

Planning for the Unexpected

Disaster Preparedness Guidance for
Historic Properties in Idaho



Cover Photo: Teton Dam, Three Days After Collapse, Fremont and Madison Counties, ID. 1976. ISA Identifier no.: 82-114.3a. Copyright Idaho State Historical Society. Permission is required for use in any form. For more information, please contact the Idaho State Archives.

This program receives federal funds for the identification and protection of historic properties. Under Title VI of the Civil Rights Act of 1964 and Section 504 of the Rehabilitation Act of 1973, the U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, age, or handicap in its federally assisted programs. If you believe you have been discriminated against in any program, activity, or facility as described above, or if you desire further information, please write to: Chief, Office of Equal Opportunity Programs, United States Department of the Interior, National Park Service, 1849 C Street., NW, MS-2740, Washington, D.C. 20240.

This publication has been funded in part with federal funds from the National Park Service, Department of the Interior. However, the contents and opinions do not necessarily reflect the views or policies of the Department of the Interior.

Costs associated with this publication are available from the Idaho State Historical Society in accordance with Section 60-202, Idaho Code.

Table of Contents

Introduction	1
General Preparedness: Being Proactive	2
Know Your Resources	2
Know Your Risks	2
Know Your Capacity	3
Put A Plan Together	4
Get Things Organized	4
Disaster Response Actions	7
If You Think a Disaster is Likely to Happen	7
General Immediate Response	8
General Recovery Response	9
General Recovery for Specific Building Elements	10
Special Considerations for Specific Emergencies	14
Earthquake	14
Fires	17
Flooding	20
Landslides	24
Snow-loads	26
Wildfires	28
Wind	31
Appendix A: Sample Inspection Checklist	33
Appendix B: Sample Historic Property Disaster Prevention Checklist	35
Appendix C: Sample Historic Property Damage Assessment Checklist	38
Appendix D: Disaster Prevention Resources	41
National Resources	41
Idaho Resources	42
Resources By County	43
Bibliography	46

Introduction

A disaster. No one expects one to happen to them. The reality of the situation, however, is that everyone is at risk of some kind of disaster. And historic properties and sites can be especially susceptible to damage from disasters for any number of reasons: old construction methods; lack of maintenance; location in a remote area. And during recovery after a disaster, there is the added risk of a property owner simply not being aware of the special considerations of working with a historic property.

But that does not mean there is nothing you can do about it. Developing a Disaster Preparedness Plan for your historic resources can help to prevent or reduce damage from disasters, streamline the response to a disaster, and may help property owners recover faster and more completely.

The purpose of the Idaho State Historic Resources Disaster Preparedness Guide is to provide property owners, agencies, and those managing and using historic properties guidance on how to minimize the chances of damage to or loss of their historic sites and structures, and provide some general recommendations for undertaking recovery efforts in a historically sensitive way.

NOTE: This document is intended to provide general guidance and information, but should not be considered a substitute for consulting with the appropriate professionals (e.g. - engineers, architects, plumbers, electricians, et cetera). Property owners should consult and engage the appropriate professionals as they work to protect their historic properties.

General Preparedness: Being Proactive

Regardless of what type of institution or what types of resources are being protected, there are some basic steps that property owners can take to help prepare them for potential disasters. Many of these steps can be taken for no or relatively low cost, and many of the steps that do require monetary investment may be covered, in whole or in part, through various outside funding sources (e.g. – Certified Local Government grants; FEMA’s Emergency Management Performance Grant; and potentially through the Section 106 consultation process). Taking such preventative actions can help to either avoid or mitigate the impacts on historic resources and sites during and after disasters.

One of the most crucial aspects of disaster preparedness is being proactive. If you wait to start planning until it looks like something is going to happen, it is too late. It is important to make sure that you have done as much of your planning as possible in advance, and that you are familiar with all the aspects of your plan. Having a working familiarity with your plan and its contents can allow you to respond more efficiently and effectively when something does happen; trying to do your planning on the fly during a disaster is not going to work out very well. It is far better to have taken care of that in advance, so you are in a position to react quickly and effectively.

Know Your Resources

It is hard to know what kind of plans you need to make if you do not know about your historic resources. Property owners need to know about their building: how it was constructed; what materials were used; what changes have been made over time; and any other details that would help them plan for protecting their building. A trained historic preservation professional may be able to help develop a vulnerability assessment for a historic structure. This assessment will help identify the potential points of failure for the building and provide recommendations on how to address those vulnerabilities.

Property owners should also conduct regular maintenance inspections of their properties. These inspections should be used to help identify and correct any issues with roofs, cracks, plumbing, and any other areas that might make the property more susceptible to damage during a disaster. Inspections also give property owners a better understanding of whether deteriorated or damaged elements were present before or only after a disaster.¹

Evaluating and documenting a historic property is a vital part of being prepared, and should be done prior to undertaking other steps of disaster planning. It is especially important that information on the buildings is available in a convenient and easily accessible format; in the event of a disaster, you are not going to have the time to dig through a bunch of disorganized records trying to find the specific record(s) you are looking for.

Know Your Risks

Not every property is going to face the same potential disasters or risks. If you are located in a major creek or river drainage, you may want to think about the potential for flooding; if your site is in a

¹ A sample inspection checklist is available in Appendix A.

forested area of Idaho, however, you will likely be more concerned with fires. This is not to suggest that there is no chance of flooding in the forested areas or that there will never be a fire in the river drainage. Rather, it is important that property owners think critically about the landscape around them and consider what kinds of disasters may affect their resources. There are a number of sources of useful information that can be used to help determine your particular risks.

Newspapers and historical records. Historic records and newspapers will almost always have stories on past disasters, and will usually include information on the date(s), severity, and damages. These can help establish a baseline for potential disasters in your area. While past events can be useful for predicting future events, care should be taken to avoid the “because it’s never happened here before, it won’t happen in the future” mindset.

Existing plans and reports. Looking at local comprehensive plans, land use plans, building codes, and other reports and plans can also provide information on potential disasters that might impact a property. There are also a number of Idaho state and county agencies that can provide information. They may not include some of the important local components, but can at least provide some basic, regional information to keep in mind and are a good place to start. There is a list of some of the State and County resources available in Appendix D.

Consult the experts. There may be people in your area that already have some of the necessary knowledge you need to be prepared: local floodplain managers, or public works, planning, engineering, and transportation departments. Local police and fire departments may also be able to provide useful information on past events. One of the best experts to consult is the Idaho Office of Emergency Management; they are the state-wide experts on disasters and preparedness. The Federal Emergency Management Agency (FEMA) also has a lot of useful resources, which are available online.²

Once you have a clear idea of which risks your property *might* be subject to, it is important to prioritize your planning and preparation to focus on those disasters which are most likely to occur. That is not to say you can safely ignore those risks which are rare, but rather that you should put more time and energy into preparing for the more likely events. Guidance on event specific preparations for different types of emergencies can be found later in this document.

Know Your Capacity

There are natural limits to what any person, agency, or community can take on. Taking the time to think about and determine what those limits are is a necessary step in any planning process.

What you can and cannot do. Think about what kinds of preparations, responses, and recovery efforts you can take on yourself. If you have experience working with historic properties, you might be in a position to take care of a lot of the evaluation and documentation of the historic property; but if you do not have experience in historic preservation, you will want to bring in someone who does. And while many of the recommendations in this plan need trained professionals to carry them out, there are a number that can be done by the average property owner. For example, there are several recommendations related to landscaping in the sections on landslides and wildfires which do not require special skills and can be done by property owners themselves.

² <https://www.fema.gov/>

Identify the people who can help catalyze others. It is important to know who you will be able to count on to help you mobilize during a disaster. These people, whether local, state, or federal, are vital to responding to and recovering from disasters. And not just for the skills and resources; you want to be in contact with people who can help you get *other* people moving and helping. When you are busy trying to respond to a disaster, you don't necessarily have the time and capacity to manage both the overall response and coordinate other people. Having a few key individuals you can trust and to whom you can delegate frees you up to focus on the big picture.

Identify and tap into the groups and networks in the area. Based on what we have learned from past disasters, the most effective support during and after disasters comes from the local level. While state and federal support is important, often the most immediate support comes from local networks and organizations. Identifying the various groups and networks in your area can broaden your access to resources and partners. For example, if you can tap into a local builders or contractors group or network, they may be an invaluable resource for expertise on both securing a building before a disaster and for recovery afterward.

Put A Plan Together

Once you have a handle on the nature of your resources, what risks you are likely to face, and what kinds of challenges you are going to encounter in preparing and responding to a disaster, it is time to put everything together into a plan. This plan is intended to ensure that everyone has access to information on how to be prepared for a disaster and how to respond afterwards. The plan should include information on your site or building's vulnerability assessment, details on the various steps and actions that should be taken before and during a disaster, a list of local, state, and federal contacts, and any other information that might be useful. The plan should also include information on the location of the shut-offs for all of the building's utilities. If you know where the shut-offs are located, you will not have to waste time trying to find them during an emergency.

The plan should be kept in both digital and hard-copy formats, both on site and off. It is advisable to have the document located in a known and easily accessible place, so that if the primary point of contact is not present or not available, other staff can find and begin to implement the plan quickly. If possible, a digital copy of the plan should be available through a cloud-service or similar system and should be accessible to multiple people; this way, someone can still access the plan even if they are not able to be on site.

Get Things Organized

It may sound a little clichéd, but one of the best things you can do to prepare for a disaster is to make sure that you and your facility are organized.

Keep important documents in one place. It is a good idea to collect all of your important documents, plans, and records in one location. Ideally, these will be stored off-site. But if you have to store them at the property, they should be stored in such a way that they can easily be transported in case of a disaster. Important documents might include things like property deeds, service records,

insurance documents, et cetera. For historic properties, ideally these documents should include information on the design and materials of the building. This information is important both for on-going maintenance and management of a historic building, and in case there is a need to properly address damage from a disaster. The last thing you want to have to do after a disaster is try to go back and reconstruct a historic property from memory. It is also a good idea to make digital copies of these documents, and have those stored off-site. This way, you have a backup should something happen to the originals.

Designate disaster response roles and responsibilities.³ In the event of an emergency, it is important that people have a clear understanding of their roles and responsibilities. One of the worst things that can happen in an emergency is to have people either not knowing what they should be doing or to have multiple people trying to do the same thing, while other things get ignored. While every organization or site is going to have its own unique needs, generally speaking, specific individuals should be identified to fill the following roles:

- Response Team Leader, who is responsible for the “big picture” and who will coordinate all the other roles;
- Emergency Responder Liaison, who serves as the immediate point of contact for emergency responders, and provide them the information they need to do their jobs as safely and as efficiently as possible;
- Facilities Coordinator, who is responsible for coordinating and managing all of the aspects of the physical site, including turning off gas, water, and electrical (if it is safe to do so), and coordinating immediate physical response efforts like closing up holes in roofs or windows, removing damaged non-historic materials, and getting initial recovery work going;
- Administrative and Financial Coordinator, who is responsible for dealing with things like insurance, detailed record keeping, and working with vendors and commercial services;
- Assessment Coordinator, who is responsible for managing the assessment of the building(s) and materials, to determine both the nature and extent of the damage, and who will assess recovery efforts and needs throughout the recovery process;
- Documentation Coordinator, who is responsible for the wide range of paperwork related to emergency response and recovery, including creating and organizing written and visual records of the emergency and the recovery efforts; and
- Salvage Coordinator, who is responsible for setting salvage priorities, determining resource needs, managing salvage efforts, and coordinating salvage staff.

