



**FACULTY OF ENGINEERING
IRRIGATION AND HYDRAULICS DEPARTMENT**

ENVIRONMENTAL MITIGATION OF WETLANDS IN EGYPT

A Thesis Submitted in Partial Fulfillment of the Requirements for the
Degree of Doctor of Philosophy in Civil Engineering

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DEDICATION

This work is dedicated to who suffered to educate, prepare, build
capacity and help

**TO
MY FATHER SOUL
And
MOTHER**

Also thanks
TO MY SIBLING

STATEMENT

This dissertation is submitted to Ain Shams University for partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Civil Engineering

The work included in this thesis was carried out by the author in the Irrigation and Hydraulics Department, Ain Shams University.

No part of this thesis has been submitted for a degree or a qualification at any other university or institution.

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Abstract

In terms of the importance of preserving the aquatic ecosystem of wetlands in Egypt and the Aquatic resource Functions with preserving the Services, this research was initiated with this objective through the numerically investigating the Borollos Lake water quality that deteriorated due to the huge of discharging the wastewater in order to enhance its quality. Primarily, the available measured data was collected in order to visualize a complete data picture the lake, and also, filed visits were carried out; Literature was assembled and reviewed, from which A double standard approach was implemented, where model investigations, for water quality hydrodynamics, were achieved by SMS12.1.7 (SMS-TABS). A model for simulating the hydrodynamic conditions and water quality within the lake has proved to be a good and effective model for this purpose and has proved its good ability to simulate the conditions inside the lake, which has enabled the use of several scenarios to restore the ecosystem of El-Borollos lake and propose different scenarios to improve the quality of the lake until the lake recovers its ecosystem , The results of water quality readings, and the environmental impact assessment of these scenarios through the implementation of the RIAM matrix, the recommended scenario was a scenario of adding a new connects channel between the lake and the Mediterranean with the treatment of southern banks, In addition, the research provided various engineering solutions that contribute to maintaining the quality of water and restoring the lake's environmental and water system by controlling the deterioration of water quality and also the possibility of implementing the recommended solutions in the form of General in lakes and other wetlands in Egypt.

The study concludes with the following recommendations:

- The importance of the treatment of southern drains before pouring in the lake.
- The importance of the widening and dredging of the old Bughaz because of its positive impact in improving the salinity level in addition to, it is improve the exchange of water currents between the lake and the Mediterranean Sea.
- The importance of establishing a new channel linking the lake to the subject of study and the Mediterranean Sea in the western region.
- The thesis concluded the relationship between the calculation of the water depth and concentration of organic matter and also between them and the different temperatures.
- It is necessary to apply the RIAM matrix before and during the implementation of the proposed solution to identify the weak points and negative points with finding solutions and also to clarify the negative effects on the environment.

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CONTENTS

CHAPTER ONE: INTRODUCTION	1
1.1.OVERVIEW	1
1.2. PROBLEM STATEMENT	1
1.3 OBJECTIVES	1
1.4. METHODOLOGY	2
1.5. THESIS OUTLINE.....	4
 CHAPTER TWO: LITERATURE REVIEW.....	5
2.1. OVERVIEW	5
2.2. WETLANDS.....	5
2.2.1 TYPES OF WETLANDS	5
2.2.1.1 NATURAL WETLANDS	5
2.2.1.2 CONSTRUCTED WETLAND.....	6
2.3 ENVIRONMENT IMPACT ASSESSMENT	7
2.4 PROJECT MANAGEMENT SYSTEM.....	7
2.5 COASTAL LAKES	8
2.6 LAKES IN EGYPT.....	9
2.7 HYDRODYNAMIC ASPECTS	10
2.8 HYDRODYNAMIC MODELLING	11
2.9 HYDRODYNAMIC AND WATER QUALITY MODELS	13
2.10 WORLDWIDE HYDRODYNAMIC MODELLING	13
2.11 HYDRODYNAMIC MODELLING IN EGYPT	14
2.12 WATER QUALITY MODELLING.....	14
2.13 MODELLING WITH DELFT-3D.....	14
2.14 HEC-RAC MODELLING	15
2.15 CMS MODELLING	15
2.16 DELFT-3D MODELLING IN BOROLLOS.....	15
2.17 SMS MODELLING.....	15
 CHAPTER THREE: STUDY AREA DESCRIPTION.....	17
3.1 STUDY AREA DESCRIPTION	17
3.2 WATER BALANCE	18
3.3. DATA ASSEMBLY	18
3.4 SIMULATION PLAN	22
CHAPTER FOUR: NUMERICAL MODELLING	23
4.1 HYDRODYNAMIC MODELLING STAGE.....	23
4.2 HYDRAULIC RUN OUTPUT.....	24
4.3 MODEL VERIFICATION	26
4.4 WATER QUALITY MODELS	32

