Midway Atoll Conceptual Site Plan

Volume IV
Monument Management Plan

Midway Atoll National Wildlife Refuge
Battle of Midway National Memorial
Papahānaumokuākea Marine National Monument

produced by

Jones & Jones Architects and Landscape Architects, Ltd.
Seattle, Washington

for the U.S. Fish & Wildlife Service on behalf of the
Papahānaumokuākea Marine National Monument Management Board

December 2008

Table of Contents

1 Vision

Vision Statements 2

Protected Area Mission and Purposes 2

Protections and Significance of Midway 3

2 Project Mission / Purpose and Process

Monument Planning Context and Midway Atoll Conceptual Site Planning 8

Description of Midway Conceptual Site Planning Process 10

3 Site Overview

Site Analysis 14

Challenges at Midway Atoll 29

4 Midway Atoll Improvement Guidelines and Principles

Goals 32

Design Guidelines and Principles 32

Management Zones and Site Zones 34

Alternatives Considered 36

A Model for Sustainability 38

Summary of Midway Atoll/Sand Island Conceptual Site Model 42

5 Midway Atoll Conceptual Site Plan

Introduction 48

Sand, Eastern, and Spit Islands Management Zones 49

Sand Island Conceptual Site Plan 50

Agency Research and Operations Facilities Concept 64

Inner Harbor Concept 66

Airport Welcome Center Concept 68

6 Priority Actions

Prioritization and Implementation 72

Resources

Planning Documents 77

Selected References of the Draft Management Plan 79

Midway Atoll Vision

1

1. Vision

Vision Statements

Papahānaumokuākea Marine National Monument Vision:

To forever protect and perpetuate the ecosystem health and diversity and Native Hawaiian cultural significance of Papahānaumokuākea.

Midway Atoll National Wildlife Refuge / Battle of Midway National Memorial Vision:

As part of the Papahānaumokuākea Marine National Monument, Midway Atoll is a unique and peaceful treasury of wildlife and history in the midst of the Pacific where nature rules, and the health of people, wildlife, and ocean are intrinsically connected. Native habitats and species dominate the Midway landscape, while remnants of the historic Battle of Midway are protected along with rehabilitated historic structures that support a cooperative interagency Monument field station. Coordinated management promotes ecological restoration, research, service-based tourism, and education to preserve and enhance this fragile island and coral reef system. Midway Atoll is the "window" to the Monument that offers people a rare opportunity to immerse themselves in the rich history, culture and ecology of the Northwestern Hawaiian Islands, a remote ecosystem of international significance. As a living classroom, Midway provides restoration and sustainability lessons for current and future generations worldwide to apply to their home communities.

Laysan albatross chick with parent

Protected Area Mission and Purposes

Papahānaumokuākea Marine National Monument Mission:

- Carry out seamless integrated management to ensure ecological integrity and achieve strong, long-term protection and perpetuation of NWHI ecosystems, Native Hawaiian culture, and heritage resources for current and future generations.

Midway Atoll National Wildlife Refuge Purposes:

- "…maintaining and restoring natural biological diversity within the refuge;
- providing for the conservation and management of fish and wildlife and their habitats within the refuge;
- fulfilling the international treaty obligations of the United States with respect to fish and wildlife;
- providing opportunities for scientific research, environmental education, and compatible wildlife-dependent recreational activities; and
- in a manner compatible with refuge purposes, …recognize and maintain the historical significance of the Midway Islands consistent with the policy stated in Executive Order 11593 of May 13, 1971." (Executive Order 13022, October 31, 1996).

Battle of Midway National Memorial Purpose:

- "[S]o that the heroic courage and sacrifice of those who fought against overwhelming odds to win an incredible victory will never be forgotten." (Secretary's Order 3217, September 13, 2000)

All activities considered in this Conceptual Site Plan will be consistent with this mission and these purposes.

beach at Rusty Bucket

Protections and Significance of Midway

On June 15, 2006, President George W. Bush issued Presidential Proclamation 8031, which designated and protected 139,792 square miles of emergent and submerged lands and waters in the Northwestern Hawaiian Islands as a Marine National Monument. It was renamed in 2007 by Proclamation 8112 as the Papahānaumokuākea Marine National Monument. This action significantly enhanced protection for the region's natural, cultural, and historic resources, and established one of the world's largest marine protected areas. Papahānaumokuākea Marine National Monument is administered jointly by three Co-Trustees – the Department of Commerce, Department of the Interior, and the State of Hawai'i – and represents a cooperative conservation approach to protecting the entire ecosystem. Co-Trustee agencies in cooperation with the Office of Hawaiian Affairs manage the Monument through the Monument Management Board. The Monument area includes the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, Midway Atoll National Wildlife Refuge/ Battle of Midway National Memorial, Hawaiian Islands National Wildlife Refuge, the State Seabird Sanctuary at Kure Atoll, and Northwestern Hawaiian Islands State Marine Refuge.

The Monument designation encompasses and maintains agency management responsibilities for all existing federal and state terrestrial and marine protected areas, including Midway Atoll National Wildlife Refuge (NWR). Midway Atoll NWR is administered by the U.S. Fish and Wildlife Service (FWS) and is part of the Hawaiian and Pacific Islands National Wildlife Refuge Complex, which consists of 19 refuges. The FWS began operating an "overlay refuge" on Midway Naval Air Station in 1988. Administration of Midway Atoll was transferred to the FWS in 1996. In 2000, the lands and waters of Midway Atoll NWR were designated as the Battle of Midway National Memorial.

Midway Atoll plays a key role as a staging ground for multi-agency field operations throughout the Monument and is critical to the operations of the State Seabird Sanctuary at Kure Atoll. Due to its accessibility by airplanes and large vessels, and its existing infrastructure, such as housing, offices, laboratories, and food service, Midway serves as an operational focal point for resource protection, management, research, and education activities in the northern section of the Monument. Additionally, considering Midway's facilities and public interest, the Presidential Proclamation establishes Midway as the only area within the Monument that can support a recreational visitor program. Midway's strategic location and physical assets also make it the ideal location to reinstate dive facilities for conducting shore based marine management in the northern atolls; enhance small boat facilities in support of seasonal enforcement operations; establish a marine research station and short term field school opportunities; and enable a more comprehensive study of maritime heritage resources particularly from World War II.

As one of the Northwestern Hawaiian Islands, Midway Atoll is representative of a remarkably unique and important marine ecosystem. Located near the northern end of one of the highest-latitude coral reef ecosystems in the world, it is bathed in relatively cold water for coral reefs, making it a vital case study in the global incidence of heat-induced coral bleaching. Part of a volcanically created and subsiding island chain, Midway is an example of atoll formation, a poorly understood geological process that can contribute to our understanding of the relationship between climate,

Midway House

Laysan albatross nesting

reef development, and carbon sequestration. Because of its remote location in the middle North Pacific, it is also an important node in the global network of ongoing biogeographical and oceanographic research.

Due its geographic isolation, Hawai'i in general has a very high percentage of endemism, or occurrence of species that are found nowhere else in the world. Many of these species are threatened or endangered, often as a result of human activity; the isolation of the Monument provides them with a huge refuge habitat. Midway Atoll is host to a wildlife spectacle on land, including the largest colony of nesting albatrosses in the world. More than 20 species of seabirds – as many as 2 million birds – nest or rest at Midway. Finally, the Northwestern Hawaiian Islands are one of the last intact, predator-dominated coral reef marine ecosystems in the United States and the world, making it invaluable to scientists' understanding of marine ecology. It also hosts a high degree of marine endemism, reaching over 50% of fish biomass. The access to this remote ecosystem provided by the infrastructure at Midway enables unparalleled opportunity for studying these isolated marine ecosystems and for providing unique field study and comparative research opportunities.

In addition to its rich assemblage of marine life, Midway Atoll contains numerous heritage resources that collectively tell the story of commerce, military, transpacific communication, and human modification of the atoll environment. Despite its small size and remote location, Midway's strategic location in the middle of the Pacific Ocean has drawn great attention over the last 100 years. Notably, Midway's pivotal role in World War II, commonly known as the "Battle of Midway," and the sacrifices of military personnel who fought at Midway, are memorialized in history. Today, Midway contains 63 existing historic properties eligible for the National Register of Historic Places; these include defensive structures, military architecture, both industrial and residential, and architecture from the Commercial Pacific Cable Company period (1903) and World War II period.

The designation of Midway as a special management area of the Monument elevates the atoll's significance regionally and globally. Midway will be a hub of Monument-wide management and operations, and the only atoll where visitors can experience the Northwestern Hawaiian Islands. Bringing people to the place in a way that does not diminish, but rather enhances, the integrity of Midway Atoll is beneficial to the Monument. Equally important is bringing the place to people who cannot visit, so that the valuable lessons and experiences of Midway reach across the world to local communities.

A key question is: How do we tell the amazing story of the natural, cultural, and historic resources of the Northwestern Hawaiian Islands and support Monument operations while preserving the atoll's character and integrity? The Midway Atoll Conceptual Site Plan offers the opportunity to re-envision the island as a powerful case study in how humans can and must live in balance with a delicate ecosystem over a long timeframe. This precept is a vital one where the atoll's remoteness and terrestrial isolation make a model of sustainability essential. In addition, Midway Atoll has a delicate ecosystem and is of a scale where our actions, both positive and negative, quickly have an enormous impact. Midway Atoll can provide a vital biosphere experiment in a natural setting, which if we learn to manage successfully, could become a model of how to take better care of the planet at large, and a great source of environmental public awareness.

