Flood-hardy?... Bon Temps!

(good times)

Status quo?... Couillon!

(stupid, crazy, dumbass)

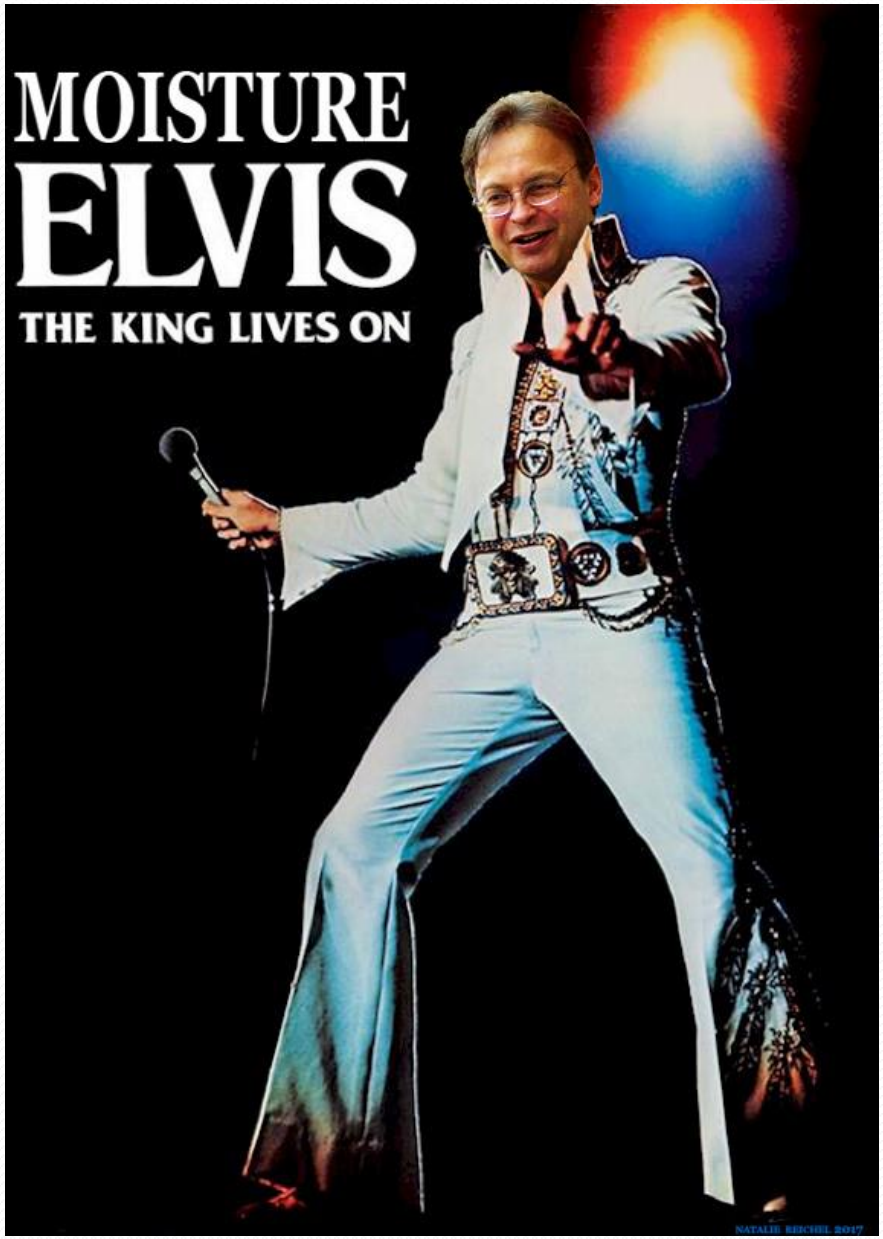
Claudette Hanks Reichel, EdD
Professor Emeritus
Louisiana State University AgCenter
Extension Service

LSU AgCenter Research · Extension · Teaching
LaHouse Home and Landscape Resource Center

2017
Summer Camp

Tale of a King, a Queen and the Couyons

By
Claudette Hanks Reichel, Ed.D.
Professor, Extension Housing Specialist
Director, LaHouse Resource Center



Understanding Cajun

That's ***lagniappe*** *[lahn yop]*
(a little something extra)

But ***ça va*** *[sah vah]* for now
(that's enough)

So, ***allons!*** *[ah lohn]*
(let's go)

Understanding Cajun

Laissez les bons temps rouler!

(Let the good times roll!)

Understanding Cajun

Mais cher, ça c'est couillon!

[*may sha, sah say cou-yon*]


LSU AgCenter
LaHouse Home and Landscape Resource Center
Shape your home to shape your future
explore
learn
benefit
Visit Baton Rouge
2858 Gourier Avenue . LSUAgCenter.com/LaHouse
LaHouse Tour Map
Benefits
and criteria of a high performance home
Tour Stop Number
Reveal
QR Code
Second Story
First Story
Resource-efficient
Durable
Healthy
Practical & Convenient
ALL
LaHouse Building Systems
Open M-F 10:00-4:30

October 2005

(after Katrina Aug. 2005)

King Joe and Queen Claudette 2006 *Down da Bayou* Tour

(with Tim Reinhold, IBHS)

8:30	Welcome	Dr. Claudette Reichel
8:35	**Wind**	**Dr. Tim Reinhold**
9:35	**Flood**	**Dr. Tim Reinhold**
10:45	**Rain**	**Dr. Joseph Lstiburek**
1:00	**Air**	**Dr. Joseph Lstiburek**
2:00	**Moisture**	**Dr. Joseph Lstiburek**
4:40	**HVAC**	**Dr. Joseph Lstiburek**

***700+** home building professionals*

Best Building Practices for the Gulf Region

6-hour continuing education seminar

for residential contractors, building officials, inspectors and designers

When you protect your clients and their homes from water, mold, wind and rising energy costs, you build so much more than a house.

Presenters: **Joseph Lstiburek**, Principal of Building Science Corporation (BSC), www.buildingscience.com -- prominent building authority, popular speaker, forensic engineer, author of climate-specific building and moisture control guides, industry consultant, member of ASHRAE, ASTM and ICC.
Tim Reinhold, VP of Engineering, Institute of Business and Home Safety (IBHS), www.ibhs.org – nationally recognized wind engineer and consultant for engineering firms worldwide.

Sponsors: Training, materials and lunch are provided free through the generous support of BSC, IBHS, the USDOE Building America Program, Georgia Pacific, LaHouse Resource Center and local Home Builders Assoc. (HBA) chapters to help Katrina and Rita impacted communities and home builders.

Content: Best building materials, assemblies, techniques and HVAC for south Louisiana hazards, conditions and climate. Workable ways to combine hot-humid climate moisture control, energy efficiency, comfort and indoor air quality with wind and flood-resistant building code requirements and options. Common flaws and failures – and how to avoid them. Options for restoring or building homes to withstand floods and keep out wind-driven rain.

Materials: Attendees will receive a variety of reference materials and building guides.

Master Builder/Designer Option: A voluntary designation is being developed to recognize, promote and give a competitive advantage to local home builders and designers who complete a specified continuing educational program. LaHouse Master Builders and Designers will be recognized on www.LouisianaHouse.org and lists provided to consumers and collaborating housing agencies. This course will fulfill part of the requirements for the designation.

DATES	LOCATIONS	TIME *	LOCAL HBA CONTACT INFO	
April 25	**Baton Rouge**: Room 212 Efferson Hall, LSU	8:15-4:15	225-769-7696	lynda@capitalregionba.com
April 26	**Houma:** Woodman of the World Hall	8:00-3:30	985-868-4725	steveil@bellsouth.net
May 3	**Metairie**: 2424 N. Arnoult Rd., HBA of GNO office	8:45-4:15	504-837-2700	no email
May 4	**Mandeville**: Benedicts Restaurant	8:45-4:15	985-882-5002	dolores@sthba.org
May 17	**Lafayette**: 135 N. Domingue Rd, AHBA office	8:45-4:15	337-981-3053	jkellen@ahbaonline.com
May 18	**Lake Charles**: Lake Charles Civic Center	8:45-4:15	337-478-7893	vickihba3@cs.com

* Time includes registration (15 min.), sponsored lunch and breaks. Baton Rouge includes lunch tour of LaHouse.

Register online at: http://www.LouisianaHouse.org/bestpractices
or call local HBA contact above. Seating is limited.

Visit our Web Site: www.lsuagcenter.com

Louisiana State University Agricultural Center, William B. Richardson, Chancellor
Issued in furtherance of Cooperative Extension work, Acts of Congress of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. The Louisiana Cooperative Extension Service provides equal opportunities in programs and employment.

Philantropists and more royalty… with good intentions and $, but…

Founder of *Make it Right* Homes

You decided:

Ça c'est bon or *Couillion!*

(That's good) (Couyon)

The ***For Where There's No Rain, No Sun, No Wind***

Make It Right house design

You decided:

Ça c'est bon or *Couillion!*

(That's good) (Couyon)

The ***Sinking Ship***

Make It Right house design

You decided:

Ça c'est bon or *Couillion!*

(That's good) (Couyon)

The ***Shark Mouth***

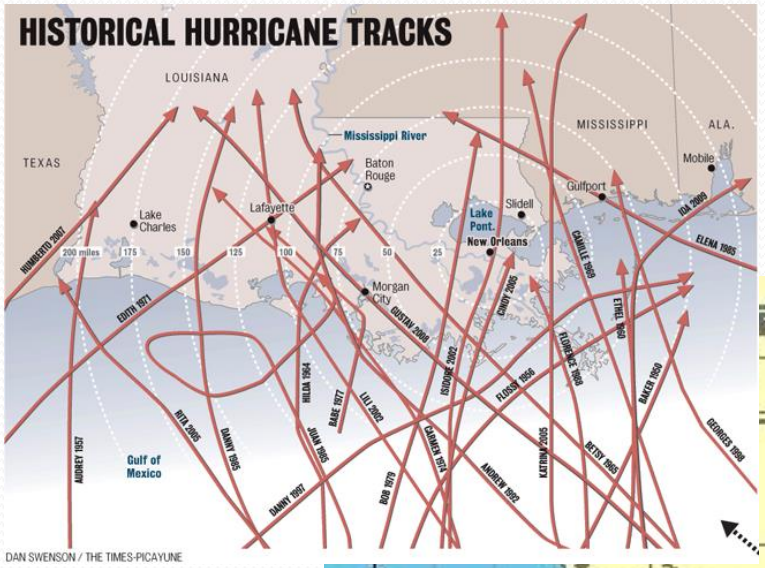
Make It Right house design

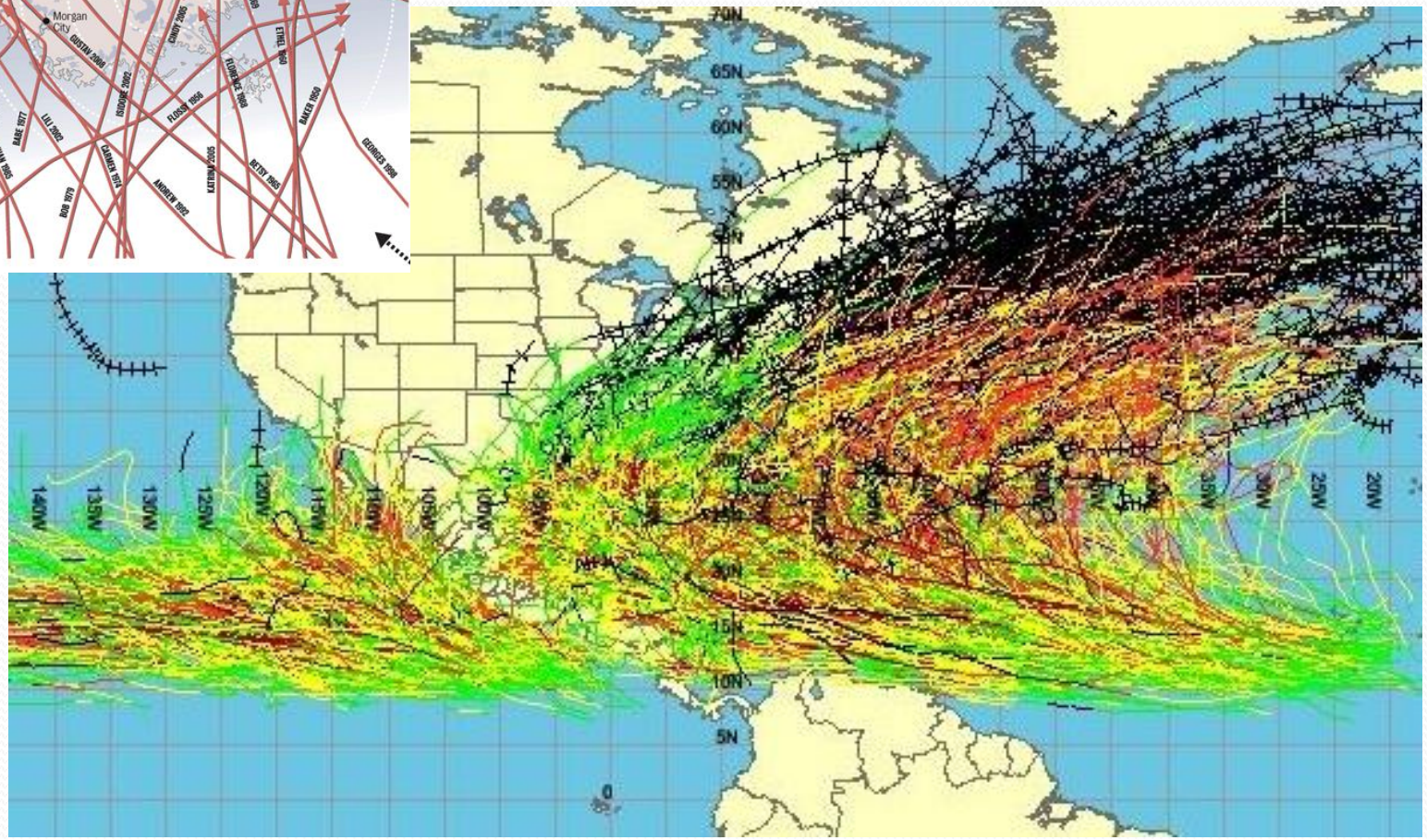
Liar, liar, pants on fire!

The face of disaster (education)

La Acadienne (Cajun)

History of Hurricane Paths





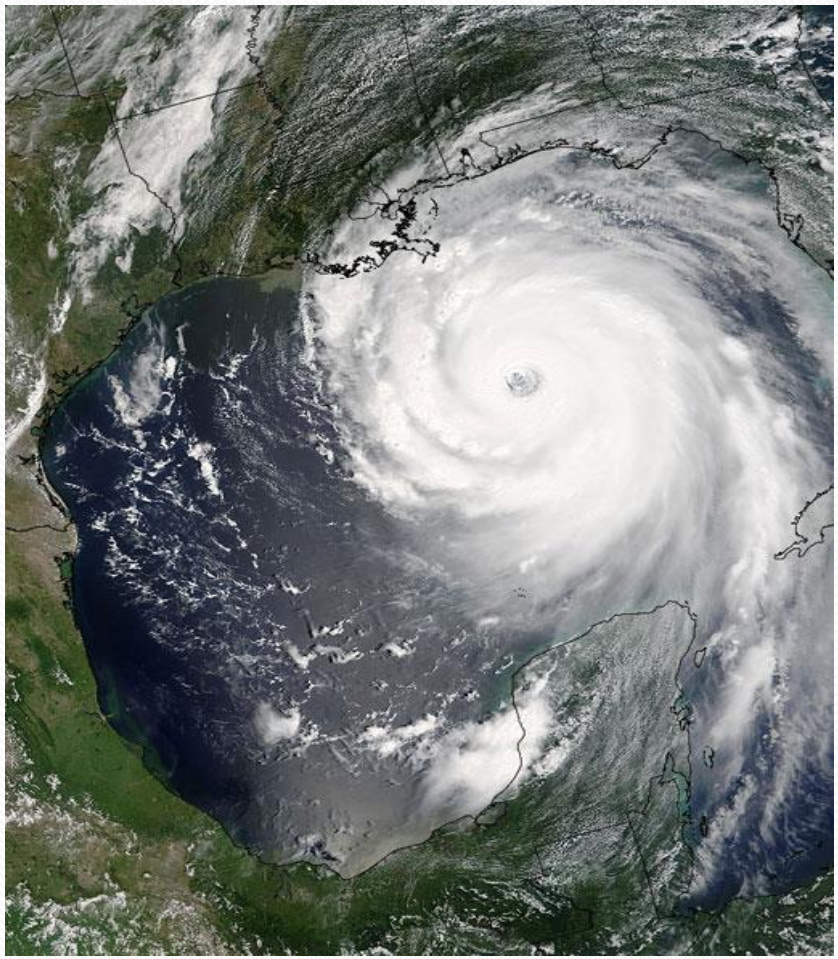
Louisiana floods…

somewhere almost every year

In 2005

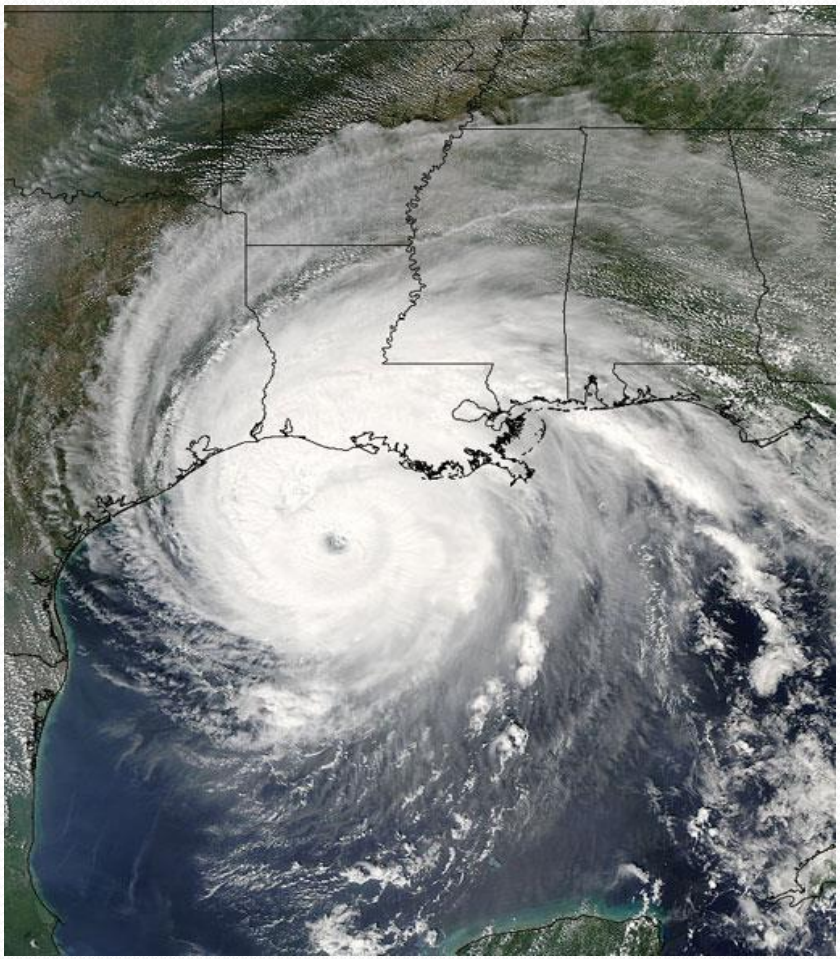
Katrina

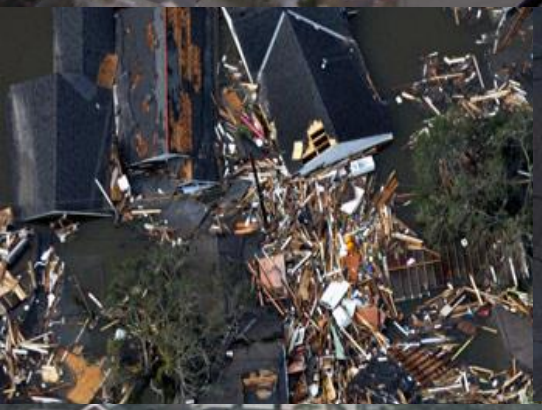
August 29



Rita

Sept. 24






AP PHOTO


AP PHOTO


AP PHOTO

Impact upon one state

- 1,080 deaths
- 215,000 severely damaged homes
- 515,000 (31%) homes damaged
- 60,300,000 cu. yd. debris
- $100,000,000,000 infrastructure loss
- 81,000 businesses affected
- 18,700 businesses destroyed
- Historic treasure, culture threatened

Impacts on Families

The work,
the time,
the cost,
the toll.

Complicating Issues

Lack of housing = lack of workers

Where's the money?

- **FEMA – *temporary housing only***
- **Flood insurance**
  - *Delays, disputes*
  - *Not enough to restore right*
- **Homeowners insurance**
  - *Wind vs. flood disputes…*
  - *Slow claims*
  - *Mold exclusion*

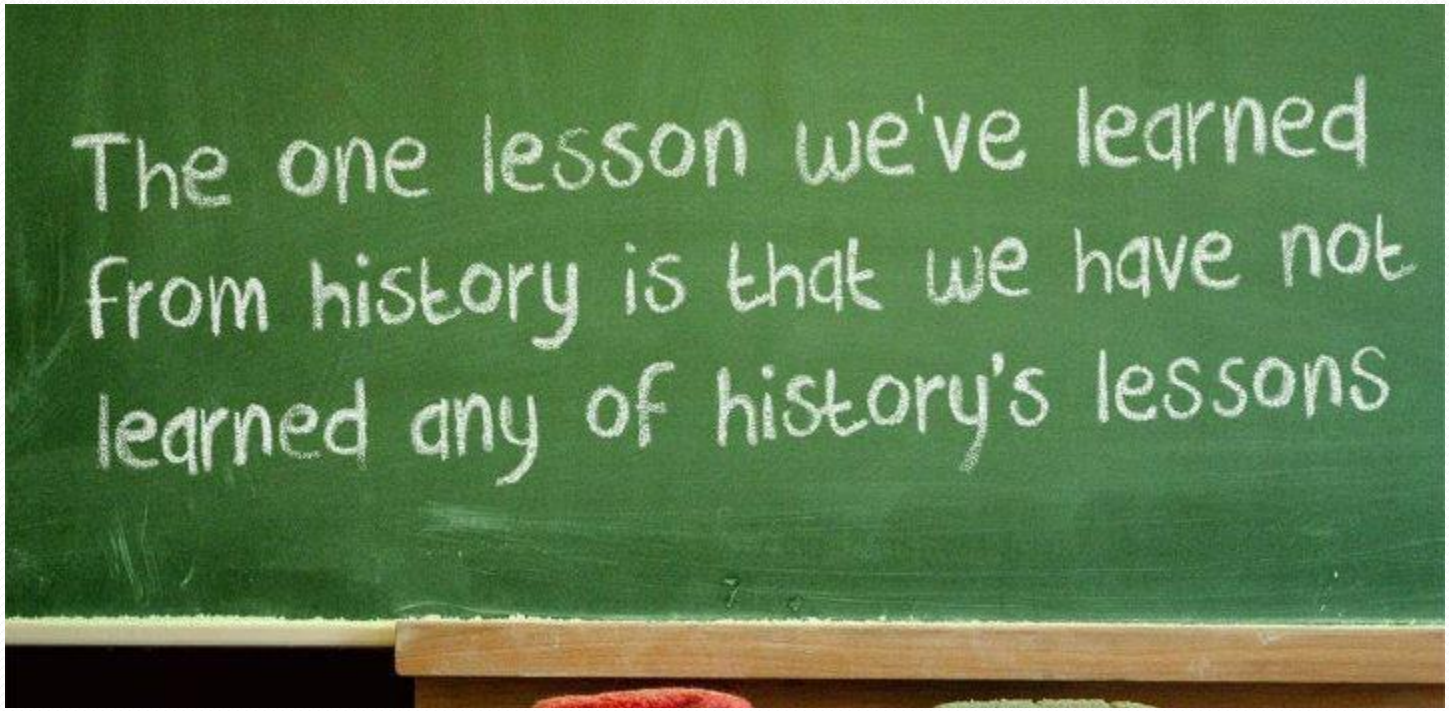
- **Disaster Assistance – *1-2 years later!***

Too little, too slow!

Too much, too fast!

