Beyond Basic Preservation:

Related Activities

NMI photo

Figure 1. A historic site managed by the Minnesota Historical Society, most of the buildings (including one of the keepers' quarters shown above) at Split Rock Light Station are interpreted to the period of its construction in 1909.

Examples of Adaptive Use/ Rehabilitation

B&Bs/Inns: A few light stations have been successfully adapted into bed-and-breakfasts by both private owners and nonprofits. Examples include East Brothers Island Light Station in San Francisco Bay, California; Saugerties Light on the Hudson River, New York; Selkirk Light Station in Pulaski, New York; and Isle Au Haut Light Station near Isle Au Haut, Maine. At Rose Island Light Station off Newport, Rhode Island, guests are expected to perform daily chores including noting the weather; keeping a lookout for boating emergencies; and working on maintenance tasks such as painting, washing windows, and making minor repairs.

Youth Hostels: Point Montara and Pigeon Point Light Stations[1] are located just 28 miles apart along the northern coast of California. Both light stations serve as youth hostels established through a cooperative agreement with the U.S. Coast Guard via the state of California. In 1978 the California legislature appropriated $1.9 million for the California State Park System's Coast Hostel Facilities Plan in response to a preliminary state plan developed in 1975. Five vacant and abandoned lighthouses were considered as suitable hostel sites. Point Montara and Pigeon Point were in the best shape and were recommended for development into part of a chain of hostels along the California coastline.

Because of initial leasing difficulties, these lighthouse projects took nearly three years to launch. Initially the Coast Guard, which owned the lighthouses, would offer only a short-term lease to the state. Without a long-term lease, the state was hesitant to invest large amounts of money for renovations. The Coast Guard allowed "interim use" of Point Montara and Pigeon Point until a long-term lease finally was approved. Under the interim agreement, the state began renovations and issued

[1] Historic Hostels Report (Washington, DC, American Youth Hostels, n.d.).

NMI photo

Figure 2. East Brother Island Light Station in San Francisco Bay, California, serves both as an active aid to navigation and bed-and-breakfast.

operating permits to the Golden Gate Council of American Youth Hostels (AYH).

The two hostels were developed almost simultaneously. Several organizations contributed to the restoration of both lighthouses, including the California Department of Parks and Recreation, which contributed in excess of $100,000 as part of its pilot coastal hostel project. The California Coastal Conservancy contributed to the hostels as part of its program to promote low-cost visitor access to the state's increasingly expensive and exclusive coastline.

Restoration of the Point Montara Lighthouse and the conversion of both the vandalized Victorian-style and modern light keeper's quarters into a 35-bed hostel facility cost more than $100,000. AYH volunteers and staff contributed $45,000 worth of labor and time. Renovations for Pigeon Point were also heavily dependent upon volunteer labor, cash contributions, and donated supplies. One of the major private contributors to this project was Crocker Bank with a $25,000 grant.

The two lighthouses attract more than 23,000 overnight guests each year. Park rangers and hostel managers cooperate to offer educational programs on the coastal environment for guests. If AYH had not occupied these lighthouses 15 years ago, the station buildings other than the towers which were maintained by the Coast Guard, would be largely in ruins today. Occupancy generally precludes damage to a historic structure. AYH is not only preserving historic sites, but enabling young people to learn about them and use them.

Tibbetts Point Lighthouse, New York, and the former lifesaving station on Nantucket, Massachusetts, are other AYH projects which have preserved historic Coast Guard structures.

NMI photo

Figure 3. At Bodie Island Light Station in Cape Hatteras National Seashore, North Carolina, the tower holds an active aid to navigation while the keeper's quarters serves as a museum.

Museums: Numerous light stations have been adapted into museums or interpretive centers. A few examples include: Montauk Point Light Station in Montauk, New York; Split Rock Light Station on Lake Superior, Minnesota; Hereford Inlet Light Station in North Wildwood, New Jersey; St. Augustine Light Station in St. Augustine, Florida; Key West Light Station in Key West, Florida; and St. Simons Island Light Station in St. Simons, Georgia. In some cases the keeper's quarters have been turned into residences for caretakers while the rest of the station such as the tower and oil house are open to the public. Currituck Beach Light Station in Corolla, North Carolina, is an example. In some cases museums, particularly maritime museums, have obtained lighthouses and moved them to their museum to serve as exhibits. Examples include Calvert Marine Museum's Drum Point Lighthouse in Solomons, Maryland; Chesapeake Bay Maritime Museum's Hooper Strait Lighthouse in St. Michaels, Maryland; and Shelburne Museum's Colchester Reef Lighthouse in Shelburne, Vermont.

Parks: Many light stations are located within the boundaries of national, state, and local parks. In some parks, buildings at the light station are accessible to the public, in others, only the grounds. A few of the better-known examples of lighthouses in parks would be Cape Hatteras Light Station in Cape Hatteras National Seashore along the Outer Banks of North Carolina; West Quoddy Head Light Station in Quoddy Head State Park, near Lubec, Maine; and Point Reyes Light Station in Point Reyes National Seashore, in California.

Research/educational facilities: Because of their location in wildlife refuges and nature preserves, a few light stations have served as research facilities. At the Lime Kiln Light Station on San Juan Island in Washington, the tower serves as a whale research lab. Matinicus Rock Light Station off Rockland,

NMI photo

Figure 4. At the Lime Kiln Light Station on San Juan Island in Washington, the tower serves as a whale research lab while the keepers' quarters serve as park housing. The station is located within Lime Kiln State Park

Maine, is used as research headquarters by Audubon biologists.

Private homes: Numerous light station keeper's quarters have been converted to private homes. Examples include New Dorp (Swash Channel Range Rear) Light on Staten Island, New York; Chapel Hill Range Rear Light in Leonardo, New Jersey; Roanoke River Lighthouse in Edenton, North Carolina; Mendota (Bete Grise) Lighthouse on Lake Superior, Michigan; and Grand Island North Light Station in Grand Island, Michigan. Other keeper's quarters are used for housing of park employees or military personnel when located in or near a park or military installation. Examples include Point Fermin Lighthouse at Point Fermin, California; Yerba Buena Island Light near San Francisco, California; Egmont Key Light Station on Egmont Key, Florida; and Prospect Harbor Point

SIDEBAR: To Relight or not to Relight?

Lighthouses which are decommissioned by the Coast Guard are no longer considered active aids to navigation although at least 17 privately owned lighthouses serve as private aids to navigation. Many restoration projects call for relighting the lighthouse. Before such efforts can be undertaken certain procedures must be followed so that new lights do not interfere with present navigation lighting systems. Coordination with the Coast Guard is absolutely necessary and approval not guaranteed. Furthermore, a new liability may result. If your light was being used for navigational purposes and for whatever reason it failed, the owners of a vessel which suffered damage as a consequence of this failure could sue. This is a major burden for a fledgling lighthouse preservation organization. The Coast Guard is protected from liability under the Federal Torts Claim Act which limits their responsibility, but this does not apply to non-Coast Guard operated aids to navigation. For stations where the Coast Guard still maintains the light, even when the light tower is under non-public ownership, the Federal Torts Claim Act is still in force. While such an arrangement may be considered an advantage, the Coast Guard will require access to the lantern room and they usually want this area restricted from public access with special exceptions. In an attempt to obtain protection from the Federal Torts Claim Act some organizations such as Friends of Sakonnet Point have attempted to lease back their lighthouse to the Coast Guard for as little as $1.00 per year, while still maintaining responsibility for the maintenance of the structure. But the Coast Guard has declined such offers. Another possible option is to relight the tower so that it is visible only from land and not visible from the water, thereby not serving as an active aid to navigation. The Coquille River Lighthouse was relit so that the light could be seen from the town of Bandon but not from the river approach at sea.

Lighthouse in Prospect Harbor, Maine. In some cases keepers quarters are rented out by nonprofit groups to help generate operating and maintenance funds. Examples include Piney Point Light Station, Piney Point, Maryland; and Rose Island Light Station off Newport, Rhode Island.

