

Midway Atoll National Wildlife Refuge Historic Preservation Plan



Department of the Interior

Fish and Wildlife Service

Pacific Region

June 1999

MIDWAY ATOLL NATIONAL WILDLIFE REFUGE

HISTORIC PRESERVATION PLAN

Prepared for:

USDI Fish and Wildlife Service, Region 1
Midway Atoll NWR
Midway Isle Station #4
PO Box 29460
Honolulu, HI 96820-1860

Prepared by:

USDI Fish and Wildlife Service, Region 1
Cultural Resources Team
20555 SW Gerda Lane
Sherwood, OR 97140

Authored by:

Lou Ann Speulda,
Anan Raymond, and
Virginia Parks
1999

Photo credit: cover by D. Pinyerd, 1998

MIDWAY ATOLL NWR: Historic Preservation Plan

Table of Contents

Executive Summary	v
Chapter 1 Introduction	1-1
1.1 Programmatic Agreement and HPP	1-2
1.2 Midway Atoll NWR Purposes, Mission, and Goals	1-6
1.3 HPP as a Refuge Planning Strategy	1-7
1.4 Standard and Nonstandard Treatments	1-8
Chapter 2. Midway's History: A Context for Cultural Resources	2-1
2.1 Environmental Setting	2-1
2.2 Summary of Midway's History	2-3
Discovery and Shipwrecks: 1850s-1903	2-3
Commercial Pacific Cable Company, Pan American Airlines, and Other Ventures: 1903-1942	2-6
Constructing Naval base Midway 1940-1942	2-13
First Attack, December 7, 1941	2-18
Battle of Midway, June 4-6, 1942	2-18
Remainder of WWII: 1942-1945	2-26
The Cold War and Pacific Rim Conflicts 1945-1990	2-27
Changing Priorities 1990-1998	2-30
Chapter 3. Identification and Evaluation of Midway's Historic Properties	3-1
3.1 Previous Cultural Resources Investigations	3-1
Architectural Studies	3-1
Archaeological Studies	3-3
3.2 National Historic Landmark (NHL) Properties	3-4
3.3 Programmatic Agreement and Treatment of Midway's Historic Properties	3-5
Chapter 4. Management Issues	4-1
4.1 Conditions Affecting Historic Properties (Natural)	4-1
Storms	4-1
Shoreline change	4-1
Weathering	4-2
4.2 Conditions Affecting Historic Properties (Human)	4-2
Public Use	4-2
Cooperator Agreement	4-4
No Cooperator	4-5
4.3 Interested Parties and Memorials	4-6

4.4 NHL Boundary Revision	4-7
4.5 Section 110	4-8
4.6 Museum Collections (FWS Manual 126 FW 1-3)	4-10
 Chapter 5. Public Involvement	 5-1
5.1 Oceanic Society (OS)	5-1
5.2 Demonstration Projects	5-3
5.3 Opportunity for Participation and Partners	5-4
Technical Expertise	5-4
Financial Assistance	5-4
In-Kind Contributions	5-5
Labor Force	5-5
5.4 Interpretation Projects	5-5
 Chapter 6. Envisioning the HPP	 6-1
6.1 Plan Review and Revision Schedule	6-1
6.2 Staff Requirements	6-2
6.3 Preservation Project Goals	6-4
6.4 Summary	6-4
First Five Years	6-4
In Ten Years	6-5
 Chapter 7. Standard Treatment of NHL properties (6)	 7-1
7.1 Planning: Condition Assessment	7-1
7.2 Standard Treatments	7-2
ARMCO huts (3)	7-2
Reinforced Concrete Structures	7-3
7.3 Consultation Plan	7-4
7.4 Nonstandard Treatments	7-4
7.5 Reporting Standards	7-5
 Chapter 8. Standard Treatment of Properties being REUSED (25)	 8-1
8.1 Planning: Condition Assessment	8-2
8.2 Standard Treatments	8-2
Reinforced Concrete Buildings and Structures (4)	8-3
Wood-frame Buildings (12)	8-3
Steel-frame Buildings and Structures (8)	8-4
8.3 Consultation Plan	8-6
8.4 Nonstandard Treatments	8-6
8.5 Reporting Standards	8-6
 Chapter 9. Standard Treatment of Properties SECURED and LEAVE AS-IS (26)	 9-1
9.1 Planning: Condition Assessment	9-3
9.2 Standard Treatments	9-4

Massive Reinforced Concrete Structures (6)	9-4
Concrete Structures--Cable Station (4)	9-4
Leave As-Is Treatments (16)	9-5
9.3 Consultation Plan	9-5
9.4 Nonstandard Treatments	9-6
9.5 Reporting Standards	9-6
Chapter 10. Standard Treatment of Properties FILLED and RELOCATED (5)	10-1
10.1 Planning: Condition Assessment	10-1
10.2 Standard Treatments	10-2
Metal Pillboxes (2)	10-2
Bomb-Torpedo, pillbox turret, submarine netting (3)	10-3
10.3 Consultation Plan	10-3
10.4 Nonstandard Treatments	10-3
10.5 Reporting Standards	10-3
References Cited	References-1 through 8

Appendices

- A. Photographs of Historic Properties
- B. Programmatic Agreement
- C. H.D. Shannon report of June 4-6, 1942
- D. Executive Order 11593
- E. Executive Order 13022
- F. Museum Collections forms

List of Figures

Figures	Description	Page
1.	Locational map of Midway Atoll NWR within Hawaiian Island Chain	1-3
2.	Map of Sand Island	1-4
3.	West Beach of Sand Island, Midway Atoll	2-1
4.	Remnant cabin of the shipwreck survivors on Sand Island, ca. 1900.	2-5
5.	Commercial Pacific Cable Company's station on Midway, ca. 1913	2-8
6.	Wooden lighthouse pole, ca. 1920s	2-10
7.	Aerial view of Eastern Island, ca. 1941	2-15
8.	Aerial view of Sand Island, ca. 1941	2-16
9.	Officer-in-Charge house, designed by Albert Kahn	2-17
10.	Elderhostel volunteers working on Eastern Island Gun in 1998	5-2
11.	Map of Sand Island, with historic properties identified	Appendix A-3
12.	Map of Eastern Island, with historic properties identified	Appendix A-4

List of Tables

Tables	Description	Page
1.	Inventory of Midway's Historic Properties	3-7
2.	Preservation Goals for Midway's Historic Properties	6-6
3.	Inventory of Midway's Historic Properties -- NHLs	7-1
4.	Inventory of Midway's Historic Properties -- Reused	8-1
5.	Inventory of Midway's Historic Properties -- Secured/Leave As-Is	9-1
6.	Inventory of Midway's Historic Properties -- Fill/Relocate	10-1

Executive Summary

This Historic Preservation Plan (HPP) defines a program to integrate historic preservation planning with the wildlife conservation mission of the U.S. Fish and Wildlife Service (FWS) at Midway Atoll National Wildlife Refuge (NWR). The Naval Air Station at Midway was commissioned in 1941. The FWS established an overlay refuge on Midway Atoll in 1988 to manage the endangered Hawaiian monk seal, the threatened green sea turtle, and a diversity of other marine species and migratory seabirds and shorebirds, including the world's largest population of nesting Laysan Albatross. The Base Realignment and Closure (BRAC) Act of 1990, P.L. 101-510, as amended, led to the closure of Midway's Naval Air Facility on 1 October 1993 and transfer of the property to the FWS on 31 October 1996. All Naval personnel withdrew from the atoll in June 1997.

Midway's historically important buildings and structures are primarily associated with World War II. Nine structures specifically associated with the June 1942 Battle of Midway were designated National Historic Landmarks (NHL) in 1986. Archaeological and architectural studies conducted in 1993 and 1994 identified and evaluated buildings, structures, and objects on the atoll's two main islands and determined that 69 additional properties were eligible to the National Register of Historic Places (NRHP).

Transition from a naval facility to a wildlife refuge necessitated a reduction in personnel and operational facilities. Therefore, identifying excess property was accomplished by the Navy and FWS in consultation with the Advisory Council on Historic Preservation (Council). Treatment of Midway's 78 historic properties during the Base Closure and transfer led to a Programmatic Agreement (PA) in 1996. One of the stipulations in the PA was for the FWS to prepare a Historic Preservation Plan (HPP) for the long-term management of historic properties. The following chapters fulfill this agreement.

Midway's HPP is unique in several respects: first, the plan focuses on treatment of properties that have been previously identified and evaluated; second, some treatment options for Midway's historic properties were determined by the PA and implemented, with adverse effects mitigated by completion of documentation for all historic properties; and third, the mission statement and primary goals of Midway Atoll NWR include preservation of historic resources. Therefore, this HPP focuses on long-term management conditions and goals for preserving and stabilizing historic properties. It also recommends procedures for treating new discoveries, caring for museum collections, and implementing a public outreach program that includes historic preservation.

Chapter 1. Introduction

The Midway Atoll National Wildlife Refuge is within Region 1 of the U.S. Department of the Interior, Fish and Wildlife Service (FWS). It is administered as part of the Hawaiian and Pacific Islands National Wildlife Refuge Complex that provides oversight for 16 refuges. Midway Atoll is at the northern end of the Hawaiian island chain, approximately 1,250 miles northwest of Honolulu. Midway comprises a roughly circular outer reef approximately 5 miles in diameter that encloses a central lagoon and two main islands, Sand and Eastern (Figure 1). Sand Island contains the highest number of historical resources as well as visitor facilities (Figure 2).

The FWS began operating an “overlay refuge” on Midway Naval Air Base in 1988. In 1996, the administration of Midway Atoll was transferred to the FWS. Changes associated with the transfer affecting historic properties were defined through consultation and resulted in a Programmatic Agreement (PA).

The PA requires that the FWS “shall in compliance with the National Historic Preservation Act and applicable historic preservation protection laws prepare a long-term Historic Preservation Plan (HPP).” The general format of this HPP follows guidelines established in Sections 106, 110(a)(2), and 100(d) of the National Historic Preservation Act (16 U.S.C. 470 et seq.), the Archaeological and Historic Preservation Act (16 U.S.C. 469), and the Archaeological Resources Protection Act (16 U.S.C. 470aa-II), in accordance with the Secretary of Interior’s *Standards and Guidelines for Preservation Planning* (48 FR 44716-20).

This plan presents background historical information as a context for examining the various resources, suggests standard treatment strategies and nonstandard exceptions, provides for consultation opportunities, and encourages public involvement. This HPP differs from other such plans because identification, evaluation, and even mitigation have been completed for all resources listed in the PA. For instance, Historic American Building Survey (HABS) or Historic American Engineering Record (HAER) documents were completed for all historic buildings and structures identified in the PA. The architectural recording served as mitigation for fifteen historic properties that were demolished prior to June 1997. The demolition was permitted, in part, because of the expense involved with lead-base paint removal.

The language that established Midway Atoll NWR contains a goal of encouraging historic preservation. This goal allows historic resources to be recognized along with wildlife as important topics for public interpretation. Midway Atoll NWR's cooperative agreement with Midway Phoenix Corporation (MPC) for operational support of facilities and air service is unique within the FWS. MPC provides staffing for the maintenance of facilities and operates the airport for refueling of civilian aircraft and emergency recovery operations. MPC also offers facilities for a destination tourist program, the first time in more than 50 years that public visitation has been permitted. The complex interplay between refuge goals, MPC services, public use, and historic properties defines the scope and topics of this HPP.

1.1 Programmatic Agreement and the HPP.

The Navy's Base Realignment and Closure (BRAC) team developed the draft Programmatic Agreement to address the complexity of issues involving historic properties, including the adverse effects of lead-base paint abatement and hazardous conditions for wildlife. Special attention was given to the 78 historic properties. Discussions among the Pacific Division, Naval Facilities Engineering Command (PACNAVFACENGCOM), the FWS, the Advisory Council on Historic Preservation (Council), the National Park Service (NPS), the State Historic Preservation Officer of the State of Hawaii (SHPO), the Sixth Defense Battalion, the U.S. Marine Corps and Defenders of Midway Islands Reunion Association, and the International Midway Memorial Foundation led to a Programmatic Agreement (PA) for the treatment of these resources (1996).

The Programmatic Agreement defined six levels of preservation (reuse, secure, leave as-is, fill, demolish, or relocate) for each of the historic properties identified on Midway Atoll by PACNAVFACENGCOM. The management category for each of the historic properties was based on many factors including historic importance, interpretive value, the overall setting, association with key themes, structural integrity, and recommendations from interest groups, specialists, and the Council.

Twenty-three buildings and structures were identified for reuse. Buildings suggested for continued use in a way similar or compatible to their original purposes include the Officer's housing; carpentry, machine, and transportation shop buildings; the refrigeration plant; the recreation facility; the seaplane ramp; and water reservoirs. These are part of the operational

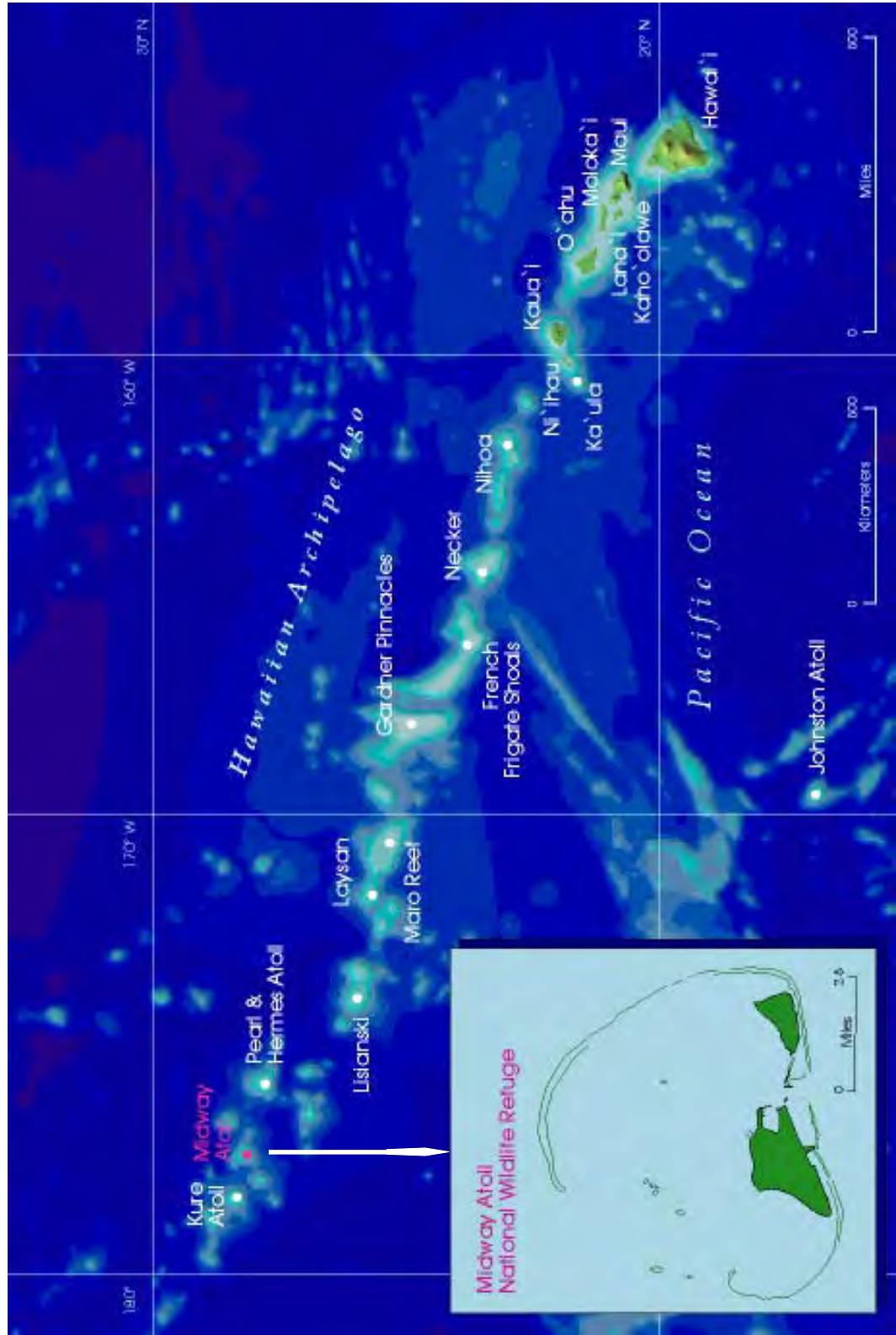


Figure 1. Hawaiian Archipelago and Midway Atoll National Wildlife Refuge.

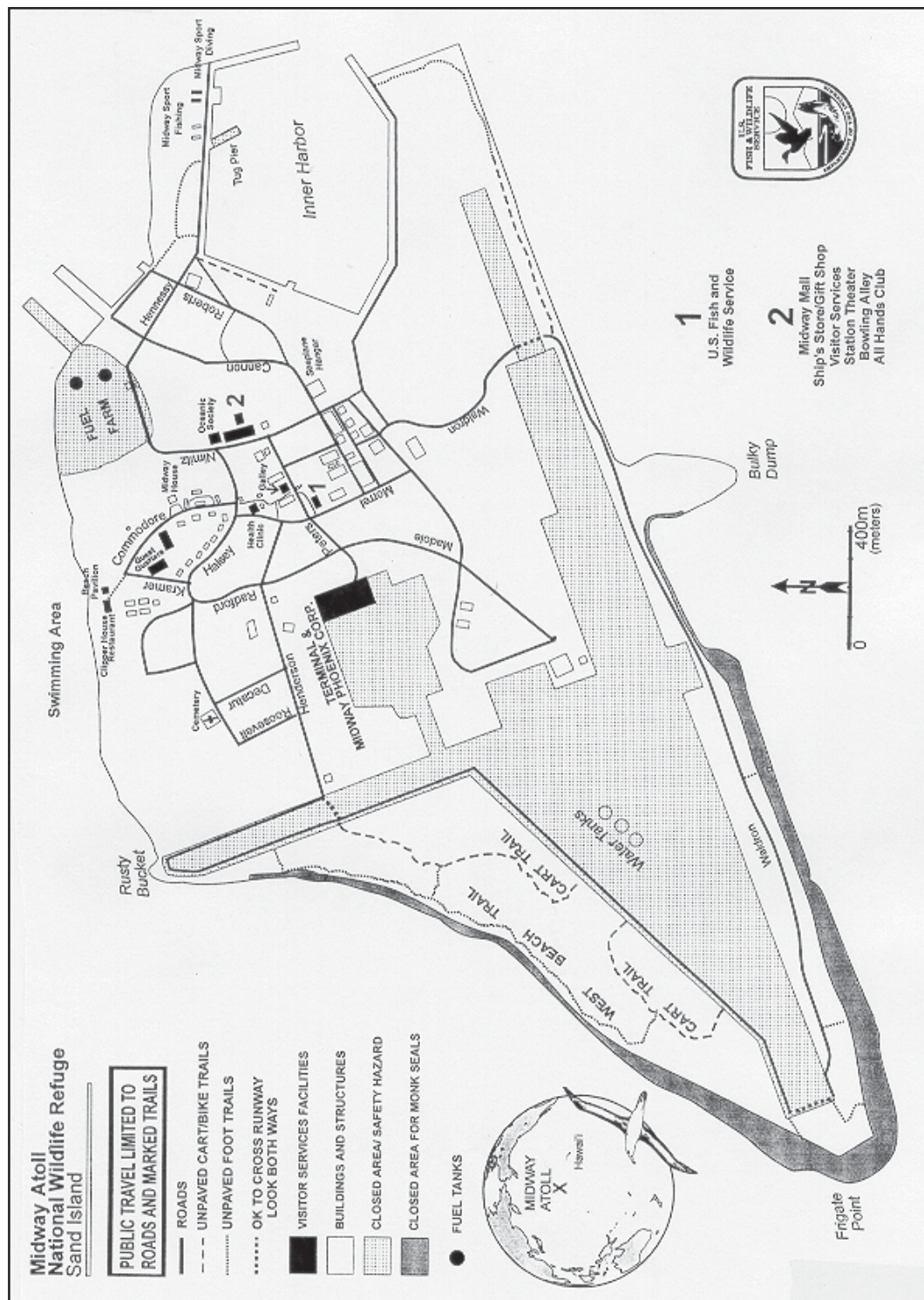


Figure 2. Sand Island Map.

infrastructure of the island and have been in continual use since their construction between 1941 and 1942. The refuge and the cooperator (Midway Phoenix Corporation) is currently reusing all of the 23 buildings identified in the PA and several additional historic properties as well.

Securing historic properties in place to stabilize or eliminate safety concerns was the suggested alternative for 13 properties. These include several massive concrete structures that have little potential for reuse: the Command Post, Radar Buildings, Power Plant, and an Underground Shelter. Additionally, the Cable Station Buildings, which are the oldest surviving buildings, cannot be reused without major restoration. Securing buildings such as these prolongs their existence and provides opportunities for adaptive reuse and interpretation. Other resources originally planned for securing included only one of the ARMCO huts, although three were eventually secured.

Four properties were identified for a securing treatment that included filling the structures with sand. This method was used for a pillbox defensive position and an underground bunker. It was also recommended for two of the ARMCO huts, but these were secured by an alternate method.

The treatment alternative chosen for 20 resources was to leave them as-is. The "leave as-is" category recognizes that the resources will slowly deteriorate in place under natural environmental conditions. The participants in the PA accepted that the final outcome for many of the structures would be deterioration to a ruin. Because these properties do not pose physical hazards to wildlife, and require little stabilization, they can be left in their existing state. Properties recommended for this approach include the Eastern Island gun, runways, and revetments. On Sand Island the resources include the cemetery, Japanese gravestones, a pillbox on South Beach, the Midway Memorial plaque and two 5-inch guns, and the gun batteries. Additionally, the one-story Cable Station building, which is in poor repair, will be allowed to deteriorate *in situ* rather than be removed from its historical setting.

Fifteen properties were slated for demolition because they were identified as potentially hazardous to wildlife and could not be economically or functionally reused. Many of these buildings were already in advanced stages of neglect and deterioration. The features demolished were mainly associated with the post-battle years and included the N.O.B. armory, the submarine base buildings, the general storehouse and air terminal building, and the blackout hangar and associated shops. Additionally, two barracks

and three ARMCO huts were demolished, but there remains a set of barracks and three ARMCO huts that represent these resource types. The Seaplane Hangar was originally slated for demolition, but it has been retained for reuse by the cooperators.

Three objects were identified for removal to a secure storage location. These include the bomb and torpedo, a pillbox turret, and portions of submarine netting. The bomb and torpedo are situated in the current air terminal and will remain there until a museum display or other secure location is created. The pillbox turret and submarine netting were transported from Eastern Island to Sand Island where they await the development of an appropriate venue for display.

All of the recommended treatments were in place prior to the Navy's final withdrawal from Midway. The FWS is currently managing the historic resources based on these treatment levels.

1.2 Midway Atoll National Wildlife Refuge Purposes, Mission, and Goals.

Midway Atoll NWR was established by an executive order which states that it will:

be managed to maintain and restore its natural biological diversity; to provide for the conservation and management of fish and wildlife and their habitats within refuge boundaries; to provide opportunities for scientific research, environmental education, and compatible wildlife-dependent recreational activities; and to recognize and maintain the historical significance of Midway Atoll (*Executive Order 13022*).

Midway's mission statement is "to preserve, protect and restore the biological diversity and historic resources of Midway Atoll, while providing opportunity for wildlife-dependent recreation, education and scientific research."

In order to meet the purposes put forth in the establishing Executive Order and elucidated in the mission statement, six goals have been identified as important to successful management. They are to 1) manage for the conservation and recovery of threatened and endangered species of animals and plants; 2) restore and manage habitat, including the remediation of impacts from prior human use, to support healthy

populations of indigenous migratory birds in their natural diversity; 3) protect and maintain the natural diversity of marine habitats and their associated animal and plant communities; 4) operate and maintain facilities, in an environmentally sensitive manner, in cooperation with Midway Phoenix Corporation; 5) provide opportunities for wildlife-dependent recreation, education, and scientific research; and 6) preserve and interpret the unique historical resources of Midway Atoll.

Operating a public-use program is complex on a remote atoll where the public cannot simply drive to the facility. Therefore, an agreement with MPC was reached whereby MPC would provide all supplies, equipment, and staff necessary to operate the facilities and implement the approved interpretive, educational, and recreational programs for the public. Included are commercial air transportation to the refuge, accommodations, meals, and a variety of other for-profit services (Public Use Plan 1997:2).

1.3 HPP as a Refuge Planning Strategy.

Recognizing the importance of Midway's historic legacy is fundamental to the development of this HPP as a management tool for implementing preservation treatments. This HPP is viewed as a working document which offers guidance and information to be used as a resource. For instance, the historical background section summarizes the primary themes relevant to Midway and their associated physical remains—the tangible evidence that links the present with the past.

As a treatment plan for the preservation, stabilization, and conservation of the important buildings and structures on Midway Atoll, this HPP serves to establish the strategies for each resource both individually and as part of a cohesive landscape. Midway's resources are closely tied to the integrity of the site as a whole. Even with the advancing and irreversible deterioration of many of the structures, the public can still receive a strong sense of what the military facility was like during World War II, along with an understanding of the atoll's history before and after this time period.

Conservation activities for Midway's historic properties focus on stabilization rather than restoration to a pristine condition. Conservation practices will be guided by principles established in the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Weeks and Grimmer, 1995). Sensitive, noninvasive maintenance is recommended to slow the deterioration.

For resources identified in the PA as belonging to the “leave as-is” category, the recommended treatment is simply to allow the properties to deteriorate naturally. The “leave as-is” treatment was preferred over the immediate demolition procedure suggested by PACNAVFACENGCOM. While natural deterioration is preferable to demolition, the FWS is concerned for public safety. Therefore, this HPP includes maintenance procedures to reduce safety risks and recommends noninvasive treatments for conserving the physical features of the properties.

Conservation and maintenance of historic properties comprise only one part of the FWS’s commitment to historic resources on Midway. Without a well-developed interpretive plan and public outreach program, the historic importance associated with the properties might go unrecognized. Public visitation to Midway is increasing, and the FWS staff are developing interpretive programs, walking tours, displays, and informational panels to present the rich history of the atoll. Therefore, this HPP not only addresses the issues presented in the PA, but also is linked to the complementary and parallel development of Midway NWR’s interpretive program.

1.4 “Standard” and “Nonstandard” Treatments for Historic Properties.

The concept of “Standard” and “Nonstandard” treatments for Midway’s historic properties is a reflection of the Programmatic Agreement that essentially set the stage for how properties are disposed. The PA not only set up various levels of treatments, but also the mechanism for mitigating adverse effects associated with those treatments. Demolition and benign neglect are adverse effects that result in the loss of a resource. Yet, these two types of treatments were justified for one third of the historic properties identified on Midway under the terms of the PA. The PA also serves as the basis for treatments in this HPP.

In essence, as long as the treatments follow the guidelines established in the PA and allow for regular consultation/monitoring of the efforts, the FWS is absolved of following the Section 106 process. Therefore, the FWS will only follow the Section 106 process for nonstandard treatments of historic properties.

A detailed discussion of what “standard” treatments are for each of the historic properties follows in Chapters 7-10. These chapters define treatments that are consistent with the PA and include routine maintenance

and preservation projects. Procedures for maintenance and preservation follow the *Secretary of the Interior's Standards for the Treatment of Historic Properties* using in-kind materials and following generally accepted procedures for treating metal and concrete buildings and structures.

nonstandard treatments, on the other hand, are considered to be new undertakings and will follow Section 106 as per 36 CFR 800. nonstandard treatments are those that substantially alter the character, use, or treatment of a property. Examples of nonstandard treatments include changing a property from reuse to leave as-is or altering the windows or facade of an Albert Kahn building. These types of actions will require consultation with the Council. Other nonstandard treatments are discussed in Chapters 7-10.

A key element of the standard and nonstandard treatments is providing regular consultation opportunities. Often referred to as monitoring, consultation is an integral part of any preservation program. Monitoring can detect problems early in the process and suggest actions that reduce or eliminate the affects on historic properties (Spennemann and Look 1994:23). Monitoring can be one of the most important components of a preservation plan. A regular monitoring program will be established to allow the Council and interested parties an opportunity to discuss this preservation plan and its implementation. Structuring the monitoring procedures to allow spontaneous response without being burdensome to the refuge staff is important to establish in a set of protocols. Protocols established in Chapters 7-10 are consistent with the treatments proposed.

Beginning with this introduction, the HPP is organized into an executive summary, ten chapters, a bibliography, and six appendices. Chapter 2 briefly discusses the history of each of the major themes of the atoll's past: discovery and shipwrecks, the Commercial Pacific Cable Company Station, Pan American Airlines, Naval base facilities, the Battle of Midway, the Cold War, and recent trends and developments. Chapter 3 presents the previous cultural resource studies that led to the identification and evaluation of Midway's historic properties. Management issues such as current and anticipated public use and natural deterioration of historic properties are discussed in Chapter 4. Also addressed in Chapter 4 are topics such as Congressional initiatives, the NHL boundary, application of the NHPA's Section 106 and 110 regulations, and responsibility for a future museum collection. Chapter 5 outlines opportunities for public involvement through partnership programs for a range of activities. Chapter 6 provides a long-term vision for Midway and presents the review and

revision schedule. It also estimates the staffing and costs required to fully implement the recommendations. Specific guidance for treatment of historic properties is provided in chapters 7, 8, 9, and 10. Chapter 7 focuses on the treatment of the NHL properties. Chapter 8 discusses properties being reused by the FWS or the cooperator. Historic properties that were identified for “securing” or “leaving as-is” are discussed in Chapter 9. Chapter 10 summarizes the treatment of properties that were “filled” and the objects that were planned for “relocation.” A bibliography and six appendices complete this plan. The appendices include: A) photographs of each of the historic properties; B) the PA; C) H.D. Shannon’s Report of June 4-6, 1942; D) Executive Order 11593; E) Executive Order 13022 establishing Midway Atoll National Wildlife Refuge; and F) examples of forms suggested for regulating Museum Collections.