- **Unlicensed contractors, scamers (*carpetbaggers*)**
- **Media frenzy**
- **Confusion, misinformation**
- **Mega Mold**
  - Conflicting, inappropriate guidelines
  - Mold remediators – 31 pricey flavors
  - Volunteers, D-I-Y tackling it

Lessons learned?
Problem solved?



Billion Dollar Disasters

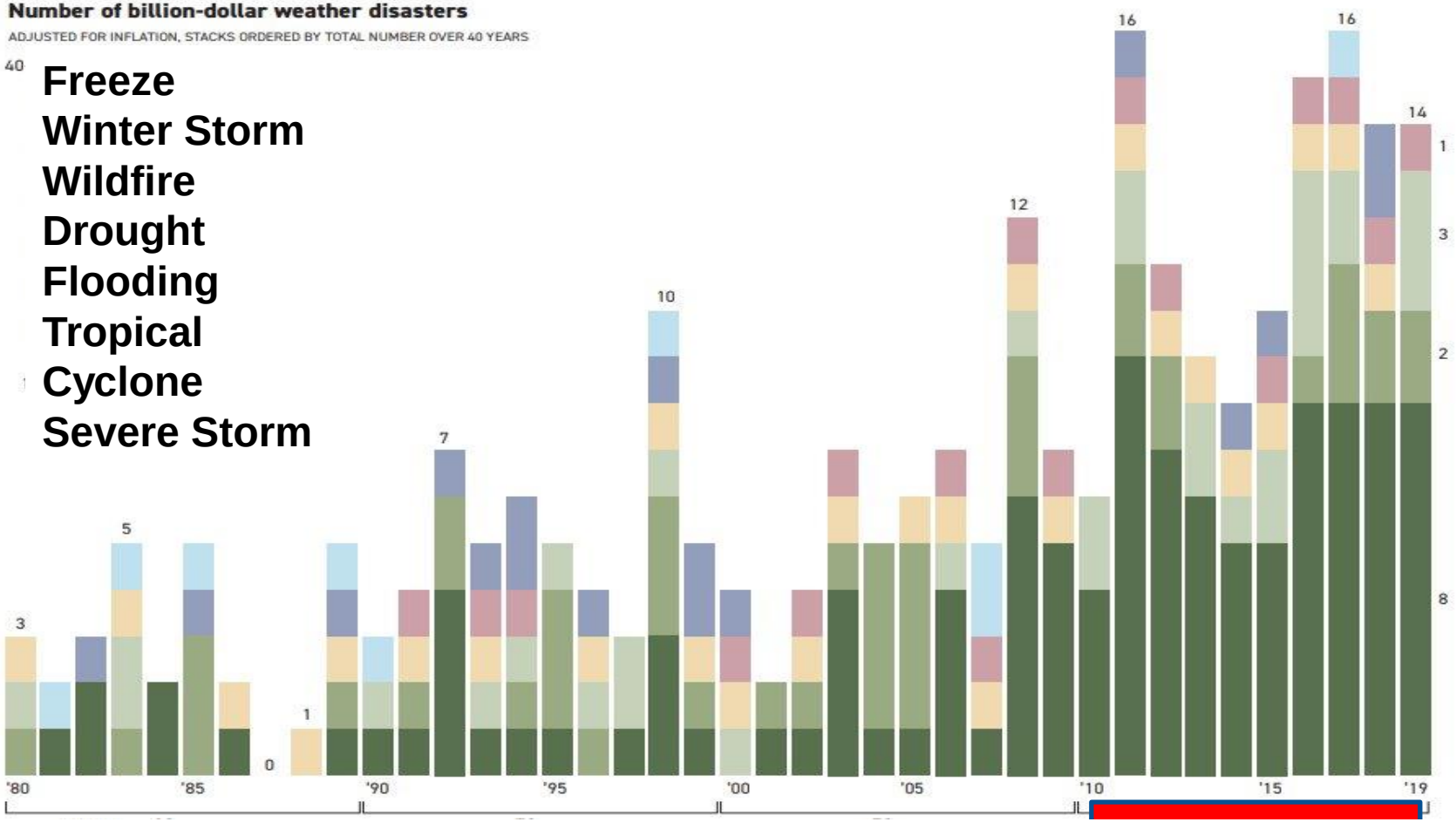
Jan. 10, 2020

2010s set record for major U.S. weather disasters

The past decade saw twice as many billion-dollar weather disasters as the previous decade, according to NOAA, with the economic costs of the past 20 years tripling over the previous 20 years. The overall increase in number and severity of weather disasters has been linked to human-caused global warming.

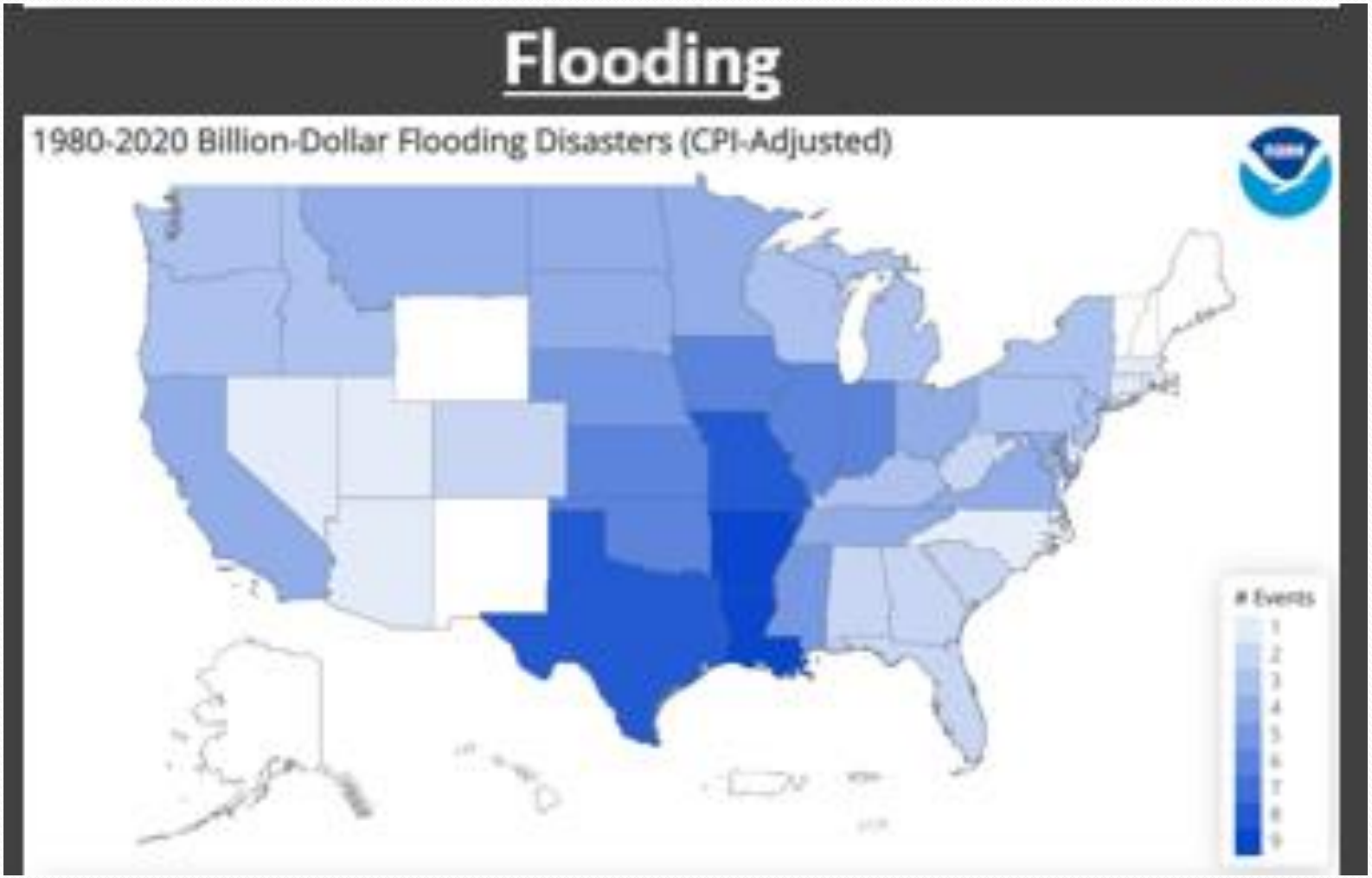
Number of billion-dollar weather disasters

ADJUSTED FOR INFLATION, STACKS ORDERED BY TOTAL NUMBER OVER 40 YEARS



Total:	**28**	**52**	**59**	**119**

Billion $ Flooding Disasters Frequency



Major sea level rise projected in next 30 years

BY SETH BORENSTEIN
AP science writer

America's coastline will see sea levels rise in the next 30 years by as much as they did in the entire 20th century, with major Eastern cities hit regularly with costly floods even on sunny days, a government report warns.

By 2050, seas lapping against the U.S. shore will be 10 to 12 inches higher, with parts of Louisiana and Texas projected to see waters a foot and a half higher, according to a 111-page report issued Tuesday by the National Oceanic and Atmospheric Administration and six other federal agencies.

"Make no mistake: Sea level rise is upon us," said Nicole LeBoeuf, director of NOAA's National Ocean Service.

The projected increase is especially alarming given that in the 20th century, seas along the Atlantic coast rose at the fastest clip in 2,000 years.

LeBoeuf warned that the cost will be high, pointing out that much of the American economy and 40% of the population are along the coast.

However, the worst of the long-term sea level rise from the melting of ice sheets in Antarctica and Greenland probably won't kick in until after 2100, said ocean service oceanographer William Sweet, the

away," Dutton said in an email. "The question is whether we continue to let houses slide into the ocean."

Sea level rises more in some places than others because of sinking land, currents and water from ice melt. The U.S. will get slightly more sea level rise than the global average.

And the greatest rise in the U.S. will be on the Gulf and East Coasts, while the West Coast and Hawaii will be hit less than average, Sweet said.

For example, between now and 2060, expect almost 25 inches of

an interview. "Many of our major metropolitan areas on the East Coast are going to be increasingly at risk."

The western Gulf of Mexico coast, should get hit the most with the highest sea level rise — 16 to 18 inches — by 2050, the report said. And that means more than 10 moderate property-damaging sunny-day floods and one "major" high tide flood event a year.

The eastern Gulf of Mexico should expect 14 to 16 inches of sea level rise by 2050 and three moderate sunny-day floods a year. By mid-century, the Southeast coast

Convictio

By The Associated Press

MARKSVILLE – A Black man is free after spending 44 years in prison for an attempted rape he says he didn't commit.

Avoyelles Parish Judge William Bennett on Tuesday overturned Vincent Simmons' conviction Tuesday, finding that Simmons did not get a fair trial because jurors never heard some evidence in his favor, news outlets reported.

Simmons, who will turn 70 on Thursday, told CBS that when he heard the verdict, he thought, "This is it. Man,

Report paints dire picture of Gulf of Mexico's future

BY REBECCA SANTANA and CURT ANDERSON
Associated Press

Hurricane Harvey dumped more than 50 inches of rain on parts of the Texas coast in 2017. Then in 2020, ferocious winds from Hurricane Laura destroyed homes across coastal Louisiana. Hurricane Ida hit in 2021, leaving the entire city of New Orleans without power for days.

Such extreme weather is becoming more common, and that's just one of the warnings for the Gulf of Mexico region in a United Nations report released this week. The devastating effects of climate change in the region also include rising seas, collapsing fisheries and toxic tides, even if humanity somehow manages to limit global warming to 2.7 degrees above the pre-industrial era.

"The hurricanes that we get, there's a higher probability that they can bloom up into major hurricanes," Louisiana's state climatologist Barry Keim said, agreeing with the report's details on more dangerous weather.

The report, an "atlas of

ASSOCIATED PRESS FILE PHOTO

Hector Morales sits on a debris pile Oct. 12, 2018, near his home, which was destroyed by Hurricane Michael in Mexico Beach, Fla. Extreme weather is becoming more common, and that's just one of the warnings for the Gulf of Mexico region in a United Nations report released this week.

said at a recent news conference. "This is the beginning of having a comprehensive plan to answer that question in the affirmative."

In Louisiana, the state's Coastal Protection and Restoration Authority has a plan with "very specific projects," the U.N. report said, such as dredging to replenish wetlands and rebuilding barrier islands damaged by storms.

Alex Kolker, an associate professor of coastal geology at the Louisiana Universities Marine Consortium in Cocodrie, noted that on Feb. 1, Louisiana also announced a plan to reduce greenhouse gas emissions to net zero by 2050.

Outbreaks of red tide, which are natural toxic organisms originally noticed by the Spanish explorers, have become more frequent and more deadly because of warmer air and water, experts say.

The increasing outbreaks kill more fish and sea life and harm the tourist industry with smelly fish-strewn beaches, poor fishing and the possibility of harms to human health, especially among people with asthma or other lung conditions.

From 2017 to 2019, accord-

lican-led Florida House of

year mortgages are already looking for homes and com-

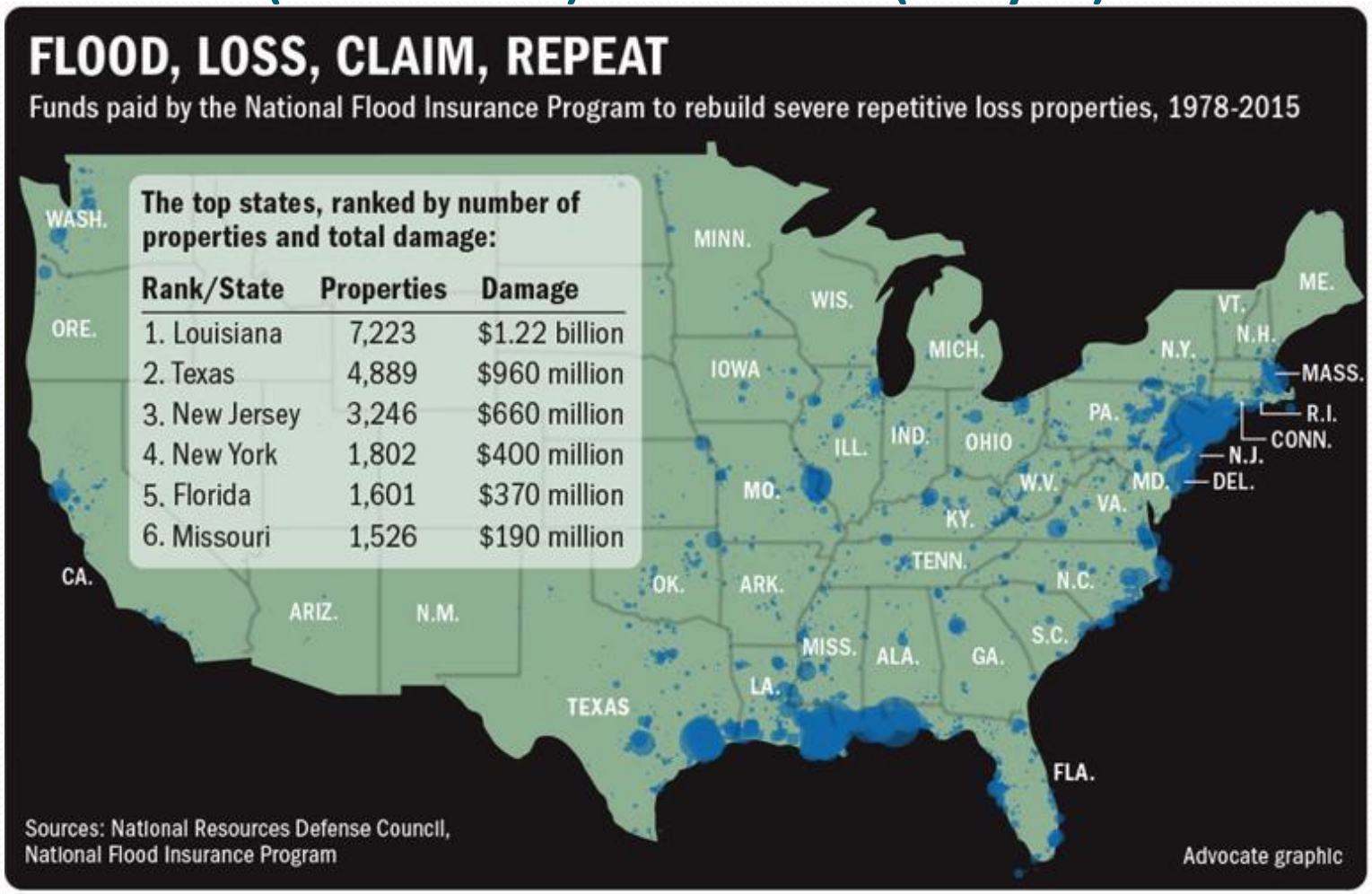
ing the river and saltwater intrusion caused by coastal

in the region to adapt to climate change. Miami-Dade

You decide:

Bon Temps or *Couillion?*

(Good Times) **(Couyon)**



You decide:

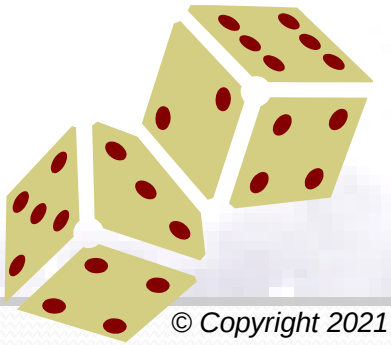
Bon Temps or *Couillion?*

(Good Times) (Couyon)

"*100-year Flood Zone*" Standard

Actually means 1%/yr. probability

- **= 26% chance in 30 years** (mortgage term)
- ***MUCH higher risk standard than wind code***
- ***Assumes levees will hold***



You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

2006 FEMA trailers (RV's)

You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

Filter bolted in

View from interior

2016 FEMA mobile homes

Resilience

You decide:

Bon Temps or *Couillion?*

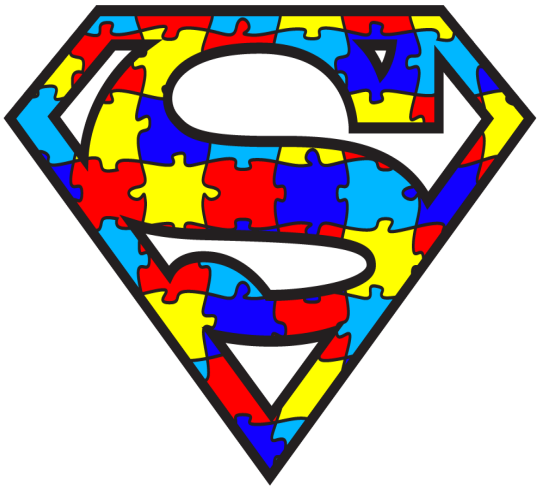
(Good Times) (Couyon)

Resilient Housing

can be quickly restored
at minimal expense
to a functional, healthy & comfortable home
following a natural hazard.

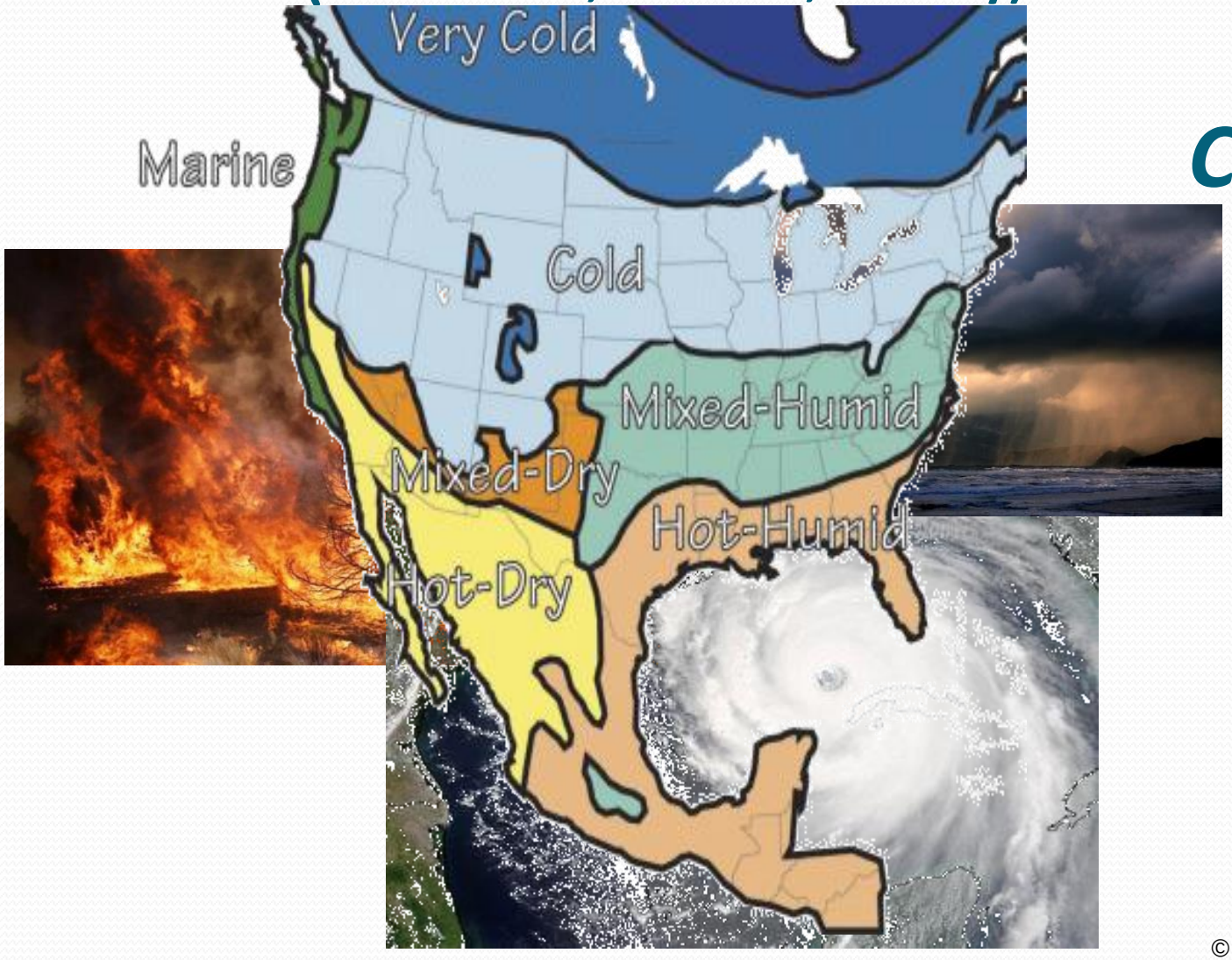
Resilient Housing

- ✓ Saves families from
  - ➢ long term displacement or homelessness
  - ➢ financial ruin
  - ➢ Ordeal, stress, turmoil
- ✓ Saves firms from loss of workers
- ✓ Reduces public cost (taxpapers' $)
- ✓ Offers opportunities for ***YOU***



To produce *resilient high-performance homes*

(i.e. durable, efficient, healthy) ….



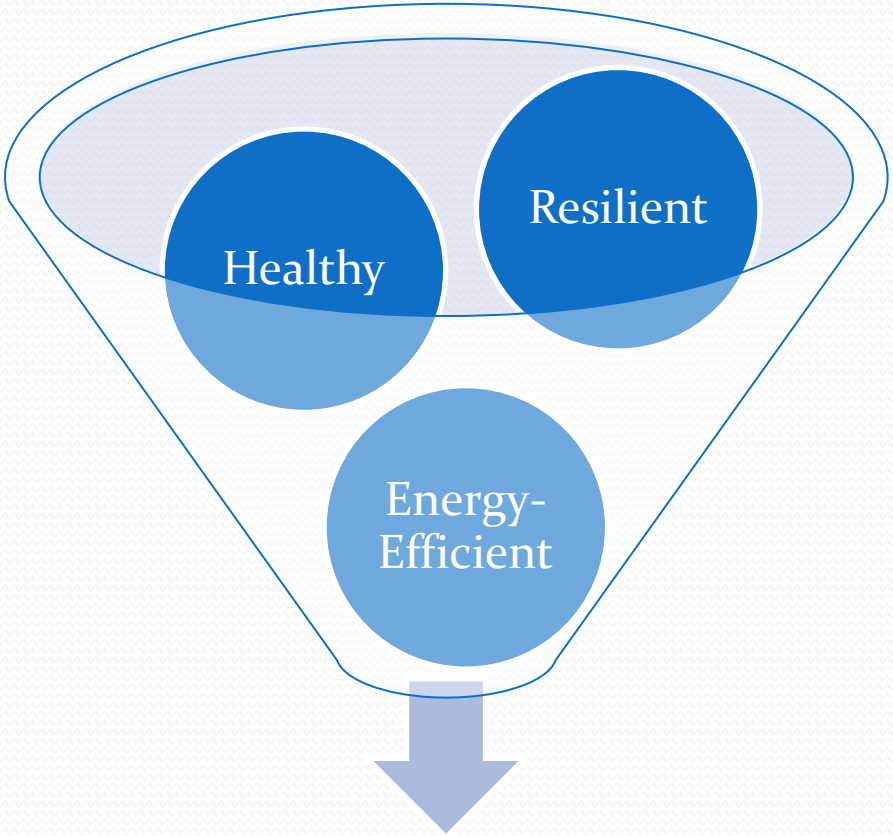
Climate, Conditions, AND Hazards Matter!