A particular historic property may not need all of these roles, or an individual person may be able to fill multiple roles. Regardless of which roles or how many people are carrying them out, it is important to have a clear understanding of who is going to be responsible for doing what *before* an emergency occurs.

Get adequate and appropriate insurance. Most traditional property insurance is not sufficient to cover damages to historic structures after a disaster. It might be a good idea for a property owner to have replacement-cost insurance. This kind of insurance will help cover the cost of the materials and workmanship necessary to repair the property with the appropriate materials and methods to protect the property’s historic integrity. Replacement-cost insurance is especially important if the property has handcrafted or older, harder to get materials like craftsman detailing or slate roofing. If the property is being used for commercial purposes, it is also a good idea to have the insurance policy cover things

³ This is really only going to apply to organizations or businesses that own or use a historic building. Individual property owners are unlikely to have a “team” to which they can assign responsibilities.

like loss of income, liability exposure, workers compensation, et cetera. It is important to make sure that you know what kind of records you will need to make a claim; be sure those documents are kept with your other important documents.

Disaster Response Actions

There are a number of disaster response actions which can be applied to a wide range of emergencies. Obviously, each disaster event is unique and that means different challenges, risks, and responses to each. But there are a number of actions and responses that are generally applicable to disasters across the board. This section will go into some of these general actions and responses. Information related to different specific disaster types (e.g. – fires, floods, earthquakes, et cetera) are addressed individually later.

If You Think a Disaster is Likely to Happen

The first priority in any disaster situation is the safety of people. Do not remain in or near the property unless it you can do so safely. If remaining would put you or other people at risk, evacuate the property *immediately*. If it is still safe to remain on site, before you evacuate, there are some general actions that you can take to help minimize damage that might occur.

Document the property. If it looks like a disaster is likely to happen, and especially if it looks like evacuation is going to be necessary, it is important to document the condition of the property immediately before leaving. Photograph the building in detail, including things like trim work, detailing, and interior and exterior designs. These photographs will be important should the building be damaged, and will be useful during the recovery phase and when dealing with insurance claims after a disaster.

Monitor public broadcasts and announcements. It is important to make sure that you are aware of the current situation, and stay apprised of how things are developing. Circumstances can change quickly; monitoring public broadcasts and announcements can let you better respond as conditions change.

Review your Disaster Preparedness Plan. Disaster preparedness plans often contain a lot of very detailed information and it easy to lose track of the details as time goes by. Reviewing the Plan and refreshing yourself on its contents is an important part of being prepared to respond. It is also good to begin reaching out to your disaster team (if you have one), your insurance provider(s), and other networks of support to which you have access. Unless the disaster is limited to only your property, do not reach out to general emergency responders; if it is a wide spread disaster event (like a wildfire, flood, earthquake, et cetera), those emergency responders will already be in action, and additional calls may only delay them. Obviously, if the emergency is limited to your property (like a fire which has just started on or nearby your property), then it is appropriate to contact emergency services if you can do so safely.

Turn off the utilities. If it looks like you are going to have to evacuate, and if you have time and the ability to do so safely, turn off the utilities. During an emergency event, it is very easy for gas, electrical, or other utility lines to be damaged or broken. This can result in additional or greater damage to the building; broken utility lines can even cause other emergencies – for example, if a gas line is damaged in an earthquake, it can very easily lead to an explosion and fire.

Collect important documents and files. If it looks like a disaster is likely, or if it looks like you might have to evacuate, have all of your important documents and plans gathered together so that

they can be easily transported. Ideally, they should be stored and transported in watertight containers, with lids that can be secured. This will help keep the documents from being damaged if they are exposed to water or if the container gets dropped.

General Immediate Response

Wait for the all clear. After a disaster, it can be natural to want to get on site as soon as possible to start assessing the damage. But it is important to wait until the authorities have given the all clear to return. While it may look like there is no longer any danger, there very well may be additional or remaining risks which are not readily apparent. Entering a disaster area before the all clear has been given not only puts you at risk, but may result in the diversion of emergency response resources which might be sorely needed elsewhere.

Protect yourself before beginning recovery efforts. First and foremost, if the situation still poses a risk to human health and safety, **do not** enter the area. After a disaster, there is a high probability of potential health risks for anyone entering or accessing a building. It is important to take precautions such as wearing protective clothing, protective eyewear, a good dust mask, and sturdy shoes or boots. If you need additional light for inspecting a property, use a flashlight, not open flame. If there has been flooding, or if there is any kind of standing water, be especially careful around electrical devices, equipment, or fixtures until/unless you are certain that power to the building is completely turned off. It is also a good idea to make sure your tetanus shot is up to date.

Turn off utilities. If the utilities were not, or could not be, turned off prior to evacuating the building, they should definitely be turned off before re-entering the property. They should not be turned back on until it has been determined by a professional that is safe to do so.

Have appliances serviced before using. Electrical controls on appliances which have been exposed to water or smoke can be damaged or contaminated, which could pose a future hazard. Having the appliances checked and serviced by a professional can help prevent further damage to the appliance and possible risk to the safety of the appliance users.

Document everything. It is important to properly and thoroughly document the condition of and damage to the site or structure. This should include both completion of an appropriate assessment form and photographic/video documentation. All of this documentation will be important as it will guide your recovery efforts going forward. It will help you get a handle on the exact situation and determine your priorities for recovery responses. A sample evaluation safety assessment form is available in Appendix C.

Avoid speculative or “knee-jerk” demolitions. In the immediate aftermath of a disaster, there can be a tendency to try and make quick decisions. This can lead to the demolition of historic structures simply because officials and/or property owners do not feel like they are able to take the time to consider a wider range of options. It is common to get a quote from someone on what rehabilitation versus demolition will cost. Often, however, these quotes end up coming from demolition companies (who have a vested interest in demolishing a building and no real experience in historic rehab) or a general contractor who does not have experience with historic structures (which may result in an inaccurate or unrealistic quote). It is important, therefore, that someone trained in working with historic properties be consulted before any demolition happens.

Stabilize the building. Once an assessment has been completed, it is important to get the building stabilized. If it is not stabilized, the building could be at risk of further damage and deterioration. The purpose of stabilization is not to return the building to active use. Rather, the point of getting the building stabilized is to buy time to review options and put together a plan for rehabilitation. Any stabilization should be done in such a way that it either is historically appropriate to the building, or that it can be reversed when more appropriate, permanent work is done. There are many temporary stabilization repairs that can be done, which are really only intended to last about six (6) months or so, giving property owners enough time to plan for long-range recovery.

General Recovery Response

Use the Secretary of the Interior's Standards for Rehabilitation. The Secretary of the Interior's Standards for Rehabilitation are the basic guidelines used for rehabilitation of historic structures throughout the United States. The Rehabilitation standards are intended to help bring a property up to current standards while protecting the historic character and integrity of the building. Generally speaking, the Rehabilitation standards are:

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will 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 elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will 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.

Take your time. Recovery from a disaster is not necessarily going to be a quick process. While each building and each disaster is going to be unique, all disaster recovery efforts are going to be a long-

term process and can often take years to complete. It is important that you not get discouraged as you work through the process. Generally speaking, recovery can be broken down into three phases: *Stabilization*, which begins immediately after the disaster is past up to about a year; *Recovery/Restoration*, which is usually years one to three; and *Preparation* for a future disaster, years three to five. This is to say, as hard as it may be, it is important that property owners try to be patient and not expect that life is going to get back to normal immediately.

Get a professional assessment of the property. If there has been any kind of damage to a historic property during a disaster, it is important to get an assessment of the building's condition from someone who is experienced in working with historic structures. Since historic properties often require special considerations, it is vitally important that the professional conducting assessments is knowledgeable about historic structures.

General Recovery for Specific Building Elements

One of the biggest challenges facing owners of historic properties when it comes to recovery after a disaster is how to ensure that the recovery efforts do not further damage the historic integrity of the building. As with any work on a historic building, disaster recovery work should always prioritize repair over replacement. If items do need to be replaced, they should be replaced with new elements that are similar to the original in design and materials. If matching replacements are not available, then any new replacements should be designed to be in keeping with the historic character of the building. And, whenever possible, remove any inappropriate materials and replace any missing historic features.

The following section provides some guidance on how to address post-disaster repairs for specific building elements and materials.

Masonry

While earthquakes are the most obvious source of damage to masonry, that is not the only way for damage to occur. High winds, which can cause strong upward pressure on roof eaves, or flooding, which can wash away mortar, can also cause damage to masonry materials.

Foundations. Foundations are one of the most important places to check for damage after a disaster. Soil settling is the most frequent cause for foundation issues. Things like heavy rainfall, improperly managed water run off over a long period of time, infiltrating tree roots, or a combination of factors can all result in soil settling, which can cause foundations to fail. Cracks are often the first sign that settling may be an issue. Stabilizing foundations can be as simple as replacing mortar or as complex as the reconstruction of the entire foundation. Be sure to consult a professional if there are signs of foundation damage.

Mortar. Mortar is another common point of deterioration or failure for masonry. Deteriorated mortar can lead to a number of problems: water infiltration, slippage of bricks, and possibly even wall collapse. Any lost or deteriorated mortar should be repaired promptly. When working with historic mortar, however, it is very important that you use a compatible mortar mix. Many modern mortars are considered too "hard" and will actually cause future damage to historic masonry. The National Park Service advises that an appropriate mortar mix is composed of three parts lime, one part portland cement, and 10 to 12 parts sand. Do **not** use caulking to fill in missing mortar.

Plaster Walls

It is very easy for plaster walls to be damaged during a wide range of disasters. Most modern wall materials have some give and can withstand a limited degree of movement without damage. But older wall materials, like plaster, are not so forgiving. They can crack after a minor earthquake, or even a severe storm; they can also begin to crack if the building settles. Restoring plaster walls is certainly possible, but it takes some care to do it right. In coordination with an experienced historic preservation professional, consider the following treatment options:

1. If the plaster wall has gotten wet or waterlogged, gradually dry the wall. This should be done with only air movement; do not use dehydrators or heaters. These can pull too much moisture out of the wall, and that can result in the formation of salt crystals in the plaster itself, which can turn the plaster to powder over time.
2. Check the plaster for firmness. It is possible for loose plaster to be reattached using an acrylic plaster mix, but this is a job for a professional.
3. Plaster that has begun to separate into layers, such as on the ceiling, can be secured using screw buttons into studs or joists.
4. Hairline cracks in plaster can be repaired with either plaster or wallboard joint compound. Sand the crack lightly with coarse sandpaper (this gives the patch something to stick to), brush out the loose plaster dust, and then force the patching material into the crack with a putty knife or your fingertips. When the patch is fully dry, sand it smooth with fine sandpaper.
5. Full removal and replacement of plaster walls should only be done as a last resort.

