

## Below is an Electronic Version of an Out-of-Print Publication

You can scroll to view or print this publication here, or you can borrow a paper copy from the Texas State Library, 512/463-5455. You can also view a copy at the TCEQ Library, 512/239-0020, or borrow one through your branch library using interlibrary loan.

The TCEQ's current print publications are listed in our catalog at [www.tnrcc.state.tx.us/admin/topdoc/index.html](http://www.tnrcc.state.tx.us/admin/topdoc/index.html).

# Table of Contents

## Volume 1

<b>Foreword</b> .....	<b>iii</b>
<b>Abstract</b> .....	<b>v</b>
<b>Acknowledgments</b> .....	<b>vii</b>
<b>Executive Summary</b> .....	<b>3</b>
Surface Water Quality Monitoring Program .....	5
Public Water Supply .....	8
Water Rights and Instream Uses .....	8
Surface Water Assessment .....	9
Streams and Rivers .....	11
Reservoirs and Lakes .....	13
Estuaries .....	15
Ocean Water .....	17
Groundwater Assessment .....	17
Water Pollution Control Programs .....	19
Threatened Water Bodies .....	19
Benefits and Costs of Surface Water Quality Programs .....	20
<b>Introduction</b> .....	<b>21</b>
<b>Background</b> .....	<b>27</b>
Rivers and Streams .....	32
Lakes, Reservoirs, and Ponds .....	33
Estuaries .....	34
Wetlands .....	35
Ocean Shoreline Waters .....	36
Ground Water .....	36
Texas Climatic and Geographic Diversity .....	37
<b>Surface Water Quality Monitoring Program</b> .....	<b>39</b>
Program Mission and Emphasis .....	41
Coordinated Statewide Monitoring Meetings .....	42
Coordinated Statewide Monitoring Schedule .....	44
Fixed Station Monitoring Network .....	45
Field Measurements, Routine Water Chemistry, and Bacteriological Analyses .....	47
Toxic Substances in Water, Sediment, and Fish Tissue .....	52
Ambient Toxicity Monitoring .....	58

Biological Monitoring .....	58
Fish Tissue Monitoring .....	61
Special Studies .....	62
Intensive Surveys .....	62
SWQM Database .....	66
SWQM Program Training .....	66
SWQM Water Quality Monitoring Procedures Manual .....	67
SWQM Supplementary Information Manual .....	68
Receiving Water Assessments .....	68
Use Attainability Analysis .....	69
Border Monitoring .....	83
Rio Grande Toxic Substances Study .....	83
Rio Grande Biocriteria Development .....	85
Clean Rivers Program .....	85
Factors Influencing Implementation of the Clean Rivers Program .....	86
The CRP Monitoring Strategy Supports Four Objectives .....	87
Overview of CRP Functions .....	87
Monitoring .....	87
Quality Assurance .....	88
Identifying Factors Influencing Water Quality .....	88
Water Quality Data Assessment and Reporting .....	88
Public Involvement .....	88
Texas Watch Environmental Monitoring Program .....	89
Texas Watch Goals and Philosophy .....	89
Partner Activities .....	89
Current Program Status .....	90
Quality Assurance of Texas Watch Data .....	90
Looking Ahead .....	90
Nonpoint Source Assessment .....	91
Coastal Zone Assessment .....	91
Special Projects .....	92
<b>Public Water Supply Program .....</b>	<b>95</b>
<b>Water Rights and Instream Uses .....</b>	<b>105</b>
Instream Flows in Streams and Rivers .....	107
Biogeography .....	108
Freshwater Inflows to Bays and Estuaries .....	109
Regulatory Program Overview .....	110
Description of the TNRCC Program .....	111
Environmental Review .....	111
Assessment .....	113
Current Areas of Concern .....	113
Active Water Rights and Environmental Protection Provisions .....	114

