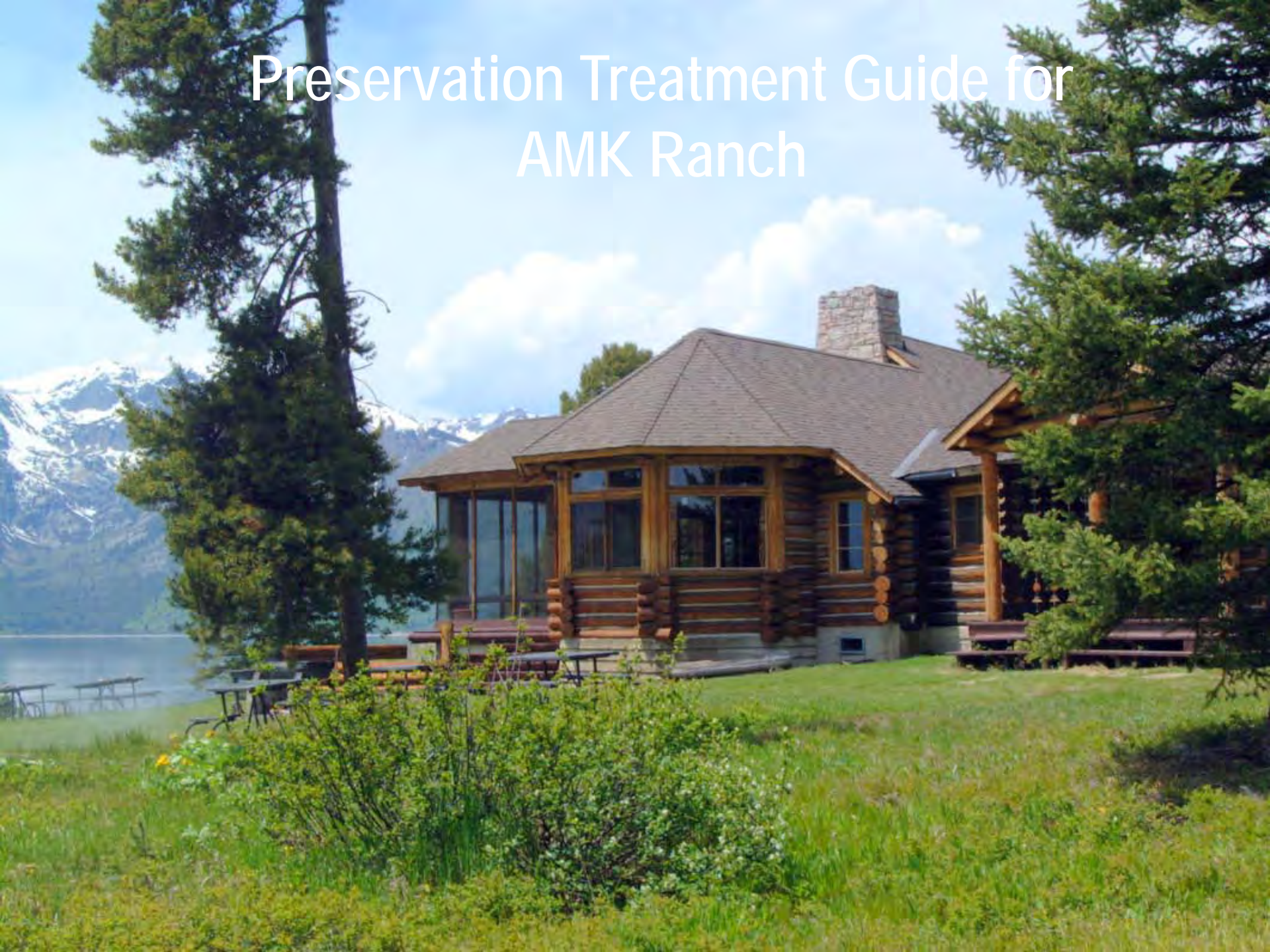


Preservation Treatment Guide for AMK Ranch



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Preservation Treatment Guide for the AMK Ranch

Prepared for the
University of Wyoming- National Park Service Grand Teton Research Center
Grand Teton National Park, Wyoming
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This report was prepared by the University of Wyoming American Studies Program
Mary Humstone, Principal Investigator
Carly-Ann Anderson, Graduate Student Intern
Sheila Bricher-Wade, Andrea Lewis, Cassie Loveland, Students

With the help of
Harrison Goodall, Conservation Specialist
Katherine Longfield, Cultural Resources Manager, Grand Teton National Park

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Introduction



The Johnson Lodge under construction in 1927

Photo courtesy JHSM, 19583171001.JPG

Introduction

This guide was developed as part of the University of Wyoming American Studies Program's 2011 summer field course in historic preservation. The course introduced students to the process of documenting and assessing the condition of historic buildings and developing treatment protocols. Students inspected buildings, interviewed property managers, researched solutions to common problems and wrote the "Preservation Treatment Guide" for use by National Park Service and University of Wyoming personnel. Students studied log building maintenance and repair at other historic sites within Grand Teton National Park and conducted experiments and demonstrations at the AMK Ranch. The course was taught by University of Wyoming Research Scientist Mary Humstone, with assistance from building conservation specialist Harrison Goodall of Langley, Washington, and Grand Teton National Park Cultural Resource Specialist Katherine Longfield.



Students, instructors and National Park Service staff at a site visit to the Lucas-Fabian cabin in Grand Teton National Park.

How to Use This Guide

The mission of the UW-NPS Grand Teton Research Center is to provide opportunities for both management-oriented and basic research on the Greater Yellowstone Ecosystem, especially Grand Teton National Park and the John D. Rockefeller, Jr. Memorial Parkway. The University of Wyoming has administered a field research program with this mission in Grand Teton National Park since 1953. Research was initially based out of the Jackson Hole Biological Research Station near Moran, but was relocated to the AMK Ranch in 1978.

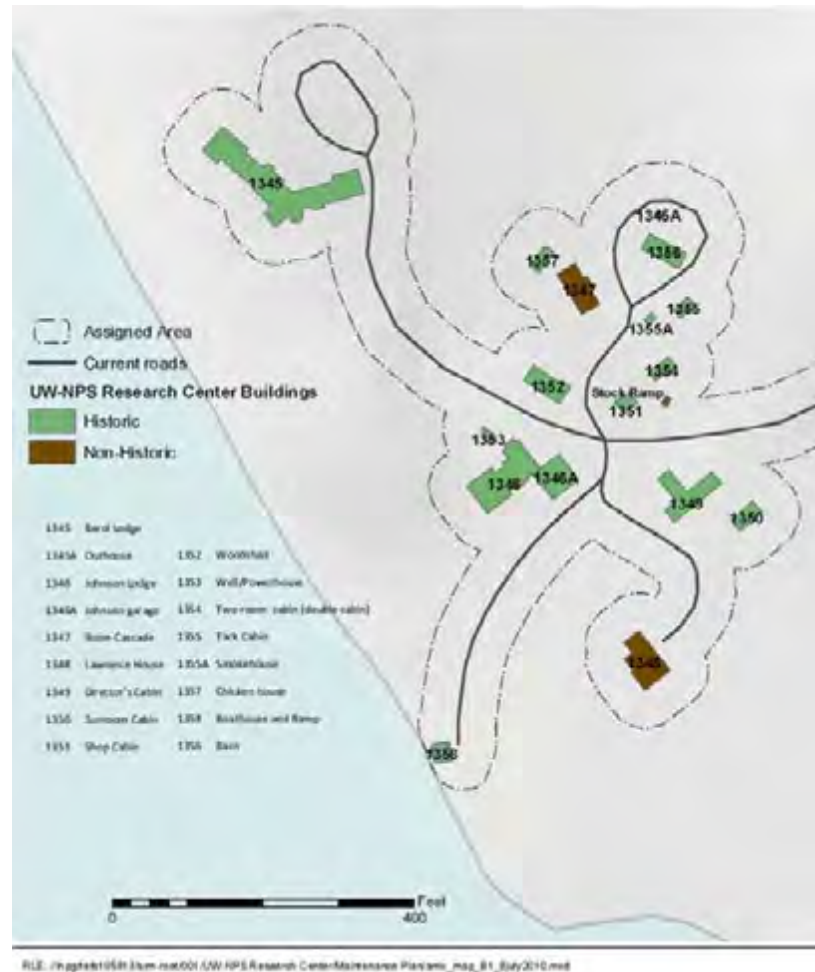
In 2010, the University of Wyoming and Grand Teton National Park entered into a ten-year general agreement that established a framework for cooperation in maintaining a long-term and proactive cooperative research program and associated support facilities within Grand Teton National Park at the AMK Ranch. Although the federal government owns the AMK Ranch land and buildings, the University of Wyoming has been assigned the buildings and surrounding land (see Map 1) and the university is charged with taking care of the structures and features contained in the assigned area. The park works cooperatively with the university to ensure that the buildings are maintained to park standards and that all work meets the Secretary of the Interior's Standards for the Treatment of Historic Properties. Likewise, the park tracks the university's progress in maintaining the structures and landscape through an NPS database, the Facility Management Software System (FMSS).

How to Use This Guide

Although the university has occupied the buildings at the AMK Ranch since 1978, the park has not provided adequate guidance on maintaining the historic structures. This guide is a first step in reversing that trend and establishing preservation goals, best practices, timelines, and priorities for the long-term preservation of the AMK Ranch.

For the purposes of this guide, the park and the university collaborated to identify problem areas in order to provide focus on “next steps” for the university in their stewardship of the ranch. This guide will act as a baseline for decision-making as the university and the park move forward creating annual maintenance plans (as specified in the 2010 general agreement). This guide is not programmatic and thus does not eliminate the need for Section 106 of the National Historic Preservation Act compliance. However, any work outlined in this document should be included in the FMSS database so that it can be tracked.

UW/NPS Research Center Buildings



Map 1

How to Use This Guide

The Preservation Treatment Guide for AMK Ranch provides building-by-building information as well as general treatment procedures for the most common preservation problems.

I. Introduction provides background information about the history and significance of AMK Ranch, and defines the general protocols for work on a National Register-listed property. This section includes *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, customized for the AMK Ranch.

II. Historic Buildings at the AMK Ranch is organized by building. An illustrated list of character-defining features and an analysis of maintenance and repair problems and recommended solutions are provided for each historic building and structure on the property.

III. Addressing Problem Areas provides specific procedures for the actions recommended in the previous section. Although most procedures are intended to be applied to all buildings on the property, remedies for specific problems existing at the Berol Lodge are included in this section.

IV. Regular Inspection and Maintenance Tasks explains use of the Building Condition Assessment Form and lists tasks that should be performed annually.

Appendix includes a CD with completed Building Condition Assessment Forms (2011) and blank forms for future use, as well as additional photographs, information on National Park Service policies and references.

Documentation

Documentation is a critical step in the process of preserving and maintaining historic buildings. Managers at the AMK Ranch need to keep a record of all actions and treatments performed on the historic structures, including major work, minor modifications, and everyday maintenance and repairs. Thorough documentation of what work was done provides a history of changes over time, an important element for conservation and historic preservation. This may not seem significant at the present time, but it becomes critical to have this record as directors, staff, or conservators change over the years.

Documentation also provides a record of successful and failed treatments which will help future managers determine the best procedures and avoid past mistakes.



Documentation of the daubing process on the Boathouse at AMK Ranch.

Documentation

How to Document

- Always include sequenced photographs of the work. Before and after pictures should be taken from the same perspective to provide continuity. See Appendix A (attached CD) for sample forms.
- Prepare a folder for each structure and keep a log with the description of all work performed on the structure. A preprinted work log sheet may help with the organization.
- Prepare a completion report of the work that was performed; require completion reports from contractors as well. Include details about the treatments and work, including what fabric was replaced or modified, what finishes, chemicals, and materials were used, when the treatments took place, and the rationale for doing the work. Include copies of the contract, specifications, photographs and all other information relating to the project.
- Incorporate all work into a facilities management program or maintenance system. Most systems provide a method for creating and archiving a work history.

Historic Background of the AMK Ranch

The AMK Ranch lies on a 143-acre peninsula defined by Jackson Lake and Sargents Bay, the latter named for the man who first homesteaded in the area in 1890. John Sargent started a small cattle ranch and maintained a family garden on the property. He also housed travelers in his ten-room house and offered boating trips and camping, although his business never developed into the full-fledged dude ranch he had envisioned. The use of the homestead for farming and tourism is significant because it resulted in its exclusion from the Yellowstone Park Timber Reserve of 1891 and thus the property remained private in private hands until its sale to Grand Teton National Park in 1976. No buildings from the Sargent era remain, but Sargent's grave and several small-scale landscape features are reminders of the property's early significance in homesteading and tourism in the area.

In 1926, William Lewis Johnson purchased the Sargent property as a summer retreat and hunting and fishing camp. Johnson, who worked for Bausch and Lomb Optical Company in Syracuse, New York, hired an architect to design a two-story log house which was constructed at the south end of the peninsula in 1927. The site for the house was chosen for its stunning views of Jackson Lake and the Teton Range. Johnson and his wife Mae named the property Mae-Lou Lodge, a combination of their names. A barn was built to accommodate horses and cabins were added to house family and friends. A boat dock also enabled access to Jackson Lake. The Johnson Lodge and attached garage as well as nine small outbuildings remain to represent the Johnson era and the change in use of the property from farming and tourism to entertainment and recreation.

Historic Background of the AMK Ranch

In 1936, Alfred Berol purchased the property and constructed a vacation home designed by George Kosmak with help from local Wyoming architect Paul Colbron. The home, now known as Berol Lodge, was built in 1938 in the popular Rocky Mountain Rustic style. It was designed for entertaining and features fantastic views and western rustic furniture. Berol, who made his fortune in the Eagle Pencil Company, placed pencil motifs throughout the building. The Berols named the property the AMK Ranch, the combined first initials of Alfred, his wife, and their son. Guests were housed in the Johnson properties and were pampered by a staff of servants. The Berols added a few buildings such as the pole barn and tack cabin to support their recreational needs. Berol also built a rifle range, a trap shooting range and a second boat dock on the east side of the peninsula. Alfred Berol died in 1974 and, after 38 years of continued summer occupancy, his son Kenneth sold the property to Grand Teton National Park in 1976. The property became the University of Wyoming-National Park Service Research Station in 1978.

Other important residents of the property were caretakers Slim and Verba Lawrence, who began working for the Johnsons in 1930 and remained as caretakers for the Berols. The Lawrences were the only full-time residents of the peninsula for several decades, and in 1968 Alfred Berol built them a house south of the Johnson Lodge. The couple enjoyed a lifestyle more like that of Sargent than their employers, hunting, fishing, skiing and enjoying the natural landscape of the peninsula. They are buried on-site.

Historic Character

General Character of the AMK Ranch

The AMK Ranch Historic District occupies a 268.84-acre peninsula oriented north to south and defined by Jackson Lake to the west and Sargents Bay to the east, with the Teton Range rising sharply along the western side of the lake. Jackson Lake is an area landmark, offering recreational opportunities, with views of the Teton Range from the shores. The district occupies a relatively flat terrain with major slopes to the west down to the lakeshore and east upward to a ridge. A ravine separates the Berol lodge from the remainder of the buildings in the central cluster. The land is heavily forested with lodgepole pine, except within the central cluster containing the predominantly Rustic-style buildings. Within the historic district, vistas include linear views down two-track roads flanked by lodgepole pines.

Significance

Significance

The AMK Ranch Historic District is significant at the local level as the location of an early homestead and vacation property. The district is also significant for its association with the life of AMK Ranch caretaker, W.C. “Slim” Lawrence, a collector of Native American and early pioneering-era artifacts, who has significantly contributed to the history of Jackson Hole, Wyoming. The AMK Ranch Historic District contains excellent and well-preserved examples of Rustic-style vacation homes, designed by prominent architects such as George Kosmak and Paul Colbron, with ancillary structures that conform to the norms of the vernacular rustic style.

The district’s period of significance extends from the establishment of John Sargent’s homestead in 1890 to 1976, the year the property was acquired by the National Park Service. Significant dates include 1926, when William Lewis Johnson acquired the property and built his own log home at the southern end of the peninsula, and 1936, when Alfred Berol bought the property and began planning an elaborate rusticated log vacation home.

Integrity

Integrity

The seven qualities of integrity assessed in accordance with National Register criteria are location, setting, design, materials, workmanship, feeling, and association. The AMK Ranch historic district retains overall integrity all seven qualities. The peninsula has remained largely unchanged since Sargent first arrived on the property in 1890. Protected within the boundaries of Grand Teton National Park, few man-made encroachments have found their way onto the peninsula. Although the use of the ranch has shifted over the years, from homesteading to vacation home to research station, the setting has remained constant and the property retains the feeling and association of earlier periods. The buildings and structures are overwhelmingly of rustic log architecture and connect visually to each other and to the setting. The integrity of each period in AMK Ranch Historic District history, including the Sargent Homestead period, the William Lewis Johnson period, and the Alfred Berol period, is analyzed below.

Integrity- Location and Setting

Location and Setting

Location is the place where the historic property was constructed or the place where the historic event occurred, while setting is the physical environment of a historic property. Boundary demarcations, small-scale elements, vegetation, and the evidence of responses to natural systems and features add to the integrity of location and setting.

Sargent Homestead Period: The majority of features associated with the Sargent period are non-extant, although the former location of Sargent's homestead, along with the tree where Edith Sargent played the violin, remains as a contributing site identified by an open area flanked by two clusters of aspens. Because of this and the fact that the property would never have developed as it did were it not for Sargent's homestead, the district retains integrity of location and setting for the Sargent period.

William Lewis Johnson Period: All buildings and the setting associated with the Johnson period are retained, without alteration. Therefore the district retains integrity in location and setting for the Johnson period.

Alfred Berol Period: Taking full advantage of the peninsula, Berol extended his recreational use of the property by constructing rifle and skeet shooting ranges along the northwestern half of the peninsula. All buildings, structures, sites, and objects associated with the Berol period are intact and therefore the district retains integrity in location and setting for this period.

Integrity- Design

Design

Design is the combination of elements that creates the form, plan, space, structure, and style of a property. Patterns of spatial organization, circulation networks, and clusters directly relate to integrity of design and strongly influence cohesiveness of a landscape.

Sargent Homestead Period: Since most of the physical evidence of the Sargent period has been removed, the property does not retain integrity in design for the Sargent period.

William Lewis Johnson Period: Because all of the buildings associated with the Johnson period have been retained, the property retains integrity in design for the Johnson period. In addition, although circulation patterns have changed since Johnson's tenure, including the construction of the AMK Ranch Road during the Berol period, the integrity of circulation patterns dating to this period is retained since the original roads can be clearly discerned through the vegetation.

Alfred Berol Period: All contributing features associated with Berol's ownership of the property are retained, and therefore the property retains integrity in design for the Berol period.