4.4.1 SALINITY PARAMETER CALIBRATION.....	32
4.4.2 DISSOLVED OXYGEN CALIBRATION	36
4.4.3 COD PARAMETER CALIBRATION.....	39
4.4.4 BOD PARAMETER CALIBRATION.....	42
4.4.5 PO4 PARAMETER CALIBRATION	45
4.4.6 NH4 PARAMETER CALIBRATION	48
4.4.7 NO3 PARAMETER CALIBRATION	51
4.4.8 Zn PARAMETER CALIBRATION	53
4.5 HYDRODYNAMIC MODELS COMMENTS	54
4.6 WATER QUALITY MODELING COMMENTS.....	54

CHAPTER FIVE: RESULTS ANALYSIS AND DISCUSSIONS 56

5.1 OVERVIEW	56
5.1.1 METHODOLOGY SCENARIOS	56
5.2 DIVERTING OF DRAINS (SCENARIOS 1& 2).....	58
5.2.1. HYDRODYNAMICS MITIGATION.....	58
5.2.2 SALINITY MITIGATION	61
5.2.3 BOD MITIGATION	62
5.3 WIDENING BUGHAZ INLET (3rd SCENARIO).....	64
5.3.1 HYDRODYNAMICS MITIGATION	64
5.3.2 SALINITY MITIGATION	67
5.3.3 DO MITIGATION.....	68
5.3.4 BOD MITIGATION	70
5.4 WIDENING BUGHAZ AND DIVERTING DRAINS (4th&5th SCENARIOS).....	71
5.4.1 HYDRODYNAMIC MITIGATION	71
5.4.2 SALINITY MITIGATION	71
5.4.3 BOD MITIGATION	72
5.5 DIVERTING DRAIN11 (6th&7th SCENARIO).....	76
5.5.1 HYDRODYNAMICS MITIGATION	76
5.5.2 BOD MITIGATION	77
5.5.3 SALINITY MITIGATION	78
5.6 WIDENING BUGHAZ & DIVERTING DRAIN11 (8th SCENARIO)80	
5.6.1 HYDRODYNAMICS MITIGATION	80
5.6.2 SALINITY MITIGATION	81
5.6.3 BOD MITIGATION	81
5.7 DIVERTING BRIMBAL DRAIN (9th SCENARIO).....	82
5.7.1 HYDRODYNAMICS MITIGATION	82
5.7.2 SALINITY MITIGATION	83
5.7.3 BOD MITIGATION	83
5.8 WIDENING BUGHAZ INLET AND DIVERTING BRIMBAL DRAIN (10th SCENARIO).....	84

