



# **RISK ASSESSMENT: WATER DAMAGE**



**PRESERVATION OF BUDDHIST TREASURES RESOURCE** is the free online resource for monasteries and communities, with practical information on digital documentation, risk assessment and disaster recovery, safer storage, and preservation of thangka and other treasures. The resource comes from over 50 years of preservation work in monasteries.



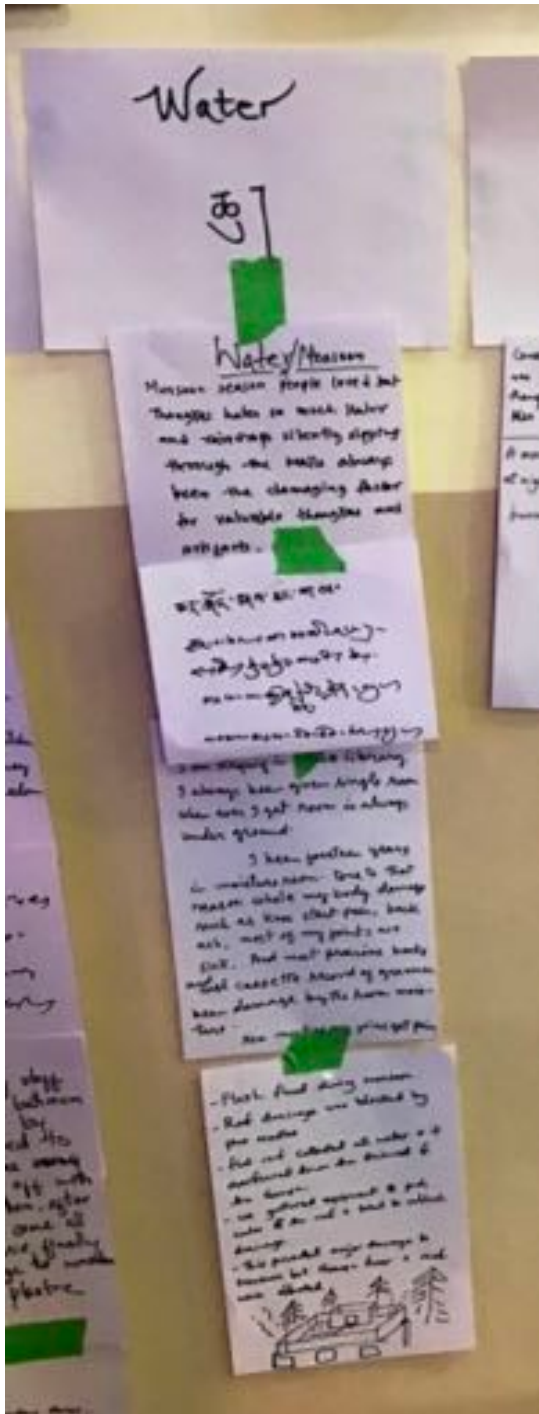
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## **RISK ASSESSMENT: WATER**

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## Introduction



Monk and nun participants in Preservation of Monastery Treasures workshop talk about their own experiences with water damage in their home monasteries and communities

- "People love the monsoon season, but thangkas do not"
- "Water and raindrops silently slipping through the walls have always been a damaging factor for valuable thangkas and artifacts"
- "I have been staying at the monastery for fourteen years and my room is always underground. Due to the moisture in my room my body is sick and my recordings and precious books are damaged"
- "Flash flood during monsoon"
- "Roof drainage blocked by pine needles"
- "Flat roof collected the water and it overflowed down the staircase of the gompa: we gathered equipment to push water off the roof and tried to unblock the drainage. This prevented major damage to treasures"
- "Make water drains for the house and choten"

<https://youtu.be/WB3JIVNUAV0>

### **Causes of Water Damage in Monasteries**

Monastics discuss, from their own experience, that water damage in their monasteries came from natural flooding from yearly monsoon, spring floods, flash floods, leaks in the roof during heavy rains, and from burst or leaking plumbing, a blocked drain, broken water mains within the monastery or nearby community, and sewage backup. Climate change has caused more severe water damage worldwide. Earthquakes can cause physical destruction such as holes in the building that allow water entry, and fires can be started by an earthquake, followed by water damage to put out those fires. Then there can be further water damage to treasures when they are left outside and unprotected by monasteries damaged in earthquakes and fires. In summary, water can destroy your treasures if the building that they are in is not maintained. Your building needs a good roof and proper drainage.



