National Park Service
U.S. Department of the Interior

# State of the Park Report

## Kalaupapa National Historical Park

**Hawaii**

**2015**

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Disclaimer. This State of the Park report summarizes the current condition of park resources, visitor experience, and park infrastructure as assessed by a combination of available factual information and the expert opinion and professional judgment of park staff and subject matter experts. The internet version of this report provides the associated workshop summary report and additional details and sources of information about the findings summarized in the report, including references, accounts on the origin and quality of the data, and the methods and analytic approaches used in data collection and assessments of condition. This report provides evaluations of status and trends based on interpretation by NPS scientists and managers of both quantitative and non-quantitative assessments and observations. Future condition ratings may differ from findings in this report as new data and knowledge become available. The park superintendent approved the publication of this report.

# Executive Summary

The mission of the National Park Service (NPS) is to preserve unimpaired the natural and cultural resources and values of national parks for the enjoyment, education, and inspiration of this and future generations. NPS Management Policies (2006) state that "The Service will also strive to ensure that park resources and values are passed on to future generations in a condition that is as good as, or better than, the conditions that exist today." As part of the stewardship of national parks for the American people, the NPS has begun to develop State of the Park reports to assess the overall status and trends of each park's resources. The NPS will use this information to improve park priority setting and to synthesize and communicate complex park condition information to the public in a clear and simple way.

The purpose of this State of the Park report is to:

- Provide to visitors and the American public a snapshot of the status and trend in the condition of a park's priority resources and values;
- Summarize and communicate complex scientific, scholarly, and park operations factual information and expert professional opinion using non-technical language and a visual format;
- Highlight park stewardship activities and accomplishments to maintain or improve the State of the Park;
- Identify key issues and challenges facing the park to help inform park management planning.

Kalaupapa National Historical Park honors the mo'olelo (story) of the isolated Hansen's disease (leprosy) community by preserving and interpreting its site and values. The historical park also tells the story of the rich Hawaiian culture and traditions at Kalaupapa that go back at least 900 years.

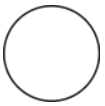
Kalaupapa National Historical Park (NHP) is significant because:

- Kalaupapa NHP preserves the only intact historic institutional settlement in the United States created for the sole purpose of isolating Hansen's disease (leprosy) patients from the rest of society.
- Kalaupapa NHP's surviving (and deceased) Hansen's disease population, with its material culture, oral histories, and intact physical community, is one of the only of its kind in the United States.
- Kalaupapa NHP is the site of renowned work by Saint Damien De Veuster, Saint Marianne Cope, and Brother Dutton, bringing international attention to leprosy and its treatment. Their work inspired many religious leaders, medical professionals and lay people to serve the Hansen's disease community.
- Kalaupapa NHP presents an exemplary geologic and scenic panorama of towering sea cliffs and a flat leaf-shaped peninsula that were created by a cataclysmic landslide and subsequent volcanic eruption.
- From mauka to makai (mountain top to coast line), Kalaupapa National Historical Park preserves and interprets some of the last remaining examples of fragile Hawaiian Island plant and animal communities found nowhere else in the world.
- Kalaupapa NHP preserves robust and diverse nearshore marine resources due to the geographic remoteness, locally restricted access, and controlled subsistence practices.
- Kalaupapa NHP's number of archeological resources, vast variety of site types, its extensive time range of habitation and land use, and the exceptional preservation of its sites combine to make the park one of the richest and most valuable archeological complexes in Hawaii.
- Many who come to Kalaupapa recognize an intense, nearly tangible, mana or powerful force that Hawaiian peoples find in all things. The 'āina (land), a vital source that links us to spirit is sacred and becomes our 'aumakua (guide) that connects us to the continued presence of all who lived out their lives on this peninsula. The 'āina's mana (spiritual essence) connects us to each other and to spirit.

The summary table, below, and the supporting information that follows, provide an overall assessment of the condition of priority resources and values at Kalaupapa NHP based on scientific and scholarly studies and expert opinion. The internet version of this report, available at http://www.nps.gov/stateoftheparks/kala/, provides additional detail and sources of information about the resources summarized in this report, including references, accounts on the origin and quality of the data, and the methods and analytical approaches used in the assessments. Reference conditions that represent "healthy" ecosystem parameters (currently derived from our understanding of historic conditions), and regulatory standards (such as those related to air or water quality) provide the rationale to describe current resource status. In coming years, rapidly evolving information regarding climate change and associated effects will inform our goals for managing park resources, and may alter how we measure the trend in condition of park resources. Thus, reference conditions, regulatory standards, and/or our judgment about resource status or trend may evolve as the rate of climate change accelerates and we respond to novel conditions. In this context, the status and trends documented here provide a useful point-in-time baseline to inform our understanding of emerging change, as well as a synthesis to share as we build broader climate change response strategies with partners.

The Status and Trend symbols used in the summary table below and throughout this report are summarized in the following key. The background color represents the current condition status, the direction of the arrow summarizes the trend in condition, and the

thickness of the outside line represents the degree of confidence in the assessment. In some cases, the arrow is omitted because data are not sufficient for calculating a trend (e.g., data from a one-time inventory or insufficient sample size).

| Condition Status | | Trend in Condition | | Confidence in Assessment | |
|---|---|---|---|---|---|
|  | Warrants Significant Concern |  | Condition is Improving |  | High |
|  | Warrants Moderate Concern |  | Condition is Unchanging |  | Medium |
|  | Resource is in Good Condition |  | Condition is Deteriorating |  | Low |

# State of the Park Summary Table

| Priority Resource or Value | Condition Status/Trend | Rationale |
|---|---|---|
| **Natural Resources** | | web ▸ |
| Weather and Climate |  | Atmospheric weather records over the past 20 years indicate average air temperatures are increasing at a rate of 0.08 °F per decade with more extreme annual temperatures. Rainfall has been declining over this same time period, but continues to be highly variable on an annual basis. Ocean temperatures have increased 0.9 °F overall since 1956, but have decreased since 2005. Ocean acidity has increased 26% since 1880 and is projected to increase 37–50% by 2100 compared with present levels. In Hawaii: sea level has risen over 5 inches since 1918 and some predictive models project a rise of 1–4 feet (0.3–1.2 m) in the 21st century, leading to increased coastal flooding. |
| Geologic Resources |  | Molokai's famous sea cliffs were created by the catastrophic collapse of the East Molokai volcano 1.4 million years ago, in effect halving the volcano at its summit. A subsequent, smaller eruption around 350,000 years ago created Pu'u 'Uao volcano and the flat, low lying peninsula upon which the park is located. The scenic and natural resources of the park are closely linked to its geologic features and ongoing natural geologic processes such as slope processes and earthquakes. |
| Waikolu Stream |  | The lower reaches of perennial Waikolu stream contain all five native amphidromous fish species at some of the highest densities reported in the Hawaiian Islands. Water chemistry and streamflow measurements indicate a healthy tropical stream ecosystem that also supports a dense population of the uncommon native stream snail *Neritina granosa*. |
| Nearshore Marine Environment |  | Since 2006 the coastal and offshore coral reef ecosystems of the park have been healthy and stable compared to other coral reefs in the main Hawaiian Islands (MHI). Average fish biomass of 97 tons per mile$^2$ is one of the highest reported levels in the MHI. |

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| **Terrestrial Plant Communities** |  | The terrestrial ecosystem contains 35 federally endangered, threatened, or candidate terrestrial plant species, and an additional 18 plant species are federal species of concern. Some vegetation communities are known to support essential habitat for native forest birds, migrant shorebirds, and several seabird species. Most of the at-risk plant species in the park are at low population levels; however, several rare plants have been successfully propagated in the park's native plant nursery and reintroduced to out-planting sites where they likely occurred historically. Park staff leverages limited funding with volunteer groups to restore critical terrestrial plant communities, particularly along coastal areas where reestablishing native plant species has been successful. In addition, exclosure fencing and continued ungulate control has aided in the recovery of some native plant communities. |
| **Threatened and Endangered Species** |  | The park has established a nursery specializing in native Hawaiian plants including T&E species. Propagules are used for out-planting at restoration sites. Exclosure fencing and continued ungulate control have aided in the recovery of some T&E species, particularly along the coastal spray zone. T&E marine species such as humpback whales and green sea turtles continue to increase in population numbers within the park boundaries. The critically endangered monk seal established a pupping colony in 1997 with 83 documented births increasing at an annual rate of 26%. Outside of the park, however, population trends for the monk seal continue to decline at an annual rate of 4%. |
| **Invasive Species** |  | Invasive plant species (e.g., Christmas berry) and feral ungulates dominate the peninsula and lower valleys beyond the coastal spray zone. At present, the park only manages invasive species within designated park management units (e.g., coastal spray zone and crater management units). Restoration efforts with volunteers are underway to remove invasive vegetation from the coastal spray zone and other fence management units. The upland rainforest is relatively intact in comparison to the dryland forest that has lost more than 20% of its native trees in the past 15 years. In the marine realm, introduced species are prevalent, but do not appear to be invasive park wide. Some species (e.g., snowflake coral, *Carijoa riisei*) are invasive in small (<100 $m^2$), localized areas. No comprehensive survey has been done on invasive species to inform numbers, distribution, and general trends, but at present, invasive species seem to be static, not getting worse in either the marine or terrestrial environment. |
| **Kauhakō Crater Lake** |  | The lake within Kauhakō Crater is the fourth-deepest lake in the United States and has the greatest relative depth (ratio of depth to surface area) of any lake in the world. The lake supports a dense and highly productive phytoplankton community and fauna including a native paleomonid shrimp, copepods, and other microzooplankton. A turnover event in 2011 resulted in anoxic water coming to the surface and the release of hydrogen sulfide ($H_2S$) gas, temporarily eliminating the surface plankton community. |
| **Offshore Islets** |  | Huelo and ʻŌkala islets support unusual relict vegetation and rich native species diversity that appear to be stable. Both islets are managed as State Seabird Sanctuaries by the park and the Hawaii Division of Forestry and Wildlife. |

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| **Cultural Resources** | | web ▸ |
| **Archeological Resources** |  | Approximately 10% of the area within Kalaupapa NHP has had a surface inventory, with only a few efforts in sub-surface testing completed. Vegetation overgrowth prevents easy or accurate inventory surveys. Known archeological sites are in fairly good condition, as the isolation and remoteness of the park has helped to maintain site condition and integrity. The archeology at Kalaupapa has been regarded as one of the most varied and well-preserved archeological complexes in Hawaii (Kirch 2002). |
| **Cultural Anthropology** |  | Oral histories are being obtained and preserved in digital and written formats for subject groups including patients and their families, physicians and kōkua (helpers), clergy and nuns, and descendants of the Hawaiian people who lived on the land prior to settlement of the Kalawao and Kalaupapa communities. The park has a cultural anthropologist on staff who regularly conducts formal and informal interviews with the patients-residents and kōkua. |
| **Cemeteries and Burial Sites** |  | Based on FY13 LCS condition assessments, 479 of the 1,181 known grave markers are in good condition, 428 are in fair condition, and 274 are in poor condition. The park has an ongoing cyclic program for preservation of grave markers that help improve the condition of grave markers each year. As of FY13, approximately 140 grave markers have received preservation treatment since 2008, when the hands-on program began. In FY14, another eight grave markers received stabilization and repair. |
| **Patient Community – Past, Present, and Future** |  | Understanding of patient experiences (past and present), points of view, and vision is fundamental to planning for the future of the park. Today, there are roughly 16 patients remaining with rights to Kalaupapa; the average patient age is 79. Regular community meetings and individual consultations are held so that the points of view and comments of patient-residents can be considered in management issues and decisions, and many personal relationships are established and maintained, both on an official and informal basis. The park's relationship with the patient community has increased since hiring a park cultural anthropologist. |
| **Hawaiian Community – Past, Present, and Future** |  | Hawaiian preference is part of NPS hiring practice at the park with more than half of the employees being native Hawaiian. Some publications being developed are bilingual. The park is also making a conscious effort to include native Hawaiian culture and practices into all aspects of park management and into planning for the park's future (see draft General Management Plan, July 2014). In FY14, native Hawaiian cultural practices and oli (chants) were incorporated into several projects, including grave marker repairs, rock wall repairs, and vegetation clearing at sacred sites. The park also hosted a series of workshops to increase traditional Hawaiian skills and cultural practices within staff and the local "topside" community. |
| **Sacredness/Spirituality** |  | Sainthood of Father Damien and Saint Marianne has a large presence at Kalaupapa NHP, and the park continues to work with religious organizations to support pilgrimages, service trips, and spiritual retreats. Presence and restoration of numerous gravesites allows for connection with family members and contemplation for visitors. Isolation has protected many sacred pre-settlement locations that are renowned throughout the islands. Sacredness and spirituality is a large part of the integrity of feeling and association of the National Historical Landmark district, which encompasses a large portion of the park. |

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|---|---|---|
| **Cultural Landscapes** |  | The park is comprised of two component cultural landscapes—the Kalaupapa and Kalawao Settlements and the Molokai Light Station. Cultural Landscape Inventories (CLIs) have been completed for both properties and a third native Hawaiian cultural landscape has been identified. Condition of the settlement areas is poor, while condition of the light station is fair. |
| **Historic Structures** |  | The park contains 315 historic buildings and structures (including roads, trails, and sidewalks) listed on the NPS List of Classified Structures (LCS), and those buildings create the majority of the features within the National Historic Landmark district. Of the total numbers of buildings and structures, 141 are in good condition, 103 are in fair condition, and 71 are in poor condition as of FY13. The park has a strong historic preservation program with an 8-person crew that regularly work on historic buildings to improve their condition. |
| **History** |  | The park maintains a fairly robust collection of primary and secondary sources frequently used for historical research pertaining to the Kalaupapa settlement period. Research pertaining to the pre-settlement period remains sparse. Information is increasing as documents are translated from the Hawaiian language. |
| **Museum Collections** |  | A new facility with climate-controlled rooms and freezers and security was completed in 2011 so that the historical archives and collections can be maintained on site, as requested by the patient-residents and other individuals who contributed to long-term park planning. With the new museum facility, the archives and collections can be properly accessioned, cataloged, treated, and stored. |
| **Visitor Experience** | | web ▸ |
| **Number of Visitors** |  | The estimated number of visitors to the park in 2012 (including visitors to the overlook at the top of the cliffs) was 58,875, which is 14% higher than the annual average of 51,455 visitors for the prior 10-year period of 2002–2011. Of this total, there were 8,865 registered visitors within the settlement. The number of visitors to the Kalaupapa settlement is limited by State law to 100 visitors per day. |
| **Visitor Satisfaction** |  | Approximately 76% of visitors were satisfied with their visit in 2012, based on the standard NPS survey. Issues noted during the visitor satisfaction study were difficulty in accessing the park, the high cost of the tour, and the poor condition of visitor amenities at the topside facilities and in other areas of the park. |
| **Sense of Place** |  | The park's preservation efforts serve as a reminder of a past life in the settlement, but the once-thriving patient community has declined. Ongoing preservation efforts contribute to the sense of place and a positive visitor experience. |
| **Educational Values** |  | Web-based educational offerings have increased along with community-based outreach programs across the island. Use of social media to interpret and showcase the park resources has also engaged a broader community. The park is increasingly engaging the local community through local events, workshops, and career days. In addition, the park recently hired an interpretive specialist to continue developing the interpretive program. |

| Priority Resource or Value | Condition Status/Trend | Rationale |
|---|---|---|
| **Community and Partnerships** |  | The park has numerous mutually-beneficial partnerships with churches, agencies of the State of Hawaii, Department of Hawaiian Homelands, University of Hawaii, and other agencies and organizations. More than half of the park employees are native Hawaiians, and the park continues to provide local employment opportunities. |
| **Park Infrastructure** | | web ▸ |
| **Overall Facility Condition Index** |  | Buildings, roads, utility systems, and other park infrastructure assets at Kalaupapa NHP are owned and operated by multiple groups, including the State of Hawaii, private owners, churches, the NPS, and other federal agencies. Since most of the buildings are historic structures within the park, the NPS tracks their condition and has cooperative agreements with some of the owners to maintain the historic buildings. |
| **Energy Consumption** |  | Energy usage (BTUs per gross square footage of buildings) at the park in 2012 was 5.9% higher than the average for the previous 4 years (Source: NPS Annual Energy Report). The park is exploring alternative energies to offset energy consumption. |
| **Water Consumption** |  | Water consumption at the park in 2012 was 16.7% lower than the 4-year average for 2008–2011 (Source: NPS Annual Energy Report). |
| **Park Carbon Footprint** |  | Kalaupapa National Historical Park belongs to a network of parks nationwide that are putting climate friendly behavior at the forefront of sustainability planning. The park's climate action plan describes commitments to reduce emissions of greenhouse gases at the park by 2016. Emissions from park operations, which exclude visitor and concessioner activities, are roughly equivalent to the emissions from the energy use of 19 households each year. The vast majority of the purchased electricity in the park is used by State of Hawaii Department of Health. |

# Summary of Recent Stewardship Activities and Key Accomplishments to Maintain or Improve Priority Resource Condition:

The list below provides recent examples of stewardship activities and accomplishments by park staff and partners to maintain or improve the condition of priority park resources and values for this and future generations:

**Natural Resources**

- Established plant nursery to raise native plants and threatened and endangered (T&E) plants for restoration efforts.
- Continued fence construction and maintenance to help keep invasive ungulates from sensitive areas.
- Targeted invasive species in sensitive areas outside of the settlement.
- Completed assessment of Rare Plant Stabilization program.
- Completed inventory of heritage trees and medicinal trees.
- Continued inventory and monitoring of natural resources by Pacific Island Network Inventory and Monitoring (I&M) Network.
- Ongoing monitoring and management of coral reef ecosystems under the National Coral Reef Program.
- Ongoing monitoring and management of T&E species, both marine and terrestrial.
- Continued park specific projects to expand our understanding of the park environmental characteristics.
- Continued support of outside researchers working within the park boundaries.
- Continued environmental support of community improvement projects.
- Maintained fuel reduction program to protect the historic settlement and its occupants.
- Assisted with developing the affected environment section of the park's General Management Plan (GMP) for the Environmental Assessment.
- Updated language for the National Natural Landmark (sea cliffs).

**Cultural Resources**

- Continued stewardship of museum collections that houses documents and objects from the Hansen's disease settlement period.
- Collected and maintained objects from native Hawaiians before settlement of Kalaupapa as part of museum archival project.
- Continued oral history project to document stories from remaining Hansen's disease patients.
- Assisted with developing the cultural resources sections of the park's General Management Plan.
- Completed two cultural landscape inventories (CLIs) for two component landscapes, including the Kalaupapa and Kalawao Settlements and Molokai Light Station.
- Initiated a revision to the NHL nomination to meet current documentation standards and incorporate information from the draft GMP and completed CLIs.
- Continued condition assessments of archeological sites through ASMIS.
- Initiated an administrative history document for the park, currently in draft form.
- Hosted and supported student interns in their development of research skills, museum management skills, and interpretive skills.
- Coordinated ongoing stabilization and repair of cemeteries, grave markers, and rock walls.
- Continued condition assessments of historic buildings, structures, and gravestones through LCS database.
- Hosted educational and cultural events, such as the Asian/Pacific Islander Heritage festival, Hapai Pōhaku, and Teacher Institute.
- Established an orientation program for new employees to focus on cultural awareness.
- Stabilized historical pre-settlement structures by removing invasive plants in conjunction with other park divisions.
- Promoted career opportunities and educational programs through visiting schools on topside Molokai.
- Coordinated with other park divisions to ensure Section 106 compliance is completed before work is carried out.
- Ongoing stabilization, repair, and rehabilitation of historic buildings and structures.
- Completed major rehabilitation of McVeigh and Paschoal Social Halls.

