



Area-Wide Water Quality Management Plan October, 1978

Financed Under Section 208 of the
Federal Water Pollution Control Act
of 1972, as amended.

Salt Lake County Water Quality & Water Pollution Control
2033 South State Street, Salt Lake City, Utah. Telephone (801) 535-7210

Preface

Over the past three years Salt Lake County has undertaken perhaps the most comprehensive and far-reaching program in its 130 year history. The Water Quality Management program, funded by the federal government, has been designed, managed, administered, and operated by local people - the citizens and elected officials of Salt Lake County and its incorporated municipalities. The 208 Water Quality Management Plan is one of the first Federal programs to be planned and carried out by local government with local control.

The long-term goals of the program try to achieve a critical balance between growth and careful environmental management in Salt Lake County. The participation of countless citizens and interest groups in the planning process resulted in a decision that growth should take place in Salt Lake County with provision of a quality environment. Growth by itself is not enough: It must preserve the values of careful planning and resource management imparted by the pioneers who settled Salt Lake Valley and it must maintain qualities that enable our children to enjoy the same economic, social, and environmental advantages that we all presently enjoy. Achieving this goal requires thoughtful, careful management of our canyons and our water resources.

The Salt Lake County Council of Governments was originally designated as the area-wide water quality planning agency with receipt of a \$1 million grant from the Environmental Protection Agency in 1975. The purpose of this grant was to provide for basic research and analysis which would result in a county-wide water quality management plan. This plan was completed as a draft in October, 1977. Over the past year extensive review and public hearings have been conducted by all appropriate federal, state, and local agencies in order

to obtain consensus on the components of the plan and to comply with federal regulations. During this year-review period the Council of Governments and the Salt Lake County Commission met to create a permanent, on-going water quality planning agency with county-wide jurisdiction - thus the creation of the Salt Lake County Department of Water Quality and Water Pollution Control.

On February 6, 1978, Governor Scott M. Matheson officially de-designated the Council of Governments, and re-designated the new Water Quality Department as the area-wide water quality planning agency. Completion of the final water quality plan was the work of the Salt Lake County Water Quality and Water Pollution Control Department: Gerald H. Kinghorn, Director; Steven F. Jensen, Assistant Director and Chief Planner; Terry G. Way, Water Quality Specialist and Environmental Engineer; and Nancy T. Bartel, Administrative Assistant.

Two important notes regarding the content of the plan are necessary. First, this plan is heavily supported by technical data in the form of 208 Technical Reports. These reports are available to the public from the County Department of Water Quality, and are required to be up-dated and re-printed annually - together with the Water Quality Management Plan. The Water Quality Plan itself is a summation of all its supporting data. Secondly, at printing time the management agency group for the Northern regional sewage treatment plant had not selected a final name for the agency. The terms, "North Plant," "Jordan Valley" plant, and "Central Valley" plant, have all been used somewhat interchangeably throughout the plan to depict the management agency to manage the North Jordan planning area regional facility.

The Water Quality staff would like to recognize two individuals whose patience and consideration are to date unsurmounted: Mr. Chet Hutchings, Salt Lake County Printing Department and Mr. Loren Mansfield of Graphic Reproductions,

Inc., were bestowed the task of printing the text and maps contained in the plan. Special thanks to these gentlemen and their respective staff.

This Water Quality Management Plan is intended to be the starting point for a continuous planning process directed toward achieving the policy of restoring and maintaining the chemical, physical and biological integrity of the waters of Salt Lake County.

Acknowledgements

208 PROJECT STAFF

David W. Eckhoff, Ph.D., P.E.
Project Manager
Terry Way
Water Quality Specialist
Steven F. Jensen
Project Planner
Nancy Bartel
Administrative Assistant
Terry J. Wirth
Planning Aid
Cheryl Contant
Technical Specialist
Jennifer Twitchell
Technical Specialist
Newell Johnson
Accountant

208 STEERING COMMITTEE

Mayor Oliver P. Davis
Chairman, South Salt Lake
Mayor Deway Bluth
Sandy
Mayor William A. Levitt
Alta
Commissioner William E. Dunn
Salt Lake County
Mayor Boyd Twiggs
Midvale
Highland Kent
Granger-Hunter Imp. Dist.
Rodney Dahl
Cottonwood Imp. Dist.
Neff Peterson
SLC Suburban Sanitation
Dist. #1
Chandler St. John
Wasatch National Forest
Dale Bateman
Soil Conservation Dist. &
Board of Irrigation Canal
Company President
Edwin Blaney
Wasatch Front Regional Council
Commissioner Jess Agraz
Salt Lake City