*Climate change and annual spring flooding threaten monasteries and their treasures*

In many areas where monasteries are located, dams have been or are being constructed. If the dams break, then they can cause serious flooding. We discussed that water can also destroy your treasures through roof leaks, plumbing leaks, and spills. Furthermore, the way the rain falls during the monsoon can cause sheet flooding and breaks in water mains.



*During spring rains, sheets of rain come down. When a roof cannot handle it, water often comes into the building. Thangkas on the walls inside, and texts on shelves next to the walls and windows, can be severely water damaged.*

Water damage is a frequent occurrence in monasteries and shedras. Sadly, the majority of water-related problems are the result of lack of building maintenance and accidents. Certainly, damage from water can result from natural occurrences, technological hazards, or mechanical failures. However, simple building maintenance is highly important, because the damages caused are preventable.

Earthquakes can create situations where water damage to your monastery treasures results. Holes in buildings due to earthquakes or even tremors can make cracks in the building where water can come in. Pipes can burst by themselves but tremors in earthquake zones cause pipes to crack as well. Sewage backup causes damage; and after catastrophes such as earthquakes, that sewage can cause severe health problems. When you have an earthquake and buildings explode and catch fire, or when fires start from butter lamps or electrical wiring, the water used to put out the fires also destroys your treasures.

Water is particularly dangerous when it comes in contact with electrical wires. Even if you think or have been told that the power is off for your entire community, it is safer for everyone to turn off the electricity at your monastery's own main breaker or fuse box. That way, if someone is standing in a pool of water with exposed electrical wires, the power will not come back on unexpectedly; you can control it.



*Water flowing through electrical circuits can cause severe health hazards, even death by electrocution*



*Plumbing located can break. After an earthquake, damage to exterior pipes was visible and they could be fixed; however, it was not as easy to see and fix damage to pipes located inside of monastery walls.*

Water damage can also come from broken plumbing. Sinks and toilets can overflow if their drains and pipes are not maintained and kept clear. If there is an earthquake tremor, it can destroy the plumbing located inside the walls, or outside. This can damage both our monastery buildings and the treasures within.

After the earthquake the monks created this sign explaining the water damage to their monastery treasures from the earthquake, to show that water itself can be a problem.



# **WATER**

Water and We have a really old relationship which is I'm going to express now. On April 25th 2015's earthquake cracked so many monastery's rooms including mine. It all happened because of there was water breakage through the cracks and damages our expensive wooden tiles, wall, statue, cloths and many more.. so we You have to be extra conscious about WATER..!!

*Monks created this sign to show how water damaged their monastery treasures*

Although natural disasters such as earthquakes can cause extensive damage, yearly recurrent weather events can cause recurring damage. One example of this is the rising damp seen on many monastery walls. In other words, the damp comes up from the earth, and it comes in from the weather in.



*There was a roof leak up at the top and this caused mold. This is what happens when water comes through the walls.*



*In this monastery office, dampness is rising through the concrete wall due to the damp ground outside of the building and due to earthquake damage to the building*

Wall paintings are often where we first notice damage from water. Some wall paintings are painted on cloth similar to the methods of thangka paintings, and other wall paintings are done directly onto the wall. In either technique when the wall beneath becomes damp or wet, the wall paintings are easily damaged. Often when wall paintings are damaged, the monastery paints over the damaged paintings. However, often the damaged layers begin to flake and peel so then the newer paint also flakes and peels.