**Visitor Experience**

- Completed rehabilitation of historic buildings for visitor use.
- Continued and ongoing maintenance of park website and other interpretive platforms.
- Conducted visitor survey at topside overlook and with visitors to the peninsula.
- Hired an interpretive specialist to continue developing new interpretive programs and educational outreach.
- Maintained partnerships with religious organizations to maintain and restore historical churches and other structures.
- Collaborated with Ka ʻOhana O Kalaupapa for plans to create the Kalaupapa Memorial.

- Updated wayside exhibits to enhance visitor experience.
- Engaged a broader audience through social media, including Facebook and Twitter.
- Updated park brochure and park fact sheet.
- Created site bulletins for park resources, including Hansen's disease, archeology, geology, Molokai Light, and trail safety.
- Installed new interpretive display cases and wayfinding signs along the pali trail.
- Supported visitors that come to visit their ancestors' gravesites.
- Continued educational programs to visit schools on topside Molokai.
- Coordinated a volunteer program that involved natural resources, cultural resources, and park infrastructure stewardship. Park-wide volunteer hours exceeded 11,000 hours in FY 2013 and 13.400 hours in FY 2014.

**Park Infrastructure**

- Continued and ongoing maintenance of grounds, especially culturally sensitive areas such as the cemeteries and Damien Road heiau.
- Completed rehabilitation of historic buildings for park operations.
- Repaired the Kalaupapa dock, breakwater, and bulkhead wall.
- Developed Solid Waste Management Program to include recycling operations.
- Completed tsunami evacuation plan.
- Repaired water tanks to support existing settlement.
- Formed numerous partnerships with other State and Federal agencies to manage lands and historic structures.
- Developed bicycling program for community members.
- Worked with Kalaupapa community (e.g., State workers) and patient-residents to maintain settlement infrastructure.
- Worked with U.S. Marine Corps regarding training exercises and use of Kalaupapa runway.
- Maintained water system for the Kalaupapa community.
- Maintained pali trail for continued visitor access.

# Key Issues and Challenges for Consideration in Management Planning

Kalaupapa National Historical Park (NHP) is located on an isolated peninsula off the Hawaiian Island of Molokai. The Kalaupapa Settlement continues to house and treat patients as one of the last active treatment centers for the disease in the United States. In response to an epidemic that swept the Hawaiian Islands in the mid-nineteenth century, the physically isolated Kalaupapa peninsula became the home for thousands of exiled people afflicted by Hansen's disease. At its peak in the early twentieth century, over 1,100 people lived there, and over 8,000 patients were treated throughout the history of the settlement. The community of Kalaupapa is still home for many surviving Hansen's disease patients, whose memories and experiences are cherished values. In Kalawao, on the windward side of the peninsula, there are the churches of Siloama and Saint Philomena. Furthermore, the work of two Saints, Saint Damien and Saint Marianne Cope, are associated with the Hansen's disease community at Kalaupapa.

Given its history and remote location, the park has several unique issues and challenges in management planning. The following is a list of key park issues compiled from the park's Foundation Document and General Management Plan (currently in draft form, dated July 2014) that require continued consideration.

- Preserving the lifestyle and privacy of the remaining patient community.
- Maintaining the sense of power and sacredness of the place by virtue of the events, circumstances, and peoples who lived and died there.
- Addressing fundamental changes in park purpose, management, and operations with near-term and long-term guidance.
- Preserving important resources and values related to the park, including archeological, ethnographic, and cultural landscape resources, museum collections, and marine and terrestrial resources.
- Conserving artifacts of the pre-contact native Hawaiian community and interpreting the associated stories and the history of the Hansen's disease settlement.
- Monitoring and responding to the influence of climate change on park resources and operations.
- Developing plans and management strategies to address the impacts of climate change and sea level rise on both natural and cultural resources as well as park operations.
- Implementing these management strategies to increase the resistance and resilience of natural and cultural resources not only within the park boundaries, but also island-wide.
- Incorporating recommended actions from the Climate Friendly Parks Program to reduce carbon emissions in all park operations.
- Preserving the archeology at Kalaupapa as one of the most varied and well-preserved archeological complexes in Hawaii.
- Identifying long-term preservation treatments for over 250 historic structures on the peninsula.
- Preserving the integrity of the National Historic Landmark district.
- Preserving and interpreting the multiple layers of history within cultural landscape of Kalaupapa.
- Preserving and interpreting some of the last remaining examples of fragile Hawaiian Island plant and animal communities found nowhere else in the world, including near shore coral reefs, narrow lush valleys, verdant rain forest, rare lowland and coastal plant species.
- Interpreting an exemplary geologic and scenic panorama of towering sea cliffs and a flat leaf-shaped peninsula that were created by a cataclysmic landslide and subsequent volcanic eruption.
- Educating the local community about their heritage and the importance of natural and cultural resource protection in the park.
- Reducing and managing invasive plant and animal species, especially feral ungulates, and restoring natural ecological processes in locations where invasive species have been removed. So far, only 0.7% (790 of 101,118) infested acres have been freed of target weed species.
- Continued monitoring of the marine and terrestrial resources at Kalaupapa in partnership with the Pacific Islands I&M Network.
- Continuation of park specific research projects through the National Coral Reef Program.
- Continued involvement with multiple partners regarding recovery of T&E species such as the Hawaiian monk seal, green sea turtle, humpback whale, and numerous plant species both in the wild and propagated in the nursery.
- Providing law enforcement services to the community and ensuring visitor safety as well as maintaining the privacy of the patient community.
- Improving the visitor experience as documented in the visitor satisfaction survey. Issues include the difficulty in accessing the park, the high cost of the tour, and the poor condition of visitor amenities at the topside facilities.
- Identifying the direction of interpretive and educational programs, types and levels of compatible uses, level of access and transportation, and appropriate levels of commercial use activities.
- Assuming all remaining operational responsibilities and costs associated with the settlement, including the transfer of the electrical system from the State of Hawaii Department of Health (DOH) to NPS.

- Operating and maintaining the water utility system, structural and wildland fire protection, 24 miles of roads and trails including access into the park, solid waste management, recycling center, waste water disposal facilities and upgrading the electrical distribution system.
- Maintaining safety readiness to deal with hurricanes, tsunamis, and earthquakes, which occur on a frequent basis.
- Addressing housing, work-life balance, and quality of life issues in support of staff retention.
- Continuing partnerships with the management agencies (e.g., State of Hawaii Department of Health), landowners (e.g., State of Hawaii Department of Hawaiian Home Lands, Department of Land and Natural Resources, Department of Transportation, R. W. Meyer Ltd), and service partners (e.g., Catholic church, Protestant church) in the park. This is critical given that the park service only owns 23 acres out of the 10,648 acres that constitute the park.
- Addressing ongoing and potential cooperative relationships with state agencies, religious institutions, and nonprofit organizations.

# Chapter 1. Introduction

The purpose of this State of the Park report for Kalaupapa National Historical Park is to assess the overall condition of the park's priority resources and values, to communicate complex park condition information to visitors and the American public in a clear and simple way, and to inform visitors and other stakeholders about stewardship actions being taken by park staff to maintain or improve the condition of priority park resources for future generations. The State of the Park report uses a standardized approach to focus attention on the priority resources and values of the park based on the park's purpose and significance, as described in the park's Foundation Document and General Management Plan (GMP), currently in draft form, dated July 2014. This report:

- Provides to visitors and the American public a snapshot of the status and trend in the condition of a park's priority resources and values.
- Summarizes and communicates complex scientific, scholarly, and park operations factual information and expert professional opinion using non-technical language and a visual format.
- Highlights park stewardship activities and accomplishments to maintain or improve the state of the park.
- Identifies key issues and challenges facing the park to inform park management planning.

The process of identifying priority park resources by park staff and partners, tracking their condition, organizing and synthesizing data and information, and communicating the results will be closely coordinated with the park planning process, including natural and cultural resource condition assessments and Resource Stewardship Strategy development. It is important to note that Kalaupapa NHP has not undergone a comprehensive cultural resources condition assessment exercise, and that this report was drafted prior to the establishment of such effort. However, the information compiled in this report will help to inform this resource condition assessment in the future.

This report mainly focuses on priority resources. The term "priority resources" is used to identify the fundamental and other important resources and values for the park, based on a park's purpose and significance within the National Park System, as documented in the park's foundation document and other planning documents. This report summarizes and communicates the overall condition of priority park resources and values based on the best available scientific and scholarly information and expert opinion, regardless of political pressure both within and outside of the National Park Service. While the park superintendent and NPS managers have reviewed and commented on this report, the goal of the preparers is to present a statement and summary of scholarly scientific and historic study and viewpoints. The intent is to describe the state of the park as it currently stands and not to overstate or understate trends, conditions, or issues.

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- Kalaupapa NHP presents an exemplary geologic and scenic panorama of towering sea cliffs and a flat leaf-shaped peninsula that were created by a cataclysmic landslide and subsequent volcanic eruption.
- From mauka to makai (mountain top to coast line), Kalaupapa National Historical Park preserves and interprets some of the last remaining examples of fragile Hawaiian Island plant and animal communities found nowhere else in the world. Some of the park's natural resources are unique in the world.
- Kalaupapa NHP preserves robust and diverse nearshore marine resources due to the geographic remoteness, locally restricted access, and controlled subsistence practices.
- Kalaupapa NHP's number of archeological resources, vast variety of site types, its extensive time range of habitation and land use, and the exceptional preservation of its archeological sites combine to make the park one of the richest and most valuable archeological complexes in Hawaii.
- Many who come to Kalaupapa recognize an intense, nearly tangible, mana or powerful force that Hawaiian peoples find in all things. The 'āina (land), a vital source that links us to spirit is sacred and becomes our 'aumakua (guide) that connects us to the continued presence of all who lived out their lives on this peninsula. The 'āina's mana (spiritual essence) connects us to each other and to spirit.

In addition, the park also encompasses a portion of the North Shore Cliffs National Natural Landmark (NNL) and the entire Kalaupapa Leprosy Settlement National Historical Landmark (NHL) within its boundary. These significant features were designated in 1972 and 1976 respectively.

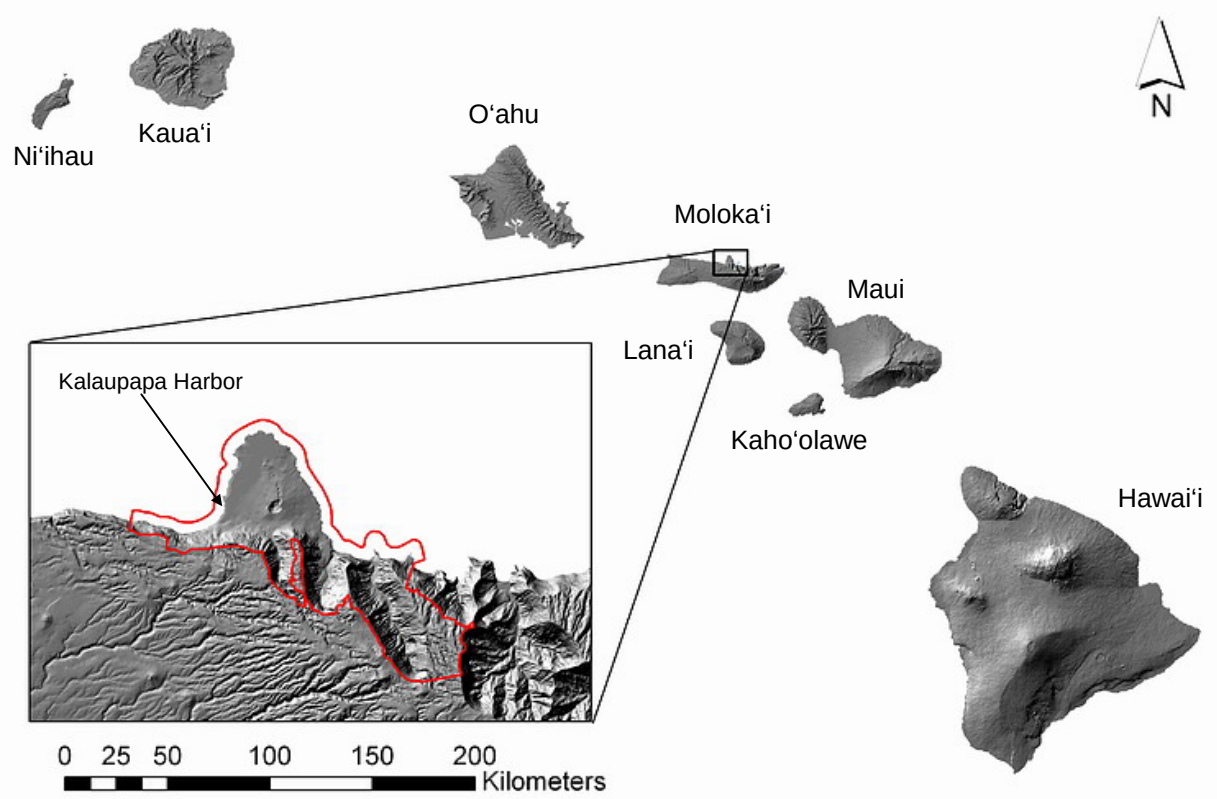


**Figure 1. Location of the park on the island of Molokai in the State of Hawaii. The park boundary is delineated by the red line**

# Chapter 2. State of the Park

The State of the Park is summarized below for four categories—Natural Resources, Cultural Resources, Visitor Experience, and Park Infrastructure—based on a synthesis of the park's monitoring, evaluation, management, and information programs, and expert opinion. Brief resource summaries are provided below for a selection of the priority resources and values of the park. Clicking on the web ▸ symbol found in the tables and resource briefs below will take you to the internet site that contains content associated with specific topics in the report.

The scientific and scholarly reports, publications, datasets, methodologies, and other information that were used as the basis for the assessments of resource condition are referenced and linked throughout the report and through the internet version of this report that is linked to the NPS IRMA data system (Integrated Resource Management Applications). The internet version of each report, and the associated workshop summary report available from the internet site, provide additional detail and sources of information about the findings summarized in the report, including references, accounts on the origin and quality of the data, and the methods and analytical approaches used in data collection and the assessments of condition. Resource condition assessments reported in this State of the Park report involve expert opinion and the professional judgment of park staff and subject matter experts involved in developing the report. This expert opinion and professional judgment derive from the in-depth knowledge and expertise of park and regional staff gained from their being involved in the day-to-day practice of all aspects of park stewardship and from the professional experience of the participating subject matter experts. This expert opinion and professional judgment utilized available factual information for the analyses and conclusions presented in this report. All subject matter experts convened in a park workshop to compile the information presented in this report. A series of reviews and edits at the park and regional levels followed.

It is important to note that Kalaupapa NHP has not undergone a comprehensive natural or cultural resources condition assessment exercise or Resource Stewardship Strategy. This report was drafted prior to the establishment of those efforts. Thus, the indicators in this report are not comparable to other State of the Park reports, but rely more heavily on expert professional opinion on the unique resources to Kalaupapa. However, the information compiled in this report will help to inform those resource condition assessments in the future.

The status and trends documented in Chapter 2 provide a useful point-in-time baseline measured against reference conditions that represent "healthy" ecosystem parameters, or regulatory standards (such as those related to air or water quality). We also note that climate change adaptation requires us to continue to learn from the past, but attempting to manage for conditions based on our understanding of the historical "natural" range of variation will be increasingly futile in many locations. Thus, these reference conditions, and/or our judgment about resource condition or trend may evolve as the rate of climate change accelerates and we respond to novel conditions. Our management must be even more "forward looking," to anticipate plausible but unprecedented conditions, also recognizing there will be surprises. In this context, we will incorporate climate considerations in our decision processes and management planning as we consider adaptation options that may deviate from traditional practices.

# 2.1. Natural Resources

## Weather and Climate

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Atmospheric Temperature** | Mean annual temperature |  | Warming of +0.08 °F (+0.04 °C) per decade from 1919–2006 and projected to increase 2.7–4.7 °F (1.5–2.6 °C) by 2100 (Keener et al. 2012). Mean annual temperatures of numerous years over the past two decades have been near the upper end of the range of variability experienced across the 20th century. Warming of the projected magnitude will have cascading impacts on terrestrial and aquatic systems. |
| **Precipitation** | Mean annual precipitation |  | Annual rainfall on the peninsula over the last 20 years has been declining (NPS RAWS data). This pattern is consistent with the statewide observations (Chu et. al. 2010), but the long-term trend is uncertain due to the high interannual variability and lack of a strong directional trend. A decrease in precipitation concomitant with warming temperatures will lead to generally drier conditions. |
| **Ocean** | Water temperature |  | Ocean temperatures increased as much as 3.6 °F (2 °C) over the 20th century (Ganachaud et al. 2011). In Hawaii, water temperature has risen more than 0.9 °F (0.5 °C) since 1956, but is currently experiencing a cooling period since 2005. It is projected to increase 2.5–4.7 °F (1.4–2.6 °C) by 2090 (Australian Bureau of Meteorology and CSIRO 2011). Recent coral bleaching events in other parts of Hawaii are related to water temperature increases (Jokiel and Brown 2004) and are projected to occur in most years in the future (Burke et al. 2011). |
| | Ocean acidity |  | Ocean acidity has increased 26% since 1880 (Feely et al. 2009) and is projected to increase 37–50% by 2100 compared with present levels (NCADAC 2013). Increased acidity can strongly inhibit calcification by marine organisms such as shellfish and corals. |
| | Sea-level rise |  | Globally sea-level has risen 8 inches (20.3 cm) since 1880; however, in Hawaii, sea level has risen over 5 inches since 1918 (Firing and Merrifield 2004). It is projected to rise 1–4 feet (0.3–1.2 m) in the 21st century (NCADAC 2013) leading to increased coastal flooding, saltwater intrusion into freshwater systems, and changes to the intertidal habitat available to T&E species such as the Hawaiian monk seal. |

# Resource Brief – Weather patterns and climate change implications

From 1919 to 2006, mean annual temperature increased 0.08 °F (0.04 °C) per decade across Hawaii and showed a statistically significant increase in the area that includes Kalaupapa NHP (Keener et al. 2012). Average and maximum daily temperatures from the Makapulapai Remote Automated Weather Station (RAWS) located on the Kalaupapa peninsula have been increasing since 1993 (NPS RAWS data collected from http://www.raws.dri.edu/wraws/hiF.html, 2013). In contrast, minimum daily temperatures have been decreasing over this same time period, indicating that temperatures are becoming more extreme throughout the year. The projected 21st-century temperature in the Kalaupapa area could increase four to seven times the amount of historical 20th-century warming.

Sea surface ocean temperatures recorded by the National Marine Fisheries Service (NMFS) for Koko Head, Oahu (1956–1992) and corrected Integrated Global Ocean Services System–National Meteorological Center (IGOSS–NMC) at the same location (1992–2012) indicate that overall temperatures have increased by more than 0.9 °F (0.5 °C) since 1956 (Figure 3; see Jokiel and Brown 2004). Ocean cooling has occurred since 2005 and this has been corroborated by temperature meters within the park. Over a longer time period, however, ocean temperatures are expected to continue rising by 2.5 to 4.7 °F (1.4–2.6 °C) due to increased $CO_2$ emissions and the concomitant increase in atmospheric temperatures (IPCC 2007).

