Irrigated Lands Regulatory Program

Existing Conditions Report

December 2008

Prepared For:

Central Valley Regional Water Quality Control Board

11020 Sun Center Drive #200
Rancho Cordova, CA 95670

Prepared By:

ICF Jones & Stokes
an ICF International Company

630 K Street, Suite 400
Sacramento, CA 95814

Irrigated Lands Regulatory Program

Existing Conditions Report

Prepared for:

State Water Resources Control Board,
California Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670
Contact: Adam Laputz

Prepared by:

ICF Jones & Stokes
630 K Street, Suite 400
Sacramento, CA 95814
Contact: Russ Grimes or Mike Rushton
916/737-3000

December 2008

ICF Jones & Stokes. 2008. *Irrigated Lands Regulatory Program Existing Conditions Report*. December. (ICF J&S 05508.05.) Sacramento, CA. Prepared for the State Water Resources Control Board and Central Valley Regional Water Quality Control Board, Rancho Cordova, CA.

Contents

Page

Chapter 1 Introduction 1-1
Background 1-1
Irrigated Lands Regulatory Program 1-2
Purpose of This Report 1-2
Program Boundaries and Subdivisions 1-3
Methodology for Data Collection 1-4
Report Organization 1-5
Preparers 1-5

Chapter 2 Regulatory Setting 2-1
Introduction 2-1
Federal Programs Affecting Irrigated Lands Discharges 2-1
State Programs Affecting Irrigated Lands Discharges 2-5
County/Regional Programs Affecting Irrigated Lands Discharges 2-15

Chapter 3 Surface Water Quality 3-1
Introduction 3-1
Importance of Surface Water 3-2
Organization and Elements 3-4
General Sources of Information 3-6
Overview of Agricultural Impacts on Surface Waters of the Central Valley 3-10
I. Sacramento River Basin 3-12
Introduction 3-12
Overview of Agricultural Impacts on Surface Water in the Sacramento River Basin 3-12
I.A Pit River Watershed 3-14
I.B Shasta-Tehama Watershed 3-19
I.C Upper Feather River–Upper Yuba River Watershed 3-25
I.D Colusa Basin Watershed 3-30
I.E Butte-Sutter-Yuba Watershed 3-35
I.F Lake-Napa Watershed 3-40
I.G Solano-Yolo Watershed 3-44
I.H American River Watershed 3-48
II. San Joaquin River Basin 3-54
Introduction 3-54

Overview of Agricultural Impacts on Surface Water in the San Joaquin River Basin 3-54
II.A Cosumnes River Watershed 3-56
II.B Delta-Mendota Canal Watershed 3-60
II.C San Joaquin River Watershed 3-66
II.D San Joaquin Valley Floor Watershed 3-69
II.E Delta-Carbona Watershed 3-77
II.F Ahwahnee Watershed 3-84
II.G Mariposa Watershed 3-88
II.H Upper Mokelumne River–Upper Calaveras River Watershed 3-90
II.I Merced River Watershed 3-94
II.J North Valley Floor Watershed 3-97
II.K Stanislaus River Watershed 3-103
II.L Tuolumne River Watershed 3-106
III. Tulare Lake Basin 3-110
Introduction 3-110
Overview of Agricultural Impacts on Surface Water in the Tulare Lake Basin Watershed 3-110
III.A Kings River Watershed 3-112
III.B Kaweah River Watershed 3-116
III.C Kern River Watershed 3-120
III.D South Valley Floor Watershed 3-124
III.E Grapevine Watershed 3-134
III.F Coast Range Watershed 3-137
III.G Fellows Watershed 3-141
III.H Temblor Watershed 3-144
III.I Sunflower Valley Watershed 3-147
III.J Southern Sierra Watershed 3-150

Chapter 4 Groundwater Quality 4-1
Introduction 4-1
Importance of Groundwater 4-1
Potential Agricultural Impacts to Groundwater Quality 4-4
Constituents of Concern in Groundwater Related to Agriculture 4-5
Groundwater Vulnerability to Pollution 4-7
Organization and Elements 4-8
General Sources of Information 4-8
Groundwater Basins 4-8
Sacramento River Basin 4-9
San Joaquin Valley Groundwater Basin 4-9
Sacramento River Basin—Introduction 4-10
Overview of Agricultural Chemical Impacts to Groundwater 4-10
Sacramento River Basin—Subbasins 4-16
Antelope Subbasin—Sacramento Valley Basin 4-16
Bend Subbasin—Sacramento Valley Basin 4-20
Capay Valley Subbasin—Sacramento Valley Basin 4-22
Colusa Subbasin—Sacramento Valley Basin 4-25
Corning Subbasin—Sacramento Valley Basin 4-31
Dye Creek Subbasin—Sacramento Valley Basin 4-35
East Butte Subbasin—Sacramento Valley Basin 4-38

