



GOONEY GAZETTE II

Friends of Midway Atoll NWR

Summer 2017 Edition

GOONEY GAZETTE II

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There is more to those turquoise waters of Midway Atoll's lagoon than meets the eye. Join researchers and scientists from NPS and NOAA as they survey Midway's marine environment and search for remnants of the past.

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Commemorated across the country, from Washington, D.C., to Midway Atoll, the 75th Anniversary was both a monumental event and a heartfelt tribute to those who have served and sacrificed.

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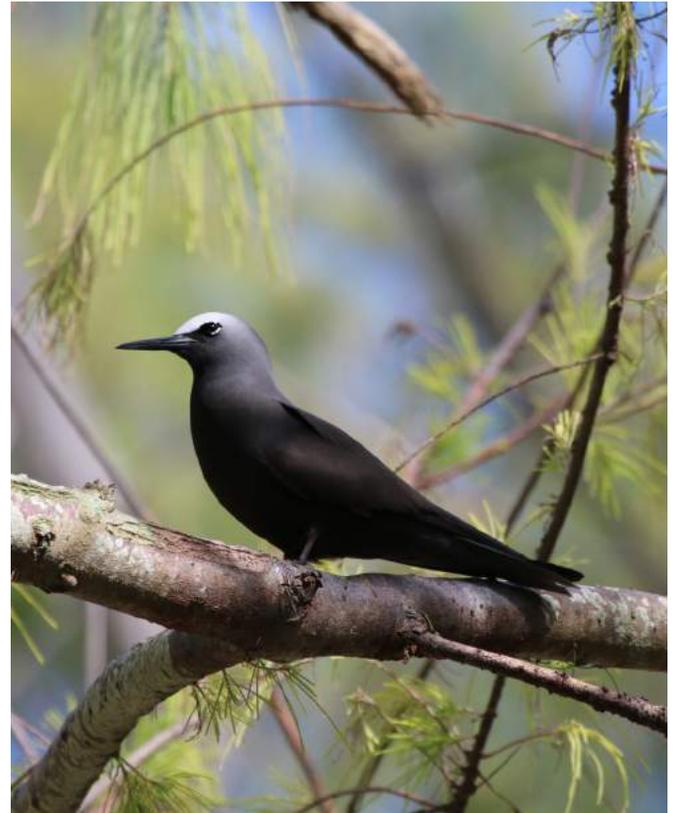
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Friends of Midway Atoll NWR (FOMA)

Battle of Midway National Memorial

Our Mission: "To support Midway Atoll National Wildlife Refuge / Battle of Midway National Memorial in its efforts to preserve, protect, and restore the biological diversity and historic resources of Midway Atoll, while providing opportunity for wildlife-dependent recreation, education, cultural experiences, and scientific research."

FRONT COVER: U.S. Navy Musician 1st Class Brandon Barbee plays "Taps" during a wreath laying at the WWII and Battle of Midway memorials on Midway Atoll's Parade Field. In the background are thousands of Laysan Albatross (*Phoebastria immutabilis*) chicks on the verge of fledging. Photo credit: USFWS.

Friends of Midway Atoll NWR

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Treasurer: Jon d'Alessio

Secretary: Michael Logan

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Barry Christenson

Helen Dunlap

Fern Duvall

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Rob Shallenberger

VISION

Friends of Midway Atoll National Wildlife Refuge plays a pivotal role in the conservation and restoration of Midway's natural and historic resources through financial and volunteer support, dynamic outreach and education, effective advocacy in the support of Refuge programs, assistance in the development of an inspirational visitor program, and productive collaboration with diverse partners.

VALUES

- Focus on highest priority actions
- Be a voice for our members
- Share science-based information
- Operate with integrity
- Be accountable with our actions and resources

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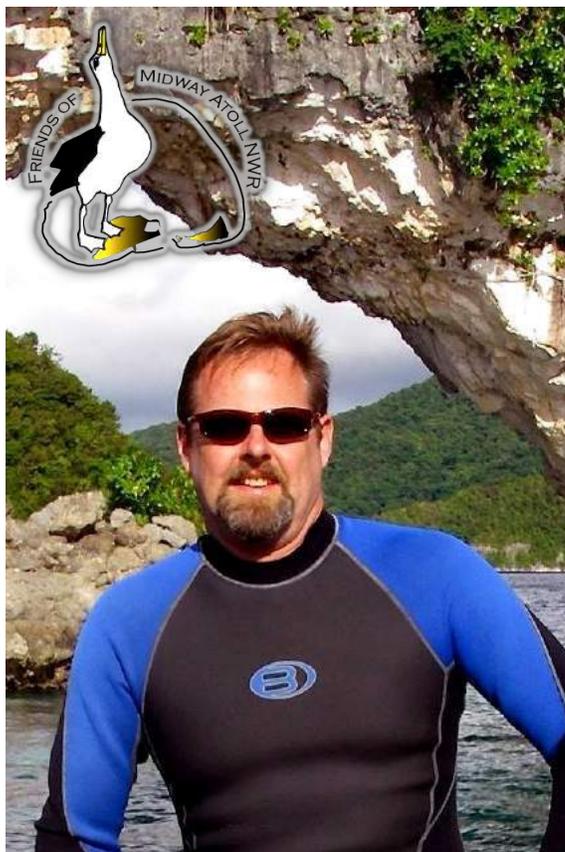
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Top right: White Tern, Rob Shallenberger. Bottom right: Eastern Island, Dan Clark/USFWS.

FROM THE PRESIDENT

Aloha Friends,
I am happy to present to you the 2017 Summer Edition of the *Gooney Gazette II*. This edition comes on the heels of the Battle of Midway 75th anniversary commemoration that was held at Midway Atoll National Wildlife Refuge and Battle of Midway National Memorial and livestreamed at many satellite locations across the country. The U. S. Fish and Wildlife Service and the U.S. Navy had the honor to host two Battle of Midway U.S. Marine Corps veterans at Midway Atoll NWR—retired Col. John F. Miniclier and retired Sgt. 1st Class Edgar R. Fox (who ultimately retired from the Army). Both Col. Miniclier and Sgt. Fox attended with their daughters, and all had also attended the Battle of Midway 70th anniversary commemoration (the first time either veteran had returned to Midway Atoll since 1942). FOMA board members were also in attendance on Midway Atoll NWR and at events in Hawai'i (Honolulu, Hilo) and Washington, D.C.

This commemoration provides us all with time to reflect on—as the U.S. Navy planning order states—“the core attributes of toughness, initiative, accountability, and integrity of American Sailors and Navy civilians who contributed to success at Midway and throughout World War II.” Due to the courageous sacrifices that these servicemen made, Midway Atoll NWR stands today as the peaceful and tranquil National Memorial to the United States' most historically significant naval victory that forever changed the tide of the war in the Pacific. I hope that you all were able to participate in the various commemoration events of the Battle of Midway 75th anniversary.

As you read through these pages, please take time to reflect on the valiant history of Midway Atoll. Remember—no matter how the physical structures on the atoll have changed over time, the grounds and waters of Midway Atoll will always be sacred and significant. Moreover, with an eye to the future, these same grounds and waters will continue to inspire new generations of Americans through the history they memorialize.

With deep gratitude,

Wayne Sentman, FOMA President (Midway Atoll Resident 1998–2002)

Sunken Heritage

Exploring the Underwater Relics of the Battle of Midway



By Bert Ho¹ and Kelly Keogh²

¹Senior Archeologist, National Park Service – Submerged Resources Center

²PhD, Maritime Heritage Coordinator/Maritime Archaeologist, NOAA – Papahānaumokuākea Marine National Monument

In May of 2017, the National Oceanic and Atmospheric Administration (NOAA) and National Park Service (NPS) conducted an exploratory project to attempt to discover sunken aircraft from the Battle of Midway. Archeologists from the NPS's Submerged Resources Center and Papahānaumokuākea Marine National Monument (PNMN), along with invasive species biologists, designed a project to survey the atoll's waters with a marine magnetometer and visually investigate any magnetic anomalies it detected. This was a large task to undertake in a very remote location, but the team took on the challenge despite the cold temperatures and chilly water.

On a previous research project in 2012 aboard the NOAA Ship *Hi'ialakai*, Dr. Kelly Keogh and Bert Ho spent some time at Midway Atoll NWR documenting a newly discovered F2A Brewster Buffalo in the eastern edge of the lagoon. A large bent propeller, 50-caliber Browning machine guns, and debris from the plane scattering the seafloor sparked our curiosity to know if other planes were underwater as well. We conducted some magnetometer surveys around the atoll, but with little time (day and a half) and difficult sea conditions, the survey for more planes was limited.