208 PROJECT CONSULTANTS

Facilities & Facilities Management
Bob Vivian, Project Engineer
Stevens, Thompson & Ruyuan
Bill Luce, Project Engineer
Nielsen, Maxwell & Wangsgard
Water Quality
Joseph Alcamo, Project Engineer
Hydroscience, Inc.
Larry Bledsoe, Project Engineer
Call Engineering, Inc.
Kent Miner
Salt Lake City and County
Health Department
W. J. Grenney, Project Engineer
Intermountain Consultants &
Planners
Land Use
Chris Deegenhardt, A.I.P., Project
Planners, ED&W, Inc.
Mike Bowie, A.I.P. Project
Planners, ED&W, Inc.
Sidney Williams, A.I.P., Project
Planners, Williams Platzek &
McCine

Margaret Rusche, A.I.P., Project
Planners, Williams Platzek &
McCine
Public Information
Lon LaFlamme
David W. Evans, Inc.
Citizens Participation
Morris Johnson
Bureau of Community Development
University of Utah
Area-Wide Implementation
Institutional & Legal
Richard Haglund
Clinton P. Mott & Assoc.
Clyde & Pratt
Attorneys at Law
Financial
Richard Christensen
Burrows, Smith & Company

208 PROJECT MANAGEMENT ADVISORY BOARD

Martin Lang, P.E., First Deputy
Administrator, Environmental
Protection Administration of NYC
E. J. Middlebrooks, Ph.D., P.E., Dean
College of Engineering Utah State
University
Ellis Armstrong, Ph.D., P.E.
President
Grant K. Borg, P.E.
Professor
Wilbur R. Thompson, Ph.D.
Northwestern University, Medill
School of Journalism

FEDERAL AND STATE AGENCY REPRESENTATIVE

Don Ostler
Utah Division of Health
Paul Blacker
Environmental Health Services
Branch
Bill Moellmer
Bureau of Water Quality
Paul Arell, Water Division
U. S. Environmental Protection
Doug Johnson, Water Division
U.S. Environmental Protection

208 PROJECT TECHNICAL COMMITTEE

CHAIRMAN

Facilities
David Brinton, Salt Lake County
Suburban Sanitary Dist. #1
Water Quality
Terry Holzworth, P.E., Salt Lake
County Water Conservancy Dist.
Land Use
Lynn Sprague, Wasatch National
Forest Salt Lake Ranger Dist.

FACILITIES AND FACILITIES MANAGEMENT TECHNICAL COMMITTEE

David Brinton, Chairman
Salt Lake County Suburban
Sanitary Dist. #1
Jess Agraz
Salt Lake City Commission
William Anderton
Superintendent of Waterworks

Jack Bonnett, Salt Lake County
Improv. Dist. #3
Charles Clay, P.E.
Murray
Max A. Finlayson
West Jordan
Ross Godfrey
Cottonwood
F. E. Gregory
Kearns
Brent Huish, Magna Water &
Sewer Improv. Dist.
Doyle Johnson
John Labrum
Taylorsville/Bennion
Gerald Larson
Granger/Hunter
Al Mason
Salt Lake City
W.S. Mickelsen, Salt Lake
County Sewage Improv. Dist. #1
Don Ostler, P.E.
State Water Quality Bureau
Philip Palmer, P.E.
Sandy City
Jack Petersen
Salt Lake City
John Rich, Sandy Suburban
Sanitary Dist.
Clayne J. Ricks
County Planning
James Shane
Alta
Draney Smith, Salt Lake
County Sanitary Dist. #2
Carl Snow
Midvale

