The following is a list of notes from West Street Recovery's (WSR) experience mucking (that is, gutting houses of materials contaminated by flood waters and mold) after Hurricane Harvey in Houston, Texas.

Tips for Mucking Houses

TOOLS NEEDED

We put together buckets of the following tools for gutting homes. Each bucket is for a crew of ~6, a nice number for tackling a house:

- **Essential tools:**
  - 6 Hammers
  - 4 Wonder Bars
  - 2 Crow Bars
  - 6 utility knives and extra blades
  - 1 large scoop
  - 2 screwdrivers
  - 1 drill
  - lots of large black trash bags
  - Brooms
  - Tape measure
  - Disinfectant soap (for cleaning hard, non-porous surfaces like tile)

- **Really nice-to-have tools:**
  - 2 chalk lines and chalk
  - 1 sawzall
  - 2 plyers
  - 2 drywall knives
  - T square

PROTECTIVE GEAR & SAFETY

We provided volunteers on our crews the following personal protective equipment (PPE):

- Mold-grade masks (N95s or respirators with replaceable cartridges)
- Eye protection
- Durable gloves

- Ear plugs

Volunteers should wear pants and long-sleeved shirts and good boots. When they get home, they should remove and wash their clothes and shower right away to disinfect. Volunteers will not only be in contact with mold that can cause long-term health impacts, but also chemicals found in building materials as well as dust and harmful pathogens.

BEFORE YOU MUCK

Keep in mind:

- The longer anything sits, the worse it gets!
- Try to balance the danger that mold spreads and gets worse and worse, but everything you remove takes resources and skills to replace.

1. **Check foundation for danger**
    a. If flood waters caused foundation and walls to shift, there is danger of collapse, especially as you knock down sheetrock. Investigate and use best judgement. Check if under the house the beams are still supported on blocks.
    b. Many old houses have severe termite damage and decay. The houses are supported by everything combined - siding, sheetrock, trim, remaining wood, shiplap. Beware as you remove layers you could be destabilizing the house. Full collapse is very unlikely, but heavy materials like one ceiling beam falling is a real danger. You can still muck, but before letting many unskilled volunteers knock walls, investigate each part of the house for safety or limit task to trim and floors.

2. **Turn off gas.** Best to do this at the main. As you are working you may crack a pipe, especially old pipes.

3. **If the fuse box got wet, turn off power!** If outlets got wet but not the box, use caution but risk is generally low. Be aware of live wires if you are cutting into walls.

MUCKING PROCESS

1. **Removing contents -**

a. You can save non-porous items and hard wood, but you should dry and clean these asap.
b. Most anything that is porous and got flooded or sat near flooded materials cannot be fully salvaged and is best to throw away. If you are going to save anything, dry as quickly as possible and try to clean.
c. If furniture or cabinets are part wood, part particle board, cut out the particle board that was flooded and move the whole item to the sun and dry out.

2. **Remove baseboard** (the trim at the bottom of the wall) **and door trim** -
    a. It's important to get all segments, including small corners.
    b. If more than 2" of door trim got wet, remove entire piece (easiest and cheapest for replacement).
    c. If it is hard wood you can try to salvage, otherwise throw it out.

3. **Remove damaged sheetrock at least 2ft above the water line (or higher if it's been sitting a while and mold has spread).**
    a. Sheetrock is hung in 4ft increments, usually starting ~2in from the floor. Easiest is to remove sheetrock at the seam (~4'2" from the ground). Either remove less than 2ft, at the seam, less than 6ft, or at junction with ceiling. Cut clean and straight if you can.
    b. Some older sheetrock is less porous, and you can get away just cutting a few inches above the water line. It's better to be cautious unless it will make a dramatic difference in repairs.
    c. A sawzall is the easiest way to cut, but beware of cutting wires. Best to cut power first.
    d. Try to remove in large chunks so disposal is easier.
    e. Only remove ceiling where you see water damage; it is very labor intensive to replace.

