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Division of Waters Land Use Management Section

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Flood Plain Management in Minnesota

Flooding is a recurring problem along many rivers and streams in Minnesota. Major flooding has occurred in every river basin in the state: most recently in 1965 and 1969 on the Minnesota and Mississippi Rivers; 1975, 1978, and 1979 on the Red River of the North; and 1978 on the Zumbro River, causing \$50 million in damages in the City of Rochester. This flooding has resulted in tremendous social and economic losses to individuals, communities and the taxpayers as a whole. Various Federal and State agencies and local governments have developed policies and programs to alleviate floods and flood related losses, but, nevertheless, flood damages have continued to increase, and lives continue to be lost due to flooding. Depending on the future approach of community flood plain management activities statewide, recurring flood damages may continue to be an ever-increasing problem in Minnesota.



PHOTO COURTESY OF: U.S. Army Corps of Engineers, St. Paul District

The most current figures available for Minnesota indicate an average annual direct flood loss of \$60 million. Average annual direct flood loss figures of this type have historically included only: 1) the direct loss to the individual homeowner, businesses and agricultural interests (e.g. structural and contents damage, damage to motor vehicles, crop loss, etc.); 2) the damage to community infrastructures (storm sewers, roads, bridges, etc.); and 3) the costs associated with the flood fight and clean up. There has developed nationwide an increased awareness that the indirect losses due to flooding are very dramatic and these losses affect individuals who do not directly live in the flood plain.

The indirect losses related to flooding include: 1) lost profits to businesses closed during flooding, 2) wage losses and unemployment benefits, 3) federally subsidized flood insurance payments via the National Flood Insurance Program (NFIP), 4) income tax deductions for flood losses not covered by insurance, 5) low interest disaster relief loans, and 6) the cost to Federal and State agencies and local government in implementing disaster relief programs. The taxpayers are burdened with a significant portion of the cost of responding to unwise flood plain development. These indirect costs may, in fact, equal or exceed the direct costs.

The reduction of direct and indirect flood damages and the protection of life can be accomplished through comprehensive community flood plain management planning. Comprehensive flood plain management programs are comprised of those "nonstructural" and "structural" measures that: 1) reduce the amount of development within the community subject to flood damage, 2) minimize the impact of the flood on individuals, and 3) control the flood itself by confining the flood waters within protective structures such as levees and floodwalls.

The traditional response to reducing flood damage was to try and keep flood waters away from people by constructing dikes, levees, floodwalls, dams and reservoirs - the so-called "structural" solution. The end result in a number of cases was the emergence of a false sense of security in those areas protected by structural projects. Some structural projects have failed because of improper design or floods occurring which overtopped the design level of the structural project, resulting in more damages than would have occurred if the project was never built.

In 1969, the Minnesota Legislature enacted a State Flood Plain Management Act (Minnesota Statutes, Chapter 104). This Act and sound flood plain management principles stress the need for a comprehensive approach to solving flood problems by emphasizing nonstructural measures such as flood plain regulations, flood insurance, flood proofing, flood warning systems and development policies that discourage flood plain development if at all possible. By law, Minnesota's flood-prone communities are required to: 1) adopt flood plain management regulations when adequate technical information is available to identify flood plain areas, and 2) enroll and maintain eligibility in the National Flood Insurance Program (NFIP) so that the people of Minnesota may indemnify themselves from future losses through the purchase of flood insurance.

The State has declared a policy that nonstructural flood plain management will be the primary method of reducing flood damage. A community flood damage reduction program that includes a structural flood control project must incorporate those nonstructural measures needed to protect structures and individuals. A nonstructural flood plain management philosophy emphasizes controlling development in flood prone areas, instead of trying to control flood waters by constructing large, expensive public works projects. The Department of Natural Resources (DNR) is the state agency with overall responsibility for implementation of the State Flood Plain Management Act and DNR is also the State Coordinating Agency for the NFIP. Comprehensive flood plain management in Minnesota, therefore, involves the inter-related activities of various Federal and State agencies and the flood plain management program activities of the local government. The State of Minnesota has encouraged the Federal government to incorporate sound nonstructural flood plain management principles in their flood disaster response and recovery programs, their design and/or cost-sharing for structural flood control projects, and the rules and regulations for the NFIP. The State has advocated strict enforcement at the federal level of Executive Order Number 11988 on flood plain management. This Presidential executive order requires all Federal agencies to avoid flood plain development where possible and to practice sound flood plain management when developing in flood plain areas.

At the state level, the DNR has promulgated minimum standards for flood plain management entitled "Statewide Standards and Criteria for Management of Flood Plain Areas of Minnesota" (Minnesota Regulations, NR 85-93). These standards have two direct applications: 1) all local flood plain management regulations adopted after June 30, 1970 must be compliant with these standards; and 2) all State agencies and local units of government must comply with Minnesota Regulations, NR 85-93, in the construction of structures, roads, bridges or other facilities located within flood plain areas delineated by local ordinance. Local flood plain regulatory programs which are administered by county government for the unincorporated areas of a county and by municipal government for the incorporated areas of a county must be compliant with federal and state flood plain management standards. Both federal and state standards identify the 100-year flood plain (Figure 1) as the minimum area necessary for regulation at the local level and the 100-year flood plain is further divided into "Floodway" and "Flood Fringe" areas for land use management purposes (Figure 2). Flood plain zoning regulations do not prohibit all flood plain development. The goal of flood plain zoning is to reduce flood damages by providing for the wise use and development of flood-prone lands.