Additionally, a structure examination report for each of the properties was prepared and distributed to the Council and Hawaii SHPO. A copy of the examination reports is also filed at the Midway Atoll National Wildlife Refuge office and at the Region 1 Cultural Resources Team office.

Chapter 2. Midway's History: A Context for Cultural Resources

2.1 Environmental Setting.

Midway Atoll is located in the north-central Pacific Ocean, near the north-west end of the Hawaiian Island chain. The refuge boundary, as defined by Executive Order 13022, lies between the parallels of 28 degrees 5 minutes and 28 degrees 25 minutes North latitude and between the meridians of 177 degrees 10 minutes and 177 degrees 30 minutes West longitude. The islands are approximately 1,250 miles northwest of Honolulu and 1,200 miles northeast of Wake Island. The atoll's coral reef is roughly five miles in diameter and is defined by a fringing reef that is broken in several areas, allowing access to the lagoon. The two main islands are Eastern and Sand.

Eastern Island, the smaller of the two, is composed of coarse pieces of coral, shells, and coarse sand gravel. Triangular in shape, it is about 1.25 miles long and .75 miles wide. The three converging airstrips utilized during the Battle of Midway are on Eastern Island.

Sand Island was essentially formed by fine sand blowing from Eastern Island (Figure 3). Only a thin layer of organic material naturally overlays the highly permeable sand and coral substrata. A large dune approxi-



Figure 3. West Beach of Sand Island, Midway Atoll (D. Pinyerd, 1998).

mately 43 feet high at the northern end is the highest natural elevation on either island. Sand Island is 1.5 miles long and about .75 miles wide. It has received the majority of alterations in the past 100 years, and today includes the community facilities and modern airfield.

Midway has a subtropical climate moderated to some extent by the surrounding ocean and the tradewind belt. The average monthly temperature is 72 degrees F, with a mean relative humidity of 76 percent. Fair weather and the northeast trade winds prevail from March through November. Much of the rain comes with the southwesterly winds between December and February. Winter storms and high winds can cause damage to the vegetation and structure of the islands. However, Midway is not within the typhoon belt and rarely suffers from extreme weather. Summers are usually warm, fairly dry, and very pleasant.

Natural conditions on Midway Atoll were initially altered when the first superintendents of the Commercial Pacific Cable Company imported tons of soil from Honolulu, and later Guam, in an effort to establish gardens and trees for windbreaks. The imported soil often blew away in storms, but finally a small grove of trees took hold near the Cable Station complex. The ironwoods (*Casuarina equisetifolia*) introduced at the turn of the century have become a dominant plant, along with a weedy species, golden crown-beard (*Verbesina encelioides*). Native plants such as beach naupaka (*Scaevola serica*), alena (*Boerhavia diffusa*), beach morning glory (*Ipomoea pes-caprae*), and beachgrass (*Eragrostis variabilis*) are being reintroduced to the islands. Canaries that escaped captivity are among the nonnative bird species present on the atoll. Rats were brought to shore when the large cargo ships were unloaded, but an aggressive trapping program appears to have eliminated the problem.

Sand Island's physical characteristics have changed dramatically. In the late 1930s, work on a harbor, seawall, and channel began in anticipation of establishing a Naval facility on Midway. The eastern end of Sand Island was altered by the construction of the seawall and dredging of the harbor and channel. After 1941, the Navy constructed streets, housing, a community center, and mechanical repair shops, and Midway's community landscape of yards, exotic tropical plantings, and gardens became more fully defined. The size of Sand Island was increased in the late-1950s when the southeast side was expanded to create a runway runoff area. Part of the harbor was filled during this modification, providing more protection for the inner harbor.

Changes to both islands have been dramatic. The military requirements for personnel, equipment, and types of operation have dictated the buildings and alterations. For instance, during World War II, Eastern Island was used as the primary airport, but after the war its use decreased and its runways were finally abandoned. After the war, Midway's function changed, requiring a buildup of such facilities as family housing, a school, church, administrative building, and airport on Sand Island. The population has fluctuated greatly during the past 100 years, from a few shipwrecked individuals in the 1880s to 15,000 men during the Battle of Midway in 1942. The current resident population is limited to about 170 people who include FWS staff, MPC personnel, and MPC subcontractor staff. Visitor levels fluctuate but are limited to 100 at any one time.

2.2 Summary of Midway's History.

The history of Midway is most notably associated with U.S. military history. Structures involved in the June 1942 Battle of Midway were recognized for their high level of significance in 1986 and were designated a National Historic Landmark (NHL). In 1993 and 1994 the Navy conducted a cultural resources survey of other buildings, structures, objects, and sites on both islands. Based on these studies, 78 buildings and structures were determined to be eligible to the National Register of Historic Places, including the nine properties previously listed as the Midway National Historic Landmark. Presented below is a summary of Midway's history, which provides a context for linking the events with the physical remains. Material for this text is derived from the Cultural Resources Studies conducted by PACNAVFACENGCOM, secondary source materials, primary accounts of the Battle of Midway, and oral interviews.

Discovery and Shipwrecks: 1850s to 1903

Legendary accounts that describe journeys by Polynesians/Hawaiians to the small islands north of Niihau suggest the possibility that people visited Midway Atoll. Yet, evidence of Polynesian/Hawaiian visitors has not been found on Midway. The distance to Midway may have deterred most travelers, especially since the island's resources were limited. It is normally too cold in the winter to support coconut palms, and the lack of soil reduced the possibility of successful cultivation. The results of cultural resources surveys on Sand and Eastern islands indicate that the landscape has been heavily disturbed by natural forces, warfare, and modern construction. Nearly two meters of fill are layered over the natural island deposits on Eastern Island. Portions of Sand Island have been mounded

or scraped and filled with mixed deposits (Jimenez and Rosendahl 1994; Hilber Hastert & Fee 1995).

The first recorded landing on the Midway Islands occurred in 1859 when Captain N.C. Brooks sailed from Honolulu in the Hawaiian bark *Gambia* on a sealing and exploring voyage. Captain Brooks named the island grouping “Middlebrook Islands” (Helber Hastert & Fee 1995; *Paradise of the Pacific* 1936, Yoklavich 1993). Confusion surrounding the exact name of the atoll was cleared up in 1869 when the name “Midway Islands” was adopted (U.S. Congress, Senate Committee on Naval Affairs, 1869 in Yoklavich 1993:6). In renaming the national wildlife refuge, “Midway Islands” has been revised to the more correct descriptor “Midway Atoll,” which encompasses the islands, lagoon, and surrounding reef.

The atoll’s location attracted transpacific commercial traders such as the Pacific Mail Steamship Company. An agent for this company, Captain Burdett, in command of the *Milton Badger*, spent at least a month on Midway in 1867 attempting to establish a coal storage depot. During this month long stay, two wooden houses were constructed on Sand Island. Political pressure by the trading companies led the Secretary of the Navy to send Captain Reynolds of the U.S. steamer *Lackawanna* to investigate and take possession of the islands in the name of the United States in 1869 (Farrell 1931:2; U.S. Congress, Senate Committee on Naval Affairs, 1869 in Yoklavich 1993:7). Captain Reynolds formally took possession of the islands and named the natural harbor Welles Harbor after Gideon Welles, the Secretary of the Navy. Reynolds conducted a survey of the lagoon and recommended that the harbor be improved as a possible military staging area.

In 1870 the U.S. Congress appropriated a sum of \$50,000 to improve the entrance channel to Sand Island. The U.S.S. *Saginaw* was dispatched to Midway to assist the civilian contractor George W. Townsend from Boston, Massachusetts. The machinery and supplies to blast, dredge, and widen an opening in the reef were moved onto Sand Island. The *Saginaw* party probably used the houses set up for the coal depot and may have constructed more buildings on Sand Island during their 6 1/2 month stay. The project stalled when the underlying solid limestone reef was encountered. The contractors determined that the channel opening would require an additional 2-5 years and nearly a million dollars. Needless to say, this caused the project to be cancelled. After the party was picked up on Midway, the *Saginaw* wrecked on Ocean (Kure) Island. After this expedition,

interest in using Midway as a harbor lessened considerably (Helber Hastert & Fee 1995:2.9; Warshauer n.d.:13).

In the late 1880s two notable shipwrecks occurred at Midway Atoll. The *General Seigel* or *Siegel*, a schooner on a shark-hunting expedition with a crew of eight, wrecked in November 1886. The men found shelter in the redwood cabin abandoned by the *Saginaw* party (Figure 4). Three crewmen died, and one was marooned by the remaining four members, who sailed from Midway on June 28, 1887. On February 3, 1888, the *Wandering Minstrel*, under the command of Captain F.D. Walker, on a similar quest for sharks, was wrecked on the coral reef. The *Wandering Minstrel's* crew of 40 included Captain Walker's wife and sons. Captain Walker and crew were surprised to find the marooned member of the *General Seigel*, Adolfe Jorgensen, still alive on Sand Island. The shipwreck survivors primarily inhabited Sand Island and commented on the blinding white sand and lack of vegetation. Eastern Island, initially called Green Island because of the vegetation present on it, was used for a residence when the small community had disagreements. During this time several crewmen died of scurvy and six other members were lost in an attempt to sail a small boat from the atoll. Adolfe Jorgensen and two others managed to



Figure 4. Remnant cabin of the shipwreck survivors, Sand Island, ca. 1900. (Courtesy of the Hawaii State Archives, Neg.#975)

sail to the Marshall Islands in October 1888. The Walker family and remaining crew members were finally rescued in April 1889, after spending 14 months stranded on Midway. Stories of these survivors, including murders, mutiny, escapes, buried treasure, and rescue inspired Robert Louis Stevenson's novel *The Wrecker*.

Once again, interest in Midway waned because of the hazardous coral reefs, extremely remote location, and lack of amenities. During the 1890s visitors to Midway were limited to passing ships, occasional wrecks, and Japanese bird hunters who killed seabirds for feathers that were popular for women's hats at the turn of the century (Yoklavich 1993:12).

Commercial Pacific Cable Company, Pan American Airlines, and Other Ventures: 1903-1942

Technological improvements in communication and an optimistic expansion phase in the United States economy renewed interest in the Pacific Rim. Midway's status as an important link with the Far East was clearly established in 1903 when the Commercial Pacific Cable Company (CPCC) chose Sand Island for a relay station on its route from San Francisco to Hawaii, to Midway, to Guam, to the Philippines, and to various points around the world. The first round-the-world telegram was issued by President Theodore Roosevelt on July 4, 1903.

The idea for a cable across the Pacific was initiated by President McKinley in 1899. The acquisition of the Hawaiian Islands and the increasing American trade united to make communication to the Pacific Islands, Japan, and China critical for American commerce. Congress, in due fashion, discussed the merits of laying a Pacific cable in each of its sessions between 1899 and 1901 (54th, 55th, and 56th) (57th Congressional Report 1902). There were seven bills on the subject, three in the Senate and four in the House (Commercial Pacific Cable Company pamphlet in 57th Congressional Report 1902:21). The Navy proposed sponsoring a cable, but this required a substantial appropriation and there was no guarantee that a government-sponsored cable would be allowed to operate from China or Japan. Another bill suggested that the government form a partnership with a private company and share the costs (57th Congressional Report 1902).

Based on documents written at the time, it appears that there was a high level of competition among the various telegraph companies. Western Union was especially contentious, disputing the right of the CPCC to install the submerged cable and suggesting that the project was illegal

and should be stopped by Presidential order (Memorandum 1902). Rivalry was intense among the cable companies and the rates they charged. Finally, a hearing before the Committee on Naval Affairs of the Senate resolved the conflicts and allowed the CPCC to proceed (57th Congress, Document No. 141 1902). This resolution resulted from CPCC's offer to install the line at lower rates and without any government subsidies. The only provision that CPCC requested was that the government not lay a second, competitive line.

The CPCC was incorporated under the laws of the State of New York on September 23, 1901. The charter authorized it to lay and operate a submarine cable from California to the Philippine Islands by way of the Hawaiian Islands. The authorized capital stock was \$3,000,000, being the amount necessary for the manufacture and laying of the first section of the cable, the section from San Francisco to Honolulu (Commercial Pacific Cable Company pamphlet in 57th Congressional Report 1902:25). The company was formed as a subsidiary of the Commercial Cable Company, which was also associated with the Postal Telegraph Company and the Eastern Extension Telegraph Company of London. Although accused of being a foreign-owned interest, the CPCC was headed by a Californian, John W. Mackay. Other officers were George G. Ward, vice-president and general manager; Edward C. Platt, treasurer; and Albert Beck, secretary (Commercial Pacific Cable Company pamphlet in 57th Congressional Report 1902:25).

At the time of the January 1902 hearing, the CPCC was already manufacturing cable and laying the line between San Francisco and Honolulu. The line was completed from Guam to Midway on June 18, 1903. The ships *C.S. Anglia* and *C.S. Colonia* installed the cable between Guam and Midway (Haigh 1978: 273).

The first superintendent of the cable station at Midway was Ben W. Colley, who arrived in April 1903 with a staff and several carpenters, in all about 30 people. Colley's wife arrived in August of 1903. Temporary houses were built while the permanent concrete and iron cable station buildings were constructed in 1904. The modern material of reinforced concrete was an innovative design for the cable station buildings. The strength of concrete walls and second-story floors was still being debated by architects on the mainland when San Francisco architect Henry Meyers sketched the plans in 1902 for the CPCC's three stations on Midway, Guam, and the Philippines. The four two-story buildings and one one-story servants' quarters provided an office for the cable operator, a mess hall,



Figure 5. View of Commercial Pacific Cable Company's station on Midway, ca. 1913. (Courtesy of the Hawaii State Archives, Neg.#1993.011)

quarters for the staff, and a superintendent's quarters (Figure 5). The permanent buildings featured a library, billiard room, were plumbed for water, and wired for electricity that was supplied by an acetylene generator. An ice-making plant, cold storage house, and windmill were also constructed. The small colony had to be self-sufficient because supplies were sent only twice a year. Delays caused by storms and wrecks were frequent and made life on the island tenuous.

The stark white sand that drifted over walkways and into buildings was a concern to Superintendent Colley. He began importing soil from Honolulu with each ship carrying supplies. The soil was used to make a garden for growing fresh vegetables. Vegetation to control the sand also was planted by Colley, including *naupaka (scaevola)*, grasses, ironwood trees, and coconuts (Colley, n.d.). The second cable station superintendent, Mr. Daniel Morrison, continued to import soil and plants during his tenure from 1906 to 1921. Other superintendents stationed on Midway included C. Desnoee from 1922 to 1923, H.W. Burdin in 1923, and Alfred J. Cottrell in 1928. The superintendents of the cable station during the 1930s have not been identified. Luis H. Stroup was the last superintendent on Midway, serving from 1941 to 1952. He transferred from the Guam station in 1941 just before the Japanese took over that island and remained on Midway

through the war, operating the cable for the Navy. This important link to Honolulu gave the U.S. Navy an advantage over Japanese intelligence.

After the war, repairs to the line were completed from Midway to Guam and Guam to Manila, but restoration of the cable to Japan and China was too expensive. By 1950 only about 1,000 messages passed between the mainland U.S. and Midway as radio communications became more reliable (Haigh 1978:274).

In 1951, the Federal Communications Commission issued an order authorizing the permanent discontinuance of all operations of the Commercial PCC's route between San Francisco and Manila (Mary Goodwin, correspondence, 1998). In the 1950s the Navy converted cable buildings into apartments, and one building was used briefly as a school.

With full-time occupation of Midway by the cable station employees and the communication link with the rest of the world, activities on Midway, such as poaching were immediately relayed to the Navy. Especially pervasive were the Japanese poachers who collected feathers and threatened the safety of island residents. In January 1903, President Theodore Roosevelt placed Midway and environs "under the jurisdiction and control of the Navy Department" by Executive Order 199-A.

In May 1904, a group of 20 marines arrived on the island to provide protection for the cable staff and island wildlife. The marine camp was established "north of the center of Sand Island at an elevation of 13 feet, and at a point 330 yards from the shore, these measurements being taken from the base of the flagpole at the south end of the company street between the two commissioned officers' tents" (Owen 1904:1-2). The men dug a well, a cellar, and a latrine. "Excellent drinking water was obtained by digging eight feet in a valley southwest of the camp. The cellar was constructed in the north side of a sand dune situated 55 yards northwest of the camp. The latrine is located 106 yards northeast of the camp, between two sand dunes which almost conceals it" (Owen 1904:2). The marines stayed on the island for about four years. Building materials were scarce and the marines may have reused materials from the cable station's temporary wooden shelters to supplement their tent camp.

With the Cable Company colony and the marines permanently situated on Midway, supply ships began arriving more regularly. This increase in traffic also led to more shipwrecks on the fringing reef during winter storms. The *Julia E. Whalen* was wrecked on October 22-23, 1903, on the

north-northwest corner of the reef, losing all of her cargo. This wreck was especially difficult to watch for the new cable station employees because the ship was loaded with their provisions including food, mail, and fuel, along with top soil, trees, shrubs, and goats (*Pacific Commercial Advertiser* 1903). The Cable Company immediately sent out two ships to provision Midway, but these found the stormy weather and reef conditions too dangerous for landing and had to turn back without unloading their sup-



Figure 6. Wooden Lighthouse Pole, ca. 1920. (Courtesy of the U.S. Coast Guard)

plies. Finally, the *Iroquois* was able to land and unload supplies on April 9, 1904, to replenish the Cable Company's depleted stock.

In 1905, the U.S. Lighthouse Service established a lighthouse on the highest point on Sand Island, further legitimizing U.S. claims to Midway Atoll. The fixed, white light was first illuminated on September 22, 1905. The light was set on a 32 foot wooden pole on the highest knob (43 ft) on Sand Island, providing an elevation of about 75 feet, visible 16 miles at sea. In 1926 a steel tower was constructed for the light because the ironwood trees planted by the Cable Company had grown sufficiently to obscure the beam (Figure 6). At least one lighthouse keeper lived on the island, but operation of the light was soon added to the Cable Company's responsibilities.

In September 1906, the President of the CPCC and his wife were on an inspection tour of the cable relay stations when their ship *Mongolia* got stuck on the coral reef southeast of the atoll. The ship was heavily loaded with coal and 250 Japanese laborers who were returning to Japan. In order to dislodge the ship, it was necessary to jettison most of the coal and personal items of the Japanese laborers. In December 1906, the *Carrollton* bound from New Castle, Australia to Honolulu with a load of coal also became lodged on the southeast fringing reef. The *Carrollton* was not as lucky as the *Mongolia*; it eventually broke in two and sank, with the anchor imbedded in the reef. In 1916, the sloop *Helene* wrecked in Welles Harbor, on the shoals about 100 yards from the cable pier. Most of the shipwrecks occurred during the winter months when strong winds and heavy seas obscured the coral reef.

Perhaps spurred by the CPCC President's visit in 1906, the schooner *Florence Ward* was contracted to make regular supply runs between Honolulu and Midway. Between 1907 and 1923, the supplies steadily improved in their variety and the frequency of their arrivals.

In 1908, the marines were removed from Midway. The marines' departure may have been motivated by an accident. In the fall of 1907, the ammunition dump exploded, setting off rockets in all directions. The Cable Company employees and marines were pinned down until all the ammunition was expended. No one was hurt, but the event caused a reevaluation of the need for marines on the island.

In 1906, James Miller, an Assistant Surgeon in the U.S. Navy, died on Midway of an apparent appendicitis. Miller became the first person buried

in a small cemetery plot on a sandy knoll at the north end of Sand Island. In 1909, Dr. G. W. Hawkins died and was buried in the cemetery. No information is available for Hawkins. His death occurred after the marines were removed from the island, so whether he was attached to the Cable Company or visiting from a passing ship is unknown. In 1910, Philip Vernon Tinker, an 18-year-old cable operator, broke his neck while diving in the lagoon and became the third entrant in the cemetery. The fourth person buried at Midway was Dr. H. Macauley, who died November 28, 1921. Macauley's death is also not well documented, but coincides with the Navy's use of the island as a rendezvous location. Otherwise, during the 1920s the Cable Station employees were the only full-time inhabitants. The fifth and last individual buried in the cemetery was Dr. B. K. Tullidge. His death in August of 1950 occurred during a period when the Naval base was closing down after World War II; in fact, the base was evacuated between April and June of 1950. His death after the Navy had removed all personnel suggests that he may have stayed longer to provide medical service to the cable station staff. Individuals who died during the war or during the military's occupation of Midway were buried at sea or transported back to Honolulu or the mainland for burial. It is not known where the shipwrecked victims who died are buried.

In 1917, the weather bureau established a station on Midway and trained the cable station employees on how to take wind and barometric observations.

Various scientific expeditions also stopped at Midway in the early decades of the twentieth century. In 1911, two zoology professors from the College of Hawaii and the State University of Iowa recommended placing a station warden at Midway to protect the bird life. In 1921, the Navy began using Midway as a rendezvous for naval vessels on the east-west Pacific routes. Investigations by the Army Air Service were favorable for using Midway for a landing site (Yoklavich 1993:18). Use of Midway Atoll in the period between 1900 and 1929 can be characterized as one of initial colonization and increasing awareness of its strategic location for the United States in the Pacific rim.

In the 1930s, Pan American Airways President Juan Trippe proposed using islands in the Pacific as refueling stations for an air mail route. Trippe is credited with re-locating Wake Island and pioneering a route across the Pacific using a series of small islands as support bases for the amphibious "flying boats." In 1935, Pan American began construction of a refueling base at Midway. The support facilities consisted of a wooden

dock and a mooring barge in the lagoon where the seaplanes landed and discharged cargo and passengers (Yoklavich 1993:19). At first the seaplanes carried only mail, but, soon added passenger service.

Pan American's guest facilities included a prefabricated hotel with a solar-heated hot water system. The hotel was Y-shaped with the lounge and dining room in the center and 20 rooms in each of the two flanking wings (Cohen 1985). With the hotel in place, passengers began arriving on Midway in 1936. Pan American's support buildings also included "a machine shop, refrigerator plant, radio station, radio beacon, offices, and power plant" (Bingham 1938 in Yoklavich 1993:20). The Pan American complex of about 20 buildings was located to the east and south of the cable station and are described in 1939 as "neat cottages, work shops, and wooden boardwalks" (Lau 1939:3).

The support personnel for Pan American, the cable station staff, and a small military contingent were the only full-time residents on Midway in the 1930s. They shared buildings, as well as tennis courts, baseball fields, and even a sandy nine-hole golf course that required the use of black golf balls. By the mid-1930s, Pan American was importing soil from Guam, but new regulations required it to be examined for contaminants. In 1936, entomologist F.C. Hadden was stationed at Midway to inspect and fumigate the planes and thus prevent damage to the agriculture of Hawaii or Guam (Bryan 1938:30).

Military interest in Midway was also stimulated by fleet maneuvers. For instance, in 1935, the 6th Regiment marines were activated at San Diego as the first marine group on the West Coast. Their training culminated in a full fleet force exercise on Midway. The men were bivouacked on Midway for 10 days in June. They had to transport all water, food, and supplies from the ship in 60-ft. boats. The USS *Utah* was transformed into a radio control ship and used for target practice with water bombs (Elsmere Sutter, personal communication 1998). These maneuvers may have been the impetus for developing a military station on Midway.

Constructing Naval Base Midway 1940-1942

Military interest in Midway accelerated as World War II started in Europe and war in the Pacific appeared to be inevitable. The 1938 report by Rear Admiral Arthur J. Hepburn noted: "From a strategic point of view, an air base at Midway was considered second in importance only to Pearl Harbor" (U.S. Navy, Bureau of Yards and Docks 1947:Vol. II, 154 in Yoklavich 1993:22). Soon after the Hepburn Report was accepted, the

Army Corps of Engineers began constructing a harbor and seaplane shelter at Midway Atoll. A new settlement on the south side of the island was built to house the Army Corps workers. This advance crew developed infrastructure facilities on Sand Island, including a well with distilling equipment, water tanks, a septic tank system, a power generator, and basic buildings such as a mess hall, recreation building, and quarters. The construction work was divided into three main tasks: construction of a breakwater, dredging of a ship channel, and dredging of a seaplane anchorage. Work on these projects was completed in 1940 (Bingham, 1938 in Yoklavich 1993:22).

A worker on Midway in 1939 described three “towns” on the island:

Cable City, Gooneyville and Used,” the last an abbreviation for United States Engineering Department. This newest of Midway’s towns was composed of “gaunt dark-grey barracks . . . machinery and machinery parts . . . tractors, . . . lumber and pipes.” Gooneyville was the name assigned to the Pan American Airways settlement. Cable City was described as the “Sunday Park of Midway” (Lau 1939:3 in Yoklavich 1993:22).

Authorization for the Naval Air Base on Midway was approved by House Resolution 2880 on April 25, 1939. One month later, an appropriation of \$63 million was approved for constructing the Midway base. On July 13, 1939, President Roosevelt issued an Executive Order: “In the interests of national defense, the establishment of Naval aviation bases on Palmyra, Johnston and Midway and at Kodiak and Sitka, Alaska be constructed at the earliest practicable date” (Warshauer n.d.:173).

Between 1939 and 1940, the Pacific Naval Air Base (PNAB) contractors built the various facilities on Midway. At first the focus was on expanding the harbor and developing a seaplane landing basin. The emphasis on seaplanes was later changed, and construction of runways on Eastern Island commenced (Figure 7). When construction projects were running full speed, there were approximately 1,500 men on Midway. The population boom required many men to live in tents (Yoklavich 1993:22-24). Indeed, photographs of Sand Island taken at this time show several temporary barracks and rows of tents near the harbor area where the construction activities were focused.

The 1940-1941 construction projects are significant for several reasons. Development of a military air station changed the character of Midway from civilian enterprise to military control. The station plan replaced the



Figure 7. Aerial photo of Eastern Island, runways under construction, ca. 1941. Declassified NND Project 868130. (Courtesy of the San Bruno National Archives, Neg.#114277)

individual units or “towns” with an overall design that clearly demonstrated the Navy’s authority by placing the Officer’s housing in the center of Sand Island and developing a road system that linked the military’s buildings (Figure 8). The architectural style of the buildings enhanced the perception of military control because of its uniform, simple, and efficient design. The Navy contracted with architect Albert Kahn of Detroit, Michigan, “one of the country’s foremost industrial designers to prepare standardized plans for barracks, mess halls, and hangars for various bases” (Woodbury 1946:76 in Yoklavich 1993:24). The plans arrived on island in October 1940. Kahn also provided plans for the Officer’s housing, barracks, and the theater (Figure 9).

The first large group of marines, consisting of nine officers and 168 enlisted men from the 3rd Defense Battalion, landed on Midway on September 29, 1940, along with two five-inch guns and other supplies. The marines were housed in the Army Corps of Engineers’ barracks. They commenced work immediately on emplacing the guns and building magazines



Figure 8. Sand Island under construction in 1941. Declassified, NND Project 868130. (Courtesy of the San Bruno National Archives,

and shelters, although they were also required to unload ships coming to Midway (Heinl 1948:3-10 in Yoklavich 1993:25).

To provide access to Eastern Island, a small boat channel measuring 1,200 ft by 50 ft by 10 ft was dredged. A mooring berth protected by sheet-piling was built on Eastern Island. Following the completion of this channel, heavy equipment including bulldozers, road graders, steam rollers, and asphalt and concrete batching plants was moved to Eastern for constructing runways (Warshauer n.d.:198-199). By the end of July 1941, the three-runway airfield on Eastern was operational. Additional facilities completed included two hangars, shop and storage buildings, a mess hall, barracks, a power plant, underground magazines, aviation gasoline storage, and a fresh water distillation plant, as well as electrical lines and telephone service (Warshauer n.d.:205). These were the first permanent structures on Eastern Island.

In October 1940, the U.S. Army Engineers finally achieved a uniform 20-ft depth in the ship entrance channel to Sand Island, and the Naval supply ship *Sirius* was able to proceed inside the lagoon. The harbor area of



Figure 9. Officer-in-Charge house, designed by Albert Kahn (Speulda 1997).

Sand Island began to take on its current configuration as sheet piling was driven along the shoreline and dredged material was backfilled to create a 2,800-ft bulkhead. A large seaplane parking mat was also constructed. Three concrete seaplane ramps were connected to the mat and a large, steel-frame seaplane hangar was built (U.S. Navy, Bureau of Yards and Docks 1947 in Yoklavich 1993:24).