Albatrosses and WWII gun battery on Eastern Island

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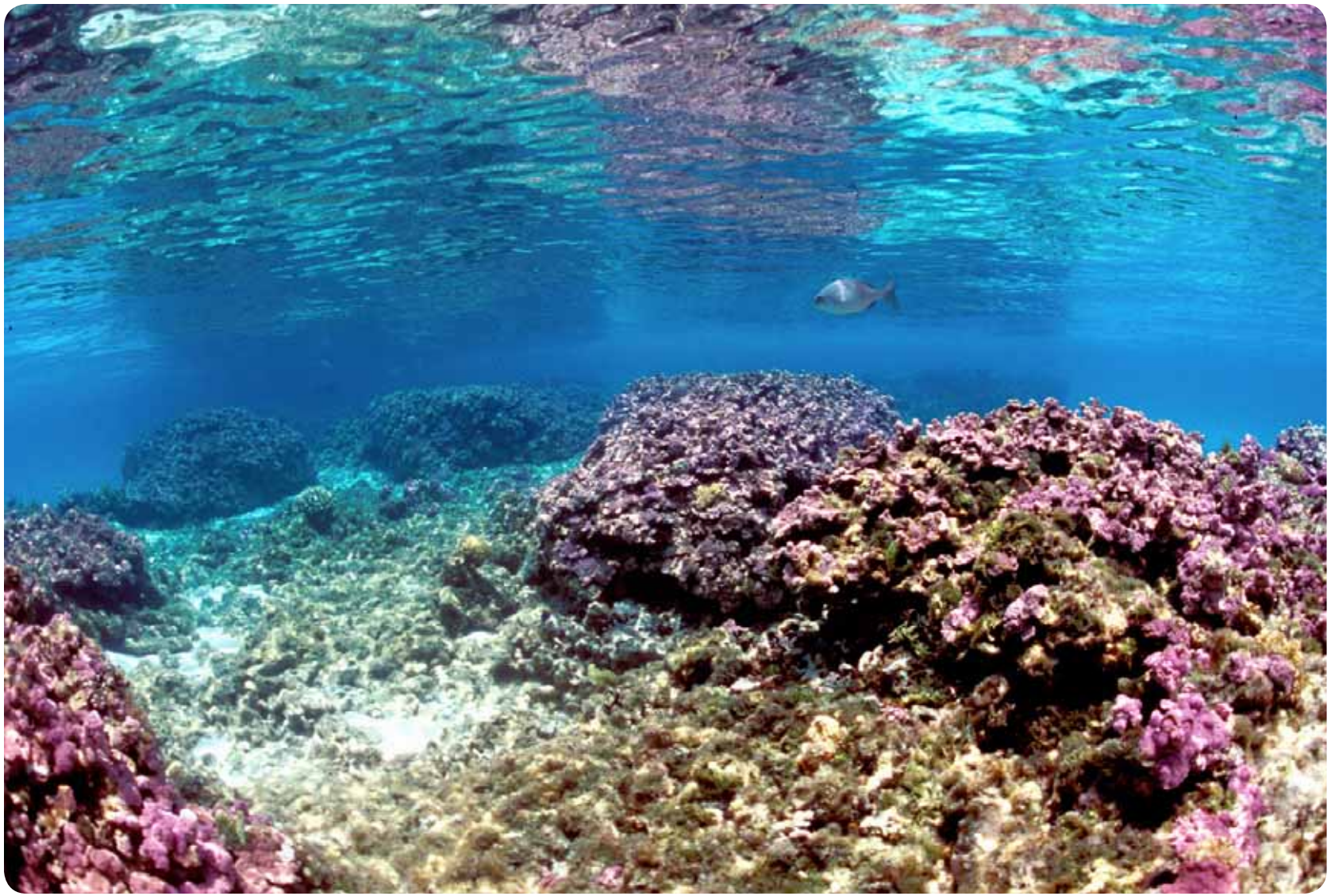
Papahānaumokuākea Marine National Monument

Midway Atoll Conceptual Site Planning



Lumpy rice coral (Montipora turgescens)

Project Mission / Purpose and Process

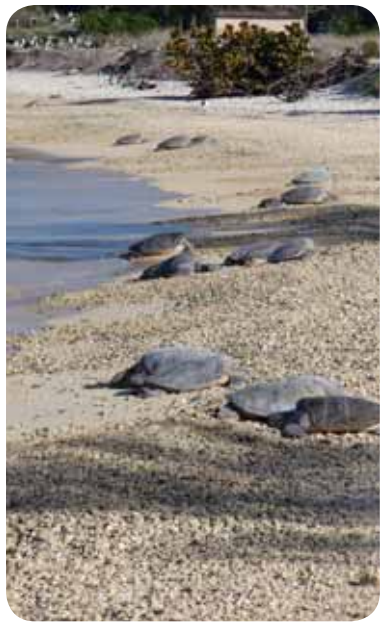
2

2. Project Mission / Purpose and Process

Monument Planning Context and Midway Atoll Conceptual Site Planning

Management Planning

The Monument Management Board recently completed a Monument Management Plan. To aid in development of the Central Operations and Coordinated Field Operations portions of the Monument Management Plan, the Co-Trustee agencies initiated two successive detailed planning processes. The first endeavor was a Papahānaumokuākea Marine National Monument requirements planning process designed to identify the agencies' existing assets and future infrastructure requirements Monument-wide. This present document, the Midway Atoll Conceptual Site Plan, is the result of the second endeavor. With the full range of agency goals, requirements, and constraints articulated for Midway in the Papahānaumokuākea Marine National Monument infrastructure requirements planning process, the Midway Atoll Conceptual Site Plan focuses with increased specificity on the required infrastructural and operational changes, offering a range of redevelopment options and solutions.



Sea turtles resting on beach

Papahānaumokuākea Marine National Monument Requirements Assessment and Planning

An important first step in effective site planning is the identification of existing assets alongside current and future field operational requirements. A multi-agency infrastructure requirements planning process took place over the course of six months in 2007, providing a general outline of people, programs, assets, and operations associated with the Monument. It summarized the functions and numbers of personnel along with the types of supporting facilities required at each location within the Monument. Those requirements were then combined to define a "Monument level" requirement at each location.

Recommendations from the requirements planning process guided development of this Midway Conceptual Site Plan. Specifically, the process identified the need for two consolidated operational strategies to be developed: one for Midway and one for the remaining locations within the Monument. The operational strategies will identify the needs of each agency, identify resource-sharing opportunities, and include mutually agreeable cost-sharing guidelines. Agencies are working to develop cooperative agreements that meet these needs.

One goal of the site and operational strategies is to promote a sustainable agenda. The Monument Management Board is working to adopt an aggressive, measurable goal to reduce conventional fuel consumption through a combination of conservation, green architecture, and renewable energy.

white tern

Scope of Midway Atoll Conceptual Site Plan

FWS Planning Team members on Sand Island

Midway Atoll is a hub of operations for all State and federal agencies conducting Monument resource protection, management, education, and research activities. It is the only location in the Monument that allows for recreational visitor experiences. All of these activities occur in an environmentally and historically sensitive area. As such, Midway requires careful and thoughtful conceptual site planning and development to ensure that our current vision for the Atoll's use and management over the next 15 years and beyond is aligned with the mission of the Monument, the purposes of the National Wildlife Refuge and the Battle of Midway National Memorial, and the mission of the National Wildlife Refuge System. Since Midway is the primary hub for agency activities and visitor programs within Monument boundaries and contains the most existing infrastructure, it is important that the conceptual site planning begin here. The lessons drawn from the development of this plan will result in a better process to plan for and coordinate all site infrastructure and field operations needs throughout the Monument to ensure that natural, cultural, and historic resources are minimally impacted, and critical resource protection, management, and research needs and requirements are addressed.

The Midway Atoll Conceptual Site Plan builds on the results of the Monument requirements planning process and the extensive infrastructural repair work that has taken place at Midway over the past 10 years. Since 2003, the Fish and Wildlife Service has implemented recommendations proposed by the Infrastructure Condition Assessment and Modification Report for Midway Atoll National Wildlife Refuge, commonly referred to as the "right-sizing" plan. When the Monument was established in 2006, it was necessary to revisit previous decisions and consider new interests and needs for managing the Northwestern Hawaiian Islands. With the designation, Midway Atoll and the rest of the Northwestern Hawaiian Islands were elevated to a status of national and global significance and public recognition. Under this plan, the Monument Management Board's goal is to protect and enhance the natural, cultural, and historic resources of Midway, while enabling more effective resource management and response to the northern Monument and providing opportunities for the public to experience its lessons and become champions of these special marine ecosystems of the Pacific.

2. Project Mission / Purpose and Process

Description of Midway Conceptual Site Planning Process

Midway Atoll conceptual site planning began in Spring 2007 occurring in tandem with the Marine National Monument management planning effort.

Staff and consultants conducted site analysis, document review, workshops, and mapping to identify primary issues and goals specific to Midway design and planning. Key design guidelines and preliminary building programs based upon biological constraints and historic preservation objectives were developed. The team facilitated a workshop in July 2007 to present preliminary concepts and receive input from management partners.

Based on the workshop findings, the Planning Team refined the Midway Atoll alternatives and the preferred site alternative. The draft Midway Atoll Conceptual Site Plan Report was produced and reviewed in three cycles by FWS and the Monument Management Board. The Midway draft report was included within the Draft Monument Management Plan as Volume IV, and distributed for public review. The comments received regarding the draft conceptual site plan and draft management plan (Volume I) regarding Midway were taken into consideration in finalizing this plan.

