

Appendix I National Parks Service Mothball Report

Appendices

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31 PRESERVATION BRIEFS

Mothballing Historic Buildings

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National Park Service
Cultural Resources
Heritage Preservation Services

When all means of finding a productive use for a historic building have been exhausted or when funds are not currently available to put a deteriorating structure into a useable condition, it may be necessary to close up the building temporarily 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 building while planning the property's future, or raising money for a preservation, rehabilitation or restoration project. If a vacant property has been declared unsafe by building officials, stabilization and mothballing may be the only way to protect it from demolition.

This Preservation Brief focuses on the steps needed to "deactivate" a property for an extended period of time. The project team will usually consist of an architect, historian, preservation specialist, sometimes a structural engineer, and

a contractor. Mothballing should not be done without careful planning to ensure that needed physical repairs are made prior to securing the building. The steps discussed in this Brief can protect buildings 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 building cannot survive indefinitely in a boarded-up condition, and so even marginal interim uses where there is regular activity and monitoring, such as a caretaker residence or non-flammable storage, are generally preferable to mothballing. In a few limited cases when the vacant building is in good condition and in a location where it can be watched and checked regularly, closing and locking the door, setting heat levels at just above freezing, and securing the windows may provide sufficient protection for a period of a few years. But if long-term mothballing is the only remaining option, it must be done properly (see fig. 1 & 2). 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 surveillance monitoring.

Comprehensive mothballing programs are generally expensive and may cost 10% or more of a modest rehabilitation budget. However, the money spent on well-planned protective measures 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 9 steps are involved in properly mothballing a building:



Figure 1. Proper mothballing treatment: This building has been successfully mothballed for 10 years because the roof and walls were repaired and structurally stabilized, ventilation louvers were added, and the property is maintained. Photo: Charles E. Fisher, NPS.



Figure 2. Improper treatment: Boarding up without adequate ventilation, lack of maintenance, and neglect of this property have accelerated deterioration. Photo; NPS file.

Documentation

1. Document the architectural and historical significance of the building.
2. Prepare a condition assessment of the building.

Stabilization

3. Structurally stabilize the building, based on a professional condition assessment.
4. Exterminate or control pests, including termites and rodents.
5. Protect the exterior from moisture penetration.

Mothballing

6. Secure the building and its component features to reduce vandalism or break-ins.
7. Provide adequate ventilation to the interior.
8. Secure or modify utilities and mechanical systems.
9. Develop and implement a maintenance and monitoring plan for protection.

These steps will be discussed in sequence below. Documentation and stabilization are critical components of the process and should not be skipped over. Mothballing measures should not result in permanent damage, and so each treatment should be weighed in terms of its reversibility and its overall benefit.

Documentation

Documenting 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 structure if it has been vacant or is deteriorated. It may be advisable to shore temporarily areas appearing

to be structurally unsound until the condition of the structure can be fully assessed (see fig. 3). 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 building. Consideration should be given to hiring a firm specializing in hazardous waste removal if these highly toxic elements are found in the building.

Documenting and recording the building. Documenting a building's history is important because evidence of its true age and architectural significance may not be readily evident. The owner should check with the State Historic Preservation Office or local preservation commission for assistance in researching the building. If the building has never been researched for listing in the National Register of Historic Places or other historic registers, then, at a minimum, the following should be determined:

- The overall historical significance of the property and dates of construction;
- the chronology of alterations or additions and their approximate dates; and,
- types of building materials, construction techniques, and any unusual detailing or regional variations of craftsmanship.

Old photographs can be helpful in identifying early or original features that might be hidden under modern materials. On a walk-through, the architect, historian, or preservation specialist should identify the architecturally significant elements of the building, both inside and out (see fig.4).



Figure 3. Buildings seriously damaged by storms or deterioration may need to be braced before architectural evaluations can be made. Jethro Coffin House. Photo: John Milner Architects.



Figure 4. Documenting the building's history, preparing schematic plans, and assessing the condition of the building will provide necessary information on which to set priorities for stabilization and repair prior to securing the building. Photo: Frederick Lindstrom, HABS.

By understanding the history of the resource, significant elements, even though deteriorated, may be spared the trash pile. For that reason alone, any materials removed from the building or site as part of the stabilization effort should be carefully scrutinized and, if appearing historic, should be photographed, tagged with a number, inventoried, and safely stored, preferably in the building, for later retrieval (see fig. 5).

A site plan and schematic building floor plans can be used to note important information for use when the building is eventually preserved, restored, or rehabilitated. Each room should be given a number and notations added to the plans regarding the removal of important features to storage or recording physical treatments undertaken as part of the stabilization or repair.

Because a mothballing project may extend over a long period of time, with many different people involved, clear records should be kept and a building file established. Copies of all important data, plans, photographs, and lists of consultants or contractors who have worked on the property should be added to the file as the job progresses.



Figure 5. Loose or detached elements should be identified, tagged and stored, preferably on site. Photo: NPS files.

Recording all actions taken on the building will be helpful in the future.

The project coordinator should keep the building file updated and give duplicate copies to the owner. A list of emergency numbers, including the number of the key holder, should be kept at the entrance to the building or on a security gate, in a transparent vinyl sleeve.

Preparing a condition assessment of the building. A condition assessment can provide the owner with an accurate overview of the current condition of the property. If the building is deteriorated or if there are significant interior architectural elements that will need special protection during the mothballing years, undertaking 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 systems; special features such as chimneys; and site drainage.

To record existing conditions of the building and site, it will be necessary to clean debris from the building and to remove unwanted or overgrown vegetation to expose foundations. The interior should be emptied of its furnishing (unless provisions are made for mothballing these as well), all debris removed, and the interior swept with a broom. Building materials too deteriorated to repair, or which have come detached, such as moldings, balusters, and decorative plaster, and which can be used to guide later preservation work, should be tagged, labeled and saved.

Photographs or a videotape of the exterior and all interior spaces of the resource will provide an invaluable record of "as is" conditions. If a videotape is made, oral commentary can be provided on the significance of each space and architectural feature. If 35mm photographic prints or slides are made, they should be numbered, dated, and appropriately identified. Photographs should be cross-referenced with the room numbers on the schematic plans. A systematic method for photographing should be developed; for example, photograph each wall in a room and then take a corner shot to get floor and ceiling portions in the picture. Photograph any unusual details as well as examples of each window and door type.

For historic buildings, the great advantage of a condition assessment is that architectural features, both on the exterior as well as the interior, can be rated on a scale of their importance to the integrity and significance of the building. Those features of the highest priority should receive preference when repairs or protection measures are outlined as part of the mothballing process. Potential problems with protecting these features should be identified so that appropriate interim solutions can be selected. For example, if a building has always been heated and if murals, decorative plaster walls, or examples of patterned wall paper are identified as highly significant, then special care should be taken to regulate the interior climate and to monitor it adequately during the

mothballing years. This might require retaining electrical service to provide minimal heat in winter, fan exhaust in summer, and humidity controls for the interior.

Stabilization

Stabilization as part of a mothballing project involves correcting deficiencies to slow down the deterioration of the building while it is vacant. Weakened structural members that might fail altogether in the forthcoming years must be braced or reinforced; insects and other pests removed and discouraged from returning; and the building protected from moisture damage both by weatherizing the exterior envelope and by handling water run-off on the site. Even if a modified use or caretaker services can eventually be found for the building, the following steps should be addressed.

Structurally stabilizing the building. While bracing may have been required to make the building temporarily safe for inspection, the condition assessment may reveal areas of hidden structural damage. Roofs, foundations, walls, interior framing, porches 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 building and that the new members do not harm historic finishes (see fig. 6). Any major vertical post added during the stabilization should be properly supported and, if necessary, taken to the ground and underpinned.



Figure 6. Interior bracing which will last the duration of the mothballing will protect weakened structural members. Jethro Coffin House. Photo: John Milner Architects.

If the building is in a northern climate, then the roof framing must be able to hold substantial snow loads. Bracing the roof at the ridge and mid-points should be considered if sagging is apparent. Likewise, interior framing around stair openings or under long ceiling spans should be investigated. Underpinning or bracing structural piers weakened by poor drainage patterns may be a good precaution as well. Damage caused by insects, moisture, or from other causes should be repaired or reinforced and, if possible, the source of the damage removed. If features such as porches and dormers are so severely deteriorated

that they must be removed, they should be documented, photographed, and portions salvaged for storage prior to removal.

If the building is in a southern or humid climate and termites or other insects are a particular problem, the foundation and floor framing should be inspected to ensure that there are no major structural weaknesses. This can usually be done by observation from the crawl space or basement. For those structures where this is not possible, it may be advisable to lift selective floor boards to expose the floor framing. If there is evidence of pest damage, particularly termites, active colonies should be treated and the structural members reinforced or replaced, if necessary.

Controlling pests. Pests can be numerous and include squirrels, raccoons, bats, mice, rats, snakes, termites, moths, beetles, ants, bees and wasps, pigeons, and other birds. Termites, beetles, and carpenter ants destroy wood. Mice, too, gnaw wood as well as plaster, insulation, and electrical wires. Pigeon and bat droppings not only damage wood finishes but create a serious and sometimes deadly health hazard.

If the property is infested with animals or insects, it is important to get them out and to seal off their access to the building. If necessary, exterminate and remove any nests or hatching colonies. Chimney flues may be closed off with exterior grade plywood caps, properly ventilated, or protected with framed wire screens. Existing vents, grills, and louvers in attics and crawl spaces should be screened with bug mesh or heavy duty wire, depending on the type of pest being controlled. It may be advantageous to have damp or infected wood treated with insecticides (as permitted by each state) or preservatives, such as borate, to slow the rate of deterioration during the time that the building is not in use.

Securing the exterior envelope from moisture penetration. It is important to protect the exterior envelope from moisture penetration before securing the building. Leaks from deteriorated or damaged roofing, from around windows and doors, or through deteriorated materials, as well as ground moisture from improper site run-off or rising damp at foundations, can cause long-term damage to interior finishes and structural systems. Any serious deficiencies on the exterior, identified in the condition assessment, should be addressed.

