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TSUNAMI

Project on

The Uninsured Elements of Natural Catastrophic Losses

The 1993 Midwest Floods, USA

Preliminary Case Study Report

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY.....	3
2. INTRODUCTION AND DESCRIPTION OF DISASTER.....	4
3. SUMMARY CHARTS AND TABLES.....	5
4. GENERAL ECONOMIC AND DEMOGRAPHIC INDICATORS.....	7
5. INSTITUTIONAL ASPECTS.....	7
5.1 PUBLIC SECTOR.....	7
5.2 PRIVATE INSURANCE SECTOR.....	10
6. TOTAL LOSSES.....	12
6.1 DIRECT LOSSES	12
6.2 INDIRECT LOSSES	19
7. COMPENSATION.....	22
7.1 GOVERNMENT COMPENSATION.....	22
7.2 PRIVATE INSURANCE COMPENSATION.....	26
8. EX-POST MEASURES.....	26
8.1 PUBLIC POLICY	26
8.2 PRIVATE INSURANCE SECTOR.....	28
8.3 HAZARD MITIGATION	28
9. CONCLUSION.....	28
10. REFERENCES	31

1. EXECUTIVE SUMMARY

The Midwest Flood of 1993 affected nine U.S. Midwest states (MS, MO, IA, IL, ND, IN, MN, WI, KA) over an area of almost 714,000 sq. miles. Torrential rain caused banks of over 100 rivers to burst and affected 48,500 other waterways. Flooding destroyed thousands of residential properties and caused major infrastructure loss, particularly in transportation systems, municipal provision of water and power.

The event caused the evacuation of 200,000 and left 31,000 homeless, claiming 50 lives as a result of flooding. Economic losses, mentioned throughout this report, measured between \$12 and \$18b, with our estimates of insured losses totaling approximately \$2.5 bn (Munich Re estimated approx. \$1bn). Around 57% of total damages were accounted for by the agricultural sector, with the commercial and household sector taking up 30% of total damages and the public sector 57%.

The National Flood Insurance Program (NFIP) of the Federal Emergency Management Agency (FEMA) was created in 1968 and provides insurance and strong incentives and assistance in the areas of risk identification and hazard mitigation. In spite of widespread success of this program since its inception, significant areas still remain without coverage. Recognizing the inability of the federal government, as well as local and state governments, to adequately finance catastrophe damage costs, new legislation encourages the involvement of private insurance companies. Proposed legislation to place more responsibility for public infrastructure costs on local and state governments has been shelved.

2. INTRODUCTION AND DESCRIPTION OF DISASTER

In geographical scope and economic injury, the Midwest Flood of 1993 was a significant hydro-meteorological event affecting the upper Mississippi River Basin, an area encompassing approximately 714,000 sq. miles (Interagency Floodplain Management Review Committee 1994). While in some areas the flooding was extra-ordinary, in most, the flooding reflected one in a series of seasonal floods that reoccur in the region. Flooding affected nine U.S. Midwest states (MS, MO, IA, IL, ND, IN, MN, WI, KA). Torrential rain caused banks of over 100 rivers to burst and affected 48,500 other waterways. Flooding destroyed thousands of residential properties and caused major infrastructure loss, particularly in transportation systems and municipal provision of water and power. The event caused the evacuation of 200,000 and left 31,000 homeless, claiming 50 lives as a result of flooding.

Flooding and flood damages have become a national problem, with annual U.S. flood damages exceeding \$3b in the ten years leading up to 1993. Excessive rainfall produced standing water, saturated soils, and overland flow. Excessive rain damaged agricultural output and local communities, and overall damage estimates range from \$12b (*New York Times*) to \$16b (Munich Re). Swiss Re produced a figure of \$18b at a later date that appears to account for some indirect costs. Many of the indirect damages remain inestimable. We have chosen \$12 bn as a baseline for **direct** losses. The choice of this conservative approximate estimate of damages may create an upward bias for re-imbursed losses (through insurance, loans, and federal assistance). Our estimates of insured losses total approximately \$2.5 bn (Munich Re estimated approx. \$1bn).

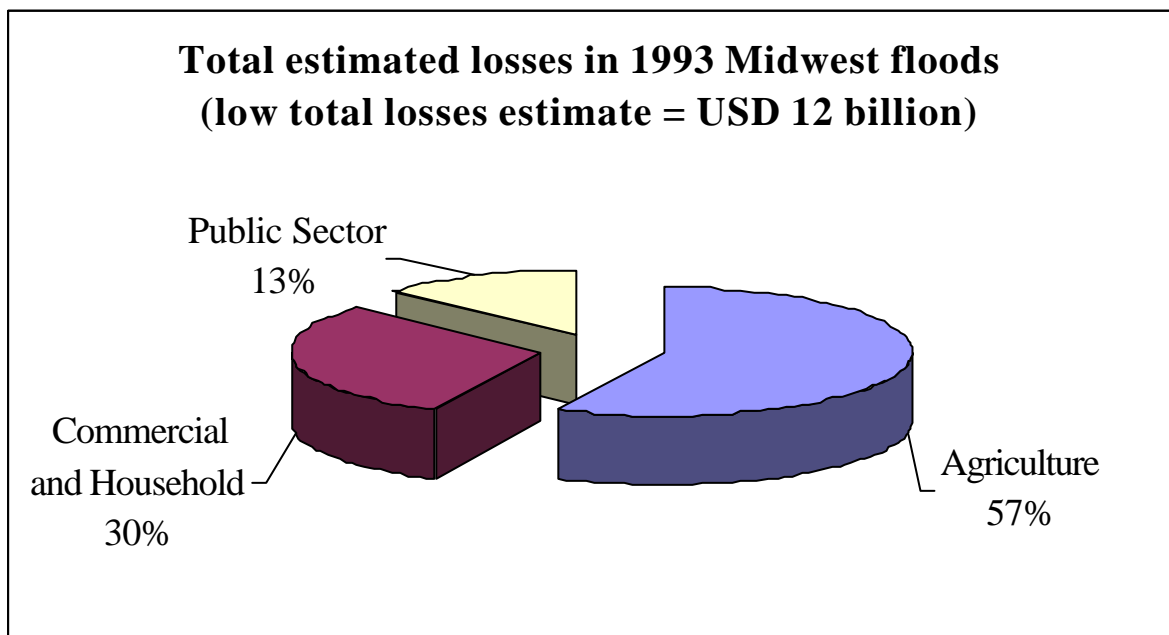
While FEMA (the Federal Emergency Management Agency) and its flooding insurance program, the NFIP (National Flood Insurance Program), provide extensive assistance in mitigation efforts and reimbursement of some types of losses, significant areas remain without coverage. Recognizing the inability of the federal government, as well as local and state governments, to adequately finance catastrophe damage costs, new legislation encourages the involvement of private insurance companies. However, proposed legislation to place more responsibility for public infrastructure costs on local and state governments has been shelved.