*This wall painting became damaged by water. You can see the raw concrete beneath where the paint has flaked away.*



*These wall paintings have been repainted many times. The paint continues to peel because the monastery walls are wet outside and the water seeps through the wall to the inside, where it damages the wall paintings.*



*Water is coming into the lhakhang through the walls from the outside of the monastery building. The water is damaging the wall paintings but also could be dangerous around the electrical panels.*

Water is especially damaging for thangka paintings due to the methods and materials they are made with, and that is why we only stabilize damage and do not attempt “cleaning.” Throughout history, older thangkas were damaged by water when they were hung up against damp stone walls. Damp walls can damage paintings and cause mold on the textile. More recently, many monasteries are built with concrete, and concrete walls are particularly apt to be damp.

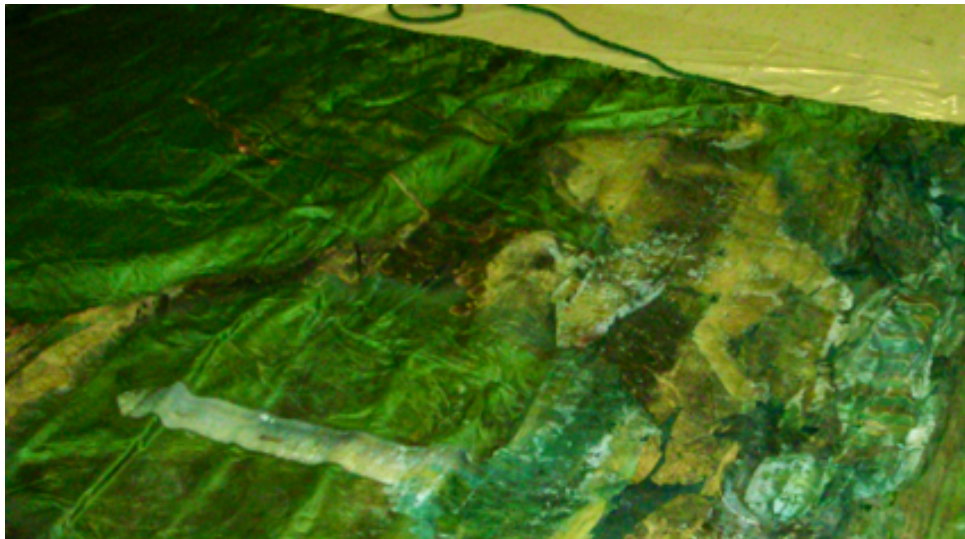
Water can quickly cause irreparable damage to both the painting and textile parts of traditional thangkas. Water also quickly damages the synthetic paints used today to paint many thangkas, as well as thangkas printed on plastic substrates.



*This older thangka became damaged by water when it was hung up against the old stone and clay walls in an old monastery. Then it was rolled up for storage, and the storage area flooded. Both the painting and the textile are water damaged. It is impossible to “clean” away this permanent water damage.*



*This thangka was permanently damaged when the owner tried to “clean” it with water. Most of the iconography is washed away, permanently ruined.*



*This painting on silk was permanently damaged when the storage room flooded.*

## **Water Damage Prevention**

What can you do to prevent more water damage to your monastery treasures? You can keep informed about the risk of flooding by keeping in touch with weather services and online. Though it may seem very basic, you must maintain your building exterior, plumbing, and electrical systems. Disasters of all types usually end in water, with resultant water damage. Raise your treasures higher in storage so that they will be well off the floor in case of flood or leak.

In specific regarding buildings exteriors, special attention can be given to roof maintenance. Also important is damp-proofing which can include changing the grade outside of the building so that the water runs in a different direction, away from your monastery walls.

