## Contents

1 Characteristics of Non-point Source (NPS) Pollution in Taihu Lake Watershed ............................... 1
  1.1 Introduction .......................................................... 2
  1.2 Analysis on Source and Sink of Agricultural Non-point Pollution ................................................. 5
    1.2.1 Framework of Source and Sink of NPS Pollution ......................................................... 5
    1.2.2 Components of the Source ..................................... 6
    1.2.3 Distribution of the Sink ....................................... 7
  1.3 Formation of Non-point Source Pollution ......................... 8
    1.3.1 Rainfall ........................................................... 8
    1.3.2 Human Activity .................................................. 8
  1.4 Management and Prevention of NPS Pollution ..................... 10
    1.4.1 Key Measures on NPS Pollution Control .............................................................. 10
    1.4.2 Reduction on Pollutants Diffusion ......................................................... 11
    1.4.3 Strengthening of Pollution Monitoring ................................................. 12
  References .......................................................... 12

2 Evaluation of Water Eutrophication on Taihu Lake-Connected Channels in Yixing City ........................ 15
  2.1 Introduction ........................................................... 16
  2.2 Materials and Methods ............................................... 19
    2.2.1 Study Area Description .......................................... 19
    2.2.2 Determination of Parameters ...................................... 21
    2.2.3 Computation Carlson Trophic State Index .......................... 23
  2.3 Results ............................................................. 23
    2.3.1 TN, TP, and Chlorophyll a (Chla) ................................ 23
    2.3.2 Carlson Trophic State Index ..................................... 25
  2.4 Discussion ......................................................... 26
  2.5 Conclusions ........................................................ 27
  References .......................................................... 27
3 Different Land Use Patterns to Combat NPS Pollution in the Region