Based on recordings from the Makapulapai RAWS, overall annual precipitation levels have been declining since 1993 (Figure 2). In the future, annual precipitation may decline further due to the restriction in cloud formation from the increased frequency of the trade wind inversion layer in Hawaii (Cao et al. 2007). In addition, there is the potential that storm frequency and extreme precipitation events may increase in certain areas of Hawaii. However, there is a high level of uncertainty associated with both the magnitude and direction of future precipitation events (Chu et al. 2010). If the projected changes in rainfall do occur, then these patterns will alter upland forest characteristics, groundwater resources, and surface stream flow (Giambelluca et al. 2008) leading to an overall reduction in water resources with the Kalaupapa watersheds.

Ocean chemistry is expected to change with increasing $CO_2$ emissions (IPCC 2007). In particular, pH is expected to decrease resulting in more acidic conditions and negatively impacting organisms (e.g., corals, mollusks, sea urchins, etc.) that secrete a calcium carbonate skeleton. The latest projection is that by 2050, coral reef ecosystems will reach a tipping point and corals will be unable to calcify and grow (Hoegh-Guldberg et al. 2007). The park began monitoring pH in 2009 as part of the Pacific Island Network I&M program, but to date, no temporal pattern has emerged.

Since Kalaupapa NHP is a coastal park, a projected sea level rise of 1–4 feet (0.3–1.2 m) will inundate low-lying natural and cultural resources such as nesting and nursing habitat for threatened and endangered species, historic structures, cemeteries, and archeological sites. Sea-level rise, in conjunction with storms, could increase the number and severity of coastal flooding events, accelerate saltwater intrusion into freshwater systems (NCADAC 2013), and submerge roughly 40 hectares (98.9 acres) of coastal land in the park (1.2% of the park's land area) (Fung and SWCA 2010). This has the potential to change the quality and quantity of intertidal habitat available to the critically endangered Hawaiian monk seal (*Monachus schauinslandi*). Globally, sea level is rising at the rate of 0.13 inches per year, although this rate has been accelerating in recent years (Church and White 2011). In Hawaii, sea level has risen over 5 inches since 1918 (Firing and Merrifield 2004). This rise in sea level is expected to accelerate in the future with melting of the polar ice caps and thermal expansion of the ocean with increasing water temperature.

General current patterns in Hawaii run east to west with eddies at various points around the archipelago (Lumpkin 1998). At the park, the currents primarily are alongshore and are faster at the surface than close to the seabed; large wave events, however, tend to drive flow in a more cross-shore orientation from the northwest (Storlazzi et al. 2011). Along the western side of the peninsula, the tidal currents flood to the north and ebb to the south (Storlazzi et al. 2011). It is unknown at this time how oceanographic currents in Hawaii, and in particular coastal waters around Kalaupapa NHP, will respond to climate change. Projected decreases in trade wind frequency may result in a reduction of surface currents and upwelling areas along the peninsula. This change in upwelling may lead to longer and more persistent upwelling events with concomitant effects on recruitment patterns as observed along the California coast for invertebrates (Iles et al. 2011).

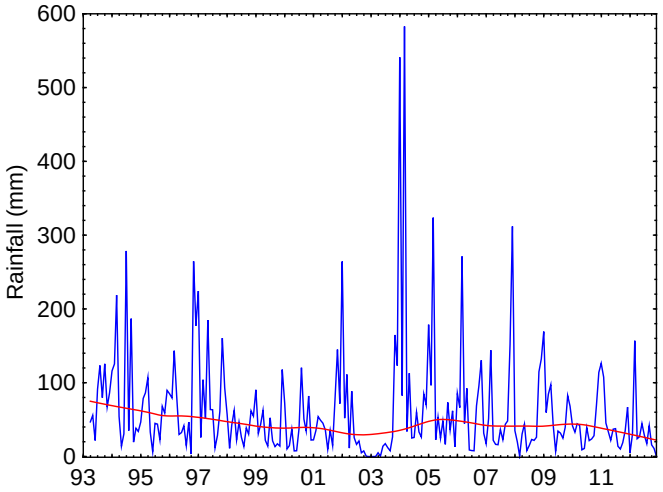


**Figure 2. Monthly rainfall (mm) from 1993 to 2012. Data were collected at the Makapulapai Remote Automated Weather Station (RAWS) within the park. The red line indicates a Lowess function fitted to the data.**

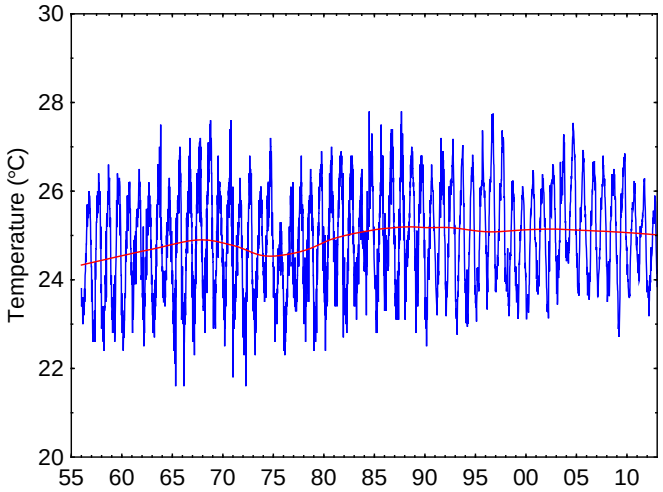


**Figure 3. Combined sea surface temperature (SST) record using National Marine Fisheries Service (NMFS) data for Koko Head, Oahu (1956–1992) and corrected Integrated Global Ocean Services System–National Meteorological Center (IGOSS–NMC) temperature data (1992 to 2012) (Modified from Jokiel and Brown 2004). The red line indicates a Lowess function fitted to the data.**

## Geologic Resources

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Kalaupapa National Historical Park is located on the island of Molokai, one of many volcanic islands and seamounts of the Hawaiian-Emperor volcanic chain. The island's volcanic origins influence nearly every aspect of the park's natural, and to some degree, cultural resources. The island itself is remarkable in that about 1.4 million years ago, its entire northern half catastrophically collapsed, scattering debris across the Pacific Ocean floor out to 120 miles from the island (Thornberry-Ehrlich 2010). The landslide generated a huge tsunami that inundated both Molokai and neighboring Lāna'i. This massive landslide created some of the tallest sea cliffs in the world, towering over 1,100 meters above the ocean in some places. A subsequent, smaller eruption around 350,000 years ago created Pu'u 'Uao volcano and the flat, low lying peninsula upon which the park is located (Clague et al. 1982). The outstanding geologic features of the north shore sea cliffs resulted in a National Natural Landmark designation in 1972. Due to its low elevation, the park is susceptible to inundation during tsunamis. Many volcanic features exist in the park, including numerous lava tubes and caves. Waikolu stream, which is the only perennial stream in the park, is listed in the Nationwide Rivers Inventory and is being considered for listing in the Wild and Scenic Rivers System. The marine geology of the park has not yet been mapped by the Inventory and Monitoring Program, which is an important data gap for developing a benthic habitat map for the park. Marine geology and associated benthic habitat provide a foundation for understanding and managing marine ecosystems and their associated species.

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Caves** | Amount of human access and utilization |  | The park contains at least 16 lava tubes, a number of which have been surveyed with some inventory work done. Archeological materials and troglobitic species are known to be present in some of them. Bird and other bones have also been observed in at least one lava tube, though not identified. The caves, in general, are well-protected because of their biological and archeological significance, and visitation is strictly limited. |
| **Mountain Slopes** | Frequency of slope movements as indicated by steep cliffs, debris flow scars, and landslide. |  | Mass wasting formed the sea cliffs at Kalaupapa, and the cliffs are highly susceptible to slope movements such as landslides, slumps, and debris flows. Their susceptibility is due to many factors including steep slopes, erodible substrate, subsurface water movement, storm events, and frequent seismic activity. These are all natural slope processes which are operating unimpaired in the park. |
| **Seismicity** | Magnitude of seismic shaking |  | Hawaii is the most seismically active place in the United States. Molokai periodically experiences earthquakes, though not as frequently as on other Hawaiian islands. Earthquakes can cause ground rupture, liquefaction, localized uplift or subsidence, and disruption of groundwater and surface water flow. Even moderate quakes can trigger landslides, slope movements, or damage to infrastructure. The USGS Hawaiian Volcano Observatory (http://hvo.wr.usgs.gov/) monitors seismic activity throughout the islands in partnership with NOAA, which operates a real-time seismometer at Kalaupapa. Seismic activity is a natural process and does pose a risk to residents and visitors alike. |

## Waikolu Stream

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Water Chemistry** | pH, Dissolved Oxygen, Nitrogen and Phosphorus concentrations |  | Water chemistry measurements indicate a relatively healthy tropical stream ecosystem that has not changed significantly since Brasher (1996) conducted some of the first studies on Waikolu. Since 2009, pH levels are normal (8.1), $O_2$ levels are fully saturated (9.3 mg/l), and nutrient levels are low (total nitrogen 0.09 mg/l, total phosphorus 0.04 mg/l) (I&M unpublished data). |
| **Fish Species** | Density (#/$m^2$) |  | Waikolu is one of the few streams in Hawaii, even with diverted flow, that supports viable and stable populations of the full complement of five endemic Hawaiian freshwater gobies Brasher (1996). Recent density estimates of 6.9 fish/$m^2$ at the stream mouth (I&M unpublished data) are consistent with values documented by Brasher (1997). |
| | Spatial distribution |  | No noticeable divergence from baseline work conducted by Brasher (1996). Fish and invertebrates are still found above the diversion (I&M unpublished data). |
| | Size frequency distribution |  | No noticeable divergence from baseline work conducted by Brasher (1996). Healthy populations of adults are still found above the diversion (I&M unpublished data). |
| **Native Invertebrates** | Density of hihiwai (*Neritina granosa*) (#/$m^2$) |  | *Neritina granosa* is a highly prized and culturally significant invertebrate collected for consumption. Density levels of hihiwai (63.6 snails/$m^2$) are some of the highest reported in the MHI and have not changed significantly since the early 1990s (Brasher 1996, I&M unpublished data). |
| **Sediment Load** | Turbidity |  | Water clarity is typically clear (-1.0 NTU) except during periods of heavy rainfall with high sediment loading (I&M unpublished data). Water measurements are normally made during low flow periods so no data exist for heavy flow events. |
| **Flow** | Discharge ($m^3$/s) |  | Flow data collected at different locations at various time periods from 1919 to 2003 indicated that discharge has declined in the stream by nearly 20% near the stream mouth and 76% by the diversion (http://water.usgs.gov/osw/streamstats/hawaii.html). Measurements of discharge in 2010 at the stream mouth (0.35 $m^3$/s, 12.5 $ft^3$/s, I&M unpublished data) are similar to values published by Brasher (1997) in the summer dry season. |
| | Amount of water diverted (mgd) |  | Currently, 5.8 millions of gallons per day on average are diverted from Waikolu stream to supply Hawaiian homelands in the central part of Molokai (Santo 2001). Dry areas are detected during the summer below the diversion which has significantly reduced the habitat availability (Brasher 2003). Fish populations, however, are still found above the diversion, but at reduced abundance levels compared to lower reaches (I&M unpublished data). Population and tourism on the island are stable and are not projected to grow. Thus the amount of water diverted should remain relatively steady. |

## Nearshore Marine Environment

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Coral Reef Communities** | Percent cover of live stony coral |  | Percent coral cover ranged from 0.5% along the east and west boundaries of the park to 24.0% at the northern tip of the peninsula. From 2006–2010, coral cover averaged 9% of the substrate and has been stable with a low incidence of disease or bleaching at less than 2% (Brown et al. 2014). |
| | Coral settlement rate (#/$m^2$/5 months) |  | The settlement rate has not been particularly high compared to other areas around the state at 116.5 larvae/$m^2$/5 months, but similar to other sites, settlement has experienced periodic annual pulses (Brown et al. 2013). |
| | Rugosity Index |  | Rugosity is a measure of topographical complexity of the bottom and has been stable since 2006 indicating no major storms (Brown et al. 2013). |
| **Marine Algae** | Percent cover of fleshy marine algae |  | Mean macroalgae cover increased from 8% in 2006 to 26% in 2008 and then was back down to 22% in 2010 (Brown et al. 2013). This pattern was primarily due to an increase in *Sargassum* sp. and *Padina* sp. cover. Macroalgae competes with corals for space and a high abundance can indicate high nutrient input or low herbivore density. |
| **Marine Fish Communities** | Density of daytime non-cryptic marine fish (#/$m^2$) |  | Fish density generally ranged from 0.3 to 3.3 fish/$m^2$ on 125 $m^2$ transects and have not declined significantly from 2006 (1.9 fish/$m^2$) to 2010 (1.2 fish/$m^2$) (Brown et al. 2012). |
| | Biomass of daytime non-cryptic marine fish (metric tons/$km^2$) |  | Mean fish biomass remained relatively stable between 2006 and 2009 (166.3 mt/$km^2$) with a slight decline in 2010 of 123.2 mt/$km^2$ (Brown et al. 2012). Compared to other, more densely populated main Hawaiian islands, the fish are larger with higher biomass, but compared to other pristine areas, biomass is less (Friedlander et al. 2008). Fishing pressure is light (Tom 2011). |
| **Water Quality** | I&M Measures |  | Marine water quality is quite good for the main Hawaiian islands and has been stable since 2010. Water chemistry values for pH of 8.2, dissolved oxygen is fully saturated at 104%, salinity at 35 ppt, low turbidity, and moderate chlorophyll levels of 29 µg/l are all within the normal oceanic range. Levels of total nitrogen less than 0.1 mg/l and total phosphorus less than 0.1 mg/l indicated low nutrient input (I&M unpubl. data). |
| **Marine Debris** | Weight removed (kg/area/year) |  | Marine debris has only been measured since 2010, but is anticipated to increase, according to the NOAA website and the Japan Tsunami Marine Debris working group. Approximately 20% of beaches are visited for cleaning (Kalaupapa NHP unpublished data). |
| **Opihi (limpet)** | Density (#/$m^2$) |  | Within the boundaries of Kalaupapa NHP, this highly prized delicacy has some of the highest reported densities (e.g., 13 limpets/$m^2$ for *Cellana exarata*) in the MHI with many of the larger size classes still found in the rocky intertidal habitat (Tom 2011). |

| | | | |
|---|---|---|---|
| **Sea Level Rise** | Water level (m) |  | Sea level rise will impact distribution patterns of organisms and cultural resources. Sea level has risen over 5 inches in Hawaii since 1918 (Firing and Merrifield 2004). Even though sea level sensors have not detected any rise since 2007, when the sensors were installed, the time series is short compared to trends from longer term data sets (Kalaupapa NHP unpublished data). |

## Terrestrial Plant Communities

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Rainforest (Pu`u Ali`i Natural Area Reserve)** | Native species diversity, richness, and abundance |  | The rainforest at Pu`u Ali`i Natural Area Reserve contains a rich abundance of native species and diversity found little where else in Hawaii. However, Koster's curse (*Clidemia hirta)* and other serious invasive plants have recently been observed in the reserve. Little can be done because seed dispersal is by birds from nearby heavily infested areas. Management is banking on the development of bio-control. The remoteness and ruggedness of the area prevents adequate surveys and prevents eradication by volunteers. |
| | Area protected (hectares) |  | All fenceable rainforest habitat within the park (405 hectares) has recently been fenced off, but feral animals are still being removed from the protected area. There is a relatively low presence of animal signs since the fencing was erected (Kalaupapa NHP unpublished data). No additional fencing is needed to protect the area. |
| | Feral pig sign (presence) |  | Informal observation of wallows, hoofprints, and scat during other activities indicates that feral pigs are low in abundance within the reserve. No formal monitoring is in place. |
| **Coastal Salt Spray** | Native species diversity, richness, and abundance |  | Repeat photos and a few repeat transects have indicated that native species diversity and abundance have qualitatively recovered in areas where feral ungulates have been removed (Kalaupapa NHP unpublished images). |
| | Area protected (hectares) |  | A cross fence was installed in 2011 protecting 80 ha of extant coastal salt spray zone. Feral animal sighting detection is low and the area is regularly cleared of animals (Kalaupapa NHP unpublished data). |
| | Vegetation composition, structure, and abundance |  | Repeat photos and a few repeat transects have indicated that the community composition of native species has qualitatively recovered in areas where feral ungulates have been removed (Kalaupapa NHP unpublished images). |
| | Deer herd size (# of individuals) |  | Observed during monthly drives of deer from the protected area. Numbers of deer have been qualitatively decreasing since the recent cross fence (Kalaupapa NHP unpublished data). |
| **Dryland Forest** | Native species diversity, richness, and abundance |  | In 2009, a repeat study was made on a 1997 dataset (Hosten and Johnson, unpublished data) that demonstrated that key tree species are in serious decline (20–30%). |

| | | | |
|---|---|---|---|
| | Area protected (hectares) |  | A large area (52 ha) has been fenced off for over 10 years, and the feral pigs and goats have been removed, but efforts to eliminate deer from the fenced area have not yet been successful (Kalaupapa NHP unpublished data). |
| | Vegetation composition, structure, and abundance |  | Repeat photos and a few repeat transects have indicated that the vegetation community composition has shifted to a more non-native forest because feral ungulates have not been removed within the fenced area (Hosten and Johnson, unpublished data). |
| | Deer herd size (# of individuals) |  | Anecdotal observations suggest that the deer herd size is influenced more by natural processes such as food and water availability than by hunting pressure. |

# Resource Brief – Conservation and socially responsible feral animal management

Polynesians brought pigs to Hawaii on their trans-ocean canoes more than 1,000 years ago. The introduction of goats is attributed to Captains Cook and Vancouver in the last quarter of the 1700s. The most recent problem ungulate introduction to Molokai occurred in 1868 as a gift of axis deer to King Kamehameha V by the government of Hong Kong. The number of deer increased from an initial 8 to an estimated 7,500 by the early 1900s. Deer were already viewed as a problem by the 1890s, but early island-wide extermination efforts failed. While these feral ungulates are seen as a threat to the biology and cultural resources (rock walls, etc.) of Molokai, they have also become critical to the subsistence way of life prevalent on Molokai today.

Hunting at higher elevations within the park is controlled by the Department of Land and Natural Resources (DLNR). The steep pali (cliff) delayed access by deer to the Kalaupapa peninsula until the early to mid-1900s. Originally only hunted by the patients, kōkua ("helpers" to patients, now understood to include all Kalaupapa residents) were later allowed to harvest animals starting in the early 1990s (Watanuki, pers. comm.). Patients no longer hunt, but other Molokai residents continue to harvest pig, deer, and goats for sustenance below 500 feet in elevation following Department of Health regulations. Only Kalaupapa residents are allowed to hunt within designated hunting areas. The system of conservation and hunting areas within Kalaupapa NHP serves as a model of balance between conservation and support for the subsistence way of life, which is achieved by strategically placed fencing to exclude unwanted animals from areas with remaining natural and cultural resources. All feral animal control activities are performed under the authority of a special permit issued by the DLNR. All animal control participants must be listed on the permit. Fenced management units will (once feral animals are removed) protect some of the last remaining vestiges of intact coastal spray vegetation, low-elevation windward dryland forest, and high elevation rainforest home to native birds (Figure 4). These sanctuaries protect threatened and endangered species while allowing hunting by Kalaupapa residents in areas without important native natural resources.