Roofs and Roofing Materials

The roof is one of the most important parts of the structure. Not only does the roof keep the elements out of the building, but the roof actually helps keep the exterior walls upright. Regardless of whether it is steeply pitched or flat, a roof will always have a structural substrate below a waterproof outer layer. If the underlying substrate becomes damaged or deteriorated, it can actually cause the connection between the substrate and the outer layer to weaken and give way.

When assessing a roof on a historic structure after a disaster, and in coordination with an experienced historic preservation professional, there are some things keep in mind:

1. Just because a roof is damaged, that does not necessarily mean that the roof needs to be completely replaced. Get expert advice from a qualified professional before making any decisions on whether the roof needs replaced. It may be that only a portion of it needs replaced.
2. Check the metal flashing at the chimneys, dormers, valleys and ridges, et cetera. This metal flashing is particularly susceptible to separating from the roof when it gets damaged. When this happens, it can become a point of water infiltration, which will lead to more damage. When repairing flashing, use only as much sealing compound as is necessary; do not apply excessive sealant.
3. If necessary, use the appropriate metal fasteners to attach the roof to the building. Use of inappropriate metal fasteners can result in them corroding, leaving the roof effectively unattached to the building.
4. If the roof is metal, it may be difficult to repair. When a metal panel gets bent or warped, it is very difficult to fix. While some pieces may be reused, this should only be done if they have

not been damaged; damaged pieces should be discarded and replaced with new panels to match the ones being discarded.

5. While roofing tar is a very handy and effective repair material, it should be used sparingly. Roofing tar is not considered an appropriate long-term repair technique and will have to be removed when permanent repairs are made.
6. Repair and/or replace compromised gutters and downspouts. Damaged or improperly functioning gutters and downspouts can cause additional damage to the building. If gutters were not installed historically, special care needs to be taken if they are added. For example, it would be inappropriate to add gutters on a roof with exposed rafter tails as doing so would cover up a significant feature of the building's design.

Windows and Doors

Doors and windows are often some of the most important character defining features on a historic structure, so property owners need to take special care when addressing windows and doors after a disaster. Changing the size, shape, materials, and/or design of windows or doors can drastically change the appearance of a historic structure. The general preservation practice of "repair rather than replace" is especially important for windows and doors.

1. Care should be taken when removing any broken panes of glass, both to avoid cuts and to avoid causing additional damage to the sash or other panes. If the glazing putty is old and hard, it can be softened with a heat gun or glazing iron, allowing the damaged glass to be removed without additional damage to other parts of the window.
2. In some circumstances, slightly cracked panes can be patched with epoxy. This is often used with old or decorative panes. Be aware, however, that epoxy can yellow over time if exposed to sunlight.
3. Imitation "old" glass often contains excessive bubbles, deformations, or "waves" (the thought being that these "imperfections" make the glass look "old" but are often taken to excess). If a whole pane needs to be replaced, it is actually better to use modern sheet glass to replace it.
4. Doors and window sashes which have become warped may need to be straightened using a racking system, which slowly forces the door or sash back to square. This should only be done by an experienced professional as, if done improperly, it can cause additional damage to historic materials.
5. If replacement of windows or doors is determined to be necessary, if at all possible, replacement should be limited to those components/parts which need to be replaced. If the whole window or door needs to be replaced, care should be taken that the design of the door or window and the exterior trim match the original as closely as possible. With multipane windows, the number, size, and configuration of panes, and the thickness of muntins, et cetera should be replicated. Replacement should be limited to those situations that require it; a disaster should not be used as an excuse to replace all of a building's windows.
6. If window sashes need to be repaired, remove them from the window frame first; major repairs to sashes should not be done while in the frame due to the potential for further damage to the sash and/or the frame. Window sashes should be restored by removing the sash from its channel and scraping off any loose putty. Minor holes in the sash can be filled with epoxy.
7. Wait to (re)install wooden trim around doors and windows. If the wall still has an unusually high moisture content (above about 20%), installing wooden trim on the damp wall can cause the trim fail and can result in the development of mold or rot.

Wood

Wooden structures are often smaller than masonry ones, but that does not necessarily mean that they are simpler, or that less concern should be exercised. In coordination with an experienced historic preservation professional, consider the following treatment alternatives:

1. Wooden structures should be checked to ensure that they are attached to their foundation, and that roofs, walls, and floors are all tied together securely.
2. Think carefully before undertaking any structural repairs to, or demolition of, wooden framing. Historic wooden structures have a tendency to have been over-built or over-engineered, especially when compared to more modern wooden frame structures. This means that historic wooden structures are often structurally stronger, and may be able to better withstand damage. Superficial damage or rot might be able to be removed, while leaving sufficient sound material to render the complete replacement of the historic material unnecessary.
3. Sometimes, minor damage to beam ends, from rot or insect damage, can be addressed by adding flitch plates, commonly referred to as "sistering" the beams.
4. If a wooden structure has a mortise-and-tenon framing system, be sure to check those joints as they can be more vulnerable to stress than post-and-beam framing systems.
5. If your disaster recovery requires replacement or upgrading of utilities, avoid drilling multiple holes or removing notches through joists and beams. Multiple holes or notches weaken the beams, which can put the whole structure at risk.

Hazards to Watch Out For

Recovery work on historic properties can present hazards not often found in newer construction. Specifically, many older buildings may have asbestos and/or lead paint, both of which can pose serious health hazards.

Asbestos. Asbestos was a common insulator and fire protection material into the early 1970s. When asbestos fibers come loose and become airborne, they can be inhaled which can result in serious health issues. Wind, water damage, and earthquakes can all cause this to happen. If asbestos is detected, or is known to be on site, all work should immediately stop and professional asbestos remediators should be brought in if necessary.

Lead Paint. Lead paint is also very common in historic structures, but is dangerous, especially to children. Whenever old paint is stripped, scraped, or sanded, the lead-contaminated dust is exposed. Lead can also be vaporized when lead paint is exposed to flame or heat guns.

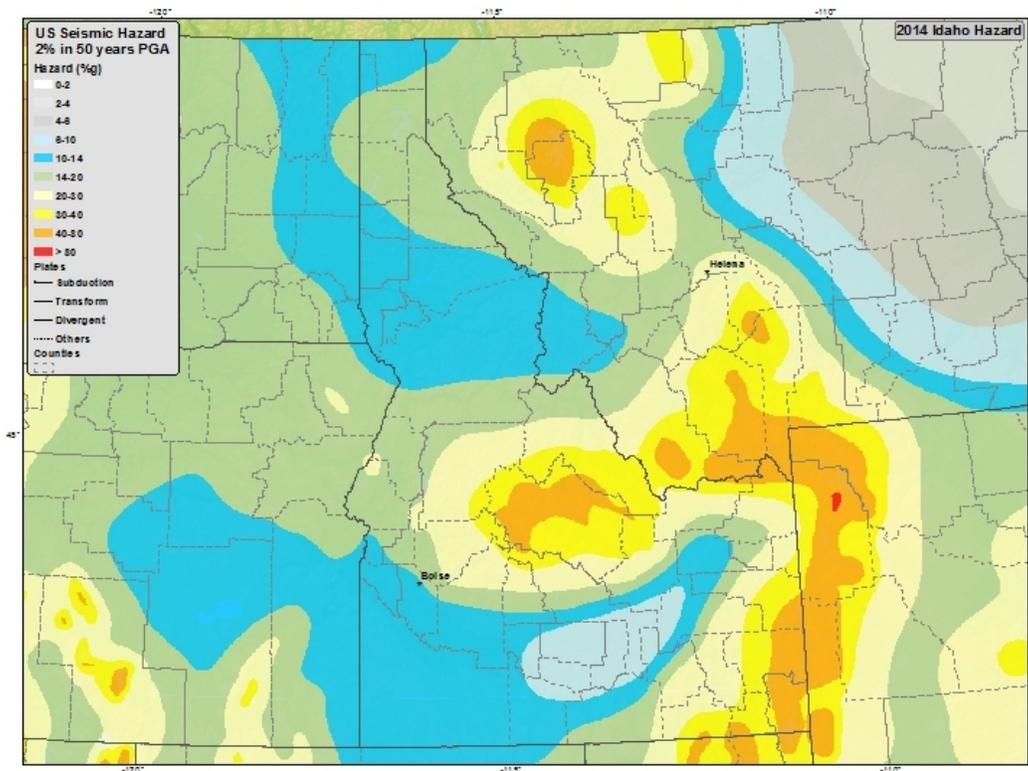
Special Considerations for Specific Emergencies

Earthquake

While the chances of experiencing a cataclysmic earthquake in Idaho is low, it can happen. And the fact is, Idaho actually experiences hundreds of earthquakes every year. These are mostly small events, only really detected by seismographs; every so often, however, Idaho will experience a significant earthquake. A few of the most notable recorded events were the magnitude 7.3 Hebgen Lake Earthquake in 1959, the magnitude 6.9 Borah Peak Earthquake in 1983, and the March 31, 2020 6.5 magnitude earthquake about 19 miles northwest of Stanley. There have been a number of other earthquakes with a magnitude of 6 or more.

Assessing Risk

The level of risk associated with earthquake is very much linked to geographic location. Certain parts of the state have much higher risks of seismic activity than others. Based on maps available from the United States Geological Survey, however, no part of the state is exempt from possible earthquakes. The risk levels for any part of the state experiencing ground shaking that exceeds 2% of gravity (a standard measure used by USGS to determine the level of impact of seismic activity, noted as "%g") in a 50 year period runs anywhere between 6-10% chance in the southcentral part of the state to as high as 40-50% in Custer County and parts of southeast Idaho.



2014 Seismic Map for Idaho, USGS

In addition to the ground shaking, earthquakes also propose a risk of causing a phenomenon called "liquefaction." This is when seismic activity causes saturated ground materials to lose cohesion,

turning the ground into a semi-liquid. This can pose significant risks to historic resources, especially those built on sandy ground, such as along rivers or on lake shores. Information from the National Earthquake Hazards Reduction Program (NEHRP) on the areas of Idaho most at risk of liquefaction is available on the Idaho Geological Survey's website.⁴



Liquefaction in deposits of river, October 17, 1989. U.S. Geological Survey.

Type of building construction. Different types of building materials react differently to seismic stresses. For example, most wooden frame buildings are likely to better withstand an earthquake than unreinforced masonry buildings. Likewise, any loose or poorly attached elements may be at risk during a severe event. A thorough, detailed assessment of the building should be completed periodically to help identify any potential problems. An engineer or architect experienced in working with historic buildings should be able to undertake this assessment by inspecting the building and reviewing any original and subsequent plans and other historic documents.

Building configuration. The shape and design of a building can play a significant role in how it is affected by earthquakes. For example, buildings which are regular in shape (e.g. – square, round, or rectangular) are often better able to withstand the torsion exerted by the moving of the ground. Conversely, irregular shaped buildings (T, L, H, or other configurations with inward-facing corners) are more susceptible to damage as the building will have areas of unequal resistance to stress, especially at those inward-facing corners. Likewise, buildings which are more complex or irregular in their elevation are more prone to severe damage during earthquakes.

