Rock Island County
Floodplain Hazard Mitigation Study

January 2002

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ACKNOWLEDGMENTS

Rock Island County would like to thank all of those who participated in the planning process. The time and effort put forth by the Hazard Mitigation Planning Committee, Economic Development Staff, Bi-State Regional Commission, Rock River Valley Association and the public for their input in the planning process. This project was funded by a Hazard Mitigation Grant provided to Rock Island County through FEMA and IEMA.

Committee Members:

Tom Phipps– Chairman
John Ames– Vice Chairman
Don DeLoose
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Denis Leftwich
Carol Vols

Staff:
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Tim Oliver– Rock Island County Economic Development
Ray Nees– Rock Island County Economic Development

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Hazard Mitigation Plan
for
Rock Island County, Illinois

Purpose

The purpose of this Hazard Mitigation Plan and the planning process is to educate the general public and those associated with the creation and enforcement of public policy, and the inherent need to reduce damages associated with natural disasters, such as earthquakes, tornado/high winds, technological disasters and flooding. The Rock Island County Emergency Services and Disaster Agency (ESDA) is responsible for handling disaster response during and after an event. The ESDA Emergency Operations Plan (EOP) addresses the necessary immediate response to natural and man-made disasters. This plan will examine and outline procedures that will assist in reducing and/or eliminating loss of life or property by mitigating the potential for such damages. Mitigation includes activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation steps now such as constructing barriers, removing structures from harms way and elevating flood prone structures will help reduce the amount of structural damage. Little or no control exists for eliminating disasters associated with nature. Yet, steps can be taken so as to reduce damages, when proper guidelines and regulations are in place to assure best possible practices are used for construction projects located within the County.

While, Rock Island County is subject to the aforementioned hazards in one way or another, flooding will continue to be the hazard that plagues residents of the county. Geographically, Rock Island County is bounded on the north by the Mississippi River. The southern boundary on the north end of the County is the Rock River, which then cuts through the center of the County. The Rock River presents the majority of the flooding problems for the County. Much of the flooding that occurs on the Rock River is predictable, as flood waters move downstream from the Upper Rock River watershed. Ice jams on the Rock River pose significant unexpected river heights in the late winter months and early spring.

Development pressure along the lower Rock River Valley adds additional concerns to the long term stability of the Rock River valley. The majority of the development existing along the Rock River is residential in nature. Much of the future development anticipated just outside of the floodplain or on the outskirts of the flood fringe is expected to be commercial. With such pressure, the need exists to prevent future damages to existing structures and reduce, if possible, the need to evacuate residents along the river on a repeated basis.

Rock Island County has been successful in its mitigation of flood damages in recent years, yet, flood heights along the Rock River continue to rise. Projections from a new study of the Mississippi River project that an increase in Base Flood Elevations (BFE) may be forthcoming. Rock Island County, also, has approximately 52 repetitive loss properties among the1,092 flood insurance policies issued to Rock Island County residents. Therefore, more needs to be done to insure reduction in future losses, by investigating a combination of mitigation measures.

The overall purpose of this plan, therefore, is to move Rock Island County toward becoming a more disaster resistant community. A number of strategies will need to be developed to assure future residents of the county that disaster losses can be kept to a minimum. In all aspects of mitigation, adopting a "good neighbor policy" will have far reaching effects on effective mitigation. The realization that what we do individually has an impact on those around us. There is nothing that can be done to control nature, yet we can control man made changes to the landscape.

Authorities

Federal: ***44CFR 60.6(a)(1-7)***

State: ***55ILCS 5/5-15001; et al***

Local: ***Rock Island County Zoning Resolution Section 135– Floodplain Regulations***

Process

Lead Agency: Rock Island County Economic Development, Zoning & GIS
Name of Individual Coordinating local team: Timothy L. Oliver
Professional Planner: Yes
Qualifications: Director Zoning & Building 7 yrs. CFM
Agencies Involved:

Rock Island County Public Heath Department
Rock Island County Economic Development, Zoning & GIS
Bi-State Regional Commission
Natural Resources and Conservation Service
Rock River Valley Association

All members of the Hazard Mitigation Planning Committee were officially appointed by the Rock Island County Board.

Members:
Tom Phipps
John Ames
Don DeLoose
Joel DeVrieze
Joe Gates
Paul Guse
Denis Leftwich
Carol Vols

Meetings:

Organizational Meeting:	June 26, 2000
Informational Meeting:	July 24, 2000
Public Input Meeting:	September 25, 2000
Working Meetings:	October 23, 2000
	April 9, 2001
	November 17, 2001
Public Hearing:	January 23, 2002
County Board Meeting:	February 19, 2002

All meetings were posted in accordance with the "Public Meetings Act". Public Notices were printed for all public input meetings. Written comments were solicited by public notice, along with notices in local newsletters.

Jurisdictional Background

Estimated Population: 149,000 (total)
Municipal Populations:

Andalusia	1,052	Moline	43,202
Carbon Cliff	1,492	Oak Grove	626
Coal Valley	2,683	Port Byron	1,002
Cordova	638	Rapids City	932
East Moline	20,147	Reynolds	583
Hampton	1,601	Rock Island	40,552
Hillsdale	489	Silvis	6,926
Milan	5,831		

History:

Mississippi River	1965, 1969, 1973, 1975, 1993
Rock River	1965, 1973, 1979, 1993, 1995, 1997, 1998, 2000, 2001

Major Rivers/Watersheds:

Rock River
Mississippi River
Mill Creek
Case Creek
Coal Creek
Meredosia Ditch
Moline Pool / Sylvan Slough

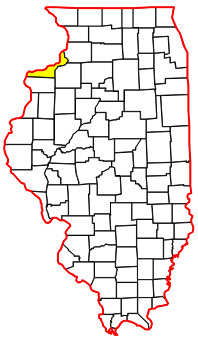
Joined the NFIP in:	1982
NFIP Community Number:	170582
Majority of Homes constructed in:	1950-1975
Does the jurisdiction have a current land use plan:	Yes
Last Update:	1997
Description of planning area:	Unincorporated Rock Island County
Are there zoned areas in your jurisdiction:	Yes
Last Update:	2000

Building Codes:		Yes
	Last Update:	1997
	Which Code:	1994 Uniform Building Code
Person who issues:		Tim Oliver
Community Industry:		Farming/manufacturing
Municipal Water system:		Not unincorporated
Sewage treatment provided by:		
	Municipal:	Individual Municipalities
	Unincorporated:	Private Septic
Utilities provided by:		
	Electric:	MidAmerican Energy
	Natural Gas:	MidAmerican Energy
	Telephone:	Ameritech
	Cable:	AT&T
Fire Insurance Rating:		9
Building Inspection Rating:		7
Flood Insurance Claims information:		
	Policies	1,092
	Coverage:	$79,070,900
	Claims:	1,137
	Claims Pd:	$5,033,544

Jurisdictional Commentary

Rock Island County is situated on the western edge of the State of Illinois. The County forms the border between Illinois and Iowa. The County with the Mississippi River on the northern boundary, is the only location where the Mississippi River runs east and west. Four hundred and twenty four square miles (271,488 acres) are in the county, the majority of which is dedicated to farming. Rock Island County was incorporated in 1831. The region was settled for one primary reason, the ***River***. As a trading center along the Mississippi River, the Quad City communities began to grow. In 1841 the City of Rock Island was formed and in 1848 the City of Moline. The development of these two communities was directly related to transportation issues on the Mississippi River. River traffic moving goods up and down the river were faced with crossing the rapids, now know as Rapids City, thus grew the downstream communities as provisions were made to transport goods around the rapids by unloading in Rock Island and moving by land upstream beyond the rapids. The towns continued to grow and prosper through the late 1800's.

The industrial era brought manufacturing to the area with John Deere, International Harvestor, Case, and Montgomery Elevator, to name a few. As with the majority of River Communities, the industrial developments developed along the Mississippi River to take advantage of transportation capabilities. In 1907 the City of East Moline became the third major community to locate on the banks of the Mississippi River. The 3 communities continued to grow their downtowns along the industrial centers of the County. As is typical of River communities with major industrial and downtown centers, levees were constructed to protect the main stays of the communities. Smaller villages began to appear upstream and downstream from these industrial centers. These became the bedroom communities of the County. The lure of overlooking the River spurred residential growth and development along the River. Eventually the Villages of Hampton, Rapids City, Port Byron, Cordova (to the north) and Andalusia (to the south) were settled to also take advantage of the River. Currently, Rock Island County is home to 16 incorporated Cities and Villages, all with varied development histories.



The Rock River, on the other hand, was experiencing a different type of growth. The majority of the development began as river cabins for

those desiring to enjoy the river for recreation. Small river cabins were erected along the Rock River from the northern village of Hillsdale to its' confluence with the Mississippi. Over the years, the urban communities experienced a great amount of growth due to the manufacturing employment base in the region. As the communities grew, municipal boundaries were pushed to the Rock River. River cabins began to be converted into permanent residential structures.

In 1956 Rock Island County began the process of adopting Zoning Ordinances on a county wide basis. This process was completed in 1963. Approximately at the same time Building codes were adopted by the Rock Island County Board for regulation of construction in the county. It was not until after several flood events that Rock Island County adopted its Floodplain Ordinance. It was in 1982 that Rock Island County became a NFIP community.

Today Rock Island County along with neighboring counties of Henry County, Illinois and Scott County, Iowa form part of the largest MSA between Chicago and Omaha and between St. Louis and Minneapolis-St. Paul. The centralized location, industrial/manufacturing base, interstate transportation system (Interstate Highways 80, 280, and 74 run through the county, along with US Routes 6, 67 and 150, and Illinois Routes 2, 92, and 84) have all contributed to the growth of the region.

Due to the industrial development, the communities have continued to grow to the point where Rock Island and Moline have become landlocked by the Rivers. Future growth requires expansion south of the Rock River with a need to provide access and infrastructure to the south. Additionally, the remaining undeveloped land between John Deere Expressway and the Rock River have been identified as the prime area for the development of commercial/retail centers for the region. To accomplish this, portions of the land in the floodplain would need to be and have been filled. Fill projects have ranged from six (6) inches to four (4) feet.

The climate of the area is classified as temperate continental, indicating cold, dry arctic air masses in the winter months, and hot, humid southwestern summer air masses. The average temperature in January is 22 degrees Fahrenheit and in July is 75 degrees F. The average snowfall is 28 inches. The first frost usually comes in mid October, and the last frost in late April. The topography of the area

has been shaped by the rivers. The valleys are relatively steep sided, and the streams have few meanders. The majority of the topography is marked by rolling hills with interspersed flat terrain. The soils of Rock Island County reflect the result of glacial and post glacial activity. The soils are essentially of three general types: glacial drift deposited by advancing or retreating glaciers; alluvial or water deposited soils; and post glacial deposits of loess or windblown soils. The bedrock in the county usually occurs at a depth of 0 to 250 feet from the surface. The alluvial soils in the county usually occur in the lowlands of the Mississippi River and the Rock River. The main difference between soils in the county is their drainage ability, which ranges between poor and good. Most of the natural vegetation in Rock Island County consists of deciduous trees and various bushes and grasses. The various bluffs and stream valleys throughout the county contain large tracts of natural vegetation.

The northern and southern most areas of the County have been and remain predominantly agricultural in nature. The mix of industrial, commercial, residential and agricultural land uses contributes to a diverse economic landscape for the region. The two rivers and numerous tributaries provide Rock Island County residents with abundant opportunities as well as responsibilities. The region, while not identified in a known earthquake fault, is located above the extreme uppermost end of the New Madrid fault running through St. Louis, Missouri. The area is frequently affected by high winds associated with Spring and Summer thunderstorms. Rock Island County is, therefore, subject to the effects of a number of natural disasters, with flooding being the predominant concern of the area.

History of Flooding Commentary

Rock Island County has perpetually been affected by flooding on both the Mississippi and the Rock rivers. With 41,380 acres identified in the floodplain, flooding affects a significant portion of Rock Island County. Approximately 3000 parcels in the floodplain have structures assessed, with less than half being covered by flood insurance. (See following page) Historically, the flooding has been the result of spring and summer rains. The worst floods generally occur in the early spring and are the combination of snow melt and spring rains. Intense thunderstorms, especially upstream, result in flooding on the lower Rock and Mississippi.

Mississippi River flooding has been reduced, in the Illinois urban communities by the construction of levee systems and/or floodwalls. Smaller pockets of residential developments such as Campbell's Island, Doyle's Addition and the Village of Andalusia are affected on a regular basis. Elevation of some residential structures in these areas has reduced overall damages. The fact that the Mississippi River is a navigable waterway, used for considerable barge traffic and under the constant vigilance of the Corps of Engineers, receives much more attention and maintenance than does the Rock River. While erosion and siltation are constant concerns for the health and navigability of the River, the Corps dredging requirements to keep the river navigable tends to alleviate some of the flooding issues occurring on the Mississippi.