3. SUMMARY CHARTS AND TABLES

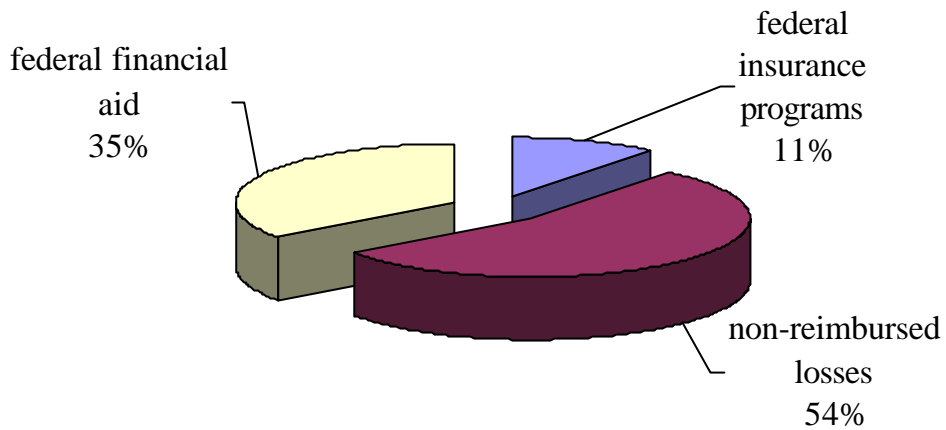
Table 1 Estimated total economic losses and insurance in USD millions

Sector	Share of total losses	Total direct losses in USD millions		Insured losses as a % of direct losses	
		low estimate	high estimate	low estimate	high estimate
Commercial and household	30 %	3,641	4,800	10%	20%
Public sector	13 %	1,519	2,080	0	0
Agricultural	57 %	6,840	9,120	25%	25%
Total	100 %	12,000	16,000	-	-

Source: Calculations based on reports and estimates made after the event by the Interagency Floodplain Management Review Committee 1994. Later estimates of up to USD 18bn. probably included indirect costs. Division of costs between direct and indirect, and the accounting used to produce these figures remains unclear at this point. No data is currently available on total commercial and household losses; the figures cited here are calculated as a residual (total losses (USD 12 bn.) less public sector and agricultural losses).



**Estimated Losses and reimbursements in
1993 Midwest floods
(assuming total losses = USD 12 billion)**



Map of Area affected in the 1993 US Midwest flood



adapted using [source: www.nationalatlas.gov/scripts/start.html](http://www.nationalatlas.gov/scripts/start.html)

4. GENERAL ECONOMIC AND DEMOGRAPHIC INDICATORS

TABLE 2	Population/km ² (1998)	1998 Per capita income at current prices in USD	Total population (millions, 1998)
United States	29.5	26,482	270.3
Illinois (IL)	83.0	28,976	12.1
Iowa (IA)	19.8	24,007	2.9
Kansas (KS)	12.4	25,049	2.6
Minnesota (MN)	22.9	27,667	4.7
Missouri (MO)	30.5	24,447	5.4
Nebraska (NE)	8.4	24,786	1.7
N. Dakota (ND)	3.6	21,708	0.6
S. Dakota (SD)	3.8	22,201	0.7
Wisconsin (WI)	37.1	25,184	5.2

Source: updated using www.census.gov/population/censusdata/90den_stco.txt
and www.bea.doc.gov/bea/regional/spi/

5. INSTITUTIONAL ASPECTS

5.1 Public sector

In the United States, two insurance programs operated at the federal level made reimbursements for losses incurred during the 1993 Midwest floods: the National Flood Insurance Program (NFIP) and the Federal Crop Insurance Program (FCIP).

Flood insurance coverage on buildings and their contents is available through NFIP in participating communities. Guaranteed by the U.S. Government, flood insurance is available across America to residents in more than 18,000 communities that participate in the NFIP. The NFIP is administered by the Federal Insurance Administration (FIA) and the Mitigation Directorate, both being components of the Federal Emergency Management Agency (FEMA) which is an independent Federal agency. Participation in the NFIP is based on an agreement between local communities and the Federal Government that states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (100-year flood areas), the Federal Government will make flood insurance available within the community as a

financial protection against flood losses. It provides coverage that most homeowners insurance do not - coverage for damage to structures and contents from flooding, flood-related erosion and flood-caused mudslides. The NFIP offers three Standard Flood Insurance Policy forms:

- 1) *The Dwelling policy* form which is used to insure residential structures and their contents including individual condominium units.
- 2) *The General Property policy* form which is used for other-residential and non-residential structures and their contents.
- 3) *Residential Condominium Building Association policy* form is used for residential condominium buildings association & their contents owned by the condominium association.

The policy texts for these three forms can be found on the following internet page:

www.fema.gov/nfip/sfip.htm

Under the NFIP, insurance premiums for buildings that predate the identification of the flood hazard in a particular community are subsidized, while buildings constructed after that date pay according to full actuarial premium rates. Currently, 59% of NFIP policy holders pay a full actuarial rate and 41% are subsidized (Krimm 1994). All administrative costs, including floodplain mapping, salaries, etc. are charged to policyholders (Sharing the Challenge, 1994, 26).

As noted in a recent Swiss Re publication (Gaschen 1999), currently 96% of the NFIP policies in force cover residential property. Flood insurance faces a distinct anti-selection problem as flood insurance is not compulsory, but cannot be refused for existing buildings in qualifying communities. (Community participation in the NFIP is voluntary, although some States require NFIP participation as part of their floodplain management program). Those who own property in certain coastal barrier areas are excluded from the federal program.

Properties with recurring flood losses account for only 2% of the nation's flood insurance policies but account for almost 40% of the \$6.8b which the NFIP paid out in settlement of losses between 1978 and 1995. Incentives to reduce flood losses have proved insufficient. Although premiums are graduated in line with flood hazard and risk quality, the poor continue to benefit from subsidies. The NFIP receives financial support from FEMA

and as of 1999 had debts of \$800m. No reinsurance is purchased on the international markets. For laws and regulations see: <http://www.fema.gov/nfip/laws.htm>

National Flood Insurance Act of 1968

(P.L. 90-448, Title XIII, 42 U.S. Code, sec. 4001 et seq.)

- Created the National Flood Insurance Program (NFIP)
- Made flood insurance available in communities that agree to adopt and enforce floodplain management ordinances

Flood Disaster Protection Act of 1973

(P.L. 93-234, 42 U.S. Code, sec. 4001 et seq.)

