under the proposed project would be caused by internal or external corrosion or levee settlement or subsidence loads. In recent years, no pipeline ruptures in the Delta have been caused by these modes (U.S. Department of Transportation 1999). PG&E more often must respond to leaks caused by farm equipment; emergency repairs in the Delta caused by ground-disturbing equipment generally occur once or twice a year (Warner pers. comm.).

Annual inspections to detect small leaks, monitor corrosion protection, identify potential levee subsidence or settlement problems, and prevent future pipeline ruptures or substantial pipeline leaks in those areas by prescribing immediate repair work will still be conducted in accordance with federal and state regulations.

Based on modeling of water storage operations for the proposed project (see Chapter 3), it is estimated that Bacon Island would be at full storage (filled by the end of December) fewer than 50% of winters, and the reservoir islands would be empty in 437 of the 864 months simulated for the 72-year hydrologic record, or approximately 51% of the time. Therefore, opportunities for repair and replacement of damaged pipeline segments under dry conditions will occur about 50% of the time.

If repairs are needed during flooded conditions on Bacon Island, the Delta Wetlands Project could increase the cost of repair operations, extend the time required by PG&E to make necessary repairs, and possibly increase the duration of service curtailments. The following sections describe the emergency repair procedures and the effects on service under existing conditions and with the Delta Wetlands Project in operation.

Existing Conditions

Emergency Repair Procedures. PG&E is required by the CPUC (CPUC General Order 112(e), which adopts 49 CFR 192) to maintain an emergency-preparedness plan. As described in the hearing testimony, PG&E has a supply of materials and specially trained welders and equipment operators for emergency shallow-water repairs of its pipeline facilities. PG&E's testimony also states that the pipelines crossing Bacon Island are under water most of the time because of shallow groundwater, and that those conditions require special procedures to facilitate repairs.

PG&E stated that it could probably mobilize crews within several weeks under existing (i.e., dry) conditions. The time required for repair cannot be estimated without knowing the conditions that led to the rupture and the extent of the rupture; PG&E would assess both of these factors after excavating and inspecting the damaged portion of the pipeline. To respond to a pipeline failure on Bacon Island under existing conditions, PG&E would:

shut off gas flowing through the line at the nearest valves (on McDonald Island, 2.9 miles east of the east side of Bacon Island, and 5.2 miles west of the west side of Bacon Island) and isolate the pipeline segment;

release gas within the pipeline section that crosses the island at one of the shut-off valves; and

drive equipment to the leak site, excavate the pipeline, dewater the working pit (because of shallow groundwater levels, some dewatering is probably necessary even during the summer), cut out the damaged section, weld a new section in place, and test the pipeline (Warner pers. comm.).

Effects on Service. If Line 57-B were damaged and removed from service, PG&E would curtail deliveries to customers if supplies were not adequate to meet demand. PG&E stated in its testimony that, under existing conditions, it distributes natural gas from three sources: the 400 and 401 lines from Canada, the 300 line from southern California, and local production. Additionally, PG&E stated that these sources of gas currently cannot meet the peak gas demand that occurs during cold weather. Line 57-B connects the McDonald Island storage facility to the distribution system to provide peak capacity and redundancy of supply if one of the other sources is interrupted. If the McDonald Island storage facility were not online during a peak-demand period, PG&E would attempt to balance its system and purchase additional gas to minimize service interruptions; however, PG&E's ability to respond to the situation is limited because the pipelines that connect to the gas sources have limited capacity.

Natural gas, like other utility services, has multiple price schedules based on delivery of the service. A supply that is interruptible is less expensive than a firm supply. If gas service must be curtailed, customers with interruptible supplies would be affected first. Customers with interruptible supplies are usually industrial users that can switch to alternative fuels, such as the electricity-generating facilities in Pittsburg, which can switch to fuel oil when natural gas supplies are curtailed (which occurred during the winter of 1997). Many firm-supply customers may not have an alternative fuel supply. During service interruptions, PG&E would not be able provide alternative service to all customers, and it would be up to customers to meet their individual needs.

Delta Wetlands Project Conditions

Emergency Repair Procedures. Under Delta Wetlands Project conditions, the procedure for pipeline repair described previously would still be used when the reservoir island is not flooded (i.e., during dry periods). PG&E testified that a repair conducted when Bacon Island is partially flooded could be completed using similar techniques as under without-project conditions, except that access to the site may require use of a boat or barge, depending on the depth of stored water relative to the height of existing roads across the island. After accessing the site, PG&E could install sheet piles around the damaged area, dewater a work area, and then complete the pipeline repair as if it were under dry conditions (Clapp testimony). However, because of the logistical problems associated with accessing the site and installing sheet piles around a larger area, PG&E would require additional resources and planning time and would incur greater costs using these techniques under flooded conditions than under dry conditions.

