# APPENDIX G

## DELTA LEVEES AND CHANNELS COST ESTIMATES

## DELTA LEVEE SYSTEM INTEGRITY PROGRAM

CALFED
Bay-Delta Program

DRAFT
October, 1997

# DELTA LEVEE AND CHANNELS COST ESTIMATES

**Foreword:**

The following cost estimates only include costs for the various components of the Delta Levee Base Level Protection Plan. Costs associated with other Elements of the Delta Levee System Integrity Program are not yet available.

These cost estimates are for the earthwork only. They do not include all other associated costs such as lands, easements, rights of way, relocations, etc.

These estimates are preliminary and are being developed and evaluated at a programmatic level. More focused analysis and detailed estimates will occur in subsequent refinement efforts. These estimates are provided in ranges because they are very rough at this stage.

## Introduction

Cost estimates shown on Table G-1 only include costs for the following components of the Delta Levee Base Level Protection Plan:

- Delta Levee Base Level Protection Plan without Ecosystem Restoration Actions
- Ecosystem Restoration Actions Only for the various Delta Conveyance Alternatives
- Delta Levee Base Level Protection Plan implemented in concert with the various Delta Conveyance Alternatives, with Ecosystem Restoration Actions

These cost estimates are for the earthwork needed to reconstruct all Project and non-Project levees in the legal Delta up to the PL 84-99 standard. At this point, they do not include all other associated costs such as lands, easements, rights of way, relocations, etc. These costs need to be estimated and included.

Costs associated with other Elements of the Delta Levee System Integrity Program are not yet available. These costs include:

- Special Improvement Project Costs
- Subsidence Control Costs
- Emergency Management Costs
- Costs for Continuing Investigation and Monitoring of Seismic Risk

## Assumptions:

- Quantities are based on a "typical" levee section for non-project levees and proposed levee improvement cross sections.

- The ERPP restoration actions and the Delta conveyance actions are not additive to the levee common program quantities. The ERPP actions replace proposed "Base Level Protection Plan" levee improvements and are to be included in the ERPP Program cost. The Delta conveyance improvements are also in lieu of proposed "Base Level Protection Plan" levee improvements and are to be included in the Water Use Efficiency Program costs.

- Levees that already meet federal flood control criteria, such as those on Holland Tract and Sargent Barnhart Tract, are assumed to not require significant improvements. Federal Flood Control Project Levees, such as Sacramento River Levees are also assumed to not require significant improvements unless identified in the USACE's 1993 report, Sacramento River Flood Control Project Systems Evaluation -Lower Sacramento.

## COST ESTIMATES for DELTA LEVEE IMPROVEMENTS

| | Low (Millions $) | High (Millions $) |
|---|---|---|
| Base Level Delta Levee Improvements Only | 1,740 | 2,240 |
| ERPP Actions Alternatives 1& 2 (Only) | 425 | 485 |
| ERPP Actions Alternative 3 w/5000 cfs I.F. (Only) | 485 | 550 |
| ERPP Actions Alternative 3 w/15000 cfs I.F. (Only) | 730 | 795 |
| Alternatives 1A, 1B, 1C W/Base Level Improvements | 1,890 | 2,360 |
| Alternatives 2A, 2B W/Base Level Improvements | 1,775 | 2,220 |
| Alternative 2D, 2E W/Base Level Improvements | 1,690 | 2,120 |
| Alternatives 3A, 3B, 3E W/Base Level Improvements | 1,820 | 2,280 |
| Alternatives 3H W/Base Level Improvements | 1,650 | 2,070 |
| Alternative 3I W/Base Level Improvements | 1,860 | 2,325 |

**Cost Summarization for Delta Levee Improvements With Habitat Benefits for Alternatives 1 and 2**

| Island Name | Proposed Improvement | Type | Location (levee mile) | Miles | Habitat Acres | Cost in Millions |
|---|---|---|---|---|---|---|
| Pierson RD 551 | 4 miles of Snodgrass setback | N | Lambert Rd south | 4 | 12 | 22M - 24M |
| New Hope RD 348 | S. Fk Mokelumne levee imp | L | l.m. 7.72 - 4.54 | 3.18 | 15.9 | 17.5M- 20.7M |
| New Hope RD 348 | Beaver Sl levee setback | N | l.m. 4.54 - 3 | 1.54 | 4.62 | 8.5 M- 9.25M |
| Canal Ranch RD2086 | S. Fk Mokelumne levee imp | L | l.m. 2.25 - 4.60 | 2.35 | 11.75 | 12.9M- 15.3M |
| Canal Ranch RD2086 | Hog Slough levee setback | N | l.m. 4.60 - 7.48 | 2.88 | 8.64 | 15.8M- 17.3M |
| Brack RD 2033 | S. Fk Mokelumne levee imp | L | l.m. 1.3-0.00&0.00-1 | 2.3 | 11.5 | 12.7M- 15M |
| Brack RD 2033 | Sycamore Sl levee setback | N | l.m. 1 - 6.62 | 6.62 | 19.86 | 30.9M- 33.7M |
| Staten RD 38 | Isl tip cut-off SE corner 0.8m | L | straight line lm 10-13 | 0.8 | 4 | 4.4M - 5.2M |
| Tyler RD 563 | Georgiana Sl levee setback | N | l.m. 8 - 6 | 2 | 6 | 11M - 12M |
| Tyler RD 563 | Georgiana Sl tip cut-off 0.4m | L | straight line lm 10-8.5 | 0.4 | 2 | 2.2M - 2.6M |
| Sherman RD 341 | San Joaquin R levee setback | N | l.m. 5.5 - 0 | 5.5 | 16.5 | 30.2M - 33M |
| Twitchell RD 1601 | Three Mile Sl wave wall prot | G | l.m. 0 - 2.47 | 2.47 | 0 | 16.5M |
| Twitchell RD 1601 | San Joaquin R levee setback | N | l.m. 7 - 8.5&9.5-11.9 | 3.9 | 11.7 | 21.4M- 23.4M |
| Twitchell RD 1601 | Isl tip cut-off on San Joaq R | L | straight lne lm 8.5-9.5 | 0.4 | 2 | 2.2M - 2.6M |
| Bradford RD 2059 | San Joaquin R levee setback | N | l.m 5.82 - 2.10 | 3.72 | 11.16 | 20.5M -22.3M |
| Little Franks Tract | Piper Slough levee imprmnt | L | south levee by Bethel | 1 | 5 | 5.5M - 6M |
| Webb RD 2026 | San Joaquin R levee setback | N | l.m. 10 - 6.8 | 3.2 | 9.6 | 17.6M -19.2M |
| Venice RD 2023 | Isl tip cut-off on San Joaq R | L | straight lne lm 7.5-9.3 | 0.8 | 4 | 4.4M - 5.2M |
| Venice RD 2023 | Isl tip cut-off on San Joaq R | L | straight lm11.5-12.3 | 0.7 | 3.5 | 3.8M - 4.6M |
| Medford RD 2041 | Middle River levee impr | L | l.m. 1.74 - 0.7 | 1.04 | 5.2 | 5.7M - 6.8M |
| Middle Roberts 524 | San Joaquin R levee impr | L | l.m. 1.5 - 6.26 | 4.76 | 23.8 | 26.2M - 31M |
| Upper Roberts 544 | San Joaquin R levee impr | L | l.m. 0 - 6.11 | 6.11 | 30.55 | 33.6M -39.7M |
| Stewart RD 2062 | San Joaquin R levee impr | L | l.m. 0 (unit 1) -2.65 | 2.65 | 13.25 | 14.6M -17.2M |
| Mossdale 2 RD2107 | San Joaquin R levee impr | L | l.m. 0 (unit 1) -2.37 | 2.37 | 11.85 | 13M - 15.4M |
| Paradise RD 2095 | San Joaquin R levee impr | L | l.m 0 (unit 2) - 3 | 3 | 15 | 16.5M -19.5M |
| Kasson RD 2085 | San Joaquin R levee impr | L | l.m 0.5 (unit 1) - 5.20 | 4.7 | 23.5 | 25.9M -30.6M |
| River Junct RD2064 | San Joaquin R levee impr | L | l.m. 0 (unit 1) - 5.53 | 5.53 | 27.65 | 30.4M -35.9M |
| | | | **Totals =** | **77.92** | **310.5** | **$426M - $484M** |

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**Cost Summarization for Delta Levee Improvements With Habitat Benefits for Alternatives 3 With 5,000 CFS Isolated Facility**

| Island Name | Proposed Improvement | Type | Location (levee mile) | Miles | Habitat Acres | Cost in Millions |
|---|---|---|---|---|---|---|
| Pierson RD 551 | 4 miles of Snodgrass setback | N | Lambert Rd south | 4 | 12 | 22M - 24M |
| New Hope RD 348 | S. Fk Mokelumne levee imp | L | l.m. 7.72 - 4.54 | 3.18 | 15.9 | 17.5M- 20.7M |
| New Hope RD 348 | Beaver Sl levee setback | N | l.m. 4.54 - 3 | 1.54 | 4.62 | 8.5 M- 9.25M |
| Canal Ranch RD2086 | S. Fk Mokelumne levee imp | L | l.m. 2.25 - 4.60 | 2.35 | 11.75 | 12.9M- 15.3M |
| Canal Ranch RD2086 | Hog Slough levee setback | N | l.m. 4.60 - 7.48 | 2.88 | 8.64 | 15.8M- 17.3M |
| Brack RD 2033 | S. Fk Mokelumne levee imp | L | l.m. 1.3-0.00&0.00-1 | 2.3 | 11.5 | 12.7M- 15M |
| Brack RD 2033 | Sycamore Sl levee setback | N | l.m. 1 - 6.62 | 6.62 | 19.86 | 30.9M- 33.7M |
| Staten RD 38 | Isl tip cut-off SE corner 0.8m | L | straight line lm 10-13 | 0.8 | 4 | 4.4M - 5.2M |
| Tyler RD 563 | Georgiana Sl levee setback | N | l.m. 8 - 6 | 2 | 6 | 11M - 12M |
| Tyler RD 563 | Georgiana Sl tip cut-off 0.4m | L | straight line lm 10-8.5 | 0.4 | 2 | 2.2M - 2.6M |
| Sherman RD 341 | San Joaquin R levee setback | N | l.m. 5.5 - 0 | 5.5 | 16.5 | 30.2M - 33M |
| Twitchell RD 1601 | Three Mile Sl wave wall prot | G | l.m. 0 - 2.47 | 2.47 | 0 | 16.5M |
| Twitchell RD 1601 | San Joaquin R levee setback | N | l.m. 7 - 8.5&9.5-11.9 | 3.9 | 11.7 | 21.4M- 23.4M |
| Twitchell RD 1601 | Isl tip cut-off on San Joaq R | L | straight lne lm 8.5-9.5 | 0.4 | 2 | 2.2M - 2.6M |
| Bradford RD 2059 | San Joaquin R levee setback | N | l.m 5.82 - 2.10 | 3.72 | 11.16 | 20.5M -22.3M |
| Little Franks Tract | Piper Slough levee imprmnt | L | south levee by Bethel | 1 | 5 | 5.5M - 6M |
| Webb RD 2026 | San Joaquin R levee setback | N | l.m. 10 - 6.8 | 3.2 | 9.6 | 17.6M -19.2M |
| Venice RD 2023 | Isl tip cut-off on San Joaq R | L | straight lne lm 7.5-9.3 | 0.8 | 4 | 4.4M - 5.2M |
| Venice RD 2023 | Isl tip cut-off on San Joaq R | L | straight lm11.5-12.3 | 0.7 | 3.5 | 3.8M - 4.6M |
| Medford RD 2041 | Middle River levee impr | L | l.m. 1.74 - 0.7 | 1.04 | 5.2 | 5.7M - 6.8M |
| Middle Roberts 524 | San Joaquin R levee impr | L | l.m. 1.5 - 6.26 | 4.76 | 23.8 | 26.2M - 31M |
| Upper Roberts 544 | San Joaquin R levee impr | L | l.m. 0 - 6.11 | 6.11 | 30.55 | 33.6M -39.7M |
| Stewart RD 2062 | San Joaquin R levee impr | L | l.m. 0 (unit 1) -2.65 | 2.65 | 13.25 | 14.6M -17.2M |
| Mossdale 2 RD2107 | San Joaquin R levee impr | L | l.m. 0 (unit 1) -2.37 | 2.37 | 11.85 | 13M - 15.4M |
| Paradise RD 2095 | San Joaquin R levee impr | L | l.m 0 (unit 2) - 3 | 3 | 15 | 16.5M -19.5M |
| Kasson RD 2085 | San Joaquin R levee impr | L | l.m 0.5 (unit 1) - 5.20 | 4.7 | 23.5 | 25.9M -30.6M |
| River Junct RD2064 | San Joaquin R levee impr | L | l.m. 0 (unit 1) - 5.53 | 5.53 | 27.65 | 30.4M -35.9M |
| | | | | | | |
| Mandeville RD 2027 | Old River levee impr | N | l.m. 7 - 11 | 4 | 12 | 22M - 24M |
| Holland RD 2025 | Sand Mound Sl levee impr | N | l.m. 6 - 5 | 1 | 3 | 5.5M - 6M |
| Bacon RD 2028 | Old River levee impr | N | l.m. 10 - 8 | 2 | 6 | 11M - 12M |
| McDonald RD 2030 | Middle River levee impr | N | l.m. 10 - 8 | 2 | 6 | 11M - 12M |
| Empire RD 2029 | Little Connection Sl levee | L | l.m. 6.5 - 7.5 | 1 | 5 | 5.5M - 6.5M |
| Rindge RD 2037 | San Joaquin R levee impr | N | l.m. 5 - 7 | 2 | 6 | 11M - 12M |
| | | | **Totals =** | **89.92** | **348.5** | **$492M - $556.5M** |

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**Cost Summarization for Delta Levee Improvements With Habitat Benefits for Alternatives 3 With 15,000 CFS Isolated Facility**

| Island Name | Proposed Improvement | Type | Location (levee mile) | Miles | Acres | Habitat Cost in Millions |
|---|---|---|---|---|---|---|
| Pierson RD 551 | 4 miles of Snodgrass setback | N | Lambert Rd south | 4 | 12 | 22M - 24M |
| New Hope RD 348 | S. Fk Mokelumne levee imp | L | l.m. 7.72 - 4.54 | 3.18 | 15.9 | 17.5M- 20.7M |
| New Hope RD 348 | Beaver Sl levee setback | N | l.m. 4.54 - 3 | 1.54 | 4.62 | 8.5 M- 9.25M |
| Canal Ranch RD2086 | S. Fk Mokelumne levee imp | L | l.m. 2.25 - 4.60 | 2.35 | 11.75 | 12.9M- 15.3M |
| Canal Ranch RD2086 | Hog Slough levee setback | N | l.m. 4.60 - 7.48 | 2.88 | 8.64 | 15.8M- 17.3M |
| Brack RD 2033 | S. Fk Mokelumne levee imp | L | l.m. 1.3-0.00&0.00-1 | 2.3 | 11.5 | 12.7M- 15M |
| Brack RD 2033 | Sycamore Sl levee setback | N | l.m. 1 - 6.62 | 6.62 | 19.86 | 30.9M- 33.7M |
| Staten RD 38 | Isl tip cut-off SE corner 0.8m | L | straight line lm 10-13 | 0.8 | 4 | 4.4M - 5.2M |
| Tyler RD 563 | Georgiana Sl levee setback | N | l.m. 8 - 6 | 2 | 6 | 11M - 12M |
| Tyler RD 563 | Georgiana Sl tip cut-off 0.4m | L | straight line lm 10-8.5 | 0.4 | 2 | 2.2M - 2.6M |
| Sherman RD 341 | San Joaquin R levee setback | N | l.m. 5.5 - 0 | 5.5 | 16.5 | 30.2M - 33M |
| Twitchell RD 1601 | Three Mile Sl wave wall prot | G | l.m. 0 - 2.47 | 2.47 | 0 | 16.5M |
| Twitchell RD 1601 | San Joaquin R levee setback | N | l.m. 7 - 8.5&9.5-11.9 | 3.9 | 11.7 | 21.4M- 23.4M |
| Twitchell RD 1601 | Isl tip cut-off on San Joaq R | L | straight lne lm 8.5-9.5 | 0.4 | 2 | 2.2M - 2.6M |
| Bradford RD 2059 | San Joaquin R levee setback | N | l.m 5.82 - 2.10 | 3.72 | 11.16 | 20.5M -22.3M |
| Little Franks Tract | Piper Slough levee imprmnt | L | south levee by Bethel | 1 | 5 | 5.5M - 6M |
| Webb RD 2026 | San Joaquin R levee setback | N | l.m. 10 - 6.8 | 3.2 | 9.6 | 17.6M -19.2M |
| Venice RD 2023 | Isl tip cut-off on San Joaq R | L | straight lne lm 7.5-9.3 | 0.8 | 4 | 4.4M - 5.2M |
| Venice RD 2023 | Isl tip cut-off on San Joaq R | L | straight lm11.5-12.3 | 0.7 | 3.5 | 3.8M - 4.6M |
| Medford RD 2041 | Middle River levee impr | L | l.m. 1.74 - 0.7 | 1.04 | 5.2 | 5.7M - 6.8M |
| Middle Roberts 524 | San Joaquin R levee impr | L | l.m. 1.5 - 6.26 | 4.76 | 23.8 | 26.2M - 31M |
| Upper Roberts 544 | San Joaquin R levee impr | L | l.m. 0 - 6.11 | 6.11 | 30.55 | 33.6M -39.7M |
| Stewart RD 2062 | San Joaquin R levee impr | L | l.m. 0 (unit 1) -2.65 | 2.65 | 13.25 | 14.6M -17.2M |
| Mossdale 2 RD2107 | San Joaquin R levee impr | L | l.m. 0 (unit 1) -2.37 | 2.37 | 11.85 | 13M - 15.4M |
| Paradise RD 2095 | San Joaquin R levee impr | L | l.m 0 (unit 2) - 3 | 3 | 15 | 16.5M -19.5M |
| Kasson RD 2085 | San Joaquin R levee impr | L | l.m 0.5 (unit 1) - 5.20 | 4.7 | 23.5 | 25.9M -30.6M |
| River Junct RD2064 | San Joaquin R levee impr | L | l.m. 0 (unit 1) - 5.53 | 5.53 | 27.65 | 30.4M -35.9M |
| | | | | | | |
| Mandeville RD 2027 | Old River levee impr | N | l.m. 7 - 11 | 4 | 12 | 22M - 24M |
| Holland RD 2025 | Sand Mound Sl levee impr | N | l.m. 6 - 5 | 1 | 3 | 5.5M - 6M |
| Bacon RD 2028 | Old River levee impr | N | l.m. 10 - 8 | 2 | 6 | 11M - 12M |
| McDonald RD 2030 | Middle River levee impr | N | l.m. 10 - 8 | 2 | 6 | 11M - 12M |
| Empire RD 2029 | Little Connection Sl levee | L | l.m. 6.5 - 7.5 | 1 | 5 | 5.5M - 6.5M |
| Rindge RD 2037 | San Joaquin R levee impr | N | l.m. 5 - 7 | 2 | 6 | 11M - 12M |

| | | | | | | |
|---|---|---|---|---|---|---|
| Palm RD 2036 | Old River levee impr | N | l.m. 4 - 5 | 1 | 3 | 5.5M - 6M |
| Orwood RD 2024 | Old River levee impr | N | l.m. 0.5 - 1.5 | 1 | 3 | 5.5M - 6M |
| Lower Jones RD2038 | Middle River levee impr | N | l.m. 1 - 0 | 1 | 3 | 5.5M - 6M |
| Upper Jones RD2039 | Middle River levee impr | N | l.m. 0 - 1 | 1 | 3 | 5.5M - 6M |
| Victoria RD 2040 | Old River levee impr | N | l.m. 7 - 9 | 2 | 6 | 11M - 12M |
| Paradise RD 2095 | Tom Paine Sl levee impr | O | none | 6.5 | 26 | 32.5M |
| Pescadero RD 2058 | Tom Paine Sl levee impr | O | none | 6.5 | 26 | 32.5M |
| Stewart RD 2062 | Paradise Cut levee impr | O | l.m. 0 - 4.03 | 4.03 | 16.12 | 20.2M |
| Stewart RD 2062 | Old River levee impr | O | l.m. 5.63 (unit 3) -1.5 | 4.13 | 16.5 | 20.6M |
| Upper RobertsRD544 | Middle River levee impr | O | l.m. 1.14 - 14.2 | 13.06 | 52.2 | 65.3M |
| MiddleRobertsRD524 | Middle River levee impr | O | none | 3.5 | 14 | 17.5M |
| Drexler | Middle River levee impr | O | none | 4 | 16 | 20M |
| | | | **Totals =** | **137.6** | **533.3** | **$723M - $801M** |

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D-031689

# Draft Estimate of Levee Miles and Cost of Levee Earthwork for CALFED Alternatives 1, 2, and 3

| Island/Reclamation District | Levee Miles | Less Project | Corps Estimate Project Levee Sacto System Fix (millions) 1 | Less Local/Other | Current Design Level | Common Program Improvements (same for all alternatives) 2 | | ERPP Modifications Alternatives 1&2 | | ERPP Modifications Alt 3 with 5,000 cfs | | ERPP Modifications Alt 3 with 15,000 cfs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Low | High | Low | High | Low | High | Low | High |
| Andrus, Upper; RD 556 | 11.7 | 11.2 | 0 | 0 | | 1.35 | 1.75 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bacon; RD 2028 | 14.3 | 0 | | 0 | HMP | 38.6 | 50 | 0 | 0 | 5.5 | 6 | 5.5 | 6 |
| Bear Creek | 2.5 | 2.5 | | 0 | | | | | | | | | |
| Bethany | 5.2 | 0 | | 5.2 | unknown | | | | | | | | |
| Bethel Island MID | 11.5 | 0 | | 0 | none | 31 | 40.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bishop; RD 2042 | 7.8 | 0 | | 0 | HMP/FEMA100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bishop East | 0.6 | 0 | | 0.6 | unknown | | | | | | | | |
| Bixler; RD 2121 | 6.2 | 0 | | 0 | unknown | | | | | | | | |
| Boggs Dist; RD 404 | 5.3 | 4.1 | | 0 | HMP | 3.2 | 4.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Borrow Pond Area | 2 | 0 | | 2 | unknown | | | | | | | | |
| Bouldin; RD 756 | 18 | 0 | | 0 | none | 48.6 | 63 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brack; RD 2033 | 10.8 | 0 | | 0 | none | 29.2 | 37.8 | 43.6 | 48.7 | 43.6 | 48.7 | 43.6 | 48.7 |
| Bradford; RD 2059 | 7.4 | 0 | | 0 | none | 20 | 25.9 | 20.5 | 22.3 | 20.5 | 22.3 | 20.5 | 22.3 |
| Brannan-Andrus RDs 2067/317/407 | 29.4 | 19.3 | 22.5 | 0 | HMP | 49.8 | 57.9 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byron; RD 800 | 19.3 | 0 | | 9.6 | HMP/PL-99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cache Haas; RD 2098 | 11.6 | 11.6 | 10.8 | 0 | Project | 10.8 | 10.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Canal Ranch; RD 2086 | 9.6 | 0 | | 0 | none | 25.9 | 33.6 | 28.7 | 32.6 | 28.7 | 32.6 | 28.7 | 32.6 |
| Chipps Island | 2.6 | 0 | | 2.6 | unknown | | | | | | | | |
| Clifton Court | 9.2 | 0 | | 9.2 | | | | | | | | | |
| Collinsville | 1.1 | 0 | | 0 | unknown | | | | | | | | |
| Coney; RD 2117 | 5.4 | 0 | | 0 | HMP | 14.6 | 18.9 | 0 | 0 | 0 | 0 | 0 | 0 |
| Deadhorse; RD 2111 | 2.6 | 0 | | 0 | HMP | 7 | 9.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delta Mendota | 2.1 | 0 | | 2.1 | unknown | | | | | | | | |
| Decker | 4.1 | 0 | | 4.1 | unknown | 11.1 | 14.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexler | 4 | 0 | | 4 | unknown | 10.8 | 14 | 0 | 0 | 0 | 0 | 20 | 20 |
| Egbert; RDs 536 and 2084 | 10.7 | 10.7 | 0.8 | 0 | none | 0.8 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ehrheart; RD 813 | 4.7 | 0 | | 0 | none | 12.7 | 16.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Empire; RD 2029 | 9.5 | 0 | | 0 | none | 25.6 | 33.2 | 0 | 0 | 5.5 | 6.5 | 5.5 | 6.5 |
| Fabian; RD 773 | 18.8 | 0 | | 0 | none | 50.8 | 65.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fay; RD 2113 | 1.6 | 0 | | 0 | none | 4.3 | 5.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Frank, Little | 3.5 | 0 | | 3.5 | unknown | 9.45 | 12.2 | 5.5 | 6 | 5.5 | 6 | 5.5 | 6 |
| Glanville; RD 1002 | 13 | 0 | | 0 | HMP | 35.1 | 45.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glide; RD 765 | 1.7 | 1.7 | | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand; RD 3 | 29 | 29 | 1.7 | 0 | PL-99/FEMA100-yr | 1.7 | 1.7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Harbor Cove (Atlas); RD 2126 | 1.9 | 0 | | 0 | unknown | 5.1 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Harveys; RD 1609 | 12.4 | 0 | | 12.4 | unknown | 33.5 | 43.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hastings; RD 2060 | 16 | 16 | 2.1 | 0 | PL-99/FEMA100-yr | 2.1 | 2.1 | 0 | 0 | 0 | 0 | 0 | 0 |





D-031689

## Draft Estimate of Levee Miles and Cost of Levee Earthwork for CALFED Alternatives 1, 2, and 3

| Island/Reclamation District | Levee Miles | Less Project | Corps Estimate Project Levee Sacto System Fix (millions) 1 | Less Local/Other | Current Design Level | Common Program Improvements (same for all alternatives) 2 | | ERPP Modifications Alternatives 1&2 | | ERPP Modifications Alt 3 with 5,000 cfs | | ERPP Modifications Alt 3 with 15,000 cfs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Low | High | Low | High | Low | High | Low | High |
| Holland; RD 2025 | 11 | 0 | | 0 | Bull 192-82/PL-99 | 0 | 0 | 0 | 0 | 5.5 | 6 | 5.5 | 6 |
| Holland Land; RD 999 | 33.4 | 33.4 | 0.2 | | | 0.2 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Holt; RD 2116 | 0.4 | 0 | | | none | 1.1 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hotchkiss; RD 799 | 6.3 | 0 | | | none | 17 | 22 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jersey; RD 830 | 15.6 | 0 | | | none | 42.1 | 54.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jones, Lower; RD 2038 | 9 | 0 | | | HMP | 24.3 | 31.5 | 0 | 0 | 0 | 0 | 5.5 | 6 |
| Jones, Upper; RD 2039 | 9.3 | 0 | | | HMP | 25.1 | 32.6 | 0 | 0 | 0 | 0 | 5.5 | 6 |
| Kasson; RD 2085 | 6.2 | 6.2 | | | | 16.7 | 21.7 | 25.9 | 30.6 | 25.9 | 30.6 | 25.9 | 30.6 |
| Kimball Island | 1.9 | | | 1.9 | | | | | | | | | |
| King; RD 2044 | 9.1 | 0 | | | HMP | 24.6 | 31.9 | 0 | 0 | 0 | 0 | 0 | 0 |
| Libby McNeil; RD 369 | 1.9 | 0.8 | | 0 | | | | | | | | | |
| Liberty; RD 2093 | 14.5 | 0 | | | unknown | 39.1 | 50.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lisbon; RD 307 | 6.7 | 6.7 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little Mandeville; RD 2118 | 4.5 | 0 | | | none | | | | | | | | |
| Los Medanos | 5.6 | 0 | | 5.6 | | | | | | | | | |
| Maintenance Area 9 | 19.6 | 19.6 | 6.4 | | | 6.4 | 6.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mandeville; RD 2027 | 14.3 | 0 | | | HMP | 38.6 | 50 | 0 | 0 | 22 | 24 | 22 | 24 |
| McCormack-Williamson; RD 2110 | 8.8 | 0 | | | none | 23.8 | 30.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| McMullin; RD 2075 | 7.5 | 7.5 | | | | | | | | | | | |
| McDonald; RD 2030 | 13.7 | 0 | | | HMP | 37 | 48 | 0 | 0 | 11 | 12 | 11 | 12 |
| Medford; RD 2041 | 5.9 | 0 | | | none | 15.9 | 20.6 | 5.7 | 6.8 | 5.7 | 6.8 | 5.7 | 6.8 |
| Merritt; RD 150 | 18.1 | 18.1 | 0.2 | | PL-99 | 0.2 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mildred; RD 2021 | 7.3 | | | | see comments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Montezuma Flats | 1.9 | 0 | | 1.9 | | | | | | | | | |
| Montezuma Island | 0.4 | 0 | | 0.4 | | | | | | | | | |
| Mossdale 2; RD 2107 | 4.2 | 4.2 | 0 | | FEMA100-yr | 0 | 0 | 13 | 15.4 | 13 | 15.4 | 13 | 15.4 |
| Naglee Burke; RD 1007 | 8.3 | 0 | | | none | 22.4 | 29 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Hope; RD 348 | 18.6 | 0 | | | none | 50.2 | 65.1 | 26 | 30 | 26 | 30 | 26 | 30 |
| Oakley | 6.7 | 0 | | 0 | | | | | | | | | |
| Orwood; RD 2024 | 6.3 | 0 | | | none | 17 | 22 | 0 | 0 | 0 | 0 | 5.5 | 6 |
| Palm; RD 2036 | 7.5 | 0 | | | none | 20.2 | 26.2 | 0 | 0 | 0 | 0 | 5.5 | 6 |
| Paradise; RD 2095 | 4.9 | 4.9 | | | | 13.2 | 17.2 | 16.5 | 19.5 | 16.5 | 19.5 | 49 | 51.4 |
| Pescadero; RD 2058 | 15.4 | 6.7 | | | HMP | 5.9 | 7.7 | 0 | 0 | 0 | 0 | 32.5 | 32.5 |
| Peters; RD 2104 | 8.4 | 8.4 | 8.3 | | | 8.3 | 8.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pierson; RD 551 | 14 | 6.8 | 0 | | FEMA100-yr | 19.4 | 25.2 | 22 | 24 | 22 | 24 | 22 | 24 |
| Prospect; RD 1667 | 10 | 2.9 | | | none | 19.2 | 24.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Quimby; RD 2090 | 7 | 0 | | | HMP | 18.9 | 24.5 | 0 | 0 | 0 | 0 | 0 | 0 |



