Pacific Bird Conservation

Mariana Avifauna Conservation Program 2016

Progress Report

The Mariana Avifauna Conservation Program 2016

Field Collection of Tinian Monarch (*Monarcha takatsukasae*) and Bridled White-eye (*Zosterops conspicillus*) from Tinian for Translocation to Guguan, CNMI

Unbanded Tinian monarch on Guguan, offspring from 2015 translocation. (Photo credit: Steve Mullin)

Trip Report

The Mariana Avifauna Conservation Program 2016 Field Collection of Tinian Monarch (*Monarcha takatsukasae*) and Bridled White-eye (*Zosterops conspicillus*) from Tinian for Translocation to Guguan, CNMI

Prepared by: Peter Luscomb and Herb Roberts

Personnel

Hannah Bailey - Houston Zoo
Peter Bibeault - Audubon Zoo
Leanne Blinco - Disney's Animal Kingdom
Jolly Ann Cruz - Pacific Bird Conservation Intern
Fields Falcone - Memphis Zoo
Kate Finch - Aquarium of the Pacific
Deidre Fontenot, DVM - Disney's Animal Kingdom
Ellen Gorrell - Toledo Zoo
Steve Howard - Houston Zoo
Kurt Hundgen - National Aviary
Chris Johnson - Saint Louis Zoo
Peter Luscomb - Pacific Bird Conservation
Josh Minor (education) - Toledo Zoo
Hanna Mounce - Maui Forest Bird Recovery Project
Scott Newland - Sedgwick County Zoo
Sheri Nishikawa - Honolulu Zoo
Ken Reininger - North Carolina Zoo
Sara Rekart - Saint Louis Zoo
Herb Roberts - Pacific Bird Conservation
Matt Runnells – Disney's Animal Kingdom
Matt Schamberger - Saint Louis Zoo
Renee Serafino - Audubon Zoo
Paul Schultz – Disney's Animal Kingdom
Joe Smith, DVM - Fort Wayne Children's Zoo
Shirley Taitano - Pacific Bird Conservation Intern
Sandy Wilson, DVM - Sedgwick County Zoo

Objectives of MAC Program 2016

1. Collect 54 Tinian monarchs and 48 bridled white-eyes on Tinian and prepare them for translocation to Guguan with a target date of 3 May 2016 to depart for Guguan.
2. Assist CNMI Department of Fish and Wildlife transport and release bird on Guguan.
3. Meet with conservation partners on Saipan to review MIRADI (Conservation Evaluation Process, miradi.org) and to identify how PBC can better assist CNMI in community conservation education.
4. Provide Tinian Elementary School with a presentation on the MAC Program and how CNMI Department of Fish and Wildlife is preserving their native avifauna from the potential introduction on the brown tree snake.
5. Support two local interns to participate in field work on Tinian.
6. Collect fecal samples from captive Tinian monarchs for Disney Animal Kingdom (DAK) to study stress hormones.
7. Assist Guam Zoo in collecting 4 bridled white-eyes and 4 rufous fantails for public exhibition on Guam.

Itinerary

17 April:	MAC core team arrives on Saipan
19 April:	Equipment picked up from the container at the Department of Fish and Wildlife base yard and taken to SN Five for transport to Tinian
	Barge going to Tinian on 20 April
20 April:	Start up team arrives and proceeds to Tinian
	Picked up equipment from SN Five and brought to hotel
21 April:	Bird room set up
22 April:	Set up trap site
	Interns arrive Tinian
23 April:	Trapping started
24 April:	Interns depart Tinian
25 April:	Close up team arrives
28 April:	Presentation to Tinian elementary school on MAC Program
	Joe Smith, DVM, and Hanna Mounce (observer from Maui Forest Bird Recovery Project) arrive
29 April:	Trapping completed
	DAK crew arrive to assist with close up
2 May:	Start up crew departs
	Birds colored banded and loaded into crates for translocation
3 May:	Birds translocated to Guguan via boat.
	Equipment packed up and taken to SN Five for transport back to Saipan
	H. Mounce departs
4 May:	Equipment picked up on Saipan and returned to storage container
	Birds released on Guguan
5 May:	MAC team members assisting with translocation returned to Saipan
6 May:	Meeting with Conservation Partners on Saipan
8 May:	Close up team departs Saipan

Background

Guam's avifauna rapidly disappeared with the introduction of the brown tree snake in the last half of the twentieth century via cargo ships. The snake is believed to be solely responsible for the extirpation or severe reduction of Guam's 25 bird species. Based on roadside surveys conducted on Guam over a 20-year period, most species experienced a 90% decline within nine years.