4. **Remove damaged insulation.** Insulation does not wick water far, so use a utility knife to cut ~6in above the water line. Do not pull all the insulation down from higher in the wall!

5. **Remove damaged floor -**
    a. Flooring is usually laid in layers. Some flooring always needs to be thrown away, and some is ok to keep if it is able to dry.
    b. Flooring is either laid on concrete slab or pier and beam or above a basement.
        i. Concrete slab offers little air circulation so you need to remove layers to dry, but you can try to salvage flooring that can be dried and reinstalled.

ii. Pier and beam or above a basement gives some air circulation, so you can try to let to dry in place, but some older houses have >3 layers.

c. If buckling or sogginess is present, always remove.
d. Types of floor:
    i. Clean and leave ceramic tile flooring (unless it is buckling or glued to obviously compromised subfloor).
    ii. Always throw out all carpet.
    iii. Hardwood and subflooring can be salvaged, but needs to be dried fully or will decay.
    iv. Vinyl tile usually traps some water underneath, but does not mold. Safest to remove if on slab, try to dry if on pier and beam.

6. Remove cabinets and vanities -

a. Turn off water!
b. Always remove if there is sheetrock behind them; that sheetrock must be removed.
c. If they are hard wood you can try to salvage - remove and dry.
d. If part hard wood or only a small part was flooded, cut out portions that were flooded and are particle board.
e. If all particle board, throw away.

7. Investigate the shower and bathtub -

a. Sometimes there is sheetrock behind the plastic or tile, and this will mold. Try to remove it from the other side of the wall to leave tile intact. If not possible, remove tile or plastic.
b. You can leave concrete board and it should dry out.

8. Investigate siding/brick from the interior -

a. It is very challenging to replace anything you remove.
b. Brick has a moisture barrier that is designed to get wet and dry out. Try to leave this intact, and check back in a few days to see if it is drying.
c. Siding often has plywood behind it, which is also designed to take on moisture and dry out. Try to leave this intact, and check back in a few days to see if it is drying.
d. There will usually be a layer of black paper that is a moisture barrier - leave if you can, but if it is trapping moisture and not drying after being exposed to air flow, remove it.
e. Old houses have shiplap, which is solid wood and usually dries out fine without removal

Tips for Mold & Toxin Remediation

SUPPLIES NEEDED

1. Cleaning product (e.g., pine sol)
2. Bleach
3. Wire brushes
4. Vacuum
5. Rags
6. Fans
7. Concrobium or equivalent mold control (optional)

REMEDIATION PROCESS

1. **Clean surfaces in contact with flood waters -**
    a. **Non-porous surfaces** (e.g., tile and cement floors) can be cleaned using soap and water to remove the film of grime and then use bleach to disinfect. Disinfecting only works if you clean first! Usually disinfectants need to remain on the surface for some time to properly disinfect - read the instructions on the bottle.
    b. **Porous surfaces** (e.g., wood): Bleach is NOT effective on porous surfaces like wall studs - it will only make them wetter and attract more mold.
        i. Wood: Hardwood can be salvaged only if you can completely dry it! Remove anything possible, like furniture and cabinets and dry. For studs, only wash them down with soap and water if you can see or smell mold.
        ii. Drywall/ particle board/ soggy wood, etc : Must be removed and disposed of.

2. **Treat for mold -**
    a. The most important way to prevent mold is make sure everything is dry and there are no new sources of moisture like leaks.
    b. To further prevent mold, you can spray porous surfaces like studs with Concrobium or equivalent, but they must be let dry before rebuilding.

3. **Dry, dry, dry -**
    a. Place fans where you can, mop up all water, remove all moisture.
    b. Do not replace any materials until all moisture is gone! (This can take over 2 weeks.)

    i. Ideally, use a moisture meter and wood will test <17% moisture, but in humid climates, this may never happen. In that case, try to dry for at least 2 weeks, make sure everything is dry to the touch.

4. **Get rid of as much dust as possible**. Dust contains mold sports, lead, and likely asbestos. Use a brush to release dust from the studs and walls. Vacuum if possible.