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## Draft Estimate of Levee Miles and Cost of Levee Earthwork for CALFED Alternatives 1, 2, and 3

| Island/Reclamation District | Levee Miles | Less Project | Corps Estimate Project Levee Sacto System Fix (millions) 1 | Less Local/Other | Current Design Level | Common Program Improvements (same for all alternatives) 2 | | ERPP Modifications Alternatives 1&2 | | ERPP Modifications Alt 3 with 5,000 cfs | | ERPP Modifications Alt 3 with 15,000 cfs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Low | High | Low | High | Low | High | Low | High |
| Randall; RD 755 | 1.9 | 1.9 | | | | | | | | | | | |
| Rindge; RD 2037 | 15.8 | 0 | | | HMP | 42.7 | 55.3 | 0 | 0 | 11 | 12 | 11 | 12 |
| Rio Blanco; RD 2114 | 4.2 | 0 | | | none | 11.3 | 14.7 | 0 | 0 | 0 | 0 | 0 | 0 |
| River Junction; RD 2064 | 11.9 | 11.9 | | | | 32.1 | 41.6 | 30.4 | 35.9 | 30.4 | 35.9 | 30.4 | 35.9 |
| Roberts, Lower; RD 684 | 16 | 0 | | | HMP | 43.2 | 56 | 0 | 0 | 0 | 0 | 0 | 0 |
| Roberts, Middle; RD 524 | 12.2 | 6.1 | | | none | 32.9 | 42.7 | 26.2 | 31 | 26.2 | 31 | 43.7 | 48 |
| Roberts, Upper; RD 544 | 15 | 10.6 | | | none | 40.5 | 52.5 | 33.6 | 39.7 | 33.6 | 39.7 | 98.9 | 105 |
| Rough and Ready | 5.5 | | | 3.2 | see comments | | | | | | | | |
| Ryer; RD 501 | 20.6 | 20.6 | 1.6 | | PL-99 | 1.6 | 1.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sacramento Deepwater | 26 | | | 26 | | | | | | | | | |
| Sargent Barnhart; RD 2074 | 6 | 1.5 | | 1 | FEMA100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sherman; RD 341 | 19.5 | 9.7 | 0.9 | | none | 26.5 | 34.3 | 30.2 | 33 | 30.2 | 33 | 30.2 | 33 |
| Sherman West | 5.5 | 0 | | 5.5 | | | | | | | | | |
| Shima; RD 2115 | 6.6 | 0 | | | HMP | 17.8 | 23.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Shin Kee | 3.6 | 0 | | 3.6 | | 9.7 | 12.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| SJCFCD Five Mile Slough | 1.4 | 0 | | 0 | | | | | | | | | |
| SJCFCD Fourteen Mile Slough | 2 | 0 | | 0 | | | | | | | | | |
| SJCFCD Mosher Slough | 4.1 | 0 | | 0 | | | | | | | | | |
| San Joaquin River; RD 17 | 16.2 | 16.2 | 0 | | FEMA100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smith Tract; RD 1614 | 2.2 | 0 | | | HMP/FEMA 100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smith Ranch; RD 1608 | 4.3 | 0 | | 0 | FEMA100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spinner Island | 0.8 | | | 0.8 | | | | | | | | | |
| Stark; RD 2089 | 3.5 | 2.8 | 0 | | HMP/FEMA 100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Staten; RD 38 | 25.4 | 0 | | | none | 68.6 | 88.9 | 4.4 | 5.2 | 4.4 | 5.2 | 4.4 | 5.2 |
| Stewart; RD 2062 | 12.3 | 12.3 | | | PL-99 | 33.2 | 43 | 14.6 | 17.2 | 14.6 | 17.2 | 55.4 | 58 |
| Sutter; RD 349 | 12.5 | 12.5 | 0.3 | | PL-99 | 0.3 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Terminous; RD 548 | 21 | 0 | | 4.9 | HMP | 56.7 | 73.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tinsley; RD 2108 | | | | | none | | | | | | | | |
| Twitchell; RD 1601 | 14.04 | 2.5 | 7.9 | | HMP | 31.2 | 40.4 | 40.1 | 42.5 | 40.1 | 42.5 | 40.1 | 42.5 |
| Tyler; RD 563 | 23.06 | 12.2 | 6.7 | | HMP | 29.3 | 38 | 13.2 | 14.6 | 13.2 | 14.6 | 13.2 | 14.6 |
| Union, East; RD 1 | 14 | 1 | | | HMP | 37.8 | 49 | 0 | 0 | 0 | 0 | 0 | 0 |
| Union, West; RD 2 | 16.2 | 0 | | | HMP | 43.7 | 56.7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Van Sickle; RD 1607 | 3.8 | 0 | | | none | 10.3 | 13.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Veale; RD 2065 | 5.7 | 0 | | 0 | none | 15.4 | 19.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venice; RD 2023 | 12.3 | 0 | | | HMP | 33.2 | 43 | 8.2 | 9.8 | 8.2 | 9.8 | 8.2 | 9.8 |
| Victoria; RD 2040 | 15.1 | 0 | | | HMP | 40.8 | 52.8 | 0 | 0 | 0 | 0 | 11 | 12 |
| Walnut Grove; RD 554 | 6.1 | 1 | | 1.5 | FEMA 100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



Common

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## Draft Estimate of Levee Miles and Cost of Levee Earthwork for CALFED Alternatives 1, 2, and 3

| Island/Reclamation District | Levee Miles | Less Project | Corps Estimate Project Levee Sacto System Fix (millions) 1 | Less Local/Other | Current Design Level | Common Program Improvements (same for all alternatives) 2 | | ERPP Modifications Alternatives 1&2 | | ERPP Modifications Alt 3 with 5,000 cfs | | ERPP Modifications Alt 3 with 15,000 cfs C | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Low | High | Low | High | Low | High | Low | High |
| Walthall; RD 2094 | 3.3 | 3.3 | | | | | | | | | | | |
| Webb; RD 2026 | 12.9 | 0 | | | HMP/Bull 192-82 | 34.8 | 45.2 | 17.6 | 19.2 | 17.6 | 19.2 | 17.6 | 19.2 |
| Weber; RD 828 | 1.7 | 0 | | | HMP/FEMA 100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Island | 3 | 0 | | 3 | | | | | | | | | |
| West Sacramento; RD 900 | 13.6 | 13.6 | | | FEMA 100-yr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wetherbee; RD 2096 | 0.2 | 0.2 | | | | | | | | | | | |
| Winter; RD 2122 | 4.8 | 0 | | | none | 13 | 16.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Woodward; RD 2072 | 8.8 | 0 | | | HMP | 23.8 | 30.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wright-Elmwood; RD 2119 | 7.1 | 0 | | | HMP | 19.2 | 24.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yolano; RD 2068 | 8.7 | 8.7 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yolo Bypass Unit 4 | 3.6 | 3.6 | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | Total Levee Miles | Total Project Levees | Total Project Sac Levee Fix Estimate | Total Local/Other Levees | Total Cost Levee Upgrades (Millions) | | | | | | | | |
| | 1125 | 385 | 70.40 | 115 | | 1740 | 2238 | 426 | 484 | 486 | 551 | 728 | 794 |

1 From US Army Corps of Engineers 1993 System Final Report - Lower Sacramento

2 Includes US Army Corps of Engineers Estimate for project Levee Repairs



Common

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# Draft Estimate of Levee Improvement Costs (Millions) for CALFED Alternatives 1 to 3

| Island Name | Earthwork Alt.1a, 1b, 1c | | Earthwork Alt. 2a, 2b | | Earthwork Alt. 2d, 2e | | Earthwork Alt. 3a, 3b, 3e | | Earthwork Alternative 3h | | Earthwork Alternative 3i | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Andrus, Upper; RD 556 | 1.35 | 1.75 | 1.35 | 1.75 | 1.35 | 1.75 | 1.35 | 1.75 | 1.35 | 1.75 | 1.35 | 1.75 |
| Bacon; RD 2028 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 |
| Bear Creek | | | | | | | | | | | | |
| Bethany | | | | | | | | | | | | |
| Bethel Island MID | 31 | 40.2 | 31 | 40.2 | 31 | 40.2 | 31 | 40.2 | 31 | 40.2 | 31 | 40.2 |
| Bishop; RD 2042 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bishop East | | | | | | | | | | | | |
| Bixler; RD 2121 | | | | | | | | | | | | |
| Boggs Dist; RD 404 | 3.2 | 4.2 | 3.2 | 4.2 | 3.2 | 4.2 | 3.2 | 4.2 | 3.2 | 4.2 | 3.2 | 4.2 |
| Borrow Pond Area | | | | | | | | | | | | |
| Bouldin; RD 756 | 48.6 | 63 | 36.4 | 47.2 | 0 | 0 | 36.4 | 47.2 | 0 | 0 | 48.6 | 63 |
| Brack; RD 2033 | 48.7 | 55.3 | 48.7 | 55.3 | 0 | 0 | 48.7 | 55.3 | 0 | 0 | 48.7 | 55.3 |
| Bradford; RD 2059 | 30.4 | 35.2 | 30.4 | 35.2 | 30.4 | 35.2 | 30.4 | 35.2 | 30.4 | 35.2 | 30.4 | 35.2 |
| Brannan-Andrus RDs 2067/317/407 | 49.8 | 57.9 | 49.8 | 57.9 | 49.8 | 57.9 | 49.8 | 57.9 | 49.8 | 57.9 | 49.8 | 57.9 |
| Byron; RD 800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cache Haas; RD 2098 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 |
| Canal Ranch; RD 2086 | 40.5 | 47.9 | 40.5 | 47.9 | 0 | 0 | 40.5 | 47.9 | 0 | 0 | 40.5 | 47.9 |
| Chipps Island | | | | | | | | | | | | |
| Clifton Court | | | | | | | | | | | | |
| Collinsville | | | | | | | | | | | | |
| Coney; RD 2117 | 14.6 | 18.9 | 14.6 | 18.9 | 14.6 | 18.9 | 14.6 | 18.9 | 0 | 0 | 14.6 | 18.9 |
| Deadhorse; RD 2111 | 7 | 9.1 | 7 | 9.1 | 7 | 9.1 | 7 | 9.1 | 7 | 9.1 | 7 | 9.1 |
| Delta Mendota | | | | | | | | | | | | |
| Decker | 11.1 | 14.4 | 11.1 | 14.4 | 11.1 | 14.4 | 11.1 | 14.4 | 11.1 | 14.4 | 11.1 | 14.4 |
| Drexler | 10.8 | 14 | 10.8 | 14 | 10.8 | 14 | 10.8 | 14 | 10.8 | 14 | 10.8 | 14 |
| Egbert; RDs 536 and 2084 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Ehrheart; RD 813 | 12.7 | 16.4 | 12.7 | 16.4 | 12.7 | 16.4 | 12.7 | 16.4 | 12.7 | 16.4 | 12.7 | 16.4 |
| Empire; RD 2029 | 25.6 | 33.2 | 25.6 | 33.2 | 25.6 | 33.2 | 25.6 | 33.2 | 25.6 | 33.2 | 25.6 | 33.2 |
| Fabian; RD 773 | 50.8 | 65.8 | 50.8 | 65.8 | 50.8 | 65.8 | 50.8 | 65.8 | 50.8 | 65.8 | 50.8 | 65.8 |
| Fay; RD 2113 | 4.3 | 5.6 | 4.3 | 5.6 | 4.3 | 5.6 | 4.3 | 5.6 | 4.3 | 5.6 | 4.3 | 5.6 |
| Frank, Little | 12.3 | 14.8 | 12.3 | 14.8 | 12.3 | 14.8 | 12.3 | 14.8 | 12.3 | 14.8 | 12.3 | 14.8 |
| Glanville; RD 1002 | 35.1 | 45.5 | 35.1 | 45.5 | 35.1 | 45.5 | 35.1 | 45.5 | 35.1 | 45.5 | 35.1 | 45.5 |
| Glide; RD 765 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand; RD 3 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| Harbor Cove (Atlas); RD 2126 | 5.1 | 6.6 | 5.1 | 6.6 | 5.1 | 6.6 | 5.1 | 6.6 | 5.1 | 6.6 | 5.1 | 6.6 |
| Harveys; RD 1609 | 33.5 | 43.4 | 33.5 | 43.4 | 33.5 | 43.4 | 33.5 | 43.4 | 33.5 | 43.4 | 33.5 | 43.4 |
| Hastings; RD 2060 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| Holland; RD 2025 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Holland Land; RD 999 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Holt; RD 2116 | 1.1 | 1.4 | 1.1 | 1.4 | 1.1 | 1.4 | 1.1 | 1.4 | 1.1 | 1.4 | 1.1 | 1.4 |
| Hotchkiss; RD 799 | 17 | 22 | 17 | 22 | 17 | 22 | 17 | 22 | 17 | 22 | 17 | 22 |
| Jersey; RD 830 | 42.1 | 54.6 | 42.1 | 54.6 | 42.1 | 54.6 | 42.1 | 54.6 | 42.1 | 54.6 | 42.1 | 54.6 |
| Jones, Lower; RD 2038 | 24.3 | 31.5 | 24.3 | 31.5 | 24.3 | 31.5 | 24.3 | 31.5 | 24.3 | 31.5 | 24.3 | 31.5 |
| Jones, Upper; RD 2039 | 25.1 | 32.6 | 25.1 | 32.6 | 25.1 | 32.6 | 25.1 | 32.6 | 25.1 | 32.6 | 25.1 | 32.6 |





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## Draft Estimate of Levee Improvement Costs (Millions) for CALFED Alternatives 1 to 3

| Island Name | Earthwork | | Earthwork | | Earthwork | | Earthwork | | Earthwork | | Earthwork | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Alt.1a, 1b, 1c | | Alt. 2a, 2b | | Alt. 2d, 2e | | Alt. 3a, 3b, 3e | | Alternative 3h | | Alternative 3i | |
| | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Kasson; RD 2085 | 25.9 | 30.6 | 25.9 | 30.6 | 25.9 | 30.6 | 25.9 | 30.6 | 25.9 | 30.6 | 25.9 | 30.6 |
| Kimball Island | | | | | | | | | | | | |
| King; RD 2044 | 24.6 | 31.9 | 24.6 | 31.9 | 24.6 | 31.9 | 24.6 | 31.9 | 24.6 | 31.9 | 24.6 | 31.9 |
| Libby McNeil; RD 369 | | | | | | | | | | | | |
| Liberty; RD 2093 | 39.1 | 50.8 | 39.1 | 50.8 | 39.1 | 50.8 | 39.1 | 50.8 | 39.1 | 50.8 | 39.1 | 50.8 |
| Lisbon; RD 307 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Little Mandeville; RD 2118 | | | | | | | | | | | | |
| Los Medanos | | | | | | | | | | | | |
| Maintenance Area 9 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| Mandeville; RD 2027 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 | 38.6 | 50 |
| McCormack-Williamson; RD 2110 | 23.8 | 30.8 | 0 | 0 | 0 | 0 | 23.8 | 30.8 | 0 | 0 | 23.8 | 30.8 |
| McMullin; RD 2075 | | | | | | | | | | | | |
| McDonald; RD 2030 | 37 | 48 | 37 | 48 | 37 | 48 | 37 | 48 | 37 | 48 | 37 | 48 |
| Medford; RD 2041 | 18.9 | 24 | 18.9 | 24 | 18.9 | 24 | 18.9 | 24 | 18.9 | 24 | 18.9 | 24 |
| Merritt; RD 150 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Mildred; RD 2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Montezuma Flats | | | | | | | | | | | | |
| Montezuma Island | | | | | | | | | | | | |
| Mossdale 2; RD 2107 | 13 | 15.4 | 13 | 15.4 | 13 | 15.4 | 13 | 15.4 | 13 | 15.4 | 13 | 15.4 |
| Naglee Burke; RD 1007 | 22.4 | 29 | 22.4 | 29 | 22.4 | 29 | 22.4 | 29 | 22.4 | 29 | 22.4 | 29 |
| New Hope; RD 348 | 63.5 | 78.6 | 63.5 | 78.6 | 63.5 | 78.6 | 37.1 | 46.4 | 63.5 | 78.6 | 63.5 | 78.6 |
| Oakley | | | | | | | | | | | | |
| Orwood; RD 2024 | 17 | 22 | 17 | 22 | 8.3 | 10.8 | 17 | 22 | 8.3 | 10.8 | 8.3 | 10.8 |
| Palm; RD 2036 | 20.2 | 26.2 | 20.2 | 26.2 | 9.7 | 12.6 | 20.2 | 26.2 | 9.7 | 12.6 | 9.7 | 12.6 |
| Paradise; RD 2095 | 21.6 | 26.1 | 21.6 | 26.1 | 21.6 | 26.1 | 21.6 | 26.1 | 21.6 | 26.1 | 21.6 | 26.1 |
| Pescadero; RD 2058 | 5.9 | 7.7 | 5.9 | 7.7 | 5.9 | 7.7 | 5.9 | 7.7 | 5.9 | 7.7 | 5.9 | 7.7 |
| Peters; RD 2104 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 |
| Pierson; RD 551 | 30.6 | 35.2 | 8.6 | 11.2 | 30.6 | 35.2 | 30.6 | 35.2 | 30.6 | 35.2 | 30.6 | 35.2 |
| Prospect; RD 1667 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 |
| Quimby; RD 2090 | 18.9 | 24.5 | 18.9 | 24.5 | 18.9 | 24.5 | 18.9 | 24.5 | 18.9 | 24.5 | 18.9 | 24.5 |
| Randall; RD 755 | | | | | | | | | | | | |
| Rindge; RD 2037 | 42.7 | 55.3 | 42.7 | 55.3 | 42.7 | 55.3 | 42.7 | 55.3 | 42.7 | 55.3 | 42.7 | 55.3 |
| Rio Blanco; RD 2114 | 11.3 | 14.7 | 11.3 | 14.7 | 11.3 | 14.7 | 11.3 | 14.7 | 11.3 | 14.7 | 11.3 | 14.7 |
| River Junction; RD 2064 | 30.4 | 35.9 | 30.4 | 35.9 | 30.4 | 35.9 | 30.4 | 35.9 | 30.4 | 35.9 | 30.4 | 35.9 |
| Roberts, Lower; RD 684 | 43.2 | 56 | 43.2 | 56 | 43.2 | 56 | 43.2 | 56 | 43.2 | 56 | 43.2 | 56 |
| Roberts, Middle; RD 524 | 42.7 | 52.4 | 42.7 | 52.4 | 42.7 | 52.4 | 42.7 | 52.4 | 42.7 | 52.4 | 42.7 | 52.4 |
| Roberts, Upper; RD 544 | 45.5 | 55.1 | 45.5 | 55.1 | 45.5 | 55.1 | 45.5 | 55.1 | 45.5 | 55.1 | 45.5 | 55.1 |
| Rough and Ready | | | | | | | | | | | | |
| Ryer; RD 501 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| Sacramento Deepwater | | | | | | | | | | | | |
| Sargent Barnhart; RD 2074 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sherman; RD 341 | 31.1 | 33.9 | 31.1 | 33.9 | 31.1 | 33.9 | 31.1 | 33.9 | 31.1 | 33.9 | 31.1 | 33.9 |
| Sherman West | | | | | | | | | | | | |
| Shima; RD 2115 | 17.8 | 23.1 | 17.8 | 23.1 | 17.8 | 23.1 | 17.8 | 23.1 | 17.8 | 23.1 | 17.8 | 23.1 |





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## Draft Estimate of Levee Improvement Costs (Millions) for CALFED Alternatives 1 to 3

| Island Name | Earthwork | | Earthwork | | Earthwork | | Earthwork | | Earthwork | | Earthwork | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Alt.1a, 1b, 1c | | Alt. 2a, 2b | | Alt. 2d, 2e | | Alt. 3a, 3b, 3e | | Alternative 3h | | Alternative 3i | |
| | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| Shin Kee | 9.7 | 12.6 | 9.7 | 12.6 | 9.7 | 12.6 | 9.7 | 12.6 | 9.7 | 12.6 | 9.7 | 12.6 |
| SJCFCD Five Mile Slough | | | | | | | | | | | | |
| SJCFCD Fourteen Mile Slough | | | | | | | | | | | | |
| SJCFCD Mosher Slough | | | | | | | | | | | | |
| San Joaquin River; RD 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smith Tract; RD 1614 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smith Ranch; RD 1608 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spinner Island | | | | | | | | | | | | |
| Stark; RD 2089 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Staten; RD 38 | 64.9 | 83.6 | 40.5 | 52 | 58.3 | 75.5 | 52.8 | 67.8 | 64.9 | 83.6 | 64.9 | 83.6 |
| Stewart; RD 2062 | 40.6 | 51 | 40.6 | 51 | 40.6 | 51 | 40.6 | 51 | 40.6 | 51 | 40.6 | 51 |
| Sutter; RD 349 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Terminous; RD 548 | 56.7 | 73.5 | 56.7 | 73.5 | 56.7 | 73.5 | 56.7 | 73.5 | 56.7 | 73.5 | 56.7 | 73.5 |
| Tinsley; RD 2108 | | | | | | | | | | | | |
| Twitchell; RD 1601 | 52.3 | 58.3 | 52.3 | 58.3 | 52.3 | 58.3 | 52.3 | 58.3 | 52.3 | 58.3 | 52.3 | 58.3 |
| Tyler; RD 563 | 42 | 52 | 12.6 | 13.8 | 42 | 52 | 27.1 | 32.7 | 0 | 0 | 42 | 52 |
| Union, East; RD 1 | 37.8 | 49 | 37.8 | 49 | 37.8 | 49 | 37.8 | 49 | 37.8 | 49 | 37.8 | 49 |
| Union, West; RD 2 | 43.7 | 56.7 | 43.7 | 56.7 | 43.7 | 56.7 | 43.7 | 56.7 | 43.7 | 56.7 | 43.7 | 56.7 |
| Van Sickle; RD 1607 | 10.3 | 13.3 | 10.3 | 13.3 | 10.3 | 13.3 | 10.3 | 13.3 | 10.3 | 13.3 | 10.3 | 13.3 |
| Veale; RD 2065 | 15.4 | 19.6 | 15.4 | 19.6 | 15.4 | 19.6 | 15.4 | 19.6 | 15.4 | 19.6 | 15.4 | 19.6 |
| Venice; RD 2023 | 37.4 | 47.6 | 37.4 | 47.6 | 37.4 | 47.6 | 37.4 | 47.6 | 37.4 | 47.6 | 37.4 | 47.6 |
| Victoria; RD 2040 | 40.8 | 52.8 | 40.8 | 52.8 | 32.7 | 42.3 | 40.8 | 52.8 | 40.8 | 52.8 | 32.7 | 42.3 |
| Walnut Grove; RD 554 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Walthall; RD 2094 | | | | | | | | | | | | |
| Webb; RD 2026 | 17.6 | 19.2 | 17.6 | 19.2 | 17.6 | 19.2 | 17.6 | 19.2 | 17.6 | 19.2 | 17.6 | 19.2 |
| Weber; RD 828 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Sacramento; RD 900 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wetherbee; RD 2096 | | | | | | | | | | | | |
| Winter; RD 2122 | 13 | 16.8 | 13 | 16.8 | 13 | 16.8 | 13 | 16.8 | 13 | 16.8 | 13 | 16.8 |
| Woodward; RD 2072 | 23.8 | 30.8 | 23.8 | 30.8 | 23.8 | 30.8 | 23.8 | 30.8 | 23.8 | 30.8 | 23.8 | 30.8 |
| Wright-Elmwood; RD 2119 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 | 19.2 | 24.8 |
| Yolano; RD 2068 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yolo Bypass Unit 4 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Total Costs:** | **1887** | **2361** | **1775** | **2221** | **1692** | **2121** | **1822** | **2278** | **1650** | **2069** | **1860** | **2326** |





D-031695

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# TABLE 4-1: EXAMPLES OF LEVEE AND HABITAT IMPROVEMENTS



| LEVEE IMPROVEMENT EXAMPLES | PURPOSE | APPLICABLE AREAS | POSITIVES | NEGATIVES |
|---|---|---|---|---|
| <br>A. Placement of Fill on Levee Crown and Landside Slope in Firm Mineral Soil Foundation Areas | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path. | Firm foundation areas, generally located in outer fringes of Delta and on old stream channels filled with mineral soils. | a. Levee structural stability is improved.<br>b. Levee improvements stay within general footprint of existing levee and drain ditch.<br>c. Relatively easily maintained as a flood control levee.<br>d. Provides small increase in seismic stability. | a. Requires import of mineral soil.<br>b. Represents a significant cost.<br>c. Provides no environmental enhancement.<br>d. Provides no significant increase in seismic stability.<br>e. Addition of fill may result in short-term instability and/or cracking if levee/foundation system is weak. |
| <br>B. Placement of Fill on Levee Crown and Landside Slope, Together with Landside Berm in Soft Foundation Areas | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation. | Most areas of Delta, but especially applicable in areas where soft foundation material exists. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability. | a. Requires significant import of mineral soil.<br>b. Represents a significant cost.<br>c. Provides no environmental enhancement.<br>d. Provides only slight increase in seismic stability.<br>e. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>f. Seepage system may need to be modified.<br>g. Infringes on inboard farm land or habitat areas. |
| <br>C. Placement of Fill on Levee Crown, on Landside Slope, and in Landside Berm in Soft Foundation Areas - Together with Seepage Cutoff Wall (Slurry or Sheetpile Wall) | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Significantly lengthens seepage path, stops concentrated seepage areas.<br>o Placement of berm accounts for soft foundation. | Areas of the Delta where both soft foundation materials and significant, concentrated seepage problems exist. | a. Levee structural stability is improved.<br>b. Provides significant improvement in control of seepage problems in levee.<br>c. Relatively easily maintained as a flood control levee.<br>d. May provide moderate improvement in seismic stability of levee if water levels inboard of cutoff wall are greatly reduced within levee (reduces amount of possible liquefaction). | a. Requires significant import of mineral soil.<br>b. Placement of fill represents a significant cost.<br>c. Construction of cutoff wall represents a major cost.<br>d. Provides no environmental enhancement.<br>e. Levee and foundation may still be unstable during earthquake loading.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Construction of cutoff wall may result in hydraulic fracturing and/or levee cracking if not carried out carefully.<br>h. Lowered ground water inboard of wall may result in differential settlement and cracking.<br>i. Seepage system may need to be modified. |