The Rock River poses the greatest flooding threats to the floodplain residents of the County. While much of the Mississippi shoreline is industrial in nature, the Rock River is lined with residential structures. These structures began as small river cabins and over time have grown into year round residences. This transformation from recreational to residential has had some impact on flooding. This is not to say that these residential structures have caused greater flood elevations. Yet, flood insurance claims have increased due to the change in land use along the river.

Big Island–April 1965

Historically, the Rock River's most significant flood events have been in the early spring or summer. Early spring flooding is generally the result of deep snows in the north and an early and rapid snow melt north of Rock Island County many times, while locally the river is still frozen. This early spring flooding is also

accompanied with ice jams, increasing the damages associated with

such flooding. Summer floods are usually the result of heavy rains both locally and up stream. The greatest floods of record on the Mississippi River at Rock Island have occurred in the Spring of 1965, 1969, 1973, 1975 and the Summer of 1993.

1979 "Flood of the Century Preparations"

Data from the "Great Flood of 1993" demonstrates the seriousness of the problem. In Rock Island County 507 structures received damages. Valuation of damages sustained totaled $4,917,887. FEMA public assistance funds paid out to Rock Island County residents as a result of the 1993 flooding totaled $1,440,716. The majority of the damages in the 1993 flood event, were sustained in the Mississippi River floodplains. The Mississippi River crested on July 9, 1993 at Lock 15 at a flood stage of 22.63 feet. This was 0.15 feet above the 1965 flood crest. Since the Great Flood of 1993, the Rock River has experienced severe flooding 6 out of 7 years, with the most recent flood event being February 2001. Each of these flood events while not recognized as the flood of record, has caused tremendous damage on a yearly basis.

Rock Island County's location at the confluence of the Rock and Mississippi rivers also complicates the flooding problems on the Rock River. When both rivers flood concurrently the effect of the Mississippi upon the Rock River is minimal because of the difference in the elevations of the two Rivers. Rock Island County's location at the end of the line, so to speak, upstream snow pack, snow melt and rain affect Rock Island County residents as much, if not more, than local weather conditions.

Significant changes in flooding events have been documented along the Rock River. Recent flood heights are drastically higher when compared to historical data. (See Table 1.)

Table 1

Recent Flood Events	
Year	**River Levels**
1948	14.46
1993	18.36
1996	18.79
1997	17.77

Increased flood heights result in greater damages. Even more alarming is that similar discharge rates are resulting in higher river levels. (See Table 2.)

Table 2

Flood Comparisons

Year	**Discharge**	**Flood Height**
1948	42,600 CFS	14.46
1996	45,098 CFS	18.79
Difference	**+4.33 ft higher**	
1948	38,000 CFS	13.93
1974	38,700 CFS	17.18
Difference	**+3.25 ft higher**	

***Note similar discharge rates result in higher river levels. Data based on Joslin River Gage.**

These increases in flood heights are the basis for increased concerns among Rock River residents.

As of March 22, 2000, Rock Island County has 1,092 flood insurance policies in effect. Coverage in those policies is valued at $79,070,900. One thousand one hundred thirty seven (1,137) claims were paid in behalf of policy holders totaling $5,033,544. Damages continue to increase as flood heights and flooding frequency increases.

The Rock River flooding that affects Rock Island County residents has become a regular occurrence in the past 10 years. It is apparent that a number of factors contribute to this situation:

- Draining & Filling of Wetlands
- Filling of Floodplains
- New levees, especially farm levees
- Sedimentation from Soil Erosion
  ➢Both Agricultural & Development
- New Obstructions in the Floodway

Draining & Filling of Wetlands– Over the years, development pressure along the Rock has resulted in the filling of wetlands or the

reduction in the value of wetlands as useful stormwater retention areas. Recent studies have shown the value of wetlands as a natural buffer, acting as an absorption field for stormwater prior to entrance into major waterways and retention areas for flood waters during times of high water.

Wetland soils and vegetation provide an effective natural mechanism for the absorption of storm and flood water. Increased development in the watershed increases runoff and stormwater, reducing the capabilities and natural functions of the wetlands. Elimination of these wetlands exacerbates these problems, by eliminating totally the natural and beneficial functions of wetlands.

Filling of Floodplains– Even more significant than filling of wetlands is the filling of floodplains or flood fringe. Floodplains are the natural storage areas for flooding rivers and streams. Historically communities have realized the economic value of being located on a river. Whether for its industrial (power and shipping) benefits or its' residential (recreational) benefits, communities have been reluctant to quash development even when filling the floodplain was a major requirement of the development.

Yet years of filling the floodplain for development, cumulatively, have had a negative impact on flooding. This has been the case especially in Rock Island County. The major cities in the county find themselves landlocked between the Mississippi River and the Rock River. The prime commercial/retail development areas are located between Blackhawk/John Deere Expressway and the Rock River. Major development projects have been approved and permitted allowing filling of the floodplain with no compensatory storage requirements being required.

New Levees including Farm Levees– Prior to 1994 a number of farm levees were constructed to protect cropland from yearly flooding. As with the filling of floodplains, levees have the tendency to prevent floodwaters from seeking natural storage areas in times of high water. Prior to 1994 AG projects were exempt from all County permitting requirements. Since 1994 permits have been required reducing the amount constructed since that time. Yet such projects would be allowed under current floodplain regulations.

Sedimentation from Soil Erosion, Agricultural & Development–

Neither Rock Island County nor any of its major communities have a Soil Erosion and Stormwater Management Plan in place. This regulatory tool would greatly assist in the stormwater management of the immediate area. The majority of development that has occurred in Rock Island County sends stormwater to the Rock River floodplains. Much of the farmland in the area also sends siltation to the river system with little or no controls. Of equal or greater concern and possibly creating greater impacts, is what takes place in the entire watershed. Being the end of the line Rock Island County feels the effects of everything that takes place upstream.

New Obstructions in the Floodway–A floodway has been identified along both sides of the Rock River. The State of Illinois Office of Water Resources is charged with oversight and permit review of floodway projects. While new obstructions are not allowed to be constructed in the floodway, provisions are made for obstructions that do not increase flood heights. While these projects individually may meet these requirements, the question arises as to the cumulative effect of such projects. This type of project includes bridges, retaining walls, garages, room additions, boat docks to name a few.

The 1982 Flood Insurance Study conducted for Rock Island County's admission into the NFIP identified not only the floodplains for regulation, but also the floodways. The Illinois Department of Transportation, Division of Water Resources, (DWR) retains jurisdiction of floodway developments. Prior to issuance of local permits, State Floodway permits must be issued for individual construction projects. The State has approved 12 Statewide Permits that, when a project falls within the parameters established, may be issued without DWR review. Those twelve (12) permits cover the following projects:

Permit Number	**Title**
SWP 1	Fringe Construction (only applicable to Rock Island County)
SWP 2	Rural Bridges
SWP 3	Barge Fleeting Facilities
SWP 4	Aerial Utility Crossings
SWP 5	Minor Boat Docks
SWP 6	Minor Floodway Construction

SWP 7	Outfalls
SWP 8	Underground Pipeline & Utility Crossings
SWP 9	Minor Shoreline and Streambank Protection Activities
SWP 10	Accessory Structures and Additions to Existing Residential Buildings
SWP 11	Minor Maintenance Dredging Activities
SWP 12	State & County Bridge and Culvert Replacement Structures

The regulations enforced by the DWR in downstate communities virtually prohibits "construction which results in increased flood heights or velocities". New structures over 500 square feet require application to the Division of Water Resources for permitting. Applications submitted for fill permits are reviewed taking into consideration where the fill will be placed and where the fill material is coming from. Some things will never change. The Rock River will always be the end of the line for floodwaters. Communities will continue to grow. As Rock Island County communities to grow south of the Rock River, development will continue to increase the problems associated with stormwater runoff. Development pressures will continue to place demands on the current eco-systems. Development pressures will continue to pit new jobs, new homes and economic viability against the treatment of floodplains as a major resource for a community.

Impact of Flooding

Infrastructure/Assessment – Critical facilities for the major municipalities are well protected from flooding. The facilities, water and sewer treatment plants are located primarily along the Mississippi River, with the exception of a Moline sewer treatment plant located along the Rock River. All of these municipal facilities are well above the BFE and/or protected by floodwalls in the case of the Mississippi River facilities.

County infrastructure (ie; roads, and drainage ditches) are the most affected by flooding, especially along the Rock River. Road closings are general occurrences in several areas when the Rock reaches flood stage. (See Road Closure Map on following page) Along with the damage to infrastructure, peril to the lives of residents and disaster personnel, considerable manpower is expended post flood to meet FEMA damage assessment requirements on structures inundated with flood waters. On the average, 500 plus hours are required to complete damages assessments after even minor flood events.

Public Health – The public health/safety issue poses greater risks for the residents of Rock Island County, both during the flood event and after. During flood events rapidly moving floodwaters pose great risks for those residents determined to remain in their homes, yet require emergency assistance at the last minute to leave inundated homes. A car will float in less than 2 feet of moving water, residents trying to return to their homes are often faced with this situation. Electrocutions is the second most frequent cause of flood deaths, claiming lives in flooded areas that carry a live current created when electrical components short out. Floods also can damage gas lines, floors and stairs, creating secondary hazards such as gas leaks, unsafe structures and fires, which are particularly damaging in areas made inaccessible to fire-fighting equipment by high water or flood related road or bridge damage.

Typical Road Closures

The majority of the parcels along the Rock River affected by high waters are residential structures located in the unincorporated county. Therefore, these properties are on well and septic systems, rather than city sewer and water. This fact is a serious concern for the public health of these residents. Aging and inadequate septic systems can be affected by prolonged flooding. The overflow of septic systems effluent into the river system also creates health risk

associated with contaminated drinking water. Residents need to be

aware of the dangers associated with drinking water contaminated subsequent to a flood event. The Rock Island County Health Department provides testing for these residents, but many may not feel the necessity to bother after so many flooding events.

The majority of homes along the Rock River have already been elevated above the BFE. Due to this fact most residents remain in their homes during high water, creating additional safety issues. Boating in and out of flooded areas after road closures puts their families and Emergency Services personnel at great risk, especially when mandatory evacuation orders are issued. Many of these structures are located not just in the floodplain but in the floodway. Residents of Campbell's Island (Mississippi River floodway) also put themselves at risk by remaining in their homes during Spring floods. River Oaks mobile home park is located in the floodway of the Rock River near Barstow, IL. This park contains 109 licensed mobile home sites. The park is located behind a non corps-certified levee, which must be sandbagged every time the River reaches flood stage. The majority of these mobile homes were set prior to 1995, when the one foot (1') freeboard requirement was being enforced in mobile home parks in Rock Island County. This situation creates serious property and public safety issues for the residents of the mobile home park and for the many volunteers who assist in the sandbagging of the levee.

Another health problem associated with flooding after the water recedes, is associated with stagnant pools of flood water that are left behind. These become breeding grounds for mosquitoes, and the wet areas of a building that have not been cleaned properly breed mold and mildew. Studies completed after the 1993 flooding of the Mississippi River identified additional health problems associated with flood events. Numerous cases of respiratory ailments were reported months after the flood waters had receded. After much investigation, increased mold spore levels were discovered as the cause of many of the health problems. Improper cleaning, turning on heat to dry out water soaked belongings and interiors, led to the growth of mold. Many times residents were unaware of the mold growth, which may have taken place behind walls, above ceilings and other locations. This serious health threat should be addressed in public awareness campaigns post flood events.

Mold/Mildew from flooding

Fortunately for Rock Island County, no serious injuries have resulted

from recent flooding events. While, the possibility exists, neither the Rock River nor the Mississippi River are subject to flash floods as discussed previously. Upstream rainfall and snowfall are primary contributors to local flooding, providing adequate warning to floodplain residents. Substantial warning is generally provided via the emergency services office and local media, providing adequate time to respond. Early spring ice jam flooding sometimes gives little warning prior to the rapid rise of river levels on the upper end of the Rock River.

Mental Health Impact– Additionally, the long term psychological impact of having been through a flood event is a problem dealt with post flooding. Having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed is extremely traumatic. The cost and labor needed to repair a flood damaged home puts severe strain on people, especially the unprepared and uninsured.