Integrity- Materials and Workmanship

Materials and Workmanship

Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property, while workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. Buildings and structures, vegetation, small-scale features, and land uses all reflect materials and workmanship.

Sargent Homestead Period: The existing contributing features related to the Sargent period, including the location of the homestead and the violin tree, do not contribute to the district's integrity in materials and workmanship.

William Lewis Johnson Period: Despite interior alterations of buildings to accommodate researchers and slight alterations in the circulation patterns, the district retains integrity of materials and workmanship for the Johnson period.

Alfred Berol Period: No alterations have been made to any of the features associated with the Berol period, and therefore the district retains integrity in materials and workmanship.

Integrity- Feeling and Association

Feeling and Association

Feeling is a property's expression of the aesthetic or historic sense of a particular period of time, while association is the direct link between an important historic event or person and a historic property.

Sargent Homestead Period: In spite of missing features associated with the Sargent period, the site retains the overall feeling of an early homestead. The homestead site and Sargent's grave remain to associate Sargent with the site. Therefore the property retains feeling and association for the Sargent period.

William Lewis Johnson Period: Although the district has changed from use as a vacation home to a research facility, it still retains the feeling of an early 20th century vacation home, along with many specific features directly associated with Johnson. Therefore the property retains feeling and association for the Johnson period.

Alfred Berol Period: The property has hardly changed since 1976 and retains feeling and association for the Berol period.

Preservation Approach

The Secretary of the Interior's Standards for the Treatment of Historic Properties was developed by the National Park Service to serve as a standard guide for preserving, rehabilitating, restoring, and reconstructing historic buildings and structures. The standards promote appropriate preservation practices, such as retaining character-defining features, repairing rather than replacing historic fabric, and if additions are necessary, creating compatible yet distinct new additions. The *Standards* provide specific guidance for each of the four standard treatments listed below. See page 28 for a complete list of the standards for rehabilitation.



Definitions- Types of Preservation

PRESERVATION: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses on the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, limited upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a *preservation* project.

REHABILITATION: The act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

RESTORATION: The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

RECONSTRUCTION: The act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Definitions- Other Important Terms

CHARACTER-DEFINING FEATURE: A prominent or distinctive aspect, quality, or characteristic of a historic property that contributes significantly to its physical character. Structures, objects, vegetation, spatial relationships, views, furnishings, decorative details, and materials may be such features.

MAINTENANCE: Actions of servicing and repair that are scheduled in response to failure; regular upkeep. *Routine Maintenance* usually consists of service activities such as tightening, oiling, pruning, etc. *Housekeeping* involves the removal of undesirable deposits of soil in ways that minimize harm to the surfaces treated.

Preventative Maintenance: The care and servicing by personnel for the purpose of maintaining equipment and facilities in satisfactory operating condition by providing for systematic inspection, detection, and correction of incipient failures before they occur or develop into major defects.

Predictive Maintenance: A method in which the service life of important parts are predicted based on inspection and diagnosis in order to use the parts to the limit of their service life.

Cyclic Maintenance: Actions of servicing and repair that are *anticipated* and therefore scheduled a year or more in advance, such as a roof repair.

Deferred maintenance: The practice of postponing maintenance to save costs, meet budget funding levels, or realign budget monies. The failure to perform needed repairs could lead to asset deterioration and ultimately loss. A policy of continued deferred maintenance may result in higher costs and in some cases health and safety implications.

Definitions- Other Important Terms

PRESERVATION MAINTENANCE: Maintenance applied to historic properties. Preservation maintenance implies steps taken to mitigate wear and deterioration of a historic property without altering its historic character by protecting its condition, repairing when its condition warrants with the least degree of intervention including limited replacement in-kind, replacing an entire feature in-kind when the level of deterioration or damage of materials precludes repair, and stabilization to protect damaged materials or features from additional damage.



Cleaning a building using appropriate products and methods of application is an example of preservation maintenance.

AMK Ranch as Adaptive Use

Constructed between 1927 and 1935, buildings comprising AMK Ranch were originally built for use as a vacation property. When the National Park Service purchased the property in 1976, the ranch was adapted for a new use. Since 1978, AMK Ranch has been open between June and September of each year, serving as the University of Wyoming-National Park Service Grand Teton Research Station and providing housing for researchers, laboratory facilities and space for seminars. At any one time, the ranch has a housing capacity of 55 researchers, usually reaching full capacity during the months of July and August. Recently renewed, the contract between the NPS and the University of Wyoming is in effect until 2021.

Using a historic property for a compatible new use while preserving historic features is known as “adaptive use.” Because of its significance and current use, the most appropriate treatment for the buildings, structures and landscape at the AMK Ranch is *Rehabilitation*, “the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.”

Secretary of the Interior's Standards for the Treatment of Historic Properties

Secretary of the Interior Standards for Rehabilitation

1. "A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment."

It is important to make every effort to use a building or structure for its original or similar purpose because often interior layouts (and even exteriors) change with new uses. The AMK Ranch, which was historically used as a vacation home, has easily transitioned into a summer-long residence for students conducting research with few alterations to accommodate the new use.

2. "The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided."

Avoiding the destruction of distinctive original features is important as their loss equates to a loss of historic integrity. Without historic integrity, the property can lose its National Register eligibility. For example, removing extended log crowns to avoid moisture penetration and future wood rot would compromise the integrity of any of the cabins at the AMK.

3. "Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken."

It is important to avoid making speculative additions or alterations because they may create a false sense of historical development. For example, although a rustic-style porch may compliment the chicken house (c. 1928) and serve as a practical addition, one might mistake the porch as an original character-defining feature, or mistake the building for having once been used as a residence.

Secretary of the Interior's Standards for the Treatment of Historic Properties

*Secretary of the Interior Standards for **Rehabilitation** (continued)*

4. "Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved."

At the AMK Ranch, the Sunroom Cabin (c. 1931) was altered in 1940 by Alfred Berol to include electricity, running water, and an enclosed sun porch. The 1940 porch has gained significance over time, and should be preserved.

5. "Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved."

Examples of craftsmanship at the AMK Ranch include the screened-in porch at the Berol Lodge (1938), which was designed by New York Architect George Kosmak, the board-and-batten siding of the barn (c. 1938), the ribbon windows of the chicken house (c. 1928), and the chinking and saddle-notched logs of the Johnson Barn/Garage (1927).

6. "Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence."

Every effort should be made to properly maintain and repair the frames and lights of original windows, which are critical character-defining features. Currently, all windows at the AMK are in good condition, and if properly maintained should last for many years.

Although most logs on AMK buildings are in fair condition, a few sill logs and log crowns have rotted beyond repair and are in need of replacement. The plan will recommend that these logs be replaced in-kind with a similar species of wood, dimensions, and texture in accordance with standard #6.

Secretary of the Interior's Standards for the Treatment of Historic Properties

*Secretary of the Interior Standards for **Rehabilitation** (continued)*

7. “Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.”

Cleaning the exterior of the historic buildings at the AMK Ranch will be necessary. Sandblasting the exterior would destroy the historic fabric, removing chinking, finishes on the logs, and even wood particles of the log, creating cavities that facilitate moisture damage.

8. “Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.”

Archeological surveys of the AMK Ranch property have been completed. If excavation is required, all ground disturbance must be approved by the Park Service and comply with Section 106 of the National Historic Preservation Act.

9. “New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.”

No new constructions, exterior alterations, or new additions are currently proposed at the AMK Ranch. However, if and when they are, it will be important to make new additions and alterations distinct yet compatible with the historic.

10. “New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.”

Future additions to any of the buildings and structures at the AMK Ranch should be designed so that if removed they would not damage the integrity of the property.

Historic Buildings at the AMK Ranch



John D. Sargent's cabin, 1891.

Photo courtesy the National Park Service

Introduction

This section provides a summary of:

- 1) the character-defining features of each of the eighteen historic buildings and structures in the AMK Ranch Historic District; and
- 2) the major preservation problems for each building and structure as identified during the summer 2011 historic preservation field course inspection, along with recommendations for correcting these conditions.

As noted above, character-defining features must be retained in the process of maintaining, repairing and rehabilitating historic properties. This section can be used to create a building-by-building file for purposes of documentation as outlined on pages 12-14.



The porch is a character-defining feature of the Johnson Lodge.

Berol Lodge, Character-defining Features



"L" shape
Intersecting gables of varying lengths and heights
Purlin roof structure

Large native stone chimneys



Gabled front porch
Oversized log columns
Chevron door pattern
Flanking windows
Porch light

Flagstone porch

Rhythm of board and batten siding
Window repetition

Berol Lodge, Character-defining Features



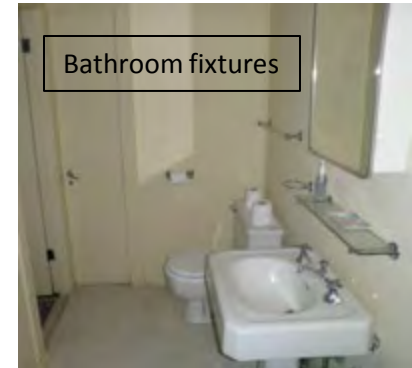
Berol Lodge Interior, Character-defining Features



Dining room chandelier with pencil motif



Pencil-motif light fixture in bedroom



Bathroom fixtures

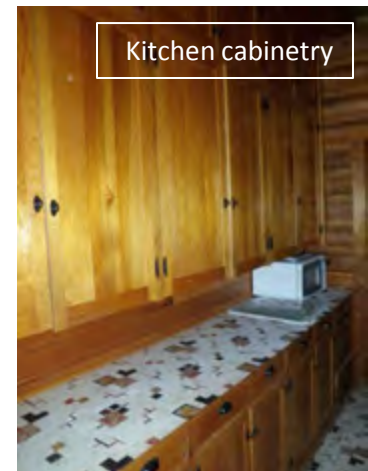
As a complex, architect-designed building, many of the features of the Berol Lodge are character-defining. Therefore most interior features including fireplaces, chandeliers, cabinetry, hardware, and woodwork, should be cleaned, maintained, and repaired in a manner which respects their integrity.



Living room fireplace



Built-in sofa in living room



Kitchen cabinetry

Berol Lodge, Problem Areas



1. Drooping shingle edge and valley flashing



2. Large flashing trough promotes poor drainage



3. Deteriorating fascia



4. Gaps in flashing around chimney

Problem	Recommendation
<ol style="list-style-type: none"> 1. Ice build-up pulls shingles off of the edge due inadequate shingle overhang. The valley flashing is ineffective because of the short overhangs. Moisture can be retained on the underside of the shingles. 2. Large flashing trough at junction of screened porch and building at west elevation collects ice, preventing proper drainage. 3. Lack of shingle overhang is allowing water to drain down the front of the fascia board, staining and deteriorating the boards. 4. Flashing around chimney does not tie into roof, creating access and habitat for bats as well as the potential for water damage. 	<ol style="list-style-type: none"> 1. As a temporary correction, flashing should be inserted below the shingles at the edge of the roof to create an overhang. When the roof is replaced, the flashing should be laid to extend past the roofline, a metal drip edge installed, and a shingle overhang created. 2. As a temporary measure, heat tape should be applied to the flashing during the winters to prevent ice build up. 3. As a temporary measure, flashing should be inserted below the shingles at the edge of the roof to create an overhang. When the roof is replaced, a metal drip edge and extended shingle overhang should be created, and damaged sections of fascia replaced. 4. When the roof is replaced, the flashing should be properly tied in to the roof.

Berol Lodge, Problem Areas



1. Sloping porch with loose stones



2. Window collecting debris; sill finish and glazing deteriorating



3. Porch column discolored and infested



4. Foundation cracking

Problem	Recommendation
<ol style="list-style-type: none"> 1. Poor drainage above is causing porch stones to loosen; porches slope toward the building, causing deterioration of the adjacent logs. 2. Window sills are filling with debris and retaining moisture, leading to deterioration and fungal growth. The glazing on several windows is missing or in poor condition. 3. Porch columns are in direct contact with concrete, allowing moisture to travel through them via capillary action. This is deteriorating the logs, encouraging fungal growth and attracting ants. 4. Foundation is cracking at several points, indicating settling and potentially a larger problem with erosion. 	<ol style="list-style-type: none"> 1. Drainage problem must be resolved before the porch can be repaired. See page 101. Then porch must be disassembled, a new foundation poured, and the porch reconstructed. 2. Sills should be cleaned on a regular basis to prevent debris and moisture collection. Sill finish and glazing should also be touched up and re-applied when necessary. 3. Log should be treated using borate (consult NPS prior to use). If and when logs are replaced, they should be raised very slightly off of stone porch to prevent capillary action moisture retention. 4. Cracks should be monitored annually and photo-documented to determine rate of settling. Addressing the drainage and grade problems may solve problem.

Berol Lodge Problem Areas, Drainage, East Side



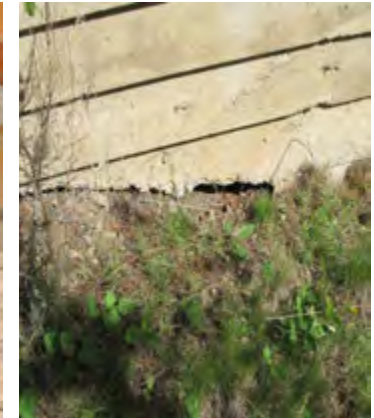
Water drains down hill directly under building



Wooden crawl space door where water drains underneath building



Trench under building where water drains causing mold on foundation



Hill eroding under foundation due to water drainage

Problem	Recommended
<ul style="list-style-type: none"> •Spring runoff is draining down the hill toward the building and running directly under the building entering through a series of wooden doors covering crawl spaces. •The hill appears to be eroding away underneath the lodge. •It is not good to have water draining under the building. Water can undermine the foundation, cause mold and deterioration, and many other problems. •The lodge is in surprisingly good shape considering the water running underneath it. However, some mold and water damage is occurring underneath the building. 	<ul style="list-style-type: none"> •Monitor the levels of moisture under the building every 3 months throughout the year and record. •Make drainage gully from south corner all the way across and around the north corner draining down the hill. See page 103 for how to make a drainage gully. •Pile dirt and gravel so water dripping from the roof runs into the drainage gully instead of under the building. •Create more ventilation under the building. •This is a large problem that needs further investigation and work. A major study with professional engineers and experts should be conducted specifically on this issue.

Berol Lodge Problem Areas, Drainage South Side



Water is dripping down wall instead of gutter causing black fungal growth on log



Corner has lots of black fungal growth and is constantly moist.



Water dripping on logs causes rot and deterioration.

Problem

- This corner is dark and very damp. Serious damage has been done to the logs and some are completely rotted.
- The gutters are ineffective and trapping moisture in the corner.
- The flashing in the valley does not extend to edge of roof and ice is wrapping around the edge of the roof causing significant damage to the fascia board. This is known as ice damming.

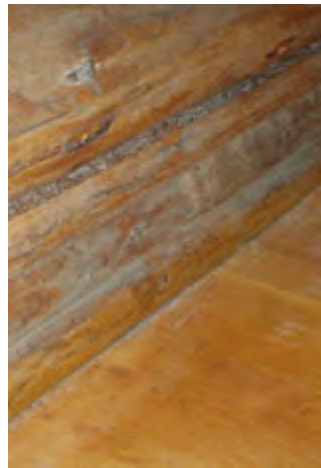
Recommendation

- Re-level gutters so water drips onto ground instead of dripping down the logs.
- Add metal drip edge that extends beyond roof edge to ensure proper runoff and protect fascia.
- Build drainage gully to catch water dripping off edge of roof and allow it to run down the hill away from the building
- For more detail on addressing this problem, see page 105.

Berol Lodge, Interior Problem Areas



1. Interior window sills experiencing water damage.



2. Woodwork is dusty and collecting debris.



3. Doors are out of alignment.



4. Boiler and pipes are wrapped in asbestos.



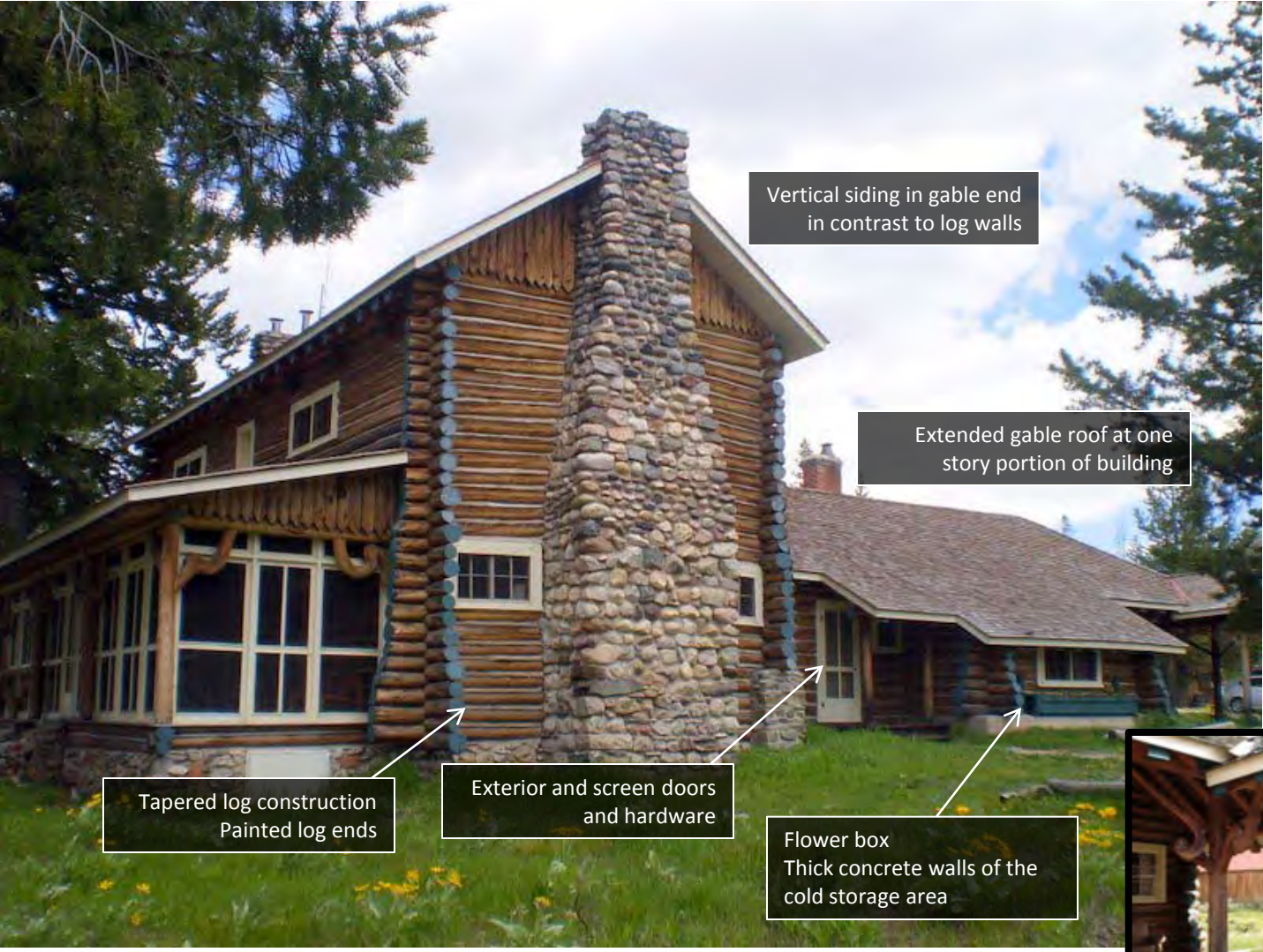
5. Ridgepole in main room is stained with fungus, indicating moisture control issues.