⁴ <https://www.idahogeology.org/earthquake-hazards>

Prior building modifications. In some cases, historic buildings in earthquake prone areas may have already been modified to better withstand seismic events. Property owners should gather any and all available information on past rehabilitations and modifications. This information may provide insight into any past seismic retrofit efforts, and may prevent property owners from duplicating work that has already been carried out.

Building condition. If a structure has damaged or deteriorated construction materials, those can compromise the structural integrity of the building as a whole. A building in a weakened state can be less capable of withstanding the forces of an earthquake. Carrying out a complete evaluation of the building on a regular basis can help property owners identify potential problem areas before an earthquake actually occurs. A qualified engineer should inspect the building to perform this evaluation.

Advance Preparations

Conduct on-going maintenance. Proper on-going maintenance is an important part of advance preparations. Property owners in earthquake prone areas should focus their on-going maintenance on the following:

- Check roofs, gutters, and foundations for any signs of moisture, and look for any signs of corrosion on metal ties at parapets and chimneys.
- Inspect all wooden materials for wood-boring insects (termites, beetles, et cetera) and take steps to keep them away, especially from any structural elements.
- Ensure that staircases, porches, and any exit steps are securely attached to building so they will be safe and functional during an emergency.
- Check the mortar on all masonry work, and do any necessary repointing with a physically and visually appropriate mortar. Historic masonry and mortars often have a different composition, meaning that they respond differently to weather conditions; repointing historic masonry with an inappropriate modern mortar can cause significant damage to the masonry.

Secure bookcases, shelving units, cabinets, et cetera. Heavy objects, especially those which are particularly top-heavy (such as bookcases and other tall furniture), can be prone to tipping over during an earthquake. Not only does this pose a risk to human life and safety, falling furniture can also damage structural elements of a historic building, such as walls, doorways, windows, and even water and electrical fixtures. For example, a falling kitchen or bathroom cabinet might break or damage a nearby faucet, resulting in secondary damage from flooding. Ensuring that cabinets, shelves, bookcases, et cetera are securely attached to wall studs can help prevent this kind of additional damage.

Check and evaluate water and gas pipes. Water and gas pipes, and their connections to appliances, can be damaged, punctured, or sheared off completely during an earthquake. Property owners should contact their local utility companies for information on flexible connectors for gas and water lines. These flexible lines and connectors are less likely to shear off or break during an earthquake.

Structural seismic retrofits. There are a number of retrofit options that may be appropriate to help provide protection for a building in case of an earthquake. These can include everything from major, structural changes which can severely affect the historic integrity of the building (such as internal structural framework), to minor alterations which will help address life-safety issues, but will not do much to protect the building as a whole from damage (such as bracing behind a parapet on the roof).

Because of the complexities of balancing the need to protect human life and safety and the historic integrity of the building, anyone considering seismic retrofit options should consult with a qualified engineer with experience working with historic structures. More detailed information on carrying out seismic retrofitting of historic structures is available in the National Park Service's Preservation Brief #41: The Seismic Rehabilitation of Historic Buildings.⁵

Response and Recovery

When it comes to earthquakes, it is important to remember that there may be aftershocks hours, days, weeks, or even months after the initial event. This does not mean that property owners need to wait months before beginning recovery efforts. Rather, property owners should be mindful of the continuing risk of aftershocks as they proceed with their work.

In most cases, once the immediate danger of an earthquake has passed, state and/or local governments will begin the process of evaluating buildings to determine their stability and condition. Often, this work will be performed by either professionals or trained volunteers. Damaged buildings will typically be tagged red (no entry), yellow (limited entry), or green (useable). When there are heavily-damaged areas, public safety officials may determine them to be off-limits. They may also impose limits on how long property owners have to address any structural issues for their buildings. This has resulted in the demolition of a number of otherwise repairable historic structures because the property owner was not able to evaluate and develop a plan to stabilize their building in time.

When it comes to long-term recovery, property owners will face many of the same challenges faced when trying to proactively pursue seismic retrofit options. Owners will have to consider the costs of various rehabilitation and retrofit options and the need to carry out stabilization and rehabilitation in the timeframe required.

Check the foundation and other structural elements. Once it is safe to return and enter a property, check the building's foundation and other structural elements (such as load-bearing walls and support columns). Earthquakes can often cause foundations to crack and/or shift, or can cause the structure to separate from the foundation. If there is any sign that the foundation or any of the structural elements have been damaged or shifted, exit the property and have it assessed by a professional.

Have septic tanks pumped and inspected. Earthquakes can easily damage septic tanks, causing cracks in the tank's walls and floor. This can lead to additional damage to the ground around the tank, and can even cause septic sewage to leak through basement walls. It will likely be cheaper and easier to have the tank pumped and inspected after an earthquake than waiting for signs of failure to appear.

Fires

Fire can pose a major hazard to any kind of building or structure, but they can be especially dangerous for historic structures. Even a small fire can dramatically and permanently alter or completely destroy the historic character of a building. But many fires are preventable simply by taking some basic precautions.

⁵ <https://www.nps.gov/tps/how-to-preserve/briefs/41-seismic-rehabilitation.htm>

Assessing Risk

The age, style, and construction materials of a historic building are all important factors in the level of fire risk. Obviously, a building with a wooden structural design is going to be more vulnerable to fire than a metal or masonry one; buildings with older electrical wiring are at greater risk than those with more modern wiring; wooden shingles are at greater risk than asphalt. All of those, however, potentially represent some of the building's most significant character defining features, and should not be removed or altered without careful consideration and consultation with a historic preservation professional.



*A crowd of citizens watch as the Central School (Boise) goes up in flames, December 1908.
Idaho State Archives (Identifier no.: 2163)*

The building's use can also have significant impact on its level of fire risk. Residential structures are far more likely to have a fire than commercial or industrial structures; residential structures account for approximately 80% of fires. Things like kitchens, smoking inside, the use of candles, wood-burning fireplaces, and other sources of open flame can all increase the chances of a fire, and all of these are more likely to be present in a structure occupied by a residential use than those employed for commercial purposes. Building codes have also historically required a greater level of fire suppression and prevention in commercial structures than residential ones.

Advance Preparations

Have appropriate fire prevention systems in place. One of the easiest and cheapest preparations a property owner can take is have basic fire prevention tools readily available: working smoke detectors and basic fire extinguishers. The placement of smoke detectors directly impacts their effectiveness, so make sure they are installed in the proper locations. Likewise, it is important that fire

extinguishers are placed where they are going to be most effective. It is important to note that not all types of extinguishers are appropriate for all types of fires, and property owners need to make sure they have the appropriately rated extinguisher. The National Fire Protection Association provides detailed guidance on both smoke detectors and fire extinguishers.⁶ It may also be necessary and/or appropriate to install a sprinkler system. The installation of sprinklers often requires modifications to the historic structure, so care should be taken to work with a historic preservation professional to ensure that the impact to historic materials and character defining features is avoided and minimized.

Inspect building's electrical system. Many historic buildings may have older or inadequate electrical systems, which can pose a significant risk to the property. Overloaded or defective wiring can result in arcing, which can start a fire. Property owners should consult a professional electrician to evaluate the building's electrical system; they should be able to perform an Insulation Resistance Test, which can help to identify potential problems. Depending on the age, condition, and capacity (how much current can be carried) of the wiring, the electrical fixtures, and/or the electrical panel, it may be necessary to replace some or all of the system. The property owner should consult with a historic preservation professional if the work is going to impact any historic features or materials. Property owners should also look into installing an Arc Fault Circuit Interrupter (AFCI) breaker, which will trip right before arcing happens to prevent fire.⁷

Take care during restoration or rehabilitation work. One of the times that a historic building may be at greatest risk of fire is during restoration or rehabilitation work. Tools overheating, buildup of volatile fumes, flammable chemicals, and heaters being left on (especially if the work is taking place during the colder parts of the year) all pose a potential risk to the historic property. Property owners and construction supervisors should take the appropriate steps to make sure that these risks are mitigated. This includes checking tools to ensure they are in proper working order, properly ventilating work areas, securely storing flammable chemicals and promptly and correctly cleaning up any spills, and checking that heaters are turned off and cool before leaving the work site.

Install fire resistant materials. Materials are often one of the character defining features of a historic property and should be preserved. There are some instances, however, when replacing certain materials with modern, fire-resistant materials may be done without impacting the historic integrity of the building. For example, it may be acceptable to replace a non-original wall or ceiling material with a modern, more fire resistant one. However, changing a major character defining feature, such as replacing wooden decorative elements with a PVC composite, would not be appropriate. It is important to consult a trained historic preservation specialist before undertaking any replacement of historic materials.

Install lightning protection. Lightning is another common cause of building fires, and many historic buildings may already have some form of lightning protection, such as a lightning rod. Regardless of the age or style of a building, the property owner should make sure that it is protected from lightning strikes. This is done, not by preventing lightning from striking, but by making sure that if it does strike the electricity is safely channeled away from the building, usually into the ground. This is especially important for buildings with tall peaks or towers, and buildings with large amounts of metal on the

⁶ <https://www.nfpa.org/Public-Education/Staying-safe/Safety-equipment>

⁷ This is different from a Ground Fault Circuit Interrupter (GFCI) breaker, which is intended to prevent electric shock hazards.

roof. The National Park Service has a Preservation Brief specifically on protecting historic buildings from lightning.⁸

Response and Recovery

Response and recovery for historic structures after a fire is going to be very dependent on how much damage has been done. Obviously, if the building has been completely destroyed, then there is nothing much that can be done. But if much of the structure remains, then there is not necessarily any need to demolish what remains.

Evaluate how much historical significance remains. After a fire, it is important to look closely at the building to determine how much of its historically significant materials and character remains intact or might be salvageable. If most or all of the character defining features and historically significant material has been lost, then the building may not retain enough integrity to meet the Secretary of the Interior's Standards. If, on the other hand, very little of that historic fabric has been damaged, then the building will likely retain its integrity. Working with a qualified historic preservation professional to make this determination will help you figure out what kind of recovery efforts you might undertake.

Flooding

Flooding can have serious and lasting impacts on historic resources. In addition to damage from being submerged in water, flooding can cause structural issues as a result of the force of rapidly moving water. Flooding also carries the health risk of storm and sanitary sewer backup. Even once the immediate impact of the flooding has passed, prolonged exposure to moisture can lead to swelling, warping, deterioration, and discoloration of materials.

Even though provisions in the National Flood Insurance Program provide some exemptions for historic structures from floodplain management requirements for new and substantial alterations, managers of historic structures should consider ways to mitigate the impacts of flooding when they are working on other rehabilitation or repair projects.

Assessing Risk

It is important to understand what the exact level of risk for flooding a particular property is subject to. The best place to find this information is the Flood Insurance Study (FIS), which comes out of the National Flood Insurance Program (NFIP). The FIS will contain the appropriate Flood Insurance Rate Map (FIRM) for your area, which shows the risk of flooding, divided into several different categories (called Flood Zones) based on the level of risk. The FIS also has a graph that shows the potential flood elevations along waterways.

⁸<https://www.nps.gov/tps/how-to-preserve/preservedocs/preservation-briefs/50Preserve-Brief-Lightning-Protection.pdf>



Midvale Flood, January 26, 1916. Idaho State Archives (Identifier no.: P2008-6-068).