This Midway Atoll Conceptual Site Plan should be considered as a conceptual document, not as a definitive operational plan or design blueprint. Much more work, including engineering studies, architectural drawings, and specific environmental analyses, will need to be completed prior to construction activities. Even so, this document provides an atoll-wide overview that will guide us into the future. The conceptual plan will be reviewed every five years as part of a review of the overall Monument Management Plan.

Midway Atoll supports the largest colonies of Laysan and Black-footed albatrosses in the world

Midway Atoll

Midway Atoll Conceptual Site Planning

Site Overview 3

3. Site Overview

Site Analysis

Located near the far northern end of Papahānaumokuākea Marine National Monument, Midway Atoll is approximately 1,250 miles northwest of Honolulu, Hawai'i. The second oldest coral atoll in the NWHI, Midway originated as a volcano approximately 27 million years ago. Midway Atoll comprises an elliptical outer reef nearly 5 miles in diameter, 580,392 acres of submerged reef and associated habitats, and three flat coral islands totaling approximately 1,549 acres. Sand Island (1,117 acres) and Eastern Island (366 acres) are the two most prominent coral islands of the Atoll, while Spit Island is only about 15 acres in size. Sand Island contains the highest number of historic resources as well as all visitor facilities.

Midway Atoll is an unincorporated territory of the United States and is the only atoll/island in the Hawaiian archipelago that is not part of the State of Hawai'i. Midway Atoll National Wildlife Refuge is owned and administered by the U.S. Fish and Wildlife Service (FWS) on behalf of the American people and has international significance for both its historic and natural resources.

Key Midway Atoll site issues are described on the following pages.

Biological

Midway Atoll's plant and animal species are protected under several Federal laws, including the Endangered Species Act, the Marine Mammal Protection Act, and the Migratory Bird Treaty Act. Twenty-three species of plants and animals listed under the Endangered Species Act are known to occur in the NWHI. These include the Hawaiian monk seal, several turtle species such as the green and loggerhead turtle, whale species, Laysan duck, short-tailed albatross, and a half-dozen native plant species. Midway is also home to several endemic species, found only in Hawai'i, that merit special protection and management efforts.

Midway Atoll consists of vast expanses of coral reef, sediment beds, and algal substrate that support a wide array of species unique to the Hawaiian Archipelago. The three small, low-lying islands are protected by encircling barrier reefs, and are marine in character: constantly under the influence of ocean weather conditions, susceptible to periodic inundation, and constructed from oceanic materials. The islands support birds and terrestrial wildlife that prey on marine species and contribute to nutrient runoff into the shallows. The interdependence between the land and nearshore waters intrinsically connects the welfare of all Monument wildlife to the health of both terrestrial and marine ecosystems. This simple and profound reality is the underpinning of the integrated approach taken by the Co-Trustees to managing the Monument.

Midway is one of the few remaining predator-dominated coral reef marine ecosystems, an anomaly among modern marine ecosystems, but typical of the Northwestern Hawaiian Islands (DeMartini and Friedlander 2006). Abundant populations of sharks, jacks, grouper, dolphins, and other "top predators" live at Midway Atoll.

endangered Laysan ducks

December 2008

Sand Island Existing Conditions

Midway Atoll Conceptual Site Planning

Aerial Image from FWS June 2007

4. Midway Atoll Improvement Guidelines and Principles

A "Model for Sustainability:" Integrated Biological, Historic, and Visitor Programs (Preferred Alternative)

This model, identified in the draft plan as Alternative B and the 'preferred alternative', provides an integrated approach for enhancing protection and understanding of biological and historic resources at Midway Atoll/Sand Island while providing a moderate increase in visitor services and interpretive, educational, and research programs and facilities. It also provides an operational hub for agencies within the Monument.

Resources will be allocated to elevating the programs and facilities in three areas: 1. biological protection, understanding, and restoration; 2. historic resource preservation and adaptive reuse; and 3. visitor education and interpretation.

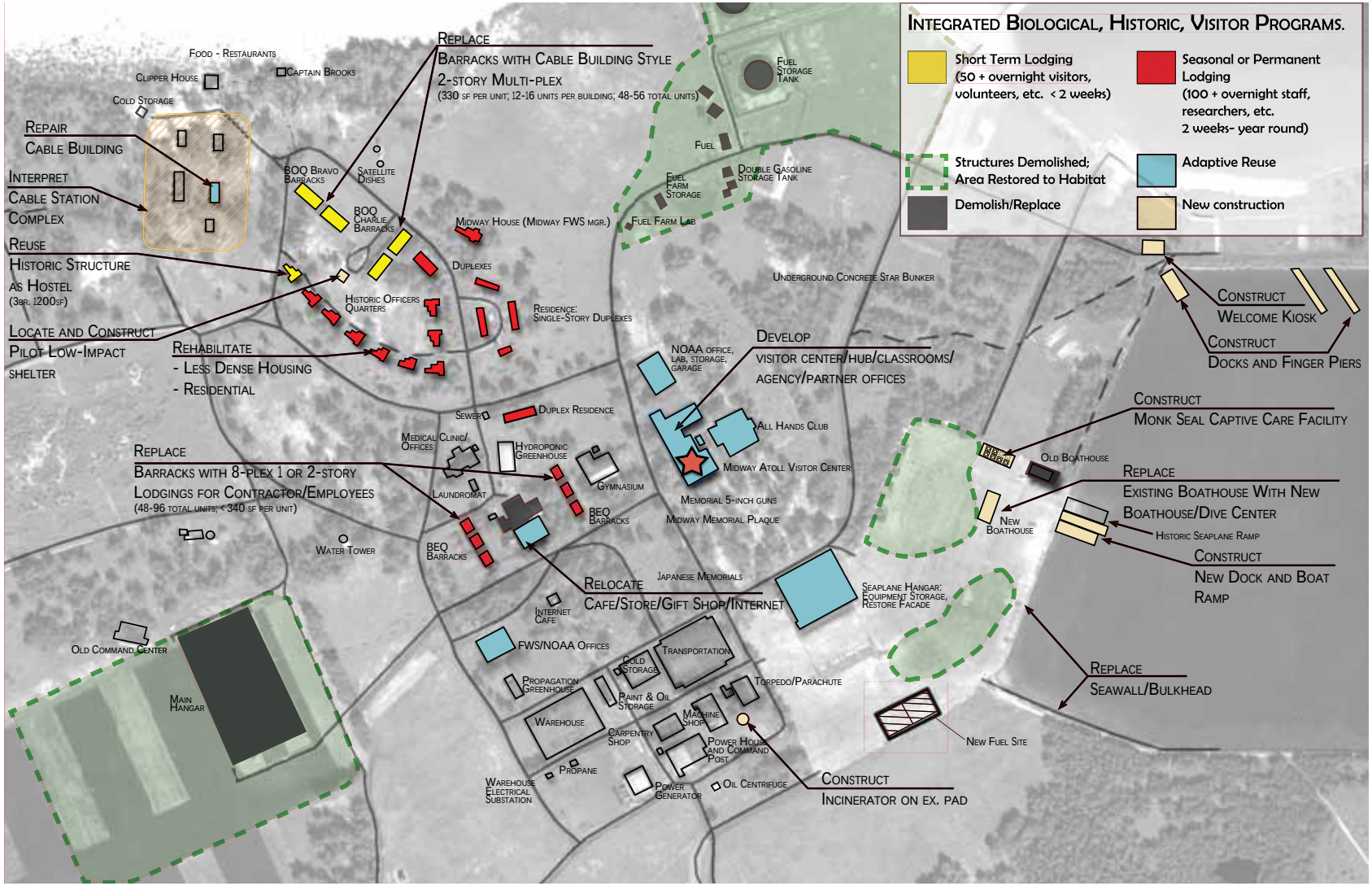
Short-term overnight visitation will not exceed 50 people, while seasonal or long-term contractors and researchers will not exceed 100 people, thus totaling no more than 150 people on any given night. The increased island population from the current regular capacity of 120 people will require enhancements in utility systems infrastructure. Up to three large groups of day visitors per year will primarily access the island via passenger vessel or aircraft, and generally no more than 400 people will be on-island at any one time.

Green turtle © James Watt

New facilities and systems will utilize green design and energy principles. Midway's physical structures as well as interpretive and education programs will emphasize the atoll's sensitive resources and its role in worldwide resource conservation and human history.