In 1941, the Naval Air Station was commissioned. The balance of the 3rd Defense Battalion arrived on February 14, 1941, along with equipment and supplies. The marines prepared gun emplacements, ammunition magazines, fire control systems, searchlight batteries, command posts, and protective cover. This defensive system consisted of 7-inch .45-caliber seacoast defense guns and 5-inch .51-caliber guns that had served in World War I as deck guns on battleships, but had been scrapped in 1924 in accordance with the 1922 Washington Naval Treaty. In order to adapt these large guns to a beach environment, batteries with a central reinforced concrete base and threaded bolts were built at strategic positions on Sand and Eastern Islands. Because of the low profile of the islands, the batteries were built on top of mounded sand. The large

guns were positioned to fire armour-piercing ammunition at approaching ships. The single-fire guns were not, however, useful for defending against planes. Therefore, interspersed among the large guns were smaller, anti-aircraft 3-inch .50-caliber machine guns for defending against low-flying aircraft. Because these guns were supported by steel outriggers, concrete bases were not necessary. The 3-inch battery design consisted of a low sand-mound base, surrounded by a reinforced concrete wall with notches for the steel outrigger supports. To guard the beaches from attack by enemy infantry landing forces, .30 caliber machine guns on tripod mounts were emplaced around both islands. Near each of the batteries the marines built ammunition magazines, usually banked in a sand dune and covered in sand to protect them from detection.

The advance echelon of the 6th Defense Battalion, lead by Lieutenant Colonel Harold D. Shannon, arrived on Midway in August 1941, replacing the 3rd Defense Battalion. A small group of seven officers and 204 enlisted men of the 4th Defense Battalion and three officers and 16 enlisted men of the United States Navy Medical detachment were included with the replacements (Warshauer n.d.:207). The transfer of marine units was completed in September (Heinl 1948:3-10 in Yoklavich 1993:25). The Marine Bombing Squadron 231 (VMSB-231) was the first permanent unit of aircraft to be based on the newly completed airfield on Eastern Island (Warshauer n.d.:219).

Within a two-year period, Midway changed from a remote air stopover facility and civilian business operation to a large military facility with a seaplane base, land airfield, defensive positions, and infrastructure sufficient to serve a small city.

First Attack, December 7, 1941

The Japanese surprise attack on Pearl Harbor on December 7, 1941, generated apprehension among the marines on Midway who stood ready all day to defend the islands from attack. Then around midnight, under cover of darkness, two Japanese destroyers shelled Sand Island for almost two hours (Hazelwood n.d. in Yoklavich 1993:26). Marine guns returned fire, but the Japanese ships caused extensive damage to several buildings, including the seaplane hangar and power plant. Four casualties and ten wounded were the result of the shelling on Midway. The most notorious hit was on the Sand Island power plant (Building 354); a round ricocheted off of the adjacent laundry building roof and entered an air vent, damaging this "bomb-proof" building and disrupting the communications center. Lieutenant George H. Cannon was fatally wounded in the

shelling, becoming the first marine to receive (posthumously) the Medal of Honor in World War II (Heinl 1948:13 in Yoklavich 1993:26).

After the attack, the marines and civilian contractors repaired most of the damage and began preparing for additional attacks. The defenders of Midway learned that Guam and Wake islands had fallen to the Japanese and, in the days immediately after Pearl Harbor, they felt that they would be the next Japanese target. In late December 1941, most civilian workers were evacuated from the island (U.S. Navy, Bureau of Yards and Docks 1947:Vol. II, 156 in Yoklavich 1993:26). The attack caused a strategic shift, from building a Naval facility to defending a frontline U.S. outpost.

Battle of Midway, June 4-6, 1942

The following discussion of the Battle is drawn from many sources, including reports of the battle by Captain Shannon, books synthesizing military records, eyewitness accounts, and interviews with World War II veterans.

The capture of Wake and Guam along with the increasingly powerful offensive operation employed by the Japanese in the Pacific, such as the Battle of the Coral Sea, caused military strategists to look closely at Midway. Midway's position was felt to be the key to retaining any hope of success in the Pacific Theater. If Midway fell, it would be a short hop from there to Honolulu and other West Coast cities. Suspecting that the Japanese were planning an invasion of Midway, Admiral Nimitz worked closely with a new code-breaking team, led by Joseph Rochefort. The pieces of intelligence pulled together by the code-breaking team indicated that a major assault was imminent and the target was probably Midway.

To determine if Midway was really the target, an intelligence trap was set. The Navy sent the plan over the secure CPCC cable that connected Midway to Hawaii, without fear of detection. Midway was ordered to broadcast a bogus radio message indicating that their water distillation plant was broken and that they needed fresh water. Two days after the fake message was transmitted, Rochefort's group "broke" a Japanese dispatch which stated that the target "AF was having trouble with its fresh water distillation system" (Cressman et al. 1990:34). With this information in hand, Nimitz began seriously planning for the battle that would soon occur. Convincing his staff that the code-breakers were correct took some effort. There were many who felt the true target was Honolulu. Japanese Admiral Yamamoto was a brilliant war strategist with the resources of the superior Imperial Navy at his command. Miscalculating his target could spell disaster for the United States.

Admiral Nimitz inspected the islands on May 2, 1942. Although the facilities on Midway were nearing completion, the visit by Nimitz spurred a last minute attempt to fortify the island with men and equipment. Nearly every day in May new personnel were arriving, planes were flying patrols, and defensive plans were being revised and implemented. For instance, the radar station was completely encased in a sand-filled crib for protection, and food and supplies were dispersed around the island in case of an air raid.

While the ground defensive plans were being implemented, new groups of air detachments were arriving. Landing on December 25, 1941, were 21 Brewster F2A-3 Buffalo fighters of the Marine Group VMF-221 and 21 Vought SB2U-3 Vindicator Scout Bombers of the VMSB-241. On May 26, 1942, the *Kitty Hawk* unloaded additional men, weapons, and equipment. Also on board were planes of the Marine Air Groups 21 and 45. There were 16 Douglas SBD-2 dive-bombers assigned to Marine Scout Bombing Squadron 241, now under the command of Major Lofton R. Henderson, and seven Grumman F4F-3 Wildcat fighters assigned to Marine Fighter Squadron 221, headed by Major Floyd B. Parks. Twenty-two of the Navy's PBV scout planes from VP-44 also arrived in May.

The pilots from VP-44, which include 22 Consolidated PBV-5A seaplanes, were soon busy flying survey patrols. The planes set out early every morning and flew 700 miles on set vectors, looking for enemy ships. The patrol route took nearly 14 hours to complete. Upon return, the men serviced their own planes and caught a few hours sleep before starting the routine over the next day. These survey patrols were critical for determining the enemy's location.

Midway Naval Air Station went on full alert May 21, 1942. But, on May 22, 1942, an event occurred that shook the general readiness of the operation. A group of sailors testing the demolition charges on the aviation gasoline tanks accidentally set off the buried explosives because the circuit wires were reversed. Huge flames erupted into the air and everyone in the general vicinity took cover as coral and steel fragments pelted the area. Fortunately, no one was hurt, but 400,000 gallons of the carefully hoarded fuel supplies went up in flames. The accident also damaged the distribution system so that all of the planes had to be fueled with hand pumps from barrels, a very time-consuming task. The accident was relayed to Pearl Harbor via the Cable Company's direct link so that the Japanese would not pick up the radio transmission.

On May 29, 1942, a group of 12-PBY patrol planes armed with torpedoes arrived from Pearl Harbor to reinforce the daily air patrols. Also on May 29th, the Army sent aircraft including four Martin B-268 twin-engine bombers that were detached from the 18th Reconnaissance Squadron and the 69th Bomber Squadron. The planes had been modified to carry torpedoes. The last Army plane to arrive that day was a B-17 Boeing four-engine heavy bomber. On May 30th, seven B-17 bombers arrived. Nine more B-17s arrived on May 31, 1942, under the command of Lieutenant Colonel Walter C. Sweeney. Eastern Island was now filled to capacity with planes and crew. The latest contingent of men arriving with Sweeney were billeted in tents because all available barrack space was filled.

Some of the last recruits to arrive on Midway were 11 PT boats of Motor Torpedo Squadron One from Pearl Harbor, dispatched from the Hawaiian Sea Frontier Force. They made the 1,250 mile voyage to Midway as a group under the command of Lieutenant Clinton McKeller, Jr. This was the longest open-water run that United States Navy PT boats had ever made (Warshauer n.d.:260).

By June 3rd, the defensive force had recruited 12 submarines; nine were stationed in a fanlike arc west of the island, two others were placed inside the 150-mile arc like linebackers (Blair 1975:236). Submarines lined up to report passing activities of the enemy were used by both Japanese and American forces with limited success. For instance, the U.S. aircraft carriers were already past the point of surveillance by the time four of the Japanese submarines were in place between Midway and Pearl Harbor; thus, the Japanese were unaware that the carriers were close to Midway prior to the Battle.

The final count of air power before the battle included a cooperative amalgamation. In fact, this was the first time in history that units of the Army, Navy, and Marine Corps had operated under a single commander (Warshauer n.d.:269). The final count of 107 planes occupied nearly every inch of Eastern Island and filled the seaplane hangar on Sand Island. Some of the planes stationed on Midway were outdated. The Brewster Buffalo and Vought Vindicator were on their way to the scrap heap when they were called back into service and sent out to Midway.

The morning of June 4, 1942, during their regular patrol, a Navy pilot radioed a contact report of “the main body” at approximately 700 miles away, headed northeast (Cressman et al. 1990:54). This report alerted Midway’s forces. Ironically, the report was not accurate; the pilot had

actually seen part of the occupation force rather than the attacking force. Yet, in a strange coincidence, the first attack launched by the Japanese was nearing Midway when the contact report was received, so that when the radar on Sand Island began picking up the incoming enemy flight at about 0630, all aircraft were ready to launch. The first group, composed of eight of the rambling F2A-3 Brewster Buffalo fighters and five F4F-3 Grumman Wildcats under the command of Major Floyd B. Parks, flew directly out to intercept the enemy. The second group, with 12 F2A-3 and one F4F-3 fighters under the command of Captain Kirk Armstead, flew slightly to the west of Major Parks' group.

Meanwhile, six new TBF-1 Grumman Avengers armed with torpedoes flew to attack the enemy aircraft carriers at the location reported. Under the command of Lieutenant Langdon K. Fieberling, the planes carried the newly developed torpedo to actual combat for the first time (Warshauer n.d.:273-274). Four B-26B Martin Marauder Army medium bombers were also armed with torpedoes and sent to attack the enemy aircraft carriers.

The last aircraft to leave Eastern Island were flown by the marines of VMSB-241. One group was composed of ancient fabric-covered SB2U-3 Vought-Sikorsky Vindicator scout bombers commanded by Major Benjamin W. Norris. These 12 aircraft were to fly to a prearranged spot 20 miles east of Midway and rendezvous with 16 SBD-2 Douglas Dauntless scout bombers under the command of Major Lofton R. Henderson, commander of VMSB-241.

Eastern Island's airfield fell eerily quiet for the few minutes prior to attack. Then 108 Japanese planes zoomed towards Midway as the 25 defending Marine fighters were trying valiantly to slow their progress. The enemy formation consisted of 36 Nakajima B5N2 high-level bombers each armed with 1,800 lb bombs, 36 Aichi D3A1 dive-bombers each armed with a 500 lb bomb, and a fighter cover of 36 Mitsubishi A6M2 "Zero" fighters. The Japanese military strategy was simple--destroy the air base at Midway and clear the way for occupation.

As the enemy force approached Midway, flaming airplanes were observed falling out of the sky. Two Nakajima bombers were hit on their first run over the islands and crashed, one on Sand Island and the other in the lagoon. High-elevation bombers and dive-bombers targeted the airfields, seaplane hangar, and large buildings in an effort to hinder the operation of Midway. The anti-aircraft guns and PT boats returned fire but with little success.

The seaplane hangar was hit and set ablaze. The fuel oil tanks 500 yards north of the seaplane hangar were also hit, sending up a thick black column of smoke that could be seen for miles. Other facilities on Sand Island destroyed or damaged in the attack included the dispensary building, torpedo shop, administration building, laundry, transportation building, and parachute loft. Battery D, a 3-inch battery located on the northwest shore of Sand Island, was also hit. On Eastern Island, a runway and the mess hall were directly hit.

The enemy's superior airplane technology was showcased when a Japanese squadron leader, upon dropping his bomb, descended to about 100 ft in altitude, turned his D2A1 upside down, and flew the length of the runway. The marines all gaped at this amazing sight, too surprised to fire. Finally, they opened fire and the pilot crashed into the lagoon at the end of the runway (Warshauer n.d.:279).

The attack lasted only 17 minutes, but left the installations on both Sand and Eastern Islands in shambles. At 7:15 a.m., the all-clear sounded and crews began the process of putting out fires and clearing the wreckage from the runways. Colonel Kimes issued the radio call that all the 5th Division fighters should return to refuel. There was no return message, as there were no planes remaining of the 5th Division. Finally, the Colonel issued a command that all fighters should return and land. Of the 15 F2A-3 Buffalo fighters sent out, 14 were shot down, and only a couple of the seven F4F-3s made it back. Of the Torpedo Squadron 8, only Ensign Albert K. Earnest was able to finally escape the enemy fighters and find his way back to Midway by sighting the black smoke cloud from the burning fuel oil tanks on Sand Island (Cressman et al. 1990:78).

The Army Air Force B-26 Midway detachment also fared badly. During their approach to the enemy aircraft carriers, two of the B-26 bombers were shot down and the other two damaged severely. To make matters worse, all of the torpedoes launched had missed their targets. Of the 16 SBD-2 dive-bombers under the command of Major Lofton R. Henderson, a total of six were shot down by Japanese fighters and anti-aircraft fire directly over the enemy fleet, including Henderson's plane. Major Norris' group of old SB2U-3 Brewster dive bombers were the last Midway Marine detachment to return to Eastern Island. Two were shot down on their return flight and two went down within sight of Midway (Cressman et al. 1990:78-79).

With all of the Midway-based planes accounted for, any approaching aircraft was viewed with suspicion. When a squadron of SBD-3 dive bombers from the carrier *Hornet* found they were critically low on fuel and chose to land at Midway, they were not well-received. The dive-bombers flew in low and jettisoned their 1,000 lb bombs upon the reef so as not to endanger the ground crew upon landing. This gesture was thought to be an attack, and fire was returned until it was noticed that they were U.S. Navy planes.

Reports of the battle were not optimistic. Out of all the planes sent out, few had caused any damage and most bombs had landed off-target. Because of the difficulty getting through the Zero cover, a night attack was planned to surprise the Japanese while their planes were down. Twelve SB2U-3 bombers under the leadership of Major Norris and Captain Tyler attempted this strategic plan. Unfortunately, the Japanese carriers were not located and all returned without sighting the enemy, except Major Norris, whose plane was lost.

The most critical assignment given to Colonel Shannon was the refueling and arming of the various aircraft that landed on Midway. With the fueling system knocked out, all high octane aviation fuel had to be pumped from the storage tanks on Sand Island into 55-gallon drums, then ferried over to Eastern Island, unloaded, and pumped into the planes by hand. During the day and night of June 4th, personnel from the Marine Air Group 22, Patrol Squadron 44 (known as Carlson's Raiders), and the army air crews worked to ensure a steady supply of fuel for aircraft. A total of 45,000 gallons of aviation fuel was transferred during that night (Warshauer n.d.:300).

While the men were working all night refueling and repairing planes, a Japanese submarine I-168 surfaced southeast of Sand Island and began shelling the atoll. At 1:23 a.m., Battery C, a 5-inch two-gun battery located on the northwest shoreline of Sand Island, returned fire. Then Battery D opened fire. Simultaneously, Batteries E and B on the northeast shoreline of Eastern Island opened fire. This skirmish lasted only a few minutes with no scores hit on either side.

The mood on Midway was low on the morning of June 5th. All battle reports showed the Japanese force moving closer. The Japanese aircraft had shredded the U.S. forces. Midway's defensive force was bracing for an assault and possible surface landing. One report that four heavy cruisers were only 90 miles away caused a wave of despair among the men.

The U.S. carriers *Enterprise* and *Hornet* were within striking distance when the location of the Japanese carriers was reported. Rear Admiral Raymond Spruance, in charge of the two carriers, decided to strike the Japanese carriers when they were refueling planes and launched an all-out attack of 20 Wildcat fighters, 67 Dauntless dive-bombers, and 29 Devastator torpedo-bombers. An additional six fighters, 17 SBDs, and 12 TBDs were later launched from the *Yorktown* which was under the command of Rear Admiral Fletcher (Morison 1963:154).

The first dive-bombers and fighters from the *Hornet* under Lieutenant Commander John C. Waldron missed the main group and were shot down by Japanese Zeros or anti-aircraft fire; only one pilot survived. The torpedo squadron from *Enterprise* came in next and lost ten out of 14; then *Yorktown's* fighters arrived, but they were also shot down, losing all but four. These three groups had not made a single hit, and the superiority of the Japanese Navy seemed invincible.

“Then, a few minutes later, with dramatic suddenness, there came a complete reversal of fortune, wrought by the Dauntless dive-bombers, the SBDs, the most successful and beloved by aviators of all our carrier types during the war“ (Morison 1963:156). Two squadron's of SBDs from the *Enterprise* dove in on the Japanese carriers *Kaga* and *Akagi*. Their arrival so soon after the last torpedo-bombing attack meant that the Zeros were still close to the water and had no time to climb (Morison 1963:156). The group from the *Enterprise* led by Lieutenant Richard Best dove first on the *Akagi*, but they were pushed off that target by the simultaneous attack by the *Hornet* group led by Wade McClusky. Best's group successfully assaulted the *Kaga* while McClusky's pilots hit the *Akagi* (Richard Best, personal communication 1998).

The *Akagi* took a bomb which exploded in the hangar, detonating torpedo storage, then another which exploded amid planes changing their armament on the flight deck. . . , and the carrier was abandoned and sunk. . . Four bomb hits on *Kaga* killed everyone on the bridge and set her burning from stem to stern. Abandoned by all but a small damage-control crew, she was racked by an internal explosion that evening, and sank.

The third carrier was the victim of *Yorktown's* dive-bombers, . . . 17 SBDs jumped *Soryu* just as she was turning into the wind to launch planes, and planted three half-ton bombs in the midst of the deck. Within twenty minutes she had to be abandoned. U.S. submarine *Nautilus*, prowling about looking for targets, pumped three torpedoes into her, the gasoline storage exploded, whipsawing the carrier, and down she went in two sections.

At 1024 Japan had been on top; six minutes later, on that bright June morning, three of her big carriers were on their flaming way down (Morison 1963:156-157).

The Japanese Navy was able to launch an assault from their one undamaged carrier, *Hiryu*, to strike the U.S. carrier fleet. Japanese attack planes found the *Yorktown* and dropped two torpedoes that damaged the vessel, previously weakened in the Coral Sea battle.

The *Enterprise* launched another group of SBDs to find the last of the four Japanese carriers. Lt. Richard Best led this second charge against the *Hiryu*. At 1700 the bombers found the carrier and dropped four hits, which did her in (Richard Best, personal communication 1998; Morison 1963:157).

The situation during the night of June 4-5 was far from clear to the people at Midway, to the carrier force commanders, or, for that matter, to Nimitz or Yamamoto. The Japanese forces had been weakened, but there was still a large landing force that had not been located. With *Yorktown* disabled, the air groups decimated, and no support in sight, Spruance had to balance pursuing the remaining Japanese fleet against risking his fleet. Consequently, Spruance retired *Enterprise* and *Hornet* to the eastward. It was fortunate that he refused to tempt fate; "had he steered westward that evening, he would have run into a heavy concentration of Yamamoto's battleships and cruisers around midnight, forcing a night gunfire battle that he would have surely lost" (Morison 1963:161).

Early in the morning of June 5, Japanese naval commander Admiral Yamamoto gave the surprising order for a general retirement of his fleet, even though he still maintained overwhelming gunfire and torpedo superiority. He had lost his entire fast carrier group, with its complement of some 250 planes, most of the pilots, and about 2,200 officers and men. In all its long history, the Japanese Navy had never known defeat (Morison 1963:160). The battle for Midway took a heavy toll on the Japanese Navy and caused a loss of morale from which it never recovered.

When news of sinking of the four carriers and retreat of the Japanese forces was transmitted to Captain Cyril Simard, a great relief swept over the Midway. June 6th saw a few more attack runs, but essentially the battle was over.

After the remaining Japanese ships and aircraft had left the area, the task of finding survivors was given highest priority. The PBYs flew out on rescue missions, checking anything that looked like wreckage or patches of oil. The last American survivors of the Battle of Midway were found on June 21, 1942, after being at sea for 17 days.

Although the Battle of Midway was actually a rather brief encounter, it was a battle filled with heroic moments and actions. The defensive ground troops displayed incredible courage when the odds were against them. Strategic plans and luck prevailed when the U.S. bombers found their targets and all four Japanese aircraft carriers were sunk along with many of their planes. The Japanese strategy was based on the element of surprise. When they were in turn surprised, it took them too long to recover--and the battle was decided. The toll of lives and equipment lost was heavy on both sides. There would not be time for the Japanese to rebuild and train men to fill the void, a fact which set the stage for their defeat in other battles, and caused this battle to be called the “turning point of World War II in the Pacific, and the beginning of Hawaii’s change from an outpost of defense to a staging area for offense” (Allen 1950:63 in Yoklavich 1993:29).

Remainder of World War II: July 1942-1945

After the June battle, Midway’s role switched from defensive to offensive. Because of the battle damage, 100 of the civilian contractors returned to make repairs and install equipment such as refrigerators, distillers, and power plants (U.S. Navy, Bureau of Yards and Docks 1947:Vol. II, 156 in Yoklavich 1993:30). In July 1942, the Midway Submarine Advanced Base was formally established. The base was necessary to reduce the time need for refueling submarines that were active along the Japanese coastline. From July through September 1942, Navy Construction Battalion (CB) groups arrived on Midway to build a submarine base and a Naval Air Station on Sand Island. Between 1943 and 1945, approximately 5,000,000 cubic yards of material was dredged for the new submarine base (Warshauer n.d.:10). During the later part of WWII, submarines played an increasingly significant role.

The Naval Operating Base was established in July 1942 to encompass all the activities on Midway Atoll. The base expansion included three runways on Sand Island, one of which was extended in August 1944. The Eastern Island runways continued to handle large planes until the end of the war (Service Information Office 1992 in Yoklavich 1993:30). A marine squad-

ron stationed on Eastern Island built temporary facilities because the battle had destroyed many of the buildings. In September 1942, the Secretary of the Navy, Frank Knox, approved renaming the airfield on Eastern Island "Henderson Field" after Major Lofton R. Henderson, commander of a squadron of dive-bombers who were shot down during the Battle of Midway on June 4, 1942.

The 5th Naval Construction Battalion, Midway detachment, constructed Sand Island's three new landing strips, revetments for the protection of aircraft on the field, airfield lighting for nighttime operations, and steel-reinforced concrete storage magazines for the safe storage of high explosive munitions. More accommodations for both officers and enlisted men were also constructed, along with mess halls, storage buildings, and other structures. The U.S. Navy invested \$16 million dollars to transform this small, sandy landform into one of the most powerful sentinels of the North Pacific Ocean.

Midway became the staging area for troops being sent to battles in the Pacific. For instance, Midway was used as a stationary aircraft carrier for long-range planes bombing Wake Island. The base was also busy as an advanced training location for pilots and a submarine refuel and repair station. Several of the submerged planes in and around the lagoon are related to mishaps during pilot training exercises during this period.

The Cold War and Pacific Rim Conflicts 1945-1990

Within a year after the Japanese surrender on 14 August 1945, the Navy began demobilizing men and removing articles of warfare from the atoll. Naval Operating Base--Midway was no longer a critical link in the defensive chain. On November 23, 1945, the submarine base on Sand Island was decommissioned and placed into a caretaker status. Men were removed and much of the equipment was removed or abandoned (Thorp 1960:25 in Yoklavich 1993:30). Military personnel were reduced to less than 300 men and officers responsible for maintaining the base and operating sea and air rescue services (Apple 1979:21 in Yoklavich 1993:30). Finally, the "defensive capabilities of the base ended in July 1947 with the departure of the Marine fighter squadron, VHF 322" (Denfeld in Yoklavich et al. 1994:2).

Pan American Airways began to use Midway as a refueling stop again, but the newer types of planes did not require as many stops, and Midway was phased out of the operation. Pan American discontinued its operations on Midway in 1947, and its air facilities were taken over by the CAA (now

FAA). The Commercial Pacific Cable Company's lines were reestablished from Midway to Guam and from Guam to Manila after the war.

As Naval Operating Base--Midway shifted to a peacetime installation, Naval Construction Battalion Detachment #1155 converted quarters into family housing for dependents. On December 30, 1945, the first families arrived on the atoll.

In 1949, drastic cutbacks in Naval installations in the Pacific's 14th Naval District were approved. Midway survived the first round of budget cuts, but by 1950 a further reduction was ordered. Because it was no longer considered to be a strategic base, Naval Air Station/Naval Operating Base-Midway was deactivated (Denfeld in Yoklavich et al. 1994:2). In April of 1950 the evacuation process began, and by mid-June all military personnel had been removed.

Initially, the CAA radio station personnel, Standard Oil representatives, and Cable Company personnel had planned to remain on Midway. But with the military personnel leaving, there was not enough manpower to maintain the infrastructure of utilities, sewage system, harbor facilities, search and rescue operations, and other necessities. Only the Cable Company staff, comprising about a dozen employees, were able to return to a self-sufficient level and remain on Sand Island.

After only two months of closure, however, the Korean conflict necessitated reactivation of the Midway base. Midway was utilized as a refueling station for ships and aircraft. In April 1953, when hostilities in Korea decreased, the naval command once again deactivated the base on Midway.

The third reactivation of Midway, in July 1953, was in reaction to Soviet bombers flying across the Pacific sparking the era of "Cold War" hostilities (Denfeld in Yoklavich et al. 1994). Newly developed radar technology was necessary to track the Soviet planes. Construction of the Distant Early Warning Line (DEW Line) was started in 1953. The "Pacific Barrier" was extended in 1957 and operated seven days a week, 24 hours a day. The initial action to extend the DEW line into the Pacific came in January 1956 with the establishment of Airborne Early Warning Wing Pacific, comprised of three squadrons of "radar constellation" aircraft. This wing and a few Navy Destroyer Escort Radar vessels made up the Pacific Barrier and extended North America's early warning system to the mid-Pacific. The Barrier became fully operational on July 1, 1958 (U.S. Naval Station Midway Island 1964:n.p.). Later the squadrons were combined to form Air-

borne Early Warning Barrier Squadron Pacific. In 1964, there were 34 flight crews with between 15 and 20 men per crew.

The purpose of this operation was to provide a radar line from Midway Atoll to Adak Island, some 1,300 miles to the north (NAS Barbers Point 1962:12). The Air Defense Command utilized commercial planes adapted with radar equipment to fly between Midway and Adak. The planes were called "Willy Victors." Each run required 14 hours; continuous coverage necessitating a staggered flight schedule with planes leaving Midway every four hours (Raymond Sheen, personal communication 1998). The planes served as contact points along an imaginary fence across the Pacific.

The Pacific Barrier operation was the largest and longest-running Cold War defensive mission at Midway (Denfeld in Yoklavich et al. 1994:7). The DEW Line was terminated in 1965 due to costs and changing technologies.

To accommodate this intensive operation, a huge construction program was required at Midway. Between 1957 and 1958, the DEW Line support facilities projects included harbor dredging and expansion, Sand Island runway expansion, building the current hangar, housing for families, barracks for bachelors, the Cannon School, a chapel, a galley for 1,000 enlisted men, water and fuel facilities, and recreational facilities.

The previously abandoned Eastern Island became the location of communications and direction finding equipment of the Naval Security Group Activity (NSGA). And, the Army located a contingent of men on Eastern Island to operate their Pacific Scatter Communication System. The scatter system was a 6,500-mile line network linked to Oahu, the Philippines, and other stations in Asia (Denfield in Yoklavich et al. 1994:7). A Naval Communication Unit was commissioned on January 1, 1963, in support of antisubmarine patrols in the Pacific and base communications needs.

During the Vietnam War, Midway was one of the main aircraft and ship refueling stations. Classified missions such as the Missile Impact Locating System (MILS) to identify test missile impact areas within the Pacific were based on Midway. The atoll also accommodated the storage and assembly of advanced underwater weapons and the Sound Surveillance System (SOSUS/Project Caesar), a secret system installed in 1968. It included miles of undersea cables with hydrophones that picked up the sounds of submarines (Denfeld in Yoklavich et al. 1994:9).

One event of historical note occurred during the Vietnam War. Midway was selected as the site for the June 8, 1969, meeting of President Thieu of the Republic of Vietnam and U.S. President Richard Nixon. President Thieu, fearful of riots if he came to the United States, asked for a remote and safe location for a meeting. Midway fit that need. The base commander's home (Building 414) was the site of this momentous meeting (Denfeld in Yoklavich et al. 1994:8-9).

Following the Vietnam War, ship and aircraft visits declined and Midway was once again reduced to caretaker status. In 1979, base operations were reduced and all dependents were removed. Late in 1981, a Base Operating Services (BOS) contract was created for Midway which provided for the operation of NAF Midway by civilian contractors with a reduced military presence (Denfeld in Yoklavich et al. 1994:11).

In the waning years of the Cold War, Midway was utilized for two new missions: Pony Express and Surge. The Pony Express joint operations were missions to monitor Soviet missile testing in the North Pacific. They were conducted from Midway from 1982 until 1989 and employed up to 20 aircraft and 500 personnel for periods of up to three months. The Surge missions were antisubmarine patrol operations (Denfeld in Yoklavich et al. 1994:11). In 1988, the military character of Midway was transcended by the inclusion of an overlay National Wildlife Refuge. Two U.S. Fish and Wildlife personnel were stationed on Sand Island, occupying housing built during the Cold War.