The islands of Saipan, Tinian, and Rota, part of the Commonwealth of the Northern Mariana Islands (CNMI), are all close neighbors to Guam and are recognized as having the greatest risk from introduction of the brown tree snake. Recovery Plans published by the U. S. Fish and Wildlife Service for the currently listed species, all cite the establishment of the brown tree snake as a major threat. To date there have been over 90 sightings of brown tree snakes on Saipan.

The Mariana Islands all have avifauna with limited distribution, with most forest bird species found only in the CNMI. Several species have extremely limited distribution such as the Tinian monarch (*Monarcha takatsukasae*), found only on Tinian; the golden white-eye (*Cleptornis marchei*), found only on Saipan and Aguiguan; the nightingale reed-warbler (*Acrocephalus luscinia*) found only on Saipan and Alamagan; and the Mariana fruit dove (*Ptilinopus roseicapilla*), found only on four CNMI islands, numbering less than 10 on some islands.
The CNMI government has requested the assistance of Pacific Bird Conservation and zoological institutions to aid with the following objectives:

- Develop techniques to capture, acclimate to captive conditions, hold, transport, and breed in captivity all of the bird species found in CNMI,
- Establish captive populations of select species that can be used as a source population for possible reintroduction back to Guam or islands in the CNMI which are able to control the brown tree snake,
- Translocate birds to islands where the brown tree snake is not present,
- Develop public education programs that will assist the conservation of their avifauna,
- Develop fund raising program to assist *in situ* conservation efforts, and
- Provide training to local biologists upon request.

The Mariana Avifauna Conservation (MAC) Program is a partnership between the CNMI Division of Fish and Wildlife (DFW), U.S. Fish and Wildlife Service, Pacific Bird Conservation, and 15 accredited zoos from the Association of Zoos and Aquariums (AZA). The MAC Program began in 2004.

For more information, please visit Pacific Bird Conservation home page at pacificbirdconservation.org, or facebook.com/MarianaAvifaunaConservation.

Overview of Project Set Up

A total of 26 individuals from 13 institutions participated in this year's translocation. MAC team members were in the Mariana Islands from 18 April until 8 May 2016. Peter Luscomb, Herb Roberts, Hannah Bailey and Scott Newland were the MAC core team and worked the entire length of the project. The majority of the crew came for two week periods and made up two teams, the Startup crew and Closing crew. Additional crew members arrived as they could to assist with the overall program.
All staff participating in field activities were required to go through an Unexploded Ordnance Awareness training program prior to working on Department of Defense lands. All staff reviewed a PowerPoint presentation and were given a trifold brochure that they carried whenever they were in the field.

The Startup crew arrived between 17 – 20 April and were responsible for picking up all equipment on Saipan and getting it transported to Tinian. Once on Tinian the Startup crew set up the bird room, field trapping site, and started to collect targeted species. The Closing crew arrived between 25 – 29 April and were responsible for finishing up the collection of birds. Once all birds were collected then we started getting them ready for translocation. All birds needed a physical to ensure that they were healthy for translocation and then they were banded with a medal band and a unique combination of color bands for future identification. Four members of the MAC team assisted in getting the birds to Guguan and released. The remaining staff closed up the field camp, bird room, and prepared all of our equipment for shipment back to Saipan. Once the equipment was back on Saipan, it was placed back into our container at the CNMI DFW base yard for safe keeping.

