

Historic Lighthouse Preservation:

Introduction



Figure 1. Brick replacement in 1996 restoration at Cape Florida Lighthouse on Key Biscayne, Florida.

Preserving Historic Lighthouses

The expressed goal for preserving historic lighthouses in Part III., **Standards, Guidelines, and the Preservation Process** is retention of the building's existing form, materials, features, and detailing. This may be as simple as basic maintenance of existing materials and features or may involve preparing a historic structures report, undertaking laboratory testing such as paint and mortar analysis, or conducting condition assessments. Protection, maintenance, and repair are emphasized while replacement is minimized. In *preservation*, the options for replacement are less extensive than in the treatment, *rehabilitation*. This is because the assumption at the outset is that building materials and character-defining features are essentially intact.

Preservation encompasses all of the maintenance issues confronting historic lighthouses; there is no one set of procedures that can be applied to every repair or maintenance scenario. The following basic concepts should, however, be applied to all preservation activities including repair and maintenance of historic character-defining features. Preservation must be considered as an option for the interim treatment of a historic lighthouse as well as the possible ultimate treatment. This decision depends on all those issues previously addressed in the "General Guidelines for the Preservation Planning Process" in Part III and on the individual qualities, integrity, and condition of the historic lighthouse in question.

Identify, Retain, and Preserve Historic Materials and Character-Defining Features

The guidance for the preservation treatment begins with recommendations to identify the form and detailing of those architectural materials and features that are important in defining the lighthouse's historic character and which must be retained in order to preserve that character. Therefore, guidance on identifying, retaining, and preserving character-defining features is always given first.

Identify the character-defining features of the historic lighthouse. Character-defining features are found on both the interior and exterior of the structure. These features include but are not limited to:

- the overall massing and shape of the lighthouse;
- the detailing of exterior materials used in the construction of the lighthouse, e.g., wood, brick, stone, concrete, cast iron, etc.;
- exterior features, such as roofs, lanterns, porches, and daymarks;
- configuration and type of windows, e.g., wood double-hung multiple-lite, wood casement, metal casement, etc.;
- door configuration, e.g., board and batten, raised panel, plank, etc.;
- door and window opening treatments, e.g., sidelights, transoms, fanlights, ornamental trim, detailed lintels, etc.;
- the interior materials, such as plaster and paint; the interior features, such as stairways and moldings, room configurations, and spatial relationships, as well as structural and mechanical systems;
- support buildings such as keeper's dwelling, oil house, fog signal building, barn, boathouse, privy, etc.
- site features such as roads and walkways, fences, flag poles, planters, water collection systems, docks and wharves, beachheads, seawalls, boat launch tracks, gardens, etc.; and

- lantern equipment including lenses, lens supports, etc.¹

Once the character-defining features are identified, an assessment should be made of those features and their physical condition at the time of the survey. The assessment should include all information known about the features such as material type, size, last time the feature was serviced, e.g., painted, repaired, replaced, etc., and the approximate age of the feature, e.g., does the feature appear to be original? or does the feature appear to be a replacement? This assessment should be kept in the maintenance file of the lighthouse in order to better plan future repair and maintenance tasks.

Retain the character-defining features and the qualities of the historic lighthouse to the greatest extent possible during any repair or maintenance activity. Once the character-defining features are identified, future repair and maintenance tasks should be planned to maintain these features, prevent them from deteriorating, and thereby prevent their loss. If a feature must be removed to address a repair issue, e.g., removal of cornice brackets during a roofing or deck repair, the features should be carefully removed and labeled in such a manner that the reinstallation of the features can be easily and correctly accomplished.

Preserve the character-defining features and qualities of the historic lighthouse through in-kind repairs and routine maintenance activities. During any repair or maintenance activity, the ultimate goal must be to preserve

¹U.S. Coast Guard policy states that "Classical lenses are of special historical interest. Classical lenses rotating on mercury floats should be modified, if possible, or replaced because of the special maintenance and safety requirements of this system. Classical lenses using other rotating systems, which remain serviceable, should be retained. Any modifications or replacement of a classical lens must be coordinated with the appropriate historic preservation interests. . . . Non-rotating classical lenses should be retained if serviceable. Modification or replacement of a classical lens must be coordinated with the appropriate historic preservation interests." (COMDTINST M16500.8A)

the lighthouse in a manner that utilizes the most sensitive means available.