Changing Priorities: 1990-1998

In 1993, NAF Midway was identified for closure under the Base Realignment and Closure (BRAC) Act of 1990, P.L. 101-510, as amended. NAF Midway was operationally closed on 1 October 1993. Midway Atoll was officially transferred to the U.S. Fish and Wildlife on 31 October 1996. Final withdrawal of all Navy personnel occurred on June 30, 1997.

Prior to the Navy's withdrawal, a massive cleanup effort removed all buildings and structures from Eastern Island, and many of the Cold War era buildings from Sand Island. The reduction in the number of post-1945 buildings has created a landscape that is actually more similar to that of 1941. In fact, many of the Albert Kahn-designed base buildings and structures have survived through the years and continue to serve their original functions.

In 1997, Midway Atoll National Wildlife Refuge began encouraging public visitation by entering an agreement with a cooperator, Midway Phoenix Corporation (MPC), who offers air passage from Honolulu and accommodations in the refurbished naval facilities. A restaurant and beach pavilion were constructed to provide additional services to tourists. In 1998, the programs expanded and the number of visitors increased. Tourists also have the opportunity to support ongoing research and historic preservation efforts by volunteering to assist with projects directed by the Fish and Wildlife Service or their cooperator.

Chapter 3. Identification and Evaluation of Midway's Historic Properties

3.1 Previous Cultural Resources Investigations.

Study of Midway's heritage resources was initiated in 1986 by the National Park Service when it conducted a survey of World War II-era properties eligible for designation as a National Historic Landmark (NHL). Nine structures, all defensive positions, were identified on Midway that convey a close association with the pivotal Battle of Midway (June 4-6, 1942), including ammunition magazines (ARMCO huts), a pillbox, and gun emplacements (Thompson 1986). All of the resources are located on the west side of Sand Island, on relatively undisturbed terrain. A buffer zone around the individual structures was included in the NHL. No resources were identified on Eastern Island for inclusion in the NHL.

Between 1992 and 1994, PACNAVFACENGCOM sponsored studies of the Naval Air Facility on Midway carried out in conjunction with the Department of Defense Legacy Resources Management Program. These investigations, which comprised archival research, interviews, and field surveys are presented in several documents, including *Cultural Resources Overview Survey at Naval Air Facility, Midway Island* (Yoklavich 1993), a *Supplemental Cultural Resources Overview Survey* (Yoklavich et al. 1994), and the *Cultural Resources Management Plan* (Helber Hastert & Fee 1995). The following is a brief synopsis of the results as reported in these documents.

Architectural Studies

The initial field effort consisted of an architectural history survey of the structures, buildings, and objects located on Sand and Eastern Islands. A military historian specializing in Cold War history performed archival research and surveyed resources on Eastern and Sand islands that were constructed after 1945. The historian concluded that none of the Cold War facilities at Midway were eligible for the National Register of Historic Places because they lacked the exceptional importance, necessary for resources less than 50 years old (Yoklavich et al. 1994).

Severe weather conditions prohibited the study of Eastern Island during the fieldwork phase in 1992. Therefore, a supplemental survey was conducted in 1994 to complete work on Eastern Island. The 1994 fieldwork also included large-format photography of historic properties following standards of the Historic American Buildings Survey (HABS). In addition to the nine NHL structures, 69 buildings, structures, and objects associ-

ated with the 1903-1945 historic period on Sand and Eastern Islands were determined eligible according to criteria established by the National Register of Historic Places (Table 1).

The properties evaluated as significant are associated with three major themes--colonization, initial years of base construction and the Battle of Midway, and 1942-1945 base construction.

Colonization: The first evidence of habitation on Midway are the buildings associated with the Commercial Pacific Cable Company, constructed in 1903-1904. San Francisco-based architect Henry H. Meyers designed these unique two-story buildings. The innovative design advanced the use of concrete with an embedded steel frame and steel posts. The main four buildings are arranged around a courtyard plan. The buildings are reminders of technological innovations in communication, colonial expansion, and early steel and concrete architecture.

Initial Years of Base Construction and Battle of Midway: Defensive construction prior to World War II includes more than just the NHL structures. An example is the Power Station building which was hit during the December 7, 1941 attack which stands as a reminder of that pivotal moment when the United States entered World War II. Approximately half of the historic properties inventoried on Midway are related to this period between 1940 and 1942. Eastern Island sustained heavy damage during the Battle; historic resources from this period are limited to the runways, a couple of defensive positions, and revetments. Construction of Midway Naval Air base began in earnest in 1940 with construction battalions and civilian contract workers. Plans for many of the buildings were developed by Detroit architect, Albert Kahn, including barracks, Senior Officer's Quarters, Shops, the Motor Pool, the Seaplane Hangar, and the Theater. Kahn was well known for his steel and concrete factories. His use of natural light to create buildings with comfortable interior spaces is reflected in the shop buildings on Midway. The Officer's housing reflects Kahn's design versatility; the houses are functional and stylish with covered patios, fireplaces, large sliding doors and windows, servant's quarters, and portal window porch details. Most of the buildings designed by Kahn are still in use.

1942-1945 Base Construction: Between 1942 and 1945, after the Battle of Midway, emphasis shifted to creating a Naval Air Station on Sand Island. Eastern Island was heavily damaged during the Battle and was left in rather rough condition, although it continued to be the base of operation for marine air squadrons. Only a few buildings remain on Sand Island that

were constructed during this period including an electric switch station, public works storehouse, radar buildings and radar tower base, diesel power plant, brackish water reservoirs, and command post.

Properties that transcend a particular theme or period include the three Japanese grave markers, the cemetery, and the Midway Mall Memorial. The Japanese markers date from about 1911 to 1916. Translations of the markers indicate that they are memorials to fishermen who died and were buried at sea. The location of the markers is not original; they were moved in the early 1970s. The small cemetery is an anomaly because all military personnel killed in battle or during duty were either buried at sea or transported back to Pearl Harbor. The dates on the gravestones range from 1906 to 1950. Four of the five individuals buried there were medical doctors. The Midway Memorial Mall encompasses several plaques, a large gooney bird statue, and two five-inch guns. One of the plaques was erected in 1941, just a few months after the Battle. The guns were probably used during the Battle, and later moved to this location.

Archaeological Studies

An archaeological survey of Sand Island was conducted by Dr. Fred Reinman in 1992 as part of the *Cultural Resources Overview Survey* (Yoklavich 1993). The field investigations consisted of a pedestrian survey of Sand Island augmented by 20 subsurface core samples. The surface inspections and core samples produced no indication of prehistoric settlement on Sand Island. Fieldwork on Eastern Island was restricted because of inclement weather. A literature review of Hawaiian legends was conducted to determine if Midway was included in any travel accounts. While references to distant low-lying islands with abundant birds and turtles were found, no clear tie to Midway was detected (Maly 1994 in Yoklavich et al. 1994:A-1-A-4).

The poor field conditions that hindered study of Eastern Island, in 1992, prompted an additional study in 1994 by Paul H. Rosendahl, Ph.D., Inc. (PHRI) on both Sand and Eastern islands for the *Supplemental Cultural Resources Overview Survey* (Yoklavich et al. 1994). The intent of this supplemental survey was to achieve uniform coverage of Eastern Island. The sample included, 45 auger cores and two contiguous 1.0 meter by 1.0 meter shovel-test units excavated on Eastern Island and three auger cores and three 1.0 meter by 2.0 meter shovel-test units excavated on Sand Island (Yoklavich et al. 1994:7). No evidence of Polynesian/Hawaiian or pre-A.D. 1900 historic period cultural remains were found.

The studies concluded that no evidence of prehistoric Polynesian/Hawaiian occupations or historic period occupations are present on either island. The subsurface archaeological investigations observed very disturbed deposits, with as much as two meters of fill or redeposited sediment over a thin layer of undisturbed sand. Polynesian/Hawaiian's may have utilized Midway in their extended travels, but the atoll has experienced such pervasive ground-disturbing activities that finding evidence of prehistoric use is problematic. Even prior to the mid-twentieth century construction, the low-profile islands were periodically scoured by storms and high winds that may have removed or buried evidence of use.

3.2 National Historic Landmark (NHL) Properties.

The significance of the Battle of Midway is achieved because of its transcendental role in World War II, as the United States successfully stopped Japanese expansion. This battle was a turning point in the Pacific Theater. Homage was paid to the Battle of Midway in 1986 by designating nine defensive positions on Sand Island a National Historic Landmark (NHL). The following description of the properties included in the NHL is derived from *World War II-Era Military Facilities, Midway Islands National Historic Landmark* nomination completed by National Park Service Historian Erwin Thompson (1986):

The first Japanese attack on Midway occurred on December 7, 1941, when destroyers shelled the naval installation. Then, flush with victory after victory in the Pacific and southeast Asia, Japan prepared in the spring of 1942 to capture the Midway Islands, establish a toehold in the Aleutians, and draw out what was left of the U.S. Pacific Fleet and decisively defeat it. Centered on four aircraft carriers, the Japanese fleet of 162 warships and auxiliaries approached Midway in the first days of June. The Marines and Navy personnel on Midway were aware of Japan's intentions and worked furiously to strengthen the defenses. Admiral Chester W. Nimitz, Commander in Chief Pacific Fleet, ordered his forces, centered on three carriers, to sea to intercept the Japanese. On June 3, Midway's aircraft spotted a part of the Japanese fleet approaching Sand and Eastern islands. Before dawn, June 4, the Japanese launched 108 aircraft which attacked both Sand and Eastern islands, inflicting considerable damage. U.S. planes took to the air from Midway but the Marine scout bombers and fighters suffered greatly. The Japanese, unaware that the American carriers were fast approaching, decided to

launch a second attack upon Midway. The American carrier planes struck while the Japanese were still rearming. By the end of the Battle of Midway, all four Japanese carriers had been sunk, while the United States lost carrier *Yorktown*. The Japanese lost 332 of their finest aircraft, and more than 2,000 of their most experienced pilots and sailors perished. The Japanese navy never fully recovered and its expansion in the Pacific had been stopped. American naval power in the Pacific was restored. The morale of the American fighting man leaped upward. The American victory at Midway was the turning point of the Pacific war.

The 1986 NHL boundary encompasses the remains of the defensive positions on Sand Island that were involved in the Battle. The six magazines S-7113, S-7119, S-7121, S-7124, S-7125, and S-6194 are listed individually with a rectangle of land centered on each magazine measuring 100 by 100 feet. The magazines have a heavy gauge corrugated metal shell with a concrete floor and are covered with sand. The pillbox (S-3) near magazine S-7125 includes a rectangle of land centered on the pillbox measuring 50 by 50 feet. The concrete pillboxes were located near the batteries and served as shelters for men attached to each of the batteries to defend the island against a land invasion. Battery D's 3-inch gun emplacement (S-2) includes a rectangle of land centered on the emplacement measuring 150 by 225 feet. For the two 5-inch emplacements at Battery C (S-1), a rectangle of land centered on each of the emplacements measuring 300 by 300 feet is the property boundary (Thompson 1986). The boundary of the NHL nomination includes the individual features between 28° 11' and 28° 13' North latitude and between 177° 19' and 177° 24' West longitude, and does not exceed one acre. The NHL properties are discussed in more detail in Chapter 7.

3.3 Programmatic Agreement and Treatment of Midway's Historic Properties.

The Programmatic Agreement defined the historic properties and six types of preservation treatments: *reuse, secure, leave as-is, fill, relocate, or demolish*. Table 1 lists each of the 78 historic properties and the treatment for each resource as presented in the PA (1996). Additionally, the current status of each property, as of June 1998, is noted. The proposed treatment and current status are not entirely congruent, reflecting several changes since the Navy transferred the property to FWS.

All of the properties planned for reuse are being reused by the FWS or the Cooperator, Midway Phoenix Corporation (MPC). Fifteen buildings and structures were *secured* by the Navy prior to June 1997. However, several of the securing procedures have failed in the past year and are causing problems with the long-term stability of the properties; this issue is discussed in more detail in Chapters 7, 8 and 10. Twenty resources, primarily structures that are inappropriate for reuse, were placed in the *leave as-is* category. In several instances, leaving properties to decay naturally is being reconsidered and proposals to conserve and protect these properties are presented in Chapter 9. Four structures including two ARMCO huts, a pillbox, and an underground bunker were to be left in place and *filled* with sand. However, only the pillbox and bunker were filled, these structures are discussed further in Chapter 10. Three artifacts (a torpedo and bomb, a pillbox turret, and pieces of submarine netting) were to be *relocated* if necessary. The pillbox turret and several pieces of submarine netting were relocated from Eastern Island to Sand Island. According to the terms of the PA, 15 properties were *demolished*, in 1996, prior to the transfer of Midway to the FWS.

The inventory of Midway's historic properties is presented below in Table 1. All of the 78 properties, including those demolished, are listed. Each of the primary treatment categories of *reuse*, *secure*, *leave as-is*, *fill*, and *relocate* are discussed further in Chapters 7-10.

Table 1. Inventory of Midway's Historic Properties.

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)	Current Status (1998)
S2115	Seaplane Ramp	Aviation Facilities/1940	Reuse	FWS and Cooperator using.
361	Electrical Switch Station	Shops/Warehouses 1944	Reuse	FWS and Cooperator using.
259	Theater, Offices, Recreation Facilities, and Shopping	Recreation/1941-44	Reuse	FWS and Cooperator using.
578, 579	Barracks	Early Base Housing/1941	Reuse	Not in use. Cooperator planning rehabilitation before reusing.
353	Carpentry Shop	Kahn design, Early Base/1941	Reuse	Cooperator using.
356	General Squadron Storehouse	Kahn design, Early Base/1941; 1942	Reuse	FWS and Cooperator using.
357	Torpedo Shop (Machine shop)	Kahn design, Early Base/1941	Reuse	Cooperator using.
414, 415, 416, 417, 418, 419, 421, 422, 423, 424	OIC, Senior Officer's Quarters	Kahn design, Early Base Housing/1941	Reuse	FWS and Cooperator using.
349	Commissary & Cold Storage	Early Base/1941	Reuse	Cooperator using.
S3126, S3127	Water reservoirs	Early Base/1941	Reuse	Cooperator using.
393	Public Works Storehouse	Base Development/1943	Reuse	Cooperator and FWS using.
151	Seaplane Hangar	Kahn design, Early Base/1941	Reuse	Cooperator using.
342	Paint and Oil Storehouse	Kahn design, Early Base/1941	Secure	Cooperator using.
363	Torpedo Shop w/parachute tower	Kahn design, Early Base/1941	Secure	Cooperator using.
144	Diesel power plant and salt water pumping station	Submarine Base/1944	Secure	Navy secured in 1997.
354	Power Plant	Early Base/1941	Secure	Navy secured in 1997, FWS planning public interpretation.
521	Command Post	Base Development/1945	Secure	Navy secured in 1997.
628, 619, 623, 643	Cable Station bldg Complex	Commercial Pacific Cable/1903-04	Secure	Navy secured in 1997.
S6194	ARMCO hut (NHL Structure)	Defensive Position/ 1941-1942	Secure	Navy (1997) removed original doors, building not secured.

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)	Current Status (1998)
631, 5187	Radar Building and Radar Tower base.	Base Development/ 1943-44	Secure	Navy closed off doors (1997).
S956	Underground Shelter	Early Base/1942	Secure	Navy closed off doors (1997).
626	Cable Station bldg	Commercial Pacific Cable/1903	Leave as-is	One-story building is a ruin.
S2123	Plaque in Midway Memorial	Battle Memorial/1942	Leave as-is	as-is
S2409	Two 5-inch Naval guns in Midway Memorial	Battle of Midway/1942	Leave as-is	as-is, FWS treated metal of 5" gun (1998)
S5247	Brackish water reservoir	Early Base/1941	Leave as-is	as-is
S9132 S2117	Seaplane ramps.	Early Base/1940	Leave as-is	as-is
S-1	5-inch gun battery C - "Charlie" (NHL structure)	Battle of Midway/1942	Leave as-is	FWS built trail, conservation of metal and clearing vegetation, including battery in interpretation of battle.
S-2	3-inch gun Battery D - "Dog" (NHL structure)	Battle of Midway/1942	Leave as-is	FWS clearing vegetation, planning conservation of metal.
S-3	Pillbox (NHL structure) near S7125.	Battle of Midway/1942	Leave as-is	Navy filled pillbox with sand.
S-4	Cemetery: Bauer Road	1906-1950	Leave as-is	FWS has built trail and is maintaining cemetery.
S-5	Three Japanese Memorials	1911-1916	Leave as-is	as-is
S-6	Pillbox, south shore (NHL Structure)	Battle of Midway/1942	Leave as-is	as-is
6-24, 12-30, 3-21	Eastern Island Runways	Early Base/1941	Leave as-is	as-is
E-1	3-inch anti-aircraft gun	Defensive equipment/ WWII	Leave as-is	Conservation efforts completed (1998).
E-2	Underground Bunker, east of runway	Defensive position/WW II	Leave as-is	as-is
E-6	Revetments	Early Base/1941	Leave as-is	as-is
E-7, E-8	Possible gun positions, south shore.	Defensive positions/WW II	Leave as-is	as-is
S-7	Metal Pillboxes, north side on inner harbor	Defensive Position/WW II	Fill	Navy filled.

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)	Current Status (1998)
S7124 S7125	ARMCO huts (NHL structures)	Battle of Midway/1942	Fill	Navy (1997) secured these two structures by placing plastic panels across front. This securing method is causing deterioration of metal
E-3	Metal pillbox, Eastern Island	Defensive Position/1942	Fill	FWS is using pillbox in interpretation.
S-8	Torpedo and bomb	WW II	Relocate	Items remain on display in terminal.
E-4	Metal pillbox (turret)	WW II	Relocate	Navy (1997) moved object to Sand Island.
E-5	Submarine netting	WW II	Relocate	Navy (1997) moved several pieces to Sand Island.
174	Quonset Hut at Submarine Base	Submarine Base/1944	Demolish	Demolished (1996)
189	Officer's Head at Submarine Base	Submarine Base/1944	Demolish	Demolished (1996)
335, 336	Barracks	Kahn Design/1941	Demolish	Demolished (1996)
343	Motor Pool and Garage	Early Base/1941	Demolish	Demolished (1996)
348	N.O.B. Armory	Base Development/ 1941-44	Demolish	Demolished (1996)
365	Laundry	Base Development/1943	Demolish	Demolished (1994)
586	General Storehouse, Marine Corps Reservation/ Air Terminal Building	Base Development/ 1941-43	Demolish	Demolished (1996)
594, 596	Airfield storage buildings	Base Development/1942	Demolish	Demolished (1996)
595	Blackout Hangar	Base Development/1943	Demolish	Demolished (1996)
S7113 S7119 S7121	ARMCO Huts	Battle of Midway/1942	Demolish	Demolished (1996)
S5182	Brackish water pumping station	Base Development/1944	Demolish	Demolished (1996)

Chapter 4. Management Issues

Managing Midway is a balancing act involving many complex issues. The guiding principals are reflected in the refuge goals and objectives, but even within this focused approach, conflicts are likely to occur among resources and activities. This chapter attempts to identify the activities, both human and natural, that are likely to affect historic properties. Management also is guided and sometimes compelled by other forces, including interest groups, Congress, and federal regulations. The outcome of pending legislation and reassessment of the NHL boundaries are unpredictable and may alter the treatment of historic properties on Midway. Compliance with the National Historic Preservation Act is predicated on the Programmatic Agreement. Continuity with the treatments presented in the PA serves as the basis for this HPP, but other treatment options are addressed as well. Midway has the potential to become a repository for museum collections; therefore the USFWS Museum Collections policy (126 FW 1-3) is also discussed.

4.1 Conditions Affecting Historic Properties (Natural)

Natural conditions include environmental factors that contribute to the deterioration of historic properties. The actions of saltwater, salt spray, salt in soils, precipitation, mechanical and chemical actions of vegetation, solar radiation, and wind erosion all take their toll. Attrition of some buildings and structures is expected as natural deterioration occurs. In part, this can not be halted. The PA addressed this unavoidable attrition by providing the “leave-as-is” category which acknowledges the slow deterioration process.

Storms

Storm conditions on Midway Atoll usually occur in the late fall and winter. Heavy rain, high winds, and high surf can cause beach erosion, uproot vegetation, tear off roofing, and break windows. Damage caused by storms is unpredictable. Maintenance of buildings and securing buildings that are not in use will lessen the cumulative affects of storm damage.

Shoreline change

As on many atolls, Midway’s shoreline and beaches are constantly in flux. Although riprap and debris dumps such as the Rusty Bucket provide support to the island structure, incremental differences and large-scale changes due to storms occur. Defensive structures such as pillboxes built on or near the beaches may be within the area affected by wave action and exposure to high surf. For instance, pillbox #S-6 is situated on the

beach in a location probably altered from its original position and orientation.

Weathering

As observed at Wake Island, salt in the soil, sea spray, and surrounding ocean waters is a major element contributing to the deterioration of historic properties. Many of the historic properties are made of concrete reinforced with iron or steel bars. These bars are deteriorated by chemical reaction with salt, causing the metal to expand as it corrodes, forcing the concrete matrix of the structures to spall. In some cases entire sides of structures have lost their exterior concrete finish, directly exposing the reinforcing rods to the elements (Jackson 1994:28). This type of weather damage is true for many of Midway's massive reinforced concrete buildings.

Vegetation growth on buildings, structures, and features contributes to their deterioration. The growth of roots causes stress on structures such as Eastern's runways and can produce cracks in the concrete. Vegetation cover allows water retention in the soils beneath the plant canopy and can cause rotting.

4.2 Conditions Affecting Historic Properties (Human)

Human-caused conditions affecting Midway's historic properties began immediately following World War II, when Midway was placed into caretaker status and most temporary buildings associated with the war, such as the rows of temporary quarters and quonset huts, were removed. The base was closed in 1950, leaving only the Cable Station employees on-island. Construction for new military needs and demolition of abandoned buildings has occurred throughout each decade as the Naval Base changed to meet new directives. Finally, in 1992, the Base Closure process identified hundreds of buildings that were no longer needed--and these were demolished.

The present facilities, left by the Navy, are serviceable for the refuge and cooperator's needs. New construction is restricted to buildings necessary for the refuge or tourism and must meet the goals of the refuge for wildlife protection and enhancement and historic preservation. No further demolition is planned. The FWS is reusing many historic properties and to the extent possible is encouraging its cooperators to reuse buildings rather than construct new facilities.

Public Use

A Public Use Plan developed for Midway Atoll NWR guides public use activities to ensure that all permitted activities on the refuge are compatible with the purposes for which the refuge was created and are in compliance with other pertinent statutes. Permitted uses within the National Wildlife Refuge System must be consistent with the National Wildlife Refuge System Improvement Act of 1997 (amendment to the National Wildlife Refuge System Administration Act of 1966 [Public Law 89-669] and the Refuge Recreation Act [Public Law 87-714, as amended]). These statutes require that permitted uses be compatible with the purposes for which a refuge was established and with the mission of the National Wildlife Refuge System. Provisions of the Endangered Species Act of 1973 (Public Law 93-205, as amended) and the Marine Mammal Protection Act of 1972 (Public Law 92-522, as amended) also affect decisions relating to permitted activities at Midway because of the presence of green sea turtles, Hawaiian monk seals, spinner dolphins, and other marine mammals. This Historic Preservation Plan must be congruous with the Public Use Plan and other federal guidance for the operation of Midway Atoll NWR in a manner compatible with the primary goals for which the refuge was established.

The public use program is designed to accommodate a diverse array of visitors and on-island residents. The impact of public use on wildlife and habitat at Midway will be averted or mitigated by controlling the number and activities of visitors and on-island residents. The current population is approximately 170 staff and up to 100 visitors. The 100-visitor limit may be lifted for short-term visits and for students and teachers working on approved educational or research projects. All visitors are required to obtain prior permission to enter the refuge and whenever possible are provided with pre-visit orientation materials to review prior to their arrival (Public Use Plan 1997:3-4). Visitors are housed in nonhistoric barracks that have been remodeled.

Visitors are provided with various combinations of media products (e.g., brochures, maps, videos, etc.) and exhibits, visitor contact stations, and guided or self-guided field programs. Historical resources are included in guided walking tours. Diving in the lagoon and outside the fringing reef, glass-bottomed boat tours, and guided kayaking tours provide an opportunity to view submerged wreckage occurring on a limited scale. All of the submerged vessels are protected by federal law. Information regarding federal regulations restricting the collection of artifacts, including submerged objects and building parts, is clearly explained to visitors. Evening

programs are presented several times a week in the Midway theater. At least one evening is devoted to historic theme subjects. An interpretive center/museum is planned to provide the visitor with more in-depth interpretation of natural and human history.

Other activities sponsored by the cooperator's contractor such as volunteer projects are subject to restrictions based on biological requirements. For instance, construction projects may be limited during sensitive seasons of nesting or pupping. Also, the size of the work groups must stay within prescribed limits for the refuge. For instance, in 1998 Oceanic Society (OS) sponsored several historic preservation projects using Elderhostel volunteers. For each of fall and winter sessions, the OS preservation specialist worked closely with refuge staff to protect wildlife while completing preservation work. The OS is continuing historic preservation efforts in 1999.

Cooperator Agreement

The FWS entered into a 20-year Cooperative Agreement with Midway Phoenix Corporation (MPC) in August 1996. The nature of the agreement is flexible because both “[p]arties recognize the unique circumstances surrounding the Refuge may require an evolving management plan during the length of the Agreement to protect and enhance wildlife resources; provide high quality, compatible, public use; and ensure the economic viability of the cooperative goals” (Agreement 1996).

A specific “Operations and Maintenance Plan” was developed to define the responsibilities of MPC and the refuge. This plan includes discussions of the historic buildings and structures. The FWS retains the overall responsibility for management of all activities occurring on the refuge, including oversight and management of cooperator operations (O & M Plan 1996:1).

As such, it is noted that “written notification and approval is also required for projects that change the nature and appearance of any historic structure. This does not apply to routine work which does not change the nature, appearance, or value of a facility” (O & M Plan 1996:13). Historic structures are more specifically discussed in Section 4. f. (O & M Plan 1996:16):

Construction and renovation of buildings listed or eligible for listing in the National Register of Historic Places, as listed in Attachment D of the Agreement must be carried out in accordance with Public Law, 96-515, National

Historic Preservation Act; Secretary of the Interior's Standards and Guidelines for Rehabilitation; the Secretary of the Interior's Standards for Historic Preservation Projects; and 36 CFR, Chapter VIII, Advisory Council on Historic Preservation.

The Cooperator shall submit plans for all proposed work or actions affecting historic properties to the Service to ensure compliance with laws, policies, and guidelines, including the National Historic Preservation Act of 1966, as amended.

This applies to any undertaking that may affect an historic structure, historic object or furnishing. The Cooperator must document proposed actions. The proposed project may be reviewed by Service staff, State of Hawaii Historic Preservation Officer, and/or the Advisory Council on Historic Preservation. Service approval is required prior to undertaking the proposed action.

No Cooperator

The cooperative agreement is viable only as long as the economic conditions are favorable. At some point in the future, it is possible that MPC will withdraw from the agreement. If this occurs and there is no other party interested in continuing the services provided by MPC, then the public use program on Midway would likely be curtailed.

In the event that Midway Atoll NWR is without a cooperator to maintain the infrastructure, the public use and operations plan would be dramatically different. While the following predictions may not be completely accurate, the purpose is to identify a "worse-case" scenario. Without a cooperator, the FWS could not afford to operate the island's infrastructure or pay a contractor to do so. It currently takes a staff of about 150 people to operate the facilities. Without maintenance and operators staff, the runway would eventually become unuseable. Access to the atoll would then be limited to watercraft. This would curtail public visitation. Without visitors, there would be no need for the deep sea fishing, diving, or subcontractor's personnel to run programs. With most support facilities shut down, operating the huge generators would not be cost effective, and the power supply would probably shift to an alternate energy source. The mess hall would be closed. Many more buildings would be abandoned, including historic properties currently in use. Essentially, a small refuge staff would be bivouacked in a ghost town.

Closing the refuge to public access and reducing staff to a caretaker status would have an adverse effect on historic properties, because the current program of reusing (maintaining) and securing (preserving) Mid-

way's historic properties would no longer be economically feasible. This change in management and the resulting degradation and loss of historic properties is considered a nonstandard treatment. As discussed in Chapter 1, nonstandard treatments will require consultation under Section 106 of the NHPA. In order to mitigate for the loss of historic properties, a Programmatic Agreement among the FWS, Council, Hawaii SHPO, and interested parties would need to be developed. This PA would probably include stipulations for documenting and securing properties, and would replace this HPP for the long-term treatment of Midway's historic properties.

4.3 Interested Parties and Memorials

Midway is a focal point and draws many interest groups with diverse and sometimes conflicting agendas. Natural resources, endangered species, and history all have their advocacy groups. Because of Midway's dramatic role in World War II and the involvement of the Army, Navy, and Marine Corps in the battle, there is a strong contingent of groups committed to preserving the site and memorializing the battle. The men who served on Midway during World War II are extremely interested in the preservation of the island's history and have formed the "Defenders of Midway" organization. Another interest group is composed of the Sixth Defense Battalion of the U.S. Marine Corps. There are also more loosely organized groups of people who lived or served on Midway throughout the years. Midway reunions are held nearly every year. Whether they are formed into a cohesive unit or simply individuals with the unique experience of having lived on Midway, these persons are Midway's constituency.