Los Molinos Subbasin—Sacramento Valley Basin 4-41
North American Subbasin—Sacramento Valley Basin 4-44
North Yuba Subbasin—Sacramento Valley Basin 4-49
Red Bluff Subbasin—Sacramento Valley Basin 4-56
Solano Subbasin—Sacramento Valley Basin 4-59
South American Subbasin—Sacramento Valley Basin 4-64
South Yuba Subbasin—Sacramento Valley Basin 4-69
Sutter Subbasin—Sacramento Valley Basin 4-75
Vina Subbasin—Sacramento Valley Basin 4-81
West Butte Subbasin—Sacramento Valley Basin 4-85
Yolo Subbasin—Sacramento Valley Basin 4-92
South Fork Pit River Subbasin—Alturas Area Basin 4-96
Warm Springs Valley Subbasin—Alturas Area Basin 4-100
American Valley Basin 4-104
Antelope Creek Basin 4-105
Ash Valley Basin 4-107
Bear Valley Basin 4-108
Berryessa Valley Basin 4-109
Big Valley (5-15) Basin 4-111
Big Valley Basin (5-4) 4-114
Blanchard Valley Basin 4-116
Burney Creek Valley Basin 4-118
Burns Valley Groundwater Basin 4-119
Butte Creek Valley Basin 4-121
Cayton Valley Basin 4-122
Chrome Town Area Basin 4-123
Clear Lake Cache Formation Basin 4-125
Clover Valley Basin 4-127
Collayomi Valley Groundwater Basin 4-128
Coyote Valley Basin 4-130
Dixie Valley Basin 4-132
Dry Burney Creek Basin 4-134
Egg Lake Valley Basin 4-135
Elk Creek Area Basin 4-136
Fall River Valley Basin 4-137
Funks Creek Basin 4-140
Goose Valley Basin 4-142
Fandango Valley Subbasin—Goose Lake Valley Basin 4-143
Lower Goose Lake Valley Subbasin—Goose Lake Valley Basin 4-145
Grays Valley Basin 4-148
Grizzly Valley Basin 4-149
High Valley Basin 4-150
Hot Springs Valley Basin 4-152
Humbug Valley Basin 4-154
Indian Valley Basin 4-156
Jess Valley Basin 4-157
Joseph Creek Basin 4-159
Lake Almanor Valley Basin 4-160
Lake Britton Area Basin 4-162
Last Chance Creek Valley Basin 4-163

Little Indian Valley Basin....4-164
Long Valley Basin (5-31)....4-166
Long Valley Basin (5-44)....4-167
Lower Lake Basin....4-168
McCloud Area Basin....4-170
Meadow Valley Basin....4-172
Middle Creek Basin....4-173
Middle Fork Feather River Basin....4-175
Mohawk Valley Basin....4-177
Mountain Meadows Valley Basin....4-179
North Fork Battle Creek Basin....4-180
North Fork Cache Creek Basin....4-182
Pope Valley Basin....4-183
Redding Basin—Introduction....4-185
Bowman Subbasin—Redding Basin....4-187
Rosewood Subbasin—Redding Basin....4-190
Anderson Subbasin—Redding Basin....4-192
Enterprise Subbasin—Redding Basin....4-195
Millville Subbasin—Redding Basin....4-197
South Battle Creek Subbasin—Redding Basin....4-199
Rock Prairie Valley Basin....4-202
Round Valley Basin....4-203
Scotts Valley Basin....4-205
Chilcoot Subbasin—Sierra Valley Basin....4-208
Sierra Valley Subbasin—Sierra Valley Basin....4-210
Squaw Flat Basin....4-213
Stony Gorge Reservoir Basin....4-214
Stonyford Town Area Basin....4-216
Toad Well Area Basin....4-217
Upper Lake Basin....4-218
Yellow Creek Valley Basin....4-221
San Joaquin Valley Groundwater Basin—Introduction....4-223
Overview of Agricultural Chemical Impacts to Groundwater....4-223
San Joaquin Valley Groundwater Basin—San Joaquin River Hydrologic Region Subbasins....4-226
Cosumnes Subbasin....4-226
Eastern San Joaquin Subbasin....4-228
Tracy Subbasin....4-231
Modesto Subbasin....4-233
Turlock Subbasin....4-236
Merced Subbasin....4-238
Delta-Mendota Subbasin....4-240
Chowchilla Subbasin....4-243
Madera Subbasin....4-245
San Joaquin Valley Groundwater Basin—Tulare Lake Hydrologic Region Subbasins....4-248
Westside Subbasin....4-248
Kings Subbasin....4-251
Tulare Lake Subbasin....4-254
Kaweah Subbasin....4-256
Tule Subbasin....4-259