For more information on this process see the National Park Service *Preservation Briefs 17: Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character*.

Stabilize and Protect Deteriorated Historic Materials and Features as a Preliminary Measure

Deteriorated portions of a historic lighthouse may need preliminary stabilization and protection measures to safeguard those features until additional work can be undertaken. Stabilization involves re-establishing the stability of an unsafe, damaged, or deteriorating structure while maintaining its existing character.

Stabilizing may include emergency short- or long-term measures; long-term structural reinforcement, weatherization, or ventilation; or correcting unsafe conditions. Temporary stabilization should always be carried out in such a manner that it detracts as little as possible from the historic lighthouse's appearance. Although it may not be necessary in every preservation project, stabilization is

nonetheless an integral part of the preservation treatment; it is equally applicable, if circumstances warrant, for the other treatments.

Maintain Historic Materials and Features

After identifying those materials and features that are important and must be retained in the process of preservation work, their protection and maintenance is addressed. Protection generally involves the least degree of intervention and is preparatory to other work. For example, protection includes the maintenance of historic materials through treatments such as rust removal, caulking, limited paint removal, and re-application of protective coatings; the cyclic cleaning of roof gutters and internal ventilation systems; or installation of fencing, alarm systems, and other temporary protective measures. Although a historic lighthouse will usually require more extensive work, an overall evaluation of its physical condition should always begin at this level.

SIDEBAR: Protection/Stabilization (“Mothballing”) of Historic Lighthouses

When all means of finding a productive use for a historic lighthouse have been exhausted or when funds are not currently available to restore a deteriorating structure into a useable condition, it may be necessary to temporarily close up or deactivate the building to protect it from the weather as well as to secure it from vandalism. This process, known as “mothballing,” can be a necessary and effective means of protecting the lighthouse while planning the lighthouse's future or raising money for a preservation, rehabilitation, or restoration project. If a vacant lighthouse has been declared unsafe by building officials, a protection/stabilization program may be the only way to protect it from demolition.

Protection/stabilization involves controlling the long-term deterioration of the lighthouse while it is unoccupied as well as finding methods to protect it from sudden loss by fire or vandalism. This

requires securing the lighthouse from unwanted entry, providing adequate ventilation to the interior, and shutting down or modifying existing utilities. Once the lighthouse is deactivated or secured, the long-term success will depend on periodic maintenance and surveillance monitoring.

Protection/stabilization is a treatment that can be tailored to suit a lighthouse's immediate and/or interim needs. Protection/stabilization can be used to secure a lighthouse after a catastrophic event until more permanent repairs can be undertaken. While providing some level of protection against the loss of significant historic materials and features, protection/stabilization is frequently used to buy time for the planning or funding needed to undertake a more permanent treatment such as restoration. As an interim treatment, mothballing activities should always be designed so they are reversible and contribute to the structure's ultimate treatment whether that be preservation or restoration.

When carried out in a manner sensitive to the historic nature of the lighthouse, protection/stabilization encompasses preliminary measures to protect and secure the property for an extended period of time. This includes correcting deficiencies to slow the rate of deterioration of the structure. These activities should not be done without careful planning to ensure that needed physical repairs are made before securing the lighthouse. The steps discussed in this text can protect lighthouses for periods of up to ten years; long-term success will also depend on continued, although somewhat limited, monitoring and maintenance. For all but the simplest projects, hiring a team of preservation specialists is recommended to assess the specific needs of the structure and to develop an effective mothballing program.

A vacant historic lighthouse cannot survive indefinitely in a boarded-up condition; even marginal interim uses where there is regular activity are generally preferable to mothballing. If a long-term treatment is the only remaining option, it must be done properly. This will require stabilization of the exterior, properly designed security protection, generally some form of interior ventilation—either through mechanical or natural air exchange systems—and continued maintenance and monitoring.