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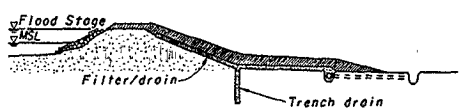
# TABLE 4-1: EXAMPLES OF LEVEE AND HABITAT IMPROVEMENTS



| LEVEE IMPROVEMENT EXAMPLES | PURPOSE | APPLICABLE AREAS | POSITIVES | NEGATIVES |
|---|---|---|---|---|
| <br>D. Placement of Fill on Levee Crown, on Landside Slope, and in Landside Berm in Soft Foundation Areas - Together with Filter/Drain System on Landside Slope | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path, stabilizes concentrated leaks and prevents piping erosion.<br>o Placement of berm accounts for soft foundation. | Areas of the Delta where both soft foundation materials and significant, concentrated seepage or settlement and cracking problems exist. | a. Levee structural stability is improved.<br>b. Provides significant improvement in control of seepage problems in levee.<br>c. May prevent piping erosion associated with both flood events and moderate earthquake-induced settlement and cracking. | a. Requires significant import of mineral soil.<br>b. Placement of fill represents a significant cost.<br>c. Construction of filter/drain represents additional cost.<br>d. Provides no environmental enhancement.<br>e. Levee and foundation may still be unstable during earthquake loading.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Seepage system may need to be modified.<br>h. Seepage and filter/drain system may need to be maintained.<br>i. Infringes on inboard farm land or habitat areas. |
|  <br>E. Placement of Fill on Levee Crown, on Landside Slope, and in Landside Berm in Soft Foundation Areas - Together with Filter/Drain System on Landside Slope and Toe Drain | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path, stabilizes concentrated leaks and prevents piping erosion through both levee and foundation.<br>o Placement of berm accounts for soft foundation. | Areas of the Delta where both soft foundation materials and significant, concentrated seepage or settlement and cracking problems exist. Particularly suited where piping erosion problems exist within levee foundation. | a. Levee structural stability is improved.<br>b. Provides significant improvement in control of seepage problems in levee and foundation.<br>c. May prevent piping erosion associated with both flood events and moderate earth quake-induced settlement and cracking. | a. Requires significant import of mineral soil.<br>b. Placement of fill represents a significant cost.<br>c. Construction of filter/drain on both slope and in trench represents additional cost.<br>d. Provides no environmental enhancement.<br>e. Levee and foundation may still be unstable during earthquake loading.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Construction of drain trench may cause levee distress or seepage problems if not carried out carefully.<br>h. Seepage system may need to be modified.<br>i. Seepage and filter/drain system may need to be maintained.<br>j. Infringes on inboard farm land or habitat areas. |

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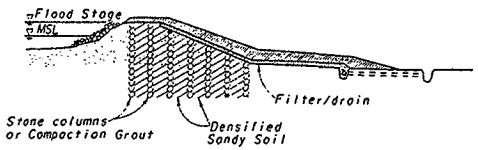
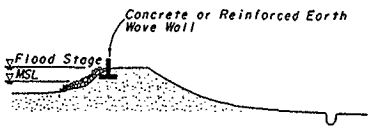
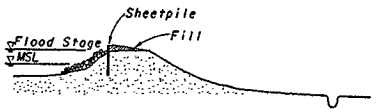
# TABLE 4-1: EXAMPLES OF LEVEE AND HABITAT IMPROVEMENTS



| LEVEE IMPROVEMENT EXAMPLES | PURPOSE | APPLICABLE AREAS | POSITIVES | NEGATIVES |
|---|---|---|---|---|
|  <br>F. Placement of Fill on Levee Crown, on Landside Slope, and in Landside Berm in Soft Foundation Areas - Together with Filter/Drain System on Landside Slope. Densification of Levee and Foundation Soils Using Vibroreplacement (Stone Columns) or Compaction Grouting. | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path, stabilizes concentrated leaks and prevents piping erosion through levee.<br>o Placement of berm accounts for soft foundation.<br>o Densification of levee and foundation soils prevents/limits earthquake-induced liquefaction. | Areas of the Delta where both soft foundation materials and liquefiable materials exist within levee and/or levee foundation. | a. Levee structural stability is improved.<br>b. Provides significant improvement in control of seepage problems in levee.<br>c. Densification reduces amount of slumping and cracking which may occur during an earthquake. Filter/drain may prevent piping erosion following an earthquake (and flood events). | a. Requires significant import of mineral soil.<br>b. Placement of fill represents a significant cost.<br>c. Construction of filter/drain represents additional cost.<br>d. Densification represents a major cost.<br>e. Provides no environmental enhancement.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Densification construction may cause levee distress or seepage problems if not carried out carefully.<br>h. Seepage system may need to be modified.<br>i. Seepage and filter/drain system may need to be maintained.<br>j. Infringes on inboard farm land or habitat areas. |
|  <br>G. Construction of Concrete Wave Wall on Levee Crown | o Provides wave protection during high tides and flood events (Probably only an interim measure). | Areas of the Delta where levee freeboard is of immediate concern. | a. Provides wave protection.<br>b. Relatively inexpensive.<br>c. Can be constructed relatively quickly. | a. Provides no significant improvement in:<br>- overall freeboard.<br>- structural stability.<br>- seepage control.<br>- piping erosion.<br>- seismic stability.<br>b. Provides no environmental enhancement. |
|  <br>H. Construction of Sheetpile Wave Wall on Levee Crown | o Provides wave protection during high tides and flood events (Probably only an interim measure). | Areas of the Delta where levee freeboard is of immediate concern. | a. Provides wave protection.<br>b. Relatively inexpensive.<br>c. Can be constructed relatively quickly. | a. Provides no significant improvement in:<br>- overall freeboard.<br>- structural stability.<br>- seepage control.<br>- piping erosion.<br>- seismic stability.<br>b. Requires limited import of fill.<br>c. Provides no environmental enhancement.<br>d. Installation of sheetpile wall may result in cracking of levee if not carried out with care. |

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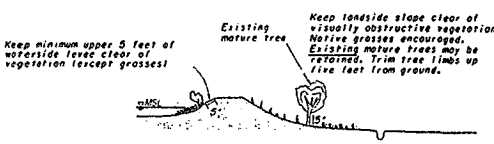
# TABLE 4-1: EXAMPLES OF LEVEE AND HABITAT IMPROVEMENTS



| LEVEE IMPROVEMENT EXAMPLES | PURPOSE | APPLICABLE AREAS | POSITIVES | NEGATIVES |
|---|---|---|---|---|
|  <br>I. Maintenance of Vegetation on Existing Levee Slopes | o Provides reasonable on-site growth and regrowth of vegetation while maintaining safety, access, and inspectability of levees. | Most areas in the Delta, but impact on levee stability must be first evaluated on a site by site basis. Waterside vegetation must be integrated with wave protection systems such as riprap to prevent major levee erosion. | a. Limited waterside vegetation provides some riparian and shaded aquatic habitat.<br>b. Limited waterside vegetation provides some wave protection for levee.<br>c. Grass vegetation provides erosion control for surface runoff.<br>d. Preservation of existing trees provides valuable riparian habitat. | a. If Engineer's guidance not followed and vegetation becomes overgrown, then:<br>- Vegetation limits access for inspection, maintenance, and flood fighting.<br>- Vegetation encourages burrowing rodents.<br>- Downing of trees during storms causes damage to levees due to fallen root balls pulling out chunks of the levee.<br>- Tree roots can also eventually provide a seepage path through levee when they decay.<br>b. Cannot be implemented on Federal levees.<br>c. Because levees require continual maintenance and remediation, some developed habitats need to be covered over with stabilizing berms. |
| <br>J. Placement of Fill on Levee Crown and Landside Slope, Together with Landside Berm in Soft Foundation Areas. Creation of Waterside Berm at Mean Sea Level to Create Waterside Wetland Habitat. | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation.<br>o Provides Waterside Wetland Habitat. | Areas of Delta where soft foundation material exists and where waterside slope is not steep (deep). Cannot be used where channel capacity is severely limited. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability.<br>d. Provides valuable Waterside Wetland Habitat (Waterside fill may limit seepage and improve waterside slope stability). | a. Requires major import of mineral soil.<br>b. Placement of landside fill represents a significant cost.<br>c. Placement of waterside fill represents a significant cost.<br>d. Provides only limited increase in seismic stability.<br>e. Limits channel capacity.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Dredging may be needed on waterside.<br>h. Seepage system may need to be modified. |
| <br>K. Placement of Fill on Levee Crown and Landside Slope, Together with Landside Berm in Soft Foundation Areas. Creation of Waterside Berm above Mean Sea Level to Create Waterside Riparian Habitat. | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation.<br>o Provides Waterside Riparian Habitat. | Areas of Delta where soft foundation material exists, and where waterside slope is not steep (deep). Cannot be used where channel capacity us severely limited. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability.<br>d. Provides valuable Waterside Riparian Habitat (Waterside fill may limit seepage and improve waterside slope stability). | a. Requires major import of mineral soil.<br>b. Placement of landside fill represents a significant cost.<br>c. Placement of waterside fill represents a significant cost.<br>d. Provides only limited increase in seismic stability.<br>e. Limits channel capacity.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Dredging may be needed on waterside.<br>h. Seepage system may need to be modified. |

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# TABLE 4-1: EXAMPLES OF LEVEE AND HABITAT IMPROVEMENTS



| LEVEE IMPROVEMENT EXAMPLES | PURPOSE | APPLICABLE AREAS | POSITIVES | NEGATIVES |
|---|---|---|---|---|
| <br>L. Placement of Fill on Levee Crown and Landside Slope, Together with Landside Berm in Soft Foundation Areas. Placement of Fill between Channel Island and Levee to Create Waterside Wetland and Riparian Habitat. | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation.<br>o Provides Waterside Riparian and Wetland Habitat. | Areas of Delta where soft foundation material exists, and where channel islands and channel between island levee is not too deep. Cannot be used where channel capacity is severely limited. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability.<br>d. Provides valuable Waterside Riparian and Wetland Habitat (Waterside fill may limit seepage and improve waterside slope stability). | a. Requires major import of mineral soil.<br>b. Placement of landside fill represents a significant cost.<br>c. Placement of waterside fill represents a significant cost.<br>d. Provides only limited increase in seismic stability.<br>e. Limits channel capacity.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Dredging may be needed on waterside.<br>h. Seepage system may need to be modified.<br>i. Channel island requires protection. |
| <br>M. Placement of Fill on Levee Crown and Landside Slope, Together with Landside Berm in Soft Foundation Areas. Placement of Sand Beach on Waterside Slope to Create Recreation Area. | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation.<br>o Provides Recreation Area. | Areas of Delta where soft foundation material exists, and where waterside slope is not too steep (deep). Cannot be used where channel capacity is severely limited. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability.<br>d. Provides valuable Waterside Recreation Area. (Waterside fill may limit seepage and improve waterside slope stability.) | a. Requires major import of mineral soil.<br>b. Placement of landside fill represents a significant cost.<br>c. Placement of waterside sandy fill represents a significant cost.<br>d. Provides only limited increase in seismic stability.<br>e. Limits channel capacity.<br>f. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>g. Dredging may be needed on waterside.<br>h. Seepage system may need to be modified.<br>i. Beach area requires maintenance. |
| <br>N. Partial Setback of Levee to Create Waterside Riparian Habitat, Placement of Fill on Levee Crown and Landside Slope. Slope, Together with Landside Berm in Soft Foundation Areas. | o Increases freeboard and flood protection.<br>o Increases overall slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation.<br>o Provides Waterside Riparian Habitat. | All areas of Delta, but especially applicable in areas where soft foundation material exists. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability.<br>d. Lengthens seepage path. | a. Requires significant import of mineral soil.<br>b. Fill placement and cost associated with levee setback greater than simply raising levee crown and adding berm.<br>c. Provides only limited increase in seismic stability.<br>d. Addition of fill likely to result in short-term instability and/or cracking if staged-construction is not used.<br>e. Seepage system may need to be modified.<br>f. Infringes on inboard farm land or habitat areas. |

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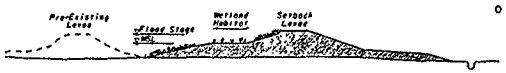
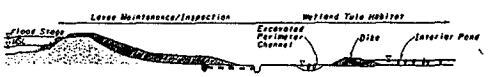
D-031700

# TABLE 4-1: EXAMPLES OF LEVEE AND HABITAT IMPROVEMENTS



| LEVEE IMPROVEMENT EXAMPLES | PURPOSE | APPLICABLE AREAS | POSITIVES | NEGATIVES |
|---|---|---|---|---|
|  <br>O. Complete Setback of Levee to Improve Channel Capacity, Improve Levee Structural Stability and Provide Waterside Wetland Habitat. | o Increases channel capacity.<br>o Improves levee stability.<br>o Provides Waterside Wetland Habitat. | Many areas of Delta, but possibly not in areas where very thick layers of soft foundation material may make creation of new setback levees infeasible. | a. Increases channel capacity and improves flood control.<br>b. New levee would be an engineered fill and would not liquefy during seismic events.<br>c. Provides Waterside Wetland Habitat. | a. Requires major import of mineral soil.<br>b. Fill placement and cost associated with levee setback greater than simply raising levee crown and adding berm.<br>c. Foundation liquefaction could still cause failure during future earthquake.<br>d. New levee fill likely to result in short-term instability and/or cracking if staged-construction is not used. This could temporarily make new levee less reliable than existing levee.<br>e. Significantly infringes on inboard farm land or habitat areas. |
| <br>P. Placement of Fill on Levee Crown and Landside Slope, Together with Landside Berm in Soft Foundation Areas. Creation of Landside Riparian Habitat. | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation.<br>o Provides Landside Riparian Habitat. | All areas of Delta, but especially applicable in areas where soft foundation material exists. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability.<br>d. Provides Landside Riparian Habitat.<br>e. Reduces subsidence near levee by not tilling land in habitat area. | a. Requires significant import of mineral soil.<br>b. Represents a significant cost.<br>c. Provides only slight increase in seismic stability.<br>d. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>e. Seepage system may need to be modified.<br>f. Significantly infringes on inboard farm land and requires some land to be taken out of agricultural production. |
|  <br>Q. Placement of Fill on Levee Crown and Landside Slope. Together with Landside Berm in Soft Foundation Areas. Creation of Inboard Ponds and Waterfilled Perimeter Ditches for Landside Wetland Habitat. | o Increases freeboard and flood protection.<br>o Increases landside slope stability.<br>o Lengthens seepage path.<br>o Placement of berm accounts for soft foundation.<br>o Provides Landside Wetland Habitat. | All areas of Delta, but especially applicable in areas where soft foundation material exists and significant inland subsidence is occurring. | a. Levee structural stability is improved.<br>b. Relatively easily maintained as a flood control levee.<br>c. Provides limited increase in seismic stability.<br>d. Provides Landside Wetland Habitat.<br>e. Reduces subsidence near levee by keeping organic soils saturated. | a. Requires significant import of mineral soil.<br>b. Represents a significant cost.<br>c. Provides only slight increase in seismic stability.<br>d. Addition of fill may result in short-term instability and/or cracking if staged-construction is not used.<br>e. Seepage system may need to be modified.<br>f. Significantly infringes on inboard farm land and requires some land to be taken out of agricultural production.<br>g. Inland pond and dike systems require maintenance. |

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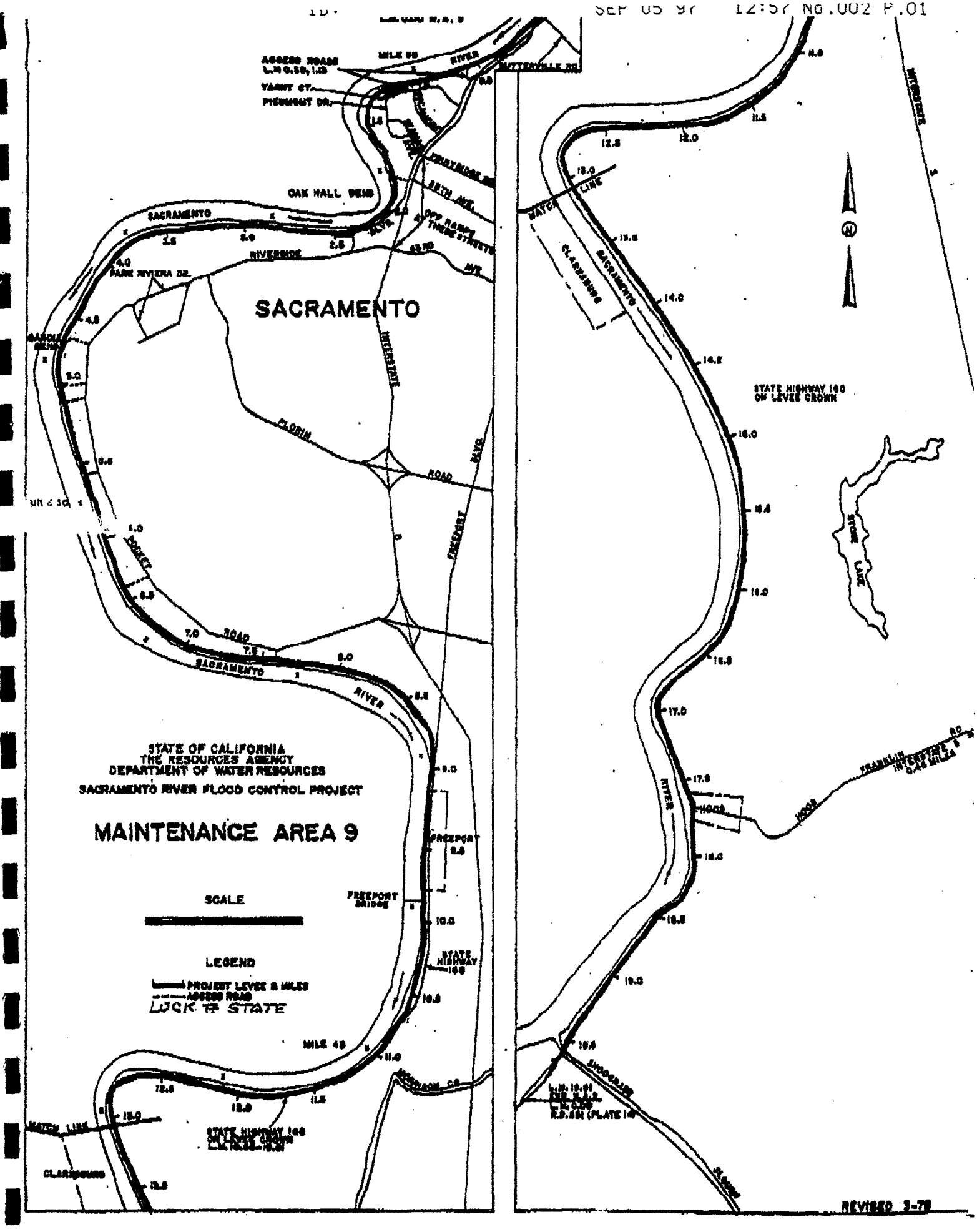
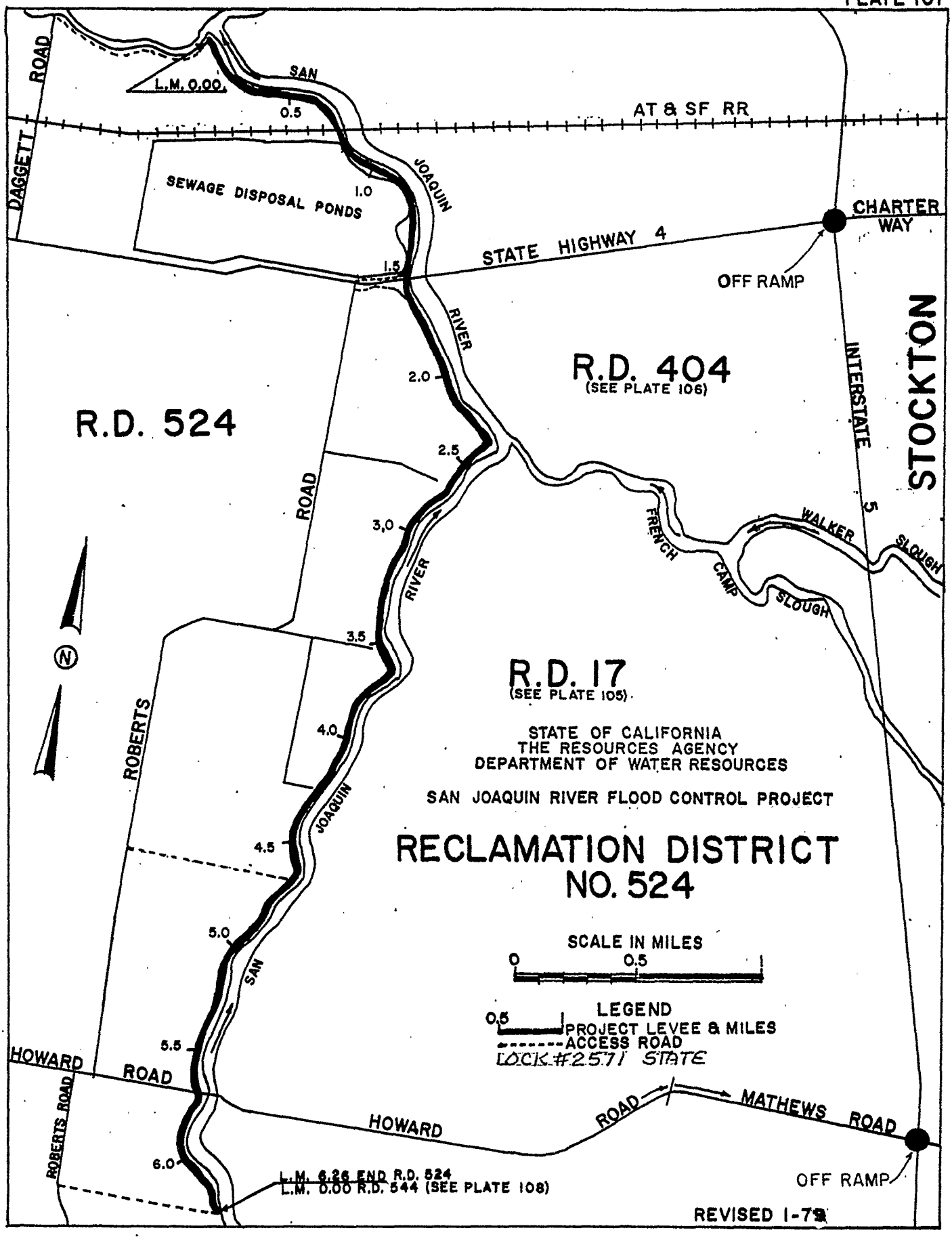
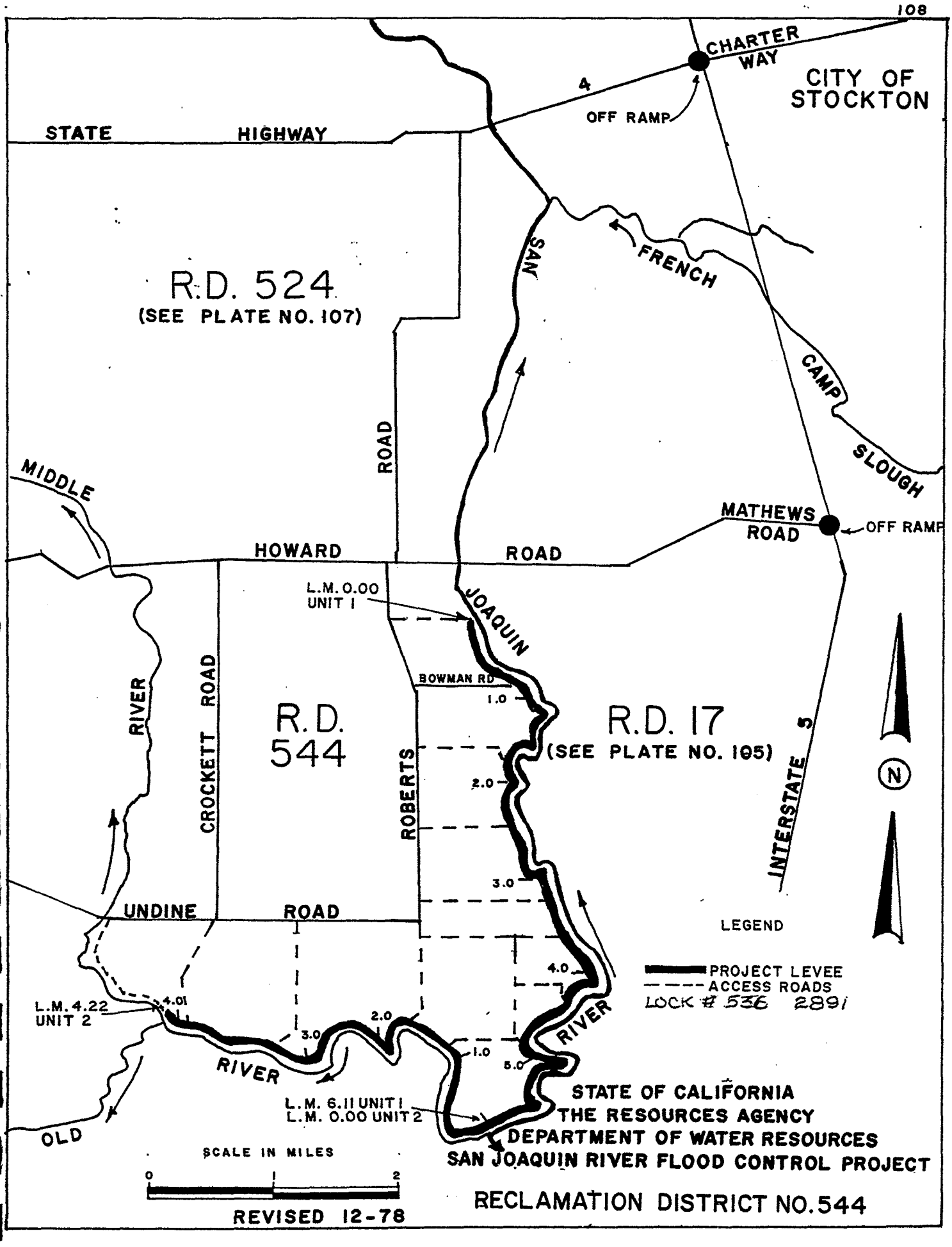

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SACRAMENTO RIVER FLOOD CONTROL PROJECT
MAINTENANCE AREA 9
SCALE
LEGEND
PROJECT LEVEE & MILES
ACCESS ROAD
LOCK TO STATE
SACRAMENTO
OAK HALL BEND
SACRAMENTO RIVER
RIVERSIDE
PARK RIVIERA DR.
FLORIN ROAD
FREEPORT BLVD.
FREEPORT BRIDGE
STATE HIGHWAY 160
STATE HIGHWAY 160 ON LEVEE CROWN
MILE 48
MATCH LINE
CLARKSBURG
STONE LAKE
HOOD
FRANKLIN INTERCEPTOR
REVISED 3-78


L.M. 0.00
SAN
JOAQUIN
RIVER
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
AT & SF RR
DAGGETT ROAD
SEWAGE DISPOSAL PONDS
STATE HIGHWAY 4
CHARTER WAY
OFF RAMP
R.D. 404
(SEE PLATE 106)
R.D. 524
ROAD
INTERSTATE 5
STOCKTON
FRENCH CAMP SLOUGH
WALKER SLOUGH
R.D. 17
(SEE PLATE 105)
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN RIVER FLOOD CONTROL PROJECT
RECLAMATION DISTRICT
NO. 524
SCALE IN MILES
0
0.5
LEGEND
0.5
PROJECT LEVEE & MILES
ACCESS ROAD
LOCK #2571 STATE
ROBERTS ROAD
HOWARD ROAD
MATHEWS ROAD
OFF RAMP
L.M. 6.26 END R.D. 524
L.M. 0.00 R.D. 544 (SEE PLATE 108)
REVISED 1-72