For the interior, nothing should be stored on the ground or on the floor: everything should be raised on shelves, pallets, etc. Basements are particularly vulnerable in areas prone to monsoon and flooding, and treasures should not be kept there at all. If it is necessary to hang treasures on walls that become damp, use techniques to hang them that allows creating an air space behind.

## **Advice for Water Damaged Treasures**

Water can cause irreversible damage to monastery treasures; however, what you try to do to save these treasures after a water event can also cause extreme damage. Soaking wet treasures are usually extremely fragile to handle, and furthermore, aggressive drying methods can cause further damage. You will need a lot of space and surfaces to save your wet treasures after a natural event, burst pipe, or faulty roof.

Treasures need to be assessed in terms of relative importance--what is most important to your monastery and your teacher. They also need to be assessed based on what they are made from--cloth, paintings, metal, wood, texts, etc. It is important to follow your Emergency Plan, so that you know the location of the most valuable treasures and have thought of places you can use for disaster recovery and set aside some supplies.

This is where workshops such as Treasure Caretaker Training [www.treasurecaretaker.com](http://www.treasurecaretaker.com) helps to prepare treasure caretakers in advance, so when disaster strikes, everyone will know what to do. Saving wet treasures is not simple or easy. The best you can do is to be prepared with knowledge: knowledge of where treasures are located, which ones to save first, where your supplies are, how to work with the materials they are made from.

For example, mold growth is a threat after water damage, so air movement is quite important, whether that is outside, or inside with fans (if there is electricity). However, placing wet fragile treasures out into a hot sun can cause rapid drying with cracks, splits and possibly rapid drying into a distorted shape. You can sort damaged wet treasures into plastic bins and trays; however it is best not to enclose them in sealed



plastic bags as mold can grow in those conditions. Simple plastic window screens are very useful here.

Thangkas can be either laid out flat on screening or hung, totally depending on the age and how damaged they are. Airflow is important, but very forceful fans can cause problems.

Supplies that are good to have in advance of water damage can include meters of plain white or undyed cloth from the market, washed in hot water and dried in the sunshine. It can be used to lightly touch wet treasures (except for the surface of paintings etc), to soak up water from areas around treasures, and to help pad them during transport to a safe area.

You can contact [www.treasurecaretaker.com](http://www.treasurecaretaker.com) or for immediate advice during an emergency or WhatsApp 0019022221467.

### **Summary**

Water damage is a frequent occurrence in monasteries and shedras. Sadly, the majority of water-related problems are the result of accidents or lack of building maintenance. Certainly, damage from water can result from natural occurrences, technological hazards, or mechanical failures. However, simple building maintenance is highly important. You can prevent water damage if you are prepared. In advance of weather events, you can fix your roof, fix your drainage, fix cracks in the walls. It is also effective to prevent water damage by paying attention to where and how treasures are placed in storage.

Your Emergency Plan is highly important for preparing for and recovering from water damage to your monastery treasures. Plan so that you know where you will move things and what you will do. Know what to do for basic care for wet thangkas and wet pechas. Be trained in what to do when your treasures get wet.

