ter colony on the Society's Freeman Seabird Preserve on Black Point, Oahu, since 2008.

118th Annual Christmas Bird Count Citizen Science Opportunity, 12/14/2017-1/5/2018. Society members and friends participated in the longest running citizen science survey in the world, which provides critical data on bird population trends. All over the United States tens of thousands of people participate. Society members and volunteers counted birds within historic circles in Honolulu and Waipio on O`ahu, and at several locations on the neighbor islands. Results were submitted to National Audubon Society data base and can be viewed on the NAS website.

Nature Hike to Kahuku Point & Wetland at Turtle Bay, 12/30/2017. Led by Angela Huntemer. Led by Angela Huntemer, participants saw Hawaiian monk seals, turtle nest sites, endangered & endemic plants, endangered Hawaiian bee nesting areas, endangered water birds, and seabirds. The 4-mile round trip walk to Kahuku Point was optional.

Society Awards, Grants and Donations

The Society gratefully received generous donations from the North Valley Community Foundation in behalf of Lynn R. Thomas (annual legacy gift), the Anderson-Beck Fund, Brad & Sherry Eichorst, Craig & Susan Scott, the Hawaii Community Foundation, and the Bill Healy Foundation pass-through grant from to support editor Cindy Hunter's a new revision of "A Natural History of the Hawaiian Islands: Selected Readings III, and donations from many, many other generous supporters.

Finances and Fundraising

A new three-year lease was signed for our office space on Richards Street. The Society currently derives the majority of its operating and programmatic funding from membership dues, generous gifts, and sales of its educational products, which include the incomparable book *Hawaii's Birds* and its audio companion *Voices of Hawaii's Birds* (2 vol. CD). In 2017 work began on the 7th Edition of *Hawaii's Birds* and Lance Tanino, a former Board member, is heading the effort to find new photographs to add to the many excellent ones already in our book. The Society also sells *Hawaii's Kolea, Treasurers of O'ahu,* a birding & family hiking map, *Hawaii's Rare & Endangered Birds* Art Collection greeting cards illustrated by Patrick Ching (pkg of 8), Elepaio patches, check lists of the birds of Hawaii, Micronesia, and the Mariana Islands, a field card, and `Elepaio, Kolea & Ruddy Turnstone "Akekeke" T shirts. The Society also depends on the many generous donations and matching gifts from our members and benefactors.

2017: Peak Colony Count During Another Year of Average Productivity and Provisioning at the Freeman Seabird Preserve

By K. David Hyrenbach, Associate Professor of Oceanography, Hawai‘i Pacific University, khyrenbach@hpu.edu

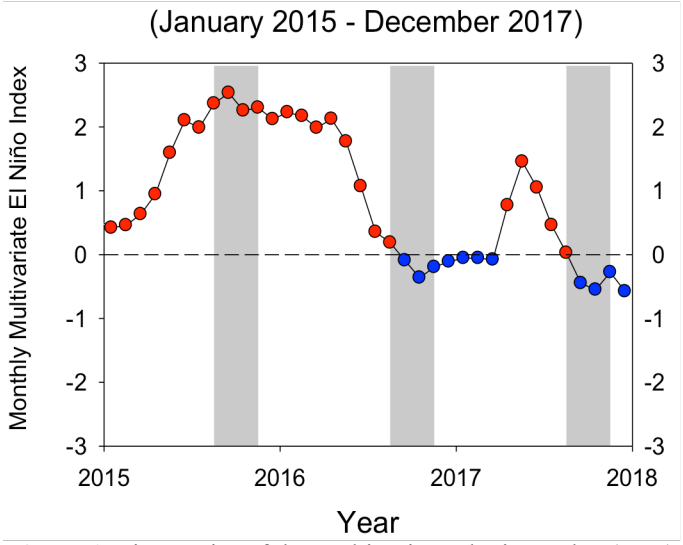

Figure 1. Time series of the Multivariate El Nino Index (MEI) between January 2015 and December 2017, spanning the last three Wedge-tailed Shearwater chick-provisioning seasons (August – November) of 2015, 2016 and 2017 (shaded). Positive anomalies (red) and negative anomalies (blue) are color coded.