To the greatest extent possible, these weatherization efforts should not harm historic materials. The project budget may not allow deteriorated features to be fully repaired or replaced in-kind. Non-historic or modern materials may be used to cover historic surfaces temporarily, but these treatments should not destroy valuable evidence necessary for future preservation work. Temporary modifications should be as visually compatible as possible with the historic building.

Roofs are often the most vulnerable elements on the building exterior and yet in some ways they are the easiest element to stabilize for the long term, if done correctly. "Quick fix" solutions, such as tar patches on slate roofs, should be avoided as they will generally fail within a year or so and may accelerate damage by trapping moisture. They are difficult to undo later when more permanent repairs are undertaken. Use of a tarpaulin over a leaking roof should be thought of only as a very temporary



Figure 7. Non-historic materials are appropriate for mothballing projects when they are used to protect historic evidence remaining for future preservation. This lightweight aluminum channel frame and roofing covers the historic wooden shingle roof. Galvanized mesh panels secure the window openings from intrusion by raccoons and other unwanted guests. Photo: Williamsport Preservation Training Center, NPS.

emergency repair because it is often blown off by the wind in a subsequent storm.

If the existing historic roof needs moderate repairs to make it last an additional ten years, then these repairs should be undertaken as a first priority. Replacing cracked or missing shingles and tiles, securing loose flashing, and reanchoring gutters and downspouts can often be done by a local roofing contractor. If the roof is in poor condition, but the historic materials and configuration are important, a new temporary roof, such as a lightweight aluminum channel system over the existing, might be considered (see fig. 7). If the roofing is so deteriorated that it must be replaced and a lightweight aluminum system is not affordable, various inexpensive options might be considered. These include covering the existing deteriorated roof with galvanized corrugated metal roofing panels, or 90 lb. rolled roofing, or a rubberized membrane (refer back to cover photo). These alternatives should leave as much of the historic sheathing and roofing in place as evidence for later preservation treatments.

For masonry repairs, appropriate preservation approaches are essential. For example, if repointing deteriorated brick chimneys or walls is necessary to prevent serious moisture penetration while the building is mothballed, the mortar should match the historic mortar in composition, color, and tooling. The use of hard portland cement mortars or vapor-impermeable waterproof coatings are not appropriate solutions as they can cause extensive damage and are not reversible treatments (see fig. 8).

For wood siding that is deteriorated, repairs necessary to keep out moisture should be made; repainting is generally warranted. Cracks around windows and doors can be beneficial in providing ventilation to the interior and so should only be caulked if needed to keep out bugs and moisture. For very deteriorated wall surfaces on wooden frame structures, it may be necessary to sheathe in plywood panels, but care should be taken to minimize installation damage by planning the location of the nailing or screw

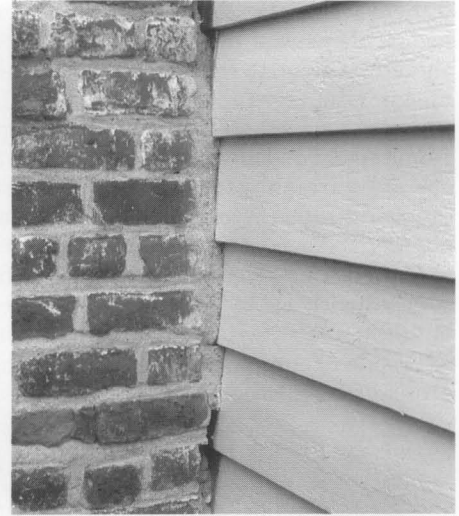


Figure 8. Appropriate mortar mixes should be used when masonry repairs are undertaken. In this case, a soft lime based mortar is used as an infill between the brick and wooden elements. When full repairs are made during the restoration phase, this soft mortar can easily be removed and missing bricks replaced.

patterns or by installing panels over a frame of battens (see fig. 9). Generally, however, it is better to repair deteriorated features than to cover them over.

Foundation damage may occur if water does not drain away from the building. Run-off from gutters and downspouts should be directed far away from the foundation wall by using long flexible extender pipes equal in length to twice the depth of the basement or crawl space. If underground drains are susceptible to clogging, it is recommended that the downspouts be disconnected from the drain boot and attached to flexible piping. If gutters and downspouts are in bad condition, replace them with inexpensive aluminum units.



Figure 9. Severely deteriorated wooden siding on a farm building has been covered over with painted plywood panels as a temporary measure to eliminate moisture penetration to the interior. Foundation vents and loose floor boards allow air to circulate inside.

If there are no significant landscape or exposed archeological elements around the foundation, consideration should be given to regrading the site if there is a documented drainage problem (see fig. 10). If building up the grade, use a fiber mesh membrane to separate the new soil from the old and slope the new soil 6 to 8 feet (200 cm-266 cm) away from the foundation making sure not to cover up the dampcourse layer or come into contact with skirting boards. To keep vegetation under control, put down a layer of 6 mil black polyethylene sheeting or fiber mesh matting covered with a 2"-4" (5-10 cm.) of washed gravel. If the building suffers a serious rising damp problem, it may be advisable to eliminate the plastic sheeting to avoid trapping ground moisture against foundations.



Figure 10. Regrading around the Booker Tenement at Colonial Williamsburg has protected the masonry foundation wall from excessive damp. This building has been successfully mothballed for over 10 years. Note the attic and basement vents, the temporary stairs, and the informative sign interpreting the history of this building.

Mothballing

The actual mothballing effort involves controlling the long-term deterioration of the building while it is unoccupied as well as finding methods to protect it from sudden loss by fire or vandalism. This requires securing the building from unwanted entry, providing adequate ventilation to the interior, and shutting down or modifying existing utilities. Once the building is de-activated or secured, the long-term success will depend on periodic maintenance and surveillance monitoring.

Securing the building from vandals, break-ins, and natural disasters. Securing the building from sudden loss is a critical aspect of mothballing. Because historic buildings are irreplaceable, it is vital that vulnerable entry points are sealed. If the building is located where fire and security service is available then it is highly recommended that some form of monitoring or alarm devices be used.

To protect decorative features, such as mantels, lighting fixtures, copper downspouts, iron roof cresting, or stained glass windows from theft or vandalism, it may be advisable to temporarily remove them to a more secure location if they cannot be adequately protected within the structure.

Mothballed buildings are usually boarded up, particularly on the first floor and basement, to protect fragile glass windows from breaking and to reinforce entry points (see fig. 11). Infill materials for closing door and window openings include plywood, corrugated panels, metal grates, chain fencing, metal grills, and cinder or cement blocks (see fig. 12). The method of installation should not result in the destruction of the opening and all associated sash, doors, and frames should be protected or stored for future reuse.



Figure 11. Urban buildings often need additional protection from unwanted entry and graffiti. This commercial building uses painted plywood panels to cover expansive glass storefronts and chain link fencing is applied on top of the panels. The upper windows on the street sides have been covered and painted to resemble 19th century sash. Photo: Thomas Jester, NPS.

Generally exterior doors are reinforced and provided with strong locks, but if weak historic doors would be damaged or disfigured by adding reinforcement or new locks, they may be removed temporarily and replaced with secure modern doors (see fig. 13). Alternatively, security gates in a new metal frame can be installed within existing door openings, much like a storm door, leaving the historic door in place. If plywood panels are installed over door openings, they should be screwed in place, as opposed to nailed, to avoid crowbar damage each time the panel is removed. This also reduces pounding vibrations from hammers and eliminates new nail holes each time the panel is replaced.

For windows, the most common security feature is the closure of the openings; this may be achieved with wooden or pre-formed panels or, as needed, with metal sheets or concrete blocks. Plywood panels, properly installed to protect wooden frames and properly ventilated, are the preferred treatment from a preservation standpoint.

There are a number of ways to set insert plywood panels into window openings to avoid damage to frame and sash (see fig. 14). One common method is to bring the upper and lower sash of a double hung unit to the mid-point of the opening and then to install pre-cut plywood panels using long carriage bolts anchored into horizontal wooden bracing, or strong backs, on the inside face of the window. Another means is to build new wooden blocking frames set into deeply recessed openings, for example in an industrial mill or warehouse, and then to affix the plywood panel to

the blocking frame. If sash must be removed prior to installing panels, they should be labeled and stored safely within the building.

Plywood panels are usually 1/2"-3/4" (1.25-1.875 cm.) thick and made of exterior grade stock, such as CDX, or



Figure 12. First floor openings have been filled with cinderblocks and doors, window sash and frames have been removed for safe keeping. Note the security light over the windows and the use of a security metal door with heavy duty locks. Photo: H. Ward Jandl, NPS.



Figure 13. If historic doors would be damaged by adding extra locks, they should be removed and stored and new security doors added. At this lighthouse, the historic door has been replaced with a new door (seen both inside and outside) with an inset vent and new deadbolt locks. The heavy historic hinges have not been damaged. Photo: Williamsport Preservation Training Center, NPS.

marine grade plywood. They should be painted to protect them from delamination and to provide a neater appearance. These panels may be painted to resemble operable windows or treated decoratively (see fig. 15). With extra attention to detail, the plywood panels can be

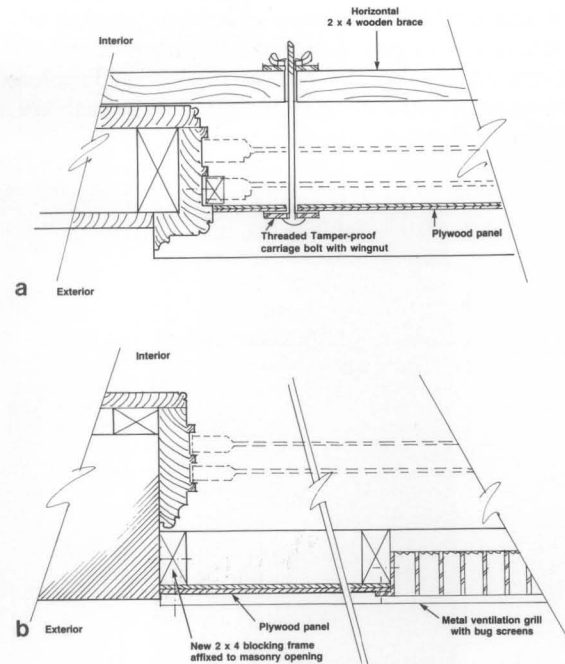


Figure 14. A: Plan detail showing plywood security panel anchored with carriage bolts through to the inside horizontal bracing, or strong backs. B: Plan detail showing section of plywood window panel attached to a new pressure treated wood frame set within the masonry opening. Ventilation should be included whenever possible or necessary.