Key activities implemented under this model include the following:

- Treat, stabilize, and clean-up all World War II-era historic buildings (e.g., rehabilitation, lead-based paint removal) to use for lodging, operations, and visitor services (approximately 18 buildings)
- Rehabilitate/repair Cable building #643 for interpretation. Partially dismantle other four Cable Station historic structures to ensure human and wildlife safety, leaving the concrete cores for interpretive purposes. Salvage recyclable materials such as windows and doors for use in Cable building #643
- Demolish B, C, and BEQ Barracks (4 buildings total) and replace in same footprint with smaller scale, energy-efficient multiplex units
- Construct low-impact-style shelters (< 200 sf) on existing concrete pad(s) or demolished building footprints as temporary lodging or ecotourism overnight facilities
- Reuse one Officers Quarters building as a hostel to accommodate overnight visitors
- Rehabilitate historic Midway Mall to serve as the new "Midway Atoll Visitor Center;" facility will be a multi-purpose center containing visitor facilities, multi-agency offices, and classrooms



Sand Island Building Program

Midway Atoll Conceptual Site Planning

December 2008

4. Midway Atoll Improvement Guidelines and Principles

A "Model For Sustainability:" Integrated Biological, Historic, and Visitor Programs (Preferred Alternative)

- Demolish nonhistoric structures or structures that do not meet the Secretary of the Interior Standards for historic preservation, and create habitat in vacated areas
- Expand biological enhancement, marine management, and research programs as part of multi-agency and partnership effort
- Plan, design, and build a marine laboratory/quarantine facility
- Construct a Hawaiian monk seal captive care facility
- Remediate all lead-based paint and other toxic materials related to structures, facilities, and soils that are creating exposure hazards to humans and wildlife within 15 years
- Monitor landfills and, if necessary, enact further remediation within 15 years
- Construct a new boathouse, dive center, and storage facility to facilitate marine-based activities
- Expand the new fuel farm to meet Co-Trustee needs
- Construct new ramp/boat dock near location of historic seaplane ramp
- Construct two welcome facilities for visitors arriving by ocean vessel and by airplane
- Replace and upgrade finger piers in the Inner Harbor
- Expand drinking-water capacity to meet needs for 30 additional people
- Expand sewage and solid waste disposal capacity
- Install new satellite antenna for telepresence, remote wildlife viewing, and research use

Benefits of implementing this model include:

- Visitation volumes do not exceed Midway Atoll's carrying capacity
- No further net loss of biological and historic resources occurs
- Significant improvements are implemented to enhance biological and historic resources
- Midway's exceptional historic resources are preserved and interpreted
- Facilities and infrastructure are upgraded to meet projected lodging, operations, visitation, safety, and maintenance needs
- Several biological research and habitat initiatives are implemented, e.g., Hawaiian monk seal captive care facility
- Educational and interpretive program is greatly enhanced; public outreach and stewardship opportunities are actively promoted at local, onsite scale to global, remote scale
- Partnerships and coalitions encouraged under this site plan may attract more funding dedicated to biological and historic preservation activities on Midway and throughout the Monument, e.g., development of a marine lab or research station, programming for field schools and other education programs
- Sustainable low-impact development at Midway will serve as a model of sustainability for remote field operations fostering conservation, recycling, and reduction of fossil fuel use
- Facilities, whether renovated or new, will incorporate sustainable design principles to enable the reduction of fossil fuel usage
- Implementation of priority projects will enable Co-Trustee investment in the atoll, greatly enhancing the field operational capacity of the Monument overall

Midway Atoll provides important habitat for albatrosses

5. Midway Atoll Conceptual Site Plan

Sand Island Conceptual Site Plan

Clustering development to reduce the extent of disturbance and create efficiencies in infrastructure and operations is a key recommendation. Reusing existing facilities and keeping the building program within the "Historic Zone" is another sustainability strategy in that it reduces the requirement to extend utilities, roads, equipment, and resources across the island.

With the limited window for construction and the likelihood that any construction will have to be tightly contained with limited areas for staging because of albatross habitat, the need for quality premanufactured, component construction would be desirable. This is not to be confused with mobile trailer type construction, which is contrary to the building guidelines that gained general acceptance with the client group.

Performance Standards for New Construction should be applied, as follows:

1. Energy-Efficiency Measures—Areas for Energy Savings:
    - Conservation through Building Design: Reduce Energy Consumption
    - Insulated building envelope, possibly "green roofs"
    - Weatherproofing
        - Airtight seals at windows and doors
    - Energy-efficient window glazing (Low-E)
    - Optimize daylighting strategies
    - Optimize natural ventilation strategies
    - Economize heating/cooling system
    - Energy-efficient equipment and appliances
        - Energy Star rated
2. Landscape and Site Design
    - Wind protection
        - Native landscape plantings clustered around buildings
        - Earthen berms to provide wind protection
    - Solar orientation
3. Alternative Energy Systems
    - Solar hot water heater
    - Full photovoltaic system
    - Fuel cells
        - Powered by hydrogen generated from electrolysis
        - Only if system does not impact local coral reef ecosystems

Strategies to Address Sea Level Rise and Climate Change

Midway power currently relies entirely on fossil fuel. Alternative energy systems should be explored, such as solar power, hydrogen fuel cells, or water-powered micro-turbines. Further study is required to measure the benefits of these alternative energy methods and their potential impacts to wildlife, birds, and marine systems. A goal for Sand Island is to have a plan in place within 15 years for alternative energy system(s) such as solar to replace the current power generation.

Midway's islands will be affected by sea level rise through loss of land and higher spring tides, therefore restoration activities should be focused on the highest elevational areas and the original footprints of the islands. One possible mitigation measure to counter the effects of sea level rise in the NWHI may be beach nourishment, whereby sand is strategically deposited onto beaches (Baker et al. 2006).

Selective removal of rip-rap and bulkheads to restore natural beach deposition processes and shoreline habitat is one strategy that has successfully been applied to marine shorelines. It is recommended that a shoreline restoration/stabilization study be performed within the next 5 years. Careful study is required to assess the current condition of seawalls, and to determine which seawalls need to be retained to protect the structures and landfill behind them, and which shoreline sections may be restored to a natural beach condition.

Managing a significant portion of the atoll as native grass and shrublands and a smaller portion of the atoll as ironwood will not only be beneficial to seabirds for breeding and resting habitat but will also demonstrate a commitment for carbon sequestering whenever possible (Conant et al. 2001; Shan et al. 2001).

Acquisition of a new airplane and small research vessel would enable fewer overall trips and increased transportation efficiency. Vessels should also be fueled by appropriately sourced biodiesel or other fuels if possible.

Sand Island Building Program within Core Historic/Development Zone

Lodging

The Planning Team evaluated visitor capacity, visitor type, and length of stay in considering lodging needs. The maximum total population for any given overnight is set for 150 people. Short-term lodging is required for visitors, researchers, agency staff, and others who stay on Sand Island from 1 night to 2 weeks. Longer-term lodging is required for volunteers, staff, researchers, and others who stay on the island on a seasonal or permanent basis from 2 weeks to year-round. Additionally, emergency overnight lodging may be required due to the island's remoteness and isolation.

Given the varying lodging needs, the Planning Team identified a range in housing facility types to accommodate these diverse visitors while maximizing the existing structures and minimizing development impacts. Refer to Summary Table for details on housing units and visitor capacity. Housing facilities will comply with accessibility requirements included within the Rehabilitation Act of 1973 (as amended), Section 504 and 508; and the Architectural Barriers Act (ABA) of 1968. The lodging types are as follows:

Officers' Quarters– Reuse eight historic officers' quarters as residences (approximately 1,600 sf each) for visitors, seasonal, or permanent staff. Convert one building into a bunkhouse with limited amenities to accommodate overnight visitors. The bunkhouse could accommodate about 14 people.

Duplexes—Repair and maintain existing duplexes (approximately 900 sf per unit). Duplexes can accommodate about 11 people, generally seasonal or permanent staff.

2-Story Cable-Style Units—Construct module units in place of Charlie and Bravo Barracks. Make structural repairs to Charlie Barracks immediately, and replace within 15 years. Replace Bravo Barracks by year 2010. New module structures will be constructed on existing pads, but designed in smaller units. The possibility of constructing buildings on pilings to allow better flow of wildlife and habitat and higher energy efficiency will be evaluated. These units will primarily house short-term visitors, researchers, and staff, but could easily accommodate seasonal or permanent staff and volunteers as well. Space and capacity: 12' x 24' units at 330 sf will house 48–56 people.

8-plex 1 or 2-story Units—Construct 1- or 2-story 8-plex units in place of BEQ Barracks 1 and 2. New module structures will be constructed on existing pads,

Cable House architectural vernacular may be applied to new lodging design

Energy efficient and smaller scale multiplex units will replace BOQ barracks

Officers' Quarters rehabilitated as residences

Sand Island Conceptual Site Plan

but designed in smaller units and potentially on pilings to allow better flow of wildlife and habitat, and higher energy efficiency. These units will primarily house seasonal or permanent staff. Space and capacity: 12' x 25' units at 340 sf will house 48–96 people, depending on whether the structure is a single- or double-story building.

Low-Impact Shelters—As an optional short-term shelter type, construct clusters of low-impact shelters on existing concrete pads or on pads of demolished buildings within the residential district. Potential sites will be evaluated to rule out conflict with wildlife. These shelters will incorporate the design principles of Pacific Island regional architecture, e.g., simple structures, durable, nonpolluting and/or recycled materials, etc. These shelters will not be air-conditioned spaces. Natural ventilation, cooling, and weather protection will be designed into the structures. The footprint of each structure will be <200 square feet. These units will provide lodgings for ecotourists, visitors staying less than 1–2 nights, or emergency guests, and will demonstrate sustainable design principles. A pilot low impact structure/shelter will be developed within 4 years to determine the feasibility of such a design. The pilot will be constructed within the Sand Island housing zone.

Emergency Shelter—The existing gymnasium could be used for emergency shelter. Repairs to the gymnasium are required, e.g., roof replacement.

Other Sand Island Buildings

Cable Station Buildings—Most of these early 1900s structures are in extremely derelict condition and pose hazards to birds, wildlife, and humans. However, they are critical to telling the early Midway story related to the Commercial Pacific Cable Company period. FWS Cultural Resources staff has assessed these structures and their recommendations are incorporated into a proposal to the State Historic Preservation Office. All but one structure (#643) would be partially dismantled due to safety issues for people and wildlife. Building materials would be removed and recycled, as well as hazardous paint and materials, yet the structures' remnants would remain in place for the preservation and interpretation of the historic landscape. Further assessment is required to determine the exact extent and methods for deconstruction. Building #643 would be stabilized and repaired to a level where the structure does not pose safety or toxicity hazards, and could be interpreted.