<b>Surface Water Assessment Methodology</b> .....	<b>117</b>
Methodology for Use Support and Identification of Water Quality Concerns .....	119
Waters Covered in Assessments .....	121
Sources of Data .....	121
Period of Record .....	121
Minimum Number of Samples .....	122
Flow Conditions .....	123
Values Below Limits of Detection .....	123
Spatial Coverage .....	124
Assignment of Causes and Sources of Pollutants .....	124
Depth of Water Quality Measurements .....	130
Determination of the Mixed Surface Layer .....	130
Determination of Tidal Influence .....	130
Methodology for Screening and Assessing Use Support .....	131
Aquatic Life Use .....	131
Dissolved Oxygen Criteria .....	131
Toxic Substances in Water Criteria .....	133
Ambient Water and Sediment Toxicity Tests .....	140
Biological Assessment .....	140
Contact Recreation Use .....	146
Noncontact Recreation Use .....	146
Public Water Supply Use .....	147
Fish Consumption Use .....	147
Oyster Waters Use .....	152
Approved Area .....	152
Conditionally Approved Area .....	153
Restricted Area .....	153
Prohibited Area .....	153
Threatened Water Bodies .....	153
Methodology for Screening and Assessing General Uses .....	155
Methodology for Screening and Assessing Water Quality Concerns .....	157
Aquatic Life Concerns .....	157
Contact and Noncontact Recreation Concerns .....	162
Nutrients and Chlorophyll <i>a</i> Screening Levels .....	162
Sediment Quality Screening Levels .....	162
Fish Tissue Screening Levels .....	163
Public Water Supply Concerns .....	164
Narrative Concerns .....	165
<b>Streams and Rivers Use Support Assessment</b> .....	<b>179</b>
Aquatic Life Use Support .....	182
Contact Recreation Use Support .....	192
Noncontact Recreation Use Support .....	192
General Use Support .....	192
Public Water Supply Use Support .....	195
Fish Consumption Use Support .....	195

Streams and Rivers Concerns Assessment .....	199
Nutrient Concerns .....	199
Chlorophyll <i>a</i> Concerns .....	204
Sediment Concerns .....	205
Fish Tissue Concerns .....	206
Public Water Supply Concerns .....	206
Narrative Criteria Concerns .....	206
<b>Reservoir and Lake Use Support Assessment .....</b>	<b>209</b>
Aquatic Life Use Support .....	212
Contact Recreation Use Support .....	218
Noncontact Recreation Use Support .....	218
General Use Support .....	219
Public Water Supply Use Support .....	220
Fish Consumption Use Support .....	221
Reservoir and Lakes Concerns Assessment .....	223
Nutrient Concerns .....	223
Chlorophyll <i>a</i> Concerns .....	225
Sediment Concerns .....	225
Fish Tissue Concerns .....	228
Public Water Supply Concerns .....	229
Narrative Criteria Concerns .....	229
Trophic Classification of Reservoirs and Lakes .....	230
Water Quality Trends in Reservoirs .....	240
Reservoir Control Programs .....	240
Subchapter D: §§311.31-311.36. ....	241
Subchapter A, B and F: §§311.1-.5, 311.11-.15 and 311.51-.55. ....	241
Subchapter G: §§311.61.-311.66. ....	242
Reservoir and Lake Restoration Efforts .....	242
<b>Estuary Use Support Assessment .....</b>	<b>243</b>
Aquatic Life Use Support .....	245
Contact Recreation Use Support .....	251
Noncontact Recreation Use Support .....	251
General Use Support .....	252
Fish Consumption Use Support .....	252
Oysters Waters Use Support .....	253
Estuary Concerns Assessment .....	253
Nutrient Concerns .....	254
Chlorophyll <i>a</i> Concerns .....	254
Sediment Concerns .....	254
Fish Tissue Concerns .....	256
Narrative Concerns .....	256
The Galveston Bay Estuary Program .....	260
The Galveston Bay Council .....	263

Plan Implementation .....	264
Coastal Bend Bays and Estuaries Program .....	266
<b>Ocean Water Use Support Assessment .....</b>	<b>269</b>
Use Support Summary .....	273
Concerns Summary .....	273
<b>Wetlands Protection Programs .....</b>	<b>279</b>
Current Status of Major Wetland Types .....	281
Coastal Wetlands .....	282
Playa Lakes of the Panhandle Region .....	282
Forested Wetlands .....	283
Trends .....	284
Wetland Systems Significant to Threatened and Endangered Species in Texas .....	286
Wetland Monitoring Program .....	287
Biological Characterization of Wetlands on a Regional Basis .....	287
Wetland Protection Activities .....	288
<b>Public Health and Aquatic Life Concerns .....</b>	<b>291</b>
Public Health Concerns .....	293
Aquatic Life Concerns .....	295
Fish Abnormalities .....	297
<b>Groundwater Assessment .....</b>	<b>305</b>
Overview - Groundwater Resources and the Texas Groundwater Protection Committee .....	307
Texas Natural Resource Conservation Commission .....	310
Railroad Commission of Texas .....	312
Texas Department of Agriculture .....	312
Texas Department of Health .....	313
Texas State Soil and Water Conservation Board .....	313
Texas Water Development Board .....	313
Texas Department of Licensing and Regulation .....	314
Texas Alliance of Groundwater Districts .....	314
Texas Agricultural Experiment Station .....	314
Bureau of Economic Geology .....	314
Process .....	319
Joint Groundwater Monitoring and Contamination Report .....	322
Groundwater Quality Data .....	325
<b>Water Pollution Control Program .....</b>	<b>387</b>
Watershed Approach .....	389
Texas Surface Water Quality Standards .....	395
Point Source Control Program .....	396
Nonpoint Source Pollution Control Program .....	399