5.8.1 HYDRODYNAMICS MITIGATION	84
5.8.2 SALINITY MITIGATION	85
5.8.3 BOD MITIGATION	85
5.9 WIDENING BUGHAZ INLET AND DIVERTING TIRA DRAIN (11th SCENARIO)	86
5.9.1 HYDRODYNAMICS MITIGATION	86
5.9.2 SALINITY MITIGATION	87
5.9.3 BOD MITIGATION	88
5.10 WIDENING BUGHAZ INLET AND DIVERTING PUMP STATION (12th SCENARIO).....	88
5.10.1 HYDRODYNAMICS MITIGATION	88
5.10.2 BOD MITIGATION	89
5.11 DREDGING BUGHAZ INLET (13th SCENARIO).....	90
5.11.1 HYDRODYNAMICS MITIGATION	90
5.11.2 SALINITY MITIGATION	92
5.11.3 BOD MITIGATION	93
5.12 DREDGING AND WIDENING BUGHAZ,(14th SCENARIO)	94
5.12.1 HYDRODYNAMICS MITIGATION	94
5.12.2 SALINITY MITIGATION	95
5.12.3 BOD MITIGATION	96
5.13 DREDGING AND WIDENING BUGHAZ.....	97
(15th SCENARIO).....	97
5.13.1 HYDRODYNAMICS MITIGATION	97
5.13.2 SALINITY MITIGATION.....	97
5.13.3 BOD MITIGATION.....	98
5.14 DREDGING AND WIDENING BUGHAZ AND ADDING MORE INLETS (16th SCENARIO).....	98
5.14.1 HYDRODYNAMICS MITIGATION	98
5.14.2 SALINITY MITIGATION	100
5.14.3 BOD MITIGATION	101
5.15 DREDGING BUGHAZ (17th SCENARIO).....	102
5.15.1 HYDRODYNAMICS MITIGATION.....	103
5.15.2 SALINITY MITIGATION.....	104
5.15.3 BOD MITIGATION.....	104
5.16 DREDGING BUGHAZ (18th SCENARIO).....	104
5.16.1 HYDRODYNAMICS MITIGATION.....	104
5.16.2 SALINITY MITIGATION.....	107
5.16.3 BOD MITIGATION.....	108
5.17 DREDGING BUGHAZ WITH ADDED ONECHANNEL (19th SCENARIO).....	108
5.17.1 HYDRODYNAMICS MITIGATION.....	109
5.17.2SALINITY MITIGATION.....	110
5.17.3BOD MITIGATION.....	110

5.18 DREDGING BUGHAZ WITH ADDED THREE CHANNE (20th SCENARIO).....	112
5.18.1 HYDRODYNAMICS MITIGATION.....	113
5.18.2SALINITY MITIGATION.....	114
5.18.3BOD MITIGATION.....	114
5.19 DREDGING BUGHAZ WITH ADDED THREE CHANNEL (21thSCENARIO).....	116
5.19.1 HYDRODYNAMICS MITIGATION.....	117
5.19.2SALINITY MITIGATION.....	117
5.19.3BOD MITIGATION.....	118
5.20 DREDGING AND WIDENING BUGHAZ WITH ADDING MORE INLET(22th SCENARIO).....	119
5.20.1 HYDRODYNAMICS MITIGATION.....	119
5.20.2SALINITY MITIGATION.....	120
5.20.3 BOD MITIGATION.....	121
5.21 SCENARIOS COMPARISON	122
5.22 SALINITY AND BOD TRENDS	127
5.22.1 BOD TRENDS.....	128
5.22.2 SALINITY TRENDS WITH DEPTH AND TEMPERATURE ..	134
5.23 EVALUATION OF PROPOSED SCENARIOS.....	140
 CHAPTER SIX: CONCLUSION AND RECOMMENDATION.....	 144
6.1 CONCLUSION.....	144
6.2 RECOMMENDATIONS.....	145
 LIST OF REFERENCES.....	 146
 APPENDIX A	 152
APPENDIX B	153
APPENDIX C	154
APPENDIX D	155
APPENDIX E	156
APPENDIX F	157
APPENDIX G	163
APPENDIX J	164

LIST OF TABLES

Table (5.1) ENVIRONMENTAL IMPACT OF 4TH SCENARIO.....	141
Table (5.2) ENVIRONMENTAL IMPACT OF 15TH SCENARIO.....	142
Table (5.3) ENVIRONMENTAL IMPACT OF 16THSCENARIO.....	142
Table (5.4) ENVIRONMENTAL IMPACT OF 22th SCENARIO	143

