NIHOA ISLAND TRIP REPORT, 14-25 AUGUST 2012

To: U.S. Fish and Wildlife Service, Hawaiian Islands National Wildlife Refuge, Honolulu, Hawaii.

From: Kevin Brinck, Ann P. Marshall, Walterbea Aldeguer, and Daniel Tsukayama.

Recommended Citation: Marshall, A.P., K.W. Brinck, W. Aldeguer, and D. H. Tsukayama. 2012. Nihoa Island biological monitoring and management, 14-25 August 2012. Unpublished report to the U.S. Fish and Wildlife Service.

Note: This report does not include activities associated with the second translocation of Nihoa Millerbirds (*Acrocephalus familiaris*) from Nihoa to Laysan, which is covered in a separate report (Farmer *et al*. 2012). This report includes only monitoring and management activities conducted after the M/V Searcher departed Nihoa Island on 15 August 2012.

Executive Summary:

After the transfer of captured Nihoa Millerbirds to the MV Searcher, which departed 15 August, population monitoring surveys were conducted for the Nihoa Millerbird and the Nihoa Finch (*Telespiza ultima*), 15-22 August, using two methods. The traditional strip transect method resulted in population estimates of 401 ± 163.0 (mean ± standard deviation) Nihoa Millerbirds and 4,613 ± 944.8 Nihoa Finches. The estimated number was low for Nihoa Millerbirds and high for Nihoa Finches relative to last year. The team observed that Millerbirds were less vocal this year than 2011 which may account for the low numbers of Millerbirds detected this year, while the high estimate of Nihoa Finches may be due to the abundance of fledglings present during the surveys. Population estimates from the distance based line transect and variable circular plot methods will be forthcoming from U.S. Geological Survey Biological Resources Division. Ten banded Nihoa Millerbirds were resighted during surveys. Fourteen seabird species were observed on Nihoa and 11 of the 14 were nesting or had fledglings. Five species of migratory shorebirds were observed as well as the non-native Northern Mockingbird (*Mimus polyglottos*), the third record from Nihoa. Native plant populations appeared healthy and few non-native grasshoppers were observed this year. Four non-native sandbur (*Cenchrus echinatus*) plants were observed and pulled and weed cloth was placed over three of the areas to minimize sprouting of any remaining seeds. In addition, 2/3 of a garbage bag of New Zealand spinach (*Tetragonia tetragonioides*) removed for disposal off-island.

Itinerary:

10 August. Searcher departs Honolulu with all personnel aboard (see personnel list below).

12 August. Searcher arrives at Nihoa Island. Disembark personnel and gear before 9:00.

12-14 August. All personnel assist with capture and care of Nihoa Millerbirds in preparation for translocation to Laysan. Tsukayama, Aldeguer, Kohley, Luscomb, and Conant camp on the island at night, but all other personnel return to the Searcher each evening.

14 August. 26 Nihoa Millerbirds are safely transferred from Nihoa Island to the Searcher. Translocation personnel disembark the island by 17:00. Searcher remains anchored on the leeward side of the island for the night. Marshall, Brinck, Aldeguer, and Tsukayama remain on Nihoa to conduct biological monitoring and management until the Searcher returns from Laysan Island.

15 August. Searcher departs Nihoa Island at approximately 10:00.

15-22 August. Marshall, Brinck, Tsukayama, and Aldeguer conduct biological monitoring and management, including surveys for Nihoa Millerbirds and Nihoa Finches, observations on abundance and nesting phenology of seabirds and migratory birds, status of native and alien plants and invertebrates, and removal of alien plants.

23 August. Searcher arrives at Nihoa; disembark Marshall, Brinck, Aldeguer and Tsukayama before 10:00. All camp materials and refuse is removed from island.

25 August. Arrive in Honolulu at approximately 20:30 hrs. All personnel disembark the Searcher.

Personnel (Figure 1):

- Walterbea Aldeguer: Office of Hawaiian Affairs/Papahānaumokuākea Marine National Monument cultural monitor (USFWS volunteer)
- Kevin Brinck: University of Hawaii, Qualitative Ecologist contracted by USGS
- Sheila Conant: University of Hawaii professor
- Chris Farmer: American Bird Conservancy biologist
- Ryan Hagerty: Videographer, USFWS
- Robby Kohley: American Bird Conservancy contractor
- Peter Luscomb: Avicultural specialist
- Annie Marshall: USFWS biologist
- Sheldon Plentovich: USFWS Coastal Program Coordinator
- Daniel Tsukayama: American Bird Conservancy contractor
- Michelle Wilcox: American Bird Conservancy contractor (Laysan)
- Thierry Work: USGS veterinarian

Figure 1. Nihoa translocation and survey team 2012. Photo by R. Hagerty.