As we returned to Oahu on the ship in 2012, we began to brainstorm ways to acquire grant funding to support a longer research project dedicated to locating other sunken aircraft. The Battle of Midway is too significant and sacrifices were too great to simply allow for a couple days of work every other year to be considered enough for locating, documenting, and interpreting the resources. For us at the National Park Service, we manage and interpret several significant WWII locations and resources, like the USS *Arizona* Memorial in Pearl Harbor, the War in the

Pacific National Historical Park in Guam, American Memorial Park in Saipan, and the Aleutian World War II historical park in Alaska. Midway Atoll, and what occurred there 75 years ago, is part of the story of the Pacific front, and we as NPS archeologists and photographers, bringing that piece of the story to enrich the stories told at other historical parks is part of our mission. That mission is no different for the maritime heritage managers at the marine monument, and anything submerged related to the maritime history of the Hawaiian Islands is also significant to the greater story of the entire island chain.

With a generous grant from NOAA's Office of Ocean Exploration and Research, that mission was finally within reach. Logistics for conducting marine operations inside and outside the lagoon at Midway Atoll NWR are complicated, and now with three federal agencies partnering (USFWS being the third), the paperwork alone could make a gooney bird's head spin! We definitely set out to work and planned for most of our gear to be shipped up on the atoll's supply barge. SCUBA cylinders, dive gear, generators, two magnetometers, tow cables, an air compressor, a backup air compressor, multiple camera systems, and all the smaller supplies needed for the biology and archaeology to occur. It all arrived safely to Midway Atoll NWR, and we followed shortly after on May 2nd.

Our method for discovery was to collect magnetometer data in as many of the pre-planned survey blocks as possible. These survey blocks were

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Top: An archeologist assesses the site of an F4U Corsair wrecked outside the lagoon and discovered in 1976 by the U.S. Navy. Photo credit: NPS/Brett Seymour.

(continued from page 4) defined by witness accounts during the battle of where planes went down on the water, and from archival information gathered from various military records. We chose a magnetometer because it is effective in detecting ferrous (iron) material culture in marine environments where coral growth and reefs are in abundance. Magnetometers operate by constantly detecting the earth's magnetic field, and anything ferrous causes deviations in that field. These deviations are recorded and after processing the data, we are able to map the anomaly locations, load them into a GPS, and then dive on their locations to identify the anomaly.

For a week and a half our six-person team split onto two small FWS boats. The larger 33-foot safe boat conducted the marine magnetometer surveys with two people on board, and the smaller safe boat conducted dive operations on anomalies with a four-person crew. Each day we all participated in a daily operations briefing at 7:30 a.m. at the snorkel shed, and then we departed on our boats for our work areas. Generally the conditions were not that bad, except for the wind, cooler air temperatures, and surprisingly cold water temps (65 degrees!). Strong winds mostly restricted us to working survey blocks inside the lagoon, but we were able to complete all the survey blocks inside and outside, as well as a larger block created in the middle of the lagoon.

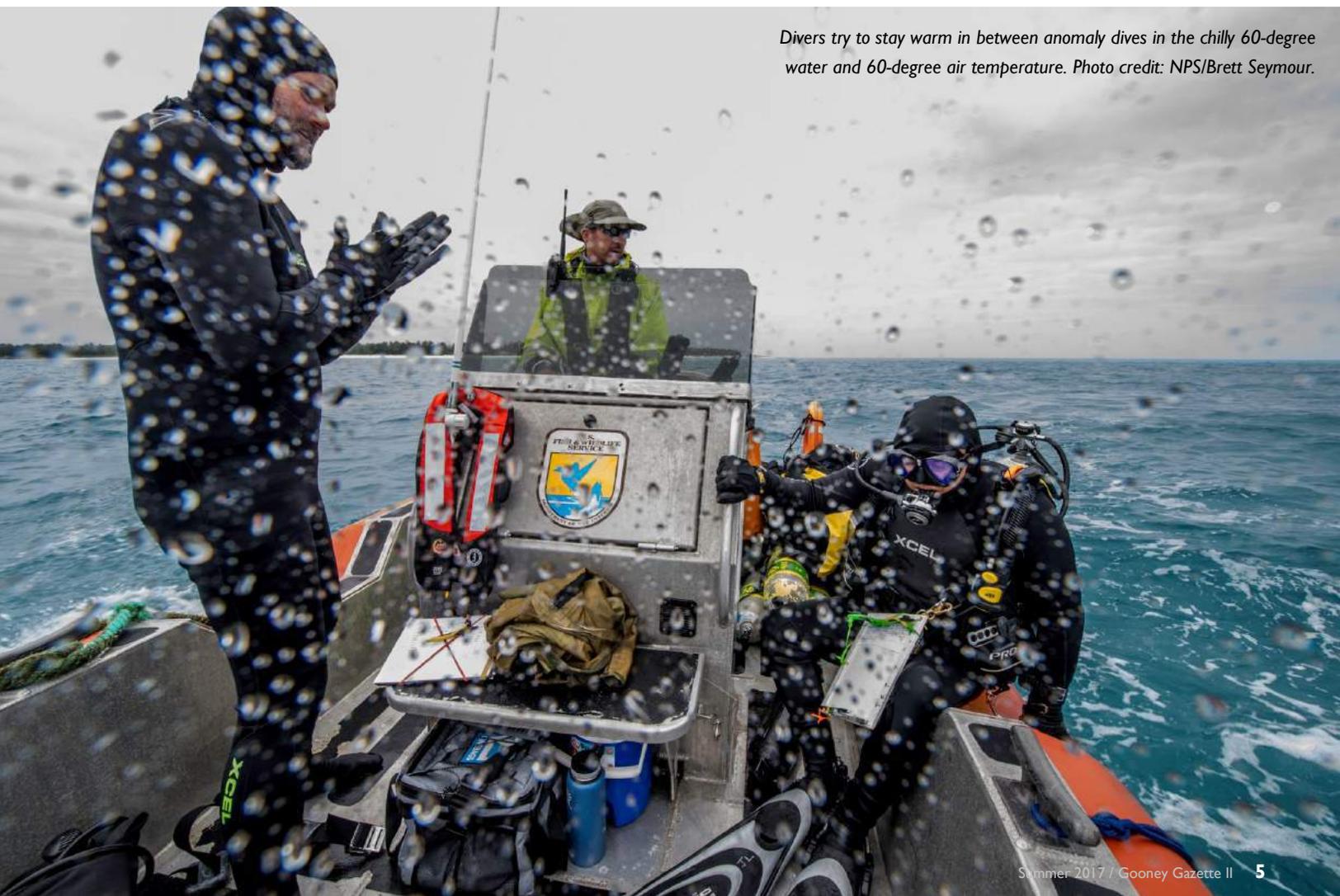
Over 200 linear nautical miles were surveyed (survey speeds are at 4-6 knots), 102 anomalies were investigated, and 86 of those investigated were positive for material culture. Now, before anyone gets too excited about the findings, you must remember that Midway Atoll was occupied for several decades by the military. Nearly 5,000 people lived on Midway Atoll

at one point! With all those people over several decades, a lot of trash gets created, and undoubtedly some of it has ended up in the lagoon. Actually a lot of it has!

We found all sorts of twisted metal, i-beams from fallen channel markers, caches of hundreds of beer bottles, oil cans, braided cable, pipes, and communication cables that just kept going and going. However, between finding these things left by some of Midway Atoll's previous residents, we also found evidence of Midway Atoll's place in maritime history. Twelve anchors were found ranging from late 19th century admiralty anchors stuck on the outside of the atoll's fringe reef, to several 20th century Navy anchors in the lagoon. It is all incredibly fascinating from a maritime archeologist's perspective because it truly speaks to the fact that Midway was a known island long before the telegraph company came in 1903, and half a lifetime before the battle in 1942. It had a safe, deep-water harbor, and was well known for its abundant natural resources.

These were all incredibly interesting to find, but alas, they were not what we were looking for as far as cultural resources were concerned. However, the other half of our project team was very successful in finding what they were looking for, except finding invasive species where you hope not to find them is not exactly a good thing. Marine biologists from PMNM were tasked with investigating the cultural findings for four types of invasives that are "biofouling" organisms. These types of organisms generally attach themselves to wood, metal, or concrete in marine environments and can easily be transported by a ship's hull. As part of the remediation process for these types of invasive species, the PMNM team routinely inspects every ship that will be transiting to or through the

(continue on page 6)



Divers try to stay warm in between anomaly dives in the chilly 60-degree water and 60-degree air temperature. Photo credit: NPS/Brett Seymour.