Even though all properties should be aware of the flood zone in which they are located, properties located in Zone A areas (commonly referred to as the 100-year floodplain) should be especially mindful of potential flooding risks. While Flood Zone A is called the 100-year floodplain, that does not mean that a flood will only happen once every hundred years; rather, it means that there is a one percent (1%) chance of a flood in any given year. It is quite possible (and not all that uncommon) to have two "100 year" floods within a few years of each other.

Advance Preparations

While there is little an individual can do to stop a flooding event from happening, there are things that can be done to help minimize any potential impacts.

Ensure the building is securely tied to the foundation. According to the U.S. Geological Survey, moving water one (1) foot deep typically exerts 500 pounds of lateral force. In frame construction buildings, it is not uncommon for buildings to only be "toenailed" – attached to the foundation only by screws or nails sunk in at an angle to the sill plate. These toenails can have a hard time withstanding the kind of lateral force applied by flood waters. The use of steel plate straps to better tie the walls to the sill plates can help ensure that flood waters do not cause the building walls to shift off the foundation, and can be installed without damaging the historic fabric of the building.

Storage of materials and resources in non-flood prone locations. Significant records, materials, and resources (such as heirlooms, documents, artifacts, et cetera) should be stored in such a way that they are protected in the event of a flood. Ideally, this would mean storing them in a location above the Base Flood Elevation (BFE). If relocation of materials is not a viable options, they should at a minimum be stored in waterproof containers. Similarly, if it is possible to safely remove decorative

elements (like trim work, molding, et cetera) *without damaging them or the building*, those items can be relocated to above BFE to protect them from water damage.

Relocation of mechanical systems. Relocating a building's mechanical systems (electrical, HV/AC, plumbing, heating, computer systems, et cetera) to above the BFE can help prevent having to replace them after a flooding event. FEMA has produced a guide for protecting electrical and mechanical systems: *Protecting Building Utilities from Flood Damage, Principles and Practices for the Design and Construction of Flood Resistant Building Utility Systems* (FEMA 348/November 1999).⁹ Care needs to be taken, however, that historically significant materials and features are not sacrificed during this process.

Use landscape to address drainage issues around the building. Evaluate the slope of the ground around the building's elevations. If there are areas where the ground slopes toward the building, the grade should be increased right against the building, so that any water flows away from the building. In some cases, it may be necessary to build up existing masonry or concrete window wells to accommodate the increased height of the fill. Additional measures that can be taken include installing retention ponds, rain gardens, rain barrels, and the reduction of impervious surfaces.

Retain/restore flood-resistant materials in basements. Many historic materials used in basements, such as dirt floors and stone or rubble walls, were intended to help address flooding issues. Materials like these meant that these basements could be repeatedly flooded without long-term damage to the building itself. Conversely, many modern finishing materials are not designed to withstand flood conditions to the same degree, meaning that they are more likely to be damaged when a flood does occur. Removal of such modern materials may allow the basement to withstand or recover from flooding like it did historically. Additional information on flood-resistant materials is available from FEMA: *Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Area in accordance with the National Flood Insurance Programs*.¹⁰

Installation of backflow prevention valves. During flooding events, it is not uncommon for storm and sanitary sewers to back up as water levels rise; this can cause the water from those systems to flow back into the building. Installation of backflow prevention valves will stop this from happening, and can often be done without any negative impact on historic features and materials.

Installation of emergency pumps. If the area is especially prone to flooding, it may be advisable to install self-powered emergency pumps. By installing self-powered pumps, they will still be able to function even if there is a loss of power. Consult with a professional before undertaking this kind of project.

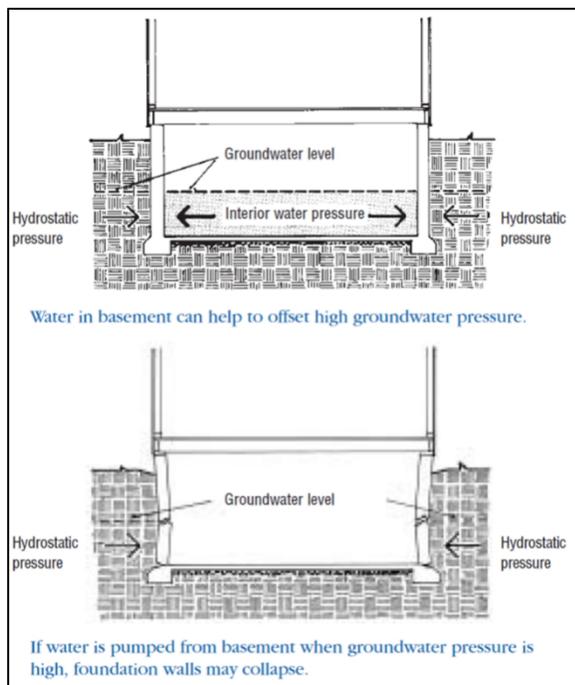
Develop plans for barriers. Sandbags, temporary structural walls, water-filled rubber tubes, and similar barriers can be very useful in a flood – but once a flood event has started, it is too late to start planning. Developing a plan (including the number, type, and placement of barriers) ahead of time means that when an event does occur time does not have to be spent figuring out how and where to deploy the barriers.

Explore elevating the building. In situations where a building is at risk of repeated flooding, one option is to explore the possibility of elevating the building so that the lowest floor is at or above the BFE. Elevation can be an expensive and complicated endeavor, and can have serious implications for a

⁹ <https://www.fema.gov/media-library/assets/documents/3729>

¹⁰ https://www.fema.gov/media-library-data/20130726-1502-20490-4764/fema_tb_2_rev1.pdf

building's eligibility for the National Register of Historic Places. If elevation of a building is being considered, it is important that the Idaho State Historic Preservation Office is consulted early in the process to ensure that the work is in keeping with the Secretary of the Interior's (SoI) Standards.



Response and Recovery

Pump out the water. Removing flood water from the interior of a historic structure is not as straightforward as simply pumping the water out all at once. Pumping should only start once the water level has receded. Care should be taken during this process and should be done at an appropriate rate. If too much water is pumped out too quickly, or if the water outside the building is still too high, the pressure from the water outside the building can actually cause damage to the building and/or its foundation. It is generally best to pump out no more than two (2) to three (3) feet and then wait twenty-four hours. If the water level in the building rises again, the pressure outside it still too high, and you should wait a little while longer. Once the water no longer rises again over a twenty-four hour period, it is safe to proceed with pumping out the remaining water. This should still be done in stages of two (2)

or three (3) feet at a time, with a twenty-four waiting period between each stage.¹¹

Check the state of the building's foundation. Once the water level has receded, the foundation should be checked for damage or deterioration. Specifically, the mortar between any bricks, stones, or blocks should be checked to ensure that large amounts of mortar have not been worn away. If a significant amount of mortar has been lost, it is important that temporary supports are installed as soon as possible.

Get the air circulating. Air circulation is a vital part of getting the building dried out, which helps prevent further deterioration and mold growth. If the building has wood siding, it may be possible to remove some boards at the bottom of the wall to allow for draining and air circulation. If the building is brick or masonry, and if it has weep holes (slots or holes near the bottom of the walls), those weep holes should be checked to ensure that they are unobstructed and clear. Open all the windows, even if there is no sign of moisture. Turning on any attic fan(s) will also help with the circulation of air throughout the building. It is important, however, that systems which pump super-dry air **not** be used when drying out a historic property. While these systems may dry things out faster, they can very easily **over** dry historic materials, especially wooden ones. This over drying can result in cracking and/or warping of materials. The air being used to dry out a property should be of comparable humidity levels to what the property is exposed to on a regular basis.

Remove interior wall materials. It may be necessary to remove portions of interior walls; opening small sections along the bottom of the walls can allow water to drain and air to start to circulate in the

¹¹ Image from "Treatment of Flood-Damaged Older and Historic Buildings," National Trust for Historic Preservation.

wall cavity. This will also allow for the removal of any wet insulation. Most modern sheetrock can hold up to being exposed to water for an hour, *maybe* two, and still be able to be repaired with relatively minimal work. In cases where modern sheetrock has only been exposed a short period of time, remove all of the sheetrock from the floor to at least one (1) foot above the high-water line. If the sheetrock has been exposed to water for more than two hours, it will all have to be removed and replaced. Plaster walls often will not need to be completely replaced, but can be more susceptible to mold and mildew. Removal of damaged wallpaper will be necessary, especially the glue or paste; wet wallpaper and its adhesives are very prone to mold and mildew. It is very important that the wall and the wall cavity be allowed to dry completely before any replacement of wall materials is completed. The moisture level can be determined using a moisture meter; depending on the level of flooding, the time it takes for a building to dry out can be weeks or even months. Wood-paneling or vinyl laminate materials cannot be salvaged; these materials should be removed and discarded.

Landslides

Given the state's terrain, it should be no surprise that landslides are a fairly common occurrence in Idaho. They can be triggered by a number of causes: heavy rain or snow fall; natural or human-caused erosion; earthquakes; overloading of the slope with rocks, mine leavings, or ore; or loss of trees or other vegetation. It is also important to remember that landslides can happen in the blink of an eye or take place over a long period of time, and that there can be obvious signs that one may happen or it may occur with very little warning at all.

Assessing Risk

While any property that is located on, along, or near a slope is at potential risk for landslide, certain types of ground formation are at a higher risk than others. According to information from the Idaho Geological Survey, the highest risks include basalt layers with a sedimentary layer between them, altered volcanic rocks, fractured metamorphic rocks, glacial and lake deposits, and weathered granite.¹²

There are number of warning signs for which you should keep an eye out. These include:

- Normally dry areas of ground that are showing signs of springs, seeps, or unusual levels of saturation.
- Unusual cracks or bulges in the ground, pavement, or sidewalks.
- Soil starting to move away from foundations.
- Structural elements such as porches and decks are tilting or moving away from the main structure.
- Sudden tilting or cracking of foundations or concrete floors.
- Unexpected damage to underground utilities or waterlines.
- Tilted or leaning utility poles, trees, fences, or walls.
- Fence lines which have slid or moved.
- Rapid increase in creek or stream levels, or a sudden decrease in levels though it is still raining or just stopped.
- Doors or windows which are suddenly out of plumb, causing them to stick.

¹² <https://www.idahogeology.org/landslide-hazards>

More detailed information on the level of risk to a particular property can be obtained by contacting the Idaho Geological Survey. They will be able to help determine the degree of risk for a particular area.

Advance Preparations

Since historic properties and resources are already built, some of the common preventative actions – such as not building on or near steep slopes or drainage ways – simply do not apply. Other measures can be taken, however, which will not adversely impact the historic character of a building or site.

Get a ground assessment of the property. A professional, qualified engineer will be able to complete an assessment of your site, and will be able to help identify potential hazards and provide guidance on how to address those issues.

Install flexible pipe fittings. Flexible pipe fittings for gas and water lines can help prevent these lines from breaking during a minor event. Please note, only a professional or a gas company technician should install gas fittings.

Build diversions. If your property is located in a potential mudflow area, building channels or deflection walls can redirect any mudflows away from or around buildings. Care should be taken, however, in the placement of any diversions; if you redirect any flows onto a neighbor's property, you may be liable for any damages.