Problem	Recommendation
<ol style="list-style-type: none"> 1. Some interior sills are experiencing water damage. 2. Woodwork is dusty and collects debris. 3. Doors are out of alignment. 4. Boiler and pipes are wrapped in asbestos. 5. Ridgepole is stained with fungus, indicating moisture control issues. 	<ol style="list-style-type: none"> 1. Identify source of water damage and take measures to correct it. Clean using Murphy's Oil Soap and refinish wood to protect. 2. Sweep and dust frequently to prevent build-up and scratching of woodwork. Clean woodwork annually with Murphy's Oil Soap. 3. Re-hang doors to keep them from scraping floors or gapping at the top. See page 113. 4. Remove all asbestos from boiler and pipes using modern safety standards for asbestos removal. 5. Identify source of moisture and take measures to correct it. Clean log using the prescribed guidelines, page 81.

Johnson Lodge, Character-defining Features



Johnson Lodge, Character-defining Features



Vertical siding in gable end
in contrast to log walls

Extended gable roof at one
story portion of building

Burled-log
breezeway

Tapered log construction
Painted log ends

Exterior and screen doors
and hardware

Flower box
Thick concrete walls of the
cold storage area



Johnson Lodge Interior, Character-defining Features



Original Hardware and fixtures



Local river rock fireplaces

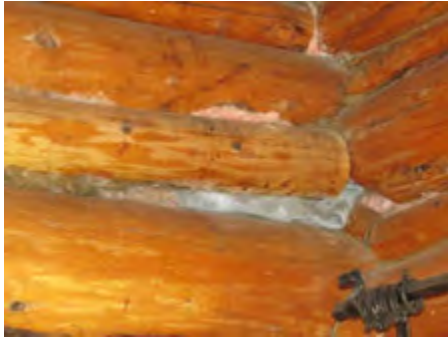


Detailed interior woodwork, including half-log staircase with polished burled log handrail, ceiling trusses, beadboard ceiling, and sapling chinking.

There are many character-defining features of the Johnson Lodge which should be cleaned, maintained, and repaired in a manner which respects their integrity. This is especially true of the two-story portion of the lodge, which has the most historic character.



Johnson Lodge, Problem Areas



1. Bats are accessing the attic and guano is appearing on walls.



2. Water damage in the bathrooms.



3. Notches have been cut into a beam to provide room for supports in the winter.

Problem	Recommendation
<ol style="list-style-type: none">1. Bats are accessing the attic of the Johnson Lodge and their guano is visible on the interior walls.2. Leaky plumbing and moisture control problems are causing water damage in the bathrooms. The wood floors and walls are being affected.3. Notches have been cut in the beam under the second story so that metal posts may be installed in the winter to provide support to the second story during the winter when snow loads are heavy.	<ol style="list-style-type: none">1. Bats must be properly excluded from buildings as they pose a potential threat to the building materials and the health of inhabitants. See page 119 for tips on bat and pest exclusion.2. Any leaking plumbing should be identified and repaired as soon as possible. Water should not be allowed to collect on the floor and excessive humidity should be avoided.3. Cutting notches in the logs should be avoided in the future, although metal posts are a good solution to helping support the building during the winter. A flat board with some padding should be placed between the post and the beam to protect it from being scratched or marred. The snow load should be cleared as frequently as possible to reduce strain on the roof. See page 126 for details.

Johnson Lodge, Problem Areas



1. Logs are shifting so they are not horizontal, causing the roof to bow. Previous remedies are not successful.

2. Holes in the soffit, the walls, and the foundation.

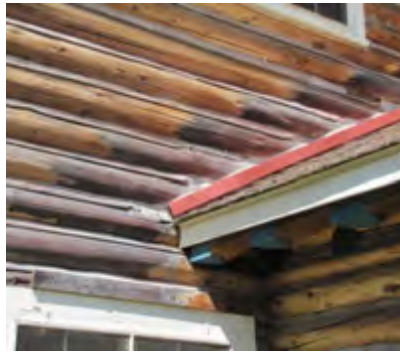
3. Vegetation is close to building.

Problem	Recommendation
<ol style="list-style-type: none"> 1. Logs at the north and south ends of the house are sinking and not remaining level with respect to the east and west walls. This is also causing the roof of the building to bow. In some places, the top few logs have been jacked up, supported, and re-daubed in an unsuccessful effort to solve the problem. 2. Holes in the soffit, the walls, and the foundation are allowing pests like bats, insects (including destructive carpenter ants), marmots and others to enter in and under the house. 3. Vegetation, including several large pine trees and hops vines, are too close to the building. 	<ol style="list-style-type: none"> 1. The cause of the logs sinking is unclear. It could be that the logs were not dry and moved after construction or that they are not properly tied into the other walls. In any case, a structural engineer should be consulted and the problem repaired as necessary. Jacking up the logs does not appear to be helping and the roof bow may only get worse if this problem continues. 2. Pests can be destructive to the building fabric and should be properly excluded according to NPS standards. See page 117 for details. 3. Vegetation is culturally significant to the site and should be properly maintained so as to not cause damage to the building. Hops should be trimmed, trestled, and kept away from the surface of the building. Large trees should be monitored so that they do not pose a threat.

Johnson Lodge, Problem Areas



1. Flashing on chimneys should be properly tied into the roof.



2. Snow load against logs causing discoloration.



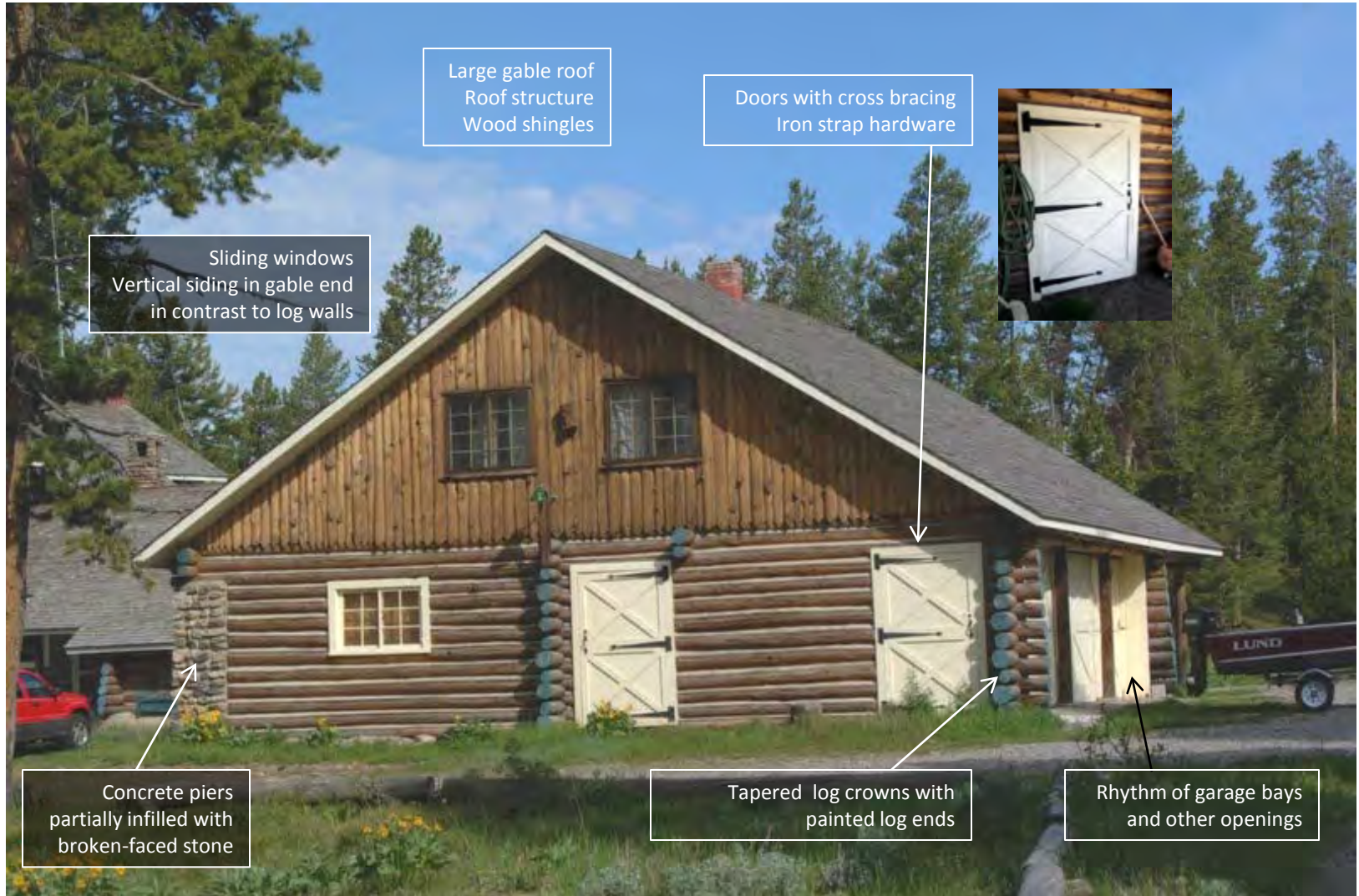
3. Shingles bowing due to moisture absorption.



4. Stone repairs improperly done.

Problem	Recommendation
<ol style="list-style-type: none"> 1. The flashing on the chimneys is not properly tied into the roof, allowing for leaks . 2. The snow load against the wall is causing discoloration and possibly damage to the logs. 3. The cedar shingles on the roof are bowing as they can absorb moisture. 4. Past stone repairs were improperly done with Portland cement and non-matching stones. 	<ol style="list-style-type: none"> 1. When the roof is replaced, the flashing should be installed properly and tied into the roof. Flashing should also come up further on the chimney to prevent damage. Portland cement should not be used as a fixative as it does not expand and contract well. 2. Snow should be removed as frequently as possible and plywood or similar barrier should be placed against the wall to prevent winter damage. See page 126. 3. A proper drip line should be installed when the roof is replaced and the shingles laid to aid in proper drainage. A cedar shingle roof should be maintained in keeping with the historic character of the building. 4. All future repairs to the stone chimney and foundations should be done properly, with the tipping finished by a qualified mason. Portland cement should not be used.

Johnson Garage, Character-defining Features



Johnson Garage, Problem Areas



1. Curling shingles due to moisture retention on underside.



2. Roof sways at middle of west elevation.



3. Log does not fit into notch.



4. Swallow nests are being built under the eaves.

Problem	Recommendation
<ol style="list-style-type: none"> 1. Wood shingles are curling due to moisture retention on the underside of the shingle. 2. A sway in the middle of the roof at the west elevation may represent structural issues or the results of green-log construction. This problem may be connected to problem #3. 3. Rafter logs do not fit in notches, leaving a place for animals to enter and for debris to collect. May also be causing structural issues. 4. Swallow nests are being built under eaves. 	<ol style="list-style-type: none"> 1. When roof is replaced, follow recommendations of the Cedar Shingle and Shake Bureau (see page 150) to ensure that shingles are ventilated so that proper drying occurs. 2. The roof should be inspected by a structural engineer to determine cause of sway and rafter-log gaps. 3. There are many potential causes for this, including settlement. The size of the gap should be measured annually to determine if it is a continuing problem. Meanwhile the holes should be plugged with daubing to prevent animals from entering. 4. Swallow nests should be removed at the proper time in the fall. Logs and surrounding soffit should be cleaned and refinished if necessary.

Well/Pumphouse, Character-defining Features

Gable purlin roof with wood shingles

Saddle-notched corners with tapered log crowns
Painted log ends



Painted wood-panel door with original hardware



Interior beadboard ceiling and sapling chinking

Well/Pumphouse, Problem Areas



1. Grade problems at NE corner 2. Log crowns rotting due to soil build up. 3. Log crowns collect run-off 4. Sills collect debris.

Problem	Recommendation
<ol style="list-style-type: none"> 1. The grade slopes down from the road to the building. Erosion is causing soil to build up around the building. There is also a slope at the northeast corner (between the well house roof to the north and the original log building) which brings the grade up to about the height of the 3rd log. 2. Log crowns on the north side of the building are rotting up to the third log from the bottom. 3. Log crowns protrude out beyond the eave, thus collecting run-off from the roof causing deterioration. 4. Window sills and tracks are filled with debris from nearby vegetation. 	<ol style="list-style-type: none"> 1. A gravel drain is recommended for the northeast portion of the building, due to run-off from both the east and the north. See page 103. 2. Once the site has been graded to 8" below the logs, repair and/or replace rotted portions of logs (see pages 94-97). 3. The protruding log crowns are a shortcoming of the original design. Log crowns should not be cut back! Clean logs crowns regularly and apply a biocide to prevent fungal growth. 4. Clean window sills regularly. Remove any vegetation that is up against or over the building.

Chicken House, Character-defining Features



Chicken House, Problem Areas



1. Paint peeling and debris accumulating in window sill.



2. Foundation is cracked; vegetation close to building.



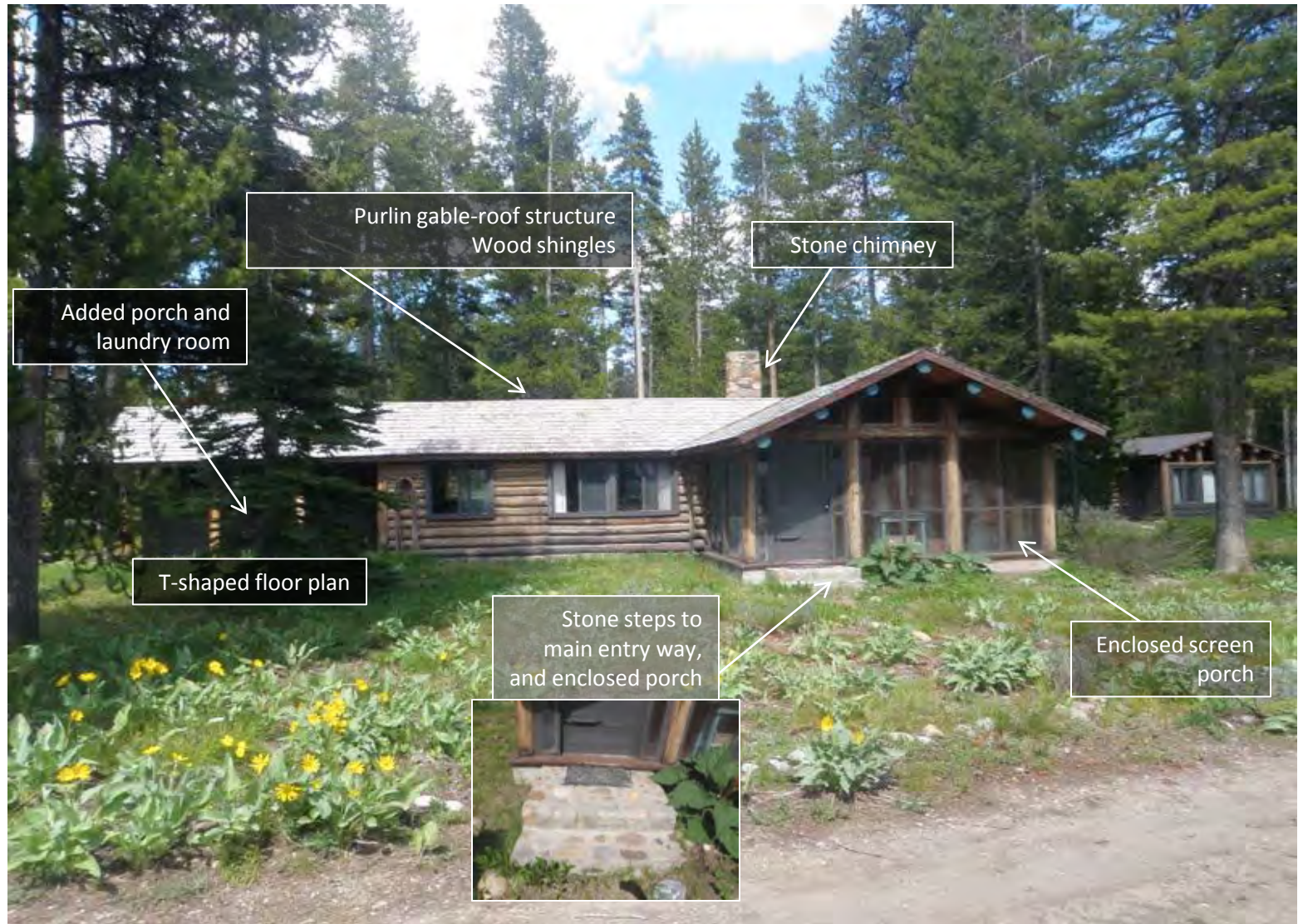
3. Holes in soffit provide animal access.



4. Serious log rot and deterioration issues.

Problem	Recommendation
<ol style="list-style-type: none"> 1. Paint is peeling on the windows and there is interior damage to the sill from rotting debris collecting and holding water. 2. Foundation is cracked in many places and the foundation has been covered due to erosion at the northeast corner. Vegetation and trees are close to the building. 3. Holes in the soffit board are providing animal access . 4. Serious log issues. The sill log is rotted, the lower log crowns are rotted, and the northwest corner crowns are completely rotted due to a moisture control issue. 	<ol style="list-style-type: none"> 1. Windows should be dry cleaned with a brush or air gun to remove debris, and re-painted. Material should not be allowed to collect on the window sills, interior or exterior. 2. Monitor foundation cracks annually and note any changes in size and number. They may be related to drainage and settlement. Vegetation should not be allowed to grow against the building. Cut or remove vegetation within five feet of the building. 3. Holes in the soffit should be patched as soon as possible to prevent further damage to building. 4. Drainage issues must be resolved to prevent further damage. Needs careful analysis before further treatment.