WATER QUALITY TECHNICAL COMMITTEE

Terry Holzworth, P.E., Chairman
Salt Lake County Water
Conservancy Dist.
Paul Blacker, Utah State Div. of
Health, Environmental Health
Services, Bureau of Water Quality
Jack Bonnett
Richard Carlquist
Boyd Christenson
Wasatch National Forest
Charles Clay, P.E.
Murray City Water
Marianne Crawford, Utah Div. of
Wildlife Resources
Lee Diamond, Salt Lake County
Water Users Assoc.
Bill Greer, Utah Div. of Wildlife
Resources
Durrell H. McGarry
Izaak Walton League
Lee McQuivey
U.S. Corps of Engineers
Kent Miner, City and County
Health Department
Reed Mower, Water Resources Div.
U.S. Geological Survey
Byron Parker, P.E., Salt Lake
County Flood Control
Paul Summers
Div. of Water Resources

Charles Wilson, Superintendent
Salt Lake City Water Depart.
Vaughn Wonnacott
Metropolitan Water Dist.

LAND USE TECHNICAL COMMITTEE

Lynn Sprague, Chairman
Salt Lake Ranger Dist.
Charles Baugh, Salt Lake
County Recreation
Terry Green
Jordan River Parkway Authority
Bob Buchanan, Consultant
Dave Conine, State Planning
Coordinator, Technical
Services Div.
Kent Hortin
Soil Conservation Service
Ed James
Sandy City Planning
Vernon Jorgensen
Salt Lake City Planning
Bruce Kaliser
Utah Geological Survey
Ray Kingston
Enteleki Architecture
Planning Research
Jim Matsumori, Salt Lake Soil
Conservation Dist.
Mick Crandle, Wasatch Front
Regional Council

AGRICULTURE ADVISORY SUBCOMMITTEE

Ralph Y. McClure, Chairman
Salt Lake County Commissioner
Dale Bateman
Dairy Farmer
Tom Bingham
Utah Farm Bureau
Rick Hales
Wheeler Machinery
Cletus Hamilton
Farmer
John Metcalf
Soil Conservation Service
Steve Stefanoff
Farmer
Lynn Sprague, ex-officio
Member, Wasatch National Forest

OTHER STAFF

Kenneth W. Watson
Anne Taylor
Maya McDonald
Jo Broadbent
Merle Bryner
Renee Esson
James A. Carley
Soil Conservation
Service
Steve Domino

SPECIAL THANKS TO

Senator Fred W. Finlinson
Gerald H. Kinghorn,
Director, Salt Lake
County Department of
Water Quality and Water
Pollution Control

Table of Contents

Page

Preface	ii
Acknowledgements	v
List of Tables	xiv
List of Figures	xviii

SECTION I. ✓ INTRODUCTION

Background	1
Congressional Objectives	3
Local Citizen Objectives	4
1. Surveying Local Public Opinion	4
2. Citizen's Advisory Committee Goals	7
3. Citizen's Advisory Committee Progress Report	13
4. Public Hearings	15
Conclusion	16

SECTION II. SUMMARY

Introduction	1
Present and Future Conditions	4
Topography and Climate	5
Existing Population and Land Use	5
Ecosystems	6
Groundwater and Water Use	10
Solid Waste	10
County Government	11
Future Population and Land Use	11
Salt Lake Valley	12
Wasatch Mountains	14
Air Quality	15
Future Wastewater Flows	16
Water Quality Conditions	18
Present Water Quality	18
Wasatch Mountain Streams	18
Intermittent Streams	21
Jordan River	21
Canals	22
Storm/Urban Runoff	22
Groundwater	22
Stream Segmentation/Classification	23
Future Water Quality	26
Waste Loads	30
Point Sources	33
Present Municipal Wastewater Management	33
Future Municipal Wastewater Management	33
Regionalization Alternatives	35

TABLE OF CONTENTS (cont'd)

Effluent Disposal	36
Treatment and Discharge to Surface	
Waters	37
Land Application	37
Treatment and Reuse	37
Conclusion	38
Specific Plans	38
Salt Lake City Planning Area	38
Magna Planning Area	39
Upper Jordan Planning Area	40
Lark	40
Copperton	40
South Valley Water Reclamation	
Facility	40
Lower Jordan Planning Area	41
Industrial Point Sources	42
Non-Point Sources	43
Urban Runoff	45
Dry-Weather Discharge	45
Stormwater Discharge	45
Construction Runoff	46
Canyon Watershed/Recreation	47
Antidegradation	47
Recreation/Construction Sites and	
Antidegradation	48
Septic Groundwater Seepage and	
Antidegradation	48
Agricultural Runoff	49
Irrigated Agricultural Effects	49
Non-irrigated Agricultural Effects	50
Animal Concentrations/Feedlot Effects	50
Mining	50
Kennecott	50
Sand and Gravel	50
South Hecla-Zinc	51
Vitro Tailings	51
Groundwater	51
Solid Waste	52
Hydrologic Modifications	52
Silviculture	53
Coal Mining	53
Non-Point Management Alternatives	53
Urban Runoff Management	55
Stormwater Facilities	55
Dry-Weather Discharges	57
Permits	57
Best Management Practices	58