Characteristics of Pollution from Storm Water .....	399
Assessments of Pollution from Storm Water .....	400
1999 NPS Assessment Report: Extent and Nature of the Problem	
in Texas Surface Waters .....	400
Identification of NPS Impaired Waters .....	401
Texas' NPS Management Approach .....	401
Nonpoint Source Program Goals and Objectives .....	402
Nonpoint Source Program Highlights .....	402
Coastal Zone Act Reauthorization Amendments (CZRA) .....	403
Total Maximum Daily Loads .....	403
303(d) Listing Process .....	404
TMDL Process .....	406
Contract Initiation .....	409
Targeted Monitoring .....	409
TMDL Allocation .....	409
TMDL Approval .....	410
Coordination with Other Agencies .....	410
<b>Benefits and Costs of Surface Water Quality Programs .....</b>	<b>413</b>
Values, Benefits and Costs .....	415
Framework for Consideration of Economic and Social Benefits and Costs .....	416
<b>Literature Cited .....</b>	<b>421</b>
<b>Appendixes</b>	
Appendix A. Acronyms Used in the Report .....	A-1
Appendix B. Major Aquifers of Texas .....	B-1
Appendix C. Minor Aquifers of Texas .....	C-1

## List of Tables

Table 1.	Atlas of Texas Surface Waters	32
Table 2.	Distribution of Statewide SWQMP Fixed Network Sites by Water Body Type	45
Table 3.	Field Measurements and Routine Water Chemistry Analyses	47
Table 4.	Routine Pesticides and Semivolatile Organic Substances in Water, Sediment, and Tissue	54
Table 5.	Routine Volatile Organic Substances in Water	55
Table 6.	Routine Metals in Water, Sediment, and Tissue	55
Table 7.	Special Studies Conducted by TNRCC and CRP during Fiscal Years 1995-2000	64
Table 8.	Intensive Surveys Conducted by the TNRCC during Fiscal Years 1995-2000	65
Table 9.	Receiving Water Assessments, October 1988 - December 2000	70
Table 10.	Use Attainability Reports	82
Table 11.	Maximum Contaminant Levels for Organic Chemicals in Public Drinking Water Supplies	98
Table 12.	Maximum Contaminant Levels for Inorganic Chemicals in Public Drinking Water Supplies	99
Table 13.	Other Drinking Water Standards	99
Table 14.	Secondary Maximum Contaminant Levels for Public Drinking Water Supplies	101
Table 15.	Active Water Rights in Texas Basins, June 2000	115
Table 16.	List of Causes/Stressors	125
Table 17.	List of Sources	126
Table 18.	Framework for Evaluating Use Support	135
Table 19.	Criteria for Specific Metals in Water for Protection of Aquatic Life	138
Table 20.	Criteria for Specific Organic Substances in Water for Protection of Aquatic Life	139
Table 21.	Statewide Index of Biotic Integrity: Scoring and Evaluation Criteria	141
Table 22.	Metrics and Scoring Criteria for Surber Samples - Benthic Macroinvertebrates	143
Table 23.	Metrics and Scoring Criteria for Kick Samples, Rapid Bioassessment Protocol - Benthic Macroinvertebrates	144
Table 24.	Decision Matrix for Integrated Assessments of Aquatic Life Use (ALU) Support Based on Bioassessment, Dissolved Oxygen, Toxics in Water and Toxicity in Water Testing Data	145
Table 25.	Maximum Contaminant Levels for Organic Chemicals in Public Drinking Water Supplies	148
Table 26.	Maximum Contaminant Levels for Inorganic Chemicals in Public Drinking Water Supplies	149
Table 27.	Human Health Criteria in Water	150
Table 28.	Framework for Evaluating General Use Support	156
Table 29.	Framework for Identifying Water Quality Concerns	158
Table 30.	Screening Levels for Metals in Sediment	167