Durability Comes First!

It isn't "sustainable" or "affordable" if it doesn't survive.

Multi-disaster resistant
Decay resistant
Termite resistant

What people need is a *fusion*…



High Performance Home

A House is a System

of *dynamic*, interacting systems…

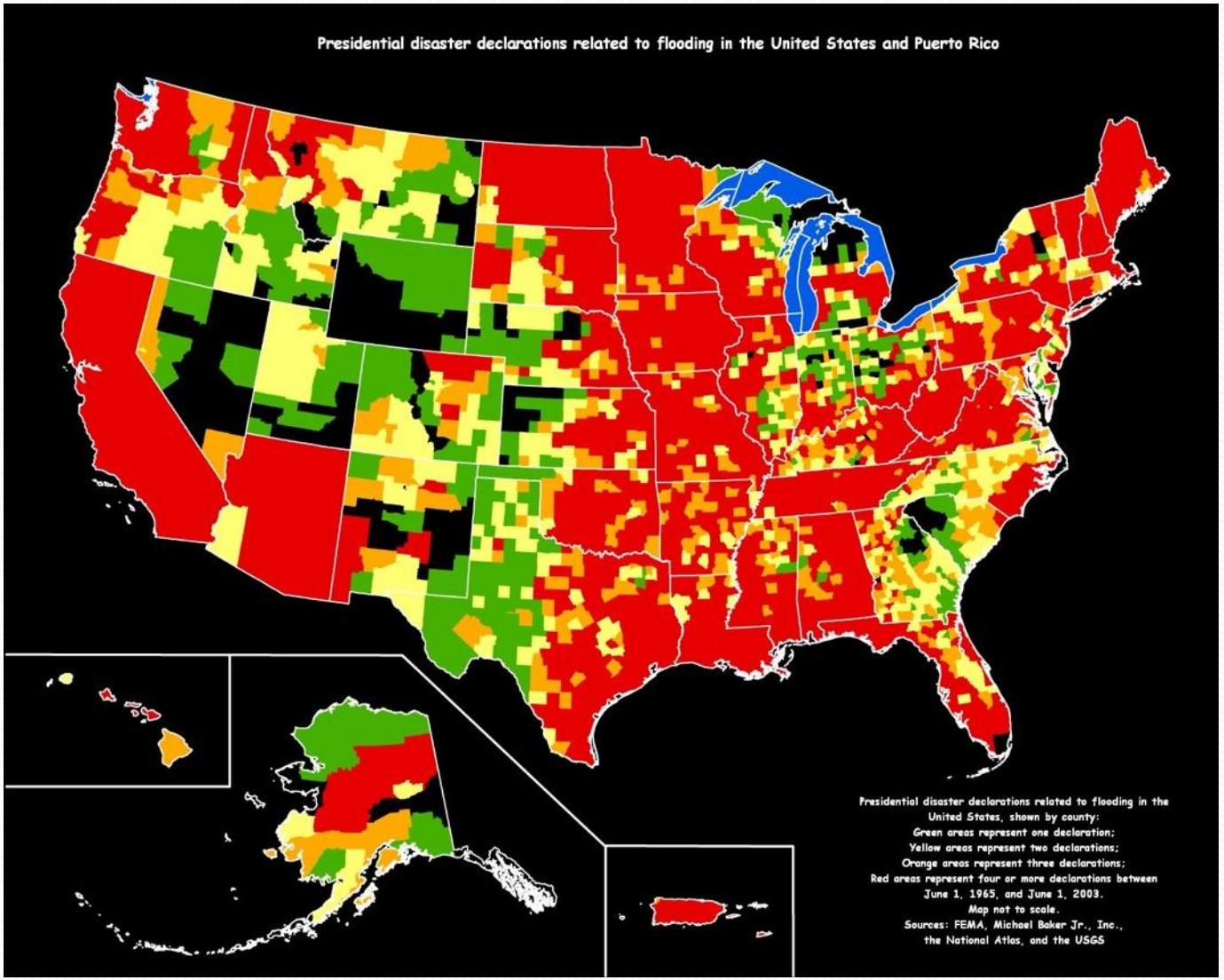
Thermal Envelope System ⟷ **Structural System**

HVAC System ✥ **Moisture Control System**

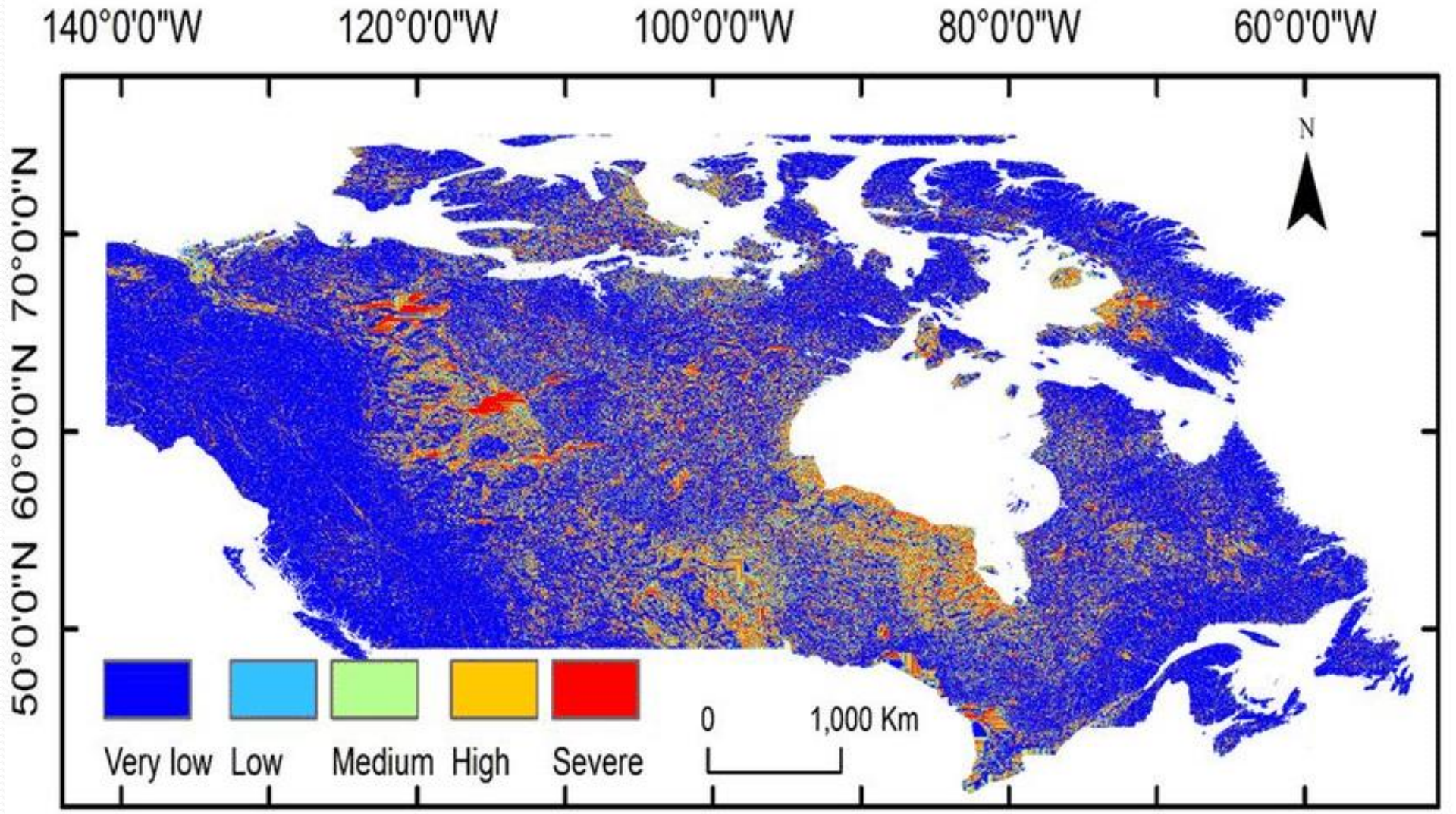
Plumbing System ⟷ **Electrical System**

The more energy-efficient the home, the more crucial this priority ranking.

Flood Disaster Declarations



Flood Hazard Map for Canada



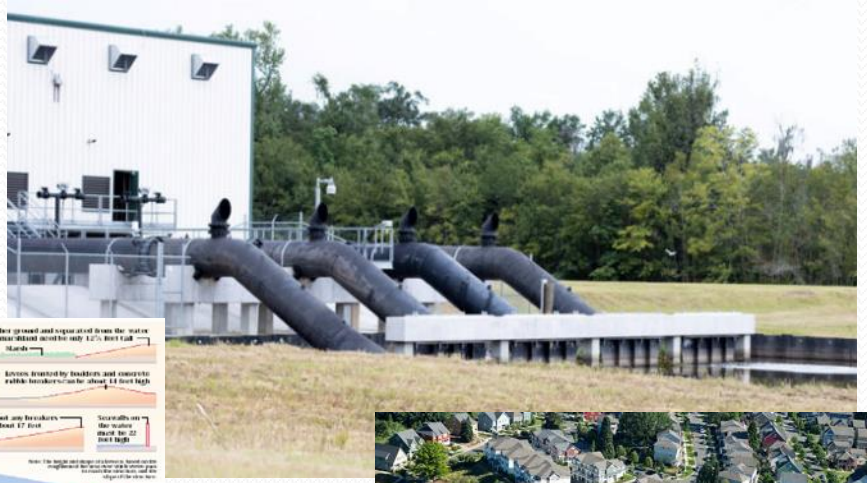
Strategies for Flood Resilience

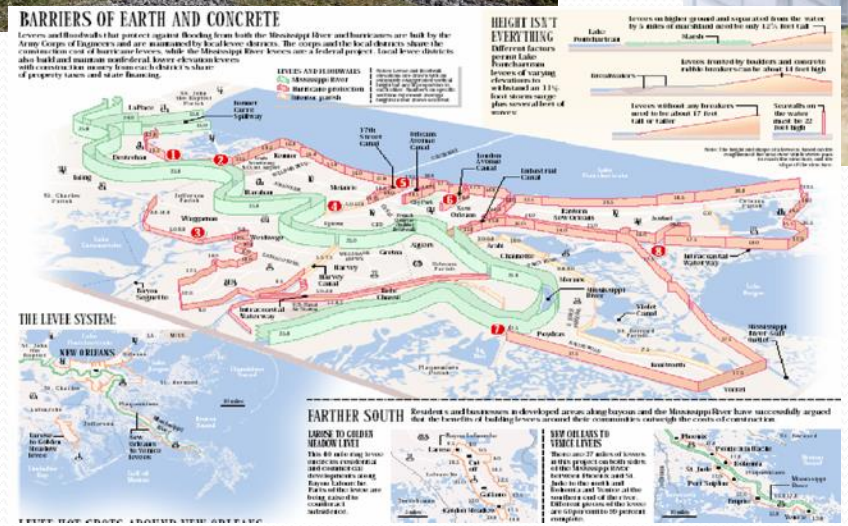
You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

Levees, Pumps, Ponds





You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

Levee "Protection"

You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

Flood Thy Neighbor

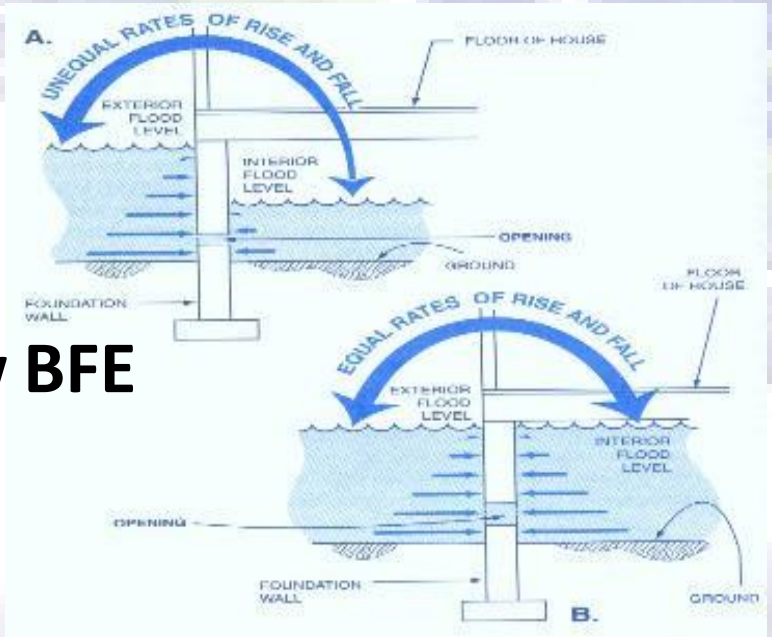
You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

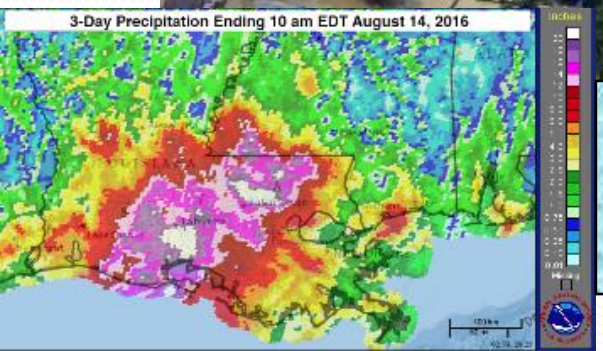
Base Flood Elevations (BFE)

- IRC uses NFIP **flood map zones:**
  - **Finished floor above BFE +1** (IRC 2018)
  - In V-zone, subfloor above BFE, no stemwalls
  - **Flood resistant materials below BFE**
  - Community may require “freeboard”
  - Flood vents below BFE



In 2016
The Great Flood

my homeland in south central La.



17–31 inches of rain in 3 days

70% of 100,000+ NOT in flood zone!

2017 and 2019

Houston, Texas Floods

20-60 inches of rain in 7 days

75% of 200,000+ NOT in flood zone!

You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

NEW NFIP Rating 2.0

- Foundation type and flood openings
- Elevated equipment
- First floor height (FFH) above grade (not BFE)
- Construction type (frame, masonry, other)
- Date of construction
- Square footage of living area
- Number of floors above ground
- Building replacement cost
- New policy
- Statutory discounts
- Other…

Flood Resilient Homes

- **Elevate 2+ ft. *above* BFE *AND* highest flood**

  (cushion of safety, lower insurance $)

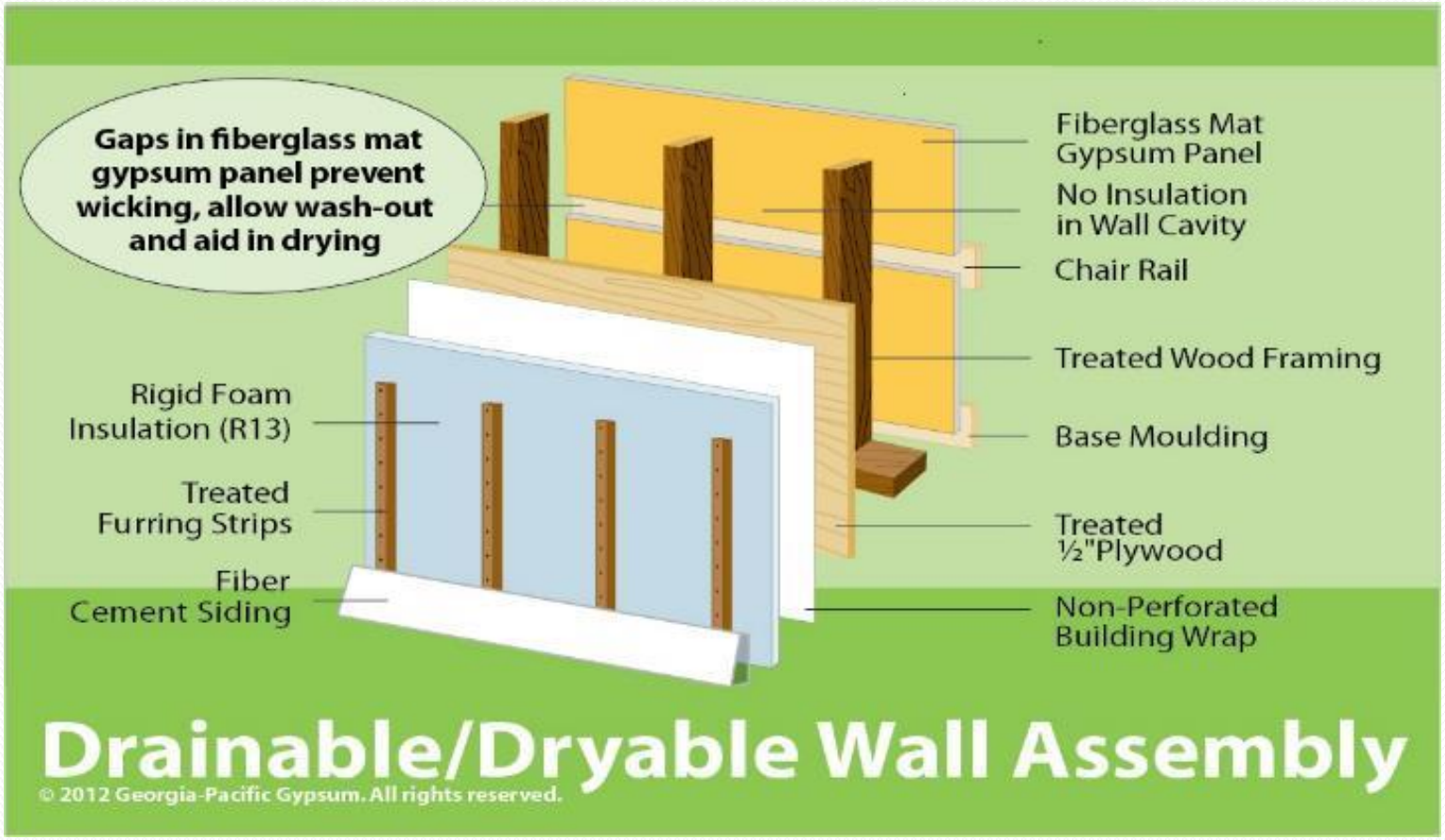
  - Pier and beam, pilings
  - Stemwall with flood vents
  - Slab cap on filled stemwall

- **Wet Floodproof to *possible* flood level** (future development, climate change, subsidence, etc.)
  - elevate equipment, utilities
  - water-resistant materials
  - removable wainscoting on a drainable wall

For lower premiums and cushion of safety,

ELEVATE

Flood-hardy!!!



For *POSSIBLE* future flood level

Flood Damage-Resistant Materials

FEMA Technical Bulletin 2

Table 2. Types, Uses, and Classifications of Materials (continued)

Types of Building Materials	Uses of Building Materials		Classes of Building Materials				
			Acceptable		Unacceptable		
	Floors	Walls/ Ceilings	5	4	3	2	1
Finish Materials (floor coverings, wall and ceiling finishes, insulation, cabinets, doors, partitions, and windows)							
Glass (sheets, colored tiles, panels)		■		■			
Glass blocks		■	■				
Insulation							
Sprayed polyurethane foam (SPUF) or closed-cell plastic foams	■	■	■				
Inorganic – fiberglass, mineral wool batts, blankets, or blown	■	■			■		
All other types (cellulose, cotton, open-cell plastic foams, etc.)	■	■				■	

Coming Soon – ASTM *Specification for Determining the Flood Damage Resistance Rating of Building Materials*

Flood Damage-Resistant Materials

FEMA Technical Bulletin 2

Table 2. Types, Uses, and Classifications of Materials (continued)

Types of Building Materials	Uses of Building Materials		Classes of Building Materials				
			Acceptable		Unacceptable		
	Floors	Walls/ Ceilings	5	4	3	2	1
Structural Materials (floor slabs, beams, subfloors, framing, and interior/exterior sheathing)							
Wood							
Solid, standard, structural (2x4s)		■		■			
Solid, standard, finish/trim		■			■		
Solid, decay-resistant[4]	■	■	■				
Solid, preservative-treated, ACQ or C-A		■		■			
Solid, preservative-treated, Borate[2]		■		■			
Structural Building Components							
Floor trusses, wood, solid (2x4s), decay-resistant or preservative-treated	■	■		■			
Floor trusses, steel[3]	■		■				
Headers and beams, solid (2x4s) or plywood, exterior grade or preservative-treated		■		■			
Headers and beams, OSB, exterior grade or edge-swell resistant		■				■	
Headers and beams, steel[3]		■	■				
I-joists	■					■	
Wall panels, plywood, exterior grade or preservative-treated		■		■			
Wall panels, OSB, exterior grade or edge-swell resistant		■				■	
Wall panels, steel[3]		■		■			

Comparison of Flooded Materials

A test of the water absorption, drying time, and after effects on selected building materials

Bradley Villars, LSU student Intern
Dr. Claudette Hanks Reichel, Professor and Director of LaHouse Resource Center

Comparison of Flooded Materials

Material Description

1 - Extruded Polystyrene Foam Panel (XPS)

Material Description: Closed-cell, rigid foam board with high strength skin, ½-inch thick

Manufacturer/Brand: DOW/Styrofoam Duramate Plus

Use: Insulating sheathing

Characteristics and Attributes:

- High, long-term insulating R-value (R5/inch). Sheathing application provides continuous insulation for enhanced energy efficiency.
- High compressive strength. Extra-strong facer resists damage (Duramate). Standard XPS has clear plastic skin.
- Closed-cell foam resists moisture in all forms; very low water absorption and water vapor diffusion.

Can serve as weather barrier and air barrier, if sealed.

*Cost: 4' x 8' x ½" standard XPS - $13; Duramate - $15; 1" standard XPS - $17

Results: Sample gained only 1 gram of water throughout the test and weighed slightly less after drying (indicator of material loss). There was no visible water damage or delamination.

2 - Polyisocyanurate Foam Panel (Iso board)

Material Description: Closed-cell, rigid foam board with facing, 1-inch thick

Manufacturer/Brand: DOW/Sturdy-R

Use: Insulating sheathing

Characteristics and Attributes:

- High insulating R-value (R 5-6/inch). Sheathing application provides continuous insulation for enhanced energy efficiency.
- High compressive strength. Strong facer resists damage. Also available with foil facing, providing radiant barrier.
- Closed-cell foam resists moisture in all forms; low water absorption and water vapor diffusion.
- Can serve as weather barrier and air barrier if sealed.

*Cost: 4' x 8' x 1" panel - $20; ½" foil faced panel - $10

Results: Sample gained 20 grams of water throughout the test and weighed less after drying (indicator of material loss). The highest net weight gain occurred in the first day. A water mark was visible about 2" above the submerged water line indicating wicking.

3 - Oriented Strand Board (OSB)

Material Description: Engineered wood panel (bonded wood flakes)

Manufacturer/Brand: Unknown

Uses: Structural sheathing, roof decking, subflooring

Characteristics and Attributes:

- Strong, stiff panel manufactured for load-bearing strength in construction.
- A viable alternative to plywood.
- Lower cost than plywood.
- More sensitive to moisture and mold than plywood (swelling and delamination); recent OSB is improved over past products. Superior moisture and mold resistant (higher cost) panels are now available.

*Cost: 4' x 8' x ½" standard panel - $13

Results: Sample of standard OSB gained 118 grams of water throughout the test and did not return to original weight (drying was incomplete) in the amount of time allowed (i.e. retained 4 grams water). Moisture wicked about 3" above the submerged water line. Sample had noticeable warping. The submerged portion was delaminating.