Miscellaneous adaptations: Many light stations, such as Piedras Blancas Light Station in San Simeon, California, have been turned over to other federal agencies and in this case, used for housing of Fish and Wildlife Service staff. The Army Corps of Engineers allow a local Coast Guard Auxiliary unit to use the keeper's quarters as a meeting and office site at Ontonagon Light Station, Ontonagon, Michigan. Other stations have been turned over to local governments. For example, the engineer's office at Government Island, formerly part of the Minots Light Station, is now used by the Cohasset Harbor Master; the oil house by the Cohasset Sailing Club; and the keeper's quarters turned into efficiency apartments. Perhaps the most unusual adaptation of a lighthouse is that of Tillamook Rock Lighthouse. Located off the coast of Oregon, it is used as a columbarium (repository for the ashes of cremated persons). Oakland Harbor Lighthouse in Oakland, California, was moved to land and turned into "Quinn's Lighthouse Restaurant." Though not a lighthouse, the St. Joseph Lighthouse Depot complex is in the process of being turned into a microbrew pub and restaurant.

Interpretation and Public Outreach

A restored light station without interpretation is an artifact with no associated information—very little educational value can be gleaned. There are several ways good interpretation can be added to lighthouses/light stations.

- ***Interpretive panels*** (signage) are the most commonly used method. The advantage is that they are relatively inexpensive to make and have relatively low maintenance cost; interpretive signs can be read at the leisure of the visitor and do not require an individual (paid or volunteer) to be present to provide information orally. Panels placed outside buildings enable visitors who arrive after hours or out of season an opportunity to learn about the property even when closed. The physically impaired, who cannot gain access to some areas can still view photographs of lantern rooms, etc.
- ***Pamphlets, brochures, and published histories*** are another means to educate the public about the property. They can be reproduced rather cheaply, and printing costs might be sponsored by a local bank or business in exchange for a credit line. A keyed map to the property can also serve as a guide to the site. Histories of the property can be published and sold both as an educational outreach tool as well as a fundraiser. Printed materials can be taken home and read at leisure as a post-visit educational tool.
- ***Guided tours*****:** Many visitors prefer the personal touch of a tour given by a knowledgeable individual. Properly trained, such tour guides can add life to a site by imparting not only historical facts, but insights into the people who worked and lived there. Many light stations have recreated living and work spaces as they may have appeared at some moment in the past. A tour guide can also keep a watchful eye on small objects which add to the realism of the recreation but might be picked up and handled, damaged, and/or stolen by unsupervised visitors. Some guides dress in keepers' uniforms or other period costumes to add realism to the experience.
- ***Living history/plays:*** Living history programs using actors who portray persons who once lived at the site are another means of interpretation. A play, based on local fact, can create a history of the site which informs the public in an entertaining way. These can be done on- or off-site and may also be used as a way to raise funds for restoration and/or operation of the facility.
- ***Audio/audiovisuals:*** An effective interpretative tool which can stand alone or be used with other educational methods is an audio tour of the site. Numerous companies create and sell the hardware. These options are relatively expensive, but have proven very popular with

Minnesota Historical Society

Figure 5. Since Split Rock was first accessible by highway in 1924, it has been popular with travelers. Today it continues to draw over 120,000 visitors annually.

CASE STUDY: Interpretation at Split Rock Lighthouse

by Lee Radzak, Historic Site Manager, Split Rock Lighthouse

The keeper finished cranking the 250-pound cast-iron weights up the 40-foot weight-way tube running up through the center of the lighthouse. He removed the crank handle from the clockwork mechanism and pulled a handkerchief from the pocket of his midnight-blue wool uniform coat and wiped a few smears from the polished brass of the lens assembly. As he took a moment to admire the sparkling prisms of the Fresnel lens, he heard strange voices coming up the spiral staircase. An eager family came puffing into the lens room to stare wide-eyed at the glittering four-and-a-half-ton marvel of French technology revolving above them. They then turned to look out the window at Lake Superior 160 feet below. "Welcome to Split Rock Lighthouse," said the keeper. "I'll bet you're wondering why the lighthouse service would build a lighthouse way up on top of this cliff."

This scene could have occurred in the late 1920s as easily as the late 1990s. The major difference is that in the 1990s the 'keeper' is a historic site interpreter employed by the Minnesota Historical Society; in the 1920s he was a light keeper employed by the U.S. Lighthouse Service. In 1939, when the U.S. Coast Guard assumed responsibility for the country's aids to navigation, they said that Split Rock was "one of the most frequently visited lighthouses in the United States." Although Split Rock Lighthouse was decommissioned as a navigational aid in 1969, visitors continued to stop at the popular landmark. The light station is now a Minnesota state

historic site; preservation and interpretation are the responsibility of the Minnesota Historical Society (MHS). Visitation peaked in 1989, the year of the U.S. Lighthouse Service bicentennial, at 212,000.

With the well-preserved light station and with public interest and high attendance a given, Split Rock was a natural addition to the Minnesota historic site system in 1976. As with all open-air museums, the interpretive program at Split Rock has been developed and customized to fit specific conditions. Visitation patterns, audience interest and demographics, the physical environment of the site, availability of historical and research information, and, of course, financial resources, are among some of the considerations when developing an interpretive plan for any historic site.

For an interpretive program to succeed at a historic lighthouse, the administrating entity needs to have a clear vision of what they want visitors to understand about the site. This can only be done by first developing a concise interpretive plan that sets objectives for what story is to be told at the site and how it is told. At Split Rock we were very fortunate: when we began research on the site in the mid-1970s, several sons and daughters of the early keepers who actually lived at the light station in the 1910s, 1920s, and 1930s were helpful in providing us with firsthand information about life at Split Rock. They were a very valuable source of anecdotal information, and even provided written records and early photographs of life at the lighthouse. This information was corroborated by the official logs for the light station that were kept by the keepers. From these, and other archival sources, we had an excellent base of information on which to build an interpretive program, as well as good documentation for restoration projects that have returned the buildings and grounds to their pre-1924 appearance.

Solid and well-researched documentation provides the fuel that will drive a successful interpretive program. For us, the next step was to look at the resources we had and how best to present them to the visiting public. First, an interpretive staff manual was developed. While this is updated annually, the basic information it contains gives an interpreter a primer in interpretive technique, as well as an in-depth background on the history of lighthouses, shipping, the Great Lakes, the U.S. Lighthouse Service, and Split Rock Lighthouse. A detailed interpretive outline for guided tours is included along with expected learner outcomes for each of the stations on a tour. In-depth staff training, though expensive, is key to an effective and successful interpretive program. Each spring we hold two full days of training for our entire staff of 22 to 24 employees. Morning meetings are held with the daily staff each day of the season and monthly full-staff meetings are held throughout the summer.

After being open to the public for 20 years, Split Rock Lighthouse historic site's program evolved into one that gives visitors a variety of options for touring the light station. For the casual visitors, self-guiding brochures allow them to see the buildings and grounds of the light station at their own pace and to interact with stationed interpreters as they wish. Hour-long guided tours are led by site interpreters to seven tour stations, or stops, on the light station. Beginning in the 1996 season the decision was made to expand our interpretive program to include costumed interpreters who role-play either the keepers or their wives from the time period of 1925. We chose

that year as our target date for the first-person interpretation because it was the first year that the new highway allowed tourist access to the isolated light station. The head light keeper's log for 1925 shows that the isolated life at Split Rock was changing and that they were dealing with tourist traffic on a regular basis. The highway is a perfect interpretive vehicle or bridge—excuse the puns—between that historical period and our interpretation of it. Visitors today still travel the same road to see the same lighthouse, and they can relate to the historical connection between the keepers and their early visitors.

Adding a living history component to an interpretive program can greatly enrich a visitor's appreciation and understanding of a site and its content. If done right, first-person, costumed role playing can be very effective, but much care, forethought, and a high level of commitment to accuracy must accompany the decision. At Split Rock we had used costumed role playing to a limited extent for special events; because of the very positive reception, we have now incorporated it into our daily interpretation. Every day, three of our seven interpreters portray either a keeper or a wife of a keeper. A limitation at our site is that only the lighthouse and one of the three light keeper's dwellings is totally restored to the 1920s, complete with period furnishings, so the first-person interpretation is most effective inside these two buildings.

If living history is to be done with any credibility, it has to be done right. That means no short cuts on costuming—accurate period keepers' uniforms and 1920s vintage reproduction house dresses for the women. Only appropriate jewelry and hairstyles are to be worn by costumed interpreters, and even the language and slang that the interpreters use while in character have to fit the 1920s. Since the time period that we are interpreting at Split Rock is relatively recent we do not portray actual keepers and family members that served at Split Rock Lighthouse. Instead, through extensive research, we have developed composite characters based on historical information specific to Split Rock and generic qualities shared by light keepers of the time period. Biographical histories were developed for six fictional characters so that an interpreter is assigned a specific character to portray for the day.