Table 31.	Screening Levels for Organic Substances in Sediment	168
Table 32.	Screening Levels for Metals in Tissue	176
Table 33.	Screening Levels for Organic Substances in Tissue	176
Table 34.	Overall Use Support in Streams and Rivers	184
Table 35.	Individual Indicators for Assessment of Aquatic Life, Fish Consumption, and General Uses	186
Table 36.	Streams and Rivers with Partially Supported or Nonsupported Aquatic Life Uses Due to Depressed Dissolved Oxygen Concentrations	188
Table 37.	Streams and Rivers with Nonsupported Contact Recreation Uses	193
Table 38.	Streams and Rivers with Partially Supported or Nonsupported General Uses	196
Table 39.	Individual Nutrient Concerns in Streams and Rivers	200
Table 40.	Streams and Rivers with Nutrient and Chlorophyll <i>a</i> Concerns	201
Table 41.	Overall Concerns in Streams and Rivers	205
Table 42.	Streams and Rivers with Sediment Concerns	207
Table 43.	Streams and Rivers with Public Water Supply Concerns	208
Table 44.	Individual Use Support Indicators for Reservoirs and Lakes	215
Table 45.	Individual Use Support Indicators for Aquatic Life, Fish Consumption, and General Uses	216
Table 46.	Reservoirs and Lakes with Partially Supported or Nonsupported General Uses	220
Table 47.	Individual Indicators for Nutrient and Chlorophyll <i>a</i> Concerns	224
Table 48.	Reservoirs and Lakes with Nutrient and Chlorophyll <i>a</i> Concerns	226
Table 49.	Overall Concern Indicators in Reservoirs and Lakes	227
Table 50.	Reservoirs and Lakes with Sediment Concerns	228
Table 51.	Reservoirs and Lakes with Public Water Supply Concerns	230
Table 52.	Types of Trophic States in Reservoirs and Lakes	231
Table 53.	Carlson's Trophic State Index and Associated Parameters	232
Table 54.	Trophic Classification of Major Texas Reservoirs Using Carlson's Trophic State Index (TSI)	233
Table 55.	Number of Texas Reservoirs Assessed in Each Trophic Class	239
Table 56.	Individual Use Support in Estuaries	248
Table 57.	Individual Use Support Indicators for Aquatic Life, Fish Consumption, and General Uses in Estuaries	249
Table 58.	Estuaries and Bays with Partially Supported and Nonsupported Aquatic Life Uses Due to Depressed Dissolved Oxygen Concentrations	251
Table 59.	Use Support of Oyster Waters	255
Table 60.	Individual Nutrient and Chlorophyll <i>a</i> Concerns	257
Table 61.	Estuaries and Bays with Nutrient and Chlorophyll <i>a</i> Concerns	258
Table 62.	Overall Concerns for Fish Tissue Contaminants, Sediment Contaminants, and Narrative Criteria	259
Table 63.	Estuaries and Bays with Sediment Concerns	259
Table 64.	Goals in <i>The Galveston Bay Plan</i>	261
Table 65.	Galveston Bay Plan Actions	262
Table 66.	Individual Use Support of Ocean Waters	274