- Made community participation in the NFIP a condition of eligibility for certain types of federal assistance
- Made the purchase of flood insurance a condition for federal and federally related mortgage loans in high-risk flood areas

National Flood Insurance Reform Act of 1994

(P.L. 103-325, 108 Stat., 2255)

- Strengthened the mandatory purchase requirements of the 1973 act
- Created the Floodplain Mitigation Assistance Grant Program
- Revised the Standard Flood Insurance Policy to include increased cost of compliance coverage
- Included the community rating system in the statutes

Source: Figure 6-1, (Pasterick 1998)

Law requires individuals to have flood insurance to receive secured financing to buy, build or improve structures in Special Flood Hazard Areas (SFHAs). The average annual premium for flood insurance is \$275 per year. The law requires flood insurance in an amount equal to the outstanding principal balance of the loan (less estimated land cost), or the maximum limit of coverage available under the Act, whichever is less. It also requires flood insurance to be maintained for the life of the loan. Up to \$185,000 coverage is available for single family residential buildings and \$60,000 is available for contents. Other residential, commercial and small business owners can also obtain flood insurance.

5.2 Private Insurance sector

About 200 insurance companies write and service the policies for the government, which finances the program through premiums. As of October 1996, approximately 90 insurance companies had signed arrangements with FIA to sell and service flood insurance under their names, within the framework of the WYO program. The Write Your Own (WYO) Program, was started in 1983, and is a cooperative undertaking of the insurance industry and the FIA. The WYO Program allows participating property and casualty insurance companies to write and service the Standard Flood Insurance Policy in their own names. The companies receive an expense allowance (just over 30% of the premium) for policies written and claims processed while the Federal Government retains responsibility for underwriting losses. The WYO Program operates within the context of the NFIP, and is subject to its rules and regulations. The goals of the WYO Program are to:

- Increase the NFIP policy base and the geographic distribution of policies;
- Improve service to NFIP policyholders through the infusion of insurance industry knowledge;
- Provide the insurance industry with direct operating experience with flood insurance.

Effective since 1st October 1999, the Financial Assistance/Subsidy Arrangement (<http://www.fema.org/nfip/wyoarr99.pdf>) intends to assist and subsidise companies in underwriting flood insurance using standard flood insurance policy. Over time, the purpose of this legislation is to increase the risk-bearing role of the insurance industry. ‘One of the primary objectives of the Program is to provide coverage to the maximum number of structures at risk and because the insurance industry has marketing access through its existing facilities not directly available to the FIA, it has been concluded that coverage will be extended to those who would not otherwise be insured under the Program.’ The Federal Insurance Administration nevertheless still determines the rates to be charged

Also effective since 1st October 1999, the Mortgage Portfolio Protection Program (MPPP) (<http://www.fema.org/nfip/99mppp.pdf>) is aimed at assisting the mortgage lending and servicing industries in bringing mortgage portfolios into compliance with the flood insurance requirements of the Flood Disaster Protection Act of 1973.

Many types of flood-induced losses may be covered to some extent by private insurance policies. Many people affected hold life insurance policies and medical insurance. In principle, each policyholder's insurance company holds the claims data. In practice, however, it remains unclear to what extent companies identify disaster-related claims from others. This complicates data collection.

6. TOTAL LOSSES

6.1 Direct Losses

CORPORATE/BUSINESS

Losses	Corporate and private losses (as a residual) are estimated at \$3.6b	<u>Source/Notes:</u> (Ayres 1993f), (Interagency Floodplain Management Review Committee 1994, IFMRC)
Insured	NFIP flood insurance payments for small businesses and non-residential buildings exceeded \$94m, private insurance data na	<u>Source/Notes:</u> (Browne 1999)
Uninsured	It appears that up to 84% of the commercial market remains uninsured for direct and indirect flood losses.	<u>Source/Notes:</u> IFMRC (1994)
What factors influence the supply or lack thereof of insurance?	The most serious obstacles to functioning flood insurance system are mutuality, assessability, and economic viability.	<u>Source/Notes:</u> (Hausman 1998)
What factors influence the demand or lack thereof for insurance services?	Availability of government subsidies and assistance—while less than for non-commercial—may crowd out private insurance options	<u>Source/Notes:</u> IFMRC (1994)
Reimbursed losses	No direct assistance except public loans	<u>Source/Notes:</u> IFMRC (1994)
Public Loans	Small Business Administration made loans to businesses that exceed \$334m for physical	<u>Source/Notes:</u> IFMRC (1994)

	damage and economic injury. Total \$597m includes loans to homeowners and renters. The SBA approved 20,285 loans for individuals and businesses.	
Non-reimbursed losses	Approximately \$1.8b for commercial and non-commercial (residential), or about 41%	<u>Source/Notes:</u> IFMRC (1994)
Retained earnings and investment	na	<u>Source/Notes:</u>

PRIVATE SECTOR

Losses	Total (residual) losses for private residential and commercial losses \$3.6b.	<u>Source/Notes:</u> IFMRC (1994)
Insured	National Flood Insurance Program (NFIP) claims payments totaled \$297.3m. 16,167 flood insurance claims but even more federal assistance for private losses (see below).	<u>Source/Notes:</u> IFMRC (1994)
What factors influence the supply or lack thereof of insurance?	Large federal program for flood insurance.	<u>Source/Notes:</u> IFMRC (1994)
What factors influence the demand or lack thereof for insurance services?	Empirical study shows demand for NFIP insurance to be dependant on income, price of policy, anticipated disaster relief efforts, and level of flood losses during the prior year. Many lenders do not require flood insurance at closing, or	<u>Source/Notes:</u> Browne (1999) IFMRC (1994) 1989 American Housing Survey (DOC 1989)

	<p>ensure that property owners maintain flood insurance coverage for the life of the loan; heavy dependence on mandatory purchase requirement to drive high levels of market penetration may not be effective, since 42.4% of owner-occupied housing is owned free of mortgages (DOC 1989). Renters do not usually buy flood insurance; floodplain inhabitants tend to be low-income whose populations have higher than average numbers of renters, elderly, public assistance recipients, and mortgage-free property owners. Informal credit agreements exacerbate efforts to require flood insurance. Flood assistance that is too generous may also dampen the demand for flood insurance. NFIP 5-day waiting periods may be too short (sometimes people wait to purchase flood insurance until waters start to rise)</p>	
<p>Non-reimbursed or non-insured</p>	<p>Approximately \$1.8b. or 41%. Insured losses to private and commercial approximately 16% of total, leaving a large portion uninsured (even accounting for</p>	<p><u>Source/Notes:</u> IFMRC (1994)</p>

	federal assistance).	
Reimbursed losses	na	<u>Source/Notes:</u>
Insurance/reinsurance (note firms if possible)	NFIP. No data on private firms.	<u>Source/Notes:</u> IFMRC (1994)

