

TABLE OF CONTENTS

	PAGE
Acknowledgements	iii
Abstract (English)	v
Abstract (Thai)	vii
List of tables	xiv
List of illustrations	xvi
Chapter 1 Introduction	1
Research objectives	4
Chapter 2 Literature Review	5
Concept of biodiversity	5
Measure of diversity	6
Species diversity indices	8
Northern region of Thailand	9
Avian ecology	11
Bird fauna in Thailand	11
The studies on bird diversity in Thailand	15
Wildlife Sanctuaries and conservation in Thailand	21
Study areas in this research	21
Chapter 3 Materials and Methods	25
Research Plan, Methods and Scope	25
Methods	26
1. Avian study	26
2. Plant study	26
3. Hydrological data	27
4. Data interpretation	27
5. Hypothesis of this research	27

TABLE OF CONTENTS (Continued)

	PAGE
Chapter 4 Results of data collection	32
1. The results of forest survey and inventory in 30x50 m sampling plots set in 4 different types of habitat.	32
1.1 The Riparian Deciduous Forest along Mae Ngae Gully (GL)	32
1.2 Deciduous Forest (DF)	35
1.3 Dry Dipterocarp Forest (DDF).	37
1.4 Dry Evergreen Forest (DEF)	39
2. The results of collecting data of birds in study area.	43
2.1 The occurrence of birds	43
2.2 Species richness	44
2.3. Abundance of species	46
Chapter 5 Correlation of biological factors	49
Diversity of Birds	49
Species richness of birds	56
1. Shannon Diversity Index	57
2. Cluster analysis for bird diversity	61
Vegetative communities in Salween Wildlife Sanctuary	66
1. Tree diversity	66
2. Structure of plant communities	68
Chapter 6 Relationship between birds and environmental factors	71
1. Relationship between birds and environmental factors in GL	72
2. Relationship between birds and environmental factors in DF	74

TABLE OF CONTENTS (Continued)

	PAGE
3. Relationship between birds and environmental factors in DDF	75
4. Relationship between birds and environmental factors in DEF	77
Chapter 7 Discussion	79
1. Plant communities and diversity of birds	79
1.1 Diversity of birds and plants	79
1.2 Forest structure and diversity of birds	80
2. Diversity of birds and environmental factors	84
3. Management Recommendations	88
4. Conclusion	89
References	90
Appendix	98
Appendix A Total number of birds observed in each day in riparian forest along Mae Ngae Gully.	99
Appendix B Total number of birds observed in each day in deciduous forest.	103
Appendix C Total number of birds observed in each day in dry dipterocarp forest.	108
Appendix D Total number of birds observed in each day in dry evergreen forest.	113
Appendix E The binary data of birds observed in riparian forest along Mae Ngae Gully for one year.	119
Appendix F The binary data of birds observed in deciduous forest for one year.	123
Appendix G The binary data of birds observed in dry dipterocarp forest for one year.	128

TABLE OF CONTENTS (Continued)

	PAGE
Appendix H The binary data of birds observed in dry evergreen forest for one year.	133
Appendix I Numbers of birds in each research areas including feeding behavior, status and feeding space.	138
Appendix J-1 Vertical and horizontal structures of 1 st GL plot.	147
Appendix J-2 Vertical and horizontal structures of 2 nd GL plot	148
Appendix J-3 Vertical and horizontal structures of 3 rd GL plot.	149
Appendix J-4 Vertical and horizontal structures of 4 th GL plot	150
Appendix J-5 Vertical and horizontal structures of 5 th GL plot	151
Appendix J-6 Vertical and horizontal structures of 6 th GL plot	152
Appendix J-7 Vertical and horizontal structures of 7 th GL plot	153
Appendix J-8 Vertical and horizontal structures of 8 th GL plot	154
Appendix J-9 Vertical and horizontal structures of 1 st DF plot	155
Appendix J-10 Vertical and horizontal structures of 2 nd DF plot	156
Appendix J-11 Vertical and horizontal structures of 3 rd DF plot	157
Appendix J-12 Vertical and horizontal structures of 4 th DF plot	158
Appendix J-13 Vertical and horizontal structures of 5 th DF plot	159
Appendix J-14 Vertical and horizontal structures of 6 th DF plot	160
Appendix J-15 Vertical and horizontal structures of 7 th DF plot	161
Appendix J-16 Vertical and horizontal structures of 8 th DF plot	162
Appendix J-17 Vertical and horizontal structures of 1 st DDF plot	163
Appendix J-18 Vertical and horizontal structures of 2 nd DDF plot	164
Appendix J-19 Vertical and horizontal structures of 3 rd DDF plot	165
Appendix J-20 Vertical and horizontal structures of 4 th DDF plot	166
Appendix J-21 Vertical and horizontal structures of 5 th DDF plot	167
Appendix J-22 Vertical and horizontal structures of 6 th DDF plot	168