Objectives:

- Conduct Nihoa Millerbird and Nihoa Finch population survey using traditional strip transect methods.
- Conduct Nihoa Millerbird and Nihoa Finch population survey using improved distance sampling techniques.
- Resight previously banded Nihoa Millerbirds to collect data for demographic analyses.
- Search for and control any discovered population of the invasive grass *Cenchrus echinatus*.
- Observe and record phenology and abundance of seabird and shorebird populations.
- Observe and record phenology and abundance of native and invasive flora.
- Observe and record phenology and abundance of native and invasive terrestrial arthropods.
- Opportunistic beach counts of Hawaiian Monk Seals.
- Remove all individuals of the invasive plant *Tetragonia tetragonioides*.

NIHOA MILLERBIRD AND NIHOA FINCH POPULATION SURVEYS

Methods. Two survey methods were used to estimate abundance of the Nihoa Millerbird and Nihoa Finch. The first method used the traditional fixed-width strip transects measuring 16.5 x 250 feet (5 x 76.2 meters) developed by Eddinger in 1967 and used for many years on Nihoa (Conant *et al*. 1981). In this method, an observer walked at a slow and steady pace along each transect while counting Nihoa Millerbirds and Nihoa Finches heard or seen within 8.25 feet (2.5 meters, 0.5 rods) on either side.

Transects were located using GPS points recorded in the field in 2008 by Tsukayama, which were based on an aerial photograph on which the transects had been hand drawn. The number of transects surveyed has varied over the past several years (Table 1). Fifty-four transects were surveyed in 2012 (Figure 2). In 2012, while traversing the line transects, the distance from the transect line to all observed Millerbirds and Finches was recorded to the nearest meter. Because distances were recorded to the nearest meter, strip transect estimates used all birds recorded ≤3 meters on either side of the strip were used in the analysis — accordingly the density estimates were for a strip 6 meters (19.7 feet) wide rather than 16.5 feet wide as in previous years. The number of invasive grasshoppers observed on transect (*Schistocerca nitens*) was also recorded.

The second method was a variable circular plot (VCP) to improve population estimates and reduce variability (Gorresen *et al*. 2012). In this method, an observer stood at a survey point for 6 minutes and recorded the horizontal distance to all Millerbirds and Finches detected by sight or sound. Survey points were located at the beginning and end of each strip transect (Figure 2). A digital range finder was used to measure the distance to each bird to increase accuracy. Distances less than 10 m (below the range finders' operational range) were estimated by the observer. During each count the cloud cover, rain, wind, wind gust, and dominant plant species and cover were also recorded.