Kern County Subbasin 4-261
Pleasant Valley Subbasin 4-264
Small Groundwater Basins 4-267
Panoche Valley Groundwater Basin 4-267
Kern River Valley Groundwater Basin 4-268
Walker Basin Creek Valley Groundwater Basin 4-270
Cummings Valley Groundwater Basin 4-272
Tehachapi Valley West Groundwater Basin 4-274
Castaic Lake Valley Groundwater Basin 4-276
Vallecitos Creek Valley Groundwater Basin 4-278
Brite Valley Groundwater Basin 4-279
Cuddy Canyon Valley Groundwater Basin 4-280
Cuddy Ranch Area Groundwater Basin 4-282
Cuddy Valley Groundwater Basin 4-284
Mil Portero Area Groundwater Basin 4-285

Chapter 5 Management Practices 5-1
Introduction 5-1
Organization 5-1
Irrigated Lands Management Practices 5-2
Sources of Information and Data 5-2
Legal and Regulatory Requirements 5-2
Water Quality Constituents 5-2
Management Practices 5-4
Proven Management Practices 5-5
Known Management Practices 5-11
Funding Resources 5-24
Statewide Grant Programs 5-24
Proposition 84 5-25
Wetland Management Practices— Sacramento Valley Subbasins 5-27
Pit River Subbasin 5-27
Colusa Subbasin 5-29
Butte-Yuba-Sutter Subbasin 5-32
Solano-Yolo Subbasin 5-35
Wetland Management Practices— San Joaquin Valley Subbasins 5-39
West Side San Joaquin Valley Subbasin 5-39
East Side San Joaquin Valley Subbasin 5-44
Wetland Management Practices— Tulare Lake Subbasin 5-46
Discussion 5-48

Chapter 6 References 6-1
Printed References and Websites 6-1

Appendix A Surface Water Quality Data
[Data files are on a separate compact disc.]

Appendix B Flow Data Tables

Appendix C Water Quality Objectives

Tables

On Page

3-1 Land Use Acreage according to DWR Land Use Data for the Pit River Watershed 3-14

3-2 Beneficial Uses in the Pit River Watershed 3-16

3-3 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Pit River Watershed 3-18

3-4 Land Use Acreage according to DWR Land Use Data for the Shasta-Tehama Watershed 3-20

3-5 Beneficial Uses in the Shasta-Tehama Watershed 3-21

3-6 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Shasta-Tehama Watershed 3-24

3-7 Land Use Acreage according to DWR and FRAP Land Use Data for the Upper Feather River–Upper Yuba River Watershed 3-25

3-8 Beneficial Uses in the Upper Feather River–Upper Yuba River Watershed 3-27

3-9 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Upper Feather River–Upper Yuba River Watershed 3-29

3-10 Land Use Acreage according to DWR Land Use Data for the Colusa Basin 3-31

3-11 Beneficial Uses in the Colusa Basin Watershed 3-32

3-12 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Colusa Basin Watershed 3-34

3-13 Land Use Acreage according to DWR and FRAP Land Use Data for the Butte-Sutter-Yuba Watershed 3-35

3-14 Beneficial Uses in the Butte-Sutter-Yuba Watershed 3-37

3-15 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Butte-Sutter-Yuba Watershed 3-39

3-16 Land Use Acreage according to DWR Land Use Data for the Lake-Napa County Watershed 3-40

3-17 Beneficial Uses in the Lake-Napa Watershed 3-42

3-18 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Lake-Napa Watershed....3-43
3-19 Land Use Acreage according to DWR Land Use Data for the Solano-Yolo Watershed....3-44
3-20 Beneficial Uses in the Solano-Yolo Watershed....3-45
3-21 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Solano-Yolo Watershed....3-47
3-22 Land Use Acreage according to DWR and FRAP Land Use Data for the American River Watershed....3-48
3-23 Beneficial Uses in the American River Watershed....3-50
3-24 Known Agricultural Contaminants and Conditions That Affect Water Quality in the American River Watershed....3-53
3-25 Land Use Acreage according to DWR and FRAP Land Use Data for the Cosumnes River Watershed....3-56
3-26 Beneficial Uses in the Cosumnes River Watershed....3-58
3-27 Land Use Acreage according to DWR and FRAP Land Use Data for the Delta-Mendota Canal Watershed....3-60
3-28 Beneficial Uses in the Delta-Mendota Canal Watershed....3-62
3-29 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Delta-Mendota Canal Watershed....3-64
3-30 Land Use Acreage according to DWR and FRAP Land Use Data for the San Joaquin River Watershed....3-66
3-31 Beneficial Uses in the San Joaquin River Watershed....3-67
3-32 Land Use Acreage according to DWR and FRAP Land Use Data for the San Joaquin Valley Floor Watershed....3-69
3-33 Beneficial Uses by River in the San Joaquin Valley Floor Watershed....3-71
3-34 Known Agricultural Contaminants and Conditions That Affect Water Quality in the San Joaquin Valley Floor Watershed....3-76
3-35 Land Use Acreage according to DWR and FRAP Land Use Data for the Delta-Carbona Watershed....3-78
3-36 Beneficial Uses in the Delta-Carbona Watershed....3-79
3-37 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Delta-Carbona Watershed....3-82
3-38 Land Use Acreage according to DWR and FRAP Land Use Data for the Ahwahnee Watershed....3-84
3-39 Beneficial Uses in the Ahwahnee Watershed....3-85
3-40 Land Use Acreage according to DWR Land Use Data for the Mariposa Watershed....3-89
3-41 Land Use Acreage according to DWR and FRAP Land Use Data for the Upper Mokelumne River–Upper Calaveras River Watershed....3-90

