

Caribbean flamingo breeding at Olivitos Wildlife Refuge and Fishing Reserve, Zulia, Venezuela

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Abstract

A total of 29 visits from 2013 to 2019, were made to estimate numbers of Caribbean flamingos (*Phoenicopterus ruber*) at the Olivitos Wildlife Refuge and Fishing Reserve, Zulia in Venezuela. The highest recorded number (in a sample month) of non-breeding adults was 118896, of breeding adults 13000, of chicks 10000 and of juveniles 15000. Reproduction takes place in both the dry and the wet season and breeding was observed in six out the seven years of observation. Even though populations fluctuate, flamingos are present in this region all year around, thanks to a regular feeding station provided for the flamingos located in the concentrators at Produsal company.

Resumen

Se realizaron un total de 29 visitas de 2013 a 2019 para estimar el número de flamenco Caribeño (*Phoenicopterus ruber*) en el Refugio de Vida Silvestre y Pesca Los Olivitos en Zulia, Venezuela. El número más alto registrado (en un mes de muestreo) de adultos no reproductores fue 118.896, de adultos reproductores 13.000, de polluelos 10.000 y de juveniles 15.000. La reproducción se lleva a cabo tanto en la estación seca como en la húmeda y la reproducción se observó en seis de los siete años de observación. Aunque las poblaciones fluctúan, los flamencos están presentes en esta región durante todo el año, debido a una estación de alimentación provista para los flamencos que se encuentran en los concentradores de la compañía Produsal.

Résumé

Au total, de 2013 à 2019, 29 visites ont été effectuées pour estimer le nombre de flamants roses des Caraïbes (*Phoenicopterus ruber*) dans la réserve de faune et de pêche d'Olivitos au Venezuela. Le nombre le plus élevé d'adultes non reproducteurs était de 118 896, 13 000 reproducteurs, 10 000 poussins et 15 000 juvéniles. La reproduction a eu lieu à la fois pendant la saison sèche et la saison des pluies et une reproduction a été observée au cours de six des sept années d'observation. Même en présence de fluctuations démographiques, des flamants roses sont présents toute l'année dans cette région, grâce à une station d'alimentation régulière prévue pour les flamants situés dans les concentrateurs de la société Produsal.

Introduction

The first recorded breeding success of the Caribbean flamingo at Los Olivitos Wildlife

Refuge and Fishing Reserve (the refuge) occurred between 1987 to 1989 (Casler et al. 1994). Flamingos built a new nesting isle (1,400 nest) but abandoned the area for

disturbance (building of dikes, flooding of nest, poaching, eggs collecting, military artillery practices) failing to breed for the next 10 years (Pirela 2000). Flamingo population numbers in Venezuela at that time was 38,000 (Espinoza et al. 2000). Flamingos returned to nest 1999 (1,100 nests) and bred successfully and building in 2004 another nesting island (4,800 mounds) (Espinoza and Perozo 2006). Since food availability was improving because of the solar salt works nearby, flamingo started breeding in dry and wet season (Espinoza y Perozo 2008), while expanding progressively the islet to 10,968 nest and fledging until 2012 approximately 176,000 chicks (Espinoza and Torres 2012), that led to an increase in the flamingo population numbers in Venezuela, in 2015 estimated in 207,628 (Saiz et al. 2016) individuals. In this article we summarise the

results of flamingo numbers and breeding success at the refuge between 2013 and 2019.

Study Area

The Olivitos refuge is located in the eastern shore of El Tablazo Bay (10°50'N 71°23'W) in the state of Zulia. Is an estuarine system of 24,000 ha., mixed habitat types of mangrove (4,800ha), shallow open water (10,000ha), sandy beaches (1,800ha) and three narrow mangroves channels through which brackish water enters the refuge from el Tablazo Bay, while fresh water comes from Palmar river from the east, where the solar salt works is located, to the shallow open waters know as Los Corianos sector (Figure 1). Annual rainfall is almost 500mm. (Figure 2).

