

2018: Peak Colony Count During Another Year of Average Productivity and Provisioning at the Freeman Seabird Preserve

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Upon reaching the 10th year anniversary of Wedge-tailed Shearwater (*Ardenna pacifica*, 'Ua'u kani) monitoring at the Freeman Seabird Preserve, we report on the ongoing efforts by Hawai'i Audubon since 2009, provide updates on the findings from the 2018 breeding season, and briefly discuss the plans for future monitoring, habitat restoration, and predator control at the site. The main take-home message is that, despite year-to-year changes in oceanographic conditions, the colony continues to grow (Fig. 1).

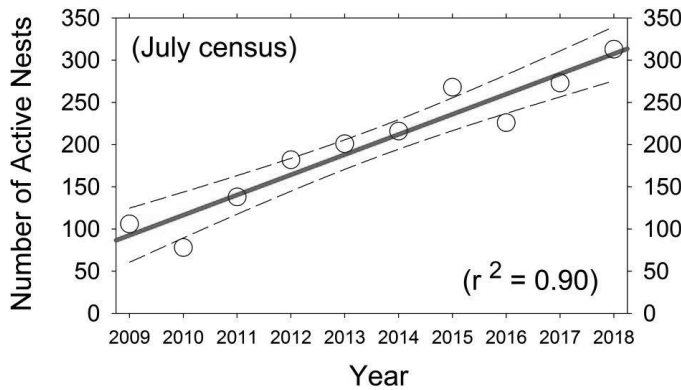
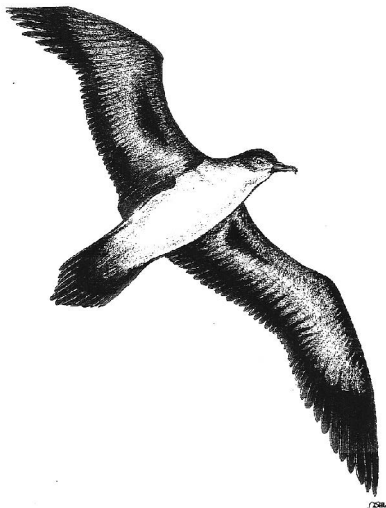


Figure 1. Trend in the number of Wedge-tailed Shearwater active nests at the Freeman Seabird Preserve, from the annual colony-wide census during the peak incubation period (July 14), showing the best-fit slope from linear regression (solid line) and the 95% confidence interval envelope (dashed line).

2018 Update

This year we documented 313 active nests of Wedge-tailed Shearwaters at the Freeman Seabird Preserve, 15 % higher than the count of 273 nests in 2017 (Hyrenbach 2018). In fact, this is the highest count to date, over the last ten years (Fig. 1).



Wedge-tailed Shearwater
By Ron Walker

Overall, the annual population surveys continue to show a statistically significant trend ($F = 84.0860$; $df = 1, 8$; $p < 0.0001$) with an average increase of 23.9 (+/- 8.2 S.D.) nests per year, which captures 90 % of the year-to-year variability in the time series. Thus, despite the decrease in the number of active nests after the 2014-15 El Niño event, the population counts increased in 2017 and 2018, and the overall trend for the colony has not changed.

The July 14 count of 313 nests was followed by a count of 240 nests, after the peak hatching period (September 14). This decline represents a loss of 23.3 % of the nests during the two-month period spanning hatching and the first month of the chick's life. Furthermore, the weekly monitoring of 54 nests between July and November revealed that 2018 was characterized by low egg loss, with 16.7 % of the monitored eggs being lost. Furthermore, chick mortality was very low in 2018, with only 4.4 % of the monitored chicks being lost.

The colony monitoring also revealed that 2018 was characterized by slightly delayed phenology, with chick hatching dates spanning from August 1 to September 1, and a mean hatching date of August 11 (+/- 5.8 S.D. days). These hatching dates fell in line with those from previous years, except 2010, when the mean hatching date was delayed substantially (August 19 +/- 9.0 S.D. days). Chick peak masses were also comparable to those recorded in the past. In 2018, they ranged from 400 to 630 grams, with a mean of 506.7 (+/- 53.7 S.D. grams). The 2018 mean value fell in line with observations during average years, and below those during a year of exceptional provisioning (2011) (Fig. 2).