Director's Cabin, Character-defining Features



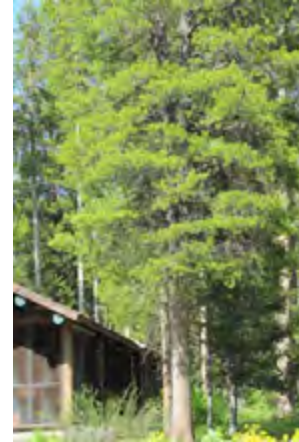
Director's Cabin, Problem Areas



1. Screen door does not close.



2. Flashing in valley is not correct.



3. Trees extend over the roof.



4. Soffit is warped in corner due to poor flashing above.

Problem	Recommendation
<ol style="list-style-type: none"> 1. Screen door does not close. 2. Flashing in valleys is not installed correctly, allowing water to seep into the roof and soffit below. 3. Trees extend over the roof, causing needles to fall onto the roof. This creates a fire hazard and allows snow pack and water to remain on the roof, accelerating rot. 4. Soffit is warped in the corner due to poor flashing and water saturation. This will allow bats, other animals and insects into the roof area. 	<ol style="list-style-type: none"> 1. Re-hang screen door so that it closes properly. See page 113. 2. When replacing the roof, install the flashing correctly and allow it to hang over the drip edge slightly. 3. Trim the trees back to prevent needles on roof and snow pack and water from settling against building. 4. When replacing roof, fix the soffit so that the edges are flush with each other and insure that the flashing is installed correctly, to prevent animals from entering eaves.

Two-room Cabin, Character-defining Features



Front-gable purlin roof with wide overhang
Log walls with saddle-notched corners
Painted log ends

Sliding wood-sash windows with painted wood trim



Original paneled, double-width wood door
Original screen door



Two-room Cabin, Problem Areas



1. Bird's nest under soffit



2. Window screen and glazing



3. North end of porch deck

Problem	Recommendation
<p>NOTE: <i>Overall, this building is in excellent condition.</i></p> <ol style="list-style-type: none">1. Birds' nests and other debris have collected between the log dividing wall and the soffit.2. Screen molding and window glazing are missing from the south window.3. The joist on the north end of the porch deck is cracked, and the decking above is buckling.	<ol style="list-style-type: none">1. Remove birds' nests when vacated; be sure to consult with the NPS on the proper timing. Clean out debris using a brush or air gun, and a water and vinegar solution if necessary.2. Replace screen molding and glazing (see page 108).3. Replace cracked joist and re-nail decking.

Sunroom Cabin, Character-defining Features



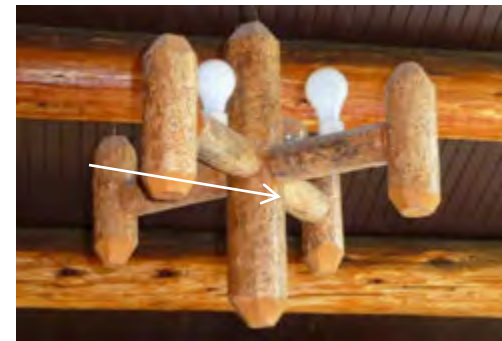
Front-gable purlin roof

Log walls with saddle-notched corners

Casement windows



Original paneled wood doors and screen doors



Pencil-motif ceiling fixture

Sunroom Cabin, Problem Areas



1. Screened soffit vent has numerous holes.



2. Incorrect chimney flashing and pointing



3. Open crawl-space access

Problem	Recommendation
<ol style="list-style-type: none"> 1. The screened soffit vent has numerous holes and evidence of animal entry and nesting. The metal fascia is not historic. 2. The chimney is incorrectly flashed, with the flashing above the roof covering. Bricks are missing at the top of the chimney and the whole chimney has missing mortar and inappropriate patching of mortar joints. 3. Screens on crawl-space vents are torn or missing, and the crawl-space access opening on the east elevation is uncovered. 	<ol style="list-style-type: none"> 1. Remove damaged soffit screening and clean area. Patch animal entry holes and replace screening. 2. When building is re-roofed, install proper flashing. Remove loose mortar on chimney and Portland cement patching. Re-point bricks using a soft, lime-based mortar. Replace missing bricks and screen to prevent animal entry. See pages 98 and 117. 3. Replace screens on crawl-space vents and replace crawl-space access door to prevent animal entry.

Shop Cabin, Character-defining Features



Brick chimney indicates original use as shop

Rocky Mountain style front-gable purlin roof with wide overhang
Painted log ends
Red brick chimney

Bead board soffit and painted fascia



Painted wood-panel double-width door with original hardware

Horizontal sliding wood windows with painted frames and original screens



Shop Cabin Problem Areas



1. Chimney lacks metal flashing.



2. Soil and vegetation build up.



3. Bird droppings on window sills hold moisture and cause decay.



4. Porch decking boards loose.

Problem	Recommendation
<ol style="list-style-type: none"> 1. There is no evidence of metal flashing where the chimney meets the roof. Chimney appears to be flashed with roofing cement applied on the outside. 2. Soil and vegetation has built up along the east elevation, especially at the NE and SE corners. 3. Bird droppings accumulating on window sills hold moisture and cause decay. 4. Several porch decking boards are loose. 	<ol style="list-style-type: none"> 1. Install proper metal flashing when re-roofing. 2. Logs should be kept out of the dirt and away from moisture to avoid deterioration. Remove all soil and vegetation from within 8" of the bottom log; re-grade if necessary. 3. Windows should be dry cleaned and re-painted. Material should not be allowed to collect on the window sills, interior or exterior. 4. The boards should be nailed down and replaced if significantly rotted or otherwise damaged.

Tack Cabin, Character-defining Features



Rocky Mountain style front-gable purlin roof with wide overhang
Bead board soffit and painted fascia

Painted wood-panel
double-width door
with original
hardware

Painted log ends

Horizontal sliding wood windows
with painted frames and original
screens



Tack Cabin Problem Areas



1. Trees are growing next to and over the roof.



2. Soil and vegetation build up.



3. Porch decking boards loose.

Problem	Recommendation
<ol style="list-style-type: none">1. Trees are growing next to and over the roof, interfering with the eaves and walls and holding snow and moisture on the roof.2. Soil and vegetation have built up around the foundation.3. Several porch decking boards are loose	<ol style="list-style-type: none">1. The tree should be removed to prevent further damage to the roof. Vegetation around the building should be kept trimmed and trees and bushes should be a minimum of five feet from the building to prevent damage.2. Logs should be kept out of the dirt and away from moisture to avoid deterioration. This includes removing all vegetation from the perimeter of the building.3. Loose boards should be nailed down and replaced if significantly rotted or otherwise damaged.

Smokehouse, Character-defining Features



Gable roof with
handmade wood
roof vents

Log walls with
saddle-notched
corners and tapered
log crowns
Painted log ends

Wood paneled, painted
door with painted wood
trim and original
hardware



Concrete fire box

Smokehouse, Problem Areas



1. Tree at NW corner of roof



2. Tree at SW corner of roof



3. Rotted log crowns, NE corner

Problem	Recommendation
<ol style="list-style-type: none">1. Trees are growing too close to the building, damaging the roof, walls and foundation.2. Trees overhanging the building drop pine needles and branches and hold snow and moisture on the roof.3. Log crowns on north and south elevations are rotting due to vegetation and soil build-up around the foundation .	<ol style="list-style-type: none">1. Remove large trees adjacent to building.2. Keep roofs clear of debris; remove or trim trees that are touching or overhanging the building.3. Remove soil build-up around the foundation, and re-grade to drain run-off away from the building. Repair or replace log crowns as necessary. See page 95.

Outhouse, Character-defining Features



Gable purlin roof
with metal vent

Log walls with
saddle-notched
corners and
painted log ends

Wood paneled, painted
door with painted wood
trim and original
hardware



Outhouse, Problem Areas



1. Building leaning to west



2. Pit under building



3. Equipment leaning on building



4. Rotted log crowns

Problem	Recommendation
<ol style="list-style-type: none"> 1. Building is unstable and leaning to the west. 2. There is no foundation under the building, and the pit beneath is eroding, leaving the building unstable. 3. Old machinery has been piled up next to the building, trapping debris, vegetation and moisture. 4. Log crowns at northeast and southeast corners are rotting due to vegetation and soil build-up around the foundation. 	<ol style="list-style-type: none"> 1. Straighten and stabilize the building. 2. Fill the pit under the outhouse; construct a foundation or piers and re-install the building. If necessary, the outhouse could be moved since presumably this is not its original location. 3. Remove equipment and junk from around the building. 4. Grade area around the building to drain run-off away from the building. Repair or replace log crowns. See page 95.

Barn, Character-defining Features

Large, open bays



Board and batten siding



Gable roofs of truss construction with log pole interior supports

Barn, Problem Areas



1. Board ends, west elevation



2. Loose battens



3. Sand piled against east wall



4. Vegetation too close

Problem	Recommendation
<ol style="list-style-type: none"> 1. Snow build-up around the building has caused rotting of lower ends of boards and battens. 2. Loose battens and animal holes in the walls will eventually lead to deterioration of the exterior siding and the interior structure. 3. Sand, gravel, old furniture and equipment piled against the east wall trap moisture and accelerate deterioration. 4. Trees and shrubs too close to the building on the east, north, and south elevations trap moisture at the base of the wood siding and drop debris on roof. 	<ol style="list-style-type: none"> 1. Replace rotted ends of board and battens. Treat with <i>Bora-Care</i> to prevent fungal growth. 2. Re-nail loose battens and repair holes in siding. 3. Remove all items stored on the perimeter of the building. Clean area and treat with <i>Bora-Care</i>. 4. Remove shrubs growing next to the foundation on the north and south elevations. Trim trees so branches do not touch building and do not hang over the roof.

Woodshed, Character-defining Features

Board and batten siding



Original wood sliding-frame windows and panel doors, painted



Large, open bays



Gable roofs of truss construction with log pole interior supports

Woodshed, Problem Areas



1. Fungus and rot at northwest corner



2. Build-up of dirt and scraps, west wall (interior)



3. High grade at northeast corner



4. Door sticking

Problem	Recommendation
<ol style="list-style-type: none"> 1. Snow build up around the exterior walls has caused fungus and rot on lower ends of boards and battens on the north, west and south elevations. 2. Soil, dirt and wood scrap build-up against interior walls keeps walls from drying out and causes decay. 3. Grade around the building is too high, especially on the north elevation, but also on the south and west. 4. The wood-plank floor in the east end is keeping the door from opening and closing easily; this will eventually damage the door. 	<ol style="list-style-type: none"> 1. Replace rotted sections of board and batten and sill board (north elevation). Treat with <i>Bora-Care</i> to prevent growth of fungus. 2. Remove soil and wood scraps along interior walls. 3. Dig down to 8" below wood level if possible; grade to drain water away from the building. 4. Re-hang the door so it opens and closes properly. See page 113.

Boathouse, Character-defining Features



Boathouse, Problem Areas



1. Missing door sill.



2. Ramp deteriorating due to poor drainage.



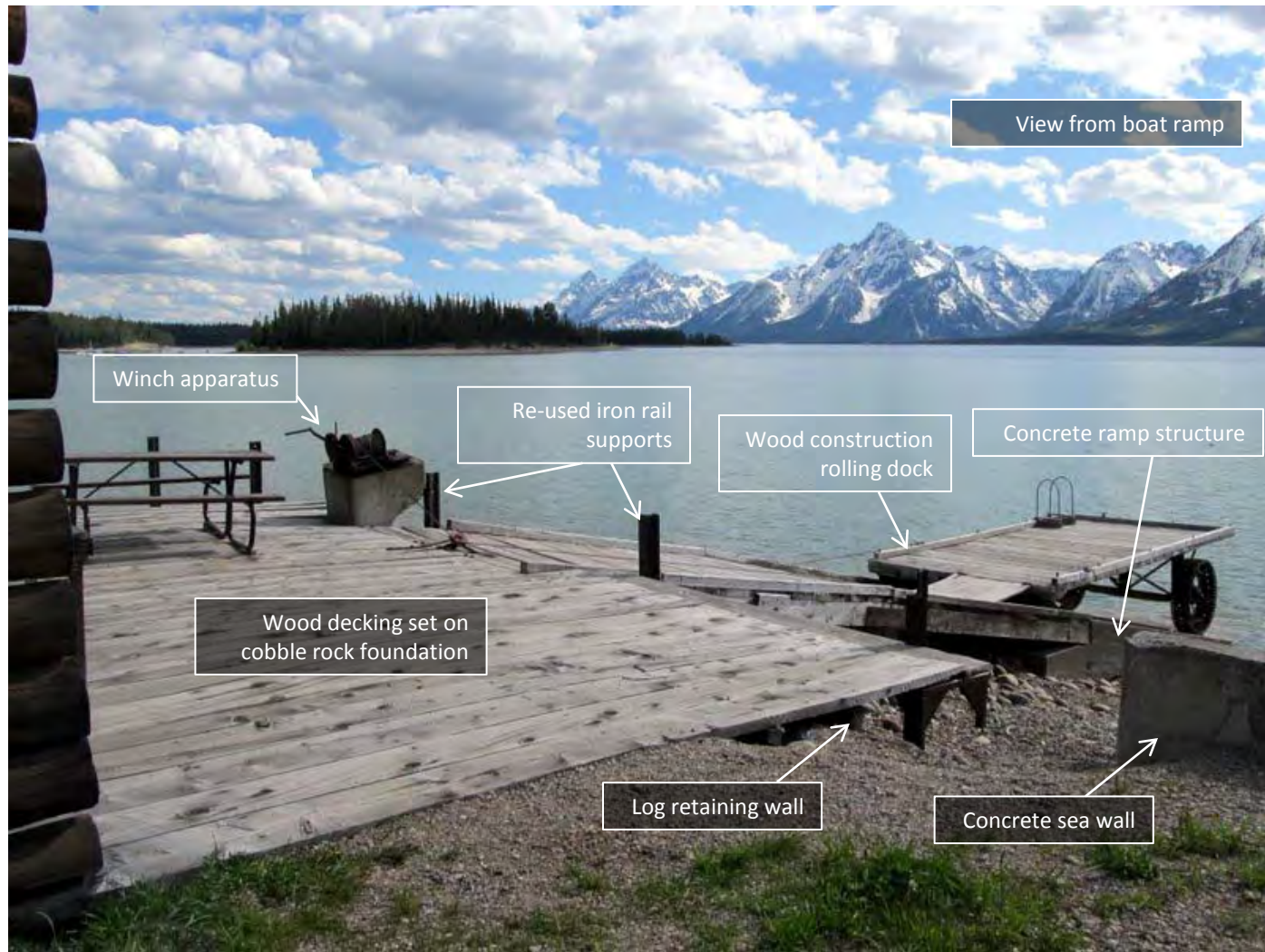
3. Deteriorating sill logs.



4. Interfering vegetation.

Problem	Recommendation
<ol style="list-style-type: none"> 1. Main door sill is missing. 2. Ramp and east door area are deteriorating due to poor drainage and erosion. 3. Sill logs are deteriorating. 4. Vegetation is interfering with the roof. 	<ol style="list-style-type: none"> 1. Replacement sill should be built to match the door. 2. Area should be re-graded, a proper drainage system installed, and the ramp replaced. 3. Sill logs should be replaced (see page 94) and the ends painted to match. Logs should be kept out of the dirt and away from moisture to avoid deterioration. This will require re-grading the site and preventing further erosion. 4. The tree should be removed to prevent further damage to the roof. Vegetation around the building should be kept trimmed and trees and bushes should be a minimum of five feet from the building to prevent damage.

Boat Ramp, Character-defining Features



Boat Ramp, Problem Areas



1. Aging and deteriorating planks.



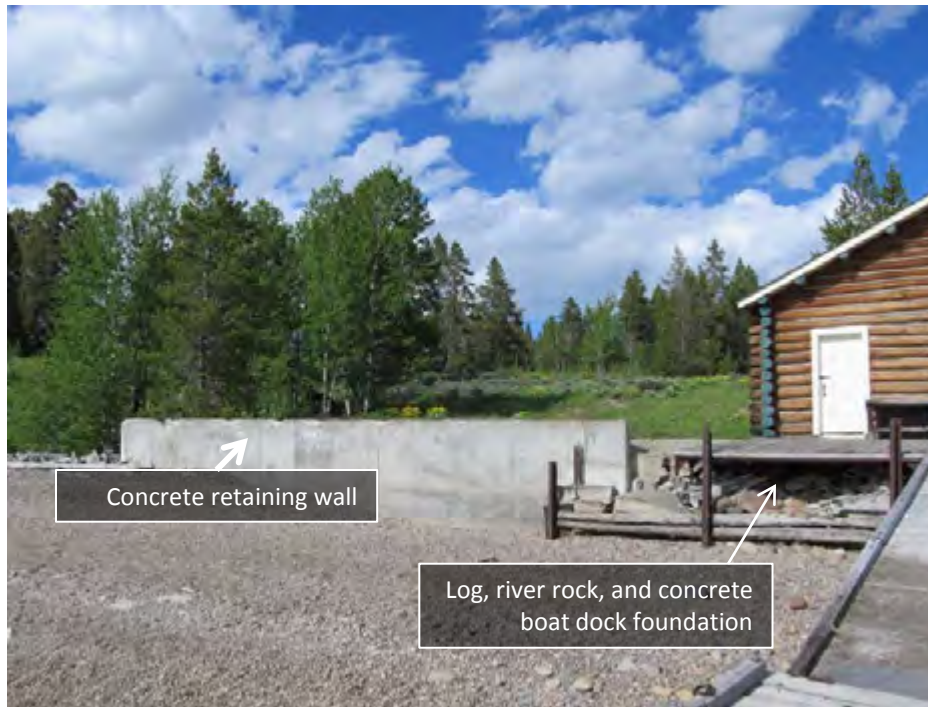
2. Aging mechanical systems.



3. Foundation of the boat ramp is eroding.

Problem	Recommendation
<ol style="list-style-type: none">1. Wood planks of the boat ramp are aging and deteriorating.2. The mechanical systems on the boat dock are rusted and aging.3. The foundation of the boat dock is eroding and the concrete is washed away in several locations. This is largely a result of the lake bed being washed away and the ramp and foundation being exposed to water.	<ol style="list-style-type: none">1. The dock should be rebuilt to maintain historic appearances. The wood should be properly treated to withstand exposure to wind and water in all seasons.2. The mechanical systems on the dock should be investigated and replaced if necessary. If possible, the system should be in keeping with the historic character of the boat dock.3. The foundation should be properly rebuilt to withstand conditions, and should be in keeping with the historic character of the AMK property.

Sea Wall, Character-defining Features



The boat ramp and sea wall are built on the eastern shore of Jackson Lake, which was created in 1906 with the construction of the Jackson Lake Dam. The boat ramp was constructed by the Johnsons and enlarged by the Berols. The location of the AMK Ranch on Jackson Lake is a critical feature. The view of towering mountains and the glacier-fed lake is clearest from the boat dock. Access to the lake is also important to the research station.

