

CHAPTER 6
SPECIAL TOPICS

6-1. General.

This chapter addresses special topics that are important to the planning, design, and operation of interior flood loss reduction systems. The topics are not necessarily directly related to hydrology, but hydrologic analysis assumptions and results are integrated into the concepts and material presented. The special topics discussed include performance standards, study considerations of urban and agricultural areas, flood damage evaluation concepts, and legal requirements.

6-2. Performance Standards.

Guidance for performance objectives for interior flood control projects are contained in ER 1105-2-20 (Reference 6) and ER 1105-2-30 (Reference 7). The Federal objective is to contribute to national economic development (NED) consistent with protecting the environment, pursuant to National environmental statutes, applicable executive orders, and other Federal planning requirements. Various plans in addition to the NED plan are to be formulated in a systematic manner. The NED plan is to be recommended for implementation unless the Secretary of a department or head of an independent agency grants an exception. Exceptions may be for potential catastrophic losses in urban areas (Reference 6) although catastrophic loss potential is not commonly found in urban interior areas. The NED plan is to be recommended in agricultural areas.

6-3. Study Concepts for Urban and Agricultural Areas.

There is no distinction in the planning and design study processes between urban and agricultural areas. There is also no direct distinction between performance standards for urban and agricultural areas. However, urban areas often produce through the study process the need for higher levels of protection than agricultural areas, because the consequences of flooding are likely to be of greater social concern and solutions may introduce more significant environmental problems. As a consequence, studies of urban interior areas often surface a more complex mix of alternatives and measures based on economic, social, and environmental factors than agricultural areas which typically yield systems that produce maximum net economic benefits. This does not preclude, however, the need throughout the study process for careful consideration of potential social and environmental impacts for agricultural areas.

6-4. Flood Damage Evaluation Concepts.

a. Flood damage evaluations of interior areas are complex. Figure 6.1 presents a conception of the damage frequency relationships for these conditions. The sketch represents the simplified condition of complete non-coincidence, but is nonetheless an important conceptualization.

