

CONTENTS

Foreword	III
Introduction	1
General Facts and Concepts about Ground Water	6
Ground-Water Development, Sustainability, and Water Budgets	15
Ground-Water Budgets	17
Hypothetical Examples of How Ground-Water Systems Change in Response to Pumping	22
Field Examples of How Ground-Water Systems Change in Response to Pumping	24
Long Island, New York	24
High Plains Aquifer	26
Effects of Ground-Water Development on Ground-Water Flow to and from Surface-Water Bodies	30
Streams	30
Lakes	40
Wetlands	42
Springs	43
Coastal Environments	44
Effects of Ground-Water Development on Ground-Water Storage	45
Storage Changes	45
Subsidence	55
Water-Quality Factors Affecting Ground-Water Sustainability	59
Land-Surface/Water-Table Connection	60
Ground-Water/Surface-Water Connection	62
Saltwater Intrusion	64
Meeting the Challenges of Ground-Water Sustainability	67
The Importance of Ground-Water Data	68
Use of Ground-Water Computer Models	70
Strategies for Sustainability	72
Concluding Remarks	76
Acknowledgments	77
References	78

BOXES

- Box A -- Confined and unconfined aquifers respond differently to pumping* **12**
- Box B -- Droughts, climate change, and ground-water sustainability* **20**
- Box C -- Ground-water/surface-water interactions and water-resources sustainability:
Examples from the Northwestern United States* **36**
- Box D -- High Plains aquifer: Egg carton or bathtub* **48**
- Box E -- The connection between surface-water quality and ground-water quality
in a karst aquifer* **63**
- Box F -- Refinement of ground-water system understanding through time:
Lessons from post audits* **71**
- Box G -- Examples of innovative approaches that contribute to ground-water sustainability* **74**