(continued from page 5) recently expanded marine monument. The four target species sought on this project are *Zoobotryon venticillatum*, *Pennaria disticha*, *Crellaspinulata*, and *Sabellestarte spectabilis*. Sadly three of the four were identified in the atoll or the surrounding waters, but the most prevalent species, *Zoobotryon venticillatum*, is also the least detrimental to the habitat.

With all these findings, I am sure you are wondering whether or not we actually found any airplanes or parts of planes. Our quick answer is yes, we believe we did. A newly located plane engine that has tentatively been identified as a Pratt and Whitney Twin Wasp engine was documented and modeled with photogrammetry. These engines were used in a wide variety of planes. One of them was flown at Midway Atoll with this Twin Wasp engine was the F4U Corsair. However, in the Battle of Midway, Corsairs were not available yet, as the first delivery of them was not until October of 1942. Another find conveniently located on the last day of dive operations is believed to be a portion of a radial engine. We are still examining the images and photogrammetry models of the artifact, and hope to be able to source it to the type of plane and possibly the pilot who flew it last. This will take some time and hours of archival research, but we hope to be able to tell the story of the plane and pilot soon.

Midway Atoll, as you all are aware, is a very special place. Its significance in the history of our country is unparalleled, and the natural beauty and resources in abundance there today are also unique in the world. For us, what made our project extra special was interacting with the dedicated people that are the caretakers of the islands, the scientists studying and protecting the birds, and the volunteers who give their time to make

Midway Atoll NWR a little better. Midway Atoll's size and remoteness quickly reminds you of how small you are in this great big world, but the community that lives there full-time quickly welcomes you and their helpfulness makes you realize that you are not alone. Thank you again to all those at Midway Atoll NWR that made our stay so memorable, including the birds! 📷

Now that you're hooked on our research, you can learn even more on our interactive website, with more expedition stories, the *Okeanos Atlas*, exploration videos and much more:

<http://oceanexplorer.noaa.gov/explorations/17midway/welcome.html>.



Top: Diver assesses the site of the F2A Brewster Buffalo located and documented in 2012.

Bottom: Diver documents an invasive species growing on modern debris on the lagoon floor.

Photo credits: NPS/Brett Seymour.



Diver documents a large admiralty anchor stuck into the reef. Photo credit: NPS/Brett Seymour.



Remembering Midway

Near and Far

By Ann Bell, FOMA Board Member

To honor the courage, bravery, and sacrifice of those who fought in the Battle of Midway from June 4th to 6th in 1942, board members with the Friends of Midway Atoll NWR were literally on deck at certain key sites on June 5th as the 75th Anniversary commemoration of the Battle was live-streamed to the National Naval Memorial in Washington D.C., the USS Midway Museum in San Diego and the USS Arizona Memorial in Honolulu. Four FOMA volunteers landed on Midway Atoll NWR days in advance to help showcase to the world the men who defended Midway Atoll by land and sea during a decisive World War II battle. If not for them, the Battle of Midway National Memorial might not exist today.

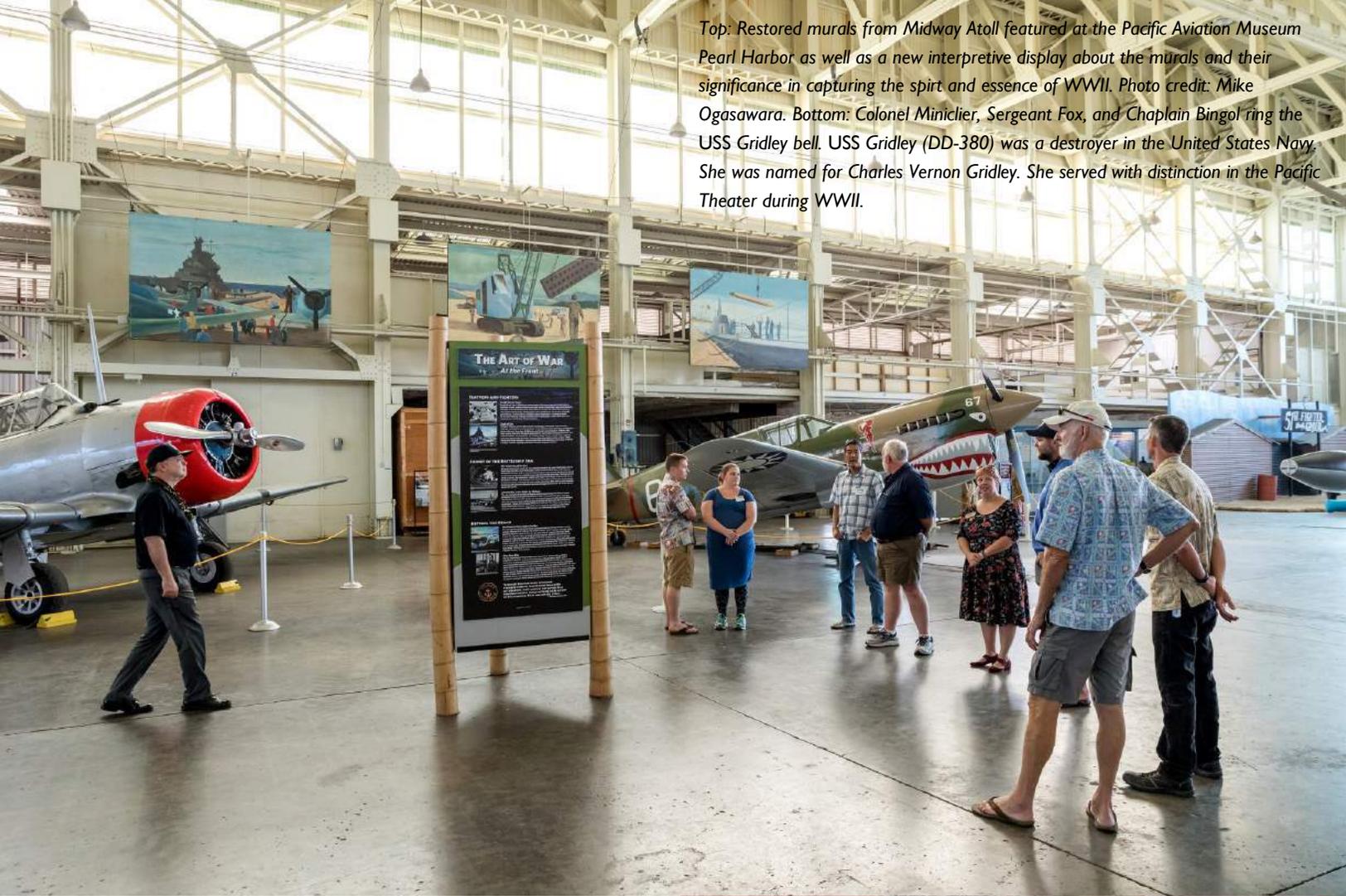
Prior to June 5th, FOMA board members Teya Penniman and Ann Bell met in Honolulu to help support U.S. Fish and Wildlife Service efforts in a series of commemorative events hosted by the Pacific Aviation Museum, Papahānaumokuākea Marine National Monument, and the U.S. Navy. During these events and the June 5th ceremony, Teya and Ann presented to VIPs a canvas swag bag and t-shirt sporting a 75th Anniversary of the Battle of Midway FOMA logo, designed by Katerina Paleckova.

Spending time with the honorary Battle of Midway veterans—Sergeant Edgar Fox and Colonel Miniclier—was at the top of the list of memorable duties at the Pacific Aviation Museum 75th Anniversary of the Battle of Midway symposium held on June 1st through the 2nd. Accompanied by their daughters, both veterans arrived in Honolulu at the end of May and—thanks to FOMA—were treated to first-class seating during their transit from Missouri and Florida, respectively.

The symposium featured fascinating presentations by military historians, who knew the tiniest of battle details and shed light on myths surrounding significant events both from the Japanese as well as American perspective. A reception the evening of June 1st was hosted by the Pacific Aviation Museum on behalf of Papahānaumokuākea Marine National Monument partners who honored the Battle of Midway veterans and celebrated their agencies and the Museum working together to provide for public viewing of new Battle of Midway displays. One of the interpretive panels highlights the story behind each scene depicted on painted murals that once decorated the walls of the theatre on Midway Atoll. Thanks in part to funds provided by the Friends of Midway Atoll NWR, all six original mid-1940s murals were hung last year from rafters of the Museum's historic WWII hangar.