At Split Rock we use a form of modified first-person that we call "my eyes, your eyes." If a visitor asks the 'keeper' why there is a light bulb in the lens, the interpreter will drop character enough to say, "To your eyes you see a 1000-watt light bulb that was used after the light station was electrified in 1940, but to my eyes in 1925 it looks like an incandescent oil vapor lamp that burns kerosene." Some living history sites and interpreters around the country would not break character if the site were burning down around them. This works well for some sites that have been able to totally reconstruct a given time period. At Split Rock we have found that many visitors have needs and questions that just can not be answered from a different time period and are confused, intimidated, or just plain do not want to play along. For them we will briefly break character if it will help interpret a concept or idea to them.

Additional methods of interpretation can strengthen a site's program**.** Each historic site has a unique story that should be told. There are many very good methods to facilitate the telling of that story. Interpretive film can be an extremely effective way to illustrate facts and ideas that can be difficult to convey in other ways. In our 22

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Figure 6. The lives of the Split Rock light keepers and their families in the 1920s is portrayed for visitors to the site by present-day interpretive staff and volunteers.

minute film, *Split Rock Light: Tribute to the Age of Steel*, which is shown every half-hour in our history center theater, we show how the growth of the Minnesota iron ranges led to the need for lighthouses on Lake Superior. In an age when every visitor relates to video, even short two or three minute audiovisual programs can be effective, and made inexpensively. A museum store should also act to support and reinforce the interpretive theme of the site. Selling either period craft items appropriate to the theme of the site or publications will take the visitor one step further in their understanding of the site. An exhibit gallery can allow for interactive displays or describe or illustrate ideas that supplement what the interpreters are able to do.

While all of these interpretive tools are a means to an end—understanding the past—we will never be able to recreate history in any kind of literal way. In some ways interpreting the past is like the mariner studying the lighthouse from the watery distance. Using his compass and his light list for guidance, and hoping that fog or a snow squall do not alter the beam, he keeps an eye to his one true contact with land. The actions of the past are a constant focal point; our interpretations of these actions in the present can affect how clearly we are able to see the past as it truly was.

(References for this case study can be found under the Related Activities portion of the Bibliography in Part V., Resources.)

visitors and make learning easy. Audio tours use hand-held tape decks, radio headsets, and/or telephone stations. Another tool is a well produced audio slide show, tape, or film. A room or portion of a room at the property can be turned into a small theater, used either for an introductory or post visit interpretative show. Cassettes can also be sold to help generate funds. One of the best introductory lighthouse films was created by the Minnesota Historical Society for Split Rock Lighthouse.

CAUTION: All of the above suggestions can be made into excellent interpretive tools, but, 1) the end product will be only as good as the basic research; 2) a poorly researched program or product can be worse than nothing at all. Misinforming the public is worse than not informing them at all. Base research on primary sources and use professionals when possible. Local museums and/or state museum associations may be able to assist in planning and creating a program. The American Association for State and Local History, 530 Church Street, Suite 600, Nashville, TN 37219-2325 (phone 615/255/2971) can also provide assistance. They also have several publications dealing with preservation, local history, and interpretation.

Fundraising Ideas

Montauk Point Lighthouse (New York)

This 108-foot-tall light tower sits on a bluff on the eastern end of Long Island and rises 160 feet above sea level. The U.S. Coast Guard leased the lighthouse and grounds, which include a small museum, to the Montauk Historical Society. To raise funds for the Society's restoration, Arlo Guthrie, a famous American folk singer, has given concerts to benefit the Montauk Point Lighthouse and museum. Proceeds from the concerts have contributed towards measures to control erosion of the shoreline which has threatened the lighthouse since the 1960s.

Anclote Key Lighthouse (Florida)

The Anclote Key "Save the Light" preservation group has similarly raised money. Entertainer Bertie Higgins, known for his hit song "Key Largo," performed a benefit concert in 1994 to help raise public awareness and funds for the restoration of the Anclote Key Lighthouse. He also paid for signs which were erected on the island announcing the preservation efforts for the lighthouse. The Florida poet and songwriter team of Lee Paulet and Betsy Bolger-Paulet performed a benefit concert aboard the Casablanca Cruise Ship in September 1995, also to benefit Anclote Key Lighthouse.

Fire Island Lighthouse (New York)

The Fire Island Lighthouse Preservation Society has successfully completed its 10th annual "Barefoot Black Tie," which includes a buffet dinner, auction/raffle, dancing, and entertainment, all "under the stars" by ticket only (rain or starlight). Over 500 people attended the 1996 event, coming from all over the country and arriving by car, water taxi, and private boat. The King Wellington Calypso Band provided the entertainment appropriately set in front of the lighthouse.

Grand Haven Lighthouse Catwalk (Michigan)

Lighthouse catwalks were constructed to allow the light keepers to safely transit above the long piers (1,000 plus feet) extending into Lake Michigan at Grand Haven, South Haven, St. Josephs, and Manistee, Michigan, as well as Michigan City, Indiana. The catwalks allowed the light keeper to access and tend the pierhead lighthouses by walking 10 to 12 feet above the breaking waves and ice formed during stormy weather and during the winter. Once the lighthouses were automated in the 1960s, however, the catwalks were no

longer needed by servicing or maintenance personnel.

The U.S. Coast Guard made plans to demolish the catwalks in 1987 because of their deteriorating condition—caused by ice damage to the iron supporting structure and concrete footings—and missing and rotting wood planking. The catwalks were an "attractive nuisance" to youth who would attempt to climb them even though access to the steps was fenced off and locked. There was a serious concern of possible injuries.

Grand Haven catwalk was originally constructed of wood in 1871. It was replaced by the present iron catwalk with wooden planking in 1922. The catwalk and the two lighthouses it serviced on the Grand Haven pier became landmarks to the tourist community over the years and were even featured on the city's official stationary. Coast Guard officials asked the city if it would take over responsibility for repairing and maintaining the catwalk before drafting plans and specifications for demolition. The city was not in a position at the time to assume responsibility; however, a local citizens' group, Save the Catwalk, Incorporated, was formed on May 22, 1987, for that purpose. The group worked actively with the city and the U.S. Coast Guard to develop an acceptable plan to 1) make repairs to the catwalk under a license from the Coast Guard, and 2) develop a plan (including liability

USCG photo

Figure 7. To raise funds to combat erosion problems at Montauk Point Light Station, Montauk, New York, the Montauk Historical Society sponsors concerts.

NMI photo

Figure 8. As a result of the Mid Atlantic Center for the Arts' successful fundraising and restoration program, the Cape May Light Station was transferred to that organization through the State of New Jersey. The Coast Guard still maintains access to the active aid to navigation in the historic tower.

insurance) to maintain the catwalk in the future.

The group arranged many local fundraisers to attract attention and assistance for their cause. Once the license to make repairs was issued, they removed all of the existing wood planking on the catwalk. They kept the good boards and cut them into pieces approximately 12 inches in length. Working with local artists and woodcarvers, a silk screened image of the Grand Haven lighthouses and catwalk was placed on each board. Then the wood was carved to make the lighthouses and catwalk stand out and a short history of the catwalk and the group's cause was glued on the back. Each board was sold as "a piece of the Catwalk." This innovative idea raised substantial funds which were later used for repairs and maintenance of the catwalk.

Cape May Lighthouse (New Jersey)

Cape May Lighthouse, a conical brick tower standing 157 feet tall, was completed in 1859. Over the years this lighthouse and others of similar design built along the mid-Atlantic seaboard during the 1850-1870 era, have shown significant structural deterioration. Repairs to the Cape Lookout Lighthouse, North Carolina, (of similar design and built during the same period) to prevent structural collapse of the lantern room cost approximately $300,000 in 1988. Likewise, the Cape May lighthouse needed repair work totaling $200,000-300,000. The U.S. Coast Guard placed this maintenance/repair project on its agenda, and although this work was necessary, it was lower priority than many other repair projects. The high cost of the lighthouse repairs prevented funding; the lighthouse continued to deteriorate, with the only maintenance being performed by servicing personnel who had very limited capabilities.