Comprehensive protection and stabilization programs are generally expensive and may cost 10% or more of a modest rehabilitation budget. The money spent on well-planned protective measures, however, will seem small when amortized over the life of the resource. Regardless of the location and condition of the property or the funding available, the following steps are involved in properly mothballing a lighthouse:

Document the architectural and historical significance of the lighthouse. Documentation of the historical significance and physical condition of the property will provide information necessary for setting priorities and allocating funds. The project team should be cautious when first entering the lighthouse structure if it has been vacant or is deteriorated. It may be advisable to temporarily brace areas appearing to be structurally unsound until the condition of the structure can be fully assessed. If pigeon or bat droppings, friable asbestos, or other health hazards are present, precautions must be taken to wear the appropriate safety equipment when first inspecting the lighthouse. Consideration should be given to hiring a firm specializing in hazardous waste removal if these highly toxic elements are found in the lighthouse.

Prepare a condition assessment. A condition assessment will provide the owner with an accurate overview of the current condition of the property. If the lighthouse is deteriorated or if significant

interior architectural elements will need special protection during the mothballing years, a condition assessment is highly recommended, but it need not be exhaustive.

A modified condition assessment, prepared by an architect or preservation specialist, and in some case a structural engineer, will help set priorities for repairs necessary to stabilize the property for both the short- and long-term. It will evaluate the age and condition of the following major elements: foundations; structural systems; exterior materials; roofs and gutters; exterior porches and steps; interior finishes; staircases; plumbing, electrical, mechanical, and lightning protection systems; features such as dormers and chimneys; and site drainage.

Structurally stabilize the lighthouse, based on a condition assessment. Stabilization involves correcting deficiencies to slow the deterioration of the lighthouse while it is vacant. Weakened structural members that might fail altogether in the coming years must be braced or reinforced; insects and other pests removed and discouraged from returning; and the lighthouse protected from moisture damage both by weatherizing the exterior envelope and by handling water runoff on the site. Even if a modified use or caretaker services can eventually be found for the lighthouse, the following steps should be addressed.

- ***Structurally stabilize the lighthouse.*** In rare cases bracing may have been required to make the lighthouse temporarily safe for inspection; the condition assessment may reveal areas of hidden structural damage. Roofs, foundations, walls, interior framing, porches, chimneys, and dormers all have structural components that may need added reinforcement. Structural stabilization by a qualified contractor should be done under the direction of a structural engineer or a preservation specialist to ensure that the added weight of the reinforcement can be sustained by the lighthouse and that the new members do not harm historic finishes. Any major vertical post added during the stabilization should be properly supported and, if necessary, taken to the ground and underpinned.
- ***Exterminate or control pests, including termites and rodents.*** Pests can be numerous and include squirrels, raccoons, bats, mice, rats, snakes, termites, moths, beetles, ants, bees and wasps, pigeons, owls, and other birds. Termites, beetles, and carpenter ants destroy wood. Mice, too, gnaw wood as well as plaster, insulation, and electrical wires. Pigeon, bat, and rodent droppings not only damage wood finishes but create a serious and sometimes deadly health hazard.
- ***Protect the exterior envelope from moisture penetration.*** It is important to protect the exterior envelope from moisture penetration before securing the lighthouse. Leaks from deteriorated or damaged roofing, decks (that cover interior spaces) from around windows and doors, or through deteriorated materials, as well as ground moisture from improper site runoff or rising damp at foundations can cause long-term damage to interior finishes and structural systems.

Ground water, at the ground surface and below the surface, does much more damage to unconditioned buildings than to conditioned and occupied buildings. It is critical that any roofs, gutters, or downspouts be in good working order and cleaned seasonally. The soil surface around the lighthouse should slope away from the building, without any opportunity for puddles to form at the base. The soil that is in contact with the foundation should never be allowed to be saturated with water, otherwise there may be damage from water erosion, mold growth, ice lensing, frost heave, or seepage. Any serious deficiencies on the exterior, identified in the condition assessment, should be addressed.
- ***Secure the lighthouse and its component features to reduce vandalism or break-ins and natural disasters.*** Securing the lighthouse from sudden loss is a critical aspect of protection and stabilization. Because historic lighthouses are irreplaceable, it is vital that vulnerable entry points are sealed. This includes doors and lower level windows.