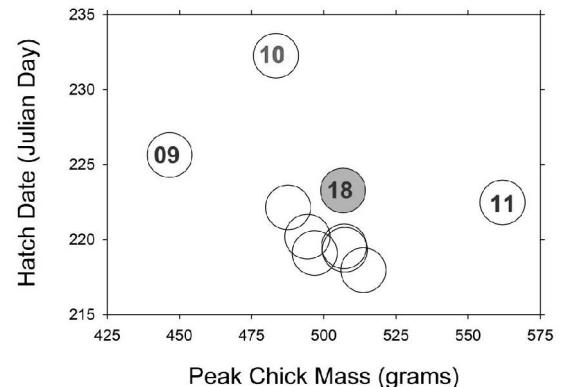


Figure 2. Mean yearly hatch date and peak mass for Wedge-tailed Shearwater chicks at the Freeman Seabird Preserve, spanning from 2009 to 2018. Three reference years (2009, 2010, 2011) are labelled, and 2018 is highlighted with a filled symbol.

Furthermore, weekly monitoring of the chicks' growth suggests that parents provisioned their chicks through the beginning of November 2018, as evidenced by increasing body masses late in the breeding season (Fig. 3). This pattern mirrors the findings from previous years of poor provisioning (2009-2010 and 2014-15), when chicks attained their peak masses late in the season, in late October or early November (Hyrenbach 2015, 2016).

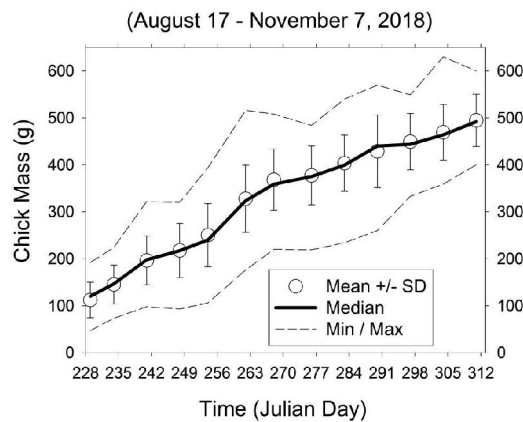


Figure 3. Time series of chick mass collected during the 2018 breeding season, showing the mean +/- S.D., the median and the range of values (maximum – minimum). Sample size = 39 chicks.

Overall, the monitoring data suggest that, in the context of the available time series (2009 – 2018), 2018 was a year of low egg losses and low chick losses, and with slightly delayed phenology and average chick provisioning.



Photo Caption: Partners from Hawaii Audubon Society, Oikonos Ecosystem Knowledge, Hawaii Pacific University and Windward Community College installed ten artificial ceramic nest modules at the Freeman Seabird Preserve in May 2018.
Photo Credit: David Hyrenbach

The El Niño conditions currently underway are expected to strengthen, and to continue until the spring (April – May – June) of 2019 (See the International Research Institute for Climate and Society ENSO forecast available at: <https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>). Based on these model predictions, we can anticipate that 2019 will be another year of “average” to “poor” Wedge-tailed Shearwater breeding at the Freeman Seabird Preserve.

Altogether, the findings from 2016 - 2018 underscore the continued growth of the colony, during a period of average breeding conditions, since the end of the 2015 -16 El Niño (Hyrenbach 2016, 2017).

Ongoing Efforts

Habitat restoration efforts continued during 2018. From January through March, while the Wedge-tailed Shearwaters were at sea, Hawaii Audubon Society members and other volunteers worked to remove alien plant species, to maintain natural nesting sites, and to create new artificial nesting sites. Additional restoration efforts in 2018 involved the installation and monitoring of 10 artificial ceramic nest modules with motion-activated cameras and temperature loggers, through a grant from the Disney Research Foundation. While the nests were not occupied by breeding shearwaters in the 2018 breeding season, we will continue to monitor these artificial nest sites for occupancy starting in March of 2019.

Habitat Restoration: From January through March, volunteers will remove introduced plants and will create new artificial nesting sites on the terrace. Additionally, we will install five more artificial ceramic nest modules before the shearwaters return in March 2019.

Colony Monitoring: Population censusing and nest monitoring for phenology, chick growth and reproductive success will continue in 2019, to augment the ongoing time series started in 2009.

Predator Control: Ongoing surveillance for predators is planned during the 2019 nesting season, to minimize and document predation by rats, cats and mongooses on breeding shearwaters.

Literature Cited

- Hyrenbach, K.D. 2016. 2015: Another Record Population Count at the Freeman Seabird Preserve During a Year of Low Productivity. ‘Elepaio 76(2): 13-14.
- Hyrenbach, K.D. 2017. 2016: A Year of Average Productivity and Provisioning at the Freeman Seabird Preserve. ‘Elepaio 77(2): 13-14.
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