In 1983, a local citizens group, the Mid-Atlantic Center for the Arts (MAC), expressed an interest in leasing the Cape

May Lighthouse from the U.S. Coast Guard for restoration and public education. After extensive negotiations between the U.S. Coast Guard, the state of New Jersey's Department of Environmental Protection and Energy (NJDEPE), and the MAC group, an agreement was reached. In December 1986 the Coast Guard leased the lighthouse to NJDEPE's Division of Parks and Forestry, which operates an adjoining state park. At the same time, the NJDEPE signed a sublease with the Mid-Atlantic Center for the Arts to restore, maintain, and open the structure to the public.

MAC hired restoration architects to determine the cost to restore the lighthouse. The architects projected that $1,000,000 would be needed over a ten-year period. Over $500,000 has been spent already by the group to allow the public to safely climb to the top of the tower.

The group used many innovative and successful fundraising ideas to pay for completed and planned repairs. In addition to giving tours of the tower and selling lighthouse souvenirs such as T-shirts, pictures, books and magnets, they initiated 'brick owner certificates'. For a nominal $1 a visitor could get a certificate stating that the bearer of such certificate 'owns' one brick of the Cape May Lighthouse in recognition for their contribution to the restoration of this historic landmark. Larger contributors were recognized for 'purchasing' steps ($100), windows ($500), and landings ($1,000). In addition to receiving certificates, contributors of $500 or more were included on a bronze plaque mounted on the first floor of the lighthouse.

As a result of MAC's successful fundraising and restoration plan, the Coast Guard transferred ownership of the Cape May Lighthouse to the Mid-Atlantic Center for the Arts in 1992. U.S. Coast Guard personnel still retain access rights to maintain the active light and associated equipment atop the lighthouse. This undertaking was a win-win situation for both the local community and the U.S. Coast Guard and is an excellent example of how leasing/privatization of lighthouses can succeed under the right management and circumstances.

Funding Sources

The National Historic Preservation Act provides financial support to state historic preservation programs from the *Historic Preservation Fund* managed by the National Park Service. Using these funds allocated to each state, State Historic Preservation Offices provide grants for historic preservation activities throughout each state. At least 10 percent of the HPF allocated to each state must be granted to local governments whose preservation programs have been certified by the State Historic Preservation Officer and the Secretary of Interior. The *certified local government* can use these funds for a variety of historic preservation activities, subject to guidelines established by the National Park Service. A number of states have state-funded grant or loan programs to support historic preservation activities including purchase, rehabilitation, and acquisition of easements on historic properties. Contact your SHPO to receive guidelines on application for federal and state funds and to determine if your project could qualify for certified local government funds.

The *Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)* declares that it is national policy "to develop a National Intermodal Transportation Systems that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner." ISTEA requires coordination in transportation planning

between state transportation departments and metropolitan planning organization, and these planning efforts must have a significant public participation component. An important feature of ISTEA is that a minimum of 10 percent of Surface Transpiration Program funds allocated to each state must be used for "transportation enhancement activities." Eligible enhancement activities include acquisition of scenic easements and scenic or historic sites; landscaping; and rehabilitation and operation of historic transportation buildings, structures, or facilities including lighthouses.

The *Housing and Community Development Act of 1974*, as amended, include many provisions including historic preservation. In 1974, the existing law was changed to combine a number of categorical grant programs into a single program under which the Department of Housing and Urban Development (HUD) provides Community Development Block Grants (CDBG) to local government, which have broad discretion in their use. CDBG funds can be used to support historic preservation activities, as well as activities that may damage historic properties. The local government that receives the grants, not HUD, is responsible for compliance with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act. Participation in a local government's housing and community development program is an important activity for many local preservation programs.

Section 170(h) of the *Internal Revenue Code of 1986* permits income and estate tax deductions for charitable contributions of partial interests in historic property. Generally, the donations of qualified real property interest to preserve a historically important land areas or a certified historic structure meets the test of a charitable contribution for conservation purposes. For purposes of the charitable contribution provisions only, a certified historic structure need not be depreciable to qualify, may be a structure other than a building, and may also be a remnant of a building, such as a facade, if that is all that remains, and may include the land area on which it is located.

State arts and humanities councils are also a possible source of funding for particular preservation projects. Private foundations and charitable organizations that fund projects in special fields of interest to your project may also be possible sources of funding. For information on these and other possible funding sources, contact your State Historic Preservation Office and the following sources:

National Endowment for the Humanities
1100 Pennsylvania Avenue, N.W., Suite 318
Washington, D.C. 20506
(202) 606-8310

National Endowment for the Arts
1100 Pennsylvania Avenue, N.W.
Washington, D.C. 20506
(202) 606-5437

The Foundation Center
1001 Connecticut Avenue, N.W.
Washington, D.C. 20036
(800) 424-9836

Use of Volunteers/Community Involvement

One the most important resources in any restoration or interpretation effort is the use of volunteers. Forming partnerships with members of the community where the lighthouse is located can be the most critical element in the success of a lighthouse project. Local businesses may be willing to support restoration projects with donations of supplies or expertise. Citizens may want to show their support not just in monetary ways, but with their time and expertise.

CASE STUDY: Point San Luis Lighthouse Keepers

by Robert S. Vessely, Point San Luis Lighthouse Keepers

The Point San Luis Obispo Light Station at Avila Beach, California, was automated in 1973; subsequently the Coast Guard personnel were moved out of the station and the property was closed. Maintenance and security of the site fell to the personnel of the Port San Luis Harbor District which owns and manages the adjacent harbor. In 1992 the light station and its 30-plus acre reservation were granted to the Harbor District on the condition that the buildings and site be restored in conformance with the *Secretary of the Interior's Standards and Guidelines for Historic Preservation Projects* and be opened to the public.

Almost immediately, the Harbor District and the Land Conservancy of San Luis Obispo County began to study the site and raise funds for its restoration. To handle the dimensions of the task, they set up an organization in 1994—the Point San Luis Lighthouse Keepers—independent of both the Harbor District and the Land Conservancy, for the sole purpose of carrying out the conditions of the agreement. The Lighthouse Keepers is an all-volunteer, nonprofit organization, made up of a wide variety of individuals from throughout the county. Through community outreach and word-of-mouth, the Keepers have developed a solid core of members who are consistently involved and a peripheral group of helpers and patrons.

When the Lighthouse Keepers began to analyze the site, they found a mixed blessing. Many of the original buildings remained, but the weather, vandalism, and theft had taken a serious toll. Fortunately, the fourth-order Fresnel lens had been removed from the tower in 1976 and safely kept in the County Historical Museum. The original tower, which is attached to the head keeper's quarters remains largely intact along with the whistle house, coal house, oil house, catch water basin and cisterns, and one privy. Originally there had been another privy and a 'double dwelling' for the assistant keepers, but they were removed by the Coast Guard. Two new assistant keepers' quarters have been added, one in about 1950 and the other in 1961. The pier that was originally the only means of supply for the station had been damaged and was removed by the Coast Guard.

Fortunately, the roofs of the buildings were in reasonable condition and kept the rain out. Unfortunately, many of the windows and doors had been broken out by vandals. The head keeper's quarters had been stripped of nearly everything, including door and window hardware, light fixtures and even many of the stone mantle pieces. When the Lighthouse Keepers took over, there was literally only one set of door knobs left and a couple of window latches. Since the head keeper's quarters had been partially open to the weather, many of the double-hung window pulleys had been almost completely dissolved by the marine air.

Aside from the restoration issues, the Keepers are faced with a significant access obstacle. The road to the light station is a narrow, winding, one-lane road precariously perched on the bluff above the bay. In addition, it crosses land owned by Pacific Gas and Electric Company (PG&E), which operates the Diablo Canyon nuclear power plant just four miles up the coast from the light station. Originally the road was built

Point San Luis Lighthouse Keepers photo

Point San Luis Lighthouse Keepers photo

Figures 9 and 10. The Point San Luis Keepers devote one Saturday a month to preserving the San Luis Obispo Light Station, Avila Beach, California.

on an easement granted by the previous property owner, but whether or not the easement is transferable is not clear. PG&E will allow the Lighthouse Keepers access for restoration work, but will not allow access by the general public. Clearly, the legal and physical status of the road will have to be improved before the light station can be opened to the public. The Lighthouse Keepers and the Harbor District have explored the idea of replacing the light station pier, but the complications and costs of that are just as daunting.

