Chapter 1

Introduction

1.1 Historic Overview

Congress created the National Flood Insurance Program (NFIP) in 1968 to alleviate problems associated with flooding along rivers, streams and lakes. Local communities participate in the NFIP by adopting and enforcing ordinances incorporating all applicable state and federal floodplain regulations. Participation in the program enables residents of the community to purchase flood insurance. The NFIP was expanded by the passage of the Flood Disaster Protection Act (1973), the National Flood Insurance Reform Act (1994) , the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner Flood Insurance Affordability Act of 2014.

As part of the NFIP, the Governor of each state assigns a state agency or office to act as the coordinating agency for the NFIP. This agency serves as the administrator of the NFIP, working with local, state and federal entities in assisting local communities in enforcing floodplain management standards. Indiana's NFIP coordinating agency is the Department of Natural Resources (IDNR), Division of Water (DOW).

The Indiana General Assembly passed the Indiana Flood Control Act (Indiana Code 14-28-1) in 1945, recognizing that preventing and limiting damaging effects of floods was in the best interest of Indiana's citizens. The Indiana Flood Control Act, Indiana Code (IC) 14-28-1, is available at the IDNR website. According to the Act, constructing a permanent abode or placing a residence in a floodway is prohibited. Any other structure, obstruction, deposit, or excavation in the floodway of any stream in the state must first be approved by the Natural Resources Commission (NRC). The Commission granted authority to the IDNR's Division of Water to act on its behalf concerning the state's flood control activities.

Proposed construction activities in a floodway are reviewed by the Department to determine if the work will:

- Adversely affect the efficiency or unduly restrict the capacity of the floodway
- Create an unreasonable hazard to life or property

- Result in unreasonably detrimental effects upon fish, wildlife and botanical resources

In 1973, the Indiana General Assembly directed the NRC to establish minimum standards for the delineation and regulation of all flood hazard areas in the state by passing the Indiana Floodplain Management Act (IC 14-28-3). The Commission responded by promulgating the Flood Hazard Area Rules, known presently as the Floodplain Management Rules. The latest version of these rules now resides under 312 Indiana Administrative Code 10 (312 IAC 10). These are minimum standards to be used by local units of government in developing floodplain management ordinances to regulate the flood hazard areas within their jurisdiction.

1.2 Terminology

Computer models are created by representing the physical characteristics of the watershed and floodplains and using historical flood information. Key terms that often occur in modeling discussions are described below and some are illustrated in Figure 1-1.

Hydrology: multidisciplinary subject addressing the occurrence, circulation and distribution of waters of the earth. In floodplain management, hydrology refers to the rainfall – runoff portion of the hydrologic cycle as it applies to extreme events. In a floodplain study, hydrology is used to estimate flood flow rates. Common methods are stream gage analysis, rainfall-runoff models, or a combination of the two.

Hydraulics: study of the mechanical behavior of water in physical systems and processes. In floodplain management, hydraulics refers to determination of the lateral and vertical extent of a particular flood. Hydraulics also encompasses the flow characteristics around and through hydraulic structures such as bridges, culverts and weirs.