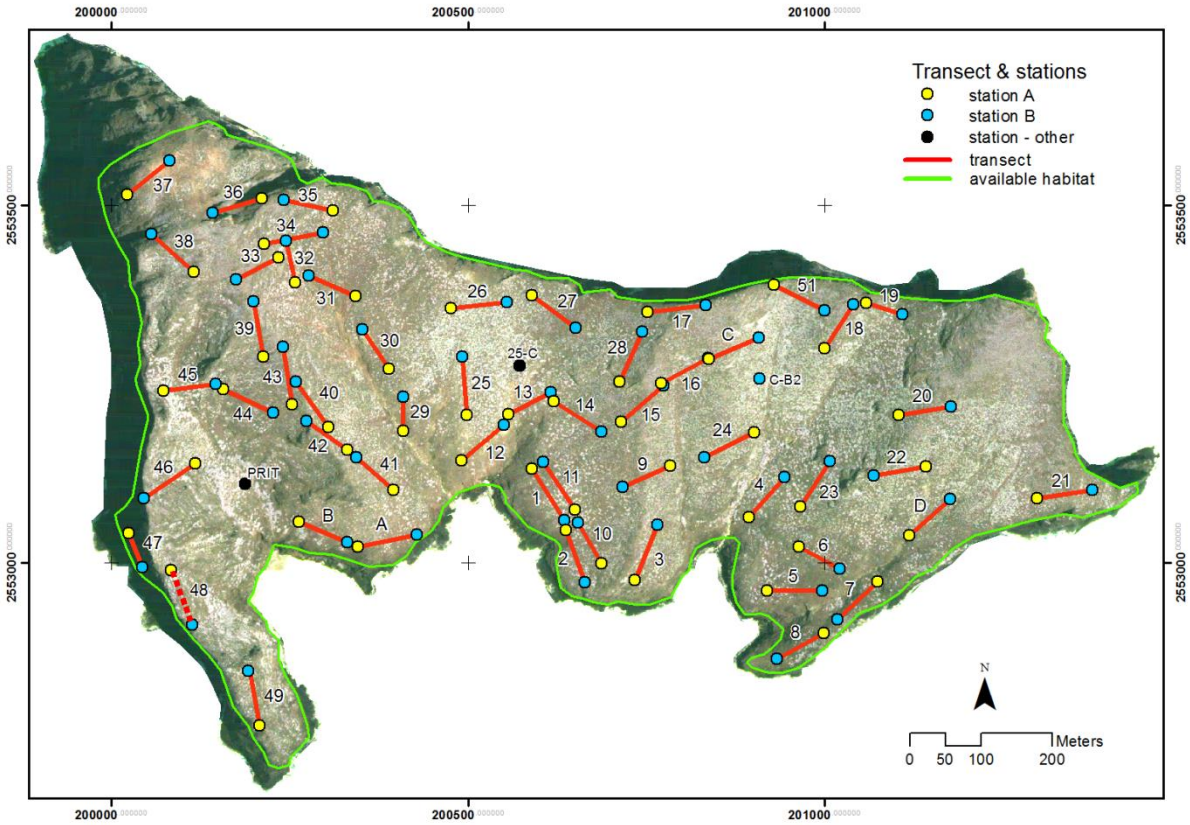

Figure 2. Locations of transects and points used in population surveys of Nihoa Millerbirds and Nihoa Finches in August 2012.

Results:

Strip Transects

A total of 54 strip transect surveys were conducted from 15-25 August 2012, during which 16 Nihoa Millerbirds and 184 Nihoa Finches were detected (Table 1). Based on the area surveyed within the 54 strip transects (250 feet × 3 meters × 3.28 feet / m × 54 = 132,860 square feet surveyed) and the total vegetated area of Nihoa in which passerine birds can be expected to occur (6,662,860 square feet), the estimated population of Nihoa Millerbirds was 401 ± 163.0 (mean ± standard deviation) birds and the estimated population of Nihoa Finches was 4,613 ± 944.8 birds (Table 1). The point estimate for the number of Nihoa Millerbirds was lower than in 2010 and 2011, but the confidence intervals were large and overlap across all three years. Although purely anecdotal, the team observed that Millerbirds were less vocal during this trip relative to 2010 and 2011. This was especially apparent when using playbacks to capture birds for translocation. The 2012 survey was conducted in August, a month earlier than the 2010 and 2011 surveys, and bird behavior may have been different. During the process of capturing birds for translocation there was evidence of breeding, including observations of fledglings and the presence of a cloacal protuberance on one captured male. A reduction in responsiveness to playbacks may be the result of having recently completed breeding. Figure 3 shows that historically there have been wide swings in point estimates of abundance between consecutive years.

Nihoa Finch numbers in 2012 appear to have increased from the 2010-2011 estimates (VanderWerf *et al*. 2011). However, this may be due in part to the prevalence of juvenile birds not having undergone the full period of juvenile survival or behaving differently than a predominantly adult population. We routinely observed finches in groups of 3 - 6, with many of the birds being fledglings, easily identifiable by the streaking on breast and presence of yellow gape on bill. As with the Nihoa Millerbirds, there has been substantial fluctuations in historical estimates, but the 2012 Nihoa Finch population estimate was similar to the 2007 estimate (Figure 4).

One Northern Mockingbird (*Mimus polyglottos*) was also detected on transect.

Table 1. Summary of detections, strip transects, and population estimates of Nihoa Millerbirds and Nihoa Finches in 2012.

Species	Date	# Transects	Detections	Estimate ± SD	%CV	Lower 95% CL	Upper 95% CL
Nihoa Millerbird	2012	54	16	401 ± 162.99	40.6	81	721
	2011	51	18	581 ± 120.51	20.7	345	817
	2010	52	16	507 ± 146.86	29	219	795
Nihoa Finch	2012	54	184	4,613 ± 944.75	20.4	2,761	6,465
	2011	51	76	2,455 ± 418.72	17.1	1,634	3,276
	2010	52	93	2,946 ± 473.04	16.1	2,019	3,873