3-42 Beneficial Uses in the Upper Mokelumne River–Upper Calaveras River Watershed....3-91
3-43 Land Use Acreage according to DWR and FRAP Land Use Data for the Merced River Watershed....3-94
3-44 Beneficial Uses in the Merced River Watershed....3-95
3-45 Land Use Acreage according to DWR and FRAP Land Use Data for the North Valley Floor Watershed....3-97
3-46 Beneficial Uses in the North Valley Floor Watershed....3-98
3-47 Known Agricultural Contaminants and Conditions That Affect Water Quality in the North Valley Floor Watershed....3-101
3-48 Land Use Acreage according to DWR and FRAP Land Use Data for the Stanislaus River Watershed....3-103
3-49 Beneficial Uses in the Stanislaus River Watershed....3-104
3-50 Land Use Acreage according to DWR Land Use Data for the Tuolumne River Watershed....3-106
3-51 Beneficial Uses in the Tuolumne River Watershed....3-107
3-52 Land Use Acreage according to DWR and FRAP Land Use Data for the Kings River Watershed....3-112
3-53 Beneficial Uses in the Kings River Watershed....3-113
3-54 Land Use Acreage according to DWR and FRAP Land Use Data for the Kaweah River Watershed....3-116
3-55 Beneficial Uses in the Kaweah River Watershed....3-117
3-56 Land Use Acreage according to DWR and FRAP Land Use Data for the Kern River Watershed....3-120
3-57 Beneficial Uses in the Kern River Watershed....3-121
3-58 Land Use Acreage according to DWR and FRAP Land Use Data for the South Valley Floor Watershed....3-124
3-59 Beneficial Uses in the South Valley Floor Watershed....3-126
3-60 Known Agricultural Contaminants and Conditions That Affect Water Quality in the South Valley Floor Watershed....3-132
3-61 Land Use Acreage according to DWR and FRAP Land Use Data for the Grapevine Watershed....3-134
3-62 Beneficial Uses in the Grapevine Watershed....3-135
3-63 Land Use Acreage according to DWR and FRAP Land Use Data for the Coast Range Watershed....3-137
3-64 Beneficial Uses in the Coast Range Watershed....3-138
3-65 Known Agricultural Contaminants and Conditions That Affect Water Quality in the Coast Range Watershed....3-140

3-66 Land Use Acreage according to DWR and FRAP Land Use Data for the Fellows Watershed 3-141
3-67 Beneficial Uses in the Fellows Watershed 3-142
3-68 Land Use Acreage according to DWR and FRAP Land Use Data for the Temblor Watershed 3-144
3-69 Beneficial Uses in the Temblor Watershed 3-145
3-70 Land Use Acreage according to DWR and FRAP Land Use Data for the Sunflower Valley Watershed 3-147
3-71 Beneficial Uses in the Sunflower Valley Watershed 3-148
3-72 Land Use Acreage according to DWR and FRAP Land Use Data for the Southern Sierra Watershed 3-150
3-73 Beneficial Uses in the Southern Sierra Watershed 3-151
4-1 Average Annual Groundwater Supply for the Sacramento River, San Joaquin River, and Tulare Lake Hydrologic Regions 4-2
4-2 Summary of Monitoring Programs by State Agency 4-3
4-3 Constituents of Concern related to Agricultural Practices in the Sacramento and San Joaquin Valley Groundwater Basins 4-5
4-4 Summary of Groundwater Quality Issues for the Groundwater Basins 4-10
4-5 Pesticide Detections in Groundwater Wells for Counties in the Sacramento River Basin (1985–2003) 4-15
4-6 Land Use in the Antelope Subbasin 4-17
4-7 Land Use in the Bend Subbasin 4-21
4-8 Land Use in the Capay Valley Subbasin 4-23
4-9 Land Use in the Colusa Subbasin 4-26
4-10 Water Quality in the Colusa Subbasin 4-28
4-11 Concentrations of Constituents of Concern Detected in the Colusa Subbasin 4-28
4-12 Land Use in the Corning Subbasin 4-34
4-13 Land Use in the Dye Creek Subbasin 4-37
4-14 Land Use in the East Butte Subbasin 4-40
4-15 Land Use in the Los Molinos Subbasin 4-43
4-16 Land Use in the North American Subbasin 4-46
4-17 Land Use in the North Yuba Subbasin 4-51
4-18 Water Quality in the North Yuba Subbasin 4-53
4-19 Concentrations of Constituents of Concern Detected in the Southeastern Sacramento Valley Aquifers (Includes the North Yuba Subbasin) 4-53
4-20 Land Use in the Red Bluff Subbasin 4-58