Table 67.	Individual Indicators for Aquatic Life, Fish Consumption, and General Uses .....	275
Table 68.	Nutrient and Chlorophyll <i>a</i> Concerns in Oceans .....	277
Table 69.	Overall Concerns for Fish Tissue Contaminants, Sediment Contaminants, and Narrative Criteria .....	278
Table 70.	Geographical Distribution of Bottomland Hardwood and Riparian Vegetation in Texas in 1980 (Frye, 1987) .....	284
Table 71.	Projected Statewide Bottomland Hardwood Loss through Direct Affects from 14 Reservoirs Listed in the Texas Water Plan .....	287
Table 72.	Toxic Substances with Numerical Criteria in the Texas Surface Water Quality Standards .....	294
Table 73.	Toxic Substances Related Fish Kills, 1994-1999 .....	298
Table 74.	Water Bodies Affected by Fish Abnormalities .....	304
Table 75.	Summary of State Groundwater Protection Programs .....	309
Table 76.	Ambient Monitoring Groundwater Quality Data / Selected Major and Minor Aquifers (1994 - 1999) .....	320
Table 77.	Ten Major Sources of Documented / Potential Groundwater Contamination .....	327
Table 78.	Statewide Documented Groundwater Contamination Cases by Agency / Activity Status .....	329
Table 79.	Groundwater Contamination Summary / Selected Major and Minor Aquifers Outcrops (1998) .....	330
Table 80.	Ambient Monitoring Groundwater Quality Data / Cenozoic Pecos Alluvium Aquifer .....	333
Table 81.	Groundwater Contamination Summary / Cenozoic Pecos Alluvium Aquifer Outcrop .....	334
Table 82.	Ambient Monitoring Groundwater Quality Data / Edwards-Trinity (Plateau) Aquifer .....	336
Table 83.	Groundwater Contamination Summary / Edwards-Trinity (Plateau) Aquifer Outcrop .....	337
Table 84.	Ambient Monitoring Groundwater Quality Data / Ogallala Aquifer .....	339
Table 85.	Groundwater Contamination Summary Outcrop / Ogallala Aquifer Outcrop .....	340
Table 86.	Ambient Monitoring Groundwater Quality Data / Capitan Reef Complex Aquifer .....	342
Table 87.	Groundwater Contamination Summary / Capitan Reef Complex Aquifer Outcrop .....	343
Table 88.	Ambient Monitoring Groundwater Quality Data / Ellenberger - San Saba Aquifer .....	345
Table 89.	Groundwater Contamination Summary / Ellenberger - San Saba Aquifer Outcrop .....	346
Table 90.	Ambient Monitoring Groundwater Quality Data / Hickory Aquifer .....	348
Table 91.	Groundwater Contamination Summary / Hickory Aquifer Outcrop .....	349
Table 92.	Ambient Monitoring Groundwater Quality Data / Marble Falls Aquifer ..	351
Table 93.	Groundwater Contamination Summary / Marble Falls Aquifer Outcrop ..	352
Table 94.	Ambient Monitoring Groundwater Quality Data / Rita Blanca Aquifer ...	354

Table 95.	Groundwater Contamination Summary / Rita Blanca Aquifer Outcrop . . .	355
Table 96.	Ambient Monitoring Groundwater Quality Data / Rustler Aquifer . . . . .	357
Table 97.	Groundwater Contamination Summary / Rustler Aquifer Outcrop . . . . .	358
Table 98.	Ambient Monitoring Groundwater Quality Data / Gulf Coast Aquifer . . .	360
Table 99.	Groundwater Contamination Summary / Gulf Coast Aquifer Outcrop . . .	361
Table 100.	Ambient Monitoring Groundwater Quality Data / Seymour Aquifer . . . . .	363
Table 101.	Groundwater Contamination Summary / Seymour Aquifer Outcrop . . . . .	364
Table 102.	Ambient Monitoring Groundwater Quality Data / Blaine Aquifer . . . . .	366
Table 103.	Groundwater Contamination Summary / Blaine Aquifer Outcrop . . . . .	367
Table 104.	Ambient Monitoring Groundwater Quality Data / Woodbine Aquifer . . .	369
Table 105.	Groundwater Contamination Summary / Woodbine Aquifer Outcrop . . . . .	370
Table 106.	Ambient Monitoring Groundwater Quality Data / Blossom Aquifer . . . . .	372
Table 107.	Groundwater Contamination Summary / Blossom Aquifer Outcrop . . . . .	373
Table 108.	Ambient Monitoring Groundwater Quality Data / Nacatoch Aquifer . . . . .	375
Table 109.	Groundwater Contamination Summary / Nacatoch Outcrop . . . . .	376
Table 110.	Ambient Monitoring Groundwater Quality Data / Lipan Aquifer . . . . .	378
Table 111.	Groundwater Contamination Summary / Lipan Aquifer Outcrop . . . . .	379
Table 112.	Ambient Monitoring Groundwater Quality Data / Hueco and Mesilla Bolsons . . . . .	381
Table 113.	Groundwater Contamination Summary / Hueco and Mesilla Bolsons Outcrop . . . . .	382
Table 114.	Ambient Monitoring Groundwater Quality Data / Bone Spring - Victorio Peak Aquifer . . . . .	384
Table 115.	Groundwater Contamination Summary / Bone Spring - Victorio Peak Aquifer Outcrop . . . . .	385
Table 116.	Agencies Involved with the TNRCC in Water Quality Management Activities . . . . .	411
Table 117.	The Framework for Considering Benefits and Costs of Texas Surface Water Quality Programs Pursuant to Section 305(b)(1)(D), Federal Clean Water Act . . . . .	418
Table 118.	Inventory of Texas Specific Studies Regarding Economic and Social Benefits and Costs of Implementing Water Quality Programs . . . . .	420