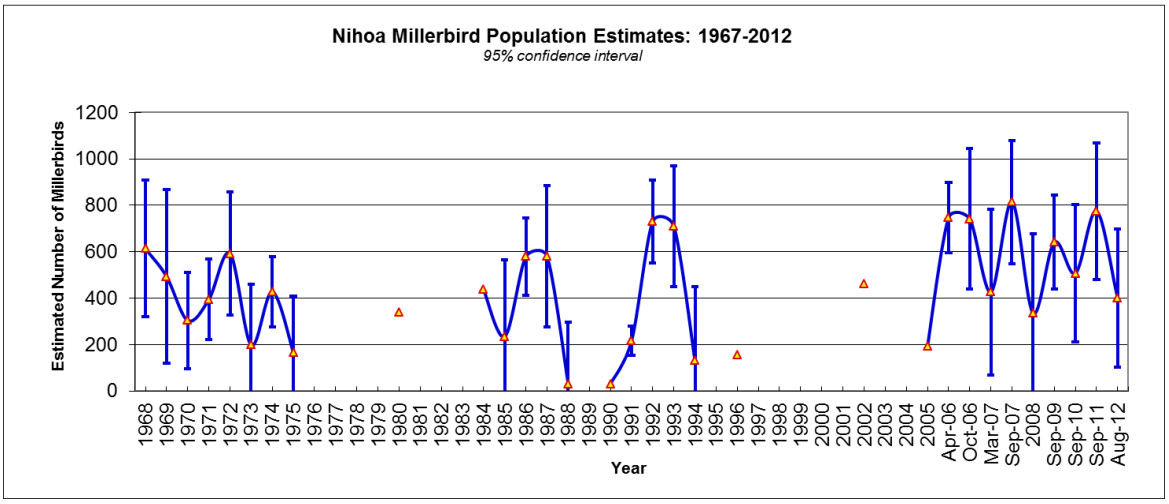

Figure 3. Nihoa Millerbird population estimates based on strip transect surveys conducted on Nihoa Island from 1967 to 2012. Note that the scale of the y-axis differs from that in Figure 4 for Nihoa Finch population estimates.

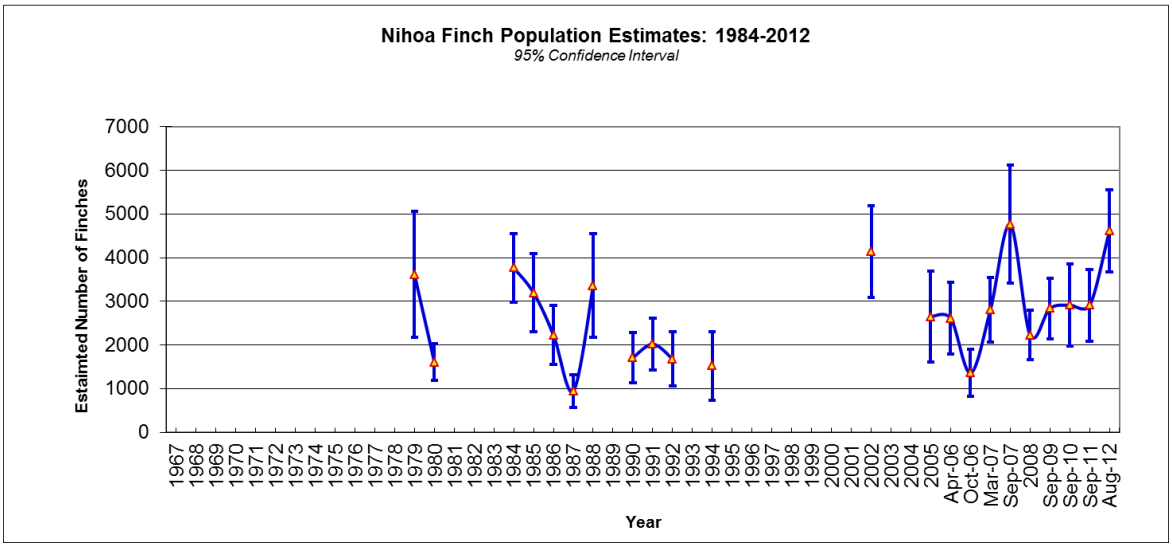

Figure 4. Nihoa Finch population estimates based on strip transect surveys conducted on Nihoa Island from 1967 to 2012. Note that the scale of the y-axis differs from that in Figure 3 for Nihoa Millerbird population estimates.

Point Counts

Point counts were conducted twice at all but a few stations (Table 2). All stations were surveyed once from 15-18 August in conjunction with the strip transects, and most stations were surveyed again from 18-22 August. Estimates of population density and size based on the VCP survey await data analyses by the USGS-BRD.

In general, distance techniques use the recorded distances to the birds detected to estimate the probability of detecting a bird at a given distance, and therefore the effective area surveyed by each observer. For example, if Nihoa Millerbirds were less vocal in 2012 than in 2010-11, there will be fewer aural detections and a higher proportion of closer-in visual detections. Closer average detection distances mean the effective areas surveyed by each observer is smaller, and reduced counts can produce the same (or higher) density estimates than years with further average detections and more counts.