The Lighthouse Keepers have organized on a number of fronts. Committees have been set up to study the buildings and make recommendations about restoration, to collect oral histories from people who lived at or had contact with the light station when it was in operation, to study the access issues, and to work on fundraising. Monthly work days have been established. One Saturday each month the group cleans, trims trees, replaces windows, scrapes and applies paint, inventories doors or

hardware, and documents the buildings and site. These workdays have proven to be an important part of the 'glue' that holds the Lighthouse Keepers together. Everyone enjoys the work days—skilled professionals and others as well. It's a chance to have a 'hands-on' part in the restoration.

Relocating Lighthouses

Recently there has been much publicity over the movement of lighthouses in an effort to save them from impending dangers such as erosion. When the Lighthouse Establishment approved the first Sharps Island Lighthouse, built in 1837 in Chesapeake Bay, the plans called for a small wooden keeper's house surmounted with a lantern and designed with 'wheels' so it could be easily moved in the event that erosion threatened the structure. The lighthouse was so moved in 1848, presumably on these wheels.

Likewise the U.S. Lighthouse Board well understood the dangers of erosion; several lighthouses were specifically designed to be moveable. In areas with shifting and eroding beaches, cast-iron plate towers were designed so they could be disassembled and re-erected as needed. This was relatively easy to accomplish as the prefabricated, curved, cast-iron panels were bolted together. Cape Canaveral Lighthouse (1868), Florida, and Hunting Island Lighthouse (1875), South Carolina, are examples of this design; both have been successfully moved.

The National Park Service has conducted studies which conclude the safest method to preserve Cape Hatteras Lighthouse, which is presently being threatened by erosion, is to move it back from the beach front. Ironically, some citizens argue that such a move will destroy the integrity of the lighthouse setting. Actually, when the Cape Hatteras Lighthouse was built in 1870, it was located approximately one-half-mile inland to protect it from beach erosion. But erosion of the beach has encroached to the point where it now endangers the structure. The movement inland of the lighthouse and its other station structures would in reality present a more appropriately true setting of the lighthouse as it appeared when it was first completed.

Should a lighthouse be moved? The best answer is no—unless the structure is threatened by destruction. While any historic structure is best located in its original location, it is better to have a historic structure in a non-original location than to have no historic structure at all. If a move is necessary to save the structure, every effort should be made to maintain as much of the original station integrity as possible. The lighthouse tower should normally have the same orientation to the water as it had before the move. Other station structures should be similarly moved to demonstrate the same relationship of one structure to the other. Landscaping can also be used to help restore the original setting of the station. Before any move of any historic structure is undertaken, contact your SHPO. Any historic structure listed in the National Register of Historic Places may lose such designation once moved. If a move is absolutely necessary and approved by the SHPO, make sure the move is conducted by a reliable moving company with proven success.

ICC photo

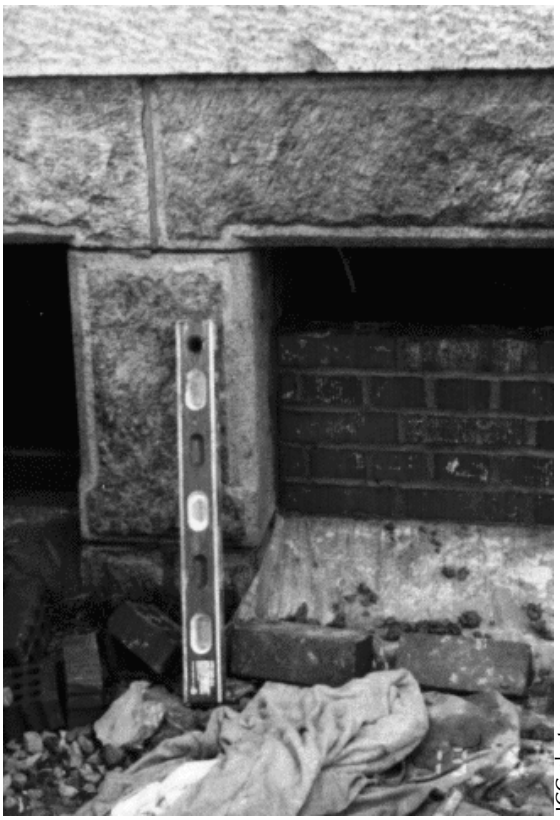
Figure 11. Block Island Southeast Light Station before the move.

CASE STUDY: Relocation of the Block Island Southeast Lighthouse

by Mike E. Prible, International Chimney Corporation

When originally constructed in 1873, Block Island's Southeast Lighthouse rested safely atop Mohegan Bluff on the Southeast tip of Block Island, Rhode Island, approximately 150 feet above sea level. By 1993, 120 years of erosion had whittled the 300 feet of land between the lighthouse and the edge of Mohegan Bluffs down to a mere 55 feet, putting the lighthouse in danger of crashing into the sea.

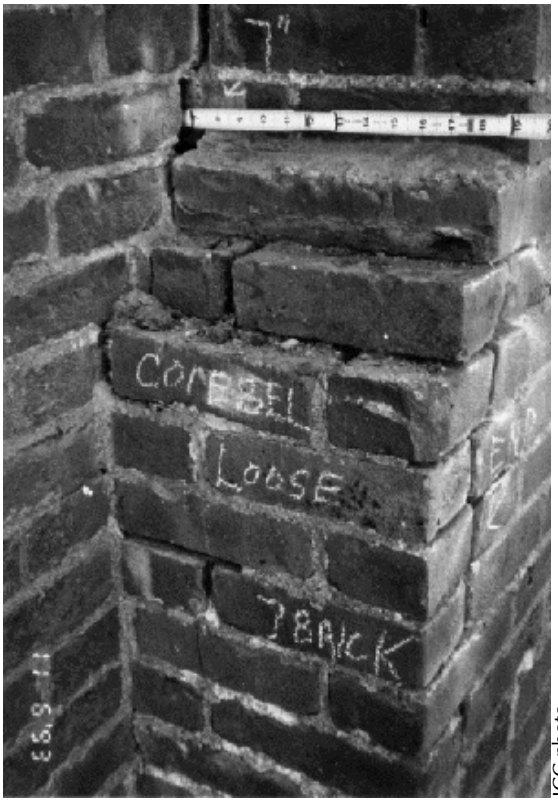
Thanks to local preservation efforts, money was raised to save the historic lighthouse. In February 1993, International Chimney Corporation (ICC) of Buffalo, New York, was awarded a $1.9 million dollar contract by the U.S. Army Corps of Engineers to move the lighthouse to safety, back away from the edge of Mohegan Bluffs. The move was paid for with money raised by local sources and funding from the State of Rhode Island and the Federal Government. ICC's plan called for the entire lighthouse, complete with attached masonry building and upper portion of the original foundation, to be moved intact.



ICC photo

Figure 12. In preparation for the move, the cellar windows openings are temporarily bricked in to stabilize the masonry above the lift point.

An ingenious and complex system was devised to move the lighthouse over its 360-foot journey. Pete Friesen, a noted consultant in the house-moving field worked with ICC to design the move. In simplified terms, the entire weight of the lighthouse (estimated at a total of 4,000,000 pounds) was to be transferred from its masonry foundation to a grid of



ICC photo

Figure 13. A complete structural survey of the building was performed and documented in order to perform the structural repairs necessary to move the building intact. All loose or eroded mortar joints were cut out and carefully pointed with a new mortar mix designed to closely resemble the original. All chimneys were braced and cabling installed around the perimeter to catch problem areas.

ICC photo

Figure 14. The concrete floor of the light tower was removed and earth excavated by hand in order to perform stabilization from the interior of the structure.

crisscrossing steel beams and then pushed along tracks to its new home. The tracks were made of steel beams with case-hardened strike plates and laid on oak cribbing along a zig-zag path between the old lighthouse location and the new. In all, approximately 800,000 pounds of steel was used in the beam grid and track system.