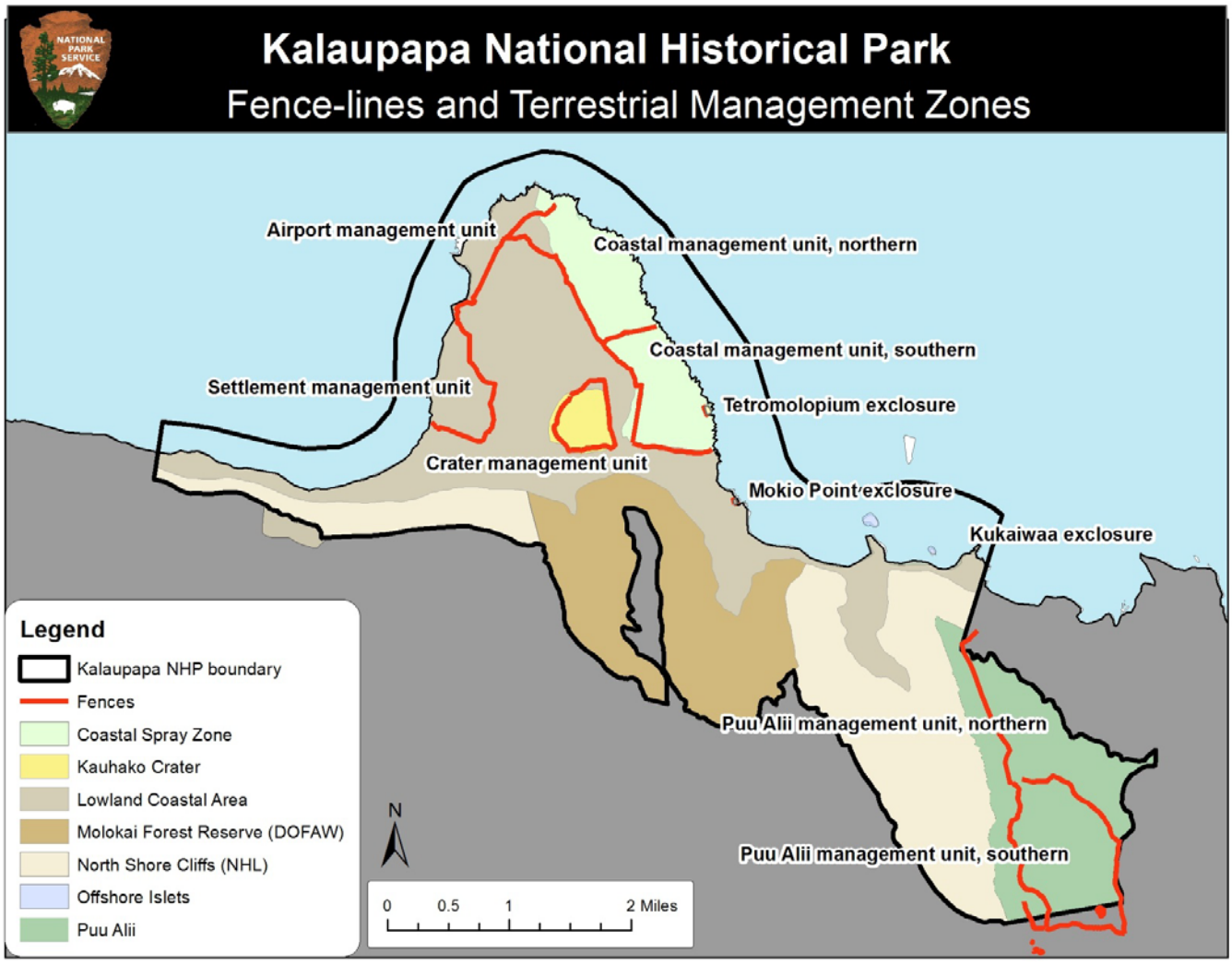


**Figure 4. Map of Kalaupapa National Historical Park showing fence-lines within the different terrestrial management zones.**

## Threatened and Endangered Species

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Hawaiian Monk Seals** | Abundance (#/ km) |  | Abundance varied by season with significantly more seals documented in the late spring and early summer months compared to other times (Brown et al. 2011). Seal density was higher on sandy beaches (2.0 monk seals per km) than basalt (0.3 monk seals per km) habitat. See resource brief below. |
| | Pupping rates (#/ yr) |  | Pupping rates have increased at an annual rate of 26% since 1997 when the first female seal began pupping at Kalaupapa (Brown et al. 2011). The numbers archipelago-wide, however, are declining. |
| **Hawaiian Hoary Bat** | # of locations detected |  | An acoustic study conducted by Fraser et al. (2007) indicated that bats were rarely heard on the peninsula, but had a higher frequency of occurrence at the top of the trail at an elevation of 1,700 ft. |
| **Green Sea Turtles** | # nests |  | Anecdotal observations by residents on the black sand beach adjacent to the settlement indicate that the number of turtle nests (5–6 per year) has been consistent over the past decade. |
| **Rainforest Plants** | # of T&E Species with viable populations |  | Recent completion of a fence around a high elevation forest and successful pig removal have allowed an improvement in the condition of rainforest habitat and provided a sanctuary for the reintroduction of rare plants (Kalaupapa NHP unpublished data). The number of plant species that are rare or at risk is unknown; however, now that the area is in recovery, surveys for presence of threatened and endangered plants could be completed. The Pu`u Ali`i Natural Area Reserve may include over 15 threatened or endangered plants and/or their critical habitat (FWS 2013). |
| **Coastal Plants** | # of T&E Species with viable populations |  | Most species have improved in this area. *Tetramolopium rockii* has increased in abundance within its enclosure and beyond to a lesser extent. One species that relies on calcareous sand substrate has been extirpated likely because of increased native plant cover (Kalaupapa NHP unpublished data). |
| **Dryland Forest Plants** | # of T&E Species with viable populations |  | *Portulaca velosa* and other candidate species are either stable at low numbers or in decline (Kalaupapa NHP unpublished data). |

# Resource Brief – Emergence of an important pupping area for the critically endangered Hawaiian monk seal

The Hawaiian monk seal (*Monachus schauinslandi*) is one of the most endangered marine mammals on earth, with the majority (90%) of the population found in the relatively uninhabited Northwestern Hawaiian Islands (NWHI) and the remaining 10% in the heavily developed main Hawaiian Islands (MHI). Since 1998, the total population has declined 4% per year to ≈ 1,100 animals in 2010 (NOAA Hawaiian monk seal homepage). Despite this trend, the population in the MHI is increasing slightly, with monk seals pupping at Kalaupapa NHP. Long-time human residents in Kalaupapa indicated that monk seals rarely used the beaches prior to 1997, and no births had been observed since at least 1941. Since 1997, a total of 83 pups have been born, with births increasing at an average annual rate of 26% (Figure 5). These births represent 40% of the pups born in the MHI. Reproductively active females born at Kalaupapa exhibited site fidelity of 56%. The park and most of the MHI are designated critical habitat for monk seals. Spatially, monk seal density was higher on sandy beaches (2.0 monk seals per km) than basalt (0.3 monk seals per km) habitat. Temporally, monk seal density was highest during the late spring and early summer due to the presence of mother-pup pairs. After weaning, monk seals also used adjacent basalt habitat and typically moved away from Kalaupapa at the onset of winter; since 2009, monk seal sightings have increased throughout the year. Explanations for the emergence of the pupping area include suitable habitat characteristics (e.g., protected shallow water habitat, high prey abundance, and low predator/competitor abundance), reduction of human activities (e.g., elimination of cattle in 1985, sparse [3.4 people per $km^2$] and declining [90% since 1900] human population, and low public visitation [8,494 people per year]), and a supportive community. Current management actions include habitat-use surveys, population studies, community presentations, and law enforcement patrols. Kalaupapa has become a productive pupping area for monk seals in the MHI, and the establishment of a birthing area provides hope for the survival of this endangered species. Nevertheless, the overall population is declining and predicted sea level rise with climate change would reduce or eliminate pupping and resting seal habitat along the beaches of the park.

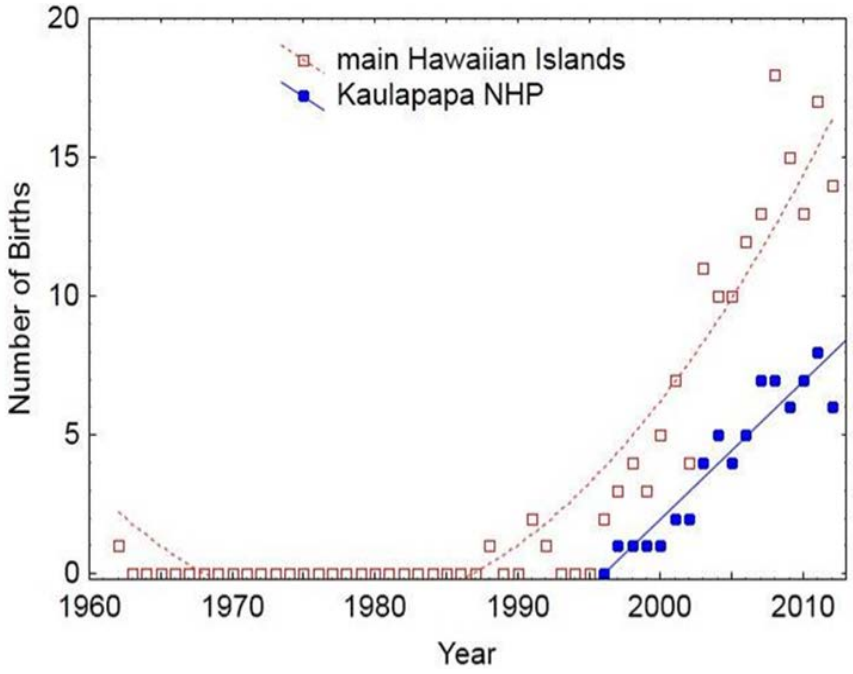


**Figure 5. Annual number of Hawaiian monk seal births in the main Hawaiian Islands (excluding Niʻihau) and at Kalaupapa National Historical Park from 1962 to 2012. Figure updated from Brown et al. (2011).**

# Resource Brief – Plant propagation and out-planting

Natural resources management staff has established a nursery and garden on approximately 3 acres within the Kalaupapa settlement. A full-time biotech maintains the premises, assists with plant propagation, and coordinates work by occasional volunteers within the nursery and restoration areas. A shade house and work area provides the infrastructure for propagating common and rare plants from seeds and cuttings (propagules). The staff at the park collects propagules from existing plants within the park, partner organizations, or receives rare plant material from past collections maintained at botanical gardens on O‘ahu and Maui. Volunteers are commonly used for nursery maintenance, plant propagation, and out-planting on the Kalaupapa peninsula.

Plants are reintroduced to protected areas free of feral animals in the form of seeds, seedlings, or more mature potted plants. The larger potted plants may take a full year to develop from the time of propagule collection. Partners (the Nature Conservancy, State Department of Land and Natural Resources, Molokai Plant Extinction Prevention Program, and the Molokai Land Trust) play an important role in collecting propagating, and out-planting rare species on NPS administered and partner-owned lands that extend beyond the park boundaries. A partnership currently under development, the Molokai Coastal Conservation Partnership, will eventually include federal, state, and private land-owners that want to protect their holdings against climate induced changes in the ocean level.

**Figure 6. The endangered ‘Ōhai (Sesbania tomentosa) has recently been reestablished along the east coast of the Kalaupapa peninsula as part of a program to insert rare plants into the recovering matrix of native vegetation.**

Associated with the nursery are gardens depicting key species from the major plant communities of interest within the park—coastal salt spray vegetation, dryland forest and wet forest. These gardens are mainly for education of visitors, but will eventually include rare species grown as mother plants for further propagation. Ohai (*Sesbania tomentosa*, Figure 6) is one of seven rare plants funded to be reintroduced to the Kalaupapa coastal spray zone (Figure 4).

## Resource Brief – Recovery of the coastal salt spray plant community

The harsh coastal environments of the Kalaupapa National Historical Park have proven resistant to invasion by non-native shrubs and trees. The eastern coast of the Kalaupapa peninsula is subject to strong salt-bearing trade winds blowing from the northeast. In these areas, native salt-tolerant vegetation resisted being overwhelmed by more salt- and wind-susceptible invasives such as lantana (*Lantana camara*), Christmas berry (*Schinus terebinthifolius*), and java plum (*Syzigium cimini*). While these native plant communities have persisted, the communities have been severely impacted by historic livestock (horse and cattle) operations as well as feral ungulates (deer, pigs, and goats). The loss of cattle as a consequence of disease outbreak (brucellosis) and more recent removal of feral animals consequent to fencing projects have allowed remarkable recovery of the coastal salt-spray vegetation. Photo-retakes show plant recovery and expansion by naupaka (*Scaevola sericea*), akia (*Wikstroemia uva-ursi*), ilima (*Sida fallax*), and mauʻu ʻakiʻaki (*Fimbristylis cymosa*) along the eastern seaboard (Figure 7). The removal of goats from Kukaiwaʻa (a higher precipitation eastern, coastal zone in the park) allowed the rapid expansion of hala (*Pandanus tectorius*) and hinahina kuahiwi (*Artemisia australis*) into former non-native grass-dominated areas. Because of coastal development and the introduction of invasives, it is rare in Hawaii to have native-dominated coastal vegetation. Kalaupapa National Historical Park was already reputed to have some of the most intact coastal salt-spray plant communities, but to see it expanding further showcases good land stewardship.


**Figure 7. Naupaka (Scaevola taccada), akia (Wieckstroemia uva-ursi), hina hina (Heliotropium anomalum) and many other native plants show large increases in abundance following the completion of coastal management unit fences and subsequent removal of feral animals.**

## Invasive Species

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Incipient Invasives** | Amount of invasive algae removed in tidepools (kg/unit of effort) |  | Algae (*Acanthophora spicifera*) have been removed from tidepools around the peninsula since 2006, but harvest levels have not been decreasing (Kalaupapa NHP unpublished data). |
| | Terrestrial plant I&M measure |  | Currently, the NPS only manages invasive plants in designated park management units (Figure 4), and no surveys have been conducted to identify the extent or number of invasive plant species in the park. Removal programs are minimal, though the park has successfully controlled two of its worst incipient weed species located on the Kalaupapa peninsula (*Verbesina encephaloides* and *Argemone mexicana).* Continued eradication of emerging seedlings continues as individuals are encountered. Natural resources management staff is starting to target higher elevation incipient weed species located along fencelines and on helicopter landing zones. High elevation species include blackberry, tibouchina (*Tibouchina herbacea*) and Koster's curse (*Clidemia hirta*). |
| **Established Invasives** | I&M Measures |  | I&M formal monitoring protocol measurements were initiated in 2012. Other park unpublished data and observations indicate the long-term widespread stable presence of invasive shrubs and trees. These common invasive species are located throughout the majority of the park and include lantana (*Lantana camara*), Christmas berry (*Schinus terebinthifolius*), java plum (*Syszygium cumini*), and date palm (*Phoenix dactylifera*). These species are particularly prevalent in areas that were historically grazed by livestock. |
| | Area treated ($km^2$) |  | Invasive shrubs (e.g., *Pluchea spp.*) have been removed from 200 acres of the eastern shore of the Kalaupapa peninsula. Because of these removal efforts, Kalaupapa NHP is now considered to include the best coastal spray vegetation in all of Hawaii. The park is also beginning to consider measures to remove date palms (*Phoenix dactylifera*) that are spreading throughout the eastern section of the park. No plans currently exist to control and remove other established invasive species (e.g., lantana, Christmas berry, java plum). |

## Kauhakō Crater Lake

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Water Quality** | I&M Measures |  | See resource brief below and article in the Pacific Island Network I&M newsletter (Brown and Tice 2011). |

## Resource Brief – Lake Kauhakō overturning event

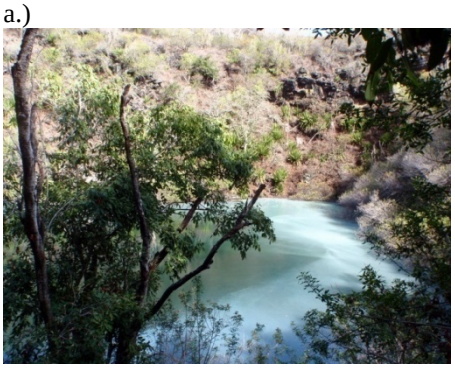
Lake Kauhakō, which lies at the bottom of Kauhakō Crater on the Kalaupapa peninsula, is a unique lake within the National Park Service system. With a depth estimated at 252 meters (832 feet), Lake Kauhakō has the greatest ratio of depth to surface area of any lake in the world. The lake has brackish water at the surface, with marine, anaerobic (no oxygen) water at depths greater than 2 meters. There is no recent evidence, however, to suggest that Lake Kauhakō has an open connection to the sea, even though it sits at sea level and is in close proximity to the Pacific Ocean.

The plants and animals in Lake Kauhakō are normally restricted to its shallow, oxygen-rich surface layer (epilimnion). Nutrients in this upper layer support a dense and highly productive phytoplankton community which in turn sustains invertebrates such as the native palaemonid shrimp (*Palaemon debilis*). Below this layer, bacteria thrive by getting their energy from sulfate in the water. As a byproduct, they produce a hydrogen sulfide ($H_2S$) gas, which smells of rotten eggs.

As part of the Pacific I&M Program's Water Quality Vital Sign Protocol, the National Park Service monitors water quality within Lake Kauhakō. Quarterly monitoring began in 2009 to examine temperature, salinity, pH, dissolved oxygen, turbidity, nitrogen, and phosphorus. For several years the lake appeared normal, especially in comparison to measurement values from earlier studies. Sometime in September 2011, the lake began emitting hydrogen sulfide gas into the atmosphere and generating a milky white layer at the surface (Figure 8a), possibly the result of an "overturning" event in the lake.

Typically, an overturning event is caused by strong winds generating a convection current that starts on the surface and cycles through a water body like a conveyer belt. At Lake Kauhakō, however, the surface winds are not usually strong enough to create this current and cause upwelling of the deeper water. Rather, the deep, hydrogen-sulfide-rich water may have come to the surface by one of two means: 1) a landslide which disrupted the boundary layer between the surface and deeper layers, or 2) prolonged drought which resulted in evaporation of the brackish, oxygen-rich surface layer. It now appears that drought conditions trigger the overturning events since the lake began experiencing a series of dramatic transformations from a relatively stable water body to one that was evolving on a daily basis, sometimes shifting water color several times within a day (Figure 8).

a.)



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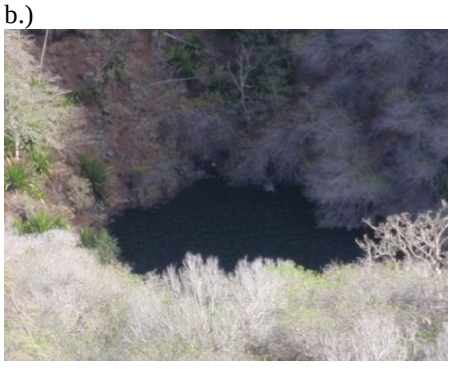

c.)