Use effective and appropriate landscaping. Strong and healthy plants can play a significant role in stabilizing and securing slopes. Specifically, native trees and shrubs are best for absorbing water most effectively. Plant a buffer zone of native shrubs between your property and the start of the slope.

Be aware of current conditions. Landslides are most often preceded by a rumbling sound, which increases in volume as the landslide gets closer; this may also include the sound of trees cracking or boulders colliding. If you hear these sounds, evacuate immediately.

Response and Recovery

As with all emergencies and disasters, if conditions are still dangerous, do not enter the area or try to go in any buildings. Once it is clear and safe to proceed, then you can begin the immediate response and recovery efforts.

Check the foundation and other structural elements. Once it is safe to return and enter a property, check the building's foundation and other structural elements (such as load-bearing walls and support columns). Landslides can often cause foundations to crack and/or shift, or can cause the structure to separate from the foundation. If there is any sign that the foundation or any of the structural elements have been damaged or shifted, exit the property and have it assessed by a professional.

Shore up damaged slopes or hillsides. If possible, any remaining slopes or hillsides near the property should be shored up to prevent future landslides. As this can be a complicated endeavor, it should only be undertaken by a trained professional.

Snow-loads

Much of Idaho spends its winter dealing with snow. Generally, this is just a part of everyday life, and is not a big deal. Every so often, however, snow can pose a significant danger to historic buildings, especially when there is a particularly wet and heavy snowfall. A heavy snow load on a building's roof can cause damage to roofing materials, roof joists, or even the overall structural integrity of the building; enough snow can cause the pitch of the roof to be pushed downward, putting strain on the walls as the roof pushes them outward. If it is severe enough, the damage from a heavy snow load can actually cause a whole building to collapse. While more modern construction may be designed to withstand heavy snow loads, that may not be the case for historic structures.



North Star Mine, Wood River, Blaine County, Idaho. The bunkhouse was destroyed by snowslide, Feb. 26, 1917. Fifteen lives were lost. Idaho State Archives (Identifier no.: 78-156-77)

Assessing Risk

Be familiar with the building's design and construction methods. Different architectural designs and methods of construction respond to stress differently. The pitch of the roof, the way the roof and walls are connected, the building materials: all these will change how heavy a snow load a building can handle. An architect with experience in cold climate design or a trained structural engineer can help evaluate a building to determine what kind of design or structural risks might need to be addressed. The Federal Emergency Management Agency's "Snow Load Safety Guide" has some useful basic information on how different building materials hold up to snow loads.¹³

¹³ [fema.gov/media-library-data/7d8c55d1c4f815edf3d7e7d1c120383f/FEMA957_Snowload_508.pdf](https://www.fema.gov/media-library-data/7d8c55d1c4f815edf3d7e7d1c120383f/FEMA957_Snowload_508.pdf)

Be familiar with conditions in the area. Not every part of the state is going to carry the same kind of snow load related risks: the snow load in Boise is usually going to be fairly low, while the risk in places like Challis is going to be much higher. The part of the state, the recent conditions, the type of snow fall, the prevailing wind direction, all of these will change how much weight is being placed on a building at any given time. Having a good understanding of what kind of conditions are currently present, or are likely to occur, is necessary to plan and prepare for potential snow load issues. The United States Department of Agriculture's Natural Resources Conservation Service has a lot of useful information on both historical trends and current conditions.¹⁴ Local news archives and/or long time residents can also provide useful information on what kind of storms are most likely to produce heavy snows (e.g. - "Late spring storms that come in from the west are the worst!").

Advance Preparations

Install snow melt systems. In some cases, it may be possible and acceptable to install electric snow melting systems on the roof. These can both help to melt the snow before it becomes too heavy, and can help prevent the build up of a dangerous ice dam situation. Ice dams occur when snow melts a little bit, and then refreezes into a block of ice. When more snow melts, the ice serves as a dam, keeping the snow melt water from being able to run off. This results in a pool of water being trapped, which can lead to water leaking into the building. An electric snow melt system prevents the ice dam from forming in the first place. Snow melt systems are not appropriate for all historic buildings, however, so care must be taken before they are installed to make sure that they do not have a negative impact on the historic character of the building.

Maintain large trees near the building. Heavy snow loads can cause tree branches, limbs, or even whole trees to come down. If the tree is in close proximity, this can cause damage to the building. Maintaining any trees near the building can help prevent this kind of damage. Preventive action to keep large branches or limbs trimmed back from the building and the maintenance of trees through proper watering and fertilizing can stop a heavy snow load from bringing down some or all of the tree.

Pre-season inspection. Before each snow season, the property owner should conduct an inspection of the building, especially the roof. The property owner should inspect the following things to ensure they are in good condition and function properly:

- Gutters and downspouts
- Attic is free of excess moisture
- Flashing around elements like vents, chimneys, and other roof equipment
- Joists and roof trusses are straight and are not leaning or out of true
- Plates and ties connecting the roof to the walls are secure
- Roof soffits and ridge ventilation

Watch for signs of potential failure. During a heavy snow event, it is important to keep an eye on the building for any warning signs that there might be a pending problem. Buildings will often show signs that the snow load is becoming overbearing. Here are some signs to watch for:

- Ceilings that are sagging, bowing, or cracking
- Popping, creaking, or cracking noises
- Doors or windows that suddenly cannot be opened or closed
- Wooden structural members which are splitting or cracking

¹⁴ <https://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/>

- New or spreading cracks in walls or masonry
- Roof leaks

Remove snow build-up. If it can be done safely (and only if it can be done safely), removal of large snow loads can help prevent damage to the building. The removal of heavy snow loads needs to be done with care, however; improper removal of snow can result in damage to the building and/or injury. Property owners should keep the following in mind:

- When removing snow, approximately two (2) inches of snow should be left on the roof; removing all the snow down to the roof can result in the roofing material being damaged.
- Do not use mechanical snow removal equipment; this can also cause damage to the roofing materials and poses a significant safety hazard.
- Remove drifted snow first, and then remove the rest of snow in the direction of the roof's primary structural support members.
- For pitched roofs, if possible, remove snow starting at the ridge and moving down toward the eaves.

Response and Recovery

After a heavy snow event, the property owner should inspect the building to determine the degree of damage (if any). During this inspection process, it is important that the property owner have a trained historic preservation professional involved. This professional will be able to provide guidance on how any necessary repair may impact the historic integrity of the building.

If extensive repairs are necessary, it may be an excellent opportunity to make some structural upgrades that may help prevent future snow load issues. For example, if it is necessary to make repairs to a building's roof trusses, that may be an opportunity to also install metal ties to connect the trusses to the building's wall, which can help prevent future issues. Again, a trained historic preservation professional should be consulted during this process to protect the historic integrity of the building.

Wildfires

Wildfires are one of the most common dangers facing historic properties in Idaho. With so much of the state being forested or open rangeland, it is only to be expected that fires have had a significant impact on the state's history. Every year, there are a great number of fires throughout Idaho and many of these pose a serious threat to local historic properties.

Assessing Risk

Be aware of current conditions. The near-term risk of fire in an area is very much related to current and recent weather conditions in the area. Pay attention to such things as temperature, precipitation and humidity levels, wind patterns, and any recent weather events (such as storms which produce lightning strikes).



Wallace after the Big 1910 Fire. Idaho State Archives (Identifier no.: 70-98.3)

Understand the surrounding landscape. Different landscapes pose different wildfire risks. Wildfires often behave very differently in a heavily wooded area than they do out on open range land. The National Fire Protection Association has some useful information on the wildland-urban interface, which can help property owners understand their surrounding landscape as it relates to their property.¹⁵

Monitor the National Interagency Fire Center website. The National Interagency Fire Center has a Predictive Services Program, which has information on weather conditions, fuels, and fire dangers, and daily, 7-day, and monthly outlooks.¹⁶ Wildfires can happen with little notice, and can spread incredibly rapidly. Staying informed about current conditions, especially during wildfire season, is vital to being prepared.

Advance Preparations

Keep up with landscaping maintenance. Keeping up with maintenance of landscaping around your historic site is an important part of being proactive in your disaster prevention efforts. Remove any dead plantings and fallen tree limbs, trim back and remove any branches near or above the roof, and do not allow piles of dead leaves to build up. Part of keeping up with landscaping maintenance includes water management. Be sure that plantings are getting an appropriate amount of water, but

¹⁵ <https://www.nfpa.org/News-and-Research/Data-research-and-tools/Wildland-Urban-Interface>

¹⁶ <https://www.nifc.gov/>

also check that they are not overwatered, which can both kill plantings and wash away the soil and nutrients needed to keep the landscape healthy.

Develop defensive landscaping. There are certain things which can be done to help keep any fire away from a building simply by developing a defensive landscape: a landscape plan that places the most flammable parts of the landscaping further away from the building. One of the best things that can be done with landscaping is to develop a fuel break. A fuel break is a strip of land where all easily flammable materials have been removed. This means that if a fire does come through, there is a line which does not, or cannot, burn. Detailed information on this kind of landscape planning can be found from the National Fire Protection Association.¹⁷

Install fire suppression systems and materials. Materials are often one of the character defining features of a historic property and should be preserved. There are some instances, however, when replacing certain materials with modern, fire-resistant materials may be able to be done without impacting the historic integrity of the building. For example, it may be acceptable to replace a non-original roofing material with a modern, more fire resistant one. However, changing a major character defining feature, such as replacing wooden siding with concrete block, would not be appropriate. It is important to consult a trained historic preservation specialist before undertaking any replacement of historic materials.

Educate yourself on U.S. Forest Service fire management. If your property is located anywhere near land managed by the U.S. Forest Service, you should take some time to understand how the Forest Service responds to wildfires. Knowing how the Forest Service responds can help you better plan your own preparations and responses.¹⁸

Removal of non-native plant species. Native plant species have evolved specifically in response to local conditions, which makes them better able to withstand normal dry conditions. It is not that native plants are not susceptible to fire; rather non-native plants are more prone to burn faster and more frequently than native species. This is especially true for rangeland, where native sagebrush can often be crowded out by invasive species like cheatgrass and medusahead rye, which burn far more easily and quickly, resulting in larger and faster moving fires. There is, however, a major caveat when it comes to removing non-native plantings from historic properties. If the landscaping and plantings are contributing to the historic character of the site, it is important that they be retained. In such cases, removal of contributing landscaping should only be done as an absolute last resort.

Response and Recovery

Response and recovery for historic structures after a wildfire is going to be very dependent on how much of the structure remains. Obviously, if the building has been completely destroyed, then there is nothing much that can be done. But if much of the structure remains, then there is not necessarily any need to demolish what remains.

Evaluate how much of the historical significance remains. After a fire, it is important to look closely at the building to determine how much of its historically significant materials and character remains intact or might be salvageable. If most or all of the character defining features and historically significant material has been lost, then the building may not retain enough integrity to meet the Secretary of the Interior's Standards. If, on the other hand, very little of that historic fabric

¹⁷ <https://www.nfpa.org/>

¹⁸ <https://www.fs.usda.gov/managing-land/fire>

has been damaged, then the building will likely retain its integrity. Working with a qualified historic preservation professional to make this determination will help you figure out what kind of recovery efforts you might undertake.