In April 1993, after a detailed engineering analysis and planning, the design was complete. Preparations at the site began. The 237,000-candle-power Fresnel lens, handcrafted in France (seen from as far away as 22 miles), was packed with sound- and vibration-dampening insulation to protect it during the move. Fire escapes and porches were removed, with porch roofs left in place. All mechanical equipment was removed from the basement. Six feet of earth was excavated from around the entire lighthouse and a path between the original foundation and the new foundation was excavated—a total of approximately 5,000 cubic yards of earth in all. Cellar windows were bricked in, the beam grid system installed, a new 18-inch-thick reinforced concrete slab foundation constructed, and other preparations made. Approximately 245 yards of concrete, 75 yards under the tower and 170 yards under the building, and 72,000 pounds of steel reinforcing were used in the new slab foundation. Other reinforcing included wooden bracing in window openings and around chimneys, 3/4-inch-diameter steel cabling around the entire structure, temporary wooden bracing supporting porch roofs, and bricked-in window openings.

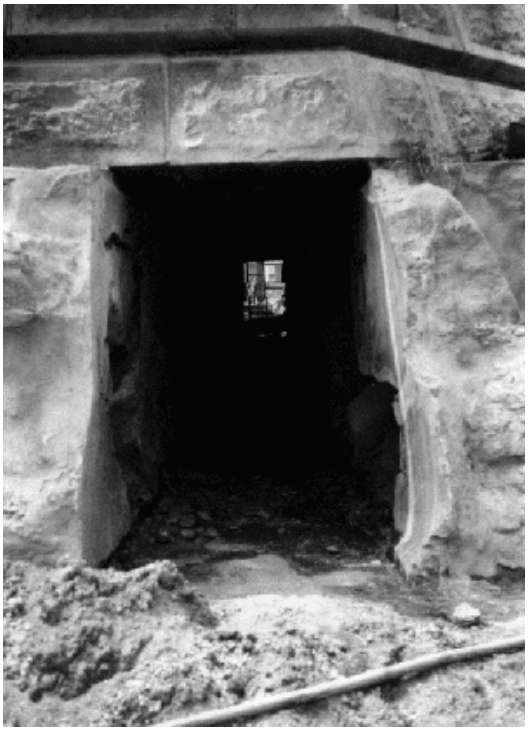
Transfer of the lighthouse to the beam grid was accomplished by cutting holes

through the original foundation, below grade level; then beams were inserted through the holes, in one side of the building and out the other. Multiple levels of beams were required. The lighthouse rested on an upper level of cross beams that were perpendicularly seated on four duplex main beams, which would house the hydraulic jacks. Thirty-eight hydraulic lifting/levelling jacks (capable of lifting 60 tons each) were installed to lift the lighthouse and to keep it level during the move. Thirty-eight 75-ton Hilman roller dollies were installed under the jacks. Once all the beams were in place, remaining portions of the foundation (the area between holes cut in the foundation) were removed. ICC worked in unison with Expert House Movers, a subcontractor experienced in moving large structures.

Following the transfer of the lighthouse load from its foundation to the beam grid, all 38 hydraulic lifting jacks were activated in unison and the entire structure was raised vertically approximately 2 feet from its original elevation. The structure was then cribbed on oak timbers, tracks positioned below and parallel to the main beams, and the hydraulics for the jacks rerouted to three separate zones to allow for compensation on uneven surfaces during travel, i.e., no stress would be placed on the structure if a bump or soft spot was encountered, because the structure would roll like a ship rather than bend. By August 11, 1993, preparations were complete. The lighthouse was ready for the move.

ICC photo

Figure 15. A hydraulic chain saw with industrial diamond teeth is being used to cut openings below the grade line for insertion of the steel beams.



ICC photo

Figure 16. Close-up of the opening for the beam cut by the wire saw measuring 5 feet high by 3 feet, 6 inches wide. The depth of the cuts ranged from 18 inches to 16 feet for multiple wall cuts.

ICC photo

Figure 17. A foundation slab is being poured using 36 tons of rebar and 245 yards of concrete. This 18-inch-thick slab was designed to handle the dynamic load of the building travelling across the slab to its final position.

ICC photo

Figure 18. Large cross steel beams are inserted into the cut opening to form part of the grid that will carry the building.

ICC photo

Figure 19. Once the initial lift was performed, the remaining foundation between the beams was removed.

ICC photo

Figure 20. Four hydraulic rams set into the track steel pushed against the main steel to set the lighthouse in motion.

The move was accomplished by pushing the lighthouse along its newly installed track system in 5-foot increments with four hydraulic pushing rams (capable of pushing 30 tons each). After the lighthouse was pushed approximately 5 feet, all four pushing rams had to be retracted for the next 5-foot move. The lighthouse did not travel in a straight line from its original location to its new home. If this were done, loads on the network of beams under the lighthouse would have become too uneven. Instead, the move was accomplished in three separate stages (legs). Time was required between legs of the move for changes in the track system in preparation for the 90-degree change in direction the lighthouse was about to take.

On August 24, 1993, Block Island Southeast Lighthouse reached its new home. It sat positioned with approximately 5 feet between the top of its new reinforced concrete slab foundation and the underside of remaining portions of its original masonry foundation. Solid brick was laid to fill the 5-foot gap (approximately 80,000 brick were required). Beams used to support the lighthouse during its journey were removed after brick was laid between the beams to carry the load. Wooden bracing and other temporary measures were removed; porches were installed; grading, landscaping, and final cleanup tasks completed. Once again, the Block Island Southeast Lighthouse rests a safe distance from the edge of Mohegan Bluffs, still facing in its original direction.

Subsequent restoration work performed in 1994 focused on the stabilization of the lower gallery deck and disassembly, repair, and isolation of all lantern elements. This

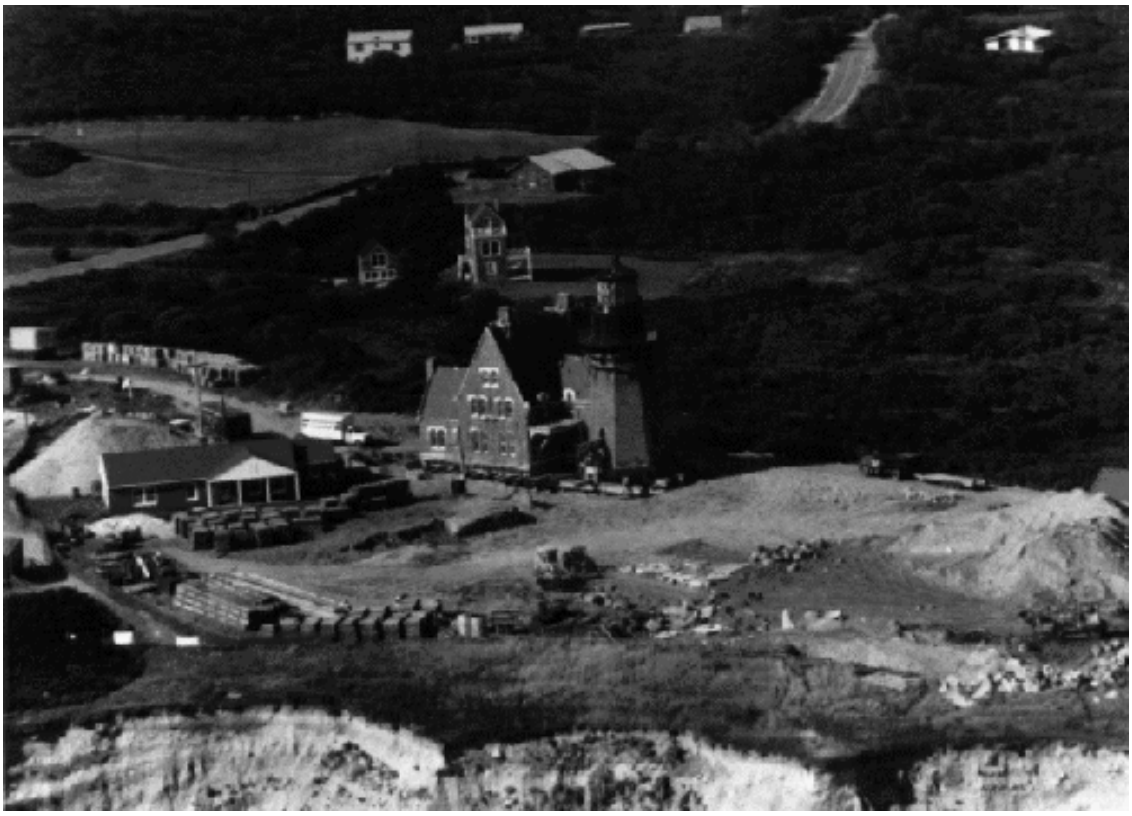
ICC photo

Figure 21. After the first leg of the journey was completed, the track steel was repositioned for a 90° turn.

