



**MONITORING PROGRAM FOR WATERBIRDS INHABITING THE SALINAS
LOCATED ON THE NORTHWEST OF BONAIRE, NETHERLANDS ANTILLES**

YEAR REPORT 2009



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1. Introduction.

This report shows the results of the second year monitoring the waterbirds inhabiting the salinas located on the Northwest of the island and presents a comparison of these results with those of last year, which are the baseline for this monitoring program. Terms in bold font are described in the glossary.

For more information on the study area, methodology and the background of the project refer to last year's report available from STINAPA Bonaire: "Monitoring program for waterbirds inhabiting the Salinas located in Northwest Bonaire, Netherlands Antilles. Year Report 2008".

2. Objectives

2.1 Main Objectives

- Determine the number of waterbird species present in each one of the eight salinas located on the Northwest of Bonaire during the months of January, April, July and October.
- Determine the number of individual waterbirds present in each one of the salinas located on the Northwest of Bonaire during the months of January, April, July and October.
- Compare the importance as a habitat for waterbirds amongst the eight salinas located in the North of the island.
- Determine the **relative abundance** of waterbirds in eight salinas located on the Northwest of Bonaire during the months of January, April, July and October.
- Determine **bird density** in the eight salinas located on the Northwest of Bonaire during the months of January, April, July and October.
- Look into changes in relative abundance of birds throughout the year (**temporal dynamics**).
- Compare all the results with those of 2008

2.2 Secondary objectives.

- Learn about bird behaviour and ecology during the surveys.
- Train and educate staff and volunteers in bird monitoring techniques.
- Find unusual birds or species never recorded in the island of Bonaire.
- Find and identify and report birds that have been ringed somewhere else.
- Create awareness for the public about the bird life on Bonaire.

3. Results and Discussion

During the months of January, April, July and October, 8 salinas in the Northwest of Bonaire were surveyed for water birds. In this reporting year a total of 7416 individuals from 40 different species were counted and identified. This is a very significant increase in both numbers of individuals (26%) and diversity of species (11%), hence, a good

indication that the habitat provided to waterbirds by the salinas maintains its quality and health.

Some species of non-breeding birds that visit the island in small numbers were found and identified, namely Long-billed dowitcher, Willet, Mallard and Black-bellied plover. No ringed birds were observed during the surveys in the reporting period.

3.1 Species diversity

The most evident feature on last year's data was the dissimilarity among the salinas regarding diversity of species and number of individuals inhabiting them. From this we concluded that the habitat quality for waterbirds must be very diverse among them, even though we tend to think about these lagoons as very similar. Comparable to last year's data, in figure 1 we can observe again a very large difference in the number of species that were present on each salina. Slagbaai and Goto with 26 species were the richest in diversity, surpassing almost 3 times the number of species of Salina Funchi, for instance. Further, identical to the previous year, the salinas Slagbaai, Goto, Matijs and Frans are on the top half of diversity and the same four are on the bottom. This is good evidence that some of the physical, chemical or biological characteristics of the top 4 must be more appealing for a larger number of waterbird species. The next step is to look for similarities among these two groups in the results of the base line study of the physical, chemical and biological characteristics of salinas done by STINAPA Bonaire and FLASA (Fundacion La Salle de Ciencias Naturales, Venezuela).

Results on the species diversity in 2009 are very gratifying from a nature conservation point of view; In figure 1 we can observe that the number of species present in the salinas increased in five of them while one remained the same and only decreased in two. In total, 5 more species than last year were registered.

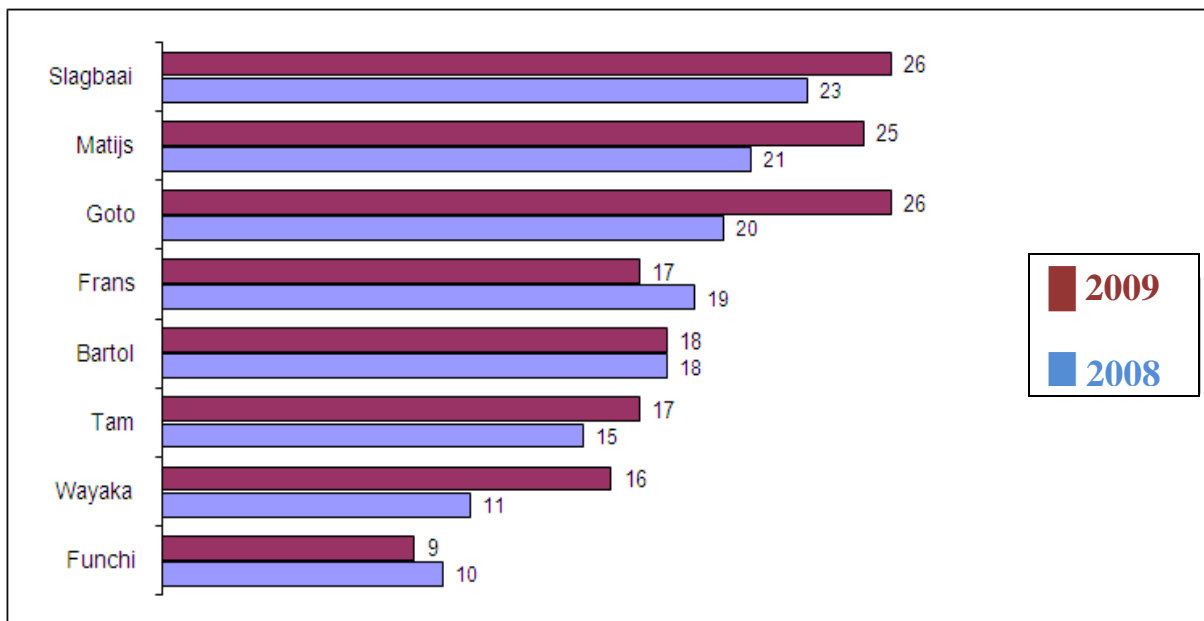


Figure 1. Comparison of species diversity per salina between 2008 and 2009.

3.2 Number of individuals

Parallel to the results on species diversity, the vast difference among the salinas in the amount of individuals present in their areas came up again in 2009. We can observe in figure 2 the almost identical shape of the charts; however the values are higher in 2009, when all salinas included in this monitoring program supported a larger amount of individual birds. Overall, this accounted for 1536 birds. This is a strong indication that the salinas as a habitat for waterbirds remain stable and no negative alterations have occurred. Again, very rewarding results from a natural resources conservation point of view. Repetitively, the same 4 salinas (Goto, Slagbaai, Frans and Matijs) rank in the top half and the same four in the lower, corroborating our conclusions about their quality differences as a waterbird habitat.

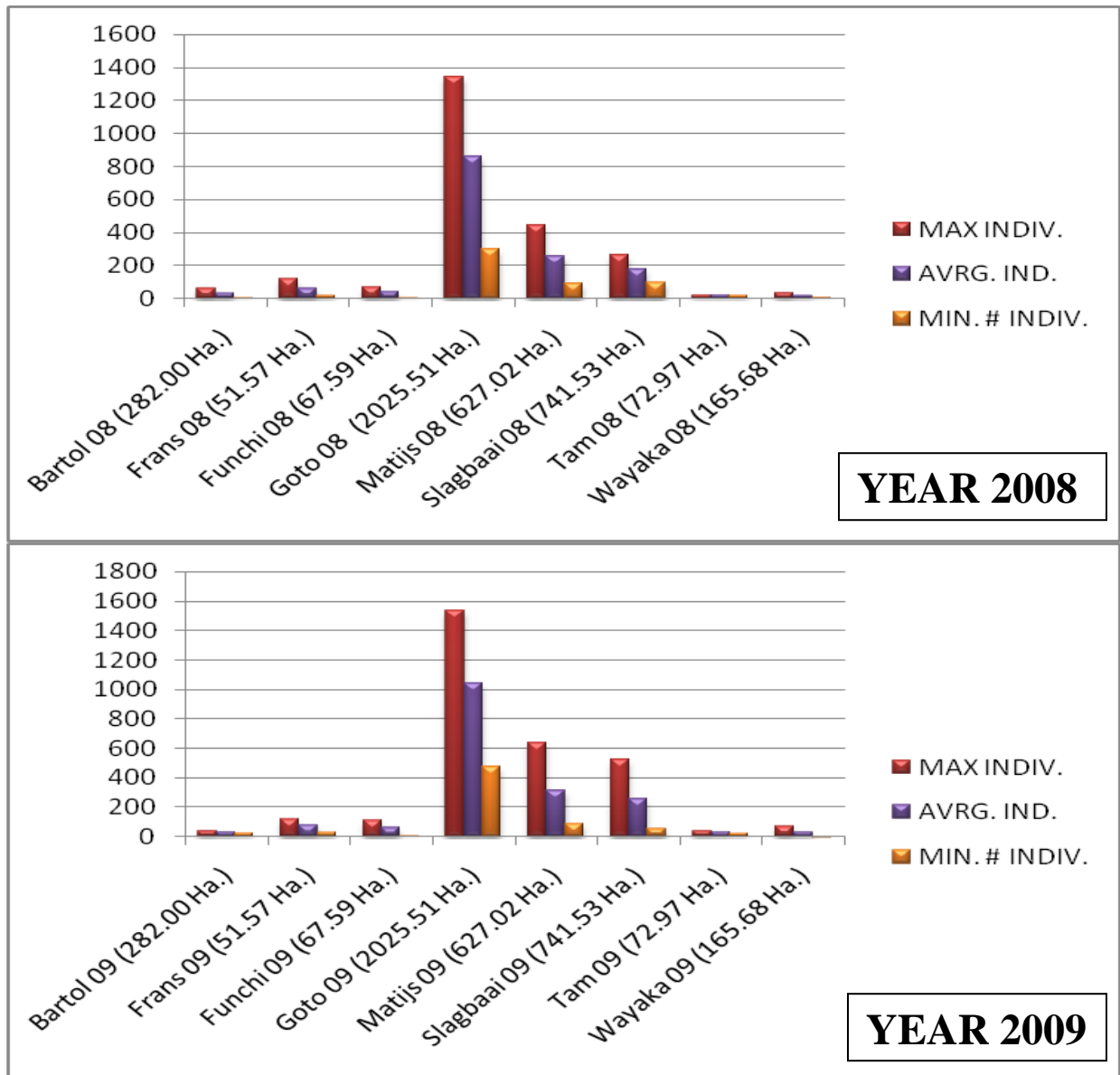


Figure 2. Comparison of number of individuals in 2008-2009 per salinas.