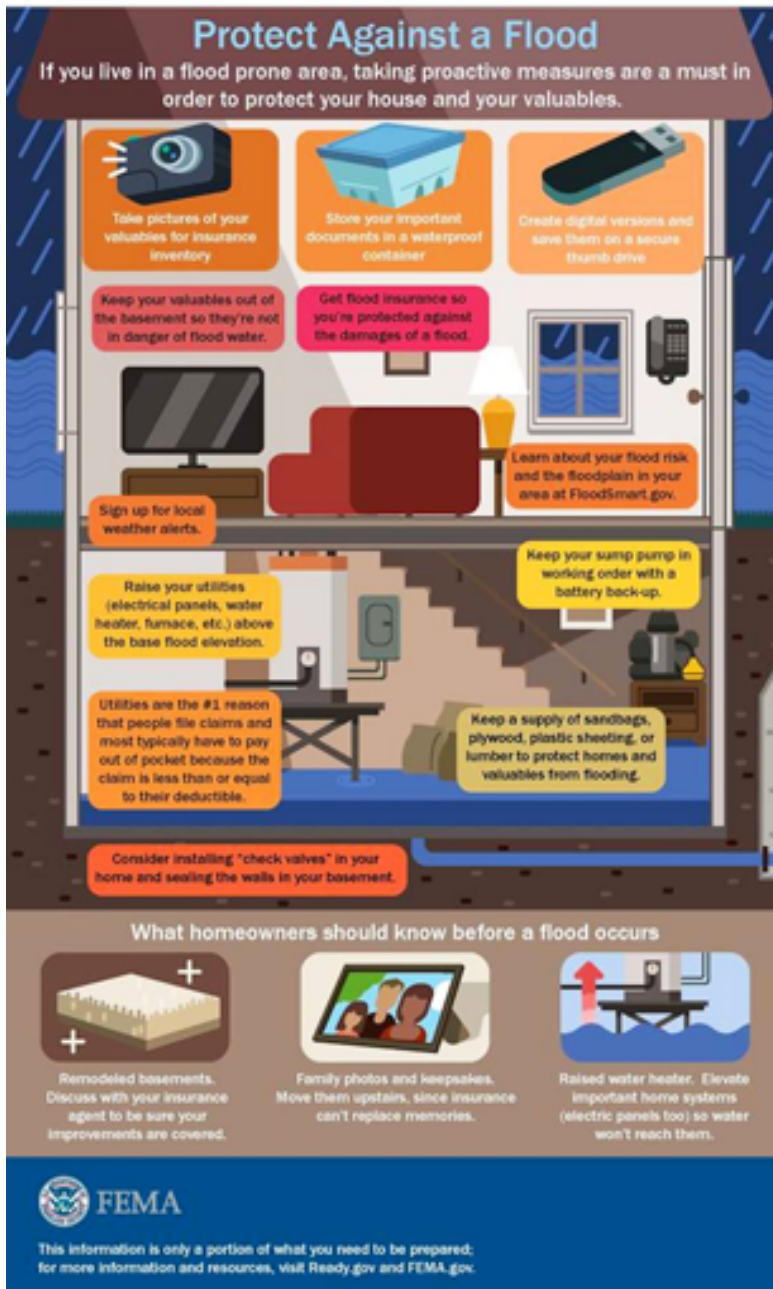
Thank you to funders for ***Preservation of Buddhist Treasures Resource***, including The Pema Chodron Foundation, Khyentse Foundation, Shambhala Trust, Shelley & Donald Rubin Foundation, Anne Thomas Donaghy, Henry Ming Shen, and many more.

LINKS AND REFERENCES

**Table 1. Factors leading to water damage.**

<b>Natural</b>	<b>Technological/Mechanical</b>	<b>Accidents</b>
<ul style="list-style-type: none"> <li>• Rainstorm</li> <li>• Windstorm</li> <li>• Hurricane</li> <li>• Sleet, hail, ice storm</li> <li>• Flash flood</li> <li>• Slow rising flood</li> <li>• Tsunami (if located in a coastal seismic zone)</li> <li>• Spring melt or run off</li> <li>• Ice jam</li> <li>• High water table</li> <li>• Located by or close to a body of water (river, lake, or dam)</li> </ul>	<ul style="list-style-type: none"> <li>• Sewer failure/back-up</li> <li>• Sprinkler system malfunction</li> <li>• Broken water line (may be caused by freezing or construction)</li> <li>• Leaking roof</li> <li>• Leak from heating system, ventilation system, or air conditioning system (HVAC)</li> <li>• Overflowing sinks, toilets, drains (that may be blocked or unable to cope)</li> <li>• Blocked eavestroughs</li> <li>• Careless use of water during special events, social functions, etc.</li> <li>• Use of water during construction and renovations</li> <li>• Poorly/improperly insulated building</li> <li>• Storm drains/sewers (that are unable to cope)</li> </ul>	<ul style="list-style-type: none"> <li>• Water used in cleaning up chemical spills</li> <li>• Water damage due to fire (sprinkler system discharge or/and fire hoses)</li> </ul>