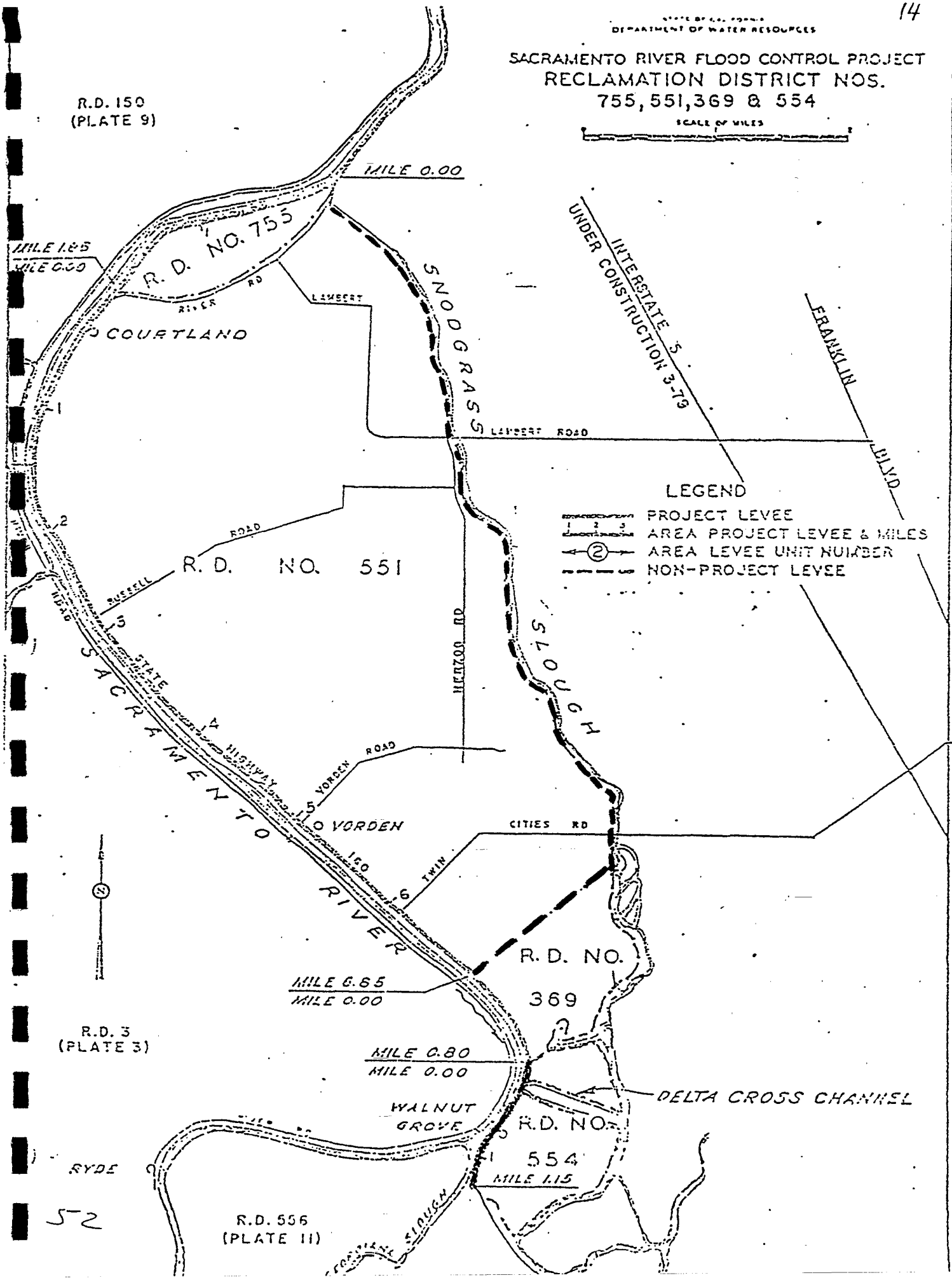

D—031704

D-031704

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

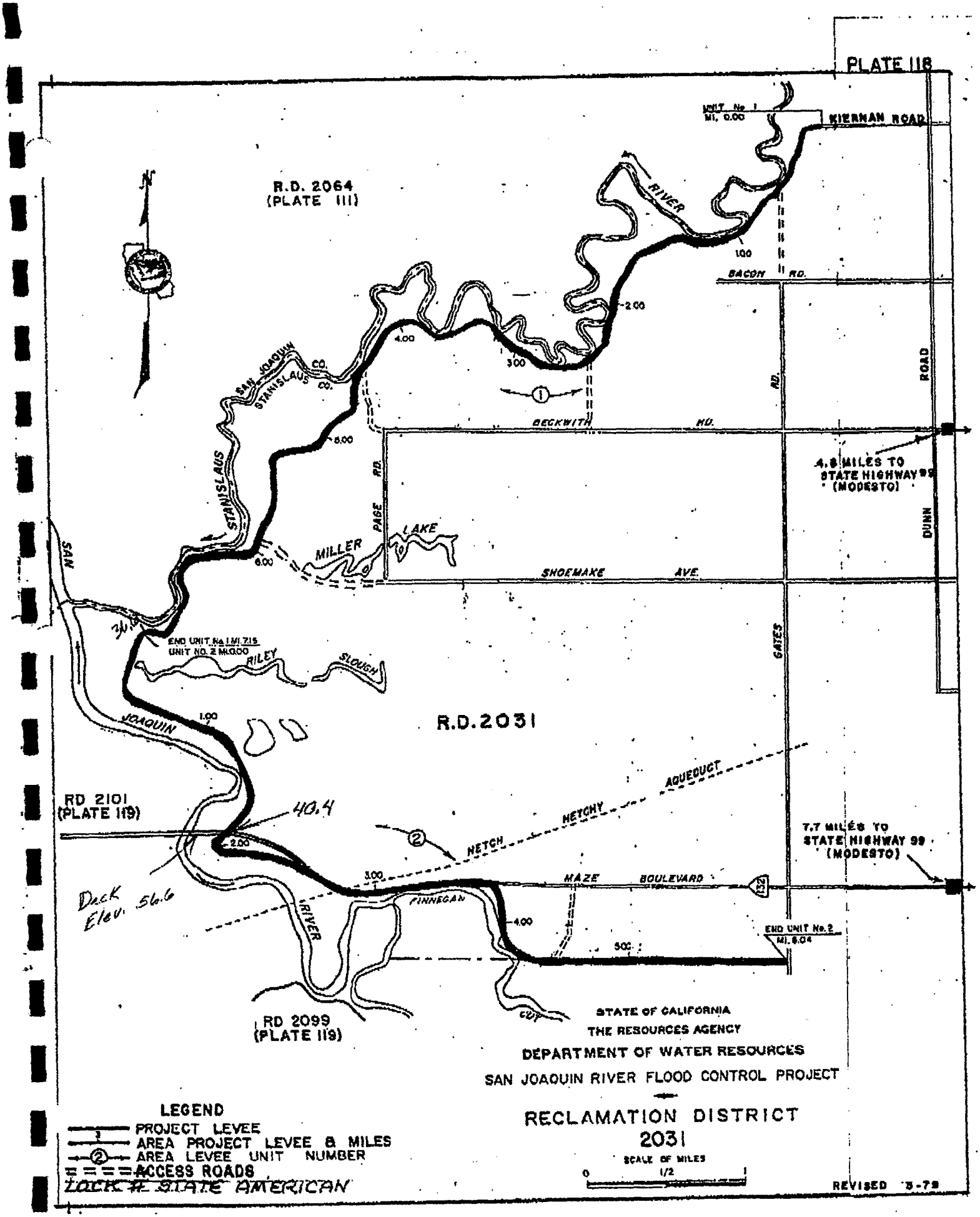
# SACRAMENTO RIVER FLOOD CONTROL PROJECT
## RECLAMATION DISTRICT NOS. 755, 551, 369 & 554

SCALE OF MILES



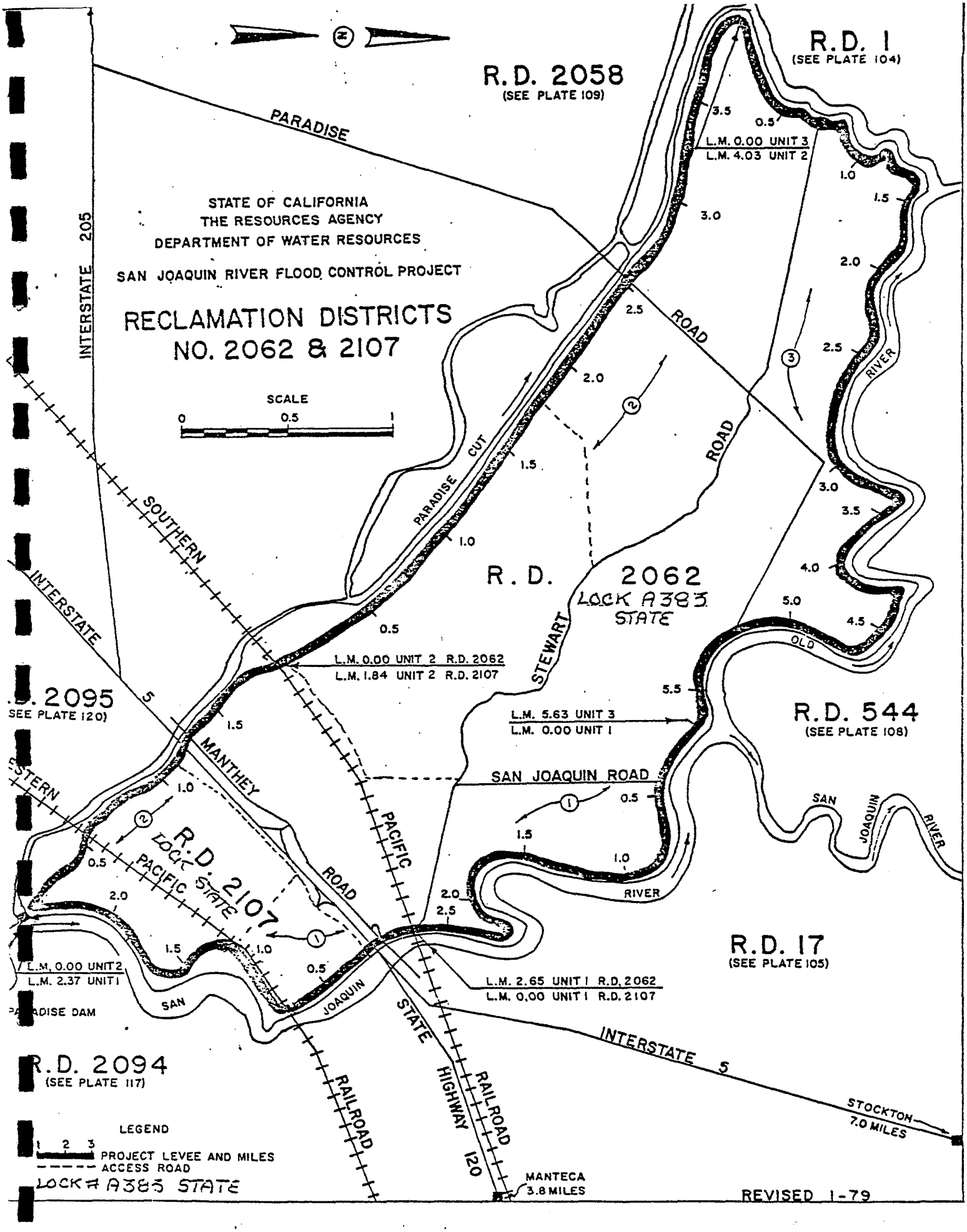

52

D—031705



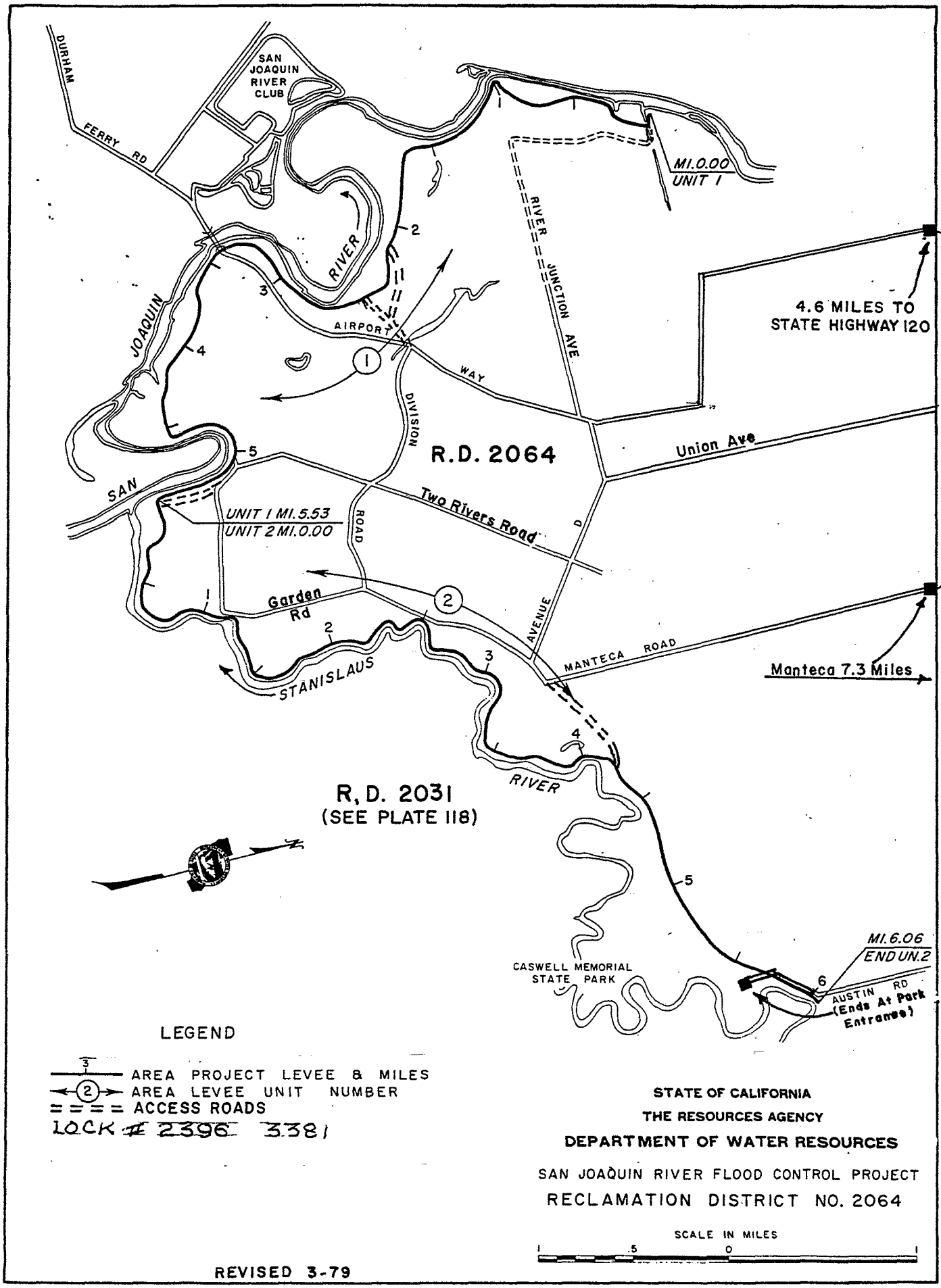

D-031706

D-031706

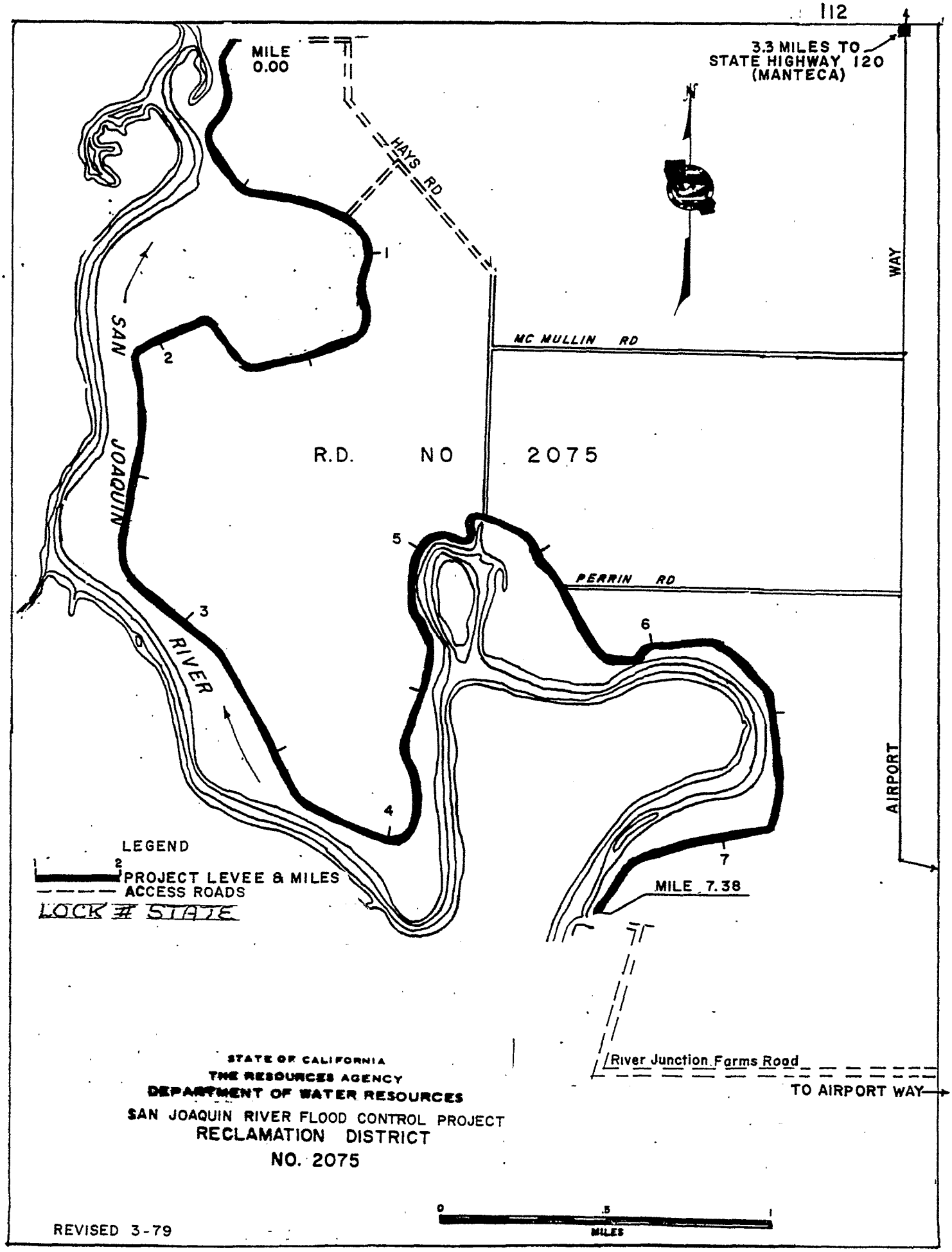


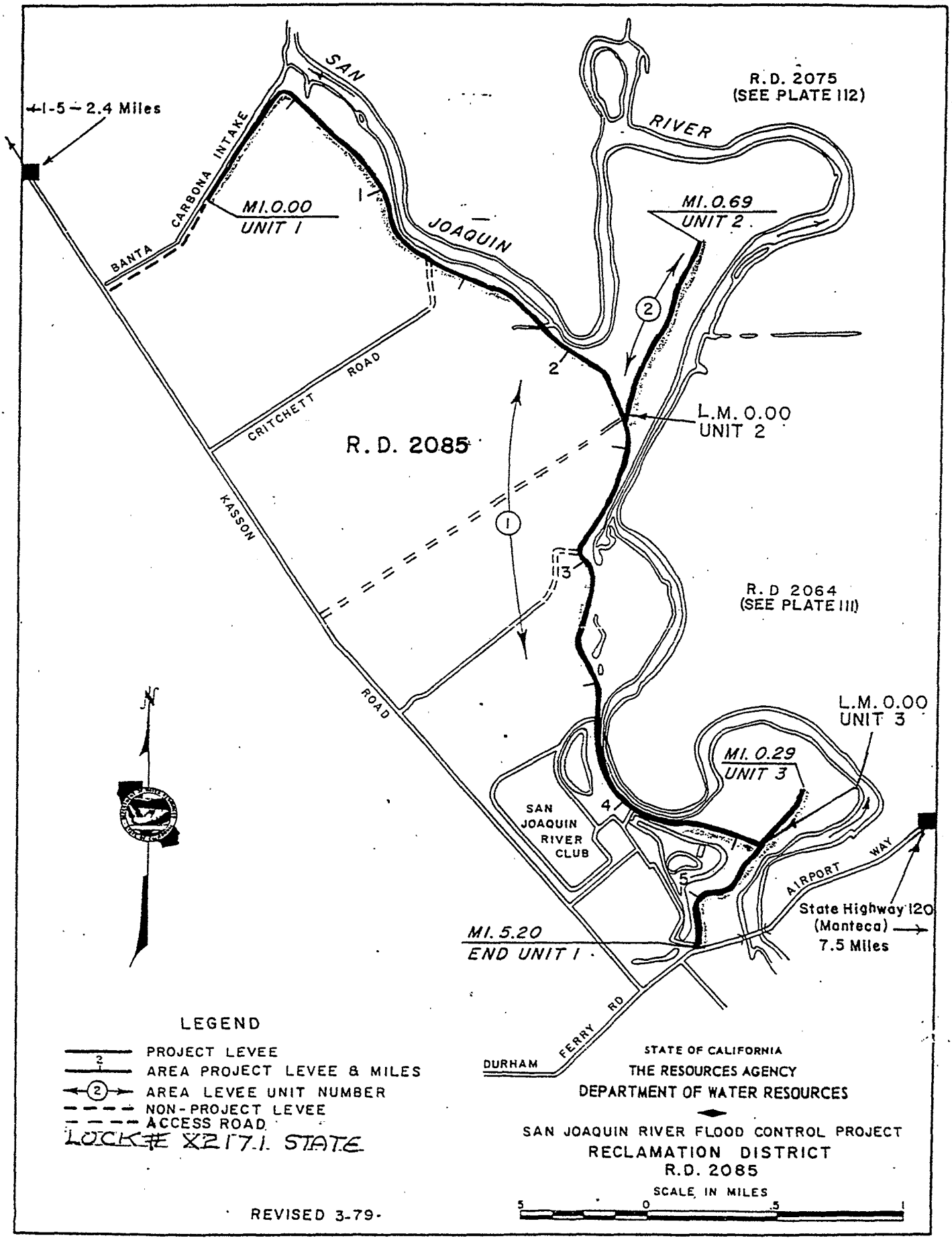

D—031707

D-031707

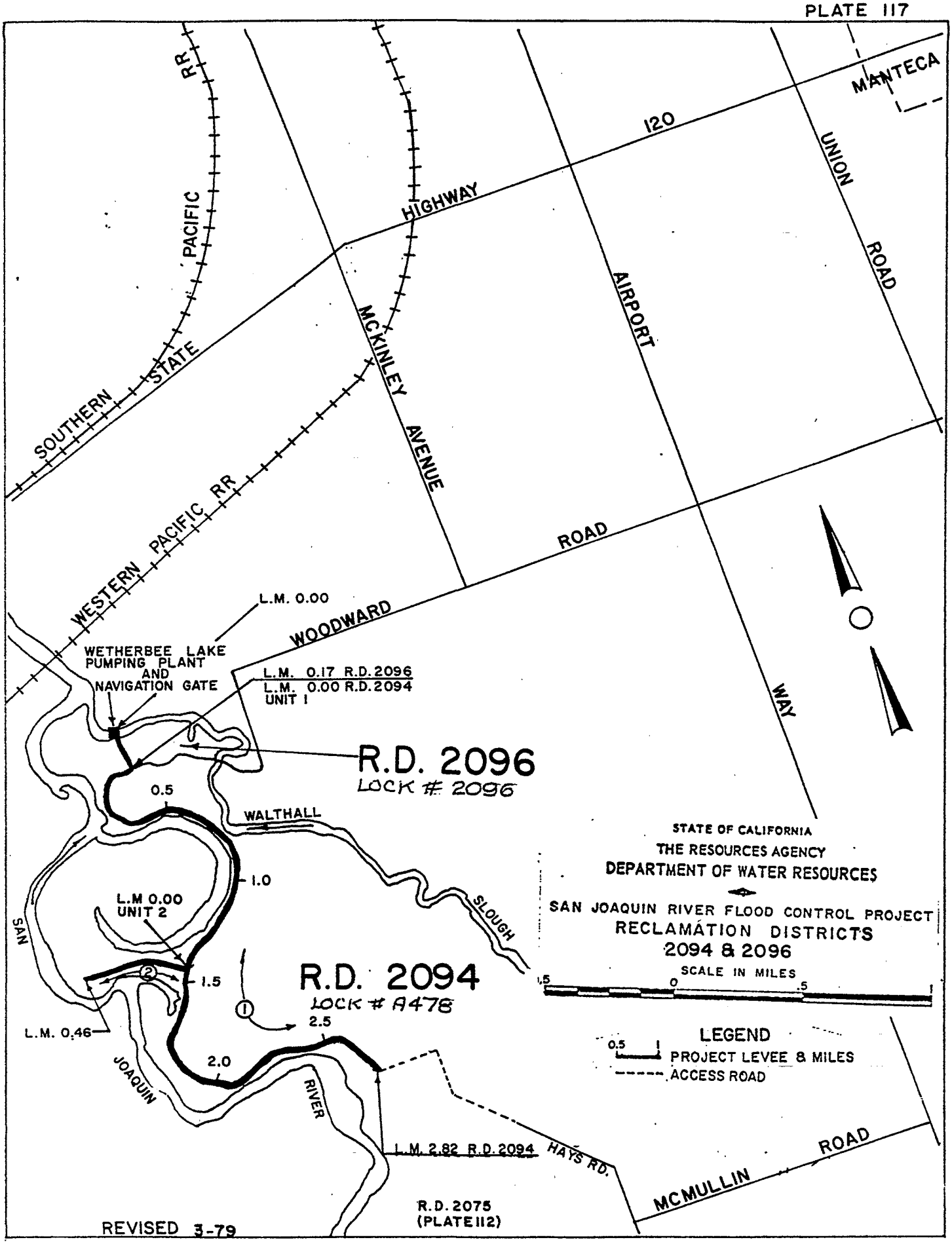

DURHAM
FERRY RD
SAN JOAQUIN RIVER CLUB
MI.0.00
UNIT 1
RIVER
JUNCTION AVE
4.6 MILES TO STATE HIGHWAY 120
JOAQUIN
AIRPORT
WAY
DIVISION
R.D. 2064
Union Ave
SAN
UNIT 1 MI.5.53
UNIT 2 MI.0.00
ROAD
Two Rivers Road
D
Garden Rd
AVENUE
MANTECA ROAD
Manteca 7.3 Miles
STANISLAUS
RIVER
R, D. 2031
(SEE PLATE 118)
MI.6.06
END UN.2
CASWELL MEMORIAL STATE PARK
AUSTIN RD
(Ends At Park Entrance)
LEGEND
AREA PROJECT LEVEE & MILES
AREA LEVEE UNIT NUMBER
ACCESS ROADS
LOCK # 2396 3381
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN RIVER FLOOD CONTROL PROJECT
RECLAMATION DISTRICT NO. 2064
SCALE IN MILES
REVISED 3-79

D—031708


MILE 0.00
3.3 MILES TO STATE HIGHWAY 120 (MANTECA)
N
HAYS RD
WAY
MC MULLIN RD
SAN JOAQUIN RIVER
R.D. NO 2075
PERRIN RD
AIRPORT
1
2
3
4
5
6
7
MILE 7.38
LEGEND
1 2
PROJECT LEVEE & MILES
ACCESS ROADS
LOCK # STATE
River Junction Farms Road
TO AIRPORT WAY
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN RIVER FLOOD CONTROL PROJECT
RECLAMATION DISTRICT
NO. 2075
REVISED 3-79
0 .5 1
MILES