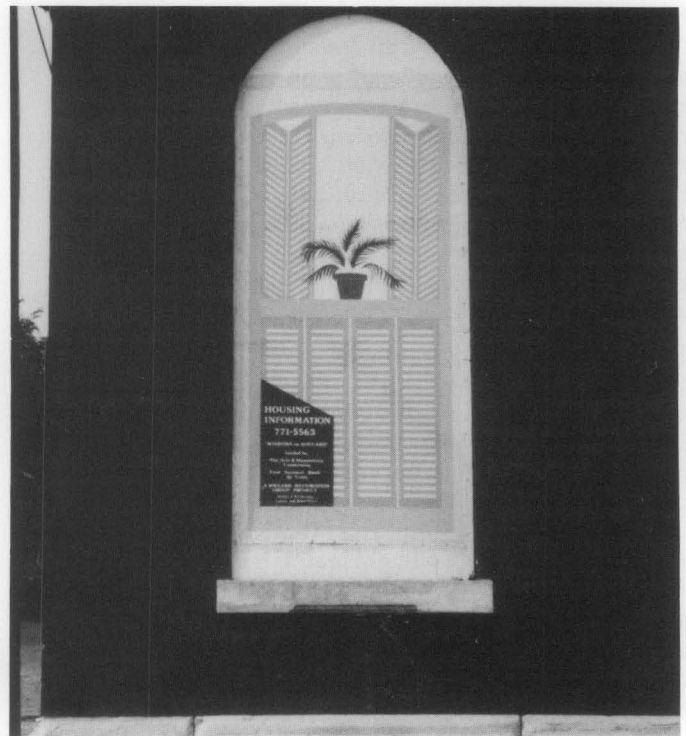


Figure 15. Painting trompe l'oeil scenes on plywood panels is a neighborhood friendly device. In addition, the small sign at the bottom left corner gives information for contacting the organization responsible for the care of the mothballed building. Photo: Lee H. Nelson, FAIA.

trimmed out with muntin strips to give a shadow line simulating multi-lite windows. This level of detail is a good indication that the building is protected and valued by the owner and the community.

If the building has shutters, simply close the shutters and secure them from the interior (see fig. 16). If the building had shutters historically, but they are missing, it may be appropriate to install new shutters, even in a modern material, and secure them in the closed position. Louvered shutters will help with interior ventilation if the sash are propped open behind the shutters.

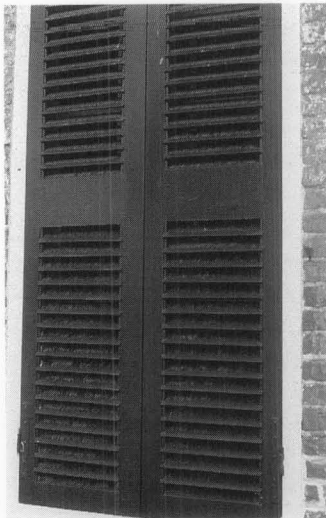


Figure 16. Historic louvered shutters make excellent security closures with passive ventilation.

There is some benefit from keeping windows unboarded if security is not a problem. The building will appear to be occupied, and the natural air leakage around the windows will assist in ventilating the interior. The presence of natural light will also help when periodic inspections are made. Rigid polycarbonate clear storm glazing panels may be placed on the window exterior to protect against glass breakage. Because the sun's ultraviolet rays can cause fading of floor finishes and wall surfaces, filtering pull shades or inexpensive curtains may be options for reducing this type of deterioration for significant interiors. Some acrylic sheeting comes with built-in ultraviolet filters.

Securing the building from catastrophic destruction from fire, lightning, or arson will require additional security devices. Lightning rods properly grounded should be a first consideration if the building is in an area susceptible to lightning storms. A high security fence should also be installed if the property cannot be monitored closely. These interventions do not require a power source for operation. Since many buildings will not maintain electrical power, there are some devices available using battery packs, such as intrusion alarms, security lighting, and smoke detectors which through audible horn alarms can alert nearby neighbors. These battery packs must be replaced every 3 months to 2 years, depending on type and usage. In combination with a cellular phone, they can also provide some level of direct communication with police and fire departments.

If at all possible, new temporary electric service should be provided to the building (see fig. 17). Generally a telephone

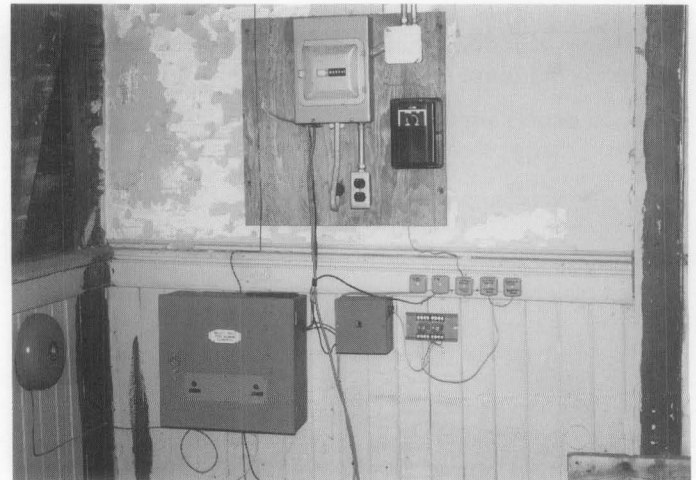


Figure 17. Security systems are very important for mothballed buildings if they are located where fire and security services are available. A temporary electric service with battery back-up has been installed in this building. Intrusion alarms and ionization smoke/fire detectors are wired directly to the nearby security service.

line is needed as well. A hard wired security system for intrusion and a combination rate-of-rise and smoke detector can send an immediate signal for help directly to the fire department and security service. Depending on whether or not heat will be maintained in the building, the security system should be designed accordingly. Some systems cannot work below 32°F (0°C). Exterior lighting set on a timer, photo electric sensor, or a motion/infrared detection device provides additional security.

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 building. Without adequate air exchange, humidity may rise to unsafe levels, and mold, rot, and insect infestation are likely to thrive (see fig. 18). 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 building has been secured. A

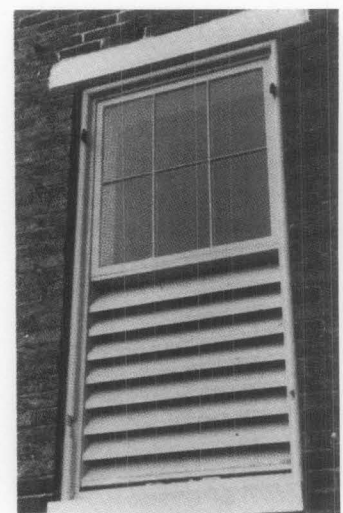
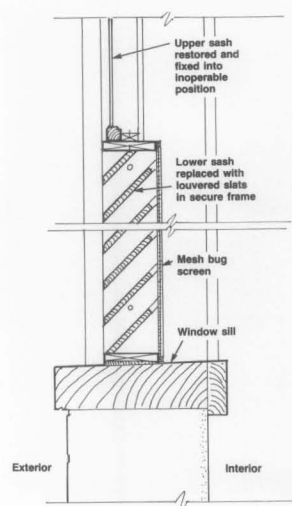


Figure 18. Heavy duty wooden slated lowers were custom fabricated to replace the deteriorated lower sash. The upper sash were rebuilt to retain the historic appearance and to allow light into this vacant historic building. Refer back to Fig. 1 for a view of the building. Photo: Charles E. Fisher, NPS. Drawing by Thomas Vitanza.

mechanical engineer or a specialist in interior climates should be consulted, particularly for buildings with intact and significant interiors. In some circumstances, providing heat during the winter, even at a minimal 45° F (7°C), and utilizing forced-fan ventilation in summer will be recommended and will require retaining electrical service. For masonry buildings it is often helpful to keep the interior temperature above the spring dew point to avoid damaging condensation. In most buildings it is the need for summer ventilation that outweighs the winter requirements.

Many old buildings are inherently leaky due to loose-fitting windows and floorboards and the lack of insulation. The level of air exchange needed for each building, however, will vary according to geographic location, the building's construction, and its general size and configuration.

There are four critical climate zones when looking at the type and amount of interior ventilation needed for a closed up building: hot and dry (southwestern states); cold and damp (Pacific northwest and northeastern states); temperate and humid (Mid-Atlantic states, coastal areas); and hot and humid (southern states and the tropics). (See fig. 19 for a chart outlining guidance on ventilation.)

Once closed up, a building interior will still be affected by the temperature and humidity of the exterior. Without proper ventilation, moisture from condensation may occur and cause damage by wetting plaster, peeling paint,

staining woodwork, warping floors, and in some cases even causing freeze thaw damage to plaster. If moist conditions persist in a property, structural damage can result from rot or returning insects attracted to moist conditions. Poorly mothballed masonry buildings, particularly in damp and humid zones have been so damaged on the interior with just one year of unventilated closure that none of the interior finishes were salvageable when the buildings were rehabilitated.

The absolute minimum air exchange for most mothballed buildings consists of one to four air exchanges every hour; one or two air exchanges per hour in winter and often twice that amount in summer. Even this minimal exchange may foster mold and mildew in damp climates, and so monitoring the property during the stabilization period and after the building has been secured will provide useful information on the effectiveness of the ventilation solution.