- ***Providing adequate ventilation to the interior.*** Once the exterior has been made weathertight and secure, it is essential to provide adequate air exchange throughout the lighthouse. Without adequate air exchange, humidity may rise to damaging levels, and mold, rot, and insect infestation are likely to thrive. The needs of each historic resource must be individually evaluated because there are so many variables that affect the performance of each interior space once the lighthouse has been secured. In some circumstances, providing heat during the winter, even at a minimal 45° Fahrenheit (7° C), and utilizing forced-fan ventilation in summer will be recommended and will require retaining electrical service. For masonry lighthouses it is often helpful to keep the interior temperature above the spring dew point to avoid damaging condensation. In most lighthouses the need for summer ventilation outweighs the winter requirements.
- ***Secure or modify utilities and mechanical systems.*** This would include, depending on the circumstances, decommissioning the electrical system although it may be necessary for security or operating the optic. A more appropriate treatment would be to have the 'live' systems inspected by qualified electricians, etc., to insure that everything is 'up to code' and that deteriorating panel boxes are not about to short out, etc. Other historic systems should also be considered, if applicable. New systems which may be considered practical for *temporary* installation as part of the mothballing treatment would be: passive or forced ventilation, heating in the lantern area, temperature and/or humidity monitors, a security/motion detector system, or a system for fire protection. These are all sensitive systems and would require some degree of human monitoring and maintenance, providing additional security.
- ***Develop and implement a maintenance and monitoring plan for protection.*** With the installation of monitoring systems and devices it becomes necessary for human attendants to pay regular visits. Historic lighthouses were once occupied by a live-in attendant who lavished it with daily care. In this age of remote and automated operation, historic lighthouses are often expected to go unattended for months at a time. Some level of scheduled inspection, monitoring, and maintenance is required for the designed life of the protection and stabilization treatment. The cycle of these visits should be tied to the quality and security of the mothballed structure. If designed to last three to five years, an increase in the frequency of site visits would be expected in the third year; by the fourth year, a new treatment would be required or the previous one renewed. It is not unusual for a structure originally intended to be mothballed for five years to have this time period stretch to eight or even ten years. If this situation presents itself, be aware that certain aspects of the original five-year program will have to be restored or renewed at that time.

Providing temporary protection and stabilization for vacant historic lighthouses and ancillary structures (keeper quarters, oil houses, boat houses, sheds, outbuildings, privies, etc.) can arrest deterioration and buy the owner valuable time to raise money for preservation or to find a compatible use for the property. While these issues may seem simple, the variables and intricacies of possible solutions make the decision-making process very important. Each building must be individually evaluated before any work takes place. In addition, a variety of professional services as well as volunteer assistance are needed for careful planning and repair, sensitively designed protection measures, follow-up security surveillance, and cyclical maintenance. In planning for the future of the structure, complete and systematic records should be kept and generous funds allocated for mothballing to ensure that the historic property will be in stable condition for its eventual preservation, rehabilitation, or restoration.

(See NPS *Preservation Briefs 31: Mothballing Historic Buildings* for more information.)

Repair (Stabilize, Consolidate, and Conserve) Historic Materials and Features

When the physical condition of the character-defining materials and features requires additional work, repair by stabilizing, consolidating, and conserving is recommended. Repair generally focuses upon the ongoing maintenance of historic materials and features rather than extensive replacement and new construction.

Preservation strives to retain existing materials and features while employing as little new material as possible. Consequently, guidance for repairing a historic material such as masonry again begins with the least degree of intervention possible, such as strengthening fragile materials through consolidation, when appropriate, and repointing with mortar of appropriate strength. Repairing masonry as well as wood and architectural metal features may also include patching, splicing, or otherwise reinforcing them using recognized preservation methods. Similarly, within the preservation treatment, portions of a historic structural system could be reinforced using contemporary materials such as steel rods or wood bracing. All work should be physically and visually compatible, identifiable upon close inspection, and documented for future research.