Seaplane Hangar—Repair of the roof is required to maintain the current structure. The Seaplane Hangar will be rehabilitated to the extent feasible to achieve functions of storage and potential military display. For example, the glass façade may be replaced.

Military Historic Structures—Several World War II-era structures still exist that historically were and still are part of island maintenance and operations. These include, among others, the Paint Shop, the Metal Shop, and the Carpentry Shop. These structures require repair and maintenance to protect the historic integrity of the buildings, and to remove hazardous materials, such as lead-based paint and asbestos, that pose threats to wildlife and humans.

Visitor Services and Facilities

Midway Atoll Visitor Center—The Midway Mall will be rehabilitated and reused as the hub of Midway Atoll. It will become a multifunctional building, including visitor center, educational facilities and classrooms, museum/library, agency offices, and partner offices. Designed by 1940s industrial architect Albert Kahn, Midway Mall offers a lot of character and interest, and has a large amount of space to accommodate diverse activities. Its strategic location in the core historic/development area and easy access for Sand Island visitors are also positive features.

Midway Atoll Visitor Center: hub of agency offices, educational facilities, and visitor services

Visitor Welcome Centers—Welcome centers are required at the Inner Harbor and at Henderson Airfield, to greet, orient, and stage visitors arriving by boat or airplane. These centers will be modest, possibly open-air structures that would will likely include interpretive exhibits.

Clipper House

Additionally, the Monument Management Plan and Visitor Services Action Plan recommend the following strategies and activities (see section 3.4.3, **Midway Atoll Visitor Services Action Plan** (VS)):

Captain Brooks

Strategy VS-1: Implement the Midway Atoll Visitor Services Plan, providing visitor opportunities for up to 50 overnight guests at any one time.

Activity VS-1.1: Provide visitors with opportunities for wildlife-dependent recreation to enhance their knowledge and appreciation of the Monument's natural resources.

Activity VS-1.2: Provide visitors with opportunities to learn about and appreciate the Monument's cultural and historic resources.

Food Services

Clipper House—The Clipper House presently serves as the primary food service facility for Midway. Overall food services will need to be expanded to accommodate future population increases and enlargement of the Clipper House, reuse of older existing food service facilities, or construction of a new dining facility will be evaluated.

All Hands Club—Structure will be reused for agency operations and management due to its proximity to Midway Mall. Alternatively, the existing structure will be demolished and the area restored for habitat. Current functions will be moved to other facilities, e.g., the Galley building or Captain Brooks.

Captain Brooks—Will be maintained as is.

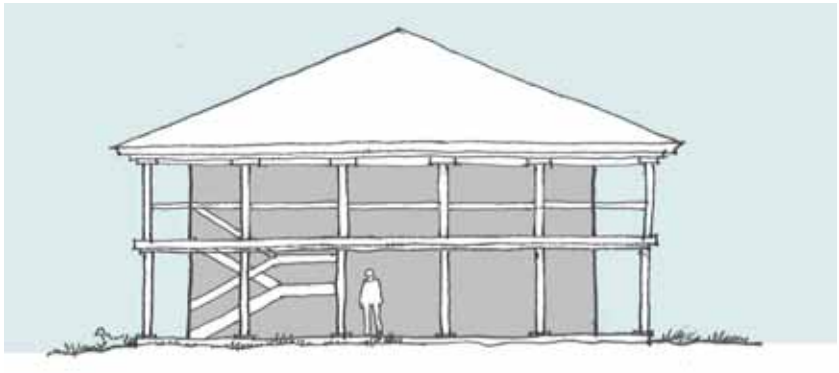
Galley Building—Galley Building will be reused as gift shop, snack bar, and Internet service for both visitors and staff. The rear half of the structure is in poor condition and will be demolished.

Hydroponic Greenhouse—Hydroponic greenhouse is used for growing produce so that Midway is more self-sufficient in terms of food production.

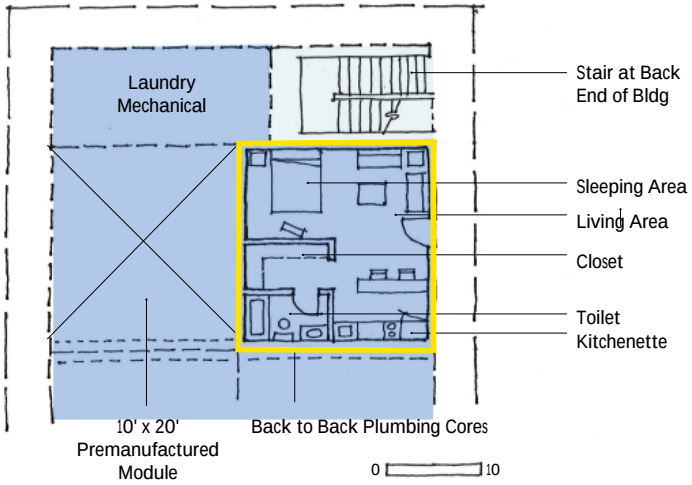
Sand Island transportation: foot, cart, or bicycle

5. Midway Atoll Conceptual Site Plan

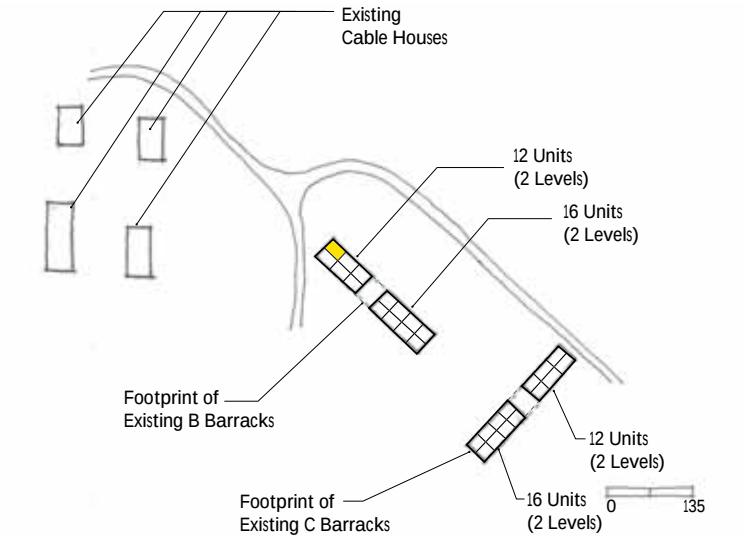
Sand Island Conceptual Site Plan



ELEVATION



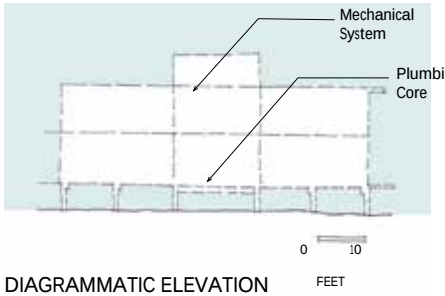
PLAN



SITE PLAN

Cable House Style ~ 1900s

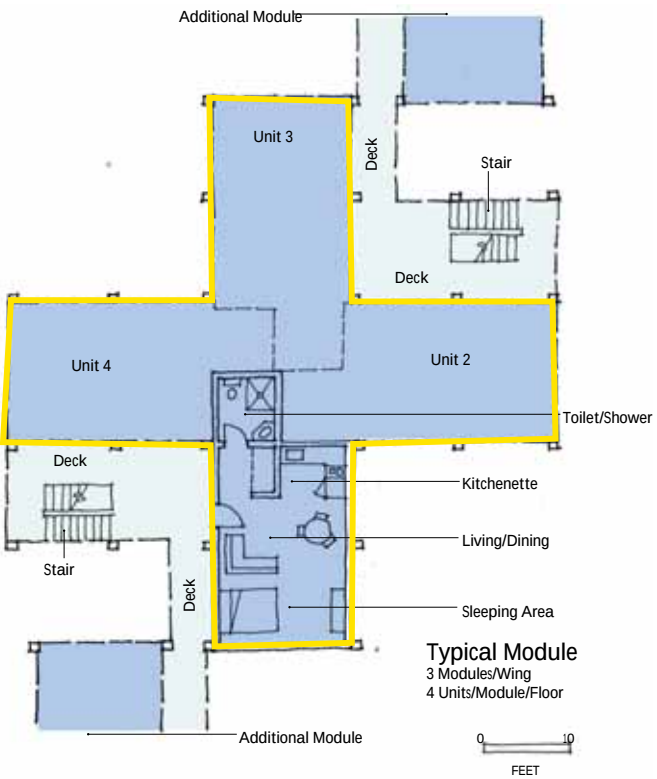
- Construct on existing concrete pads or pads of demolished buildings
- Incorporate design aesthetic of historic cable station buildings
- Smaller units allow higher energy efficiency and flow of wildlife
- Provide lodging for short-term visitors, volunteers, and staff, or seasonal and permanent staff



DIAGRAMMATIC ELEVATION

With "piling" design, this could be built in many locations without major disruption of the Albatross.

This plan better reflects the Kahn Builings. No attempt was made to express architectural character.