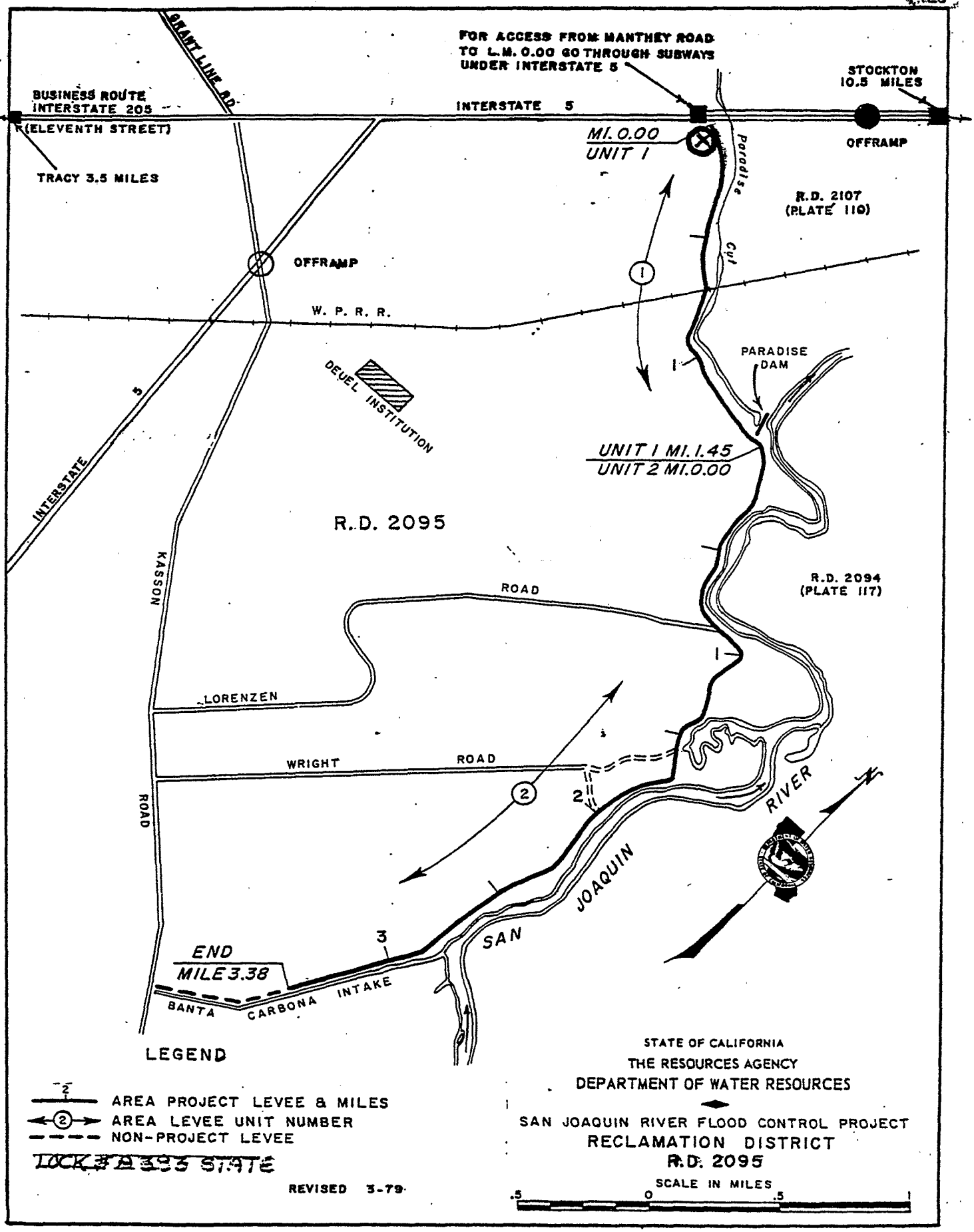

I-5 – 2.4 Miles
SAN
JOAQUIN
RIVER
R.D. 2075
(SEE PLATE 112)
CARBONA INTAKE
BANTA
MI. 0.00
UNIT 1
MI. 0.69
UNIT 2
CRITCHETT ROAD
R.D. 2085
KASSON ROAD
L.M. 0.00
UNIT 2
R.D 2064
(SEE PLATE 111)
L.M. 0.00
UNIT 3
MI. 0.29
UNIT 3
SAN JOAQUIN RIVER CLUB
AIRPORT WAY
State Highway 120
(Manteca)
7.5 Miles
MI. 5.20
END UNIT 1
DURHAM FERRY RD
LEGEND
PROJECT LEVEE
AREA PROJECT LEVEE & MILES
AREA LEVEE UNIT NUMBER
NON-PROJECT LEVEE
ACCESS ROAD
LOCK # X217.1. STATE
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN RIVER FLOOD CONTROL PROJECT
RECLAMATION DISTRICT
R.D. 2085
SCALE IN MILES
REVISED 3-79

D—031710

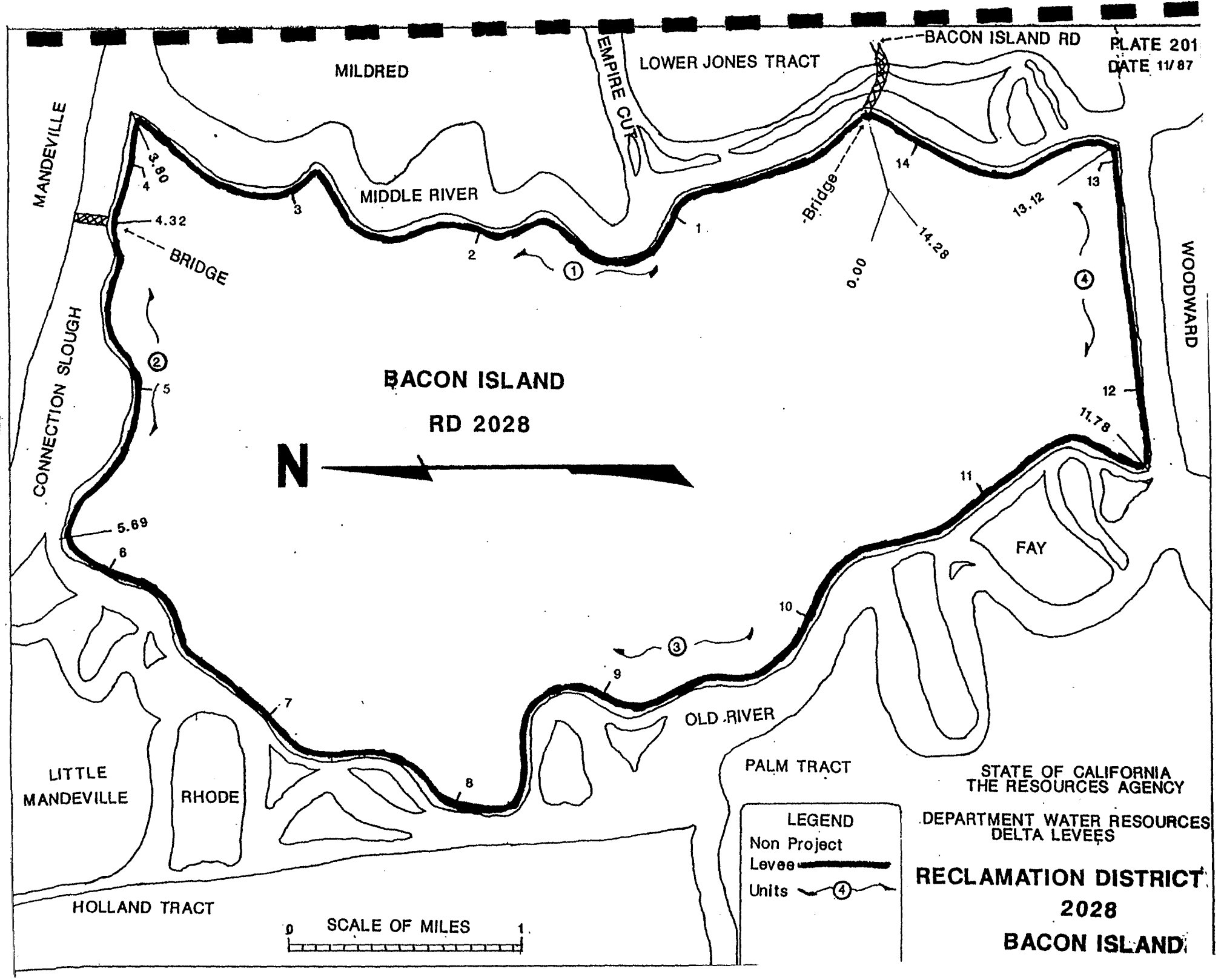

MANTECA
120
HIGHWAY
UNION
ROAD
AIRPORT
MCKINLEY
AVENUE
SOUTHERN
STATE
PACIFIC
RR
WESTERN PACIFIC RR
ROAD
WOODWARD
WAY
L.M. 0.00
WETHERBEE LAKE
PUMPING PLANT
AND
NAVIGATION GATE
L.M. 0.17 R.D.2096
L.M. 0.00 R.D.2094
UNIT 1
R.D. 2096
LOCK # 2096
0.5
WALTHALL
1.0
SLOUGH
L.M 0.00
UNIT 2
SAN
1.5
R.D. 2094
LOCK # A478
2.5
L.M. 0.46
2.0
JOAQUIN
RIVER
L.M. 2.82 R.D.2094
HAYS RD.
MCMULLIN
ROAD
R.D. 2075
(PLATE 112)
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN RIVER FLOOD CONTROL PROJECT
RECLAMATION DISTRICTS
2094 & 2096
SCALE IN MILES
.5
0
.5
1
LEGEND
0.5
1
PROJECT LEVEE & MILES
ACCESS ROAD
REVISED 3-79



D-031711


FOR ACCESS FROM MANTHEY ROAD TO L.M. 0.00 GO THROUGH SUBWAYS UNDER INTERSTATE 5
STOCKTON 10.5 MILES
BUSINESS ROUTE INTERSTATE 205
GRANT LINE RD.
INTERSTATE 5
(ELEVENTH STREET)
TRACY 3.5 MILES
MI. 0.00
UNIT 1
OFFRAMP
Paradise Cut
R.D. 2107 (PLATE 110)
OFFRAMP
W. P. R. R.
PARADISE DAM
DEUEL INSTITUTION
UNIT 1 MI. 1.45
UNIT 2 MI. 0.00
INTERSTATE 5
R.D. 2095
KASSON ROAD
ROAD
R.D. 2094 (PLATE 117)
LORENZEN
WRIGHT ROAD
SAN JOAQUIN RIVER
END
MILE 3.38
BANTA CARBONA INTAKE
LEGEND
AREA PROJECT LEVEE & MILES
AREA LEVEE UNIT NUMBER
NON-PROJECT LEVEE
LOCK #A395 STATE
REVISED 3-79
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN RIVER FLOOD CONTROL PROJECT
RECLAMATION DISTRICT
R.D. 2095
SCALE IN MILES
.5 0 .5 1