AGRICULTURAL SECTOR

Losses	Total losses reported by the <i>New York Times</i> approximately \$7.2b. \$2.5bn directly attributed to floods, \$1.4bn in lost corn and soybean sales, damages to field fertility and to farm infrastructure exceeded \$100 m (\$190/acre to restore fertility; sand removal \$3,200/acre, \$10.8m to remove debris from ditches). Secondary impacts of agriculture depend on the importance of agriculture in local communities (lost sales and unemployment), value of land and property tax base of affected communities; agricultural subsidies decreased by \$2.6bn (for corn alone in 1993)	<u>Source/Notes:</u> IFMRC (1994) Ayres (1993f)
Insured	Federally insured crop assistance: ASCS Disaster Programs paid 1.3bn for program crops and \$142m for non-program crops and totaled	<u>Source/Notes:</u> IFMRC (1994)

	\$1.4bn in agricultural payments	
Non-reimbursed or non-insured	Approximately 51% or \$3.9b	<u>Source/Notes:</u> IFMRC (1994)
What factors influence the supply or lack thereof of insurance?	Government provides insurance for most farmers, or serves in a reinsurance capacity for private firms. This is not necessarily a case of crowding out, but a partnership between state and regional companies and federal financial institutions.	<u>Source/Notes:</u> IFMRC (1994)
What factors influence the demand or lack thereof for insurance services?	Perception, availability of federal subsidies of various kinds, disaster risk	<u>Source/Notes:</u> (Hausman 1998)
Loans	Between 14.7 and 15.8m in loans from federal programs (primarily the FmHA which makes loans to farmers).	<u>Source/Notes:</u> IFMRC (1994)

PUBLIC SECTOR

Losses	Data available for approximately \$420m in losses (reimbursed losses approximately \$1.5b, this figure is uncertain)	<u>Source/Notes:</u> These estimates are based on FEMA projections of infrastructure spending that include a 10% local cost share.
Buildings and cultural property	Damages to public buildings exceeded \$27m.	<u>Source/Notes:</u> IFMRC (1994)
Infrastructure		<u>Source/Notes:</u>
Transportation	Railroads: \$131m physical damage to railways; Airports suffered damages of \$5.4m. Road damage not available.	<u>Source/Notes:</u> IFMRC (1994)

Water/sewage facilities	Damage to water, wastewater treatment, and utilities exceeded \$85m. 388 wastewater facilities affected. Water control facilities had more than \$20m in damages State and local costs for restoration of damaged levees and watersheds exceeded \$130m.	<u>Source/Notes:</u> IFMRC (1994)
Communication	na	<u>Source/Notes</u>
Other	Parks and recreation facilities recorded more than \$22m in damages.	<u>Source/Notes:</u> IFMRC (1994)
Insured		<u>Source/Notes:</u>
What factors influence the supply or lack thereof of insurance?	No data at this time on public sector insurance.	<u>Source/Notes:</u>
What factors influence the demand or lack thereof for insurance services?		<u>Source/Notes:</u>
Uninsured	Possibly all.	<u>Source/Notes:</u>
Reimbursed losses (distinguish between federal and local governments)	Public sector losses \$1,518.6m, of which Department of Education \$100m, State and local mitigation investments \$50.7m, State and local public assistance \$42m, FEMA \$1,100m, EPA \$34m, National community social service \$4m, Department of Transportation \$146.7m, Department of Interior \$41.2m.	<u>Source/Notes:</u> IFMRC (1994)

International disaster aid	na	<u>Source/Notes:</u>
Non-reimbursed losses	Approximately \$747.9m.	<u>Source/Notes:</u> IFMRC (1994)
Ex post borrowing (taxpayers and future generations)	na	<u>Source/Notes:</u>
Taxes	Tax losses not available, but public assistance for tax losses due to falling real estate prices have gone to local school districts which would have benefited from those tax revenues in the amount of \$70m.	<u>Source/Notes:</u> IFMRC (1994)
Budget diversions	na	<u>Source/Notes:</u>
World Bank and other financial institutions	Not applicable	<u>Source/Notes:</u>

6.2 Indirect Losses

Assessing the indirect economic losses associated with natural catastrophes has received increasing attention by the research and business community recently. Few quantifiable results exist to measure the true magnitude of the indirect economic impacts that occurred as a result of the 1993 Midwest Floods. However, evidence suggests that the indirect impacts held a nonlinear relationship to the size of the event and may account for a large fraction of total losses and damage incurred.

NFIP does not insure corporate or business disruptions associated with natural catastrophes, although private insurers offer these services. Limited statistics in government reports (see chart below) are available that illustrate the magnitude of business disruptions (IFMRC 1994). The impacts of new investment and industrial output and employment effects of post-flood rebuilding efforts remain unclear. Of importance to note, however, is that short-term indirect effects may include both losses and gains.

Losses may occur from sales, wages, and profits due to damage or destruction related to the flooding event. Input and output losses to firms forward- and/or backward-linked sectors may occur as businesses close due to direct physical damage or infrastructure failure. In addition, slowdowns and shutdowns may occur as a result of dampened demand for inputs and supplies of outputs from damaged enterprises. Firm closures or cutbacks may in turn trigger a multiplier effect as spending reductions ripple through the economic system.

Possible short-term gains could include some of the following and are likely to occur in areas bordering the affected disaster region: Changes in future production, employment and income and /or changes in these flows outside the damaged area; Current production outside the immediate area of impact or future production within the affected region may compensate for initial disaster-induced losses; Income gains outside the impact area to owners of commodities inflated in price by disaster-induced shortages. Both agricultural commodities lost in a disaster and construction materials demanded during restoration are likely to generate these extra-regional windfall profits. In addition, disasters may generate certain types of jobs in construction and clean-up as well as disaster management and urban development markets as clean-up and reconstruction activities proceed after the flooding event.

While few estimates exist to estimate longer term impacts, data on migration flows, changes in development and housing values from insurance costs, reduced consumption

(due to increased borrowing to repair and replace damaged structures and goods), and altered government expenditures that derive from new patterns of migration and development may be used to infer the type and magnitude of indirect economic impacts of the 1993 Midwest floods. For example, approximately \$30m in property tax revenues were lost as property values dropped in damaged areas. Property taxes in many communities were earmarked to support local public education and these deficits were filled by public grants and loans from the government.

Although detailed statistics for indirect impacts are not readily available, it seems reasonable to assume that only portions of the United States economy as a whole were affected by the event. Agriculture output in specific crops (corn and soybean) were impacted but without overall impacts on the national economy. Employment markets appeared diversified enough to largely absorb the shocks to labor, with some short-term assistance from the government, noted in the chart below.

The National Research Council (IFMRC, 1994) has made several recommendations to improve the measurement of indirect costs associated with natural catastrophes, areas which in the future may generate the type of information necessary to help insurance related services and disaster relief agencies identify appropriate areas of operation and assistance.