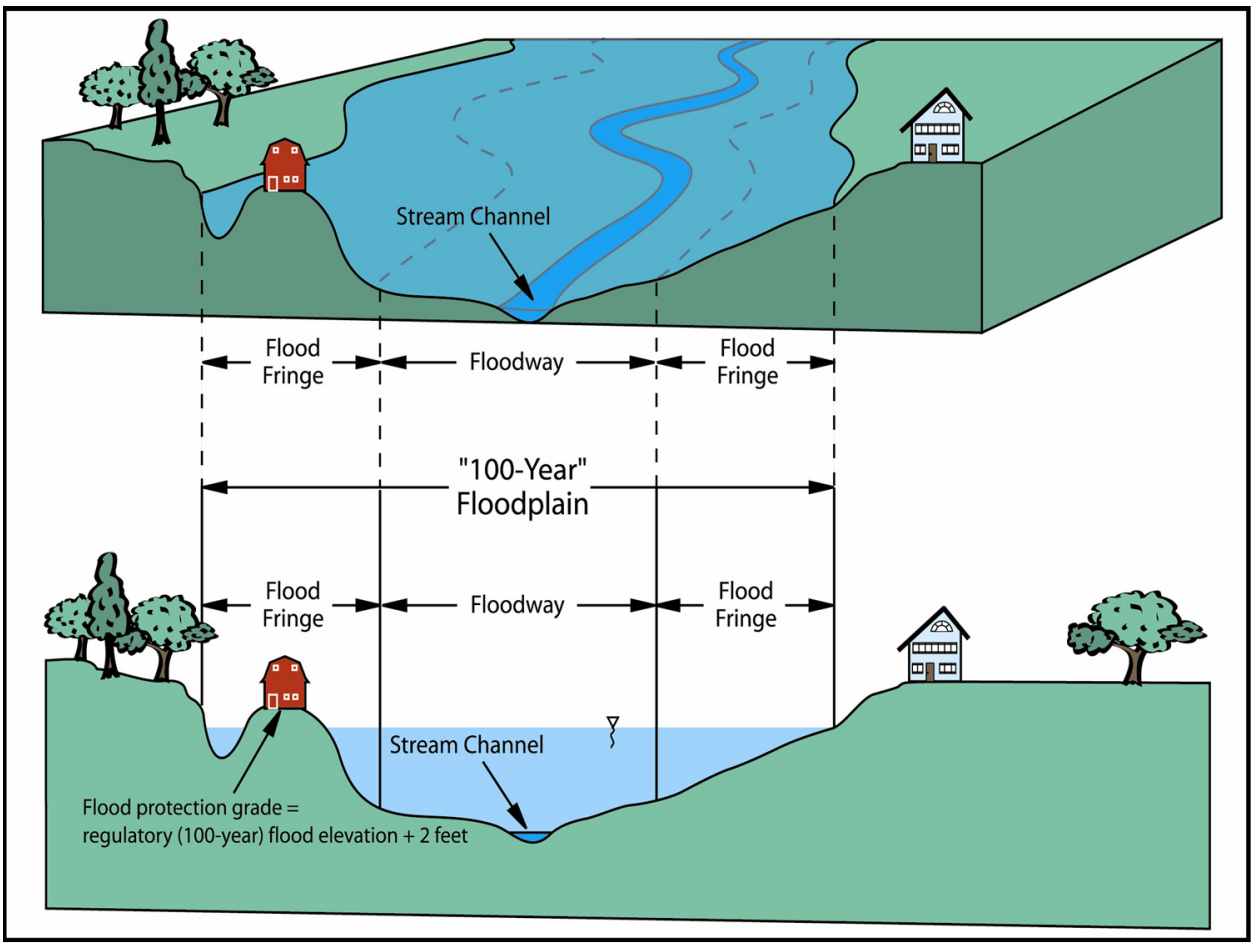
Base flood elevation (BFE): elevation of the flood having a one percent chance of being equaled or exceeded in any given year. This flood is the regulatory standard of both the NFIP and the Indiana Flood Control Act. This flood is also known as the 1% annual chance flood, the 100-year flood or the regulatory flood.

Floodplain: usually wide, flat to gently sloping area contiguous with and typically lying on both sides of a channel. For regulatory purposes, the floodplain corresponds to the lateral extent of the BFE.

Floodway: the channel of a river or stream and those portions of the floodplains adjoining the channel which are reasonably required to efficiently carry and discharge the peak flood flow of the regulatory flood of any river or stream. The floodway is the portion of the floodplain where the IDNR has jurisdiction, based on the Indiana Flood Control Act. Floodway delineation based on Indiana standards is more stringent than floodway delineation following federal criteria.

Flood fringe: portions of a regulatory floodplain lying outside of the floodway.

Figure 1-1. The floodplain consists of the floodway and flood fringe.



1.3 Purpose of Guidelines

The objective of these guidelines is to assist the engineering community in the State of Indiana to successfully complete floodplain analyses, whether for the evaluation of a project for construction purposes, or for the initial identification of the flooding potential of a stream. The guidelines are also intended as a resource for answering common questions that arise in the process of completing a floodplain model. Finally, these guidelines were created with the purpose of increasing the quality of the modeling submitted to the IDNR for review, and to assist the IDNR in the timely review of these models.

These guidelines are intended for use by modelers that have a background in hydrologic and/or hydraulic modeling; it is not intended as a primer on modeling. It is assumed that the modeler has taken water resources classes as part of their university training and has completed specific training in the various modeling programs. Short courses in modeling programs are available from many universities and from the American Society of Civil Engineers (ASCE), along with other groups.

This document is intended to replace the previous IDNR document "Suggested Division of Water Procedures for Hydraulic Modeling," dated October 26, 1994, and is an update to "The General Guidelines for the Hydrologic-Hydraulic Assessment of Floodplains in Indiana", dated December 5, 2002. Other agencies have procedures that they must follow, but where they are not mutually exclusive, these guidelines should be followed. The committee formed to draft this document tried to rectify some of the inconsistencies that have been noted between IDNR practices and the practices of other agencies.

The profession of floodplain management and the sciences of hydrology and hydraulics are evolving, as advances are made. Therefore, this document should be considered a "living" document in that it will probably be frequently updated. To obtain the latest version of these guidelines, please check the IDNR website.

These guidelines are not meant to exclude other approaches that apply more directly to a given situation. The IDNR provides no assurance that adherence to these guidelines will result in an acceptable model. Modeling and other floodplain analyses should be directed by a licensed engineer experienced in hydrology and hydraulics.