**Figure 8. After the overturning event, Lake Kauhakō underwent a series of color changes. a.) On November 1, the surface of the lake had a milky white layer, most likely caused by a bloom of sulfide oxidizing bacteria. b.) On December 8 and 12, in the absence of phytoplankton, the lake was a clear, deep blue-green color. c.) On December 14, after heavy rainfall, the lake had turned bright green as a result of a phytoplankton bloom.**

The water quality monitoring efforts captured the dramatic changes that occurred in the surface waters of the lake as a result of this overturning event (Table 1). After overturning, the surface water was saltier, more acidic, and most noticeably, lacking in oxygen (often >100% saturated, now 2–3% oxygen). This is why the shrimp couldn't survive. Phytoplankton in the lake also disappeared, and the water in the lake became extremely clear. Interestingly, two new invertebrates were found in the lake, so it was not completely devoid of life.

**Table 1. Water quality parameters measured in Lake Kauhakō from February 2011 to December 2011. Values after the overturning event in September 2011 are in bold.**

| Parameter | Unit | Feb-11 | May-11 | Aug-11 | Nov-11 | Dec-11 |
|---|---|---|---|---|---|---|
| Dissolved Oxygen | % | 139.36 | 98.16 | 227.37 | **2.52** | **2.93** |
| pH | | 8.26 | 7.92 | 8.05 | **6.83** | **6.94** |
| Salinity | ppt | 23.90 | 30.15 | 31.05 | **29.35** | **31.49** |

Although scientists had long suspected an event like this could occur in Lake Kauhakō, such an event had not been recorded at Kalaupapa in historical times. The $H_2S$ gas emitted by Lake Kauhakō is also extremely poisonous in high concentrations (>300 ppm), and $CO_2$ (which is odorless) may also have been emitted. Fortunately, the effects of this event appear limited to the lake itself, since no dead animals such as deer or birds have been found in the crater.

As the park continued to monitor the changes in the lake, staff began to wonder if and when it would recover. On December 12, 2011 the lake waters were clear (Figure 8b), no shrimp were observed, and a hydrogen sulfide smell was still detectable in the air. Heavy rains fell on Kalaupapa over the next 48 hours, causing a rapid and dramatic change in the lake. When park staff returned on December 14, they immediately noticed the lake was a bright green color, no smell was detected, and, most incredibly, two palaemonid shrimp were spotted swimming along the rocky shore of the lake! It appeared the rain had built up a new oxygen-rich surface layer on the lake, trapping the anaerobic, hydrogen sulfide-rich waters below. Phytoplankton had begun to bloom, turning the water a murky, bright green (Figure 8c). The shrimp, which have life stages that allow them to survive for long periods under adverse conditions, had also begun to recover. The recovery, however, was short-lived because the lake was back to a dark, blue-green color on December 16 with no signs of life. The park continues to periodically monitor the lake, but staff is hopeful that the lake can renew itself in a short time span given the right conditions such as an abundance of rain.

## Offshore Islets

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Threatened and Endangered Species** | Population size |  | The National Tropical Botanical Garden, Molokai Plant Extinction Prevention program, and others are periodically measuring T&E populations on the offshore islets. Numbers of rare species (*Pittosporum halophilum and Brighamia rockii*) have been documented and continue to decline. |
| **Invasive Species** | Presence of rats |  | Rats were extirpated on Mōkapu in 2008. Rats have not been detected on the other two islands (Partnership to Protect Hawaii's Native Species). |
| | Presence of invasive plants |  | Invasive shrubs have been recorded but not removed (Kalaupapa NHP unpublished data, National Tropical Botanical Garden). |
| | Presence of invasive marine invertebrates |  | Snowflake coral (*Carijoa reisei*) has been documented at ʻŌkala and three repeat visits have indicated no change in overall abundance (Coles et al. 2008). |

**Figure 9. Offshore islets of Huelo (left) and ʻŌkala (right) looking westward along the North Shore Cliffs NNL.**

# 2.2. Cultural Resources

## Archeological Resources

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Completeness of Inventories** | Percentage of park that has been surveyed |  | Per the draft July 2014 General Management Plan (GMP), approximately 10% of park lands have had a surface inventory; but very little sub-surface inventory has been completed. Vegetation overgrowth prevents easy or accurate inventory surveys. Projects in progress include archeological research designs and an inventory survey. Known sites and features are recorded in the NPS Archeological Sites Management Information System (ASMIS). |
| **Certified Site Condition** | Number of sites in good condition per ASMIS |  | More than half of the sites recorded in ASMIS still need to undergo a condition assessment. Of the 354 sites that have condition assessments, 208 of them are in good or excellent condition. Isolation and remoteness of the park have helped to maintain condition and integrity due to limited visitor impacts. The archeology at Kalaupapa has been regarded as one of the most varied and well-preserved archeological complexes in Hawaii (Kirch 2002). |
| **Site Stability** | Level of site threat per ASMIS |  | Most threats to stability are from invasive animals and vegetation. Proactive measures that are underway include exclusion fencing and vegetation management. There is low human impact to sites. Coastal sites, however, are vulnerable to a projected sea level rise of 1–4 feet (0.3–1.2 m) in the 21st century (NCADAC 2013). |
| **National Register Eligibility** | Known sites with adequate National Register documentation |  | Of the archeological sites recorded in ASMIS, the majority of them have not been formally determined eligible for the National Register of Historic Places. A broader study to examine archeological sites in a broader context to make determinations of eligibility is needed. Despite this undetermined status, the park treats all archeological sites as if they have been determined eligible. |
| **Completeness of Baseline Documentation** | Known sites that have complete and accessible documentation |  | Adequate data have been collected on some sites, but effective data management is still needed. Completion of baseline documentation (research design, inventory surveys and an updated archeological overview and assessment) will help resolve the problem. The park has an archeological overview and assessment from 2006, but the document isn't very detailed and needs to be updated. Project statements for baseline documentation have been drafted and uploaded to the Project Management Information System (PMIS). |

## Cultural Anthropology

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Representativeness of Oral Histories** | Adequate representation of subject groups |  | Subject groups include interviews with patients, patient families and children, physicians and kōkua (helpers), descendants of kama‘āina (people of the land—before contact), clergy, and nuns. Funding is often difficult to obtain for oral histories. |
| **Preservation and Management of Oral Histories** | Media curation, protection, and access |  | Histories are in multiple digital formats and are currently being converted to current DVD and MP3 formats. Transcription to written format is in progress. Sensitivity of content needs to be evaluated and considered (different levels of access need to be determined). |
| **Completeness of Baseline Documentation** | Sufficient research and appropriate studies that document ethnographic resources |  | Three ethnographic studies with oral histories have been completed from the mid-1980s to 2008 and a fourth is underway as of FY14. While these studies contain valuable information, the park does not have an ethnographic overview and assessment that meets NPS standards. |

## Cemeteries and Burial Sites

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Condition of Cemeteries** | LCS of grave markers |  | Based on LCS condition assessments, 479 of the 1,181 known grave markers are in good condition, 428 are in fair condition, and 274 are in poor condition. The park has a recurring cyclic program for preservation of grave markers where markers are prioritized each year based on level of deterioration, immediate threat, and available funds. Approximately 140 grave markers have received preservation treatment since 2008, when the hands-on program began. In 2013, ten complex tomb repairs were carried out and another 8 grave markers received treatment in 2014. As work is completed, condition assessments are updated in LCS. |
| | Condition of cemetery grounds |  | Mowing, weed whacking, and vegetation removal are performed with appropriate tools. Invasive plants and animals are managed, but problematic due to the intensity of plant growth. Original cemetery organization and signage (ethnicity, faith) are maintained. Park is actively working to improve the condition of cemetery ground in a sustainable manner through interdivision collaboration. Use of herbicide to control invasive plants near grave markers was begun in FY14. |
| **Condition of Other Burial Sites** | Condition of actively managed sites |  | Includes Moku Puakala (concentration of marked and unmarked graves near St. Philomena Church), Kauhakō Crater area, and other dispersed sites, both marked and unmarked. Management is variable among sites; information on graves is maintained; each location requires a unique management plan (some are instituted and some are not). The graves at Moku Puakala, Kauhakō Crater area, and other sites are generally in fair condition. Work on the burials in the Kauhakō Crater area was carried out in 2014. |
| **National Register Eligibility** | Cemeteries with adequate National Register documentation |  | All cemeteries and burial sites are contributing features to the Kalaupapa Leprosy Settlement National Historic Landmark district. The existing NHL district was completed in 1976 and does not meet current NHL standards. A revised NHL nomination is currently underway and should include additional information about the character-defining features and significance of the cemeteries. |
| **Completeness of Baseline Documentation** | Known cemeteries that have complete and accessible documentation |  | A comprehensive inventory of grave markers within the cemeteries has been conducted, but only included information visible on grave markers and general grave marker location. The corresponding map of cemetery delineations has been misplaced. Additional baseline documents are needed, including maps of cemetery trees, walls, and other small-scale features and lidar and/or laser scanning of grave markers. Lidar and/or laser scanning of grave markers may become important documentation techniques in the future as climate change impacts coastal cemeteries. |

## Patient Community – Past, Present, and Future

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Relationships with Current Patient Community** | Level and frequency of engagement; status of the relationship |  | The patient community is included regarding management issues and decisions. Today, there are roughly 16 patients remaining with rights to Kalaupapa; the average patient age is 79. Ongoing efforts to ensure that patient points of view and comments are considered. Regular community meetings are held, individual consultations, and many personal relationships are established and maintained, both on an official and informal level. NPS is continuing to cultivate trust with the patient community. The park's relationship with the patient community has increased since hiring a park cultural anthropologist. |
| **Inclusion of Patient Experience and Vision into Planning** | Inclusion of patient experience and vision into planning for park future |  | Understanding of patient experiences (past and present), points of view, and vision is fundamental to planning for the future of Kalaupapa NHP. (Draft GMP dated August 2013 includes results of scoping and interviews). |
| **Relationships with Patient 'ohana** | Level and frequency of engagement with 'ohana |  | NPS assists family members with research, sponsors families, and provides personal assistance and guidance during visits. The number of requests is increasing. |
| | Inclusion of 'ohana experience and vision into planning for park future |  | NPS works with consulting parties including patient 'ohana, Native Hawaiian Organizations (NHO) and Ka 'Ohana O Kalaupapa. Relationships have been strengthened through projects and regular consultation. |

## Hawaiian Community – Past, Present, and Future

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Relationship with and inclusion of Native Hawaiian Community** | Level and frequency of engagement; status of the relationship |  | Hawaiian preference is part of NPS hiring practice at the park with more than half of the employees being native Hawaiian. Some publications being developed are bilingual. Inclusion of native Hawaiian culture and vision into all aspects of park management and integral to planning for park future (see Draft GMP dated July 2014; Foundation Document). |
| **Gathering and Hunting Rights** | NPS policies that recognize right and significance |  | Community-based management of ungulates and pigs allows for hunting and minimizes damage to vegetation and cultural features. Requests for specific gathering (salt, plants) by native Hawaiians are accommodated as possible. The park is also beginning to consider a gathering and collecting policy for managing these activities into the future. |

## Resource Brief – Hawaiian Community, Kama`āina displacement from 1866–1895

In order to make way for the approximate 8,000 individuals with Hansen's disease that would be sent to the geographically isolated peninsula, the native Hawaiian population living on the peninsula at that time was ultimately uprooted and displaced in three waves between 1865 and 1895. Evident by the thirty-year time span of kama`āina relocation, such a transition was not easily executed. "After disposing their homes and land holding to the Government, [sic] all the Kama'āinas in Kiokio [Kalaupapa side] did not leave with their fellow Kama'āinas, they remained behind and continued to live on their Kuleanas undisturbed until the year 1895, when the Provisional Government gave notice to these people of taking over all remaining Kuleanas and houses on these privately owned lands and ordered to leave within a specified time…" (Hutchison 1932:29). Furthermore, "…more than once the terse report of the Board of Health [noted] an invasion of Kalaupapa by a fleet of canoes, beaching silently under cover of night and as secretly stealing away before dawn after a visit to former homes." (Damon 1948:57).

While compensation in the form of money or land exchanges were made; this has not erased the fact that such a displacement cut cultural ties and associations of generations of people with the `āina. For Hawaii and Hawaiian families, the psychological, emotional and spiritual healing required as a result of these tragic events in Hawaii's history is ongoing, and is aided by the re-identification and restoration of ancestral ties to those who have lived and those who remain at Kalaupapa. Statistics suggest that an overwhelming number of the state's population, in one form or another, has a connection to Kalaupapa. Today, a number of individuals are still discovering for the first time that they have relations to past and/or remaining Hansen's disease patients at Kalaupapa.

In cooperation with the University of Hawaii, the park is funding historical studies of these events. An archival study focusing on the kama'āina of the peninsula has amassed Hawaiian language newspapers, land exchange records, and other archives. It is proving to be difficult to delineate kama'āina from resident-patient, and thus the work is revealing an intermingling of community on the peninsula. This work is only scratching the surface of many more archival records that are still yet to be transcribed from Hawaiian to English and collated. A second study builds upon the archival work and targets lineal descendants of kama'āina for oral history research. The research is presently underway. The NPS hopes to build relationships with these lineal descendants and make efforts to consult with them on management objectives, such as preservation and conservation treatments regarding the peninsula.

## Sacredness/Spirituality

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Sacredness and Spirituality in all Aspects of Park Life and Work** | Inherent understanding and engagement of all park staff |  | Sainthood of Father Damien and Saint Marianne have a large presence at Kalaupapa NHP, and the park continues to work with religious organizations to support pilgrimages, service trips, and spiritual retreats. Presence and restoration of numerous gravesites allows for connection with family members and contemplation for visitors. Isolation has protected many sacred pre-settlement locations that are renowned throughout the islands. Sacredness and spirituality is a large part of the integrity of feeling and association of the National Historical Landmark district. |
| **Sacredness of Location Pre-Settlement** | Maintaining the undisturbed nature of locations; interpretation of significance |  | Numerous heiau occur on the peninsula; the Damien Road heiau has a wayside marker and was recently cleared of invasive vegetation to be more visible to visitors. Isolation has protected many sacred pre-settlement locations that are renowned throughout the islands. |

## Resource Brief – Interfaith Community

Kalaupapa is characterized by a diversity of faiths and interfaith tolerance among the patient residents. Throughout the history of the settlement, different faiths supported one another as well as the greater Kalaupapa community, and they brought residents together through activities such as choir groups and clubs for men and women. The residents also showed their support of different faiths by going to multiple services each week. Today, many community members still attend both the Protestant and Catholic services on Sunday. Recently in 2009 and 2012, pilgrimages to Rome, Italy by community members of multiple faiths, celebrated the canonization of Father Damien and Mother Marianne.

Faith and community are at the heart of everyday life in Kalaupapa. This is evident in community gatherings that begin with prayers representing multiple faiths and are often spoken in Hawaiian. For non-patient residents living in Kalaupapa, it is essential that they respect the patient residents and honor their community traditions. In general, non-patient residents understand this and accept it as part of the privilege of living in Kalaupapa. As a result, many strong friendships exist among the residents of Kalaupapa. Visitors also acknowledge the uniqueness of the interfaith community and many of them come over to Kalaupapa as part of a service trip or spiritual retreat.

## Cultural Landscapes

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Completeness of Baseline Documentation** | Number of Cultural Landscape Inventories (CLI) completed |  | Two CLIs have been completed for two component landscapes—Kalaupapa and Kalawao Settlements and the Molokai Light Station. A potential native Hawaiian cultural landscape has been identified and will be inventoried and documented when funding becomes available. This undocumented native Hawaiian landscape may be a traditional cultural property. |
| | Number of Cultural Landscape Reports (CLRs) completed |  | There are no completed Cultural Landscape Reports (CLRs) for the park. A CLR for the Kalaupapa and Kalawao Settlements was originally planned in conjunction with the GMP and NHL revision; however, funding has not been secured. A CLR project statement has been drafted and uploaded to PMIS. It is anticipated that a CLR for the light station will also be completed at a later date. |
| **Certified Condition of Cultural Landscapes** | CLI condition assessment |  | The landscape condition of the Kalaupapa and Kalawao Settlements is poor as noted in the 2011 CLI. The most significant threat is deferred maintenance of buildings, structures, and landscape features in a wet, tropical climate. In addition to deferred maintenance, high winds, heavy rains, pest infestation, and vegetation overgrowth also contribute to the poor landscape condition. While some actions, such as rebuilding rock walls, may be improving the condition, there is also deterioration resulting from the inability to maintain historic vegetation.<br><br>The Molokai Light Station landscape is in fair condition according to the 2011 CLI. The area shows clear evidence of structural deterioration, pests/diseases, erosion, deferred maintenance, exposure to the elements, and encroaching invasive vegetation. |
| **National Register Eligibility** | Cultural landscapes with adequate National Register documentation |  | Two cultural landscapes have been determined eligible for listing on the National Register and are contributing features to the National Historic Landmark district. A revised NHL nomination is currently underway and should include additional information about the character-defining features and significance of the cultural landscapes, as noted in the CLIs. Much of the information provided in the CLIs can be used for the updated NHL nomination. |

## Historic Structures

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Kalaupapa National Historical Park is responsible for the preservation and maintenance of over two hundred historic buildings, nearly one hundred historic structures, and nearly twelve hundred historic grave markers. Despite this impressive array of historic buildings and structures, the number of buildings/structures that the park currently maintains is significantly lower than when the park was established in 1980. At that time, the park was given over four hundred historic buildings—several of which were severely deteriorated and beyond repair. The park prioritized the buildings and directed limited funds to the stabilization and preservation of approximately two hundred buildings. Nevertheless, the buildings and structures that remain at Kalauapapa today are a fraction of those that were present historically, signifying a substantial loss of historic fabric. Nearly all of the buildings, structures, and grave markers that remain today are part of the Kalaupapa National Historic Landmark (NHL) district. The district is significant for its architecture, community planning, religion, social history, and archeology from 1866 to the present. The district was listed as an NHL in January 1976.

To maintain the buildings and structures of the NHL district, the staff works through ongoing programs for roofing, painting, carpentry, and cemetery marker preservation. Specialized materials and skills are required to perform this work in compliance with the Department of the Interior's Secretary Standards for Treatment of Historic Properties. Stabilization, preservation, restoration and rehabilitation are outlined as appropriate treatment options within the Standards, and the park often uses a combination of treatments depending on the building and use. In general buildings are repaired as closely as possible to their historic designs and configurations, using materials and methods which maintain their historic appearance and character in order to comply with the Secretary of the Interior's Standards for Treatment of Historic Properties.

At the heart of the park building preservation program is an 8-person historic preservation crew. Funded by a combination of project and base funds, the crew prioritizes needed work to buildings based on health, safety, occupancy, and use. The crew regularly roves around the park, working on historic buildings to improve their condition. However, despite the in-house preservation crew, much stabilization, repair, and rehabilitation work remains. Deferred maintenance on buildings owned by the Department of Health and patient-residents contribute to a large backlog of stabilization and preservation work, as outlined in the draft GMP. Despite this, the in-house preservation crew regularly works to maintain NPS-owned buildings and structures and has increased the condition of those buildings.

Preservation of the tangible historic elements of Kalaupapa provides the means to convey the stories, and the intangible elements, to park visitors.