While we were on Tinian we used two hotels, the Lorilynn Hotel and the Fleming Hotel to support our overall program. The Lorilynn, typically the hotel we use on Tinian, was not able to accommodate the large number of people we had in our crew. The Lorilynn did have a large room that they made available to us that was ideal to use as our bird room so this hotel was used to house our husbandry operation along with animal care and veterinarian staff. The Fleming hotel was used to house our field staff.

Peter Luscomb and Herb Roberts were the overall project leaders for MAC 2016 but Hannah Bailey from Houston zoo oversaw all activities associated with the management of birds being held in captivity, while Scott Newland from Sedgwick County Zoo oversaw all field activities.

Field protocols developed previously were used to guide all activities associated with the capture, holding, and transport of birds.

Methods and Results

Trapping

All trapping activities were done on the north end of Tinian. We set up our nets in an area known as the North Field, alongside the southern runway (Figures 1-2). Trapping activities took place during the time period of 23 – 29 April. All trapping was done with the use of mist nets. We used a total of 27 net sets over the course of 6 days of trapping amounting to 567.75 net hours. The nets used were either 24mm or 30mm nets. We prefer using 24mm nets when we have a lot of rufous fantails in the area as they can get more tangled in larger mesh nets.

Our initial trapping efforts focused on collecting six bridled white-eyes for the Guam Zoo which took only a few hours of effort. We then focused our efforts on Tinian monarchs as they are territorial and would require that we set up a lot of nets to catch our targeted numbers. When setting up the nets our field crew would first scout out the appropriate habitat were the targeted species are expected to be found. Nets would be set, then monitored. If nets were not catching targeted species, then they were taken down and moved to a new location. Once our initial nets (11) were set up we divided our field crew and had a group monitoring the nets and the others scouting for new net site and then cutting net lanes so nets could be moved quickly. The number of nets managed on a day varied from a maximum of 21 nets on day four to three nets on day six (Table 1).

Figure 1: Northern portion of Tinian Island. Trap site in red.

Figure 2: Location of mist nets at trap site.