Sea Wall, Problem Areas



1. The shoreline is eroding.



2. Rip-rap is nonfunctional.



3. Erosion is undermining the boat ramp.



4. Overall, the sea wall is an important issue.

Problem	Recommendation
<ol style="list-style-type: none"> 1. The shoreline is eroding because the sea wall is simply not doing its job. Land area is being lost and threatening structures, especially the boat house and ramp. 2. The rip-rap and iron rails which have been installed are nonfunctional as the shore continues to erode. In their exposed state they are also visually unappealing and hazardous for people and animals walking along the shoreline. 3. Erosion of the shoreline is undermining the structure of the boat ramp. 4. Overall, the sea wall is an important issue at the AMK Ranch and must be corrected to prevent further loss of cultural and natural resources. 	<ol style="list-style-type: none"> 1. To prevent erosion and its associated problems, the sea wall must be fixed. 2. A better erosion-prevention system should be investigated. The current rip-rap should be removed. The iron rails may be useful. 3. The boat ramp and boat house are critical to the present function of the AMK as a research station and are also historically relevant. The sea wall must be fixed to prevent their loss or damage. 4. We recommend a design charrette involving the NPS, SHPO, AMK staff, and UW. Engineers, architects, and historic preservation specialists should be present in order to find an ideal solution to prevent erosion and maintain the historic resources at the AMK Ranch.

Lawrence House, Character-defining Features



Sweeping, low-pitched purlin gable roof with wide overhangs extending on the north to form a carport.

Two bands of triple picture windows facing the Tetons.

Painted exterior plywood siding with battens.

Overall horizontal emphasis.

Lawrence House, Problem Areas



1. 40+-year-old built-up roof

2. Carpenter ants are in the columns on the carport and may also be accessing the roof from there.



2. Loose porch decking, NW corner

Problem	Recommendation
<p>Note: <i>Overall, the Lawrence House is in excellent condition.</i></p> <ol style="list-style-type: none"> 1. The broad, built-up roof is probably original, therefore 43 years old. 2. Carpenter ants can be found in swarms on the columns of the carport. The ants may also be able to access the roof and the rest of the house from there. 3. Loose decking board at the northwest corner of the deck is extending beyond the eave line, thus catching run-off from the roof. 	<ol style="list-style-type: none"> 1. Inspect roof annually. When roof needs to be replaced, consult with cultural resources staff regarding replacement materials that will retain the look of the original design. 2. The columns should be treated regularly with a borate solution to get rid of the ants. See page 118. 3. Replace end decking board so that it is in line with the rest of the deck and does not protrude past the eave. Re-nail any loose decking boards.

Addressing Problem Areas



Addressing Problem Areas

This section contains specific treatments to address problem areas outlined in the previous section, including:

- Exterior log maintenance, including cleaning, finish, daubing, replacing sill logs, splicing, repairing log crowns and faces
- Roof and chimneys
- Ventilation and flashing
- Grading and drainage, including special instructions for Berol Lodge
- Vegetation
- Window and door maintenance and repair
- Berol Lodge southwest porch repair
- Pest control, including ants and bats
- Snow removal and winterization



Student Cassie Loveland checks moisture levels in the crawlspace beneath Berol Lodge.

Exterior Log Maintenance: Log Cleaning Procedure



This photograph shows the average condition of logs in buildings at the AMK Ranch, all of which have been treated with log oil. The bottom log in particular shows a high level of fungal buildup.



This photograph shows the buildup of log oil on the logs. This log oil also decomposes in the sun, causing it to flake off.

Problem

- The exterior logs on AMK buildings have been regularly treated (approximately once every three years on rotating cycles) with a log oil mixture that includes paraffin, linseed oil and turpentine. This treatment has helped to preserve the logs over time.
- However, log oil acts as a food source for fungal growth. The fungal growth appears to be an aesthetic issue not affecting the structure of the logs, but should be monitored and tested to be sure.

Recommendation

- The cyclic application of log oil to building exteriors is **NOT** recommended, due to the fact that fungus grows on the log oil and may affect the integrity and appearance of the log.
- Due to time constraints, we were not able to determine the best option for log conservation and thus are unable to recommend a definitive replacement procedure.
- It is recommended that oiling be discontinued and logs be cleaned to remove buildup and prevent fungal growth.
- Application of a borate product and UV treatment after cleaning will help protect the logs.

Exterior Log Maintenance: Log Cleaning Procedure



Only the bottom sill log was cleaned. By removing the black fungal growth, the log can be returned to its original color.

Problem	Recommendation
<ul style="list-style-type: none">•Repeated application of log oil allows it to penetrate deeply into the wood, embedding with it layers of dirt and fungus and causing the logs to darken.•The hardened outer shell of dirt, fungus, and oil prevents other appropriate and affordable treatments like UV protection to be successfully applied. The layers must first be removed, which is difficult without chemically abrasive or labor-intensive cleaning procedures.•Power washing, especially, is potentially damaging to the logs and is NOT AN ACCEPTABLE METHOD for log cleaning.	<ul style="list-style-type: none">•See detailed Log Cleaning Procedures, following pages.•The logs should be cleaned with a mix of organic, non-abrasive cleaners. A mixture of <i>Simple Green</i>, <i>OxiClean</i>, and water worked well, as did a combination of baking soda, followed by vinegar, and then <i>OxiClean</i>. Bleach was also tested, but did not perform significantly better than the other options. Given its potentially harmful effects, it is not recommended.•These chemical combinations were applied to the log using a hand-held <i>Scotch-Brite</i> pad as well as a nylon scrub brush. These tools worked well, and were not so abrasive that they harmed the log.•An <i>Osborn</i> brush worked well for cleaning but could damage the logs if applied with too much force. A <i>Recipro</i> Scrub brush worked, but was unwieldy to use.•More experimentation could be done with products such as <i>Tide</i> laundry soap.

Log Cleaning Procedure

Materials needed:

Water
Baking Soda
Vinegar
OxiClean
Simple Green
Osborn brush
Scotch-Brite pad, with handle
Rubber gloves
Protective eyewear
Spray bottle



Procedure:

1. Clean out dirt and debris with air compressor (40-80 psi).
2. Pre-wet surfaces before using cleaning solution.
3. Apply baking soda, followed by vinegar or a *Simple Green*/*OxiClean*/water mix.
4. Scrub surfaces with *Osborn* brush; wait 10 minutes and scrub again.
5. Thoroughly rinse with gentle spray or mist; do not saturate logs.
6. Repeat if needed.
7. Rinse a second time.

Log Cleaning Procedure, Cracks and Checks

While dry cleaning with the air compressor, pay extra attention to cracks and checks. Try to blow out all dirt and debris. Be sure to remove organic matter, decay and soft wood in checks, but avoid damaging the log surface.

When rinsing after cleaning, rinse all cleaning solution out of cracks and checks. When applying preservative, thoroughly saturate the log checks in order to get the product inside the log.



Checks are the v-shaped notches that form in the log as it dries. Checks collect water and debris and can be the entry point for rot and insects. If properly installed, the checks on a log should be facing down so they do not collect water and debris. Never fill checks with epoxy or caulk. If pockets of decay are found within a check, use *ConServ Flexible Epoxy 100* to consolidate the wood decay.



Exterior Log Maintenance: Log Finish Recommendations

The current application of linseed oil, turpentine, and paraffin has protected the logs and kept them in relatively good shape. They are in better condition than other log structures in the park that have been painted, whitewashed, treated with other finishes or left untreated. However, because of the fungal growth caused by buildup of the oil, it is not recommended to continue this treatment.



We also recommend putting some form of Ultraviolet (UV) protection on the logs, since the current oil application does not provide UV protection. A well tested product is X-100 from American Building Restoration Products. It does not grow mold and will not break down the logs. It works well in conjunction with a borate preservative.



We recommend applying a borate product like Bora-Care to the clean log. This acts as a preservative, fungicide, and insecticide. This will help protect the log and prevent fungal growth. It should only be applied after a log has been thoroughly cleaned; otherwise, it will not saturate the log and will do no good. There are various forms of borate and the application is different for each type. It can be mixed with water and sprayed with a backpack sprayer for easy application on the logs.

Log Daubing Procedure - Summary

Procedure:

1. Remove loose or deteriorated existing daubing.
2. Clean chink area with compressed air and stiff brush. Leave the filler material.
3. If there are no cleats, place 6d galvanized nails 2"-4" apart in lower log to reinforce daubing. Nail heads must be at least ½" below finished daubing.
4. Wet chink areas at least two times a day up to three days in advance. Moisten areas prior to application.
5. Mix daubing to a stiff or firm mixture. Match existing daubing formula. This may require mixing sample batches and allowing them to dry. Or use 4 parts clean mason's sand, 1-2 parts lime (type-s), 1 part Portland cement. Mix dry ingredients then add water. Mix only enough to use within ½ hour; do not remoisten if it becomes too stiff.
6. Press daubing mixture firmly into the chink area. Angle daubing surface so that it is tucked under the upper log (see detail to the right). Do not apply in direct sun or if temperatures drop below freezing. Moisten installed daubing with a fine mist periodically for 4 hours after application.
7. Trowel surface to match texture and appearance of original or early daubing.
8. Monitor daubing for hairline cracking as daubing sets.
9. When daubing is fully cured, scrub logs with mild vinegar-water mix (1/2 cup vinegar to 1 gallon of potable water) to remove residue. Clean and scrape residue from checks. Rinse with fine spray.

Log Daubing

Procedure:

1. Remove loose or deteriorated existing daubing.
2. Clean the chink area with compressed air and stiff brush.
3. If there are no cleats, place 6d galvanized nails 2"-4" apart in lower log to reinforce daubing. Nail heads must be at least ½" below finished daubing.
4. Wet chink areas at least two times a day up to three days in advance. Moisten areas prior to application.
5. Mix daubing to a stiff or firm mixture. Match existing daubing formula. This may require mixing sample batches and allowing them to dry. Or use 4 parts clean mason's sand, 1-2 parts lime (type-s), 1 part Portland cement. Mix dry ingredients then add water. Mix only enough to use within ½ hour; do not remoisten if it becomes too stiff.
6. Press daubing mixture firmly into the chink area. Angle daubing surface so that it is tucked under the upper log. See detail below. Do not apply in direct sun or if temperatures drop below freezing. Moisten installed daubing with a fine mist periodically for 4 hours after application.
7. Trowel surface to match texture and appearance of original or early daubing.
8. When daubing is fully cured, scrub logs with mild vinegar-water mix (1/2 cup vinegar to 1 gallon of potable water) to remove residue. Clean and scrape residue from checks. Rinse with fine spray.

Products:

Mason's sand
Lime, type S
Portland cement
Materials available at
building supply stores



Conservation Services
4550 W. CENTER ROAD, LENOIR, VA 24645
756.533.4444

Definition: Daubing is the mortar-like material that is often used to fill the chink areas between logs. The work in this section consists of daubing the log walls. Many call this process chinking.

Log Daubing Procedure

Materials Needed

Water

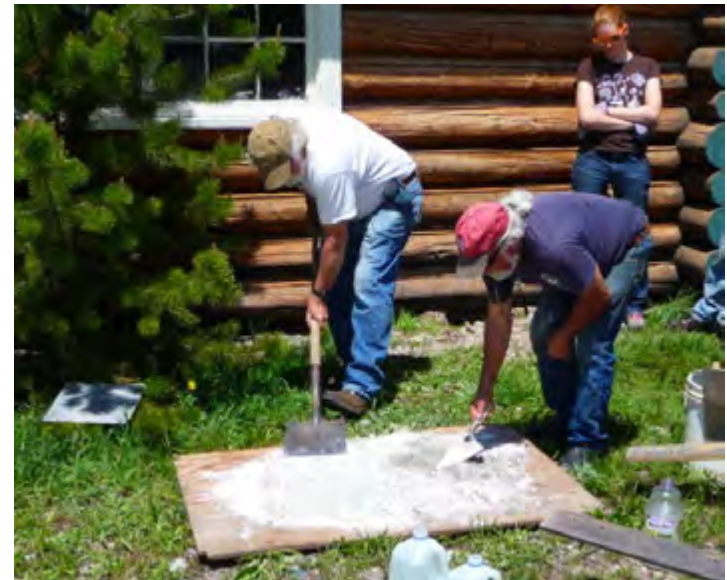
Mason's sand (clean)

Lime Type-S

Portland cement

Masonry tools

- Trowels in multiple sizes to fit best in the chink
 - Hawk, or a flat board to hold your daubing as you apply it
- Spray bottle
Mixing board



Log Daubing Procedure

Step 1: Remove loose or deteriorated existing daubing, leaving the filler materials between the logs.



Filler Material: Filler material can be just about anything that will create insulation. In this case the filler is oakum. Oakum can be found dry or curated with oil.

Log Daubing Procedure

Step 2: Clean chink area with compressed air and stiff brush.



Step 3: If there are no cleats place 6d galvanized nail 2"-4" apart in lower log to reinforce daubing. Nail heads must be at least ½" below finished daubing.



Cleats: Long strips of wood cut to ¼" by ½" and placed on the upper section of each log. Small saplings can also be used. Cleats are used to hold the daubing in place.

Log Daubing Procedure

Step 4: Wet chink areas at least two times a day up to three days in advance. If the area is in sunlight, place a tarp over it once soaked to help keep it moist. Moisten areas prior to application.



Conditions:

Temperature: Daub only when the surface, material, and ambient temperatures are above 50 degrees F, for a period of at least 12 hours. Do not daub in temperatures above 90 degrees F.

Weather: Do not apply daubing in adverse weather conditions such as rain or intense heat.

Sun: Do not mix, store, or apply daubing in intense sun when temperatures are above 100 degrees F. Protect freshly daubed areas from direct sun during warm weather until cured.

Log Daubing Procedure

Step 5: Mix daubing to a stiff or firm mixture. Match existing daubing formula. This may require mixing sample batches, allowing them to dry, and comparing them to the original. Or use approximately 4 parts clean mason's sand, 1-2 parts lime (Type-S), and 1 part Portland cement.* Mix only enough to use in ½ hour. Do not remoisten mix if it becomes too stiff.



Mixture should be the thickness of mashed potatoes, or dough.

Mix up dry ingredients before adding the water.



* Note: Proportions may vary considerably depending on the texture of the sand. It is highly recommended that samples be mixed, applied, allowed to dry, and evaluated for color, texture, softness, and workmanship before proceeding with the full application of daubing.

Log Daubing Procedure

Step 6: Press daubing mixture firmly into the chink area. Angle daubing surface so that it is tucked under the upper log.* Do not apply in direct sun or if temperatures drop below freezing. Moisten installed daubing with a fine mist periodically for 4 hours after application.



Step 7: Trowel surface to match texture and appearance of original or early daubing.



*Note: Logs must be washed and cleaned with potable water prior to application (non-potable water can introduce contaminants that may affect the integrity of the logs or daubing). Be sure to keep tools and mixing surface areas clean through the whole process.

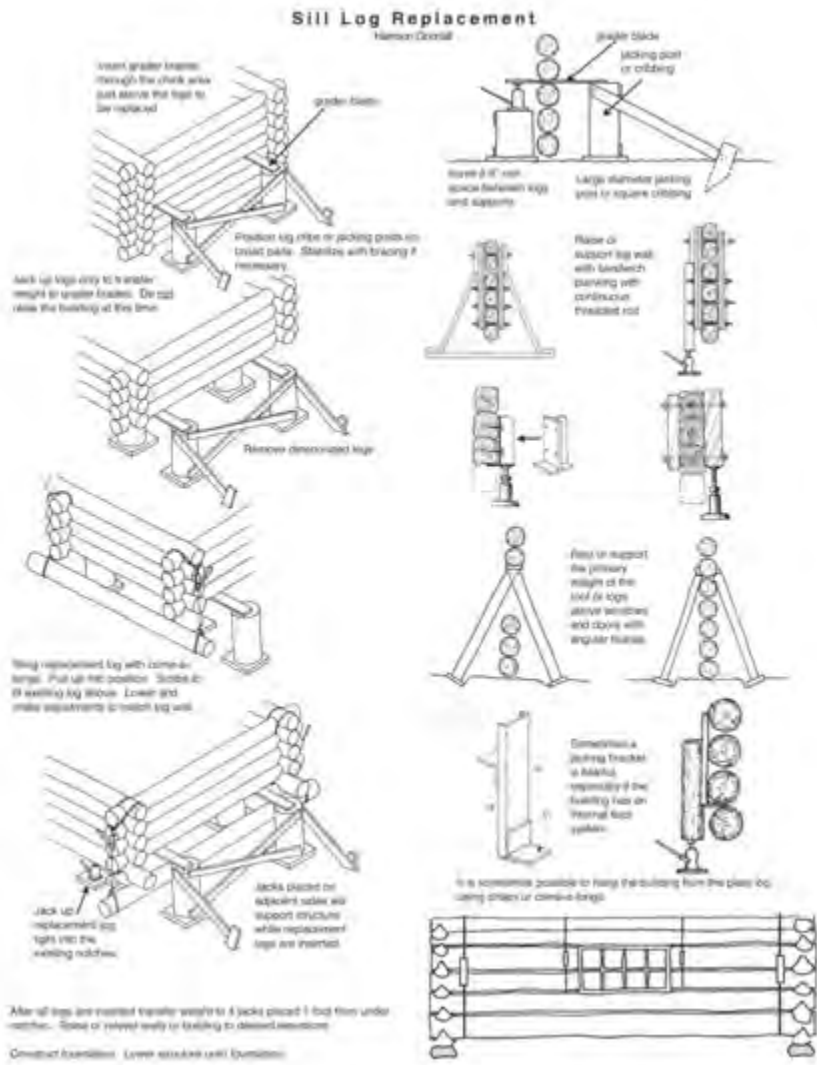
Log Daubing Procedure

Step 8: Monitor for hairline cracking as daubing sets. Cracking may indicate inadequate water saturation of logs prior to daubing; too much lime in proportion to sand in mix; overly dry or hot conditions during application; exposure to direct sunlight; or that the nail reinforcement too close to the surface.



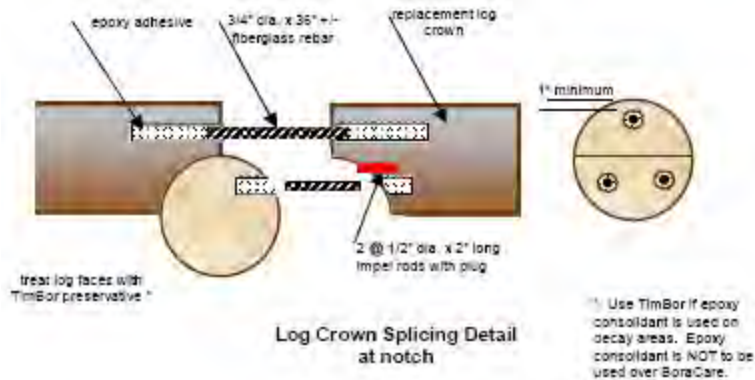
Step 9: When daubing is fully cured, scrub logs with mild vinegar-water mix (1/2 cup vinegar to 1 gallon of potable water) to remove residue. Clean and scrape residue from checks. Rinse with fine spray.