During the early morning of June 5th, a formal ceremony led by the USFWS in partnership with the U.S. Navy and the National Park Service was held at the Valor in the Pacific National Monument on the grounds of the USS Arizona Memorial. The ceremony featured remarks from Rear Admiral Andrew Singer (U.S. Navy, retired) who is now Deputy Director for Intelligence U.S. Pacific Command; USFWS Pacific Regional Director Robyn Thorson; and World War II Valor in the Pacific National Monument Superintendent Jacqueline Ashwell. This beautiful and solemn occasion ended with a presentation of a 75th Anniversary of the Battle of Midway wreath that was ceremonially placed at the wall listing the names of those lost on December 7th, 1941 at the USS Arizona Memorial. *(continue on page 9)*

Top: Restored murals from Midway Atoll featured at the Pacific Aviation Museum Pearl Harbor as well as a new interpretive display about the murals and their significance in capturing the spirit and essence of WWII. Photo credit: Mike Ogasawara. Bottom: Colonel Miniclier, Sergeant Fox, and Chaplain Bingol ring the USS Gridley bell. USS Gridley (DD-380) was a destroyer in the United States Navy. She was named for Charles Vernon Gridley. She served with distinction in the Pacific Theater during WWII.



(continued from page 8) The personal connections made on behalf of FOMA should help pave the way for an awareness of the spectacular resources and gifts that are intrinsic to a coral atoll and the newly expanded protections to the entire battle site now within the Papahānaumokuākea Marine National Monument. 📧

Learn more about the Battle of Midway 75th Anniversary

- Watch the Battle of Midway Commemorative film here: <https://www.youtube.com/watch?v=un9y70Dw9Rc&feature=youtu.be>.
- Miss the 75th commemoration ceremony? Watch it here: <https://www.dvidshub.net/video/529537/75th-anniversary-battle-midway>. To learn more about the 75th Anniversary Commemoration, visit the following link: <http://midway75.org/>.
- For more coverage of the 75th ceremonies on Midway Atoll NWR and Honolulu, Hawai'i, check out the USFWS's Flickr account here: <https://www.flickr.com/photos/usfwspacific/sets/72157682607185840>.
- FOMA interviewed Colonel Miniclier and created a short documentary clip of his accounts on Midway Atoll during the Battle of the Midway. You can view this video at the following link: <https://www.youtube.com/watch?v=GAmD00QHE4Q>.





Commemoration Reflections

By Barry Christenson, FOMA Board Member
 Additional info by Helen Dunlap and Wieteke Holthuijzen

After my elation at being selected to represent FOMA at the Battle of Midway (BOM) 75th Anniversary commemoration on Midway Atoll NWR, I was reminded of previous BOM events that I was lucky to have attended. I served as Refuge Manager on Midway Atoll NWR for over three years, from 2005 to 2008. In that time, the U.S. Fish and Wildlife Service (USFWS) hosted three BOM events, and since leaving Midway Atoll NWR, I have been fortunate to return as a volunteer for the 70th and 75th Anniversaries. Each of those events was unique and very special in its own way.

On June 5th, 2005, I began the day describing the approaching Sand Island from the bridge of the cruise ship *Pacific Princess* to 800 excited Midway Atoll visitors as we ended our 2½ day cruise from Honolulu, Hawai'i. The *Princess* was touring World War II Pacific battlefields and Midway Atoll was their first stop. Awaiting us was a team of USFWS staff and volunteers who spent the day interpreting Midway Atoll's history and natural resources to the enthusiastic visitors. Our visitors left after a full day of touring the island with a better appreciation of the Battle and Midway's amazing wildlife resources.

In 2007, more than 2,000 visitors (who arrived via cruise ship and multiple planes) observed the 65th Anniversary of the World War II Battle. Speakers included Secretary of Interior, Dirk Kempthorne; Assistant Secretary of the Navy, B.J. Penn; Governor of Hawai'i, Linda Lingle; and Commander, U.S. Pacific Fleet Admiral Robert F. Willard; and International Midway Memorial Foundation (IMMF) President, Dr. James M. D'Angelo. To properly handle that many visitors, the USFWS brought out a large team including many from the National Park Service. It was an incredible day for everyone, highlighted by the half-dozen BOM veterans who were

hosted by the U.S. Navy. What a day indeed—after the event, North Beach looked more like Waikiki than Midway!

The 66th Anniversary was marked by a visit from a small group of WWII focused visitors who again gained a sense of the wonder of Midway—both historical and biological. Only a small ceremony marked the event, but any visit to Midway Atoll is special.

My next BOM experience was as a volunteer when I returned to help prepare the island for another great commemoration, the 70th Anniversary. Once again, the USFWS and U.S. Navy worked together to produce a memorable event that was highlighted by the return to Midway Atoll of two former BOM Marine privates: retired Colonel John F. Miniclier, USMC, and Sergeant Edgar Fox. Watching them remember the past and experience the present on Midway Atoll was a magical experience I thought could not be topped. Talking to them brought Midway Atoll's past closer to all of us who have been lucky enough to work on or visit this wonderful place.

As June 5th, 2017, approached, I found myself wondering how this year's commemoration would compare to those past. I knew it would be smaller, but a larger size does not dictate success. And I knew that the U.S. Navy was fully on board, which has always been a critical component for a successful day. Equally important, I knew that the USFWS was determined that this Anniversary would be larger in scope and much farther reaching because of the use of modern technology. And most exciting of all, Colonel Miniclier and Sergeant Fox were going to return once again to share their memories of this crucial battle against the Japanese 75 years ago. Prior to the arrival of the WWII veterans and *(continue on page 12)*



(continued from page 11) various visiting dignitaries and guests, 4 FOMA board members (including Rob Shallenberger, Helen Dunlap, and Wieteke Holthuijzen) joined representatives of USFWS and U.S. Navy to prepare for the 75th Commemoration. Designed with a smaller ceremonial footprint on Midway Atoll NWR, the overall scope of the 75th Celebration was actually larger than any previous anniversary event. Simultaneous events were held at USS *Midway* in San Diego, CA; the National WWII Museum in New Orleans, LA; the National Naval Aviation Museum in Pensacola, FL; the National Naval Memorial in Washington, D.C.; the Mokupāpapa Discovery Center in Hilo, HI; the WWII Valor in the Pacific National Monument, in Honolulu, HI; and the Patriots Point Naval & Maritime Museum in Charleston Harbor, SC. Quite a spread!

About 12 minutes of the 40-minute Midway Atoll ceremony were live-streamed to those locations with the whole event featuring Miniclier and Fox; Rear Adm. (Ret.) Samuel Cox, Director, Naval History and Heritage Command; Jim Kurth, Acting Director, U.S. Fish and Wildlife Service; Cynthia Martinez, Chief, National Wildlife Refuge System; and the USFWS Honor Guard and U.S. Navy soloists. It was a moving ceremony attended by everyone on Midway Atoll NWR. The remainder of the morning was passed with tours of Sand and Eastern islands to explore the atoll's historical and biological heritage.

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Previous page: U.S. Navy Musician 1st Class Brandon Barbee plays "Taps" during a wreath laying at the WWII and Battle of Midway memorials on Midway Atoll's Parade Field. Photo credit: USFWS.

Current page, top: The early morning ceremony honored the many veterans whose determination and sacrifice led to the U.S. and allied forces winning the war in the Pacific. From left to right, Marine Corps Colonel (Ret.) John Miniclier, Navy Chief Sonar Technician – Submarine Justin Culbertson, and former Marine Corps Sergeant Edgar Fox observe a moment of silence during the wreath laying ceremony. Photo credit: USFWS.

Bottom: Members of the USFWS Honor Guard provided full honors for the ceremony. Photo credit: USFWS.



(continued from page 12) I was fortunate to accompany Miniclier to Eastern Island while Sergeant Fox toured South Beach on Sand Island. On Eastern, Miniclier wanted to see the runways and that portion of the island close to the south reef where he had spent his second year in charge of search lights while he was on the atoll. During this time I was struck by how, for the first time in many years, the island looked similar to what it would have been in 1942. The invasive ironwood trees (*Casuarina equisetifolia*) and golden crown-beard (*Verbesina encelioides*) no longer dominate the landscape, making it very easy to see the old runways and remaining mounds from the sand berm revetments built to protect aircraft. It was a wonderful tour highlighting this never-to-be-repeated event.