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Documentation of Significant Historic Structures** | Number of Baseline Documents Completed |  | Baseline documentation for historic buildings and structures is largely in the form of nearly 1,500 List of Classified Structures (LCS) records and the existing NHL nomination. All buildings and grave markers have been evaluated and are included on the LCS database. The NHL nomination includes building descriptions of the more prominent buildings, but less prominent buildings are not included. The buildings and structures of the Molokai Light Station are listed on the National Register of Historic Places, but the nomination is outdated. Approximately 100 buildings have HABS/HAER/HALS documentation (mostly photographs with limited drawings). Buildings and structures are also noted to some degree within the CLIs for Kalaupapa and Kalawao Settlements and the light station. All buildings and structures need to be reevaluated for historical context, have defined periods of significance, and have updated building descriptions, drawings, and photographs. Updated baseline documentation will be important in the future as the park moves forward with treatment and stabilization options outlined in the draft GMP. |

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| | Number of Treatment Documents Completed |  | The park has completed four Historic Structures Reports (HSRs) for its historic buildings/structures. An HSR for St. Philomena (Father Damien's Church) was completed in 1985, an HSR for the pali trails was completed in 1991, and an HSR was done for the Molokai Light Station in 2001. Most recently, an HSR was completed for Bishop Home Convent, Chapel, and Cottages; AJA Hall and Outbuilding; Visitor Quarters; and Staff Row Dormitory in 2004. Although these documents are titled as HSRs, none of them are very detailed or meet NPS standards. Completed HSRs need to be updated with additional research pertaining to the building histories and updated with existing conditions drawings and photographs. Additional HSRs are needed for many of the residences, churches, and social halls. |
| **National Historic Landmark District** | Completeness of documentation |  | All buildings and structures that date from 1866 to 1969 are contributing to the National Historic Landmark district. The existing NHL district nomination for Kalaupapa was completed in 1975 and listed in 1976. While more detailed than most NHL nominations from that time, the current documentation does not meet today's NHL standards. A revised NHL nomination was planned in conjunction with the completion of the CLIs and GMP and is currently underway. It is anticipated that the revised NHL nomination will include updated narrative descriptions for all contributing resources and updated period of significance. |
| | Historic Integrity Assessment |  | The NHL district retains integrity of location, setting, design, materials, workmanship, feeling, and association. The settlements of Kalawao and Kalaupapa retain their original locations. Integrity of design, materials, and workmanship are largely retained through the numerous residences, churches, outbuildings, and other built features throughout the area. Integrity of setting and feeling have been somewhat altered with the loss of historic buildings over time, encroachment of vegetation, and loss of viewsheds to the ocean. However, this loss is not enough to detract from the overall integrity of the district, which retains a high degree of association as a settlement for Hansen's disease patients of the 19th and 20th centuries. |
| **Kalawao Structures** | LCS condition assessment for buildings and churches |  | The condition of Siloama and St. Philomena churches are good based on recent condition assessments using the LCS methods and standards. Of the two other buildings at Kalawao, one is in good condition, and one is in poor condition. |
| | LCS condition assessment for other structures |  | The 13 other historic structures at Kalawao include historic building ruins, stone walls, the east coast pier, sun-dial, and picnic shelters. Four structures are in good condition, 7 are in fair condition, and two are in poor condition. Structures have been mapped, stabilized, and photographed, and recent improvements have been made to some of the stone walls. |
| | Completeness of documentation |  | Documentation includes LCS records and several historic photographs of the Kalawao Settlement. HABS/HAER/HALS documentation has also been completed for Siloama and St. Philomena churches. Documentation will be updated as the NHL nomination is revised. |

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| **Kalaupapa Residences** | LCS condition assessment |  | The 112 historical residences at Kalaupapa, many of them built by patient-residents, included dormitories, visitor houses, and residences. Based on LCS assessments, 56 are in good condition, 40 are fair, and 16 are in poor condition. |
| | Completeness of documentation |  | Documentation includes LCS records, historic photographs, and HABS/HAER/HALS documentation. Documentation will be updated as the NHL nomination is revised. A historic structure report is needed for many of the historical residences, and evaluations are needed for the interior of the buildings. |
| **Kalaupapa Churches** | LCS condition assessment |  | The four Kalaupapa churches are all in good condition. Two churches will have new roofs and paint, and one has had a complete rehabilitation in 2006–2007. |
| | Completeness of documentation |  | Documentation includes LCS records, historic photographs, and HABS/HAER/HALS documentation. Documentation will be updated as the NHL nomination is revised. Historic structure reports are not available for several of the churches. |
| **Kalaupapa Sheds and Garages** | LCS condition assessment |  | Many of the sheds and garages were built by patients with a variety of materials and methods, which adds to their historical value. Fifteen of the sheds and garages are in good condition, 18 are in fair condition, and 23 are in poor condition. The park is in the fourth year of a project to preserve the historic integrity of sheds and garages and other buildings in the park. Assistance has been provided by a group of volunteer tradespeople from Honolulu. Many structures are still being uncovered as vegetation is thinned. An additional benefit is that the buildings can be put back into use. |
| | Completeness of documentation |  | There is not a lot of documentation for sheds and garages, but in some cases, not much is needed. A Documentation Plan has been completed for storm-damaged structures. Photo-documentation of work is a standard procedure for work completed. |
| **Kalaupapa Social Halls** | LCS condition assessment |  | Paschoal Hall is in good condition based on LCS assessments, and McVeigh Social Hall, Damien Hall, Latter Day Saints Parish Hall, and Kanaana Hou Church Parish Hall are all in fair condition. Paschoal Hall has been rehabilitated, and the interior painting in McVeigh has been completed after the 2004 rehabilitation of the exterior. Rehabilitation includes bringing structures up to code. The Catholic Social Hall has also been recently rehabilitated; Protestant Social Hall is functional but needs repair. |
| | Completeness of documentation |  | Documentation includes LCS records, historic photographs, and HABS/HAER/HALS documentation. Documentation will be updated as the NHL nomination is revised. No Historic Structure Reports have been done for social halls. Many photographs are available (both interior and exterior), but need further organization. Additional documentation is needed to inform rehabilitation work and to document structure history. |

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| **Kalaupapa Other Buildings** | LCS condition assessment |  | Other buildings at Kalaupapa include the Post Office, Fumigation Hall, Separation House, AJA Hall, Ocean View Pavilion, Kalaupapa Store, Gas Station, Meat House, Slaughterhouse, Old Stone Church (Jail), Lighthouse, and Fuesaina Bar. Approximately half of these structures are being actively maintained and improved by NPS or the State of Hawaii. 22 are in good condition, 13 fair, and 18 are in poor condition. |
| | Completeness of documentation |  | Documentation includes LCS records, historic photographs, and some HABS/HAER/HALS documentation. Documentation will be updated as the NHL nomination is revised. Photo documentation is available for other buildings at Kalaupapa, but other formal documentation is minimal, with the exception of a Historic Structures Report for the Lighthouse (Chapman 2001). |
| **Other Structures** | LCS condition assessment |  | Other historical structures include Portuguese oven, several rock walls, stone gateways and entry piers, the landing pier, boilerhouses, and livestock and poultry enclosures. Many are part of ongoing improvement processes, whereas others have not been touched. Based on LCS, the condition of 28 structures is good, 15 are fair, and 4 are poor. |
| | Completeness of documentation |  | Documentation exists for some items. A full list of descriptions and photographs will be completed in the future as part of the NHL update. Stone walls have all been photographed and mapped manually and geospatial data were taken in 2012. |

## Resource Brief – Rehabilitation of Sheds and Garages

Many of the garages, sheds, and other outbuildings in the settlement were built by patients at Kalaupapa during the period of exile, (as opposed to buildings built by the State {or Territory} of Hawaii Department of Health) and are therefore vital contributors to the NHL district. The buildings were generally constructed utilizing materials which were second hand (having been previously used in other structures) since there was virtually no opportunity for the purchase and shipment of new building materials by the patients. The use of disparate materials is a character-defining feature of these structures, which indicates the ingenuity and determination of the patients who built them to live as "normal" a life as they could in their very adverse living situations. An example of a garage rehabilitation is shown in Figure 10.

**Figure 10. The M3 garage showing before (left) and after (right) rehabilitation work was conducted.**

# Resource Brief – Rock wall repair

Hawaiian archeology from pre-contact to the historic period is characterized by dry-set mortar-less rock structures. Kalaupapa National Historical Park remains home to thousands of structures dating from approximately 900 years BP (before present), including house structures, heiau (temples), canoe sheds, temporary camps, ahupua‘a (land division) walls, rock lined trails, animal pens, plant enclosures, etc. Many of the structures used by kama‘āina prior to the arrival of the patient-residents were re-used or repurposed during the times of the settlement, and offer unique material evidence of activities within the settlement. The types and size of pōhaku (rock) may indicate the availability of resources and labor investment in early features, as well as changes in land use. The walls often contain material evidence of earlier times, including tools, historic bottles, anchor weights, and household items from both the pre-contact and historic period.

Kalaupapa National Historical Park supports the preservation of the rock walls in the park by collaborating with Hawaiian masons skilled in ho‘oniho (dry set masonry) to stabilize failing rock walls (Figure 11). The National Park Service in Hawaii gained the valuable resource of skilled masons following the Earthquake Project, a multi-year project to address the Heiau collapse at Pu‘ukoholā Heiau NHS (Hawaii Island) following the earthquakes of 2006. The project served as an impetus and informal program to perpetuate the transmission of dry set masonry skills between expert masons and apprentices. The masons have come to Kalaupapa National Historical Park annually to address specific rock wall structures, and to train park staff and community members in the methods and technology of ho‘oniho, including cultural protocols.

In a place rich in traditional Hawaiian archeology and history, the stabilization work and perpetuation of Hawaiian cultural skills have become an important part of the living history of the park. The work on the rock walls represents a dynamic, collaborative approach to site stabilization, and continues to build capacity within the park and Hawaiian community to mālama (care for) important cultural resources.

**Figure 11. Collapsed wall section with vegetation overgrowth (left) and after (right) repair work was conducted.**

## History

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Completeness of Baseline Documentation** | Completeness of historical research and documentation |  | The accumulation of primary and secondary sources and research pertaining to Kalaupapa settlement period is robust, but research pertaining to the pre-settlement period remains sparse. Information is increasing as documents are translated from the Hawaiian language. Research related to land and ownership, as well as church records, is increasing. Periodic research permits are granted for archeological work. The NPS has also completed a historic resource study (HRS) for the settlement period; however, the document needs to be updated and expanded. Completed in the 1980s, it no longer meets NPS standards. A park administrative history was funded in FY13; however, the document remains in draft form and needs major edits. An archival project is also underway in partnership with the University of Hawaii to find information related to pre-settlement kamaʻāina. Park staff regularly scans the State of Hawaii Archives for additional research data. |

## Museum Collections

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Museum Facility Integrity** | Museum facility standards met |  | A new museum facility at the park was completed in 2011, with HVAC and freezers, completed shortly thereafter. Implementation of the security system is scheduled for completion within the next several years. The facility meets the NPS Museum Handbook standards. |
| **Completeness of Curation** | % of objects accessioned and catalogued;<br>Data quality audits |  | The current Collection Management Report for the park museum collection indicates that of the 364,000 items in the collection at this time, 309,000 items have been accessioned and cataloged into the Interior Collections Management System. The collection is continually growing due to donations and additional research which accounts for the backlog that has been acquired by the Cultural Resource Management staff for several years when there was no full-time museum staff to process the items. |
| **Collection Condition** | Overall condition of the collection based on condition survey and improvements to storage |  | The collection is in fair/good condition based on the most recent Collection Condition Survey in 2009; however, only 75% of the collection was surveyed at that time. Conservation treatment projects for museum objects have been submitted for both NPS project and park friends group funding. Since 2009, funding was obtained in 2011 to complete and upgrade the storage facility to meet NPS Museum Standards. Improvements to the museum storage facility are in process to increase security and other potential threats. The condition and status of the museum collections is considered a key park-wide issue. The museum collections are identified as a fundamental resource in the forth-coming park General Management Plan. |
| **Completeness of Baseline Documentation** | Adequate and current baseline documentation |  | The park has a current Scope of Collections Statement, Collection Condition Survey, Collections Management Plan, Housekeeping Plan, Integrated Pest Management Plan, and Security Survey. The majority of these documents date from the mid-2000s and are up-to-date.<br><br>The park needs to address the completion of Fire Protection Plan, Collection Storage Plan, and implementation of the security system. |
| **Historic Houses and Locations** | Facilities meet NPS exhibit or storage standards |  | Includes Kenso Seki house, Edward Kato art studio, and lighthouse garage (storage for Fresnel lighthouse lens). These three historic buildings are planned for extra museum storage and interpretive exhibit space. All buildings have been stabilized and rehabilitated, and are currently used for general storage. Plans have not been completed yet for museum storage or interpretive exhibits. |

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| **Collection Accessibility** | Portion of collection accessible for research (NPS and public; on-site and electronic access) |  | Areas targeted for accessibility include photographs, photographs of objects, objects, archives, natural history collections, and oral history recordings. Many materials have been digitized for access (NPS Web Catalog) by users off-site or those who can't travel to park; however, some content is sensitive and requires restricted distribution. Copyright and permissions issues also limit distribution of some materials. |

# 2.3. Visitor Experience

## Visitor Numbers and Visitor Satisfaction

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Number of Visitors** | Number of visitors per year |  | The estimated number of visitors to the park in 2012 (including visitors to the overlook at the top of the cliffs) was 58,875, which is 14% higher than the annual average of 51,455 visitors for the prior 10-year period of 2002–2011 (NPS Public Use Statistics). Of this total, there were 8,865 registered visitors within the settlement, 49,410 visitors at the overlook (within the park boundary), and 600 visitors on the rainforest Jeep tour. The number of visitors to the Kalaupapa settlement is limited by State law to 100 per day. Visitor transportation options to the park are somewhat limited as the park is only accessible by hiking, guided mule tours, or charter plane. The percentage of visitors arriving by foot, mule, or plane is unknown. |
| **Visitor Satisfaction** | Percent of visitors who were satisfied with their visit |  | The percent of visitors who were satisfied with their visit in 2011, based on the standard NPS survey, was 76%, which was the lowest value reported for the 311 national parks that were surveyed. Issues noted as part of the visitor satisfaction survey were difficulty in accessing the park, the high cost of the tour, and the poor condition of visitor amenities at the topside facilities and in other areas of the park (Papadogiannaki et al. 2011). Low visitor satisfaction may indicate an opportunity for the park to educate visitors about what to expect when they arrive. |

## Sense of Place

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Natural Beauty and Serenity** | Isolation and remoteness |  | Kalaupapa NHP is a beautiful expanse of green, fertile land surrounded by sea cliffs. The beauty and peacefulness of the land conflicts with the events that occurred here over the years. It is the combination of the beauty and the sadness that defines this place and the natural beauty and serenity is a major contributing factor to the sense of place and integrity of the NHL district. Overflights and increased boat traffic could be potential threats, but at present have been reduced or halted in recent years. In the long-term future after the patients are gone, visitors to the peninsula will likely increase, reducing the sense of isolation and remoteness. |
| | Natural sounds, dark night skies |  | Natural sounds include birds, trade winds in trees, wildlife, and surf. There is a lack of urban noise and light, the latter of which contributes to the generally dark night skies. Overflights and increased boat traffic could be potential threats, but at present have been reduced in the last decade. |
| | Views |  | Views of cliffs, lack of development, open coastline and ocean, and few people define Kalaupapa NHP. Increased boat traffic or development could be potential threats, but have been reduced or halted in recent years. Invasive vegetation has altered some views throughout the park (e.g., view from crater to the settlement); however, important vistas and views are occasionally cleared and maintained by volunteers. |
| **Built Environment** | Character of the Settlement |  | The park possesses a sense of stepping back in time. The settlement reflects older Hawaiian architecture and town life. Mature, heritage trees (purposefully planted) and the lack of modern conveniences and development are also key character elements of the built environment. However, the loss of some historic buildings and heritage trees over time, encroachment of invasive vegetation, and loss of viewsheds has impacted the historic character and could potentially impact sense of place in the future. |

## Resource Brief – Sense of Place

Spirit and sense of place are the unique characteristics and cherished qualities of a place that are defined and valued by the people associated with that place—in this case, the last surviving Hansen's disease community who call the peninsula home, some of whom have lived at Kalaupapa for over 70 years. In addition to the patients, there are the resident kōkua (state and federal workers) who work and live on the peninsula. In the long-term future after the patients are gone, visitors to the peninsula will be the park's main audience.

The aesthetics of a cultural landscape directly relate to the visual and auditory elements within that landscape. Besides being connected to the visual landscape, spirit of place is also connected to the ambient environment or soundscape. All of the surviving patients agree that Kalaupapa peninsula is a "sacred" as well as a "spiritual" place. Many visitors to Kalaupapa have also expressed this sentiment. As a sacred and spiritual place, the visual aesthetics and the ambient soundscape are both important elements to the association, feeling, and setting of the cultural landscape and NHL district. At Kalaupapa, the unusually still silence—especially at night—and at other times the natural elements like the sounds of the wind and the ocean are all part of the ambient soundscape. These elements evoke at different times feelings and emotions such as sacredness, spirituality, of being alone in a remote place, a sense of heaviness (kaumaha), of relating to the emotional pain and suffering that many "feel" when at Kalaupapa. It allows one to engage, interact with, and learn from the landscape in a very real and personal way by connecting to the incredibly moving and inspiring history of Kalaupapa.