Limited Replacement In Kind of Extensively Deteriorated Portions of Historic Features

If repair by stabilization, consolidation, and conservation proves inadequate, the next level of intervention involves the limited replacement in kind of extensively deteriorated or missing parts of features when there are surviving prototypes (for example, gallery brackets, steps, window casings, hardware, railings, or portions of roofs). The replacement material needs to match the old

both physically and visually, i.e., oak with oak, cast iron with cast iron, etc.

Thus, with the exception of hidden structural reinforcements and new mechanical system components, the wholesale use of substitute materials is generally not appropriate in the preservation treatment. Although using the same kind of material is always the preferred option, substitute materials may be acceptable in certain instances, i.e., repairing a damaged piece of historic lantern glazing, if the form and design, as well as the material itself, convey the visual appearance of the remaining parts of the feature and finish. Again, it is important that all new material be identified and properly researched for future needs.

If prominent features such as interior staircase, exterior cornice, or roof ventilator are missing, then a *rehabilitation* or *restoration* treatment may be more appropriate.

These treatments are critical components of the process and should not be overlooked. Treatment measures should not result in permanent damage, and so each should be weighed in terms of its reversibility and its overall benefit. New exterior additions or reconstruction are not within the scope of any of these treatments.

Preserving Materials and Features in Historic Lighthouses

The following sections recommend treatments for the preservation of historic lighthouses based on the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

The information presented is designed to be used as a general preservation treatment guide for managers of historic lighthouses. The materials and features are divided into eight sections: masonry, iron, wood, and concrete construction; windows; doors; lanterns; interiors; and grounds. Each section deals

with two levels of preservation: protection/stabilization (mothballing) and repair.

The raw data used for this text were collected during a lighthouse condition assessment project performed by the NPS Historic Preservation Training Center (formerly the Williamsport Preservation Training Center) in cooperation with the U.S. Lighthouse Society and the NPS National Maritime Initiative. During this project, site visits were made to 21 DoD- and USCG-owned light stations. These structures were located in various parts of the country; states visited included California, Delaware, Florida, Maine, Maryland, Michigan, New Jersey, New York, and North Carolina, Oregon, and Virginia. The sites were chosen because they represented the full range of construction types.

In addition to the raw data, resources for the treatment sections of this handbook include the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, technical information from the National Park Service *Preservation Briefs* series, National Park Service *Tech Notes* series, U.S. Coast Guard maintenance manuals, and other technical information sources. The bibliography cites the primary sources of information listed by chapter.

For more project-specific questions, a historical architect or engineer should be consulted. The State Historic Preservation Officer can also provide useful guidance and needs to be consulted before the start of any project impacting a historic property as part of Section 106 compliance. (For more information on Section 106, see “Laws and Regulations” under Part I., **Why Preserve Lighthouse?**)

How to Use Part IV of this Handbook

This handbook is lighthouse specific—it does not address all the issues concerning other light station buildings. The information in Part

IV is designed to be referenced in both a general and specific fashion. When planning a preservation treatment for a lighthouse, refer to the sections relating to construction type, i.e., masonry, iron, wood, or concrete. In addition to information relating to treatments of specific construction types, the text will guide you through an inspection procedure. The inspection will more than likely indicate problems not specific to construction type. Refer to the sections on windows, doors, lanterns, interiors, and grounds for guidance on these components.

General guidelines for both protection/stabilization (mothballing) and repair treatments are given for lighthouse construction types and components. As stated in Part III., protection and stabilization is an interim treatment to prevent a lighthouse from further decay until resources are available for a more extensive preservation treatment. With this in mind, protection and stabilization in the following sections should be considered as temporary fixes or “band aids” to keep deterioration in check for a limited period of time. The repair treatments outlined in the following sections are designed to be used a guide for actions taken to correct deteriorated and/or damaged components of historic lighthouses. All guidance is intended to assist the lighthouse manager in putting together a comprehensive long-term preservation treatment plan for his or her lighthouse with maximum retention of historic fabric.

For treatments that go beyond basic preservation, refer to the case studies in Part V., **Beyond Basic Preservation.**