4 - Standard (Paper-faced) Gypsum Drywall

Material Description: Standard ½" thick gypsum core panel with paper facing on both sides

Manufacturer/Brand: Unknown

Use: Interior wall board

Characteristics and Attributes:

- Popular interior wall finish for non-fire-rated areas in residential construction.
- Quick installation and lower cost than plaster; easy to score and snap.
- Resists cracking, easy for DIY to patch holes.
- Paper facing vulnerable to moisture, mold and termites.

*Cost: 4' x 8' x ½" panel - $10

Results: Sample gained 136 grams of water on first day. It began to deteriorate and lost mass upon submersion. After drying stage, it weighed 25 grams less than the initial weight (indicator of loss of core gypsum material). Moisture wicked throughout the paper facing (4" above water line) and it delaminated after day 2. Sample loss strength and became brittle.

5 - Fiber Cement

Material Description: Composite of wood fiber and cement formed into siding boards or panels

Manufacturer/Brand: CertainTeed/Weatherboards Vertical Siding

Uses: Siding, trim, soffits

Characteristics and Attributes:

- Low-maintenance exterior finish material; simulates wood.
- Strong, stable, consistent.
- Moisture-, termite-, and decay-resistant.
- Available pre-primed, and factory finished (longer lasting paint).
- Moderate cost.
- Requires special saws, methods, and silica dust control; somewhat brittle and heavy.

*Cost: 4' x 8' x .312" panel - $11

Results: Sample gained 60 grams of water and returned close to the initial weight during drying stage. There was no visible water damage or delamination.

Experimental Procedure

To simulate flooding, material samples were suspended in a container of water, held halfway submerged for 7 days. On day 8, the container was emptied and the materials were suspended to air dry. Each day for 28 days, a visual observation was made and each sample was weighed as an indicator of water absorption and drying rate. During the flood stage, the data was recorded every day. During the drying stage, the data was recorded every 3 days.

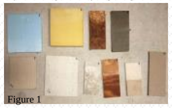


Figure 1


Figure 2


Figure 3

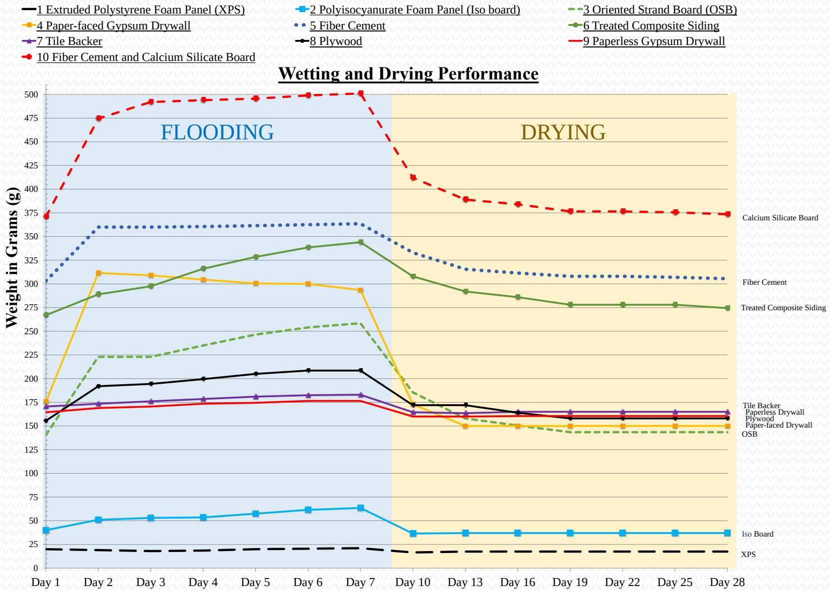
The top right photo (figure 1) shows how the material samples were suspended in the bin during the flood and drying stages.

The top left photo (figure 2) shows the material samples after the 7-day flood simulation (before drying).

The bottom left photo (figure 3) shows a sample being weighed as an indicator of the amount of water absorbed compared to dry weight (during flood stages).

Flooded Materials


These photos show each of the 10 material samples after the drying stage of the experiment.



This graph illustrates the level and rate of water absorption during a week of flooding (blue portion, days 1-7) and the level and rate of drying for three weeks (yellow portion, days 8-28). The lines depict changes in the weight of each material as it absorbed water and dried over time.

Results:

- The materials that absorbed the least water and dried quickly included: **XPS, paperless drywall,** and **tile backer.**
- Materials with modest absorption that dried quickly with little damage included: **Iso board** and **plywood.**
- The materials that absorbed substantial water, but dried over time with little or no damage included: **calcium silicate board, fiber cement** and **treated composite siding**.
- The materials that absorbed substantial water and showed significant damage after the drying period included: **paper-faced drywall** and **OSB**.

OSB, fiber cement, treated composite siding, plywood, and calcium silicate board did not return entirely to their initial dry weights during the 3 weeks of air drying.

Material Description

6 - Treated Composite Siding

Material Description: Engineered wood product treated with zinc borates, waxes, advanced binders and resin overlay

Manufacturer/Brand: Louisiana Pacific/LP SmartSide

Uses: Siding, exterior trim

Characteristics and Attributes:

- A tan, wood-grain textured surface; closely resembles wood siding, pre-primed and ready to paint.
- High durability; resists moisture, decay and termite damage.
- Manufactured with SFI-certified environmentally friendly process.
- APA rated for structural applications.
- Lighter than comparable fiber cement panel; cuts with standard woodworking tools.

*Cost: 4' x 8' x .375" - $30

Results: Sample gained 80 grams of water throughout the test. After drying stage, it remained 10 grams heavier than the initial weight (indicating residual moisture retention). There was no visible water damage or delamination of the material.

7 - Tile Backer (gypsum)

Material Description: Treated, moisture-resistant gypsum core with fiberglass mat facings and water-resistant coating.

Manufacturer/Brand: Georgia Pacific/DensShield Tile Backer

Use: Tile substrate (backer board) for walls, ceilings, floors and countertops suitable for high moisture areas.

Characteristics and Attributes:

- Moisture resistant with built-in water barrier, omitting need to add membrane for wet areas.
- Highly mold resistant.
- Lighter than cement or fiber cement boards; easy to cut.
- Tiles can be glued straight to the board.
- Can be painted or used in non-wet areas.

*Cost: 4' x 8' x ½" panel - $30

Results: Sample gained 13 grams of water throughout the test and dried to below the initial weight (6 grams below initial weight, indicating slight material loss). Moisture wicked up most of the sample after day 2. After the drying stage, a flood line and slight pitting and erosion of gypsum below the flood level is visible.

8 - Plywood

Material Description: Engineered wood product made of wood sheets in thin layers (plies) that are glued together 90 degrees to one another

Manufacturer/Brand: Unknown

Uses: Structural sheathing, roof decking, subflooring

Characteristics and Attributes:

- Strong, uniform structural panels.
- Many different types and grades for various uses; Sande plywood has sanded finish suitable for interiors; CDX is typical for structural sheathing and subflooring.
- More moisture and mold resistant than OSB; more resilient and less prone to damage from moisture exposure; more water vapor permeable.

*Cost: 4' x 8' x ½" CDX panel - $25

Results: Sample gained 50 grams of water throughout the test and returned to near initial weight after drying stage (5 grams heavier). Moisture wicked about 2" above the water level. Minor cracks and a water line are visible. There was no noticeable delamination.

9 - Paperless Gypsum Drywall

Material Description: Moisture resistant gypsum core panel with fiberglass matt facings on both sides

Manufacturer/Brand: Georgia Pacific/DensArmor Plus

Use: Interior wall board

Characteristics and Attributes:

- Interior wall finish, well suited for moisture prone areas.
- FEMA approved flood-damage resistant material.
- Mold resistant, no food for termites.
- Resists warpage due to humidity; can use ½ inch panels in ceilings and 24" on center framing without bowing.

*Cost: 4' x 8' x ½" board: $20

Results: Sample gained 10 grams of water throughout the test and returned to slightly below initial weight during the dry stage. Moisture wicked 1" above the water level. After the drying stage, superficial pitting of edges of gypsum below flood level. Sample remained in sound condition and facing intact.

10 - High-density Calcium Silicate Board

Material Description: High-density composite panel of fiber cement reinforced calcium silicate

Manufacturer/Brand: Amnova/Redstone MEGA board

Uses: Interior wallboard and backer board for walls, ceilings and floors.

Characteristics and Attributes:

- High strength and impact/shock resistant.
- Mold-resistant, moisture-resistant and water vapor permeable – no paper, no gypsum.
- Fireproof, heat isolating and sound absorbing material.
- Resists warping and swelling in high humidity and flooding.

*Cost: 2'8" x 4'0" x ½" panel - $35 (4' x 8' area = $105

Results: Sample gained 130 grams of water throughout the test and returned to near initial weight in drying stage (2-3 grams heavier than the initial weight). Water wicked up entire sample after day 2, but there was no deterioration and no visible damage or loss of strength.

*Cost is approximate based on June 2017 price search.

Results

BEST PERFORMANCE

XPS Foamboard

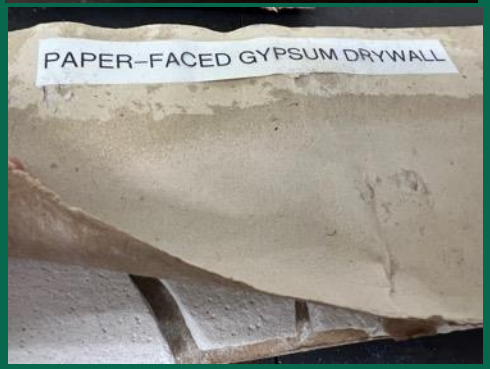
Paperless Drywall

Absorbed little water, dried quickly, *NO damage*.

POOR PERFORMANCE

OSB Panel

Paper-faced Drywall

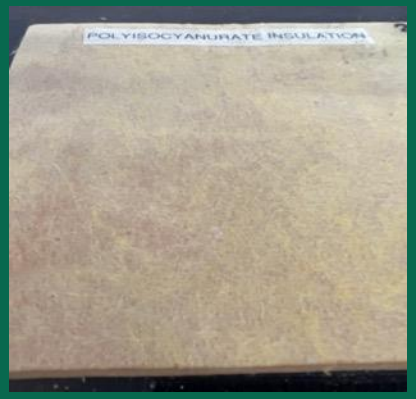


Showed substantial permanent damage.

Results

GOOD PERFORMANCE

Polyiso Foamboard



CDX Plywood

Modest absorption, dried fast, minimal damage.

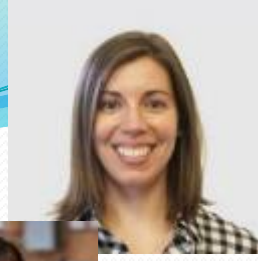
OK PERFORMANCE

Fiber Cement

Treated Composite

Higher absorption, dried slower, minimal damage.

Build Resilient!



2008 **2010**

The *Wash-N-Wear* Houses

Prototype post-Katrina demonstration homes in New Orleans

Building Science Corporation

Building America U.S. Department of Energy

Catholic Charities Archdiocese of New Orleans

U.S. Department of Energy | Energy Efficiency & Renewable Energy

LaHouse Home and Landscape Resource Center

LSU AgCenter Research & Extension

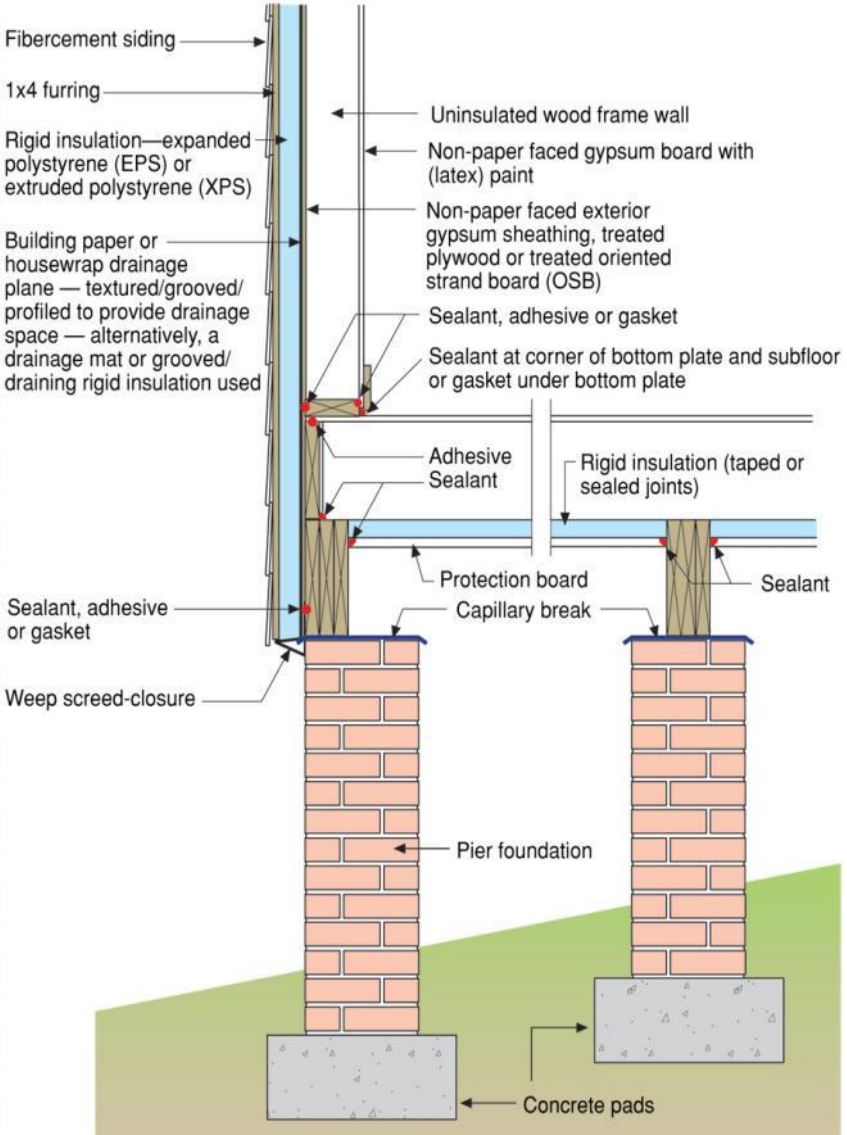
Prototype *Green Dream* Homes 1 & 2

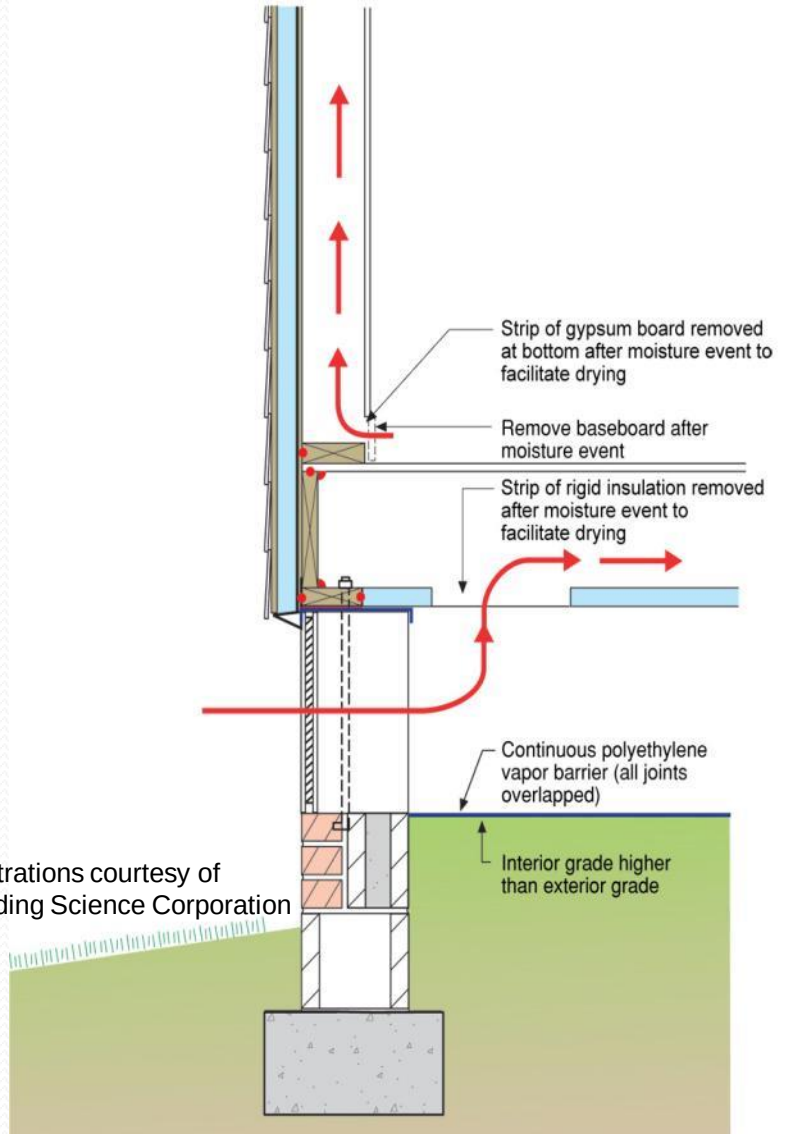
(Flood-hardy, strong, durable, energy-efficient, healthy, affordable)

- **Flood-hardy** materials and building systems
- **Elevated** on piers to BFE +2
- **Wind connections,** sheathing for 130 mph
- **Termite-resistant** borate-treated lumber, plywood
- **Rain, moisture, air** and **thermal controls**
- **HVAC** for low energy and healthy home

Wood frame, Flood-Hardy *(drainable, dryable)* Building System

(solid lumber, plywood & closed cell foam insulation)





Illustrations courtesy of Building Science Corporation

Elevated, Stable Foundation

- **Elevated to BFE + 2** (5 ft. above grade)
- **Pier and beam:** precast concrete piers on continuous footings

Flood Hardy Materials

solid lumber & plywood – no OSB or LSL in floor and walls

Flood Hardy Materials

Paperless drywall w/ moisture resistant core – no mold food

Tile flooring

Fiber cement siding and trim

Flood Hardy Materials

GD 1: 2.5” closed cell spray foam in wall cavities – partial fill

GD 2: 2” rigid Iso foam board outside sheathing & wrap

GD 1

GD 2

GD1 Solution:

Drainage plane AND space

Furring strips over non-perforated housewrap w/ screen wrap insect excluder

Fiber cement siding

GD2 Solution: Drainage Plane AND Space

1. Non-perforated housewrap over plywood sheathing.
2. Insect screen draped over bottom flashing.

3. Foil-faced 2” rigid foam insulation over housewrap.
4. Furring strips over foam board, screen wrapped over strips.

5. Trim out window well.
6. Fiber cement siding, trim.

Flood Hardy Materials

GD 1: Fire rated rigid foam under floor joists, taped & sealed

GD 2: Closed cell spray foam between floor joists, rim

GD 1

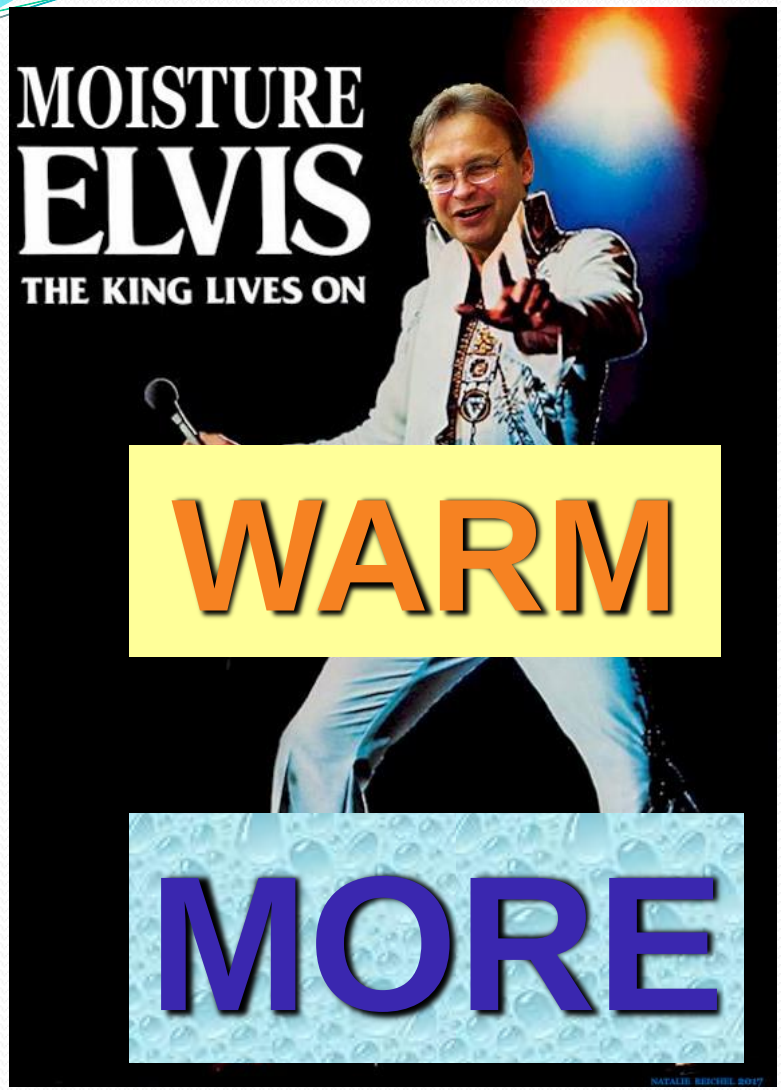
GD 2

Warm-humid Weather

Raised floors rot and cup in the summer!

Cool A/C
+ impermeable flooring
+ permeable insulation

- **wet subfloors**
- **cupped wood flooring**
- **mold and decay fungi**
- **termite attraction**



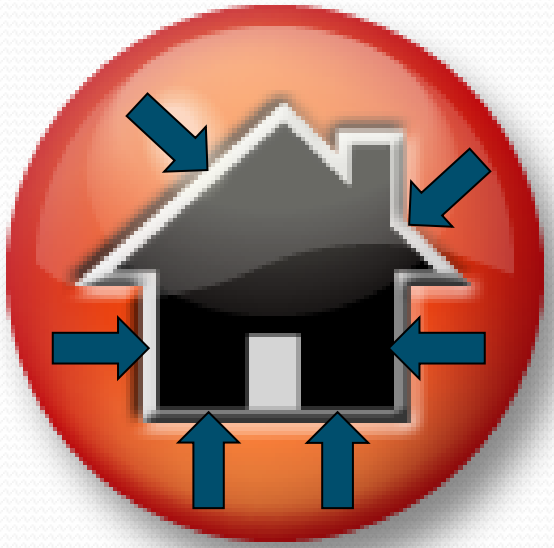
Moisture Flows…

WARM → **COLD**

MORE → **less**

So….