There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

Inventory of Structures in the Floodplain – Using the County's Geographic Information System, over 5,000 parcels were identified as being affected by the floodplain in Rock Island County. This includes parcels with the floodplains of Rock River tributaries bisecting them. Approximately 3,000 of these parcels have structures with values of over $1500 on them. Many of the parcels with tributary floodplains, have the structures located well outside of the floodplain boundaries. These 5,000 parcels include those located within municipal boundaries. Approximately 2,000 are regularly monitored for development activity by the Rock Island County Office of Economic Development, Zoning & GIS.

Manufactured Housing – As previously mentioned, River Oaks Mobile Home Park is located in the floodway of the Rock River. The park is licensed for 109 sites. The park is behind a non corps-certified levee, which if not sandbagged would be topped annually. The levee would have been breached in each of the past five (5) years. March 2001 ice jam flooding threatened this levee again. Frost in the levee and sandbags left in place from the previous (2000)

flood event prevented its being breached.

Since 1995 all mobile homes moved into the park have been required to be set one foot (1') above the BFE, per Rock Island County's floodplain ordinance. This mobile home park does not experience much move out activity, thus the majority of the mobile homes are still below the BFE. The park has been identified as a potential future buyout project. (See Mitigation Goals)

Number of Structures Substantially Damaged in most recent flood events – No structures have been substantially damaged in flooding that has occurred in the most recent flooding(Spring 2000). One (1) in 1997 as a result of ice jam flooding experienced a collapsed foundation wall. Rock Island County has adopted the cumulative damage language in its ordinance and as a result 3 structures crossed the cumulative 50% requirement in the Spring 2000 flood.

Repetitive Loss Properties – As a result of such increased flood heights, damages to residential properties has increased. Evidence of this is Rock Island County's repetitive loss report. NFIP defines a "**Repetitive Loss**":

> **"As any property which has had four (4) or more insured flood losses (claims) as well as those structures that have had two (2) or three (3) losses that cumulatively exceed the structure's value."**

Rock Island County currently has 47 repetitive loss properties. Of those 47, 23 have received claim amounts in excess of 50% of the fair market value (FMV) of the structure. Of those 23, ten (10) have received claim amounts in excess of 80% of their FMV. Two (2) of those ten have received amounts for more than the FMV of the structures. The majority of these repetitive losses have occurred in the past 5 years.

ID	# of Losses	Total Paid	FMV	Insurance
1	2	51,218	119,028	NO
2	2	47,023	87,600	NO
3	3	46,502	218,240	YES

4	3	31,959	132,200	YES
5	2	20,161	28,000	NO
6	2	20,534	49,052	YES
ID	**# of Losses**	**Total Paid**	**FMV**	**Insurance**
7	4	8,913	35,200	NO
8	2	36,682	42,984	YES
9	2	27,955	35,235	YES
10	6	54,668	67,500	NO
11	2	17,583	70,848	YES
12	2	11,534	2,495	YES
13	2	24,113	37,333	YES
14	2	4,430	23,200	NO
15	3	45,343	45,000	NO
16	5	21,760	68,869	YES
17	2	3,620	21,700	NO
18	2	35,627	48,576	YES
19	2	8,473	110,200	YES
20	2	13,559	88,200	NO
21	3	14,302	167,200	YES
22	7	114,585	113,724	YES
23	8	107,607	196,806	YES
24	4	18,874	156,000	YES
25	2	27,145	145,200	YES
26	2	58,009	N/A	YES
27	2	21,882	N/A	YES
28	3	43,443	80,064	YES
29	2	14,045	53,150	NO

30	2	9,135	47,500	YES
31	5	14,476	55,715	YES
32	4	33,708	40,635	YES
ID	**# of Losses**	**Total Paid**	**FMV**	**Insurance**
33	5	38,254	119,000	YES
34	3	16,546	84,390	YES
35	2	42,370	100,000	YES
36	2	12,439	92,646	YES
37	2	10,616	41,764	YES
38	2	41,480	36,703	YES
39	3	13,882	71,474	YES
40	4	16,123	31,980	YES
41	8	30,216	58,994	YES
42	2	24,748	66,000	YES
43	3	24,468	4,822	YES
44	2	4,382	48,053	YES
45	7	27,955	100,000	YES
46	2	5,005	2,502	YES
47	2	5,271	21,000	NO

***Note: See Exhibits 1-9 and County Map for Location of repetitive loss properties.**

****Note: Repetitive Loss Report does not reflect March 2001 flood data.**

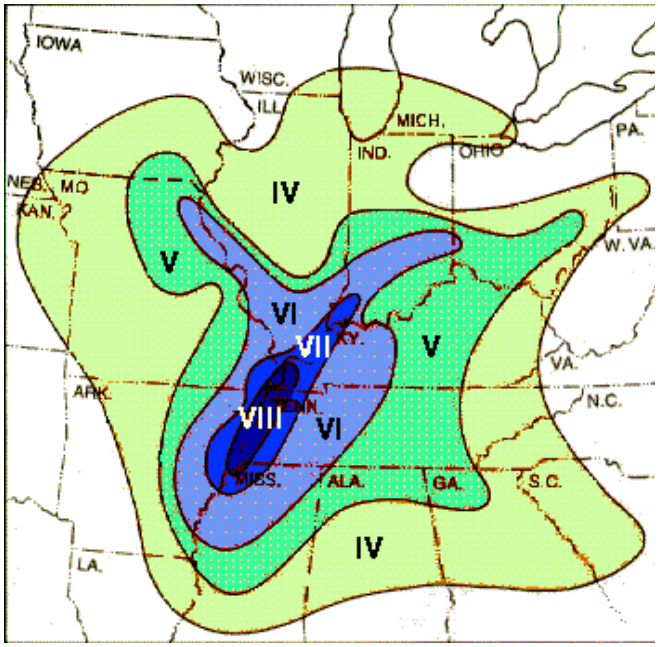
Other Public Facilities – The Barstow and Hillsdale fire stations are located within the floodplain. Both of these, while not in the floodway, are very close to designated floodway boundaries. These facilities have not been damaged in recent flood events and are

generally used as staging areas for disaster relief organizations.

Other Potential Hazards

Rock Island County is vulnerable to additional hazards other than flooding. Earthquakes, tornadoes, high winds, snow and technological disasters could also affect the residents.

Earthquakes– An earthquake is defined as "a shaking or trembling of the crust of the earth, caused by underground volcanic forces or the sudden breaking and shifting of rock beneath the surface". Earthquakes are unpredictable and strike without warning. They may range in intensity from slight tremors to great shocks, and may last from a few seconds to as long as 5 minutes. Shocks could come in a series over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Most casualties result from building collapse or falling objects. Disruption of landline communications, along with light and power lines, gas, sewer and water mains can be expected. Rock Island County has not experienced a major earthquake in its history, however, the possibility of such an occurrence is ever present. The County is located north of a fault which originates in the southern tip of Illinois and extends south along the Mississippi River to the northeastern tip of Arkansas. Rock Island County is in a "minor to moderate damage" risk area. Besides building code regulations, residents of Rock Island County should be educated with regard to the vulnerability to earthquakes, post disaster precautions and preparation of adequate response plans in case of such an emergency.



New Madrid Earthquake Potential Damage Zones

Tornadoes– A tornado is defined as violent whirl of wind that ranges from a few hundred feet to a mile in diameter. It is an atmospheric storm of short duration composed of winds rotating at very high speeds, usually moving in a counter clockwise direction. Many times, the funnel cloud associated with a tornado has an interior air pressure of 10 to 20 percent below the surrounding atmospheric pressure. Tornadoes form in severe thunderstorms and are visible as a vortex. They travel over the ground at speeds ranging

from zero to seventy miles per hour with a path from 16-200 miles

long. Tornadoes are classified in order of severity from F-0, (40-72 mph)minor damage to F-5, (261-318 mph) major damage lifting homes off foundations. Tornadoes, on the average, have caused more loss of lives and damages to property than any other natural hazard. Windstorms, unlike tornadoes, have no noticeable funnel nor are they as violent in action. Windstorms are caused by jet moving frontal passages. Thunderstorms and squall lines are generally classified as a grade below tornadoes.

Rock Island County has experienced many tornadoes and violent windstorms. As a whole, Illinois has experienced 235 tornadoes between 1990 and 1995, compared to 295 in Iowa and 183 in Missouri(See following). Tornadoes and windstorms can occur at any time of the year in the County. Because the damage from such storms can be extensive, the vulnerability of the community is high in terms of potential loss. Unfortunately, there is currently no way to predict that one area or section of the County is more vulnerable than another.

The most effective method by which to prepare for a tornado or windstorm is to make advance arrangements for warning the affected population. Presently, Rock Island County has an outdoor radio-activated warning system which provides for most of the County. In addition efforts are made to educate the general public regarding tornado preparedness. Enforcement of building standards during the construction process, also helps mitigate future damages from tornadoes and windstorms.

Snowstorms – A winter storm is considered severe when it meets one or more of the following criteria:

1. A snow storm which produces 6 or more inches of snow at any one point within 48 hours.
2. A wind storm with gusts in excess of 35 miles per hour in combination with considerable falling or blowing snow which reduces visibility to a quarter mile or less.
3. A snow storm which produces conditions leading to property damage, injury and/or death, regardless of the amount of snowfall.
4. An ice storm, blizzard and/or extreme cold from which damage, injury and/or death occurs.

The effects of severe winter storm can be devastating. They can damage communications from broken wires and poles. They can also have secondary effects, such as flooding when heavy snowfalls melt rapidly or when heavy rain falls on heavily glazed surfaces causing immediate runoff. Rock Island County has experienced severe winter storms and glaze storms in 1956, 1967, 1969, 1972, 1973, 1979, 1983. Normally, there has been only one severe storm occurrence per winter, however, the possibility for multiple storms is a reality. Besides educating the public post disaster, education with regard to construction techniques to meet snow load requirements will assist in mitigating structure damages due to severe winter storms.

The best form of mitigation with regard to these hazards is consistent enforcement of Building Codes. Rock Island County has adopted the 1994 Uniform Building Codes (UBC) for all building code issues. The UBC sets the boundaries for additional enforcement for these other hazards such as earthquake, winds and snow. Rock Island County is located in the "D" wind zone classification. This requires the use of additional construction techniques such as wind bracing and hurricane clips in the construction of structures. Additional requirements are outlined to meet roof snow load requirements in the region. All of these requirements are enforced by the building inspectors in both the plan review phase as well as the inspection phase of construction. While these potential hazards are addressed in the 1994 UBC, there is no specific area of the County that is more or less subject to such hazards. These other potential hazards are addressed regularly as part of the building code review process.

Current Mitigation Activities

A. Flood Control

Levees located at:

Drury Township

Hillsdale / Zuma

B. Property Protection

Covemakers I & II Acquisition Projects

Date Started:

Total Costs:

Source of funds:

FEMA	75%
DCCA	25%

Number of Residences	38
Mobile Homes	0
Businesses	0
Other Structures	0
Vacant Lots	0

Harold's Acquisition Projects

Date Started:

Total Costs:

Source of funds:

FEMA	75%
Owner	25%

Number of Residences	3
Mobile Homes	0
Businesses	1
Other Structures	0
Vacant Lots	1

Covemakers III Acquisition Projects

Date Started:	Pending

Total Costs:

Source of funds:

FEMA	75%
City of Moline	25%

Number of Residences	6
Mobile Homes	0
Businesses	0
Other Structures	0

Vacant Lots	0

Relocation Projects – None to date.

Elevation Projects

Date Started	Ongoing
Total Cost	
Source of Funds	
Homeowner	100%

(Note: ICC Funding 4 projects 2001)

C. Emergency Services

ESDA	Yes
Coordinator	Geri Burkhart
Warning system	
EOP	Yes
Rescue plan	Yes
Flood fighting plan	Yes
Last Review	Currently

D. Floodplain Management

Last update of Ordinance	November 2000
Name & Title of Administrator	Timothy Oliver, CFM Director of Economic Development, Zoning & GIS
Freeboard Required	Yes
If yes, how much	1 foot
Freeboard outside FP	No
Elevation Certificates Req.	Yes
System (form)	FEMA cert.
Ordinances Adopted by Community:	
Floodplain	Yes
Zoning	Yes
Subdivision	Yes
Erosion Control	No
Stormwater	Future
Stream Maint.	No
Other	

Mitigation Alternatives Considered

As with all aspects of this plan, consideration has been given to all hazards. Primary emphasis though has been given to flooding. The Hazard Mitigation Planning Committee examined potential hazards for Rock Island County, mitigation options both feasible and infeasible.