Alternatively, as suggested in the water right hearings, underwater repair methods could be used to repair a damaged pipeline. PG&E stated that it is not currently equipped to service pipelines through water with divers and underwater welding equipment (Warner pers. comm.). However, PG&E staff also testified that the utility has a supply of materials and specially trained welders and equipment operators for emergency

shallow-water repairs of its pipeline facilities (Clapp testimony). Nevertheless, underwater repair methods would be costly and require specialized equipment and do not appear to be a practical alternative at this time.

The final practicable repair option is to shut down the pipeline, empty the reservoir, and use dry-condition repair techniques. If a significant pipeline leak occurred on Bacon Island during water- storage operations and the leak could not be repaired by installing sheet piles and dewatering a work area, the pipeline would probably have to be shut down until the reservoir could be drawn down and conventional dry-conditions construction techniques could be used. According to Delta Wetlands' testimony, drawing the stored water down at the maximum rate assuming a full reservoir would take at least three weeks, assuming that Delta Wetlands' operational rules would allow discharge at the maximum rate. Additional time would be required to allow the land surface to dry before equipment could be operated on the ground surface, possibly substantially increasing the waiting period before the pipeline could be repaired. This repair technique, in addition to using sheet piling, appears to be the most practical repair method available if an emergency occurred during reservoir operations.

Additionally, the 1995 DEIR/EIS suggested that directional drilling, which is used for pipeline repairs at Delta channel crossings, would be a practical repair solution. When a line fails under a Delta channel, PG&E directionally drills under the channel adjacent to the damaged line and pulls a new pipeline segment. The new pipeline segment is welded into the existing line on both sides of the channel, and the damaged line is sealed (usually filled with concrete) and abandoned in place. However, under closer review, this technique is not a practicable solution to repair the line across Bacon Island. To drill entirely under Bacon Island, the entrance and exits of the bore would need to be located on the land on Palm Tract and McDonald Island, greatly increasing the bore length (from about 2 miles to 5 miles).

Although technically possible, the construction of a new line under Bacon Island when the reservoir is full would be costly and time-consuming. It could take months to design the new pipeline segment, mobilize the appropriate equipment, obtain the pipe, and secure the necessary permits and leases from the regulatory agencies. For example, the California State Lands Commission requires that detailed engineering plans be prepared and approved before it will grant a lease to cross state lands (the channels adjacent to the Delta Wetlands islands), and the California State Reclamation Board requires that PG&E receive an encroachment permit from the local reclamation district before construction.

Shorter pipeline segments could be installed using directional-drilling techniques by creating temporary gravel islands within Bacon Island. However, the necessary equipment would be difficult to transport to the site. Barges are typically used to move such equipment, but they would not have access to the island interior. A large crane would be required to lift equipment over the levee, from the adjacent channel to the island interior. The storage level (water depth) at the time of repair could limit the size of equipment that could be used, further slowing the repair process. As with a single directional drill, it could take months to design the new pipeline segment, mobilize the appropriate equipment, obtain the pipe, and secure the necessary permits and leases from the regulatory agencies. This does not appear to be a practicable repair technique on Bacon Island.

PG&E contends that the only suitable solution to potential adverse effects on its pipelines and potential interruption of service would be construction of new pipelines around the proposed project. The pipeline incident data collected by the DOT, however, do not support this conclusion. Pipelines very rarely fail catastrophically without external forces or third-party actions. Flooding Bacon Island and discontinuing the current agricultural activities would all but eliminate any potential third-party action that could damage the pipeline. Internal inspection, required by federal and state regulations, detects corrosion or abnormalities in the pipeline walls in advance of potential failure. Furthermore, it is a common industry practice to allow

small leaks to go unremedied for months while engineering studies are completed and specialized equipment and personnel are mobilized.

In summary, conducting a repair while the reservoir is inundated or drawing the reservoir down before conducting a dry-land repair would take longer and cost more during Delta Wetlands reservoir operations when compared to existing conditions. Without knowing the specifics of the pipeline rupture, it is difficult to determine the magnitude of the effect on PG&E's repair time and associated costs of the additional time needed to plan for a shallow-water repair or the time required to draw down the reservoir.