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
Forest Recreation/Watershed Management	59
Agricultural Runoff Management	60
Other NPS Management	61
Implementation	62
Non-Point Source Implementation	62
Point Source Implementation	63
Environmental Assessment	64
SECTION III. EXISTING AND FUTURE ENVIRONMENT	
Existing Conditions	1
✓ Planning Boundaries - A Definition of the Study Area	1
✓ History	2
✓ Culture	3
Present Water Quality Management.	4
✓ Topography.	5
✓ Climate	6
Air Quality	10
Standards	12
Current Air Quality	17
✓ Geology and Soils	17
Population and Land Use	21
Mountains and Agriculture	25
Other Major Features	25
Transportation System	28
Terrestrial and Aquatic Ecosystems	28
City Creek	30
Red Butte Creek	31
Emigration Creek	31
Parley's Creek	32
Mill Creek	32
Big Cottonwood Creek	34
Little Cottonwood Creek	35
Jordan River	36
Hydrologic Overview	37
Solid Wastes Management	39
Financial Status	42
Future Conditions	44
Projected Land Use	44
Salt Lake Valley - 1995	51
Wasatch Canyons-1995	57
Future Air Quality	62
Anticipated Wastewater Flows	66
SECTION IV. WATER QUALITY CONDITIONS	
Present Water Quality	1
City Creek	1

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
Red Butte Creek	2
Emigration Creek	5
Parleys' Creek	6
Mill Creek	9
Big Cottonwood Creek	9
Little Cottonwood Creek	11
Intermittent Streams	13
Jordan River	15
Canals	15
Storm/Urban Runoff	20
Groundwater	20
Water Quality Standards	29
Proposed Water Quality Standards	29
Anti-Degradation Policy	30
Use Designations	30
General Provisions	31
Stream Segmentation	33
Projected Water Quality	42
City Creek	51
Red Butte Creek	51
Emigration Creek	52
Parleys' Creek	52
Mill Creek	52
Big Cottonwood Creek	53
Little Cottonwood Creek	53
Intermittent Streams	53
Jordan River and Surplus Canal	54
Irrigation Canals	59
Sewage Canal	60
Kersey Creek/C-7 Ditch	60
Waste Load Analysis	60

SECTION V. POINT SOURCES

Introduction	1
Present Wastewater Management	1
Facilities Planning Areas	2
Sewage Treatment Plan Summary	2
Effluent Quality	9
Alternative Wastewater Treatment Systems	12
Treatment Plant Siting Alternatives	13
Salt Lake City Planning Area	13
Magna Planning Area	13
Upper and Lower Jordan Planning Areas	13
Screening to Determine Best Practicable	
Treatment	15
Treatment and Discharge to Surface Waters	15
Land Application	17

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
Treatment and Reuse	21
Conclusion	27
Final Cost Estimates	28
Specific Plans	28
Salt Lake City Planning Area	28
Magna Planning Area	31
Upper Jordan Planning Area	32
Lark	33
Copperton	33
South Valley Water Reclamation Facility	33
Lower Jordan Planning Area	35
Industrial Point Sources	37

SECTION VI. NON-POINT SOURCES

Introduction	1
Non-Point Source Assessment	3
Urban Storm Runoff	5
Dry Weather Discharge	5
Stormwater Discharge	7
Construction Runoff	8
Canyon Watershed/Recreation Runoff	14
Non-degradation: Local Public Policy	15
Recreation/Construction Sites and Non-Degradation	16
Septic Groundwater Seepage and Non-Degradation	18
Agricultural Runoff	21
Irrigated Agricultural Effects	21
Non-Irrigated Agricultural Effects	21
Animal Concentrations/Feedlots	21
Mining	24
Kennecott Copper	24
Sand & Gravel	25
South Hecla Mine	25
Vitro Tailings	25
Groundwater	27
Solid Waste	28
Hydrologic Modifications	30
Silviculture	32
Coal Mining	32
Proposed Non-Point Management Alternatives	33
Predominant Non-Point Source Factors	33
Secondary Non-Point Source Factors	35
Urban Runoff Management	37
Stormwater Facilities	37
Wet Weather Discharges	38
Flooding Considerations	39