An important group interested in Midway is the International Midway Memorial Foundation (IMMF), an organization interested in the protection and interpretation of Midway's historic resources, particularly those associated with the Battle of Midway. IMMF erected two monuments on Midway in 1996, one on Eastern Island commemorating Henderson Airfield and one on Sand Island depicting the Battle of Midway and listing the squadrons and ships involved in the battle. The IMMF also is sponsoring legislation to designate Midway as a national memorial. If enacted, S940/HR2800 "Battle of Midway National Memorial Act," would result in a memorial feasibility study with involvement of IMMF in management of the national memorial, inventory of all known past and present facilities of historical significance, and review of how each of the facilities contributes to the

designation and interpretation of the proposed national memorial. The bill passed the Senate in 1998 and will probably be reintroduced in Congress during 1999. The FWS supports the efforts of IMMF to designate Midway a national memorial, but disagrees with IMMF over the need for a “feasibility study.” The FWS believes that the archaeological and architectural studies (described in Chapter 3) adequately identified the historic properties on Midway and that the PA, developed in consultation with IMMF, has initiated the type of treatment appropriate for Midway’s historic buildings and structures. This HPP continues these efforts by providing additional information on the individual properties and recommendations for their treatment. However, depending on the outcome of the legislation, there may be revisions to the treatment of historic properties on Midway.

Other parties interested in Midway include military organizations, peace foundations, and international groups. Some interested parties have proposed placement of additional memorials at Midway. While it is difficult to anticipate the range of requests that might be made, several key issues are pertinent to this HPP. Therefore, the following standards will apply in consideration of all proposals:

- memorials and all types of markers must be directly associated with an important historical event or period on Midway;
- the information presented on the marker must be historically accurate;
- the marker should not duplicate or supersede other markers;
- the scale and materials of the marker should be appropriate and proportional for Midway;
- interested public and organizations shall be given an opportunity to review proposals;
- signs and markers should not be attached to historic properties or block the view of a historic facade;
- the information displayed on the markers must be reviewed by the Refuge Manager prior to approval for display;
- reconstruction of a building or structure must be clearly marked as a reconstruction;

- moving historic properties is prohibited, except for objects prepared for a museum display; and
- removing objects or vessels from submerged conditions is strictly prohibited, unless provisions stipulated through a special use permit are met.

4.4 NHL Boundary Revision

The NHL document was prepared in 1986, but it was not exhaustively field-checked. For instance, Battery C is actually built for a 5-inch gun rather than a 3-inch gun. Additionally, in the past few years new discoveries of bunkers and gun emplacements have occurred as previously closed areas became accessible. It is possible that with shifting sand dunes, removal of vegetation, and further investigations even more features of the pre-1945 landscape will be revealed.

The FWS supports amending the NHL with additional resources and updated information. Additional structures that should be considered for inclusion in the NHL include: Battery A, which was not previously located; the underground bunker on south beach; and the south beach pillbox (S-6). The Eastern Island runways should also be considered for designation. All of these features are directly associated with the Battle, which is the focus of the NHL document. Following the formula presented in the NHL document, each of the new structures could be included in the designation with a surrounding buffer of about 50 feet.

Interest in the submerged planes and ships associated with the Battle of Midway was piqued in 1998 by Dr. Robert Ballard's rediscovery of the aircraft carrier *Yorktown*. A careful study of the wrecks in the lagoon and near the fringing reef surrounding Midway needs to be conducted to identify and evaluate the vessels before their inclusion in the NHL boundary can be justified. Another issue is whether or not to expand the NHL to include features of secondary importance to the Battle of Midway, or even to encompass the entire atoll. Expanding the NHL beyond the components directly associated with the "Battle of Midway" would require a redirection of the document and additional research to develop the historic linkages necessary for evaluating the properties prior to designation as a National Historic Landmark.

4.5 Section 110

Section 110 of the National Historic Preservation Act institutes an affirmative role for agencies, charging them with specific responsibilities with respect to historic properties. Several of the responsibilities stipulated by Section 110 are especially applicable to Midway Atoll NWR. These are to:

- locate agency-controlled historic properties and nominate them to the Register. With the advice of the Secretary [of the Interior] and in cooperation with the State Historic Preservation Officer for the State involved, each Federal agency shall establish a program to locate, inventory, and nominate to the Secretary all properties under the agency's ownership or control by the agency that appear to qualify for inclusion on the National Register of Historic Places; and
- use historic properties. Prior to acquiring, constructing, or leasing buildings for purposes of carrying out agency responsibilities, each Federal agency shall use, to the maximum extent feasible, historic properties available to the agency.

For the most part, inventory and evaluation of properties for the National Register of Historic Places was completed by the Navy prior to the transfer. As discussed in Chapter 3, both Sand and Eastern Islands have been reviewed by architectural historians and archaeologists for significant cultural resources. However, new discoveries are always possible. If new discoveries are made, they will be documented and evaluated according to the directives of the National Register of Historic Places within the historic contexts developed for Midway. The properties can then be categorized as to the most appropriate treatment level in consultation with the Hawaii SHPO and Advisory Council on Historic Preservation.

One area not comprehensively inventoried is the lagoon and near-shore rim of the atoll. Underwater survey of submerged artifacts and wrecks using noninvasive equipment and techniques, such as sonar is recommended. The submerged items need to be accurately identified in order to establish their historical association and eligibility to the National Register. Additionally, there is a chance that unexploded ordnance is present. The underwater survey procedures will be coordinated with the Naval Historical Center because the Navy maintains custody of any military vessels in the waters surrounding Midway, or in the case of the Battle, of any such vessels nearly 150 miles northeast of the atoll. Navy custody is based on the property clause of the U.S. Constitution, international maritime law,

and Articles 95 and 96 of the Law of the Sea Convention. These laws establish that right, title, or ownership of federal property is not lost to the government due to the passage of time. Only by congressional action can government property be declared abandoned.

The National Historic Preservation Act encourages the reuse of historic properties to the extent feasible. On Midway, many of the remaining buildings and structures are historic and are continuing to function in their original use. For instance, the Officer's housing is still serving as housing. The theater is still being used for public presentations. The shops and garage are still in use. Two of the barracks are awaiting restoration before they can be reused. The FWS has a strong commitment to reusing the historic buildings on Midway.

4.6 Museum Collections (126 FW 1-3)

The FWS has established policies and procedures for Library and Museum Services in the Service Manual 126 FW 1-3. This guidance establishes responsibilities, standards, and guidelines for preserving and managing Service museum collections consistent with Departmental policies found in 411 DM. The policies address minimum environmental and security standards for storing and exhibiting collections; requirements for documenting the type and use of collections; planning, inventory, and reporting requirements for FWS offices responsible for managing museum property; and FWS-wide data standards and definitions for tracking collections (Part 126 FW 1-3 1997). These new standards are reflected in a series of forms for carrying out the goals of the policy. The forms provide specific information for managing museum collections (sample forms are attached in Appendix F of this HPP).

Specific to Midway are a couple of key questions. What will the collection contain and how will it be stored and accessed? These questions will be addressed by following the Museum Property Handbook guidance and creating a "Scope of Collections Statement" specific to Midway. The Scope of Collection Statement (SOCS) serves as the basic planning document that is required for all Department of the Interior bureaus. A SOCS succinctly defines the scope of museum property holdings at present and for the future, identifies those museum objects that contribute directly to the mission of the unit, as well as those additional objects that the bureau is legally mandated to preserve. The SOCS provides the framework for what materials will be collected, how the materials will be

acquired, and how the collection will be curated. Once acquired, all museum property will be stored according to the standards set in 126 FW 1-3 and 411 DM 1-3 of the Museum Property Handbook.

Materials relating to Midway are scattered across the country in museums, archival institutions, and private collections. It is not feasible for a repository on Midway to duplicate the holdings of the National Archives or Naval Historical Center. In addition, preservation of documents is a challenge on Midway because of the extreme environmental conditions. Therefore, the FWS is focusing its efforts on acquiring copies of photographs and documents from each of the historic periods defined in Chapter 2 of this HPP. Copies of materials will not be treated as “museum property” allowing flexibility for storing the materials in less than ideal conditions and allowing public access. The difference between accessioned museum property and non-accessioned copies of materials stored on Midway is analogous to a library holding with two categories of books, rare books with restricted access and books that circulate.

The broad scope of the collection is also an attempt to meet the full spectrum of interests expressed by visitors. Because many tourists want to learn more about Midway while they are visiting, there is a need for a museum/library that is accessible and covers a broad range of topics. For instance, it is the long-term aspiration of the refuge to have an oral history library where visitors can listen to tapes or record their memories during their visit.

The SOCS document will help define other types of artifacts such as family mementos, artifacts, and exhibited materials that may be donated to the FWS. Currently, the number of artifacts remaining on Midway are limited. If items were available for acquisition, objects relating to the Commercial Pacific Cable Company, Pan America Airlines, and the Battle of Midway would be the top priorities. Items associated with personal mementos and recollections from families offer a unique opportunity to explore the individual’s experience on Midway. Especially compelling are the memories, either recorded in oral interviews or as written recollections, of people who were stationed on Midway as children. However, if rare or fragile items are donated to the FWS, Midway Atoll NWR, their permanent, secure storage will be arranged at a repository in Hawaii. Copies or reproductions of the items curated on Hawaii will be maintained at the Midway museum.

The Midway museum should be a general repository containing copies of written material and photographs, artifacts, oral histories, and personal memorabilia relating to Midway's history. The museum should include a climate-controlled storage area, as well as research desks and tape recording/listening booths. The Midway museum should be a unique repository for records and materials useful for interpreting the history and natural history of Midway Atoll.

Chapter 5. Public Involvement

The base closure and transfer of Naval Station Midway to the FWS has created an opportunity for the public to visit and enjoy the diverse cultural and natural resources on the atoll for the first time in more than 50 years. Public participation is encouraged through various programs. Volunteers and specialists play an essential role in the refuge's plans for conducting biological research, maintaining habitat, controlling invasive plants and introduced animals, and conserving historic properties. All of the volunteer programs operate within the restrictions defined in the Public Use Plan for Midway Atoll NWR.

The following sections describe the current program and discuss the potential for expanding the historic preservation program and for embracing additional partners. Additionally, long-term goals for the historic preservation program are presented and opportunities for outside funding are explored.

5.1 Oceanic Society

The Oceanic Society (OS) serves as the primary ecotourism contractor on Midway, operating as a subcontractor to Midway Phoenix Corporation. Midway is also the headquarters for several OS research projects. In October 1998, OS began offering the first in a series of Historic Preservation tours on Midway. Elderhostel volunteers worked with a trained historic preservation specialists to stabilize and conserve Midway's historic properties. The projects are tailored to fit within 10-day sessions, providing each group with a varied experience. All work projects are coordinated with the FWS staff on Midway and the FWS cultural resources staff in order to ensure consistency with this HPP and the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

The OS projects focus on preserving, restoring, maintaining, and interpreting the buildings and artifacts that are historically important to Midway. Work during the winter 1998 sessions included Gun Battery C, Eastern Island Gun (Figure 10), Gun Battery A, 5-inch gun Memorial, West Beach Pillbox, and the Cemetery. Additionally, the groups completed a structural examination report for the theater. The volunteers also organized historical accounts, newspaper articles, personal reminiscences, oral interviews, and donated family albums that have accumulated at the FWS office over the past couple of years. Archiving the information includes placing documents in protective sleeves and building a computer database that will



Figure 10. Elderhostel volunteers working on Eastern Island gun (Pinyerd, 1998).

allow individuals to search by key words to retrieve the pertinent reference.

Among the conservation projects undertaken was Gun Battery C, an NHL-designated property. The condition of the battery prior to this program was fair to poor. Battery C was overgrown with vegetation, and the concrete was failing because of structural problems with shifting sand. Exposed metal bolts, straps, and rebar was corroding rapidly. The battery was chosen for the first of OS's preservation projects because it is an NHL structure and the preservation tasks were relatively simple. The battery was cleaned of loose debris and sand, vegetation was cut back or removed, and the metal bolts were treated with rust preventative products. The battery was recorded in detail and photographed during the preservation process. A "Treatment Report" was completed for each of the projects.

The OS-sponsored program continued in February and March 1999. Projects undertaken by volunteers included rehabilitating ten of the steel-frame sash windows in the theater, finishing the archive database, and completing a condition assessment of the Cable Station buildings.

The OS program funds the salary for an on-island historic preservation specialist to direct the projects and work with the volunteers. An informal team consisting of OS staff, the OS historic preservation specialist, and FWS staff was assembled to share information and develop a detailed scope of work for each of the projects. Project planning is flexible enough to consider wildlife issues, different skill levels, and variable weather conditions. The team also works together to develop the list of supplies and equipment needed for each project.

The Elderhostel volunteers provided the hands-on labor force to clear vegetation away from historic structures and clean and conserve the metal on the batteries. Treatment of the Eastern Island gun required transporting materials and volunteers across the lagoon to Eastern Island and setting up a tent to protect the gun during treatment (Figure 12). It took several days to apply cleaner, rust convertor, primer, and topcoat enamel.

The OS historic preservation projects are very beneficial to Midway's historic properties. For instance, the Eastern Island Gun is now coated with a protective cover of paint; without this treatment the gun probably would have disintegrated during the next season. The gun is still in critically fragile condition, but with continued maintenance of the protective coatings, its life may be extended. The visitors' experience is greatly enhanced by the ongoing preservation projects and volunteers' efforts. Continuing this program will promote appropriate maintenance of Midway's historic resources and strengthen the link between the structures and the historic events for visitors.

5.2 Demonstration Projects

Demonstration projects are primarily tied to technical services and preservation specialists. The National Park Service (NPS) often sponsors workshops that present restoration methods for various materials. For instance, David Look (NPS-San Francisco) was part of a team assembled to provide training for metal conservation on Guam and the Republic of the Marshall Islands. It is conceivable that a metal stabilization training course could be held at Midway. Other types of demonstration projects or training exercises that would be beneficial to the resources at Midway could relate to reinforced concrete structure stabilization, window repair (wooden and metal sash), interior plaster repair, restoration carpentry, landscape planning and restoration, and masonry restoration.

Demonstration projects or training in oral interview and video interviewing techniques would also be very valuable for the refuge staff and volunteers. Many of Midway's visitors are former residents and veterans of World War II who are interested in sharing their experiences. Training several staff members in the techniques and protocols of conducting oral and video interviews would provide consistency in the information collected. Recording oral histories and documenting the memories of the people who lived on Midway would be important contributions to the Midway Museum.

5.3 Opportunities for Participation and Partners

Opportunities for individuals to participate in Midway's historic preservation program or to become a partner engaged in this program can take many forms. This section outlines only a few.

Technical Expertise

The FWS applied for and received a grant through the National Park Service Technical Assistance Program in 1998 to assist with the Structure Examination Reports for the three ARMCO huts and the Power Plant (354). The technical assistance will result in specific recommendations for the long-term treatment of these structures. Additionally, the cable station complex was briefly reviewed. The information gathered during this study is incorporated in to chapters 7 and 9. Additional technical assistance will be needed as preservation decisions and treatment of historic resources develops over the years.

Underwater archaeology is another arena where technical expertise and appropriate equipment are required. Identifying and inventorying the submerged resources in the lagoon are needed to accurately evaluate these resources for possible inclusion in the NHL. It is hoped that a University offering a graduate degree in underwater archaeology might be willing to operate a field school at Midway. The field school would provide an opportunity for students to gain experience, explore a previously restricted area, and provide the refuge with a detailed inventory of objects in the lagoon.

Financial Assistance

Direct funding for projects will be managed by the "Friends of the Refuge" or other nonprofit organizations focused on historic preservation. Funding from grants and foundations will be pursued as appropriate. It is expected

that the level of funding needed to complete priority projects will vary from year to year. The FWS will establish the priority list and plans for historic preservation projects. This HPP and the Structure Examination Reports will provide the baseline information for planning projects and calculating costs. Potential partners include groups interested in historic preservation, military history, veterans groups, and corporate sponsors.

In-Kind Contributions

Contributions of restoration materials and supplies is another avenue for expanding the network of partners. Restoration products such as rust convertor, primer, and enamel paint are needed in large quantities; contributions of these supplies would augment the refuge's limited budget. Contributions could also include construction materials such as lumber and glass window panes; supplies such as termite control products; and archival supplies such as video and cassette tapes, photograph sleeves, acid-free paper folders, and storage boxes. A list of contributions and a "wish list" of items needed will be maintained at the refuge office.

Labor Force

Historic preservation is usually labor-intensive, slow, painstaking work. Enlisting the assistance of a consistent labor force is necessary to implement the technical plans. Currently, the OS Elderhostel program is fulfilling this requirement. Other potential participants are University field school programs, refuge volunteers, and specific demonstration projects and workshops. There is also a need for volunteers with other types of knowledge including graphic skills for photography, detailed architectural drawings, and interpretive panels; writing skills for interpretive text and newsletters; library and computer skills for cataloguing written materials; and research skills for locating information from archival holdings across the country.

5.4 Interpretation Projects

Midway Atoll NWR staff is currently developing a comprehensive interpretation plan directed toward "broadening awareness and understanding of our natural and cultural environment; inspiring and adding perspective to our lives; and providing recreation opportunities while on the refuge." Information will be presented in a variety of formats including signs, trail panels, and exhibits. Additionally, lectures, plays, and movies are presented in the theater.

Historic preservation/restoration projects offer a unique blend of activities and exhibit possibilities. Information can be presented on signs while work projects are in-progress. Information can also be conveyed in a finished exhibit, depicting before and after photographs of the work. Hands-on activities will greatly enhance the experience of the casual visitor. Interpretation is a key component to appreciating historic properties and their associations with past events.

Chapter 6. Envisioning the HPP

This historic preservation plan for Midway Atoll NWR serves as a guide for decisions affecting the treatment of historic properties. The HPP delineates the types of treatments that will be considered “standard” or “non-standard.” Standard treatments follow prescribed steps that are provided in the following chapters. Whereas, nonstandard treatments may effect properties differently than standard treatments and may alter the character or use of a property. Consultation is an important key to this plan; the time line and mechanisms for consulting are identified for each treatment category.

The following sections discuss the HPP review schedule, staffing requirements, preservation project goals, and cost estimates. Most HPPs are developed with an expiration date. This commitment to a term approach is predicated on the assumption that at each expiration date a substantive review will occur. Such a review and consultation are important for updating the procedures base on “real-life” conditions. This balance between a clear decision-making document and the flexibility to adjust decisions based on new conditions is essential. Moreover, staffing requirements and preservation goals presented serve only as reference points. Actual projects will vary widely based on the season, transportation requirements, supplies, contributions, volunteers, and base funding. The HPP may also serve as a “step-down plan” or auxiliary to the refuge’s other planning documents.

6.1 Plan Review and Revision Schedule

This HPP will be in effect for a period of five years. Beginning six months prior to the conclusion of the initial term of the HPP, the plan shall be reviewed by the FWS and the Council for adequacy and compliance. Additionally, supporting documents including photographs, structural examination reports or treatment reports, and notes on the condition of resources will be submitted as part of the consultation documentation. Should either the FWS or the Council seek changes in the plan, both parties shall negotiate any such requested changes in good faith with the goal of implementing the revised HPP on the day following the termination of the previous version. If there are no changes, then the plan will remain activated for another period of five years.

Two exceptions to the five-year review requirement are the NHL properties and nonstandard treatment activities, both of which are governed by other regulations. The status of the NHLs is reported to the NPS yearly. A

letter report to the NPS and Council describing the condition of the six remaining NHLs will be completed in September of every year (prior to the end of the fiscal year). If appropriate, photographs and treatment reports will be attached to supplement the NHL letter report.

Nonstandard treatment of historic properties is considered an undertaking according to Section 106 of the National Historic Preservation Act and requires case-by-case consultation prior to implementation.

6.2 Staff Requirements

A variety of staffing levels is required in order to carry out the treatment plans for historic properties and to fulfill the reporting requirements as defined in this HPP. In brief, these responsibilities reflect the ongoing stewardship discussed as “standard” treatments in this HPP. The on-island staff is responsible for keeping track of the condition and use of each of the historic properties, a requirement which entails completing condition reports and photographing the properties. The on-island staff is also responsible for taking a proactive approach to the maintenance needs of historic properties. The Region 1, Cultural Resources Team is responsible for coordinating the on-island activities and preparing the yearly NHL reports and the HPP review documents. The information for the yearly NHL report will be provided by the on-island staff. A Cultural Resource Team member will travel to Midway at least once every five years to gather summary data for reviewing the HPP and documenting the properties in order to provide an adequate consultation opportunity for the Council. Staff positions and their responsibilities toward historic preservation activities are identified by functional titles below:

- *Refuge Manager*. The Refuge Manager serves as the point of contact for all activities on the refuge, including those of the cooperator (Midway Phoenix Corporation), subcontractors, and is the responsible party for adherence to the National Historic Preservation Act and promulgating this HPP;
- *Cooperator (Midway Phoenix Corporation)*. The Midway Phoenix Corporation’s Resident Manager is the direct link to subcontractors and maintenance staff. The Manager is responsible for setting maintenance priorities and coordinating staff to assist with preservation projects. Maintenance of historic properties will follow the *Secretary of the Interior’s Standards for the Treatment of Historic Properties*.

- *Outdoor Recreation Planner.* The ORP is the liaison with the preservation partners (such as the OS project coordinator), serves on the historic preservation project team, purchases supplies for preservation projects, coordinates library projects, provides document control over the library materials, and conducts oral history interviews. The ORP has the fundamental responsibility for gathering information, including photographs, for the yearly report to NPS on the condition of the NHL structures. The ORP is also responsible for maintaining the files that contain the condition reports on each of the 63 properties and updating these files as appropriate. The ORP will also assist the Cultural Resources Team staff in gathering information for the HPP review every fifth year;

- *Interpretive/Park Rangers.* The Park Rangers lead the historical tour, develop events and public participation activities, conduct oral history interviews, provide expertise on the development of interpretive materials, and may work as *ad hoc* members of the preservation project team;

- *Region 1, Cultural Resources Team.* The Region 1, Cultural Resources Team is responsible for preparing the yearly report on the NHLs to the NPS. It is also responsible for preparing the HPP review documentation. Every fifth year a cultural resources team member will visit Midway and conduct a review. This review will include not only a condition assessment of each historic property, but also a review of the library, museum collections, and historic preservation activities. Information gathered during this on-island inspection will be documented in a report and transmitted to the Council and Hawaii SHPO. The Cultural Resources Team provides expertise and support for ongoing projects, for the identification and evaluation of new discoveries; is part of the preservation project team; and may conduct oral interviews and research;

- *Historic Preservation Specialist.* The role of historic preservation specialist will probably be filled by a number of individuals. The tasks of developing preservation plans, monitoring work, ordering supplies, coordinating with volunteer groups, and planning training sessions for the refuge staff will be handled by a variety of specialists. All projects that potentially affect historic properties will be guided by an individual who is a qualified historic architect, architectural historian, historian, underwater archaeologist, or historical archaeologist, as appropriate to the project, as provided in "Professional Qualifications Standards," Title 36, Code of Federal Regulations, Part 61; and

- *Historic Architect/Engineer.* A historic architect/engineer will be necessary on a case-by-case basis as historic preservation/restoration projects are accomplished. The expertise of a historic structural engineer or architect will probably be filled under contract.

6.3 Preservation Project Goals

Preservation projects are contingent on many issues, including the cost of working in a remote setting, transportation of construction materials, limited available labor source, and lack of persons trained in the conservation of historic structures on-island. Costs could be ameliorated by the use of volunteers, donated supplies, and working with partners willing to accept part of the financial burden.

The HPP provides a framework for the treatment of historic resources on Midway Atoll NWR. Long-term goals for preserving Midway's historic resources will require dialogue with interested parties, physical assessment of the properties, and consideration of the economic limitations at this remote location. Table 2 summarizes a few of the long-term preservation goals and costs for some of Midway's historic properties.

6.4 Summary

Devising a long-term plan for Midway's historic properties is difficult because of the variability in funding levels, in potential partners, and in the resources themselves. Therefore, the following discussion reflects the current conditions and trends, extending the view to five years and then ten years into the future.

First Five Years

The next five years are critical for the survival of Midway's more fragile properties, including the cable station complex, theater, and ARMCO huts. The maintenance and preservation programs undertaken in the next few years will decide the fate of several of these resources.

Preservation projects completed to date have focused first on the NHL structures. Conserving and interpreting the NHL structures are important activities that provide the public with a renewed sense of the significant World War II "Battle of Midway" fought at this tiny U.S. outpost. In the next five years, each of the batteries and pillboxes will be subject to an inten-

sive preservation program that encompasses, preparing plans and elevations, cleaning and coating the exposed metal, and possibly repairing the concrete. Construction of the wooden ready boxes and interpreting the activities associated with the batteries and pillboxes are also planned. An examination of the NHL ARMCO huts was conducted in December 1998, a report will include steps for stabilizing these structures.

In the next five years, condition assessments and detailed repair and rehabilitation plans for the theater designed by Albert Kahn should be completed. A complete condition assessment of the Commercial Pacific Cable Company buildings will also be completed in order to initiate stabilization techniques for these unique buildings. Efforts should focus on maintaining their structural integrity and developing plans for their restoration.

In five years a visitor to Midway should be able to visit the NHL structures and gain some appreciation and knowledge of the Battle of Midway. The original Naval facilities designed by Albert Kahn will be identified and appropriate repairs will be under way. The Cable Station complex will be secured, with restoration plans ready for implementation. The net effect of this work will be a “curated” historic landscape, that is, a landscape treated with conservation methods that preserves the integrity of historic properties *in situ*.

In Ten Years

The second five-year period should see the dramatic transformation of the Cable Station. At least one of the buildings will be restored to a visitor accessible condition, with rehabilitation of the other buildings to a secure level. The result of this work on the Cable Station will benefit the public and allow tours through the complex. The Albert Kahn-designed buildings, especially the theater, should be repaired and the interiors refurbished. The visitor’s experience will be enhanced by the use of these historic buildings and the continuing preservation projects. At the same time, however, many of the large reinforced concrete structures will continue to deteriorate. Most visitors will comprehend that preservation is a long-term process that is not appropriate for every structure. The goal of the first decade is to prepare detailed plans for preserving the historic properties of Midway Atoll NWR and begin implementing these plans.

Table 2. Preservation Goals for Midway's Historic Properties.

Resource	Long-Term Preservation Goals	Costs
Batteries	Sample and test concrete for ingredients. Return batteries to stable condition. Clean and treat exposed metal. Clean and repair spalled concrete. Maintain sand at base of battery. Clear overhanging trees from around batteries. Interpret the use of batteries in WW II. All batteries are in process of conservation as of 1998.	\$120,000
Concrete pillboxes	Sample and test concrete. Stabilize concrete pillboxes. Repair wooden interior.	\$35,000
E-1 gun	Conserved metal gun in December 1998. Continue monitoring treatment of metal.	\$<1,125>
Paint & Oil bldg, Torpedo Shop, Carpentry Shop, Metal Shop, Transportation bldg.	Replace plywood window coverings with glass panes, patch roof leaks, repair gutters, repair window hardware, repaint with historic colors, trim back vegetation. Maintain functional qualities of buildings, refurbish original fabric and replace missing elements. These buildings are an important element of the 1941 landscape and their continued use is important to the interpretation WWII.	\$500,000
Diesel Power Station, Power Plant, Command Post, Underground Shelter	Collect concrete samples for testing ingredients. Treat metal with preservative. Secure openings. Paint with historic colors. Trim back vegetation. Replace bars in windows of Command Post. Remove non-historic additions. Stabilize these massive concrete structures as much as possible. Provide interpretation as to their use and function.	\$1,000,000
ARMCO Hut S6194, S7124	Measure entrance for replacement door. Fabricate doors to match original (see HAER photographs). Clean and treat metal. Condition assessment completed in 1998. Preserve/stabilize ARMCO huts. Interpret use of these structures and association with batteries.	\$120,000
Cable StationComplex	Prepare structural engineer and restoration specialist inspection reports. Shore-up verandah and roof. Repair roof, collect sample of slate from roof in order to match material. Fabricate doors and window sashes to match original. Repaint to historic colors. Cut back vegetation from roofs. Collect sample of concrete to match for repairs. Treat rust on original columns with preservative. Remove non-historic interior modifications. Re-draft floor plan, for use in long-term plan. Stabilize buildings. Restore at least two buildings. Develop interpretive panels for exterior tours of buildings. Initiate tours of interior of restored building, host receptions and provide sense of historic use to visitors.	\$3,000,000
OIC & Officer's Housing	Replaced roofs in 1998. Repair water damage on interiors, treat for termites, repair/restore interiors. Develop ongoing maintenance plan to <i>Secretary of the Interior's Standards</i> for use by MPC and their construction contractors.	\$400,000
Theater/Mall Complex	Review repair needs with Restoration Specialist. Maintain building and use as a theater. Develop ongoing maintenance plan to <i>Secretary of the Interior's Standards</i> for use by MPC and their construction contractors. Repair roof, treat for termites. Repair interior damage. Clean and refurbish interior.	\$250,000

Chapter 7. Standard Treatment of NHL properties (6)

Standard treatment of the NHL structures will follow guidelines determined by the PA and their material composition and condition. The two primary types of structures are ARMCO huts that are metal and the batteries and pillboxes constructed of reinforced concrete. The NHL structures are identified in Table 3.