There is no exact science for how much ventilation should be provided for each building. There are, however, some general rules of thumb. Buildings, such as adobe structures, located in hot and arid climates may need no additional ventilation if they have been well weatherized and no moisture is penetrating the interior. Also frame buildings with natural cracks and fissures for air infiltration may have a natural air exchange rate of 3 or 4 per hour, and so in arid as well as temperate climates may need no additional ventilation once secured. The most difficult

VENTILATION GUIDANCE CHART

CLIMATE	AIR EXCHANGES		VENTILATION				
	Winter air exchange per hour	Summer air exchange per hour	Frame Buildings passive louvering		Masonry Buildings passive louvering		Masonry Buildings fan combination
			% of openings louvered	% of openings louvered	% of openings louvered	% of openings louvered	one fan + % louvered
		winter	summer	winter	summer	summer	
hot and dry Southwestern areas	less than 1	less than 1	N/A	N/A	N/A	N/A	N/A
cold and damp Northeastern & Pacific northwestern areas	1	2-3	5%	10%	10%	30%	20%
temperate/humid Mid-Atlantic & coastal areas	2	3-4	10%	20%	20%	40%	30%
hot and humid Southern states & tropical areas	3	4 or more	20%	30%	40% or more	80%	40% or more

Figure 19. This is a general guide for the amount of louvering which might be expected for a medium size residential structure with an average amount of windows, attic, and crawl space ventilation. There is currently research being done on effective air exchanges, but each project should be evaluated individually. It will be noticed from the chart that summer louvering requirements can be reduced with the use of an exhaust fan. Masonry buildings need more ventilation than frame buildings. Chart prepared by Sharon C. Park, AIA and Ernest A. Conrad, PE.

buildings to adequately ventilate without resorting to extensive louvering and/or mechanical exhaust fan systems are masonry buildings in humid climates. Even with basement and attic vent grills, a masonry building may not have more than one air exchange an hour. This is generally unacceptable for summer conditions. For these buildings, almost every window opening will need to be fitted out with some type of passive, louvered ventilation.

Depending on the size, plan configuration, and ceiling heights of a building, it is often necessary to have louvered opening equivalent to 5%-10% of the square footage of each floor. For example, in a humid climate, a typical 20'x30' (6.1m x 9.1m) brick residence with 600 sq. ft.(55.5 sq.m) of floor space and a typical number of windows, may need 30-60 sq. ft.(2.75sq.m-5.5 sq. m) of louvered openings per floor. With each window measuring 3'x5'(.9m x 1.5 m) or 15 sq. ft. (1.3 sq.m), the equivalent of 2 to 4 windows per floor may need full window louvers.

Small pre-formed louvers set into a plywood panel or small slit-type registers at the base of inset panels generally cannot provide enough ventilation in most moist climates to offset condensation, but this approach is certainly better than no louvers at all. Louvers should be located to give cross ventilation, interior doors should be fixed ajar at least 4" (10cm) to allow air to circulate, and hatches to the attic should be left open.

Monitoring devices which can record internal temperature and humidity levels can be invaluable in determining if the internal climate is remaining stable. These units can be powered by portable battery packs or can be wired into electric service with data downloaded into laptop computers periodically (see fig. 20). This can also give long-term information throughout the mothballing years. If it is determined that there are inadequate air exchanges to keep interior moisture levels under control, additional passive ventilation can be increased, or, if there is electric service, mechanical exhaust fans can be installed. One fan in a small to medium sized building can reduce the amount of louvering substantially.

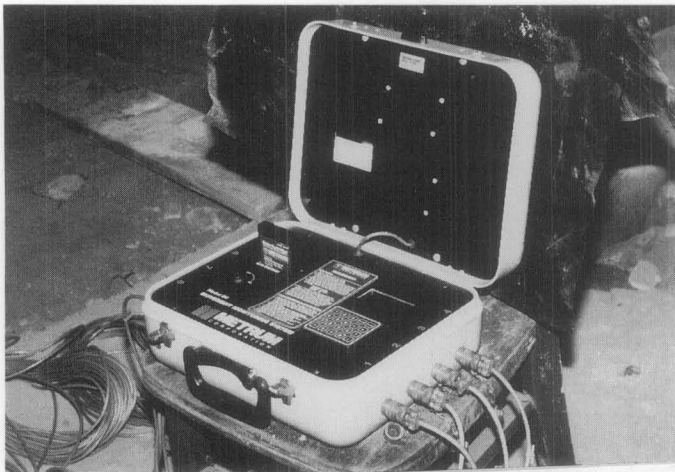


Figure 20. Portable monitors used to record temperature and humidity conditions in historic buildings during mothballing can help identify ventilation needs. This data can be downloaded directly into a lap top computer on site. These monitors are especially helpful over the long term for buildings with significant historic interiors or which are remaining furnished. If interiors are remaining damp or humid, additional ventilation should be added or the source of moisture controlled.

If electric fans are used, study the environmental conditions of each property and determine if the fans should be controlled by thermostats or automatic timers.

Humidistats, designed for enclosed climate control systems, generally are difficult to adapt for open mothballing conditions. How the system will draw in or exhaust air is also important. It may be determined that it is best to bring dry air in from the attic or upper levels and force it out through lower basement windows (see fig. 21). If the basement is damp, it may be best to zone it from the rest of the building and exhaust its air separately. Additionally, less humid day air is preferred over damper night air, and this can be controlled with a timer switch mounted to the fan.

The type of ventilation should not undermine the security of the building. The most secure installations use custom-made grills well anchored to the window frame, often set in plywood security panels. Some vents are formed using heavy millwork louvers set into existing window openings (refer back to fig.18). For buildings where security is not a primary issue, where the interior is modest, and where there has been no heat for a long time, it may be possible to use lightweight galvanized metal grills in the window openings (refer back to fig.7). A cost effective grill can be made from the expanded metal mesh lath used by plasterers and installed so that the mesh fins shed rainwater to the exterior.

Securing mechanical systems and utilities. At the outset, it is important to determine which utilities and services, such as electrical or telephone lines, are kept and which are cut off. As long as these services will not constitute a fire



Figure 21. This electric thermostat/humidistat mounted in the attic vent controls a modified ducted air/fan system. The unit uses temporary exposed sheet metal ducts to pull air through the building and exhaust it out of the basement. For over ten years this fan system in combination with 18" x 18" preformed louvers in selective windows has kept the interior dry and with good air exchanges.

hazard, it is advisable to retain those which will help protect the property. Since the electrical needs will be limited in a vacant building, it is best to install a new temporary electric line and panel (100 amp) so that all the wiring is new and exposed. This will be much safer for the building, and allows easy access for reading the meter (see fig. 22).

Most heating systems are shut down in long term mothballing. For furnaces fueled by oil, there are two choices for dealing with the tank. Either it must be filled to the top with oil to eliminate condensation or it should be drained. If it remains empty for more than a year, it will likely rust and not be reusable. Most tanks are drained if a newer type of system is envisioned when the building is put back into service. Gas systems with open flames should be turned off unless there is regular maintenance and frequent surveillance of the property. Gas lines are shut off by the utility company.

If a hot water radiator system is retained for low levels of heat, it generally must be modified to be a self-contained system and the water supply is capped at the meter. This



Figure 22. All systems except temporary electric have been shut off at this residence which has been mothballed over 20 years. An electric meter and 100 amp panel box have been set on a plywood panel at the front of the building. It is used for interior lighting and various alarm systems. The building, however, is showing signs of moisture problems with efflorescent stains on the masonry indicating the need for gutter maintenance and additional ventilation for the interior. The vegetation on the walls, although picturesque, traps moisture and is damaging to the masonry. Photo: H. Ward Jandl, NPS.

recirculating system protects the property from extensive damage from burst pipes. Water is replaced with a water/glycol mix and the reserve tank must also be filled with this mixture. This keeps the modified system from freezing, if there is a power failure. If water service is cut off, pipes should be drained. Sewerage systems will require special care as sewer gas is explosive. Either the traps must be filled with glycol or the sewer line should be capped off at the building line.

Developing a maintenance and monitoring plan. While every effort may have been made to stabilize the property and to slow the deterioration of materials, natural disasters, storms, undetected leaks, and unwanted intrusion can still occur. A regular schedule for surveillance, maintenance, and monitoring should be established: (See fig. 23 for maintenance chart).

MAINTENANCE CHART	
periodic	
<input type="checkbox"/>	regular drive by surveillance
<input type="checkbox"/>	check attic during storms if possible
monthly walk arounds	
<input type="checkbox"/>	check entrances
<input type="checkbox"/>	check window panes for breakage
<input type="checkbox"/>	mowing as required
<input type="checkbox"/>	check for graffiti or vandalism
enter every 3 months to air out	
<input type="checkbox"/>	check for musty air
<input type="checkbox"/>	check for moisture damage
<input type="checkbox"/>	check battery packs and monitoring equipment
<input type="checkbox"/>	check light bulbs
<input type="checkbox"/>	check for evidence of pest intrusion
every 6 months; spring and fall	
<input type="checkbox"/>	site clean-up; pruning and trimming
<input type="checkbox"/>	gutter and downspout check
<input type="checkbox"/>	check crawlspace for pests
<input type="checkbox"/>	clean out storm drains
every 12 months	
<input type="checkbox"/>	maintenance contract inspections for equipment/utilities
<input type="checkbox"/>	check roof for loose or missing shingles
<input type="checkbox"/>	termite and pest inspection/treatment
<input type="checkbox"/>	exterior materials spot repair and touch up painting
<input type="checkbox"/>	remove bird droppings or other stains from exterior
<input type="checkbox"/>	check and update building file

Figure 23. Maintenance Chart. Many of the tasks on the maintenance chart can be done by volunteer help or service contracts. Regular visits to the site will help detect intrusion, storm damage, or poor water drainage.

The fire and police departments should be notified that the property will be vacant. A walk-through visit to familiarize these officials with the building's location, construction materials, and overall plan may be invaluable if they are called on in the future.

The optimum schedule for surveillance visits to the property will depend on the location of the property and the number of people who can assist with these activities. The more frequent the visits to check the property, the sooner that water leaks or break-ins will be noticed. Also, the more frequently the building is entered, the better the air exchange. By keeping the site clear and the building in good repair, the community will know that the building has not been abandoned (see fig. 24). The involvement of neighbors and community groups in caring for the property can ensure its protection from a variety of catastrophic circumstances.

The owner may utilize volunteers and service companies to undertake the work outlined in the maintenance chart.