CAPTION: Summary of possible causes of water damage and results from CCI <https://www.canada.ca/en/conservation-institute/services/agents-deterioration/water.html>



*This poster has general information that can be useful for monasteries*



## Basic Elements of Emergency Plan for Monasteries and Communities

1. People First
2. Who Do You Call?
  - Who is in charge?
  - Emergency phone numbers
  - Full monastery residence list, to text, WeChat, WhatsApp, etc.
3. Who Should Salvage Collections?
  - Monastery Treasures Salvage Team (trained previously)
4. Where to Bring Damaged Treasures
  - Another monastery?
  - Your monastery dining room, classrooms, etc.
5. What Do You Salvage First?
  - Decide your priorities, preferably before an emergency
  - Mark the location of these priority treasures on floor plans
6. Where Are the Emergency Supplies?
  - Stockpile supplies before an emergency occurs
  - Mark the location of supplies on floor plans
  - Contact local vendors for additional supplies
7. Who Provides Security During an Emergency?
  - Monastics, community members, or government?
8. What Information Technology Will You Need to Replace?
  - Survey your hardware and software currently in use
  - Store monastery files in "cloud" or duplicated offsite
9. Do You Have Insurance?
10. Who Has the Plan?
  - Make a list of who has copies of your Emergency Plan
  - Update Emergency Plan and Team

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## Preservation of Buddhist Treasures

### **RISK ASSESSMENT** ཉེན་ཁ་བདེ་བྱུང་ཞིབ།

- ❖ **Pandemic** ཡོངས་ཁྱབ་རིམས་ནད།
- ❖ **Earthquake** ས་ཡོམ།
- ❖ **Fire** མེ།
- ❖ **Water** ལྷ།
- ❖ **Theft** ལྷན་མ།
- ❖ **Pests** གནོད་འབྲུ།
- ❖ **Temperature and Relative Humidity** རྫོད་ཚད་དང་ལྗོས་བཅས་ཀྱི་བཞུའ་ཚན།
- ❖ **Human Choices** མིའི་འདུམ་གྱ།
- ❖ **Pollution** འབགས་བཅོལ།
- ❖ **Light** རྫོག་མེ།

### **EMERGENCY PLANNING AND DISASTER MITIGATION** མངོན་འཚར་གཞི་དང་རྒྱུན་ལྔ་ཞི་འཇམ།

### **SAFE STORAGE** ཉེན་མེད་རྫོས་ཁང།

### **DOCUMENTATION** ཡིག་ཆ་ཚོ་བཞོད།



དགོན་པའི་གནའ་བོའི་གཏེས་སྤུང་སྤྱོད་བཅའ་ཚོགས་པ།

**Digital inventory** འགྲུལ་ཚུལ་ལོག་ནས་དངོས་ལོར་འདོད་པ།

**Risk assessment and disaster mitigation** ཉེན་ཁ་ཚེན་འཕོག་དང་མོད་ལྷན་གདོང་ལེན།

**Recording digital interviews with elders** མི་རྒན་རབས་དང་འགྲུལ་ཚུལ་ལོག་ནས་བཅའ་ལྷི་མཉམ་སྤྱད་ལྟེང་པ།

**Scientific research** ཚན་རིག་ཉམས་ཞིབ།

**Current project** ད་ལྟོ་བྱ་བ་ལུ་ཚུ།

**Free online preservation resource for communities and monasteries**

དགོན་པ་དང་སྤྱི་ཚོགས་ཀྱི་ཚེད་དུ་གནའ་བོའི་གཏེས་སྤུང་ཐབས་ལམ། མི་རྒན་རབས་ལོག་རིན་ལེད་དུ་སྤྱེད།



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