SOME INDIRECT ECONOMIC LOSSES

<i>Corporate/business disruptions</i>	Railroads sustained \$51m in indirect losses due to train detours,. Navigation: losses of revenue to navigation industry were \$300m per month	<u>Source/Notes:</u> IFMRC (1994)
New investment	Mitigation investment using federal (HMGP) funds: Indirect benefit: the anticipated total return from mitigation efforts in the Midwest, at a minimum is \$304.5 million in reduced future disaster damages over the next 50 years.	<u>Source/Notes:</u> IFMRC (1994)

Output/Employment	36,000 claims approved for a total of \$92m in Disaster Unemployment Assistance	<u>Source/Notes:</u> IFMRC (1994), p.19
Impacts on GNP and growth	na	<u>Source/Notes:</u>

<i>Public sector</i>		<u>Source/Notes:</u>
Public cleanup and response	na	<u>Source/Notes:</u>
Output/Employment	na	<u>Source/Notes:</u>
Impacts on GNP and growth	na	<u>Source/Notes:</u>
FDI flows	No foreign borrowing or investment occurred in direct relation to the Midwest Floods of 1993.	<u>Source/Notes:</u> (Gaschen 1999)
Diversion of productive forces or resources (police force, etc.) and impacts on civil disruption	na	<u>Source/Notes:</u>

<i>Households</i>		<u>Source/Notes:</u>
Costs to family/personal disruption (Note: education, sanitation, suffering, psychological effects/trauma)	Education: \$100m (primarily lost tax revenues)	<u>Source/Notes:</u>

7. COMPENSATION

7.1 Government Compensation

‘Federal expenditures represent disaster response and recovery costs borne by the federal government. Among these are disaster assistance payments to individuals and farmers, costs to repair levees and other infrastructure, costs to provide health and social services; and costs associated with hazard mitigation, housing and community development.’ (IFMRC, 1994). See table A2.5, below for a breakdown of these expenditures. Individuals, families and businesses may be eligible for federal assistance if they live, own a business, or work in a county declared a Major Disaster Area, incur sufficient property damage or loss, and, depending on the type of assistance, do not have the insurance or other resources to meet their needs.

Disaster assistance: FEMA and other federal, state, local and volunteer agencies offer disaster assistance in several forms:

For flood victims :

Low-Interest Loans. Most, but not all, federal assistance is in the form of low interest loans to cover expenses not covered by state or local programs, or insurance. People who do not qualify for loans may be able to apply for a cash grant. The Farm Service Agency (FSA) and the Small Business Administration (SBA), offer low interest loans to eligible individuals, farmers and businesses to repair or replace damaged property and personal belongings not covered by insurance.

Cash grants for up to \$13,600 adjusted annually for inflation. Individuals who do not qualify for a loan from SBA may be eligible for these grants from State to help recover unmet necessary expenses and serious needs. These unmet necessary expenses and serious needs include medical, dental, and funeral expenses that are incurred as a result of the disaster. Home inspections are normally conducted before a check is issued. FEMA funds 75% of the grant program's eligible costs with the remaining 25% covered by the state. The state administers the program, known as the Individual And Family Grant (IFG) program.

Housing Assistance: FEMA's Disaster Housing Program (DHA) makes funds and services available to individuals whose homes are unlivable because of a disaster.

Veterans Benefits. The Department of Veterans' Affairs provides death benefits, pensions, insurance settlements and adjustments to home mortgages for veterans.

Tax Refunds: The Internal Revenue Service (IRS) allows certain casualty losses to be deducted on Federal income tax returns for the year of the loss or through an immediate amendment to the previous year's return.

Unemployment Benefits: Disaster Unemployment assistance and unemployment insurance benefits may be available through the state unemployment office and supported by the U.S. Department of Labor.

For states and communities:

Community mitigation grants: Authorized under Section 404 of the Stafford Act, the Hazard Mitigation Grant Program (HMGP) administered by the Federal Emergency Management Agency (FEMA) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. FEMA can fund up to 75 % of the eligible costs of each project. Eligible applicants are State and local governments, Native American tribes, and certain non-profit organizations. Individual homeowners and businesses may not apply directly to the program; however a community may apply on behalf of homeowners and businesses.

Post-event assistance: FEMA's Public Assistance Grant Program is one way federal assistance gets to the state and local governments and to certain private nonprofit organizations. These grants allow them to respond to disasters, to recover from their impact and to mitigate impact from future disasters. While these grants are aimed at governments and organizations -- their final goal is to help a community and all its citizens recover from devastating natural disasters.

Under a 90/10 FEMA cost-sharing scheme, the state/local share for the 1993 Midwest Floods was approximately \$42m for Public Assistance and nearly the same amount for assistance to individuals (Kulik 1994).

State Roles and Responsibilities in the Public Assistance Program:

The state is the grant administrator for all funds provided under the Public Assistance Program. Part 13 of the Code of Federal Regulations gives the states more discretion to administer federal programs in accordance with their own procedures and thereby simplify the program and reduce delays. As grantee, the state is responsible for administering the programmatic and grants management requirements of the Public Assistance Program. Key among these requirements is informing the applicants of the assistance available to them -- what is eligible and how to apply for it. Grant management includes applying for federal assistance, monitoring and closing out the grant. Power point presentation: <http://www.fema.gov/r-n-r/asstprog/index.htm>

<p>National public disaster payments (for commercial and private)</p>	<p>FEMA approved 89,734 applications for Disaster Housing Program and 38,423 applications for Individual Housing Program. Federal expenditures for corporate and private losses totaled approximately \$1.2b, of which HMGP \$152.3m, State and local assistance to individuals \$41m, Department of Commerce \$201.3m, USACE \$253.1m, HUD \$500m, HHS \$75m, and Department of Labor \$64.6m. Total federal expenditures for the Midwest Flood of 1993: \$4,254.2m (\$4.3bn)</p>	<p><u>Source/Notes:</u> IFMRC (1994)</p>
<p>Local public disaster payments (note mechanisms and special programs)</p>	<p>For the 1993 Midwest Floods, \$152.3 million was available through the HMGP. Taking into account the 75/25 cost-share, another \$50.7 million will be spent by State and local governments for future mitigation efforts. Because FEMA provided assistance at a 90/10 cost</p>	<p><u>Source/Notes:</u> The HMGP, administered by FEMA, is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988. The HMGP can provide grants to State and local</p>

	share, the state/local share was approximately \$42m for public assistance and about \$41m for assistance to individuals(Kulik 1994).	governments on a 75 percent Federal / 25 percent non-Federal cost-share basis to pursue eligible and cost-effective mitigation measures. For the Mid-West floods these measures were focused on elevating or floodproofing structures to comply with National Flood Insurance Program standards, or acquiring properties in a floodplain, or relocating owners of flood damaged structures to new, safe and sanitary housing outside the floodplain.
Charitable aid, other charities (name groups if possible)	Na	<u>Source/Notes:</u>
Non-reimbursed losses	Approximately 41% of losses, or \$1.8b.	<u>Source/Notes:</u> IFMRC (1994)
Savings	Na	<u>Source/Notes:</u>
Banks and other financial institutions	Na	<u>Source/Notes:</u>
Note movements in subsidies and taxes	As property values fell and real estate tax revenues declined, tax receipts also decline. Tax refunds and decreased agricultural subsidies based on crop output also declined.	<u>Source/Notes:</u> IFMRC (1994)