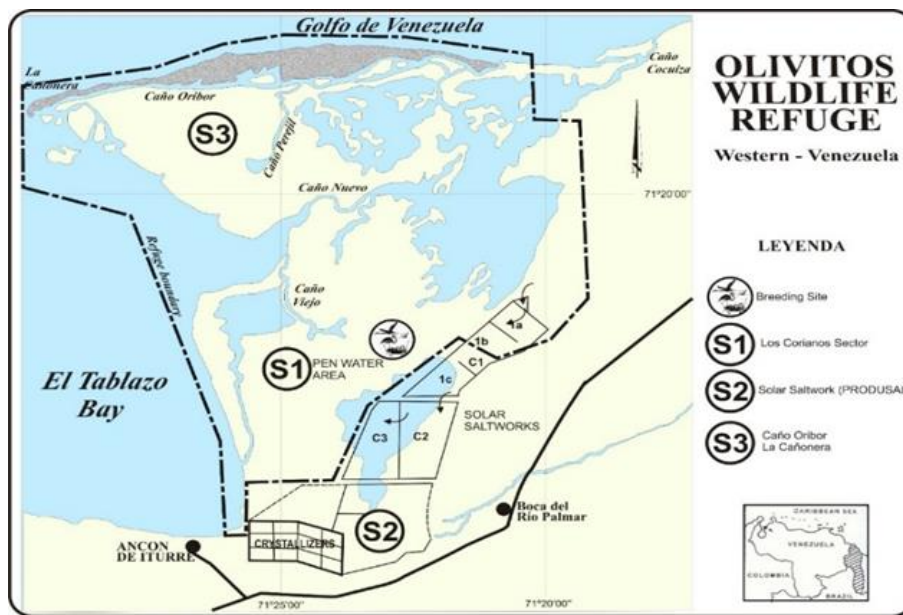


Figure 1: Map of Olivitos Wildlife Refuge and Fishing Reserve, Zulia, Venezuela.

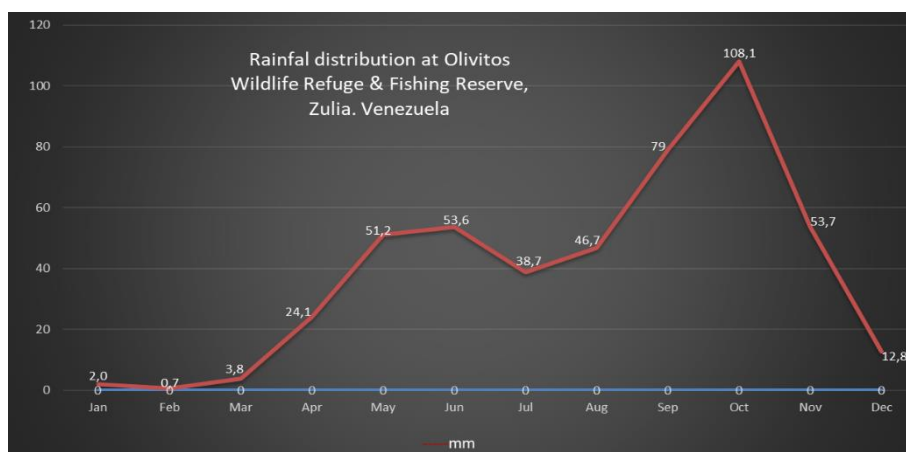


Figure 2. Rainfall distribution at Olivitos Wildlife Refuge, Zulia, Venezuela.

Methods

Twenty-nine visits were made from 2013 to 2019, to estimate populations numbers of: Non-breeding adult flamingos from the eastern coast line of El Tablazo Bay to Los Corianos sector. Flamingos in breeding activity. Crèches of young's chicks in the surroundings and on the isle and juveniles present at Los Corianos sector. Direct estimations numbers were made from a distance of 400 to 500m to the isle. Although it was difficult to count flamingos and chick's that were in the back of the colony. We used 15x60 spotting scope, 8x40 binoculars and electronic camera to record (back-up) numbers of flamingos. Counting of nest mounds was done when de colony was empty.

Results

Most of breeding activity at the refuge started between November and December, when moist conditions in the soil were still prevailing from previous precipitation months, allowing adult flamingos work with enough mud material to build and repair nest, while hundreds of adults begins to mate, laying eggs, incubate, hatch and continuing activities into the driest month of the year. For

instance, estimations for the numbers of chicks, during February are: 2013 (2,000), 2014 (6,000), 2017 (2,000), and 2019 (3,000)-all were very close in number (Table 1).

In 2015 we made more observations (12 visits), than any other year, finding the present of the highest number of non-breeding adults during May (118,896) and June (111,4000), as well as juveniles in October (12,000). While the first chicks appeared in June, with peaks numbers between July and September. In June 2016, we counted groups of 7,000 adult flamingos on the nesting isle, repairing, building nest and displaying, however in our next visit in November, there was no sign of breeding success, only 120 juveniles almost one-year-old, indicating that some disturbing factors may have interrupted the colony and flamingo stop breeding.

In February 2017, we counted 7,000 adults on breeding activity and 2,000 chicks. We returned in August, counting several crèches totalling 10,000 chicks and 15,000 juveniles on the same day. Later in December 2017, a total of 13,000 breeding adults were estimated (highest number recorded) and 3000 chicks.

Table 1: Monitoring of Caribbean Flamingo numbers and breeding activity at Los Olivitos Wildlife Refuge Venezuela, 2013-2019