4-21 Land Use in the Solano Subbasin 4-61
4-22 Land Use in the South American Subbasin 4-66
4-23 Land Use in the South Yuba Subbasin 4-71
4-24 Water Quality in the South Yuba Subbasin 4-72
4-25 Concentrations of Constituents of Concern Detected in the Southeastern Sacramento Valley Aquifers, including the South Yuba Subbasin 4-73
4-26 Land Uses in the Sutter Subbasin 4-77
4-27 Water Quality in the Sutter Subbasin 4-78
4-28 Concentrations of Constituents of Concern Detected in the Sutter Subbasin 4-79
4-29 Land Use in the Vina Subbasin 4-83
4-30 Land Uses in the West Butte Subbasin 4-87
4-31 Water Quality in the West Butte Subbasin 4-88
4-32 Concentrations of Constituents of Concern Detected in the West Butte Subbasin 4-89
4-33 Land Use in the Yolo Subbasin 4-93
4-34 Land Use in the South Fork Pit River Subbasin 4-98
4-35 Data from DWR Study of the Alturas Basin in 1986 4-99
4-36 Land Use in the Warm Springs Valley Subbasin 4-102
4-37 Data from DWR Study of the Alturas Basin in 1986 4-103
4-38 Land Use in the American Valley Basin 4-104
4-39 Land Use in the Antelope Creek Basin 4-106
4-40 Land Use in the Ash Valley Basin 4-107
4-41 Land Use in the Bear Valley Basin 4-109
4-42 Land Use in the Berryessa Valley Basin 4-110
4-43 Land Use in the Big Valley Basin 4-112
4-44 Land Use in the Big Valley Basin 4-115
4-45 Land Use in the Blanchard Valley Basin 4-117
4-46 Land Use in the Burney Creek Valley Basin 4-118
4-47 Land Use in the Burns Valley Basin 4-120
4-48 Land Use in the Butte Creek Valley Basin 4-122
4-49 Land Use in the Cayton Valley Basin 4-123
4-50 Land Use in the Chrome Town Area Basin 4-124
4-51 Land Use in the Clear Lake Cache Formation Basin 4-126
4-52 Land Use in the Clover Valley Basin 4-127
4-53 Land Use in the Collayomi Valley Basin 4-129

4-54 Land Use in the Coyote Valley Basin 4-131
4-55 Land Use in the Dixie Valley Basin 4-133
4-56 Land Use in the Dry Burney Creek Valley Basin 4-134
4-57 Land Use in the Egg Lake Valley Basin 4-135
4-58 Land Use in the Elk Creek Valley Basin 4-136
4-60 Land Use in the Fall River Valley Basin 4-139
4-61 Land Use in the Funks Creek Basin 4-141
4-62 Land Use in the Goose Valley Basin 4-142
4-63 Land Use in the Fandango Subbasin 4-144
4-64 Land Use in the Lower Goose Lake Valley Subbasin 4-147
4-65 Land Use in the Long Valley Basin 4-149
4-66 Land Use in the Grizzly Valley Basin 4-150
4-67 Land Use in the High Valley Basin 4-152
4-68 Land Use in the Hot Springs Valley Basin 4-153
4-69 Land Use in the Humbug Valley Basin 4-155
4-70 Land Uses in the Indian Valley Basin 4-156
4-71 Land Use in the Jess Valley Basin 4-158
4-72 Land Use in the Joseph Creek Basin 4-159
4-73 Land Use in the Lake Almanor Valley Basin 4-161
4-74 Land Use in the Lake Britton Area Basin 4-162
4-75 Land Use in the Last Chance Creek Valley Basin 4-164
4-76 Land Use in the Little Indian Valley Basin 4-165
4-77 Land Use in the Long Valley Basin 4-166
4-78 Land Use in the Lower Lake Basin 4-169
4-79 Land Use in the McCloud Area Groundwater Basin 4-171
4-80 Land Use in the Meadow Valley Basin 4-172
4-81 Land Use in the Middle Creek Basin 4-174
4-82 Land Use in the Middle Fork Feather River Basin 4-176
4-83 Land Use in the Mohawk Valley Basin 4-178
4-84 Land Use in the Mountain Meadows Valley Basin 4-179
4-85 Land Use in the North Fork Battle Creek Basin 4-181
4-86 Land Use in the North Fork Cache Creek Basin 4-182
4-87 Land Use in the Pope Valley Basin 4-184
4-88 Concentrations of Constituents of Concern Detected in the Redding Basin in 1979 4-186