7.2 Private Insurance Compensation

Data is not readily available

8. EX-POST MEASURES

8.1 Public Policy

Since the late 1980s, FEMA has received a regular annual appropriation of \$320 m to cover the costs of its relief efforts. For the fiscal year 1999, Congress reduced this figure to \$308m. FEMA's regular annual appropriations, however, seldom cover the costs of federal disaster relief it holds responsibility for paying for in a single fiscal year. The 1993 Midwest floods, the 4th most-costly event in the U.S., greatly exceeded FEMA's meager annual appropriation. FEMA makes its payments only by receiving supplemental appropriations from Congress, which up until 1994 were treated as emergency disaster supplements which added to national deficit. After 1994 Congress required all disaster supplements to be offset with cuts in expenditures elsewhere.

For changes in NFIP legislation see section 5 above: **National Flood Insurance Reform Act of 1994.**

Also of interest:

1. Senate Bill increased financial assistance for mitigation—insurance which pays for additional costs of elevating, floodproofing, demolishing, or relocating substantially damaged or repetitively damaged buildings as a standard benefit to the policy holder
2. House Bill provides for a study of mitigation insurance and established a mitigation fund of \$30m/year for state and community mitigation projects. Provides grants for floodproofing, demolishing, or relocating substantially damaged or repetitively damaged buildings and are funded through surcharges on flood insurance policies.
3. FEMA changed focus in repair and rebuilding from an inspection and enforcement role, to an advisory and supportive role. GPR: Government Performance and Results Act of 1993 requires each agency to establish a set of performance measures for Congress to gauge efficiency and effectiveness of agency's programs (<http://www.fema.gov/r-n-r/asstprog/sld003.htm>). "In response to the 1993 floods, the Director of FEMA issued a policy in September of 1993 which stated that acquisition, elevation, or relocation of flood damaged structures would be the priority of the Hazard Mitigation Grant Program

(HMGP) funds during the flood recovery effort.²⁷ At that time, a total of \$44 million in HMGP funds were available for the 9 affected states. Recognizing that this allocation would not meet the needs of tens of thousands of flood victims, Congress provided two supplemental appropriations: \$200 million in 1993, and \$250 million in 1994 in U.S. Department of Housing and Urban Development Community Development Block Grant (CDBG) funds earmarked for the Midwest Floods. Amendments to the Stafford Act which increased the amount of HMGP funds for the 9 states almost fourfold. The resulting amendment changed the formula for calculating mitigation funds to 15 percent of the total Stafford Act grants. To achieve the State and local match, FEMA coordinated an intensive search on behalf of the flood-ravaged states to locate funds to serve as the non-Federal match required for FEMA's mitigation funds. As a result of this effort, by October 1, 1996, 170 mitigation projects involving approximately 10,000 properties have been approved in the 9 states affected by the floods. Included in this count are mitigation projects funded through the HMGP and Section 1362 of the National Flood Insurance Program and the two supplemental CDBG appropriations.

Loans in Areas Having Special Flood Hazards (1996): several federal bodies amended regulations, and the Farm Credit Administration (FCA) issued new regulations, regarding loans in areas having special flood hazards. This action is required by statute to implement the provisions of the National Flood Insurance Reform Act of 1994. Established new escrow requirements for flood insurance premiums, added references to the statutory authority and the requirement for lenders and servicers to "force place" flood insurance under certain circumstances, enhanced flood hazard notice requirements, set forth new authority for lenders to charge fees for determining whether a property is located in a special flood hazard area, and contained various other provisions necessary to implement the National Flood Insurance Program.

Finally, proposed FEMA proposal requiring that local and state governments insure their losses for up to 80% of the replacement cost, if destroyed by earthquake, flood, hurricane or fire, has been shelved.

8.2 Private Insurance Sector

No apparent change here, except incentives in 1999 by Congress to increase involvement of insurance in writing flood insurance (see section 5.2 above).

8.3 Hazard Mitigation

Community Rating System: The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the Community Rating System in the NFIP. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance (<http://www.fema.gov/nfip/crs.htm>).

Public policies for prevention and mitigation: Ex ante flood damage reduction projects and floodplain management programs, where implemented, worked essentially as designed and significantly reduced the damages to population centers, agriculture, and industry. It is estimated that reservoirs and levees built by the U.S. Army Corps of Engineers (USACE) prevented more than \$19bn in potential damages. Watershed projects built by the Soil Conservation Service saved an estimated \$400m. Land use controls required by the NFIP and state floodplain management programs reduced the number of structures at risk throughout the basin.

9. CONCLUSION

Losses from the 1993 Midwest floods were substantial. Agricultural losses were especially high and public infrastructure losses appear relatively lower. Most insurance contracts were on private/residential and agricultural losses, and this insurance is offered mainly by the Federal Government. However, insured losses were very low (from 10 - 15% of total direct losses), which would indicate substantial opportunities for private insurers.

These opportunities are enhanced by the significant investments on the part of the Federal government with respect to floodplain mapping. In particular, opportunities may exist for insuring the following types of losses:

- Industrial, commercial losses (not covered by NFIP)
- Business disruption (not covered by NFIP)
- Government infrastructure losses, especially if legislation is passed reducing federal assistance
- Administering (WYO -Write-your-own) contracts for the NFIP
- Underwriting contracts within the new framework set out by FEMA

- Providing reinsurance to NFIP, especially given legislation limiting Congressional appropriations via deficit financing?

If chosen as a main case study, further work on this case would focus especially on the following:

- Validating and improving data reporting
- Pursuing information on the operations of private insurers that underwrite flood risk in the area
- Clarifying many issues on the changing legislative landscape
- Investigating issues of insurability
- Investigating opportunities for marketing private insurance and reinsurance within the NFIP framework
- Investigating opportunities for insuring commercial risks, as well as municipal and state governments (As a pilot study, a letter has been sent to several municipal and state authorities inquiring about their pre- and post-disaster funding possibilities)
- Investigating opportunities for insuring business disruption and other indirect losses

- Investigating how policies after the 1993 floods impacted on the losses (mitigation policies) and the spread of these losses (insurance reforms) of the 1997 mid-West floods.

10. REFERENCES

Ayres, B. D. J. (1993f). What's left from the great flood of '93. New York Times. New York.

Browne, M., Hoyt, RE (1999). "The demand for flood insurance: Empirical evidence." .

DOC (1989). American housing Survey Data Chart. Washington, D.C., U.S. Department of Commerce and U.S. Department of Housing and Urban Development.