D—031712

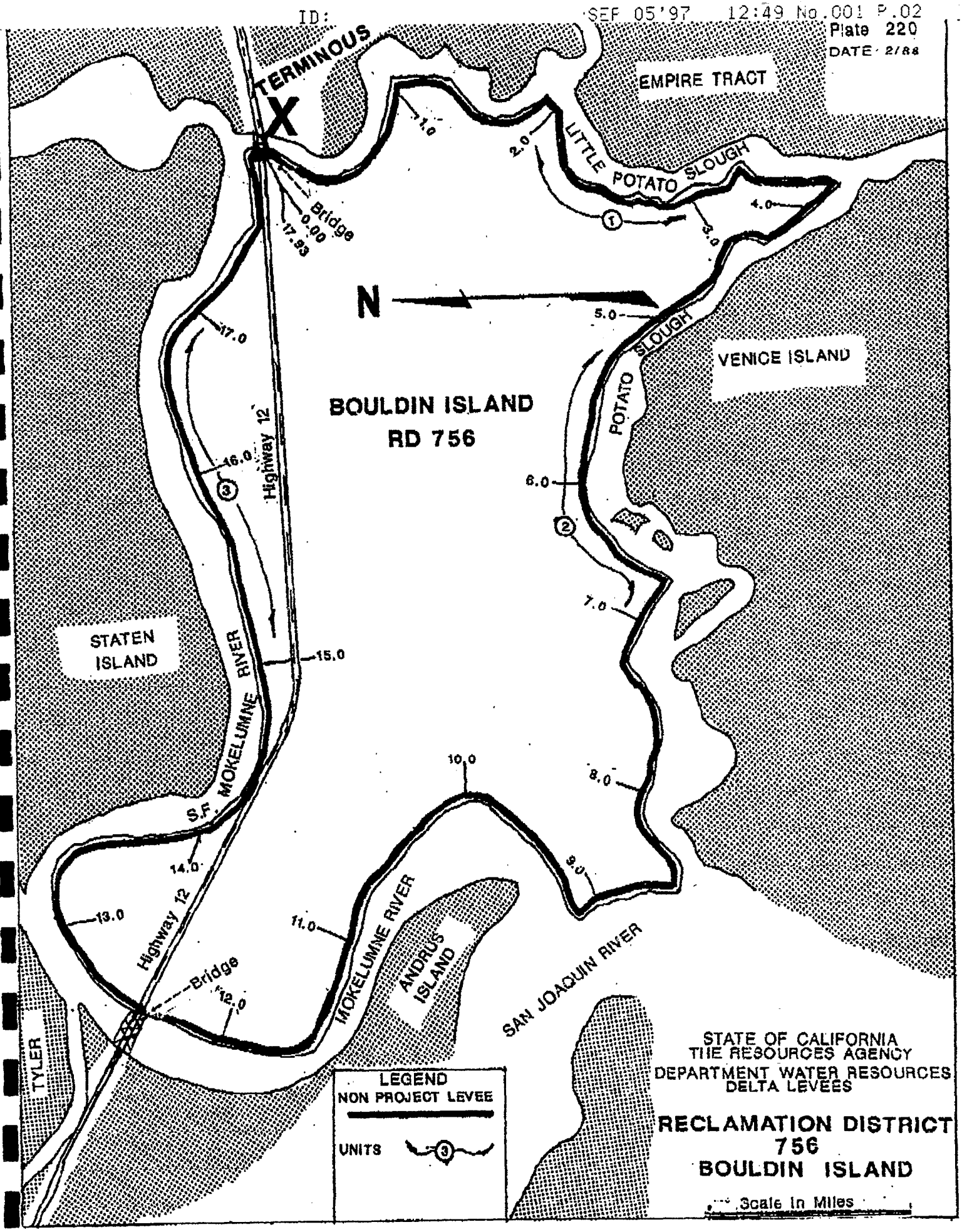



D-031713

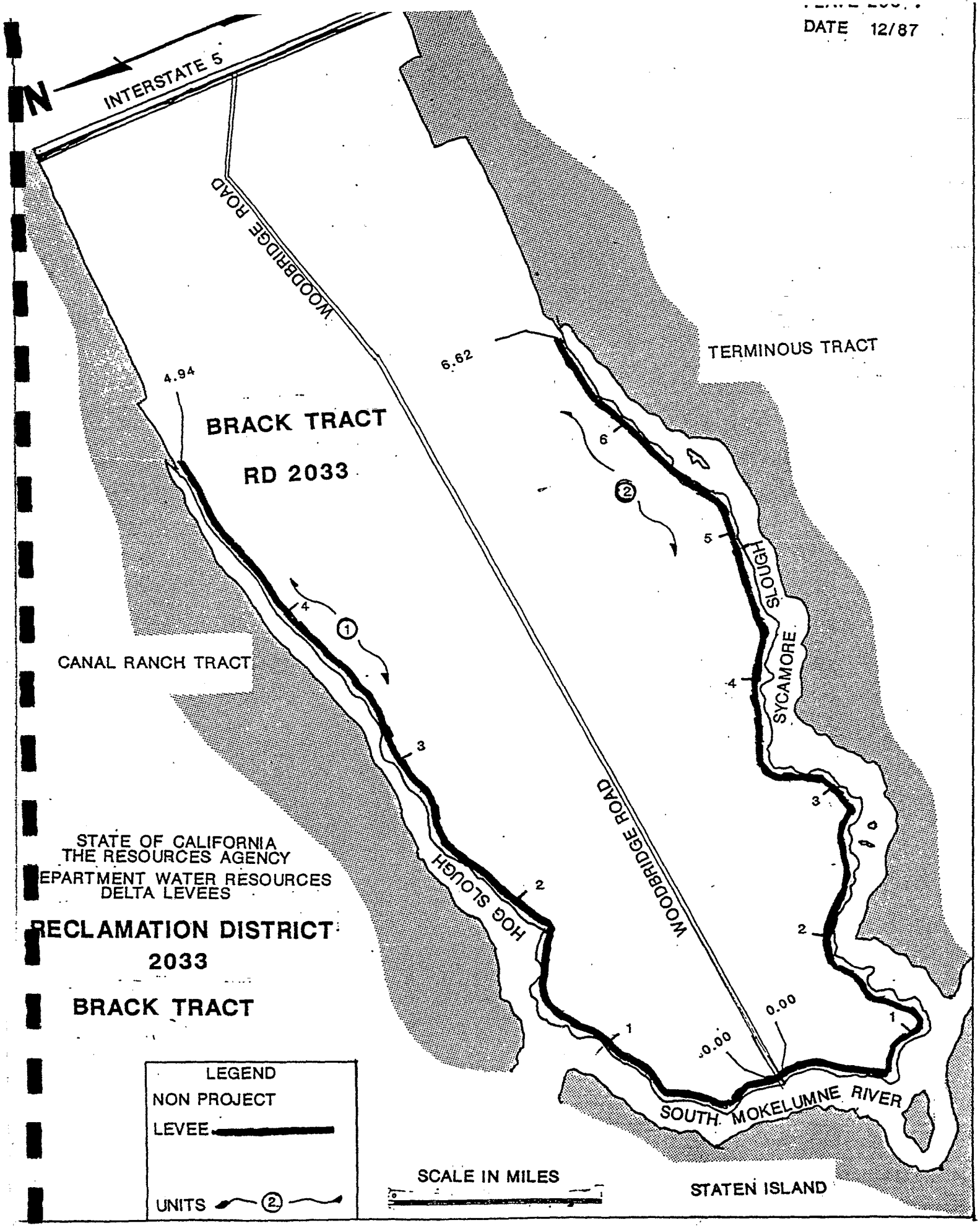
D-031713

Plate 220

DATE 2/88

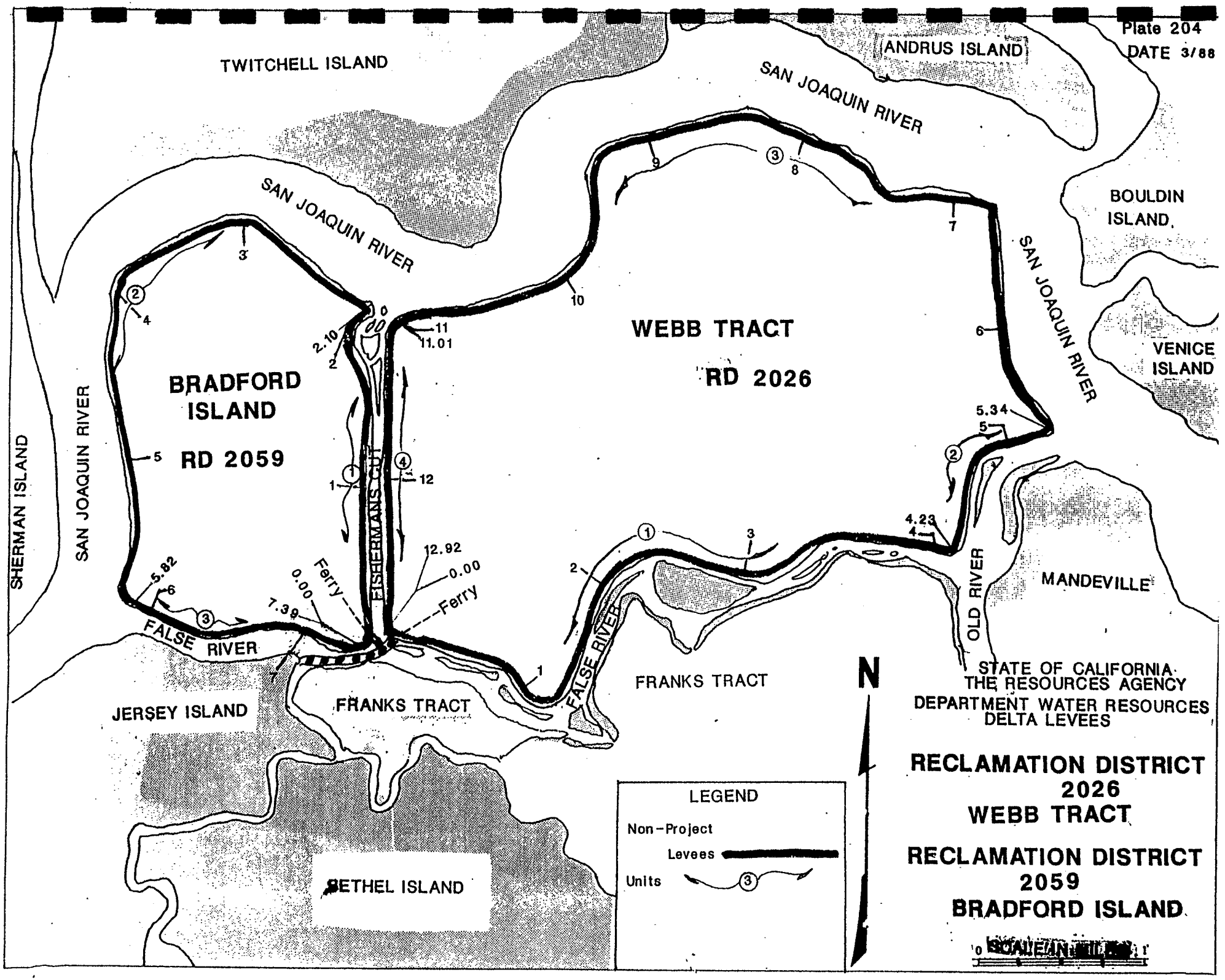


DATE 12/87




D-031715

D-031715



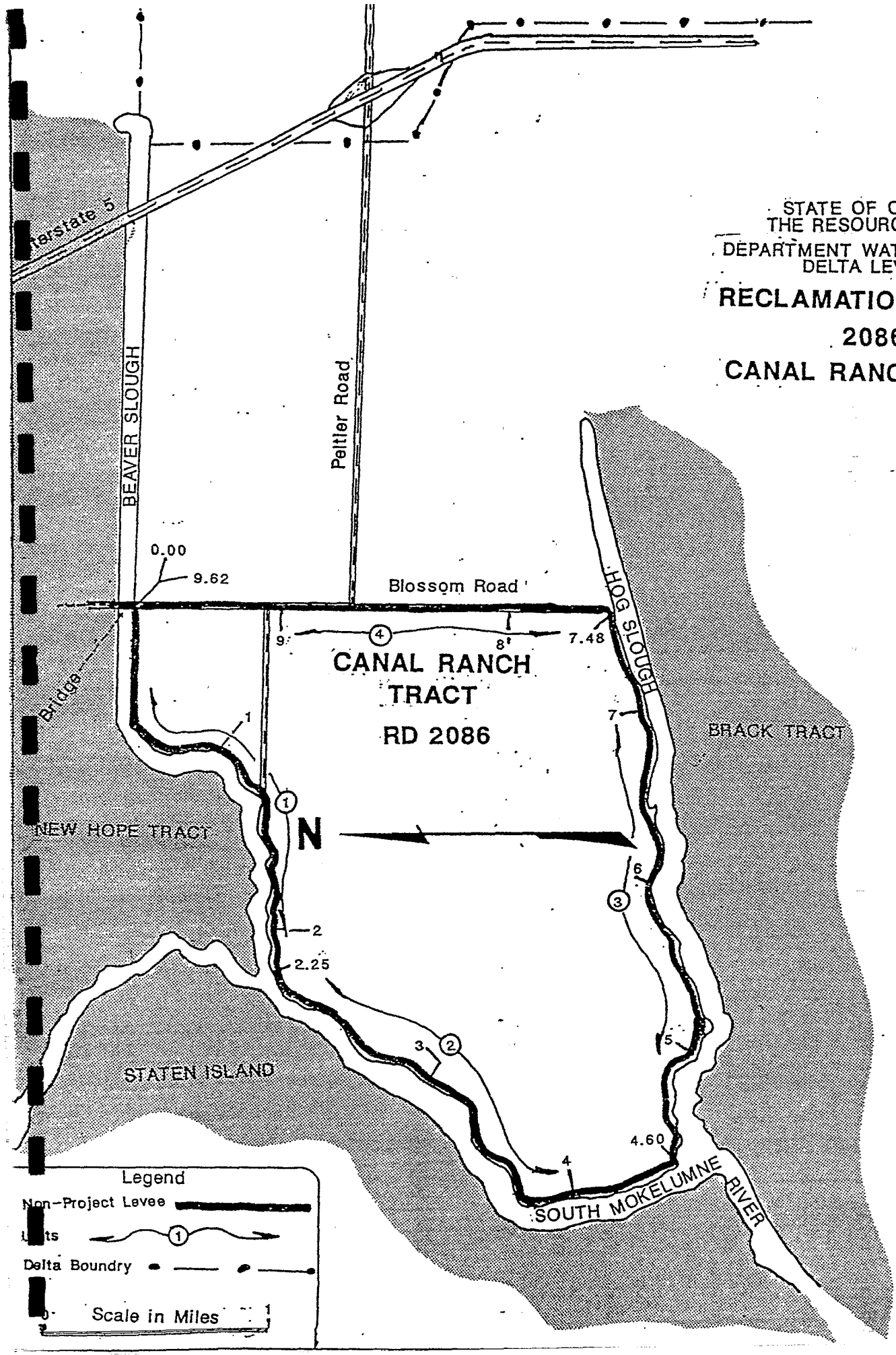

D-031716

D-031716

Plate 226
DATE 4/88

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES

# RECLAMATION DISTRICT 2086
# CANAL RANCH TRACT




D-031717

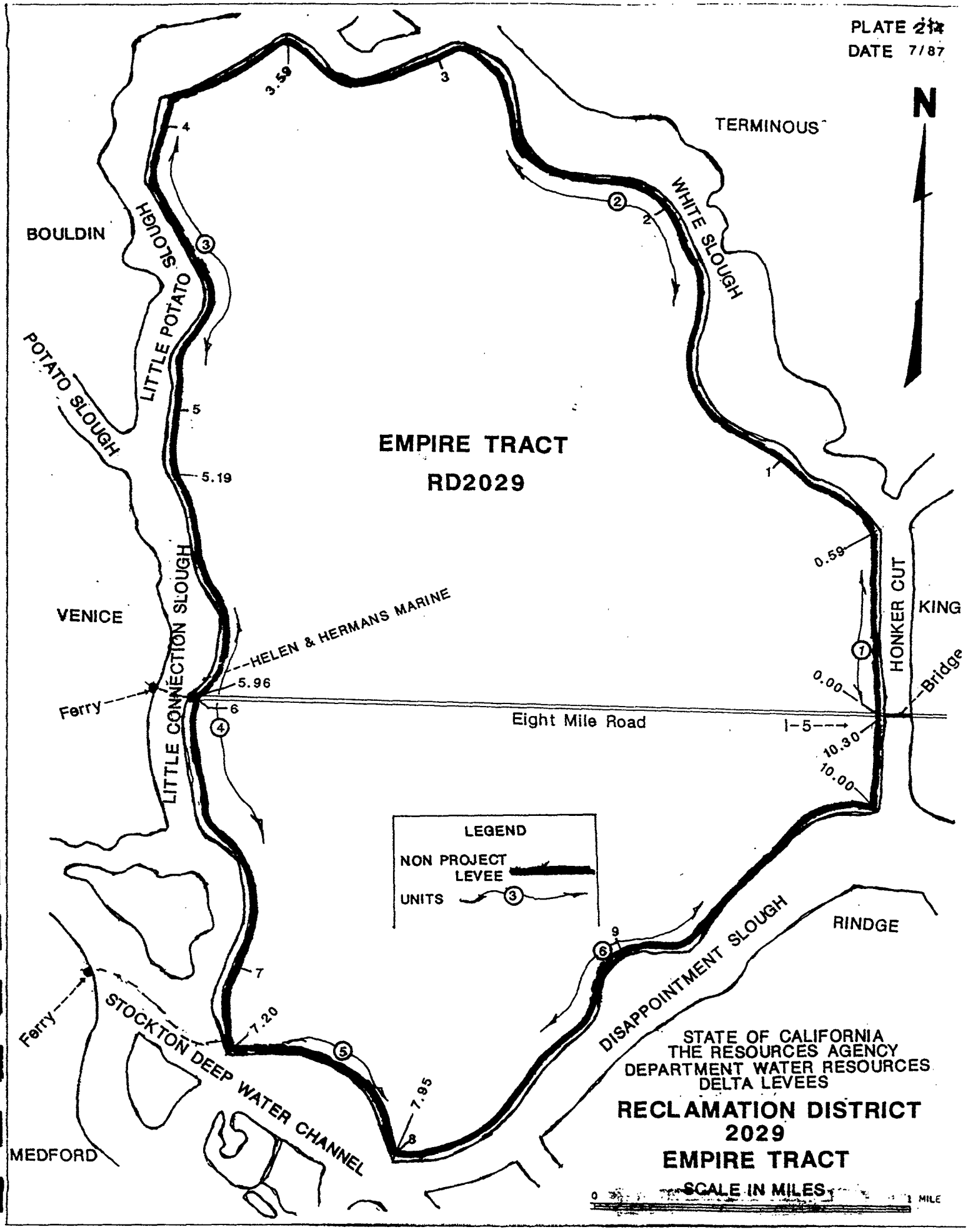
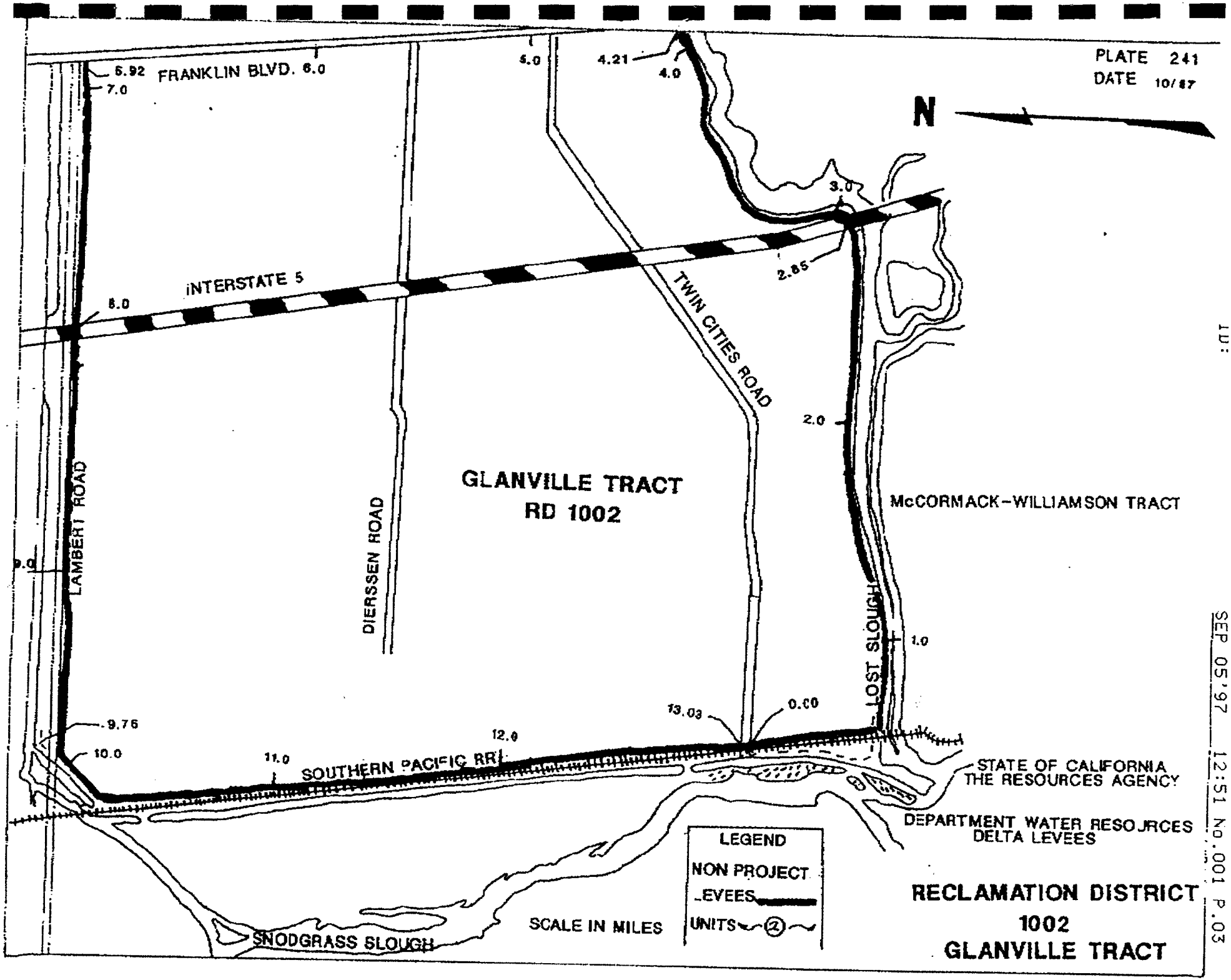
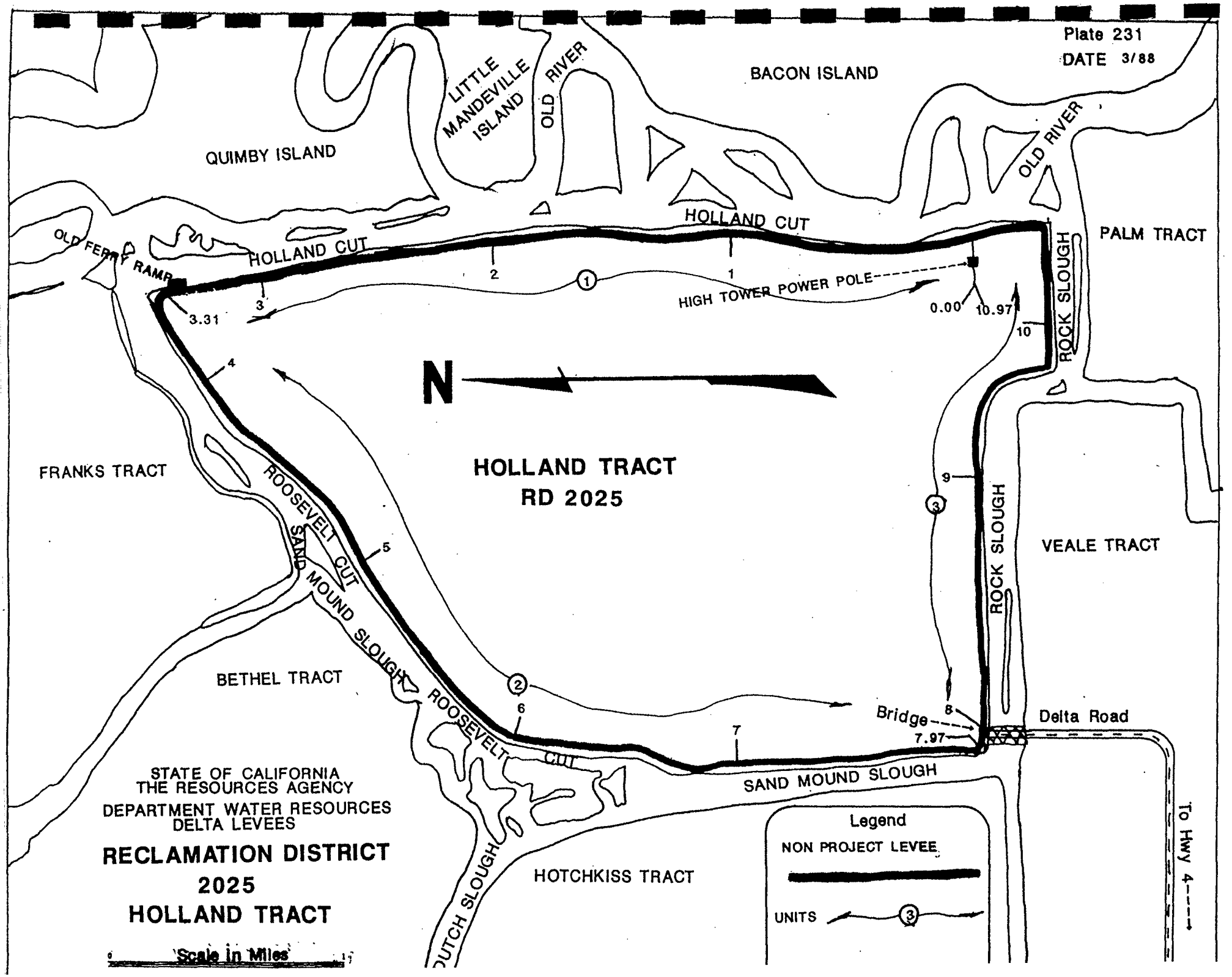


PLATE 2
DATE 7/87
N
TERMINOUS
BOULDIN
WHITE SLOUGH
LITTLE POTATO SLOUGH
POTATO SLOUGH
EMPIRE TRACT
RD2029
VENICE
LITTLE CONNECTION SLOUGH
HELEN & HERMANS MARINE
Ferry
Eight Mile Road
I-5
HONKER CUT
KING
Bridge
LEGEND
NON PROJECT LEVEE
UNITS
RINDGE
DISAPPOINTMENT SLOUGH
STOCKTON DEEP WATER CHANNEL
MEDFORD
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT
2029
EMPIRE TRACT
SCALE IN MILES
0
1 MILE

D-031718

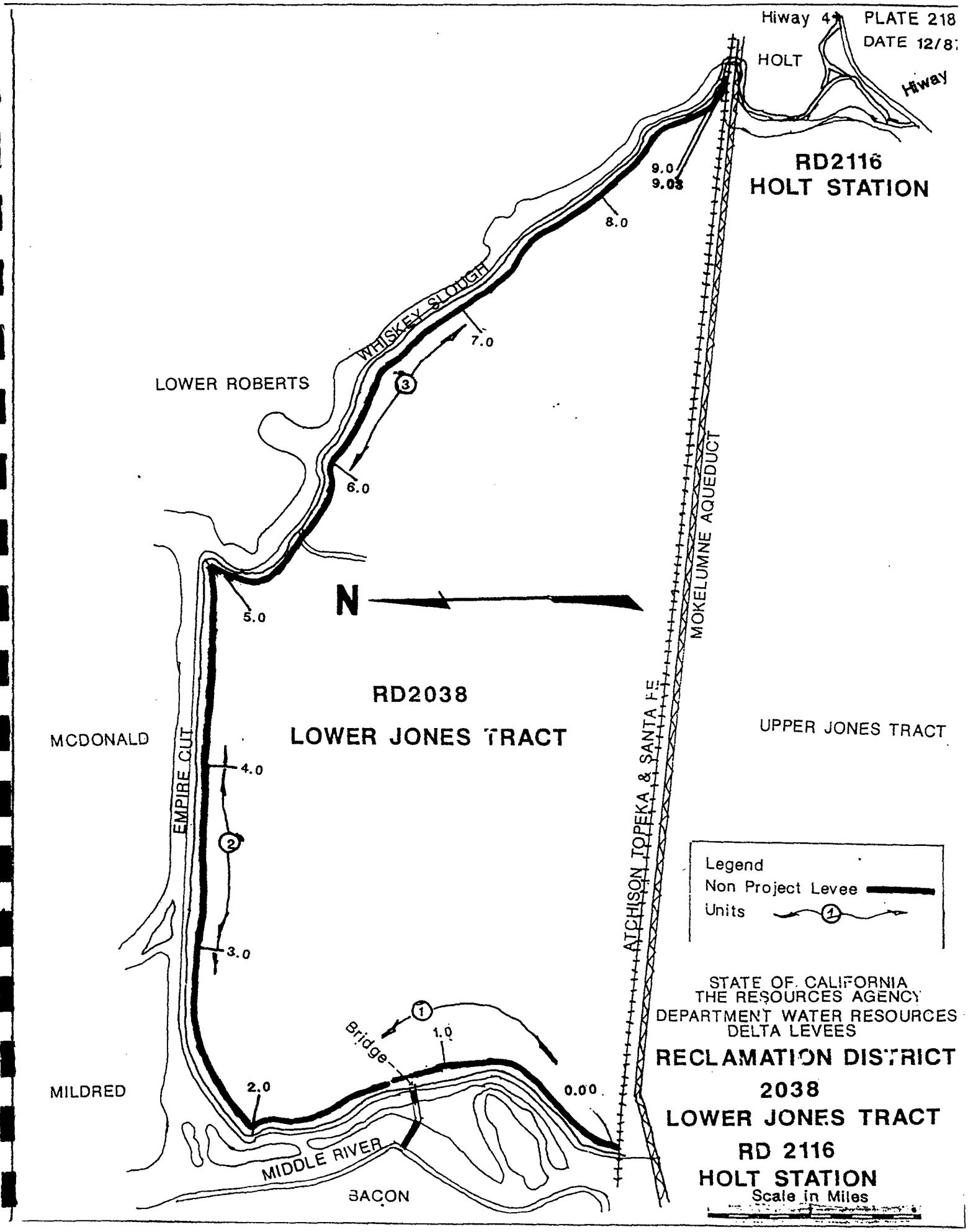



D-031719
D-031719
SEP 05,97 12:51 No.001 P.03




D-031720

D-031720


Hiway 4
PLATE 218
DATE 12/8
HOLT
Hiway
RD2116
HOLT STATION
9.0
9.03
8.0
WHISKEY SLOUGH
7.0
LOWER ROBERTS
3
6.0
MOKELUMNE AQUEDUCT
N
5.0
RD2038
LOWER JONES TRACT
UPPER JONES TRACT
MCDONALD
EMPIRE CUT
4.0
2
3.0
ATCHISON TOPEKA & SANTA FE
Legend
Non Project Levee
Units
1
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT
2038
LOWER JONES TRACT
RD 2116
HOLT STATION
Scale in Miles
1
Bridge
1.0
MILDRED
2.0
0.00
MIDDLE RIVER
BACON

D—031721

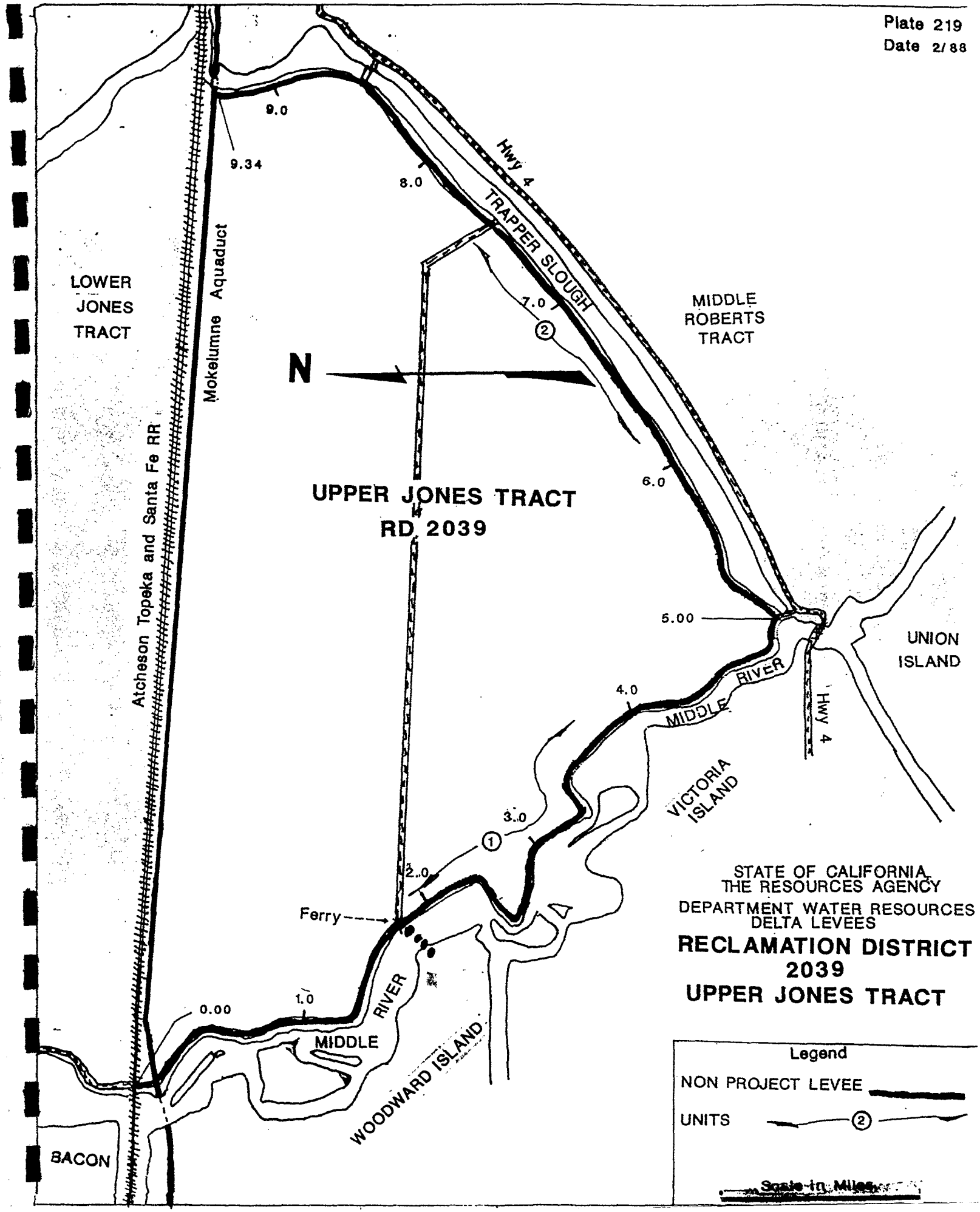
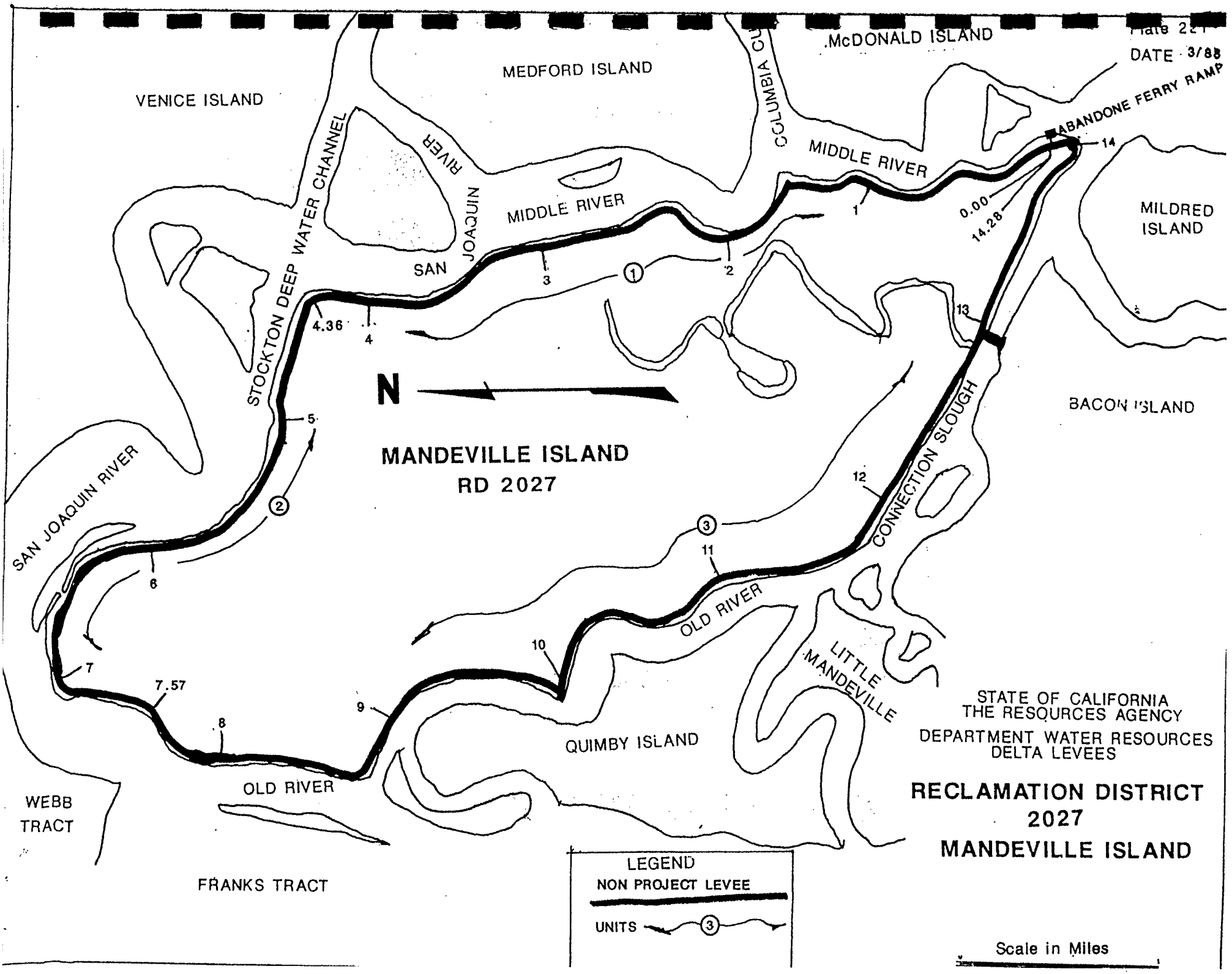


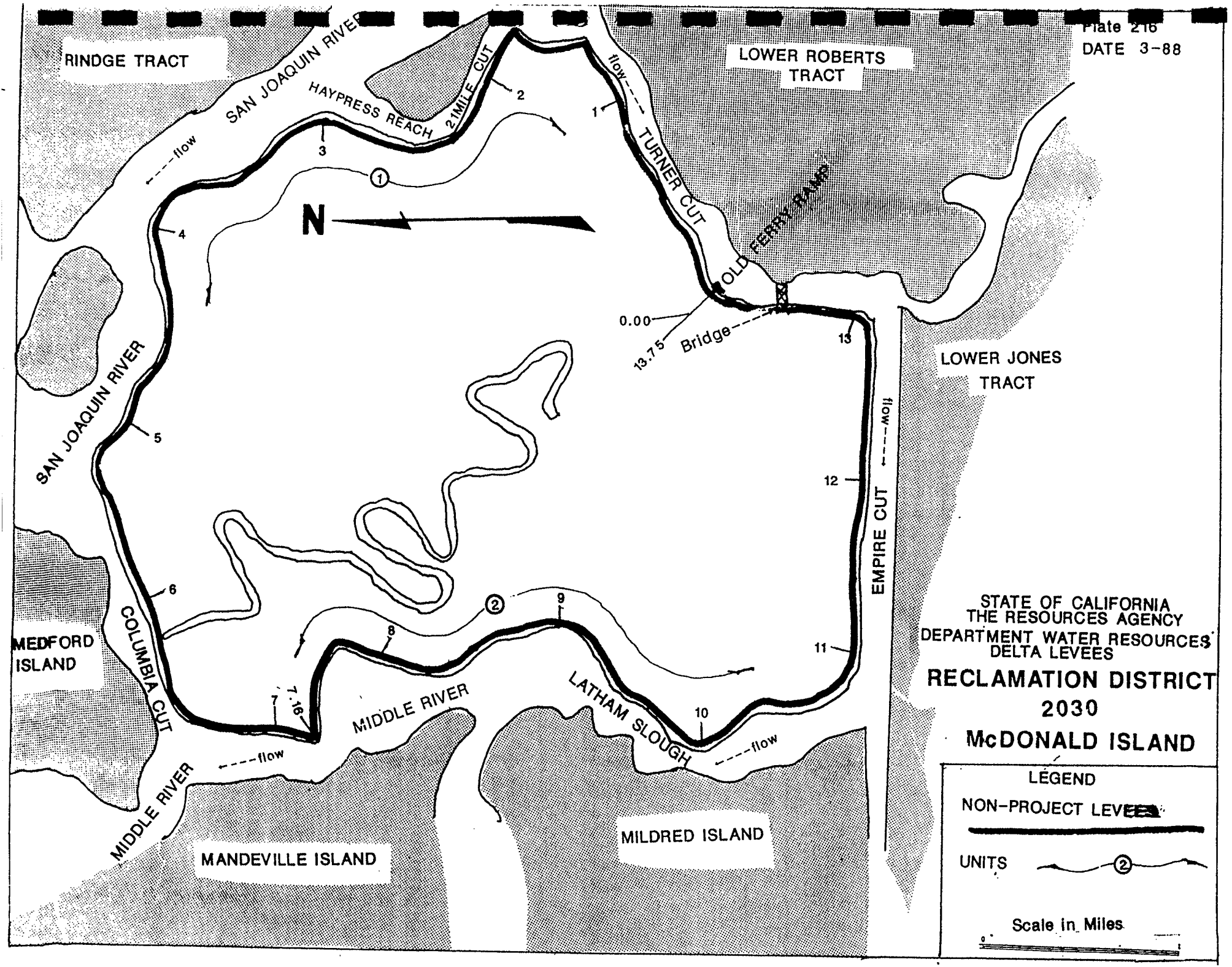
Plate 219
Date 2/88
9.0
9.34
8.0
Hwy 4
TRAPPER SLOUGH
7.0
2
LOWER
JONES
TRACT
Mokelumne Aquaduct
MIDDLE
ROBERTS
TRACT
N
Atcheson Topeka and Santa Fe RR
UPPER JONES TRACT
RD 2039
6.0
5.00
UNION
ISLAND
4.0
MIDDLE RIVER
Hwy 4
VICTORIA
ISLAND
3.0
1
2.0
Ferry
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT
2039
UPPER JONES TRACT
0.00
1.0
MIDDLE RIVER
WOODWARD ISLAND
BACON
Legend
NON PROJECT LEVEE
UNITS
2
Scale in Miles