Effects on Service. Inundation of the island under Delta Wetlands Project operations could slow PG&E's response time to repair a pipeline leak and could interrupt service for a longer period than would occur under existing conditions. As described above, a severe leak or pipeline rupture would take longer to repair under flooded reservoir conditions than the existing dry conditions. This delay in repairs could result in longer periods of using alternative gas sources.

Impact Conclusion for Potential Delay in Emergency Repair

As evidenced by the Office of Pipeline Safety data, the long-term risk of catastrophic pipeline failure is very low under existing conditions, and implementation of the project would further reduce the risk to the pipeline from potentially damaging third-party activities. Flooding of Bacon Island could delay and complicate repairs to PG&E's pipeline facilities if a rupture occurred during water-storage operations. Flooding the island would also increase the cost of such repairs. If a repair required an immediate drawdown of the reservoir, it is simulated that all the water could be removed within three weeks (under full-reservoir storage) while appropriate engineering studies are being completed and before repair equipment and personnel could be mobilized. The three-week drawdown estimate assumes that Delta Wetlands discharges from Bacon Island would not be restricted by water quality mitigation measures or other operational constraints. The potential impact on PG&E's operations is an economic one. The incremental costs to PG&E (e.g., lost revenue and purchase cost of alternative supplies) and its customers resulting from an extended time required to repair the pipeline under project conditions cannot be determined but are recognized as a potential economic effect of the Delta Wetlands Project. Because economic effects are not considered environmental impacts under CEQA and NEPA, no significance conclusion is made and no mitigation is identified (see also Chapter 3K, "Economic Conditions and Effects").

Cumulative Impacts

Implementing the Delta Wetlands Project would not contribute significantly to cumulative risk of gas pipeline failure in the Delta. Activities in the Delta that could affect gas pipelines include agricultural activities and levee strengthening or maintenance. Because the Delta Wetlands Project would substantially reduce ground-disturbing activities, it would reduce the cumulative risk to pipelines from third-party activities (e.g., farming). PG&E monitors some levee crossings, including the Bacon Island and McDonald Island levee crossings, using monthly inspections of installed tilt meters at the levee crossings (Clapp testimony). Cumulative risks to gas pipelines at levee crossings in the Delta are considered less than significant because PG&E applies monitoring procedures and implements pipeline improvements in response to levee maintenance or settlement on an ongoing basis. Therefore, the cumulative effect on gas pipelines in the Delta is considered less than significant and no mitigation is required.

Impact Evaluation of Project Alternatives from the 1995 Draft EIR/EIS

As described in Chapter 2, Bacon Island would be used for water storage under all three project alternatives. Consequently, effects on PG&E's gas pipeline would be the same under all alternatives. The impacts and mitigation measures described above apply to the proposed project (Alternatives 1 and 2) and also to Alternative 3.

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Table 3E-1. Comparison between Delta Wetlands Project Impacts on Natural Gas Facilities in the 1995 Draft EIR/EIS and in the 2000 Revised Draft EIR/EIS