Service companies on a maintenance contract can provide yard, maintenance, and inspection services, and their reports or itemized bills reflecting work undertaken should be added to update the building file.



Figure 24. Once mothballed, a property must still be monitored and maintained. The openings in this historic barn has been modified with a combination of wood louvers and metal mesh panels which require little maintenance. The grounds are regularly mowed, even inside the chain link security fence. Photo: Williamsport Preservation Training Center, NPS.

Components of a Mothballing Project

Document: Brearley House, New Jersey; 2½ story center hall plan house contains a high degree of integrity of circa 1761 materials and significant early 19th century additions. Deterioration was attributable to leaking roof, unstable masonry at gables and chimneys, deteriorating attic windows, poor site drainage, and partially detached gutters. Mothballing efforts are required for approximately 7-10 years.

Stabilize: Remove bat droppings from attic using great caution. Secure historic chimneys and gable ends with plywood panels. Do not take historic chimneys down. Reroof with asphalt shingles and reattach or add new gutters and downspouts. Add extenders to downspouts. Add bug screens to any ventilation areas. Add soil around foundation and slope to gain positive drain; do not excavate as this will disturb archeological evidence.

Mothball: Install security fence around the property. Secure doors and windows with plywood panels (½" exterior grade). Install preformed metal grills in basement and attic openings. Add surface mounted wiring for ionization smoke and fire detection with direct wire to police and fire departments. Shut off heat and drain pipes. Add window exhaust fan set on a thermostatic control. Provide for periodic monitoring and maintenance of the property.

Figure 25. Above is a summary of the tasks that were necessary in order to protect this significant property while restoration funds are raised. Photographs: Michael Mills; Ford Farewell Mills Gatsch Architects.



a. A view showing the exterior of the house in its mothballed condition.



b. Plywood panels stabilize the chimneys. Note the gable vents.



c. The exhaust fan has tamper-proof housing.

MOTHBALLING CHECKLIST

Mothballing Checklist In reviewing mothballing plans, the following checklist may help to ensure that work items are not inadvertently omitted.	Yes	No	Date of action or comment.
<i>Moisture</i> <ul style="list-style-type: none"> • Is the roof watertight? • Do the gutters retain their proper pitch and are they clean? • Are downspout joints intact? • Are drains unobstructed? • Are windows and doors and their frames in good condition? • Are masonry walls in good condition to seal out moisture? • Is wood siding in good condition? • Is site properly graded for water run-off? • Is vegetation cleared from around the building foundation to avoid trapping moisture? 			
<i>Pests</i> <ul style="list-style-type: none"> • Have nests/pests been removed from the building's interior and eaves? • Are adequate screens in place to guard against pests? • Has the building been inspected and treated for termites, carpenter ants, and rodents? • If toxic droppings from bats and pigeons are present, has a special company been brought in for its disposal? 			
<i>Housekeeping</i> <ul style="list-style-type: none"> • Have the following been removed from the interior: trash, hazardous materials such as inflammable liquids, poisons, and paints and canned goods that could freeze and burst? • Is the interior broom-clean? • Have furnishings been removed to a safe location? • If furnishings are remaining in the building, are they properly protected from dust, pests, ultraviolet light, and other potentially harmful problems? • Have significant architectural elements that have become detached from the building been labeled and stored in a safe place? • Is there a building file? 			
<i>Security</i> <ul style="list-style-type: none"> • Have fire and police departments been notified that the building will be mothballed? • Are smoke and fire detectors in working order? • Are the exterior doors and windows securely fastened? • Are plans in place to monitor the building on a regular basis? • Are the keys to the building in a secure but accessible location? • Are the grounds being kept from becoming overgrown? 			
<i>Utilities</i> <ul style="list-style-type: none"> • Have utility companies disconnected/shut off or fully inspected water, gas, and electric lines? • If the building will not remain heated, have water pipes been drained and glycol added? • If the electricity is to be left on, is the wiring in safe condition? 			
<i>Ventilation</i> <ul style="list-style-type: none"> • Have steps been taken to ensure proper ventilation of the building? • Have interior doors been left open for ventilation purposes? • Has the secured building been checked within the last 3 months for interior dampness or excessive humidity? 			

Figure 26.. MOTHBALL CHECKLIST. This checklist will give the building owner or manager a handy reference guide to items that should be addressed when mothballing a historic building. Prepared by H. Ward Jandl, NPS.

Conclusion

Providing temporary protection and stabilization for vacant historic buildings can arrest deterioration and buy the owner valuable time to raise money for preservation or to find a compatible use for the property. A well planned mothballing project involves documenting the history and condition of the building, stabilizing the structure to slow down its deterioration, and finally mothballing the structure to secure it (See fig. 25). The three highest priorities for the building while it is mothballed are 1) to protect the building from sudden loss, 2) to weatherize and maintain the property to stop moisture penetration, and 3) to control the humidity levels inside once the building has been secured. See Mothballing Checklist Figure 26.

While issues regarding mothballing may seem simple, the variables and intricacies of possible solutions make the decision-making process very important. Each building must be individually evaluated prior to mothballing. 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 (see fig. 27).

In planning for the future of the building, complete and systematic records must be kept and generous funds allocated for mothballing. This will ensure that the historic property will be in stable condition for its eventual preservation, rehabilitation, or restoration.

Acknowledgements

This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments on the usefulness of this publication may be directed to H. Ward Jandl, Deputy Chief, Preservation Assistance Division, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127. This publication is not copyrighted and can be reproduced without penalty. Normal procedures for credit to the author and the National Park Service are appreciated.

The author, Sharon C. Park, Senior Historical Architect, Preservation Assistance Division, National Park Service, would like to acknowledge the assistance of the following individuals in the preparation and review of this publication. H. Ward Jandl served as the technical editor and assisted with producing this Preservation Brief. In addition the following persons have provided invaluable information and illustrations: Ernest A. Conrad, PE; Doug Hicks, NPS Williamsport Preservation Training Center; Thomas C. Taylor, Colonial Williamsburg; Karen Gordon, Seattle Urban Conservation Office; Kevin B. Stoops, Seattle Department of Parks and Recreation; Michael Mills, AIA; Christine Henry, architect, Mary Beth Hirsch, Ohio Historical Society. Thanks also to Preservation Assistance Division staff members Michael J. Auer, Anne E. Grimmer, Kay D. Weeks, Timothy A. Buehner, and Jean Travers, and to the numerous staff members of the NPS Regional offices who submitted comments.

All photographs and drawings are by the author unless otherwise noted.

Cover photograph: Mothballing of this historic house involved a new membrane roof covering over the historic roof and slatted window covers for security and ventilation. Photo: Williamsport Preservation Training Center, NPS.

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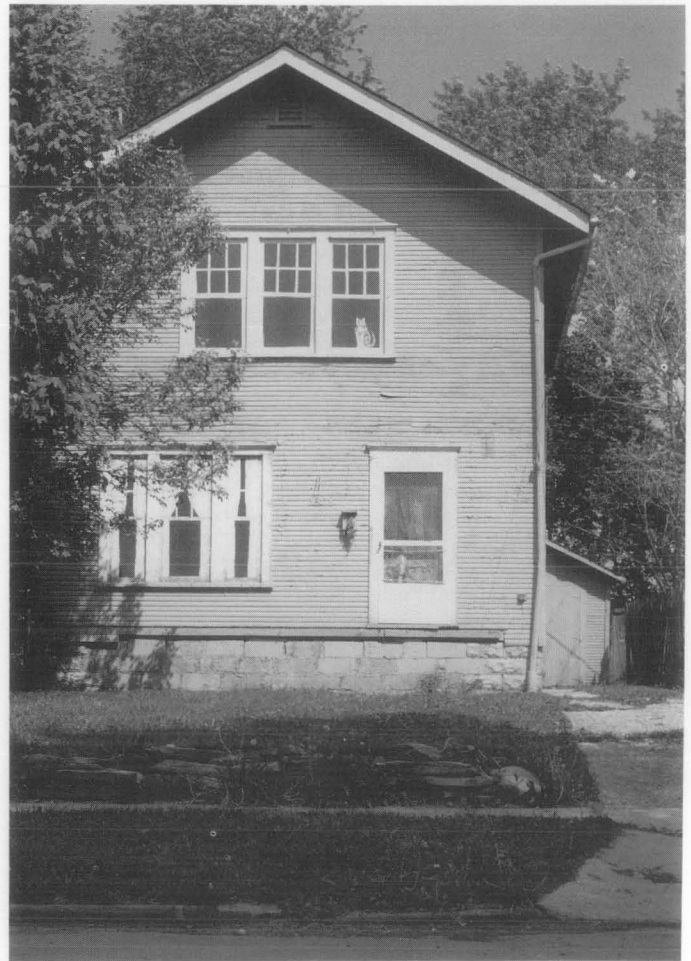


Figure 27. This residential building blends into its neighborhood even though all the windows have been covered over and the front steps are missing. The grounds are maintained and the special attention to decoratively painting the window panels shows that the property is being well cared for until it can be rehabilitated. Photo: Ohio Historical Society.

Further Reading

Cotton, J. Randall. "Mothballing Buildings." *The Old House Journal*. July/August, 1993.

Fisher, Charles E. and Thomas A. Vitanza. "Temporary Window Vents in Unoccupied Historic Buildings." Preservation Tech Note (Windows, No. 10). Washington, DC: National Park Service, 1985.

Frazier Associates. "Mothballing Historic Buildings." Preserving Prince William, 2. County of Prince William, VA, 1990.

Michell, Eleanor. *Emergency Repairs for Historic Buildings*. London: Butterworth Architecture, 1988.

"Mothballing Vacant Buildings," *An Anti-Arson Kit for Preservation and Neighborhood Action*. Washington, DC: Federal Emergency Management Agency, 1982.

Nelson, Lee H. *Preservation Briefs 17. Architectural Character-Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character*. Washington, DC: Government Printing Office, 1988.

Solon, Thomas E. "Security Panels for the Foster-Armstrong House." *Association for Preservation Technology Bulletin*. Vol XVI no. 3 & 4, 1984. (note the design of the panels, but be aware that additional louvering may be needed on other projects).