Use native species when restoring landscaping. When you get to the point of restoring the landscaping around a historic property after a fire, this is a good time to consider removing non-native plantings and use native species which are better adapted to the local climate. It is also a good time to develop the defensive landscaping discussed earlier. Again, if the landscaping contributes to the historic character of the property, then it is important to restore the landscaping to that condition.

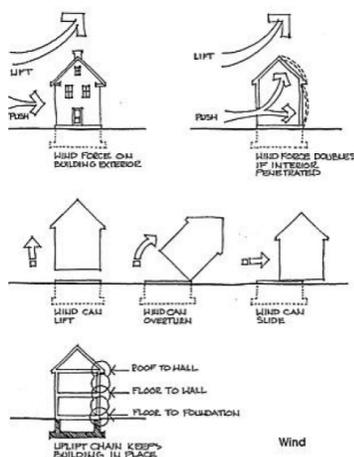
Wind

High winds can cause damage to roofs from upward drafts, and to walls from debris; they can even lift or slide buildings off their foundations. While most buildings are designed to withstand wind, that ability is based on winds impacting the outside of the building only. If wind penetrates the interior of a building, the building is subject to double the wind strength.

Obviously, not all wind is going to pose a threat to historic buildings. But anyone who has ever experienced a microburst or a “derecho” will tell you that high winds are nothing to ignore. High winds can easily do significant damage to historic buildings, sometimes with very little notice. Given the lack of warning that can precede high winds, it is extra important that property owners take preparatory measures in advance; once high winds hit, it is too late.

Advance Preparations

Ensure an unbroken uplift chain from foundation to roof. An unbroken uplift chain means that the vertical elements of a building are securely attached to the horizontal ones: floor to wall and wall to ceiling. This basically ensures that the building operates as a single unit, rather than separate pieces stacked on top of each other. Pay particular attention to things like porches, cupolas, and towers, which are often not as solidly built as the rest of the building, and are at a greater level of risk to uplift wind damage.



Limit wind penetration into the interior of the building. Make sure that things like doors and windows are secure and in good repair. This will help prevent high winds from getting into the interior of the building, which can increase the wind’s impact and potential for damage. For some buildings, it may be appropriate to install operable exterior shutters, which can be closed to protect windows. But these shutters should only be installed if they were historically present or appropriate for the building; shutters are not appropriate in all cases, and the property should consult with a historic preservation professional before installing them. If storm shutters are not an option, and if there is time before high winds hit, the property owner might consider covering the windows with plywood; this might be especially wise if the property is left unoccupied for long periods of time in a area known for damaging winds.

Maintain large trees near the building. High winds can cause tree branches, limbs, or even whole trees to come down. If the tree is in close proximity, this can cause damage to the building. Maintaining any trees near the building can help prevent this kind of damage. Preventative action to keep large branches or limbs trimmed back from the building and the maintenance of trees through proper watering and fertilizing can help prevent wind from bringing some or all of the tree down.

Response and Recovery

The two most immediate needs after a high wind incident are to prevent water infiltration and stabilization. Once it has been determined that it is safe enter the building, it should be checked for any places where water might come in: damaged roofing materials, holes in the roof, walls, or damaged windows. If there are any openings, they should be secured and covered as soon as possible to prevent secondary damage from water. Next, the building should be inspected by a structural engineer with experience in historic structures to determine what structural repairs may be necessary.

Appendix A

Sample Inspection Checklist

Doors and Windows

1. Check the caulking around doors, windows, corner boards, et cetera; replace any missing or deteriorated caulking.
2. Check window glazing; replace any cracked, damaged, or missing panes.
3. Check weather stripping; replace any missing or damaged sections.

Exterior Walls

1. Repair and/or repaint/reseal any wooden surfaces to prevent water penetration.
2. Check siding, shingles, trim, and ornamentation for looseness, warping, decay, or damage.
3. Repair cracks, gaps, or deteriorated mortar on masonry walls.
4. Check the "trueness" of the building. Look at the building from a distance. Does it look like the building leans or is out of square?

Foundation/Masonry

1. Check foundation, masonry, basement, and exterior walls for seepage and condensation issues.
2. Check basements for leakage after wet weather.
3. Check foundation walls, steps, retaining walls, walks, patios, garage floors, and similar areas for settling, cracks, heaving, and crumbling.
4. Ensure that the foundation and the structure are attached to each other.
5. Check chimneys for cracked or missing caps, and loose or missing mortar.
6. Ensure that landscaping is graded away from the building foundations.

Landscapes

1. Monitor the condition and health of trees, shrubberies, and other plantings.
2. Remove dead materials, limbs, and leaves from around the property.
3. Keep plantings trimmed back from building foundations and rooflines.

Roof and Gutters

1. Check for damaged, loose, or missing shingles or tiles. Check flat roofs for blisters, cracks, or other damage. Sagging in the roof shape may indicate underlying damage.
2. Check gutters for misalignment, leaks, and damage. Check all downspouts, straps, and gutter guards or screens. Ensure that downspouts direct the water away from the foundations of the building.
3. Check that tree limbs are pruned back away from the roof.
4. Check the flashing and sealants around chimneys, roof stacks, vents, skylights, et cetera.

Unreinforced Masonry Buildings

1. Ensure that architectural details and other elements are securely attached to the building. Parapets can be braced, unanchored veneer can be anchored, and loose bricks reset in new mortar.
2. Check that walls are anchored to the floor, and that roof framing uses steel or other reinforcements.
3. Check sheer walls for cracking and lateral drift, which may indicate the need for additional strengthening.

Utilities

1. Know the location of utility shut offs, and ensure that they are accessible and labeled.
2. Check the condition of plumbing, making sure that any damaged or deteriorated plumbing is repaired or replaced.
3. Have utility systems professionally inspected periodically.

Appendix B

Sample Historic Property Disaster Prevention Checklist



Historic Property Disaster Prevention Checklist

Idaho State Historic Preservation Office

Form Preparer: _____

Date: _____

Property Name: _____

NR #: _____

Street Address: _____

ISHI #: _____

Property Type: _____

Construction Date: _____

Property Use: _____

Occupied (Y/N): _____

Roof Structure: _____

Roof Material: _____

Wall Structure: _____

Wall Material: _____

Foundation: _____

Number of Stories: _____

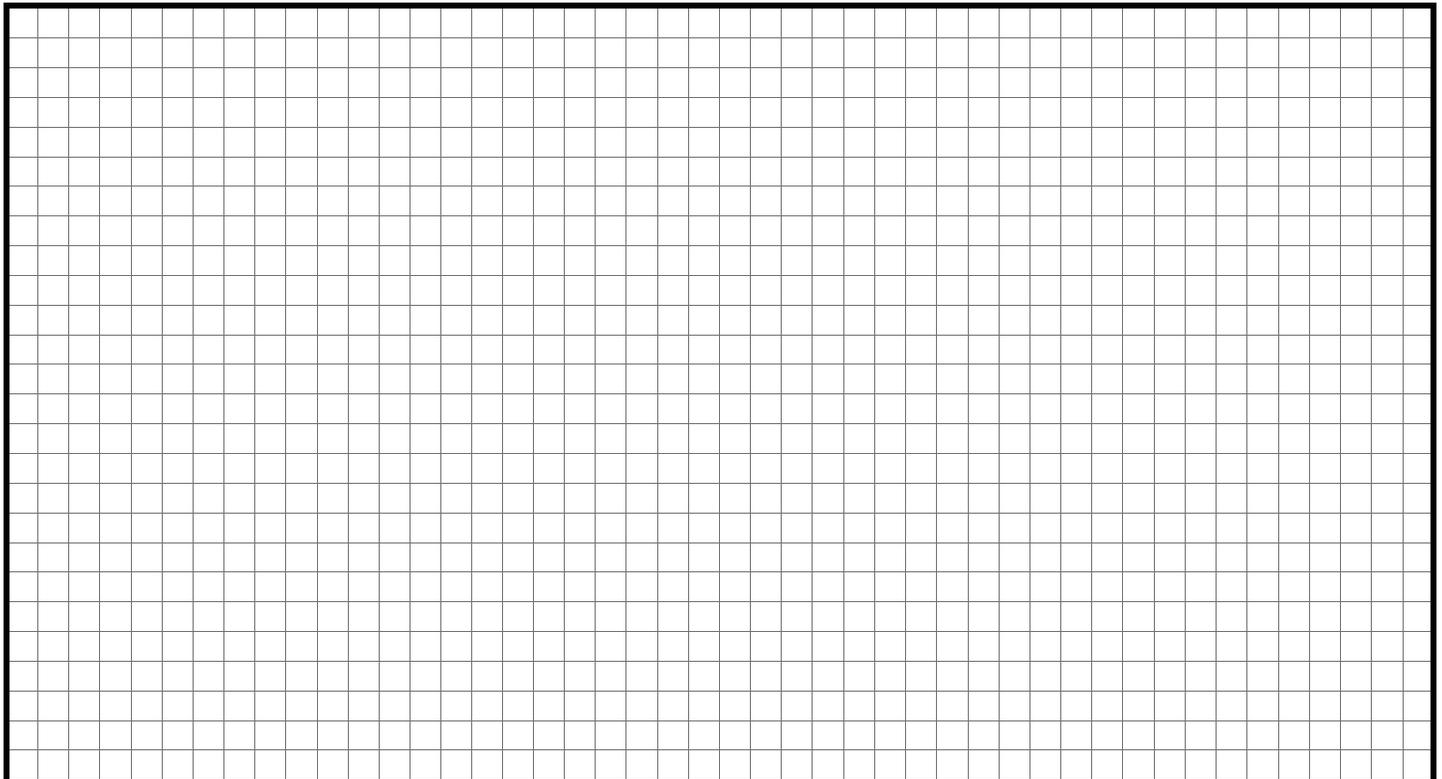
General Preparedness Checklist

Feature	Existing Conditions	Recommendations
Roof/Wall Connection		
Roofing Materials		
Gutters/Downspouts		
Floor/Wall Connection		
Wall Materials		
Doors		
Windows		
Window/Roof Flashings		

General Preparedness Checklist (Cont.)