4-89 Land Use in the Bowman Subbasin 4-189
4-90 Land Use in the Rosewood Subbasin 4-191
4-91 Land Use in the Anderson Subbasin 4-193
4-92 Land Use in the Enterprise Subbasin 4-196
4-93 Land Use in Millville Subbasin 4-198
4-94 Land Use within the South Battle Creek Subbasin 4-201
4-95 Land Use in the Rock Prairie Valley Basin 4-203
4-96 Land Use in the Round Valley Basin 4-204
4-97 Land Use in the Scotts Valley Basin 4-207
4-98 Land Use in the Chilcoot Subbasin 4-210
4-99 Land Use in the Sierra Valley Subbasin 4-212
4-100 Land Use in the Stony Gorge Reservoir Basin 4-215
4-101 Land Use in the Stonyford Town Area Basin 4-216
4-102 Land Use in the Toad Well Area Basin 4-218
4-103 Land Use in the Upper Lake Basin 4-220
4-104 Land Use in the Yellow Creek Valley Basin 4-221
4-105 Pesticide Detections in Groundwater Wells for Counties in the San Joaquin Valley Groundwater Basin (1985–2003) 4-225
4-106 Land Use in the Cosumnes Subbasin 4-227
4-107 Land Use in the Eastern San Joaquin Subbasin 4-229
4-108 Land Use in the Tracy Subbasin 4-232
4-109 Land Use in the Modesto Subbasin 4-235
4-110 Land Use in the Turlock Subbasin 4-237
4-111 Land Use in the Merced Subbasin 4-239
4-112 Land Use in the Delta-Mendota Subbasin 4-241
4-113 Land Use in the Chowchilla Subbasin 4-244
4-114 Land Use in the Madera Subbasin 4-246
4-115 Land Use in the Westside Subbasin 4-249
4-116 Land Use in the Kings Subbasin 4-252
4-117 Land Use in the Tulare Lake Subbasin 4-255
4-118 Land Use in the Kaweah Subbasin 4-257
4-119 Land Use in the Tule Subbasin 4-260
4-120 Land Use in the Kern County Subbasin 4-263
4-121 Land Use in the Pleasant Valley Subbasin 4-265
4-122 Land Use in the Panoche Valley Groundwater Basin 4-268

4-123 Land Use in the Kern River Valley Groundwater Basin....4-269
4-124 Land Use in the Walker Basin Creek Valley Groundwater Basin....4-271
4-125 Land Use in the Cummings Valley Groundwater Basin....4-272
4-126 Land Use in the Tehachapi Valley West Groundwater Basin....4-274
4-127 Land Use in the Castaic Lake Valley Groundwater Basin....4-276
4-128 Land Use in the Vallecitos Creek Valley Groundwater Basin....4-278
4-129 Land Use in the Brite Valley Groundwater Basin....4-279
4-130 Land Use in the Cuddy Canyon Valley Groundwater Basin....4-281
4-131 Land Use in the Cuddy Ranch Area Groundwater Basin....4-282
4-132 Land Use in the Cuddy Valley Groundwater Basin....4-284
4-133 Land Use in the Mil Portero Area Groundwater Basin....4-286
5-1 EQIP Funding Categories with Potential to Benefit Water Quality....5-21
5-2 Recent Water Quality Grants by Various Funding Agencies....5-24
5-3 CWA 303d List of Impaired Water Bodies near the West Side San Joaquin Valley....5-41