Mitigation alternatives were examined with what should be classified as a good neighbor policy - as two categories of action plans. The first: prevent or lessen the impact of flooding. It is obvious that preventing flooding all together is not a viable option. Natural disasters beyond human control will continue to have their effects. Options that would prevent the impact of flood events were given serious consideration. "Permanent Structures" such as levees and flood walls are always viewed as the most effective way of keeping the "water" away from the "people". A closer examinations of the history of levees, (especially 1993 Mississippi River flooding), the cost involved, new Corps policies and the good neighbor aspects of levees caused this method not to be selected as viable for Rock Island County.

The 1993 flooding on the Mississippi River demonstrated that reliance on levees as a form of permanent protection can be devastating. Numerous instances of levee failure and/or overtopping resulted in millions of dollars of damages up and down the river. Post 1993 flooding changes to Corps policies with regard to funding, construction and maintenance of levees has also changed the view of the nation as a whole on future levee construction. Primarily though, the good neighbor policy becomes the guiding force in this rejection of levee construction as a mitigation alternative. Someone, somewhere along the river is adversely affected by the construction of a levee. If constructed on only one side of the river, property owners across the river are affected. If constructed on both sides of the channel, owners upstream and downstream of the structures are affected. Property owners behind these structures may also be affected by a false sense of security, waiting too long before moving from harm's way.

Floodwall vs. No Floodwall

Considerable attention should then be given to reducing the impact development has on the worsening of floods. Development and growth are crucial for the economic well being of Rock Island

County communities. A "no growth policy" would be detrimental to the entire region. "Growth/Development" ***done right*** though, is an asset for any community. Changes are required throughout the Rock River watershed to address this issue. A Rock River watershed study should be initiated to examine the full impact of development on the watershed and sedimentation affecting the river basin.

No new construction and no fill in the floodplain were also examined as options. Public reaction to such regulations has always been mixed to such restrictive policies. The " good neighbor policy" should be disseminated through all education programs undertaken as a result of the hazard mitigation planning process. The impact of numerous small fill projects viewed cumulatively may have the same impact as one large project, and therefore would require a stricter review process than say, new residential type construction projects not involving fill. Construction of new structures both accessory and primary, when in compliance with the existing floodplain regulations, should have little impact when compared to filling the floodplain. Therefore, a complete ban on such construction projects was felt unacceptable as an option.

The second area of mitigation activities examined were classified as those that would reduce or eliminate losses to existing structures. Consideration was given to the impact that each of these options would offer the public acceptance of the concept and the costs associated therein.

Reviewed as alternatives were relocation of existing structures, elevation and acquisition. All of these options were viewed as viable and given considerable discussion. The downside to relocation was twofold. One, lack of available building sites in Rock Island County. Very few vacant lots exist in Rock Island County suitable for the relocation of structures. Moving structures a great distance to rural areas no longer makes relocation a cost-effective method for mitigation. Secondly, the majority of structures that require mitigation would not be structurally sound enough to be considered viable. Many of the structures began as river cabins built strictly for weekend recreation. Over the years, room additions enabled year-round residency, yet building codes did not begin to affect such construction until the late 1960's after much of the conversion had already taken place. The scattered locations of these structures also prevents a true open space benefit from accruing. Acquisition and

elevation will continue to be the preferred method of mitigation.

Hazard Mitigation Goals

The goals established by the Hazard Mitigation Planning Committee, reflect input received during the public hearing portions of the planning process and are generally related to unincorporated Rock Island County specific issues. Mitigation includes activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation steps now such as constructing barriers and purchasing flood insurance will help reduce the amount of structural damage. Little or no control exists for eliminating disasters associated with nature. Yet, steps can be taken so as to reduce damages, when proper guidelines and regulations are in place to assure best possible practices are used for construction projects located within the County. The committee did express that goals, especially pertaining to stormwater management and filling of the floodplain be expanded to a more regional level at the lead of Rock Island County. The goals address not just the mitigation issues that affect structures, but a more complete long term plan to reduce or eliminate damages and contribute to the overall health of the watershed and river system.

"The Problem with Floods"

Flood Mitigation

- Watershed Issues
  - Stormwater Management Plan
    - Erosion & Sedimentation
  - Rock River Valley Watershed Study and Coalition
    - Watershed Study and effects on flooding
    - Establish common goals for watershed
  - Dredging of the Rock River
- Reduce or Eliminate Repetitive Loss Properties
  - Acquisition projects should be expanded
  - Affordable Replacement Housing
  - Elevation projects as a compliance issue
- Regulatory Issues
  - Restrict fill in the Floodplain
  - Require no impact
  - Protection of Wetlands
  - Increase Freeboard
- Participation in CRS
  - Meeting minimum requirements for recognition
  - Increase public awareness of floodplain issue

"The Other Problem with Floods"

Include higher regulatory standards in ordinance

Consistent floodplain management throughout county
Including Incorporated Cities
Public ownership/control of floodplain storage areas
Deed restrictions thru acquisition projects
Increase open space in floodplain areas for parks

Other Hazards

Public awareness campaigns
Review of Building Codes to include potential other hazards
Prepare public information brochures

Emergency Services

Expand public awareness through education programs
Publish brochures/handbooks for public use

Watershed Related Issues--As demonstrated earlier, similar discharge rates, are producing flood heights of higher levels than historically recorded. Several recent flood events on the Rock River in the north end of the County are exceeding 100 year flood elevations, especially when associated with ice jam flooding and/or significant upstream rainfall within the watershed. It is evident from low water observations that the Rock River channel is suffering from erosion and sedimentation in the watershed. The Rock River is not considered a navigable waterway by the Corp of Engineers. Therefore, the main channel of the river is not maintained nor dredged on a regular basis. This issue should be addressed through a number of objectives.

Stormwater Management Plan – A countywide soil erosion and stormwater management plan should be commissioned and implemented. Rock Island County should take the lead in bringing the local municipalities together for the development of a Stormwater management plan. New Federal NPDES II Regulations require the municipalities to prepare stormwater plans in accordance with the new regulations. These plans should specifically address the effect of stormwater runoff and detention not just within the city limits, but also on the unincorporated areas of the County contiguous to municipal boundaries. The municipalities are currently landlocked between the Mississippi River and the Rock River. The stormwater runoff from these communities contributes significantly to water levels on both rivers. The future growth areas for the cities of Rock Island, Moline and Milan are all south of the Rock River. These potential growth areas and developments currently in the planning stages, will increase stormwater runoff tremendously if plans are not in place to address the issue.

A feature of the Soil Erosion and Stormwater Management Plan (SESWMP) should be a detailed consideration of the effects of ***Erosion and Sedimentation*** on river levels. The Mississippi River, while dredged on a regular basis is still greatly affected by erosion sedimentation. Development projects in the incorporated areas of Rock Island County contribute to the problem when precautions are not taken during the construction time period. Farmland erosion may contribute to a some extent, due to the large number of

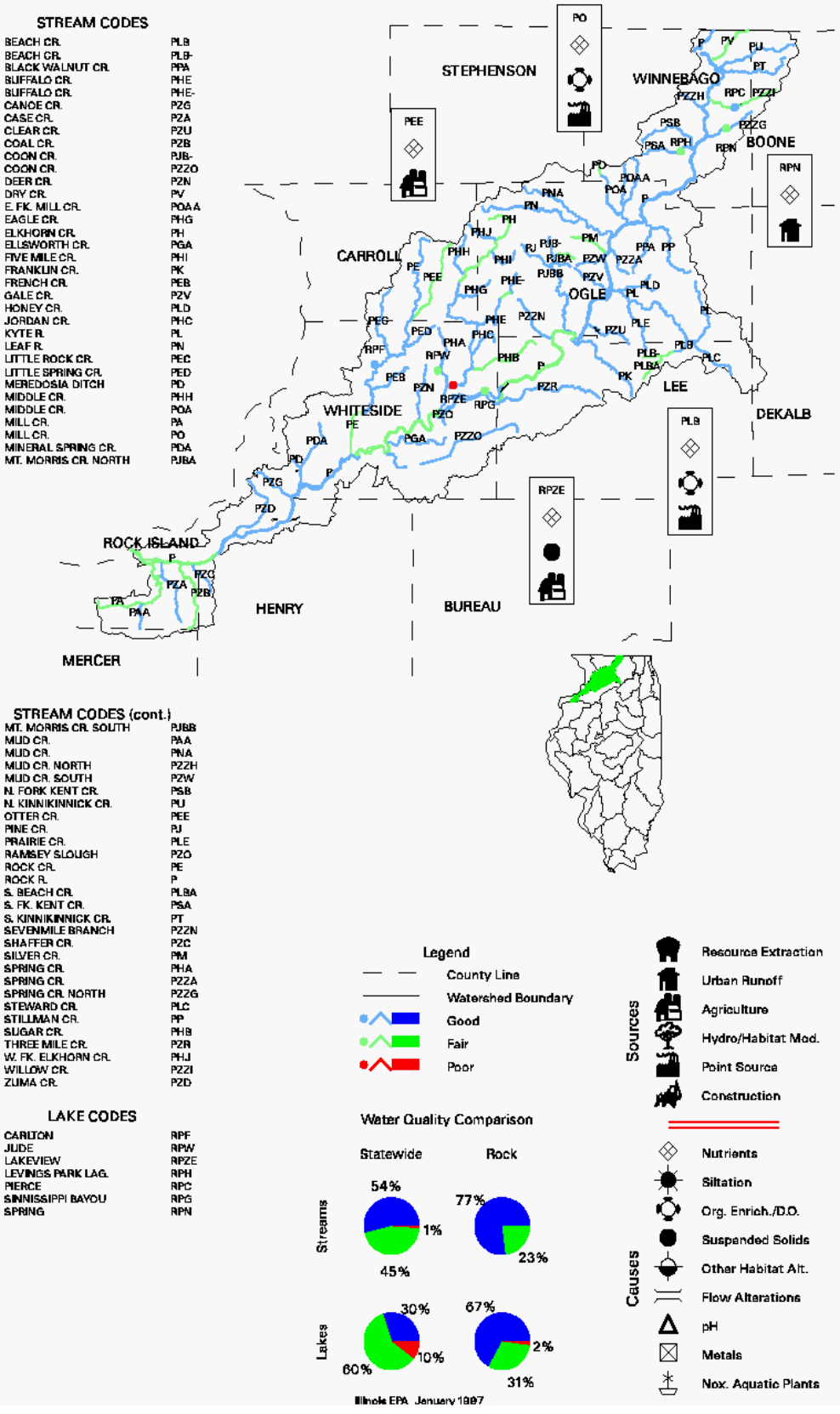
cropland acres in the watershed, but current "best practices in farming methods" used by the majority of Rock Island County farmers, effectively reduces erosion from this source. *The Illinois Urban Manual*, (A Technical Manual Designed for Urban Ecosystem Protection and Enhancement) should be used as a guide in preparing the regulations for erosion and sedimentation sections of the stormwater management plan. While this document is referenced in the Rock Island County Subdivision Ordinance, effective enforcement of the regulations should be included in the SESWMP. The Rock Island County Soil and Water Conservation District has a great deal of experience in working with soil erosion and stormwater plans. They should be used along with Bi-State Regional Planning Commission to facilitate the development of a regional plan. Additionally, guidelines should also be included for reducing erosion by making use of natural buffers and by restoring wetlands, especially in open farm fields in the upper Rock River watershed.

Rock Island County's location at the end of the Rock River watershed,(See Watershed Map on following page) complicates the flooding and mitigation issues affecting the County. The sedimentation and erosion issues follow the entire course of the Rock River, but Rock Island County is where it all ends. The sedimentation problem increases especially at the times when the Mississippi River is above flood stage and the Rock River is held at bay. To truly address the issues of increased flood heights and increased damages, the necessity exists to study the issue from a watershed viewpoint. Therefore, the creation of a ***Rock River Valley Watershed Study and Coalition*** should be undertaken with the lead agency being Rock Island County. The study should look at the cause and effects upon the Rock River valley from both the urban and rural perspectives. Flood damages occur along the entire length of the Rock River and while the Rock Island County Hazard Mitigation Plan and future Soil Erosion and Stormwater Management Plan will address county specific issues, upstream development and land management practices will continue to have far more impact on increased flood heights than new regulations resulting from local initiatives. Participants in the study and coalition should include the Corps of Engineers, US Fish and

Wildlife, US Department of Agriculture, Conservation 2000, Rock Island County Soil and Water Conservation Service, Lower Rock River Ecosystem Partnership. These established organizations and agencies will also bring to the table the ability to identify funding sources for both the study and the implementation of the objectives. The goal of such a study and coalition would be to strive for the development of a set of ***Common Goals for the Rock River Watershed*** and guidelines to achieve such goals.