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
Water Quality Considerations	39
Cost Estimates for Implementation	46
Dry Weather Discharges	57
Summary	61
Permits	62
Best Management Practices	63
Forest Recreation/Watershed Management	67
Septic Tank Discharges	68
Canyon Growth and Water Pollution	69
Agricultural Runoff Management	71
Sources	72
SECTION VII. IMPLEMENTATION	
Water Quality Planning - A Success Story	1
Enabling Ordinance	7
Water Quality Implementation	15
Non-Point Source Management Agencies	16
Point Source Management Agencies	18
Existing Institutional Capabilities	18
Improvement Districts	18
Cities	26
Special Service Districts	26
County Service Areas	27
County Government	27
Management Alternatives Evaluation	27
Designated Management Agencies	29
South Plant	29
North Plant	29
Salt Lake City and Magna	29
Management Agency Contracts and Agreements	30
SECTION VIII. ENVIRONMENTAL ASSESSMENT	
Introduction	1
Economic Impact	2
Land Use Impact	9
Point Source Plan	9
Central Valley Facilities	9
Magna Facilities	9
Salt Lake City Facilities	9
South Valley Facilities	10
Non-Point Source Plan	12
Visual/Topographic Impact	22
Point Source Plan	22
Central Valley Facilities	22
Magna Facilities	22
Salt Lake City Facilities	22
South Valley Facilities	23

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
Non-Point Source Plan	24
Social Impact	25
Public Health & Safety	25
Education	33
Recreation	34
Social Impacts	35
Central Valley Facilities	35
Magna Facilities	35
Salt Lake City Facilities	35
South Valley Facilities	36
Cultural Resource Survey	37
Ecologic Impact	38
Non-Living Matter	38
Soils	38
Geology	40
Present Water Quality	46
Projected Water Quality	46
Present Air Quality	46
Projected Air Quality	46
Living Matter	51
Wildlife Communities	51
Vegetative Communities	54
Ecological Analysis.	62
Point Source Plan Elements	62
Non-Point Source Plan Elements	64

APPENDICIES

A-1. 208 Project Publications and Bibliography	A-1
1. 208 Project Publications	A-2
2. Bibliography	A-6
A-2. Utah Water Quality Standards	A-9
1. Current Water Quality Standards	A-10
2. Current Stream Classification.	A-33
3. Draft Water Quality Standards	A-44
4. Draft Stream Classification	A-66
A-3. Contract Agreements	A-76
1. South Valley Water Reclamation Facility	A-77
a. Resolution Adopting Interlocal Cooperation Agreement.	A-77
b. Interlocal Cooperation Agreement	A-79
c. Salt Lake County Designation Agreement	A-90

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
2. Central Valley Water Reclamation Facility	A-96
a. Resolution Adopting Inter-local Cooperation Agreement	A-96
b. Resolution to Publish Interlocal Cooperation Agreement	A-98
c. Authorized Attorney's Approval of the Interlocal Cooperation Agreement	A-100
d. Interlocal Cooperation Agreement	A-101
e. Salt Lake County Designation Agreement	A-113
A-4. 208 Project Letter to Corps of Engineers	A-120
A-5. Public Hearings	A-124
1. Draft Water Quality Plan	A-125
2. Facilities Regionalization Lower Jordan Planning Area	A-154
A-6. Glossary	A-194
1. Glossary	A-195
2. Abbreviations	A-200
3. Units of Measure	A-201
4. Equivalencies	A-202
A-7. Environmental Assessment	A-203
1. Cultural Resource Clearances	A-204
2. Division of Wildlife Resources Assessment	A-206
3. Identified Ecosystem Habitat Types and Inventoried Faunal Components	A-210