RESOURCE MANAGEMENT CULTURAL ADVANCED: *Mothballing* of Historic Buildings, Structures, and Landscapes March 25-30, 2012

Training Syllabus



William Penn Mott Jr. Training Center



Memorandum

Date: February 10, 2012

To: Supervisor

From: **Department of Parks and Recreation**
William Penn Mott Jr. Training Center

Subject: Employee Attendance at Formal Training
Resource Management Cultural Advanced:
Mothballing of Historic Buildings, Structures, and Landscapes Group 3

An employee from your office will soon be attending the formal training program described in the attached. Please insure that the employee is fully prepared to attend the session and that the groundwork is laid for the employee's implementation of the training upon returning to work.

You can assist with capturing the full value of the training by taking the following steps:

Prior to Training

1. Make sure that specific employee needs are identified and, if necessary, called immediately to the attention of the Training Coordinator.
2. Review with the employee the reason for the employee's attendance.
3. Review objectives and agenda with the employee.
4. Discuss objectives and performance expected after the training.

Immediately Following Attendance

1. Discuss what was learned and intended uses of the training.
2. Review the employee's assessment of the training program for its impact at the workplace and review the due date of the Post-Training Evaluation form.
3. Support the employee's use of the training at the work place.

Prior to Three Months Following Training

1. Employee, after discussion with supervisor, must login to the Employee Training Management System (ETMS) to complete the Post-Training Evaluation form.
2. Supervisor evaluates the effectiveness of the training on the employee's job performance and logs in to the ETMS to complete the Training Effectiveness Assessment form.

Thank you for your assistance in seeing that the full benefit of training is realized.



Joanne Danielson
Academy Director, Acting

Attachment

cc: Participant

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Mission Statement Training Section

***The mission of the Training Section is to improve
organizational and individual performance through
consulting, collaboration, training, and development.***

MOTT TRAINING CENTER STAFF

David Saxby Department Training Officer, Acting
Joanne Danielson..... Academy Director, Acting
Juventino Ortiz.....Academy Coordinator
Pat Bost..... Office Manager
Chuck Combs Training Specialist
Dave Galanti..... Training Specialist
Karyn Lombard Training Specialist
Sara M. Skinner..... Training Specialist
Matt Cardinet..... Cadet Training Officer
Dan Kraft Cadet Training Officer
Nikki Shannon Cadet Training Officer
Dan Raducanu..... Cadet Training Officer
Pamela Yaeger..... Assistant Program Coordinator
Edith Alhambra Assistant Program Coordinator
Ellen Dewsnup..... Assistant Program Coordinator
Rogers Williams Program Assistant
Socorro Wallace Program Assistant
Joanne Ciccone..... Program Assistant

THE MISSION

of the California State Parks is to provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high quality outdoor recreation.



FORMAL TRAINING GUIDELINES

Welcome to formal training, an essential component in your career development.

Since 1969, our Department has been providing a continuously changing number of diverse training programs at its main training facility, the William Penn Mott Jr. Training Center, and other locations including the Marconi Conference Center. The Department strives to enhance your learning and job performance with formal training of the highest quality.

Our Department's dedication to training is only one aspect of its commitment to you and to the public. This commitment is costly and represents an important investment in you and your career. You and the Department realize a return on that investment by your positive participation in formal training itself and post training follow-through.

The program you will be participating in is described in this training syllabus, which outlines what you can expect from this training and what is expected of you. This syllabus details what you should do before you leave for training; what to do when you arrive; what you will be doing while in training; and, importantly, what you should be able to do when you return to your work site. Specifically:

1. **SYLLABUS:** Your copy of this syllabus is an important part of your training experience and should be brought with you to Training. Read it before you arrive and review it following the program along with material you received at training.
2. **PRE-TRAINING ASSIGNMENTS:** Your completion of pre-training assignments is essential to the success of your training. You are responsible for all reading assignments in preparation for classroom sessions. Time will be provided during working hours to accomplish any assignments which involve either individual or group efforts and resources.
3. **TRAVEL:** Arrange your travel to and from the training site through your District or Office. (No reimbursement for travel expense – including per diem costs – will be approved for travel not specifically authorized in advance by the District

Superintendent). Individuals may claim reimbursement for incidental expenses incurred as outlined in DAM 0410.6.

4. HOUSING: Housing will be assigned to you on a shared-room basis and will be available from 3:00 p.m. on the date of arrival to 10:00 a.m. on the date of departure. The Department provides your room and board expenses at the Marconi Conference Center only. No per diem allowance will be authorized for living off-grounds. This does not preclude living off-grounds at your own expense. In the event of an emergency, staff must know your room assignment; therefore, you may not switch rooms without staff approval. Overnight guests are not allowed in the buildings unless registered beforehand at the front desk in the Marconi Conference Center Administration Building.
5. **ENROLLMENT OR HOUSING CANCELLATION POLICY:** To cancel participation in a course, the participant must have their District Superintendent or Section/Office Manager send an email to the Training Specialist assigned to the course requesting to remove the participant. If you do not need lodging or must change or cancel your reservation for lodging, you must contact the Mott Training Center or Training Specialist assigned to the course at least 72 hours prior to your date of arrival. Lodging, registration, and associated fees will be charged to the employee's District or Section/Office if a training cancellation is received with less than 72 hours notice.

The Mott Training Center is committed to ensuring that the reservation that has been made for you is accurate and needed.

6. MEALS: Meals will be provided from dinner on the date of arrival through lunch on the date of departure. Meals will be served at 7:00 a.m. for breakfast, 12:00 noon for lunch, and 6:00 p.m. for dinner. Hot or box lunches may be provided on some days. If you require a special diet, notify the Marconi Conference Center no later than one week before your scheduled arrival.
7. CLOTHING: Field uniforms as found in "Description of Required Field Uniforms", DOM Chapter 2300, Uniform Handbooks, not including optional items, will be worn daily by all uniformed employees during formal training sessions **unless otherwise specified in the Program Attendance Checklist**. Non-uniformed employees shall wear apparel normally worn on the job. Appropriate attire includes apparel suitable for professional office dress. It does not include such items as shorts, t-shirts, tank tops, or sandals.

Because we are on the conference grounds with other groups, and the image we project as State Park employees is important not only during working hours but off duty hours as well, your informal sportswear should be appropriate.

8. **COURSE LEADERS:** The formal training you will attend is developed and, for the most part, conducted by experienced State Park employees in field and staff positions. Some courses will be conducted by qualified instructors from other agencies and educational institutions. Your course leaders have proven their ability and knowledge in their profession, and provide a level of expertise difficult to match.
9. **TRAINING SECTION STAFF:** Chuck Combs is your Training Specialist and has been assigned the responsibility for your training group. During the program, you may be asked to assist Training Section Staff in the logistics of your training program (organizing field trip transportation, supervising classroom breaks, etc.). Training Section Staff will do all within their power to make your training experience pleasant and meaningful.
10. **ATTENDANCE:** Regular attendance is a critical course requirement and your participation is important to the success of this training. All absences, except those of an emergency nature, must be approved in advance by the Training Specialist.
11. **TRAINING MATERIALS:** May be made available to you at both your unit and at the Marconi Conference Center. Handout materials issued at your unit should be brought to training for possible use. A conference binder or notebook will be issued to you at the training session for note taking and convenience in handling materials. Please bring your own pens and pencils.
12. **CELL PHONES:** As a courtesy to your fellow participants and course leaders ensure that your cell phone is turned off during classes. Participants should not be receiving or making cell phone calls during class time. Please limit those calls to your breaks.

Please remember that cell reception is poor at Marconi. There is a payphone which takes prepaid phone cards or coins. If you have a phone in your room you can also use a prepaid calling card. There is one computer available for checking email in the Administration Building. There is also Wi-Fi access, which requires a pre-established account or a fee for use which cannot be charged to your room.

13. **TELEPHONE:** Limit phone calls during classroom hours to urgent business or emergencies. Anyone wishing to contact you by telephone during working hours should call (415) 663-9020.
14. **POST-TRAINING ASSIGNMENTS:** In connection with formal training are to be completed under the direction of your supervisor.

◆ **Marconi Conference Center**
 ◆ **PLANNING INFORMATION**

To make your visit as comfortable and satisfying as possible, please take a few moments to read the following.

◆ **CHECK-IN/CHECK-OUT**

Please check in at the Front Desk. Follow the signs for Check-in.

Check-in: 3 p.m. to 11 p.m.
 Check-out: 7 a.m. to 10 a.m.
 (Bring your key)

Late check-out (after 10 a.m.) will incur an additional day's charge.

◆ **DINING**

Meals are served in Redwood Dining Hall.

Breakfast buffet: 7 a.m. to 9 a.m.
 Lunch buffet: 11:30 a.m. to 1:30 p.m.
 Full service dinner: 6 p.m. to 8 p.m.

◆ **LODGING**

You may wish to bring: shampoo, flashlight, comfortable shoes for hilly trails. Please note cooking and other appliances, candles and incense are not allowed, and food should not be kept in your room as it attracts insects.

◆ **PARKING**

Please park in designated parking spaces only and observe the law regarding spaces for the handicapped. Campers, recreational vehicles and motor homes are not permitted.

◆ **DRIVING**

Please drive slowly and carefully, yielding to pedestrians, bicyclists and animals. The speed limit is 15 mph, and all signs and barriers must be observed.

◆ **GAS STATIONS**

The closest gas station is located in Point Reyes Station, 15 minutes to the south.

◆ **TELEPHONES**

Your guestroom has a private telephone number which you can give callers after you check in, as well as a port for your modem. All outbound telephone and modem calls require a toll-free 800 number. Bring your calling card for phone calls; check with your ISP for 800-number access. Most cellular phones DO NOT work at Marconi Conference Center.

◆ **MESSAGES, FAXES, MAIL**

If your callers would like to leave a message, give them this number:

Front Desk Telephone: (415) 663-9020

You may also want to give them your lodging building, room number and name of conference, to expedite receiving emergency messages.

We post messages for guests on the message board. We'll also post a notice if you receive mail or a package. *Emergency messages will be delivered.*

If you wish to receive a fax, use this number:

Front Desk Fax: (415) 663-1731

We will post a notice on the message board when your fax arrives and collect the service charge when you pick it up.