Gaschen, S., Hausman, P., Menzinger, I., Schaad, W. (1999). Floods--an insurable risk? A market survey. Zurich, Swiss Re.

Hausman, P. (1998). Floods--an insurable risk? Zurich, Swiss Re.

Interagency Floodplain Management Review Committee, I. (1994). *A Blueprint for change: Sharing the Challenge: Floodplain Management into the 21st Century*. Washington, D.C., U.S. Government Printing Office, FEMA.

Krimm, R. W. (1994). Business procedures, Federal Emergency Management Agency.

Kulik (1994). USDA Emergency Assistance Paid to Flood States, USDA Flood Information Center, Washington, D.C.

National Research Council, N. (1999). Natural disaster losses: A framework for assessment. Washington, D.C., National Research Council, Committee on Assessing the Costs of natural Disasters, Board on National Disasters, Commission on Geosciences, Environment and Resources.

Pasterick, E. T. (1998). The National Flood Insurance Program. Paying the Price: The status and role of insurance against natural disasters in the United States. H. Kunreuther, Roth, R.J. Washington, D.C., Joseph Henry Press.

APPENDIX I: PARTICIPATING COMMUNITIES ' CURRENT DISCOUNT PERCENTAGES

CLASSIFICATIONS AND DISCOUNTS

All communities start out with a Class 10 rating (which provides no discount). There are 10 CRS classes: Class 1 requires the most credit points and gives the greatest premium reductions; Class 10 identifies a community that does not apply for the CRS, or does not obtain a minimum number of credit points and receives no discount. There are 18 activities recognized as measures for eliminating exposure to floods. Credit points are assigned to each activity. The activities are organized under four main categories: Public Information, Mapping and Regulation, Flood Damage Reduction, and Flood preparedness. Once a community applies to the appropriate FEMA region for the CRS program and its implementation is verified, FIA sets the CRS classification based upon the credit points. This classification determines the premium discount for policyholders. Premium discounts ranging from 5 percent to a maximum of 45 percent will be applied to every policy written in a community as recognition of the floodplain management activities instituted. This is a voluntary program for communities.

The CRS has 18 floodplain management activities available for credit divided into four categories.

- **Public Information (Series 300):** This series credits programs that advise people about the flood hazard, flood insurance, and ways to reduce flood damage. These activities also provide data needed by insurance agents for accurate flood insurance rating. They generally serve all members of the community and work toward all three goals of the CRS.
- **Mapping and Regulations (Series 400):** This series credits programs that provide increased protection to new development. These activities include mapping areas not shown on the FIRM, preserving open space, enforcing higher regulatory standards, and managing stormwater. The credit is increased for growing communities. These activities work toward the first and second goals of the CRS, damage reduction and accurate insurance rating.

- Flood Damage Reduction (Series 500): This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting floodprone structures, and maintaining drainage systems. These activities work toward the first goal of the CRS, damage reduction.
- Flood Preparedness (Series 600): This series credits flood warning, levee safety, and dam safety programs. These activities work toward the first and third goals of the CRS, damage reduction and hazard awareness.

APPENDIX II: USEFUL TABLES SUMMARIZING FLOOD-RELATED DATA

Table A2.1 Damage estimates for 1993 Midwest Flooding, \$m

State	National Weather Service Totals	State Totals	State Agriculture	<i>New York Times</i> Totals	<i>New York Times</i> Agriculture
Illinois	2,640	1,000-2,000	565	1,535	605
Iowa	5,740	>3,400	na	2,200	1,200
Kansas	551	>500	441	574	434
Minnesota	964	1,700	1,500	1,023	800
Missouri	3,430	3,000	1,790	3,000	1,800
Nebraska	295	na	na	347	292
North Dakota	414	600	500	1,500	705
South Dakota	763	596	572	595	595
Wisconsin	904	930	800	909	800
Total	15,701	12,000-13,000	na	11,683	7,231
Source: (Interagency Floodplain Management Review Committee 1994)					

Table A2.2 US Department of Agriculture ASCS Disaster Payments, 1993

States	Program crops (\$)	Non-program crops (\$)	Total payments (\$)
IL	42,662,617	7,445,761	50,108,378
IO	342,849,940	12,910,334	355,760,274
KS	42,662,617	4,823,055	65,562,624
MN	414,574,259	30,983,156	445,557,415
MO	113,812,607	8,290,327	122,102,934
NE	64,123,698	13,233,694	77,357,392
ND	67,127,874	34,760,511	101,888,385
SD	142,318,846	11,299,410	153,618,256
WI	82,468,812	18,377,402	100,846,214
9-state total	1,330,678,222	142,123,650	1,472,801,872
Source: (Interagency Floodplain Management Review Committee 1994)			

Table A2.3 Summary of Federal Insurance Claims Payments by State for the 1993 Midwest Floods, USD millions

Program	Total	IL	IA	KS	MN	MO	NE	ND	SD	WI
Federal Crop Insurance Program Claims Payments	1,017.0	25.4	281.2	40.4	353.9	27.7	49.0	139.3	54.1	46.0
National Flood Insurance Program Claims Payments	297.3	61.4	23.4	10.7	1.7	192.3	4.8	0.3	0.8	2.0
Total Claims Payments	1,314.3	86.8	304.6	51.1	355.6	220.0	53.8	139.6	54.9	48.0

Source: (Interagency Floodplain Management Review Committee 1994)

Table A2.4 NFIP Flood Insurance Losses from 01.04.1993 to 30.09.1993 by state for 1993 Midwest Floods

State	Policies 1/31/94	Loss count	Total payments (\$)	Average payment (\$)	Losses (%)	Payments (%)
IL	36,844	3,624	61,389,123	16,939.6	22	21
IO	8,689	1,690	23,378,415	13,833.38	10	8
KS	11,065	1,071	10,702,780	9,993.26,	7	4
MN	3,472	372	1,712,960	4,604.73	2	>1
MO	20,981	8,271	192,296,740	23,249.52	5	65
NE	6,652	503	4,833,133	9,608.61	3	2
ND	3,008	198	285,572	1,442.28	1	>1
SD	1,313	115	745,309	6,480.95	2	>1
WI	7,096	323	1,999,654	6,190.88	2	>1
Total	99,120	16,167	297,343,686	18,392.01		

Source: (Interagency Floodplain Management Review Committee 1994)