Reduction or Elimination of Repetitive Loss Properties **–** As previously described herein, Rock Island County at the time of this document has 47 recorded repetitive loss properties. To achieve this goal with regard to repetitive loss properties, the methods of remediation will be dependent on location within the County. What may work in some areas may not be cost effective in others. For properties near urban areas, existing compliance of surrounding

6. Rock River Watershed



properties, would deem acquisition not to be cost effective, while elevation would meet the cost benefit analysis. On the other hand, remote areas with several contiguous parcels would be ideal acquisition projects. The ultimate goal is to reduce permanently losses attributed to repeated flood events. The reduction or elimination of these losses could be accomplished in a number of ways.

Acquisition Projects– Rock Island County has been very successful in completing acquisition projects in recent years. The three (3) projects completed by the County have been successful due to the intergovernmental cooperation that was necessary to complete the projects. In all 3 of these projects, Rock Island County was the lead agency and applicant for funding. Bi-State Regional Commission administered the grant on behalf of the County. Funding was provided by FEMA, through IEMA (Illinois Emergency Management Agency) matching funding by DCCA and in the last project, the property owner provided the matching funds to accomplish the acquisition. To complete the cooperation, the City of Moline, has agreed to take title to the properties for use as open park space, in all three projects.

Harold's–1969 Corp Study

Harold's–1996 Flooding

At the closeout hearing for the first phase of the Covemaker's acquisition project, a request was made to consider additional applications on behalf of property owners in the Barstow area of Rock Island County. This community (unincorporated) is repeatedly affected by high water levels and is inaccessible to emergency services when the Rock River is at flood stage. The Barstow area is also the location of the River Oaks Mobile Home Park that is inadequately protected by the non certified levee. Additional acquisition projects are identified below (See location map on following page). For acquisition projects to meet the cost benefit analysis criteria, contiguous properties would need to be packaged together for acquisition.

Identified Acquisition Projects

Green Valley - This project would be a continuation (application submitted in 2000) of the successful Covemaker's acquisition projects completed by Rock Island County through IEMA.

Approximately twenty structures remain in this subdivision, six of

which are included in the pending application. (FEMA/IEMA 75%; City of Moline 25% match.) At the time of the 1998 Covemaker's project, the program required purchase offers to be based on pre-1993 Fair Market Value. The Fair Market Value difference from 1993 to 1997 was enough to prevent these property owners from accepting the offers. The completion of the acquisition would meet all of the goals as established.

- Number of Properties -
  Phase I 6
  Phase II 18

- 2001 Acquisition Cost - $739,449

Osborn - Spring 2001 ice jam flooding generated a significant number of requests for property acquisitions. This area had already been identified as a potential project, but with owner support, almost annual flooding and record flood heights in this area, acquisition now seems a very viable alternative. Property owners, though, are now faced with a difficult choice: no funding is currently available for this project, and some will be required to elevate or relocate to meet ordinance requirements.

This, too, should be an issue for FEMA and NFIP. If acquisition and creation of open space continue to be the favored mitigation option, funding should be readily available when such requests are made. Property acquisition while the most permanent option is the most controversial; therefore, when owners request such alternatives, response should be forthcoming.

- Number of Properties 25

- 2001 Acquisition Cost $1,143,435

Barstow/River Oaks - Property owner request generated the inclusion of this project. Three factors would affect this project: 1) the number of structures involved; 2) the mobile home park (River Oaks); and 3) the number of flood events that directly impact the small community. This project should be submitted in phases, with the mobile home park as Phase I priority, and Barstow as Phases II

and III with lower priorities.

- BARSTOW - Number of Properties 58
- 2001 Acquisition Cost $2,186,299
- RIVER OAKS - Number of Properties 4
- 2001 Acquisition Cost $296,012 +URA Benefits

Edgewater - This project has been previously submitted and approved for acquisition funding to IEMA. The 25% match could not be identified and the project has been put on hold. The City of Rock Island would take title to this property upon completion of the project, but has a 75% buyout acceptance clause in the agreement to take title. This may be difficult to achieve and would, therefore, make this project the last on the priority list.

- Number of Properties 27
- 2001 Acquisition Cost $739,449

Country Courts - Five property owners have requested acquisition in this project. The project was previously approved and funded under the 1993 FMV requirement. Had the offers been current FMV offers, all five properties would have been acquired. Property owners have again requested acquisition and would accept current FMV offers.

- Number of Properties 6
- 2001 Acquisition Cost $214,203

Acquisition as mitigation is the most effective, in that the structures are permanently removed from the floodplain, along with the residents. Deed restrictions requiring that the parcels, 1) remain in public title; 2) remain as open space for perpetuity; 3) no structures can be constructed on the parcel; all protect the community from ever having to deal with property damages on these parcels again.

Successful acquisition projects bring with them an issue that also needs to be addressed, especially in Rock Island County. The homes generally considered for acquisition projects, would be considered to fall in the low to moderate income levels. In Rock Island County, suitable replacement housing in this price range would be difficult to locate. Even more, when several homes are acquired as part of one project. Therefore, as part of this mitigation feature, ***Affordable Housing Development*** should be considered as part of the overall acquisition plan. Especially would this be the situation, if the top 2 acquisition projects identified were to move forward. This displacement of the mobile home park and surrounding community would displace a number of families, who may not be able to locate affordable housing. The 109 mobile homes, if displaced, would not find comparable sites anywhere in Rock Island County, nor would the existing mobile home parks be able to absorb the displaced units. Future acquisition projects, may then need to include in the planning stages, a development plan to provide an adequate supply of affordable housing units outside of the floodplain, which may also include looking at the expansion of existing mobile home parks or the establishment of new ones.

Before Elevation

Elevation projects in Rock Island County have been very successful. Just within the last 5 years approximately 25 elevation projects have been completed, 100% owner funded. In large part, this is due to effective floodplain management, which includes damage assessments, post flood event. The cumulative substantial damage clause, recently added to the Rock Island County Floodplain Ordinance, has also been effective in requiring elevation of structures that have experienced damage on multiple occasions. As a result of the Spring 2000 flooding, four (4) properties in Rock Island County have crossed the 50% threshold, requiring elevation. Increased Cost of Compliance coverage (ICC) funding through NFIP has assisted in the elevation of these structures. These 4 property owners were required to elevate, after damage assessments calculated past and current damages to exceed 50% of the fair market value of the structures. Rock Island County's GIS system is crucial for the tracking and documenting of substantial damages, improvements, and

damage assessments in the event of a flood. The County's floodplain and historical building permit databases, allow the Building Department to track improvements and current fair market values.

The ICC coverage benefits only those property owners that have flood insurance. Recent NFIP changes with regard to mandatory flood insurance purchases, has increased participation. Yet, a number of homes are still sold "contract for deed" bypassing the flood insurance requirements. In the future grant funding may need to be looked into as an option for elevation projects that are outside the scope of ICC funding. Due to the scattered geographical location of these potential elevation projects, elevation seems the preferred option rather than acquisition. This raises a significant issue as to the cost/benefit analysis used by funding agencies regarding elevation projects, especially when the fair market value of the structures may be extremely low.

Regulatory Issues – Addressing the issue of higher regulatory standards, the consensus is that some features of the existing floodplain ordinance should be reviewed to provide increased protection to structures in the floodplain. A current Mississippi River study underway by the Corp of Engineers, is projecting that the BFE on the Mississippi could rise by 1-2 feet. The impact of such an increase could also have a dramatic affect on the Rock River BFE's. Existing conforming structures on both rivers would become non-conforming post FIRM constructions. The implications of this study would create hardships for existing property owners and could jeopardize re-certification of Corp certified levees providing protection to many areas of the county. Existing ordinances and regulations may need to be amended to address increased property protection.

Freeboard describes the added protection provided by raising the finished floor above the BFE as identified on the FIRM's. Rock Island County's current floodplain ordinance requires one (1) foot of freeboard. That is, the top of the lowest finished floor must be one (1) foot above the BFE as determined by the FIRM's for the County. Significant reductions in insurance rates accrue to property owners the higher they are above the BFE. If new BFE projections meet

expectations, all new construction between amending the floodplain ordinance and adoption of updated maps, would be in compliance and not non-conforming. Changing the freeboard definition would not be a hardship for the majority of property owners who have already elevated structures. The average elevation project in Rock Island County requires raising the finished floor approximately 5-6 feet above ground elevations. The majority of elevation projects have elevated a full eight (8) feet above ground elevations to take advantage of ground level garages and/or storage for non-insurable items. The HMP committee therefore, recommends that the definition for **Flood Protection Elevation (FPE)** be amended as follows:

> The elevation of the base flood, plus one foot of freeboard, **as measured to the bottom of the structural floor support members, (all structural components below the flood protection elevation shall be constructed of materials resistant to flood damage)** at any given location in the floodplain.

As previously discussed, the Illinois DWR prohibits fill in identified floodways. This insures no further obstructions in the floodway. While this floodway requirement is reviewed on a case by case basis, the cumulative impact of permitted obstructions is not generally analyzed. ***Fill in the Floodplain,*** project by project may not seem to have an impact, yet cumulatively, small fill projects, over time, have similar impacts. The HMP committee therefore recommends, the Rock Island County Floodplain Ordinance be amended as follows:

> 38.b.1.f-the fill shall not increase the water surface profile greater than 0.1 feet on adjoining properties, as certified by a registered professional engineer.
>
> 38.e- Non-residential buildings elevated on fill (which shall include parking areas) shall not increase the water surface profile greater than 0.1 feet on adjoining properties as certified by a registered professional engineer.

The review process should require "cumulative no impact engineering" as part of all fill applications submitted to the county for permitting when such permitting is required by the adopted building code for Rock Island County.

Participation in Community Rating System (CRS)– Rock Island County has participated in the NFIP since 1982. Effective floodplain management has been a cornerstone of regulations since that time. Duplicate building permit files have been maintained based on parcel ID numbers. A complete history is therefore available parcel by parcel in the County. Elevation information, and more recently FEMA Elevation Certificates have been retained on all construction projects within the floodplain. Damage assessments have routinely been completed after each flood event. A complete inventory of all floodplain structures, fair market value and building permit data is now maintained in the County's GIS.

All of these activities are credited in the CRS program. In fact, Rock Island County exceeds the minimum requirements for recognition as a CRS community. Rock Island County is working on entry into the CRS program. The repetitive loss report for the County requires the preparation and adoption of the Hazard Mitigation Plan prior to application to the CRS program. One of the features of the CRS program that the county will be undertaking on a more regular basis is a ***public awareness*** campaign. During flood events and shortly thereafter, public awareness is especially high. Let a few months pass, residents choose to forget or ignore problems associated with flooding. Workshops, brochures, newsletters included with tax bills and additional tools can be utilized to raise public awareness of floodplain development requirements. ICC coverage benefits will be a significant part of future education campaigns. Local home shows provide possible forums for dispensing information to floodplain residents.

Consistent floodplain management between jurisdictions– This should continue to be a top priority for not only Rock Island County departments charged with floodplain management, but also all jurisdictions within the county. Countywide floodplain maps (DLG's projected delivery 2002) will be a

major step in this direction. Education of County staff in floodplain management principles, enables the entire staff to provide accurate information to floodplain residents. This consistency should also extend within the incorporated municipalities. All of the incorporated municipalities are members of the NFIP with varying levels of expertise in floodplain management. This also becomes an important factor as some communities begin to look at annexation of isolated enclaves of floodplain properties. Rock Island and Moline have historically gone around floodplain properties to avoid annexation of such and incur floodplain management responsibilities. As these communities expand and annex floodplain properties consistency becomes a regulatory as well as an enforcement issue. Rock Island County is negotiating intergovernmental agreements for such enforcement and inspections in the Village of Hillsdale and willing to enter into such agreements with other communities not so equipped to administer floodplain regulations.

Rock Island County's Office of Economic Development, Zoning and GIS is charged with floodplain management for the unincorporated areas of the County. It is crucial for effective floodplain management that staff of this Office continue in the education process of floodplain management. This is accomplished by a number of methods. Membership in both Illinois Association of Floodplain and Stormwater Management (IAFSM) and the national Association of Floodplain and Stormwater Management (AFSM) which provide the most up-to-date information available. Several staff members have received EMI training certificates dealing with floodplain management. The Director of the Office is currently a Certified Floodplain Manager (CFM) and the job description for the position now requires certification within 2 years of employment. Certification plays a vital role in the day-to-day operations of a department that oversees as much floodplain as has been identified in Rock Island County. Staff will continue to pursue continuing education in floodplain management .