Date	Est. num. non-breeding adults	Est. num. breeding adults	Est. num. chicks	Est. num. juveniles	Total
Feb 26 2013	78000	0	2000	10000	90000
Jul 06 2013	33800	1200	0	0	35000
Feb 10 2014	21700	8000	6000	0	35700
Jul 05 2014	42855	0	0	2000	44855
Feb 18 2015	89780	0	0	0	89780
May 08 2015	118896	104	0	0	119000
May 23 2015	115600	4000	0	0	119600
May 26 2015	114400	5000	0	0	119400
May 30 2015	113000	6000	0	0	119000
Jun 06 2015	111180	8000	0	0	119180
Jun 14 2015	111400	8500	0	0	119900
Jun 24 2015	108500	11000	110	0	119610
Jul 13 2015	42400	11500	4000	1000	58900
Jul 31 2015	91600	1000	2000	6000	100600
Sep 13 2015	74200	500	5000	10000	89700
Oct 17 2015	97500	100	300	12000	97900
Jun 05 2016	37000	7000	0	0	44000
Nov 19 2016	59175	0	0	120	59295
Feb 18 2017	60200	7000	2000	0	69200
Aug 08 2017	44728	5000	10000	15000	74728
Sep 17-2017	53800	0	0	5000	58800
Dec 15 2017	47600	13000	3000	0	636000
Mar 24 2018	55915	5000	2000	7000	69915
Apr 18 2018	41000	8000	4000	1700	54700
Apr 28 2018	27200	4000	1200	6000	38400
Jan 13 2019	56800	9000	6000	2000	73800
Jan 25 2019	64300	10000	2000	3500	79800
Feb 17 2019	72200	12000	3000	1000	78200
May 11 2019	51200	6000	500	7000	64700

We did not monitor the breeding colony the first two months of 2018 but is highly possible that reproduction continue the path registered until December 2017, since in three consecutives visits from March to April, we estimated a total of 6,200 chicks and 14,700 juveniles. Finally, observations of the colony from January to February 2019, permitted an estimation of 11,000 chicks and 6,500 juveniles several months old, confirming that reproduction cycle have also started in the last months of 2018.

Disturbance of the nesting island

On 11th March 2018, photos taken by a drone (Figure 4), showed the main nesting island broken in two segments, presumably washed away by a rainstorm and high tides, destroying many numbers of nests. For instance, previous numbers of nest mounds counted in 2009, were 10,968, when the main island was still consolidated. Another count of 7,257 nets made in 2013, showed a different of 3,711 fewer nests with respect to 2009 estimation. In 2014, a new nest count totalled 10,645 mounds, indicating an increase of 3,388 nest from previous estimation and very close to the results of 2009 estimation.



Figure 4: Flamingo breeding site, showing the breaking of the breeding isle. Photo credit: Rio Verde, 2018.

Discussion

Flamingos at Olivitos Wildlife Refuge usually engage on reproduction in any month of the year. Even though, November was no visit during the project, census on December 15, 2017, showed 13,000 breeding flamingos and 3,000 chicks, suggesting that reproductions started earlier in November or even in October. The highest numbers of breeding adults were estimated in June (11,000) and July (11,5000) 2015. Whereas counts of non-breeding adults made in May and June 2015, were over 100,000 individuals (98,568/visit), with highest numbers observed in May (118,896). This population tendency was not seen in other years. Numbers of chicks present in 17 out of 29 visits, accounted for 54,110 individuals (3,182 chicks/visit), distributed in 11 months of the year.

In Olivitos, the onset of reproduction depends on previous hydrological factors, sometimes excessive high volume of rains and tides keeps flamingos off nesting until water levels stabilize. Yet, the study period as whole may also have coincide with a relative favourable wet period, that may even trigger consecutive months of reproductions like the pattern described for Espinoza and Torres (2012), when flamingos in Olivitos kept reproducing

(breeding waves) from August 2010 to July 2012.

In the case of juveniles, the highest estimation numbers (15,000) were observed in August 2017. Later in September we came back to the refuge and there were only 5,000 individual's left. Such differences in both counts, could be attributed to factors like age groups between cohort, that made 67 %, of the juveniles drifted away to other areas of the refuge. On the other hand, juvenile's estimations in July 13th (1,000) and 31st (6,000) 2015, showed an opposite pattern that could be attributed to an increasing number of fledging and growing chicks. This situation was also seen in the censuses on September and October 2015, when juvenile's numbers increased from 10,000 to 12,000. With respect to the absent of chicks during the two visits made in 2016, we think that lack of data will not supports the idea of not reproduction in Olivitos for that particular year. Nevertheless, in Bonaire (with whom we share flamingo populations) breeding activity in 2016, was the lowest in the last 20 years, when only 107 young were observed in October-November at Pekelmeer saline. However, since March 2017, to April 2019, flamingos in Bonaire did not stop breeding (breeding waves) producing a total

of 16,649 young (Frank van Slobe, personal communication).

The importance of solar salt works as alternative feeding place for the flamingo breeding population at the refuge has to be mentioned once again (Espinoza and Perozo 2008), since we strongly believe that is one of the key factors contributing to the conservation and improvement of the

Southern Caribbean flamingo population (Figure 5). We believe our census results are very conservative for an area as large as Los Olivitos, and to improve our estimation numbers (to improve breeding data) the population census should take place at least six-times-per-year. To accomplish this task, we need financial resources to cover boat trips to the area and equipment.



Figure 5. Flamingos breeding at Olivitos Wildlife Refuge, Venezuela. L. Torres.

Acknowledgements

We would like to express particular thanks to Albenis Avila (Macho), Helimenes Perozo (Pepe), Francis Perozo, Pedro Caldera, Teobaldo Torreblanca (MINEC), Rio Verde, Besly Fores, Vanessa Espinoza and the people from Ancon de Iturre, for caring about conservation of la Ciénaga de Los Olivitos.

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