In 2008, our baseline year, we created an importance index by simply multiplying the number of individuals by the number of species present on each. The objective was to help envision the individual significance of each salina and the differences among them as a habitat for waterbirds. Before going into discussion about the comparison between 2008 and 2009, it is important to clarify that every salina included in this study have a high conservation value and that a low number in the importance index does not imply a low value of the salina as a habitat per se. Instead, this is just a tool to compare the salinas among themselves.

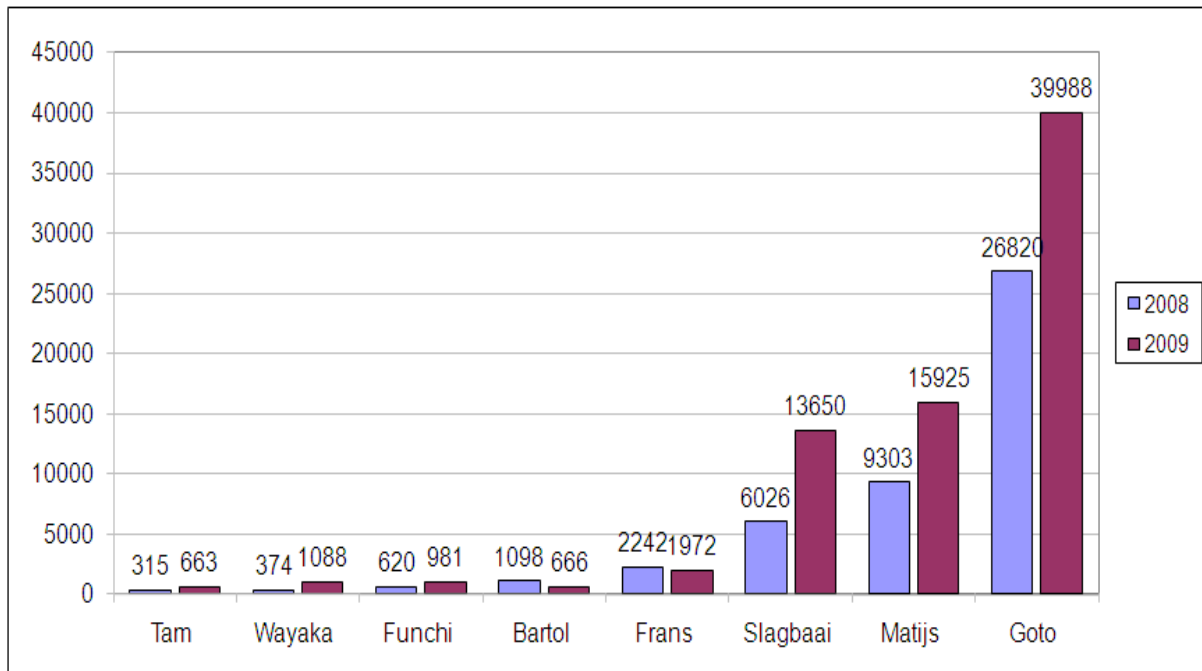


Figure 3. Comparison of the importance index for each salina in 2008 and 2009.

In figure 3 we can clearly observe, once again, that the shape of the curve is almost identical for both years and that only the vast majority of the values are higher in 2009. This situation corroborates and strengthens our conclusions and recommendations from last year regarding the urgent need for legal protection for the ones which are not.

In summary, Salina Goto clearly stands out as the most important of all the salinas as a habitat for waterbirds on Bonaire but only a portion of it is located inside the Washington Slagbaai National Park therefore, the boundaries of the park should be expanded to include the whole area of Salina Goto in order to give the area the legal protection it deserves and simultaneously increase the conservation value of our terrestrial national park. Additionally, Salina Frans due to its exceptional value for both aquatic and terrestrial birds (specially our endemic and vulnerable subspecies of Yellow-shouldered Amazon) and its lack of legal protection, should also be included within the park boundaries and be nominated for Ramsar designation. For more details into this discussion refer to the report available from STINAPA Bonaire: “Monitoring program for waterbirds inhabiting the Salinas located in Northwest Bonaire, Netherlands Antilles. Year Report 2008”.

3.3 Bird density

As expected, bird density also presents a matching situation with the number of individuals and species diversity. That is an almost identical graph in both charts, but higher values in general for 2009, a situation which once again corroborates that both the waterbird populations and the habitats surveyed remain in good or even better shape than the previous year, which was our baseline year. Identical to the chart with the values of the number of individuals, the large variation in the maximum and minimum throughout the year is related to the migratory character of some of the species.

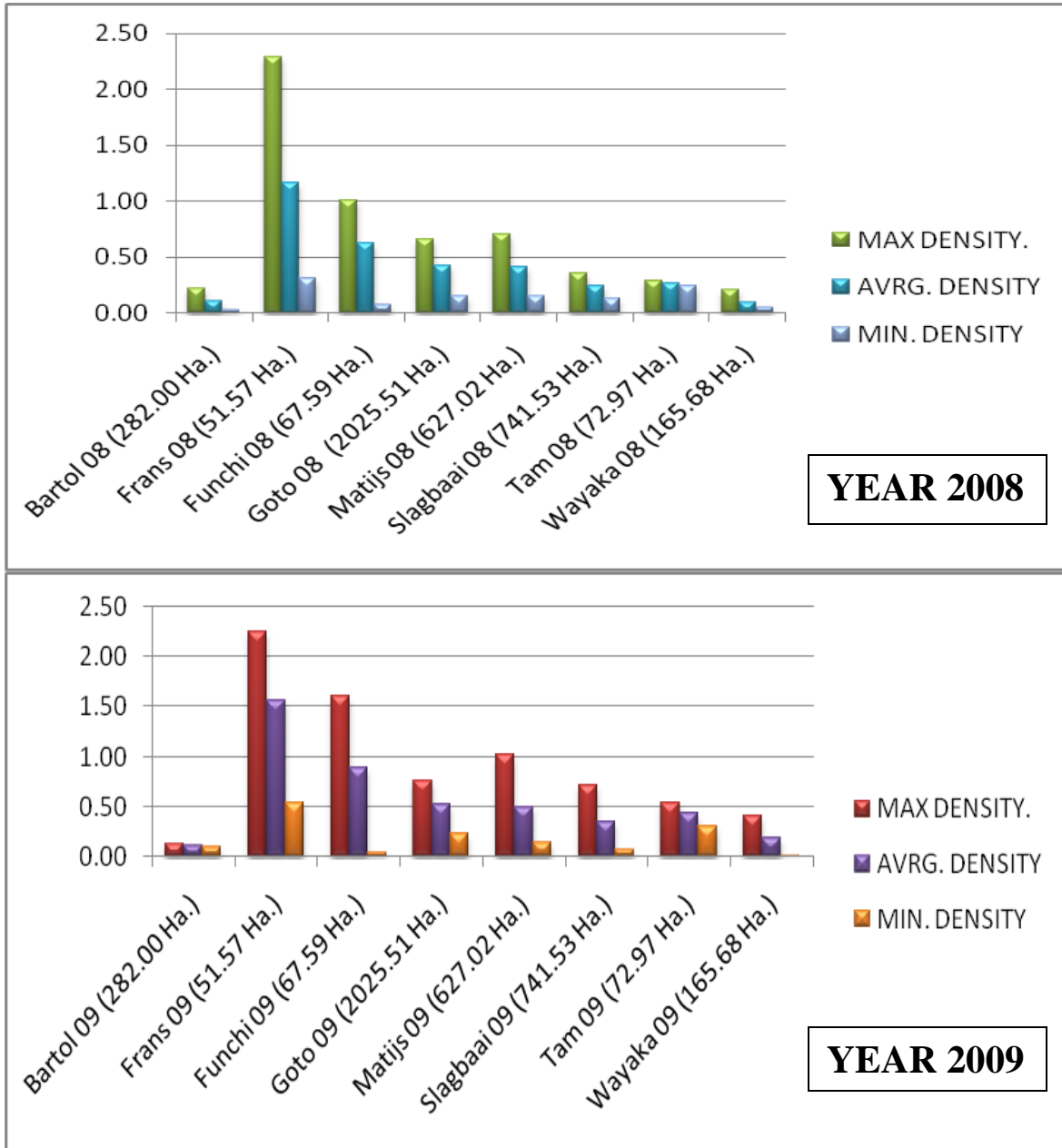


Figure 4. Comparison of bird density in 2008-2009 per salina.

3.4 Relative abundance

Looking at the charts of relative abundance of species (figures 5 to 13), it is obvious that the Greater Caribbean Flamingo remains as the species with the largest presence in the salinas and accounts for more than half of the total number of individual birds found and no other species comes closer to its numbers. However, its relative abundance is lower than last year by 4.36. This is mainly caused by a much larger presence in 2009 of Black-necked Stilts, which accordingly increased its relative abundance by 3.83 points. Since this program does not cover all the habitats in the island, it is impossible to determine if this situation means an increase in the number for the island population of Black-necked stilts or if it is just a shift of the birds from other areas of the island (e.g. Lac Bay) to the salinas on the Northwest. As resources become available STINAPA Bonaire will include other important areas of the island in this program in order to obtain a better understanding of these resident populations. Least Sandpiper is another species with a change in relative abundance of approximately 4 points; however it remains on the five top positions of the charts.

After the Greater Caribbean Flamingo, the most abundant species for Bonaire remain the same as last year, namely Least Sandpiper, Lesser yellowlegs and Black-necked Stilt. However, in the group of egrets and herons, the Tricolored Heron surpassed both the Snowy Egret and the Green Heron, which were the most abundant last year, yet with minor changes in their percentages. The rest of the positions and percentages on the graphs remained occupied by essentially the same species with very small changes.