Preserved Open Space

Public Ownership of Floodplain and Wetlands – Public ownership of floodplain storage areas and wetlands becomes increasingly important. Aside from acquisition projects using

Federal funds, the county should investigate additional methods of increasing ownership and/or control of vacant properties within the floodplain and/or the watershed. Elimination of development and preservation of these areas as open space provide multiple benefits to the community. Providing open space and parks add to the quality of life for area residents. Preservation of the open space also reduces or eliminates further negative impacts to the storage capacity of area floodplains. The county already has bike trails along the Mississippi River, park and open space (Illiniwek Park and Loud Thunder Forest Preserve) that bring families to the riverfront to enjoy the open space associated with the rivers. Two of Rock Island County's completed acquisition projects have added significant open space along the Rock River corridor.

Development rights and perpetual easements may be another avenue pursued by the County jointly with municipalities, to assure limited or no development in the floodplains. Rock Island County, along with all the municipalities have adopted a Greenway Plan for both active and passive greenways. Not surprising, the identified greenways follow many of the tributary ravines feeding both the Mississippi and the Rock rivers. Protection of the greenways protect and reduce the impact of development within the watersheds.

Existing State and Federal programs should be accessed to fund the purchase of both open space and development rights. The *Emergency Watershed Protection Program* has successfully been used by adjoining counties to purchase development rights from property owners. Property owners retain title to the property, but sell the rights to develop or continue farming the property. Property taxes are reduced and future development is prohibited. The property reverts to open space and natural absorption fields for high water.

Updated land use plans, zoning ordinances and proposed subdivision ordinance amendments also encourage "Conservation Subdivision Design Concepts". The design concepts are based around the protection of the environment, letting the landscape guide the course of development, natural preservation of stormwater runoff and retention areas. The

latter is accomplished by the reintroduction of native plant life into the ecosystem to restore the natural and beneficial functions of wetlands, prairies, streams and floodplain storage areas.

Geographic Information System (GIS) for floodplain management-

The County's GIS is a crucial element for the effective management of the floodplain. Many of the goals established herein rely on detailed historical and current data. Continued compliance is directly related to the integrity of the data used to make regulatory decisions in the floodplain. "The cumulative substantial improvement/damage" language in the ordinance requires constant tracking of all activity on structures in the floodplain.

Rock Island County has developed a countywide GIS. The system uses as its base map digital orthophotography. The county also maintains a parcel layer and street centerline layer. The Q3 data is currently used for preliminary determination of all properties in or near the floodplain. Linked to the parcel layer is the tax parcel database containing ownership, zoning, and assessed valuations for all structures. (The County uses a 3.1 multiplier on assessed valuation to calculate FMV.) Additionally, all building permit data is linked to the GIS enabling accurate information available prior to the issuance of building permits. A separate database is also maintained with BFE and available "as-built" information from FEMA elevation certificates maintained on file. A photo database of all floodplain structures is also maintained for quick reference, prior to issuance of building permits. (See Sample Data Sheet, on following page.)

Rock Island County NRCS has also developed useful layers to be used in conjunction with the countywide GIS. Farm tract and field information layers have been created to be used by planners. Wetland inventories have also been created as GIS layers by the NRCS. This wetland inventory should become an important feature of future land use decisions by the County and by all of the municipalities. In the fall of 2001, the soils layer is anticipated to be delivered. These layers will further enhance the decision making process when

examining land use changes in areas that are affected by flooding or are sensitive areas that require additional investigation.

New orthophotography, with accompanying contours (2 foot in the some areas) will be inserted as completed. The addition of the new contours will provide the County with significant data to re-evaluate the existing FIRM's. The County is in the process of creating stormwater/sewer layers for the City of Rock Island. This data, along with future data collection efforts will be of significant importance in the development of the stormwater management plan for the entire County. The GIS has also been used for the design of conservation subdivisions and identifying open space adjacent to Rock River tributaries. The GIS will provide a more complete record of affected flood areas and damage assessment based on river levels. The GIS will also provide data on which structures require damage assessments post flood event.

Rock Island County D'Firms and countywide maps are in production. A preliminary review of the countywide maps was conducted in 1999. After re-certification of levees by the Corps of Engineers, the maps received approval from reviewing agencies, except for the Village of Carbon Cliff. A new study had been completed at the request of the Village and major changes were reflected in the study area, raising concerns for village officials. The adoption of the countywide maps has been delayed until this matter has been resolved. Upon resolution of this issue, new digital floodplain maps will be provided to the County's GIS department.

Other Hazards– Earthquakes, tornados, high winds and snow loads are potential hazards that could affect Rock Island County residents. These potential hazards are reviewed on a regular basis as building codes are adopted and amended. The Uniform Building Code (UBC) establishes regulations for construction to include the use of extra clips, bracing and fasteners in construction framing. In addition to the requirements being met at the time of inspections, public awareness may be increased by means of printed materials and joint sponsorship of workshops in conjunction with other Building departments and trade organizations and Rock

Island County ESDA.

Emergency Services and Disaster Agency– This organization is the one that no one is aware of until a disaster occurs (ie; floods, nuclear plant melt down, earthquakes, or tornado). Most residents consider ESDA the organization to call on during or after an emergency. Public awareness, printed information and public service announcements should be increased pre-disaster to assist residents in becoming aware of how to prepare and what not to do when disaster strikes.

Funding Alternatives

The HMPC realizes the key to effective mitigation is completion of mitigation projects. Many times successful completion of such projects is wholly dependent on the financial stability of the projects. The majority of mitigation goals identified as priorities will require substantial public contributions in whole or in part to succeed. Funding sources will need to be identified to initiate and complete these mitigation goals.

Elevation Projects - Properties identified for elevation in Rock Island County are generally scattered throughout the County. This geographical consideration recommends elevation as the most cost effective option. Additionally, the FMV of the majority of these structures, along with their structural integrity deems elevation the most rational approach. The NFIP's new ICC coverage will provide the primary funding mechanism for such projects. Rock Island County's "cumulative substantial damage" definition mandates compliance with the floodplain ordinance when damage exceeds 50%, calculated cumulatively over the life of the structure.

Watershed Study - While a watershed study may seem an unlikely mitigation project or goal, it would provide the necessary documentation to move ahead on "channel" related measures. Without the results of a detailed study of the entire watershed, long term restoration and mitigation measures will be ineffective.

The regional nature of this study area, the national applicability and impact on the Mississippi River, should qualify the project for funding from a number of local, state and federal sources. All of the local units of government in the watershed become potential contributors to such a study. The Upper and Lower Rock River Conservation 2000 Groups should not only assist with funding from the Conservation 2000 program, but should be instrumental in facilitating such an undertaking. The State Division of Water Resources would also be a funding source for a study of this magnitude. While the Rock River is not considered a navigable waterway, the watershed sedimentation and erosion issues in the watershed do impact the Mississippi River. Therefore, the Corps of Engineers should also participate in the process.

Stormwater Management Plan - The funding for the development

of this plan should be a combination of agencies including local governments, state and federal agencies. The best approach for Rock Island County would be a unified Stormwater Management Plan adopted by all communities in the County. While Rock Island, Moline and the County will be directly impacted by NPDES II, all of the municipalities disperse stormwater into the two rivers and their watershed.

The success of such a Stormwater Management Plan is directly related to its **implementation** and enforcement while the benefits of having a Stormwater Management Plan with attainable goals and objectives far outweigh not having such a plan, the true value can only be achieved by implementation.

Implementing and enforcing a Stormwater Management Plan will require detailed review of all new development plans submitted for approval. The cost of such review should be incorporated by including a Stormwater Management Plan review fee. Equally as important is the long term maintenance of all retention/detention structures created by future developments. The creation of a Stormwater utility with fees based on pervious/impervious surface ratios seems to be the only effective means of the long term sustainability of Stormwater Management. The creation of a stormwater utility would be a mechanism to fund the maintenance of a stormwater district. Funds collected should be used to develop and maintain stormwater retention/detention areas, purchase of open space to be preserved for floodplains, greenways and wetlands. The fund could also be used for the creation of a wetland bank for future developments projects. The Stormwater plan should provide details for the management and use of funds collected as part of a stormwater utility. The ability to create such a utility at the County level is currently prohibited by State law. Numerous attempts at passage of such legislation have failed due to opposition. The future of such legislation is still in doubt. Local governments and conservation agencies should take an active role in support of future initiatives.

Acquisition Projects - Acquisition Projects will continue to be the only mitigation option for some areas. The major obstacle for these projects is now and will continue to be funding. Local funding for entire projects is not readily available. Combinations of funding sources will continue to be required to permanently remove

March 2001 Ice Jam–Rock River

structures from disaster prone areas.

FEMA funding through IEMA will prove to be crucial for future acquisition projects. The 75% FEMA match for such mitigation projects needs to remain a high priority for FEMA and current and future administrations. The unavailability of large sums of project funding, currently tied to disaster declarations, impedes the success of such projects.

Example March, 2001 ice jam on the Rock River: Record flood heights resulted because of a seven mile ice jam. State and Federal agencies inspected flooding and damages. State disaster declarations provided funding assistance to local agencies for flood fighting and public facility repairs. This flood event, while not justifying a Federal Declaration (i.e.; Federal Disaster dollars) generated a substantial number of buyout requests from affected property owners. Without the Federal declaration for Rock Island County or a remaining disaster balance, Federal participation is non-existent. Homes will be repaired and some substantially damaged will be elevated and no longer able to meet the cost benefit ratios to justify buyouts at a later date. Thus, this area identified previously as a number one priority for future buyout projects wil1 become interspersed with compliant structures ineligible for acquisition.

Matching Funds also become a critical issue when planning acquisition projects. Local governments currently are hard pressed to identify "extra" dollars to dedicate to acquisition projects. While funds may be available in Park and Recreation budgets, this, too, is generally programmed for contingency funding. Therefore, Division of Water Resources, DCCA, Conservation 2000, Open Lands Trust funding etc., should be made available to meet matching fund grant applications.

Rock Island County has been successful in leveraging multiple sources of funding to successfully complete its projects. FEMA, through IEMA, DCCA, and the City of Moline have all participated in past projects. The most recent project completed in Rock Island County was completed with the property owner providing the 25% matching funds. This option was a success due to the fact that one (1) of the properties was a business along with two (2) residential structures, and one (1) vacant lot. Dealing with one property owner on all four parcels made this feasible. Future projects would not

likely take this approach, since the 25% match would be more than the home equity held by most owners.

Acquisition projects, while the most effective in meeting the goals of this plan, will continue to be the most difficult to fund. Rock Island County should pursue all options available for funding future acquisition projects.

Affordable Housing Developments - Hand in hand with acquisition projects will be the need to pursue funding sources to increase affordable housing stock in the area. The majority of subject properties would be classified as low to moderate housing stock. The mobile home park alone consists of 95 structures. The existing real estate market and available housing stock would provide limited opportunities to locate replacement housing.

The acquisition of the mobile home park would also require the payment of Uniform Relocation Assistance (URA) benefits. This feature of the acquisition projects would also increase the funding needs of such a project. Yet, URA benefits would assist these homeowners with the ability to find replacement housing.

Rock Island County should also begin working with developers experienced in residential developments that market to the affordable housing population group. Identifying a location for a development that would provide affordable single family dwellings should also become a priority. The residents of the identified acquisition areas are not the typical multi-family dwellers.

Mitigation Recommendations

The recommendations from the Hazard Mitigation Planning Committee takes two approaches. While both approaches should move forward as soon as possible, it is realized that to accomplish some of these goals, substantial funding will be needed to proceed. These recommendations have been divided into two categories: 1) Planning and Regulatory issues; and 2) Mitigation projects.

Planning and Regulatory Issues - To move ahead with these mitigation options would require little if any additional capital expenditures on the part of the County and fall under the jurisdiction of the Economic Development, Zoning and GIS Department. As with any planning process, it should not stop with the completion and adoption of "a plan". The plan should become a living document, that recommends changes and effects changes made. Just as the rivers change, so too must the plan that addresses concerns regarding the river and its life cycle, must reflect those environmental changes. The Hazard Mitigation Planning Committee (HMPC) should continue as a body that reviews the plan and recommends future changes to the plan. It should also become the core committee in future studies recommended herein. The HMPC should review annually the plan and its implementation process, be involved in the development of the Stormwater and Soil Erosion Management Plan, a Rock River Watershed Study and involved with the development of future amendments to the Rock Island County Floodplain Ordinance. Having such a core group involved in all of these processes, assures a continuity between future plans and the Rock Island County Hazard Mitigation Plan.

Regulatory modifications to the existing floodplain ordinance to address the issues identified should move forward. In many cases this would mean that Rock Island County would enforce requirements stricter than the model ordinance provided by the Illinois Division of Water Resources. This could include the addition of "Repetitive Loss Language" to the ordinance such as:

> *"Repetitive Loss" - Flood-related damages sustained by a structure on two separate occasions during a ten-year period for which the cost repairs at the time of each such flood event equals or exceeds 50% of the FMV of the structure before the damage occurred.*

The addition of such verbiage strengthens property owners' ability to receive Increased Cost of Compliance coverage paid through NFIP flood insurance policies.