Figures

At End of Chapters

1-1 Program Boundaries and Subdivisions

3 Conceptual Surface Water Model

3-1 Sacramento Valley Basin

3-2 San Joaquin Valley Basin

3-3 Tulare Lake Basin

3-4 Pit River Watershed

3-5 Shasta–Tehama Watershed

3-6 Upper Feather River–Upper Yuba River Watershed

3-7 Colusa Basin Watershed

3-8 Butte–Sutter–Yuba Watershed

3-9 Lake–Napa Watershed

3-10 Solano–Yolo Watershed

3-11 American River Watershed

3-12 DWR Land Use Pit River Watershed

3-13 DWR Land Use Shasta–Tehama Watershed

3-14 DWR Land Use Upper Feather–Upper Yuba River Watershed

3-15 DWR Land Use Colusa Basin Watershed

3-16 DWR Land Use Butte–Sutter–Yuba Watershed

3-17 DWR Land Use Lake–Napa Watershed

3-18 DWR Land Use Solano–Yolo Watershed

3-19 DWR Land Use American River Watershed

3-20 Cosumnes River Watershed

3-21 Delta–Mendota Canal Watershed

3-22 San Joaquin River Watershed

3-23 San Joaquin Valley Floor Watershed

3-24 Delta–Carbona Watershed

3-25 Ahwahnee Watershed

3-26 Mariposa Watershed
3-27 Upper Mokelumne–Upper Calaveras Watershed
3-28 Merced River Watershed
3-29 North Valley Floor Watershed
3-30 Stanislaus River Watershed
3-31 Tuolumne River Watershed
3-32 DWR Land Use Cosumnes River Watershed
3-33 DWR Land Use Delta–Mendota Canal Watershed
3-34 DWR Land Use San Joaquin River Watershed
3-35 DWR Land Use San Joaquin Valley Floor Watershed
3-36 DWR Land Use Delta–Carbona Watershed
3-37 DWR Land Use Ahwahnee Watershed
3-38 DWR Land Use Mariposa Watershed
3-39 DWR Land Use Upper Mokelumne–Upper Calaveras Watershed
3-40 DWR Land Use Merced River Watershed
3-41 DWR Land Use North Valley Floor Watershed
3-42 DWR Land Use Stanislaus River Watershed
3-43 DWR Land Use Tuolumne River Watershed
3-44 Kings River Watershed
3-45 Kaweah River Watershed
3-46 Kern River Watershed
3-47 South Valley Floor Watershed
3-48 Grapevine Watershed
3-49 Coast Range Watershed
3-50 Fellows Watershed
3-51 Temblor Watershed
3-52 Sunflower Valley Watershed
3-53 Southern Sierra Watershed
3-54 DWR Land Use Kings River Watershed
3-55 DWR Land Use Kaweah River Watershed
3-56 DWR Land Use Kern River Watershed
3-57 DWR Land Use South Valley Floor Watershed
3-58 DWR Land Use Grapevine Watershed
3-59 DWR Land Use Coast Range Watershed
3-60 DWR Land Use Fellows Watershed

3-61 DWR Land Use Temblor Watershed
3-62 DWR Land Use Sunflower Valley Watershed
3-63 DWR Land Use Southern Sierra Watershed
4-1 Conceptual Groundwater Model
4-2 Sacramento River Groundwater Subbasins
4-3 Northern Portion of San Joaquin Valley Groundwater Basin
4-4 Tulare Lake Groundwater Basins
4-5 DWR Land Use Northern Portion of San Joaquin Valley Groundwater Basin
4-6 DWR Land Use Southern San Joaquin Valley Groundwater Basins

Acronyms and Abbreviations

µg/L	micrograms per liter
µmhos/cm	micro-reciprocal ohms per centimeter
µS/cm	microSiemens per centimeter
1988 Plan	State Water Resources Control Board 1988 *Nonpoint Source Management Plan*
2007 Review of Monitoring Data for ILRP	*Revised Draft of the 2007 Review of Monitoring Data for the Irrigated Lands Conditional Water Program*
2,3,7,8-TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin
2nd Circuit Court	United States Court of Appeals for the Second Circuit
AB 3030	Assembly Bill 3030
ACET	2-amino-4-chloro-6-ethylamino-s-triazine
ACID	Anderson Cottonwood Irrigation District
AMA	Agricultural Management Assistance
ARMP	Aggregate Resource Management Plan
ASAR	adjusted sodium adsorption ratio
Basin Plans	water quality control plans
BDAT	Bay Delta and Tributaries Project
BLM	Bureau of Land Management
BMPs	best management practices
BOD	biochemical oxygen demand
BWGWD	Biggs West Gridley Water District
CAC	County Agricultural Commissioners
CalEPA	California Environmental Protection Agency
CAS	California Aquifer Susceptibility assessment
CBR	Chili Bar
CCC	criteria continuous concentration (chronic regulatory standard)
CCID	Central California Irrigation District
CCRs	California Code of Regulations
CCWD	Corning Canal Water District
CD	compact disc
CDEC	California Data Exchange Center
CDF	California Department of Forestry and Fire Protection
CDFA	California Department of Food and Agriculture
CDPH	California Department of Public Health
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFAC	California Food and Agricultural Code
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIMIS	California Irrigation Management and Information System
CMC	criterion maximum concentration (acute regulatory standard)
Corps	U.S. Army Corps of Engineers
CSD	Community Service District