Some species which were registered in 2008 have not been observed during the surveys in 2009, namely Black-bellied Plover, Cattle Egret, Mallard, Stilt Sandpiper and Sanderling. All of them are not very common for Bonaire and only a few individuals were registered last year, hence this is not a reason for alarm. Further, considering the small amount of surveys in the year and the fact that they do not cover the entire potential habitat for waterbirds in the island some variety in the species to be registered each year is expected.

Species which were registered for the first time in 2009 for this monitoring program include the Caribbean Coot, Least Grebe, Piping Plover, Spotted Plover, Western Sandpiper, Black-crowned Night Heron, Kingfisher, Pied-billed Grebe, Spotted Sandpiper and Blue-winged teal.

Overall, a very stable or even improved situation of the waterbird populations and the salinas surveyed in the Northwest of Bonaire compared to last year. We registered more species and higher numbers of individual birds, a very positive result from a nature conservation perspective.

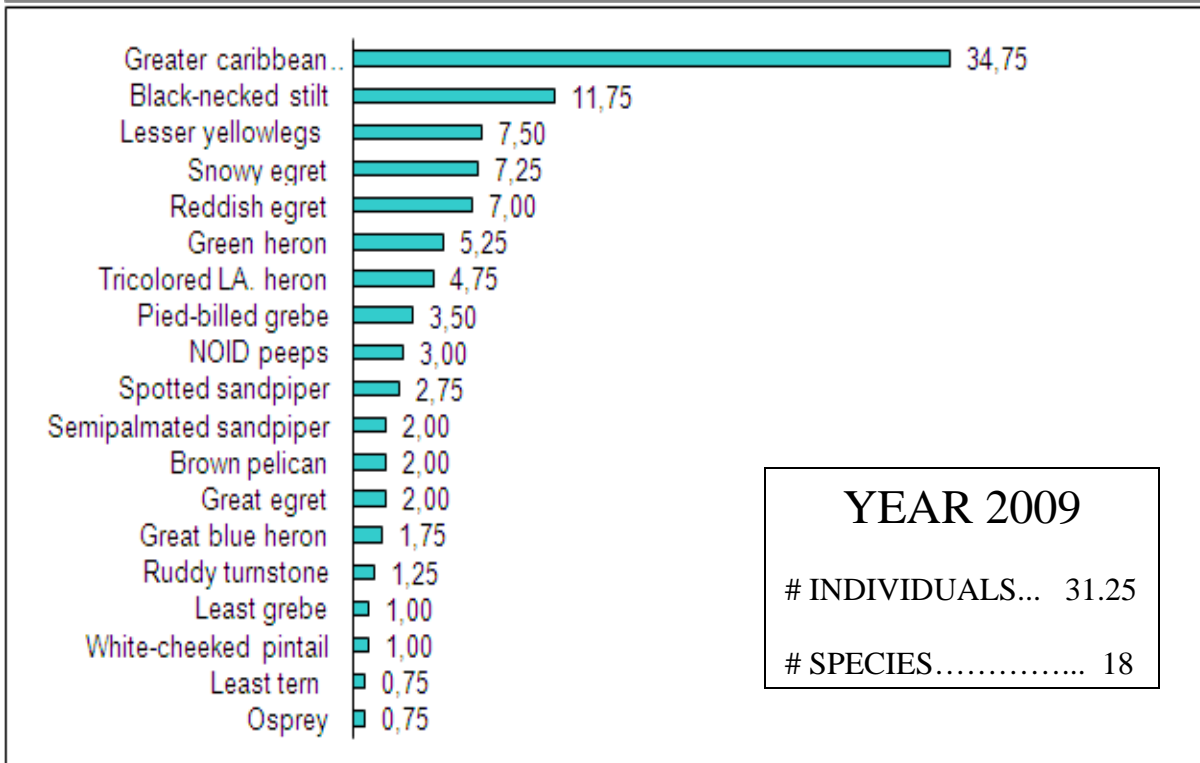
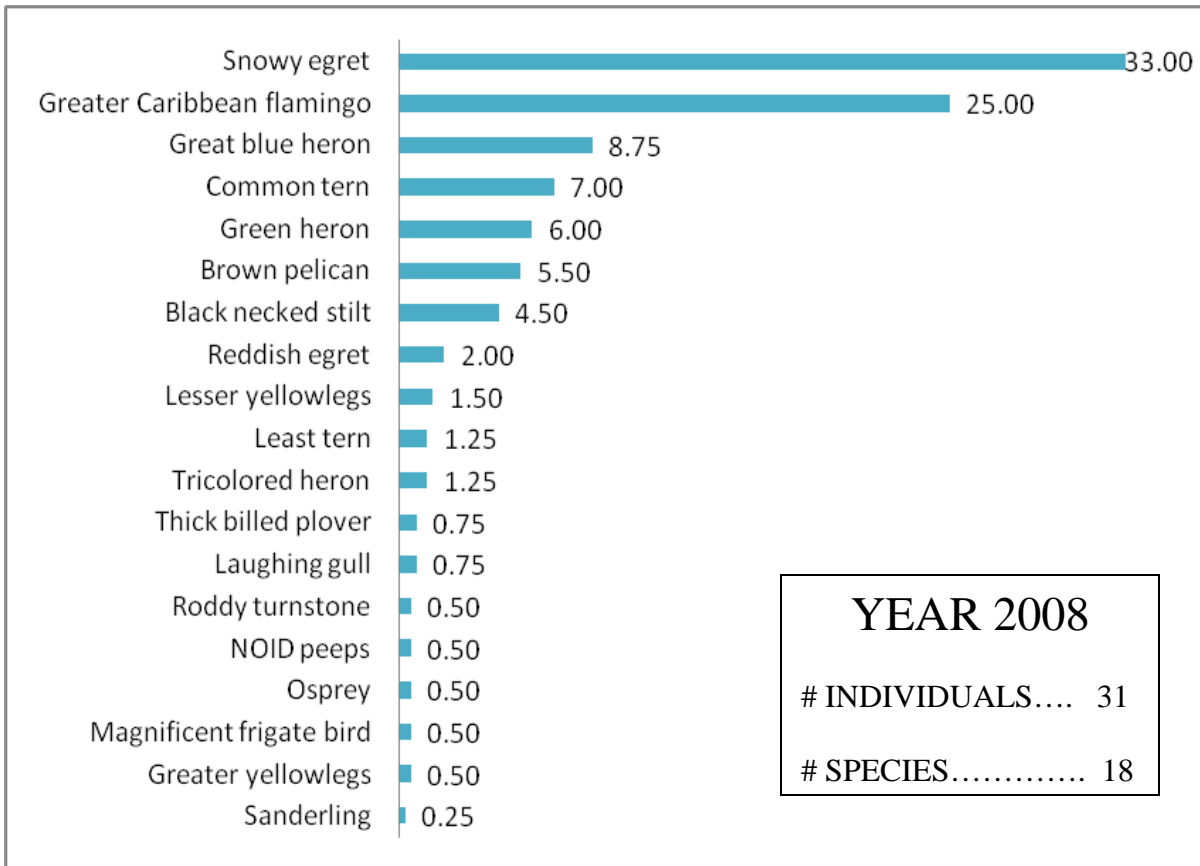


Figure 5. Comparison of the year average of relative abundance of species for 2008-2009 in Salina Bartol (%).