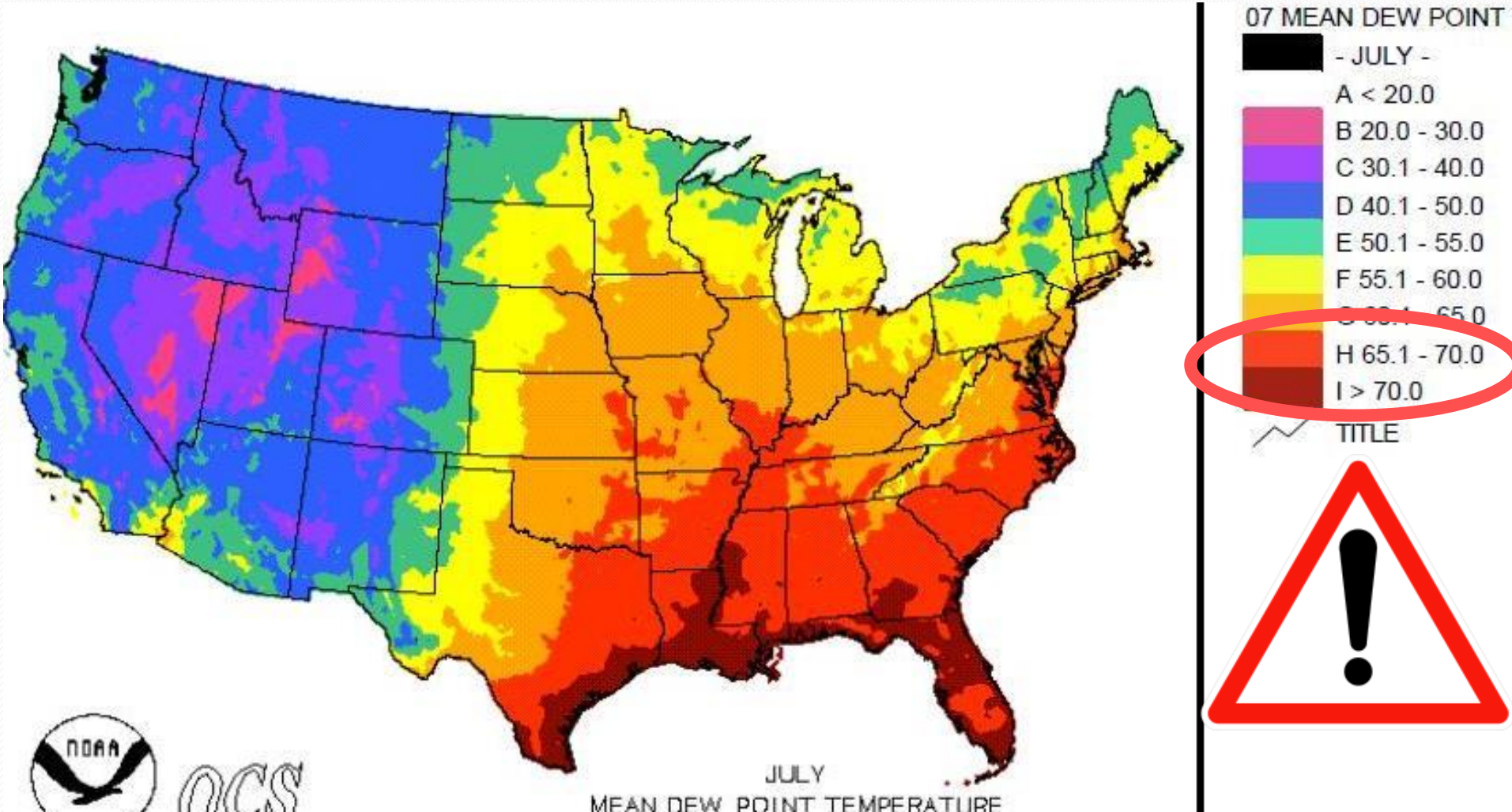
Which way does it flow?

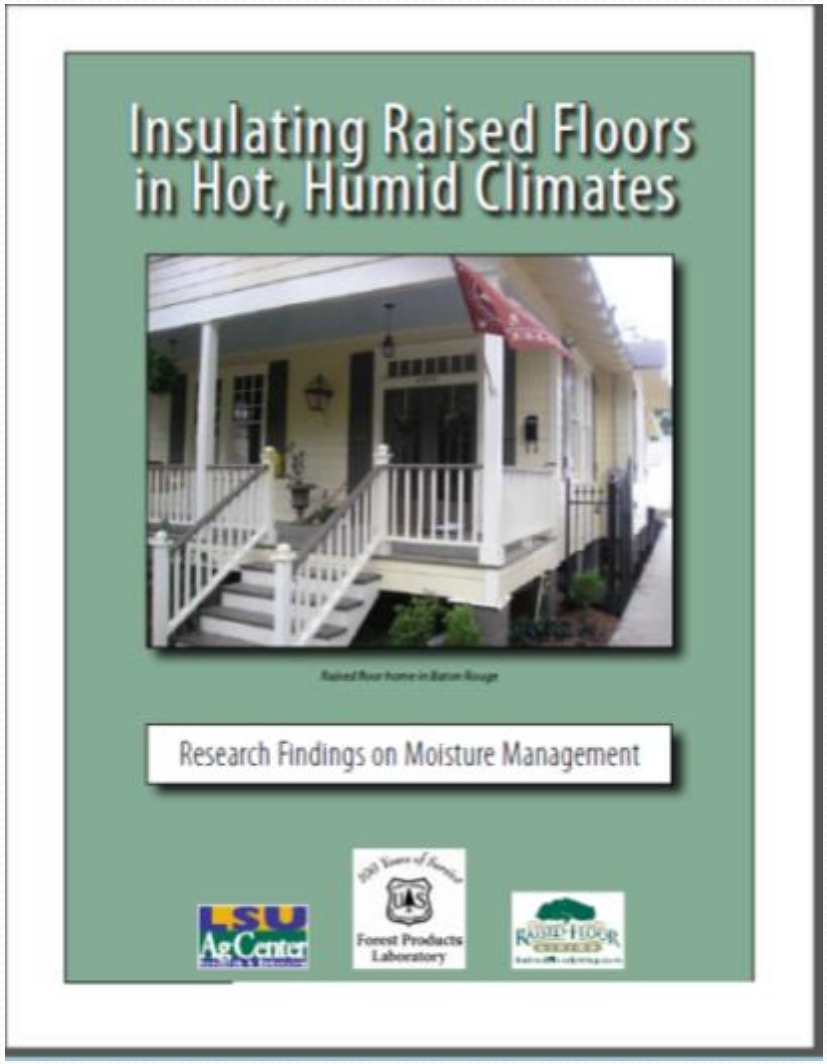


Hot and humid outside
+ Cool, dry A/C inside

Dewpoint

Temperature where condensation occurs





Available at *LaHouse Resource Center* web site

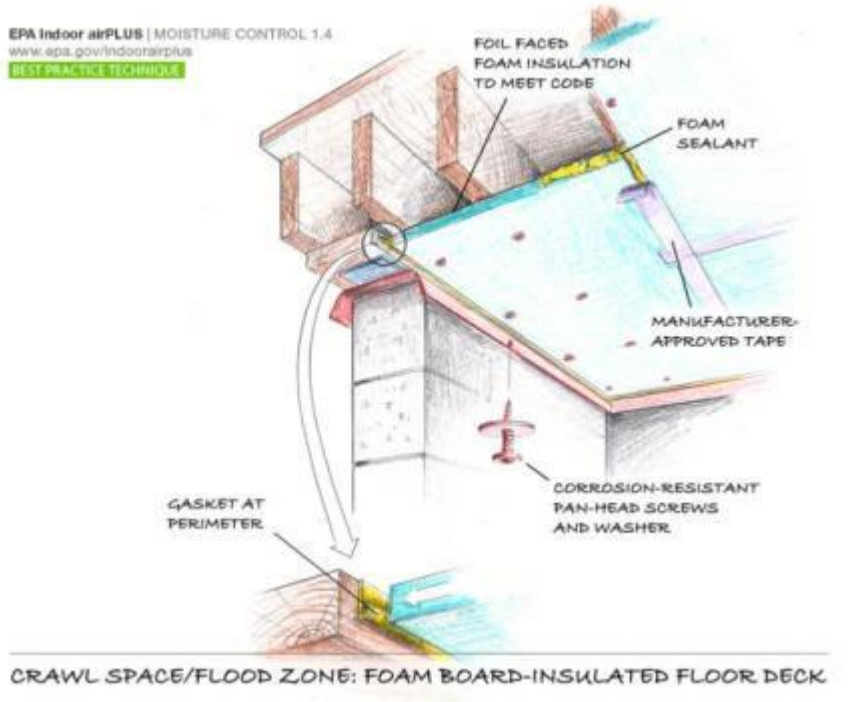
www.LSUAgCenter.com/LaHouse

Raised Wood Floor Option 1:

Sealed, Rigid Foam Panels Under Floor Joists

Airtight, low-perm, insulation system – protects entire subfloor

- **Foil-faced Iso board** (fire code)
- **Taped seams**, **sealed** edges & penetrations
- Spray foam **insulated rim**
- **Termite shield, capillary break**
- **Flood vents or open** pier & beam



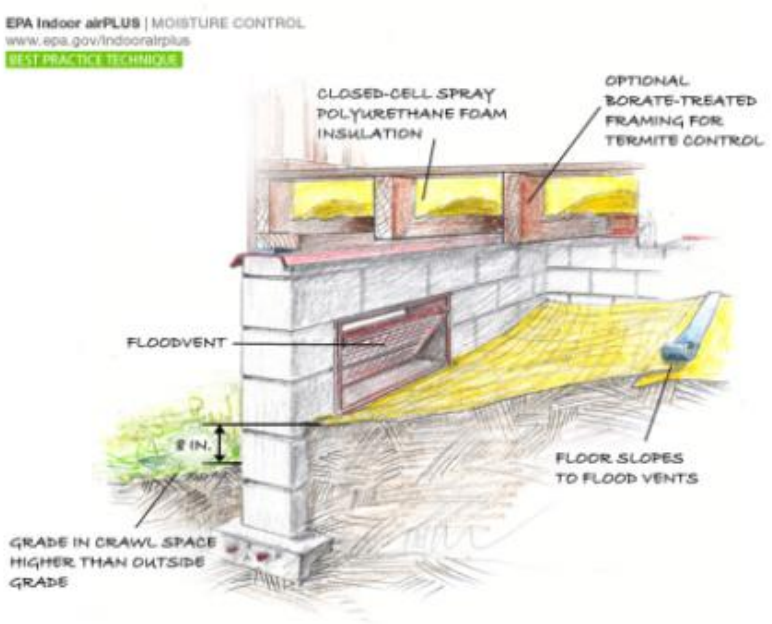
U.S. Environmental Protection Agency's "Indoor air PLUS" new homes labeling program <www.epa.gov/indoorairplus>, see Technical Guidance-Moisture Control; Illustrations- Dennis Livingston, Community Resources.

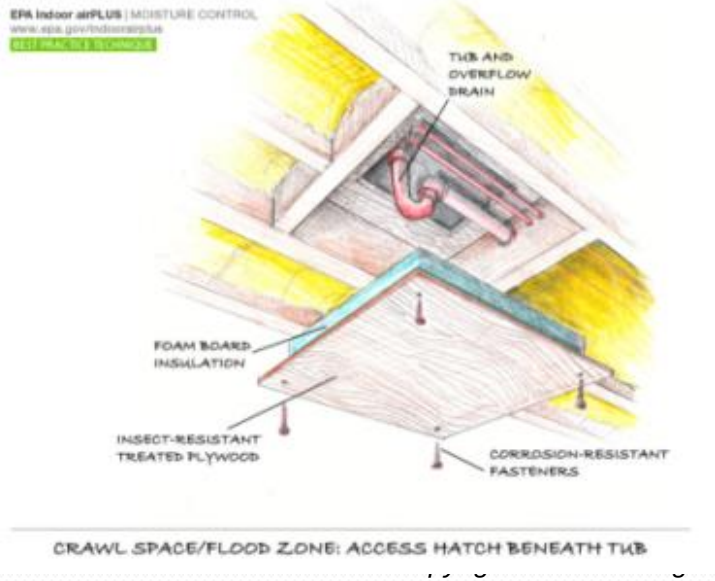
Raised Wood Floor Option 2:

Closed Cell Spray Foam

Airtight low-perm insulation system

- **Min. 2 in.** (R-13 & vapor retarder)
- **Inside grade higher** than outside
- Plastic **ground cover**
- If enclosed, **coat joists**
- **Termite shield** below wood





You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

sealed crawlspace

You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

sealed crawlspace at Joe's house

(NO flood risk)

Hurricane Hardy Roof

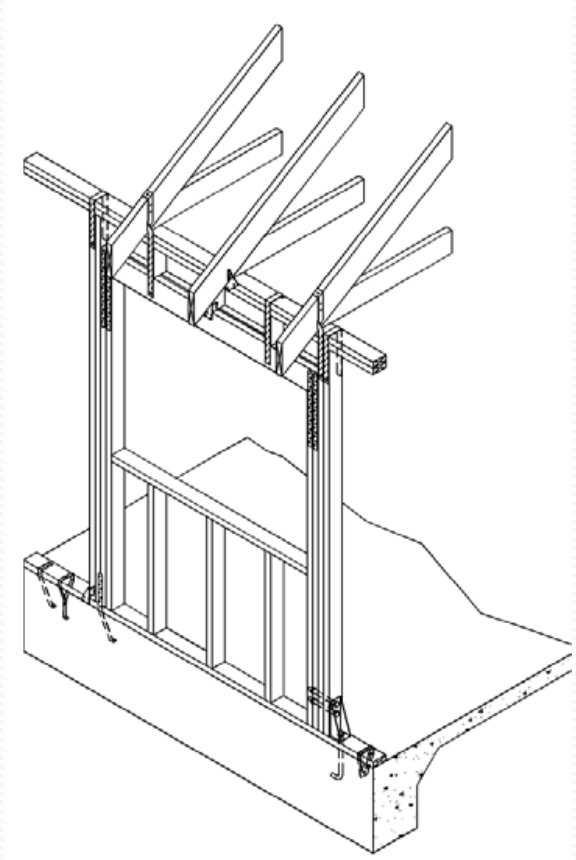
Plywood decking, **ring shank nails**, 6 in. spacing

Peel-and-stick membrane – ***secondary moisture barrier***

Class H (150-mph) **wind-rated, Class 4 hail-rated** shingles

Continuous Load Path

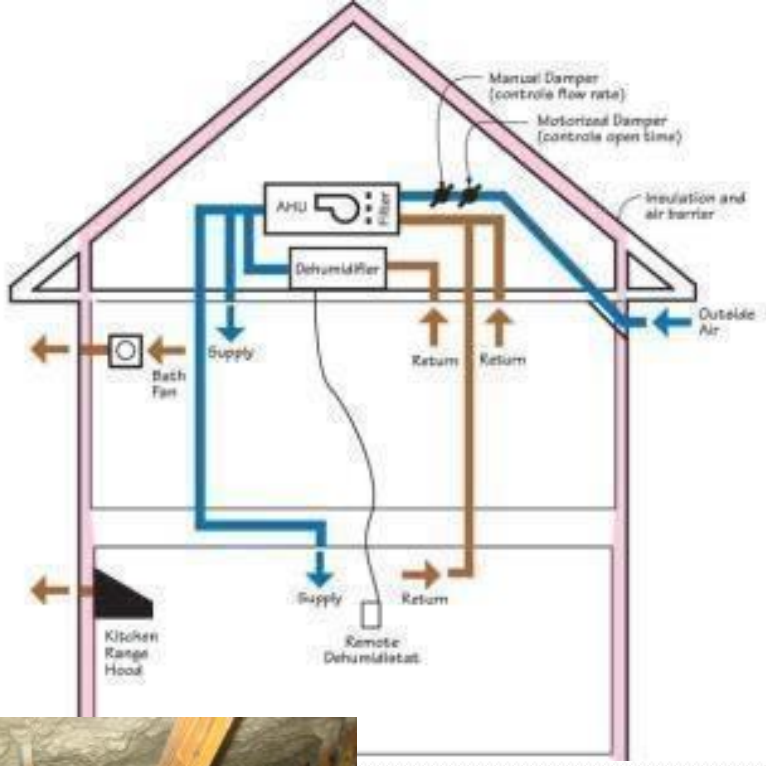
from roof to foundation

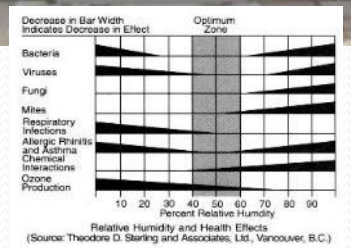


High DP, Impact Rated, Flood-hardy
Energy Star Windows and Doors

High, Dry & Healthy Efficient HVAC

- HVAC in semi-conditioned, unvented attic
- Elevated outdoor unit
- Controlled fresh air ventilation
  - Clean outside air ducted to AH
  - Filter plus flow controller
  - Positive pressure: dries building in hot, humid climate
- Spot exhausts
- Supplemental dehumidification





Materials That *Last*

- Foundation for expansive soils
- Treated woods
- Corrosion resistant hardware
- Pre-primed fiber cement siding
- 30-year HP roofing (UL Class 4 hail, Class H wind)
- 20-year window glass
- Long-lasting floorings, countertops, factory finish, moisture resistant
- Energy Star equipment with long warranties

You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

If (or when) the levees fail again…

They won't be long term homeless, again.

You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

Newer flood-hardy wood-frame building system

(Source: Building Science Insights 101 – *Rebuilding Houston*)

- **XPS sheathing + cc foam**
  - **No wood sheathing**
- **CC foam provides racking resistance**
- **Washable, drainable, dryable**
- **Higher R-value**

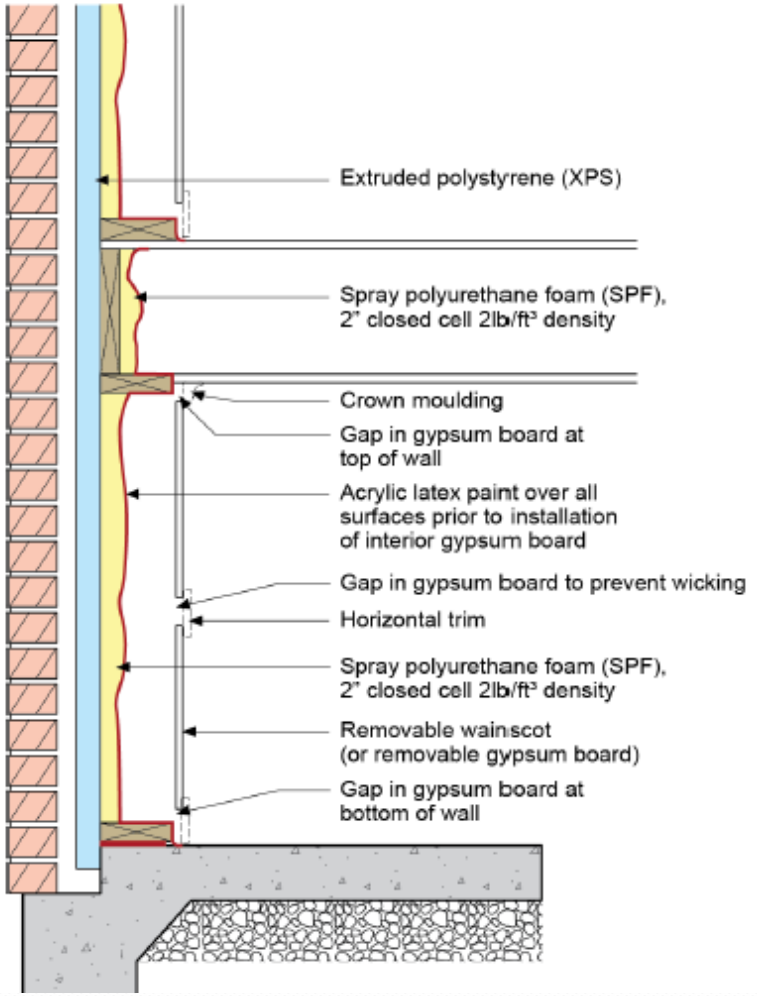
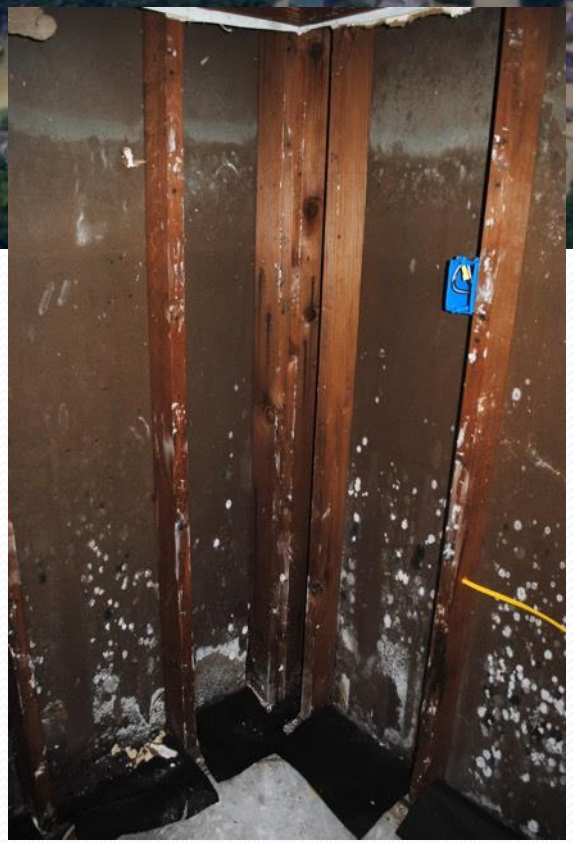


Illustration courtesy of Building Science Corporation



Now what about existing homes?

Restore for MORE than Before

Resilient

Healthy

Efficient

to create a silver lining

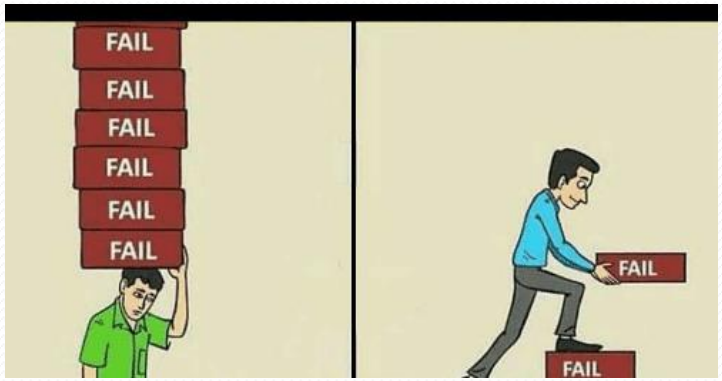
You decide:

Bon Temps or *Couillion?*

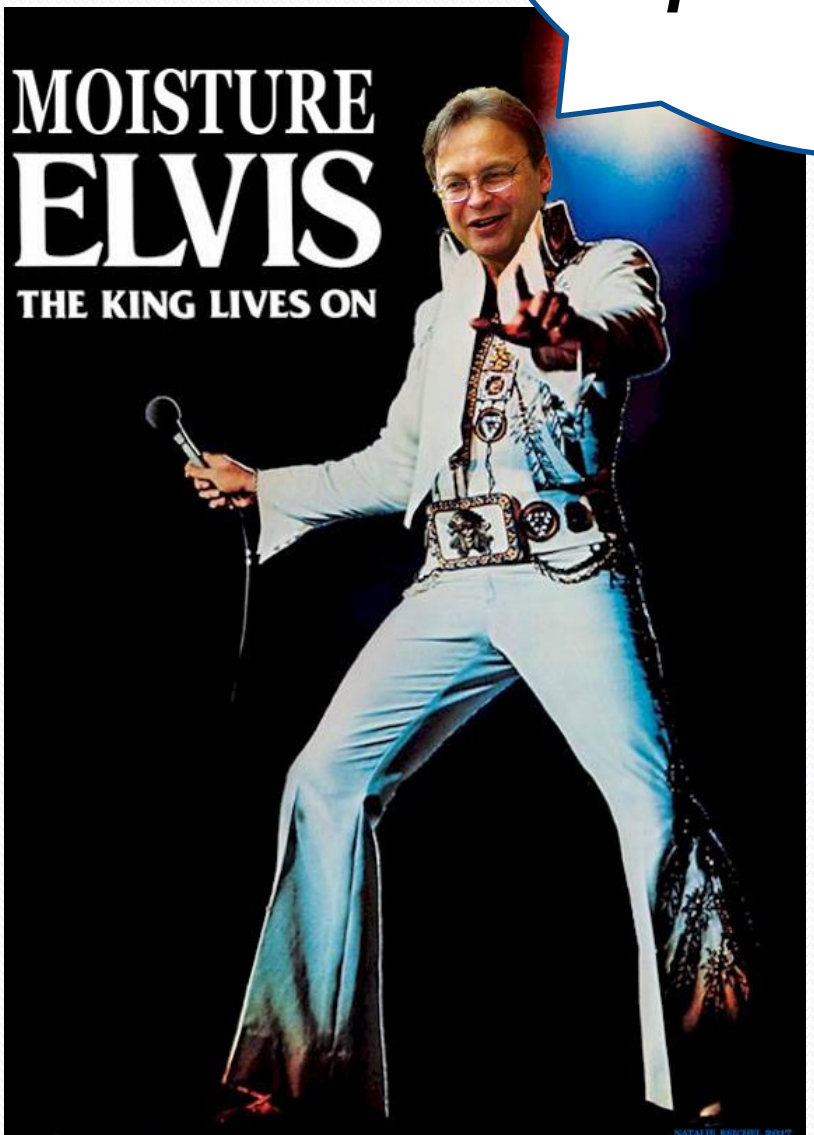
(Good Times) (Couyon)

NFIP Flood Insurance

- Pays only to restore home with **same vulnerable materials** (not resilient upgrades)
- "Substantial damage" triggers **requirement to elevate** and bring up to code
- But provides **only $30,000**, so..