Procedure for Replacing Sill Logs



As the bottom log in a log wall, the sill log is critical to the structural integrity of the building. If a significant portion of the sill log is rotten, it should probably be replaced. This is **not** true for other (upper) logs, which can be repaired by log splicing (see next page). Methods for replacing sill logs depend on the construction of the log building, the type of corner notching, whether or not there is a foundation and/or an interior floor, etc. The critical first step in replacing a sill log is jacking up the building. This diagram shows different methods of jacking up a building to replace the sill log. Replacement log should match the original in wood type, size and method of hewing.

Procedure for Splicing Logs and Repairing Crowns



Deteriorated Condition (CWA)



Remove Deteriorated Crown



Recess to center line



Drill holes, prefit, insert rebar



Assemble log crown replacement

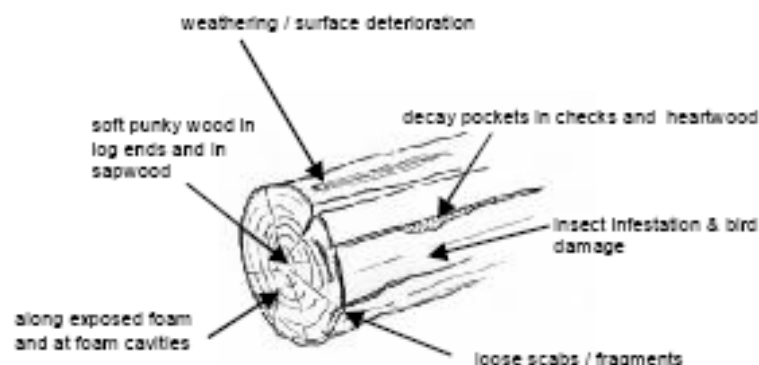


Completed treatment

Log Crown Splicing Procedures:

1. Remove deteriorated crown. Recess remaining portion back to the center line of the log wall.
2. Remove any decayed wood within the existing log (if necessary)
3. Treat interior log faces with TimBor preservative. Allow to completely dry before applying epoxy. (<20%)
4. Stabilize the decayed areas with a flexible epoxy consolidant. (if necessary)
5. Prepare replacement log crown to match existing log and the spaces surrounding it. Replacement should be of the same species, matching exterior shape and textures, and seasoned or less than 20% moisture content. Prefit to be sure replacement crown fits properly.
6. Typical log crown attachments require one 3/4" diameter fiberglass rebars embedded 12"+ deep in the top of the existing wall log and to the replacement crown. Two 4" rebar pins must be placed at the bottom of the log connection to make crown more rigid. Drill holes 3/8" larger than the rebar diameter to accommodate the epoxy adhesive. Maintain a minimum of 1" of good wood (without decay) between the hole and the edge of the log. See details for typical applications. Prefit crown again with rebar pins. TimberLoc screws may be used for stabilizing the crown ends.
7. Install 2 @ 1/2" dia. x 2" long Impel rods in center of replacement crown. A plug may be inserted.
8. Fill holes with an epoxy adhesive and insert rebar pins with a twisting motion into the crown replacement.
9. Assemble log crown replacement. Support until epoxy has cured - usually 24+ hours.
10. Blend log crown repair with existing log wall.

Procedure for Splicing Logs and Repairing Crowns



Consolidate and Patch

Epoxy Consolidation and Patching Procedures:

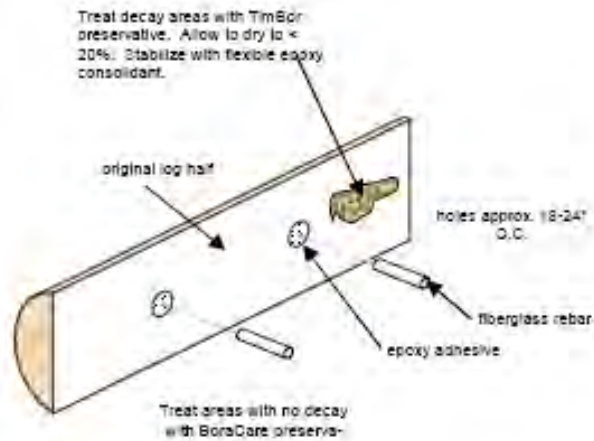
1. Remove decay soft punky wood and decay.
2. Clean cavities, checks, or surfaces by blowing, vacuuming, or brushing.
3. Treat effected areas with TimBor preservative. Allow to completely dry before applying epoxy. (<20%)
4. Mask surrounding areas to prevent splash or dripping of epoxy.
5. Saturate decay areas with a flexible epoxy consolidant. Repeat applications 3 - 5 times within 4 hours.
6. For large cavities or openings fill with flexible epoxy patch.
7. Loose scabs and fragmented areas may be adhered back into place using an epoxy adhesive.
8. If structural qualities are needed fill with structural epoxy.
9. Blend surfaces with the original textures. All epoxy repairs must receive an opaque finish.

For additional information go to: <http://www2.cr.nps.gov/tps/technotes/PTN28/>



Material	Name	Source
epoxy adhesive	Simpson Strong Tie Adhesive	www.strongtie.com
fiberglass rebar	ConServ Fiberglass Rebar 800	www.conservepoxy.com
flexible epoxy consolidant	ConServ Flexible Epoxy Consolidant 100	www.conservepoxy.com
Tim-Bor preservative	Tim-Bor Preservative	www.prginc.com
BoraCare preservative	BoraCare preservative	www.prginc.com
Impel Rods	Impel Rods	www.prginc.com
Hex Drive Screws	TimberLoc	www.mcfelys.com

Procedure for Repairing Log Faces



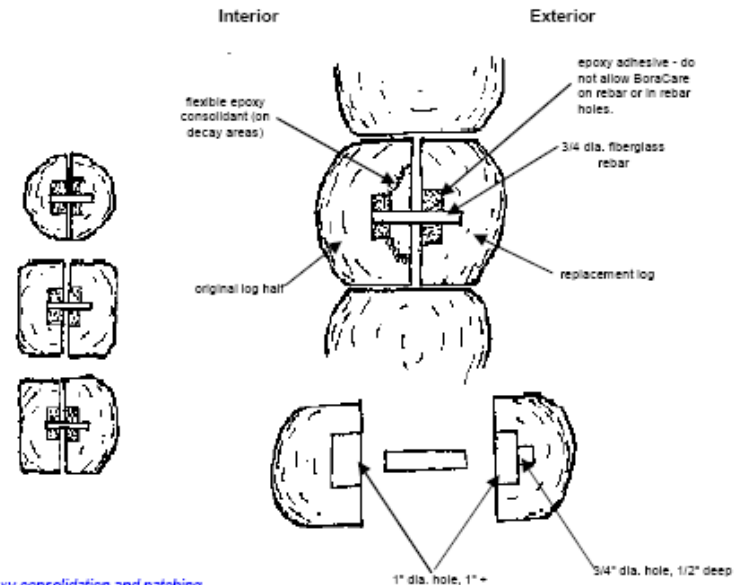
* Use TimBor if epoxy consolidant is used on decay areas. Epoxy consolidant is NOT to be used over BoraCare.

Impel rods may be inserted in areas that are susceptible to moisture

Material	Name	Source
epoxy adhesive	Simpson Strong Tie Adhesive	www.strongtie.com
fiberglass rebar	ConServ Fiberglass Rebar 800	www.conservepoxy.com
flexible epoxy consolidant	ConServ Flexible Epoxy Consolidant 100	www.conservepoxy.com
Tim-Bor preservative	Tim-Bor Preservative	www.prginc.com
BoraCare preservative	BoraCare preservative	www.prginc.com
Impel Rods	Impel Rods	www.prginc.com

Log Facing Procedures:

1. Remove deteriorated face of existing log down to or near the centerline
2. Remove any decayed wood within the existing log (if necessary)
3. Treat interior log faces with BoraCare (if epoxy consolidant is not to be used). Use TimBor preservative if consolidant is used. Allow to dry to > 20%.
4. Stabilize decayed areas with a flexible epoxy consolidant. Structural issues may require other structural epoxy treatments.
5. Prepare replacement face to match existing log. Replacement should be of the same species, matching exterior shape and textures, and seasoned with less than 20% moisture content.
6. Drill holes for rebar pins to connect replacement face to existing log at 18" to 24" intervals. Center pins are preferable to dual pins to allow for face movement..
7. Embed fiberglass rebar pins into holes with an epoxy adhesive (Simpson Strong Tie Adhesive)
8. Blend repair with existing log wall
9. Rr



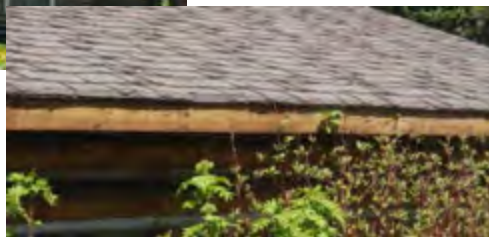
Refer to epoxy consolidation and patching details and procedures on page 14.

Log Facing Detail

Roofs and Chimneys



There are a variety of roof coverings at the AMK Ranch, including asphalt shingles, cedar shingles, and a built-up roof.

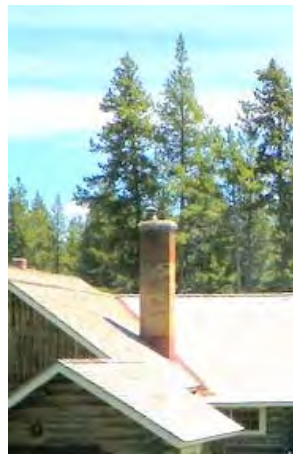


- Roofs should be monitored annually for damage resulting from winter conditions, storms, and debris collection. Debris, such as pine needles or branches, should be removed seasonally and vegetation kept trimmed to avoid the collection of such material.
- Keeping track of the lifetime of the roof can indicate when replacement is needed.
- When roofs are re-shingled, they should be recovered in a product that best approximates the look of the original roof to maintain the historic character of the buildings. New roofs should include drip edges, proper flashing and overhangs, and be laid to promote adequate draining and drying.
- Bowing or leaning roofs should be investigated by an architect or engineer to determine the root of the problem before re-roofing.
- For recommendations on snow removal, see page 126.

Roofs and Chimneys



The chimneys at the AMK Ranch are constructed of local river rock or brick.



- Chimneys are character-defining features of buildings and should be maintained.
- Chimneys should be monitored for structural stability. Signs of leaning, settling, or cracking should be addressed as soon as possible.
- When repairs are needed, they should be done by a professional mason. Repairs should always use materials that match the historic fabric of the building. Portland cement should never be used as a mortar on the AMK structures.
- The flashing around a chimney should be laid when the roof is repaired and properly tied into the roof to promote proper drainage. Flashing should form a cove between the chimney and the roof to prevent water damage.
- Blocking pests from chimneys can be accomplished using a wire mesh firmly secured at the flue.
- Chimneys should be inspected regularly if they will be in use to avoid any hazards.

Ventilation and Flashing

Ventilation:

- Provide ventilation to all attic, roof, eave, soffit, and other building void spaces to meet code standards.
- Remove all opaque or solid dampers and covers from ventilators; this is important to prevent condensation damage even when building is winterized, closed, and unheated.
- Equip vents with storm-proof louvers and insect screens in removable frames to bar moisture, insects, and animals.



Flashing:

- Protect all exterior building joints and wood members adjacent to ground or bearing on concrete and masonry with moisture-proof flashing.
- Add inconspicuous flashing whenever adding to, altering, or repairing existing original construction which had no flashing protection. Make sure all flashing around chimneys and in valleys provides for proper drainage and does not allow any water in.
- Add metal drip edge along the edge of all roofs. Make sure all roof eave drip edges extend beyond the fascia and that runoff does not cling to the eave flashing.

Grading and Drainage

- Several buildings have problems with grading and drainage. Water runoff deposits sediments which cover the lower logs of buildings, causing them to deteriorate over time and compromise structural integrity.



- Re-grading the site around the building and diverting water away from the foundations of the buildings will keep the logs in better condition and over time will save money. Diverting water can also help to avoid issues with erosion, which can compromise foundations.

- Soil should be removed from around the sill logs. The site should be re-graded for several feet around the entire perimeter of the building. In severe areas of run-off, drainage gullies should be dug and filled with gravel, giving water a place to travel.

Drainage Procedures

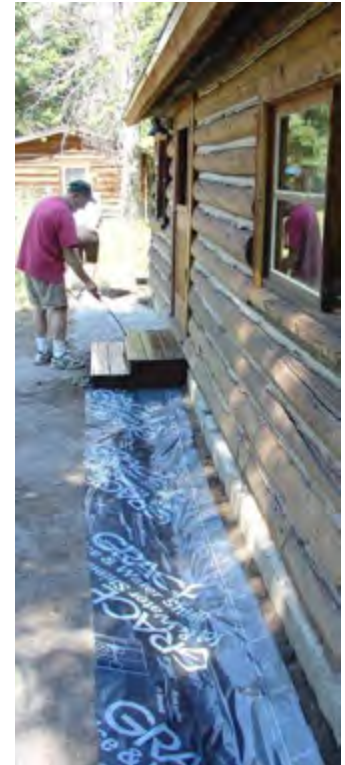
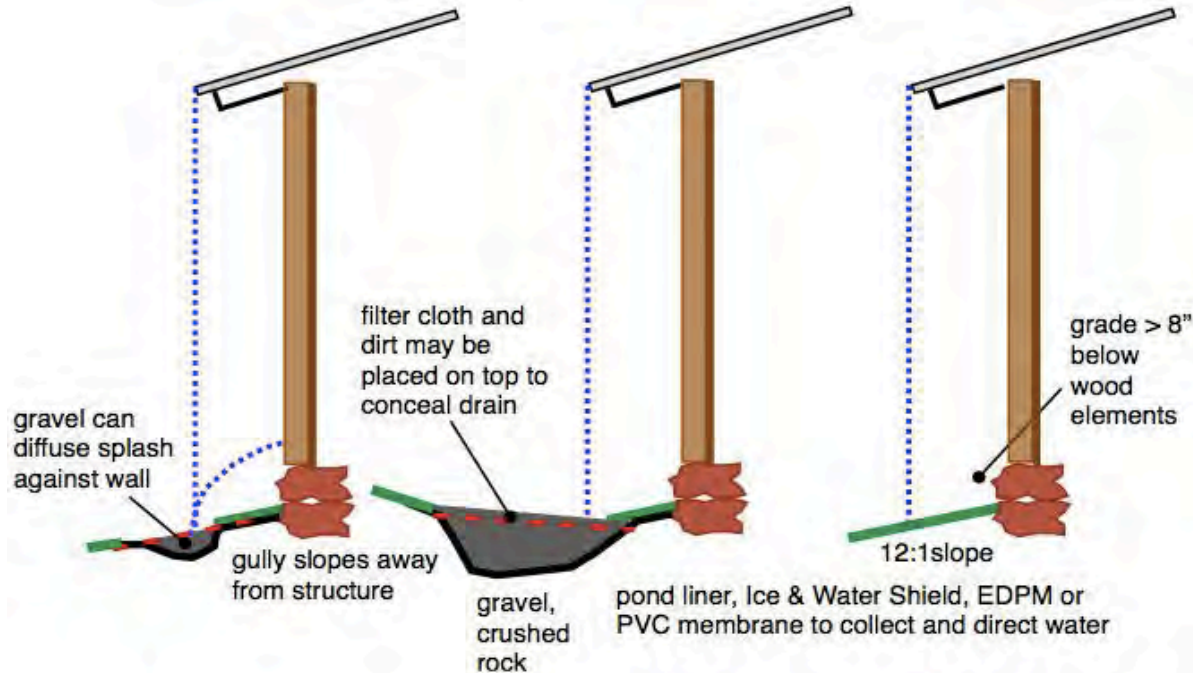
***Soil and water against the building can be a serious preservation and maintenance problem.**

- Surface drainage and roof runoff should be directed away from the buildings. Every precaution should be taken to ensure that there is no standing water at building edges or beneath buildings raised on piers.
- Keep grade at historic levels, preferably 8" below wood. Remove soil and vegetation covering siding and sills, and expose buried original pavements.
- Attempt to reduce or eliminate splash against wood surfaces. Provide positive drainage around structure with particular emphasis at roof edges to reduce backsplash against walls.
- Slope surface of ground adjacent to building down away from its perimeter a minimum of 4% slope, to conduct surface water away from building to a suitable drain or water course. Make sloped ground areas around buildings at least five feet wide where practicable. Provide building perimeter surface drainage channels, swales, or other suitable water courses when necessary to intercept, collect, and direct water around and away from a building.
- Cut out and remove pavements that are in direct contact with any wood sills or walls, and provide curbs and other surface water controls to keep water from paved areas away from buildings.



Drainage Procedures

How To Make a Drainage Gully:



Reduce roof runoff splash / provide positive drainage

- Lower grade around building to be >8" below sill logs.
- Construct gully directly under drip edge.
- Line with EDPM or membrane. Slope to direct water away from the foundation and away from the building .
- Fill gully with crushed washed gravel (1/2"-3/4 minus).
- Compact and blend to grade.

Berol Lodge, Drainage South Side

Current Design



Water is dripping down wall instead of gutter causing black fungal growth on log



Corner has lots of black fungal growth and is constantly moist.



Water dripping on logs causes rot and deterioration.

Problem

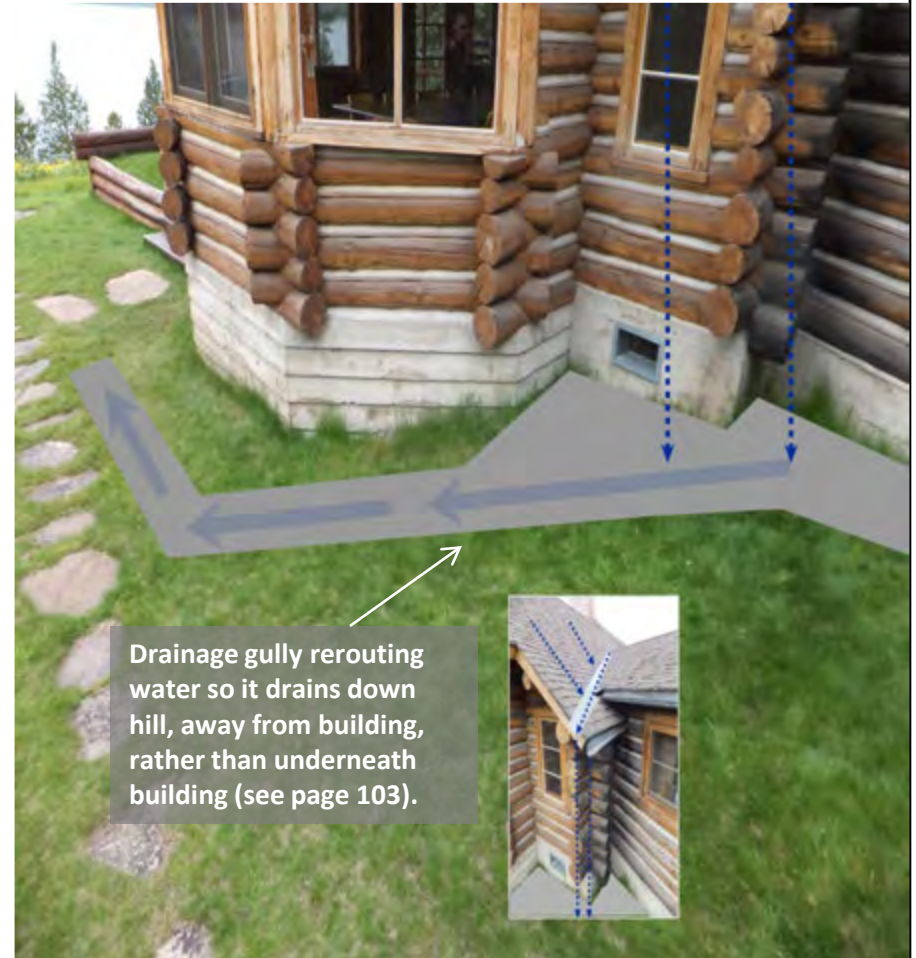
- This corner is dark and very damp. Serious damage has been done to the logs and some are completely rotted.
- The gutters are ineffective and trapping moisture in the corner.
- The flashing in the valley does not extend to edge of roof and ice is wrapping around the edge of the roof causing significant damage to the fascia board. This is known as ice damming.