D—031722



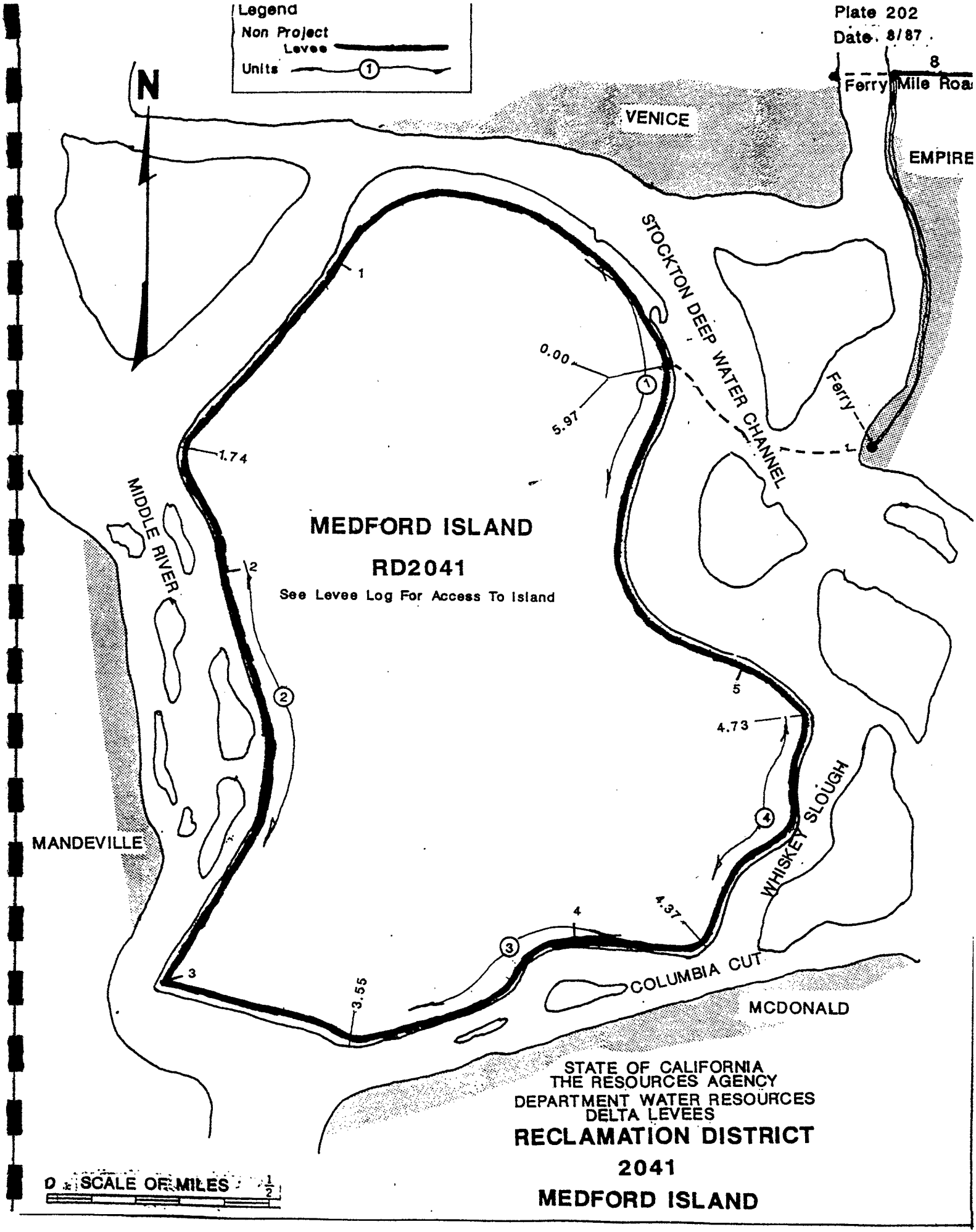

D-031723

D-031723

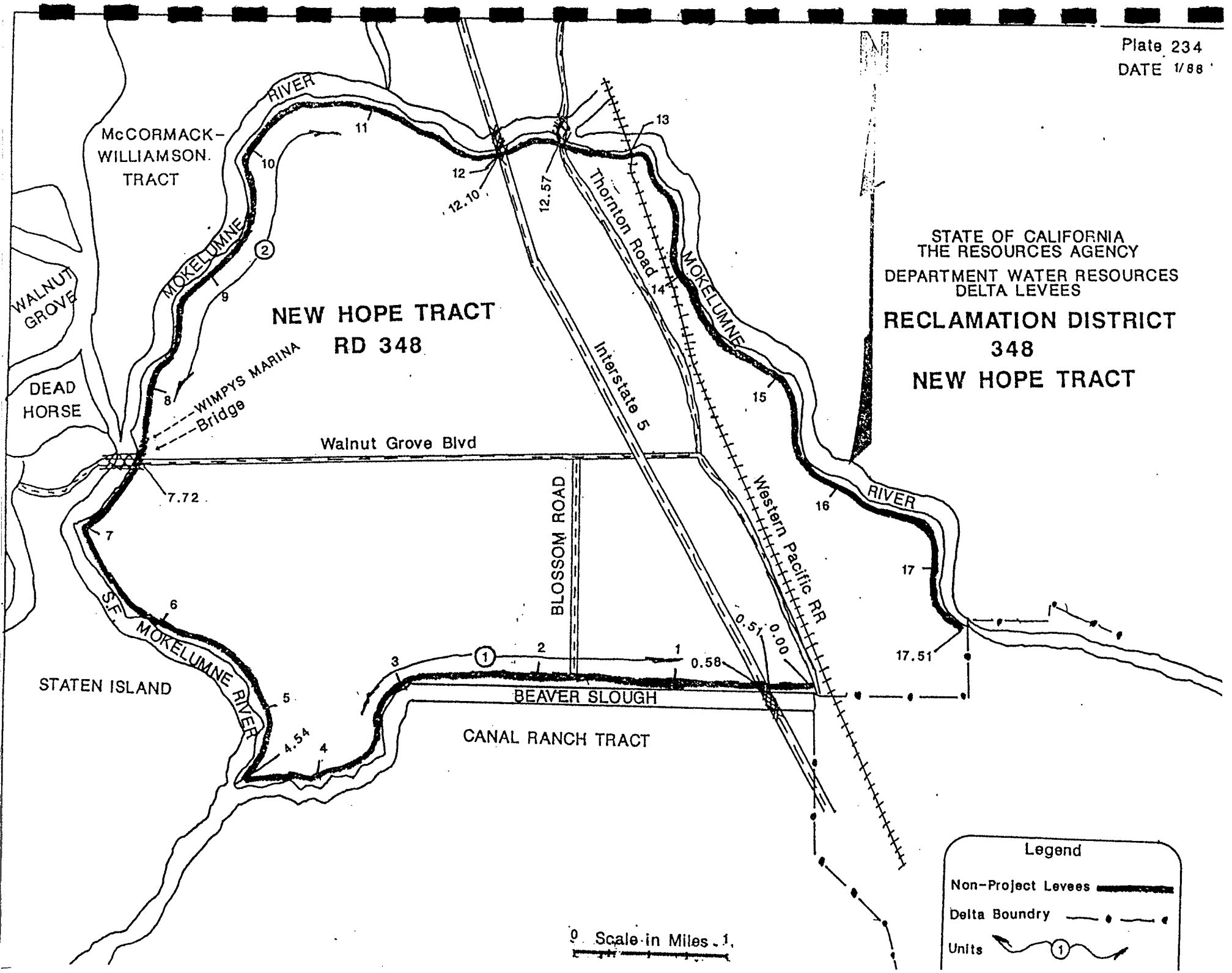



D-031724

D-031724


Legend
Non Project Levee
Units
Plate 202
Date. 8/87
N
VENICE
EMPIRE
Ferry Mile Road
STOCKTON DEEP WATER CHANNEL
Ferry
MIDDLE RIVER
MEDFORD ISLAND
RD2041
See Levee Log For Access To Island
MANDEVILLE
WHISKEY SLOUGH
COLUMBIA CUT
MCDONALD
0.00
5.97
1.74
4.73
4.37
3.55
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT
2041
MEDFORD ISLAND
SCALE OF MILES

D-031725




D-031726

D-031726

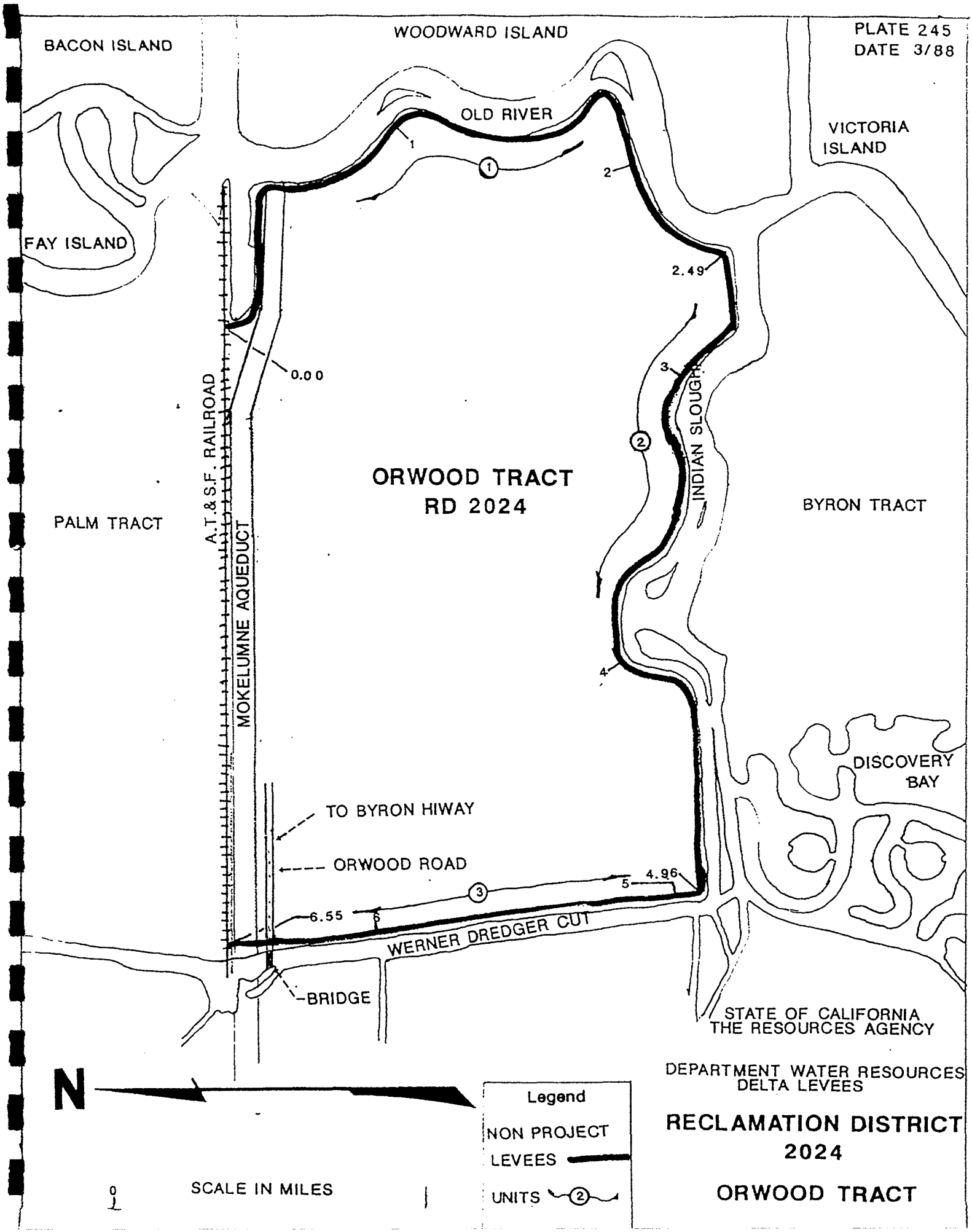
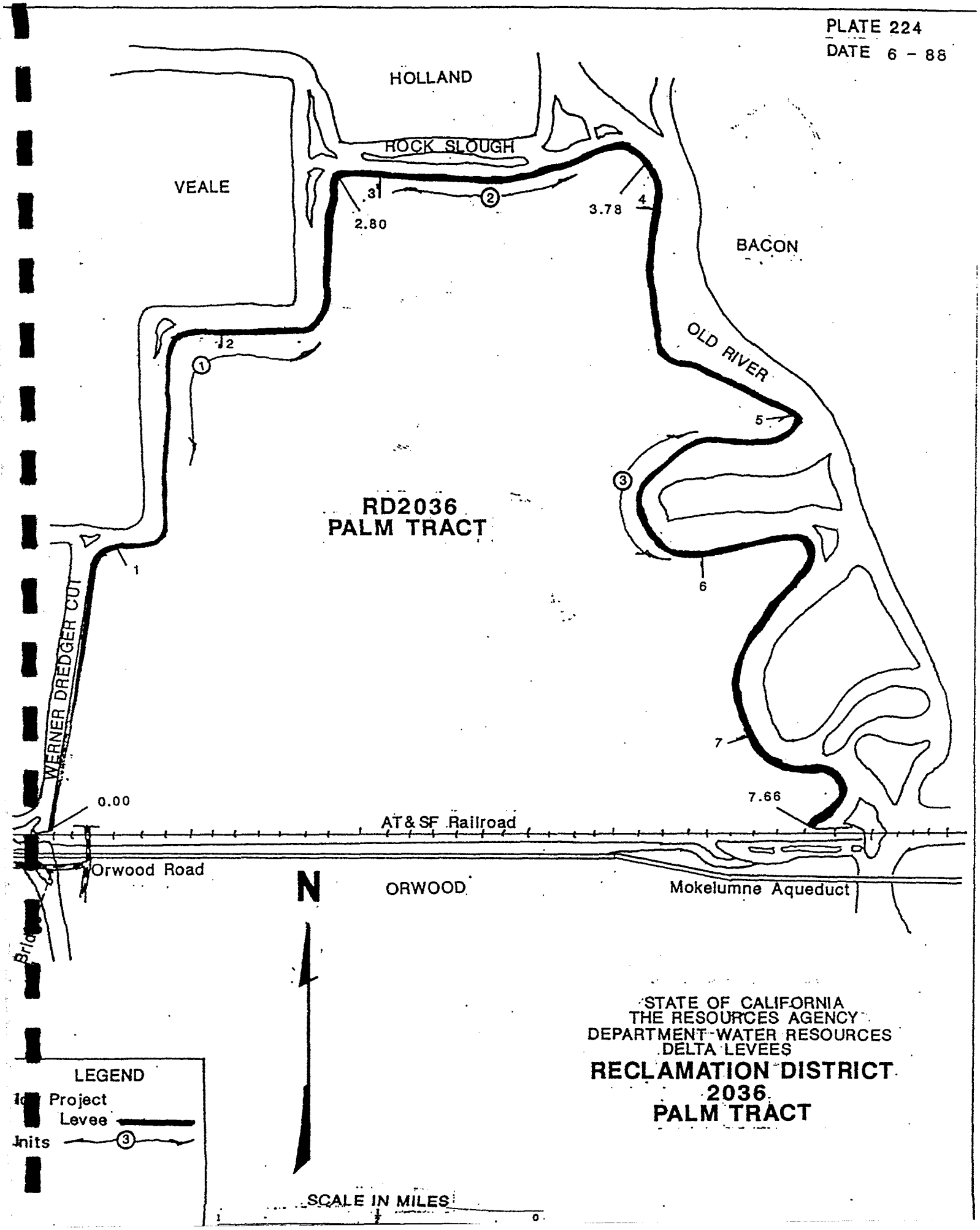


PLATE 245
DATE 3/88
BACON ISLAND
WOODWARD ISLAND
OLD RIVER
VICTORIA ISLAND
FAY ISLAND
1
2
2.49
0.00
3
INDIAN SLOUGH
ORWOOD TRACT
RD 2024
PALM TRACT
A.T.&S.F. RAILROAD
MOKELUMNE AQUEDUCT
BYRON TRACT
4
DISCOVERY BAY
TO BYRON HIWAY
ORWOOD ROAD
4.96
5
6.55
6
WERNER DREDGER CUT
BRIDGE
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
N
Legend
NON PROJECT LEVEES
UNITS
SCALE IN MILES
0
1
RECLAMATION DISTRICT 2024
ORWOOD TRACT

D—031727

PLATE 224
DATE 6 - 88




STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES

**RECLAMATION DISTRICT 2036**
**PALM TRACT**

D—031728

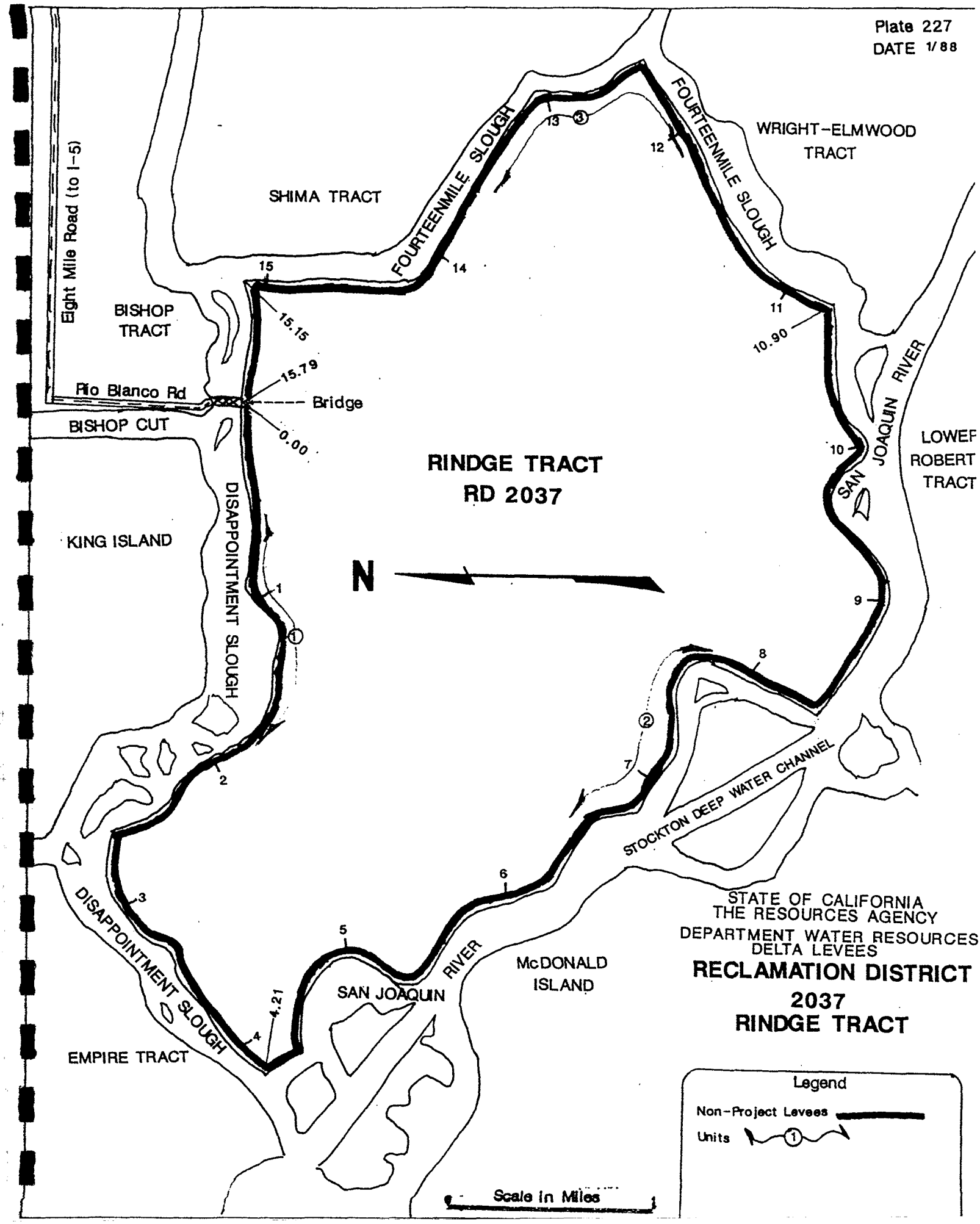
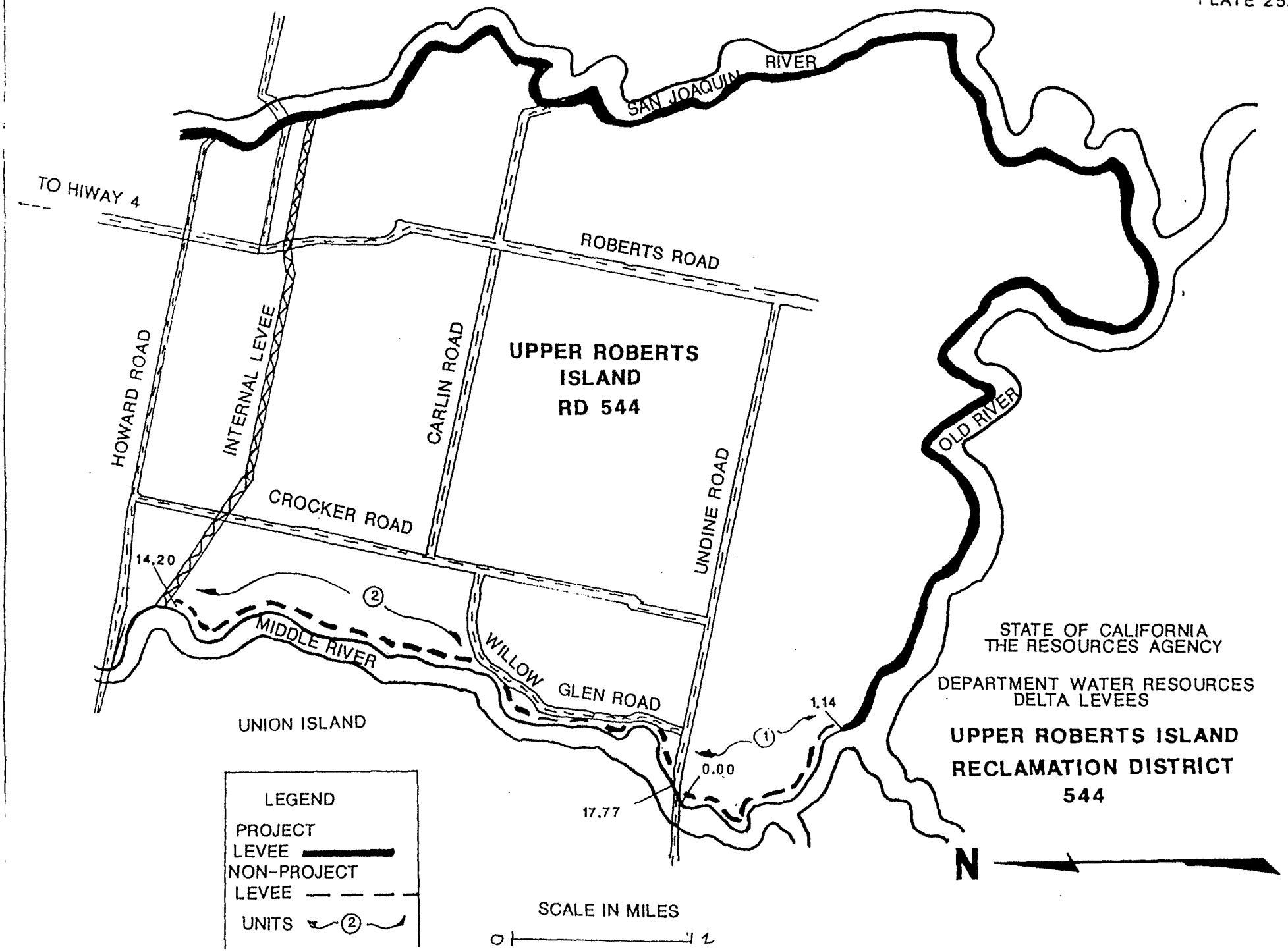


Plate 227
DATE 1/88
Eight Mile Road (to I-5)
SHIMA TRACT
FOURTEENMILE SLOUGH
FOURTEENMILE SLOUGH
WRIGHT-ELMWOOD TRACT
BISHOP TRACT
Rio Blanco Rd
Bridge
BISHOP CUT
15.15
15.79
0.00
10.90
SAN JOAQUIN RIVER
LOWER ROBERT TRACT
RINDGE TRACT
RD 2037
KING ISLAND
DISAPPOINTMENT SLOUGH
N
STOCKTON DEEP WATER CHANNEL
DISAPPOINTMENT SLOUGH
4.21
SAN JOAQUIN RIVER
McDONALD ISLAND
EMPIRE TRACT
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT
2037
RINDGE TRACT
Legend
Non-Project Levees
Units
Scale in Miles

D-031729

DATE 12/88
PLATE 252




D-031730

D-031730

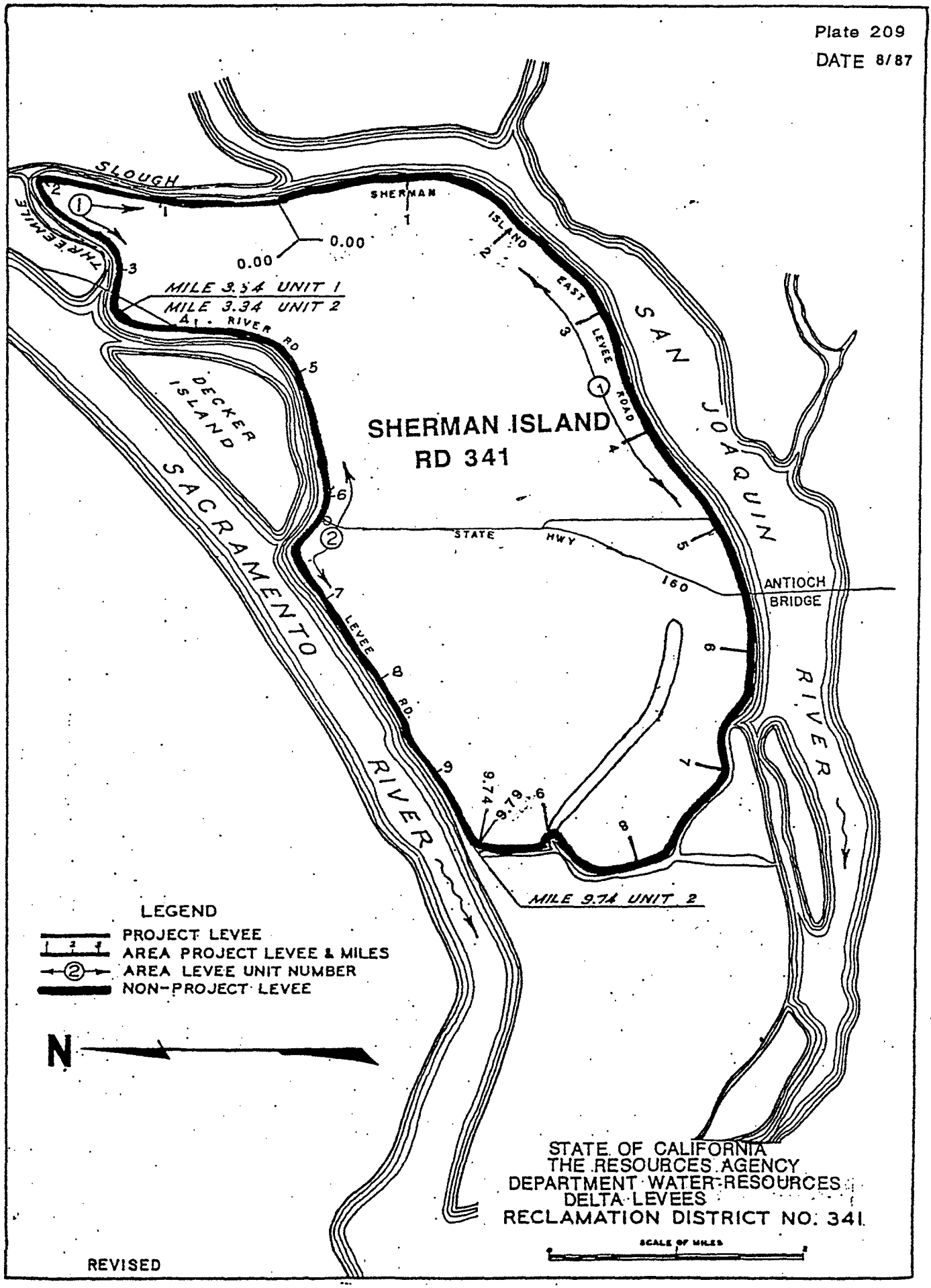


Plate 209
DATE 8/87
SLOUGH
THREE MILE
SHERMAN
ISLAND
EAST
LEVEE
ROAD
0.00
0.00
MILE 3.34 UNIT 1
MILE 3.34 UNIT 2
RIVER RD
DECKER ISLAND
SHERMAN ISLAND
RD 341
SAN JOAQUIN
SACRAMENTO
RIVER
STATE HWY 160
ANTIOCH BRIDGE
LEVEE RD.
9.74
9.79
MILE 9.74 UNIT 2
LEGEND
PROJECT LEVEE
AREA PROJECT LEVEE & MILES
AREA LEVEE UNIT NUMBER
NON-PROJECT LEVEE
N
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT NO. 341
SCALE OF MILES
REVISED