List of Tables

	<u>Page</u>
II-1	Acreage Absorption by Statistical Area II-13
II-2	Land Suitable for Development II-14
II-3	Projected Average Daily Flows II-17
II-4	General Water Quality in Salt Lake County Streams and Canals II-24
II-5	Stream Segmentation and Classification for Waters of Salt Lake County II-27
II-6	Results of Correlation Analyses for Wasatch Front Streams II-28
II-7	Identification of Non-Point Sources within Salt Lake County II-44
II-8	Non-Point Management Needs II-55
III-1	National Ambient Air Quality Standards III-13
III-2	Fugitive Dust Emissions Inventory, Salt Lake County III-16
III-3	State Air Quality Monitoring Network in Salt Lake County III-17
III-4	Particulate Data for Salt Lake County III-18
III-5	Water Sources in Salt Lake County III-38
III-6	Water Uses in Salt Lake County III-39
III-7	Landfill Loadings III-41
III-8	Future Landfill Loading Calculation III-42
III-9	Acreage Absorption by Statistical Area III-50
III-10	Low and Medium Density Alternatives - Total Residential Land Use and Density; Salt Lake County III-54
III-11	Land Suitable for Development III-59
III-12	Alternate Use Levels III-61
III-13	Projected Average Daily Flows and Loads by Facilities Planning Areas III-67

LIST OF TABLES (cont'd)

	<u>Page</u>
III-14	Multiplication Factors for Extreme Conditions III-67
IV-1	Total Coliform Numbers at City Creek Water Purification Plant IV-2
IV-2	Water Quality in Red Butte Creek IV-5
IV-3	Water Quality in Emigration Creek IV-7
IV-4	Coliform (Total) Numbers in Parley's Canyon Streams IV-8
IV-5	Water Quality of Mill Creek IV-10
IV-6	Water Quality in Big Cottonwood Creek IV-12
IV-7	Water Quality of Little Cottonwood Creek IV-14
IV-8	Water Quality of the Jordan River IV-16
IV-9	Water Quality in Major Salt Lake Valley Irrigation Canal Systems IV-19
IV-10	Water Quality of Storm/Urban Runoff IV-20
IV-11	TDS in Shallow Aquifer IV-25
IV-12	Classification and Segmentation of Waters of Salt Lake County IV-38
IV-13	Sample Stations for Monitoring Programs in Salt Lake County IV-45
IV-14	Projected Dissolved Oxygen Concentrations in the Jordan River IV-55
IV-15	Projected Ammonia Concentrations in the Jordan River IV-56
IV-16	Projected Chlorine Concentrations in the Jordan River IV-57
IV-17	Summary of Bacteria and Solids Projections for the Jordan River IV-58
IV-18	Salt Lake County Industrial NPDES Permit Inventory. . IV-64

LIST OF TABLES (cont'd)

		<u>Page</u>
IV-19	Evaluation of Present Industrial Discharges as to Processes Necessary to Meet Proposed "10/10" Standards and Increases in Loads Where "10/10" Standards are Expected to be Satisfied (Discrete Dischargers)	IV-65
IV-20	1975-1985-1995 Located Employment in Manufacturing Industry by Statistical Area Group	IV-66
V-1	Salt Lake County Sewage Treatment Plants and Contributory Collection Districts	V-5
V-2	Description of Facilities Planning Areas	V-7
V-3	Utah State Definition of Polished Secondary and Standard Secondary Effluents	V-10
V-4	Effluent Requirements for Treatment Plants Discharging to the Jordan River	V-10
V-5	Preliminary Estimated Costs for Treatment and Discharge - Total Costs	V-18
V-6	Preliminary Estimated Costs for Treatment and Discharge - Local Costs	V-19
V-7	Land Application Systems - Removal Efficiencies for Major Constituents	V-20
V-8	Land Requirements for Land Application Alternatives	V-20
V-9	Preliminary Estimated Costs for Land Application - Total Costs	V-22
V-10	Preliminary Estimated Costs for Land Application - Local Costs	V-23
V-11	Upper and Lower Jordan Planning Areas - Summary of Wastewater Treatment Cost Effectiveness Analyses	V-29
V-12	Salt Lake City and Magna Construction and Operating and Maintenance Cost Estimates	V-30
V-13	Cost Estimate: Industrial Upgrading for BAT	V-38
VI-1	Identification of Non-Point Sources within Salt Lake County	VI-4