The day's official schedule closed with a FOMA-sponsored reception and picnic near North Beach at Captain Brooks. Refuge Manager Bob Peyton was Master of Ceremonies; FOMA Board Member (and Midway Atoll's first Refuge Manager) Dr. Rob Shallenberger and IMMF President Dr. James M. D'Angelo both shared presentations, reflecting on Midway Atoll's past but also looking to the future. Most importantly, both Colonel Miniclier and Sergeant Fox were honored with flags that were flown at Parade Field on Midway Atoll NWR from December 7th to June 5th and were given special commemorative coins by Dr. D'Angelo. In addition, FOMA presented special 75th anniversary commemorative gifts to all the visiting dignitaries, guests, and ceremony attendees. Beyond these gifts, FOMA took great pride to ensure the presence of both Colonel Miniclier and Sergeant Fox (and their daughters, Peggy Miniclier and Debbie Fox, respectively) at the commemoration by covering their travel expenditures (first class) from their homes to Honolulu and back again. This reception was truly memorable, as we all had the unique opportunity to visit with Colonel Miniclier and Sergeant Fox, sharing their personal insight to the past, honoring their bravery, and remembering the sacrifice of others on this special day.

As commonly occurs with USFWS personnel on Midway Atoll NWR, I went to the island because of the incredible wildlife, but soon became enthralled by the overwhelming sense of history that is still there today. Having read every book about the Battle of Midway that I could find, it was a wonderful opportunity to speak with Admiral Cox (a noted Midway historian) and Dr. D'Angelo about the Battle. Having two Midway experts as well as Colonel Miniclier and Sergeant Fox to talk with about the Battle was an amazing opportunity. As June 5th came to a close, my thoughts turned to the 80th anniversary. Will there be an 80th Battle of Midway Commemoration? The importance of the Battle of Midway and the beauty and wonder of this small atoll will continue to shine in five years and far beyond. ☒

Left: Sergeant Fox (left) and Colonel Miniclier (right) receive flags flown over Midway Atoll during the morning ceremony. Photo credit: USFWS. Below: Sergeant Fox (left) and Colonel Miniclier (right) with all USFWS and Honor Guard members. Photo credit: Rob Shallenberger.



Friends of Midway Atoll Board Members are proud to be part of the Battle of Midway 75th Anniversary Commemoration

Top left: FOMA Board Member Ann Bell reconnects with Colonel Miniclier at the Battle of Midway Symposium in Honolulu. Photo credit: USFWS.
Top right: FOMA Board Members (and both past Refuge Managers of Midway Atoll NWR) Barry Christenson (left) and Rob Shallenberger (right) stand with Colonel Miniclier (far left) and Sergeant Fox (far right) at the Battle of Midway and WWII memorials on Midway Atoll. Photo credit: Helen Dunlap.
Bottom: Kupu/Americorps Invasive Plant Control Specialist (and FOMA Board Member) Wieteke Holthuijzen (right), USFWS Biologist Kelly Goodale, and Rob Shallenberger (FOMA Board Member) lead a tour on Eastern Island with IMMF President Dr. James D'Angelo and his wife Christine D'Angelo following the Battle of Midway ceremony. Standing on top of a revetment constructed to protect aircraft during WWII, Wieteke and Rob discuss efforts to control and eradicate golden crown-beard (*Verbesina encelioides*), a highly invasive plant once widespread across the atoll that caused severe issues for albatross survival and reproductive success. Photo credit: Helen Dunlap.



Returning to a Place I'd Never Been Before

Photos and text by Eric Baker, 2016/2017 Midway Atoll NWR Biology Program Volunteer



It is difficult to relate the experience of living and working on Midway Atoll NWR to someone who has never been here. The long hours spent under an unrelenting sun pulling invasive plant species, carrying a 20-pound spray pack filled with herbicide, and scraping albatross puke off your pants, you are repaid with the sheer joy of holding a newly-hatched chick in your hands, banding your first (or even your hundredth) albatross, and knowing that the 'Ākulikuli (*Sesuvium portulacastrum*) you just planted will help restore the habitat of Midway Atoll NWR.

Getting here isn't easy. The selection process is very competitive; I was one of four volunteers selected out of 63 applicants. That process is very important, because volunteers will work with, live with, and rely upon each other for next six months. My cohorts were the best I could have hoped for. Michelle Smith previously spent a field season working with Hawaiian Monk Seals on remote Laysan Island—another protected island part of the Papahānaumokuākea Marine National Monument, which includes Midway Atoll NWR as well. Beth Wolff had worked as a wildlife biology consultant on a wide variety of projects through out the West. Miki'ala Taylor brought with her a background in Hawaiian culture and

language, and already had native plant experience. I had previous seabird and remote-fieldwork experience, but no habitat restoration background. None of us thought we had the necessary experience.

The first two weeks were intense; learning protocols and trying to memorize an intimidating list of native and invasive plant species in a very short time. Fortunately, then-Refuge Biologist Meg Duhr-Schultz and Volunteer Crew Leader Kristina McOmber were patient mentors, repeating—for the third time—the plant species at which we were looking. Given the importance of proper habitat restoration, the responsibility entrusted to volunteers is significant.

Working on Midway Atoll NWR was, in part, about returning to a place I had never been before. My father was stationed here during World War II so, in a sense, my presence was an extension of his journey I (see the Winter 2016 *Gooney Gazette II*). My “returning” to Midway Atoll NWR completed the circle by allowing me to participate in the restoration of a habitat damaged by politics and war. Where my father had angry wings of aluminum overhead, I had wings of feathers.

Arriving in October—before any albatross have returned to Midway Atoll NWR to breed—it is hard to imagine that, a month later, you will be surrounded by more than a million albatross. The sheer number of birds is impressive, but it is perhaps the affection and devotion that albatross pairs share with one another, through their elaborate courtship dances and gentle preening, which make them so captivating to work with. When fully immersed in a sea of albatross, you became part of their world, and they seem to be as intrigued with you as you are of them. Albatross are, in my opinion, the most endearing of all the seabirds I have worked with.





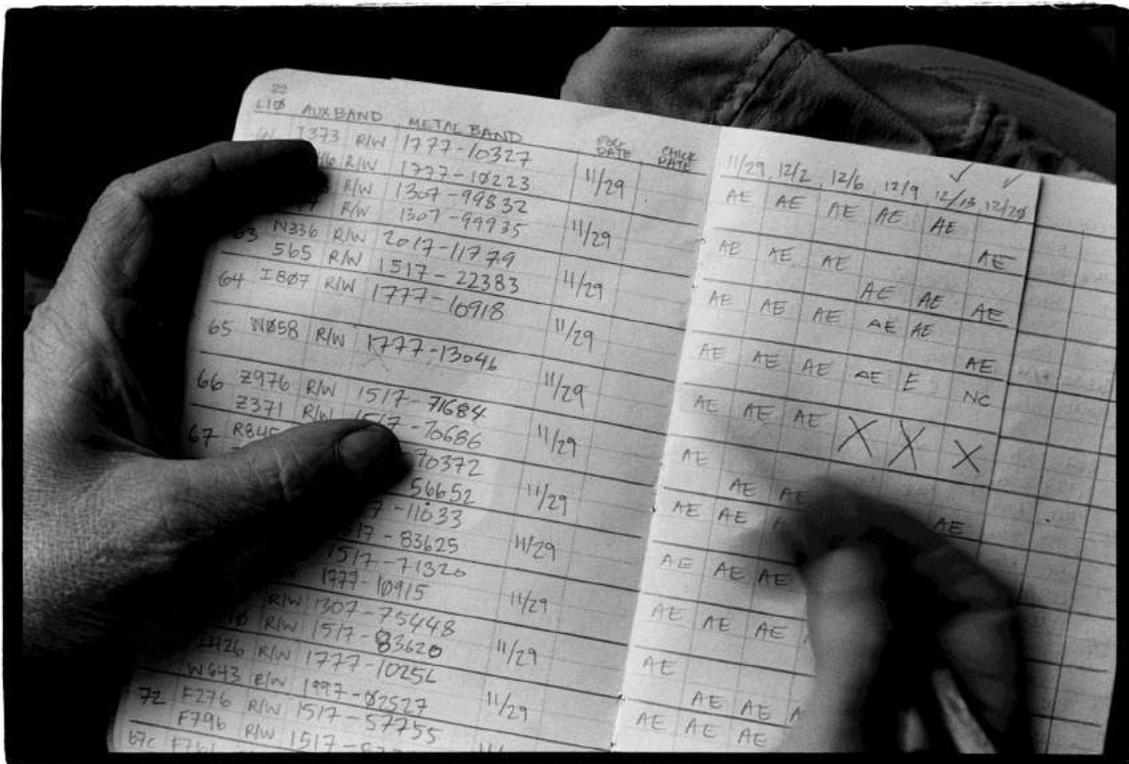
Top: Volunteers Beth Wolff (left) and Michelle Smith (right) replace an aluminum band with a sturdy but lightweight stainless steel one on a Laysan Albatross nearby Charlie Barracks on Sand Island. Aluminum bands are no longer used because the soft metal deforms, can become entangled in fishing line or marine debris, and the band numbers become illegible over time.