Staff should review ordinances from other NFIP communities for examples of regulations dealing with "no fill in the floodplain" or requirements for "cumulative impact study requirements for fill". This provision would look at all projects cumulatively for future impact to the floodplain. The "good neighbor" no further impact policy should also be initiated via education and future regulatory modifications.

The creation and adoption of a County-wide Stormwater Mitigation Program should also be pursued as soon as possible. A county led initiative should begin to look at the impact of stormwater on flooding and develop a plan for county-wide adoption including all of the municipalities. This may also include the creation of a stormwater utility to fund the management of stormwater issues in the County. The County should support legislative amendments that would provide for the creation of such a utility at the county level.

Rock Island County should also take the lead role in the development of a Rock River watershed study. As previously discussed, Rock Island County flooding is a "watershed issue" and, to have a true impact, the entire watershed needs to be studied. This undertaking would require not only multi-jurisdictional participation, but a combination of funding sources to cover the cost of such a study.

Staff education in floodplain management-related courses should continue to be encouraged. Certified Floodplain Manager certification should also be required for not only the Director, but at least one other employee in the department staying current on all changes to State and Federal requirements, by means of continuing education is also crucial to effective management. Application to the Community Rating System should be an immediate goal for staff upon adoption and approval of this plan by the Rock Island Board, IEMA, ISO and FEMA.

Building code issues should be reviewed on a regular basis as part of the Building Code update policy. This will ensure the best possible practices are being used to mitigate against such other hazards as tornadoes, windstorms, snowloads, earthquakes, as well as flooding.

As part of their process and the Community Rating System process, Continuing Education Units should also be included. A primary method for this education feature should be printed brochures made available at the time of permit issuance, and the County's website.

Mitigation Project - Projects identified in this plan on the other hand, will require substantial funding assistance from outside sources. Acquisition projects alone, herein identified, would require as much as $5.5 million, not including administrative and legal fees. Rock Island County should pursue all funding options available to complete these projects through a phased process. This would also include working with local developers now to develop subdivisions to meet the needs of low-to-moderate income property owners that may be affected by such projects.

Elevation projects should continue to be funded by Increased Cost of Compliance coverage, along with homeowner funds. The scattered nature of elevation projects in Rock Island County prevents these type of projects from being identified as a "project area". Effective cumulative substantial damage and improvement calculations will insure future compliance for such projects.

Preservation of Open Space and Wetlands - The County should pursue these options by both regulatory means and project means. The inclusion of "conservation subdivision" language into both zoning and subdivision ordinances will not only allow but encourage such developments. This could also include funding requests from the County for the purchase of open space and/or wetlands to insure the protection of such areas.

Implementation

Planning and Regulatory goals should begin being implemented by staff as soon as possible upon adoption of this plan. Draft amendment to the floodplain ordinance can be recommended to the Rock Island County Zoning Board of Appeals for inclusion into the Zoning Ordinance. "Conservation subdivision" is currently (2001) being drafted for inclusion by Rock Island County, the City of Moline, East Moline, Rock Island and Milan.

The submission of the Community Rating System application should begin upon approval of this document by the reviewing agencies. Funding options should also be pursued as they become available. Pre-applications should be completed so as to earmark future funds be made available through IEMA and FEMA.

This Hazard Mitigation Plan should also be viewed as a living document by those responsible for its creation, adoption and enforcement. A plan is only a good as its implementation. A great deal of effort and thought has gone into its compilation. The Hazard Mitigation Planning Committee will not have completed its task with the adoption of this plan. This should not be the end of the process. The Hazard Mitigation Planning Committee (HMPC) should remain intact to review the plan bi-annually to examine the success or failure of the goals and objectives as set forth herein. Recommendations for future changes to the plan and Floodplain Ordinance amendments should be made after review and approval of the HMPC. Members of the HMPC should be included as part of the core groups involved in future plan development, such as the stormwater plan and a Rock River watershed study.

The office of Economic Development, Zoning & GIS will be responsible for the continued day-to-day floodplain management issues. Additionally, Economic Development, Zoning & GIS will be assigned the tasks of organizing future planning project as well as pursuing funding for projects as outlined herein. This plan, therefore, should become the blueprint for future projects associated with mitigating Rock Island County from Natural Hazards..

The irrefutable fact is that natural forces are beyond the control of humans. Nature will continue to wreak havoc on the lives of the residents of Rock Island County. The ultimate goal, therefore, of

this plan is to prepare the residents and reduce or eliminate damages by taking appropriate measures to remove them from harm's way or, at the very least, lessen the dangers through effective mitigation measures.

Appendix A-Acronyms

ACV	Actual Cash Value
ASFPM	Association of State Floodplain Managers
BF	Base Flood
BFE	Base Flood Elevation
CAC	Community Assistance Contact
CAV	Community Assistance Visit
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CLOMA	Conditional Letter of Map Amendment
CLOMR	Conditional Letter of Map Revision
COE	Corps of Engineers
CRS	Community Rating System
DAP	Disaster Assistance Program
DFO	Disaster Field Office
DS	Dam Safety
EIS	Environmental Impact Statement
EO	Executive Order
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
ERM	Elevation Reference Mark
FBFWM	Flood Boundary Floodway Map

FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIA	Federal Insurance Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMV	Fair Market Value
FPE	Flood Protection Elevation
GIS	Geographic Information System
HAZ/MIT	Hazard Mitigation
HMA	Hazard Mitigation Assistance
HMPG	Hazard Mitigation Program Grant
IEMA	Illinois Emergency Management Agency
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision
MSL	Mean Sea Level
NFIP	National Flood Insurance Program
PA	Public Assistance
PDA	Property Damage Assessment
RM	Reference Mark
SBA	Small Business Administration
SFHA	Special Flood Hazard Area
WYO	Write Your Own

Appendix B-Floodplain Ordinance

ARTICLE XXXVIII -DEVELOPMENT IN SPECIAL FLOOD HAZARD AREAS

38.0 PURPOSE

This ordinance is enacted pursuant to the police powers granted to this County by 55 Illinois Compiled Statutes 5/5-1041, 5/5-1042, and 5/5-1063 (State Bar Edition) in order to accomplish the following purposes:

a. To prevent unwise developments from increasing flood or drainage hazards to others;

b. To protect new buildings and major improvements to buildings from flood damage;

c. To promote and protect the public health, safety, and general welfare of the citizens from the hazards of flooding;

d. To lessen the burden on the taxpayer for flood control, repairs to public facilities and utilities, and flood rescue and relief operations;

e. To maintain property values and a stable tax base by minimizing the potential for creating blight areas; and

f. To make federally subsidized flood insurance available.

38.1 DEFINITIONS

For the purposes of this ordinance, the following definitions are adopted:

Base Flood - The flood having a one-percent probability of being equaled or exceeded in any given year. The base flood is also known as the 100-year flood. The base flood elevation at any location is as defined in **Section 38.2** of this ordinance.

Base Flood Elevation (BFE) - The elevation in relation to mean sea level of the crest of the base flood.

Building - A structure that is principally above ground and is enclosed by walls and a roof including manufactured homes and prefabricated buildings. The term also includes recreational vehicles and travel trailers to be installed on a site for more than 180 days.

Development - Any man-made change to real estate including:

a. construction, reconstruction, or placement of a building, or any addition to a building, exceeding 70 square feet in floor area;

b. substantial improvement of an existing building;

c. installation of a manufactured home on a site, preparing a site for a manufactured home, or installing a travel trailer on a site for more than 180 days;

d. installation of utilities, construction of roads, bridges, culverts or similar projects;

e. construction or erection of levees, dams, walls, or fences;

f. drilling, mining, filling, dredging, grading, excavating, paving, or other alterations of the ground surface;

g. storage of materials including the placement of gas and liquid storage tanks; and

h. channel modifications or any other activity that might change the direction, height, or velocity of flood or surface waters.

NOTE: Development does not include maintenance of existing buildings and facilities; resurfacing roads; or gardening, plowing, and similar practices that do not involve filling, grading, or construction of levees.

FEMA - Federal Emergency Management Agency.

Flood - A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow, the unusual and rapid accumulation, or the runoff of surface waters from any source.

Flood Fringe - That portion of the floodplain outside of the regulatory floodway.

Flood Insurance Rate Map - A map prepared by the Federal Emergency Management Agency that depicts the floodplain or special flood hazard area (SFHA) within a community. This map includes insurance rate zones and may or may not depict floodways and show base flood elevations.

Floodplain and **Special Flood Hazard Area (SFHA)** are synonymous. Those lands within the jurisdiction of the county that are subject to inundation by the base flood. The floodplains of the county are generally identified as such on the Flood Insurance Rate Map of the county prepared by the Federal Emergency Management Agency and dated December 18, 1986.

Floodproofing - Any combination of structural or nonstructural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate, property and their contents.

Floodproofing Certificate - A form published by the Federal Emergency Management Agency that is used to certify that a building has been designed and constructed to be structurally dry floodproofed to the flood protection elevation.

Flood Protection Elevation or **FPE** - The elevation of the base flood plus one foot of freeboard at any given location in the floodplain.

Floodway - That portion of the floodplain required to store and convey the base flood. The floodway for the floodplains of Rock, North Channel Rock River and Mill, Coal, & Meredosia Ditch Creek shall be as delineated on the Flood Boundary and Floodway Map prepared by FEMA and dated December 18, 1986. The floodways for each of the remaining floodplains of the county shall be according to the best data available from Federal, State, or other sources.

IDOT/DWR - Illinois Department of Transportation/Division of Water Resources.

Manufactured Home - A structure transportable in one or more sections, that is built on a permanent chassis and is designed to be used with or without a permanent foundation when connected to required utilities.

NFIP - National Flood Insurance Program.

SFHA - See definition of floodplain.

Substantial Improvement - Any combination of repairs, reconstructions, rehabilitations, additions, or improvements of a structure, taking place during the life of the structure, the cumulative cost of which equals or exceeds fifty (50) percent of the market value of the structure before the start of construction of the improvement. This term includes structures that have incurred substantial damage, regardless of the actual repair work performed,

NOTE: Substantial improvement is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building

commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either:

(1) any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or

(2) any alteration of a structure listed on the National Register of Historic Places or the Illinois Register of Historic Places.

38.2 BASE FLOOD ELEVATION

This ordinance's protection standard is the base flood. The best available base flood data are listed below. Whenever a party disagrees with the best available data, the party may finance the detailed engineering study needed to replace the existing data with better data and submit it to the **Federal Emergency Management Agency** for approval.

a. The base flood elevation for the floodplains of the Mississippi, Rock, & North Channel Rock River and Mill, Coal & Meredosia Ditch Creek, Moline Pool/Sylvan Slough shall be as delineated on the 100-year flood profiles in the Flood Insurance Study of the county prepared by the Federal Emergency Management Agency and dated December 18, 1986.

b. The base flood elevation for each floodplain delineated as an "AH Zone" or "AO Zone" shall be that elevation (or depth) delineated on the Flood Insurance Rate Map of the county.

c. The base flood elevation for each of the remaining floodplains delineated as an "A Zone" on the Flood Insurance Rate Map of the county shall be according to the best data available from federal, state or other sources. Should no other data exist, an engineering study must be financed to determine base flood elevations.

38.3 DUTIES OF THE ADMINISTRATIVE OFFICER

The Administrative Officer shall be responsible for the general administration of this ordinance and ensure that all development activities within the floodplains under the jurisdiction of the county meet the requirements of this ordinance. Specifically, the Administrative Officer shall:

a. Process development permits in accordance with **Section 38.4**;

b. Ensure that all development in a floodway (or a floodplain with no delineated floodway) meets the damage prevention requirements of **Section 38.5**;

c. Ensure that the building protection requirements for all buildings subject to **Section 38.6** are met and maintain a record of the "as-built" elevation of the lowest floor (including basement) or floodproof certificate;

d. Assure that all subdivisions and annexations meet the requirements of **Section 38.7**;

e. If a variance is requested, ensure that the requirements of **Section 38.8** are met and maintain documentation of any variances granted;

f. Inspect all development projects and take any and all actions outlined in **Section 38.10** as necessary to ensure compliance with this ordinance;

g. Assure that applicants are aware of and obtain any and all other required local, state, and federal permits;

h. Provide information and assistance to citizens upon request about permit procedures and floodplain construction techniques;

i. Cooperate with state and federal floodplain management agencies to coordinate base flood data and to improve the administration of this ordinance; and

j. Maintain for public inspection base flood data, floodplain maps, copies of state and federal permits, and documentation of compliance for development activities subject to this ordinance.