7.1 Planning: Condition Assessment

In order to devise a useful plan for treatment, the condition of each NHL property was assessed. The condition of each of the structures was recorded on a "Structure Examination Report." The examination reports are a method of tracking a continuous cycle of preservation actions, for the NHLs this cycle will be on a yearly basis. An example of the report is included at the end of this chapter for Battery C. A structure examination report for each of the NHLs will be maintained at the refuge office. Copies of these reports will also be on-file at the Region 1, Cultural Resources Team office. This report format provides the basis for discussing treatments that are standard and nonstandard.

The Structure Examination Report provides a framework for collecting information that is consistent for each property. While some variation will occur, the basic categories are the same. Orientation refers to the direc-

Table 3. Inventory of Midway's Historic Properties -- NHLs.

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)
S6194	ARMCO hut	Defensive Position/ 1941-1942	Secure
S-1	5-inch gun battery C - "Charlie"	Battle of Midway/1942	Leave-as is
S-2	3-inch gun Battery D - "Dog"	Battle of Midway/1942	Leave-as is
S-3	Pillbox near S7125.	Battle of Midway/1942	Leave-as is
S7124 S7125	ARMCO huts	Battle of Midway/1942	Fill
S7113 S7119 S7121	ARMCO Huts	Battle of Midway/1942	Demolish

tion the facade or front of the property is facing, looking outward from the doorway. For some structures, such as Battery D, which has no doorway, the direction toward the ocean is the orientation. Several categories include a variety of choices, if an item applies to the structure, then the item is underlined. As many variables as appropriate can be underlined. Severity of condition is subjective, but should be based on comparisons with other, similar structures on Midway. Repair needs can consist of general maintenance recommendations or a professional assessment. The historic context section can be expanded as information is gathered for each of the properties.

A companion form, the "Treatment Report," will be used to track preservation treatment actions for each of the properties. A treatment report for Battery C is included, as an example, at the end of this chapter. The treatment report includes the preservation activities including cleaning, products used, method of treatment, an assessment of the structure's condition after treatment, photographs of the project, recommends maintenance procedures, provides a cost of the project, and includes a list of participants (volunteers) and hours spent on the project. The Treatment Report will be maintained by the refuge and Cultural Resources Team and will serve as a guide for preparing the NHL annual report, as well as, the HPP review report.

7.2 Standard Treatments

The treatment plan for the NHLs, as provided in the PA, is fairly static with treatments of secure, leave As-is, or fill. The fill suggestion was not followed for two of the ARMCO structures. Therefore, all three of the remaining ARMCO huts are considered in the "secure" category for treatment. The reinforced concrete batteries and pillboxes were simply to be "left as-is."

ARMCO Huts (S6194, S7124, and S7125)

Treatment options for the ARMCO huts are limited by the condition of the structures. PACNVAFACENGCOM's efforts to secure the structures prior to transfer has led to a dilemma for future conservation. Original fabric has been lost (doors) and new materials welded to the front are not appropriate. The Navy made no attempt to conserve the existing metal prior to applying the new exterior coverings. Therefore, stabilizing and conserving the remaining original fabric is an important activity.

Short-term goals are ongoing, require time and maintenance procedures and are well-suited to public participation in a volunteer program. Long-term goals are to remove intrusive materials and restore missing elements. Long-term goals are larger projects that require specialized supplies, a skilled workforce, and an adequate budget to complete the work. The long-term goals also require input from a historic preservation specialist with experience in treating metals in a temperate marine environment.

Short-term goals: Stabilize and preserve-

- Remove overgrown vegetation. Plants in contact with the metal surfaces hold moisture and cause metal to decay. Vegetation removal is an activity that will need to be completed regularly, probably seasonally.
- Clean metal surfaces to grey metal if possible.
- Protect cleaned surfaces, using rust inhibitors and compatible paints.
- Maintain coating of paint on metal; this is probably one of the best methods of slowing deterioration.
- Repeat steps 1-4 as needed.

Long-term goals: Remove intrusive materials and restore missing elements-

- Fabricate new doors to replace missing doors.
- Remove welded plastic surfaces on ARMCO hut fronts
- Patch deteriorated metal with compatible materials
- Restore ceramic vents on top

Reinforced Concrete Structures -- Batteries C and D (and possibly A) and Pillbox S7125 (and possibly S-6)

The reinforced concrete structures are essentially in a state of slow deterioration as the treatment category "leave as-is" suggests. However, non-invasive methods of conservation will be attempted to prolong the existence of the structure, as long as staff and funding are available. Batteries C and D were stabilized in 1998. Conservation methods will include:

- Removing large vegetation from around the structures, especially ironwood trees. The roots of the ironwood trees and other large foliage are forcing the concrete to shift and crack. Removing vegetation from around the structures will delay the rate of decay.
- Cleaning concrete surfaces using gentle methods.
- Painting batteries will await sufficient documentation as to the color and type of paint used. The batteries may not have been painted. Documentation of paint colors through oral interviews and eyewitness accounts is recommended.
- Cracks will be monitored to note any changes from the “current condition.”
- Conservation of the structures by repairing cracks will follow recommendations of a historic preservation specialist.
- Exposed metal such as the bolts can be treated with metal preservative and painted.

7.3 Consultation Plan

The consultation plan for the NHL structures requires a report to the NPS every year. The NPS is responsible for annually reporting the status of NHL properties to Congress. Therefore, a brief report will be prepared by the Region 1, Cultural Resources Team, with information gathered by the refuge’s Outdoor Recreation Planner, and forwarded to the NPS-San Francisco Office and to the Advisory Council by 30 September each year. The report will address each of the NHLs and include: current condition, treatments accomplished during the year, products used, number of volunteer hours expended, amount of budget expended, and expectations for work in the following year. Photographs will be included when possible, but are not essential. If no work is accomplished, then simply describing the current condition is sufficient. Additional opportunities for consultation will be provided at the request of the NPS or Council.

7.4 Nonstandard Treatments

Nonstandard treatments for the NHL properties will require conformance with Section 106 of the NHPA. While not all nonstandard treatments can be determined at the present time, generally if the activity will result in the loss of more than 25% of the remaining original materials, will significantly alter the use, or cause a dramatic change in condition (demolition) then these activities are considered to be outside of the standard treatments identified in the PA and will need to be reviewed on a case-by-case basis in consultation with the Council.

7.5 Reporting Standards

It is anticipated that the structure examination and treatment reports will be used as companion records for each of the NHL structures and updated regularly. The Examination Report and Treatment Report for Battery C are attached as an example of how these forms will be used. Collecting consistent information about the condition of each of the structures and tracking preservation activities is important for the long-term care of the resources.

Chapter 8. Standard Treatment of Properties being REUSED (25)

Standard treatment of the properties to be reused will follow guidelines established in the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Weeks and Grimmer 1995). In most instances the treatment will follow principles established for the "preservation level", including actions that "prevents or slows down the rate of deterioration of historic buildings in order to extend the life of the building as long as possible without substantial replacement of historic materials." This level of treatment encourages the conservation of materials. It is expected that only in a few cases will the level of treatment rise to rehabilitation or restoration. Properties currently being reused are listed in Table 4.

Table 4. Inventory of Historic Properties -- Reused.

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)
S2115	Seaplane Ramp	Aviation Facilities/1940	Reuse
361	Electrical Switch Station	Shops/Warehouses 1944	Reuse
259	Theater, Offices, Recreation Facilities, and Shopping	Recreation/1941-44	Reuse
578, 579	Barracks	Early Base Housing/1941	Reuse
353	Carpentry Shop	Kahn design, Early Base/1941	Reuse
356	General Squadron Storehouse	Kahn design, Early Base/1941; 1942	Reuse
357	Torpedo Shop (Machine shop)	Kahn design, Early Base/1941	Reuse
414, 415, 416, 417, 418, 419, 421, 422, 423, 424	OIC, Senior Officer's Quarters	Kahn design, Early Base Housing/1941	Reuse
349	Commissary & Cold Storage	Early Base/1941	Reuse
S3126, S3127	Water reservoirs	Early Base/1941	Reuse
393	Public Works Storehouse	Base Development/1943	Reuse
151	Seaplane Hangar	Kahn design	Reuse

8.1 Planning: Condition Assessment

In order to devise a plan for treating the properties being reused, the properties are grouped by primary fabric and the condition is assessed. The condition of each of the properties is recorded on a "Structure Examination Report." The examination reports are a method of tracking preservation activities. An example of this report form is presented in Chapter 7. Completed report forms will be maintained at the refuge office. Copies of these reports will also be on-file at the Region 1, Cultural Resources Team office. This report format provides the basis for discussing treatments that are standard and nonstandard.

The Structure Examination Report provides a framework for collecting information that is consistent for each property. While some variations will occur, the basic categories are the same. Orientation refers to the direction the facade or front of the property is facing, looking outward from the doorway. Several categories include a variety of choices, if an item applies to the property, then the item is underlined. As many variables as appropriate can be underlined. Severity of condition is subjective, but should be based on comparisons with other, similar properties on Midway. Repair needs can consist of general maintenance recommendations or a specific task list. The historic context section can be expanded as information is gathered for each of the properties.

A companion form, the "Treatment Report," will be used to track preservation treatment actions for each of the properties. A treatment report for Battery C is included, as an example, at the end of Chapter 7. The treatment report includes the preservation activities including cleaning, products used, method of treatment, an assessment of the property's condition after treatment, photographs of the project, recommendations for maintenance procedures, costs, and a list of participants (volunteers) and hours spent on the project. The Treatment Report will be maintained by the refuge and Cultural Resources Team and will serve as a guide for preparing the HPP review report.

8.2 Standard Treatments -- Implementing the Secretary of the Interior's Standards

Treatment of the properties being reused will follow guidelines established in the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (Weeks and Grimmer 1995). Maintenance procedures will

focus on preserving the original materials. Conserving rather than replicating or replacing building parts is a key element of preservation. For instance, when the Officer's housing all needed roof and soffit repairs, much of the original materials including the copper gutters and rafters were cleaned, repaired, and reused. The roofing material chosen was a new product, that was superior to the tar roofing material, which was not original. And, since the flat roof is not visible from the street this replacement does not detract from the appearance of the buildings.

Replacement of exterior fabric or materials that are contributing to the historic character of the buildings such as interior wall treatments, fireplaces, or theater accoutrements will be sensitive to the original materials and either be "in-kind" or match as closely as possible. However, the condition assessment will take into account modifications that have occurred within the past 50 years. As an example, the theater was extensively altered in 1957 to accommodate the new movie projector equipment and "modernizing" the facade. Following the *Secretary of the Interior's Standards*, the preservation level of effort will conserve these alterations, rather than restoring the theater back to an earlier or original appearance.

To simplify this discussion, buildings and structures constructed with similar materials are grouped together. The categories are reinforced concrete, wood -frame, and steel-frame.

Reinforced Concrete Buildings and Structures (S2115, S3126, S3127, 361)

The reinforced concrete buildings and structures are represented by four resources: the seaplane ramp which serves as a boat launch; two water reservoirs for brackish water, and the electric switch station. Each of these resources are in fair condition. Maintenance procedures will continue, but no preservation actions are needed.

Wood-Frame Buildings (414, 415, 416, 417, 418, 419, 421, 422, 423, 424, 349, 342)

Each of the wood-frame resources were designed by Albert Kahn. The wood-frame buildings are most susceptible to damage by termites and water. Water damage can be controlled by maintaining the exterior envelope of the building, especially keeping the roof and windows sealed. Termite damage will require aggressive treatment and ongoing vigilance. Repairs that are made will use products that are treated with termite resistant products. Generally, procedures will follow a maintenance regime that will include:

- Maintenance of roofs and keeping gutters clear of debris.
- Replacement of broken windows, maintaining a seal at the windows.
- Repair interior damage caused by previous water damage.
- Repair/repoint fireplaces and chimney's in Officer's housing.
- Clean and re-glaze windows.
- Maintain exterior walls with a painted finish.
- Maintain doors and porches.
- Treat exposed metal with rust preventative and seal coat.

Steel-frame Buildings and Structures (259, 578, 579, 353, 356, 357, 393,151)

The steel-frame properties also were designed by Albert Kahn and are more in keeping with his industrial-style of architecture. The transportation building (356) is an especially fine example of the use of high wall and clerestory windows to allow natural light and ventilation into a large volume work-space. The resources in this category will need routine maintenance with special attention give to:

- Maintain the exterior envelope. It is vitally important for regular inspections to occur and include the roof, windows, doors, and exterior siding to identify the need to clean, patch, repair, or replace components in order to keep the building in good condition.
- Inspect the interior steel beams for signs of rust. Treat rust with cleaning and rust preventative coating. Maintaining a sealed painted surface on the steel beams will increase their life-expectancy considerably.
- Replace window glass. Windows are one of the signature qualities of the Albert Kahn design. Maintaining the window glazing, cleaning the glass, and keeping the steel sash coated with a metal preservative are imperative. Many of the broken glass panes were repaired with plywood, this is an unacceptable substitute, and should be viewed as a temporary fix. Replacement with glass is the best solution.

- Repair and paint the lower reinforced concrete walls. The paint has been removed, but the exterior concrete should be painted to seal out invasive salt air. Any cracking or spalling of these walls should be repaired.
- Maintain the transite panels with gentle cleaning method and repair broken pieces.
- Trim vegetation so that it doesn't overhang the roofs.
- Use of a building should not exceed the level of its original capacity.

Two resources the theater (259) and the barracks (578 and 579) are planned to receive more intensive treatment. Rehabilitating the theater will require a focused attention on the roof, repairing the steel-sash windows, repairing previous water damage, replacing wood damaged by termites, and refurbishing the interior. The building has been remodeled several times. A detailed plan of the theater rehabilitation will be developed in coordination with the FWS Cultural Resources Team, a historic architect, the Hawaii SHPO, and the Council.

The barracks are in poor condition and were originally planned for demolition. The twin buildings have received substantial interior alterations. MPC is considering rehabilitation of these buildings to accommodate tourists. A detailed plan of the barracks rehabilitation will be developed in coordination with the FWS Cultural Resources Team, a historic architect, the Hawaii SHPO, and the Council.

Five buildings in this category represent the core of the "shop street scene" that is such an important element in the history of Midway. The street represents one of the few areas (besides the Officer's quarters) where the original base design is not compromised by later development. The visitor can get a clear sense of the base organization and appearance from these buildings. Most of the buildings have been in use continuously, and are in fair to good condition. Maintenance procedures and repairs to the roof and windows should be a priority.

The seaplane hangar is in fair condition, but is problematic for maintenance. It is one of the buildings most closely associated with the Battle of Midway, and appears prominently in John Ford's film footage. The huge structure is an important element of the landscape. Yet, this building,

because of its size, is difficult to maintain. The steel beams have peeling paint and rust on the beams is activated. The beams need to be cleaned and coated with metal preservative and sealed with paint. The roof and siding of metal panels have been replaced over the years.

8.3 Consultation Plan

Consultation will occur at two intervals: when rehabilitation plans are developed for individual resources and on the five year review cycle of the HPP. A maintenance and repair log will be employed to track the date of activity, the type of activity and the products used. If the work is part of a historic preservation program than additional documentation of the methods and volunteer participation will be indicated on a "Treatment Report." The maintenance log, treatment report, and photographs will be part of the review documentation during the periodic review by the Council for the standard treatment of historic properties being re-used. Additional opportunities for consultation will be provided at the request of the Council.

8.4 Nonstandard Treatments

Nonstandard treatments for the properties being reused will require conformance with Section 106 of the NHPA. While not all nonstandard treatments can be determined at the present time, generally if the activity will result in the loss of more than 25% of the remaining original materials, will change the use, or cause a dramatic change in condition then these activities are considered to be outside of the standard treatments identified above and in the PA, and will need to be reviewed on a case-by-case basis in consultation with the Council.

8.5 Reporting Standards

It is anticipated that the structure examination and treatment reports will be used as companion records for each of the properties being reused and will be updated regularly. Collecting consistent information about the condition of each of the properties and tracking preservation activities is important for the long-term maintenance of historic resources on Midway.

Chapter 9. Standard Treatment of SECURED and LEAVE AS-IS properties (26)

The treatment of secured and leave as-is properties is one of calculated neglect. Natural deterioration of the buildings, structures, and features identified in this chapter is expected and has been mitigated through recordation of these resources to HABS/HAER standards. Efforts to conserve most of these properties is not economically feasible. A Historic Preservation Plan designed for Wake Island contains a similar treatment category. As discussed in the Wake Island Historic Preservation Plan, “in the case of the massive reinforced concrete structures, efforts to repair the spalling material would compromise the integrity of the resource by necessitating the wholesale removal of portions of the original fabric and replacing it with modern materials. And, for those structures located within the wave zone of the shoreline, there are no known measures that could halt the effects of the sea on these properties” (BioSystems Analysis, Inc 1994:73).

The standard treatment procedures for the properties assigned to the secure and leave as-is categories were minimally completed by the Navy

Table 5. Inventory of Midway’s Historic Properties -- Secure or Leave As-Is.

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)
342	Paint and Oil Storehouse	Kahn design, Early Base/1941	Secure
363	Torpedo Shop w/parachute tower	Kahn design, Early Base/1941	Secure
144	Diesel power plant and salt water pumping station	Submarine Base/1944	Secure
354	Power Plant	Early Base/1941	Secure
521	Command Post	Base Development/1945	Secure
628, 619, 623, 643	Cable Station bldg Complex	Commercial Pacific Cable/1903-04	Secure
S6194	ARMCO hut (NHL Structure)	Defensive Position/ 1941-1942	Secure
631, 5187	Radar Building and Radar Tower base	Base Development/ 1943-44	Secure
S956	Underground Shelter	Early Base/1942	Secure

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)
626	Cable Station bldg	Commercial Pacific Cable/1903	Leave As-is
S2123	Plaque in Midway Memorial	Battle Memorial/1942	Leave As-is
S2409	Two 5-inch Naval guns in Midway Memorial	Battle of Midway/1942	Leave As-is/ FWS con- served metal - 1998
S5247	Brackish water reservoir	Early Base/1941	Leave As-is
S9132, S2117	Seaplane ramps	Early Base/1940	Leave As-is
S-4	Cemetery: Bauer Road	1906-1950	Leave As-is
S-5	Three Japanese Memorials	1911-1916	Leave As-is
S-6	Pillbox, south shore	Early Base/1941	Leave As-is
6-24, 12-30, 3-21	Eastern Island Runways	Early Base/1941	Leave As-is
E-1	3-inch anti-aircraft gun	Defensive equipment/ WWII	Leave As-is/ FWS con- served metal -1998
E-2	Underground Bunker, east of runway	Defensive position/ WWII	Leave As-is
E-6	Revetments	Early Base/1941	Leave As-is
E-7, E-8	Possible gun positions, south shore	Defensive positions/ WW II	Leave as is

prior to their departure in June of 1997. Yet, many of the secure treatments have proven problematic and follow-up measures are required. Additionally, opportunities for preservation projects include properties from these categories.

For instance, the NHL structures including one of the ARMCO huts, the gun batteries and a concrete pillbox were included in the secure or leave as-is category. These resources are discussed in Chapter 7 of this HPP. For most of the NHL structures, a modification in treatment has occurred. Instead of allowing the structures to deteriorate naturally, the Oceanic Society's historic preservation program is working with the Midway Atoll NWR staff to conserve the materials following the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. And, the Albert Kahn designed shops are being reused and are discussed in Chapter 8 of this HPP.

Properties identified within the Secure or Leave As-Is category, except for the NHL structures, are presented in Table 5.

9.1 Planning: Condition Assessment

In order to monitor the affects of the Secure and Leave As-Is treatment strategies on the resources a "Structure Examination Report" has been completed. An example of this report form is presented in Chapter 7. Completed report forms are maintained at the refuge office, and at the Region 1, Cultural Resources Team office. This report format provides the basis for discussing treatments that are standard and nonstandard.

The Structure Examination Report provides a framework for collecting information that is consistent for each property. While some variations will occur, the basic categories are the same. Orientation refers to the direction the facade or front of the property is facing, looking outward from the doorway. Several categories include a variety of choices, if an item applies to the property, then the item is underlined. As many variables as appropriate can be underlined. Severity of condition is subjective, but should be based on comparisons with other, similar properties on Midway. Repair needs can consist of general maintenance recommendations or a specific task list. The historic context section can be expanded as information is gathered for each of the properties.

A companion form, "Treatment Report," will be used to track preservation treatment actions for each of the properties. A treatment report for Battery C is included, as an example, at the end of Chapter 7. The treatment report includes the preservation activities including cleaning, products used, method of treatment, an assessment of the property's condition after treatment, photographs of the project, recommendations for mainte-

nance procedures, costs, a list of participants (volunteers), and hours spent on the project. The Treatment Report will be maintained by the refuge and Cultural Resources Team and will serve as a guide for preparing the HPP review report.

9.2 Standard Treatments

The standard treatment for properties “secured” according to the PA will consist of monitoring the secure procedures and maintaining those efforts, as needed. The “leave as-is” treatment category requires no active management, rather these resources will simply be monitored. Standard treatment may also include activities that follow the guidelines established in the *Secretary of the Interior’s Standards for the Treatment of Historic Properties*. In most instances the treatment will follow principles established for the “preservation level”, including actions that “prevents or slows down the rate of deterioration of historic buildings in order to extend the life of the building as long as possible without substantial replacement of historic materials.” This level of treatment encourages the conservation of original materials.

Massive Reinforced Concrete Structures (144, 354, 521, 631, 5187, S956)

- Replace window and door coverings as they deteriorate. Replacement materials will vary.
- Re-seal entrances.
- Remove rubble wall fall, or close areas that are unsafe to the public.
- Institute preservation steps to prevent or slow down the rate of deterioration according to the *Secretary of the Interior’s Standards for the Treatment of Historic Properties*.

Preservation opportunities are being explored for the Power Plant (354). Plans are being considered to secure the entrance to allow visitors access to the interior where interpretation of the intact equipment is possible.

Concrete and steel-frame buildings -- Cable Station (628, 619, 623, 643)

- Repair roofs.
- Replace window and door coverings as they deteriorate.

- Re-seal entrances.
- Institute preservation level steps to prevent or slow down the rate of deterioration according to the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- Develop and implement restoration plan.

Current plans are for stabilizing the Cable Station buildings and restoring at least two of the buildings if funds can be found to complete the work. The unique architectural aspects of the buildings have gained greater recognition in the past couple of years. The Cable Station reflects a resource type that is being reconsidered as to the appropriate treatment level. Although costly the buildings are very important for interpreting the early, pre-1940 landscape of Sand Island and perhaps could be used for visitor activities. The Cable Station is an example of the dynamic qualities of the this HPP and the preservation possibilities that can occur with public participation.

Leave As-Is Treatments (626, S2123, S2409, S5247, S9132, S2117, S-4, S-5, 6-24, 12-30, 3-21, E-1, E-2, E-6, E-7 and E-8)

This group of resources includes a rather diverse range of properties. For several of the resource types, including the Cemetery, Midway Memorial, and Midway Memorial 5-inch guns, Eastern Island gun, runways, and water reservoirs. According to the PA, all of these resources could be left without further treatment to deteriorate at a natural rate.

The FWS is reconsidering this treatment option for several of the Leave As-Is treatment properties. For instance, the 3-inch anti-aircraft gun on Eastern Island is an important icon of the Battle and it was determined that an attempt should be made to preserve it. FWS and Oceanic Society developed a plan to conserve the metal gun. The metal was cleaned of rust, salt spray, and organic materials. Then a rust convertor was applied to the bare metal. While red-lead primers have been found to be effective, the toxic content and close proximity of wildlife precludes the use of this product on Midway Atoll NWR. Instead two coats of primer and a compatible top coat finish was applied in December 1998. Cleaning and coating of one of the 5-inch guns on Sand Island was also accomplished in 1998.

Opportunities for other preservation projects on properties previously treated as Leave As-Is or Secure may occur as public participation increases. The treatment category suggested in the PA is viewed as the standard treatment, but not the best or only option available.

9.3 Consultation Plan

The Midway HPP will be reviewed every five years and this will serve as the interval for consultation for the standard treatments as outlined above for the buildings and structures in the Secure and Leave As-Is categories. A report detailing the secure efforts expended and the most recent photographs of each of the building and structures will be copied and sent to the Council as part of the five year review documentation. Additional opportunities for consultation will be provided at the request of the Council.

If a preservation activity such as treating the Eastern Island gun with a coating of rust preventative products is undertaken as part of a historic preservation program than additional documentation of the methods and volunteer participation will be indicated on a "Treatment Report" and included in the documentation sent to the Council as part of consultation.

9.4 Nonstandard Treatments

Nonstandard treatments for the properties that were secured or left as-is will require conformance with Section 106 of the NHPA. Nonstandard treatments for the secure and leave as-is category resources would generally be associated with demolition or restoration. Either of these activities would cause a dramatic change in the condition of the property and would be reviewed on a case-by-case basis in consultation with the Council.

Restoration of at least one of the Cable Station buildings is possible. A restoration effort will require the coordination of an engineer, historic architect, the FWS Cultural Resources Team, the Hawaii SHPO, and the Council to develop and implement appropriate plans.

9.5 Reporting Standards

It is anticipated that the structure examination and treatment reports will be used as companion records for each of the properties in the secure and leave as-is categories and will be updated regularly. Collecting consistent information about the condition of each of the structures and tracking preservation activities is an important aspect of this HPP.

Chapter 10. Standard Treatment of FILL and RELOCATE properties (5)

The treatment of properties by filling them with sand is essentially an *in situ* secure procedure. However, natural deterioration of the metal is expected. Relocating several large objects was a treatment method that foresaw the potential for a museum or exhibit.

Two of the NHL structures were originally included in the Fill treatment. However, during implementation procedures, filling of the ARMCO huts with sand was found to be infeasible and they were secured with rigid plastic panels. These resources are discussed in Chapter 7 of this HPP.

Properties identified within the Fill or Relocate category, except for the NHL structures, are presented in Table 6.

10.1 Planning: Condition Assessment

In order to monitoring the affects of the Fill and Relocate treatment strategies on the resources a "Structure Examination Report" was completed in 1998. An example of this report form is presented in Chapter 7. Completed report forms will be maintained at the refuge office and at the Region 1, Cultural Resources Team office. This report format provides the basis for discussing treatments that are standard and nonstandard.

The Structure Examination Report provides a framework for collecting information that is consistent for each property. While some variations will occur, the basic categories are the same. Orientation refers to the direc-

Table 6. Inventory of Midway's Historic Properties -- Fill and Relocate.

Bldg. No.	Common Name	Theme/Period	Treatment (PA-1996)
S-7	Metal Pillboxes, north side on inner harbor	Defensive Position/WW II	Fill
E-3	Metal pillbox, Eastern Island	Defensive Position/1942	Fill
S-8	Torpedo and bomb	WW II	Relocate
E-4	Metal pillbox (turret)	WW II	Relocate
E-5	Submarine netting	WW II	Relocate

tion the facade or front of the property is facing, looking outward from the doorway. Several categories include a variety of choices, if an item applies to the property, then the item is underlined. As many variables as appropriate can be underlined. Severity of condition is subjective, but should be based on comparisons with other, similar properties on Midway. Repair needs can consist of general maintenance recommendations or a specific task list. The historic context section can be expanded as information is gathered for each of the properties.

A companion form, "Treatment Report," will be used to track preservation treatment actions for each of the properties. A treatment report for Battery C is included, as an example, at the end of Chapter 7. The treatment report includes the preservation activities including cleaning, products used, method of treatment, an assessment of the property's condition after treatment, photographs of the project, recommendations for maintenance procedures, costs, and a list of participants (volunteers) and hours spent on the project. The Treatment Report will be maintained by the refuge and Cultural Resources Team to serve as a guide for preparing the HPP review report.

10.2 Standard Treatments

The standard treatment for properties Filled according to the PA will consist of monitoring the resources and maintaining those efforts, as needed. The Relocate treatment category requires no active management, rather these resources will simply be monitored, until such a time that moving them to a museum or interpretative display area is desired. Standard treatment may also include activities that follow the guidelines established in the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. In most instances the treatment will follow principles established for the "preservation level", including actions that "prevents or slows down the rate of deterioration of historic buildings in order to extend the life of the building as long as possible without substantial replacement of historic materials." This level of treatment encourages the conservation of materials.

Metal Pillboxes (S-7 and E-3)

- Photograph each of these resources at least once every five years.
- Institute preservation steps to prevent or slow down the rate of deterioration according to the *Secretary of the Interior's Standards for the*

Treatment of Historic Properties. For instance, the metal pillbox on Eastern Island has been emptied of sand and is part of an interpretive loop trail. Conservation treatment of the metal is being considered for an Oceanic Society preservation project.

Bomb-torpedo, pillbox turret, submarine netting (S-8, E-4, E-5)

- No further documentation is required until relocated.

- Institute preservation steps to prevent or slow down the rate of deterioration according to the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

10.3 Consultation Plan

The Midway HPP will be reviewed every five years and this will serve as the interval for consultation for the standard treatments as outlined above for the structures and objects in the Fill and Relocate categories. The most recent photographs showing the condition of the filled resources and the current location of the objects to be relocated will be copied and sent to the Council as part of the HPP review documentation. Additional opportunities for consultation will be provided at the request of the Council.

If a preservation activity is undertaken, for instance, as part of the Oceanic Society historic preservation program, than additional documentation of the methods and volunteer participation will be indicated on a "Treatment Report" and included in the documentation sent to the Council as part of consultation.