MAC 2015 Net Description, Location, and Net hours																										
Net				12-Jun		13-Jun		14-Jun		15-Jun		16-Jun		17-Jun		18-Jun		19-Jun		20-Jun		21-Jun			
	Net Description		GPS Location	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours	Hours Open	Net Hours		
1	12m X 24mm	2	N15°03.816' E145°38.269'	2.00	4.00	7.50	15.00	11.50	23.00	11.50	23.00	11.00	22.00	10.25	20.50	10.25	20.50	7.50	15.00		0.00				
2	12m X 24mm	2	N15°03.815' E145°38.260'	2.00	4.00	7.50	15.00	11.50	23.00	11.50	23.00	11.00	22.00	10.25	20.50	10.25	20.50	12.50	25.00	11.75	23.50	3.25	6.50		
3	12m X 60mm	2	N15°03.816' E145°38.318'	2.00	4.00	7.50	15.00	11.50	23.00	11.50	23.00														
4	12m X 60mm	2	N15°03.814' E145°38.359'	2.00	4.00	7.50	15.00	11.50	23.00	11.50	23.00														
5	9m X 24mm	0.75	N15°03.828' E145°38.287'	2.00	1.50	7.50	5.63	11.50	8.63	9.50	7.13														
6	9m X 24mm	0.75	N15°03.813' E145°38.279'			7.50	5.63	11.50	8.63	9.50	7.13														
7	9m X 24mm	0.75	N15°03.802' E145°38.272'			7.50	5.63	11.50	8.63	9.50	7.13														
8	12m X 24mm	1	N15°03.800' E145°38.258'			7.50	7.50	11.50	11.50	11.50	11.50	3.50	3.50												
9	12m X 24mm	1	N15°03.791' E145°38.259'			7.50	7.50	11.50	11.50	11.50	11.50	3.50	3.50												
10	12m X 24mm	1	N15°03.781' E145°38.258'			7.50	7.50	11.50	11.50	11.50	11.50	3.50	3.50												
11	12m X 24mm	2	N15°03.816' E145°38.287'					11.50	23.00	5.50	11.00	11.00	22.00	10.25	20.50	10.25	20.50	9.50	19.00						
12	12m X 24mm	2	N15°03.817' E145°38.254'					11.50	23.00	11.50	23.00	11.00	22.00	10.25	20.50	9.00	18.00								
14	12m X 24mm	1	N15°03.785' E145°38.242'					11.50	11.50	11.50	11.50	11.00	11.00	5.25	5.25										
15	12m X 24mm	1	N15°03.791' E145°38.228'					11.50	11.50	11.50	11.50	11.00	11.00	10.25	10.25	4.25	4.25								
16	12m X 24mm	1	N15°03.795' E145°38.234'					11.50	11.50	11.50	11.50	11.00	11.00	10.25	10.25	4.25	4.25								
17	12m X 24mm	1	N15°03.786' E145°38.232'					11.50	11.50	11.50	11.50	11.00	11.00	10.25	10.25	4.25	4.25								
18	12m X 24mm	1	N15°03.801' E145°38.235'					11.50	11.50	11.50	11.50	11.00	11.00	5.25	5.25										
19	12m X 24mm	1	N15°03.808' E145°38.232'					11.50	11.50	11.50	11.50	11.00	11.00	10.25	10.25	10.25	10.25	5.75	5.75						
20	12m X 24mm	1	N15°03.804' E145°38.222'					11.50	11.50	11.50	11.50	11.00	11.00	10.25	10.25	10.25	10.25	5.75	5.75						
21	9m X 24mm	0.75	N15°03.855' E145°38.284'									11.00	8.25	5.25	3.94										
22	9m X 24mm	0.75	N15°03.866' E145°38.282'									11.00	8.25	5.25	3.94										
23	12m X 24mm	1	N15°03.826' E145°38.267'									4.50	4.50	10.25	10.25	4.25	4.25								
24	12m X 24mm	1	N15°03.835' E145°38.253'									4.50	4.50	10.25	10.25	10.25	10.25	4.00	4.00						
25	12m X 24mm	1	N15°03.832' E145°38.231'									4.50	4.50	10.25	10.25	10.25	10.25	4.50	4.50						
26	12m X 24mm	1	N15°03.838' E145°38.227'									4.50	4.50	10.25	10.25	10.25	10.25	4.50	4.50						
27	12m X 24mm	1	N15°03.838' E145°38.220'											4.50	4.50	10.25	10.25	12.50	12.50	7.25	7.25				
28	12m X 24mm	1	N15°03.839' E145°38.200'											4.00	4.00	10.25	10.25	12.50	12.50	7.25	7.25				
29	9m X 24mm	0.75	N15°03.833' E145°38.188'											3.50	2.63	10.25	7.69	12.50	9.38	3.25	2.44				
30	9m X 24mm	0.75	N15°03.837' E145°38.175'											3.50	2.63	10.25	7.69	12.50	9.38	3.00	2.25				
31	12m X 24mm	1	N15°03.856' E145°38.194'													3.50	3.50	12.50	12.50	2.50	2.50				
32	12m X 24mm	1	N15°03.871' E145°38.181'													3.50	3.50	12.50	12.50	11.75	11.75	3.25	3.25		
33	12m X 24mm	1	N15°03.871' E145°38.178'													3.50	3.50	12.50	12.50	11.75	11.75	3.25	3.25		
34	12m X 24mm	1	N15°03.862' E145°38.170'													3.50	3.50	12.50	12.50	11.75	11.75	3.25	3.25		
35	12m X 24mm	1	N15°03.863' E145°38.298'													1.75	1.75	12.50	12.50	11.75	11.75	3.25	3.25		
36	12m X 24mm	1	N15°03.880' E145°38.304'													1.00	1.00	12.50	12.50	11.75	11.75	3.25	3.25		
37	12m X 24mm	1	N15°03.882' E145°38.314'													0.50	0.50	12.50	12.50	11.75	11.75	3.25	3.25		
38	9mm X 24mm	0.75	N15°03.864' E145°38.302'															11.50	8.63	11.75	8.81	3.25	2.44		
39	9mm X 24mm	0.75	N15°03.813' E145°38.233'															9.25	6.94	6.25	4.69				
40	12m X 24mm	1	N15°03.836' E145°38.254'															8.25	8.25	7.00	7.00				
41	12m X 24mm	1	N15°03.845' E145°38.175'															7.50	7.50	11.75	11.75	3.25	3.25		
42	12m X 24mm	2	N15°03.841' E145°38.287'															7.00	14.00	5.00	10.00				
43	12m X 30mm	1	N15°03.884' E145°38.328'															3.25	3.25	11.75	11.75	3.25	3.25		
44	12m X 30mm	1	N15°03.885' E145°38.332'															3.00	3.00	11.75	11.75	3.25	3.25		
45	12m X 30mm	1	N15°03.860' E145°38.327'															1.50	1.50	11.75	11.75	3.25	3.25		
46	12m X 24mm	2	N15°03.849' E145°38.285'															2.50	5.00	5.00	10.00				
47	9m x 30mm	0.75	N15°03.851' E145°38.337'																	7.25	5.44	3.25	2.44		
48	9m x 30mm	0.75	N15°03.844' E145°38.344'																	6.75	5.06	3.25	2.44		
49	9m x 30mm	0.75	N15°03.836' E145°38.353'																	6.50	4.88	3.25	2.44		
50	9m x 30mm	0.75	N15°03.865' E145°38.335'																	2.75	2.06	3.25	2.44		
51	9m x 30mm	0.75	N15°03.865' E145°38.329'																	2.50	1.88	3.25	2.44		
	Total Net Hours				18		99		279		262		210		206		201		273		223		54	1824	