Don't do stupid things!



FAQ's: After Gutting Your Flooded Home

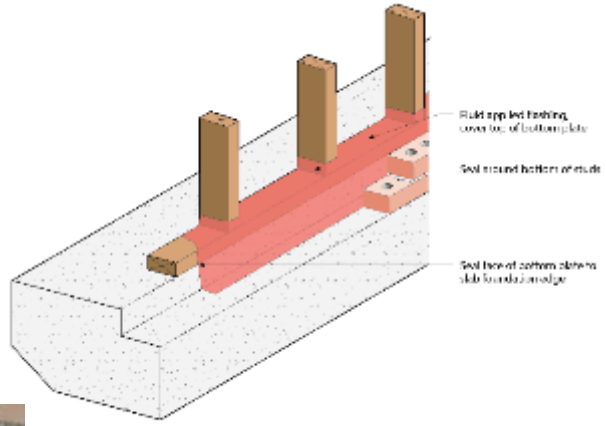
1. *My home is gutted above the flood level. Now what?*
2. *Does bleach kill mold? Should I clean with bleach?*
3. *What should be sprayed in wall cavities, etc.?*
4. *Does flooding affect my termite treatment?*
5. *Who should I hire to remediate or apply treatments?*
6. *So how should mold be removed and prevented?*
7. *What is "speed drying"? I'm using fans, so why is it taking so long?*
8. *How do I know when it's dry enough to restore?*
9. *Do I need a "clean home certification"?*
10. *What's that material between the studs and bricks (or siding)? Is it needed?*
11. *The studs are dry, but not the sheathing/subfloor. What should I do?*
12. *Must siding be removed to help exterior sheathing dry?*

Lead-safe (RRP)
Clean + speed dry
15%MC, 30-60% RH
Borate spray

***Clean Home* cert**
Toxic biocides
Sealants
Fiberboard

13. What's that black plastic/tar paper at the bottom of the wall cavity, between studs and sheathing? What should I do with it?

- **Brick ledge flashing**
- **Installed wrong, but still needed**
- **Slit to allow drying, then restore**
- **OR, replace with new vinyl or liquid applied flashing**



14. What should be done with brick weep holes?

- **Remove mortar mounds**
- **Clear weep holes**

15. When damaged sheathing is removed (since it's rotten, soft, won't dry, mold infested fiberboard, etc.), how can it be replaced?

16. I can't afford to replace the brick veneer, so now what?

Restoration Method Options:

1. CC spray foam with rainscreen

- *Rainscreen* strips on brick for drainage
- 2.5" closed cell spray foam behind & between studs

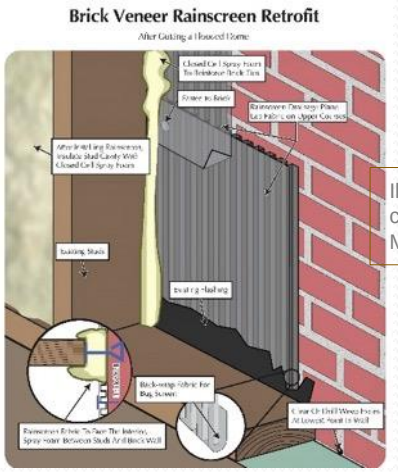


Illustration courtesy of MTI

2. CC spray foam with thin XPS sheets

- Thin XPS sheets with shims for drainage
- 2 " closed cell spray foam between studs

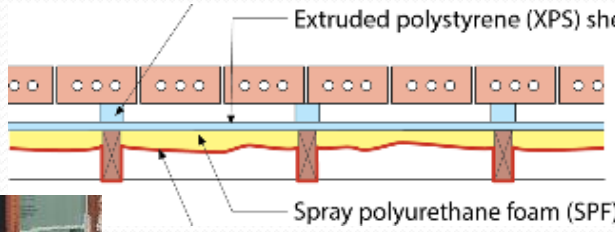
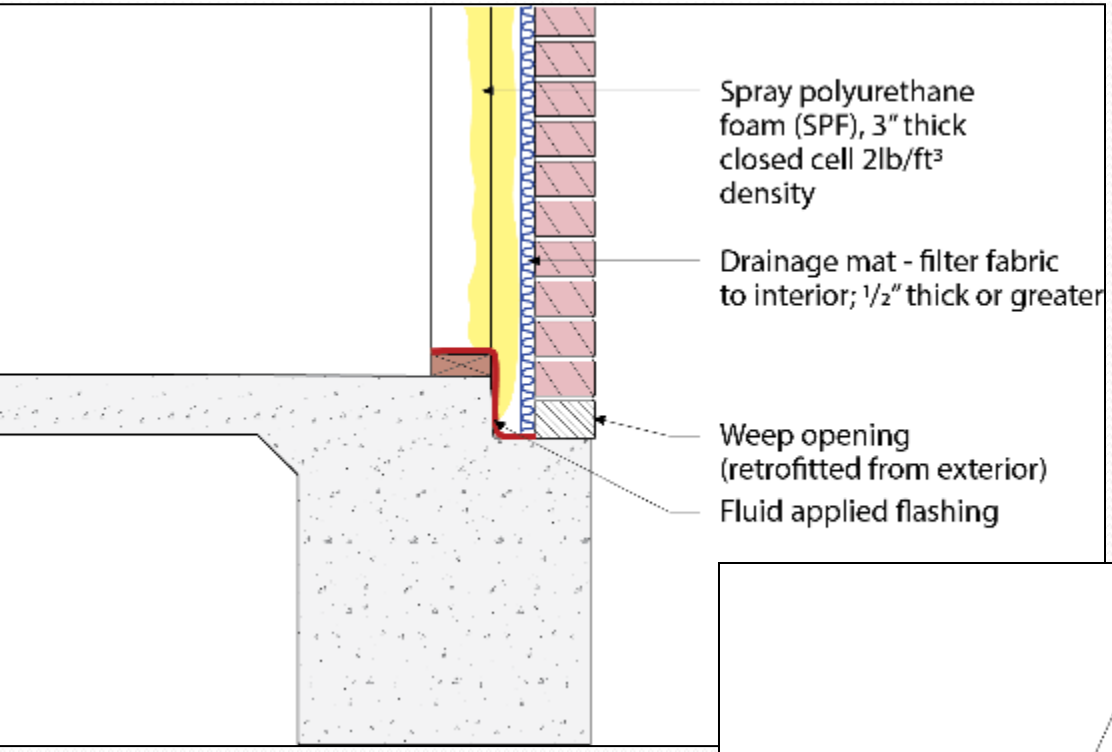


Illustration courtesy of Building Science Corporation

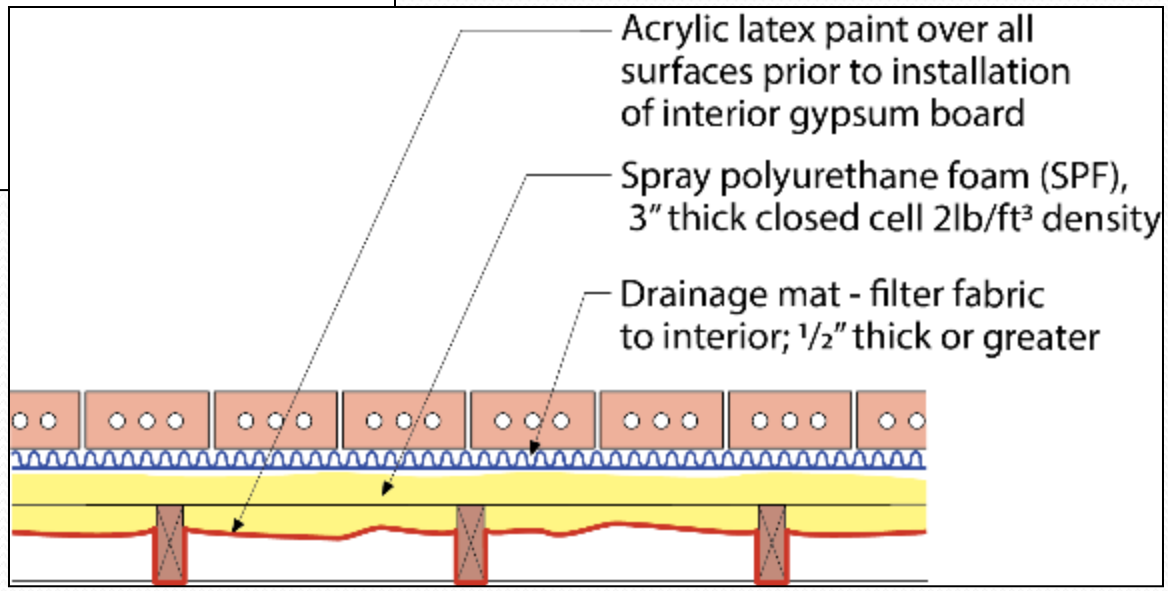
3. Rigid XPS foamboard inserts

Video of flood hardy restoration alternatives

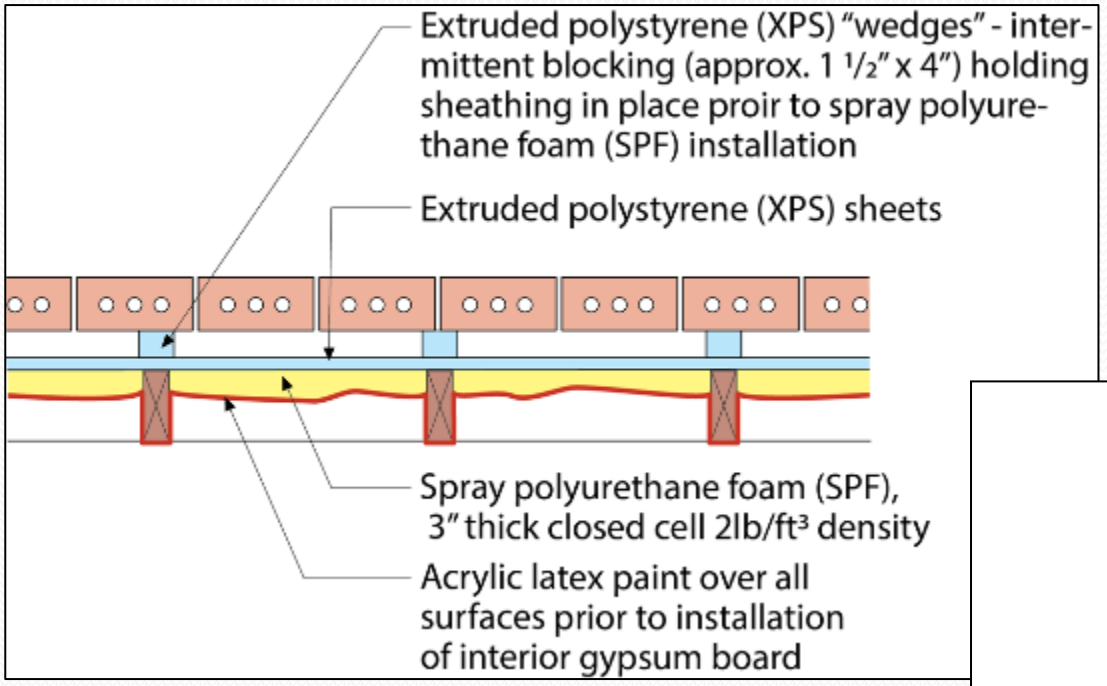
Closed Cell Spray Foam with Rainscreen Method



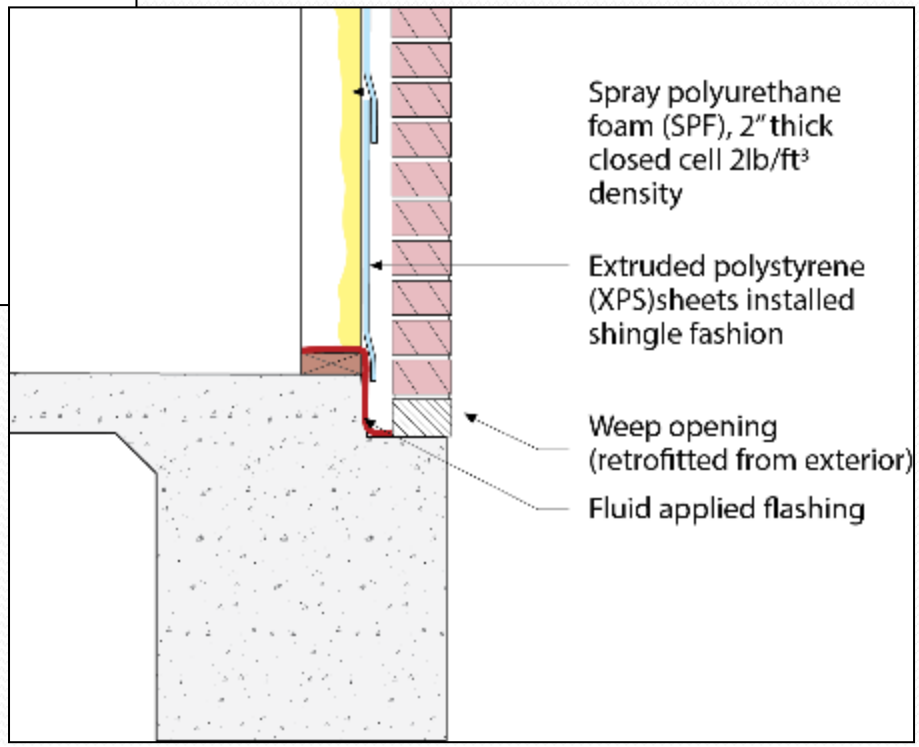
Illustrations courtesy of
Building Science Corporation



Closed Cell Spray Foam with *Thin XPS Sheets* Method



Illustrations courtesy of
Building Science Corporation



CC Spray Foam Methods
Considerations

- Provides **WRB**; protects studs
- **Adds structural capacity** (2" cc foam between studs)
- **R 13+ air-tight insulation** system for energy efficiency
- Can be ***flood-hardy, washable, drainable, dryable***
- **Permit officials** may require 1-inch space
- Will **hamper drying**- limit to **60% fill,** avoid coating studs
- Need **well-trained, pro foam applicator**
- **Cost**

Rainscreen method:

- **Retains & supports brick ties**
- **Faster, easier**;
- **More expensive**

Thin XPS sheets method:

- **More time & labor** - remove brick ties, nails, and insert shims
- May need **retrofit brick ties**
- **Less expensive materials**

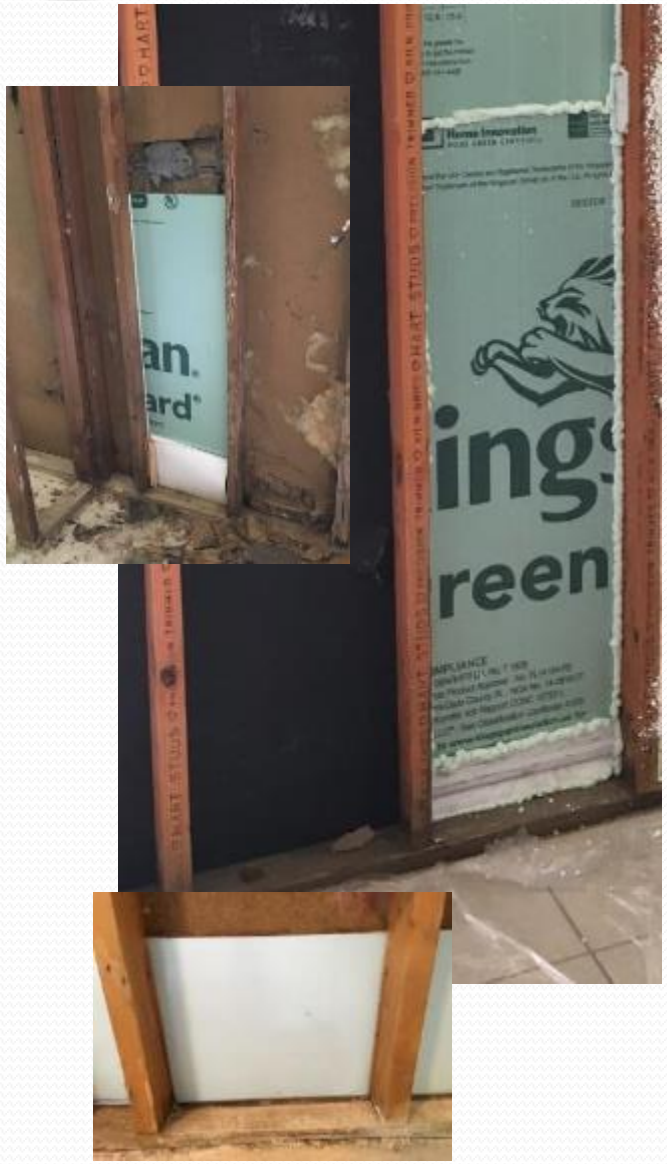
XPS Foamboard Method

- **Restore brick ledge flashing**
  - Repair, replace or liquid applied
- **Protect exterior of studs**
  - Retain sheathing behind studs or paint
- **Cut XPS foamboard to fit each cavity**
- **Insert XPS** between studs, behind flashing
  - Ensure **drainage space** (shims)
- **Seal** w/ compatible caulk or foam
- **Add** more **insulation**
  - More XPS layers for flood-hardy

XPS Foamboard Method

Considerations:

- **DIY method**; off-the-shelf materials
- **Labor intensive,** time, detail work
- XPS is **WRB,** shingle-fashion with flashing
- 1” = R 5, caulked airtight **(energy upgrade)**
- **Exterior of studs exposed,** so need paint or retain sheathing
- **May need structural bracing**
- **Multiple layers XPS needed for flood-hardy**



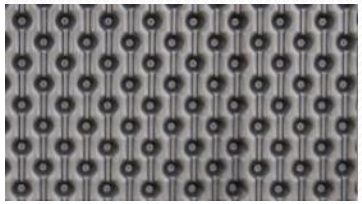
17. Where can I get a "rainscreen" or vent baffle product to maintain drainage space behind brick veneer?

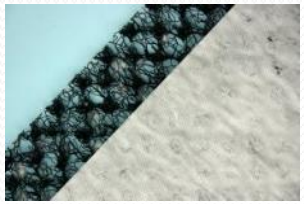
No endorsements, but we found available:

- ADO Brand Durovent® polystyrene air channel (cut to fit)
- Advanced Building Products, Inc. Mortairvent® 203 rainscreen
- Benjamin Obdyke Home Slicker® Plus Typar® rainscreen 10 mm
- Brentwood Industries AccuVent® cathedral ceiling vents (16" o.c.)
- Cosella-Dorken Products Inc. Delta-Dry® ventilated rainscreen
- MTI Masonry Technology Inc. 10mm Sure Cavity™ rainscreen drainage plane
- Stuc-o-flex WaterWay® 11 or 19 mm rainscreen and ventilation mat

Check compatibility with cc foam!

Get OK from code official!





18. What kind of insulation should be used…?

Many **options** for R13:

- **Unfaced batts** installed w/ no voids or compression
- **BIBS** – properly dense packed
- **Dry spray** mineral/glass fiber
- Damp spray **cellulose with boric acid** – min. water
- **Open cell foam**

For flood-hardy, drainable, dryable wall:

- **2.5 - 3 inches XPS** (rigid)
- **2 in. closed cell spray foam**

19. Should cellulose or cotton insulations be avoided…?

No. Absorbency can increase moisture "buffer capacity".

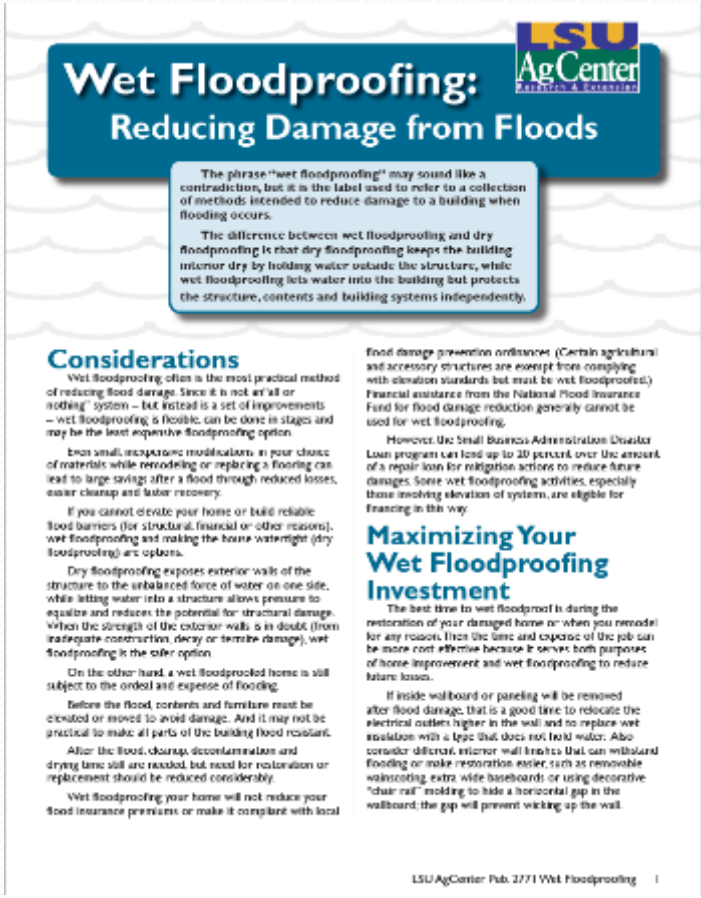
20. Does foam cause moisture problems & mold? Don't walls need to breathe?

Wrong term! Air leaks are NOT good!

We DO need water vapor open (permeable) interior finish.

- In hot, humid climate – walls dry to inside.

22. *If I can't elevate, is there any way to avoid so much damage and hassle after another flood?*



Wet Floodproofing:
Reducing Damage from Floods

The phrase "wet floodproofing" may sound like a contradiction, but it is the label used to refer to a collection of methods intended to reduce damage to a building when flooding occurs.

The difference between wet floodproofing and dry floodproofing is that dry floodproofing keeps the building interior dry by holding water outside the structure, while wet floodproofing lets water into the building but protects the structure, contents and building systems independently.

Considerations

Wet floodproofing often is the most practical method of reducing flood damage. Since it is not an "all or nothing" system – but instead is a set of improvements – wet floodproofing is flexible, can be done in stages and may be the least expensive floodproofing option.

Even small, inexpensive modifications in your choice of materials while remodeling or replacing a flooring can lead to large savings after a flood through reduced losses, easier cleanup and faster recovery.

If you cannot elevate your home or build reliable flood barriers (for structural, financial or other reasons), wet floodproofing and making the home watertight (dry floodproofing) are options.

Dry floodproofing exposes exterior walls of the structure to the unbalanced force of water on one side, while letting water into a structure allows pressure to equalize and reduces the potential for structural damage. When the strength of the exterior walls is in doubt (from inadequate construction, decay or termite damage), wet floodproofing is the safer option.

On the other hand, a wet floodproofed home is still subject to the ordeal and expense of flooding.

Before the flood, contents and furniture must be elevated or moved to avoid damage. And it may not be practical to make all parts of the building flood resistant.

After the flood, cleanup, decontamination and drying time still are needed, but need for restoration or replacement should be reduced considerably.

