FLOOD HAZARD MITIGATION PLANNING
Hazard Identification/Risk Assessment/Vulnerability Analysis

Analyzing the flood hazard in a community is a vital step in the mitigation planning process. Before a community can develop a mitigation strategy and identify cost-effective and feasible mitigation activities, they will need to complete a **hazard identification, risk assessment, and vulnerability analysis**.

Hazard Identification identifies the risk of flooding within the community.

Risk Assessment is the process of determining the frequency and severity of the past events and the potential threat for the future.

Vulnerability Analysis includes inventorying what in the community is most at risk from such events.

The hazard identification, risk assessment, and vulnerability analysis is a critical step in the planning process, however, it is also the most difficult one for a community to complete. Based on the risk and potential impact to each site, the community will be able to develop a list of prioritized mitigation measures to reduce the risk and damages for each location.

The first thing the community should do is to collect all available information regarding flooding and existing conditions within the community so that the planning "work group" will have a complete picture of the flood hazard, its impact on the community, and what is currently being done to reduce the impacts.

The community should identify all potential resources for information, including maps, to describe the existing flood hazard and risk in the community. The community should gather information that is already available from other studies and/or other agencies/departments that may have been completed for the community. Potential sources for information include:

- Flood Insurance Rate Maps (FIRMs) in which FEMA identifies the base 100-year floodplain which the community must regulate under the National Flood Insurance Program (NFIP)
- Flood Insurance Studies
- National Flood Insurance Program (loss information including repetitive loss data)
- Historical data (books, library, newspaper and TV reports, older residents, etc.)
- US Army Corps of Engineers
- State Department of Natural Resources (floodplain management and dam safety programs)
- County and State Emergency Management Offices
- Regional Planning Commissions
- National Weather Service
- Federal and State Departments of Transportation
- Natural Resources Conservation Service (a branch of the USDA)

Local agencies within the community will be able to provide much of the information needed for hazard identification. Below are agencies that should be contacted and may already be part of the planning "work group."

- Planning Department
- Zoning/Building Inspection Department
- Land Information Office
- Public Works/Highway Department
- City Engineer
- Fire and Police
- Agricultural Extension Office
- Local Assessor
- Red Cross and Salvation Army
- Chamber of Commerce or major businesses in the community
- Banks and Insurance Companies

The plan should include maps of the flood hazards in the community. It is suggested that the community start with the FIRMs developed by FEMA. Using these maps as a starting point, also consider problems discovered since the maps were developed as well as drainage problems, sewer backups, and other flood-related problems. The Flood Insurance Study will also have historical and technical information. This will be useful when producing the written description and map(s) assessing the flood hazards in the community. The written description should describe the severity of the flood risks in terms of flood depths, warning times, and frequency. The following are questions the community should consider in identifying flood hazards and risks:

- How often is the flood likely to occur?
- How bad will it get?
- Where will it strike and how large an area will be affected?
- How long will it last?
- When is the flood most likely to occur?
- How much warning time is there?
- Is there a warning system?

The next step in the planning process is to complete the vulnerability analysis, or inventory what is at risk in the community. This consists of identifying the number and type of structures in the flood hazard area and their value. Then the community will be able to determine expected damages and impacts based on a given scenario.

The amount of data required for the structure inventory depends on the flood hazard risk in the community. At a minimum, the plan must include information for all identified floodplains within the community. The following should assist the community in determining how much inventory data will be required.

Areas with Minimal Flood Risk

If there are floodplains in the community that do not have a flooding problem or experience only very minimal flooding, then the plan needs to make a statement to that effect. Minimal planning is required for these areas. The plan will need to identify the areas and provide a description of the flooding. In the goals section of the plan the community should include a statement that flooding in this area is a low priority and why; and that they will continue to monitor these areas in future updates of the plan and reprioritize if necessary.

If there are no **structures** within the floodplain, the plan should state that the land is agricultural, parks, designated open space, etc., and discuss how the floodplain ordinance addresses future development.

Areas with Minimal Damages

If there are structures in the floodplain that incur **minimal damage** (what we refer to as nuisance flooding, i.e., yard and basement flooding) the plan will need to include the following information:

1) Description of the area (i.e., by street or subdivision);
2) Map of the area if available (the floodplain map or a plat/parcel map identifying the approximate floodplain and the properties within);
3) Estimate of the number of structures in the area (count the number of parcels, etc.);
4) Estimate of property value (obtain from the local assessor or clerk);
5) Estimate of property damage (make some basic assumptions such as if they are incurring basement flooding we can assume that their water heater, furnace, washer/dryer, freezer are getting damaged; multiply by the number of properties in the area);
6) Type of flooding (overland, riverine, stormwater, nuisance, basement, yard, street, etc.);
7) Flood frequency.

For these areas, a structure inventory is not necessary, but the plan needs to include some general discussion of the flooding problems.

Again, in the goals section of the plan the community should include a statement that flooding in this area is a low priority and why; and that they will monitor and reevaluate these areas on an annual basis in updating the plan and reprioritize if necessary.

Areas of High Flood Risk and Flood Damages

For those areas that are a high-priority for the community and are incurring major flood damages the plan will need to include more in-depth information. The plan must include **flood depth and damage potential** for this area. A structure inventory including the following information, if available, would be ideal:

1) Types of structures (commercial vs. residential; ranch, bi-level; with or without basement, etc.);
2) Flood frequency (10, 25, or 100-year flood, etc.);
3) Type of flooding (overland, riverine, stormwater, etc.);
4) Elevations (grade, first floor, base flood, etc.);
5) Flood insurance status (do they have flood insurance?);
6) Fair market values if available;
7) Damages (reported damages by a property survey, etc.);
8) And any other pertinent information.

If any or all of the above information is not available, the following is the minimal information that will be required:

1) A map identifying the floodplain (this can include again a plat/parcel map with an overlay of the floodplain);
2) Estimate of the number and type of structures (commercial vs. residential; single family or multiple family homes; mobile homes, etc.);
3) Estimate of the fair market value (if available);
4) Estimate of average flood depth for the area (this can be done as simply as stating that during the flood of record there was an average of 3 feet of water above grade that was determined by physical observation; local responders such as police and fire, public works, city engineer, etc. may have made such observations);
5) Estimate of damages and damage potential (Based on the flood depth information make assumptions on the damages, i.e., number of structures multiplied by an estimate of damage per structure to arrive at a total of estimated damages. If the area has had 3' of flooding above grade you can assume that they had first floor flooding of 2 feet or more which means that all mechanicals in the basement have been damaged or destroyed, and that flooring, cabinets, electrical, etc., has been damaged on the first floor. The personal property loss will be also high. Do not forget to include the damages incurred by the community such as damages to streets, bridges, search and rescue costs, sandbagging, pumping, emergency shelter, public health, etc.).