If you wish to receive mail, use this address:

(your name), (conference name)
 c/o Marconi Conference Center
 P.O. Box 789, 18500 State Route 1
 Marshall, CA 94940

We will post a notice on the message board and hold your mail at the Front Desk.

no charge. Our commissary sells snacks, cold drinks, personal hygiene items, flashlights/batteries, writing supplies, stamps. We have a selection of Marconi souvenirs such as shirts, hats, mugs and other items that make wonderful remembrances of your stay with us. Our Front Desk staff can also help you with local information.

◆ **BUSINESS CENTER**

The Business Center is located in the Pelican Building lounge and is open 7 am to 11 pm. For your convenience, we are pleased to provide **free of charge**, the following services:

- ◆ Internet / E-mail
- ◆ Computer with MS Office
- ◆ LaserJet Printer
- ◆ Photocopier

◆ **WALKING & EXPLORING**

Marconi Conference Center is a unit of the California State Park system and all natural elements such as branches, pine cones, mushrooms and flowers are protected by state law and may not be removed. Camping and campfires are not permitted. We suggest walking on designated footpaths to avoid poison oak. The pine needles can be slippery—please use caution. We recommend flashlights at night.

◆ **SMOKING**

State law prohibits smoking in or within 50 feet of Marconi Conference Center buildings. Ashtrays are located at entrances, on decks and on patios. Smoke only in paved areas and please use extreme caution when smoking on the property.

◆ **PETS**

With the exception of guide dogs for the handicapped, *pets are not permitted* in Marconi

Conference Center buildings and cannot remain on the property overnight. Dogs must be on a leash at all times.

◆ **ENJOY!**

We hope that between highly productive meetings you'll have some time to appreciate the rich human and natural history that surrounds us here. Please let us know if there is anything we can do to enhance your stay.



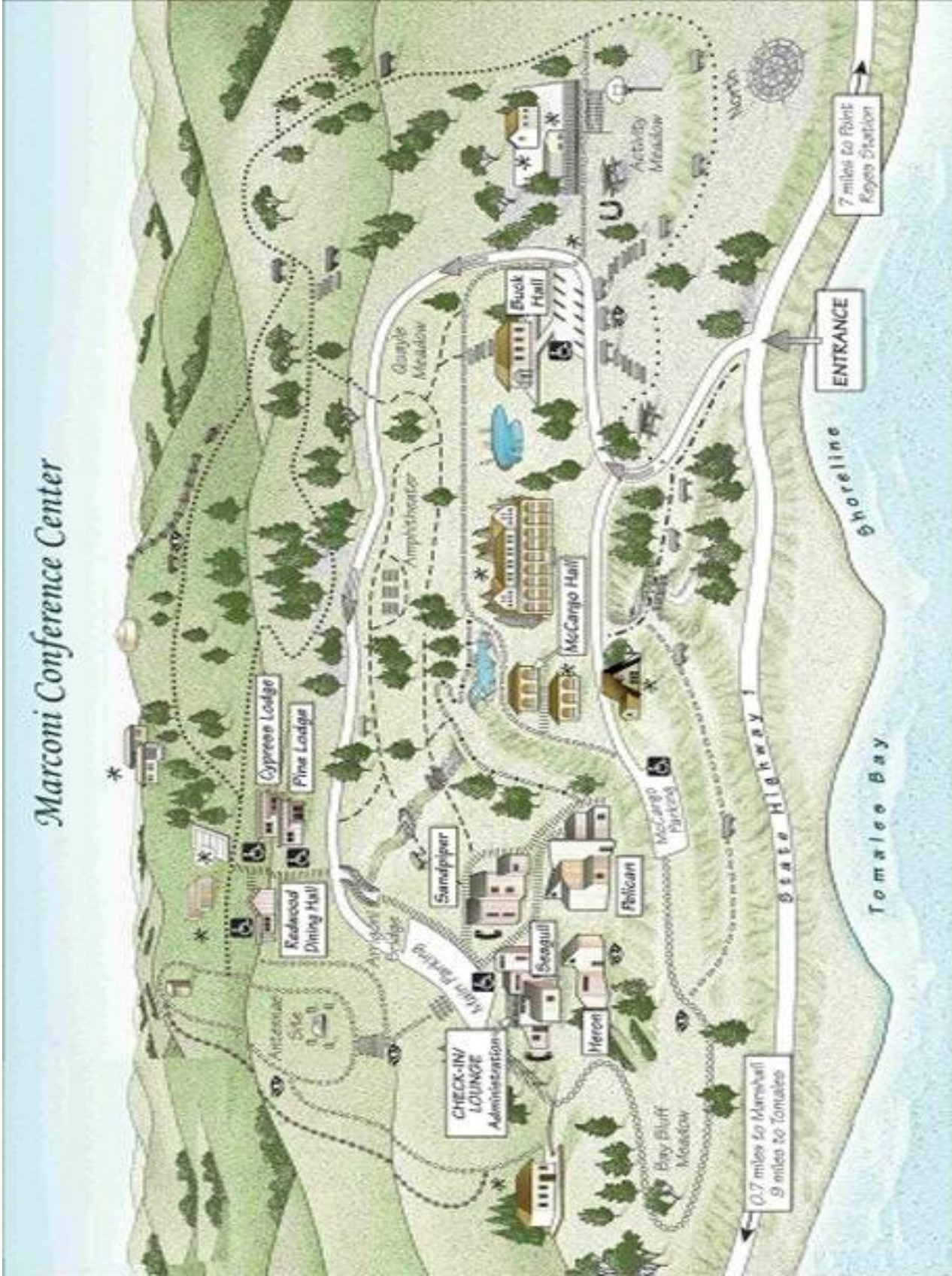
Marconi Conference Center's guestrooms overlook Tomales Bay

◆ **EMERGENCIES**

Between 11 p.m. and 7 a.m., the recorded message on (415) 663-9020 tells callers how to contact a guest or Marconi staff member in an emergency.

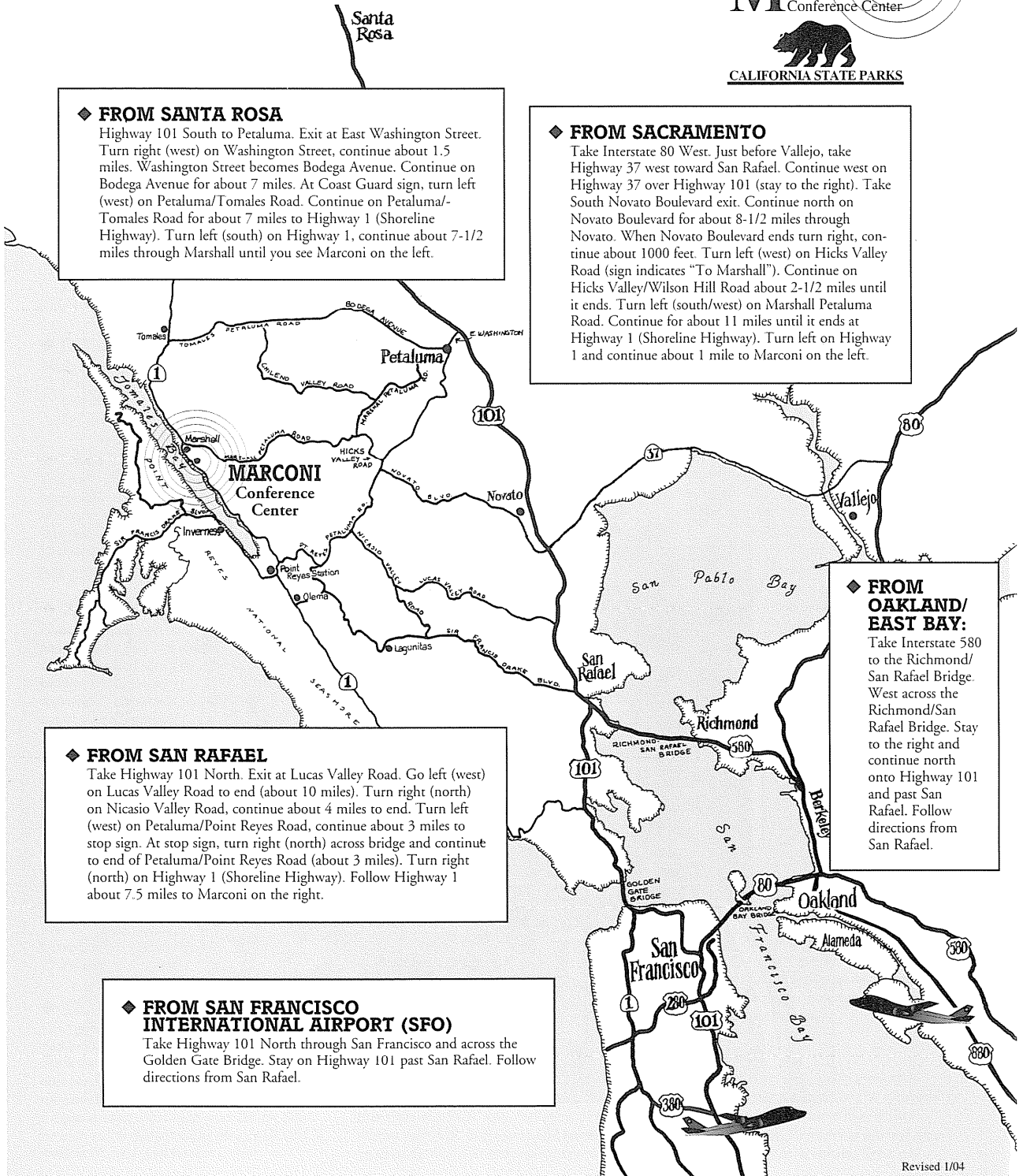
◆ **GUEST SERVICES**

In the front desk area we have games, reading material and a VCR with a selection of movie videos; volleyball, badminton and horseshoe equipment; ice, irons and ironing boards, all at



Marconi Conference Center

◆ **Marconi Conference Center**
 ◆ **GETTING TO MARCONI**
 (415) 663-9020



◆ **FROM SANTA ROSA**
 Highway 101 South to Petaluma. Exit at East Washington Street. Turn right (west) on Washington Street, continue about 1.5 miles. Washington Street becomes Bodega Avenue. Continue on Bodega Avenue for about 7 miles. At Coast Guard sign, turn left (west) on Petaluma/Tomales Road. Continue on Petaluma/Tomales Road for about 7 miles to Highway 1 (Shoreline Highway). Turn left (south) on Highway 1, continue about 7-1/2 miles through Marshall until you see Marconi on the left.