## Educational Values

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Education and Outreach Programs** | Number of programs and participants |  | School programs emphasize Hawaiian history, natural and cultural resources, and issues of social justice. The park hosts school excursions to the park—primarily by older students (high school and college). In the past, very few educational and outreach programs have been given. Even today, the NPS does not offer any regularly scheduled interpretive programs or activities because of the restricted nature of visitation to the park and because private, Hansen's disease patient-owned tours are offered. However, the park recently hired an interpretation specialist to develop education and outreach programs. Educational programs are currently completed through partners, often in conjunction with service learning and volunteer efforts. In FY14, the first-ever Teacher Institute was held at the park. Approximately ten educators traveled to the park for a week to learn about park resources and how to incorporate them into educational curriculum. The park actively participates in local career days, promoting careers within the NPS. In addition, the park has ongoing informal education and outreach. The park brochure, park fact sheet, and park website have recently been updated. New site bulletins were also created for a variety of topics. There is great potential to increase educational outreach. |
| **Volunteer Programs** | Number of participants and hours |  | The Volunteers In Parks (VIP) program at Kalaupapa NHP has continued to grow in both numbers and scope of work being done. Examination of the VIP program's past six years indicates the number of volunteers at Kalaupapa has steadily increased. Since the VIP program began in 2008 the number of recorded VIPs at the park has grown by 300%. The number of recorded VIP hours has grown by 387%. In FY13, the park supported 252 volunteers who completed a total of 11,068 hours of work in administration, cultural resource management, maintenance, and natural resource management. In FY14, the number of volunteers decreased to 245, but the number of hours increased to 13,436 hours. Volunteers must be 16 years or older. Volunteer groups are given background on overall park history, significance, and features in addition to their specific area of focus. |

## Community and Partnerships

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| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Inclusion of Island Community** | Employment of native Hawaiians |  | More than half of the park employees are native Hawaiians, and the park continues to provide local employment opportunities. Efforts are underway to increase the number of native Hawaiians in management positions. The park has provided exposure to different career paths. |
| | Special events |  | Special events include Earth Day, Night of Aloha, Rededication of Paschoal Hall, Celebration events for Saint Damien and Saint Marianne, and rock wall repair workshops (Hapai Pōhaku—"carrying stones"). With the addition of an interpretive specialist to the park staff, the number of events is likely to increase. Many events are community-based with NPS participation; other events are supported or sponsored by NPS. |
| **Other Partnerships (formal)** | Currency and effectiveness of partnerships |  | Other formal partnerships include churches, state agencies, University of Hawaii, lease agreement with Department of Hawaiian Homelands, Pacific Historic Parks. Partnerships are stable and mutually beneficial. There is great potential to increase partnerships in the future. |

# 2.4. Park Infrastructure

## Overall Facility Condition Index

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The National Park Service uses a facility condition index (FCI) to indicate the condition of its facilities and infrastructure. FCI is the cost of repairing an asset, such as a building, road, trail, or water system, divided by the cost of replacing it. The lower the FCI number, the better the condition of the asset. The condition of the buildings and other infrastructure assets at each park is determined by regular facility inspections, or "condition assessments", including daily informal inspections and formal yearly inspections. Deficiencies identified from these assessments are documented in the NPS Facility Management Software System and the cost for each repair determined. Repairs that cannot be completed within the year count against the condition of a structure. The total cost of these deferred repairs divided by the total cost to replace the structure results in the FCI, with values between 0 and 1 (the lower the decimal number, the better the condition). The FCI is assigned a condition category of good, fair, poor, or serious based on industry and NPS standards. Deferred maintenance projects that require additional funding are identified based on FCI. The FCI does not take into consideration whether a building is historic. Planned preventive maintenance on critical components occurs during the year, using a park's base budget. For additional information about how park managers use information about the condition of facilities and infrastructure to make decisions about the efficient use of funding for maintenance and rehabilitation activities at the park, click here.

| Asset Category | Number of Assets 2008 / 2013 | FCI 2008 / 2013 | Condition Status/Trend | Rationale |
|---|---|---|---|---|
| **Buildings** | 284 /289 | 0.072 / 0.039 |  | Buildings at Kalaupapa NHP are owned and operated by multiple groups, including the State of Hawaii, private owners, churches, NPS, and other federal agencies. Most of the park buildings are historical structures; the NPS tracks their condition and has cooperative agreements with some owners to maintain the historic structures. Threats include termites, moisture, deferred maintenance, and climate change/weather events. The park undergoes a cyclical integrated pest management (IPM) program to deal with the pests as well as other regular stabilization treatments. The level of repair and rehabilitation varies depending on building ownership, management, and building significance. |
| **Trails** | 6 / 8 | 0.195 / 0.254 |  | Two of the bridges along the trail to "topside" Molokai are rated as being in serious condition and are to be replaced. Bridge repair and replacement is planned in FY15. |
| **Waste Water Systems** | 0 / 13 | ------ / 0.035 |  | 13 new septic tanks have been installed in recent years. All waste water systems were included in a 2014 infrastructure inventory study. The study provided minimum recommendations related to repairs, rehabilitation, and/or replacement. |
| **Water Systems** | 1 / 5 | 0.071 / 0.079 |  | Water tanks are scheduled to be completely rehabilitated and disinfected. The entire water system was included in a 2014 infrastructure inventory study, which outlined minimum recommendations related to repairs, rehabilitation, and/or replacement. |

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| **Unpaved Roads** | 9 / 19 | 0.123 / 0.002 |  | All unpaved roads listed in the FMSS database are in good condition. However, some unpaved roads, including Damien Road and the crater road are in need of additional gravel and grading to fill in low spots. |
| **Paved Roads** | 0 / 10 | ------ / 0.003 |  | Eight of the paved roads listed in FMSS are in good condition. Fence Line Road is in poor condition. |
| **All Others** | 25 / 60 | 0.080 / 0.082 |  | Other structures include fences and walls; the radio, telephone, and electrical systems; monuments and crosses, and the solid waste management system. In 2014, the park underwent an infrastructure inventory and study that verified the condition and capacity of the existing electrical system and made minimum recommendations related to repairs, rehabilitation, and/or replacement. The inventory study will also research ownership of the electrical system. As the State of Hawaii Department of Health incrementally reduces its operations due to declining patient numbers, they will transfer all operational responsibilities and costs to NPS. The park's largest remaining responsibility will be to assume the settlement electrical system. NPS presently does not have the staff or the budget to assume this new burden, but both have been requested. |

## Energy Consumption

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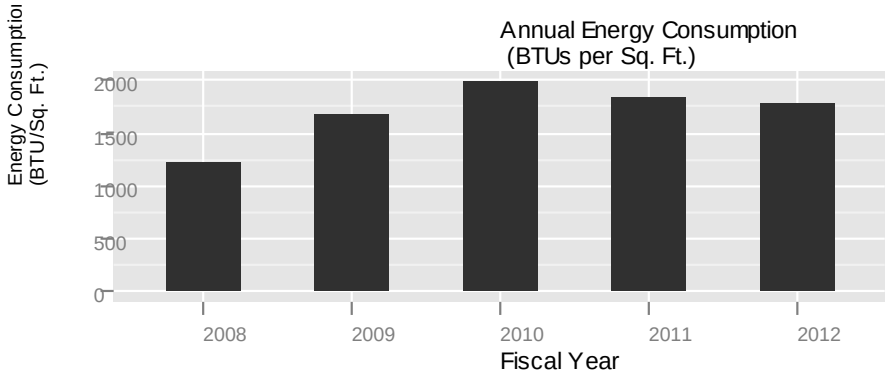
The production of energy to heat, cool, and illuminate buildings and to operate water utility systems is one of the largest contributors to greenhouse gas emissions in the United States. The National Park Service is committed to improving facility energy performance and increasing its reliance on renewable energy sources. The National Park Service has a goal to reduce Servicewide building energy consumption per square foot of building space by 35% by 2016 from the baseline set in 2003 (NPS Green Parks Plan 2012).

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Energy Consumption** | BTUs per gross square footage of buildings | | Energy usage (BTUs per gross square footage of buildings) at the park in 2012 was 5.9% higher than the average for the previous 4 years (Source: NPS Annual Energy Report). The park is exploring alternative energies to offset energy consumption. However, careful consideration should be given to the NHL district and viewsheds throughout the park. |



## Water Consumption

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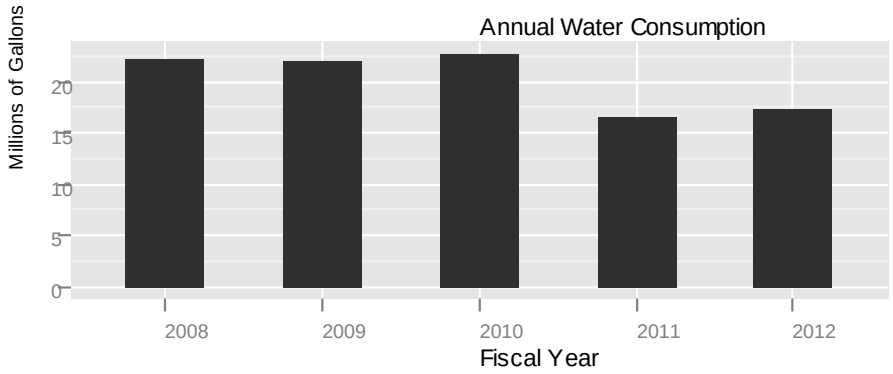
The national and global supply of fresh water has diminished in recent decades, and this trend is likely to continue due to drought, other climatic changes, and human developments. To contribute to the responsible use of freshwater supplies, encourage groundwater recharge, and protect water quality, the National Park Service is improving its efforts to conserve water, reuse gray water, and capture rainwater, and has set a goal to reduce non-irrigation potable water use intensity by 30% by 2020 from the baseline set in 2007 (NPS Green Parks Plan 2012).

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Water Consumption** | Millions of gallons | | Water consumption at the park in 2012 was 16.7% lower than the 4-year average for 2008–2011 (Source: NPS Annual Energy Report). Shower heads, toilets, and aerators in residential houses have been swapped out with low-flow models whenever possible. |



## Park Carbon Footprint

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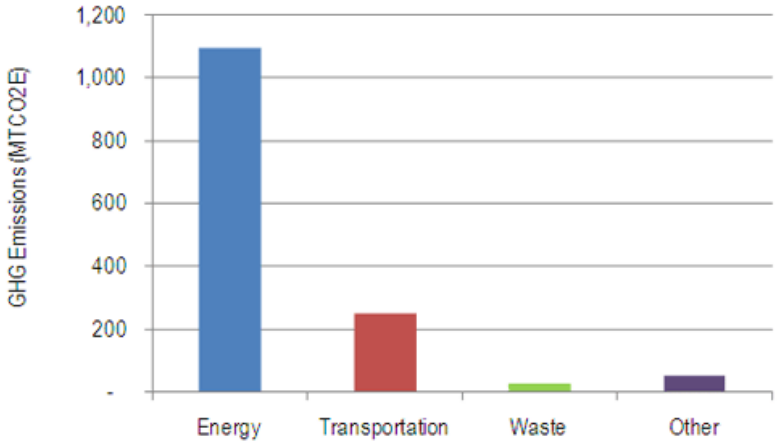
| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Greenhouse Gas Emissions** | Metric tons of $CO_2$ equivalent ($MTCO_2E$) | | Kalaupapa National Historical Park belongs to a network of parks nationwide that are putting climate friendly behavior at the forefront of sustainability planning. The park's climate action plan describes commitments to reduce emissions of greenhouse gases at the park by 2016. Emissions from park operations, which exclude visitor and concessioner activities, totaled 224 $MTCO_2E$ during the 2008 baseline year, which is roughly equivalent to the emissions from the energy use of 19 households each year. The vast majority of the purchased electricity in the park is used by State of Hawaii Department of Health. |

## Profile – Park Carbon Footprint

Carbon footprint is measured by greenhouse gas (GHG) emissions resulting from the combustion of fossil fuels for transportation and energy (e.g., boilers, electricity generation), the decomposition of waste and other organic matter, and the volatilization or release of gases from various other sources (e.g., fertilizers and refrigerants). A decreasing carbon footprint indicates the park is striving to reduce its impact on the climate change through mitigation efforts. In 2008, the baseline GHG emissions were set within Kalaupapa National Historical Park totaled 1,421 metric tons of carbon dioxide equivalent ($MTCO_2E$). This includes emissions from park and concessioner operations and visitor activities, including vehicle use within the park. To put this in perspective, a typical U.S. single family home produces approximately 12 $MTCO_2$ per year (U.S. EPA 2011). Thus, the emissions from park operations are roughly equivalent to the emissions from the energy use of 118 households each year. The largest emission sector for Kalaupapa National Historical Park is energy, totaling 1,093 $MTCO_2E$ in 2008. Purchased electricity comprises 94 percent of emissions from energy and 72 percent of total park emissions. The vast majority of the purchased electricity in the park is used by State of Hawaii Department of Health. Emissions from park operations, which exclude visitor and concessioner activities, totaled 224 $MTCO_2E$. Park operations emissions mainly result from stationary combustion and purchased electricity (52 percent combined), though transportation is a significant source as well (28 percent). The graph above, taken from the park's Climate Action Plan, shows our baseline emissions in 2008 broken down into sectors, including visitor travel. Learn more.




Kalaupapa National Historical Park intends to:

- Reduce 2008 energy GHG emissions from park operations by 20 percent by 2016.
- Reduce 2008 transportation GHG emissions from park operations by 20 percent by 2016.
- Reduce 2008 waste GHG emissions from park operations by 10 percent by 2016.
- Reduce total 2008 park GHG emissions, including concessioners, by 5 percent by 2016.

To read more about what we are doing at Kalaupapa National Historical Park about climate change, check out our Action Plan!

# Resource Brief – Solid Waste Management and Sustainability Program

The remote location of Kalaupapa National Historical Park (there are no roads that connect it with other parts of Molokai) and the tropical climate present numerous challenges for disposing of solid waste and hazardous materials. Until recently, about 79% of the solid waste generated in Kalaupapa was buried in two landfills on the peninsula, and the remaining 21% was shipped out annually on a barge for recycling. These processes, along with past practices, have led to some degradation of the historic resources, natural resources, and visitor experience. Beginning in 2010 and 2011, the landfills were closed and the park began a Solid Waste Management and Sustainability Program to develop and encourage appropriate alternatives to the landfills such as recycling and composting (Figure 12). In FY13 alone, the program resulted in 195,358 pounds of solid waste being recycled and disposed of in a sustainable way. In addition, many pallet loads of hazardous materials that had been stored in the Kalaupapa community for decades, such as car and truck batteries, waste oil, waste fuel, and chemical waste, have also been safely and properly disposed. The goal of the program is an integrated solid waste management system that results in minimal impacts to the land, water, and people of Kalaupapa.

An important component of the Solid Waste Management and Sustainability Program was the establishment of an education and outreach program for the resident community and employees of the National Park and Hawaii Department of Health. The community members embraced the idea of being sustainable. The park has begun to purchase bio-based alternatives for automotive and equipment oil, and has also begun to purchase "green" cleaning agents and eco-friendly paints and herbicides to contribute to the protection of public lands.

Numerous beach clean-up projects were held within Kalaupapa NHP and community members as well as state and federal workers and volunteer groups were invited to join in. Within the last three years, a total of 8,900 pounds of beach debris has been removed. As a result of the leadership of the "Green Team", Kalaupapa NHP was chosen for the State of Hawaii – Keep America Beautiful Award.

**Figure 12. Employees processing waste and recyclable materials and the Kalaupapa National Historical Park recycling center.**

# Chapter 3. Summary of Key Stewardship Activities and Accomplishments

## Activities and Accomplishments

The list below provides examples of stewardship activities and accomplishments by park staff and partners to maintain or improve the condition of priority park resources and values for this and future generations:

**Natural Resources**

- Established plant nursery to raise common native and threatened or endangered plants for restoration and reintroduction efforts.
- Continued maintenance of fences to keep invasive ungulates from sensitive areas. Installed and maintained 15 miles (24 km) of fence in these management units. No more fence construction is envisioned, other than wingfences to aid animal capture. Focus is now on removing animals from management units.
- Increased use of technology and diverse methods of animal control are resulting in more successful feral ungulate control.
- Targeted invasive species in sensitive areas outside of the settlement. Cleared 3 acres of invasive shrubs in the seasonal wetland. Sweep and maintain 0.7% (790 of 101,118) infested acres free of target weed species, and eradicated satellite populations of coastal target noxious weeds.
- Completed assessment of Rare Plant Stabilization program. Maintained a total of 7 fenced out-planting enclosures (11.5 acres) for rare and native plant stabilization.
- Tested methods of reintroducing 5 threatened or endangered plants into protected management units including coastal strand vegetation.
- Continued implementation of the feral cat spay neuter program. There are fewer cats in the settlement, and those remaining are healthier.
- Completed inventory of heritage trees and medicinal trees.
- Continued inventory and monitoring of natural resources by Pacific Island Network I&M Network. Implemented the NPS I&M protocols for benthic communities, marine fish, water quality freshwater animals, climate change, and terrestrial plant communities.
- Continued monitoring of sea level and ocean temperature as part of climate change monitoring. Maintenance and installation of weather stations to monitor long-term weather patterns. Continued monitoring of water flow and temperature in one perennial and four intermittent streams.
- Continued monitoring and management of threatened and endangered species, both marine and terrestrial. The park contains well over 35 threatened or endangered and candidate species including marine [cetacean, sea turtles, and coral] and terrestrial [plants, invertebrates, birds, and a mammal (bat)] organisms. While location and condition of low elevation terrestrial plants are well known, more surveys are needed at higher elevations to identify rare plants and surrounding conditions in the rainforest.
- Conducted population and habitat-use studies of the critically endangered Hawaiian monk seal in partnership with NOAA. Documented 83 births in the park since 1997 and identified critical habitat areas for pupping.
- Continued park specific projects to expand our understanding of the park marine resources as part of the National Coral Reef Program. Examined physical oceanographic characteristics (tides, currents, and waves) offshore of the park. Determined current patterns and the tidal correction for this area in the state of Hawaii.
- Continued support of outside researchers working within the park boundaries. Documented Kauhakō Crater Lake overturning event in 2011 and subsequent changes. Monitored gas and water levels as well as temperature in partnership with the University of Hawaii-Mānoa. Established baseline population levels and developed a monitoring protocol for a highly prized intertidal resource species (Hawaiian Limpet or ‘opihi) in partnership with the University of Hawaii-Hilo.
- Added Kalaupapa NHP to the National list of Marine Protected Areas (MPAs) under the NOAA MPA Center for its natural and cultural significance.
- Continued environmental support of community improvement projects. Conducted biological pre and post assessment for harbor improvement project in 2012 to estimate impact on coral communities. Conducted biological pre and post assessment of the community cesspool upgrades.
- Maintained fuel reduction program to protect the historic settlement and its occupants. Cleared 40 acres of invasive shrubs to improve fire safety within settlement, also to protect nursery and gardens with threatened and endangered plants. While additional clearing is necessary (approximately 50 acres), decline in funding is making it difficult to maintain currently cleared areas.
- Assisted with developing the affected environment section of the park’s General Management Plan for the Environmental Assessment.
- Updated language for the National Natural Landmark (sea cliffs).

**Cultural Resources**

- Continued maintenance of collections museum that archives documents and objects from the Hansen's disease settlement period.
- Collected and maintained objects from native Hawaiians before settlement of Kalaupapa as part of museum archival project.
- Continued oral history project to document stories from remaining Hansen's disease patients.
- Assisted with developing the cultural resources sections of the park's General Management Plan.
- Completed two cultural landscape inventories for two component landscapes, including the Kalaupapa and Kalawao Settlements and Molokai Light Station.
- Initiated a revision to the NHL nomination to meet current documentation standards and incorporate information from the draft GMP and completed CLIs.
- Continued condition assessments of archeological sites through ASMIS.
- Initiated an administrative history document for the park, currently in draft form.
- Hosted and supported student interns in their development of research skills and general museum management skills.
- Coordinated ongoing stabilization and repair of cemeteries and headstones.
- Continued condition assessments of historic buildings, structures, and gravestones through LCS database.
- Hosted educational and cultural events, such as the Asian/Pacific Islander Heritage festival.
- Established an orientation program for new employees to focus on cultural awareness.
- Stabilized historical pre-settlement structures by removing invasive plants in conjunction with the natural resources division.
- Promoted career opportunities and educational programs with schools visit on topside Molokai.
- Coordinated with other park divisions to ensure Section 106 compliance is completed before work is carried out.
- Ongoing stabilization and rehabilitation of historic buildings and structures.
- Completed major rehabilitation of McVeigh and Paschoal Social Halls.

**Visitor Experience**

- Completed rehabilitation of historic buildings for visitor use.
- Continued and ongoing maintenance of park website and other interpretive platforms.
- Engaged a broader audience through social media, including Facebook and Twitter.
- Updated park brochure, park fact sheet, and park website. Created new site bulletins for a variety of topics.
- Conducted visitor survey at topside Overlook and with visitors to the peninsula.
- Recently hired an interpretive specialist to continue developing new interpretive programs and educational outreach.
- Maintained partnerships with religious organizations to maintain and restore historical churches and other structures.
- Collaborated with Ka ʻOhana O Kalaupapa for plans to create the Kalaupapa Memorial.
- Updated wayside exhibits to enhance visitor experience.
- Supported visitors that come to visit their ancestors' gravesites.
- Continued educational programs to visit schools on topside Molokai.
- Coordinated a volunteer program that involves natural resources, cultural resources, and park infrastructure stewardship. Park-wide volunteer hours exceeded 11,000 hours in FY 2013 and 13,400 hours in FY 2014.