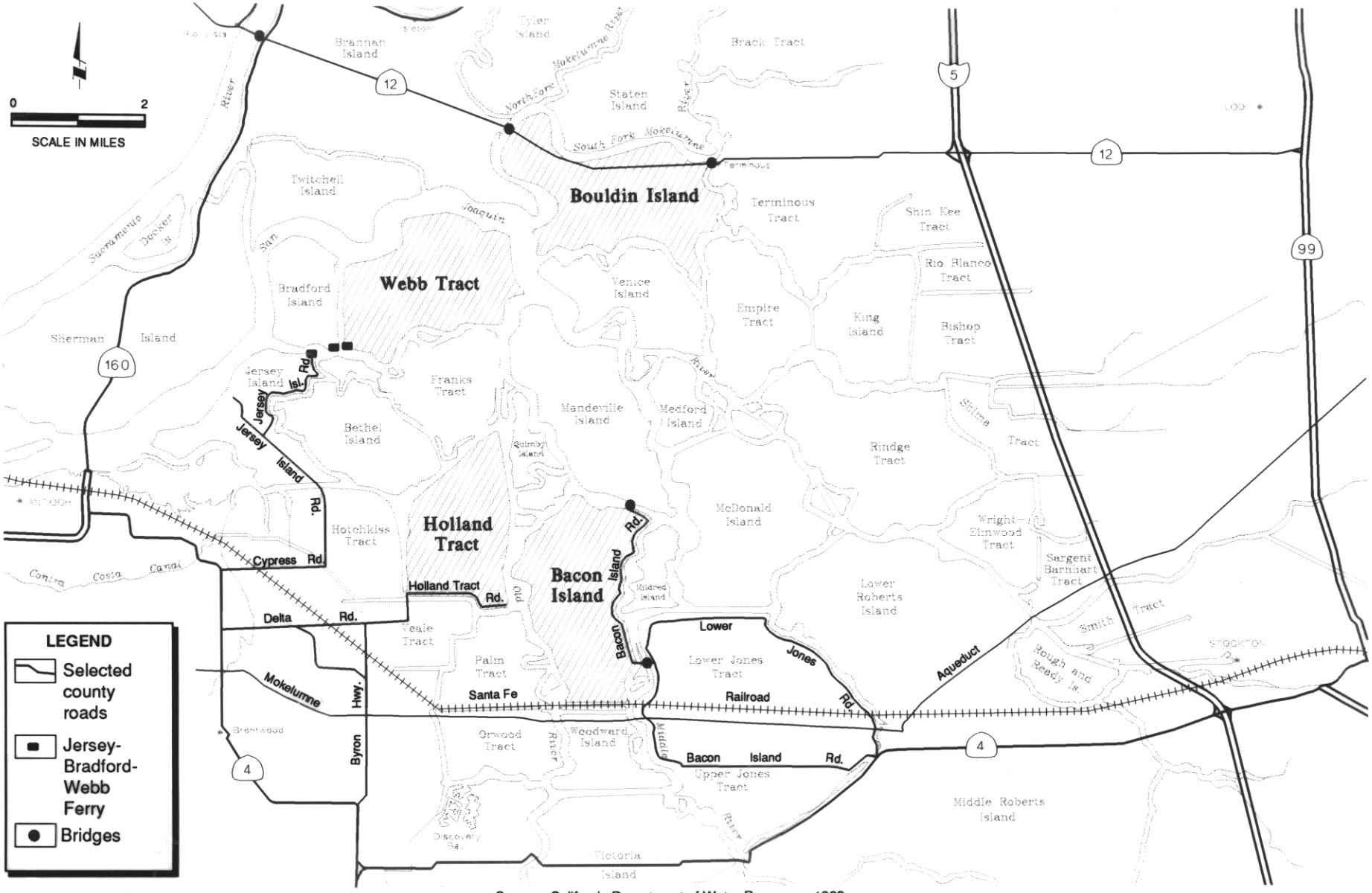
Impacts and Mitigation Measures of 1995 DEIR/EIS Alternatives 1 and 2	Differences between 1995 DEIR/EIS and 2000 REIR/EIS
Impact E-3: Increase in the Risk to Gas Lines Crossing Exterior Levees on Bacon Island (LTS) C No mitigation is required.	**Risk of Pipeline Leak or Rupture Resulting from Levee Improvements.** Potential settlement issues or increased loads on the pipelines at the levee crossings may require corrective measures during levee construction and settlement. This impact is considered significant and the following mitigation measures are recommended. (S) 1. Monitor Locations Where Gas Pipelines Cross Bacon Island Levees during and after Levee Construction and • Implement Corrective Measures to Reduce Risk of Pipeline Failure during Levee Construction. (LTS)
----	**Risk of Pipeline Leak or Rupture Resulting from Island Inundation.** The risk of pipeline rupture would decline under project conditions because the project would substantially reduce ground-disturbing activities, such as agricultural practices, that could result in line rupture. This effect is considered beneficial. However, Line 57-A may require additional weighting before the island is flooded. The line could float under inundated conditions, resulting in increased risk of damage to this pipeline and the need for pipeline modifications. Therefore, this impact is considered significant and the following mitigation measure is recommended. (S) • Securely Anchor Line 57-A before Bacon Island Flooding. (LTS)

Note: S = Significant; SU = Significant and unavoidable; LTS = Less than significant; B = Beneficial.