Table 1: Net locations and net hours.

The field crew monitored the nets on a 30-minute schedule in the morning, and as when air temperatures rose the time interval went to 15 minutes (Figure 3). By mid-morning, if nets were in direct sunlight we stationed a crew member for immediate removal of trapped birds. On 25 April we had to close all nets for a few hours because of heavy rain. All target species were removed from the net and placed into a cloth bag and then transferred to our field bird holding area. Our vet staff would first examine the bird to make sure it was in good health. The bird was then placed it into a field holding box with food and water. Birds were transferred back to the hotel bird room usually starting at 10:00 am and then every two hours.

Trapping Results

A total of 272 birds from 8 species were collected. The following birds were collected: 73 bridled white-eye (BRWE), 69 Tinian monarch (TIMO), 54 rufous fantail (RUFA), 42 Micronesian honeyeater (MIHO), 7 Micronesian starling (MIST), 14 collared kingfisher (COKI), 12 orange-cheeked waxbill (OCHW) and 1 white-throated ground dove (WTGD) (Table 2). In six days with 27 nets amounting to 567 net hours of effort we were able to collect our targeted number of birds. Our trapping results for MAC 2016 were significantly better than MAC 2015. In 2016 it took approximately 8.2 net hours to collect each TIMO. This is compared to our 2015 trapping season where it took approximately 35.8 net hours to collect each TIMO. In 2015 we trapped in the mid to late June after the breeding season in drier conditions. This year's trapping was done in the second half of April and the vegetation was a lot greener.

