0 2007 0037085 7
CALIFORNIA STATE LIBRARY

THE SETTLEMENT GEOGRAPHY OF
THE SACRAMENTO - SAN JOAQUIN
DELTA, CALIFORNIA
PT. 1

THOMPSON, J. 1958

U·M·I Dissertation
Information Service

THE SETTLEMENT GEOGRAPHY
OF THE
SACRAMENTO-SAN JOAQUIN DELTA, CALIFORNIA

A DISSERTATION
SUBMITTED TO THE COMMITTEE ON GRADUATE STUDY
OF STANFORD UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN
GEOGRAPHY

By
John Thompson

December 1957

C-076886
C—076886

PREFACE

This study of the Sacramento-San Joaquin Delta is an attempt to apply geographical principles to the settlement of a delta area in a highly advanced technological society. This is one of the first delta areas of the world to be developed with modern machinery and reclamation methods instead of under the primitive methods which have been applied to other deltas of the world. Among the delta's serious physical handicaps to permanent settlement and agricultural productivity were river and tidal floods, levee and soil subsidence, salt-water incursion, and wind erosion. Periodically the attempted corrective measures in engineering and legislation have added to the physical problems.

The nature of the delta as it appears today is the product of changes wrought by physical and cultural agencies chiefly in the past century. To understand the problems of settlement of this delta under modern conditions one must analyze the physical setting as well as the many human activities which have been essential in winning the delta area for agricultural production. Reminders of this cultural imprint are most evident in the levees, the land cover, local relief, soils, and the outline of islands and channels. The Sacramento-San Joaquin Delta does not fit the usual deltaic

ramento and San Joaquin rivers enter two of the corners of the triangle and form many distributaries which are confined in a single drainage channel to Suisun Bay and subsequently into San Pablo and San Francisco bays and eventually through the Golden Gate Channel into the Pacific Ocean.

Although the Sacramento-San Joaquin Delta is unique among world deltaic regions, there are physical similarities with the Fens of east coastal England and the reclaimed North Sea fringes of the West European Plain. The paper is offered as a basis for comparative study of the settlement geography of other deltas.

The research on the Sacramento-San Joaquin Delta began in the spring of 1955. Intensive field work was performed during that summer and frequent visits in all seasons continued to the present. In addition to field observation and interrogation, research in primary materials was conducted in the Bancroft Library and General Library of the University of California, the California State Library at Sacramento, the College of the Pacific Library, the Stanford University Library, and the Sacramento, San Francisco, and Stockton city libraries. Unpublished material of considerable value to this study was made available also by such United States agencies as the Bureau of Reclamation and the Bureau of Land Management in Sacramento, the District Court in San Francisco, and the Soil Conservation Service. The Division of Water Resources, the Reclamation Board, the University of

C-076887
C—076887

of California Department of Soils and Plant Nutrition also permitted access to their files or libraries. The courtesies which the various agencies extended to this writer were, together with advice and a "feeling" for the delta, realized through the aid of a number of individuals among whom Messrs. John McKeag, W. C. Fleming, John Spurlock, Alan Carlton, R. S. Baskett, John P. Underhill, John Golden, and Dr. Stanley W. Cosby are recalled as being particularly generous of time and effort. This writer also wishes to express gratitude to Mr. F. Hal Higgins, Mr. J. R. Morrison, Dr. J. N. Bowman, and Mr. William Q. Wright for their initiative in bringing information to his attention.

Deep appreciation is due to Professors Joseph E. Williams, E. Louise Peffer, and Paul F. Griffin for shaping the perspective and guiding the exposition of facts and ideas in this paper. The writer also wishes to thank the following students who executed most of the cartographic work: Sabina M. Pyzell, Nancy S. Johnson, Janet M. O'Hara, Nicholas A. Vaksvik, Barbara Westinghouse, Wayne R. Irvin, V. Kay Vinson, and Hugh N. March. A final acknowledgment is due to Miss Liselotte B. Hofmann and Mrs. Jean S. Thompson for their editorial suggestions and typing.

TABLE OF CONTENTS

	Page
PREFACE	iii
LIST OF TABLES	xii
LIST OF MAPS	xiii
LIST OF PLATES	xv
LIST OF MAP PLATES	xvii
LIST OF ABBREVIATIONS	xviii
INTRODUCTION	2
PART ONE: PHYSICAL GEOGRAPHY	
Chapter	
I. THE DELTA, ITS HYDROGRAPHY AND LAND FORMS	7
The Delta Characteristics	12
Delimiting the Delta	15
The Tidal Basin	21
Salinity in the Delta	22
The Sacramento River	26
The San Joaquin River	30
Lesser Delta Affluents	31
Natural Levees	33
The Basins	41
The Islands	42
Hydrography and Cultural Modifications of the Delta	43
II. THE DELTA VEGETATION, CLIMATE, SOILS, AND FAUNA	51
Vegetation	51
Climate	60
Delta Soils	64
Delta Soil Classification	66
Organic Soils	69
Mineral Organic Soils	71
Mineral Soils	72
Soil Conservation	74
Fauna	83

C-076888

C—076888

III. EXPLORATION OF THE DELTA 88

Preliminary Discoveries, 1772-76 88
Comparative Inactivity, 1777-1806 93
Mission-Site Reconnaissance, 1806-12 94
Frontier Warfare, 1813-45 96

IV. TRAPPER EXPLOITATION OF THE DELTA 101

Jedediah Smith's Discovery, 1827-28 101
McLeod and Ogden Brigades, 1828-30 103
Laframboise and Work Brigades, 1832-33 . . . 104
A Decade of Complications, 1834-43 105