Table A2.5 Summary of Federal Expenditures by State for 1993 Midwest Floods, \$m

Program	Total	IL	IA	KS	MN	MO	NE	ND	SD	WI
Crop loss payment	1,463.3	49.2	351.1	65.5	442.2	121.2	76.0	99.5	151.1	107.2
Emergency Conservation Program	2.7	0.1	1.5	--	0.1	0.7	0.1	--	0.2	--
Emergency Watershed Program	57.2	9.5	13.8	4.0	1.1	11.9	1.0	0.9	3.5	1.0
Food Stamps and Commodities	10.9	2.1	2.4	--	--	6.4	--	--	--	--
FmHA Loans and Grants	15.8	2.4	7.4	0.2	2.5	1.4	0.1	0.2	0.9	0.8
SCS Supplemental for 1994	150.0	--	--	--	--	--	--	--	--	--
<i>USDA Subtotal</i>	1,699.9	63.3	376.2	69.7	446.2	141.6	77.2	100.6	155.7	109.0
Infrastructure (proj.)	424.4	92.8	99.6	31.2	27.5	94.9	41.8	8.2	9.9	18.5
Human Services (proj.)	449.1	59.7	54.9	56.5	24.4	125.9	3.5	22.7	20.4	18.0
Hazard Mitigation	134.9	26.3	27.0	15.2	9.7	30.0	10.0	4.2	4.5	8.0

(proj.)										
Administration	89.6	18.7	8.3	8.8	1.3	40.7	3.5	2.0	2.1	1.9
(proj.)										
FEMA Subtotal	1,098.0	197.5	189.8	111.7	62.9	291.5	58.8	37.1	36.9	46.4
CDBG 1993	200.0	35.9	43.1	18.8	13.5	57.2	7.8	11.9	6.0	5.9
Allocations										
HOME 1993	50.0	10.8	11.4	3.4	2.7	15.3	1.3	2.6	1.3	1.3
Allocations										
CDBG 1994	250.0	48.2	53.2	18.4	13.6	79.6	15.3	7.7	6.8	7.2
Allocations										
HUD Subtotals	500.0	94.9	107.7	40.6	29.8	152.1	24.4	22.2	14.4	14.4
EDA Assistance	200.0	8.3	48.4	17.9	7.4	51.7	0.6	2.9	1.6	0.7
Programs:										
NOAA Expenses	1.0	0.1	0.1	--	0.5	0.2	--	--	--	0.1
Legal Services	0.3	--	--	--	--	--	--	--	--	--
Corporation										
Commerce Subtotal	201.3	8.4	48.5	17.9	7.9	51.9	0.6	2.9	1.6	0.8
Flood Control	218.0	70.0	7.0	11.0	0.3	128.0	1.0	--	--	--
Emergency										
Emergency	31.4	--	--	--	--	--	--	--	--	--
Operations and										

Contingencies										
Operation and Maintenance	3.7	0.3	2.7	--	--	0.7	--	--	--	--
<i>USACE Subtotal</i>	253.1	70.3	9.7	11.0	0.3	128.7	1.0	0.0	0.0	0.0
<i>HHS Subtotal</i>	75.5	7.4	22.8	4.2	4.0	19.3	2.3	2.2	2.6	3.9
Impact Aid	70.0	--	--	--	--	--	--	--	--	--
Student Financial Assistance	30.0	1.4	11.1	0.2	0.8	4.5	0.4	0.8	0.5	0.3
<i>Education Subtotal</i>	100.0	1.4	11.1	0.2	0.8	4.5	0.4	0.8	0.5	0.3
<i>Labor Subtotal</i>	64.6	10.0	15.0	10.0	5.0	15.0	3.0	2.0	3.1	1.5
<i>National Community Service Subtotal</i>	4.0	0.4	1.2	0.4	0.7	1.0	--	--	--	0.3
Coast Guard Operation	10.0	--	--	--	--	--	--	--	--	--
Federal Highway Administration	152.1	32.7	16.7	19.8	4.6	66.4	3.0	3.6	2.5	2.8
Local Rail Freight Assistance	21.0	0.6	5.4	3.8	2.7	7.1	--	--	1.4	--
<i>DOT Subtotal</i>	146.7	33.3	22.1	23.6	7.3	73.5	3.0	3.6	3.9	2.8
Abatement, Control, and Compliance	24.3	3.4	3.4	1.9	0.8	6.9	1.5	0.9	0.7	0.9

Program and Research Operations	1.0	0.2	--	0.1	--	--	--	--	--	--
Underground Storage Tanks	8.0	1.4	1.2	0.7	1.4	0.7	0.5	0.3	3	1.5
Oil spill response	0.7	0.3	--	0.4	--	--	--	--	--	--
EPA Subtotal	34.0	5.3	4.6	3.1	2.2	7.6	2.0	1.2	3.7	2.4
FWS Construction	30.0	10.5	0.2	0.7	5.2	2.7	--	0.4	--	4.3
Historic Preservation	5.0	1.0	1.0	0.2	0.3	1.0	0.3	0.2	0.2	0.2
NPS Construction	0.9	--	0.3	0.1	0.1	0.2	0.1	--	--	0.1
USGS Surveys	1.4	0.3	0.6	0.3	0.3	1.2	0.1	0.2	0.3	0.2
BIA Programs	3.9	--	--	--	0.1	--	--	--	0.4	--
DOI Subtotals	41.2	11.8	2.1	1.3	6.0	5.1	0.5	0.8	0.9	4.8
TOTAL	4,254.2	520.8	810.8	294.1	573.5	910.4	173.2	173.4	203.4	186.1
Source: (Interagency Floodplain Management Review Committee 1994)										

ADDITIONAL READING

The following publications on flood-related subjects are available at no charge from the Federal Insurance Administration/Federal Emergency Management Agency:

FEMA-14 - Guide to Flood Insurance Rate Maps - for understanding how to read and use a FEMA Flood Insurance Rate Map.

FEMA-15 - Design Guidelines for Flood Damage Reduction – provides general information on flooding and how to properly design and build in floodprone areas.

FEMA-54 - Elevated Residential Structures - covers proper design and construction methods for elevated areas.

FEMA-55 - Coastal Construction Manual - demonstrates design and construction techniques for construction in coastal high hazard areas.

FEMA-85 - Manufactured Home Installation in Flood Hazard Areas - contains information on how properly to site and install a manufactured home in a flood hazard area with emphasis on design of elevated foundations.

FEMA-102 - Floodproofing Non-Residential Structures - describes a variety of floodproofing strategies for commercial and industrial structures.

FEMA-114 - Design Manual for Retrofitting Floodprone Residential Structures - presents floodproofing techniques that can be used for existing residential structures.

FEMA-116 - Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials - designed to help local governments improve their floodplain management programs for high risk flood hazard areas.

FIA-12 - Appeals, Revisions, and Amendments to Flood Insurance Maps: A Guide for Community Officials - details how to obtain revisions to FEMA flood risk maps.

FIA-13 - Flood Emergency and Residential Repair Handbook - outlines for the homeowner those actions that can be taken before and after a flood to help reduce damage and speed repairs.

FEMA-100 - A Unified National Program for Floodplain Management - updates a 1979 report which presents strategies fundamental to implementing a balanced approach to floodplain management.

To order any of these publications write to:

Federal Emergency Management Agency

P.O. Box 70274

Washington DC 20024

ATTN: Publications