Table 3E-1. Continued

Impacts and Mitigation Measures of 1995 DEIR/EIS Alternatives 1 and 2	Differences between 1995 DEIR/EIS and 2000 REIR/EIS
----	**Potential Interference with Pipeline Inspection Procedures.** To the extent practical, walking inspections would be completed during dry periods; however, PG&E would need to modify its inspection practices during inundated conditions by using a boat rather than a walking inspection. According to PG&E, this represents a substantial alteration in PG&E's maintenance procedures. Additionally, flooding Bacon Island would inundate cathodic protection test stations. This impact is considered significant and the following mitigation measures (described in the text) are recommended to assist PG&E in conducting its routine maintenance and reduce the impact to a less-than-significant level. (S) • Provide Adequate Facilities on Bacon Island for Annual Pipeline Inspection. • Relocate Cathodic Protection Test Stations before Bacon Island Flooding. (LTS)
Impact E-4: Increase in PG&E Response Time to Repair a Gas Line Failure on Bacon Island (LTS) C No mitigation is required.	**Potential for Delay in Emergency Repairs and Unscheduled Interruption of Service.** Project operations would not preclude routine inspections and emergency repairs. However, reservoir operations on Bacon Island would delay and complicate the repairs of PG&E's pipeline facilities that would be needed if a rupture occurred during water-storage operations. Flooding the island would also increase the cost of such repairs. The potential impact on PG&E's operations is an economic one. The incremental costs, if any, to PG&E and its customers resulting from an extension of time required to repair the pipeline under project conditions are recognized as a potential economic effect of the Delta Wetlands Project. Because economic effects are not considered environmental impacts under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), no significance conclusion is made and no mitigation is identified (see also Chapter 3K, "Economic Conditions and Effects" in the 1995 DEIR/EIS).

Note: S = Significant; SU = Significant and unavoidable; LTS = Less than significant; B = Beneficial.



Source: California Department of Water Resources 1993.

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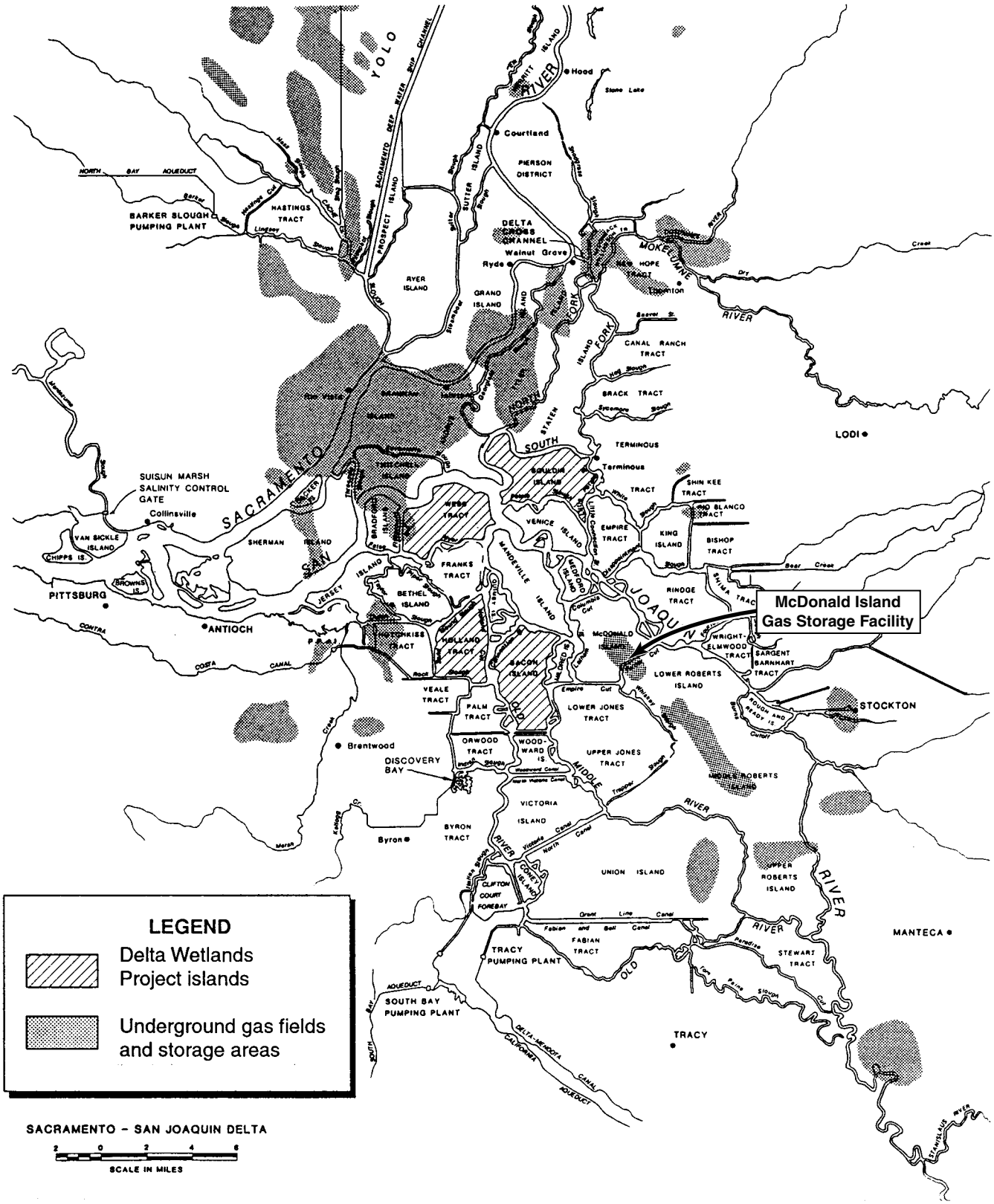
Figure 3E-1
Transportation and Water Conveyance Infrastructure in the Delta Wetlands Project Vicinity