3.1 Ecological Protection Model

3.1.1 Ecological Protective Forest Model

3.1.2 Wetland Park Model

3.2 Countryside Tourism Model

3.2.1 Village Public Green Land Model

3.2.2 Personal Private Courtyard Model

3.3 Multiple Production Models

3.3.1 Open Stereoscopic Agriculture Model

3.3.2 Greenhouse Agriculture Model

3.4 Conclusions

References

4 Countermeasures to Control NPS Pollution in Headwaters of Taihu Lake Basin

4.1 Introduction

4.2 Functions and Planting Techniques of Hedgerows

4.2.1 Functions of Hedgerows

4.2.2 Techniques of Hedgerows Development

4.3 Techniques of Establishing Riparian Forest Buffer Zone

References

5 Roles of Forests in Ecological Control of NPS Pollution

5.1 Current State of Pollutions

5.1.1 Loss of Chemical Fertilizers and Pesticides from Farmlands

5.1.2 Pollutants from Livestock Breeding and Aquaculture

5.1.3 Domestic Sewages

5.1.4 Atmospheric Deposition

5.1.5 Diffuse Sources of Pollutions

5.2 Influencing Factors for Occurrence of Non-point Source Pollution

5.2.1 Land Use Types

5.2.2 Farming Systems

5.3 Functions of Forests on Ecological Control of NPS Pollution

5.3.1 Source Reduction

5.3.2 Sink Expansion

5.4 Discussion and Conclusions

References
6 Develop Urban Forestry to Prevent Surface Runoff and Eutrophication

6.1 Introduction

6.2 Eutrophication and Its Implications for Coastal Ecosystem

6.2.1 The Big Pressure on the Coastal Environment

6.2.2 The Concept of Eutrophication

6.2.3 Implications of Eutrophication on Coastal Ecosystem

6.3 Causes of Eutrophication

6.3.1 Agricultural Sources

6.3.2 Urban Sources

6.3.3 Marinas/Boats

6.4 Functions of Urban Forestry

6.5 Conclusions

References

7 Landscapes Change and Its Effect on Water Quality in Taihu Lake Watershed: A Case Study in Yixing City

7.1 Site Conditions of Experimental Area

7.2 Methods

7.2.1 Computation Method of “Source–Sink” Landscape Contrast Index

7.2.2 Field Sampling

7.2.3 Statistical Analysis

7.3 Results

7.3.1 Landscape Contrast Index

7.3.2 Change of Water Quality

7.4 Discussion and Conclusions

References

8 Ecological Public Welfare Forests Construction in Yixing City

8.1 Introduction

8.2 Natural and Social Economic Status in Yixing

8.2.1 Natural Geography Conditions

8.2.2 Social and Economic State

8.2.3 Forest Resources Totally

8.2.4 Forests Distribution Along Taihu Lake

8.3 Ecological Public Welfare Forests Construction

8.4 Works Have Done

8.5 Key Technology of Forests Building

8.5.1 Tree Species Selection

8.5.2 Tree Species Collocation Pattern

8.5.3 Seedling Size and Treatment

8.5.4 Planting Density

8.5.5 Planting Techniques
9 Effects and Planting Techniques of Hedgerows in Slope Lands for NPS Pollution Control

9.1 Introduction. .......................................................... 122
9.2 Theory of Agriculture NPS Pollution Control from the Source. .................................................. 124
9.3 Effect and Benefits of Slope Land Nitrogen Fixation by Hedgerows .............................................. 126
9.4 Planting Techniques of Hedgerows in Slope Lands ................................................................. 130
  9.4.1 Design Principle .................................................. 130
  9.4.2 Soil Preparation .................................................. 132
  9.4.3 Planting Technology ............................................. 133
  9.4.4 Maintenance and Management ................................. 136
9.5 Discussion and Conclusions ........................................... 137
References ........................................................................ 138

10 Purification of Eutrophicated Water and Dynamic Kinetics of Nitrogen Absorption by 2 Salix integra Clones

10.1 Materials and Methods ................................................. 143
  10.1.1 Experimental Materials ...................................... 143
  10.1.2 Purification Efficiency of Willows on Nitrogen and Phosphorous ........................................... 145
  10.1.3 Measurement of Different Forms of Nitrogen ................. 146
  10.1.4 Absorption Kinetics of NO₃⁻—N .............................. 146
10.2 Results and Analysis .................................................... 147
  10.2.1 Purification Effect of S. integra ............................. 147
  10.2.2 Absorption Kinetics of S. integra 
on Different Forms of Nitrogen ........................................ 151
10.3 Discussion and Conclusions ........................................... 154
References ........................................................................ 157

11 Physiological Characteristics and Nitrogen Absorption/Distribution Features of Salix matsudana Under Different Nitrogen Stresses

11.1 Introduction. .............................................................. 161
11.2 Materials and Methods ................................................. 162
  11.2.1 Cultivation of Testing Materials .......................... 162
  11.2.2 Experimental Methods ........................................ 163
  11.2.3 Data Treatment .................................................. 164
11.3 Results and Analysis .................................................... 165
  11.3.1 Effect of Nitrogen Treatment on Biomass and Nitrogen Absorption ................................. 165
  11.3.2 Effect of Nitrogen Treatment on ^15N Absorption and Distribution ...................................... 165
14.4 Results and Analysis ........................................ 220
  14.4.1 NPS Pollutant Generation, Migration Law, and Temporal and Spatial Distribution ................. 220
  14.4.2 Farmland Sewage Purification by Artificial Pond–Wetland System ................................. 222
  14.4.3 Water Pollutant Purification in Artificial Wetland ............ 227
14.5 Discussion and Conclusions ................................ 230
References .................................................................. 232

15 N and P Absorption by Hydrophytes and Wetland Sustainable Management ................................. 235
  15.1 Introduction ............................................................ 236
  15.2 N and P Absorption and Cycle in Wetland Ecosystem ............ 236
    15.2.1 Seasonal Change of N and P in Various Organs of Reeds ........................................ 237
    15.2.2 Spatial Distribution Characteristics of N and P in Reeds ........................................ 239
    15.2.3 Seasonal Accumulation of N and P in Different Organs of Cattail ....................... 240
    15.2.4 Spatial Distribution Characteristics of N and P in Cattail .................................. 241
    15.2.5 Absorption and Accumulation of N and P in \emph{Arundo donax} .................................. 242
  15.3 Wetland Sustainable Management ................................. 243
    15.3.1 Ecological Compensation from Public Finance ......................... 244
    15.3.2 Ecological Compensation Oriented with Market Mechanism .............................. 247
    15.3.3 Management with Community Participation .................................................. 247
  15.4 Conclusions ............................................................ 250
References .................................................................. 252

Plant Directory in Yixing .............................................. 255

Index .......................................................................... 287
Forestry Measures for Ecologically Controlling Non-point Source Pollution in Taihu Lake Watershed, China
Zhang, J.
2016, XVI, 289 p. 166 illus., 119 illus. in color., Hardcover