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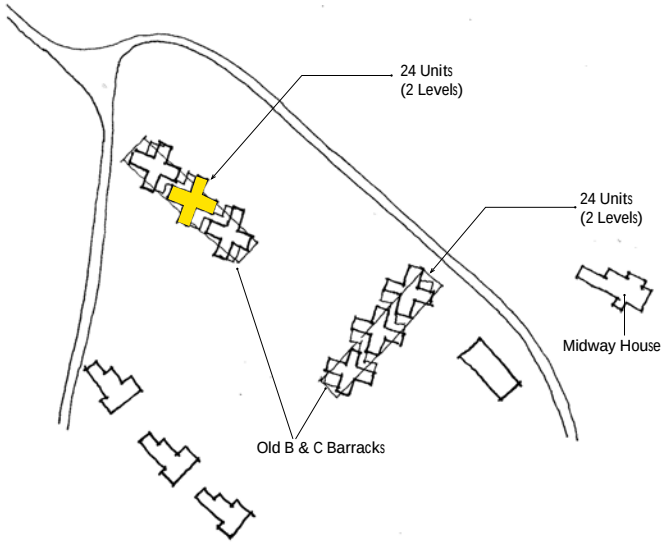


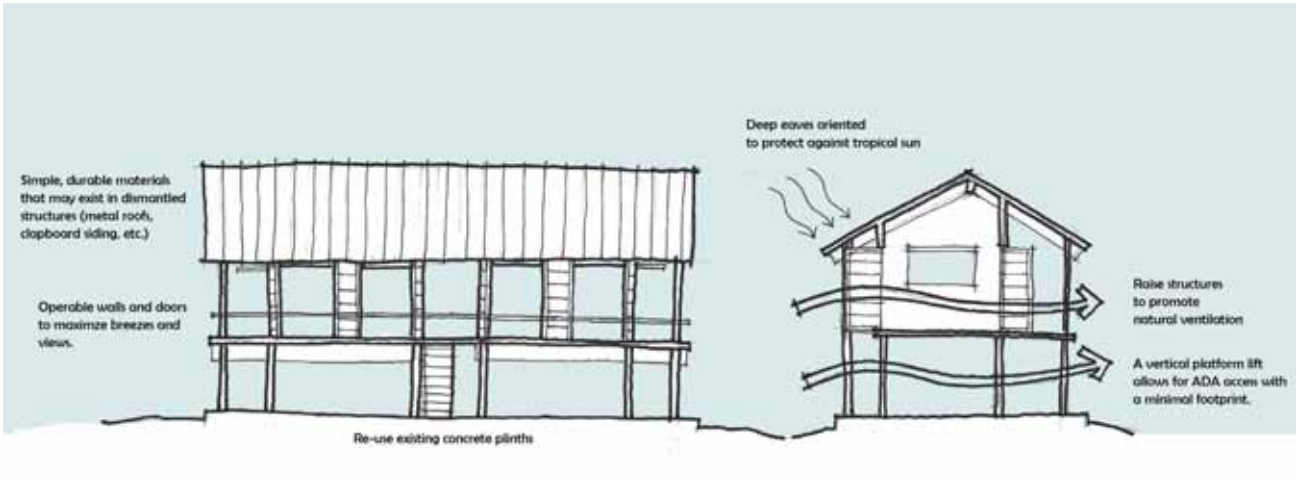
SITE PLAN
48 individual units shown on Sites of B & C Barracks

Kahn Modules ~1940s

- Construct on existing concrete pads or pads of demolished buildings
- Incorporate design aesthetic of architect Albert Kahn
- Smaller units allow higher energy efficiency
- Provide lodging for seasonal or permanent staff

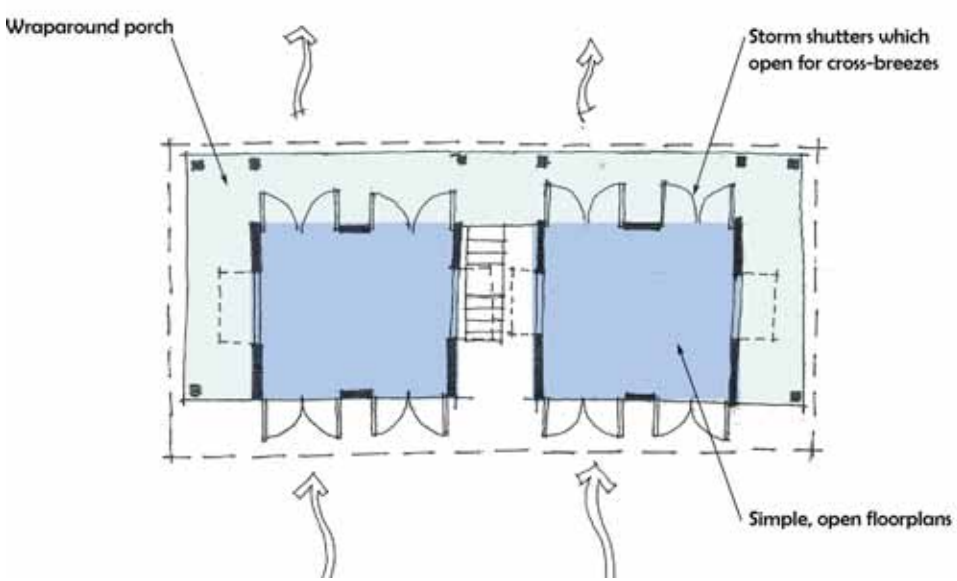
5. Midway Atoll Conceptual Site Plan

Sand Island Conceptual Site Plan



Low Impact Shelters

- Construct on existing concrete pads or pads of demolished buildings
- Incorporate design principles of Pacific Island regional architecture
- Natural ventilation, cooling, and weather protection
- Demonstrate sustainable design principles
- Provide lodging for eco-tourists, visitors staying fewer than 1-2 nights, or emergency guests



Architectural Concept for New Lodging: Tropical Vernacular

Midway Atoll Conceptual Site Planning

Albatross chick

5. Midway Atoll Conceptual Site Plan

Agency Research and Operations Facilities Concept

Midway Mall—Co-Trustee offices and other partner facilities move into Midway Mall, which will also provide visitor services, classrooms, and other functions. Midway Mall is the hub of agency operations on Midway Atoll and field operations in the northern part of Papahānaumokuākea Marine National Monument. The primary hub of operations for NWHI is based in Honolulu FWS, NOAA, and State offices.

Fish and Wildlife Services Office—FWS office retained for additional office facilities.

Marine Laboratory—Wet lab, dry lab, refrigeration, quarantine, and office space will be integrated into a Marine Laboratory building. The Old Commissary Building's proximity to Midway Mall suggests reuse of the building for agency research or biological programs. However, several buildings will be evaluated for this purpose.

Monk Seal Captive Care Facility—NOAA has expressed interest in creating a new Monk Seal Captive Care Facility on Sand Island. A suggested location for this facility is near the Inner Harbor on existing asphalt pad. This location is close to water, transportation, and the agency facilities housed in Midway Mall.

The following are the NMFS monk seal research program facilities needs:

Seal Holding

a. For the first 5 years seal holding will consist of pools sufficient to hold 10–12 seals and the potential to isolate individuals. This could be accomplished with four 20' diameter holding tanks each enclosed with dry resting area to a combined foot print of 30' x 30' for each of the four tanks.

b. It is anticipated that after 3–5 years, twice that holding would be used.

c. The total footprint in the first phase will be about 4,500 sq ft with an addition expandable capacity to approximate total of 8–9,000 sq ft.

Water

a. Source—1000–1200 gpm sea water for 10–12 juvenile seals.

b. Semi-open or closed systems could be considered when conducting environmental analysis.

Ancillary Structures

a. Fish prep—200 sq ft area will be necessary to support the 10–12 seals

b. Freezer—seal food will depend on the potential schedule of resupply.

c. Housing for 6 animal care personnel and 2–3 associated seal scientists/biologists

Quarantine Facility—required for biological species protection and recovery programs administered by FWS and/or NOAA.

Holding Tanks—required for biological species protection and recovery programs administered by FWS and/or NOAA.

Midway Mall interior

Midway Mall reused as Midway Atoll Visitor Center

Monk seal

Chugach offices and Medical Clinic

Biological research is a vital Midway Atoll activity

Nursery pen for Laysan duck reintroduction on Sand Island

5. Midway Atoll Conceptual Site Plan

Inner Harbor Concept

The Inner Harbor area includes the historic Inner Harbor and its associated shoreline, piers, and facilities. One of two approaches to the island (by vessel or aircraft), the Inner Harbor zone is critical to visitor arrival, transportation of services and goods, and water-based activities (e.g., ecotourism via passenger vessels, marine research, rescue operations, security).

Several improvements to the Inner Harbor zone are recommended. The current seawall around the perimeter of the basin is extremely degraded and requires assessment and repair. Additionally, concrete rubble and other materials in-water near the west docking area impede vessel travel and anchoring; these materials need to be removed after determination of toxicity issues.

A new ramp and pier is proposed at or near the vicinity of the historic seaplane ramp in the west Inner Harbor area. The presently used ramp is too shallow to launch or load boats onto trailers without "floating the trailer out" beyond the launching vehicle. Further historic analysis is needed to determine if the seaplane ramp may be redesigned as a ramp suitable for boat launching, or whether it should remain in place and a new ramp and pier be constructed nearby. Additionally, a series of finger piers are needed to accommodate small or mid-sized boats.

If an additional mid-sized pier is required to separate uses (e.g., operations versus visitors), a second pier could potentially be sited in the inner harbor.

Further analysis will be necessary to finalize the location of any new infrastructure in the inner harbor.

The existing boathouse is periodically flooded by surface flows across the large asphalt surface. The structure will be resited further upland and possibly elevated on the existing concrete pad and reconstructed as a new boathouse/dive center to meet interagency needs. The boathouse will include a dive center, storage for marine-associated equipment, and potentially a temporary bunkhouse space for short-term use and limited interim lab space until other facilities are renovated or reconstructed.