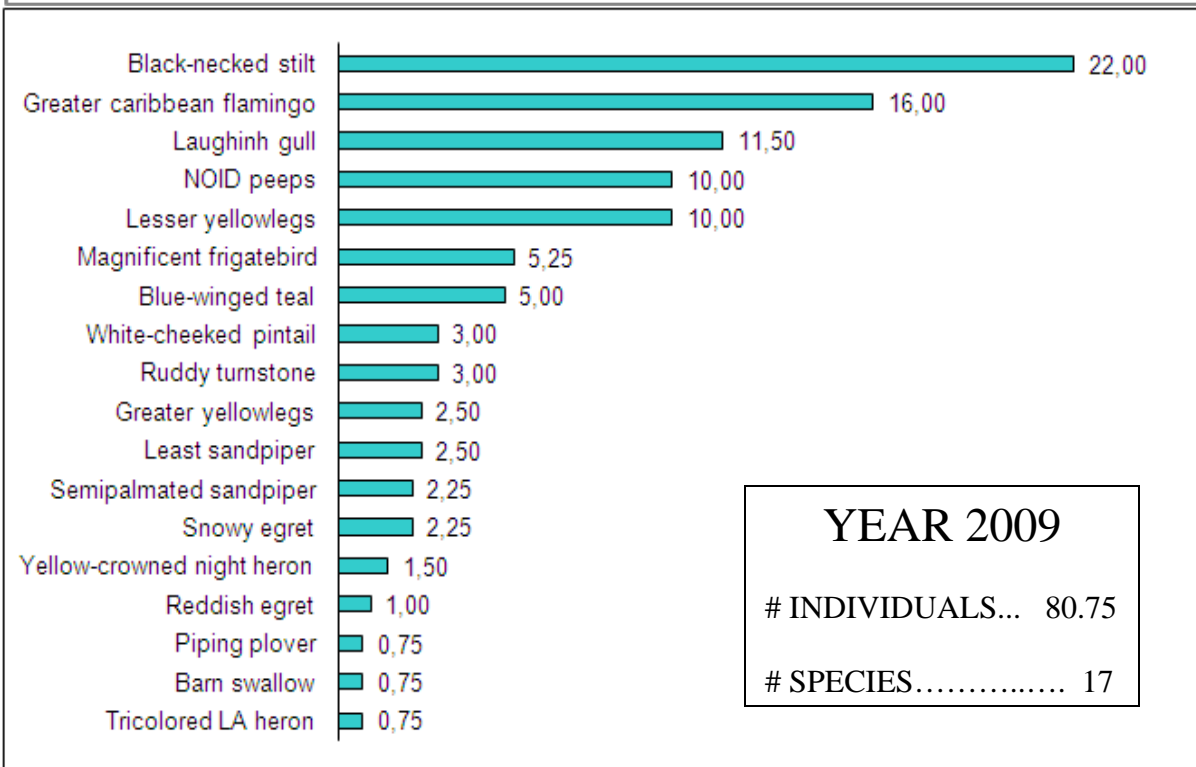
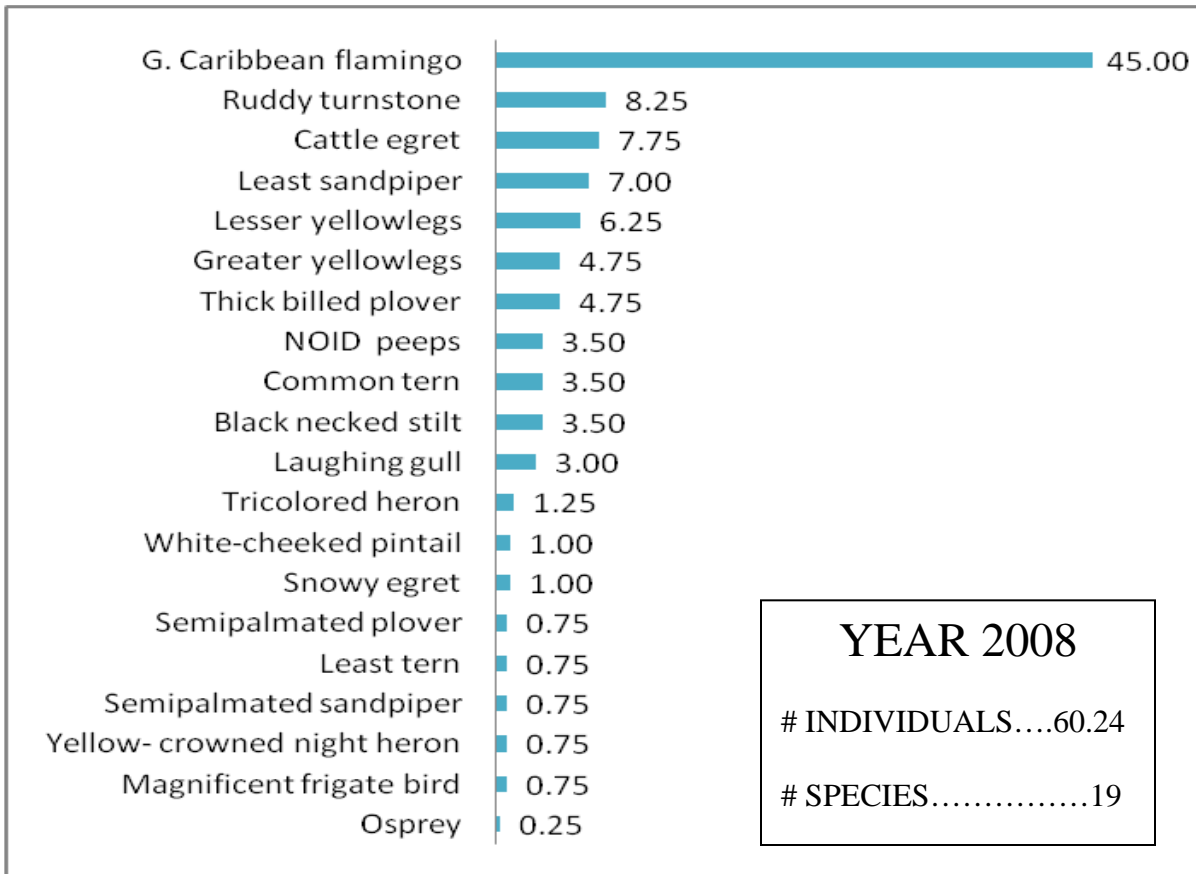


Figure 6. Comparison of the year average of relative abundance of species in for 2008-2009 in Salina Frans (%).

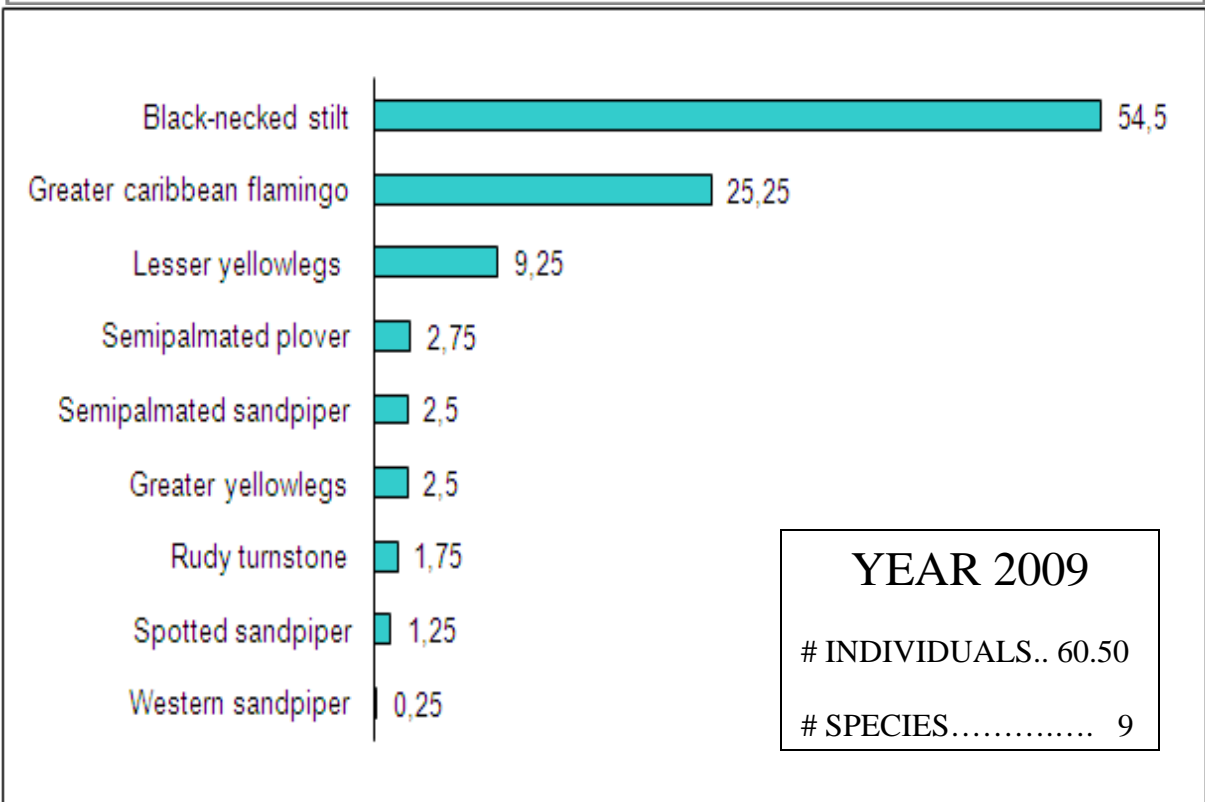
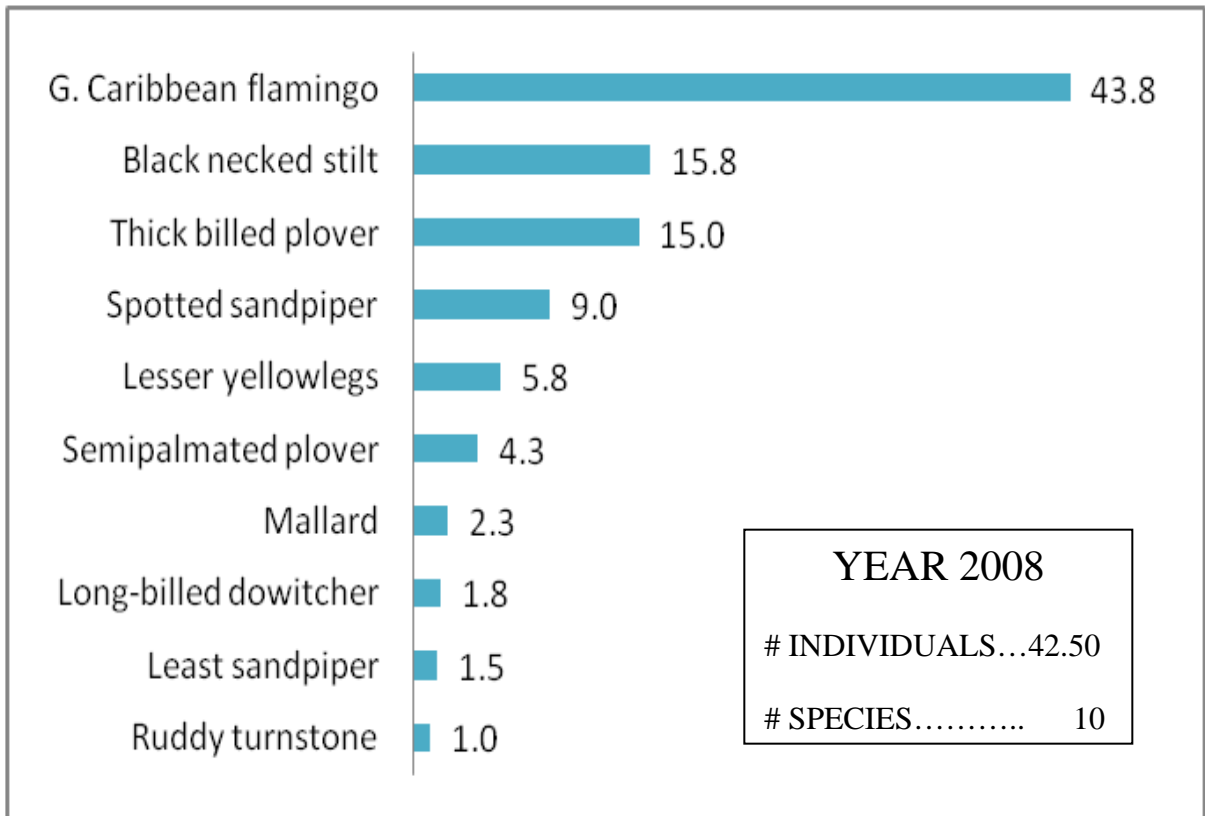


Figure 7. Comparison of the year average of relative abundance of species for 2008-2009 in Salina Funchi (%).