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

Figure (1.1) Methodology Plan.....	3
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CHAPTER TWO: LITERATURE REVIEW

Figure (2.1) Water resource decision support system framework.....	8
Figure (2.2) four large lagoons on the Nile coast (In Egypt).....	10

CHAPTER THREE: DISCRIPTION OF STUDY AREA

Figure (3.1) Geographical location of Borollos Lake.....	17
Figure (3.2) image for Borollos Lake and drains outfall.....	19
Figure (3.3) Measured water levels in Lake Borollos....	20
Figure (3.4) Water quality monitoring stations inside the lake.....	20
Figure (3.5) Seasonal variation of Drains discharge.....	21
Figure (3.6) Stations Temperature inside Borollos Lake.....	21

CHAPTER FOUR: NUMERICAL MODELLING

Figure (4.1) Bathymetric map of Borollos Lake and drains Location.....	24
Figure (4.2) Bathymetry mesh for bed elevations of Borollos Lake.....	25
Figure (4.3) Contour Bed Elevations with drains inlet for Lake.....	25
Figure (4.4) Velocity vectors and Direction inside the lake with.....	26
The absence of wind force and tide wave	
Figure (4.5) Simulation Water Depths inside the lake.....	26
Figure (4.6) Velocity magnitude and Direction of flow in.....	27
Borollos Lake in case of wind Force and absence of tide Force	
Figure (4.7) Water depth values at Bughaz Outlet in case of win.....	28
Figure (4.8) Velocity and flow direction in the lake in case of wind force &Tidal wave.....	29
Figure (4.9) Velocity and Flow Direction around Bughaz in.....	30
Case of wind force and (plan A-A).....	30
Figure (4.10) Comparison between the measured and simulated.....	30
Water depth values (m) at monitoring station.....	30
Figure (4.11) Correlation coefficient between the measured and.....	31
Simulated water depth values (m) at monitoring station	
Figure (4.12) Comparison between the measured and simulated.....	31
Water sea levels values (m) at monitoring station	
Figure (4.13) Correlation coefficient between the measured and simulated water surface levels at monitoring station.....	32

Figure (4.14) Seasonal variation of salinity (gm/l.) distribution at different stations in Borollos Lake	33
Figure (4.15) Borollos lake water salt intrusion (gm/l.), and around Bughaz Outlet	34
Figure (4.16) Comparison between the measured and simulated values for Salinity values at monitoring station.....	35
Figure (4.17) the correlation coefficient between the measured and The simulated salinity values (gm/l.) at monitoring station	35
Figure (4.18) Seasonal variation of DO (mg/l) at different stations In Borollos Lake.....	37
Figure (4.19) Water quality parameter distribution DO (mg/l) In Borollos Lake	37
Figure (4.19a) Borollos Lake water DO parameter at western part (Plan A-A).....	38
Figure (4.20) Comparison between the measured and simulated DO values (mg/l) at monitoring station	38
Figure (4.21) Correlation coefficient between the measured and Simulated DO values at monitoring station.....	39
Figure (4.22) Seasonal variation of COD (mg/l) at different stations In Borollos Lake.....	39
Figure (4.23) Water quality parameter distribution, COD (mg/l) In Borollos Lake	41
Figure (4.24) Water quality simulated for COD (mg/l) around West region of Borollos Lake (plan A-A)	41
Figure (4.25) Comparison between the measured and simulated COD (mg/l) values at monitoring station.....	42
Figure (4.26) Correlation coefficient between the measured and..... Simulated values at monitoring station.....	42
Figure (4.27) Seasonal variation of BOD (mg/l) at different station in Borollos lake	44
Figure (4.28) Parameter distribution BOD (mg/l) in the lake.....	44
Figure (4.29) Comparison between the measured and simulate..... BOD (mg/l) values at monitoring station.....	45
Figure (4.29a) Correlation coefficient between the measured and..... Simulated BOD values at monitoring station	45
Figure (4.30) Seasonal variation of PO ₄ (µg/l) at different stations in Borollos Lake.....	47
Figure (4.31) Water parameter distribution PO ₄ (µg/l) across..... Borollos Lake.....	47
Figure (4.32) Comparison between the measured and simulated PO ₄ Values at monitoring station	48
Figure (4.32a) Correlation coefficient between the measured and Simulated at monitoring station	48