Recommendation

- Re-level gutters so water drips onto ground instead of dripping down the logs.
- Add metal drip edge that extends beyond roof edge to ensure proper runoff and protect fascia.
- Build drainage gully to catch water dripping off edge of roof and allow it to run down the hill away from the building

Berol Lodge, Drainage South Side

Proposed Design



Berol Lodge Drainage, South Side



Problem

- The ground slopes inward toward the building allowing water to run in under the building through the crawl space.

Recommendation

- Slope ground so water drains away from the building.
- Build drainage gully (see page 103) running from east to west of building allowing water to flow down the hill instead of under the building.
- Build barrier around crawl space entrance stopping water from entering.

Vegetation



Problem

- Trees, live and dead branches, and bushes are much too close to the buildings.
- Tree and shrub branches should not touch building surfaces as it creates a potential for storm and fire damage, as well as creating a microclimate that accelerates deterioration by moisture.
- Trees also deposit much organic matter and dirt on roofs which accelerates deterioration of roof surfaces.
- Root systems destroy foundations, branches can cause abrasion on walls and roofs, and dense growth can foster dampness.

Recommendation

- Trim or remove tree branches within 25 feet of a historic structure. Remove all dead branches, standing and downed, within 35 feet. Trim all bushes and vegetation within 5 feet of all buildings.
- Tree branches should be cut so that they do not touch walls or overhang roof surfaces. Vegetation should be trimmed to maintain shape.
- Trees planted away from building foundations may remain if there is not apparent damage to foundation. Historic landscaping elements should be maintained, with restoration where possible.
- Remove shrubs and trees of any size when growing directly against building foundations. When removal of a shrub creates a “gap” within the landscaping scheme, a new replacement shrub should be planted at a distance of 3’-5’ from the building foundation. New trees should be planted with appropriate distance and should be in scale with the original landscaping intent.
- Cut and maintain grasses and small plants at a low height near building walls and foundations so that **no vegetation** touches or covers building.

Windows

Windows are critical character-defining features and help to convey the architecture and significance of a building. As such, windows should be properly maintained to ensure their longevity.



Fixed-pane windows



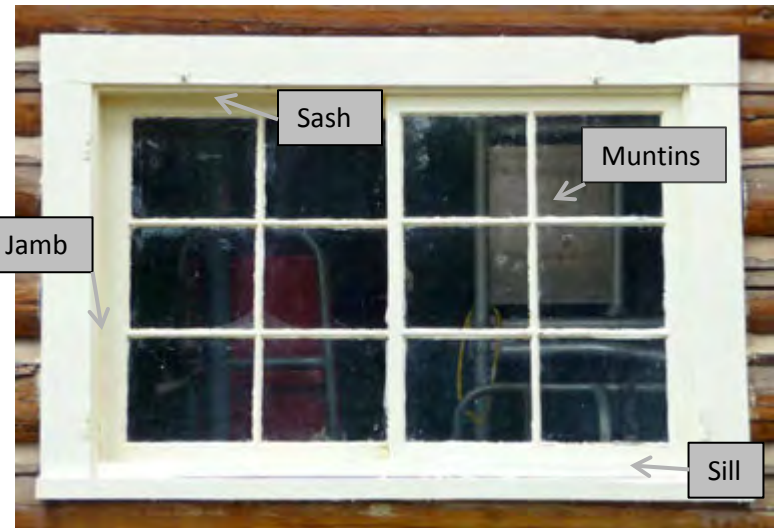
Casement windows



Picture windows

Many of the windows at the AMK Ranch are in good condition; however, those that have not been maintained or repaired are difficult to operate and have infiltration and heat loss.

Below are some areas of typical accumulation of dirt and organic matter, which lead to deterioration.



Sliding windows

There are multiple types of windows at the AMK Ranch.

Windows

Regular maintenance on windows will keep them looking and operating like new.

When inspecting windows, look for checks, punky wood (flakes off easily), and peeling paint.

All window elements (sill, sash, jambs) require annual cleaning.

- Remove screens
- Using air compressor, blow out accumulated dirt and organic matter.
- Scrape between the jamb and sill to dislodge debris if necessary.
- A wet rag can be used after to clean the sill and the space under the jamb.
- Avoid damaging the wood!



Also remove any material from the interior window sills that may cause dirt to build up.

Remember that primary windows should be operable and lockable.

Windows should be repaired, rather than replaced. If necessary, replacement sash should match the original in size, shape, type, muntin profile, etc.

Window Maintenance

Regular maintenance questions to ask about windows include:

- Do the muntins flex when pressed?
- Do the sashes glide easily and operate properly? (The lower sash should operate too.)
- Are repairs needed to the screens, including replacing missing molding?

When maintaining windows, be sure to wash them and adjust or repair any screens or screen fasteners that may need it.

Painted surfaces should be well maintained to prevent moisture from affecting the wood. The whole window does not need to be repainted each time. If there is a problem area, scrape off the peeling and flaking paint, sand, and retouch. This will help avoid the build-up of many layers of paint, which eventually destroys the historic window profile. Be sure that the paint matches the existing color. Remove paint from the glass and do not allow paint drips to form.



Vegetation close to windows can promote rotting of the wood through retention of moisture, dirt, and organic material. It can also pose a threat to the windows during storms as the wind blows or snow builds up.

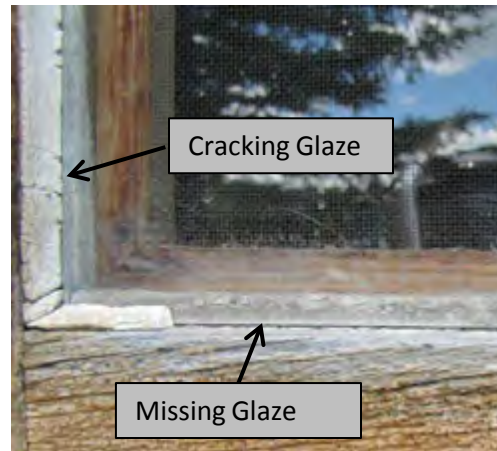
Vegetation near windows should be pruned so it does not interfere with the windows or be removed if necessary.

Glazing Windows

Window glazing is the actual glass of a window and is mounted within the frame using putty.

Materials for glazing:

- Paint scraper
- Putty knife (Be sure to use a small putty knife made for glazing and make sure that it is always clean.)
- Safety glasses
- Gloves
- Appropriate glazing compound
- Appropriate sized glazing points



Step 1. Remove window and in a clean shop, pry away glazing that is loose or needs to be replaced using a putty knife.

Step 2. Watch for the points holding in the glass, and if possible save for reuse. Some newer points are too large for older windows.

Step 3. Make sure the glazing putty is warm enough to apply and work.



Step 4. Apply a thin bead of putty to the frame. One method is to roll out a thin bead and place it on the frame.



Step 5. Make sure the bead is large enough so that the glaze squeezes out for a good seal. Then press the glass into it, leaning the glass against the front of the frame. You should see the putty squeeze between the glass and the frame. Some will squeeze out of the back and can be cleaned up later.



Photos courtesy www.thisoldhouse.com

Glazing Windows

Step 6. Once the glass is tight against the glaze, insert the points.

- Small panes up to 12" can use 1 or 2 points per side, evenly spaced, adding 1 point every 6-8 inches.
- To insert the points, put against the glass with the point down into the wood. Use your putty knife to wiggle-push the point down until it is seated at a height below the final height of the putty.
- Trim the putty off the frame that has squeezed out on the opposite side of the frame.



Step 7. Remove a golf ball sized piece of putty and warm it by rolling it in your hands and press it into the frame against the glass so that the groove is overfilled. Do not worry about neatness here.



Step 8. Once you have done all four sides, pick up your putty knife and, starting in any corner, glide the knife over the putty, pressing it firmly into the frame and cutting off the excess putty at the same time.

Step 9. Move slowly with the knife at a deep angle to the frame. Use your fingers for smoothing.

Step 10. Let the glazing set for at least 7-14 days. The glazing hardens through oxidation and therefore takes time.

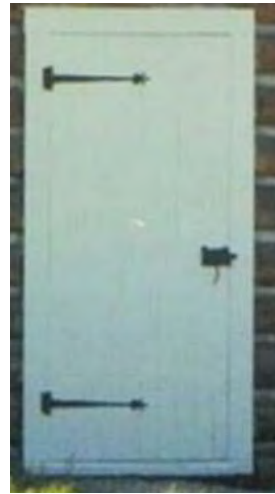
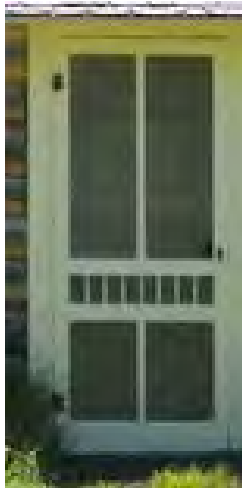


Step 11. After the glazing has thoroughly dried, the frame may be primed and painted. Before painting, the glass should be cleaned to remove oils from the putty. When painting, it is important that the paint flows over the glazing onto the window (wipe the paint from the glass immediately) so the paint forms a watertight seal. A small, good quality brush is recommended.

Photos courtesy www.thisoldhouse.com

Doors

Doors are critical character-defining features and help to convey the architectural significance of a building. As such, doors should be properly maintained to ensure their longevity.



There are a variety of wood panel doors at the AMK Ranch, most of which are in good condition.

When maintaining doors, be sure to clean dust, dirt, organic matter, and mold growth along the jambs, at sills, and at connections. Doors should be vacuumed and treated with *Murphy's Oil Soap*.

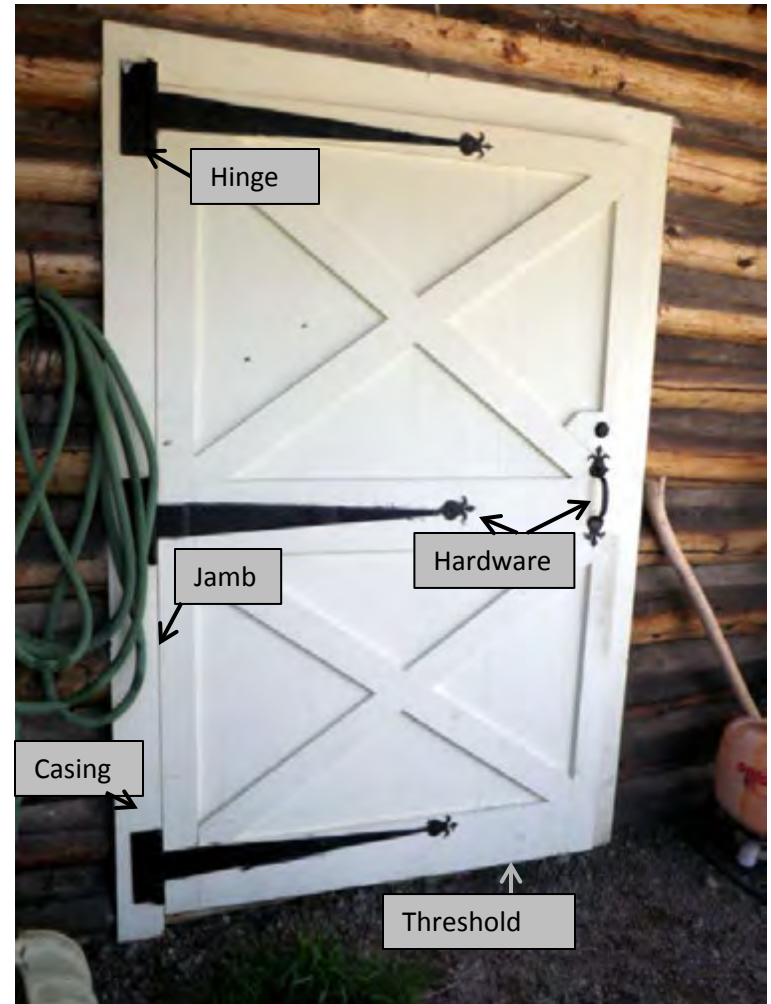
Doors

Regular maintenance on doors will keep them looking and operating like new.

All door elements (sill, sash, jambs) require annual cleaning.

Doors should also be checked for:

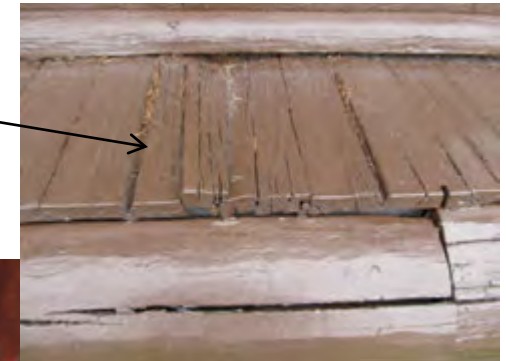
- Tight, secure, and functional hardware
 - Hardware should be lubricated periodically for best operation.
 - Door hardware is also significant- if it has not been painted, do not paint it.
- Proper hanging and operation
 - Door should open and close easily, and should not scrape the floor
 - Never plane a door that scrapes; rather, rehang the door so that it functions well.
- Functional weather stripping
 - Weather stripping should be concealed
 - Should work to keep out air, water, and critters.
- Sturdy door threshold
- If painted, paint should not flake or peel
 - See painting instructions for windows, pages 110-112.
- Avoid damaging the wood!



Berol Lodge, Southwest Porch



Exterior planking coming apart

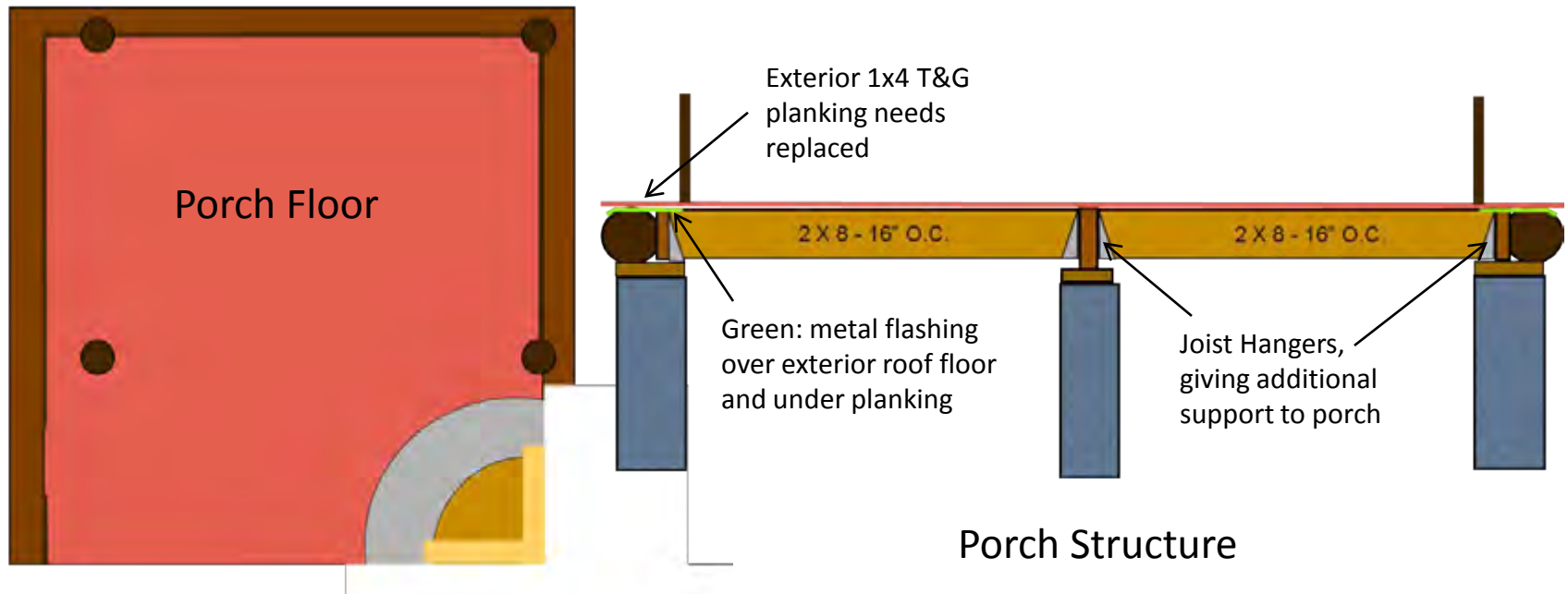


Interior floor damage due to lack of drainage inside

Problem

- The Porch is not structurally sound enough to support all the people coming and going on it, especially during the Thursday lecture and dinner.
- The floor is unlevel and slopes downward.
- Lack of drainage holes catches water on porch.
- Outside planking on the floor is deteriorating and is raising .
- Water is let under the house from the porch, causing mold and damage to the foundation.
- Wood boards are laying on the dirt underneath the porch.

Berol Lodge, Southwest Porch



Recommendation

- Replace exterior 1x4 tongue and groove planking around porch. While replacing saturate with Bora Care before painting.
- Install flashing over the exterior portion of roof floor to prevent water from seeping underneath.
- Add Joist hangers to provide appropriate structural support.
- Create some drain holes on interior of porch so water is not trapped inside and seeps below damaging floorboards and foundation.
- Some of the planking on the inside, especially around the wooden columns may be deteriorating and need replaced. Saturate base of column with Bora Care.
- Repair any damaged flooring.
- Remove wood laying on dirt under the porch.
- Saturate all wood elements with Bora Care. Be sure not to allow it to stain concrete foundation.

