

List of Figures

Sr. No.	Figure	Page No.
Chapter - 1		
1.1	Distribution of Flamingo species of the world	5
1.2	Flamingos of the World (classification and size)	6
1.3	Map showing distribution of Lesser Flamingos in the World	9
1.4	Lesser Flamingo distribution Map	10
1.5	Map of Bhavnagar Taluka	27
1.6	Location map of Kumbharwada Area of Bhavnagar, Gujarat	28
1.7	Google earth image of Kumbharwada Study Area of Bhavnagar	30
1.8	Location map of Newport Area of Bhavnagar, Gujarat	34
1.9	Newport study site showing different habitat types	36
1.1	Breeding (Gulf of Kachchh and Surajbari Creek) and Non-breeding areas (western Gulf of Khambhat) under present study	41
1.11	Google Earth image of Surajbari Creek nesting site	43
Chapter - 2		
2.1	Estimates of Flamingo numbers at Kumbharwada (2009-2012)	51
2.2	Estimates of Flamingo numbers at Newport salt pans	53
2.3	Number of Lesser Flamingos on both the study sites (2009-2012)	54
2.4	Flamingo distribution at two study sites across the study period	55
2.5	Rate of change in % of juvenile population at both the study sites	56
Chapter - 3		
3.1	Salinity in three different habitat types in Kumbharwada site across the study period	72
3.2	Boxplot diagram for salinity across different habitat types at Kumbharwada site	73
3.3	Scatter plot diagram to showing correlation between salinity and Flamingo population at Kumbharwada site	73
3.4	Salinity in three different habitat types in Kumbharwada site across the study period	75
3.5	Boxplot diagram for salinity across different habitat types at Newport site	76
3.6	Scatter plot diagram showing correlation between salinity and Flamingo population at Newport site	76
3.7	Variation in Dissolved Oxygen (DO) level in three different habitat types at Kumbharwada site	77
3.8	Variation in Dissolved Oxygen (DO) level in three different habitat types at Newport site	78

Sr. No.	Figure	Page No.
3.9	Scatter plot diagram showing correlation between Dissolved Oxygen (DO) level and Flamingo population in sewage ponds	79
3.10	Scatter plot diagram showing correlation between Dissolved Oxygen (DO) level and Flamingo population in sewage ponds	80
3.11	pH in three different habitat types at Kumbharwada site	81
3.12	pH in three different habitat types at Newport site	81
3.13	Percentage of grass cover in Sewage pond habitat of Kumbharwada site	83
3.14	Scattered plot matrix for grass height and Flamingo numbers in Sewage pond habitat of Kumbharwada site	84
3.15	Scatter plot diagram for Aeluropus lagopoides height vs flamingo numbers	85
3.16	Height of P. coarctata and Number of feeding flocks of Flamingo	86
3.17	Height of A. lagopoides and Number of feeding flocks of Flamingo	86
3.18	Water level at three sites in Newport site across the study period	89
3.19	Water level at three sites in Kumbharwada site across the study period	90
3.20	Scatter plot diagram for water level vs flamingo numbers at Sewage pans habitat of Kumbharwada	91
3.21	Water temperature across the study period in Kumbharwada and Newport Saltpans area	93
3.22	Results of Cluster Analysis of different habitat types in the study area	94
3.23	Proportion of available and used habitat by Lesser Flamingos in Kumbharwada	96
3.24	Proportion of Available and used habitat by Lesser Flamingos in Newport site	98
Chapter - 4		
4.1	Nest clustering recorded during 2009 nesting season	110
4.2	Graphical representation of nesting pattern at Surajbari (2009)	110
4.3	Nest clustering recorded during 2011 nesting season	112
4.4	Nest clustering recorded during 2011 nesting season	113
4.5	Soil texture diagram based on USDA soil classes	117
4.6	Length of 13 eggs measured at Surajbari Nesting site	118
4.7	Width of 13 eggs measured at Surajbari Nesting site	119
Chapter - 5		
5.1	Time spent (in %) by Lesser Flamingos in different time blocks at Kumbharwada site	131
5.2	Histogram of feeding activity during early morning (06:00 to 9:00 hrs) with H_0 and 95% t confidence interval for the mean	132
5.3	Histogram of feeding activity during late evening (06:00 to 9:00 hrs) with H_0 and 95% t confidence interval for the mean	132
5.4	Histogram of resting activity during early morning (06:00 to 9:00 hrs) with H_0 and 95% t confidence interval for the mean	133

Sr. No.	Figure	Page No.
5.5	Histogram of feeding activity during evening (06:00 to 9:00 hrs) with H_0 and 95% t confidence interval for the mean	133
5.6	Variation in time spent in feeding and resting behavior through different blocks	134
5.7	Activity pattern at Low water level (<10 cm) at Kumbharwada site in Sewage pans	136
5.8	Activity pattern at mid water level (10-30 cm) at Kumbharwada site in Sewage pans	136
5.9	Activity pattern at High water level (>30 cm) at Kumbharwada site in Sewage pans	137
5.10	Activity pattern of Flamingos at Low water level (<10 cm) at Kumbharwada site in Salt pans	138
5.11	Activity pattern of Flamingos at Moderate water level (10-30 cm) at Kumbharwada site in Salt pans	139
5.12	Activity pattern of Flamingos at high water level (> 30 cm) at Kumbharwada site in Salt pans	140
5.13	Activity pattern of Flamingos at Low water level (<10 cm) at Kumbharwada site in Fellow Land / ASP	141
5.14	Activity pattern of Flamingos at moderate water level (10-30 cm) at Kumbharwada site in abandoned saltpans	142
5.15	Activity pattern of Flamingos at High water level (> 30 cm) at Kumbharwada site in abandoned saltpans	143
5.16	Time spent (%) by Lesser Flamingos in different time blocks at used Salt Pans Resting Preening Feeding Movement Alert	145
5.17	Activity pattern at Low water level (<10 cm) at Newport site in Used Saltpans habitat	146
5.18	Activity pattern at Moderate water level (10-30 cm) at Newport site in Used Saltpans habitat	147
5.19	Activity pattern at Low water level (<10 cm) at Newport site in Abandoned saltpans habitat	148
5.20	Activity pattern at Moderate water level (10-30 cm) at Newport site in abandoned saltpans habitat	149
5.21	Activity pattern of Flamingos at High water level (> 30 cm) at Newport site in abandoned saltpans habitat	150
5.22	Activity pattern at Low water level (<10 cm) at Newport site in Mudflats habitat	151
5.23	Activity pattern at Moderate water level (10-30 cm) at Newport site in Mudflat habitat	151
5.24	Activity pattern of juvenile Lesser Flamingos in study area	152
5.25	Mean group size in different time blocks at Kumbharwada site	154
5.26	Activity pattern of Lesser Flamingos at Vadgam (GoKh)	155

Sr. No.	Figure	Page No.
5.27	Activity pattern of Lesser Flamingos at Little Rann of Kachchh (LRK)	156
5.28	Logarithmic regression analyses showing the proportion of time spent on various behavioral categories in relation to flock size in Lesser flamingo	157
5.29	Activity pattern of Lesser Flamingos at Surajbari creek (Breeding site)	159
Chapter - 6		
6.1	Time series images of Google earth (2004-2013), Note the reduction in open water area	178
6.2	Rate of increase of salt production in study area	180
6.3	Increase in area of saltpans from 1995-2003	180
6.4	Map showing Coastal Vulnerability on the basis of geomorphology for the Gujarat coast	183