Figure (4.33) Seasonal variation of NH_4 (mg/l) at different stations In Borollos Lake	49
Figure (4.34) Seasonal variation of NH_4 (mg/l) across. Borollos Lake	50
Figure (4.34a) Comparison between the measured and simulated NH_4 values at monitoring station	50
Figure (4.34b) Correlation coefficient between the measured and..... Simulated NH_4 values at monitoring station	51
Figure (4.35) Seasonal variation of NO_3 at different stations in Borollos Lake Water quality parameter distribution NO_3 (mg/l).....	
In Borollos Lake	52
Figure (4.36a) Comparison between the measured and simulated NO_3 values at monitoring station	53
Figure (4.36b) Correlation coefficient between the measured and..... Simulated NO_3 values at monitoring station.....	53
Figure (4.37) Seasonal variation of heavy metals ($\mu\text{mg/l}$) at different stations in Borollos Lake	54

CHAPTER FIVE: ANALYSIS AND RESULTES

Figure (5.1) Scenarios Groups.....	57
Figure (5.2) Water levels (m), in Borollos, (1st scenario).....	58
Figure (5.3) Water levels (m), in Borollos, (2nd scenario).....	59
Figure (5.4) the water levels comparison between the current case and 1 st scenario.....	60
Figure (5.5) Comparison the water levels (m), between the current and 1st scenario.....	60
Figure (5.6) The velocity vector and magnitude at El-Bughaz 1st scenario...	61
Figure (5.7) Water salt intrusion (gm/l), in Borollos Lake 1st scenario.....	62
Figure (5.7a) Water salt intrusion (gm/l) in Borollos Lake 2nd scenario....	61
Figure (5.8) Comparison between scenarios (1th and 2nd) for BOD removal Efficiency.....	63
Figure (5.8a) Comparison between scenario no (1th and 2nd) for the salinity increasing efficiency	63
Figure (5.9) Water depth (m) distribution in Borollos.....	64
Figure (5.9a) Distribution of water level (m) in Borollos.....	65
Figure (5.10) Velocity direction and magnitude, at Bughaz.....	65
Figure (5.10a) Velocity direction and magnitude, at Bughaz..... At the current state	66
Figure (5.11) Comparison between the water levels (m) values in current state and the proposed 3rd, scenario, across drains inlet	67
Figure (5.12) Water salt intrusion (gm/l) in the lake and in the vicinity of Bughaz Outlet	68