The passerine point estimates and 95% CI presented for 2010 and 2011 (Table 1) are different than reported previously (VanderWerf *et al*. 2011). In 2011, contemporary satellite imagery of Nihoa island was inspected within a Geographic Information Systems framework to better determine the vegetated area of the island suitable for passerine habitat. Excluding the steep, unvegetated cliffs bordering the island slightly reduced the habitable area to 61.9 ha (6,663,000 square feet) (green border in Figure 2). In addition, some of the line-transect distances were recorded to all birds and all these were included as being in the 5 meter wide strip and removing birds ≥ 2 meters from the line produces the numbers here and in the Gorresen *et al*. (2012) report.

Table 2. Number of Nihoa Millerbirds and Nihoa Finches detected on point counts in 2012.

Species	Date	# Stations	Effort	Detections	Detections/Effort
Nihoa Millerbird	2012	108	263	116	0.44
	2011	108	200	284	1.42
	2010	90	91	197	2.16
Nihoa Finch	2012	108	263	1,447	5.50
	2011	108	200	681	3.41
	2010	90	91	373	4.10

NIHOA MILLERBIRD RESIGHTING

A total of 10 banded Millerbirds were resighted (Table 3). All resights were obtained during passerine census surveys.

Table 3. Nihoa Millerbird resights on Nihoa, August 2012.

Date	Time	Observer[1]	color combo[2]	North_Lat.	West_Long.	Comments
08/17/12	0933	DHT	SR,Y(?)	23 05975	161 91855	Obs during point count 4B. appeared to have just a single band on right leg
08/17/12	0819-0834	APM	(?)R(?),OS			Obs during strip transect 40A to 40B
08/20/12	0717	DHT	GR,OS	23 06027	161 92480	Obs during point count 40A. w/ below NIMI

Date	Time	Observer[1]	color combo[2]	North_Lat.	West_Long.	Comments
08/20/12	0718	DHT	WY,BKS	23 06027	161 92480	Obs during point count 40A. w/ above NIMI
08/20/12	0722	DHT	G,OS	23 06027	161 92480	Obs during point count 40A. w/in 3m of above pair
08/21/12	0904	DHT	Y,BS	23 06315	161 92761	Obs during point count 37A. w/unb NIMI
08/21/12	0647	DHT	RW,GS	23 05894	161 92357	Obs during point count AB
08/21/12	0701	DHT	WG,OS	23 05876	161 92436	Obs during point count AA
08/22/12	0740	DHT	WR,YS	23 06031	161 91898	Obs during point count 24A
08/22/12	0854-0900	APM	BS,(?)(?)			Obs during point count 30B

[1] Observer: DHT = Daniel Tsukayama, APM = Ann Marshall. [2] Color combination read in following order: left upper, left lower, right upper, right lower. S= Service band.

SEABIRDS (Table 4)

Wedge-tailed Shearwater (*Puffinus pacificus*). Abundant throughout the island, and observed nesting in a wide range of habitat, though rarely in exposed areas. Especially numerous under the *Pritchardia* canopy in West Palm and East Palm Valleys. Nests were generally observed in earlier stages, anywhere from eggs to partly feathered chicks.

Christmas Shearwater (*Puffinus nativitatus*). Adults and almost completely feathered chicks interspersed throughout the island. Adults are frequently observed flying in the evenings and resting on land in groups and couples in the early mornings.

Bulwer's Petrel (*Bulweria bulwerii*). Abundant in rocky crevices and caves throughout the island. Nests contained chicks that ranged from downy to partly-feathered. Some adults were present on the island during the day, but many more were observed returning to the island at dusk.

Red-footed Booby (*Sula sula*). This species was common and widely distributed over much of the island, where vegetation provided suitable nesting habitat. Nest contents ranged from eggs to fully-feathered chicks. Fledglings were also observed. Active nests were estimated to be at least several hundred.

Brown Booby (*Sula leucogaster*). Brown Boobies were most numerous on the steep slopes and cliffs on both Miller's Peak and Tanager Peak, as well as along the rocky ridges of the island. Many fledged juveniles were seen and several nests were observed with fully feathered chicks.

Masked Booby (*Sula dactylatra*). This species was not numerous and mostly concentrated on Miller's Plateau. Chicks were observed from partly feathered to fledged.

Great Frigatebird (*Fregata minor*). Roosting adults and nests were common throughout the island in areas where vegetation provided suitable habitat for roosting. Chicks ranged from downy to mostly feathered. No nests with eggs were seen.

Red-tailed Tropicbird (*Phaethon rubricauda*). Approximately 20 nests were observed under shady outcroppings, with chicks ranging from downy to fully-feathered. Adults were commonly seen flying near the cliffs on the Northern side of the island.