4

Probability of Occurrence is the percent chance that a flood of a given frequency will be equaled or exceeded in any given year. The commonly used flood frequencies and percent chance of occurrence comparisons are:

10-year frequency flood 50-year frequency flood 100-year frequency flood 500-year frequency flood 10.0% chance per year 2.0% chance per year 1.0% chance per year 0.2% chance per year



If a development is proposed within a 100-year flood plain area, the developer should contact the local planning or zoning officials immediately to determine the specific flood plain management criteria established for the respective community. The DNR and various Federal agencies offer technical assistance to individuals and communities to encourage the proper design of flood plain development. (Note: Certain flood plain areas fall within the jurisdiction of legally established watershed districts pursuant to Minnesota Statutes, Chapter 112. Watershed district regulations may contain development standards in addition to those of the local unit of government.)

During the past 10 years, the major emphasis at the state level has been to enroll communities in the NFIP and to provide technical flood plain information so that flood-prone communities will adopt flood plain regulatory programs. This effort has been very successful. The vast majority of floodprone communities in Minnesota have adopted, or will adopt in the near future, flood plain regulatory programs for future development of flood-prone areas.



REFERENCE: U.S. Department of the Interior, Office of Water Resea <u>A PROCESS_FOR_COMMUNITY_FLOOD_PLAIN_MAN</u>



rch & Technology, <u>AGEMENT</u>, April 1980.

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There has been an increased awareness at the federal and state level of the need for expanded efforts directed at alternative nonstructural flood plain management activities at the local level including: improved community flood warning systems, pre-flood fight and post-flood recovery planning, and flood hazard mitigation planning (e.g. flood proofing/elevating existing flood-prone buildings, relocation of flood-prone structures, etc.) Because of the successful program of getting the State's flood-prone communities to adopt regulatory programs, the past trend of unwise flood plain development will be substantially halted. We must still face the task of reducing damages to existing development in flood plain areas through community flood plain management programs tailored to specific community needs. Successful community flood plain management planning can only be accomplished if local officials and private citizens are kept informed of innovative flood plain management activities and programs that are available for their use. In this effort, the DNR has prepared this brochure and the informational brochures and technical reports listed in this brochure for use by State and local officials in their development of comprehensive flood plain management programs.

A successful statewide flood damage reduction program is dependent upon a coordinated effort between the various levels of government involved with flood plain management activities. Private citizens and state and local officials must be encouraged to become actively involved in local flood damage reduction programs. The consequence of not adequately addressing flood plain management issues was dramatically stated in 1972 by Don Barnett, former Mayor of Rapid City, South Dakota:

"Elected public officials must give the same attention and priority to their drainage problems as they give to their police and fire problems. In the history of Rapid City, perhaps 35 people have died in fires and another 35 have been killed during the commission of crimes, but in just two hours, 238 people died in a flood." *

Flood damage reduction must continue to be the mutual goal of all persons concerned with protecting life and property in Minnesota.

* REFERENCE: National Science Foundation, <u>A REPORT ON</u> <u>FLOOD HAZARD MITIGATION</u>, Washington D.C., September 1980.

MINNESOTA DEPARTMENT OF NATURAL RESOURCES FLOOD PLAIN MANAGEMENT PROGRAM PUBLICATIONS

- 1. Chapter 104 of Minnesota Statutes.
- 2. NR 85-93, "Statewide Standard and Criteria for Management of Flood Plain Areas of Minnesota."
- NR 82-84, "Statewide Standards and Criteria for Management of Municipal Shoreland Areas of Minnesota" and Cons 70-84, "Statewide Standards and Criteria for Management of Shoreland Areas of Minnesota."
- 4. Technical Report No. 1, "Field Surveys for Flood Hazard Analysis," January 1971.
- 5. Technical Report No. 2, "Normal Depth Analysis," January 1971.
- 6. Technical Report No. 3, "Local Flood Data Collection," March 1971.
- 7. Technical Report No. 4, "Use of Experienced Data in Flood Plain Management," November 1971.
- 8. Technical Report No. 5, "On-Site Sewage Disposal in Flood Plain Area," December 1974.
- 9. Technical Report No. 6, "The Regulatory Floodway in Flood Plain Management," December 1974.
- 10. Technical Report No. 7, "Procedures and Requirements for Flood Hazard Evaluation," March 1980.
- 11. "Sample Flood Plain Zoning Ordinance For Local Units of Government," September 1978.
- 12. DNR Reports 88, "New Ways to Reduce Flood Damage."
- 13. Informational Brochure No. 1, "Reducing Flood Damages by Acquisition and Relocation: The Experiences of 4 Minnesota Communities."
- 14. Informational Brochure No. 2, "Before You Buy or Build In The Flood Plain: What You Should Know."
- 15. Informational Brochure No. 3, "Flood Hazard Mitigation Planning: What It Is and What It Can Do For Your Community."

- 16. Informational Brochure No, 4, "Urban Stormwater Management Another Alternative For Reducing Flood Damage."
- 17. Informational Brochure No. 5, "Would A Flood Warning System Benefit Your Community." 18. Informational Brochure No. 6, "Flood Plain Management in Minnesota."
- 19. Flood Plain Management Information Sheet No. 1, "Preparing for Floods."
- 20. Flood Plain Management Information Sheet No. 2, "Preparing to Evacuate."
- 21. Flood Plain Management Information Sheet No. 3, "It's Time to Clean Up."

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FLOOD PLAIN MANAGEMENT Informational Brochure No. 6

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