Figure (5.12a) Water salt intrusion (gm/l) in the lake and in the vicinity of Bughaz Outlet (plan A-A).....	68
Figure (5.13) Dissolved oxygen distribution (mg/l.), in the lake.....	69
Figure (5.13a) Dissolved oxygen increase ratio (mg/l), in the lake.....	69
Figure (5.14) Water distribution parameter BOD in the lake at current state	70
Figure (5.15) Water distribution parameter BOD (mg/l.) in the lake (3rd scenario).....	70
Figure (5.16) Comparison between the water levels (m) Values in the current state and in the 4th scenario.....	72
Figure (5.16a) distribution of water level (m) in Borollos, 4th scenario	72
Figure (5.17) Flow direction and velocity in the vicinity of Bughaz Outlet	73
Figure (5.17a) Water salt distribution parameter (gm/l) in the lake (4th scenario).....	73
Figure (5.18) Water distribution parameter BOD (mg/l) in the lake (4th scenario).....	74
Figure (5.19) Water distribution parameter DO (mg/l) in the lake (4th scenario).....	74
Figure (5.20) Comparison between the water levels (m) Values in current state and the 5th scenario	75
Figure (5.21) Comparison between the first to the 5th scenarios for BOD removal efficiency	75
Figure (5.22) Comparison between the First to the 5th scenarios for Salinity values increase	76
Figure (5.23) Comparison for water levels (m) values between.....	77
The current and proposed scenario at monitoring stations	77
Figure (5.24) Water distribution parameter BOD (mg/l) in the lake	77
(6th scenario)	
Figure (5.25) Water distribution parameter BOD (mg/l) in the lake (7th scenario).....	78
Figure (5.26) water salt distribution in the lake in gm/l	78
Figure (5.27) Salinity distribution (gm/l) in the Bughaz vicinity	79
Plan (A-A).....	79
Figure (5.28) BOD removal efficiency at monitoring stations.....	79
(6th and 7 th scenarios).....	79
Figure (5.29) Salinity values (gm/l) at monitoring stations.....	80
(6 th and 7 th scenarios).....	80
Figure (5.30) Water levels (m) values winter in the lake	80
Figure (5.31) Recorded water levels (m) comparison between current and proposed scenario.....	81
Figure (5.32) water salt distributions (gm/l.) in the lake	81
Figure (5.33) BOD water distribution values (mg/l.) in the lake.....	82

Figure (5.34) Water levels distribution (m) in the lake	83
Figure (5.35) Water salt distribution (gm/l.) in the lake	83
Figure(5.36) BOD water distribution (mg/l.) in the lake	84
Figure (5.37) Distribution of Water surface elevations in the lake.....	84
Figure (5.38) Water salt distribution in the lake	85
Figure (5.39) Water distribution BOD (mg/l.) in the lake	86
Figure (5.40) Water levels distribution in the lake	87
Figure (5.41) Water salt distribution (gm/l) in the lake	87
Figure (5.42) Water distribution BOD (mg/l.) in the lake	88
Figure (5.43) Water levels distribution in the lake	89
Figure (5.44) Water Salt distribution (g/l.) in the lake	89
Figure (5.45) Bed levels (m) distribution in Borollos.....	90
Figure (5.46) water surface level (m) in Borollos, in winter 2015	90
Figure (5.47) water depth (m) distribution in the lake.....	91
Figure (5.48) Velocity vector and magnitude in the vicinity of Bughaz	92
Figure (5.49) Velocity vector and magnitude in the vicinity of Bughaz	92
Figure (5.50) water salt intrusion (gm/l), in the lake	93
Figure (5.51) water BOD distribution (mg/l), in the lake	93
Figure (5.52) comparison between normal case and 14th scenario	94
For water levels (m)	
Figure (5.53) water depth (m) distribution in Borollos.....	95
Figure (5.54) Velocity vector and magnitude in the vicinity of Bughaz	95
Figure (5.55) water salt intrusion (gm/l), in the lake	96
Figure (5.56) water BOD distribution (mg/l), in the lake	96
Figure (5.57) water BOD distribution (mg/l), in the lake	97
Figure (5.58) water levels (m) in winter 2015, in the lake	
Figure (5.59) comparison of water levels values (m) between.....	99
Normal case and the scenario no.15th	
Figure (5.60) Velocity values (m/s) and its direction in the lake.....	100
Figure (5.61) Velocity value and vector in the vicinity of new inlets	100
Figure (5.62) water salt intrusion (gm/l), in the lake	101
Figure (5.63) water BOD distribution (mg/l), in the lake	101
Figure (5.64) water BOD distribution (mg/l), in the lake	102
Figure (5.65) Comparison between different scenarios For BOD	102
Removal efficiency	
Figure (5.66) Water surface distribution inside the lake in case of 17th Scenario (m)	103
Figure (5.67) comparison between normal case and 17th Scenario for water level (m)	103
Figure (5.68) Velocity magnitude (m/s) and direction of flow at Bughaz Outlet	
Figure (5.69) Water depth distribution inside the lake in case of 18 th	