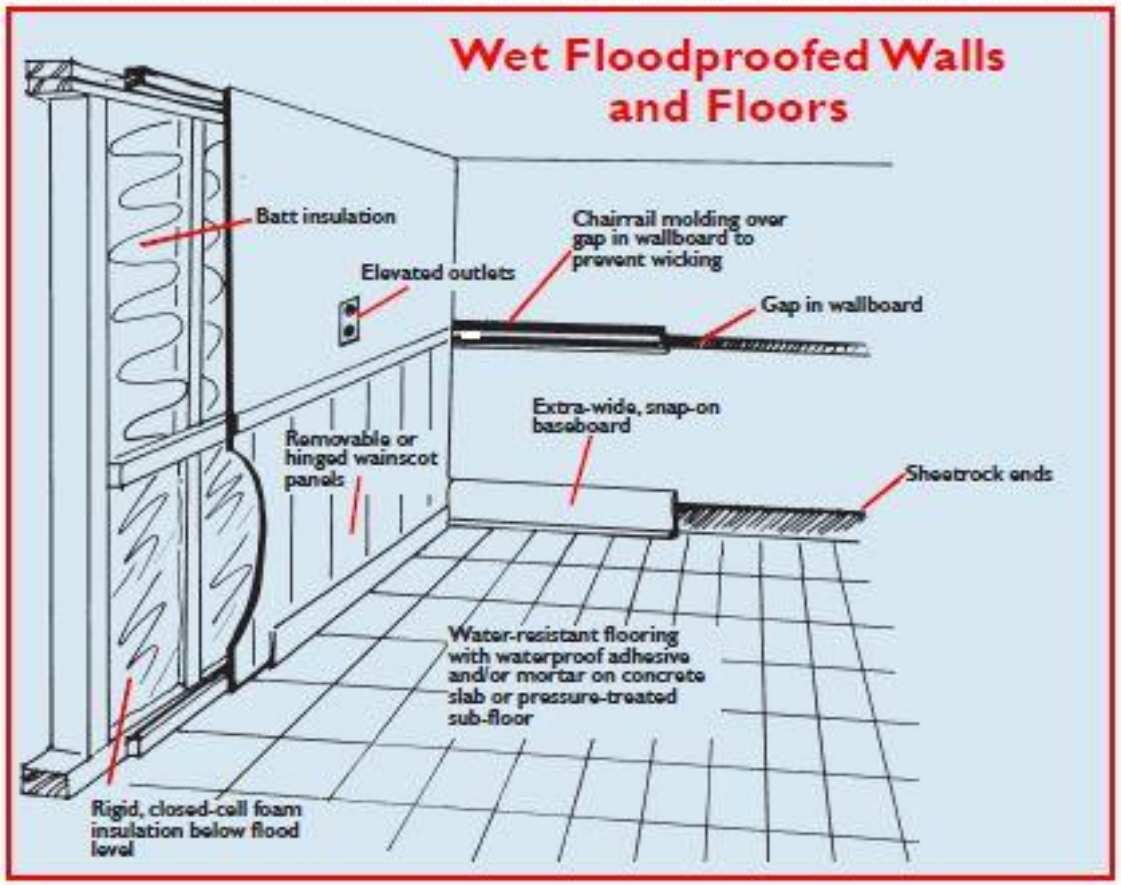
Wet floodproofing your home will not reduce your flood insurance premiums or make it compliant with local flood damage prevention ordinances. (Certain agricultural and accessory structures are exempt from complying with elevation standards but must be wet floodproofed.) Financial assistance from the National Flood Insurance Fund for flood damage reduction generally cannot be used for wet floodproofing.

However, the Small Business Administration Disaster Loan program can lend up to 20 percent over the amount of a repair loan for mitigation actions to reduce future damages. Some wet floodproofing activities, especially those involving elevation of systems, are eligible for financing in this way.

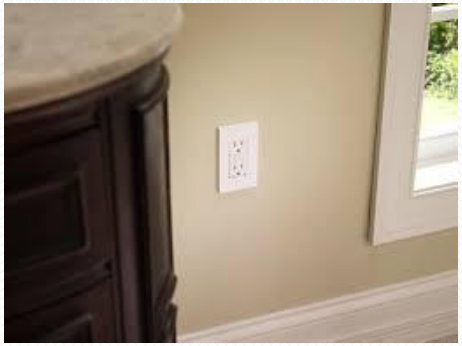
Maximizing Your Wet Floodproofing Investment

The best time to wet floodproof is during the restoration of your damaged home or when you remodel for any reason. Then the time and expense of the job can be more cost effective because it serves both purposes of home improvement and wet floodproofing to reduce future losses.

If inside wallboard or paneling will be removed after flood damage, that is a good time to relocate the electrical outlets higher in the wall and to replace wet insulation with a type that does not hold water. Also consider different interior wall finishes that can withstand flooding or make restoration easier, such as removable wainscoting, extra-wide baseboards or using decorative "chair rail" molding to hide a horizontal gap in the wallboard; the gap will prevent wicking up the wall.



1. Elevate Appliances & Utilities



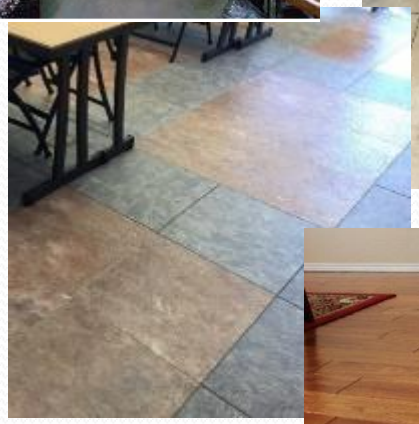
- **HVAC Equipment**
  - **A/C Compressor**
  - **Air Handler/Furnace**
  - **Return air grille**
- **Water Heater**
- **Washer & Dryer**
- **Wall oven**
- **Freezer**
- **Outlets & wiring**

2. Use Flood Hardy Materials

Structural Materials

concrete, solid lumber & plywood – no OSB

2. Use Flood-Hardy Materials



Floorings

- Decorative concrete
- Ceramic, porcelain tile
- Solid vinyl or rubber interlocking tiles
  - No paper backings
  - No adhesive
- Solid hardwood (if removable)

2. Use Flood-Hardy Materials

Wall Finishes

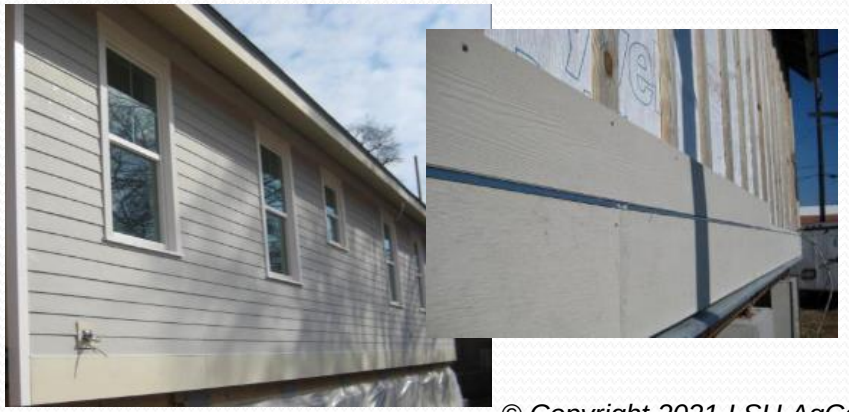
Interiors:

- Removable wainscoting, moldings

- Paperless drywall

Siding & Trim:

- Brick
- Vinyl, aluminum
- Fiber-cement
- Some composites
- *Drainable* stucco



2. Use Flood Hardy Materials

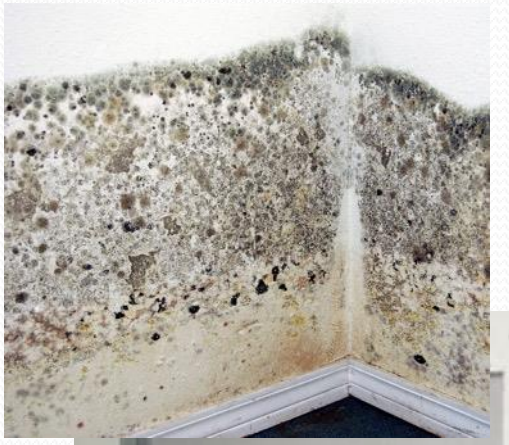
Raised Floor Insulation Systems

Rigid closed cell foam panels under floor joists, taped & sealed airtight

Closed cell spray foam (min. 2 in.) between floor joists and on rim

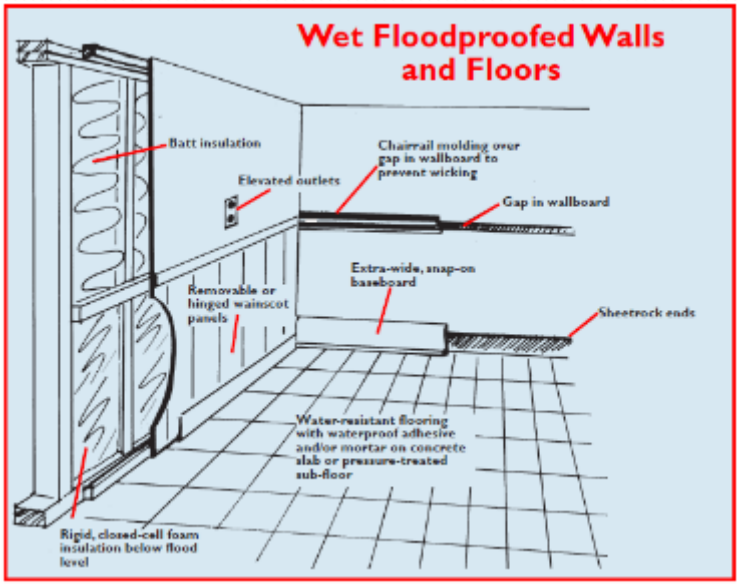
3. Make Mold-Resistant Improvements

- **NO vinyl wallpaper!!**
- **Paperless wallboard**
- **Acrylic latex paint with fungicide**
- **Borate-infused wood and insulations** (cellulose, rigid foam)
- **Borate spray application**
- **Solid, smooth floorings** (with no paper or particle board backing)
- **Insulated windows and doors**



4. Form *Washable, Drainable, Dryable* Walls

- Removable wainscot
- Or, paperless drywall
- Wicking breaks
- Pop-off baseboard, moldings
- Closed cell insulation (or none)
  - rigid foam ext. sheathing
  - or, rigid foam cut to fit between studs
  - or, closed cell spray foam, partial fill
- Space for washing & draining
- Fiber-cement, vinyl siding, or brick veneer w/drainage



23. What else should I do or consider during my home's restoration?

Durable • Healthy • Convenient • Resource-efficient • Practical

Improve Your Home and Prosper

Include energy-saving, hazard-hardy upgrades

Money isn't all you're saving!

When you save energy and prevent damage to your home, you're not just saving money. *You're helping the environment and our nation.* While making a wise investment, you also can feel good about reducing America's need for foreign energy resources, conserving nonrenewable natural resources for future generations and reducing pollution.

Much of the energy used in homes is produced by power plants that burn fossil fuels such as coal, oil or natural gas. They produce air pollution that can contribute to smog, acid rain and respiratory illnesses. In fact, the energy used by the average home accounts for more air pollution than the average car! Choosing energy-efficient products for your home is one of the best ways you can do your part to improve the environment. Using energy-efficient products instead of standard ones can result in a reduction of carbon dioxide emissions equal to taking a car off the road for seven years.

A durable home that withstands natural hazards saves money, time, the ordeal of making repairs and potentially even your health. Hidden water damage can lead to the growth of unhealthful molds. Durable buildings help communities and the nation by reducing disaster costs. They help the environment, too, by reducing waste.

Rising energy prices, floods and hurricanes happen, but they don't have to bust your budget, damage your home, rob your time or deny your comfort. *You can take control of your future by including both energy-saving and hazard-resistant improvements when you remodel or restore your home.* In the big picture, energy efficiency and durability don't cost you. You prosper every day you own the home – in several ways.

The right home improvement investments can return:

- Lower energy bills
- Greater comfort
- Higher quality
- Less damage, expense and ordeal after storms and floods
- Less maintenance
- Environmental benefits

Here are some smart investments to improve your southern region home and to prosper:

Lighten Up

On the outside

When repainting, re-siding or re-roofing your home, *choose light colors.* Among roofing options, a white painted metal or tile roof can make a big difference in cutting heat gain and saving cooling costs.

Light-colored siding may not offer as much benefit as heat reflective roofing, but color choice also is a no-cost way to reduce heat gain through walls.

On the inside

Light-colored interiors (another no-cost strategy) ...

Choose Appliances and Lighting That Pay Back

In general, each three kilowatt-hours of energy saved in the home reduces the energy needed for cooling by an additional kwh. So when you buy energy-efficient appliances and lighting, you save energy and money two ways and increase your home's comfort and convenience.

Labels that make it easy

When replacing appliances, electronics, lighting fixtures and other products, look for models with the *Energy Star label*, a verification of high energy-efficiency. Also, use the big yellow *EnergyGuide labels* on appliances to reveal the hidden costs (operating costs) and compare models. Even though the purchase price may be a little higher, investing in higher efficiency will pay off over the life of the equipment – usually several times over.

EnergyGuide label

EnergyStar label

Water heating typically is the second biggest energy user, after cooling and heating, so invest in the highest-efficiency water heater ...

For flood hazard areas

Try to choose appliances that can be installed above the likely flood level. A front loading washer on a built-in drawer has multiple advantages: energy and water conservation, a more convenient height, protection from low-level flooding, storage space and accessibility from a wheelchair. A separate wall oven and cooktop are convenient and high above the floor. Install a new energy-efficient ...

Compact fluorescent lamps

Advancements in lighting

When replacing or adding *new lighting fixtures* (both indoors and outdoors), choose from the many attractive residential styles of fluorescent, LED or other high-efficiency Energy Star fixtures. *Fluorescent lamps* now are available that produce a natural, appealing light. (Look for a CRI rating over 0.80 and a warm color or CCT of 2,700 to 3,000 K.) Outdoor fluorescent fixtures are made to withstand wet and cold weather. You can even get dimmable and multi-level fluorescents.

Likewise, replace your high-use incandescent light bulbs in existing fixtures with screw-in Energy Star labeled *compact fluorescent lamps.* The newer electronic types do not flicker or hum and come in many shapes and sizes to fit almost any fixture.

Fluorescents have a little higher price tag but use about a ...

Seek and Seal Leaks

Increase A/C SEER, Not Size

Go Duct Hunting – For Leaks

Compressor tips

Look Overhead

It's R-value, not inches, that counts

Water and Wind Worries

Be Wise With Windows

The numbers that matter

Look Below and Within

HERS Can Help You Save!

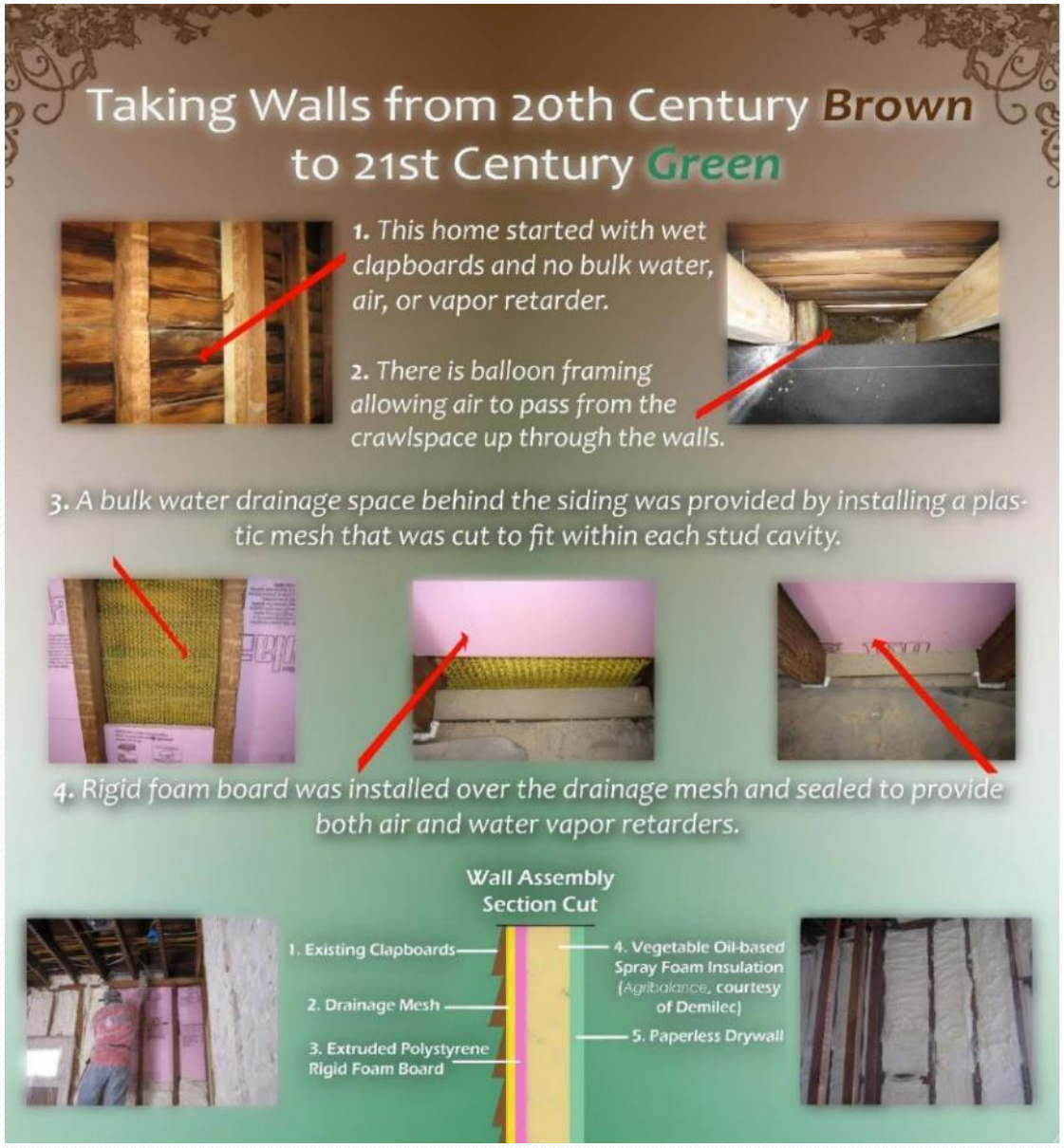
Did you know?

For windows in flood hazard locations

Learn more

Historic Home *Green and Resilient* Restoration

- **drainage mat +**
- **rigid foam board weather barrier +**
- **cavity insulation +**
- spray foam is reversible due to XPS
- use closed cell for flood-hardy
- **paperless drywall**



You decide:

Bon Temps or *Couillion?*

(Good Times) (Couyon)

What about the risks

of mold and contaminants,

if you don't gut and replace everything?

Compare Risks

GUT & REPLACE W/ SAME

- **Wait *MONTHS or YEARS*:**
  - **$** (insurance, disaster aid)
  - Materials – at high prices
  - Qualified contractors
    - Settle for scammers
    - Shoddy, unfinished, depleted $
- **DIY gut, haul, expose to**:
  - Mega mold, bacteria, etc.
  - Glass fibers, lead, asbestos, deconstruction dust, debris
  - Heavy wet materials
  - Toxic, corrosive disinfectants

FLOOD-HARDY

- **Quickly:**
  1. Remove moldings or wainscoting
  2. Flush with cleaning solution
  3. Sanitizing rinse
  4. Drain and *speed dry*
     - Dehumidifiers + fans
     - 30-50 % RH
     - ≤ 15% moisture content
- **Restore home, life in *DAYS***
  - Continue < 50% RH
  - Be alert for moisture, mold

Compare Risks

GUT & REPLACE W/ SAME

- **Wait *MONTHS or YEARS*:**

- **DIY gut, haul, expose to:**

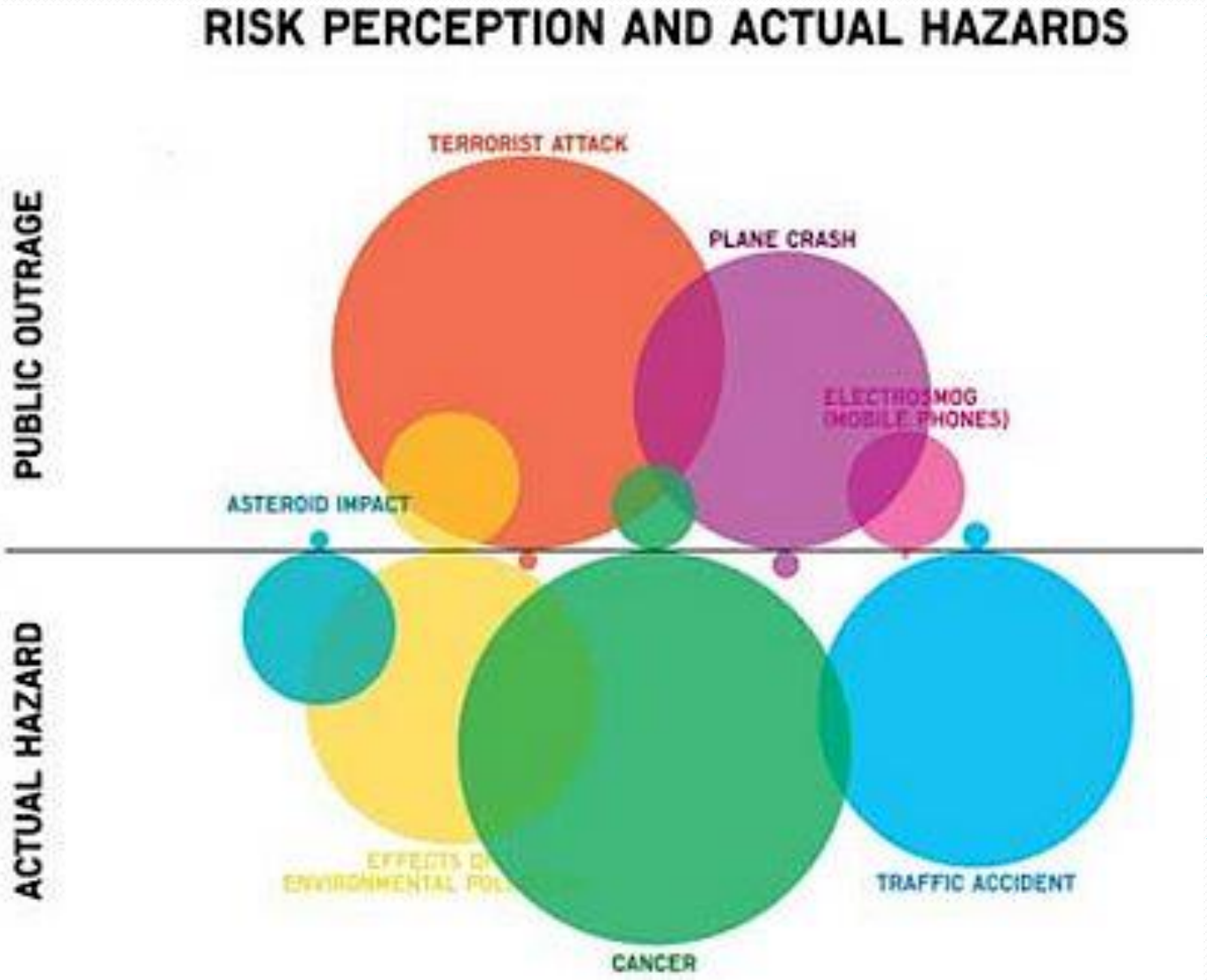
FLOOD-HARDY

- **Quickly:**

ters + fans

ld

Risk Perceptions vs. Reality



- External cause to blame
- No control
- Perceived sense of control
- Denial ("It won't happen to me.")

The 2nd point to remember…

Consumer decisions are based on

emotion !

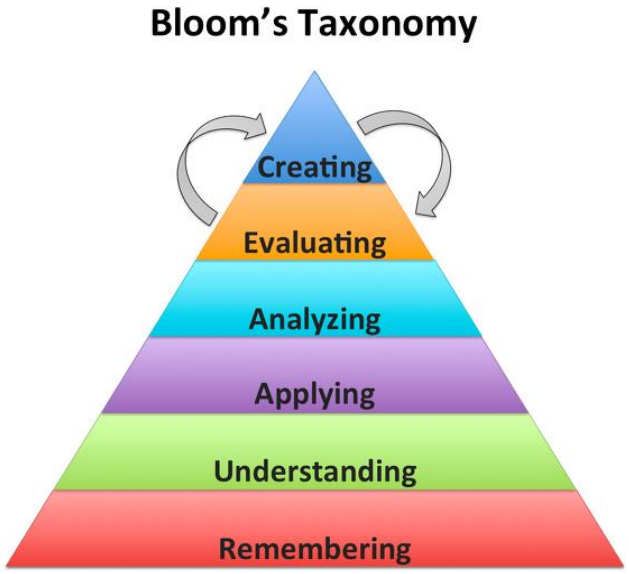
Logic and facts just come in handy to justify them.