Bottom: Individually-numbered stainless steel bands are now used exclusively; they are lightweight, retain their shape, and remain legible for the life of the bird.





Top, from left: Volunteers Miki'ala Taylor, Beth Wolff, Michelle Smith, and Volunteer Crew Leader Kristina McOmber react with excitement at the discovery of a Black-footed Albatross egg as it is pipping—the start of the hatching process.



Bottom: The progress of nesting albatross and their chicks in established plots across Sand Island of Midway Atoll NWR is recorded in detail every few days. These data are vital for monitoring the health of the albatross population on the Refuge.



Biking is the primary way of getting around Midway Atoll NWR. Volunteer Michelle Smith (left) and Volunteer Crew Leader Kristina McOmber (right) head out on a pre-dawn Laysan Duck resighting survey. Flat tires are a common occurrence—then you walk.



Volunteer Crew Leader Kristina McOmber (right) leads volunteers in the collection of 'Ākulikuli cuttings at the Bulky Dump site. Those cuttings were later planted in the Hale Honu Restoration Site by another volunteer crew in late May.



Marine debris is loaded onto a USFWS Safeboat. While most of the debris comes from the fishing industry, the variety of items that wash ashore is endless: liquor bottles (some empty), lighters, toothbrushes—along with a disturbing amount of pharmaceutical items—are commonly removed from the Refuge's beaches. The rare discovery of a glass Japanese fishing float and innumerable variations of plastic childrens toys (which can blossom into vast collections), however, are bright spots in the frequent marine debris cleanups.



Top: A Laysan Albatross chick begs for a meal from its parent.



Bottom: Volunteer Beth Wolff applies a temporary plastic leg band to a Laysan Albatross chick as its parent patiently waits. As the chick grows it will receive a second, larger, temporary leg band, and finally—before fledging—a permanent stainless steel band.



Top: Numbering only a few thousand when the Naval Air Facility was closed in 1993, Bonin Petrels now number an estimated one million birds after successful rat eradication on Midway Atoll NWR in the late 1990s. At dusk, they fill the sky as they return from the sea. The small seabirds elicit a love-hate relationship from nearly everyone. While their antics make them adorable, they burrow everywhere; stepping on and collapsing their burrows while working on the island is inevitable. Protocol dictates that one immediately stop and dig out the burrow to confirm that a petrel is not trapped inside.

Bottom: Volunteer Crew Leader Kristina McOmber (foreground) leads volunteers in the task of checking burrows for petrels in preparation of filling-in the burrows to gain access to an active restoration site. Petrels liberated from their burrows are relocated elsewhere on the Refuge.

Top: Preparing to band an albatross requires a stainless steel band held between the thumb and forefinger, a red plastic auxiliary band around the pinkie, and a pair of banding pliers in hand. Banders work in two-person teams: a “bander,” who applies the bands and a “scribe,” who records the data and shields the bander from the sharp end of the albatross. Nearly all albatross are banded on the nest (rather than picked up and handled, as is the case for most birds). Albatross are such devoted parents that they usually remain glued to their egg and put up little fuss while being banded. The process can take as little as 30 seconds, minimizing disturbance and stress to the bird.

Bottom: The fate of albatross India-seven-eight-four (I784) graphically illustrates how important bands are in tracking the life history of a bird. The bones of I784 (its red auxiliary band still around its femur) were discovered along the south seawall of Sand Island on December 11, 2016. Tracing the band back revealed that I784 was raised in nest 81, Plot L10, which indicates that it was a Laysan Albatross (“L” plots track only the Laysan Albatross within them). Its parents were black auxiliary band L104 (a 15-year-old bird, also hatched in Plot L10) and a red auxiliary band N971 (age unknown). The egg that became I784 was laid December 1, 2014, hatched on January 2, 2015, and I784 was banded on May 11, 2015. I784 fledged and left the plot on July 12, 2015. Since its bones were found the following year, it is likely that I784 never made it off the island. Immature albatross typically spend five years at sea before returning to Midway Atoll NWR to breed; they usually return to a location within a few meters from where they hatched.





Volunteer Miki'ala Taylor makes an early morning check on a Black-footed Albatross chick in Plot B7.



A Black-footed Albatross prepares to regurgitate a meal to its chick—a dark, oily stream of nutritious liquid (partially digested flying fish eggs, squid, and other prey items) that only an albatross chick can appreciate.



Top: Miki'ala Taylor helps rescue albatross from an entrapment hazard. Severe winter storms excavated a deep pit in the sand behind the undersea cable terminus, trapping multiple albatross in it.

Bottom right: Volunteer Michelle Smith participates in an early morning Laysan Duck resighting survey.

Bottom left: Volunteer Beth Wolff works in the greenhouse preparing native plants for future outplanting in habitat restoration sites.



Abandoned naval buildings are entrapment hazards for birds. This Laysan Albatross had wandered into the long-abandoned Delta Barracks, beneath a mural of what can best be described as “The Lady of the Tropicbirds.” It was escorted out. Many buildings are littered with carcasses of birds that did not find a way out.



Rusty Bucket on Sand Island is a prime location for watching sunsets, seen here in a time exposure taken shortly after sundown. The U.S. Navy dumped everything from engine blocks to automobile chassis at this location along North Beach—hence its name.



White Terns are a fixture on Midway Atoll NWR. The small, inquisitive seabirds hover around people wherever they go.



Imprints of two species in the coral sands. ☒



Hands On Learning

Winged Ambassadors and Midway Atoll NWR Boluses Educate Bering Strait School District Staff and Students

By Karen Beranek

Science and Social Studies Facilitator, Bering Strait School District

The innumerable videos of albatross of all stages of development dying from ingestion of plastic abound on the internet. This mute testimony to the problematic presence of plastic in our oceans is quite compelling and serves as a catalyst for awareness, education and change.

These videos represented an issue for me as a curriculum facilitator and teacher coach in the Bering Strait School District. Our students are well aware of the impacts of climate change, but too often see themselves as non-participants in the matter. I was interested in providing background and hands-on activities for these students to enable them to realize their own involvement.

With help from the Winged Ambassadors Project (Oikonos) and Amy Olliffe from USFWS' Education and Outreach Program in Honolulu, Hawai'i, our district was sent 50 albatross boluses to enhance student engagement with this problem. Science teachers and their students love hands-on experience in the classroom, and the units are created with flexibility in mind. They can be adapted to any level of student ability and the videos and questions provide the investigation and reflection that are the hallmarks of good teaching and engaged learning.

One concern was that teachers would implement the dissection piece of Winged Ambassadors before providing adequate background. Thanks to an opportunity provided by the University of Alaska Fairbanks REACH Up educational outreach program, I was able to present an overview and brief experience with dissecting a bolus for 22 teachers from our 15 school sites in the Bering Strait School District and hold a brief, proactive discussion on how the inquiry units might be used and how to circumvent potential issues with classroom use. Teachers were very excited by the possibilities presented—nearly all our schools are coastal communities that not only see many seabirds but also rely on them for subsistence—so the presence of plastic and contamination is a serious matter.

Lon Gillas, one of our science teachers in Stebbins, Alaska, reported that his students were quite excited to learn about the albatross and dissect the bolus. Students related the lab inquiry to ducks and geese that are hunted for subsistence and non-food items that had been found in the stomachs of birds that had been harvested. Students also began researching inventions designed to remove plastic from waterways.

The Bering Strait School District is indebted to Midway Atoll NWR, Oikonos, and USFWS and hopes to continue to work with them in the interests of our students. ☒



Students in Stebbins, Alaska, dissect albatross bolus after working through *Winged Ambassadors*.



Students in Mr. Gillas' science class in Stebbins, Alaska divide up items found in an albatross bolus. Stebbins is a coastal community that relies on sea birds, fish and mammals for subsistence.