Sooty Tern (*Sterna fuscata*). Sooty Terns were observed in colonies in several parts of the island, most notably on the slopes below Tanager Peak on the Eastern side of the island. A small colony was present in the camp area, but all chicks observed were fully feathered and fledged, thus impact to these birds in this area was considered nominal.

Gray-backed Tern (*Sterna lunata*). This species was common over much of the island. Chicks were often observed in exposed areas, ranging from downy to fully feathered and fledged.

Brown Noddy (*Anous stolidus*). Brown Noddies are ubiquitous on Nihoa. Adults, juveniles, and nests containing eggs and chicks of all sizes were present throughout the island.

Black Noddy (*Anous minutus*). Abundant on the sheer cliffs of the northern and western sides of the island and the rocky ledges over the se cliffs. Because of this habitat, abundance and phenology were difficult to determine for this species.

Blue-gray Noddy (*Procelsterna cerulea*). Especially numerous on the sheer cliffs of the northern side of the island, though also commonly observed flying near the shoreline and landing in rocky caves and ledges throughout the island. No nests, eggs, or juveniles were observed.

White Tern (*Gygis alba*). White Terns were observed on the sheer cliffs on the northern side of the island and in the Devil's Slide Canyon, but the number of birds present and their breeding phenology were difficult to determine.

Table 4. Summary of seabird abundance and nesting phenology on Nihoa Island, August 2012.

Species	Presence	Nesting	Chicks Present
Bulwer's Petrel	Abundant	Yes	Yes
Wedge-tailed Shearwater	Abundant	Yes	Yes
Christmas Shearwater	Abundant	Yes	Yes, near fledging
Red-footed Booby	Common	Yes	Yes
Brown Booby	Patchy, Rare	Finished	Fledged
Masked Booby	Patchy	Yes	Yes, many fledged
Great Frigatebird	Abundant	Yes	Yes, some near fledging
Red-tailed Tropicbird	Fairly common	Yes	Yes
Sooty Tern	Abundant	Finished	Fledged
Gray-backed Tern	Common	Finished	Fledged
Brown Noddy	Abundant	Yes	Yes
Black Noddy	Common on sheer cliffs	Unknown	Unknown
Blue-gray Noddy	Patchy	No?	Unknown
White Tern	Common on sheer cliffs	Unknown	Unknown

INDIGENOUS MIGRATORY BIRDS

Pacific Golden-plover or **Kolea** (*Pluvialis fulva*). This species was often seen on the rocky shoreline, individually or in small numbers.

Ruddy Turnstone or **'Akekeke** (*Arenaria interpres*). This species was common, with most individuals foraging on the rocky shoreline. It is also not uncommon to see this species higher up on the island.

Wandering Tattler or **'Ulili** (*Heteroscelus incanus*)**.** A few Wandering Tattlers were seen along the rocky shoreline, easily distinguished by their vocalizations.

Bristle-thighed Curlew or **Kioea** (*Numenius tahitiensis*). A single individual was observed in and around the camp area during our stay.

Sanderling or **Hunakai** (*Calidris alba*)**.** One Sanderling was observed along the rocky shoreline on two afternoons.

NON-NATIVE BIRDS

Northern Mockingbird (*Mimus polyglottos*). A single individual was seen and photographed in Devil's Slide by Brinck on 18 August during a transect survey. This is the third record of a Northern Mockingbird on Nihoa, and presumably the same individual that was seen in 2011.

NATIVE ARTHROPODS

Nihoa Trap-door Spider (*Nihoa mahina*). On 13 August, Brinck and Marshall observed a single individual in Middle Valley during efforts to catch Millerbirds. On 22 August, Aldeguer and Tsukayama observed a single individual in the camp area.

ALIEN ARTHROPODS

Schistocerca nitens. A total of 22 grasshoppers were observed on the passerine bird survey transects.

NATIVE PLANTS

The island was very dry during this visit compared to other years, as would be expected in August of a relatively dry year (S. Conant, *in litt*. 2013).

'Emoloa (*Eragrostis variabilis*). Observed in abundance throughout the island, particularly on the south-facing slope of Millers Peak where this plant is dominant. Most plants consisted of more than 50% dry matter with empty seed heads, though some plants still displayed ripe seed.

Kakonakona (*Panicum torridum***)**. This native bunch grass was common and widespread over much of the island, but all plants observed had senesced and were brown and withered. Having arrived one month earlier than last year, its prevalence was more noticeable, and it is obviously one of the most widespread and abundant plant species on Nihoa.

Lo'ulu (*Pritchardia remota***)**. Lo'ulu stands in West Palm Valley and East Palm Valley remain healthy, though less fruit was observed than last year, and no flowers were noted. Fruit that was present was mostly unripe. Per request from Laysan personnel, approximately 2 gallons of seeds were collected and transported to Laysan Island for subsequent cultivation.