Market the *Benefits*, *and the* **Motives**

- Comfort ---------- ➢ Pleasure
- Health ---------- ➢ Protect children
- **Resilience ----------** ➢ **Sense of control**
- **Safety and Security ----** ➢ **Peace of mind**
- Low Energy, Restoration Bills ---------- ➢ More money for…
- Return on Investment - ➢ Bonus! Thrill of winning…
- Less Maintenance ------- ➢ Time for…
- High Quality ---------- ➢ Pride, Status
- Eco Friendly ---------- ➢ Feel good, doing my part…
- Reliability ---------- ➢ Fear, Frustration

Bons Temps!

PR vs. Marketing vs. Consumer Education



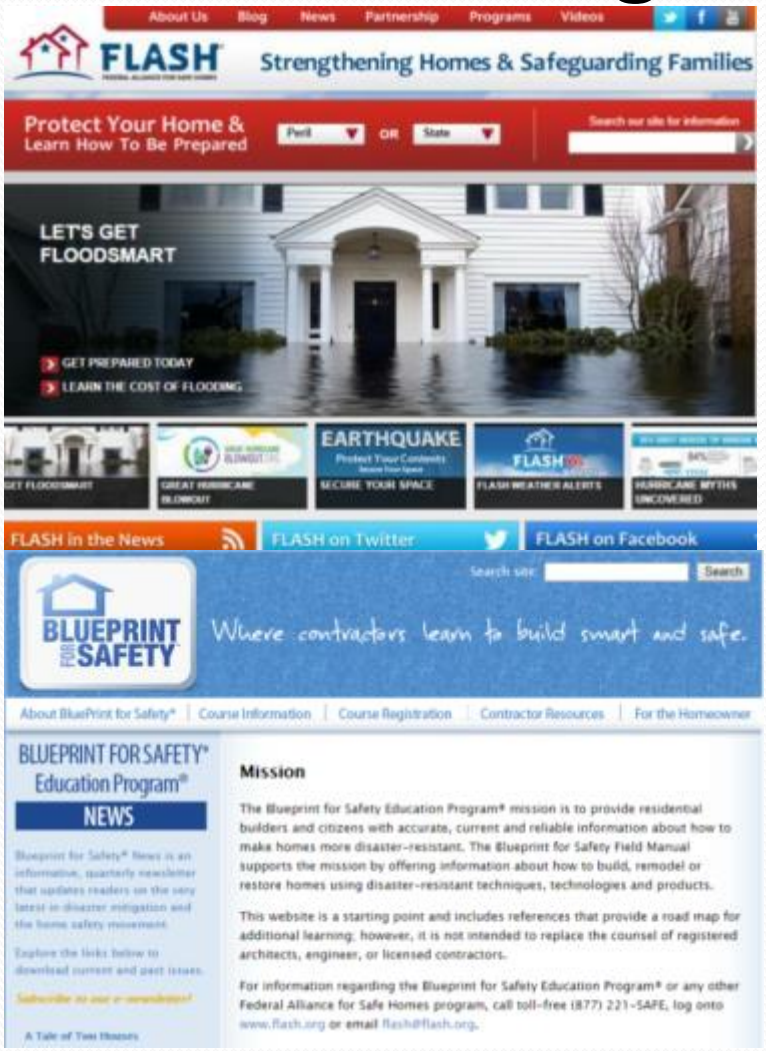
Levels of Learning

	PR	Marketing	Education
Shape attitudes	x	x	x
Build interest, felt need	x	x	x
Tap "teachable moment"		x	x
Increase awareness, knowledge, recall	x	x	x
Expand understanding			x
Spur application		x	x
Enable analysis and evaluation			x
Provide objectivity, credibility, confidence			x
Reduce remorse, complaints			x

For more information:

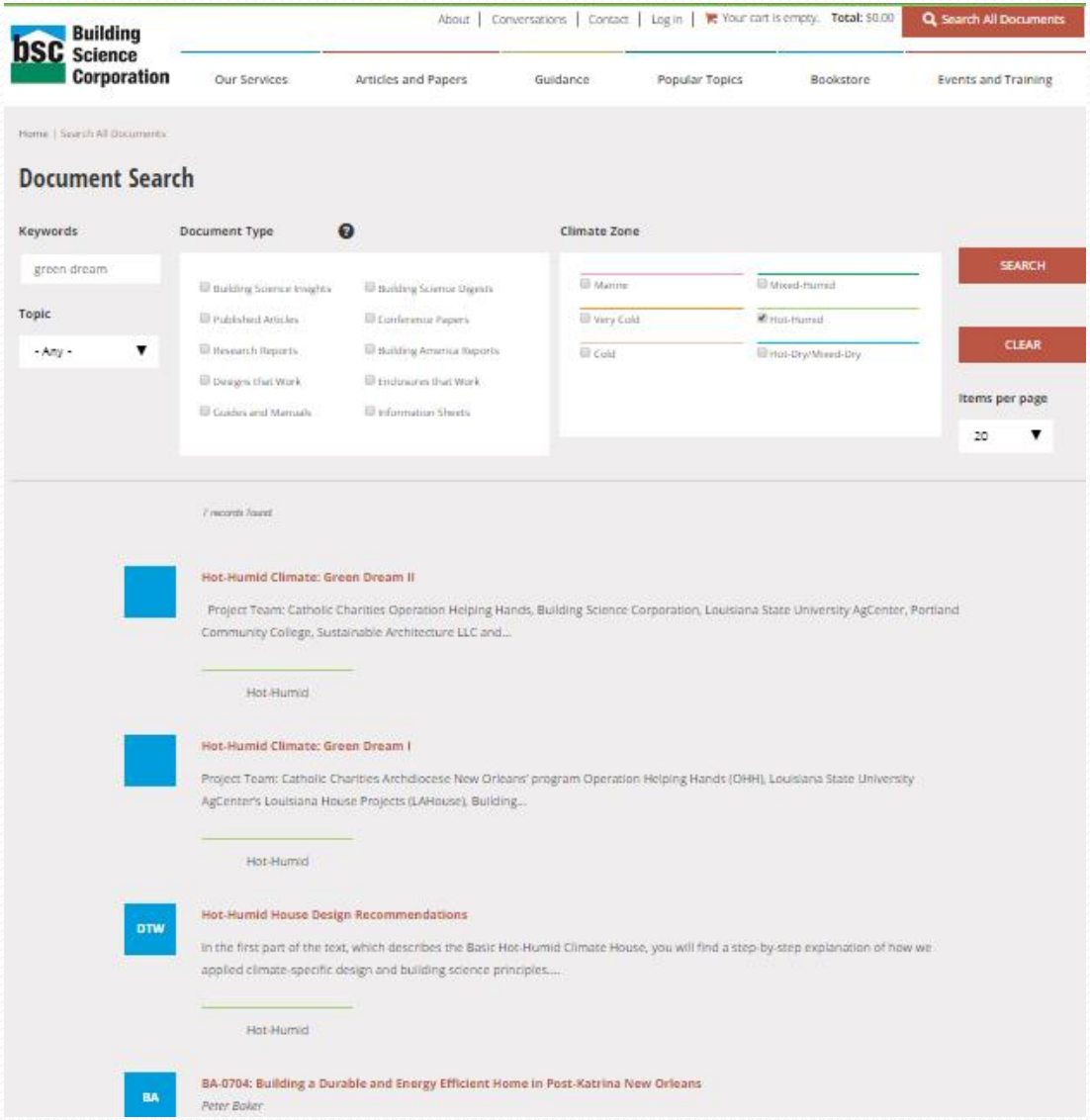
www.disastersafety.org

www.flash.org



For more information:

www.BuildingScience.com



Building America Solution Center

(Energy-efficiency + Moisture, Durability, Case Studies, Research…)

basc.pnnl.gov

FUNDING For *Resilient* & Efficient

Energy Codes

ENERGY.GOV
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Building Energy Codes Program

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STATUS ▼ IMPACTS ▼ TECHNICAL ASSISTANCE ▼

DOE Notice of Intent

DOE has issued a Notice of Intent (NOI) to publish a funding opportunity supporting the implementation of resilient and efficient energy codes, in accordance with Section 40511 of the Infrastructure Law.

READ MORE

www.energycodes.gov

For more information:

FEMA

Search | Prepare for Disasters | Apply for Assistance | Get Flood Insurance

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- Risk Management
  - Building Science
    - Building Science Resource Library
    - Building Science Training
    - Building Code Documents
    - National Flood Insurance Technical Bulletins
    - Mitigation Assessment Team Program
    - Substantial Damage Estimator Tool
    - Report: Building Codes Save
    - Nationwide Building Code Adoption Tracking
    - Frequently Asked Questions
    - Order Publications

Building Science Resource Library

The Building Science Resource Library contains all of FEMA's hazard-specific guidan that focuses on creating disaster-resistance communities.

You can search for a document by its title, or filter the collection to browse by:

- **Disaster Type:** High winds, flood, earthquake, etc.
- **Document Type:** Brochure, report, fact sheet, infographic, etc.
- **Audience:** Building professionals & engineers, individuals & homeowners, teach & kids, etc.

Search by Document Title

Filter by Disaster Type
- Any -

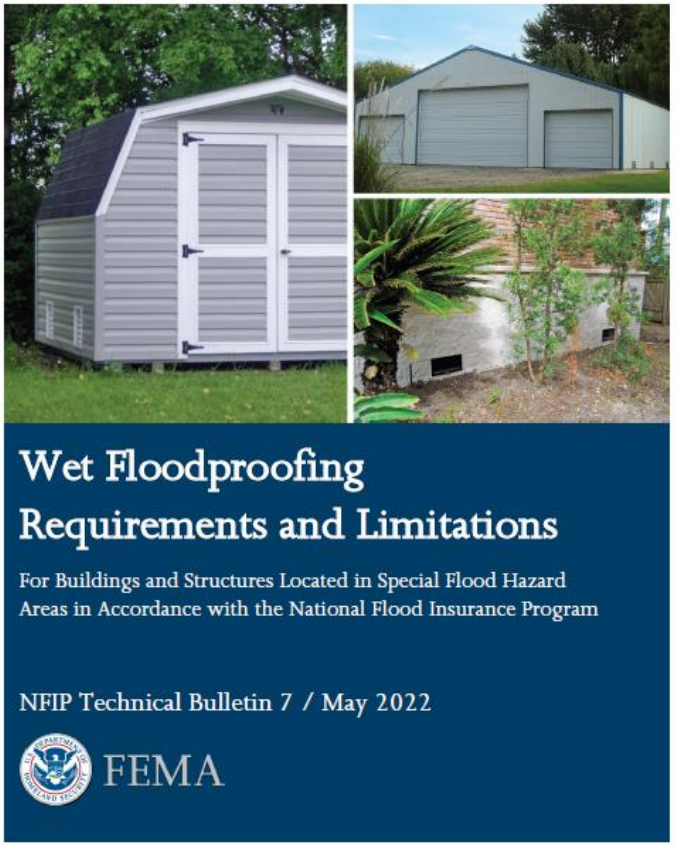
Filter by Document Type
- Any -

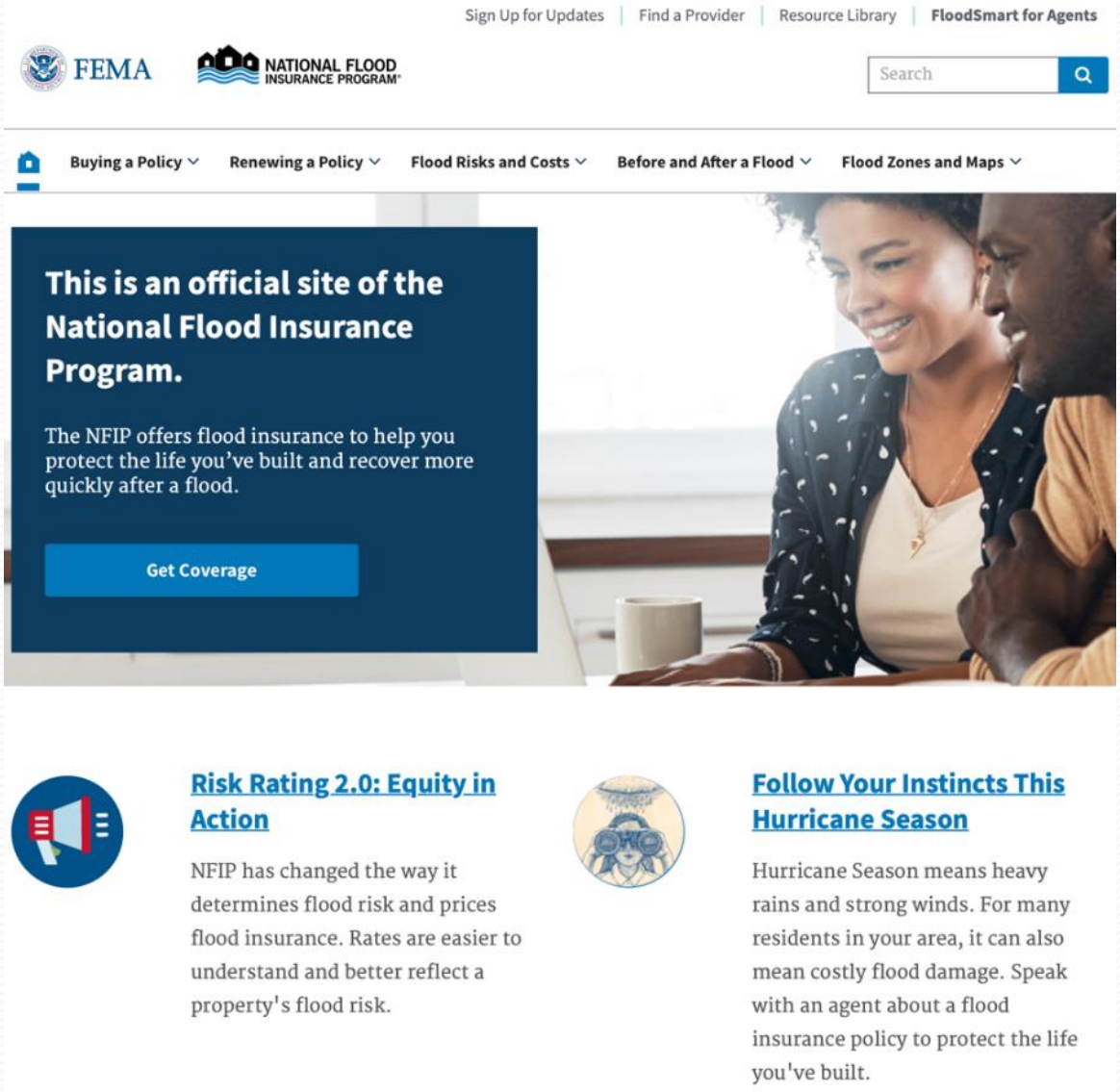
Filter by Audience
- Any -

Search Media

FEMA L-781, Building Science for Disaster-Resistant Communities: Hurricane Hazard Publications

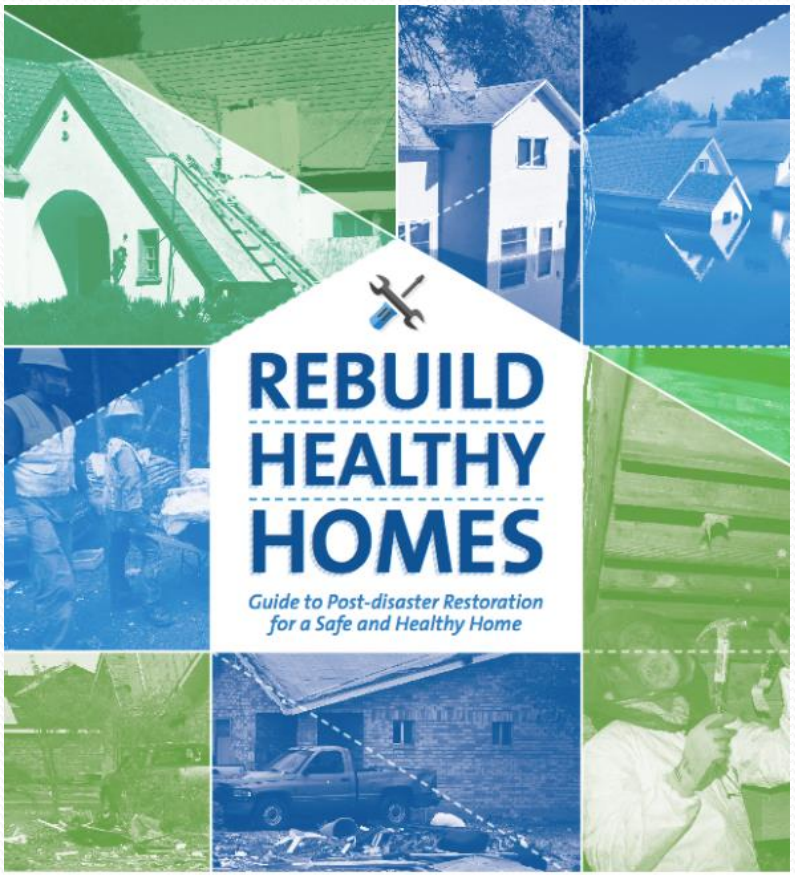
This brochure provides readers with a quick summary of publications that





www.FloodSmart.gov

HUD.gov/HealthyHomes



2015 Edition

- Updated and expanded edition
- For all types of disasters & hazards
  - Mold, lead, asbestos, chemical, etc.
- Comprehensive how-to manual
- For homeowners and volunteers
- *Restore for More than Before* resilient restoration section
- FREE online pdf and mobile app

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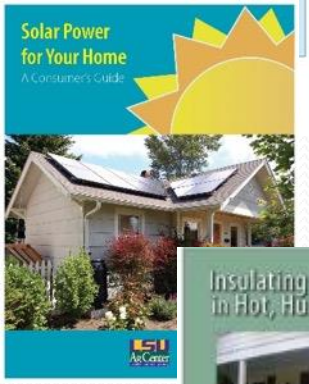
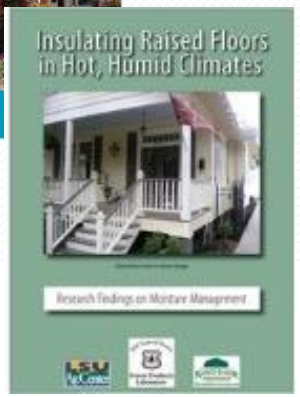


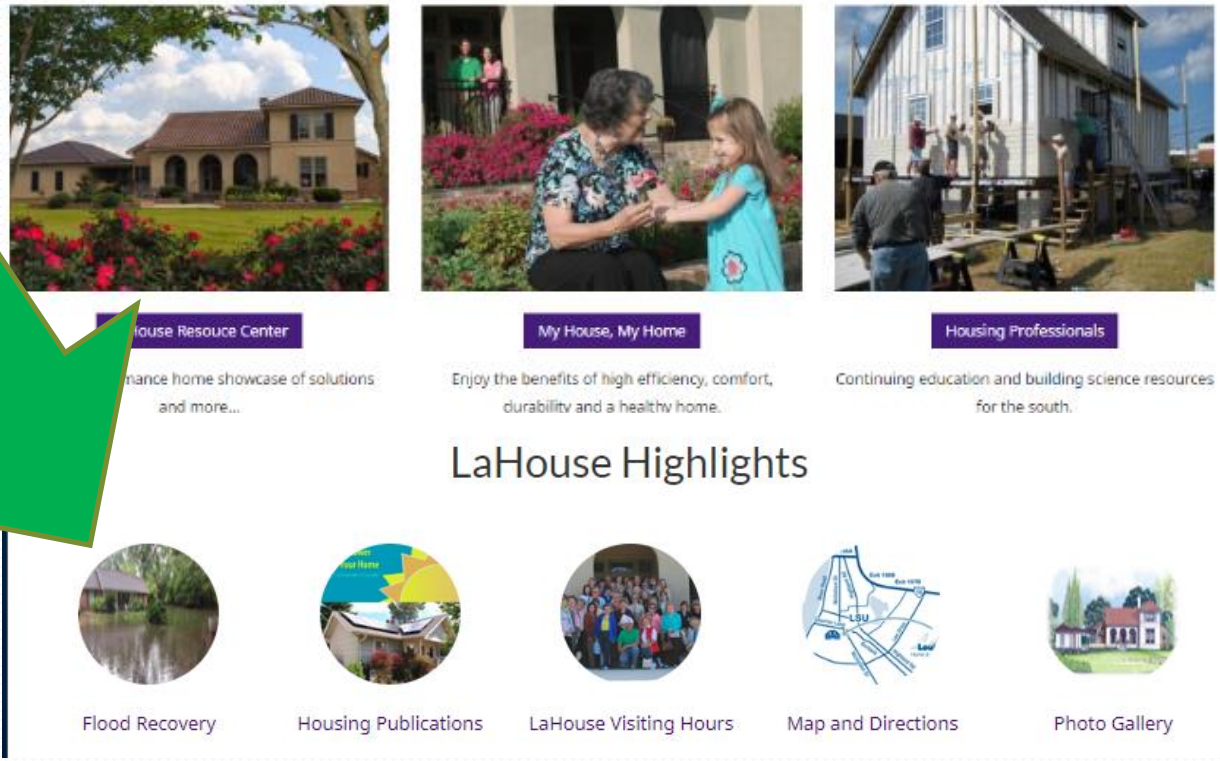


LSUAgCenter.com/LaHouse

Facebook.com/myLaHouse YouTube.com/myLaHouse

For more information:

www.LSUAgCenter.com/LaHouse



www.LSUAgCenter.com/LaHouse

Flood Recovery Resources

Storm Damage Cleanup Highlights

Wet Floodproofing

Disaster Information

FAQ's – After Gutting Your Flooded Home

Innovate . Educate . Improve Lives

The LSU AgCenter and the LSU College of Agriculture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Shape your home to shape your future
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and criteria of a high performance home
Resource-efficient
Durable
Healthy
Practical & Convenient
ALL
Tour Stop Number
Reveal
QR Code
Second Story
First Story
LaHouse Building Systems
Open M-F 10:00-4:30

History has shown us…

As we shape our homes…

we shape our future.

So the morale of this story is…

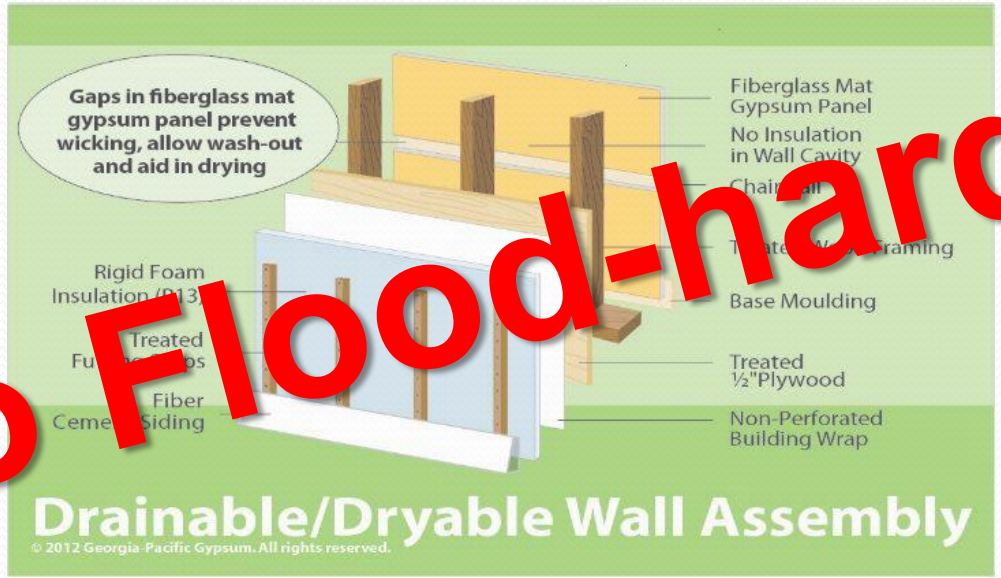
Hindsight is 20/20…

Foresight is Priceless

Despite all the Couillions…

Lache pas la patate!

(*Don't let go of the potato – i.e.* don't give up!)



Go Flood-hardy!

So the good times can roll, even when the floods take hold

Mais cher…L'heure est arrivée

(But dear, the time has come)

Laissez les bons temps rouler!

(Let the good times roll!)

Throw me somethin, mista!