10.4 Nonstandard Treatments

Nonstandard treatments for the properties that were filled or relocated will require conformance with Section 106 of the NHPA. Nonstandard treatments for the fill and relocate treatments include activities that will cause a dramatic change in condition, such as demolition, and will need to be reviewed on a case-by-case basis in consultation with the Council.

10.5 Reporting Standards

It is anticipated that the structure examination and treatment reports will be used as companion records for each of the properties in the Fill and Relocate categories and updated as appropriate. Collecting consistent information about the condition of each of the structures and tracking preservation activities is an important aspect of this HPP.

References Cited

Allen, Gwenfread

1950 *Hawaii's War Years: 1894-1945*. University of Hawaii Press, Honolulu.

Anonymous

1922 Correspondence from Superintendent of Cable Station on Midway regarding "conditions at Midway Islands". Typed letter, on file at the Bishop Museum Archives, PSIC Group 1, Box 20, "Midway Islands".

Apple, Russell A. and Gerald Swedberg

1979 History of the Midway Islands. Unpublished manuscript prepared for Commanding Officer Naval Air Facility, Midway Island, by National Park Service, U.S. Department of the Interior. On-file PACNAVFACENGCOM, Pearl Harbor, Hawaii.

Bailey, Alfred M. And Robert J. Niedrach

1951 Stepping Stones Across the Pacific: A Narrative of the Denver Museum of Natural History Expedition to the Mid-Pacific Ocean. *Museum Pictorial* (3), Denver Museum of Natural History, Denver, Colorado.

Barty-King, Hugh

1979 *Girdle Round the Earth: the story of Cable and Wireless and its predecessors to mark the group's jubilee 1929-1979*. Heinemann, London.

Bender, Marylin and Selig Altschul

1982 *The Chosen Instrument: Pan Am, Juan Trippe, The Rise and Fall of an American Entrepreneur*. Simon and Schuster, New York.

Bingham, Lt. Col. Sidney V.

1938 Report on U.S. Navy Engineering Expedition to Midway Island, May 1938. Typed manuscript, on-file at the Bishop Museum Archives, PSIC Group 1, Box 20 "Midway Islands", (copied pgs 5-11).

Blair, Clay, Jr.

1975 *Silent Victory: The U.S. Submarine War Against Japan*. J. B. Lippincott Company, New York.

Bryan, J. III

- 1982 Midway: Turning Point In the Pacific, pgs 192-211. *Reader's Digest Illustrated Story of World War II*. Reader's Digest Association, Inc., New York.

Bryan, E.H. Jr.

- 1938 Midway Island, U.S.A. *Paradise of the Pacific* 50(6):29 and 30.

Bump, Herbert D.

- n.d. Cleaning and Stabilizing Metal Artifacts by Means of Electrolysis and Protective Coatings. Unpublished paper from Research and Conservation Laboratory, Florida Division of Archives, History and Records Management, Tallahassee, Florida.

Cable and Wireless

- n.d. *Global from the Start: A Short History of Cable & Wireless*. Brochure published by the Cable and Wireless plc, London.

Cohen, Stan

- 1985 *Pan American Clippers Planes 1935 to 1945: Wings to the Orient - A Pictorial History*. Pictorial Histories Publishing Company, Missoula, Montana.

Colley, Ben W.

- n.d.b. Midway. [Typed manuscript of *Reminiscences of B.W. Colley*, first Cable Station Superintendent, 16 pages]. And, Notes Regarding Important Events on Midway, April 29, 1903 through April 28, 1907 by Colley; and History of Midway Islands [July 5, 1859 through May 29, 1947] author unknown. At Bishop Museum Archives: Ms. Doc 29.

Commercial Pacific Cable Company

- 1902 The Commercial Pacific Cable Company and the Telegraph Construction Maintenance Company Limited: Contract for the Manila-Guam-Midway-Honolulu Cable, 1902. Archives of the Cable and Wireless Communications, London.
- 1903 The Commercial Pacific Cable Company, Midway-Guam Cable 1903. Cable Engineers Final Reports and Appendices. Report of the Laying of the Commercial Pacific Company's Guam-Midway Section by C.S. *Colonia* 5th June to 23rd June 1903. Doc/CPCC/3/2, Archives of the Cable and Wireless Communications, London.

- Cressman, Robert J., Steve Ewing, Barrett Tillman, Mark Horan, Clark Reynolds, and Stan Cohen
1990 *A Glorious Page In Our History: The Battle of Midway 4-6 June 1942*. Pictorial Histories Publishing Company, Missoula, Montana.
- Denfeld, D. Colt
1994 Assessment of Cold War Facilities, Appendix B, in Ann Yoklavich et al., *Supplemental Cultural Resources Overview Survey*. Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii.
- Executive Order 13022
1996 *Executive Order to Establish Midway Atoll National Wildlife Refuge*. Copy on-file Midway Atoll National Wildlife Refuge, Midway.
- Farrell, Andrew
1931 The Taming of an Island at Its Worst. *Asia*. Hawaii State Library, Hawaii & Pacific Section, "Midway" pamphlet file.
- Garrah, G. R. M.
1950 *One Hundred Years of Submarine Cables*. HMSO, London.
- Haigh, Kenneth Richardson
1978 *Cableships and Submarine Cables*. Std. Telephones and Cables, Ltd., London.
- Hazelwood, Harold
n.d. How the Marines on Midway Stalled the Jap Time-Table; as told to Sgt. Murray Lewis, Marine Corps Public Relations. *Sensation*. Magazine clipping from Sgt. John V. Gardner, Nevada City, California.
- Helber Hastert & Fee
1995 *Cultural Resources Management Plan*. Prepared by Helber Hastert & Fee, Planners. Submitted to Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii.
- Heinl, Robert D., Jr.
1948 *Marines at Midway*. Historical Section of Public Information, Headquarters, U.S. Marine Corps, Washington, D.C.

- International Nickel Company, Inc. (INCO)
1955 *Corrosion in Action*. 6th Edition reprint 1977, The International Nickel Company, Inc., New York.
- Jablonski, Edward
1971 *Airwar*. Doubleday & Company, Inc, New York.
- Jackson, Thomas L.
1994 *Draft: Historic Preservation Plan for Wake Island Airfield, Wake Island*. Prepared under contract # DACA83-91-D-0024 for the U.S. Army Corps of Engineers, Pacific Ocean Division, Ft. Shafter, Hawaii. Prepared by BioSystems Analysis, Inc., Kailua, Hawaii.
- Jimenez, Joseph A. and Paul H. Rosendahl
1994 Appendix A: *Archaeological Subsurface Testing for Supplemental Cultural Resources Overview Survey, Midway in Supplemental Cultural Resources Overview Survey: Sand and Eastern Islands, Midway Atoll*, by Ann Yoklavich, D. Colt Denfeld, Joseph A. Jimenez, and Paul H. Rosendahl. Prepared by Spencer Mason Architects, Inc. with Paul H. Rosendahl, Ph.D., Inc. Submitted to Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii.
- Kruger, Jerome
1978 Corrosion: Facts for the Consumer. *NBS Consumer Information Series 9*. U.S. Department of Commerce, National Bureau of Standards, Washington, D.C.
- Kuttruff, Carl, Stephen R. James, Jr., Jack C. Hudson, and Nancy Farrell
1995 *Comprehensive Resource Inventory and Preservation Study for World War II Cultural Resources at the United States Army Kwajalein Atoll*. Prepared for the United States Army Space and Strategic Defense Command, Hunstville, Alabama. Prepared by Panamerican Consultants, Inc., Tuscaloosa, Alabama, Under Contract to: EARTH TECH, Hunstville, Alabama, Contract # DASG60-92-C-0001.
- Lau, Robert
1939 That Midway Myth. *Honolulu Advertiser*. Magazine Section, April 23, 1939. In Hawaii State Library, Hawaii and Pacific Section, "Midway" pamphlet file.

- Lindberg, R. I.
n.d. A Simplified Discussion of Corrosion. Unpublished paper, Metallurgical Research Division, Reynolds Metals Company.
- Look, David W. and Dirk H.R. Spennemann
1993 *For Future Use: A Management Conservation Plan for the World War II Sites in the Republic of the Marshall Islands*. U.S. National Park Service, Western Regional Office, San Francisco, California, U.S.A.
- 1994 Preparing for the 50th Anniversary of Guam Liberation: Metals Conservation Course and Demonstration Project. *CRM* Volume 17:No. 8, pgs 35-36.
- 1996 In a Tropical Marine Climate: Conservation Management of Historic Metals. *APT Bulletin: The Journal of Preservation Technology*. Volume 27:Number 1-2, pgs 60-69, Williamsburg, Virginia.
- Lord, Walter
1967 *Incredible Victory*. Harper and Row, New York.
- Maly, Kepa
1994 Appendix A: Limited Historical Documentary Research, pp. A1-A4, in *Archaeological Subsurface Testing for Supplemental Cultural Resources Overview Survey, Midway in Supplemental Cultural Resources Overview Survey: Sand and Eastern Islands, Midway Atoll*, by Ann Yoklavich, D. Colt Denfeld, Joseph A. Jimenez, and Paul H. Rosendahl. Prepared by Spencer Mason Architects, Inc. with Paul H. Rosendahl, Ph.D., Inc. Submitted to Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii.
- Morison, Samuel Eliot
1963 *The Two-Ocean War: A Short History of the United States Navy in the Second World War*. Little, Brown and Company, Boston.
- Museum Property Handbook
1993 *Volume I -- Preservation and Protection of Museum Property*. Department of the Interior, Office of the Secretary, Washington, D.C.

NAS Barbers Point

- 1962 Naval Air Station, Barbers Point: Base Guide. Photocopy on-file
Midway Atoll National Wildlife Refuge, Midway.

National Park Service

- n.d. *Secretary of the Interior's Standards for Preservation Planning*.
Department of the Interior, National Park Service, Washington,
D.C.
- 1980 *Resource Protection Planning Process*. National Park Service,
Department of the Interior, Washington, D.C.

Operations and Management Plan: Midway

- 1996 *U.S. Fish and Wildlife Service/ Midway Phoenix Corporation
Cooperative Agreement for Midway Atoll National Wildlife Ref-
uge Support*. Agreement on-file Midway Atoll National Wildlife
Refuge, Midway.

Olsen, E.

- 1918 *The Midway Tragedy*. *Mid-Pacific Magazine*, Vol. XV:1, Jan.
1918, pgs. 77-81. On-file at the Bishop Museum Archives.
PSIC Group 1, Box 20 "Midway Islands".

Owen, Clarence S.

- 1904 *Marine Barracks, Midway Island, June 10, 1904*. Letter report
from Clarence S. Owen, 2d Lieut. U.S.M.C., Commanding Ma-
rines to The Brigadier General, Commandant, U.S.M.C., Wash-
ington, D.C. On-file, National Archives, reproduced copy on-file
Midway Atoll NWR.

Prange, Gordon W.

- 1982 *Miracle At Midway*. Penguin Books, New York.

Programmatic Agreement (PA)

- 1996 Programmatic Agreement among the Pacific Division, Naval
Facilities Engineering Command, the Advisory Council on His-
toric Preservation, and the U.S. Fish and Wildlife Service, for the
closure of U.S. Naval Air Facility Midway and transfer to the U.S.
Fish and Wildlife Service. Document on-file Midway Atoll Na-
tional Wildlife Refuge, Midway.

Public Use Plan

1997 *Public Use Plan for Midway Atoll National Wildlife Refuge, Midway Atoll, Northwestern Hawaiian Islands.* Prepared by the U.S. Fish and Wildlife Service. Document on-file Midway Atoll National Wildlife Refuge.

Spennemann, Dirk H.R.

1994 8-inch (200mm) Coastal Defense Guns: British, Italian and Japanese Naval Guns and their Emplacements in Micronesia. *Conservation Management of Historic Metals in Tropical Environments: Background Notes 6.* Charles Sturt University, Albury, Australia.

Spennemann, Dirk H.R. and David W. Look

1993 Saving WWII Historic Sites: Metals Conservation Course in the Marshall Islands. *CRM Volume 16:No. 5*, pgs 22-25.

1994 Writing Conservation Management Plans: Concepts and Considerations for Conservation Management Plans. *Conservation Management of Historic Metals in Tropical Environments: Background Notes 11.* Charles Sturt University, Albury, Australia and National Park Service, San Francisco, California, U.S.A.

Taylor, Albert Pierce

1928 Midway, the Cable Islands. *Paradise of the Pacific.* December, 1928, pgs. 73-76.

Thompson, Erwin

1986 *World War II-Era Military Facilities, Midway Islands.* National Historic Landmark nomination. Form prepared by National Park Service. Document on-file Midway Atoll National Wildlife Refuge, Midway.

Warshauer, Kent

n.d. *Midway Islands.* Manuscript in Draft, on-file Midway Atoll National Wildlife Refuge, Midway.

Weeks, Kay D. And Anne E. Grimmer

1995 *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings.* U.S. Department of the Interior, National Park Service, Washington, D.C.

Woodbury, David O.

1946 *Builders for Battle: How the Pacific Naval Air Bases Were Constructed.* E.P. Dutton and Company, Inc., New York.

Yoklavich, Ann

1993 *Cultural Resources Overview Survey at Naval Air Facility, Midway Island.* Prepared by Spencer Mason Architects, Inc. Submitted to Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii.

Yoklavich, Ann, D. Colt Denfeld, Joseph A. Jimenez, and Paul H.

Rosendahl

1994 *Supplemental Cultural Resources Overview Survey: Sand and Eastern Islands, Midway Atoll.* Prepared by Spencer Mason Architects, Inc. with Paul H. Rosendahl, Ph.D., Inc. Submitted to Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii.

U.S. Congress

1902 57th Congressional Report, Washington, D.C.

U.S. Naval Station Midway Island

1964 *U.S. Naval Station Midway Island 1964.* Daito Art Printing Co., Ltd, Tokyo. (Photo reproduction on-file Midway Atoll NWR).

PERSONAL COMMUNICATION

Richard Best, with author, Santa Monica, California, 22-23 September 1998.

Raymond Sheen, with author, Santa Monica, California, 22 September 1998.

Elsmere Sutter, with author, Pasadena, California, 23 September 1998.

Barney Finn, National Museum of American History, Smithsonian Institution, History Department, Electrical Collections, Washington D.C. by telephone with author August 1998.

Mary Godwin, Cable and Wireless Archivist, London, by letter with author August/October 1998.

APPENDIX A:

HISTORIC PROPERTIES DESCRIPTIONS

The following section provides maps of Sand and Eastern Islands with the locations of historic properties identified (Figures 11 and 12), along with a photograph of most of the 63 resources. The photographs are arranged to correspond with Chapters 7 through 10, with NHL properties first, followed by properties in the *Reused*, *Secure*, *Leave as-is*, *Fill* and *Relocate* categories.

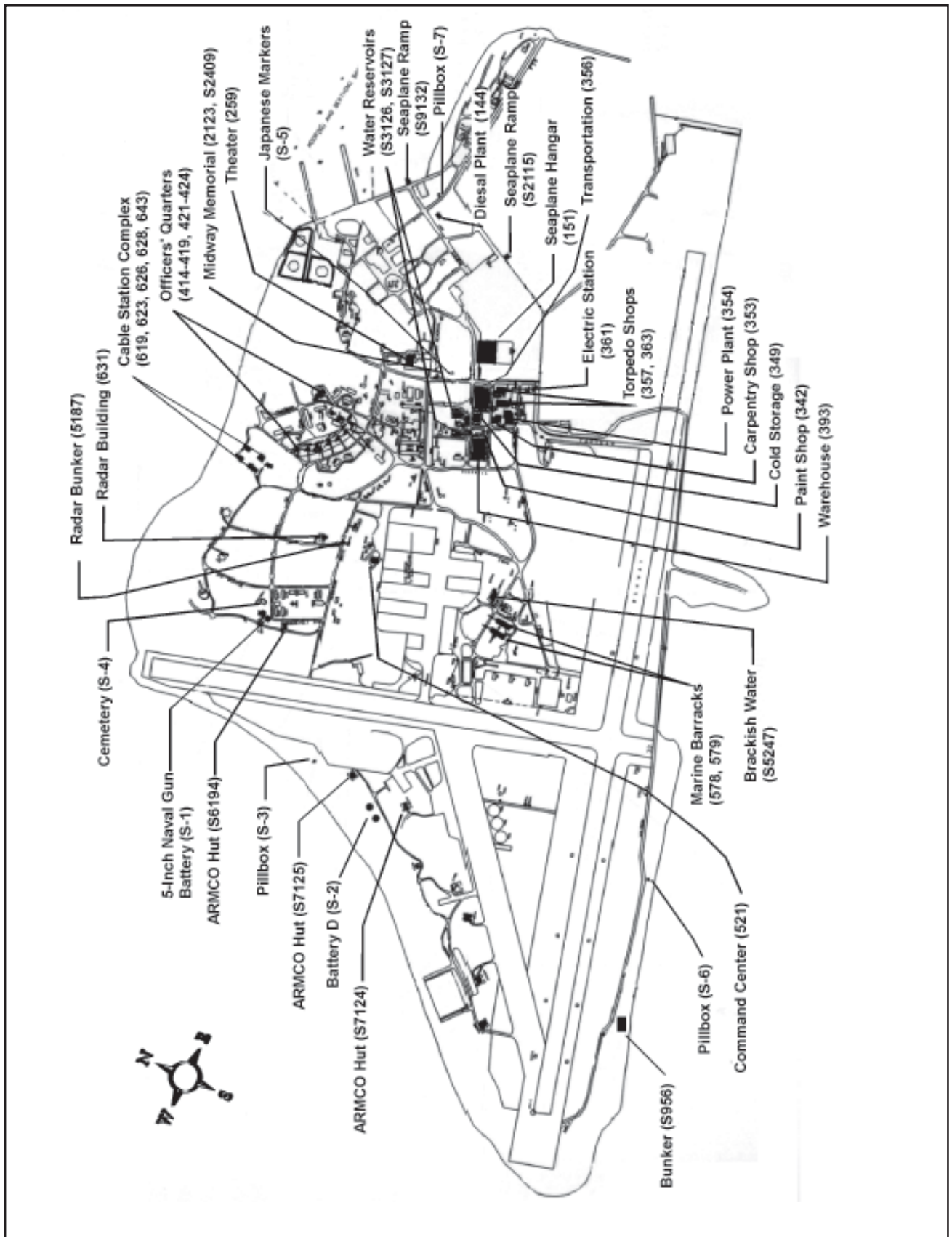


Figure 11. Map of Sand Island, with historic properties identified

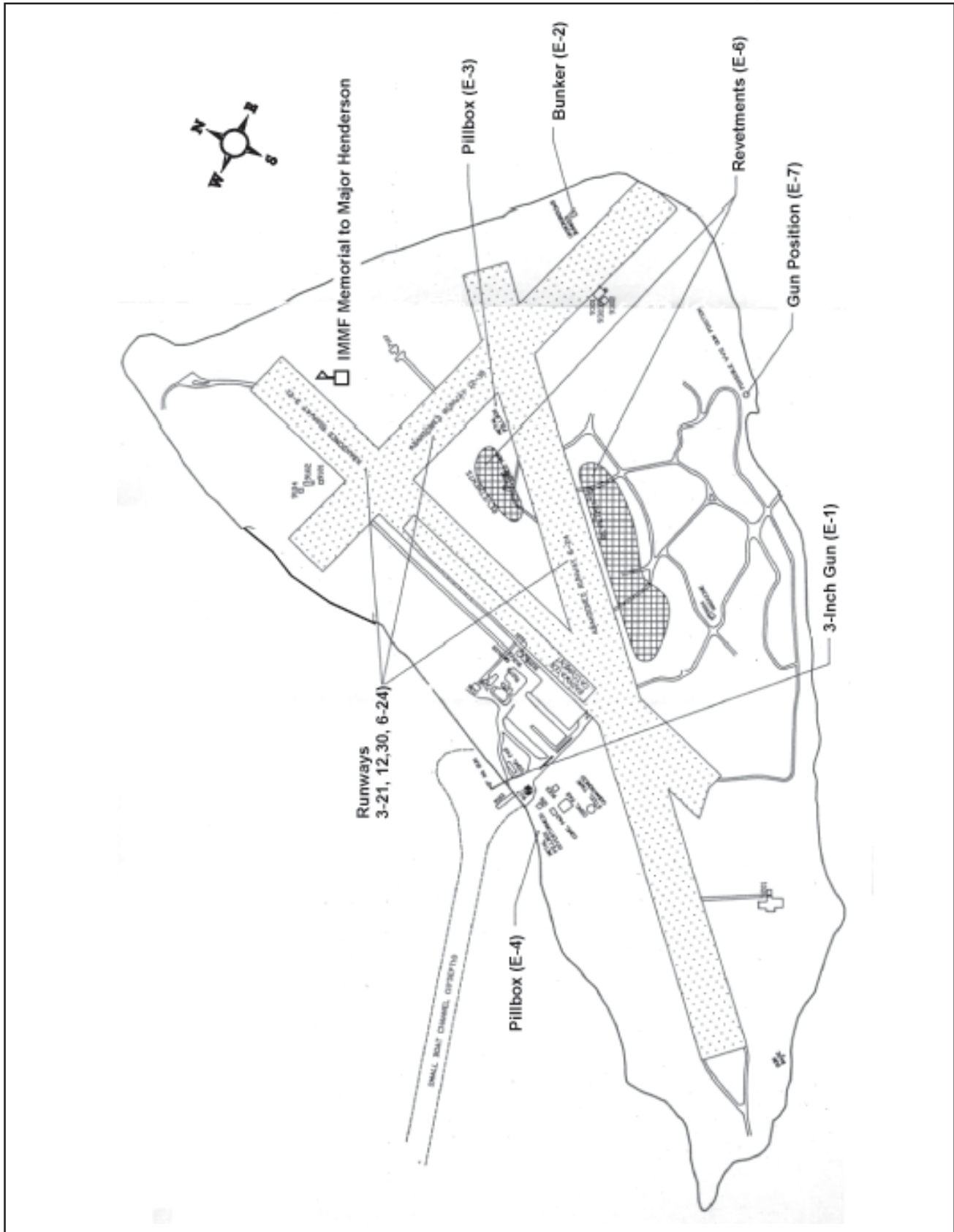


Figure 12. Map of Eastern Island, with historic properties identified

National Historic Landmarks (NHLs)

Common Name	Building #	Photographer, Date
ARMCO Huts	#S6194	Dodge, 1997
	S7124	Dodge, 1997
	S7125	Raymond, 1997
Battery C	S-1	Raymond, 1997
Battery D	S-2	Raymond, 1997
Pillbox near S7125	S-3	Dodge, 1997







REUSED

Common Name	Building #	Photographer, Date
Seaplane Ramp	#S2115	Dodge, 1997
Electrical Switch Station	361	Dodge, 1997
Theater, Offices, Recreation Facilities and Shopping	259	Dodge, 1997
Barracks	578, 579	Dodge, 1997
Carpentry Shop	353	Dodge, 1997
General Squadron Storehouse	356	Dodge, 1997
Torpedo Shop (Machine Shop)	357	Dodge, 1997
OIC, Senior Officer's Quarters	414, 415, 416, 417, 418 419, 421, 422, 423, 425	Dodge, 1997
Commissary and Cold Storage	349	Dodge, 1997
Water reservoirs	S3126, S3127	Maxfield, 1996
Public Works Storehouse	393	Dodge, 1997
Seaplane Hangar	151	Dodge, 1997
Torpedo Shop with Parachute Tower	363	Dodge, 1997
Paint and Oil Storehouse	342	Dodge, 1997

Sea Plane Ramp

S2115 and S9132 - Reused



Electrical Switch Station

#361 - Reused







Torpedo Shop (Machine Shop)

#357 - Reused



Officer-in-Charge Quarters

#414 - Reused











SECURE

Common Name	Building #	Photographer, Date
Diesel Power Plant and Salt Water Pumping Station	144	Raymond, 1997
Power Plant	354	Dodge, 1997
Command Post	521	Dodge, 1997
Cable Station Building Complex	628, 619, 623, 643	Dodge, 1997
Radar Building and Radar Tower Base	631, 5187	Dodge, 1997
Underground Shelter	S956	Dodge, 1997









LEAVE AS-IS

Common Name	Building #	Photographer, Date
Cable Station Building	626	Dodge, 1997
Plaque in Midway Memorial	S2123	Dodge, 1997
Two 5" Naval Guns in Midway Mem.	S2409	Raymond, 1997
Brackish Water Reservoir	S5247	Dodge, 1997
Seaplane Ramps	S9132, S2117	Dodge, 1997
Cemetery: Bauer Road	S-4	PACNAVFACENCOM, 1996
Three Japanese Memorials	S-5	Raymond, 1997
Pillbox, south shore	S-6	Raymond, 1997
Eastern Island Runways	6-24, 12-30, 3-21	Raymond, 1997
3" Anti-aircraft Gun	E-1	Raymond, 1997
Underground Bunker	E-2	PACNAVFACENCOM, 1996
Revetments	E-6	Raymond, 1997
Possible Gun Positions	E-7, E-8	PACNAVFACENCOM, 1996



See photo of S3126 and S3127 in *Reused* Section

See photo of S2115 in *Reused* Section





Underground Bunker, east of runway

#E-2 - Leave as-is



Pillbox, South Shore

#S-6 - Leave as-is





FILL

Common Name	Building #	Photographer, Date
Metal Pillbox, north side on inner harbor	S-7	Raymond, 1997
Metal Pillbox, Eastern Island	E-3	Raymond, 1997

Metal Pillbox, north side on inner harbor

#S-7 - Fill



Metal Pillbox, Eastern Island

#E-3 - Fill



RELOCATE

Common Name	Building #	Photographer, Date
Torpedo and Bomb	S-8	no photo
Metal Pillbox (turret)	E-4	no photo
Submarine Netting	E-5	no photo

APPENDIX B:

Programmatic Agreement

PROGRAMMATIC AGREEMENT AMONG
THE PACIFIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
AND THE U.S. FISH AND WILDLIFE SERVICE

WHEREAS, the U.S. Navy, Pacific Division, Naval Facilities Engineering Command (PACNAVFACENGCOM) proposes to administer the closure of U.S. Naval Air Facility Midway (NAF Midway) authorized by the Base Realignment and Closure (BRAC) Act of 1990 (P.L. 101-510) as amended; and

WHEREAS, the U.S. Fish and Wildlife Service (Service) is the expected subsequent landowner of Midway Atoll, has participated in the consultation, and has been invited as a signatory to this Programmatic Agreement; and

WHEREAS, PACNAVFACENGCOM has consulted with the Advisory Council on Historic Preservation (Council) pursuant to Section 800.13 of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f) and Section 110(f) of the same Act (16 U.S.C. 470-2(h)); and

WHEREAS, the Department of the Interior's National Park Service (NPS), the State Historic Preservation Officer of the State of Hawaii (SHPO), the Sixth Defense Battalion, U.S. Marine Corps and Defenders of Midway Islands Reunion Association and the International Midway Memorial Foundation participated in the consultation; and

WHEREAS, the definitions given in Appendix A are applicable throughout this Programmatic Agreement.

NOW, THEREFORE, PACNAVFACENGCOM, the Service and the Council agree that the closure of NAF Midway shall be administered in accordance with the following stipulations to satisfy PACNAVFACENGCOM's Section 106 responsibility for all individual undertakings of the aspects of this project.

Stipulations

PACNAVFACENGCOM and the Service shall ensure that the following measures are carried out:

I. IDENTIFICATION AND EVALUATION

- A. PACNAVFACENGCOM has prepared the Cultural Resources Overview Survey at Naval Air Facility, Midway Island (Preliminary Report), the Supplemental Cultural Resources Overview Survey, Sand and Eastern Islands, Midway Atoll (Final Report), and the Cultural Resources Management Plan, Sand and Eastern Islands, Midway Atoll (Review Copy) to identify all Category I and II buildings, structures, and objects on Sand and Eastern Islands, NAF Midway either included or eligible for inclusion in the National Register of Historic Places. PACNAVFACENGCOM has determined that the closure of NAF Midway may have an adverse effect upon properties.

- B. PACNAVFACENCOM and the Service agree to consider all Category I and II buildings, structures, and objects on Sand and Eastern Islands, NAF Midway, as defined in Appendix B, as eligible for inclusion in the National Register of Historic Places ("Register") and subject to the terms of this agreement.
- C. All buildings, structures, and objects on Sand and Eastern Islands, NAF Midway not identified in Appendix B shall not be considered eligible for inclusion in the Register and National Historic Landmark and therefore, not subject to the terms of this Programmatic Agreement.
- D. PACNAVFACENCOM has determined that the cost of manually removing potentially hazardous lead-based paint from the exterior surfaces of a large number of historic properties is economically prohibitive.
- E. PACNAVFACENCOM has not determined nor can guarantee the structural integrity of the structures to remain.
- F. PACNAVFACENCOM and the Service are aware of the important role played by the servicemen of the United States during the 7 December 1941 attack on Midway and the June 1942 Battle of Midway, widely recognized as the turning point for the World War II war in the Pacific. Therefore, the Service shall within the constraints of the National Wildlife Refuge Administration Act allow accessibility to Midway Atoll for parties interested in the historical significance of the islands.