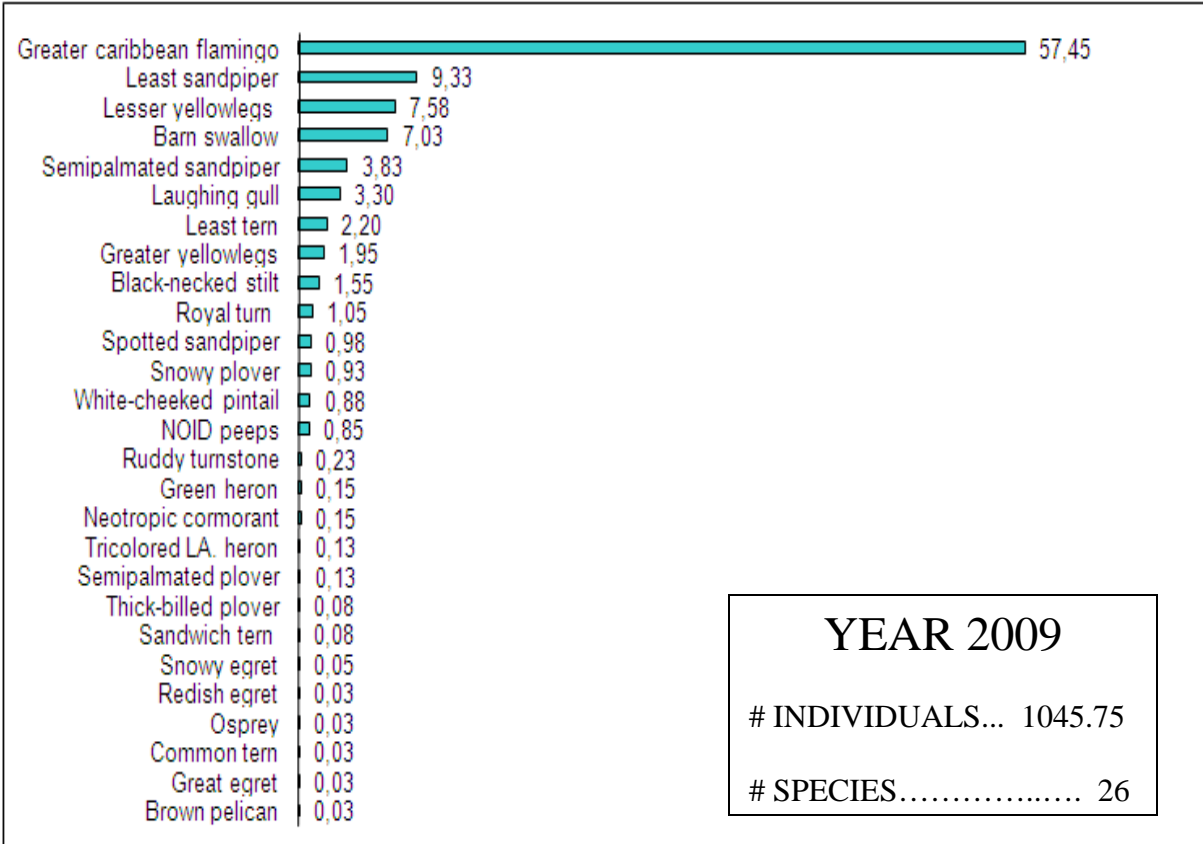
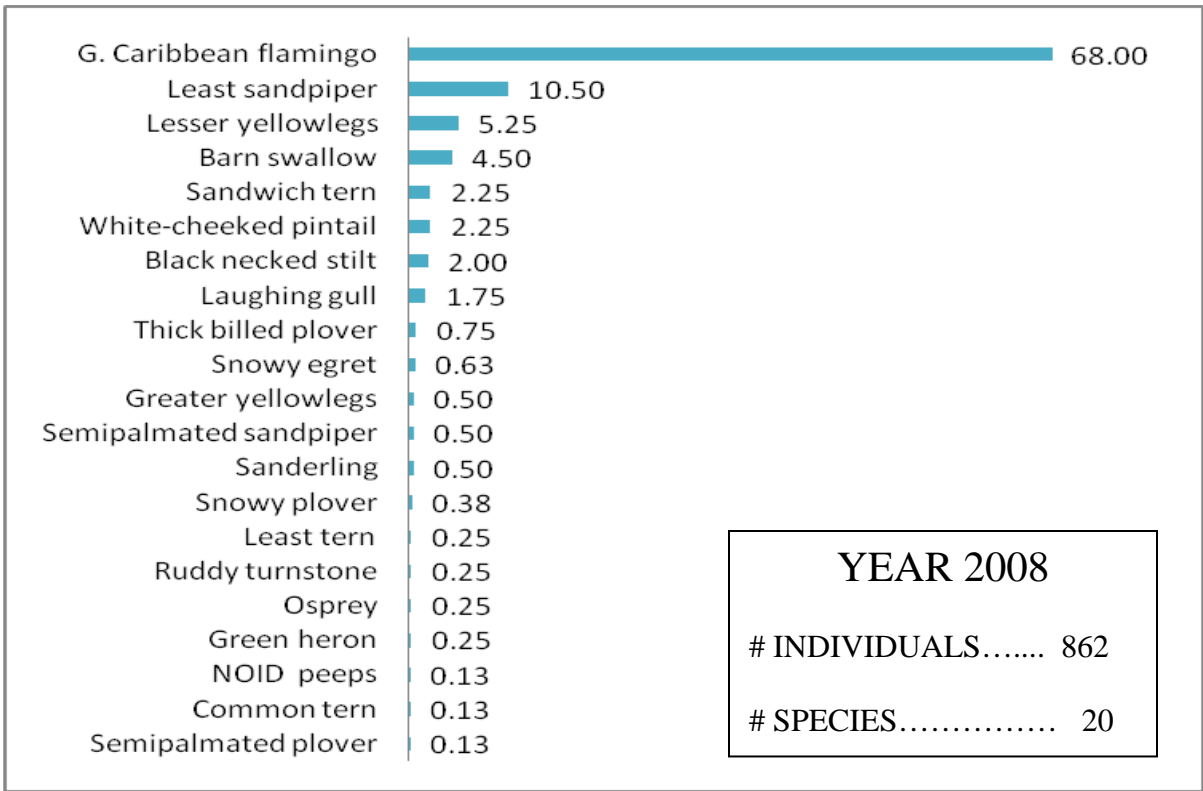


Figure 8. Comparison of the year average of relative abundance of species for 2008-2009 in Salina Goto (%).

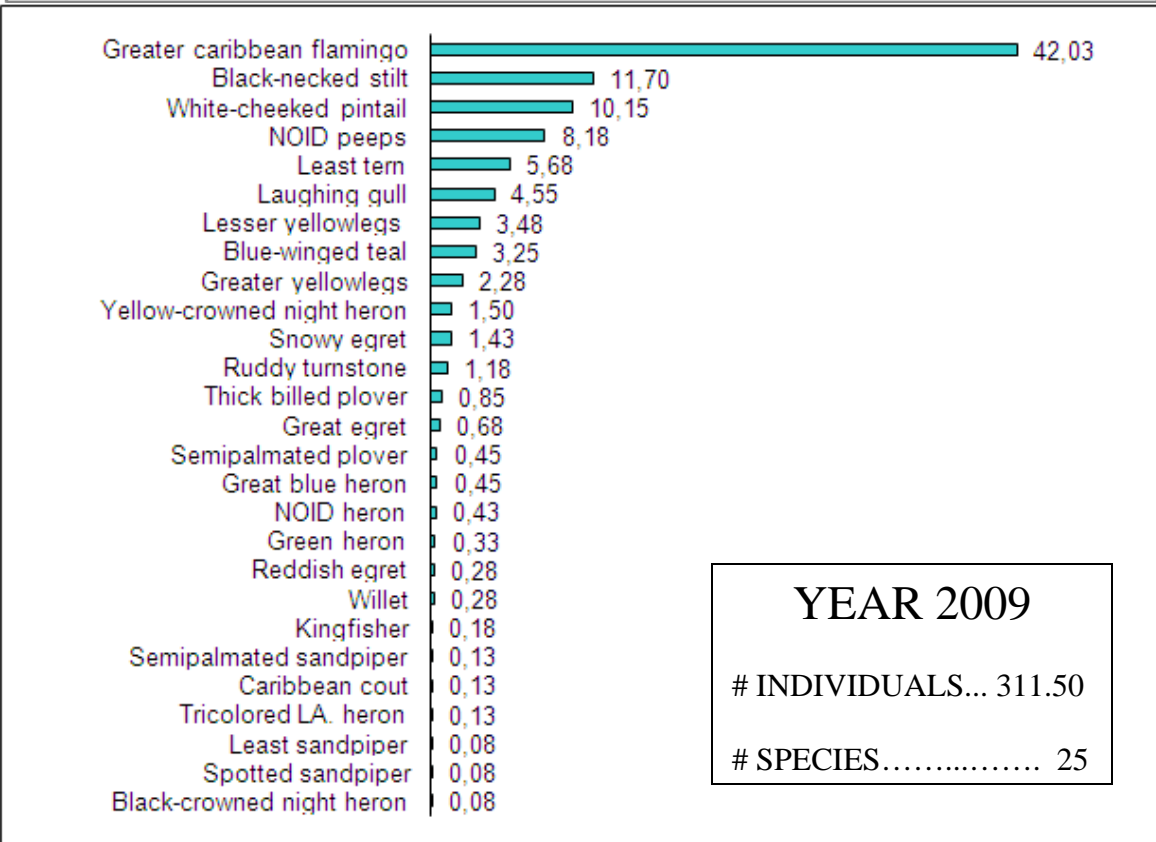
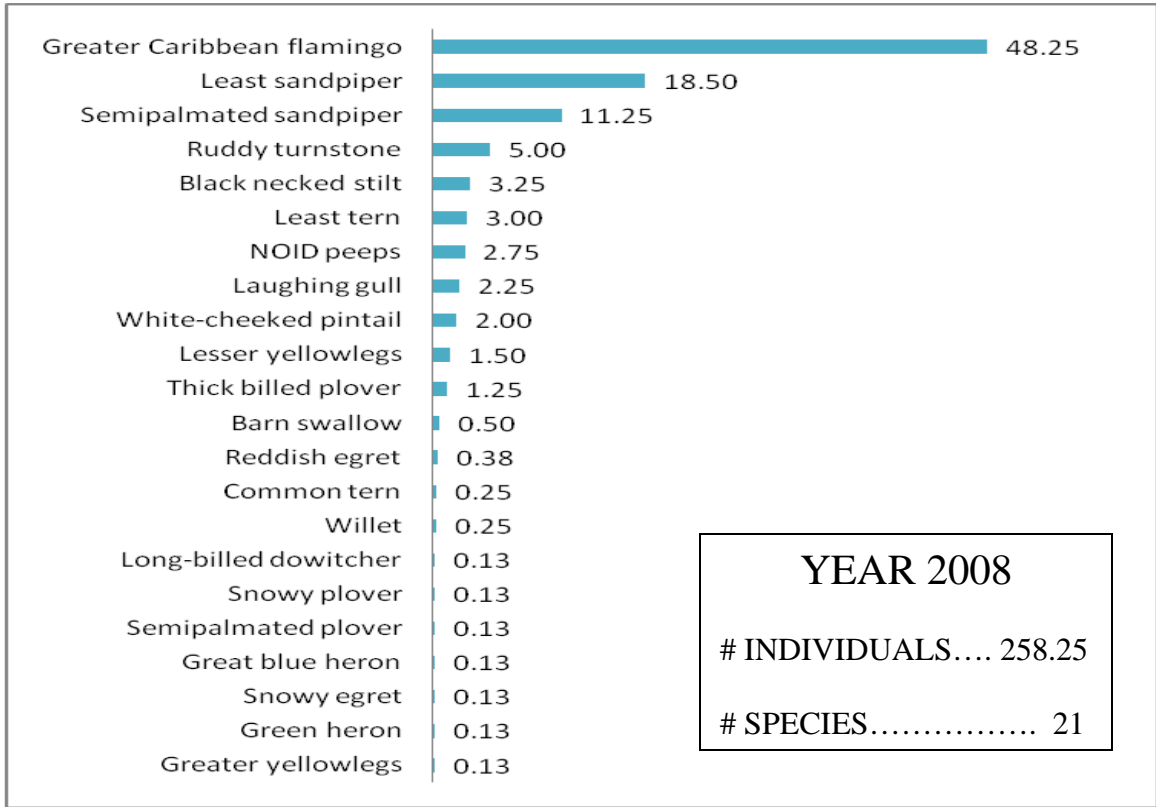