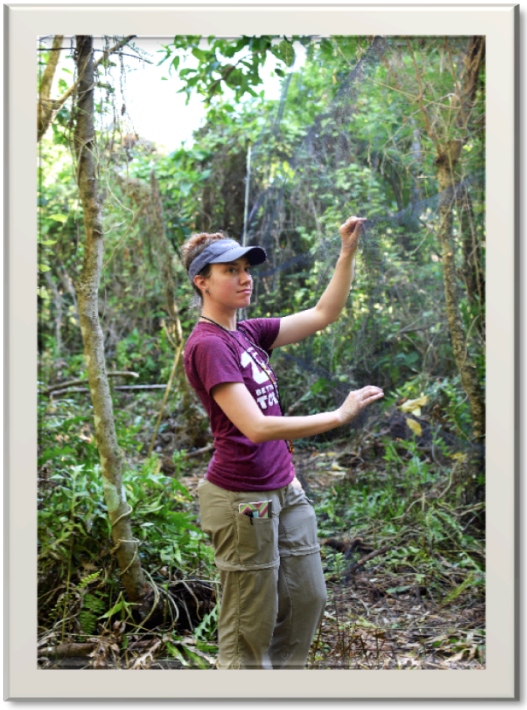

Figure 3: Ellen Gorrell (Toledo Zoo) checks a mist net for bird captures on Tinian, CNMI.

MAC 2016 Trapping Results

	Species											
Net Number	BRWE	TIMO	RUFA	MIHO	MIST	COKI	MAFD	OCWB	ISCD	WTGD	Total	
1	0	0	3	0	0	1	0	0	0	0	4	
2	2	1	0	1	0	0	0	0	0	0	4	
3	2	10	3	3	0	1	0	0	0	0	19	
4	0	5	1	1	0	2	0	0	0	0	9	
5	0	5	0	0	0	0	0	0	0	0	5	
6	1	3	1	0	0	0	0	0	0	1	6	
7	1	6	3	1	0	0	0	0	0	0	11	
8	1	3	3	2	0	1	0	0	0	0	10	
9	1	3	1	2	0	0	0	0	0	0	7	
10	1	4	2	2	0	1	0	0	0	0	10	
11	0	1	2	0	0	1	0	0	0	0	4	
12	3	6	0	1	0	1	0	0	0	0	11	
14	1	1	5	2	0	0	0	0	0	0	9	
15	2	1	0	2	0	0	0	0	0	0	5	
16	2	0	0	1	0	1	0	0	0	0	4	
17	1	1	4	2	0	0	0	0	0	0	8	
18	1	7	4	2	0	0	0	0	0	0	14	
19	0	0	3	4	0	0	0	0	0	0	7	
20	1	3	3	0	0	0	0	0	0	0	7	
21	2	5	2	1	1	0	0	0	0	0	11	
22	28	1	4	3	0	3	0	8	0	0	47	
23	14	0	2	1	5	1	0	2	0	0	25	
24	8	1	2	6	1	1	0	2	0	0	21	
25	0	1	2	0	0	0	0	0	0	0	3	
26	1	1	1	0	0	0	0	0	0	0	3	
27	0	0	3	5	0	0	0	0	0	0	8	
Total Per Species	73	69	54	42	7	14	0	12	0	1	272	Total Birds Captured

BRWE: Bridled White-eye, TIMO: Tinian monarch, RUFA: Rufous fantail, MIHO: Micronesian Honeyeater, MIST: Micronesian Starling, COKI: Collared Kingfisher, MAFD: Mariana Fruit dove, OCWB: Orange-cheeked Waxbill, ISCD: Island Collared dove, WTGD: White-throated Ground dove.

Table 2: Species captured by net.

Husbandry

A total of 61 Tinian monarchs and 54 bridled white-eyes were brought into captivity for translocation. Six additional bridled white-eyes were brought into captivity for transfer to the Guam Zoo. After birds were captured in the field, they were taken within 2 hours back to the climate controlled bird holding room at the Lorilynn Hotel on Tinian. The Tinian monarchs were housed singly in individual holding cages while the bridled white-eyes were housed as pairs. All birds were given a full health assessment after their first day of capture by MAC team veterinary staff (Drs. Sandy Wilson, Joe Smith, and Deidre Fontenot) Basic biological data were taken on each bird: capture weight, body condition index, fat stores, wing cord, tail length, and tarsus length. Weights were taken each day on all monarchs in order to ascertain health status. Fecal samples were taken on all birds to determine potential parasite loads. All birds were banded with a numbered aluminum leg band and a unique combination of three color bands to allow for identification in the field during future CNMI DFW surveys.