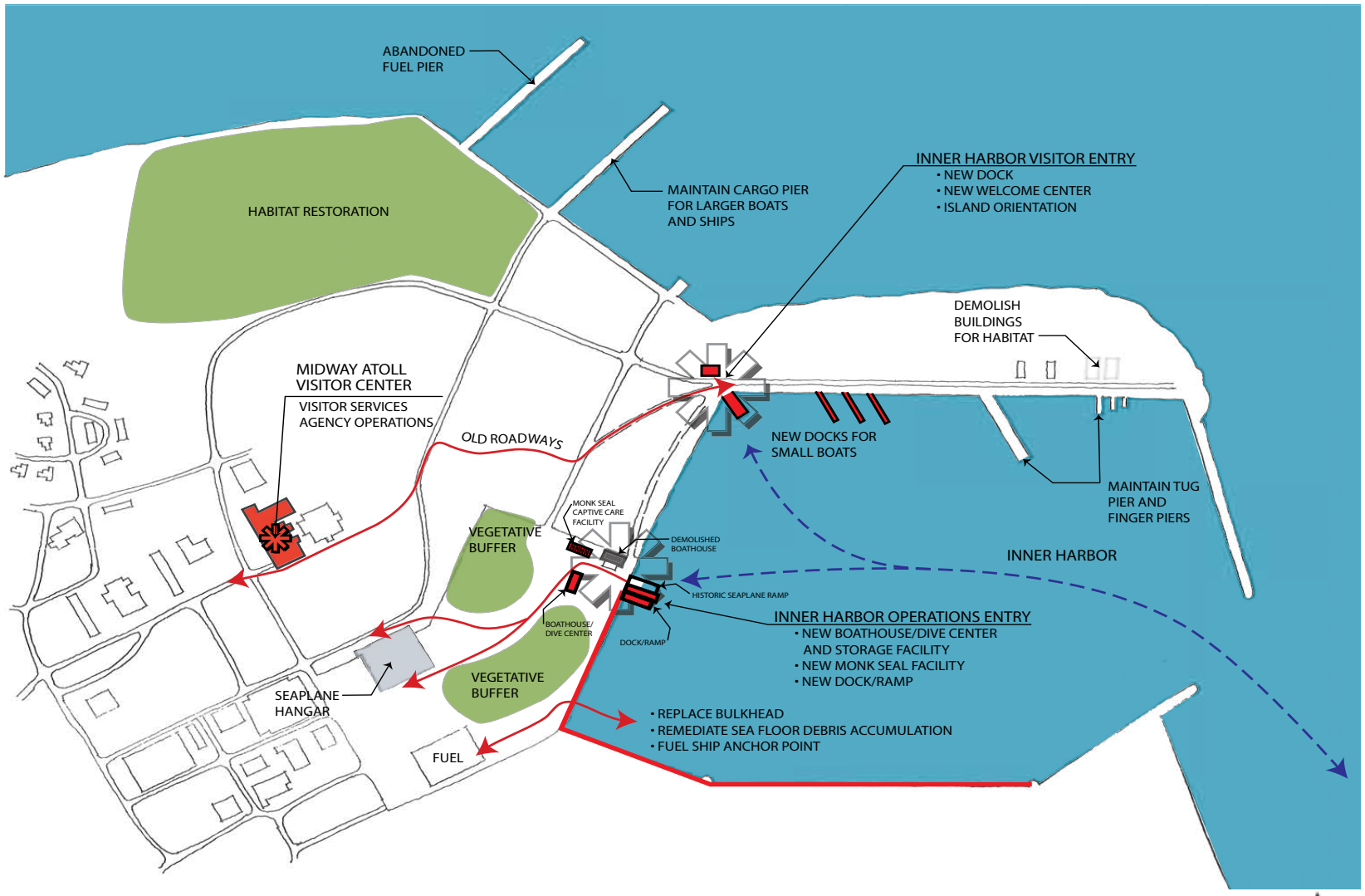
A small welcome kiosk may be appropriate onshore in the Inner Harbor in the northwest corner of the Inner Harbor to greet and orient visitors arriving by water. Paths and circulation routes to the Midway Atoll Visitor Center will be clearly delineated along existing or historic routes.

Visitor arrival by boat

Historic seaplane ramp and existing boathouse

Inner Harbor seawall

new FWS boat



Inner Harbor Conceptual Plan

Midway Atoll Conceptual Site Planning

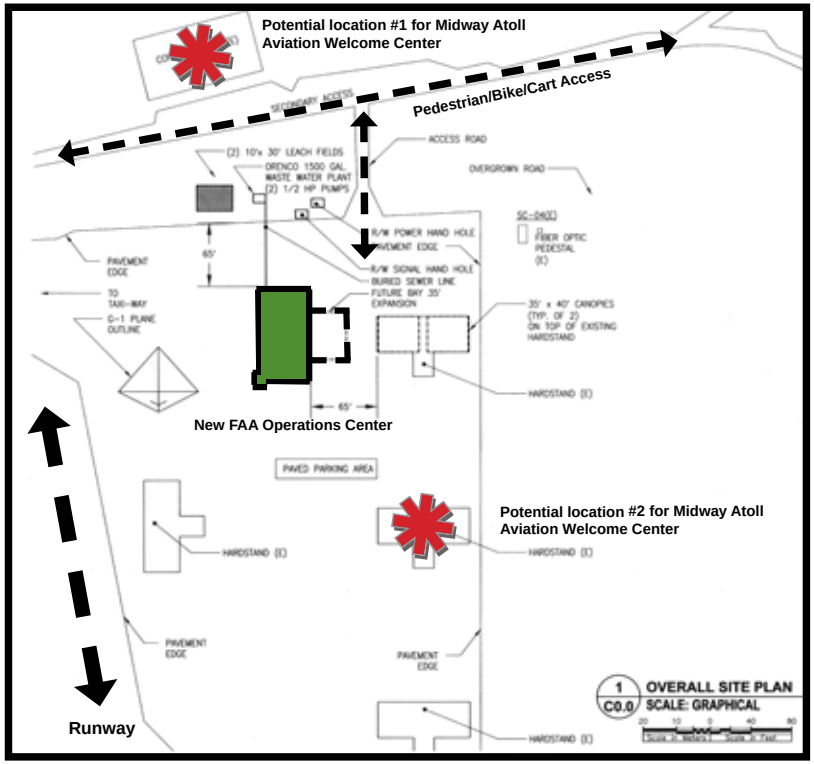
December 2008

5. Midway Atoll Conceptual Site Plan

Airport Welcome Center Concept

The Airfield Operations Zone on Sand Island includes the runway and the new Henderson Airfield operations center. One of two approaches to the island (by boat or aircraft), the Airfield Operations zone is critical to visitor arrival, transportation of services and goods, and aviation activities (ecotourism via air travel, research, emergency operations, security).

A new small Welcome Center will be appropriate to greet and orient visitors arriving by airplane. While the new operations center is now in place, there is no shelter to gather or greet visitors. Preliminary concepts for a Welcome Center indicate two potential locations that may be appropriate to build this facility. The proposed alternatives locate the structure on existing concrete or asphalt pads that are in close proximity to existing circulation routes but avoid conflict with airplane operations. Further analysis and coordination with FAA and Midway operations will be necessary to finalize the location of the Welcome Center.



Midway Atoll Aviation Node

Visitor arrival on Sand Island is a big event

Priority Actions and Next Steps

6

6. Priority Actions and Next Steps

Prioritization and Implementation

This Plan provides long-term guidance for management decisions at Midway, including best estimates of future needs and project activities. These estimates are substantially above current construction budget allocations, and are included primarily for strategic planning and program prioritization purposes, although they also serve to make the public aware of the costs of possible actions. This plan does not constitute a commitment of funds, or a commitment to request funds, by Federal or State agencies. All funding for actions included here is subject to the budgeting and appropriations processes.

The following narrative provides a preliminary framework for beginning to organize actions in terms of implementation schedule. Agency partners will work together to identify project priorities, roles and responsibilities, potential funding sources, and comply with appropriate environmental assessment requirements. These projects are important to support Monument operations as a whole, benefiting all of the agencies involved with its management.

Annual Maintenance

Through the Base Operations and Support Services (BOSS) contract for operation of Midway, FWS and the Federal Aviation Administration (FAA) fund routine cyclical preventive maintenance and minor repairs of equipment and facilities. Larger maintenance projects, such as roofing replacement, are also routinely completed as an addition to the contract. Both FWS and FAA add funds for routine maintenance projects that are over and above the scope of the BOSS contract.

These two funding sources allow for required maintenance work to be completed over the course of a year to both historic and nonhistoric buildings and facilities. This ongoing program will continue throughout the life of the plan to ensure that Midway's infrastructure is maintained in the best possible condition within available funding.

Larger, more expensive projects are either:

a) Developed and put into the Service's database for Deferred Maintenance projects for which the Service receives an annual appropriation from Congress. Midway's extensive infrastructure needs have provided justification for those larger Midway projects and their resultant funding. This has allowed the Service to systematically work toward reducing the large maintenance backlog at Midway, and it is anticipated that this level of support will continue throughout the life of this plan.

b) Funded by the FAA's Airport Capitol Improvement Program. Funding is provided to the FWS to support the design and construction of new airfield infrastructure (Airport Operations Building), or the improvement of existing facilities (resurfacing the runway).