Figure 9. Comparison of the year average of relative abundance of species in Salina Matijs(%).

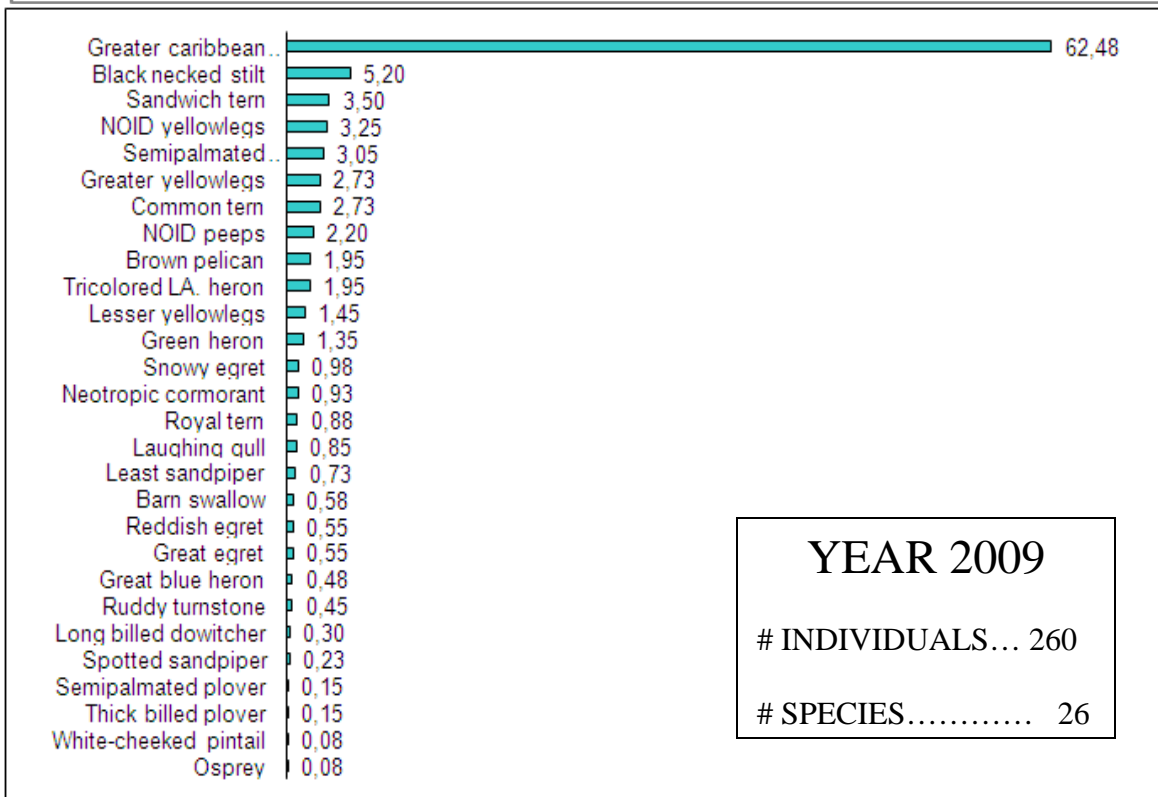
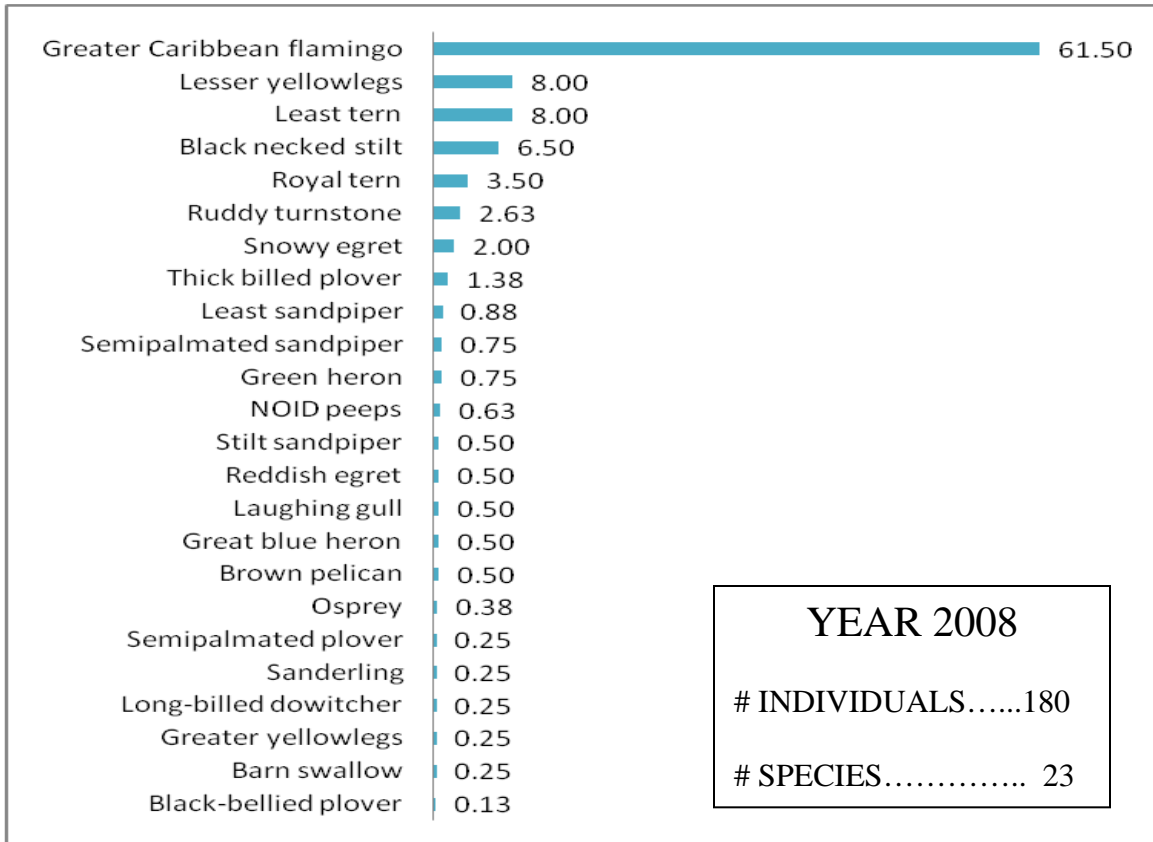


Figure 10. Comparison 2008-2009 year average of relative abundance of species in Salina Slagbaai (%).