II. MITIGATION MEASURES

As a result of consultation between PACNAVFACENCOM, the Council, and the Service, the parties have reached agreement on the following:

- A. The Service shall "reuse" and maintain the historic properties listed in Appendix C. PACNAVFACENCOM shall provide for spot repairs of peeling and chipping lead-based paint on exterior property surfaces. Repairs shall be accomplished by scraping areas of peeling and chipping lead-based paint and repainting the affected area with a new layer of lead-free non-toxic paint. PACNAVFACENCOM shall be responsible for monitoring deterioration and/or performance of maintenance until such time as the property is transferred to the Service as agreed to in the phase-in plan. Any requirements for monitoring deterioration and/or performance of maintenance after transfer shall be performed by the Service.
- B. PACNAVFACENCOM shall "secure" and abandon in place the properties listed in Appendix D. The properties are considered wildlife hazards and as such shall be secured from intrusions with semi-permanent closure of all openings. Allowance for adequate ventilation shall be provided. PACNAVFACENCOM shall also provide for spot repairs of peeling and chipping lead-based paint on exterior property surfaces. Repairs shall be accomplished by scraping areas of peeling and chipping lead-based paint and repainting the affected area with a new

layer of lead-free non-toxic paint. PACNAVFACENGCOM shall be responsible for monitoring deterioration and/or performance of maintenance until such time as the property is transferred to the Service as agreed to in the phase-in plan. Any requirements for monitoring deterioration and/or performance of maintenance after transfer shall be performed by the Service.

- C. PACNAVFACENGCOM shall abandon and leave in place the properties listed in Appendix E "as-is." PACNAVFACENGCOM shall also provide for spot repairs of peeling and chipping lead-based paint on exterior property surfaces. Repairs shall be accomplished by scraping areas of peeling and chipping lead-based paint and repainting the affected area with a new layer of lead-free non-toxic paint. PACNAVFACENGCOM shall be responsible for monitoring deterioration and/or performance of maintenance until such time as the property is transferred to the Service as agreed to in the phase-in plan. Any requirements for monitoring deterioration and/or performance of maintenance after transfer shall be performed by the Service.
- D. PACNAVFACENGCOM shall "fill" or cover the properties listed in Appendix F with sand. The properties are considered potential wildlife entrapment hazards and as such all entrances shall be blocked from intrusions with sand. Structures which are considered in imminent danger of collapse shall be filled with sand. Impermeable sheeting shall be used to separate the property walls from fill material. PACNAVFACENGCOM shall also provide for spot repairs of peeling and chipping lead-based paint on exterior property surfaces. Repairs shall be accomplished by scraping areas of peeling and chipping lead-based paint and repainting the affected area with a new layer of lead-free non-toxic paint. PACNAVFACENGCOM shall be responsible for monitoring deterioration and/or performance of maintenance until such time as the property is transferred to the Service as agreed to in the phase-in plan. Any requirements for monitoring deterioration and/or performance of maintenance after transfer shall be performed by the Service.
- E. PACNAVFACENGCOM shall "demolish" the properties listed in Appendix G. Rubble materials shall be placed in the proposed Bulky Waste Landfill on whichever island the structure is located.
- F. PACNAVFACENGCOM shall "relocate" the properties listed in Appendix H. The World War II torpedo and bomb now located in Building 5306 shall be moved to a more suitable location if requested by the Service. A representational section of submarine net and floaters located on Eastern Island shall be relocated to a more permanent location on Sand Island. The metal pillbox, also located on Eastern Island, shall be moved to an existing concrete slab on Eastern Island. PACNAVFACENGCOM shall be responsible for monitoring deterioration and/or performance of maintenance until such time as the property is transferred to the Service as agreed to in the phase-in plan. Any requirements for monitoring deterioration and/or performance of maintenance after transfer shall be performed by the Service.

- G. PACNAVFACENGCOM shall ensure that HABS/HAER documentation of the installation and its historic properties is carried out in consultation with the NPS as recommended in Appendices D through H. Final documentation shall be submitted to and accepted by NPS before proceeding with proposed disposition. Copies of approved documentation shall be provided to the Service and Hawaii SHPO.
- H. PACNAVFACENGCOM shall ensure that all public works department records relating to the operation of NAF Midway are transferred to the Service as agreed to in the phase-in plan for service activities.
- I. PACNAVFACENGCOM shall ensure that all historic documents and historical files collected by the Navy or its subcontractors relating to Midway Atoll are included in the property transfer to the Service.
- J. PACNAVFACENGCOM shall ensure that all historic preservation work pursuant to this Programmatic Agreement is carried out by or under the direct supervision of a person or persons meeting at a minimum the professional qualifications established by 36 CFR §61.9 for architectural historians.
- K. The SERVICE shall in compliance with the National Historic Preservation Act and applicable historic preservation protection laws prepare a long-term Historic Preservation Plan (HPP) for submission to the NPS, SHPO, and the Council within one year of PACNAVFACENGCOM completing all work.
- L. In the event the Service enters into a lease or contract for the management of Midway Atoll, pursuant to Section 111 of the National Historic Preservation Act, the Service shall ensure the preservation of historic properties is maintained and require the contractor to support the HPP for Midway Atoll.

III. DISPUTE RESOLUTION

- A. Should any of the signatories of this agreement object to any actions proposed pursuant to this agreement, PACNAVFACENGCOM shall consult with the objecting party to resolve the objection. If PACNAVFACENGCOM determines that the objection cannot be resolved, PACNAVFACENGCOM shall forward all documentation relevant to the dispute to the Council. Within 30 days after the receipt of all pertinent documentation, the Council will either:
 - 1. Provide PACNAVFACENGCOM with recommendations, which PACNAVFACENGCOM will take into account in reaching a final decision regarding the dispute; or
 - 2. Notify PACNAVFACENGCOM that it will comment pursuant to 36 CFR Part 800.6(b), and proceed to comment. Any Council comment provided in response to such a request will be taken into account by PACNAVFACENGCOM in accordance with 36 CFR Part 800.6(c)(2) with reference to the subject of the dispute.

- B. Any recommendation or comment provided by the Council will be understood to pertain to the subject of the dispute; PACNAVFACENGCOM and the Service shall be responsible to carry out all actions under this agreement that are not the subjects of dispute.

IV. ANNUAL REPORT

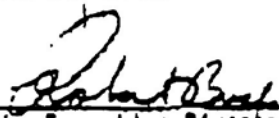
The Service, with the cooperation and assistance from PACNAVFACENGCOM, shall prepare an annual report with an assessment of the condition of properties listed in Appendix B and include a 3" x 5" black-and-white photograph of each property not demolished. PACNAVFACENGCOM shall assist the service by providing the required assessment and photographs for properties not transferred to the Service. The report shall be submitted to the Council by 30 June of each calendar year until final departure by PACNAVFACENGCOM. If the Service is unable to submit the report on this date, it shall notify all parties to this agreement in writing of this delay and inform the parties of the expected completion date.

V. MONITORING


- A. The Council may monitor activities carried out pursuant to this Programmatic Agreement, and will review such activities if so requested. PACNAVFACENGCOM and the Service shall cooperate with the Council in carrying out its monitoring and review responsibilities.
- B. This Programmatic Agreement shall be effective upon signature and considered in full force until replaced by future agreement between the Service and Council.
- C. From the period this agreement is signed and in effect until the expected PACNAVFACENGCOM clean-up completion and departure date of 30 June 1997, any party to this Programmatic Agreement may request that it be amended. Amendments shall be addressed in accordance with 36 CFR § 800.13 and in consultation with the Council.
- D. Any party to this Programmatic Agreement may terminate it by providing thirty (30) days written notice to the other parties, provided that the parties will consult during the time prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, PACNAVFACENGCOM will comply with 36 CFR § 800.4 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.
- E. In the event PACNAVFACENGCOM does not carry out the terms of this Programmatic Agreement, PACNAVFACENGCOM will comply with 36 CFR § 800.4 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.

Execution and implementation of this Programmatic Agreement evidences that PACNAVFACENGCOCM has afforded the Council and the Service a reasonable opportunity to comment on the closure of NAF Midway and that PACNAVFACENGCOCM has taken into account the effects of the closure on historic properties.

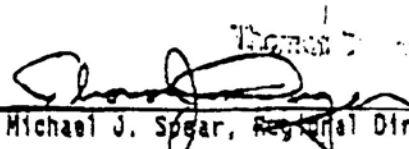
ADVISORY COUNCIL ON HISTORIC PRESERVATION

By:  Date: 2/5/96
Robert Bush, Executive Director

PACIFIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND

By:  Date: 12-20-95
Capt. Peter Check, Head Public Works Support, PACNAVFACENGCOCM

UNITED STATES FISH AND WILDLIFE SERVICE

By:  Date: 1/19/96
for Mr. Michael J. Spear, Regional Director, Region I

Appendix A

Definitions

Historic Property	"Historic Property" means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register. This term "eligible for inclusion in the National Register" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria.
National Historic Landmark	"National Historic Landmark" means a historic property that the Secretary of the Interior has designated a National Historic Landmark.
National Register	"National Register" means the National Register of Historic Places maintained by the Secretary of the Interior.
SHPO	"State Historic Preservation Officer" means the official appointed or designated pursuant to Section 101(b)(1) of the Act to administer the State historic preservation program or a representative designated to act for the State Historic Preservation Officer.
Undertaking	"Undertaking" means any project, activity, or program that can result in changes in the character or use of historic properties, if any such historic properties are located in the area of potential effects. The project, activity, or program must be under the direct or indirect jurisdiction of a Federal agency. Undertakings include new and continuing projects, activities, or programs and any of their elements not previously considered under Section 106.
Phase-in Plan	"Phase-in Plan" means a plan of action that will provide a schedule and outline procedures for the transfer of operational responsibilities and facilities for Midway Atoll from the time the U.S. Fish and Wildlife Service assumes custody and accountability until June 1997.
Physical Hazards to Wildlife	"Physical Hazards to Wildlife" means any human-built structures, the presence of which can result in death or serious injury to wildlife, as used in the <i>Wildlife Hazards Assessment, Sand and Eastern Islands, Midway Atoll Final Report</i> (January 1995).

Appendix B
Known Resources Considered Eligible for or Listed in
The National Register of Historic Places
Sand and Eastern Islands, Midway Atoll

Navy Building Number or Name	Common Name	Date Constructed	Qualifying Characteristics	Treatment Category
SAND ISLAND				
Early 20th Century Buildings				
619, 623, 626, 628, 643	Cable Station Buildings Office, Staff Quarters, Superintendent's Quarters, Mess Hall	1904-5	Oldest structures on island. Associated with history of trans-Pacific communication. Significant role in WW II.	I
Early Base Housing				
335, 336, 578, 579	Barracks	1941	Designed by A. Kahn. Associated with broad patterns of Navy base development before WW II.	I
414, 415, 416, 417, 418, 419, 421, 422, 423, 424	Senior Officers' Quarters	1941	Designed by A. Kahn. Associated with broad patterns of Navy base development before WW II.	I
Utilities				
354	Power Plant and Command Center	1941	Associated with attack on Dec. 7, 1941 and Lt. George Cannon, recipient of Congressional Medal of Honor	I
144	Diesel power plant and salt-water pumping station at Submarine Base	1944	Associated with broad patterns of Navy base development in WW II.	II
S3126, S3127	Water reservoirs	1941	Associated with broad patterns of Navy base development before and during WW II.	II
S5247	Brackish water reservoirs	1941	Associated with broad patterns of Navy base development before and during WW II.	II
S5182	Brackish water pumping station	1944	Associated with broad patterns of Navy base development before and during WW II.	II
Shops/Warehouses				
357, 363	Torpedo Overhaul Shops (Electric and Steam)	1941-42	Designed by A. Kahn. Associated with attack on December 7, 1941 and with broad patterns of Navy base development before and during World War II	I
342, 353	Paint and Oil Storehouse, Station Maintenance	1941	Designed by A. Kahn. Associated with broad patterns of Navy base development before and during WW II.	II
343	Motor Pool and Garage	1941	Designed by A. Kahn. Associated with broad patterns of Navy base development before and during WW II.	II

Appendix B
Known Resources Considered Eligible for or Listed in
The National Register of Historic Places
Sand and Eastern Islands, Midway Atoll

Building Number or Name	Common Name	Date Constructed	Qualifying Characteristics	Treatment Category
365	Laundry	1943	Associated with broad patterns of Navy base development in WW II. Replacement building for Laundry damaged during 7 December 1941 bombardment.	II
349, 356	Commissary and Cold Storage, General Squadron Storehouse	1941	Designed by A. Kahn. Associated with broad patterns of Navy base development before WW II.	II
361	Electrical Switch Station	1944	Associated with broad patterns of Navy base development in WW II.	II
393	Public Works Storehouse	1943	Associated with broad patterns of Navy base development in WW II. Designed by Public Works Department	
Aviation Facilities				
151	Seaplane hangar	1941-43	Designed by A. Kahn. Hangar associated with Dec. 7, 1941 and Battle of Midway attacks, and with broad patterns of Navy base development before and during WW II.	I
S2115, S9132	Seaplane ramps	1940	Seaplane ramps associated with Dec. 7, 1941 and Battle of Midway attacks, and with broad patterns of Navy base development before and during WW II.	I
S2117	Seaplane ramp	1940	Seaplane ramp associated with Dec. 7, 1941 and Battle of Midway attacks, and with broad patterns of Navy base development before and during WW II.	I
586	General Storehouse Marine Corps Reservation/Air Terminal Building	1941-43	Designed by A. Kahn. Associated with broad patterns of Navy/Marine base development in WW II and development of airfield on Sand Island.	II
595	Blackout Hangar for Torpedo Bomber	1943	Designed by Midway Public Works Department. Associated with broad patterns of Navy base development in WW II and development of airfield on Sand Island.	II
594, 596	Airfield storage buildings	1942	Designed by Midway Public Works Department. Associated with broad patterns of Navy base development in WW II and development of airfield on Sand Island.	II
Command and Radar Buildings				
631 and 5187	Radar Buildings and Radar Tower Base	1943-44	Associated with development of radar technology during World War II.	I

Appendix B
Known Resources Considered Eligible for or Listed in
The National Register of Historic Places
Sand and Eastern Islands, Midway Atoll

Navy Building Number or Name	Common Name	Date Constructed	Qualifying Characteristics	Treatment Category
521	Command Post	1945	Associated with broad patterns of Navy base developments in WW II.	II
Recreational Facilities				
259	Recreation Facilities, Theater, Offices and Shops for Enlisted Men	1941-44	Designed by A. Kahn. Associated with broad patterns of Navy base development in WW II.	II
Ordnance-Related Structures and Defensive Positions				
S6194, S7113, S7119, S7121, S7124, S7125	ARMCO huts	1942	Included in National Historic Landmark, associated with the Battle of Midway.	I
S-1	3-inch Naval Gun Battery (off Bauer Road)	1941-2	Included in National Historic Landmark, associated with the Battle of Midway.	I
S-2	Battery D (west shore Sand Island)	1941-2	Included in National Historic Landmark, associated with the Battle of Midway	I
S-3	Pillbox (west side of Sand Island, near S7125)	1941-42	Part of National Historic Landmark, associated with the Battle of Midway.	I
S-6	Pillbox (south shore of Sand Island)	1941-42	Associated with Battle of Midway and base defenses in World War II.	I
348	N.O.B. Armory	1941-44	Designed by Midway Public Works Department. Associated with broad patterns of base defenses in WW II.	II
S956	Underground shelter or storage	1942	Probably associated with Battle of Midway. Associated with broad patterns of base defenses in WW II.	II
S-7	Metal Pillboxes (north side of inner harbor-Sand Island, near Building 110)	1942	Associated with broad patterns of base defenses in WW II.	II
Other Resources				
S2123	Plaque in Midway Memorial	1941	Plaque erected within weeks of the December 7, 1941 attack on Midway.	I
S2409	Two 5-inch guns in Midway Memorial	1916	Associated with development of Navy coastal defense equipment.	I
174	Quonset Hut at Submarine Base	1944	Associated with broad patterns of Navy base development in WW II. Only extant example of this building type on atoll.	II

Appendix B
Ka. Resources Considered Eligible for or List
The National Register of Historic Places
Sand and Eastern Islands, Midway Atoll

Navy Building Number or Name	Common Name	Date Constructed	Qualifying Characteristics	Treatment Category
189	Toilet Building at Submarine Base	1944	Associated with broad patterns of Navy base development in WW II.	II
S-4	Cemetery for Physicians Bauer Road	various 1906-50	Associated with Cable Station, and first Marine garrison on Island.	II
S-5	Japanese Memorials near Nimitz Avenue	1911-16	Markers dated 1191 and 1916, history is unclear, but may be associated with Japanese use of island for hunting and fishing.	II
S-8	Torpedo and bomb displayed in Bldg. 5306	1940s	Associated with broad patterns of Navy WW II equipment design.	II
EASTERN ISLAND				
Ordnance-Related Structures and Defensive Positions				
E-2	Underground Bunker (East shore, east of runway, Eastern Island)	WW II	Only structure of its type on atoll. Associated with broad patterns of Navy defense build-up before the Battle of Midway.	I
E-7	Possible gun position (South shore of Eastern Island)	WW II	Associated with broad patterns of base defenses in WW II.	II
E-8	Possible gun position (South shore of Eastern Island)	WW II	Associated with broad patterns of base defenses in WW II.	II
E-1	3-inch anti-aircraft gun (Southeast of pier on Eastern Island)	WW II	Associated with broad patterns of Navy defensive equipment design.	II
E-3	Metal Pillbox (Eastern Island, within runway triangle)	1942	Associated with broad patterns of Navy defense build-up before the Battle of Midway.	II
E-4	Metal Pillbox (Eastern Island, west of pier)	1942	Associated with broad patterns of Navy defense build-up before the Battle of Midway	II
Other Resources				
6-24, 12-30, 3-21	Eastern Island Runways	1941	Associated with broad patterns of Navy base development in World War II and with the Battle of Midway.	I

Appendix B
Known Resources Considered Eligible for or Listed in
The National Register of Historic Places
Sand and Eastern Islands, Midway Atoll

Building Number or Name	Common Name	Date Constructed	Qualifying Characteristics	Treatment Category
E-6	Revetments (Eastern Island)	1941	Associated with broad patterns of Navy base development in World War II and development of an airfield on Eastern Island..	II
E-5	Submarine net and floaters (Eastern Island)	WW II	Associated with broad patterns of Navy defensive equipment design.	II

Appendix C
Historic Properties on Midway Atoll Identified for Reuse by
the U.S. Fish and Wildlife Service

Navy Building Number or Name	Common Name	Approx Date	Historic Treatment Category	Management Approach	Recordation Approach
151	Seaplane Hangar	1941-43	I	Use	HABS/HAER Level 2
259	Recreation Facilities Theater, Offices, and Shops for Enlisted Men	1941-44 ¹	II	Use	HABS/HAER Level 2
S2115	Seaplane ramp	1940	I	Use	HABS/HAER Level 2
349	Commissary and Cold Storage	1941	II	Use	HABS/HAER Level 2
353	Station Maintenance	1941	II	Use	HABS/HAER Level 2
356	General Squadron Storehouse/Marine Corps Reservation	1941	II	Use	HABS/HAER Level 2
357	Torpedo Overhaul Shop Electric	1941-42	I	Use	HABS/HAER Level 2
361	Electrical Switch Station	1944 ¹	II	Use	HABS/HAER Level 3
393	Public Works Storehouse	1943	II	Use	HABS/HAER Level 2
414, 415, 416, 417, 418, 419, 421, 422, 423, 424	Senior Officer's Quarters	1941	I	Use	HABS/HAER Level 2
578, 579	Barracks	1941	I	Use	HABS/HAER Level 2
S3126, S3127	Water reservoirs	1941	II	Use	HABS/HAER Level 3

¹ Date of Construction based on construction documents

Appendix D
Historic Resources on Midway Atoll Recommended for
Securing

Navy Building Number or Name	Common Name	Approx Date	Historic Treatment Category	Management Approach	Recordation Approach
144	Diesel power plant and salt water pumping station at Submarine Base	1944 ¹	II	Secure	HABS/HAER Level 2
342 ²	Paint and Oil Storehouse	1941	II	Secure	HABS/HAER Level 2
354 ²	Power Plant and Command Center	1941	I	Secure	HABS/HAER Level 2
363	Torpedo Overhaul Shop Steam	1941-42	I	Secure	HABS/HAER Level 2
521	Command Post	1945 ¹	II	Secure	HABS/HAER Level 2
619, 623, 628, 643	Cable Station Buildings Office, Staff Quarters, Superintendent's Quarters, Mess Hall	1904-5	I	Secure	HABS/HAER Level 2
631 ³ , 5187	Radar Buildings and Radar Tower Base	1943-44 ¹	I	Secure	HABS/HAER Level 2
S6194	ARMCO hut	1942	I	Secure	HABS/HAER Level 3
S956 ⁴	Underground Shelter or storage	1942	II	Secure	HABS/HAER Level 3

¹ Date of construction based on construction documents

² Demolish attached shed

³ Fill hole near entrance

⁴ Secure entrance with ground level panel

Appendix E
Historic Resources on Midway Atoll Recommended to be Left "As-Is"

Navy Building Number or Name	Common Name	Approx Date	Historic Treatment Category	Management Approach	Recordation Approach
626	One-story Cable Station Building, Servants Quarters	1904-05	I	Leave "As-Is"	HABS/HAER Level 2
S2123	Plaque in Midway Memorial	1941	I	Leave "As-Is"	HABS/HAER Level 3
S2409	Two 5-inch Naval guns in Midway Memorial	1940-41	I	Leave "As-Is"	HABS/HAER Level 3
SS247	Brackish water reservoirs	1941 ¹	II	Leave "As-Is"	HABS/HAER Level 2
S9132, S2117	Seaplane ramps	1940 ¹	I	Leave "As-Is"	HABS/HAER Level 2
S-1	3-inch Naval Gun Battery (off Bauer Road)	1941-42	I	Leave "As-Is"	HABS/HAER Level 3
S-2	Battery D (west shore Sand Island)		I	Leave "As-Is"	HABS/HAER Level 3
S-3	Pillbox (west side of Sand Island, near S7125)	1941-42	I	Leave "As-Is"	HABS/HAER Level 3
S-4	Five Gravestones - Cemetery Bauer Road	various 1906-50	II	Leave "As-Is"	HABS/HAER Level 3
S-5	Three Japanese Memorials Nimitz Avenue	1911-16 ²	II	Leave "As-Is"	HABS/HAER Level 3
S-6	Pillbox (south shore of Sand Island)	1941-42	II	Leave "As-Is"	HABS/HAER Level 3
6-24, 12-30, 3-21 ³	Eastern Island Runways	1941	I	Leave "As-Is"	HABS/HAER Level 3
E-1	3-inch anti-aircraft gun (southeast of pier on Eastern Island)	WWII	II	Leave "As-Is"	HABS/HAER Level 3
E-2	Underground Bunker (East shore, east of runway, Eastern Island)	WW II	I	Leave "As-Is"	HABS/HAER Level 3
E-6	Revetments (Eastern Island)	1941	II	Leave "As-Is"	HABS/HAER Level 3
E-7	Possible gun position (South shore of Eastern Island)	WW II	II	Leave "As-Is"	Field Records
E-8 ⁴	Possible Gun Position	WWII	II	Leave "As-Is"	Field Records

¹ Date of construction based on construction documents

² Date based on Kanji translation

³ Treated as one historic property

⁴ Tar in and around structure to be removed

Appendix F
Historic Resources on Midway Atoll Recommended for Filling

Navy Building Number or Name	Common Name	Approx Date	Historic Treatment Category	Management Approach	Recordation Approach
S7124, S7125	ARMCO huts	1942	I	Fill	HABS/HAER Level 3
S-7	Metal Pillboxes (north side of inner harbor-Sand Island, near Building 110)	1942	II	Fill	HABS/HAER Level 3
E-3	Metal Pillbox (Eastern Island, within runway triangle)	1942	II	Fill	HABS/HAER Level 3

Appendix G

Historic Resources on Midway Atoll Recommended to be Demolished

Navy Building Number or Name	Common Name	Approx. Date	Historic Treatment Category	Management Approach	Recordation Approach
174	Quonset Hut at Submarine Base	1944	II	Demolish	HABS/HAER Level 3
189	Officer's Head at Submarine Base	1944	II	Demolish	HABS/HAER Level 3
335, 336	Barracks	1941	I	Demolish	HABS/HAER Level 2
343	Motor Pool and Garage	1941	II	Demolish	HABS/HAER Level 2
348	N.O.B. Armory ¹	1944	II	Demolish	HABS/HAER Level 2
365 ²	Laundry	1943	II	Demolish	HABS/HAER Level 3
586	General Storehouse Marine Corps Reservation/Air Terminal Building	1941-43 ³	II	Demolish	HABS/HAER Level 2
594, 596	Airfield storage buildings	1942	II	Demolish	HABS/HAER Level 3
595	Blackout Hangar for Torpedo Bomber	1943	II	Demolish	HABS/HAER Level 2
S7113, S7119, S7121	ARMCO Huts	1942	I	Demolish	HABS/HAER Level 3
S5182	Brackish water pumping station	1944	II	Demolish	HABS/HAER Level 3

¹ N.O.B. - Naval Operating Base

² After consultation with the Advisory Council on Historic Preservation, building demolished in November 1994.

Adjacent shed S3139 corrugated building panels to be salvaged and secured in a remaining structure.

³ Date of construction based on construction documents

Appendix H
Historic Resources on Midway Atoll Recommended to be Relocated

Navy Building Number or Name	Common Name	Approx Date	Historic Treatment Category	Management Approach	Recordation Approach
S-8 ¹	Torpedo and bomb displayed in Bldg. 5306	1940s	II	Relocate	HABS/HAER Level 3
E-5 ²	Submarine net and floaters (Eastern Island)	WW II	II	Relocate	HABS/HAER Level 3
E-4	Metal Pillbox	1942	II	Relocate	HABS/HAER Level 3

¹ Relocate only if requested by USFWS

² Consultation with the Advisory Council on Historic Preservation determined only a representational section of submarine net and floaters be salvaged and relocated to Sand Island for preservation

APPENDIX C:

H.D. Shannon Report of June 4-6, 1942

APPENDIX D:

Executive Order 11593

Protection and Enhancement of the Cultural Environment 3 C.F.R. 154 (1971), reprinted in 16 U.S.C. § 470

This executive order directs Federal agencies to take a leadership role in preserving, restoring, and maintaining the historic and cultural environment of the Nation. Federal agencies must locate, inventory, and nominate to the National Register all historic resources under their jurisdiction or control. Until these processes are completed, agency heads must exercise caution to ensure that potentially qualified Federal property is not inadvertently transferred, sold, demolished, or substantially altered. When planning projects, agencies are urged to request the opinion of the Secretary of the Interior as to the eligibility for National register listing of properties whose resource value is unknown or has not been inventoried. Agencies are directed to institute procedures, in consultation with the Advisory Council on Historic Preservation, to ensure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned historic resources.

(The executive order was codified when Section 110 was added to the National Historic Preservation Act in 1980; most of the language in Section 110 was derived directly from Executive Order 11593.)

APPENDIX E:

Executive Order 13022

Midway Atoll National Wildlife Refuge was established by Executive Order 13022 of October 31, 1996 as follows,

Section 1. The Midway Islands, Hawaiian group, and their territorial seas, located approximately between the parallels of 28 degrees 5 minutes and 28 degrees 25 minutes North latitude and between the meridians of 177 degrees 10 minutes and 177 degrees 30 minutes West longitude, were placed under the jurisdiction and control of the Department of the Navy by the provisions of Executive Order 199-A of January 20, 1903, and Part II of Executive Order 11048 of September 4, 1962, and are hereby transferred to the jurisdiction and control of the Department of the Interior. The provisions of Executive Order 199-A of January 20, 1903, and the provisions of Executive Order 11048 of September 4, 1962, that pertain to the Midway Islands are hereby suspended.

Section 2. The Midway Islands Naval Defensive Sea Area and the Midway Islands Naval Airspace Reservation are hereby dissolved. The provisions of Executive Order 8662 of February 14, 1941, as amended by Executive Order 8729 of April 2, 1941, are hereby superseded.

Section 3. (A) The Secretary of the Interior, through the United States Fish and Wildlife Service, shall administer the Midway Islands as the Midway Atoll National Wildlife Refuge in a manner consistent with Executive Order 12996 of March 25, 1996, for the following purposes:

- (1) maintaining and restoring natural biological diversity within the refuge;
- (2) providing for the conservation and management of fish and wildlife and their habitats within the refuge;
- (3) fulfilling the international treaty obligations of the United States with respect to fish and wildlife;
- (4) providing opportunities for scientific research, environmental education, and compatible wildlife dependent recreational activities; and
- (5) in a manner compatible with refuge purposes, shall recognize and maintain the historic significance of the Midway Islands consistent with the policy stated in Executive Order 11593 of May 13, 1971 (61 FR 56875-76).

Section 4. Any civil or criminal proceeding that is pending under the Midway Islands Code, 32 CFR Part 762, upon the date of this order, shall remain under the jurisdiction of the Secretary of the Navy. Actions arising after the date of this order are the responsibility of the Secretary of the Interior and shall be administered pursuant to regulations promulgated by the Secretary of the Interior.

Section 5. To the extent that any prior Executive order or proclamation is inconsistent with the provisions of this order, this order shall control.

Section 6. Nothing in this order shall be deemed to reduce, limit, or otherwise modify the authority or responsibility of the Attorney General of the United States to represent the legal interest of the United States in civil or criminal cases arising under the provisions of 48 U.S.C. 644a.

APPENDIX F:

Museum Collections Forms