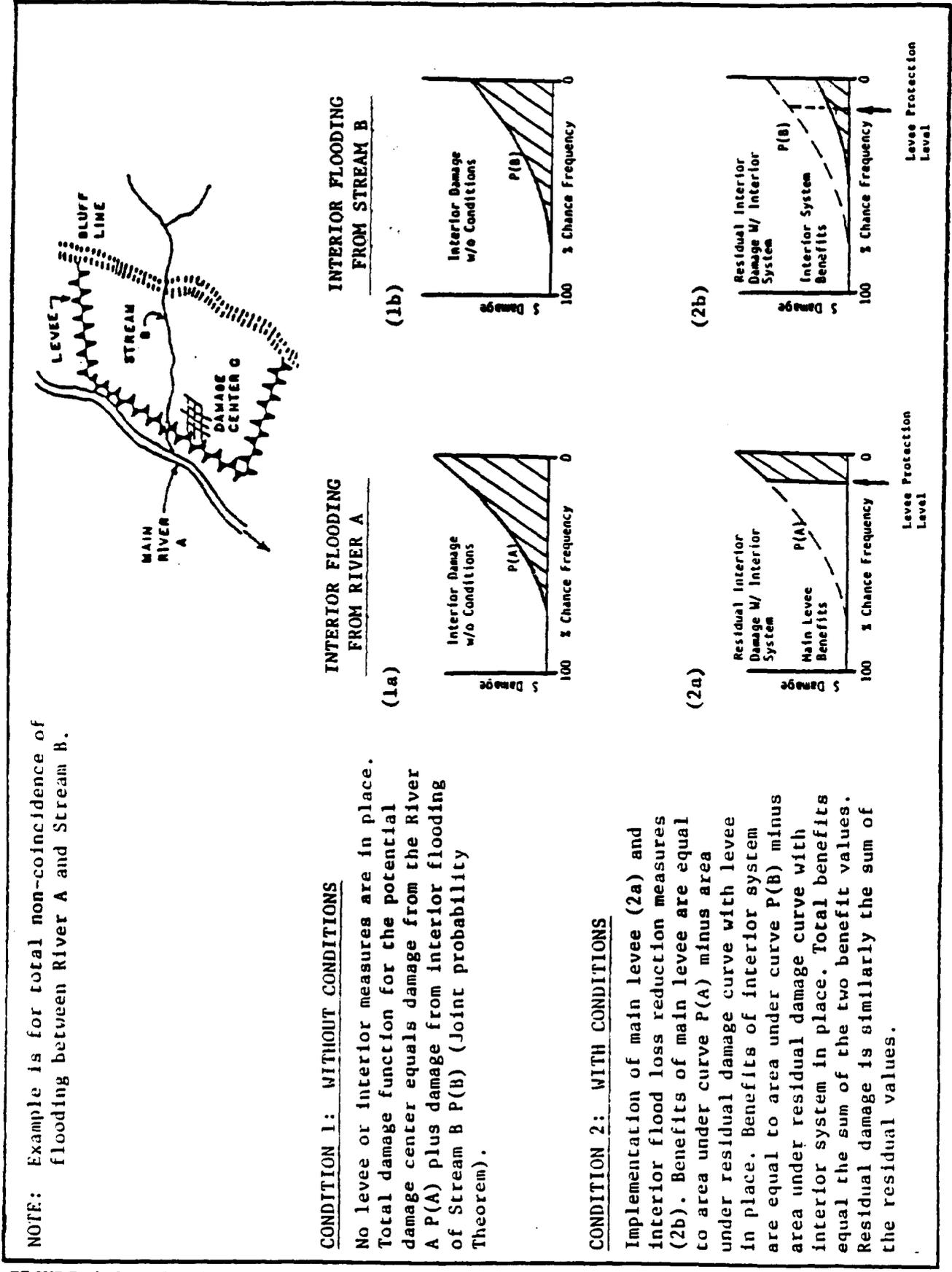


FIGURE 6.1 Flood Damage - Frequency Relationship Concepts

b. Condition 1 displays the total damage frequency function for damage center C for the without conditions. Without conditions are defined as without the main levee or wall and without any interior flood loss mitigation measures. The damage-frequency relationship for damage center C is equal to the sum of the individual functions for the river (A) and interior runoff (B). Each function is developed as if the other did not exist, then the two are simply added.

c. Condition 2 illustrates the resulting damage-frequency relationship for damage center C after the main levee or flood wall and interior flood loss reduction measures are implemented. The function generated in Condition 1a for without conditions is truncated at the level-of-protection. The figure for Condition 2b interior flooding illustrates the damage-frequency function (residual) at damage center C after implementation of proposed interior flood loss reduction measures, such as enlarged gravity outlets and/or pumping stations.

d. The benefit analysis summary is also conceptualized in Condition 2. The benefit is the area under the without conditions damage-frequency curve minus the area under the residual damage curve for both the main levee and the interior.

e. If instead of complete non-coincidence, complete coincidence had been sketched and analyzed, the benefits attributable to interior measures would be different. The benefits would be less by the hatched damage frequency block in 2b that represents events exceeding the levee protection level. This is because interior events more rare than the line-of-protection design level could not accrue interior benefits ... the design line-of-protection would have already failed.

6-5. Legal Requirements.

a. The capability of an interior flood loss reduction system to function over the project life must be assured. This often requires legally binding commitments from the local sponsors of the project to properly operate and maintain the system. Real estate interest required and specifications for operating and maintaining detention storage areas, pumping facilities, and conveyance networks, should be integral to all agreements for implementation of interior system of flood loss mitigation measures.

b. Those items that the local sponsor must provide as a condition for Federal participation in a local project are commonly referred to as the a, b, c's, and usually derived at least in part from Section 3, Public Law 738, 74th Congress - Flood Control Act of 1936.

"..Sec 3. That hereinafter no money appropriated under authority of this Act shall be expended on the construction of any project until States, political subdivisions thereof, or other responsible local agencies have given assurances satisfactory to the Secretary of War that they will (a) provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction

of the project, except as otherwise provided herein; (b) hold and save the United States free from damages due to the construction works; (c) maintain and operate all the works after completion in accordance with regulations prescribed by the Secretary of War:....."

This act has been subsequently amended by Section 9 of the Water Resources Development Act of 1974 (Public Law 93-251). Regulations were prescribed by the Secretary of Army for maintenance and operation under Section 7, 58 Statutes 890; 33 USC 709.

c. 31 December 1970, Public Law 91-611 - River and Harbor and Flood Control Act of 1970, Section 221, provides that the construction of any water resources project must not be commenced until each non-Federal interest has entered into a written agreement to furnish its required cooperation for the project (84 Stat. 183, 42USC 1962d-5b).

d. The Federal and non-Federal participation in the plan should be developed and described in the authorizing document in a logical manner as follows:

(1) State the objectives and benefits expected to be achieved by the proposed plan. Provide specific information on the reduction in flood depths (elevation), duration, damages, etc., not just general statements.

(2) Describe all features of the plan necessary to achieve the objectives and benefits, not just the Federally constructed parts. This includes all structural and non-structural features, including any ponding areas and any other local actions needed (which local cooperation requirements will cover).

(3) Define the functional and operational requirements of each feature in specific terms: the necessary storage volume should the ponding areas; gravity drain capacity; gate closing elevations; pumping capacity; and the time equipment and manpower required to close the closure structures, etc.

(4) Present the capability of local interest to operate and maintain the plan. Also, present and discuss legal and financial capabilities and constraints that influence plan selection and/or operation. For example, it may be necessary to acquire a legal interest in ponding areas or channels where local interest does not have the legal capability to assure the required capacity by other means.

(5) Discuss operation and maintenance requirements in general. Provide a complete discussion of those requirements specific to the proposed plan not covered adequately in Title 33 CFR.

(6) In the section normally referred to as local cooperation, describe what locals must do as a condition to Federal participation. Describe project features and real estate interest that local organizations must provide. O&M requirements are usually referred to Title 33 CFR. If ponding areas are required, make a specific statement to this effect.