Rumex albescens. A few hundred healthy plants were observed in the lower section of Devil's Slide (Figure 3). Several plants had both flowers and seeds. D. Tsukayama noted that this species appeared even more abundant than the 2011 tour, yet remaining limited to the rich soil and semi-shaded areas in this locale.

Figure 5. *Rumex albescens* seeding in the Devil's Slide area. Photo by D. Tsukayama.

'Aweoweo (*Chenopodium oahuense***)**. This species was sparsely distributed on steeper slopes and ridges, and more commonly on Miller's Plateau and Dog's Head. Several plants were observed with seeds. This species was more common in the past, and was more abundant than *Sida* and *Solanum*, and grew in dense monotypic stands on some places (Conant, *in litt*. 2013).

Schiedea verticillata. Like *Rumex albescens*, this endemic species was mostly found in the lower section of Devil's Slide, though it is also found on other areas of the island during spring and winter months. A few hundred plants were observed which is comparable to last year's numbers. Most plants were small (less than 3in). In addition a few individuals were observed by Tsukayama on the north facing slope of Dog's Head.

'**Ohai** (*Sesbania tomentosa*). 'Ohai was common over much of the island. Small plants (less than 2 feet) were healthy and abundant throughout the island, and much more numerous than 2011. This plant, though apparently perennial, seems to have a pattern of senescence on Nihoa, with large (up to 3 foot)

‘skeletons’ of dead individuals common over the island, and new seedlings emerging around this time of year.

Nohu (*Tribulus cistoides*). A few individuals were noted on the rocky ridges of the eastern end of the island. No seeds or flowers were observed.

Amaranthus brownii. Not observed.

‘Akoko (*Chamaesyce celastroides*). This species was abundant on the rocky ridges on the eastern and western ends of the island, where it often forms thick stands. Plants were observed with flowers and seeds.

‘Ilima (*Sida fallax*). ‘Ilima is very abundant on the island. This species exhibits a large range of characteristics; from long, nearly leafless stems, to leafy verdant shrubs. Many plants had both flowers and seeds.

Ipomoea indica. Not observed

Popolo (*Solanum nelsoni*). One of the three most abundant plant species on Nihoa, the popolo on Nihoa displays a large range of characteristics and leaf-shapes. While some plants may exhibit sparse, fuzzy, silver-green foliage, other plants might have large leaves (4in), with a waxy appearance. This variance does not seem to be phenological, but reflective of the substrate in which the plant grows. The plants were heavy with fruit, ranging in color from light orange or red to purple or black. Fruit was again abundant, though not as prolific as last year. Approximately 2 quarts of fruit was collected for transport to Laysan Island for subsequent cultivation.

Sicyos pachycarpos. This species was observed in a small patch on the northeast face of Miller’s Peak where it is commonly present, and in Devil’s Slide. Plants were observed with flowers and seed pods.

NON-NATIVE PLANTS

Portulaca spp. *Portulaca* was commonly observed. Three species are present on Nihoa (*P. lutea, P. villosa,* and *P. oleracea*), but no attempt was made to distinguish them or estimate abundances.

Sandbur (*Cenchrus echinatus*). September 2011 was the first year that *Cenchrus echinatus* was observed on Nihoa since Sheila Conant observed and pulled a single plant from the camp area in the ‘80’s. In 2011, six small patches were observed in two distinct areas. The first area (Cluster 1) was located in Miller’s Valley and consisted of 4 plants, and the second area (Cluster 2) was observed in the lower part of Middle Valley and consisted of two plants. Though the plants were almost completely yellow and dry, the remaining plant matter and the fallen seeds were collected and removed. Areas with the highest concentration of fallen seeds were covered with black plastic trash bags.

This year four *Cenchrus* plants were observed and pulled from two areas (one known and one new). Two plants were completely dry and two had some green growth at the base of the plants; one of these had three green seeds. Of the four plants observed, just one was outside of the two areas where *Cenchrus*

had been documented in 2011; this single individual was found and pulled by D. Tsukayama on the western ridge above Miller's Valley, constituting a third distinct area where *Cenchrus* has been found. The other three plants were found within Cluster 1, very near to where plants had been observed in 2011. In addition, no *Cenchrus* plants were observed in the area around Cluster 2.

Excluding opportunistic searching during passerine surveys, approximately 12 hours were spent in efforts to eradicate *Cenchrus* from Nihoa. Aquamaster herbicide was brought out in the event that *Cenchrus* numbers proved both vegetative and too numerous to pull, but since neither was the case, manual extraction and using weed cloth to cover concentrated areas were the only methods used to eradicate *Cenchrus* (Figure 5).