V. SEDENTARY OCCUPATION OF THE DELTA AND VICINITY 110

Indians of the Delta 110
Delta Vicinity Land Grants 112
Los Meganos 112
Los Medanos 115
New Helvetia 116
El Pescadero Grants 119
Los Ulpinos 120
Campo de los Franceses 120
Sanjon de los Moquelumnes and Rancho Moquelamo 122
Other Settlement 122
Settlement and Politics, 1846-47 123
Colony Development, 1846-47 126
Campo de los Franceses 126
Los Ulpinos 127
Montezuma and New Hope 128
New Helvetia and Sutterville 128
Effects of Sedentary Occupation 129

VI. THE GOLD RUSH AND THE DELTA 133

Water Travel through the Delta 135
Delta Settlement 139
Trade and Transportation Nodes 144
Stockton 145
French Camp 147
The San Joaquin Crossing 148
Antioch 150

PART THREE: RECLAMATION AND LAND USE

VII. HYDROGRAPHIC PROBLEMS AND SOLUTIONS IN THE DELTA 152

Hydrographic Problems 152
Floodplain Shrinkage 152
Alluviation 153
Salt-Water Penetration 158
Seeking Corrective Measures 159
Early Public Opinion 159
State Engineer's Investigation 161
Board of Drainage Commissioners 164
Court Injunctions 166
The Federal Government and Navigation . . 167
The California Debris Commission 168
Manson and Grunsky Plan 170
Implementing Correctives 170
Navigation Improvement by the Corps of Engineers 170
The Dabney Commission 173
The Minor Project 174
The Major Project 175
Salt-Water Invasion 179
The Central Valley Project 180
Recent Salinity and Delta Flood Protection Investigations 182

VIII. SWAMPLAND LEGISLATION 185

Defining Swamp and Overflowed Land 187
Early Swamp and Overflowed Land Policy . . . 192
Locating Swamp and Overflowed Tracts 195
Board of Reclamation Commissioners 196
County Administration of Swamp and Overflowed Land 198
The Reclamation Board 204

IX. RECLAMATION SEQUENCE 208

Reclamation Initiated 210
Projects of the Board of Reclamation Commissioners 213
Independent Reclamation 218
The Large-Scale Reclamation Operators . . . 225
Tide Land Reclamation Company 226
Glasgow-California Land and Reclamation Company 232
George Shima 234
Cumulative Reclamation 237

X. RECLAMATION METHODS 239

Levee Fill 239
Damming Sloughs 244
The Levees 245
Levee Maintenance 251

C-076889
C-076889

XI. THE LABOR FORCE AND EQUIPMENT OF RECLAMATION . 260

Employing Men and Horses 260
Dredging Equipment 265
Ditch Diggers 272
Pumps 274
Reclamation Costs 282

XII. BREAKING AND DISPOSING OF THE LAND 287

Removing the Tules 290
Breaking the Soil with Fire 290
Breaking the Soil with the Plow 294
Traction Engines and Tractors 296
Land-Breaking Costs and Value Increment . . 298
Tenantry 300

XIII. LAND USE IN THE DELTA 307

Growth of Agriculture, 1849-1900 309
Agriculture, 1900-24 312
Agriculture, 1924-57 315
Food and Industrial Crops 318
Subsistence and Commercial Gardening . . . 318
Potatoes 330
Beans 337
Asparagus 343
Celery 351
Sugar Beets 352
Onions 357
Tree Crops 358
Chicory 371
Seed Crops 372
Miscellaneous Crops 374
Feed Crops 374
The Small Grains 374
Field Corn and Milo 382
Alfalfa Hay and Pasture 384
Livestock 387
Early Stock Movement 388
Sheep 391
Dairying 394
Beef Cattle 396
Swine 398
Horses 400
Hunting 401

XIV. TRANSPORTATION AND TOWN DEVELOPMENT 403

Water Transportation 403
Water Transportation and the Railroads . . . 410

Decline of Water Transportation 412
Towns and Other Communities 415
Mokelumne City 417
New Hope 418
Rio Vista 418
Emmaton 420
Onisbo, Hagginsville, and Venice 421
Maine Prairie, Moore's Landing, and Banta 422
Freeport and Brack's Landing 423
Antioch and Stockton 424
Walnut Grove 426
Courtland 428
Isleton 429
Clarksburg 431
Ranch Communities 432
Resort Communities 435

CONCLUSIONS 442

APPENDIX A. FLOODS IN THE DELTA 446

Floods of 1850 to 1861 446
The Flood of 1861/62 447
Floods, 1862 to 1877 449
Floods of 1878 451
Floods, 1879 to 1903 455
Floods, 1904 to 1911 459
Later Floods 463

APPENDIX B. RECLAIMED COMPONENTS OF THE DELTA 468

Unrestrained Reclamation 468
Sacramento and Mokelumne Districts 469
Sutter Island 470
Merritt Island 470
Ryer Island 471
Grand Island 472
Pierson District 474
Andrus Island 475
Tyler Island 476
Staten Island 477
Bouldin Island 478
Sherman Island 479
Brannan and Twitchell Islands 482
Southern San Joaquin Islands and Mainland . 482
Reclamation District 17 483
Rough and Ready Island 484
Roberts Island 486
Union Island 490
Pescadero Properties 492

C-076890

0 6 8 9 7 0 — C

The Mokelumne and Calaveras Mainland 494
Mokelumne Tracts 495
Calaveras Tracts 497
West Delta Districts 498
North Delta Margin 502
Central Delta 503
Sacramento Basin Districts 505
Yolo Basin Districts 506
Cache Slough Districts 506
Holland District 508

BIBLIOGRAPHY 510

C-076891
C—076891