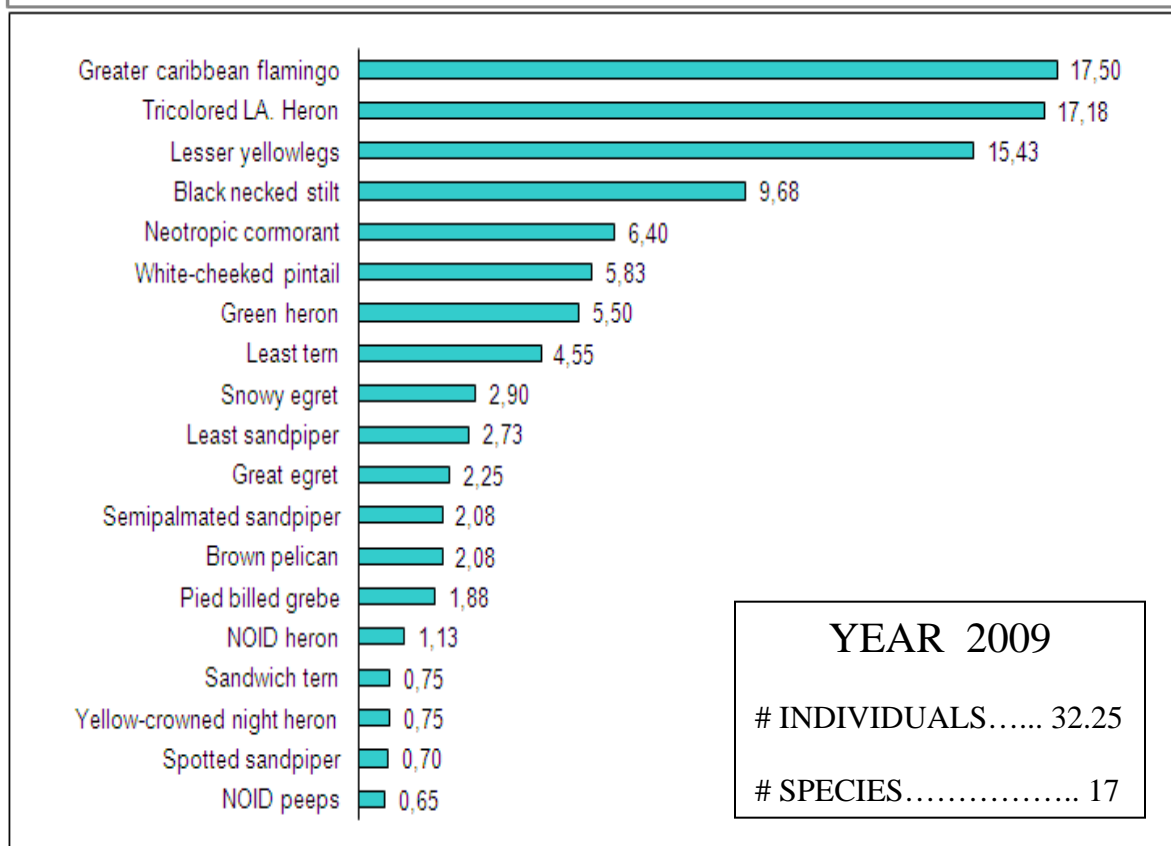
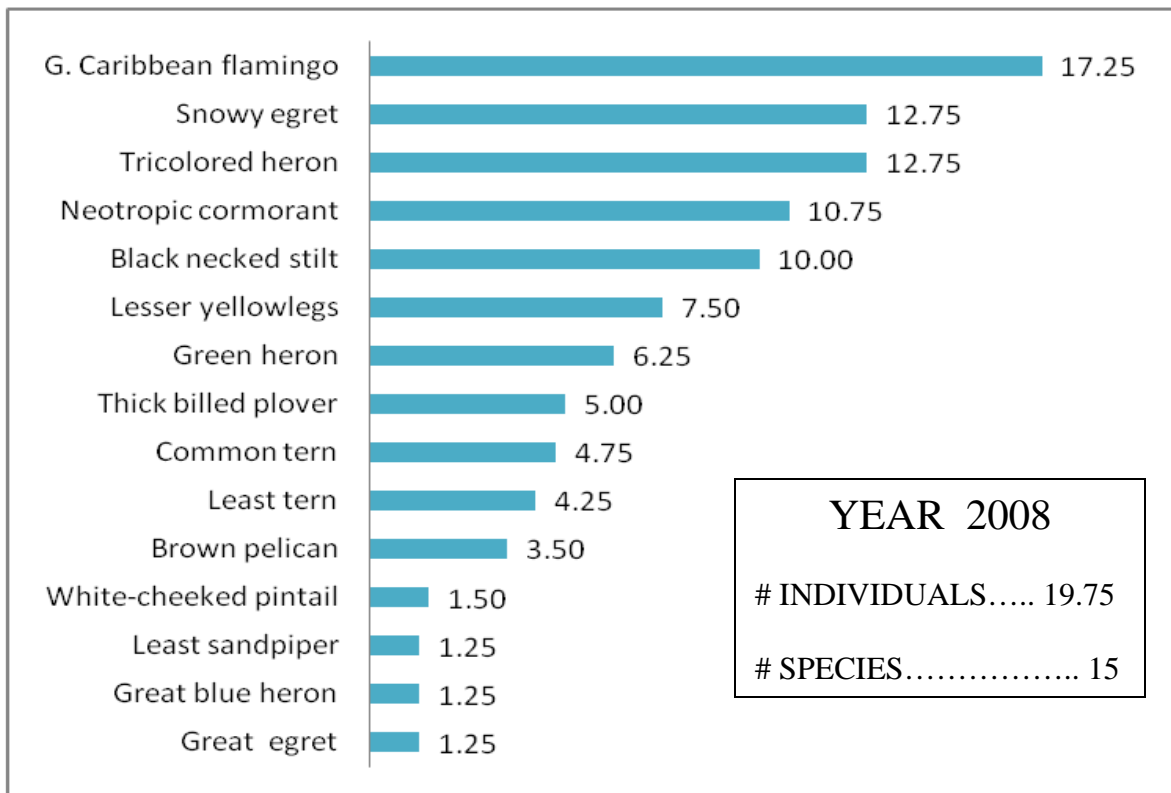


Figure 11. Comparison 2008-2009 year average of relative abundance of species in Salina Tam (%).

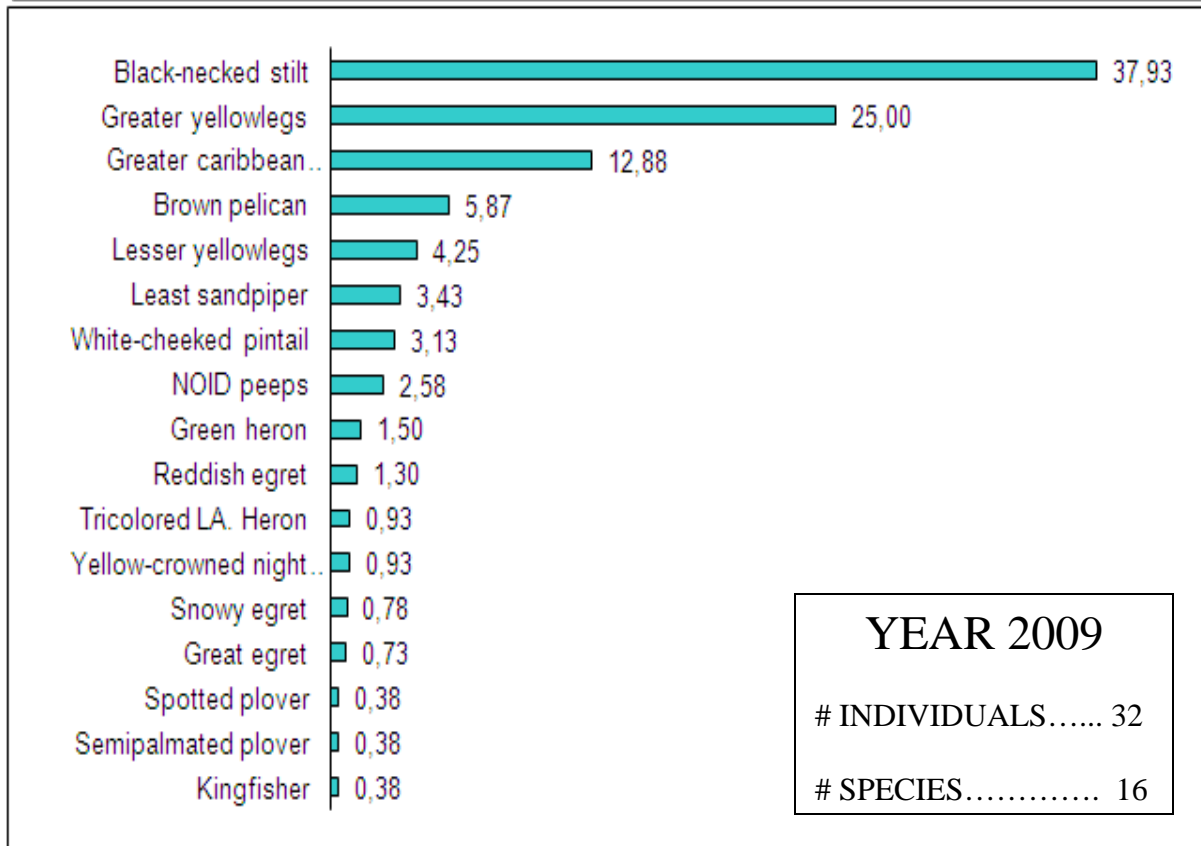
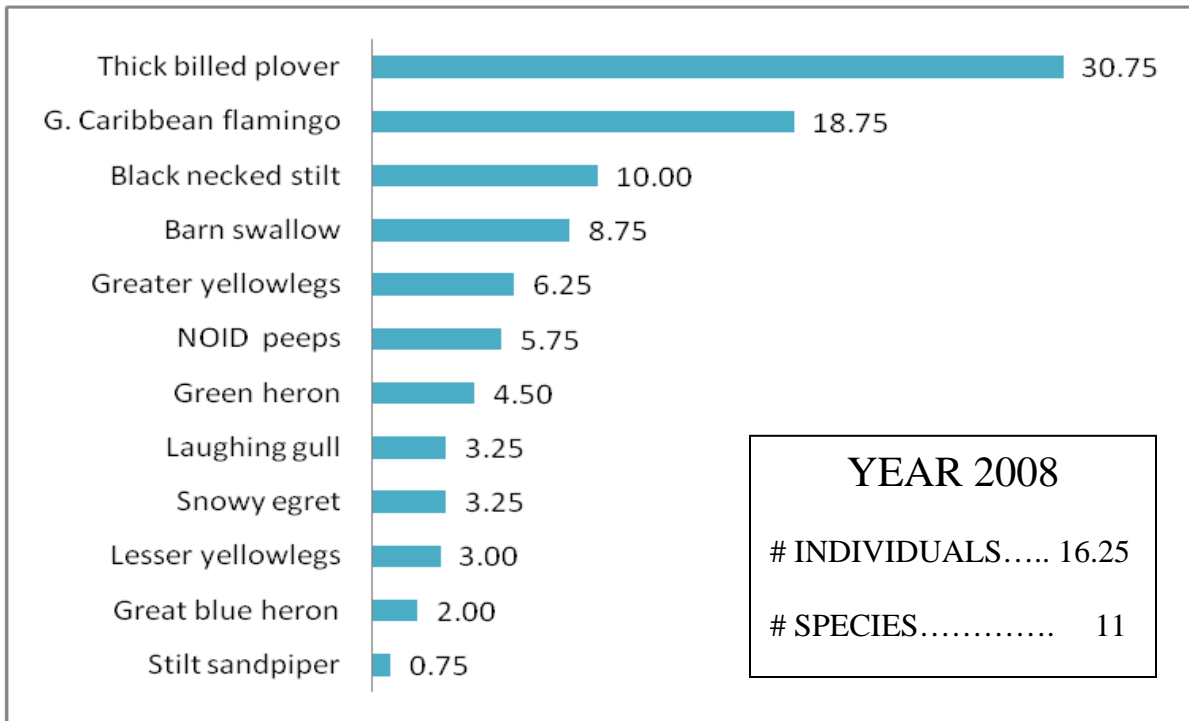