It is notable that future efforts to search for *Cenchrus* on Nihoa should coincide with the time of year when Cenchrus is vegetative, but before it has seeded. Identifying this weed once it has senesced is extremely difficult, since it can be easily mistaken for the native *Panicum torridum* which is also in senescence and entirely composed of dry leaf matter. This time of year, differentiating *Cenchrus* was only possible by spotting the stalk of the empty seed-heads which have a corkscrew-like appearance.

To reiterate the 2011 trip report, "The presence of *Cenchrus echinatus* on Nihoa Island should be a 'red flag' in the management plan of the Monument. Considering the history of *Cenchrus* in the archipelago, the relatively pristine nature of Nihoa, and the now limited occurrence of this weed, *immediate and aggressive measures should be taken to eradicate this species from the island.*"

Table 5. GPS points where *Cenchrus* has been found on Nihoa Island. See VanderWerf *et al.* 2011 for more details.

Number	Year Found	North_Lat.	West_Long.	Comments
1	2011 & 2012	23.061253	161.924272	Area covered with weed cloth
2	2011	23.060213	161.922736	No *Cenchrus* obs. in 2012
3	2011 & 2012	23.061154	161.924321	Area covered with weed cloth
4	2011	23.060872	161.924461	No *Cenchrus* obs. in 2012
5	2011	23.061153	161.92432	No *Cenchrus* obs. in 2012
6	2011	23.06021	161.922386	No *Cenchrus* obs. in 2012
7	2011 & 2012	23.060907	161.924258	Area covered with weed cloth
8	2012	23.06097	16192461	New point within Cluster 1. Covered with weed cloth.
9	2012	23.06017	161.92522	New point = Cluster 3

Figure 6. One of four *Cenchrus* points covered with weed cloth. Photo by D. Tsukayama.

New Zealand spinach (*Tetragonia tetragonioides*). This alien species was observed in a small section of Devil's Slide, where it has been observed for several years. Plants were observed with both flowers and seeds. On 21 August, Brinck, Marshall, Aldeguer, and Tsukayama, removed 2/3 of a garbage bag, and carried it back to camp for disposal off-island. D. Tsukayama noted numbers to be about 40% less than last year. In lieu of the density of endemic species in the small area of Devil's Slide, continued removal of this alien plant should remain a priority for future trips to Nihoa.

MONK SEAL OBSERVATIONS

8/17/12 – 5EJ (right flipper) 5EI (left flipper), 5ET (right flipper) 5ES left flipper), 2 unmarked seals on rocks below camp

8/19/12 - 5ET (right flipper) 5ES left flipper), 1 unmarked seal on rocks below camp

8/20/12- 5ET (right flipper) 5ES left flipper) on rocks below camp

8/21/12 –5ET (right flipper) 5ES left flipper) coming out of water onto shore, 5EJ (right flipper) 5EI (left flipper), 1 unmarked seal already on rocks below camp

8/22/12- 5ET (right flipper) 5ES left flipper), 1 unmarked seal on rocks below camp

8/23/12 – 5EJ (right flipper) 5EI (left flipper), and 705 (brand on right, left sides of body and back) on rocks below camp

Literature Cited

Conant, S., M. S. Collins, and C. J. Ralph. 1981. Effects of observers using different methods upon the total population estimates of two resident island birds. Studies in Avian Biology 6: 1981.

Farmer, C, S. Plentovich, S. Conant, R. Hagerty, R. Kohley, P. Luscomb, M. Wilcox, T. Work, W. Aldeguer, K. Brinck, A. Marshall, and D. Tsukayama. 2012. Second Millerbird Translocation, 10-25 August 2012. Nihoa and Laysan Islands, Northwest Hawaiian Islands, Papahānaumokuākea Marine National Monument, Report to U.S. Fish and Wildlife Service, Honolulu, Hawaiʻi.

Gorresen, P.M., R.J. Camp, K.W. Brinck, and C.A. Farmer. 2012. Developing accurate survey methods for estimating population sizes and trends of the critically endangered Nihoa Millerbird and Nihoa Finch. Hawaiʻi Cooperative Studies Unit Technical Report HCSU-034. University of Hawaiʻi at Hilo.

VanderWerf, E.A., D.H. Tsukayama, F.A. Amidon, and W. Aldeguer. 2011. Nihoa Island biological monitoring and management, 2-16 September, 2011. Unpublished report to the U.S. Fish and Wildlife Service.

***In Litt*. Communications**

Conant, Sheila. 2013. University of Hawaii professor, Honolulu, Hawaii.