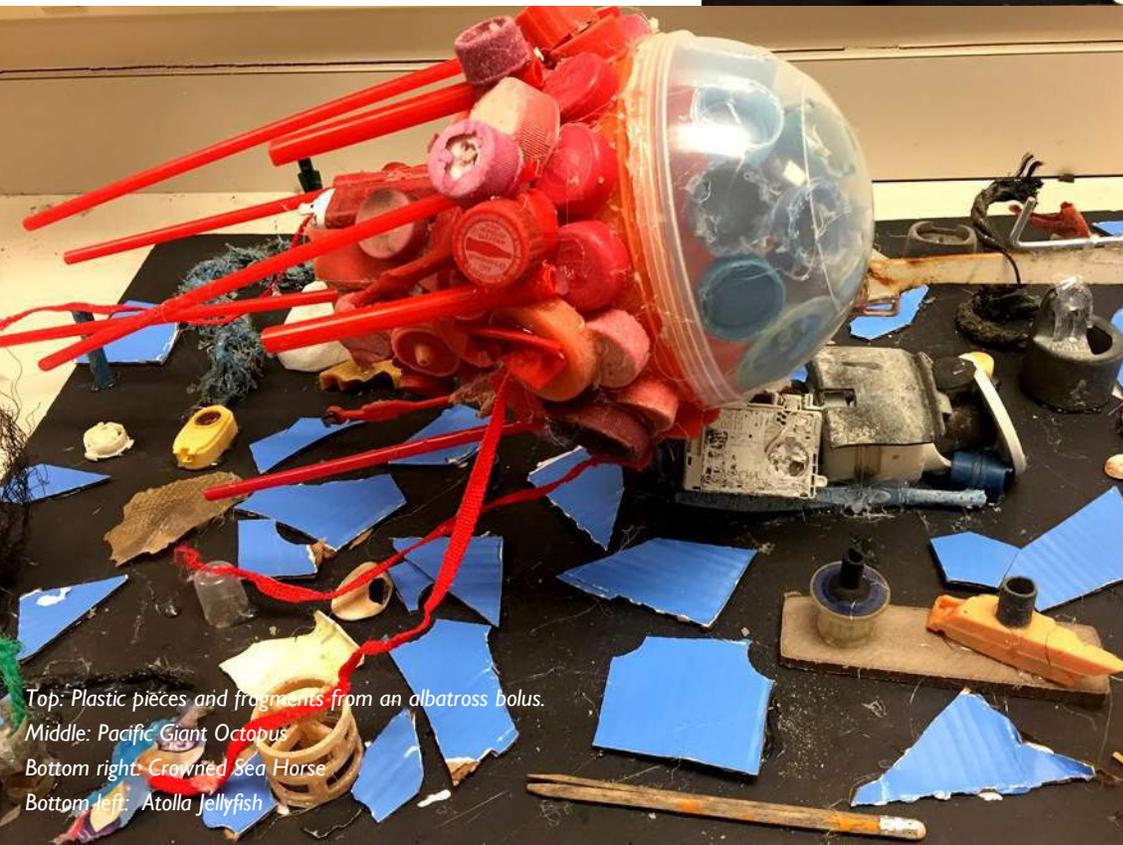
Albatross Art

Students use plastic from albatross boluses to illustrate an important lesson

Last fall, a Colorado middle school turned to Oikonos's Winged Ambassadors Ocean Literacy curriculum, WashedAshore.com, and the Friends of Midway Atoll NWR, to teach students some somber but inspiring lessons about the environmental and biological hazards of trash that winds up in the ocean. Armed with lessons that included getting to know the albatross food chain, migration patterns, and the plastic-filled boluses they regurgitate, students at the Lewis-Palmer Middle School applied their new understanding of pollution, recycling, and thoughtful consumer behavior by creating collage-style creatures made of everything from bottle caps, lighters and toys to candy wrappers, pencil fragments, and string. The ingenious results include a Crowned Sea Horse, Pacific Giant Octopus, Loggerhead Sea Turtle, Scarlet Macaw, and Fairy Penguin.

Oikonos studies and protects imperiled ecosystems by engaging diverse communities through innovative scientific and artistic collaborations. Additionally, Oikonos has created curriculum lessons for use in K-12 classrooms based on migration and plastic ingestion data from Tern Island and Kure Atoll in the Papahānaumokuākea Marine National Monument and Cordell Bank National Marine Sanctuary. Friends of Midway Atoll NWR is dedicated to sharing educational and outreach resources from a wide array of partner organizations and collaborators to increase knowledge and passion for seabird conservation and healthy oceans. ☒

By Hilary Penner
Teacher, Lewis-Palmer Middle School



Top: Plastic pieces and fragments from an albatross bolus.
Middle: Pacific Giant Octopus
Bottom right: Crowned Sea Horse
Bottom left: Atolla Jellyfish

Manu-o-Kū



All of the nearly two dozen species of Hawaiian seabirds that nest at Midway Atoll NWR are fascinating in their own ways. That said, my hands-down favorite during the three years I worked and lived on the Refuge was the White Tern, or Manu-o-Kū. Scientists call it *Gygis alba*, a combination of ancient Greek for “mythical” and Latin for “white.”

Why is this bird so special? It stands apart from the other Midway Atoll birds. Let me count the ways:

- it is the only all-white tern in the Hawaiian islands
- it is an aerobatic expert, able to hover in flight and to engage in elaborate courtship flights
- it captures a variety of fish and squid from the ocean surface and transports its prey in its beak, unlike other terns that regurgitate their prey to feed their young
- it typically lays its single camouflaged egg onto the branch of a tree, but it may nest on the ground or on a sign post, a window sill, or even a bicycle seat
- its chicks are able to grip tightly to a precarious perch due to their virtually webless feet
- its chicks can be surprisingly intimidating when approached by other birds or humans

White Terns are widely distributed throughout the tropical marine environment, including all of the Northwestern Hawaiian Islands. But perhaps the most striking adaptation of all is illustrated by their successful nesting in the most urbanized areas of Honolulu, O’ahu. The huge Monkey Pod Trees (*Samanea saman*) and other landscape trees of Kapiolani Park, Thomas Square, the Governor’s Residence, and Queen’s Hospital provide suitable habitat. This growing attraction to residents and visitors led to the White Tern’s designation as the official Honolulu bird in 2007 and the creation of an annual Manu-o-Kū Festival each May. FOMA participated in the 2017 Manu-o-Kū Festival by hosting a booth, donating in support of the event, and providing gifts for the education programs directed at children.

Staff, volunteers, contractors, and visiting researchers at Midway Atoll NWR take great pleasure in observing and photographing White Terns in flight or engaged in mutual preening and brooding of their young chicks. Their raspy calls are easily distinguished from the cacophony of other birds that share the habitat. Less welcome is the morning (4 a.m.) “song” of White Terns outside the bedroom windows.

Most people who spend extended periods in seabird colonies find the high incidence of mortality upsetting. It is particularly disturbing when the mortality is due, at least in part, to human “factors.” Despite their remarkable ability to nest successfully on tree branches, several White Tern eggs and chicks are lost due to strong winds. In some years, residents have retrieved abandoned chicks, placed them onto accessible branches, and reared them artificially using small bait fish caught in the nearshore water. Although some do not make it to fledging, a surprisingly large number do survive. ☒

Photos and note by Rob Shallenberger, FOMA Board Member





Faces of Midway

Featuring “Pong,” Head Chef at the
Clipper House on Midway Atoll

The *Gooney Gazette II* is proud to introduce the man behind the cuisine that the denizens on Midway Atoll NWR happily devour every day at the Clipper House. He is also a friend to all; his name is Pongsakorn Wichasa but we call him Pong. The following conversation took place between Pong and Wieteke Holthuijzen, FOMA board member, who provided nominal translations for Pong’s replies where necessary.

Gooney Gazette II: How did you come to work on Midway Atoll NWR?

Pong: I applied to a company in Thailand to find work as a cook. I had a friend who was already working on Midway Atoll who recommended me to come here.

GG: How long have you lived and worked here? What’s it like for you?

Pong: I have been on Midway for 11 years total, but first came out to Midway Atoll in 2004. What is it like here? There is a lot of quiet, a lot of birds who are very friendly. There is a strong community. I am very happy here; it is a very peaceful and quiet place. But most importantly, it is not complex here—just a simple life.

GG: What were you doing before you came to Midway Atoll NWR?

Pong: I worked on cruise ships [as a cook] but also worked in places like Israel and Taiwan—again, as a cook.

GG: Did you study to be a chef or is cooking a natural talent that you built into a career?

Pong: I was trained to cook in high-end hotels in Thailand for many years. I like cooking and have been cooking for 20 years.

GG: How would you describe the kinds of dishes you like to make? Do you use an ethnic influence or do you make anything that comes to mind? How do you keep things interesting week after week?