Pest Control

- Pests, including marmots, martens, bats, ants and insects, birds, and others can cause damage to buildings. Damage can result from digging, nesting, and otherwise inhabiting the buildings, both inside and outside.

- Because the AMK Ranch is part of Grand Teton National Park, pests must be trapped and removed without harming them. Additionally, it should always be remembered that the creatures are wild, may carry disease, and must be handled properly to avoid injury to the creature or the carrier.

- Creatures should be removed when they are least likely to be impacted. This means avoiding mating and nesting seasons and waiting for offspring to mature. Many times, this means waiting until late fall before the winterization process.

- Excluding the pest in the first place is the best solution. Holes should be filled or carefully covered with a small-gauge mesh. Any burrows should be filled in and blocked. Birds' nests should be removed from the sides of buildings and the wood cleaned.

- Pesticide use is strictly controlled in the park. All pesticides, herbicides or associated chemicals need to be approved through the Park IPM Coordinator (see page 149).



Pine marten



Marmot



Ants



Note about borate: Borate won't kill the ants instantly. It is effective because it inhibits a digestive enzyme thus starving the ants. A piece of wood soaked in borate can be used as bait. Ants will take the wood back to the colony, eventually destroying the colony. Additionally, borate kills fungus on logs and acts a preservative.



Borate products come in various forms. Naturally found in crystallized form, borate also comes in powder, liquid gel, and cylindrical rods. All are applied differently. Borate can be mixed with water and sprayed on logs, sprinkled, or injected into cracks.



Problem

- Carpenter ants and red ants are found in several places throughout the property.
- The carpenter ants are eating the logs and hollowing them out.
- As the AMK is located in a national park there are restrictions on which pesticides and methods can be used to get rid of ants.

Recommendation

- Try to find places where ants are concentrated; look at basements, crawl spaces, chimney bases, pipes, and cracks. Try to eliminate all holes where the ants may be entering (new chinking may be needed).
- Apply a borate product on areas of ant concentration. Caution: borate will stain concrete foundations and steps!
- Consult with park service officials about other products that can be used, and experiment.
- Fix drainage problems and eliminate moisture on logs; dampness creates good habitat for ants.

Bats: General Information

1. Bats are born during the months of May and June.
2. They can live up to 10 years of age.
3. Bats mate in the fall, but ovulation and fertilization occurs in the spring.
4. They can fit into narrow slits:
 - Gaps: $\frac{1}{4}$ x $1\frac{1}{2}$ Inches
 - Holes: $\frac{5}{8}$ x $\frac{7}{8}$ inches
 - Openings: $\frac{3}{8}$ inches wide (the size of a dime)
5. Bats commonly enter buildings through openings such as roof edges, valleys, eaves, apex of gable, chimney, attic, roof vents, dormers, siding, loose fitting doors, window gaps in walls, and utility vents.
6. To stay away from predators, bats will roost in the highest points of a building. They will also enter and exit through high points.
7. Bats should not be removed from building between June and August.
8. Rub marks due to oils on the bat's fur will often mark an entry/exit point.
9. Colonies of bats are often a group of all female bats preparing for/with pups (baby bats). The colony will double when the babies are born.



Little Brown Bat, a common bat species found in the Berol Lodge.

Bats: Where to look and the damage they cause

1. Bats can be found in any dark, warm corner or room of the building. Some places to look for bats in the Berol Lodge are along the ridgepole and purlins in the living room as well as the curtains in the hallway.
2. Bat guano can cause damage to any fiber in the building, such as wood, carpet, furniture, and curtains.
3. Bat guano and urine can cause health issues such as Histoplasmosis, a lung disease.
4. Bats have also been known to carry rabies.



Bat sleeping in the curtains in the Berol Lodge hallway.



Damage to the upper logs in the Berol Lodge living room.

Bats: Evacuation and Exclusion from Building

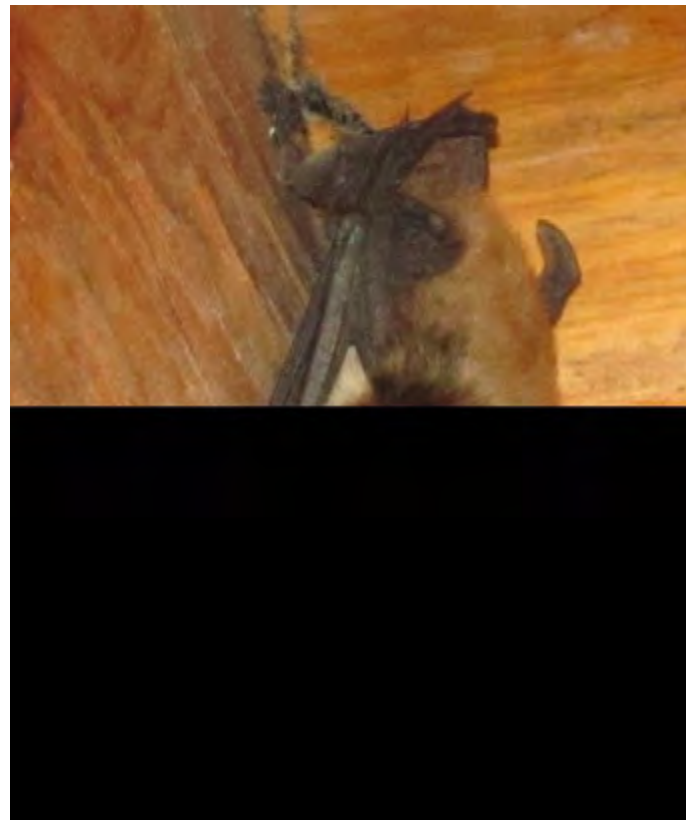
Bats must be evacuated from the building and permanent steps take to exclude them. Do not attempt to trap bats.

Step 1: Inspect the interior of the building to determine where the bats are living, and the bat species. The most common bat around the Berol Lodge is the Little Brown Bat.

Step 2: Inspect entire building for holes, cracks, points of entry and exit. Determine exactly where the bats are getting in and out. The best time to do this is at dusk when they leave to feed.



Watching where bats emerge from the Berol Lodge at dusk.



Little Brown Bat hanging on the upper wall in the hallway of the Berol Lodge.

*Steps from: www.wildlife-removal.com

Bats: Evacuation from Building

Step 3: Close secondary entry and exit points.

Step 4: Remove existing bat netting (the existing netting on Berol Lodge is draped incorrectly and has openings large enough to allow bat access).

Step 5: Allow bats to leave the building at dusk, then place the exclusion netting over the hole, to allow those that are still in the building to come out, and prevent those that are out from reentering.

NOTE: Exclusion should not occur during times when a bat nursery colony may be present thus trapping juvenile bats while excluding adults.

Step 6: Check the building for remaining bats. If none remain, then seal up the building to keep them out following the procedure for exclusion on the next page.

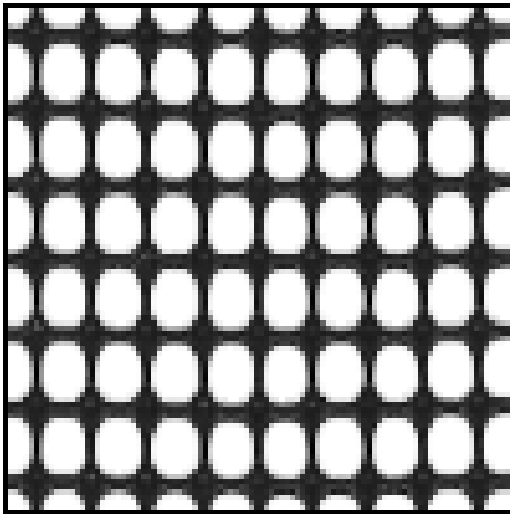
Step 7: Clean up. As bat guano can cause health problems, it should be properly handled. See page 125.



Correct exclusion netting in place. Netting should be draped over the hole to allow bats to fall carefully out, but not allow them back in.

Bats: Exclusion from Building

1. After ensuring all bats have left the building, fill up the primary entry/exit holes. This is best done in August after the bats migrate.
2. Use synthetic chinking or daubing mixture to fill in all holes around purlin logs, wall logs, or chimney.
3. Where possible, remove the soffit and place netting in spot looping it around the upper side of the board, keeping it tight. Tack it against the building and replace the soffit. This netting can be held in place with synthetic chinking if it is covering bigger holes.
4. Clean up the bat guano by following the steps outlined on page 125.



Bat netting should be 1/8th inch or less, like the one on the left, to prevent bats from becoming caught in it. The one currently installed is 3/8th inch, the size of a dime, allowing bats to get trapped in it.



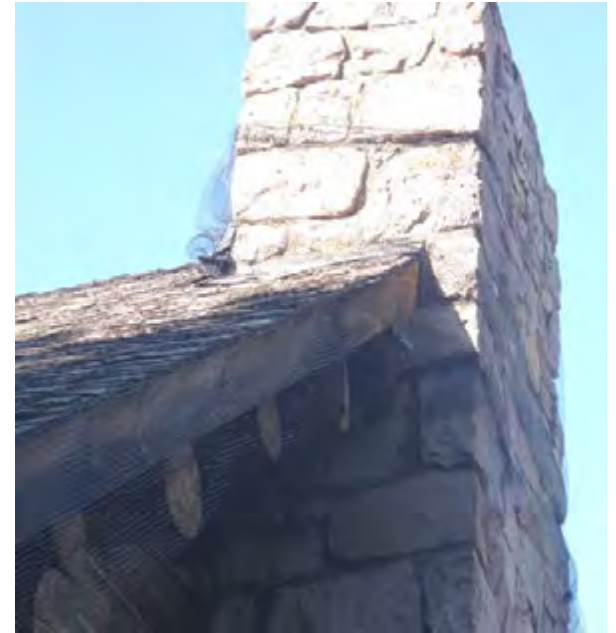
Bats: Things That Don't Work For Exclusion

There are many different methods for evacuating and excluding bats from buildings. The following have proven to be ineffective at the AMK Ranch:

- Bat houses have not worked for the Berol Lodge. They should not be ruled out as a potential solution, however. Temperature, size, and exposure are important factors in creating a bat box and other designs could be tested.
- Filling holes with steel wool (may help, but at this point is hard to tell as not all the holes have been found and filled).
- Sonic sound emitters.
- Draped bat netting with 3/8" holes.



Bat house placed on the north end of the west side of the Berol Lodge, which appears to be vacant. The NPS should be consulted for ideas on other designs that may be more successful.



The current bat netting is not working to exclude the bats from the Berol Lodge.

Bats: Clean up Procedure

Step 1: Make sure that all bats have left the building, and spaces sealed so none can reenter the building.

Step 2: Remove all loose droppings with vacuum and scrub contaminated surfaces with an enzyme-based cleaner.

- Green enzyme cleaners can be found at www.enzyme-cleaner.net.

Step 3: If insulated, remove all insulation. If it is soiled it will have to be replaced.

Step 4: Fog space with special cleaner (electric atomizer and enzyme-based cleaners such as *Bac-Azap*, or *Bioshield* work best for the chemical breakdown of organic material). Fogging ensures all nooks and crannies in the room are covered for clean up.

- See <http://www.pestproducts.com/bac-azap.htm>.



*Steps from: www.wildlife-removal.com

Snow Removal and Winterization



Driving into the AMK Ranch, circa 1940 (left)

Verba Lawrence, former AMK Ranch caretaker, shoveling the Johnson Lodge roof (right)



Problem

- According to Teton County Emergency Management, the ground snow load is 175 pounds per square foot. As much as three feet of snow can fall in a single storm.
- Snow loading can collapse roofs.
- Shoveling and raking the roofs results in large snow piles forming on either side of the building which causes prolonged moisture exposure at heights that would not normally be experienced if the roofs were not shoveled.

Recommendation

- Continue annual installation of snow supports (simple t-shaped supports made of dimensional lumber) under ridgepole or at other critical loading points of cabins and the Johnson Lodge.
- Develop a model based on the requirements of ASCE 7-05 "Minimum Design Loads for Buildings and Other Structures" to determine if the roofs can withstand anticipated snow weight with no shoveling, but supports on the interior.
- If it is determined that the structures can withstand the loads, it may be recommended that shoveling and raking be minimized or stopped.
- Prevent snow accumulation from contact with walls by propping plywood sheets at an angle against the walls of buildings where snow tends to accumulate.

Regular Inspection and Maintenance Tasks



Regular Inspection and Maintenance Tasks

To best maintain the buildings at the AMK Ranch, regular inspections and maintenance tasks should be completed.

Inspections should take place annually, preferably in the spring as the AMK Ranch is opened for the season.

Regular inspections will make the process of identifying maintenance problems easier, making deferred maintenance less likely. Building Condition Assessment Forms (see page 130) should be used to track the condition of each building.

As soon as problems are identified, repair should be scheduled.

Regular Maintenance Tasks

- Clean roofs, gutters, and valleys
- Clean the interiors and exteriors of each building, including window and door sills and thresholds
- Paint any surfaces where paint is peeling and chipping
- Hang screens and storm windows as needed
- Blow out log checks
- Trim vegetation around buildings
- In winter, remove snow as necessary



Appendix



Appendix A: Building Condition Assessment Forms

The Building Condition Assessment Forms are used to record the results of building inspections. These should be completed annually to create a timeline of condition and maintenance issues for each building.

Initial Building Condition Assessments were completed in the Summer of 2011. They can be found on the CD included with this guide. A PDF and a Word copy of a blank Building Condition Assessment Form have also been included.

We recommend using a printed copy in the field and entering the data into a Word document later in order to keep both a paper and a digital record.

The building should be described (most information can be copied from past forms) and the conditions noted in detail.

AMK RANCH – BUILDING ASSESSMENT FORM

Feature	GF?	Description	Cond.	Condition/deficiency description	Recommendation
Overall					
Roof cover/ structure/eaves					
Chimney					
Exterior walls					
Ext. finish					
Windows					
Doors					

Additional Photographs



Bench built for Verba Lawrence



Entering the AMK from the road



Buck and Rail Fence surrounding campus

Additional Photographs- Berol Lodge



East-facing façade



West and south elevations



East-facing façade and north elevation



North and west elevations

Additional Photographs-Outhouse



East-facing façade



North elevation



West elevation



East-facing façade and south elevation

Additional Photographs- Johnson Lodge



West-facing façade



South elevation



North elevation



East elevation, with garage in view

Additional Photographs- Johnson Garage



South and east elevations



North elevation



Burlled log hallway at northwest corner



East elevation

Additional Photographs- Boise Cascade Residence



East-facing façade and south elevation

Additional Photographs- Lawrence House



North elevation

West elevation



Additional Photographs- Director's Cabin



West-facing façade



South elevation

Additional Photographs- Sunroom Cabin



West-facing facade



South elevation



North elevation



East elevation

Additional Photographs- Shop Cabin



West-facing façade



East elevation



South elevation



North elevation

Additional Photographs- Woodshed



South elevation



North elevation



East elevation



West elevation

Additional Photographs- Well/Powerhouse



South-facing façade



North elevation



West elevation



East elevation

Additional Photographs- Two-room Cabin



West-facing façade



North elevation



South elevation



East elevation

Additional Photographs- Tack Cabin



West-facing façade and north elevation



East elevation



South elevation

Additional Photographs- Barn



West elevation



North elevation



South elevation



East elevation

Additional Photographs- Chicken House



South-facing façade and east elevation



South-facing façade



West elevation



North elevation

Additional Photographs- Boathouse



West-facing façade



North elevation



East elevation



South elevation

Additional Photographs- Ramp



North elevation



South elevation



North elevation facing east



North elevation facing west

NPS Integrated Pest Management Program

National Park Service
US Department of the Interior

Concession Environmental Management Program
Denver, Colorado



Understanding the National Park Service's Integrated Pest Management Program



The National Park Service requires all entities operating within the park to adhere to an Integrated Pest Management Program (IPM). The key points are:

1. All pesticides, herbicides or associated chemicals with an EPA Registration number need to be approved through the Park IPM Coordinator.
2. All herbicides and pesticides used each year must be reported to the Park IPM Coordinator on a form provided by the park.
3. AMK Ranch is responsible for all basic IPM but the Park IPM Coordinator is available for advise or consultation. More complex pest issues will be handled on a case by case basis.
4. Any modifications or repairs to the buildings other than basic exclusion should be approved by the park.

Resources/References

Cedar Shingle and Shake Bureau

-Roof Manual <http://www.cedarbureau.org/installation-and-maintenance/roof-manual/>

Diem, Kenneth L., Lenore L. Diem, and William C. Lawrence

-*A Tale of Dough Gods, Bear Grease, Cantaloupe, and Sucker Oil: Marymere/Pinetree/Mae-Lou/AMK Ranch*, 1986.

Goodall, Harrison

-*Conservation Guide, Murie Ranch Historic District, Moose, Wyoming* (2007)

-*Customized Secretary of the interior Standards and Guidelines for the Murie Center* (2007)

-*Preservation Maintenance, Murie Center, Moose, Wyoming* (2007)

-*Preservation Maintenance Procedures, Murie Center, Moose, Wyoming* (2007)

http://web.me.com/harrisingoodall/Harrison/Conservation_Services.html

Henry, Michael C.

-*The Heritage Building Reinvestment Model* (2008)

-*Materials in Older Buildings*. National Center for Preservation Technology and Training, 2003.

Humstone, Mary and Sarah Schill. *National Register of Historic Places Nomination for the AMK Ranch*, 2005.

National Park Service

-Preservation Tech Notes <http://www.nps.gov/history/hps/tps/technotes/tnhome.htm>

-Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings

http://www.nps.gov/hps/tps/standguide/rehab/rehab_standards.htm

-*Understanding the National Park Service's Integrated Pest Management Program* (2003)

-*Walk Through Historic Buildings* <http://www.nps.gov/history/hps/tps/walkthrough/>

Resources/References

National Park Service. *Preservation Briefs* <http://www.nps.gov/history/hps/tps/briefs/presbhom.htm>

Specific *Briefs* relevant to this project:

03: Conserving Energy in Historic Buildings

04: Roofing for Historic Buildings

06: Dangers of Abrasive Cleaning to Historic Buildings

09: The Repair of Historic Wooden Windows

10: Exterior Paint Problems on Historic Woodwork

16: The Use of Substitute Materials on Historic Building Exteriors

17: Architectural Character - Identifying the Visual Aspects of Historic

18: Rehabilitating Interiors in Historic Buildings - Identifying Character-Defining Elements

19: The Repair and Replacement of Historic Wooden Shingle Roofs

20: The Preservation of Historic Barns

26: The Preservation and Repair of Historic Log Buildings

31: Mothballing Historic Buildings

32: Making Historic Properties Accessible

35: Understanding Old Buildings: The Process of Architectural Investigation

36: Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes

39: Holding the Line: Controlling Unwanted Moisture in Historic Buildings

45: Preserving Historic Wooden Porches

47: Maintaining the Exterior of Small and Medium Size Historic Buildings