Tinian monarchs have always been a challenge to bring into captivity. Our MAC management protocol for monarchs require that each bird be placed into its own holding box and weights be taken twice a day, early morning and at the end of the day. Weights are one of the best ways of determining the health status of the birds. When birds are first brought into captivity we take a capture weight. The first morning weight is taken the following day. The morning weight is the lowest weight the bird will have during the day and it is the weight that we use to monitor their status. For the 61 birds brought into captivity we had an average weight change of 1.83% increase in weight from their first morning until their last morning. Our maximum weight gain was 11.03% gain and maximum weight loss was -5.31%.

Our husbandry staff also monitored bird activity patterns, food consumption, fecal output to determine health status. For the 61 Tinian monarchs brought into captivity we had two mortalities. Both birds were captured on 23 April 2016. They were both found dead in their holding cage on 24 April. Both birds had consumed food and did not show any outward signs of illness. Preliminary necropsy indicated that the birds were in good health and probably died from stress related issues. After these two mortalities, it was decided to release any bird that did not show signs of thriving in captivity. We eventually release 2 more birds after one day in captivity, 2 birds after three days in captivity, and 1 bird prior to translocation because it was surplus to our translocation goal. We ended up with 54 birds, which was our target number for translocation.

The bridled white-eyes were placed two birds to a holding box. A capture weight was taken when they were first brought into captivity and the day before release, but daily weights were not taken. We found the average weight change for all of the bridled white-eyes was an average loss of 1.9% body weight, with a maximum weight gain of 6.0% and maximum weight loss of 13.0%. All of the white-eyes did well in captivity and six birds that were surplus to our goals were released back at their trap site. A total of 48 birds were translocated to Guguan.

Translocation

The CNMI Division of Fish and Wildlife was able to contract the Super Emerald, a 64 ft Coast Guard approved vessel, to transport birds and staff out to the Northern Islands for this year's translocation effort. DFW and PBC staff were able to review the Super Emerald prior to translocation to identify how we would be able to best manage the birds during their transport to Guguan. An isolated area in the bow was determined to be the best location to house the birds during the trip, and the area was modified by the boat owner so MAC team members would be able to secure the bird crates during transport.

On 3 May, 17 crates of birds (54 TIMO and 48 BRWE) were transported to Guguan along with 20 members of DFW staff and 4 MAC team members (Joe Smith, DVM, Hannah Bailey, Scott Newland, and Chris Johnson). The overnight trip to Guguan took approximately 13 hours. When the Super Emerald reached Guguan it anchored about 100 m off shore and a small crew headed to the island via small skiff to make preparations for the birds. DFW staff cut a trail up to the release site which was approximately 100 m for the beach landing area. Once the trail was ready, the birds were transported to the beach. Hannah Bailey remained on the boat to oversee the transfer of birds from the Super Emerald to the skiff. Scott Newland received the birds from the skiff and organized getting the crates strapped to modified metal pack frames that were used to transport the crates up to the release site. Two to three crates were placed onto the frames and then Chris Johnson and DFW staff carried them to the release site where Joe Smith removed them from the pack frames and stationed them for release. Dr. Smith checked all of the birds to ensure that they still healthy after their trip from Tinian. All of the bird crates were placed under the trees in the shade and allowed to settle for a short while before release. After the acclimation time, the 102 total birds were released. All of the birds seemed to be healthy and happy to be out of their transport boxes and now in the wilds of Guguan.

Supplemental Objectives

3. Meet with conservation partners on Saipan to review MIRADI (Conservation Evaluation Process, miradi.org) and identify how PBC can better assist CNMI in community conservation education.
    a. On 6 May DAK staff (Leanne Blinco and Deidre Fontenot, DVM) organized a meeting with a number of our conservation partners. The purpose of this meeting was to review the MIRADI process that the MAC Program is aiming to implement. MIRADI is an Adaptive Management Software for Conservation Management. MIRADI is a five step process : 1. Conceptualize, define scope of project, 2. Plan Actions and Monitoring program, 3. Implement Actions and Monitoring program, 4. Analyze, Use and Adapt, 5. Capture and Share Learning. This is a management cycle that feeds back into its self and allows you to adapt and change so you can maximize your conservation impacts.
    b. PBC is working to identify how we can best fit into DFW conservation efforts and best use our resources to assist with CNMI conservation.

