

CONTENTS

CHAPTER 1		CHAPTER 4	
INTRODUCTION	1	THE PHYSICAL DATA	54
1-1 Historical Background	1	4-1 Geology	54
1-2 Planning Model	4	4-2 Land Resources	64
1-3 Limitations of Planning	6	4-3 Groundwater (Hydrogeology)	68
1-4 Recent Trends	7	4-4 Physical Geography	74
1-5 Description of Water Resources Planning	9	4-5 Meteorology	77
1-6 The Planners	11	4-6 Surface Water Hydrology	82
		4-7 Water Quality	87
		4-8 Environment (Ecology)	93
CHAPTER 2		CHAPTER 5	
STARTING THE		SOCIOECONOMIC DATA	99
PLANNING STUDY	16	5-1 Institutional Analysis	99
2-1 Identifying Goals and Objectives	16	5-2 Demographic Data	101
2-2 Organizing the Planning Study	16	5-3 Economic Data	110
2-3 Administering the Planning Study	19	5-4 Financial Data	134
2-4 The Planning Budget	28	5-5 Legal Data	140
		5-6 Social Data	144
CHAPTER 3		CHAPTER 6	
DATA MANAGEMENT	35	WATER RESOURCES MODELS	150
3-1 Introduction	35	6-1 Hydrologic Models	150
3-2 The Five Steps	35	6-2 Hydraulic Models	164
3-3 Economics	43		

6-3	Groundwater Models	171	CHAPTER 9		
6-4	General Simulation Models	174	PLAN IMPLEMENTATION		278
6-5	Optimization Models	179	9-1	What Is Implementation?	278
			9-2	Public Involvement	279
			9-3	Written Reports (Communication)	283
			9-4	Why Plans Fail	285
			9-5	Successful Implementation	288
			9-6	Summary	290
			CHAPTER 10		
CHAPTER 7			POSTANALYSIS		292
FORMULATION OF ALTERNATIVES		193	10-1	Introduction	292
7-1	General Principles	193	10-2	The Process	293
7-2	Alternatives for Policy, Framework, and General Appraisal Studies	197	10-3	Case Studies	298
7-3	Water Supply Alternatives (Irrigation)	201	10-4	Lessons from Postanalysis	307
7-4	Water Supply Alternatives (Municipal and Industrial)	205	APPENDIX A		
7-5	Flood Control Alternatives	206	SELECTIVE OVERVIEW OF ECONOMICS		311
7-6	Hydropower Alternatives	212	A-1	Microeconomic Principles	311
7-7	Multipurpose Reservoirs	220	A-2	Welfare Economics	315
7-8	Navigation	224	A-3	Engineering Economics	317
7-9	Water Quality	229	APPENDIX B		
7-10	Fish and Wildlife	232	COMPUTER PROGRAMS DOCUMENTATION		333
7-11	Recreation	233	B-1	Linear Regression (MLINREG)	333
CHAPTER 8			B-2	Nonlinear Regression (POLYREG)	333
EVALUATION OF ALTERNATIVES		238	B-3	Step Drawdown Analysis (FASTEP)	337
8-1	Introduction	238	B-4	Optimal Discharge (QOPTIM)	345
8-2	Evaluation Theory	239	B-5	Rate of Return (ROR)	347
8-3	Evaluation Practice	246	CREDITS		351
8-4	Policy Evaluation (Technology Assessment)	264	INDEX		355
8-5	Evaluation of Water Resources Functions	268			