Source: DWR 1993.

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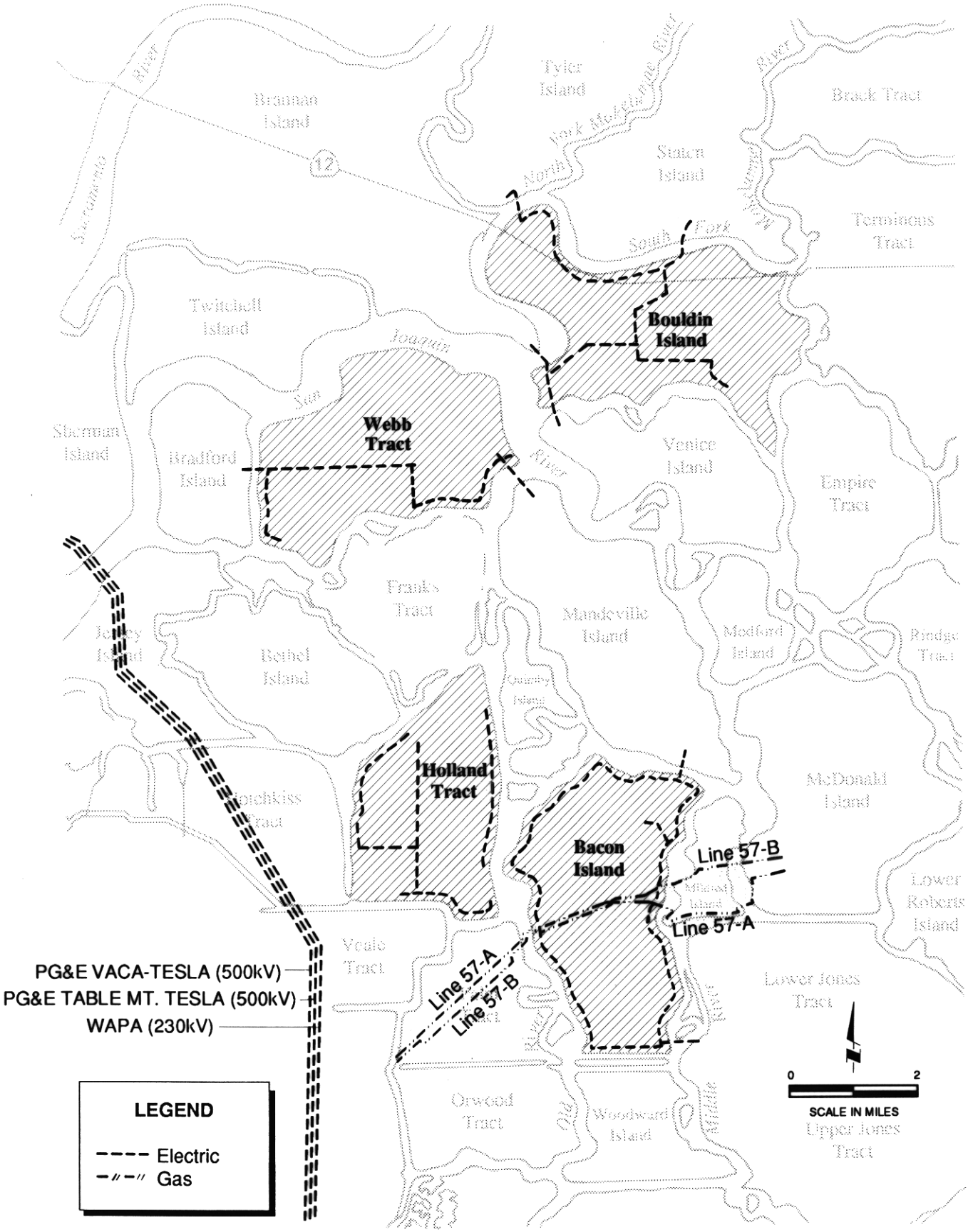
Figure 3E-2
Underground Gas Fields and Storage Areas in the Delta Wetlands Project Vicinity