ICC photo

Figure 22. Construction of a new foundation around the support beams.

included removal of the existing lens and pedestal, the design and installation (by the Coast Guard) of a different fixed lens, and installation of a new lens support platform.



ICC photo

Figure 23. On August 23, 1993, the Block Island Southeast Light Station reached its new home.

Safety Management Issues

Lighthouse towers were not designed for access by the general public and were built before modern building code regulations. Therefore, providing safe access to light towers for the general public is challenging. The most serious concerns include: tripping on stairs; falling, either deliberately or unintentionally, from the tower; throwing of objects from tower; visitor behavior; emergency evacuation; and fire safety. Because of these concerns, some lighthouse sites restrict public access to the tower altogether.

Tripping: Proper lighting and handrails are the two most critical methods for reducing tripping on stairs. Most stairs in lighthouse towers consist of a spiraling series of pie-shaped treads. The narrow part of the tread toward the center of the tower is the most dangerous because there is usually no hand rail and the tread to riser ratio of the stair makes a misstep more likely to lead to a trip, possibly resulting in a fall. Precautions used at some lighthouses include the placement of a second inner handrail about two-thirds of the way across the tread. This keeps visitors from using the narrow portion of the tread and provides a second handrail. In larger lighthouses where the tread is wide enough, visitors going up can use the outer handrail along the inner wall of the tower and visitors going down can use the inner handrail. In smaller towers where it is difficult for visitors to share the stairs going both up and down, it may be necessary to limit access to guided tours and/or alternating one-way sections along the stairs; similar to traffic lights on a one-lane bridge.

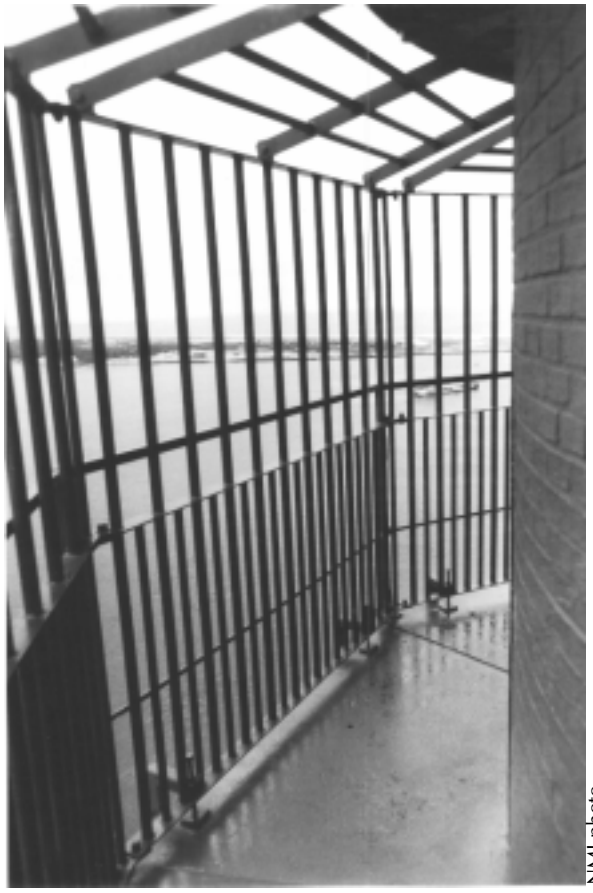
Stairwells are often not well lit so that sections between landings where windows are usually located are dark. On cloudy days these sections become even less well lit. Artificial lighting can also create problems if not well designed. For example, many treads in light towers are cast-iron treads with perforations cast into them to make them lightweight. Light directed from below may shine through the treads and/or around them, making the tread surface appear less visible to those descending the stair. Strong light directed into the eyes of climbers can also affect their ability to see the stair tread surfaces properly. At one lighthouse tower (Cape May), strip lighting, similar to that seen in movie theater isles, was placed under the nose of each tread illuminating the surface of the tread below. Installations of such systems can be made reversible so they do

NMI photo

Figure 24. Visitors are prohibited from the Barnegat Lighthouse's lantern room; however, they can view it from the watch room through plexiglas sheets. While these protective sheets prevent access to the lantern room, they do collect dust and need periodic cleaning. In other lighthouses, a person is stationed in the watch room to prohibit access to the lantern room as well as control visitor behavior.

not permanently harm the historic fabric of the structure.

Falling: For those lighthouses where visitors are allowed to access the gallery decks around the watch room and/or lantern, special precautions must be taken to keep visitors from accidentally falling or from attempting suicide. Some visitors who are not in good health, while climbing the stairs and/or upon reaching the gallery deck may experience dizziness, cardiac or respiratory distress, disorientation, fear of heights, unsteadiness of legs, etc. High temperatures in the upper portion of a tower may also be a health hazard. All of these symptoms may contribute to accidental falling. The most effective method used by many lighthouse groups is to build a metal cage that fits around the gallery deck. The maximum space between pickets should be no more than four inches (BOCA, Building Officials & Code Administrators, International). The pickets need to completely extend to a structural element above or bend back to the tower/ lantern wall so no one, even if deliberately climbing, could get over the top. One lighthouse suicide in 1995 was accomplished by climbing between overhead cage pickets with 9-inch spacing. Cages can be designed so they are attached reversibly to light towers without doing any permanent damage to the historic fabric of the structure.



NMI photo

Figure 25. To protect visitors from falling or jumping from a lighthouse tower, a safety railing system or 'cage' is often built around the gallery decks. The cage at Barnegat Lighthouse was designed so that it has minimal impact on the historic structure and can be removed with little, if any, damage to the original fabric. Note that the cage is also enclosed to prevent climbing over the top.

NMI photo

Figure 26. Note how the cage is clamped to the gallery deck, minimizing any impact on the structure's original fabric.

Throwing Objects: The throwing of objects from any height can cause serious harm, even death, to visitors below. The use of screens, such as rat-wire, will limit such practices but can also detract from the visitor experience. Most lighthouses have adopted the practice of prohibiting the throwing of objects from the tower as part of the rules for being admitted to the tower. Docents must be present at the top of the tower to remind visitors, especially children, of such rules.

Visitor Behavior: While most visitors do not run up or down stairs, push or pass others on the stairs, climb rails, throw objects, or "horse around," there will always be that small faction who do. Children often run ahead of their parents and essentially become unchaperoned; large school groups also can be problematical. Others just do not realize the hazards of a lighthouse tower. Many lighthouse groups have devised "rules" for visitors which are posted at the base of the tower and which visitors are expected to follow. These same rules are often provided in onsite brochures. Caution can also be indicated on signage, warning those in poor physical condition of potential hazards to their health. It is helpful to indicate the total height of the climb and number of stairs to the top. Some larger lighthouses which have stair landings provide a cross-section of the tower plan showing visitors where they are in relation to the top or bottom of the tower. Many lighthouses also have someone at the bottom and someone at top to help control visitors.

Weather conditions: Adverse weather conditions such as high velocity winds, rain, and lightning may force lighthouse sites to close temporarily for safety reasons.

Emergency Evacuation for Injury & Accidents: The most probable injury/ emergency is an accident from tripping, falling, or heart attack. Most lighthouse groups have a person on station at the bottom and one at the top of the tower. For tall towers this is essential. These individuals must have communication between themselves and outside help in the form of a telephone or walkie talkie. They should be trained in first aid, CPR, and have a clear understanding of when to and when not to move an injured individual. They should also have written guidelines on proper procedures for notifying the police and/or ambulance. It is highly recommended to keep a well stocked first-aid kit onsite at all times.

Fire: Another concern is fire. Smoke in the tower can make emergency evacuation from a tower very difficult. This is especially true for a light tower attached to a keepers quarters or other structures where a fire might begin and affect evacuation from the tower itself. Staff, whether paid or volunteer, must have training in fire evacuation procedures, which in some cases may require keeping visitors on the gallery deck instead of descending into the smoke. Smoke detectors are difficult to position in a lighthouse tower as smoke is not trapped until it reaches the watch room and/or lantern. Many types of smoke detectors are not rated for use in unheated buildings or for below-freezing temperatures; towers in areas with subfreezing environments will require another solution. Lighthouse towers are not treated as a separate building type in code books. One lighthouse tower was successfully evaluated as an aviation traffic control tower as far as meeting fire code concerns. Lighthouse organizations need to work closely with their local fire marshal and code officials. Preparation of fire safety objectives is strongly recommended (see following text, "Fire Prevention and Protection Objectives").

