After a Flood: What to Know about Flood Hazard Management

Presented by
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Plan for Increased Flooding

Figure 3. Percent increases in the amount falling in very heavy precipitation events (defined as the heaviest 1% of all daily events) from 1958 to 2007 for each region.¹

After the 2011 floods, with increased flood frequency and intensity, what should be the “restored” condition?
How do you balance being a neighbor and a local official?

...especially when your community is just trying to figure out how to supply basics like food and water

Ludlow, VT 2011
It’s about Public Safety and...

Marlboro, VT
Floodplains...

Otter Creek, Pittsford, VT, September 3, 2011
Photo: Lars Gange Mansfield Heliflight
Floodplains...

...Dissipate water energy & reduce flashiness

...Stores flood debris & sediment

...Provides habitat biodiversity

...Recreation & transportation

...And necessary for maintaining Dynamic Equilibrium!

Mad River, Moretown, during and after Irene
Photo Credit: David Cain
River Corridor and Floodplain Protection Bylaws

42 Communities
National Flood Insurance Program (NFIP)

- Flood Insurance
- Floodplain Management Regulations
- Flood Hazard Mapping
Community Participation in the NFIP

Voluntary participation for:

- Ability for **all** building owners in town to purchase flood insurance
- Access to Federal & State grants or loans (HMGP, PDM, etc.)
- Availability of Federal disaster assistance to the Town and insurable buildings
National Flood Insurance Program
Special Flood Hazard Area (SFHA)

Floodway = Flood Right-of-Way

Flood Fringe = More Shallow and Slower Floodwaters

Land area inundated by the base flood
The area affected in the 1% annual chance flood, aka the “100 year” floodplain
Flood Hazard Maps

Older format with 2 separate maps

Flood Insurance Rate Map (FIRM)

Floodway Boundary and Floodway Map (FBFM)
Flood Hazard Maps
Less old format with all information on 1 map

Flood Insurance Rate Map (FIRM)
Flood Hazard Maps

Newest format - Digital Flood Insurance Rate Map (DFIRM)

- Special Flood Hazard Area with an aerial photo base map
- Available as a .pdf document, GIS data, or paper document
Flood Hazard Maps
2.3 Principal Flood Problems

In comparison with many other communities in the region which suffer flood damage as a result of extensive flood plain development, the Town of Wallingford has not sustained unduly large or frequently recurring flood losses. However, at frequently intervals, the community has experienced unusually high flood stages on its streams with relatively severe flood damage in some areas. Floods of large magnitude have occurred in Wallingford during the years 1811, 1839, 1889, 1913, 1927, 1938, 1973, and 1976. Minor flooding occurs nearly every spring, particularly along Otter Creek when melting snow combines with spring rainfall flows from the surrounding mountains.

The worst natural flood of historic record in the Town of Wallingford occurred November 4, 1927, when more than 8 inches of rain fell within 36 hours. Route 7 was flooded both north and south of Wallingford Village and part of Gulf Road was washed out. Roaring Brook did more damage in the Town of Wallingford as it cut new channels during the flood (Reference 5).

In late September 1938, hurricane-generated rains, falling on already saturated soils, resulted in major flooding. The Mill River, in particular, caused considerable damage when an oxbow was cut off resulting in the loss of a home and property.

On June 30, 1973, a flood damaged the Dugway and other roads near South Wallingford, and part of Sugar Hill Road. In East Wallingford, the bridge over Freeman Brook went out (Reference 5).
DFIRM and FIS do not capture:

- Worst case, or probable maximum flood;
- Dam breach impact area;
- Ice and debris jams;
- Impacts of infrastructure failure; or,
- Dynamic adjustments of stream channels
How Can Buildings be More Resilient to Flooding?

Colchester Point, 2011
Photo by Rob Evans
After flooding, communities are required to issue permits for repairs and all other development.

**Substantial Damage:**

- Damage of any origin
- Cost to restore structure to its *pre-damaged* condition equals or exceeds 50% of the pre-damaged market value of the structure
- Automatically considered a substantial improvements regardless of actual repairs performed

2011, St. Albans, VT

Irene, 2011
There are many resources to help you.....

- State and Regional Staff (regulatory & planning)
- VT Water Quality Division fact sheets and publications
  [www.vtwaterquality.org](http://www.vtwaterquality.org)
- FEMA FIRM & FIS data
- FEMA technical guidance documents
You do not have to be an NFIP engineer, architect, or NFIP expert!
Substantial Improvement/
Substantial Damage
Desk Reference

FEMA P-758 / May 2010
Top 11 Permitting Considerations

- **Permitting** - A permit is required for all floodplain development
- Floodway
- Inspections
- Elevation Certificates
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- Variances
- Historic Structures
Top 11 Permitting Considerations

- Permitting
- **Floodway** - No encroachment such as fill, new construction, substantial improvement of any kind unless there is a no rise analysis that shows **no rise**
- Inspections
- Elevation Certificates
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- Variances
- Historic Structures
Top 11 permitting considerations