We report on the ongoing monitoring and restoration efforts at the Freeman Seabird Preserve by Hawai'i Audubon since 2009, provide updates on the findings from the 2017 breeding season, and briefly discuss the plans for future monitoring, habitat restoration, and predator control at the site.

2017 Update

This year we documented 273 active nests of Wedge-tailed Shearwaters (*Ardenna pacifica,* 'Ua'u kani) at the Freeman Seabird Preserve, 21 % higher than the count of 226 nests in 2016. In fact, this is the highest count to date, surpassing the peak of 268 nests documented in 2015 (Hyrenbach 2016). Overall, the annual population censuses continue to show a statistically significant trend ($F = 52.0264$; $df = 1, 7$; $p = 0.0002$) with an average increase of 23.4 (+/- 9.7 S.D.) nests per year, which captures 86 % of the year-to-year variability in the time series (Fig. 2). The population rebound observed in 2017 mirrors a similar increase in 2011, following the warm-water conditions of 2010. Thus, despite the decrease in the number of active nests after the 2015-16 El Niño event, the overall trend for the colony has not changed.

The July 14 count of 273 nests was followed by a count of 145 nests, after the peak hatching period (September 14). This decline represents a loss of 46.9 % 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 2017 was characterized by low egg loss, with 22.2 % of the monitored eggs being lost. Furthermore, chick mortality was very low in 2017, with only 8.0 % of the monitored chicks being lost.

The colony monitoring also revealed that 2017 was characterized by average phenology, similar to that documented in previous years. In 2017, chick hatching dates spanned from July

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.

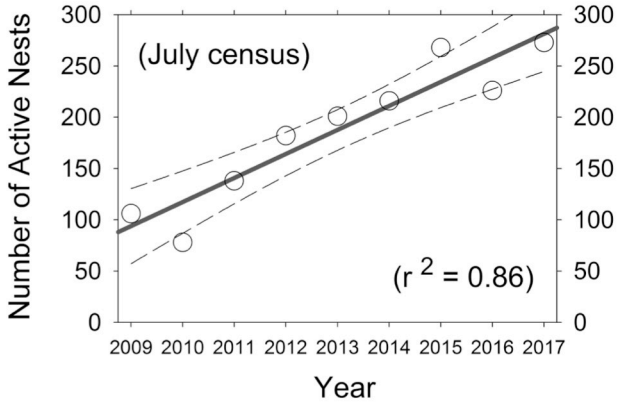

Figure 2. Trend in the number of Wedge-tailed Shearwater active nests at the Freeman Seabird Preserve, from the annual colony-wide census during the peak incubation period (July 14), showing the best-fit linear regression (solid line) and the 95% confidence interval envelope (dashed lines).

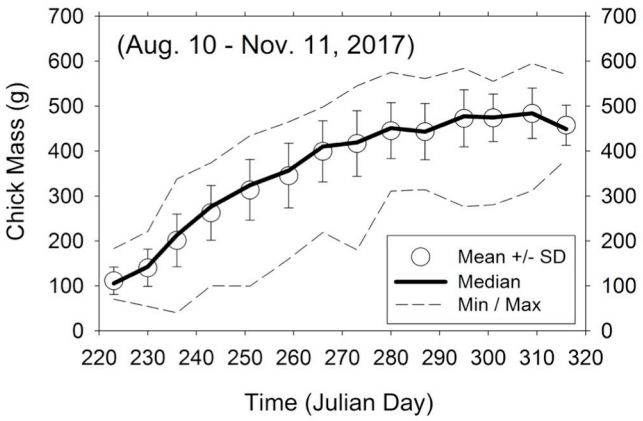

Figure 3. Time series of chick mass collected during the 2017 breeding season, showing the mean +/- S.D., the median and the range of values (maximum – minimum). Sample size = 35 chicks.

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.

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