Historic Resources

Maintenance of many of Midway's significant historic buildings and facilities is included in the BOSS contract described above and as such is ongoing. However, it does not include all the historic elements as described in the Historic Preservation Plan, which makes maintenance of those elements outside the scope of the contract and a management challenge for the Service. As outlined in the Monument Management Plan (Section 3.1.3 Historic Resources Action Plan), the Historic Preservation Plan will be rewritten

within the next year to be consistent with this Conceptual Site Plan and reflect the Service's commitment to reuse as many of Midway's historic buildings as possible to meet the Monument's and Refuge's needs at Midway. To maintain those buildings, structures, and facilities, additional funding must be found. The Service will work with other federal agencies, private organizations, veterans' groups, and others to find the support needed to maintain these important aspects of Midway's history.

Priority Maintenance/Construction Projects at Midway Atoll

Design and Construct Airport Welcome Center on Sand Island

$500,000 — 2 years

A small passenger terminal/welcome facility will be constructed at the airport to handle passenger arrival and departures from Midway. This simple facility will offer restrooms, baggage handling, information, and a waiting area for staging passengers out of the weather.

Develop Biodiesel Fuel Capacity or Other Sustainable Fuel Types

$750,000 — 2 years

In an effort to advance the use of sustainable technologies at Midway, small boats, vehicles, and heavy equipment will be evaluated and, where feasible, transitioned to the use of biodiesel. This fuel could be stored on the existing concrete pad along the north wall of the inner harbor. Alternatively tanks could be located near the newly constructed fuel farm on the southwest corner of the inner harbor.

Utilize Existing Footprint of Bravo Barracks for Replacement Housing

$10 million — 3 years

Demolition costs for existing building must be included in construction cost. Bravo Barracks replacement is essential in order to provide safe housing for permanent island residents and transients working on future maintenance/construction projects.

Complete Phase I Rehabilitation of the Commissary Building and Midway Mall

$2 million — 3 years

Collectively the commissary building and the Midway Mall present ideal central locations for Co Trustee and partner office, classroom, storage, and basic laboratory space. Phase I rehabilitation of the commissary will include cleaning and maintenance, construction of office and classroom space, and a feasibility study of how best to incorporate solar power and other sustainable design principles. The Midway Mall will require more substantial design and a preservation plan for renovation to provide basic office and storage space along with visitor information.

Design and Construct a Pilot Low Impact Shelter

$1.3 million — 4 years

Construct a low impact shelter for short term housing in the housing zone. The housing will be constructed as a sustainable design pilot project intended to showcase the synergistic potential of innovative design on the island. The design may elevate the building off the ground, providing for human habitation while increasing the total amount of available wildlife habitat, and providing environmental security from tsunamis and storm surges. This structure will incorporate

6. Priority Actions and Next Steps

Prioritization and Implementation

Pacific Island regional design principles to consider local wind and sunlight patterns, will aim to be nonpolluting, and will incorporate recycled materials. The use of solar power, composting toilets, and, if needed, a small rain catchment system will be explored in an effort to sustain the building off the power grid and minimize wildlife impacts.

Metal pillbox, Eastern Island

Treat All Wooden Historic Structures for Termites

$2 million — 5 years

By treating all wooden/historic structures immediately we buy ourselves 5–10 more years to find funding for ultimate rehabilitation/restoration. Without treatment these structures either need to be rehabilitated immediately or abandoned forever.

Rehabilitate Water Catchment/Distribution System

$3 million — 5 years

Reliable water will be required to support any future build-up.

Rehabilitate Septic/Wastewater Systems

$2 million — 5 years

Reliable septic/wastewater systems will be required to support any future build-up. To reduce the required capacity and cost of the system, on-site composting and waste reduction will be considered.

Redevelop Existing Boathouse into New Boathouse, Dive Center, and Water-based Storage Facilities

$1.5 million — 5 years

Redevelop the existing boathouse at Midway into a multipurpose boathouse, dive center, and storage facility to support agency operations in the northwestern end of the Monument. The facility will have maintenance bays and equipment for servicing small boats; a dive locker including a compressor, recompression chamber; and appropriate storage and work areas. The dive center may also support the visitor program. The building will be re-sited or reconstructed and potentially raised to address concerns of flooding on the seaplane pad.

Rehabilitate/Replace Finger Piers along the Inner Harbor

$450,000 — 5 years

To meet small boat needs, within 5 years construct/rehabilitate three finger piers. These piers may be used for fueling, loading, and short-term in-water storage of vessels. These vessels will be used to support programs at Midway and neighboring atolls in the future.

Design a Marine Laboratory and Develop in Phases

$2.25 million — 5 years

A variety of needs will be met by a marine laboratory at Midway. An evaluation and planning effort will help determine if the research and educational needs of potential users will be best met by developing several small facilities over time, or by a modular design that allows new requirements to be filled as they arise. Initially the lab would provide basic amenities to augment research and education capacity including field schools, seasonal research, and long-term monitoring. Wet/dry lab infrastructure, quarantine standards, and possibly freezer space will be included in the plan. Several locations are well-suited for a small laboratory, including the old commissary building adjacent to the Midway Mall, as well as several sites on the seaplane apron. The commissary building may be ideal for a first phase location and could help support the Hawaiian monk seal captive care program.

Green turtle on Eastern Island

Complete Full Rehabilitation of Midway Mall

$8 million — 10 years

Midway Mall would be rehabilitated as the "Midway Atoll Visitor Center" and would be used as Co-trustee office space and for other potential partner personnel, as well as a hub for visitor services, classrooms, and education. Phase I rehabilitation would allow for agency offices and be completed within 3 years.

Rehabilitate Officers' Row Housing

$5 million — 10 years

The 10 historic Officers' row houses serve as examples of historic Albert Kahn architecture and will be restored. This increased housing capacity will accommodate increased agency and partner personnel.

Remodel or Replace Clipper House

$1.75 million — 10 years

The Clipper House presently serves as the primary food service facility for Midway. Overall food services will need to be expanded to accommodate future population increases and enlargement of the Clipper House, reuse of older existing food service facilities, or construction of a new dining facility will be evaluated.

Rehabilitate Seaplane Hangar

$2.5 million — 10 years

Due to its size (large enough to hold heavy equipment, boats, workshops, etc.), its location (short distance from inner harbor and boat ramp) and its historic significance (designed by Albert Kahn, still contains scars from the Battle of Midway), this building needs to be utilized and preserved. Rehabilitation work will be guided by a detailed preservation plan.

Utilize Existing Footprint of Charlie Barracks for Replacement Housing

$10 million — 10 years

Charlie Barracks replacement is essential in order to provide safe housing for island visitors and transient personnel. Demolition costs for the existing building must be included in the construction cost. This replacement is expected to take place within 10 years.

Repair Inner Harbor Sea Wall

$20 million — 15 years

The harbor is critical to operations at Midway. Any future expansion of docking/pier facilities in the harbor must be preceded by the repair of the existing sea wall.

6. Priority Actions and Next Steps

Prioritization and Implementation

Requirements Planning Process

Many of the priority projects listed above are the result of a Monument-wide field requirements planning process that took place in the fall of 2007. The goals of this process were to outline general infrastructure requirements within the Monument by matching projected field requirements with priority management needs. During this process the Monument Management Board analyzed current and future management needs and projected personnel, infrastructure, and equipment requirements to meet them. In addition, efforts were made to identify areas of overlap that could be consolidated to make field operations as efficient as possible.

The results of this process constitute a detailed vision of the long-term field requirements, primarily for Midway and neighboring atolls, but also for the Monument as a whole. These detailed requirements must have the appropriate infrastructure such as buildings, power, and water; as well as associated means of transportation, such as vessels and aircraft. The priority maintenance and construction projects listed above along with the activities in the Monument Management Plan's section 3.6.3, Coordinated Field Operations Action Plan, will support these requirements over the next 15 years.

Specific field requirements that were identified during the field requirements planning process include increases in visiting and permanently stationed personnel to oversee regular research, education, cultural, historic, management, and protected species work based out of Midway, but servicing neighboring atolls as well. Activities associated with this work will be phased in over time as the attendant infrastructure and modes of transport are developed in a way that is compatible with resource protection. The small boat and diving assets, supply needs, air transport, laboratory facilities, housing, and visitor outreach needs that were coarsely defined during the requirements process have been refined in the Midway Conceptual Site Plan and will be thoroughly evaluated and acted upon based on the strategies and activities found in the Monument Management Plan.

Assessment of Midway Conceptual Site Plan during the Management Plan 5-year Review

The Monument Management Plan will be reviewed every 5 years. The review represents an essential element of the adaptive management process and includes public involvement, characterization of issues, and review and evaluation of action plans. The Midway Atoll Conceptual Site Plan is part of the Monument Management Plan and will be assessed as part of this broader five-year plan review, or as needed, to determine if changes need to be made to this 15-year conceptual plan. This will also provide an opportunity to review the Midway Conceptual Site Plan after other site plans (i.e., Tern Island, Kure Atoll) are developed.

Summary

Several other high-priority projects (habitat, cleanup, and visitor services projects) have been identified for Midway Atoll during the process of developing this Conceptual Site Plan and the larger Monument Management Plan. For detailed information on these projects, please refer to the appropriate Actions Plans contained in the Monument Management Plan.

As the Monument Management Board and partners work toward implementation of the Monument Management Plan, it is important for all parties to find ways to make incremental steps that will lead toward the many larger projects described in this document and the Plan. By working together and combining resources to achieve common goals, agencies and partners can realize the benefits and synergy that come from people working together. This Conceptual Site Plan offers an achievable view of Midway's future considering the resources that already exist and those that hopefully will be available in the future. The vision of Midway as presented in this plan is something that can be completed within the next 15 years—it will be a challenge and an opportunity for all involved to be a part of that transformation.

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Laysan ducks in created wetland

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