Feature	Existing Conditions	Recommendations
Floor/Foundation Connection		
Foundation Materials		
Porch Connections		
Porch Materials		
Landscaping Grading/Slope		
Utility and Mechanical Systems		

Site Sketch



Appendix C

Sample Historic Property Damage Assessment Checklist



Historic Property Damage Assessment Checklist

Idaho State Historic Preservation Office

Form Preparer: _____

Date: _____

Property Name: _____

NR #: _____

Street Address: _____

ISHI #: _____

Property Type: _____

Construction Date: _____

Property Use: _____

Occupied (Y/N): _____

Roof Structure: _____

Roof Material: _____

Wall Structure: _____

Wall Material: _____

Foundation: _____

Number of Stories: _____

Damage Data

Damage Cause(s): _____

Description:

Damage Date: _____

Hazard	Yes	No	Comment
Collapse			
Off Foundation			
Noticeable Lean			
Water Damage			
Fire Damage			
Chimney/Falling Hazard			
Ground Shift			
Utilities Down			
Other			

Damage Assessment

Feature	Damage	Recommendations
Roof Materials		
Roof Structure		
Exterior Features		
Ceilings		
Walls		
Windows and Doors		
Foundation		
Utility and Mechanical Systems		

Next Steps

Action	Needed		Comment
	Yes	No	
Secure Property			
Professional Evaluation			
Insurance Claim			
Site Clean Up			

Appendix D

National Resources

American Red Cross: <https://www.redcross.org/>

Federal Emergency Management Agency (FEMA): <https://www.fema.gov/>

HUD Disaster Relief and Emergency Assistance: Idaho:
<https://www.hud.gov/states/idaho/library/disasterrelief>

National Earthquake Hazards Reduction Program (NEHRP): <https://www.fema.gov/national-earthquake-hazards-reduction-program>

National Fire Protection Association: <https://www.nfpa.org/>

National Flood Insurance Program: <https://www.fema.gov/national-flood-insurance-program>

National Interagency Fire Center: <https://www.predictiveservices.nifc.gov/predictive.htm>

National Park Service: <http://nps.gov>

- Disaster Preparedness: <https://www.nps.gov/subjects/historicpreservation/protect.htm>
- Preservation Briefs: <https://www.nps.gov/tps/how-to-preserve/briefs.htm>
- Secretary of the Interior's Standards: <https://www.nps.gov/tps/standards/four-treatments/treatment-rehabilitation.htm>

U.S. Army Corps of Engineers: <https://www.usace.army.mil/>

U.S. Department of the Interior Office of Emergency Management: <https://www.doi.gov/emergency>

U.S. Department of Agriculture, Natural Resources Conservation Service:
<https://www.nrcs.usda.gov/wps/portal/nrcs/site/id/home/>

U.S. Geological Survey: <https://www.usgs.gov/>

U.S. Forest Service: <https://www.fs.usda.gov/>

- Regional Offices: <https://www.fs.usda.gov/about-agency/contact-us/regional-offices>
- Wildfires: <https://www.fs.usda.gov/managing-land/fire>

Idaho Resources

Idaho Associated General Contractors: <https://www.idahoagc.org/>

Idaho Building Contractors Association: <https://ibca.org/>

Idaho Department of Health and Welfare:
<https://healthandwelfare.idaho.gov/health/readyidaho/tabid/1613/default.aspx>

Idaho Geographic Survey: <https://www.idahogeology.org/geologic-hazards>

Idaho Heritage Trust: <http://idahoheritage.org/>

Idaho Office of Emergency Management: <https://ioem.idaho.gov/>

Idaho State Historic Preservation Office: <http://history.idaho.gov>

Idaho Transportation Department: https://itd.idaho.gov/pop/ITDPOP_13.html

Preservation Idaho: <https://www.preservationidaho.org/>

Resources By County

State of Idaho, County and Tribal Emergency Managers Contacts:

<https://ioem.idaho.gov/about/contact/county-tribal-emergency-managers-contacts/>

Ada County Emergency Management and Community Resilience:

<https://adacounty.id.gov/emergencymanagement/>

Adams County Emergency Management Department: <https://co.adams.id.us/community-resources/emergency-management/>

Bannock County Emergency Services: <https://www.bannockcounty.us/BannockOEM/>

Bear Lake County: <https://www.bearlakecounty.info/departments.html>

Benewah County: Benewah County Clerk, 701 W College Avenue, St. Maries, ID 83861, (208) 245-3212

Bingham County Emergency Operations:

https://www.co.bingham.id.us/homeland_security/emergency_operations_plan.html

Blaine County Disaster Services: <https://www.co.blaine.id.us/322/Disaster-Services>

Boise County Emergency Management: <https://boisecounty.us/services/emergency-management/>

Bonner County Emergency Management:

<https://www.bonnercountyid.gov/departments/EmergencyManagement>

Bonneville County Emergency Management: <https://www.co.bonneville.id.us/index.php/emergency-management>

Boundary County Emergency Management: <http://boundarycountyid.org/site-page/emergency-management-0>

Butte County: <https://www.buttecountyid.us/butte-county/>

Camas County Sherriff: <http://camascounty.id.gov/camas-county-sheriffs-office/>

Canyon County Emergency Management: <https://www.canyonco.org/elected-officials/sheriff/emergency-management/>

Caribou County Emergency Services: <https://www.cariboucounty.us/departments/ems.php>

Cassia County Emergency Management: <https://www.cassiacounty.org/emergency-management>

Clark County Emergency Management: <https://www.clark-co.id.gov/emergency-management>

Clearwater County Emergency Management:

https://www.clearwatercounty.org/departments/emergency_management/index.php

Custer County Emergency Services: <https://www.co.custer.id.us/departments/executive/emergency-services/>

Elmore County Emergency Management: <https://elmorecounty.org/emergency-management/>

Franklin County Emergency Management: <https://www.franklinemergencymanagement.com/>

Fremont County Emergency Management:
https://www.co.fremont.id.us/departments/emergency_management/index.htm

Gem County Emergency Management: <https://www.gemcounty.org/disaster-services/>

Gooding County Office of Emergency Management: <https://www.goodingcounty.org/177/Office-of-Emergency-Management>

Idaho County Emergency Management: <https://idahocounty.org/disaster-management/>

Jefferson County Emergency Management:
http://www.co.jefferson.id.us/Emergency_Management.php

Jerome County Emergency Management: <https://www.jeromecountyid.us/Directory.aspx?did=16>

Kootenai County Emergency Management: <https://www.kcsheriff.com/186/Emergency-Management>

Latah County Emergency Services: https://www.latah.id.us/disaster_services/

Lemhi County Emergency Management Department: <http://lemhicountyidaho.org/emergency.htm>

Lewis County Emergency Management: <http://www.lewiscountyid.us/Departments/Emergency-Management>

Lincoln County Emergency Management: <http://lincolncountyid.us/emergency-management/>

Madison County Homeland Security: <https://www.co.madison.id.us/departments/homeland-security>

Minidoka County Emergency Services: <https://www.minidoka.id.us/273/Disaster-Services>

Nez Perce County Emergency Management:
<https://www.co.nezperce.id.us/Departments/EmergencyManagement.aspx>

Oneida County: <https://oneidacountyid.com/>

Owyhee County Sheriff: <https://owyheecounty.net/departments/sheriff/>

Payette County Emergency Management Office: <https://www.payettecounty.org/pcemo>

Power County Emergency Management: <http://www.co.power.id.us/tag/emergency-management/>

Shoshone County Emergency Management: <https://shoshonecounty.id.gov/emergency-services/>

Teton County Emergency Management:

<https://www.tetoncountyidaho.gov/department.php?deptID=11&menuID=1>

Twin Falls County Office of Emergency Management: <https://twinfallscounty.org/des/>

Valley County Sheriff's Office: <http://www.co.valley.id.us/departments/sheriffs-office/>

Washington County Emergency Management: <https://www.co.washington.id.us/150/Emergency-Management>

Bibliography

- Borough of Milton, PA, "Looking to the Future: Alternatives for Reducing Flood-Related Damage in Historic Communities." June 2002.
- California Office of Historic Preservation, "Disasters and Historic Resources." Accessed 2 April 2020. http://ohp.parks.ca.gov/?page_id=25509
- Chicora Foundation, Inc., "Cemetery Disaster Planning." 2013.
- City of San Francisco Department of Emergency Management, "SF72" website. Accessed 2 April 2020. <https://www.sf72.org/home>
- Federal Emergency Management Agency, "Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies." FEMA 386-3, April 2003.
- Federal Emergency Management Agency, "Floodplain Management Bulletin: Historic Structures." FEMA P-467-2, May 2008.
- Federal Emergency Management Agency, "Getting Started: Building Support for Mitigation Planning." FEMA 386-1, September 2002.
- Federal Emergency Management Agency, "Integrating Historic Properties and Cultural Resource Considerations into Hazard Mitigation Planning." FEMA 386-6, May 2005.
- Federal Emergency Management Agency, "Multi-Jurisdictional Mitigation Planning." FEMA 386-8, August 2006.
- Federal Emergency Management Agency, "Snow Load Safety Guide." FEMA P-957, January 2013.
- Federal Emergency Management Agency, "Understanding Your Risks: Identifying Hazards and Estimating Losses." FEMA 386-2, August 2001.
- Florida Department of State, Division of Historical Resources, "Disaster Mitigation for Historic Resources: Protection Strategies." August 2008.
- Georgia Department of Natural Resources, Historic Preservation Division, "After the Flood: Rehabilitating Historic Resources." N.D.
- Idaho Bureau of Homeland Security, "Putting Down Roots in Earthquake Country: Your Handbook for Earthquakes in Idaho." September 2009.
- Karter, Jr., Michael J. *Fire Loss in the United States During 2010*. National Fire Protection Association, Fire Analysis and Research Division, September 2011.
- Maryland Historical Trust, "Flood Mitigation Guide: Maryland's Historic Resources." June 2018.
- Minnesota State Historic Preservation Office, "Disaster Planning." Accessed 2 April 2020. <https://mn.gov/admin/shpo/planning/disaster/>

Minnesota Historical Society, "Emergency Preparedness and Recovery Plan." April 2007.

National Earthquake Hazards Reduction Program (NEHRP) website. Accessed 2 April 2020. <https://www.fema.gov/national-earthquake-hazards-reduction-program>

National Fire Protection Association website. Accessed 2 April 2020. <https://www.nfpa.org/>

National Flood Insurance Program website. Accessed 2 April 2020. <https://www.fema.gov/national-flood-insurance-program>

National Interagency Fire Center website. Accessed 2 April 2020. <https://www.predictiveservices.nifc.gov/predictive.htm>

National Trust for Historic Preservation, "Treatment of Flood-Damaged Older and Historic Buildings." N.D.

Nelson, Carl L., *Protecting the Past from Natural Disasters*. Washington, D.C.: The Preservation Press, National Trust for Historic Preservation, 1991.

New Jersey Historic Trust, "Historic Structure Reports and Preservation Plans: A Preparation Guide" (2nd edition). November 2015.

O'Rourke, Michael, and Jennifer Wikoff, "Snow Related Roof Collapse and Implications for Building Codes." *Structure Magazine* online, January 2014. Accessed 10 December 2020. <https://www.structuremag.org/?p=1155>

Preservation Pennsylvania, "The Crisis Handbook: A Guide to Community Action." 2010.

Regan, Ashley Lauren. "Historic Resources and Disaster Planning: Strategies for Mitigation and Recovery." MA thesis, University of Georgia, 2004.

U.S. Department of the Interior, "An Integrated Rangeland Fire Management Strategy." May 2015.

U.S. Department of the Interior Office of Emergency Management website. Accessed 2 April 2020. <https://www.doi.gov/emergency>

U.S. Geological Survey website. Accessed 2 April 2020. <https://www.usgs.gov/>

U.S. Forest Service website. Accessed 2 April 2020. <https://www.fs.usda.gov/>

Utt, Emily. "This Debris Matters: Preserving Fire-Damaged Historic Buildings." MA thesis, Goucher College, 2013.

Watts, Jack, *Fire Safety in Historic Buildings*. Washington, D.C.: The Preservation Press, National Trust for Historic Preservation, n.d.