LIST OF TABLES (cont'd)

	<u>Page</u>
VI-2 Chemical Analysis of Groundwater in Vicinity of Salt Lake County Landfill	VI-30
VI-3 Non-Point Management Needs	VI-35
VI-4 Particle Settling Velocity	VI-43
IV-5 Cost Estimate for Wet Weather Discharge Facilities. .	VI-55
VI-6 Cost Estimates for Dry Weather Discharges	VI-59
VI-7 Dry Weather Interceptor Design Flows	VI-59
VII-1 Management Agencies to be Designated for Plan Implementation	VII-17
VII-2 Management Agencies to be Designated for Urban Runoff Program Category	VII-19
VII-3 Management Agencies to be Designated for Recreation/Watershed Runoff Category	VII-22
VII-4 Management Agencies to be Designated for Agricultural Runoff Category	VII-25
VIII-1 Jordan River Water Quality Projections with Implementation of Selected Municipal Sewage Treatment Plan	VIII-49

List of Figures

	<u>Page</u>
I-1 Designated Areawide Water Quality Planning Organizations in Utah	I-2
I-2 208 Project Organization	I-8
II-I Summary of Environmental Impacts Resulting from Implementation of the Water Quality Plan	II-65
III-1 Topographic Map, Salt Lake County, Utah	III-7
III-2 Most Frequent Thunderstorm Paths	III-8
III-3 Average Annual Precipitation, 1970-1976	III-9
III-4 Salt Lake County Wind Rose	III-11
III-5 Schematic Diagram of Air Quality Standards	III-14
III-6 1977 Total Suspended Particulates (TSP) Inventory for Salt Lake County	III-19
III-7 1977 Sulphur Dioxide (SO ₂) Inventory for Salt Lake County . .	III-20
III-8 Geology of Salt Lake County	III-22
III-9 Existing Development (1975)	III-26
III-10 Existing Landfill Sites	III-40
III-11 Governmental and Jurisdictional Fragmentation: Salt Lake County	III-43
III-12 Water Quality Project Statistical Areas	III-46
III-13 1975 Population/Dwelling Units	III-47
III-14 Projected 1985 Population/Dwelling Units	III-48
III-15 Projected (High) 1995 Population/Dwelling Units	III-49
III-16 Urban Expansion 1975-1995: Low Density Alternative	III-52
III-17 Urban Expansion 1975-1995: Medium Density Alternative	III-53
III-18 Projected Development, 1995, Salt Lake County	III-56
III-19 Wasatch Canyon Development; Suitability, Anticipated Locations	III-63
IV-1 Major Salt Lake Valley Streams and Canals	IV-3

LIST OF FIGURES (Cont'd)

<u>Figure</u>		<u>Page</u>
IV-2	Sample Station Locations for General Water Quality Discussion	IV-4
IV-3	Locations of Sewage Treatment Plants Discharging to the Jordan River	IV-17
IV-4	Salt Lake County Main Canals and Their Terminus Points	IV-18
IV-5	Location of Sample Stations on Major Salt Lake Valley Irrigation Canals and Ditches	IV-21
IV-6	Location of Sample Stations for Urban/Storm Runoff	IV-22
IV-7	Approximate Extent of Various Aquifers in Salt Lake County	IV-24
IV-8	Total Dissolved Solids in Water From the Principle Aquifer	IV-26
IV-9	Water Temperature in the Principle Aquifer in Salt Lake County	IV-27
IV-10	Well Locations for TDS Concentrations in Table IV-11	IV-28
IV-11	Subbasin Drainage Areas in Salt Lake County	IV-35
IV-12	Stream Segmentation for Salt Lake County.	IV-38
IV-13	Sample Station Locations in Salt Lake County for Various Monitoring Programs	IV-43
IV-14	Wastewater CBOD and Jordan River Assimilation Curves	IV-62
IV-15	Location of Existing Discrete Industrial NPDES Discharges	IV-65
V-1	Existing Sewage Collection Districts in Salt Lake County	V-3
V-2	Existing Sewage Treatment Plants in Salt Lake County	V-4
V-3	Salt Lake County Facilities Planning Areas	V-6
VI-1	Examples of Dry Weather Flows in Salt Lake County	VI-6
VI-2	High Erosion and Runoff Potential Soils	VI-9
VI-3	Areas of Projected Development with High Erosion and Runoff Potential	VI-11
VI-4	Areas with Serious Septic Tank Infiltration	VI-19