## List of Figures

Figure 1.	Historical and Projected Texas Population	29
Figure 2.	Composition of Texas Water Use in 1994 and 2050	30
Figure 3.	Projected Texas Municipal and Industrial Water Use	30
Figure 4.	Composition Comparison of Water Supplies to Meet Uses, 1994 and 2050	31
Figure 5.	Groundwater Schematic	36
Figure 6.	Texas Ecoregion Map	38
Figure 7.	Map of TNRCC Regional Office Boundaries	43
Figure 8.	Map of All Fixed Sampling Sites	46
Figure 9.	Sampling Frequencies at Fixed Sampling Sites in 2000	47
Figure 10.	Maps of Sites for Different Kinds of Monitoring	57
Figure 11.	Violations of Maximum Contaminant Levels in Public Drinking Water Supplies, December 1999	102
Figure 12.	Streams and River Miles Surveyed	181
Figure 13.	Summary of Use Support in Assessed Streams and Rivers	182
Figure 14.	Causes and Sources in Streams and Rivers	183
Figure 15.	Reservoir and Lake Acres Surveyed	211
Figure 16.	Summary of Overall Use Support in Assessed Reservoirs and Lakes	212
Figure 17.	Causes and Sources of Pollution in Reservoirs and Lakes	214
Figure 18.	Estuary Square Miles Surveyed	245
Figure 19.	Summary of Use Support in Assessed Estuaries	246
Figure 20.	Causes and Sources of Impaired Estuary Miles	247
Figure 21.	Ocean Square Miles Surveyed	271
Figure 22.	Summary of Overall Use Support in Assessed Ocean Waters	271
Figure 23.	Causes and Sources of Impaired Ocean Square Miles	272
Figure 24.	Coverage of Texas Coastal and Inland Wetlands in Acres	281
Figure 25.	Major Causes of Statewide Fish Kills, 1994-1999	297
Figure 26.	Major Causes of Toxic Substances-Related Fish Kills, 1994-1999	297
Figure 27.	Selected Texas Aquifers - 1998 and 1999	317
Figure 28.	Selected Texas Aquifers - 1996, 1998 and 2000 Reports	318
Figure 29.	Texas Ambient Monitoring Wells	321
Figure 30.	Texas Regulated Facilities With Known Groundwater Contamination	328
Figure 31.	Public Water Supply Wells	331
Figure 32.	Cenozoic Pecos Alluvium Aquifer	332
Figure 33.	Edwards-Trinity (Plateau) Aquifer	335
Figure 34.	Ogallala Aquifer	338
Figure 35.	Capitan Reef Complex Aquifer	341
Figure 36.	Ellenberger - San Saba Aquifer	344
Figure 37.	Hickory Aquifer	347
Figure 38.	Marble Falls Aquifer	350
Figure 39.	Rita Blanca Aquifer	353
Figure 40.	Rustler Aquifer	356
Figure 41.	Gulf Coast Aquifer	359
Figure 42.	Seymour Aquifer	362
Figure 43.	Blaine Aquifer	365

Figure 44.	Woodbine Aquifer .....	368
Figure 45.	Blossom Aquifer .....	371
Figure 46.	Nacatoch Aquifer .....	374
Figure 47.	Lipan Aquifer .....	377
Figure 48.	Hueco and Mesilla Bolsons .....	380
Figure 49.	Bone Spring - Victorio Peak Aquifer .....	383
Figure 49.	The Five-Year Basin Management Cycle .....	390
Figure 50.	TNRCC Watershed Management Planning Areas .....	391
Figure 51.	The Statewide Basin Management Schedule .....	393
Figure 52.	The TMDL Development Process .....	407