Pong: Thai food! I love making Thai food. Especially curries, like red curry, and stews. I like to make anything. I ask for suggestions, try to bring in new foods, and look for ideas on the internet for new dishes.

GG: Did you know anything about Midway Atoll NWR before you arrived? Which aspects of the Refuge’s many missions intrigues you the most, honoring its history or ecological conservation? Or both?

Pong: I did not know anything about Midway before I came. When I applied for the job, all I wanted was to not work at sea on a cruise ship; I wanted to work on land and ended up on Midway Atoll with Chugach Defense Base Services, Inc. For me... I like the wildlife. I love the White Terns, Monk Seals, and especially the gooney birds, which are very friendly. But my favorite... I think that is the Bonin Petrel chick. They are very cute.

GG: When the day is done, what do you do for relaxation and entertainment?

Pong: I do the same thing each day. I go home, clean my room and the house, listen to music, check email on the internet, and then meditate. I meditate every day, always before work. I meditate, in total, for 2 hours every day.

GG: What kind of a person does it take to live and work on a speck of land in the middle of the ocean?

Pong: Some people like a busy life, a city life, and entertainment—but some people like the quiet life. I don’t like the busy life, I just want a simple life. Life is easy on Midway. There is no crazy entertainment, just quiet. I have a good job and can support my family; if they are happy, that makes me happy. Midway is a quiet, calm place. ☒

Meet the Crew

Introducing the Summer 2017 Biology Program Volunteers

Kyle Davis | I'm gladly donating my summer to Midway Atoll NWR's volunteer program! After earning my B.S. from the University of Alabama, I spontaneously jumped into remote island field work on another isolated National Wildlife Refuge—Johnston Atoll—where I quickly fell in love with the tropicbirds and coral reefs. I decided I had to return to Hawai'i, so I recently applied to Midway Atoll NWR, and I'm very thankful to have gotten the opportunity to work here. The island life is amazing, the food is nothing short of epic, and now that summer's rapidly approaching, the water's finally tranquil, pacific, and warm to the touch. While I'm sad to see the albatross depart and face the trials of life on the wing, I feel incredibly fortunate to have witnessed their life cycle so intimately, and I'm thankful there's a whole community of spectacular friends who support this glorious place.

Johnathan Plissner | My introduction to Midway Atoll came as a young teenager watching Charlton Heston and Henry Fonda on the big screen in the 1976 dramatization of the WWII battle. I was already fascinated by birds and it would not have been much longer before I began to associate the atoll with albatross as well. I focused on an educational path that has led me to a 30+ year career as an ecologist, with a decidedly heavy ornithological bias. Based in an Oregon office of a smallish environmental consulting company based in Fairbanks, Alaska, I managed a variety of projects throughout the U.S., including Hawai'i, for nearly a dozen years. My projects largely focused on field studies of the potential impacts of energy developments on birds and other wildlife. During this time, I found my primary interest drawn more and more toward seabirds. When I heard about the opportunity to volunteer on Midway Atoll NWR, I couldn't pass it up. While the birds are obviously a significant reason for my desire to be on Midway, I have also been eager to gain more experience with habitat restoration. I expect my time on Midway

to be one of my most enjoyable and memorable experiences that I will be sharing with others for years to come.

Sky Bischoff-Mattson | Originally from the western U.S. (possibly Arizona), I've been wandering around with field jobs on islands and in remote areas for several years now before ending up here at Midway Atoll NWR. This is also serving as a mix of peace and preparation for going to graduate school this fall. I've done some work on other islands before, and was (and am) thrilled to be doing another job in such a beautiful place, especially one with such a remarkable history! Add to that the incredible restoration work, and who wouldn't want to come out to see this place and help? The birds are always a wonder and a constant presence out here, no matter what senses you use. Visually, they surround you every day and flood the fields with activity; audibly they weave a background score of calls, songs, and shrieks; and of course, the large bird colony also has quite an impact on your nose! Dip into the water, and the muted sounds let you peacefully watch the turtles and reef fish glide and drift past. There are few places quite like this, and it's always a joy to be able to work in such a locale.

Emma Struivig de Groot | I live in Vancouver, Canada, where I attended the British Columbia Institute of Technology. I earned a bachelor's degree in Ecological Restoration, during which I worked on different stream and wetland restoration projects within the Vancouver area. I have loved learning about Midway Atoll's unique ecosystem and contributing to the important restoration work being completed here. Midway Atoll, despite its remoteness, is plagued with the same bane of most restoration projects: invasive plants! It has been very rewarding beating back invasive plant species and helping propagate native ones instead. While habitat restoration is what brought me to Midway, after banding some resident albatross, I am hooked on seabirds. I have loved watching the albatross transition from adorable chicks to bumbling adolescents, with all the funny hairstyles in between. After Midway Atoll NWR, I hope to work on other seabird colonies and help restore these remote, unique places. ☒

Top row (left to right): Kyle Davis, Jonathan Plissner, Sky Bischoff-Mattson. Bottom row (left to right): Emma Struivig de Groot, Kristina McOmber (Kupu/Americorps, Volunteer Crew Leader 2016-2017).



Lend a Hand

Volunteer Opportunities with FOMA and USFWS



Photo by Jonathan Plissner/USFWS

BECOME A FOMA VOLUNTEER

FOMA is a volunteer-run non-profit organization. Board Members donate their time and skills to support the Refuge because of their passion for Midway Atoll NWR. The FOMA “office” is located in the hearts and minds of the Board, which means that all donations and grant funds go directly to on-atoll projects or outreach activities about the Refuge. We are always looking for volunteers to help with a variety of tasks.

General FOMA Volunteer Needs

Volunteer activities will be directed by and in concert with board members. Even a few hours of your time can make a difference. Some possible areas for volunteer assistance and specific activities include:

- Research and summarize military history on Midway Atoll
- Create new materials about FOMA for display at the Refuge
- Design and create education or outreach materials to inform students and the public about Refuge resources and challenges
- Research information and find images for our newsletter, website, blog, and social media
- Find “lost” email addresses for former members or constituents

If you are interested in helping FOMA with any of these tasks, please inquire with us at FriendsMidway@gmail.com. We look forward to hearing from you!

BECOME A USFWS VOLUNTEER OR ADVOCATE

- Check out all the opportunities at: http://www.fws.gov/refuge/Midway_Atoll/. Spend up to 6 months on the atoll as a Refuge Biology Volunteer by helping with seabird monitoring and habitat restoration efforts. Not ready for a 6-month commitment? Apply as an Annual Nesting Albatross counter and spend 3 weeks over the winter time (it’s still warm!) to help to count all the albatross across the atoll.
- Not able to volunteer on Midway Atoll NWR? The saying goes that the “pen is mightier than the sword,” so consider advocating for Midway! Talk to your state representatives and senators about supporting the National Wildlife Refuge System (Midway Atoll is one of the +560 National Wildlife Refuges across the nation). With an operations and maintenance backlog of \$3.5 billion and counting, the Refuge System is vastly underfunded. In fact, more than one third of Refuges across the nation have no onsite staff due to budget cuts. To learn more, visit www.RefugeAssociation.org.
- Find a Refuge near you! The National Wildlife Refuge System is responsible for managing more than 850 million acres of lands and waters, including 5 marine national monuments. There is at least one National Wildlife Refuge in each state and U.S. territory. About 500 Refuges are open to the public and nearly all offer free entry. Visit www.fws.gov/refuges/refugelocatomaps/ to find a Refuge near you and discover your place to connect with wildlife or join a Friends group to advocate for your favorite Refuge. ☒



Your membership supports crucial ecological conservation and historic preservation of Midway Atoll NWR's unique resources—*join or renew today!*

Photo by Jonathan Plissner/USFWS

Friends of Midway Atoll NWR MEMBERSHIP APPLICATION

Please fill out this application and mail (with check) to:
 Friends of Midway Atoll NWR
 17 Katrina Lane
 San Anselmo, CA 94960

Or visit our website at <http://www.friendsofmidway.org/membership/> and follow the instructions to purchase or renew your membership.

Name _____
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Membership Level:

- WWII Veteran.....**Honorary**
- Veteran.....\$20.00
- Student.....\$25.00
- Individual.....\$35.00
- Family.....\$50.00
- Contributor.....\$100.00
- Supporter.....\$250.00 or more
- Life.....\$1,500.00
- Donation.....\$_____

- New Membership
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*All contributions are tax deductible.
 Please make checks payable to:
 FOMA or Friends of Midway Atoll NWR*