CTR	California Toxics Rule
CUP	Conditional Use Permit
CURES	Coalition for Urban/Rural Environmental Stewardship
CVP	Central Valley Project
CVPIA	1992 Central Valley Project Improvement Act
CWA	federal Clean Water Act
CWD	Chowchilla Water District
CWHR	California Wildlife Habitat Relationships
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
DACT	2,4-diamino-6-chloro-s-triazine
Dairy General Order	Waste Discharge Requirements General Order No. R5-2007-0035 for Existing Milk Cow Dairies
DBCP	1,2-dibromo-3-chloropropane
DDE	1, 1-dichloro-2,2'-bis-p-chlorophenyl-ethylene
DDT	1, 1, 1 -trichloro-2, 2'-bis-p-chlorophenyl-ethane
DEA	deethyl-atrazine
Delta	Sacramento–San Joaquin River DeltaDFG California Department of Fish and Game
DMC	Delta-Mendota Canal
DO	dissolved oxygen
DOC	dissolved organic carbon
DOI	U.S. Department of the Interior
DPR	California Department of Pesticide Regulation
DWEL	Drinking Water Equivalent Level
DWR	California Department of Water Resources
DWSC	Deep Water Ship Channel
EBMUD	East Bay Municipal Utilities District
EC	electrical conductivity
EIR	environmental impact report
EMS	Environmental Monitoring Section
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
ESA	federal Endangered Species Act of 1973, as amended
ESJWQC	East San Joaquin Water Quality Coalition
ESPP	Endangered Species Protection Program
Farm Bureau	California Farm Bureau Federation
FFDCA	Federal Food, Drug, and Cosmetic Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act, as amended
FQPA	Food Quality Protection Act of 1996
FRAP	Fire Resources Assessment Program
FREP	Fertilizer Research and Education Program
GAMA	Groundwater Ambient Monitoring Assessment
GCID	Glenn-Colusa Irrigation District
GIS	geographic information systems
gpm	gallons per minute
GWD	Grassland Water District
HA	hydrologic area (major tributaries)
HR	hydrologic region
HSA	hydrologic sub-area
HU	hydrologic unit (major rivers)
ID	identification number

ID	Irrigation District
IEP	Interagency Ecological Program
ILRP	Irrigated Lands Regulatory Program
IPM	integrated pest management
IPM	integrated pest management
IRIS	Integrated Risk Information System
KRCD	Kings River Conservation District
LMMWC	Los Molinos Mutual Water Company
MAA	Management Agency Agreement
MCL	maximum contaminant level
MFAR	Middle Fork American River
mg/kg	milograms per kilogram
mg/L	milligrams per liter
Mgd	million gallons per day
mi^2	square miles
mL/g	milliliters per gram
MPs	management practices
mS/cm	millisiemens per centimeter
MTBE	methy tertiary-butyl ether
NA	indicates that the particular type of criteria is not available
NAQWA	National Water Quality Assessment
NCWA	Northern CA Water Association
ND	non-detect
NEPA	National Environmental Policy Act
NFAR	North Fork American River
ng/L	nanograms per liter
NMP	Nutrient Management Plan
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source
NPS Implementation and Enforcement Policy	*Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program*
NPS Program Plan	State Water Resources Control Board January 2000 *Plan for California's Nonpoint Source Pollution Control Program*
NRCS	Natural Resources Conservation Service (formerly, Soil Conservation Service)
NWR	National Wildlife Refuge
OP	organophosphate
PCAs	Pest Control Advisors
PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene, also known as perchloroethylene,
PG&E	Pacific Gas and Electric Company
pg/L	picograms per liter
PHG	public health goal
Policy	State Implementation Policy for Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
Ppb	parts per billion
ppm	parts per million
PUP	Pesticide Use Proposals

PWS	planning watershed
QAPP	quality assurance project plan
RBDD	Red Bluff Diversion Dam
RCD	Resource Conservation District
Reclamation	U.S Department of the Interior, Bureau of Reclamation
RM	river mile
ROWD	Report of Waste Discharge
RWA	Regional Water Authority
RWQCB	Regional Water Quality Control Board
Sacramento and San Joaquin Rivers Basin Plan	*Water Quality Control Plan for the Sacramento and San Joaquin River Basins*
SB	Senate Bill
SDWA	Safe Drinking Water Act
SFAR	South Fork American River
SGA	Sacramento Groundwater Authority
SJRECWA	San Joaquin River Exchange Contractors Water Authority
SJVFS	San Joaquin Valley Floor Subwatershed
SNARL	suggested no adverse response levels for non-cancer toxicity (mercury SNARL concentration is total)
SPWS	super planning watershed
SR	State Route
SS	suspended sediments
State Water Board	State Water Resources Control Board
SVFS	South Valley Floor Subwatershed
SVWQC	Sacramento Valley Water Quality Coalition
SWAMP	Surface Water Ambient Monitoring Program
SWP	State Water Project
TCC	Tehama Colusa Canal
TCCA	Tehama Colusa Canal Authority
TCE	trichloroethylene
TDS	total dissolved solids
THM	trihalomethane
TID	Turlock Irrigation District
TIE	toxicity identification evaluation
TMDL	total maximum daily load
TSS	total suspended solids
UFRW	Upper Feather River Watershed
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VADD	Vegetated Agricultural Drainage Ditches
VAMP	Vernalis Adaptive Management Plan
VOCs	volatile organic compounds
WA	Wildlife Area
Water Code	California Water Code
WDRs	waste discharge requirements
WSD	water storage district
WSJVDA	Westside San Joaquin Valley Drainage Authority