LIST OF FIGURES (Cont'd)

<u>Figure</u>		<u>Page</u>
VI-5	Areas of Existing and Anticipated Canyon Development	VI-17
VI-6	Remaining Agricultural Land in Salt Lake County, 1995	VI-22
VI-7	Existing Cropland and Animal Concentrations	VI-23
VI-7a	Location of Significant Mining and Extraction Operations	VI-26
VI-8	Floodway-Parkway Detention Basin Plan	VI-38
VI-9	Flood Control Plan Using Detention Basins	VI-39
VI-10	Typical Cross Section on the Jordan River Parkway	VI-40
VI-11	Reduction of SS and BOD by Settling in 14 Inch Graduated Cylinder	VI-43
VI-12	Conventional Detention Basin Design	VI-45
VI-13	Modified Detention Basin Design	VI-45
VI-14	Existing and Proposed Facilities	VI-47
VI-15	Dry Weather Discharge Interceptor Sewer Alternative	VI-58
VI-16	Priority Areas of Stabilization and Runoff Control	VI-62
VII-1	Planning & Management Agency Organization	VII-5
VII-2	Citizen Participation in Water Quality Planning Activities	VII-6
VIII-1	Summary of Environmental Impacts Resulting from Implementation of the Water Quality Plan	VIII-3
VIII-2	Central Valley Facility Site Location	VIII-4
VIII-3	Magna Facility Site Location	VIII-5
VIII-4	Salt Lake City Facility Site Location	VIII-6
VIII-5	South Valley Facility Site Location	VIII-7
VIII-6	Estimated Economic Impact of Proposed Water Quality Management Actions	VIII-8
VIII-7	Existing Land Use, Central Valley Facility	VIII-14
VIII-8	Projected Land Use, Central Valley Facility	VIII-15

LIST OF FIGURES (Cont'd)

<u>Figure</u>		<u>Page</u>
VIII-9	Existing Land Use, Magna Facility	VIII-16
VIII-10	Projected Land Use, Magna Facility	VIII-17
VIII-11	Existing Land Use, Salt Lake City Facility	VIII-18
VIII-12	Projected Land Use, Salt Lake City Facility	VIII-19
VIII-13	Existing Land Use, South Valley Facility	VIII-20
VIII-14	Projected Land Use, South Valley Facility	VIII-21
VIII-15	Visual/Topographic Conditions, Central Valley Facility . . .	VIII-26
VIII-16	Limits of Jordan River and Mill Creek Floodways at Central Valley Facility Site	VIII-27
VIII-17	Visual/Topographic Conditions, Magna Facility	VIII-28
VIII-18	Visual/Topographic Conditions, Salt Lake City Facility . . .	VIII-29
VIII-19	Limits of Jordan River Floodway at Salt Lake City Facility Site	VIII-30
VIII-20	Visual/Topographic Conditions, South Valley Facility	VIII-31
VIII-21	Limits of Jordan River Floodway at South Valley Facility Site	VIII-32
VIII-22	Existing Soils Conditions, Central Valley Facilities	VIII-41
VIII-23	Existing Soils Conditions, Magna Facilities	VIII-42
VIII-24	Existing Soils Conditions, Salt Lake City Facilities	VIII-43
VIII-25	Existing Soils Conditions, South Valley Facilities	VIII-44
VIII-26	Geology, Central Valley Facility	VIII-47
VIII-27	Geology, South Valley Facility	VIII-48
VIII-28	Projected Jordan River Water Quality Summary	VIII-50
VIII-29	Ecosystem Habitat Types in Salt Lake County	VIII-53
VIII-30	Existing Dominant Vegetation by Rangesite, Central Valley Facilities	VIII-58
VIII-31	Existing Dominant Vegetation by Rangesite, Magna Facilities	VIII-59

LIST OF FIGURES (Cont'd)

<u>Figure</u>		<u>Page</u>
VIII-32	Existing Dominant Vegetation by Rangesite, Salt Lake City Facility	VIII-60
VIII-33	Existing Dominant Vegetation by Rangesite, South Valley Facility	VIII-61