Figure12. Comparison 2008-2009 year average of relative abundance of species in Salina Wayaka (%).

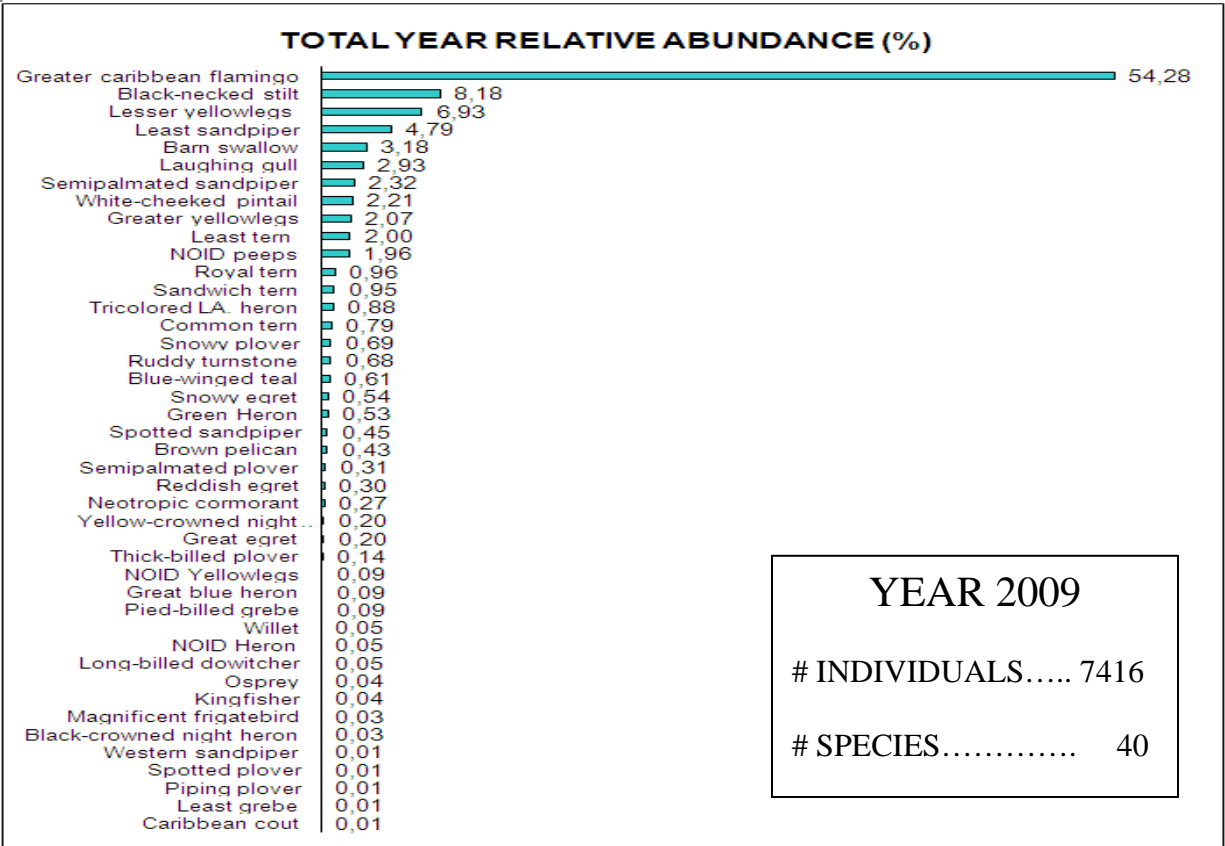
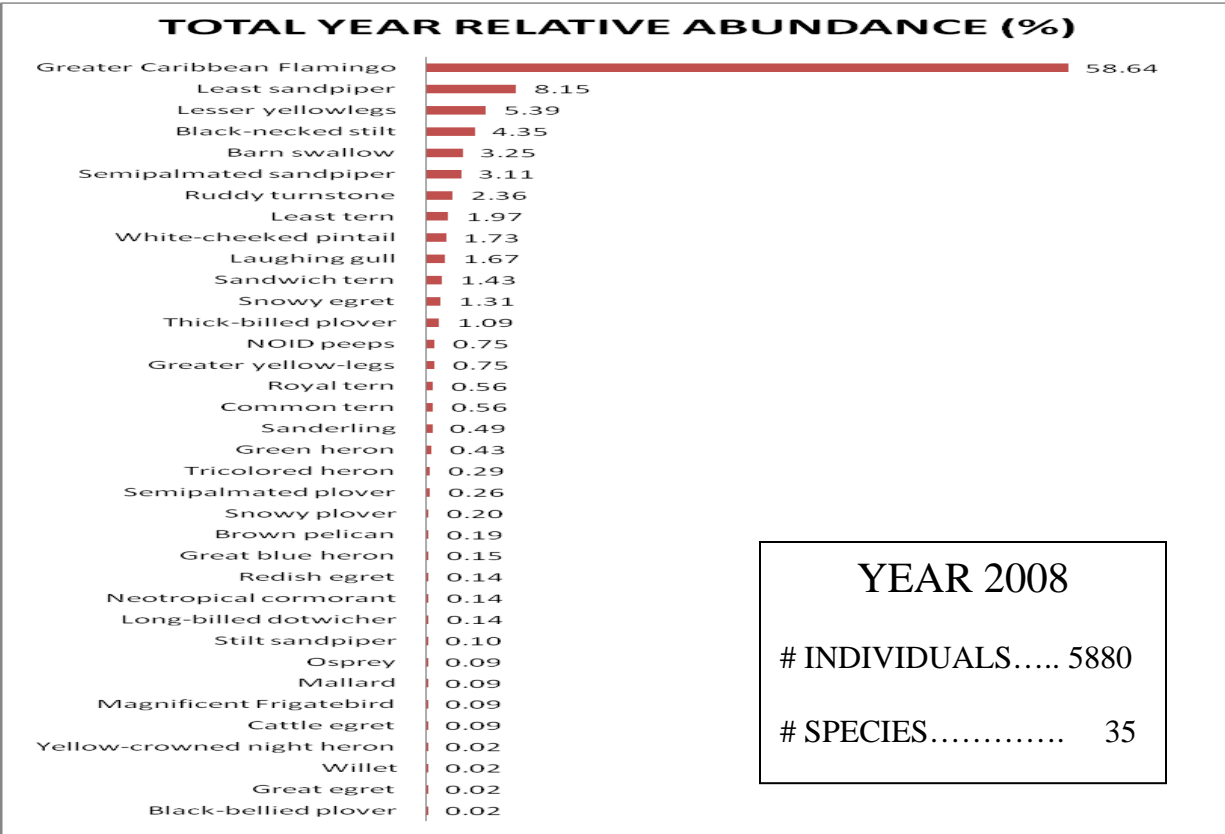


Figure 13. Comparison of the 2008-2009 overall year relative abundance of species.

4. Recommendations

- Include all the area of Salina Goto and salina Frans inside the borders of WSNP. This expansion will not only benefit the waterbirds but every other native species of flora and fauna as well.
- Pursue the designation of Salina Frans as a **Ramsar** site for Bonaire.
- Keep collecting data for the long term monitoring programs. It is fundamental for the proper management of our natural resources.
- Provide more training for the staff and volunteers involved in the counts.
- Install permanent depth gauges in all the salinas being monitored.
- Conduct more scientific research for a better understanding of the ecological functions of the salinas as a habitat for water birds
- As resources or time become available, start a monitoring program for the nesting seasons of our resident waterbirds.
- Spread out monitoring areas to include the Salinas in Central and South of Bonaire.

Glossary

Area count: A counting method for bird surveys that consists in counting all the birds found in an entire selected area instead of counting plots or transects.

Avian habitat importance index: A value created by multiplying the number of individuals by the number of species present in one area to obtain an indication of the importance of that area for the different species of birds. It can also be used to compare changes from year to year.

Base line data: The first set of data collected regarding a certain subject, usually but not always with the intention of comparing it with future data.

Bird density: The numbers of birds divided by the size of the area, in this case birds per Hectare.

Ramsar: An international agreement signed by most countries of the world in which recognition and protection are given to selected wetlands. The name comes from the city in Iran where the convention was held.

Relative abundance: The percentage of the individuals from different species that compose the total population of animals of a similar group in a given area; in this case species of water birds.

Temporal dynamics: The changes in population numbers of a group of animals during a period of time. In this case, during the year 2008.