- Permits
- Floodway
- **Inspections** - Buildings during construction should be inspected when the foundation is complete but **before the framing** to assure the lowest floor including basement will be at or above Base Flood Elevation
- Elevation Certificates
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- Variances
- Historic Structures
Top 11 Permitting Considerations

- Permitting
- Floodway
- Inspections
- **Elevation Certificates** - For all new construction and substantial improvements
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- Variances
- Historic Structures
Top 11 Permitting Considerations

- Permitting
- Floodway
- Inspections
- Elevation Certificates
- **Basements** - A basement is an enclosure that is below ground level on all sides. Basement floors must be at or above Base Flood Elevation
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- Variances
- Historic Structures
Top 11 Permitting Considerations

- Permitting
- Floodway
- Inspections
- Elevation Certificates
- Basements
- **Enclosures** - Enclosures below Base Flood Elevation must be constructed with flood resistant materials, must have hydrostatic vents and can only be used for storage, access and parking
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- Variances
- Historic Structures
Top 11 Permitting Considerations

- Permitting
- Floodway
- Inspections
- Elevation Certificates
- Basements
- Enclosures

**Substantial Improvements/Substantial Damage** – Substantially damaged or improved structures must meet NFIP regulations and local floodplain ordinance, *including interior improvements*

- Getting base flood data for A zones
- Critical Facilities
- Variances
- Historic Structures
Top 11 permitting considerations

- Permitting
- Floodway
- Inspections
- Elevation Certificates
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage

**Getting base flood data for A zones - Development proposals exceeding 5 acres or 50 lots in a Zone A area must include a base flood elevation (BFE) determined by an engineer. Local bylaws may require BFEs for all Zone A development.**

- Critical Facilities
- Variances
- Historic Structures
Top 11 permitting considerations

- Permitting
- Floodway
- Inspections
- Elevation Certificates
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- **Critical Facilities** - Police stations, hospitals, fire stations and other important emergency response and special need facilities should be located outside the Special Flood Hazard Area. They should also be located outside of the 500-year floodplain, also known as the 0.2-percent-annual-chance flood
- Variances
- Historic Structures
Top 11 Permitting Considerations

- Permitting
- Floodway
- Inspections
- Elevation Certificates
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- **Variance**s - In most cases, variances should not be granted. Variances can only be granted based on the physical attributes of the land
- Historic Structures
Top 11 Permitting Considerations

- Permitting
- Floodway
- Inspections
- Elevation Certificates
- Basements
- Enclosures
- Substantial Improvements/Substantial Damage
- Getting base flood data for A zones
- Critical Facilities
- Variances

**Historic Structures** – Historic structures are exempt from substantial improvement requirements but should still incorporate mitigation measures when repairing damages from flooding.
Role of the local government official is to help prepare and respond for emergencies

HOW?
**How Can We Avoid Damages Due to Flooding?**

- Develop data to identify inundation & erosion hazards
- Provide model regulations
- Develop incentives for communities
- Regulations to avoid known hazards & not aggravate risk to assets already in the hazard zone
- Take steps to reduce existing exposure & improve emergency response capacity
- • Make a family plan
  • Prepare emergency kit
  • Update and practice plan
  • Get insurance
  • Get finances in order
  • Elevate structure
  • Relocate structure
TOWN OF READSBORO
VERMONT

TOWN PLAN

Approved, September 1, 2010

Funded by a 2009 Municipal Planning Grant
From the State of Vermont
River Corridor Planning on the Batten Kill, Vermont

Prepared for:
John J. Field
Field Geology Services
Farmington, ME

Submitted to:
River Management Program
Department of Environmental Conservation
Vermont Agency of Natural Resources

March 2007

Phase 2 Stream Geomorphic Assessment
Black River Watershed
Rutland & Windsor Counties, Vermont
July 2009

Prepared under contract by
Southern Windsor County Regional Planning Commission
P.O. Box 320
Araucany, VT 05029
## TOWN/ CITY/ VILLAGE

**FLOOD HAZARD BYLAW**

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- No new structures in the Fluvial Erosion Hazard Zone or Special Flood Hazard Area
- Improvements one foot above the base flood
- No fill in Flood Hazard Area
- Project Review Sheet
- Significant Improvements determined cumulatively over three years.
- Certificate of Occupancy
FEMA Grant Opportunities

Bridge & Culvert Replacement
FEMA Grant Opportunities

Property Acquisition
Opportunities for Community Action:

1. Flood and Erosion Hazard Maps  What is at risk where?
2. Emergency Operations Plan  What is our capacity during an emergency?
3. Pre-Disaster Hazard Mitigation Plan  Where do we start to reduce risk?
4. Flood and Erosion Hazard Area Regulations  How do we avoid aggravating risk?
5. National Flood Insurance Program  How do we provide for financial resilience?
6. Hazard Mitigation Assistance Grants  How can we reduce current exposure?
7. Work with communities in the watersheds.  How do we manage floodplain assets?
“Avoiding the unmanagable and managing the unavoidable”

For more information:
www.vtwaterquality.org/rivers.htm
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