D—031731

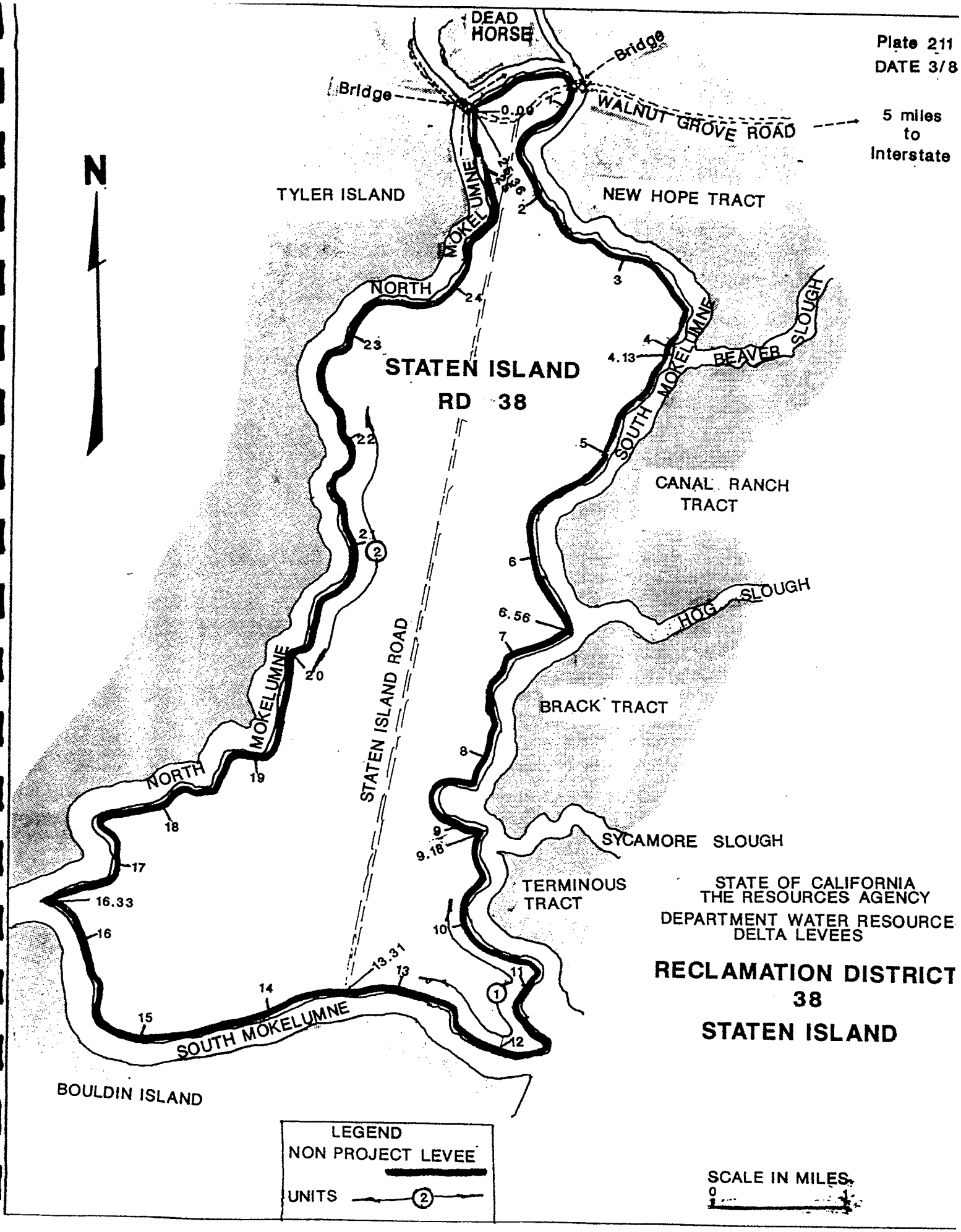


Plate 211
DATE 3/8
DEAD HORSE
Bridge
Bridge
WALNUT GROVE ROAD
5 miles to Interstate
N
TYLER ISLAND
NEW HOPE TRACT
NORTH MOKELUMNE
STATEN ISLAND
RD 38
SOUTH MOKELUMNE
BEAVER SLOUGH
CANAL RANCH TRACT
HOG SLOUGH
BRACK TRACT
STATEN ISLAND ROAD
SYCAMORE SLOUGH
TERMINOUS TRACT
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCE
DELTA LEVEES
RECLAMATION DISTRICT
38
STATEN ISLAND
SOUTH MOKELUMNE
BOULDIN ISLAND
LEGEND
NON PROJECT LEVEE
UNITS
SCALE IN MILES
0
1

D—031732

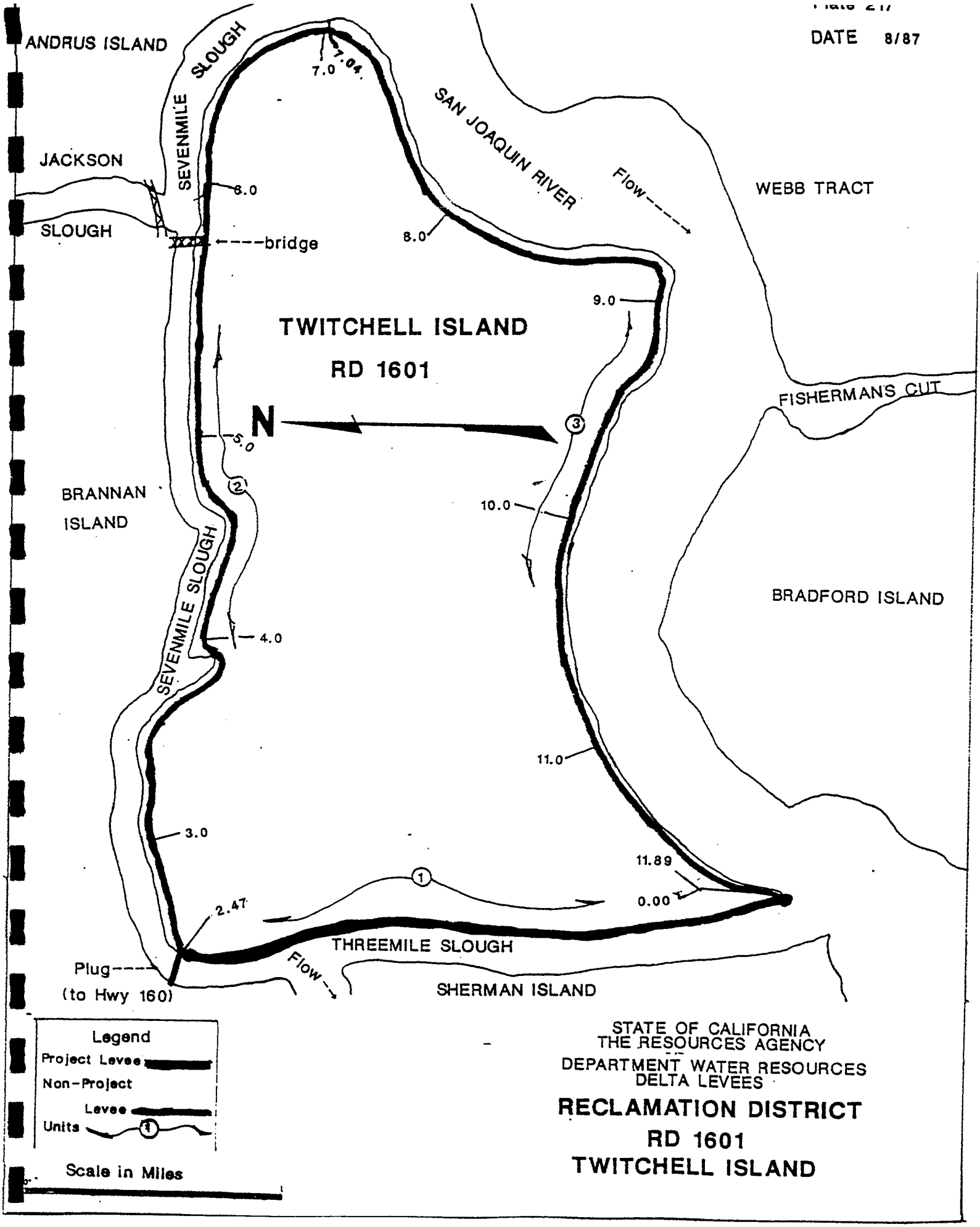


Plate 217
DATE 8/87
ANDRUS ISLAND
SEVENMILE SLOUGH
7.0
7.04
SAN JOAQUIN RIVER
Flow
WEBB TRACT
JACKSON
SLOUGH
6.0
bridge
8.0
9.0
TWITCHELL ISLAND
RD 1601
N
FISHERMAN'S CUT
5.0
BRANNAN
ISLAND
10.0
SEVENMILE SLOUGH
BRADFORD ISLAND
4.0
11.0
3.0
11.89
0.00
2.47
THREEMILE SLOUGH
Flow
Plug
(to Hwy 160)
SHERMAN ISLAND
Legend
Project Levee
Non-Project
Levee
Units
Scale in Miles
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT
RD 1601
TWITCHELL ISLAND

D-031733

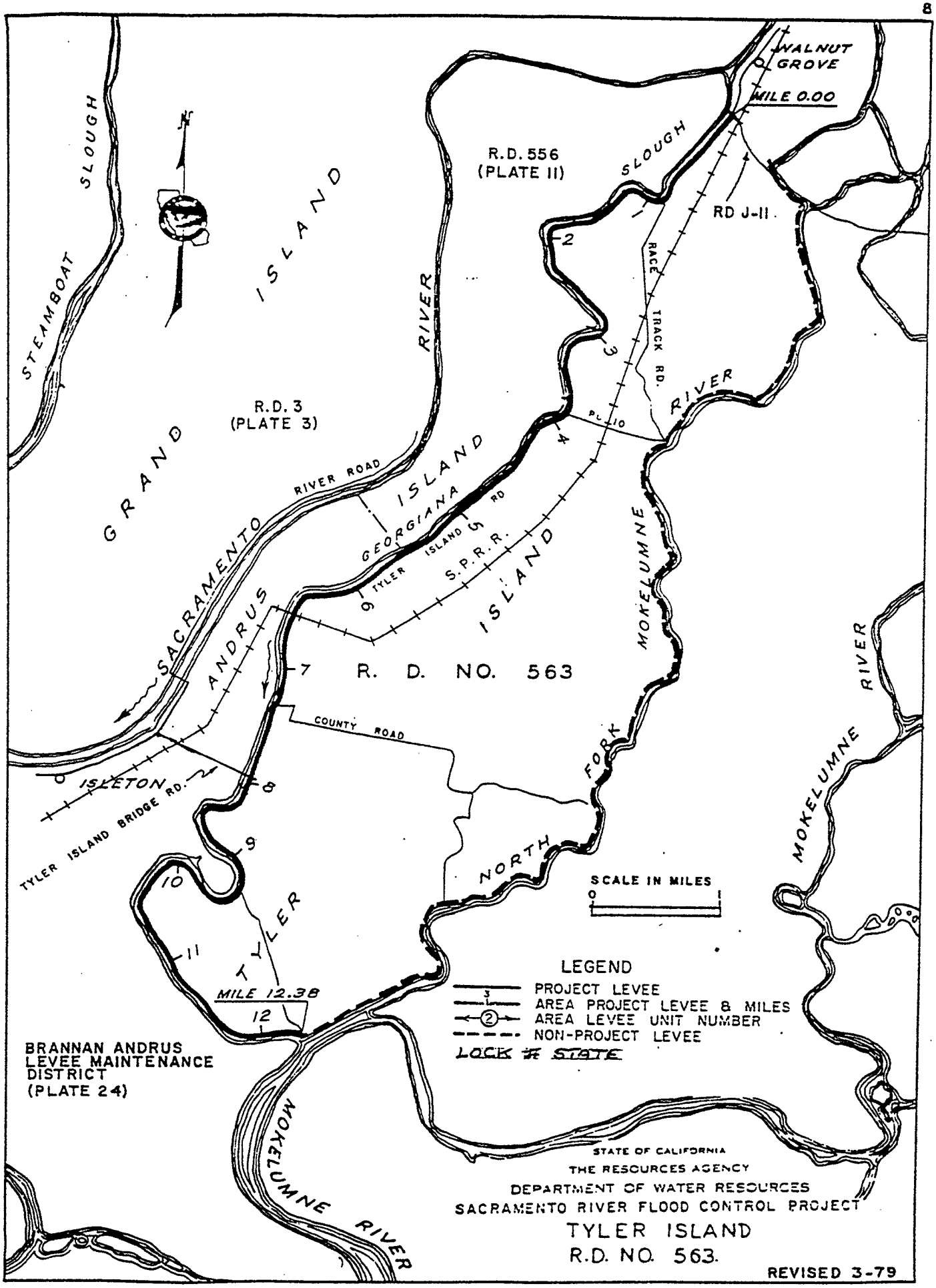
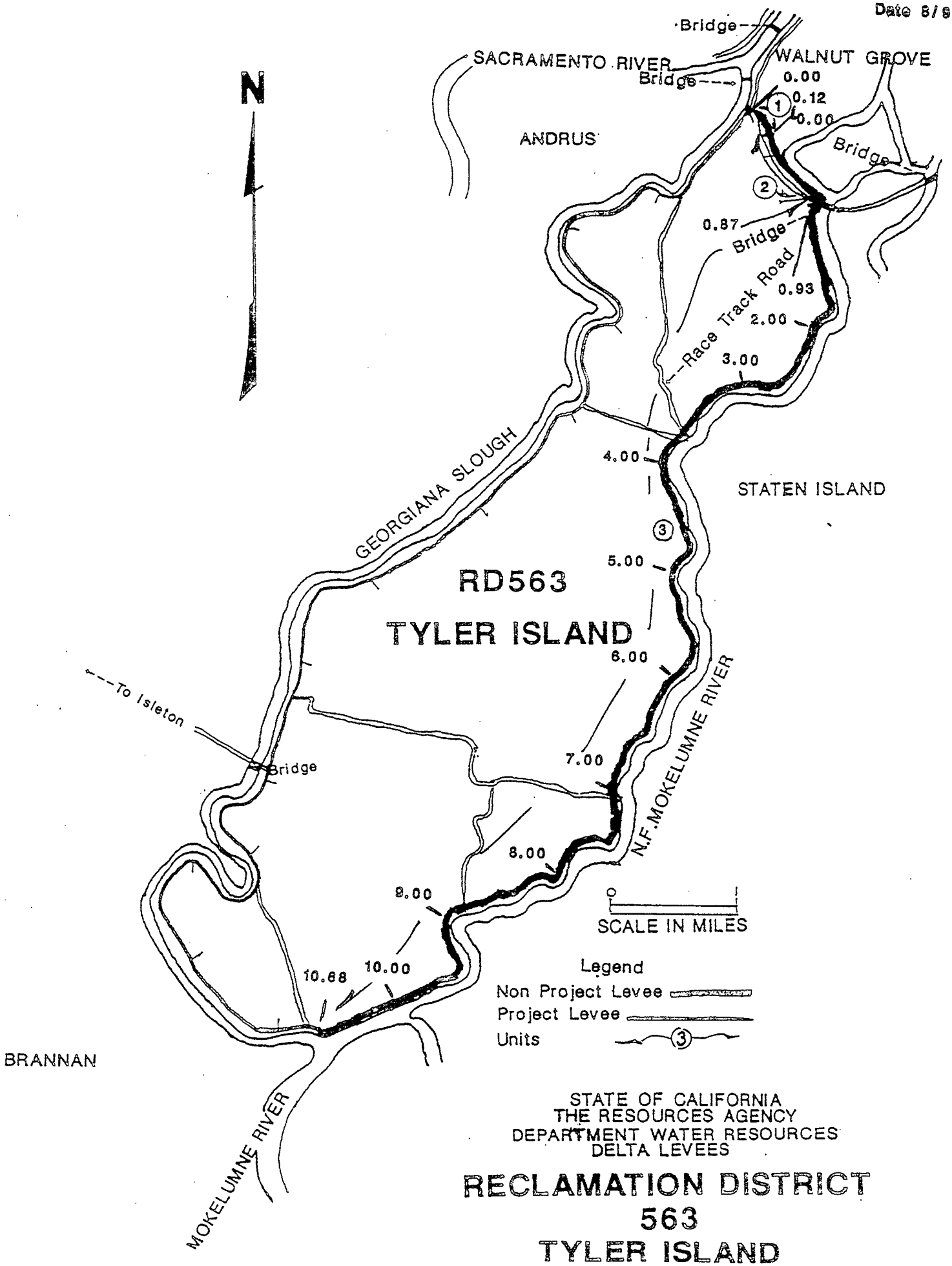

WALNUT GROVE
MILE 0.00
R.D. 556
(PLATE 11)
SLOUGH
RD J-11
RACE TRACK RD.
STEAMBOAT SLOUGH
GRAND ISLAND
RIVER
R.D. 3
(PLATE 3)
PL 10
RIVER
RIVER ROAD
GEORGIANA ISLAND
TYLER ISLAND G RD
S.P.R.R.
SACRAMENTO
ANDRUS ISLAND
MOKELUMNE
R. D. NO. 563
COUNTY ROAD
ISLETON
TYLER ISLAND BRIDGE RD.
NORTH FORK
MOKELUMNE RIVER
SCALE IN MILES
0 1
TYLER
MILE 12.38
LEGEND
PROJECT LEVEE
AREA PROJECT LEVEE & MILES
AREA LEVEE UNIT NUMBER
NON-PROJECT LEVEE
LOCK # STATE
BRANNAN ANDRUS
LEVEE MAINTENANCE
DISTRICT
(PLATE 24)
MOKELUMNE RIVER
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SACRAMENTO RIVER FLOOD CONTROL PROJECT
TYLER ISLAND
R.D. NO. 563.
REVISED 3-79

Plate 210
Date 8/86




STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES

# RECLAMATION DISTRICT 563 TYLER ISLAND

D—031735

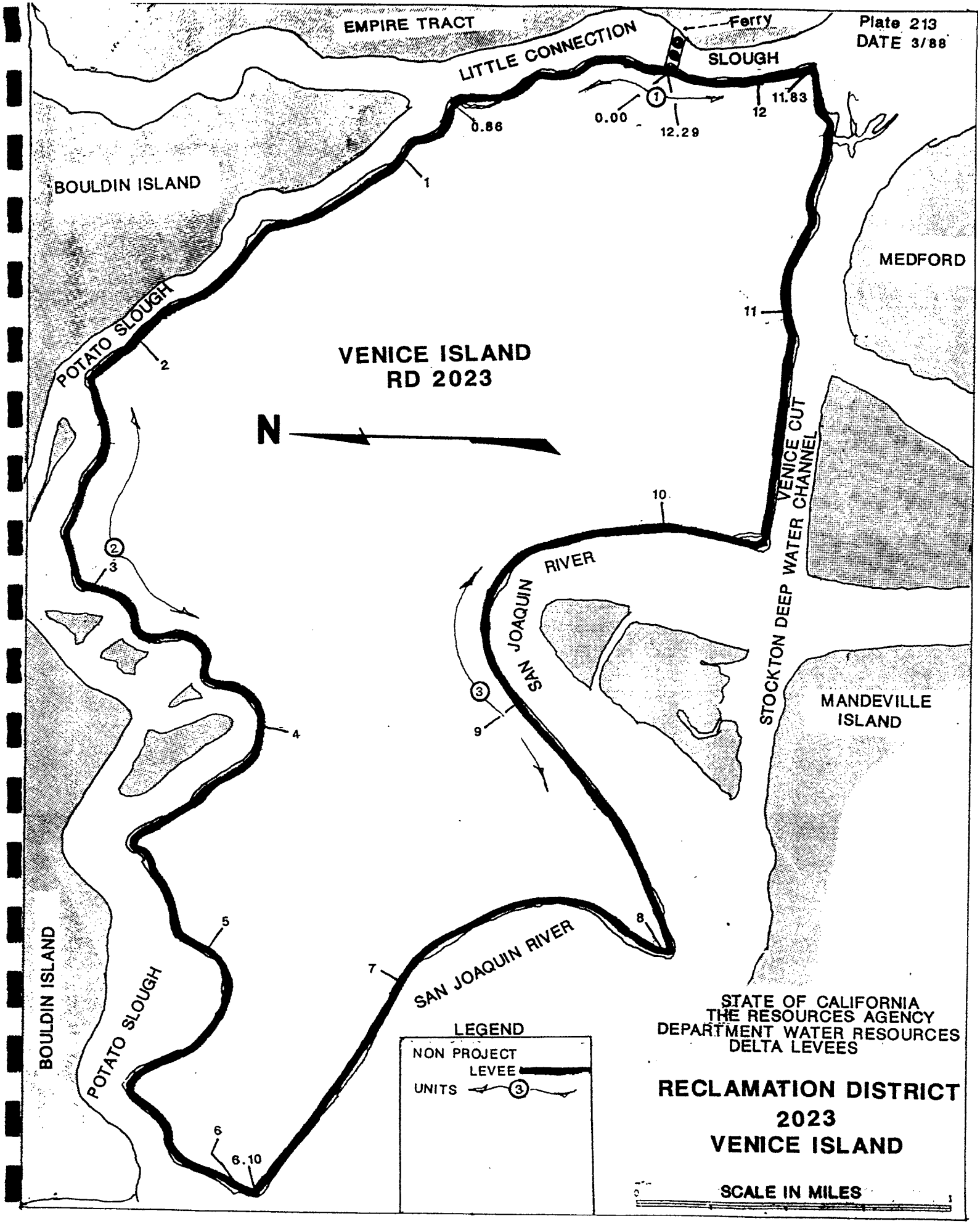
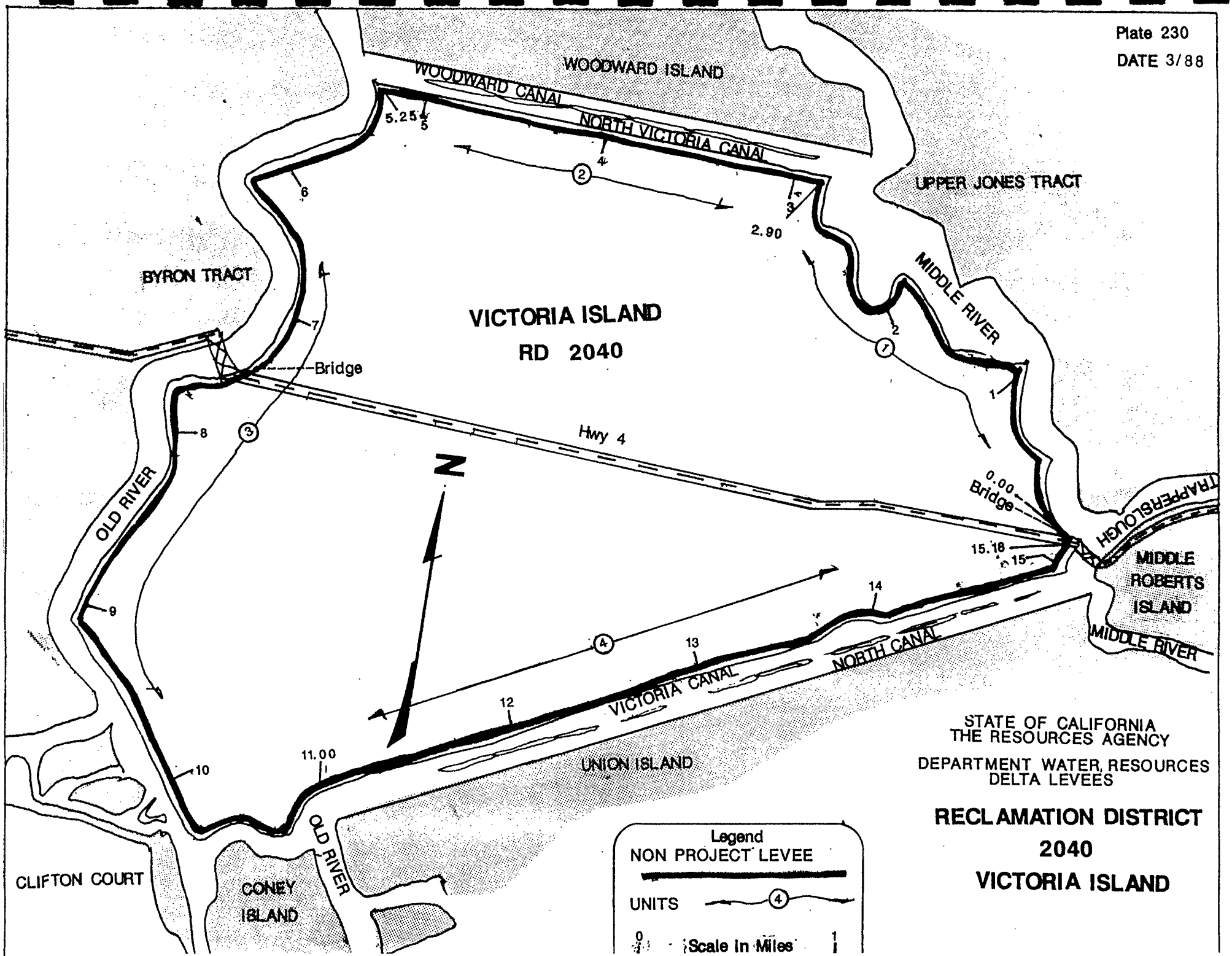


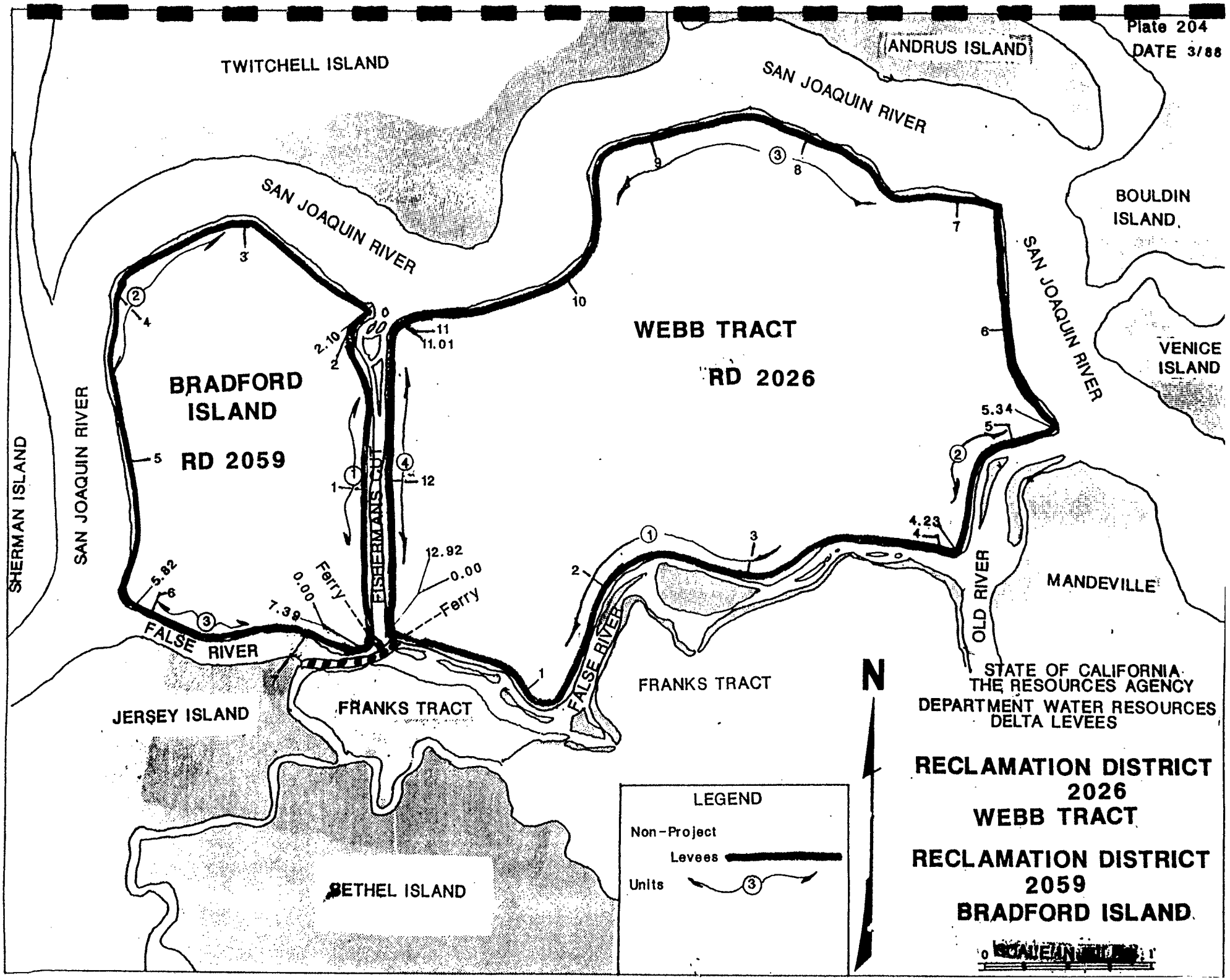
Plate 213
DATE 3/88
EMPIRE TRACT
Ferry
LITTLE CONNECTION
SLOUGH
0.00
12.29
11.83
12
0.86
1
BOULDIN ISLAND
MEDFORD
POTATO SLOUGH
2
11
VENICE ISLAND
RD 2023
N
VENICE CUT
STOCKTON DEEP WATER CHANNEL
10
SAN JOAQUIN
RIVER
3
9
4
MANDEVILLE
ISLAND
5
8
7
SAN JOAQUIN RIVER
BOULDIN ISLAND
POTATO SLOUGH
6
6.10
LEGEND
NON PROJECT
LEVEE
UNITS
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT WATER RESOURCES
DELTA LEVEES
RECLAMATION DISTRICT
2023
VENICE ISLAND
SCALE IN MILES

D—031736




D-031737

D—031737




D-031738

D—031738

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