Americans with Disabilities Act (ADA): Providing accessibility for people with

disabilities in historic lighthouses and associated structures is an important and challenging task. To balance accessibility and historic preservation mandates, owners of historic properties should take care to provide the greatest level of accessibility without threatening or destroying features and materials that convey a property's significance. New construction and alterations to historic properties, including restoration and rehabilitation, must meet specific accessibility requirements (in general, maintenance, such as reroofing and painting, do not trigger specific compliance requirements). While ADA regulations mandate that accessibility for the disabled be given priority, if it is not possible to make a historic building physically accessible without threatening or destroying its significance, which is the case with most lighthouses, alternative methods of access must be used. This includes management of interpretive programs and media, such as audio/visual materials and other interpretive devices which show inaccessible areas of the historic property, and/or displays and written material located where it can be used by an impaired, challenged, or disabled person. These alternatives are only possible for "qualified historic properties" such as those listed or determined eligible for listing on the National Register of Historic Places, and those designated under State or local law, and only after consultation and approval from your State Historic Preservation Officer (SHPO) (see Part VI., **Resources** for SHPO list). A useful free brochure on this issue, "Preserving the Past and Making it Accessible for People with Disabilities," is available from the National Park Service's Heritage Preservation Services (see Part VI., **Resources**).

Fire Prevention and Protection Objectives

Despite the fact that most lighthouses are constructed of noncombustible materials,[1] fire can still be a threat to historic lighthouses. The impacts of a fire are devastating and will often cause serious irreversible damage and loss of historic fabric, not to mention injury or even death to its occupants. Fire prevention and protection work together to create a fire safety plan. The working assumption must be that there will be a fire despite the best prevention efforts. Fire safety plans for the control of a fire, or for understanding the consequences of lack of fire control, must be developed and must be realistic. Prevention planning is the most important element of protecting historic lighthouses and their admiring public from fire.

A systematic approach to fire prevention should seek to satisfy the following three general fire safety objectives: prevent fire ignition; control the effects of fire should one start; and protect the building occupants and contents from the effects of a fire. A fire safety plan would also help in identifying those architectural features of the lighthouse which are significant; part of the plan would be to identify ways to limit damage to the structure caused by fire, smoke, and firefighting efforts.

In historic lighthouses the most important of these three goals is to prevent fire ignition. Fire prevention management is essentially the control of possible ignition sources within the lighthouse. Three conditions contribute to ignition: inadequately controlled ignition sources, hazardous arrangements of fuel, and circumstances or behaviors that bring the two together.

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[1] Twelve percent of all lighthouses are constructed of wood according to the National Park Service's *1994 Inventory of Historic Light Stations*.

There is seldom a high degree of control over these conditions. Consequently, lighthouse managers must be alert to their possible presence in a project and be prepared to control or compensate for them.

Identify possible ignition sources such as fuel and seek to control or eliminate them. The three most common sources of ignition are: open flame (especially related to careless use of smoking materials), electrical energy (arc), and mechanical energy (friction).

Suggestions for minimizing the threat of ignition are:

- To minimize fires caused by vandalism the interior should be kept clean and free from storage of maintenance and operational equipment and supplies. This includes items such as fuel containers, old batteries, lawn mowers, bulk paper, or rags, etc., as well as combustible materials. Grounds should be kept in a similar manner. Security is another high priority and all openings should be secured to prohibit unauthorized entry.
- To minimize the threat of an electrical fire, any existing electrical service should be inspected by a licensed electrician. Any deficiencies should be corrected or the service should be disconnected if there is no need for power. This is especially critical during times of stabilization or mothballing when the structure is likely to be unoccupied for long periods of time.

Tragically, another frequent cause of fire is construction activities. Work taking place during the protection and stabilization phase has often created dangerous situations sometimes leading to disaster. Careful planning and oversight of construction activities should include the development and use of a strict fire safety plan. Storage of combustible or volatile construction or housekeeping materials such as paints, solvents, cleaning fluids and rags, packing materials, or fuels in the lighthouse must be prohibited.

- Open flames should not be allowed in or near the lighthouse. If the structure has a fireplace or stove pipe connection, chimneys, flues, or stoves, they should be inspected regularly and fires permitted only under strict guidance with properly rated fire extinguishers nearby. The use of fire in a historic setting for interpretive reasons must be carefully considered. Smoking should be prohibited in all locations.
- Hazardous areas, such as a generator room, should be compartmentalized and separated through the use of fire-rated partitions if they are located in the historic lighthouse. Removing this type of use from the historic structure is another alternative.

NFPA[2] 241 "Safeguarding Construction, Alteration and Demolition Operations"; NFPA 911 "Protection of Museums and Museum Collections"; and NFPA 914 "Recommended Practice for Fire Protection on Historic Structures" offer valuable guidance in developing fire prevention and protection strategies.

Suggestions for controlling the effects of fire after one has started:

- Fire extinguishers should be located at various positions throughout the lighthouse for prompt use in the event of a localized emergency. Local authorities should be brought in for a tour of the structure and grounds so they may assist in planning the number, type, and location of fire extinguishers or other firefighting equipment. Fire extinguishers require annual inspection and maintenance. Some types should not be subject to below-freezing temperatures.
- In populated areas a Neighborhood Watch program can be organized in cooperative effort with local police and fire department authorities. An intrusion alarm system connected to a central station alarm will alert managers to vandalism events.
- There are two ways to detect a structure fire: human observation and fire-detection systems. Unfortunately, most historic lighthouses are no longer occupied on a full-time basis. Therefore,

[2] National Fire Protection Association (NFPA), Quincy, Massachusetts, 617/ 770-4543

photoelectric smoke detectors and mechanical heat detectors should be used to supplement the human detector capability when it makes sense. Photoelectric- or ionization-type smoke detectors are not rated for use in below-freezing environments. Consult with local authorities or professionals for placement, number, and types of detectors.

A combination of heat and smoke detectors connected to a central station alarm is an effective way to detect fires when a signal can be relayed to authorities who can respond in a timely manner. Heat and smoke detectors must be used to create a system designed for each individual structure as each building has its own unique fire behavior. The use of these systems is more problematic with lighthouses located in remote areas, although an emergency response plan should still be developed.

- An evacuation plan should also be developed with the local authorities. The performance of the tower itself as a natural chimney must be carefully considered, especially if the attached vestibule house or dwelling house construction is combustible. Since most lighthouse towers have only one means of egress, and that may be through a combustible structure, evacuation must be carefully planned. This plan should be posted at entry points and available onsite for education of all docents.
- An emergency or disaster plan should be drawn up by responsible parties. Local authorities should have input. Meeting with the local fire department or volunteer fire company is a first step. Orientation to the structure will familiarize the authorities with the nature of the structure and will allow for discussion of local options for dealing with fire prevention, detection, firefighting strategies, and other emergencies. This plan should also identify the important architectural features of the structure which warrant special attention and protection during firefighting operations.

An important part of managing a fire is support for firefighters. Develop a firefighting plan with the local authorities as part of the emergency or disaster plan. There may be specific character-defining features of the lighthouse that are more important to protect than others. Historic lighthouse managers should talk about these concerns with firefighting officials. Work with them to develop strategies for placement of water streams and identification of locations where smoke vents will be opened through the structure. Loss of historic fabric is inevitable, but identifying what is important will help fire fighting officials plan their strategy to minimize damage to the historic lighthouse.

Protecting the building occupants and contents from the effects of a fire is an important consideration, especially at sites where the lighthouse complex is open to the public and may include museum facilities housing precious, irreplaceable artifacts. In these instances careful attention must be given by lighthouse managers to the primary protection of life safety and secondarily to the museum artifacts. Working with registered architects or fire department authorities to develop a realistic and manageable fire safety program should be a top priority for the historic lighthouse management community.

See also the following references: NFPA 1 “Fire Prevention Code”; NFPA 10 “Standards for Portable Fire Extinguishers”; NFPA 17 “Standard for Dry Chemical Extinguishing Systems”; NFPA 70 “National Electrical Code”; NFPA 78 “Lightning Protection Code.”