4. Provide Tinian Elementary School with a presentation on the MAC program and how CNMI DFW is preserving their native avifauna from the potential introduction of the Brown tree snake.
    a. On 28 April MAC staff were able to conduct two one hour presentations at the Tinian Elementary School for K-6 grades (Figure 4). The presentations were done in the school cafeteria which was able to hold approximately 150 students per presentation. With funding from the Disney Conservation Fund, PBC was able to purchase a laptop computer, projector and screen. The introduction of our presentation was done by Josh Minor from Toledo Zoo. Josh is part of the Toledo Zoo Education Department and he is well versed in talking to children and getting them excited about conservation issues. After our introduction we played a short documentary film (youtu.be/vTXmgvmD9so) developed by Toledo Zoo on Pacific Bird Conservation and the role the MAC Program plays to assist CNMI in their avian conservation efforts. After the film was completed Fields Falcone (Memphis Zoo), Ellen Gorrell (Toledo Zoo), and Steve Howard (Houston Zoo) put on a skit that showed the students how birds were caught and eventually transported to their new home on Guguan. They used a mist net, bird holding box, and a transport container as props to let the kids understand how we accomplished our work. When we finished our presentation we were able to give each child a bird card with information about the unique species found on their island. The children really seemed to respond to this

presentation and showed a lot of excitement about what we were doing. It became apparent that many of the kids were impacted by the presentation as several parents introduced themselves to us at a festival later in the week and commented that their kids came home and would not stop talking about what they had learned in school that day. It was heartwarming to see many of the kids who had come to this presentation, would later wave and smile at us whenever they saw us in town.

Figure 4: MAC Education Team 2016: Fields Falcone, Steve Howard, Ellen Gorrell, Josh Minor; Tinian, CNMI.

5. Support two local interns to participate in field work on Tinian.
    a. We have previously tried to arrange to have our interns work with the MAC Program for the entire project, but because it was scheduled in April while university was still in session, students were only able to come for a weekend between classes. Two students flew over to Tinian on Friday and then departed late Sunday. Shirley Taitano and Jolly Ann Cruz interned from 22-24 April. They were able to participate in all aspects of our work and were learned how to set up mist nets, remove birds from nets, and care for them in captivity.

6. Collect fecal samples from captive TIMO for Disney's Animal Kingdom to study stress hormones.
    a. DAK has been conducting a multi-year study of the stress hormone cortisol in CNMI birds since 2011. We are hoping to use these data to better understand the effects our management systems have on avian stress.

7. Assist Guam Zoo in collecting 4 bridled white-eyes and 4 rufous fantails for public exhibition on Guam.
    a. Six white-eyes were caught and held in quarantine for seven days prior to shipment to Guam where they arrived in good health. We had planned to acquire rufous fantails, but with the equipment available to us on Tinian this year we would not have been able to capture the required amount of flies to feed fantails until they could be acclimatized to captive, sedentary diets. It was determined that we would postpone the capture on fantails until 2017 when we will be collecting fantails for translocation to Guguan and we will be set up for this species.

2016 MAC Field Teams

Tinian MAC Team 2016 (PBC and zoo staff): Collected birds and assisted with translocation.

Guguan MAC 2016 Team (DFW staff): Translocated birds to Guguan and carried out field surveys.

MAC 2016 Project Support and Funding

Major contributor: CNMI Department of Land and Natural Resources

Disney Conservation Fund grant awarded for MAC 2016: $24,700

Contributing/Participating Zoos:
Aquarium of the Pacific
Arizona Center for Nature Conservation
Audubon Commission
Disney's Animal Kingdom
Fort Wayne Children's Zoo
Honolulu Zoo
Houston Zoo
Memphis Zoo
National Aviary
North Carolina Zoo
Saint Louis Zoo
Sedgwick County Zoo
Toledo Zoo