Source: Bennett and Forkel pers. comms.

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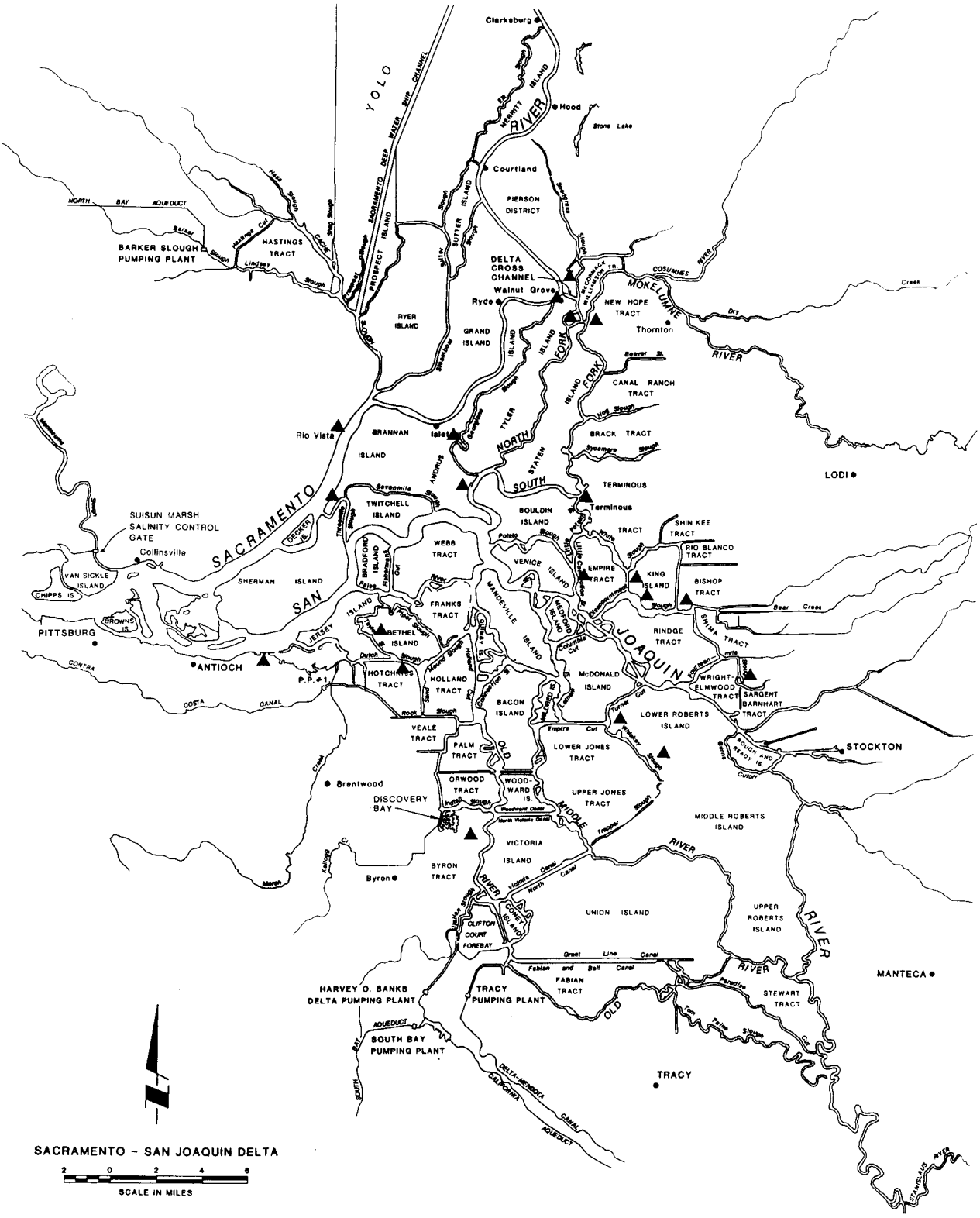
Figure 3E-3
Gas and Electric Transmission and Distribution Lines in the Delta Wetlands Project Vicinity



Source: San Francisco Estuary Project 1995.

