

30 to August 20, with a mean of August 7 (+/- 5.4 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 2017, they ranged from 312 to 595 grams, with a mean of 503.0 (+/- 54.2 S.D. grams). Again, the 2017 mean value fell in line with observations during “average” years (2010, 2012, 2013, 2014), was above those during a year of poor provisioning (2009) and below those during a year of good provisioning (2011).

Furthermore, weekly monitoring of the chicks’ growth over time suggests that parents provisioned their chicks through early November in 2017, as evidenced by increasing body masses late in the breeding season (Fig. 3). This pattern, which mirrors the findings from 2016, contrasts with the previous warm-water year (2015), when chick masses continued to increase through mid November (Hyrenbach 2015, 2016).

In summary, the monitoring data suggest that 2017 was a year of low egg losses and low chick losses, with average phenology and chick provisioning, in the context of the available time series (2009 – 2017). Chick peak masses in 2017 (mean = 503.0 +/- 54.2 S.D. grams) were, on average, intermediate between those documented in 2016 (mean = 513.7 +/- 52.4 g S.D.) and in 2015 (mean = 496.8 +/- 56.1 g S.D.). This result suggests that, chick provisioning improved after the transition from El Niño to La Niña conditions in the fall of 2016. Nevertheless, the return to a positive Multivariate El Niño Index (MEI) in the spring / summer of 2017 lead to average provisioning during the 2017 breeding season, despite a transition into negative MEI conditions in the fall of 2017 (Fig. 1). The La Niña conditions currently underway are expected to weaken, and to transition to ENSO-neutral conditions by late spring (See NOAA’s Climate Prediction Center ENSO Diagnostic Discussion, www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/). Based on these model predictions, we can anticipate that 2018 will be another “average” year for Wedge-tailed Shearwater breeding at the Freeman Seabird Preserve. Altogether, the findings from 2016 and 2017 underscore the dynamic conditions faced by breeding shearwaters during the last two years, since the end of the 2015 - 16 El Niño (Hyrenbach 2016, 2017).

Ongoing Efforts

Habitat restoration efforts continued during 2017. From January through March, while the Wedge-tailed Shearwaters were at sea, Hawai’i 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 and management efforts in 2018 will involve monitoring the colony and enhancing the breeding habitat at the Freeman Seabird Preserve.

Habitat Restoration: From January through March, volunteers will remove alien plant species and will create new artificial nesting sites on the terrace.

Colony Monitoring: Population censusing and nest monitoring for phenology, chick growth and reproductive success will continue in 2018, to augment the ongoing time series started in 2009.

Predator Control: Ongoing surveillance for predators is planned during the 2018 nesting season, to minimize and document predation by rats, cats and mongooses on breeding shearwaters.

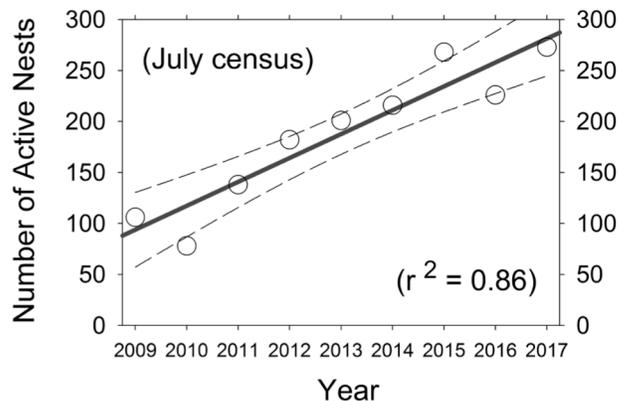


Figure 2. Trend in the number of Wedge-tailed Shearwater active nests at the Freeman Seabird Preserve, from the annual colony-wide census during the peak incubation period (July 14), showing the best-fit linear regression (solid line) and the 95% confidence interval envelope (dashed lines).

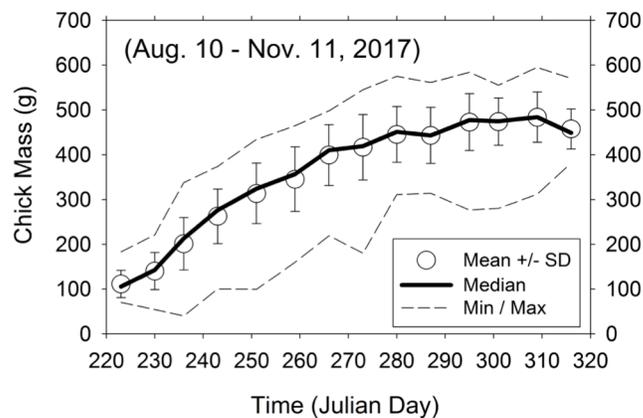


Figure 3. Time series of chick mass collected during the 2017 breeding season, showing the mean +/- S.D., the median and the range of values (maximum – minimum). Sample size = 35 chicks.

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.