**Park Infrastructure**

- Continued and ongoing maintenance of grounds, especially culturally sensitive areas such as the cemeteries.
- Completed rehabilitation of historic buildings for park operations.
- Repaired the Kalaupapa dock, breakwater, and bulkhead wall.
- Developed Solid Waste Management Program to include recycling operations.
- Completed tsunami evacuation plan.
- Repaired water tanks to support existing settlement.
- Formed numerous partnerships with other State and Federal agencies to manage lands and historic structures.
- Developed bicycling program for community members.
- Worked with Kalaupapa community (e.g., State workers) and patient-residents to maintain settlement infrastructure.
- Worked with U.S. Marine Corps regarding training exercises and use of Kalaupapa runway.
- Maintained water system for the Kalaupapa community.
- Maintained pali trail for continued visitor access.

# Chapter 4. Key Issues and Challenges for Consideration in Management Planning

**Natural and Cultural Resources**

Kalaupapa National Historical Park (NHP) is located on an isolated peninsula off the Hawaiian Island of Molokai. The Kalaupapa Settlement continues to house and treat patients as the last active treatment center for the disease in the United States. In response to an epidemic that swept the Hawaiian Islands in the mid-nineteenth century, the physically isolated Kalaupapa peninsula became the home for thousands of exiled people afflicted by Hansen's disease. At its peak in the early twentieth century, over 1,100 people lived there, and over 8,000 patients were treated throughout the history of the settlement. The community of Kalaupapa is still home for most of the surviving Hansen's disease patients, whose memories and experiences are cherished values. In Kalawao, on the windward side of the peninsula, there are the churches of Siloama and Saint Philomena, associated with the work of Saint Damien (Joseph De Veuster) and Saint Marianne Cope.

One of the greatest challenges facing Kalaupapa, as well as other parks nationwide, is the impact of climate change on park resources and operations. These changes include projected increases in temperature, sea level, storm frequency and intensity as well as potential decreases in rainfall and oceanic pH leading to more acidic conditions in the marine environment. Alterations in the local weather patterns will have profound impacts on plants, animals, historical structures, cemeteries, archeological sites, and everyday park actions. For example, increases in ocean temperature could lead to increased coral bleaching events and associated mortality. In 1996, the first major bleaching event in Hawaii was attributed to an increase in ocean temperature for a prolonged time period (Jokiel and Brown 2004). The park will continue to plan mitigation for these potential impacts by identifying and protecting areas not only within the park boundaries, but also island-wide that are resistant and resilient to these changes. These areas will include both natural and cultural resources. Coastal parks such as Kalaupapa will also have to assess and protect cultural and natural significant sites and cultural landscapes that are vulnerable to sea level rise. Finally, park management plans to reduce carbon emissions by adopting many of the recommended actions in the climate friendly parks program.

Kalaupapa National Historical Park is home to a number of archeological resources with a variety of site types, extensive time range of habitation and land use, and exceptional preservation of archeological sites. These factors combine to make the historical park one of the most diverse archeological complexes in Hawaii (Kirch 2002).

Kalaupapa has an amplified sense of power and sacredness by virtue of the events, circumstances, and peoples who lived and died there. The sheer numbers of patients who are buried at Kalaupapa create a sense of kuleana—the cultural responsibility to care for the bones of the ancestors. In turn, the ancestors watch over this ʻāina and protect it. In addition, Kalaupapa's isolation and beauty offers healing and restoration of the human spirit.

The power and sacredness of place is just one aspect of the cultural landscape at Kalaupapa. Combined with the historic buildings, vegetation, circulation patterns, views, and natural systems and features, the resulting spatial organization of the landscape is a large and important part of the NHL district. Continued stabilization, repair, and rehabilitation of the buildings and structures have preserved much of the built environment. However, given the tropical environment of the island, ongoing termite infestations, frequent severe storms, rising sea levels, and limited funding, the park will be faced with major planning and prioritization decisions. The challenge going forward will be to develop a sustainable program that preserves the historic buildings and cultural landscape features associated with the Hansen's disease settlement while also preserving and enhancing other resource values of the park.

The park is responsible for preserving and interpreting the stories and artifacts of the pre-contact native Hawaiian community and the history of the Hansen's disease settlement in the collections. The park museum building houses nearly 300,000 objects including personal correspondence, formal documents, historical photographs, memorabilia, books, specialized equipment for handicapped patients, clothing, artwork, pre-contact archeological artifacts, archived oral histories, and reference collections of animals and plants found in the park. These objects are in a climate-controlled facility that requires maintenance and high energy needs.

From mauka to makai (mountain top to coast line) Kalaupapa National Historical Park preserves and interprets some of the last remaining examples of fragile Hawaiian Island plant and animal communities found nowhere else in the world. Kalaupapa abounds in significant natural resources including the spectacular north shore sea cliffs, robust and diverse near shore marine, narrow lush valleys, a conic volcanic crater, verdant rain forest, rare lowland and coastal plant species on the Islets of Huelo and ʻŌkala and in areas along the coast and unique lacustrine macro fauna in the Lake Kauhakō. The marine ecosystem at Kalaupapa has a high fish biomass compared to other areas of the MHI. In addition, natural and paleontological resources within the caves at Kalaupapa are also unique with a high potential for undocumented and rare cave-adapted plants and animals. Several of these cave areas provide rare native habitat for threatened or endangered Hawaiian plants and animals as well as thousands of ancient Hawaiian archeological sites.

These unique resources require continual monitoring and management of invasive plant and animal species, especially feral ungulates. The monitoring programs for both marine and terrestrial natural resources are in partnership with the Pacific Islands I&M program and the National Coral Reef Program. The park is involved with multiple partners (e.g., NOAA, DLNR, TNC, Molokai Land Trust) regarding recovery of T&E species such as the Hawaiian monk seal, green sea turtle, humpback whale, and numerous plant species both in the wild and propagated in the nursery. The park also monitors the influence of climate change on park resources and operations with not only the I&M program, but also other agencies (e.g., NOAA) responsible for tracking long-term weather patterns. Cultural resources, including archeological sites, cultural landscapes, and historic buildings and structures are inventoried and monitored on a regular basis through the NPS ASMIS, CLI, and LCS databases.

Kalaupapa's plant and animal communities, including the seabird colonies and Loulu (*Pritchardia hillebrandii*) forest, hearken back to the pre-contact condition of the Hawaiian Islands. The rarity of these surviving fragile populations is a reminder of how much has been lost. Kalaupapa National Historical Park's unique and thriving coral reef environment reminds us of what these areas were once like throughout Hawaii, and it serves as a potential source of replenishment for degraded coral reef systems around the islands.

Kalaupapa's unique site preservation and variety of site types (including the loʻi of Waikolu Valley) together with its long history of subsistence and its geographic location allow visitors to appreciate the ways in which native Hawaiian communities flourished in the Kalaupapa region and its valleys for hundreds of years. Their ingenuity, work ethic, and adaptation to the harsh windswept and weathered environment reflect important components of Hawaiian history and traditional cultural practices.

**Visitor Services**

Visitation at Kalaupapa includes visitors who access the settlement on the daily patient-run Damien Tours, visitors who view Kalaupapa peninsula from the overlook at Palaʻau State Park, and those who are guests of the residents at Kalaupapa Settlement. Since 1996, visitation to Kalaupapa has ranged between 58,000 and 87,000 people per year. On average, approximately 68,000 people visit Kalaupapa each year with visitation fairly steady throughout the year. About 58,000 people visit the Kalaupapa peninsula overlook in Palaʻau State Park, while about 10,000 people come to the Settlement via mule rides, hiking, or by aircraft.

Hawaii Revised Statutes Chapter 326 limits access to the peninsula by requiring a permit for entry, which is administered by the Hawaii Department of Health, and establishes a limit of no more than 100 visitors per day. All non-residents visiting the peninsula must have a permit with the Department of Health.

Visitors to Kalaupapa may be classified into four general categories, including:

1. *Guests of Kalaupapa Settlement Residents*. The residents at Kalaupapa may invite family and friends to visit them at the Settlement. The guests may stay overnight in visitor quarters or in private homes. They can swim and snorkel, fish, picnic, and walk through Kalaupapa Settlement unescorted and may travel beyond the Settlement if accompanied by a sponsor.

2. *Natural resource enthusiasts* come to the park to view wildlife, especially the unique Hawaiian avian fauna, and the unusual native plants. The same access restrictions apply to visitors as in the first category.

3. *Sightseeing Visitors.* About 85 percent of Kalaupapa visitors stop at the overlook in Palaʻau State Park to view the surrounding scenery, natural landscapes, geologic formations, and cultural and historical sites. Visitors can hike through the ironwood, koa, and eucalyptus forests or view Kalaupapa peninsula and the cliff on the north coast of Molokai from Kalaupapa Lookout. The NPS maintains information wayside exhibits to provide information about the Kalaupapa peninsula's people, history, and archeology. Some visitors choose to ride mules or hike the steep two mile (3.2 km) Pali Trail to Kalaupapa Settlement and take the guided bus tour which restricts visitor access to the tour route itself.

4. *Cultural practitioners* come to Kalaupapa to gather natural materials used in ceremonies and worship, or to visit sacred sites that hold spiritual significance. Hawaiians still visit the peninsula for traditional activities. These practitioners still must comply with HRS 326.

Because an important purpose of Kalaupapa NHP is to protect the lifestyle and individual privacy of the Hansen's disease patients, there are several restrictions for visitors at Kalaupapa. These include requirements that visitors obtain a permit from the Hawaii State Department of Health to enter Kalaupapa Settlement (a commercial tour company arranges permits for customers, and guests of residents have their permits arranged by their sponsor), not be under the age of 16, not take photographs of patients without their written permission, and not camp overnight. The NPS does not offer any regularly scheduled interpretive programs or activities because of the restricted nature of visitation to the park and because private, Hansen's disease patient-owned tours are offered. Consequently, many of the visitors have commented on the difficulty in visiting the park, restricted access to areas of interest within the park, the high cost of the tour, and the poor condition of visitor amenities. In fact, the percentage of visitors who were satisfied

with their visit at Kalaupapa NHP in 2011, based on the standard NPS survey, was 76%, which was the lowest value reported for the 311 national parks that were surveyed (2011 Visitor Survey Card Data Report).

Despite these constraints, visitor services are a critical issue at the park. The park has started to address the issue by increasing awareness about the park and its resources to the public. The park brochure, park fact sheet, and park website were recently updated, in addition to new site bulletins that were created. The park should also increase awareness about the condition of the pali trail, visitor amenities, and lack of hospital facilities in the settlement. As the General Management Plan process moves forward, the document will guide and inform future visitor services.

**Park Infrastructure**

The NPS is responsible for providing a well-maintained community which includes preserving, stabilizing, and maintaining over 250 historic buildings in the park. Termites, moisture, and other weather events are common threats to the buildings. The park undergoes a cyclical integrated pest management (IPM) program to deal with the pests as well as other regular stabilization treatments. The level of repair and rehabilitation varies depending on building ownership, management, and building significance.

In addition, the NPS is responsible for operating and maintaining the water utility system, structural and wildland fire protection, 24 miles of roads and trails, solid waste management, recycling center, waste water disposal facilities and upgrading the electrical distribution system. The 2014 infrastructure inventory will verify the condition and capacity of the existing electrical, water, and waste water systems. This information will be used to address life safety, resource preservation, and operational deficiencies. The inventory study will also research ownership of the electrical system. An important component of the park infrastructure is maintaining the safety readiness for not only the community, but visitors as well to deal with hurricanes, tsunamis, and earthquakes, which occur on a frequent basis. The NPS must also address housing and quality of life issues in support of staff retention.

These activities require continuing partnerships with the management agencies (e.g., State of Hawaii Department of Health), landowners (e.g., State of Hawaii Department of Hawaiian Home Lands, Department of Land and Natural Resources, Department of Transportation, R. W. Meyer Ltd), and service partners (e.g., Catholic church, Protestant church) in the park. This is critical given that the park service only owns 23 acres out of the 10,648 acres that constitute the park.

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## See Also:

Collection of General References

Collection of Natural Resource-Related References

Collection of Cultural Resource-Related References

Collection of Visitor Experience-Related References

Park Infrastructure-Related References

# Glossary

See the State of the Parks home page for a link to a complete glossary of terms used in State of the Park reports. Definitions of key terms used in this report are as follows:

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| Archeological Sites Management Information System (ASMIS) | The National Park Service's standardized database for the basic registration and management of park prehistoric and historical archeological resources. ASMIS site records contain data on condition, threats and disturbances, site location, date of site discovery and documentation, description, proposed treatments, and management actions for known park archeological sites. It serves as a tool to support improved archeological resources preservation, protection, planning, and decision-making by parks, centers, regional offices, and the national program offices. |
| Baseline Documentation | Baseline documentation records the physical condition of a structure, object, or landscape at a specific point in time. A baseline provides a starting point against which future changes can be measured. |
| Carbon Footprint | Carbon footprint is generally defined as the total set of greenhouse gas emissions caused by an organization, event, product, or person. |
| Climate Friendly Park | The NPS Climate Friendly Park designation requires meeting three milestones: completing an application; completing a comprehensive greenhouse gas (GHG) inventory; and completing a Climate Action Plan, which is the actions, policies, programs, and measures a park will put into place to reduce its GHG emissions. |
| Cultural Landscape Inventory (CLI) | A Cultural Landscapes Inventory describes historically significant landscapes within a park. The inventory identifies and documents each landscape's location, size, physical development, condition, characteristics, and features, as well as other information useful to park management. |
| Cultural Landscape Report (CLR) | A Cultural Landscape Report (CLR) is the principal treatment document for cultural landscapes and the primary tool for long-term management of those landscapes. It guides management and treatment decisions about a landscape's physical attributes, biotic systems, and use when that use contributes to historical significance. |
| Curation | National parks are the stewards of numerous types of objects, field notes, publications, maps, artifacts, photographs, and more. The assemblage of these materials comprises a museum collection. Curation is the process of managing, preserving, and safeguarding a collection according to professional museum and archival practices. |
| Facility Condition Index (FCI) | FCI is the cost of repairing an asset (e.g., a building, road, bridge, or trail) divided by the cost of replacing it. The lower the FCI number, the better the condition of the resource. |
| Foundation Document | A park Foundation Document summarizes a park's purpose, significance, resources and values, primary interpretive themes, and special mandates. The document identifies a park's unique characteristics and what is most important about a park. The Foundation Document is fundamental to guiding park management and is an important component of a park's General Management Plan. |
| Fundamental and Other Important Resources and Values | Fundamental resources and values are the particular systems, processes, experiences, scenery, sounds, and other features that are key to achieving the park's purposes and maintaining its significance. Other important resources and values are those attributes that are determined to be particularly important to park management and planning, although they are not central to the park's purpose and significance. These priority resources are identified in the Park Foundation Document and/or General Management Plan. The short-cut name that will be used for this will be Priority Resources. |

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| General Management Plan (GMP) | A General Management Plan is a strategic planning document that outlines the future management of a National Park Service site for the next 15 to 20 years. The plan will set the basic philosophy and broad guidance for management decisions that affect the park's resources and the visitor's experience. |
| Historic Integrity | Historic Integrity is the assemblage of physical values of a site, building, structure, or object and is a key element in assessing historical value and significance. The assessment of integrity is required to determine the eligibility of a property for listing in the National Register. |
| Historic Resource Study (HRS) | The historic resource study is the primary document used to identify and manage the historic resources in a park. It is the basis for understanding their significance and interrelationships, a point of departure for development of interpretive plans, and the framework within which additional research should be initiated. |
| Historic Structures Report (HSR) | The historic structure report is the primary guide to treatment and use of a historic structure and may also be used in managing a prehistoric structure. |
| Indicator of Condition | A selected subset of components or elements of a Priority Resource that are particularly "information rich" and that represent or "indicate" the overall condition of the Priority Resource. There may be one or several Indicators of Condition for a particular Priority Resource. |
| Integrated Resource Management Applications (IRMA) | The NPS-wide repository for documents, publications, and data sets that are related to NPS natural and cultural resources. |
| Interpretation | Interpretation is the explanation of the major features and significance of a park to visitors. Interpretation can include field trips, presentations, exhibits, and publications, as well as informal conversations with park visitors. A key feature of successful interpretation is allowing a person to form his or her own personal connection with the meaning and significance inherent in a resource. |
| Invasive Species | Invasive species are non-indigenous (or non-native) plants or animals that can spread widely and cause harm to an area, habitat or bioregion. Invasive species can dominate a region or habitat, out-compete native or beneficial species, and threaten biological diversity. |
| List of Classified Structures (LCS) | LCS is an inventory system that records and tracks the condition of the approximately 27,000 historic structures listed in the National Register of Historic Places that are the responsibility of NPS. |
| Museum Collection | NPS is the steward of the largest network of museums in the United States. NPS museum collections document American, tribal, and ethnic histories; park cultural and natural resources; park histories; and other aspects of human experience. Collections are managed by professionally-trained NPS staff, who ensure long-term maintenance of collections in specialized facilities. |
| National Historical Landmark (NHL) | National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. Today, fewer than 2,500 historic places bear this national distinction. |
| National Historical Park (NHP) | Historic areas in the National Park System that have great physical extent and complexity. NHPs are automatically listed on the National Register of Historic Places. |

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| National Natural Landmark (NNL) | The National Natural Landmarks (NNL) Program recognizes and encourages the conservation of sites that contain outstanding biological and geological resources, regardless of landownership type. It is the only natural areas program of national scope that recognizes the best examples of biological and geological features in both public and private ownership. |
| Pacific Island I&M Network (PACN) | One of 32 I&M networks established as part of the NPS Inventory and Monitoring Program The Pacific Island I&M Network provides scientific data and expertise for natural resources in 11 parks located in Hawaii, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. |
| Priority Resource or Value | This term refers to the Fundamental and Other Important Resources and Values of a park. These can include natural, cultural, and historic resources as well as opportunities for learning, discovery and enjoyment. Priority Resources or Values include features that have been identified in park Foundation Documents, as well as other park assets or values that have been developed or recognized over the course of park operations. Priority Resources or Values warrant primary consideration during park planning and management because they are critical to a park's purpose and significance. |
| Project Management Information System (PMIS) | A servicewide intranet application within the National Park Service to manage information about requests for project funding. It enables parks and NPS offices to submit project proposals to be reviewed, approved and prioritized at park units, regional directorates, and the Washington Office. |
| Resource Management | The term "resources" in NPS encompasses the many natural, cultural, historical, or sociological features and assets associated with parks. Resource management includes the knowledge, understanding, and long-term stewardship and preservation of these resources. |
| Specific Measure of Condition | One or more specific measurements used to quantify or qualitatively evaluate the condition of an Indicator at a particular place and time. There may be one or more Specific Measures of Condition for each Indicator of Condition. |
| Volunteers In Parks Program (VIP) | The Volunteers In Parks Program (VIP) was authorized by Public Law 91–357 enacted 1970. The primary purpose of the VIP program is to provide a vehicle through which the National Park Service can accept and utilize voluntary help and services from the public. The major objective of the program is to utilize this voluntary help in such a way that is mutually beneficial to the National Park Service and the volunteer. Volunteers are accepted from the public without regard to race, creed, religion, age, sex, sexual orientation, national origin, or disability. |