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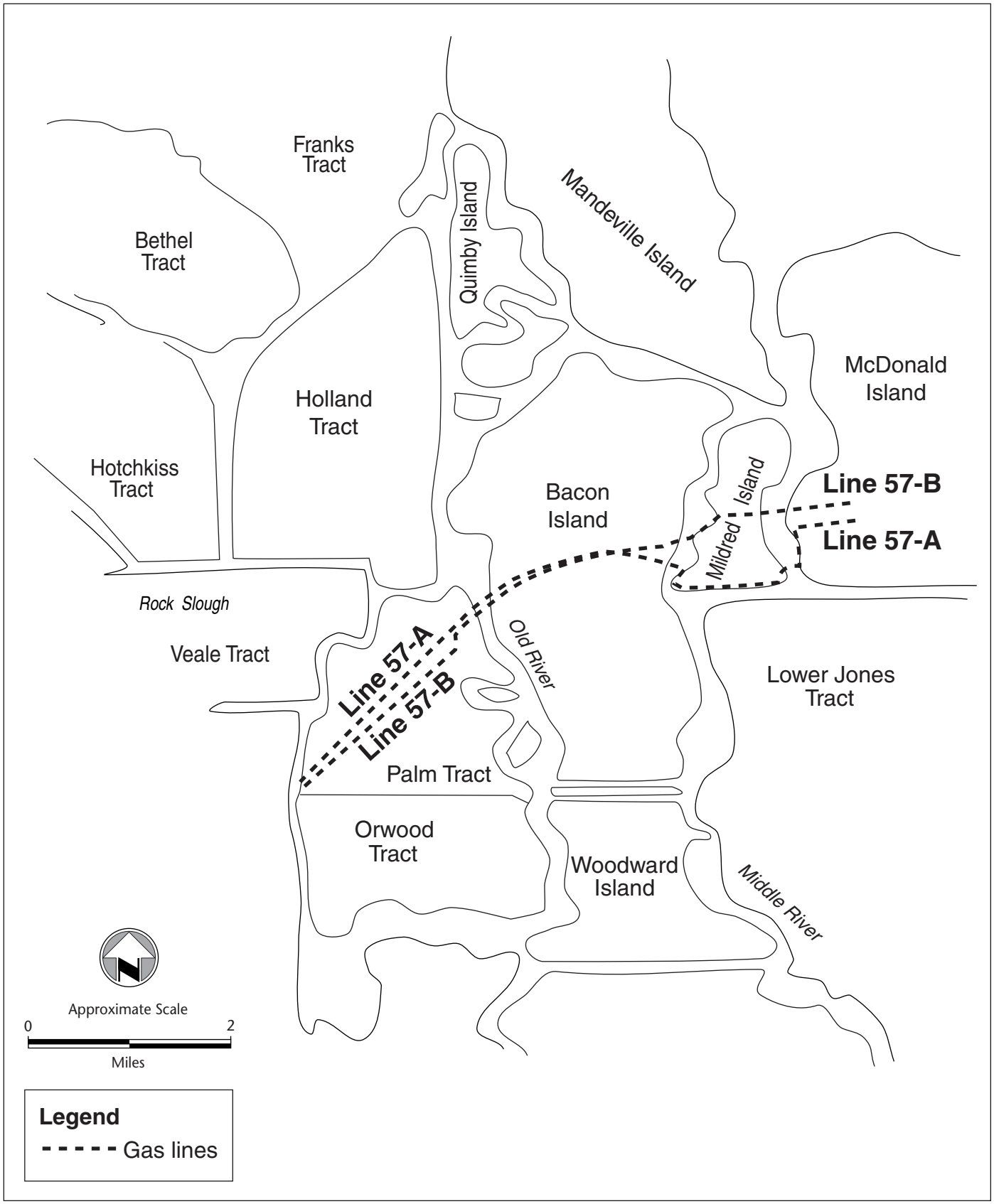
Figure 3E-4
Pumpout Stations in the Delta Wetlands Project Vicinity



Source: Bennett pers. comm., Forkel pers. comm.

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Figure 3E-5
Gas Transmission Lines on Bacon Island