◆ **FROM SACRAMENTO**
 Take Interstate 80 West. Just before Vallejo, take Highway 37 west toward San Rafael. Continue west on Highway 37 over Highway 101 (stay to the right). Take South Novato Boulevard exit. Continue north on Novato Boulevard for about 8-1/2 miles through Novato. When Novato Boulevard ends turn right, continue about 1000 feet. Turn left (west) on Hicks Valley Road (sign indicates "To Marshall"). Continue on Hicks Valley/Wilson Hill Road about 2-1/2 miles until it ends. Turn left (south/west) on Marshall Petaluma Road. Continue for about 11 miles until it ends at Highway 1 (Shoreline Highway). Turn left on Highway 1 and continue about 1 mile to Marconi on the left.

◆ **FROM SAN RAFAEL**
 Take Highway 101 North. Exit at Lucas Valley Road. Go left (west) on Lucas Valley Road to end (about 10 miles). Turn right (north) on Nicasio Valley Road, continue about 4 miles to end. Turn left (west) on Petaluma/Point Reyes Road, continue about 3 miles to stop sign. At stop sign, turn right (north) across bridge and continue to end of Petaluma/Point Reyes Road (about 3 miles). Turn right (north) on Highway 1 (Shoreline Highway). Follow Highway 1 about 7.5 miles to Marconi on the right.

◆ **FROM OAKLAND/EAST BAY:**
 Take Interstate 580 to the Richmond/San Rafael Bridge. West across the Richmond/San Rafael Bridge. Stay to the right and continue north onto Highway 101 and past San Rafael. Follow directions from San Rafael.

◆ **FROM SAN FRANCISCO INTERNATIONAL AIRPORT (SFO)**
 Take Highway 101 North through San Francisco and across the Golden Gate Bridge. Stay on Highway 101 past San Rafael. Follow directions from San Rafael.

Revised 1/04

TRAINING ATTENDANCE CHECKLIST AND PRE-TRAINING ASSIGNMENTS

To assist you in your preparation for this training at Marconi Conference Center and Olompali State Historic Park the following checklist is provided:

1. Be sure you have read and understand the Resource Management Cultural Advanced Syllabus prior to the first scheduled session.
2. Prepare a list of topics for discussion by the instructors. Topics should address problems you have experienced in any of the program subject areas. E-mail the list to Program Coordinator Chuck Combs chuck@parks.ca.gov by March 19, 2012.
3. Download and read the following:
 - ***The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.*** (From attachment to this syllabus PDF link)
 - National Park Service ***Technical Brief #31: Mothballing Historic Buildings*** by Sharon C. Park, AIA, <http://www.nps.gov/hps/tps/briefs/brief31.htm> . Be familiar with the issues and practical applications of *mothballing* historic buildings.
4. Arrange travel through your District/Section Office.
5. Bring the following items with you to training:
 - Training Syllabus.
 - Personal safety equipment: safety glasses, ear protection, leather, gloves, hard hat, and sunscreen.
 - Appropriate work uniforms, rain gear, and coveralls with good work boots.
 - Pens, pencils.
 - Reusable coffee cup and refillable water bottle.

If you have questions or need assistance, call the Program Coordinator Chuck Combs at 831-649-7124 or email chuck@parks.ca.gov.

POST-TRAINING ASSIGNMENT

Prior to ninety days after the completion of this program, the employee and his/her supervisor should sit down and discuss the impact and assess the effectiveness this program has had on the employee. Then both the supervisor and employee should login to the Employee Training Management System (ETMS) and complete the Post-Training Evaluation form (an email will be sent to both employee and supervisor notifying them that the evaluation needs to be completed).

The post-training evaluation process is intended to provide a bridge between classroom instruction and the on-the-job application of training. The information obtained through this process will assist the training participant, supervisor, and Training Center in providing a return on the investment the Department has on training.

RESOURCE MANAGEMENT CULTURAL ADVANCED GROUP 3
Mothballing Historic Buildings and Collections - Agenda
March 25-30, 2012

Sunday

March 25

1500-	Registration (check-in at the Marconi Conference Center Administration Building)	All
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Monday

March 26

0800-0900	Orientation and Introductions	Combs/Bjelajac/ Wooley
0900-1000	Park/Building Closures: General Discussion, Question and Answer	Bjelajac/Wooley
1000-1100	Review of Building Closures/Stabilization in Parks	Wooley/Frazier
1100-1200	Historic Overview of Olompali SHP	Parkman
1200-1300	Lunch	
1300-1400	Cultural Resources Protection for Park Closures	Frazier
1400-1700	<i>Mothballing</i> , Stabilizing, and Securing Your Historic Buildings	Wallace

Tuesday

March 27

0800-0930	Park Closures – What it Means for Facility Management	Sederquist
0930-1100	Park Closures – What it Means for Grounds and Historic Landscapes	Brody/TBA
1100-1130	THA – Task (Job) Hazard Analysis	Combs
1130-1200	Park Closures – What it Means for Artifacts: Storage, Pests, and Security	Quist
1200-1300	Lunch	
1300-1400	Van Pool to Olompali SHP	
1400-1500	Welcome and Orientation to Olompali SHP	Rodriguez/Bjelajac/ Parkman
1500-1600	Introduction to the Field Labs Activities	Bjelajac/Brown/ Brody/Quist
1600-1700	Van Pool from Olompali SHP	All

RESOURCE MANAGEMENT CULTURAL ADVANCED GROUP 3
Mothballing Historic Buildings and Collections - Agenda
March 25-30, 2011

Wednesday

March 28

0800-0900	Van Pool to Olompali SHP	All
0900-1200	Field Training: Rotating Labs	Bjelajac/Brown/ Brody/Quist
1200-1300	Lunch at Field Site	
1300-1600	Field Training: Rotating Labs, (continued)	
1600-1700	Van Pool from Olompali SHP	

Thursday

March 29

0800-0900	Van Pool to Olompali SHP	All
0900-1200	Field Training: Rotating Labs, (continued)	Belajac/Brown/ Brody/Quist
1200-1300	Lunch at Field Site	
1300-1600	Field Training: Rotating Labs, (continued)	
1600-1700	Van Pool from Olompali SHP	

Friday

August 28

0800-0930	Check out of Marconi Conference Center and Travel to Olompali SHP	All
0930-1030	Project Wrap-up, Cleanup, and Demobilization	All
1030-1130	Recap/Examination and Review	Bjelajac/ Wooley
1130-1200	Program Summary and Evaluation Depart	Combs

RESOURCE MANAGEMENT CULTURAL ADVANCED

36 HOURS

PROGRAM OUTLINE

PROGRAM ADMINISTRATION 2.0
Welcome, Applications, and Course Review
Evaluation and Wrap-up.....

INTEGRATED RISK ASSESSMENT 34.0
Park Closures: General Discussion and Question and Answer.....
Review of Building Closures/Stabilization in State Parks
Park Closures – What it Means for Facility Management.....
Park Closures – What it Means for Historic Landscapes.....
Park Closures – What it Means for Facility Management.....
Historic Overview of Olompoli SHP
Cultural Resources Protection for Park Closures
Mothballing, Stabilizing, and Securing Your Historic Buildings.....
Air Flow and Water/Humidity Issues.....
Pests: Buildings and Collections
Field Training: Shutters and Security
Field Training: Louvers and Ventilation
Field Training: Data Loggers
Field Training: Systems.....

TOTAL HOURS 36.0

RESOURCE MANAGEMENT CULTURAL ADVANCED MOTHBALLING HISTORIC BUILDINGS AND COLLECTIONS

PURPOSE: This class was designed with two purposes in mind. The primary purpose is to train State Park personnel in the accepted procedures for closing (i.e. *mothballing*) historic buildings and providing for the preservation of museum collections housed in those same, or other buildings scheduled for closure. The secondary purpose is to unite maintenance, cultural specialist, curatorial, and other State Park staff into teams that will work together to affect closure through proper methods and techniques, while retaining a team relationship which will continue to work toward preserving our historic resources over time.

OBJECTIVES: By the close of the training session participants will

For Historic Buildings:

1. Describe NPS Preservation Brief #31 – *Mothballing Historic Buildings*.
2. Understand the implications of park closures on historic buildings and collections from both a cultural heritage and maintenance perspective.
3. Identify the critical steps in the *mothballing* of historic buildings and grounds.
4. Identify condition issues that could affect resource preservation and how to respond to minimize or eliminate threats.
5. Stabilize a historic building with regard to pests, moisture, structural stability, and vulnerability to vandalism.
6. Perform the necessary steps to properly close or *mothball* a historic building.
7. Install monitoring equipment and schedule surveillance for the continued preservation and protection of historic buildings.

For Historic Landscapes:

1. Understand the need for ongoing maintenance of landscape elements to prevent loss of distinguishing elements of the historic fabric and how that differs from ongoing maintenance in an operational park unit.
2. Develop schedules to maintain landscape at acceptable levels in *caretaker status*.
3. Identify which elements of a historic landscape that need periodic monitoring.

For Museum Collections:

1. Describe how to use the MCFI survey to determine where collections should be stored for optimum preservation.
2. Identify, move, and store objects that are fragile, have great historic or monetary value.
3. Track physical inventory documentation, collections records, and all other support documentation for collections and objects.
4. Recognize the need and be able to use archival quality products to store collections properly.
5. Monitor environmental conditions under which collections are stored, and how to use/interpret these records.
6. Work with Cultural staff to set-up inspection and monitoring schedules and how to record and photograph any changes that warrant modification of either the storage location or environmental conditions.



Vicinity Map



Area Map