38.4 DEVELOPMENT PERMIT

No person, firm, corporation, or governmental body not exempted by state law shall commence any development in the floodplain without first obtaining a development permit from the Administrative Officer. The Administrative Officer shall not issue a development permit if the proposed development does not meet the requirements of this ordinance.

a. The application for development permit shall be accompanied by:

1. drawings of the site, drawn to scale showing property line dimensions;

2. existing grade elevations and all changes in grade resulting from excavation or filling;

3. the location and dimensions of all buildings and additions to buildings; and

4. the elevation of the lowest floor (including basement) of all proposed buildings subject to the requirements of **Section 38.6** of this ordinance.

b. Upon receipt of an application for a development permit, the Administrative Officer shall compare the elevation of the site to the base flood elevation. Any development located on land that can be shown by survey data to have been higher than the base flood elevation as of the date of the site's first Flood Insurance Rate Map identification is not in the floodplain and therefore not subject to the requirements of this ordinance. The Administrative Officer shall maintain documentation of the existing ground elevation at the development site and certification that this ground elevation existed prior to the date of the site's first Flood Insurance Rate Map identification.

38.6 PREVENTING INCREASED FLOOD HEIGHTS AND RESULTING DAMAGES

Within the floodway identified on the Flood Boundary and Floodway Map, and within all floodplains where a floodway has not been delineated, the following standards shall apply:

a. except as provided in **Section 38.5.b**, no development shall be allowed which, acting in combination with existing and anticipated development, will cause any increase in flood heights or velocities or threat to public health and safety. The following specific development activities shall be considered as meeting this requirement:

1. Barge fleeting facilities meeting the conditions of IDOT/DWR Statewide Permit No. 3;

2. Aerial utility crossings meeting the conditions of IDOT/DWR Statewide Permit No. 4;

3. Minor boat docks meeting the conditions of IDOT/DWR Statewide Permit No. 5;

4. Minor, non-obstructive activities meeting the conditions of IDOT/DWR Statewide Permit No 6;

5. Outfall structures and drainage ditch outlets

meeting the conditions of IDOT/DWR Statewide Permit No. 7;

6. Underground pipeline and utility crossings meeting the conditions of IDOT/DWR Statewide Permit No. 8;

7. Bank stabilization projects meeting the conditions of IDOT/DWR Statewide Permit No. 9;

8. Accessory structures and additions to existing residential buildings meeting the conditions of IDOT/DWR Statewide Permit No. 10;

9. Minor maintenance dredging activities meeting the conditions of IDOT/DWR Statewide Permit No. 11; and

10. Any development determined by IDOT/DWR to be located entirely in a flood fringe area.

b. Other development activities not listed in **Section 38.5.a** may be permitted only if:

1. a permit has been issued for the work by IDOT/DWR (or written documentation is provided that an IDOT/DWR permit is not required); and

2. sufficient data has been provided to FEMA when necessary to approve a revision of the regulatory map and base flood elevation.

38.6 PROTECTING BUILDINGS

a. In addition to the damage prevention requirements of **Section 38.6**, all buildings to be located in the floodplain shall be protected from flood damage below the flood protection elevation. This building protection requirement applies to the following situations:

1. construction or placement of a new building valued at more than $1,000;

2. substantial improvements made to an existing building;

3. structural alterations made to an existing building that increase the floor area by more

than 20%;

4. installing a manufactured home on a new site or a new manufactured home on an existing site (the building protection requirements do not apply to returning a manufactured home to the same site it lawfully occupied before it was removed to avoid flood damage); and

5. installing a travel trailer on a site for more than 180 days.

b. Residential or non-residential buildings can meet the building protection requirements by one of the following methods:

1. The building may be constructed on permanent land fill in accordance with the following:

(a) the lowest floor (including basement) shall be at or above the flood protection elevation;

(b) the fill shall be placed in layers no greater than one foot before compaction and should extend at least ten feet beyond the foundation before sloping below the flood protection elevation;

(c) the fill shall be protected against erosion and scour during flooding by vegetative cover, riprap, or other structural measure;

(d) the fill shall be composed of rock or soil and not incorporate debris or refuse materials; and

(e) the fill shall not adversely affect the flow of surface drainage from or onto neighboring properties; or

2. The building may be elevated in accordance with the following:

(a) The building or improvements shall be elevated on stilts, piles, walls, or other foundation that is permanently open to flood waters;

(b) The lowest floor and all electrical, heating, ventilating, plumbing, and air conditioning equipment and utility meters shall be located at

or above the flood protection elevation;

(c) If walls are used, all enclosed areas below the base flood elevation shall address hydrostatic pressures by having a minimum of two permanent openings no more than one foot above grade and providing a total net area of not less than one square inch for every one square foot of enclosed area subject to flooding below the base flood elevation;

(d) the foundation and supporting members shall be anchored and aligned in relation to flood flows and adjoining structures so as to minimize exposure to hydrodynamic forces such as current, waves, ice and floating debris;

(e) all structural components below the flood protection elevation shall be constructed of materials resistant to flood damage;

(f) water and sewer pipes, electrical and telephone lines, submersible pumps, and other service facilities may be located below the flood protection elevation provided they are waterproofed; and

(g) no area below the flood protection elevation shall be used for storage of items or materials.

c. Manufactured homes and travel trailers to be installed on site for more than 180 days shall be:

1. elevated to or above the flood protection elevation; and

2. shall be anchored to resist flotation, collapse, or lateral movement by being tied down in accordance with the **Rules and Regulations for the Illinois Mobile Home Tie-Down Act** issued pursuant to 77 IL Adm. Code 870.

d. Non-residential buildings may be structurally floodproofed (in lieu of elevation) provided a registered professional engineer certifies that:

1. below the flood protection elevation the structure and attendant utility facilities are watertight and capable of resisting the effects of the base flood;

2. the building design accounts for flood velocities, duration, rate of rise, hydrostatic and hydrodynamic forces, the effects of buoyancy, and the impact from debris and ice; and

3. floodproofing measures will be operable without human intervention and without an outside source of electricity. Levees, berms, floodwalls and similar works are not considered floodproofing for the purpose of this subsection.

38.7 SUBDIVISION AND OTHER DEVELOPMENT REQUIREMENTS

The county board shall take into account flood hazards, to the extent that they are known, in all official actions related to land management use and development.

a. New subdivisions, manufactured home parks, annexation agreements, planned unit developments, and additions to manufactured home parks and subdivisions shall meet the damage prevention and building protection standards of **Sections 38.5** and **38.6** of this ordinance. Any proposal for such development shall include the following data:

1. the base flood elevation and the boundary of the floodplain (where the base flood elevation is not available from an existing study, the applicant shall be responsible for calculating the base flood elevation);

2. the boundary of the floodway when applicable; and

3. a signed statement by a Registered Professional Engineer that the proposed plat or plan accounts for changes in the drainage of surface waters in accordance with the **Plat Act** (765 IL. Compiled Statutes 205/2).

b. Public health standards must be met for all floodplain development. In addition to the requirements of **Sections 38.5** and **38.6**, the following standards apply:

1. No development in the floodplain shall include locating or storing chemicals, explosives, buoyant materials, flammable liquids, pollutants, or other hazardous or toxic materials below the flood protection elevation unless such materials are stored in a storage tank or floodproofed building constructed

according to the requirements of **Section 38.6** of this ordinance.

2. New and replacement sanitary sewer lines and on-site waste disposal systems may be permitted providing all manholes or other above ground openings located below the flood protection elevation are watertight.

3. All other activities defined as development shall be designed so as not to alter flood flows or increase potential flood damages.

38.8 VARIANCES

Whenever the standards of this ordinance place undue hardship on a specific development proposal, the applicant may apply to the Zoning Board of Appeals for a variance. The Zoning Board of Appeals shall review the applicant's request for a variance and shall submit its recommendation to the County Board. The County Board may attach such conditions to granting of a variance as it deems necessary to further the intent of this ordinance.

a. No variance shall be granted unless the applicant demonstrates that:

1. the development activity cannot be located outside the floodplain;

2. an exceptional hardship would result if the variance were not granted;

3. the relief requested is the minimum necessary;

4. there will be no additional threat to public health or safety, or creation of a nuisance;

5. there will be no additional public expense for flood protection, rescue or relief operations, policing, or repairs to roads, utilities, or other public facilities;

6. the applicant's circumstances are unique and do not establish a pattern inconsistent with the intent of the NFIP; and

7. all other required state and federal permits have been obtained.

b. The Zoning Board of Appeals shall notify an applicant in

writing that a variance from the requirements of the building protection standards of **Section 38.6** that would lessen the degree of protection to a building will:

1. result in increased premium rates for flood insurance up to $25 for $100 of insurance coverage;

2. increase the risks to life and property; and

3. require that the applicant proceed with knowledge of these risks and that the applicant acknowledge in writing the assumption of the risk and liability.

c. Variances to the building protection requirements of **Section 38.6** of this ordinance requested in connection with the reconstruction, repair or alteration of a site or building included on the National Register of Historic Places or the Illinois Register of Historic Places may be granted using criteria more permissive than the requirements of **Sections 38.8.a(1)** thru **38.8.a.(5)**

38.9 DISCLAIMER OF LIABILITY

The degree of protection required by this ordinance is considered reasonable for regulatory purposes and is based on available information derived from engineering and scientific methods of study. Larger floods may occur or flood heights may be increased by man-made or natural causes. This ordinance does not imply that development either inside or outside of the floodplain will be free from flooding or damage. This ordinance does not create liability on the part of the county or any officer or employee thereof for any flood damage that results from reliance on this ordinance or any administrative decision made lawfully thereunder.

38.10 PENALTY

Failure to obtain a permit for development in the floodplain or failure to comply with the conditions of a permit or a variance shall be deemed to be a violation of this ordinance. Upon due investigation, the State's Attorney may determine that a violation of the minimum standards of this ordinance exists. The State's Attorney shall notify the owner in writing of such violation.

a. If such owner fails after ten days notice to correct the violation:

1. The county may make application to the circuit court for an injunction requiring conformance with this ordinance or make such other order as

the court deems necessary to secure compliance with the ordinance;

2. Any person who violates this ordinance shall upon conviction thereof be fined not less than twenty-five dollars ($25.00) nor more than two-hundred dollars ($200.00); and

3. A separate offense shall be deemed committed upon each day during or on which a violation occurs or continues.

b. The State's Attorney shall inform the owner that any such violation is considered a willful act to increase flood damages and therefore may cause coverage by a **Standard Flood Insurance Policy** to be suspended.

c. Nothing herein shall prevent the county from taking such other lawful action to prevent or remedy any violations. All costs connected therewith shall accrue to the person or persons responsible.

38.11 ABROGATION AND GREATER RESTRICTIONS

This ordinance repeals and replaces other ordinances adopted by the county board to fulfill the requirements of the **National Flood Insurance Program including: RZ-94-110.** However, this ordinance does not repeal the original resolution or ordinance adopted to achieve eligibility in the program. Nor does this ordinance repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. Where this ordinance and other ordinance easements, covenants, or deed restrictions conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

Appendix C-Historical News Articles

Appendix D-FIRMs

Rock Island FIRM's (Flood Insurance Rate Maps) consist of 9 Map Panels for the Floodplain and 6 Map Panels for the Floodway. Additionally, the Flood Insurance Study is also available for Rock Island County. Due to the number of map panels and length of the study, the maps are included by reference as part of this Hazard Mitigation Plan. You may review a copy of the Study and associated maps at:

Rock Island County
Office of Economic Development, Zoning & GIS
1504 Third Avenue
Rock Island, IL 61201

Or you may purchase a copy of the maps from the FEMA Map Center by contacting the FEMA web site:

www.fema.gov

Or contacting the FEMA Map Center by phone at:

1-800-358-9616

Appendix E-Bibliography

Rock River Floodplain Information, Corps of Engineers, 1969

Report on Regulations of Construction Within the Floodplain-Lower Rock River, Illinois Department of Transportation, Division of Water Resources, 1978

Rock Island Flood Recovery Plan, Bi-State Regional Commission, 1995

Depth and Frequency of Flooding in Illinois, Byron J. Purgh, Jr., 1976

Flood Insurance Study, FEMA, 1986

Floodplain Management, Illinois Department of Transportation, Division of Water Resources, 1996

www.usgs.gov	Daily Streamflow Values
www.fema.gov	Tornadoes Earthquakes Mitigation Library
www.epa.il.water	Rock River Watershed Map

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Corps of Engineers
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