TABLE OF CONTENTS (Continued)

	PAGE
Appendix J-23 Vertical and horizontal structures of 7 th DDF plot	169
Appendix J-24 Vertical and horizontal structures of 8 th DDF plot	170
Appendix J-25 Vertical and horizontal structures of 1 st DEF plot	171
Appendix J-26 Vertical and horizontal structures of 2 nd DEF plot	172
Appendix J-27 Vertical and horizontal structures of 3 rd DEF plot	173
Appendix J-28 Vertical and horizontal structures of 4 th DEF plot	174
Appendix J-29 Vertical and horizontal structures of 5 th DEF plot	175
Appendix J-30 Vertical and horizontal structures of 6 th DEF plot	176
Appendix J-31 Vertical and horizontal structures of 7 th DEF plot	177
Appendix J-32 Vertical and horizontal structures of 8 th DEF plot	178
Appendix K Environmental data collected by rangers of forest protection units of Salween Wildlife Sanctuary during July 2002-June 2003 in different types of forest.	179
Appendix L Calculation Procedure	181
Appendix M Pictures of some birds in Salween Wildlife Sanctuary	185
Curriculum Vitae	187

LIST OF TABLES

TABLE	PAGE
2.1 Northern forest areas in 2003	9
2.2 The remaining areas of forest type in northern Thailand	10
4.1 Details of Relative Frequency (RF), Relative Density (RD), Relative Dominance (RDo), Importance Value (IVI) and Diversity Index (H') of riparian forest along Mae Ngae Gully (GL)	33
4.2 Details of Relative Frequency (RF), Relative Density (RD), Relative Dominance (RDo), Importance Value (IVI) and Diversity Index (H') of Deciduous Forest (DF)	35
4.3 Details of Relative Frequency (RF), Relative Density (RD), Relative Dominance (RDo), Importance Value (IVI) and Diversity Index (H') of Dry Dipterocarp Forest (DDF)	38
4.4 Details of Relative Frequency (RF), Relative Density (RD), Relative Dominance (RDo), Importance Value (IVI) and Diversity Index (H') of Dry Evergreen Forest (DEF)	40
4.5 Summary of bird data collected in this research	43
4.6 Summary of abundance of birds in 4 habitat types	47
5.1 Diversity index of birds in each habitat and its comparison	58
5.2 Diversity index of resident birds in different habitats and statistical comparison	59
5.3 Similarity index of birds found in each pair of habitats using Simplified Morisita Index (%)	60
5.4 Diversity index and statistical value of different forest communities	66
5.5 Similarity index of plant communities	67
5.6 Statistical comparison of 3 parameters among plant communities	70

LIST OF TABLES (Continued)

TABLE	PAGE
6.1 Coefficients of multi-correlation in 4 different habitats	71
7.1 Feeding guilds of birds in different habitats	81
7.2 Feeding guilds of migratory birds	82
7.3 Percentage of birds classified stratifically for 4 types of habitats	83
7.4 Proportion of migratory birds classified stratifically for 4 habitats	84

LIST OF ILLUSTRATIONS

FIGURES	PAGE
1 Location maps of Salween Wildlife Sanctuary	29
2 Topographic map of Salween Wildlife Sanctuary	30
3 Map of watershed classification for Salween Wildlife Sanctuary	30
4 Habitat map of Salween Wildlife Sanctuary showing the sampling areas	31
5 The vertical profile of GL plot 6 which has the highest Diversity Index ($H'=2.7613$)	34
6 The vertical profile of DF plot 1 that had the highest Diversity Index ($H'=2.9831$)	37
7 The vertical profile of DDF plot 5 containing the highest Diversity Index ($H'=2.5925$)	39
8 The vertical profile of DEF plot 3 that had the highest Diversity Index ($H'=2.7471$)	42
9 Numbers of bird species found in different habitats	51
10 Number of resident birds species found in different habitats	52
11 Numbers of migratory species found in different habitats	54
12 Species richness of birds collected monthly in each forest type	56
13 Monthly diversity index of birds in each habitat type	57
14 Cluster analysis of birds identified in DF over a year	62
15 Cluster analysis of birds found in DEF over a year	63

LIST OF ILLUSTRATIONS (Continued)

FIGURES	PAGE
16 Cluster analysis of birds identified in DDF over a year	64
17 Cluster analysis of birds found in GL over a year.	65
18 Cluster analysis of plants found in different communities	67
19 Numbers of trees in different size class among plant communities	68
20 Relationship between species of birds and environmental factors in GL	72
21 Relationship between species of birds and environmental factors in DF	74
22 Relationship between species of birds and environmental factors in DDF	75
23 Relationship between species of birds and environmental factors in DEF	77
24 Dendrogram of group of forest types using environmental data	85