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of the most pressing conservation issues of our time, including but not limited to ongoing efforts to control invasive species, the struggle to ensure the survival of Palila in the Big Island, and the challenge of bringing additional resources to bear on the recovery of the Hawaiian Monk Seal. Looking back on 72 years of continuous dedication by HAS members to solving environmental conservation challenges we face in Hawai'i, our commitment, expertise, and hard work have built an impressive record of accomplishment. Taking full advantage of the resourcefulness of our membership, as well as the incredible opportunities we have to pursue effective conservation at the FSP and elsewhere, we anticipate another year of exciting challenges and accomplishments as well as continued opportunities to build and expand conservation partnerships.

2011: A Mixed Year at the Freeman Seabird Preserve

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We briefly report on the ongoing monitoring and revegetation program at the Freeman Seabird Preserve, and provide updates on the findings from the 2011-12 breeding season and the plans for future monitoring, habitat restoration, and predator control at the colony.

2011 Update

This was a mixed year for the Freeman Seabird Preserve, with good and not-so-good news.

First the good news: 2011 was a peak year of Wedge-tailed Shearwater (*Puffinus pacificus*) nesting at the preserve and of rapid and sustained chick growth. The yearly July 14 colony-wide census yielded the highest nest count to date (123 nests), substantially higher than previous counts in 2009 (106) and 2010 (78). It was particularly noteworthy that the shearwaters were nesting within the Naio (*Myoporum sandwicense*) hedge planted along the preserve's rock wall (6 nests), in the "condo" rock wall (10 nests) and in the rock piles (4 nests) provided as part of the habitat restoration efforts. This high incubation period nest count was followed by another high count of 87 nests in early September, after the peak hatching date, underscoring the continued growth of the shearwater colony.

The demographic monitoring also revealed that 2011 was characterized by early breeding and high peak chick masses. Chick hatching dates spanned from August 2 to September 6, with a mean of August 13 (Table 1). When compared with the two previous years, hatching dates were significantly delayed in 2010. There was a significant difference amongst years (One-way ANOVA, $F = 6.437$, $df = 2, 72$, $p = 0.03$), with post-hoc Tukey tests revealing that 2010 was later than 2009 and 2011. Moreover, peak chick mass was significantly higher in 2011 than in the two previous years (Table 1), underscoring the rapid and sustained growth of the chicks (Fig. 1). There was also a significant difference in chick peak mass amongst years (One-way ANOVA, $F = 26.963$, $df = 2, 57$, $p < 0.001$), with post-hoc Tukey tests revealing that 2011 was higher than 2009 and 2010. In summary, chicks hatched early in 2011 and reached the highest peak masses documented to date.

And now for the not-so-good news: 2011 was a year of low hatching and fledging success. Despite the high incubation count in mid-July, the early-September count showed a large relative decline in the number of active nests of 29.3%. Coincidentally, 25% (8 out of 32) of the nests we monitored from July 14 to December 14 were lost before the chicks hatched: two were cracked and infested by ants and six vanished from their nests. Additionally, chick losses were very high in 2011: 2 were lost to predators and 5 disappeared without leaving a trace. This unusually high losses of eggs and chicks lead to a low productivity year, with merely a 70.8% fledging rate (defined here as the proportion of hatched chicks that fledged); compared with previous rates of 95.4% (2009) and 82.7% (2010).

Native plants thrive at the Freeman Seabird Preserve.
(Photo taken by David Hyrenbach, July 2011)

Thus, despite the anti-predator efforts at the Freeman Seabird Preserve (Young et al. 2012), the 2011 breeding season was characterized by depressed reproductive success. This disparity between the "good" oceanographic conditions, that supported early breeding and high provisioning rates, and the "poor" conditions at the colony, with substantial loss of eggs and chicks, made 2011 a mixed year.

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Ongoing Efforts

We anticipate that three ongoing efforts will continue in 2012: habitat restoration, colony monitoring, and predator control.

Habitat Restoration

From January through March 2011 professional native plant landscapers from Hui Kū Maoli Ola completed work begun in 2010, transforming a vacant house-lot into a unique example of pre-contact Hawaiian dryland coastal habitat with multiple shearwater nesting sites. Hawai'i Audubon Society volunteers and school groups tirelessly supported these efforts, removing invasive plants, trimming foliage, and maintaining burrows. Volunteers will continue to play a vital role in caring for the beautiful Freeman Seabird Preserve during the months that the wedge-tailed shearwaters are at sea.

Colony monitoring

Population censusing and nest monitoring for phenology, chick growth and reproductive success will continue in 2012, starting with a colony-wide survey in July 14. These data will add to the ongoing time series started in 2009 (Hyrenbach 2011).

Predator Control

Rat-bait stations have been maintained at the site since 2008, but in September of 2011, evidence of chick predation by cats necessitated further action. Pacific Rim Conservation was contracted to install and monitor infrared cameras and to deploy four live cage traps for the duration of the nesting season. Three domestic cats were photographed on or near the traps on several occasions, and one cat was trapped, but was released by neighbors who heard its distress calls. No further signs of cat predation were noted after the cat monitoring and trapping program were initiated (Young et al. 2012). Planning is in process for predator control during the 2012 nesting season at Freeman Seabird Preserve.

Literature Cited

Hyrenbach, K.D. 2011. Tale of Two Years: Monitoring Wedge-tailed Shearwaters at Freeman Seabird Preserve in Black Point, O'ahu. 'Elepaio 71(3): 17-20.

Young, L., VanderWerf, E.A., and Lohr, M.E. 2012. Freeman Seabird Preserve predator control. 'Elepaio 71(1): 6.

Figure 1: Time series of chick mass collected during the 2011 breeding seasons, showing the mean +/- SD, median and range of values (maximum – minimum). Sample size = 18 chicks.

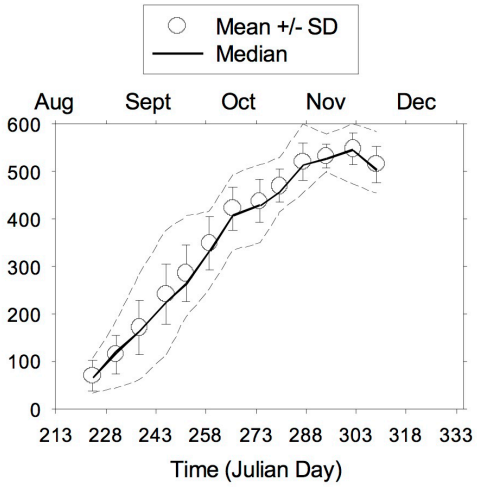

Table 1. Comparison of wedge-tailed shearwater phenology and provisioning (2009 - 2011).

		2009	2010	2011
Hatching Date	sample size	21	29	24
	mean	Aug. 13	Aug. 19	Aug. 13
	range	Aug. 4 - 28	Aug. 1 - Sept. 8	Aug. 2 - Sept. 6
Peak Chick Mass (grams)	sample size	19	21	18
	mean	447	483	562
	range	515 - 325	575 - 360	600 - 505
Final Chick Mass (grams)	sample size	19	21	18
	mean	379	383	516
	range	495 - 280	475 - 210	585 - 445