

U.S. ARMY CORPS OF ENGINEERS
ANNUAL FLOOD DAMAGE
REDUCTION REPORT
TO CONGRESS
FOR
FISCAL YEAR 2003

INCLUDES
STATISTICAL DATA
1994-2003

Prepared by the
U.S. Army Corps of Engineers
Engineering and Construction Division
in Cooperation with the
National Weather Service
Office of Hydrology
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U.S. ARMY

CORPS OF ENGINEERS

ANNUAL FLOOD DAMAGE REPORT

TO CONGRESS

FOR FISCAL YEAR 2003

INTRODUCTION AND AUTHORITY

This report provides information on storm events and associated flood damages in the United States and is published annually in response to House Committee Report 98-217, Energy and Water Development Appropriation Act of 1984. The report includes data on flood damages reduced by projects controlled by the U.S. Army Corps of Engineers, flood damages suffered and loss of life. The report represents preliminary estimates available at the end of the fiscal year from a variety of Federal and non-Federal sources. Because of the general nature of the subject and the rapid compilation of the preliminary data estimates, its accuracy and completeness cannot be assured. The information is neither intended to be used for detailed research nor to replace subsequent studies. Rather, the report data are intended to provide a broad national picture of storm events and the extent of beneficial flood damage reduction that Corps activities and Corps controlled water projects are having on the Nation.

FLOOD DAMAGES REDUCED

Flood damage reduction within the United States as a result of work by the U.S. Army Corps of Engineers totaled \$15.7 billion in FY 2003. This amount is lower than the ten-year (1994-2003) average of \$21.1 billion. Annual amounts have varied over the past 10 years from \$2.8 billion in FY 2000 to \$47.2 billion in FY 1997. Flood control projects providing protection include dams and reservoirs, levees, channel diversions, channel modifications, pump stations and local protection projects. Emergency activities include technical assistance, materials and construction. The amount of damages prevented in FY2003 was below average reflecting the moderate incidents of storms for the year. Four areas of the Nation – Virginia, Kentucky, South Carolina, and Georgia - recorded

substantial amounts of flood damages reduction compared to normal for the area. The nation experienced a below average amount of flood damages reflecting the fact that flood damage prevention efforts were effective and many of the events occurred in areas where the Corps has flood protection facilities in addition to a continuation of drought conditions across parts of the Nation. Seventy-three flood-related deaths occurred in FY2003, slightly below the FY 1994-2003 average of 83.5 fatalities.

TABLES & FIGURES

Tables 1 and 2 summarize the FY 2003 data by state. Table 1 presents flood damage reduction and Table 2 provides the flood damages suffered, potential damages and flood-related loss of life. Tables 3, 4 and 5 tabulate the past ten years (1994-2003) showing damages reduced, damages suffered and lives lost. Table 6 provides damage reduction by river basin areas described in Figure 4. Figures 1 and 2 provide graphical presentations of damage reduction, suffered and potential damages for the past ten years. Potential damages are the damages that would have occurred without federal flood control projects or federal flood fighting activities. Figure 5 provides a comparison of benefits of federal projects to their costs. *Damage data in this report are not adjusted for inflation, with the exception of Figure 5. All figures and tables appear at the end of this report.*

FLOOD DAMAGES REDUCED BY CORPS CONTROLLED FLOOD PROJECTS

Both damage reduction for FY 2003 and actual damages suffered were below average. Actual damages suffered were about 58.56 percent of average. South Carolina and Virginia both reported “very high” amounts of flood damage reduction compared to their respective ten-year average. Georgia and Kentucky reported a “high” amount of flood damage reduction compared to the same average. Water projects controlled by the Corps reduced flood damages by an estimated \$15.7 billion. This year approximately three-fourths of the damage reduction is attributed to Corps levees and one-fourth to reservoirs. See Table 1 for totals and distribution by state. The last column in Table 1 provides a description of the flood damage reduction for each state. These descriptions are a comparison of damage reduction in FY 2003 to the ten-year average. The descriptions are ranked as follows: **low** is less than half of the average, **medium** is half to twice the average, **high** is two to five times the average, and **very high** is more than five times the average. Table 2 provides the percentage of potential damages reduced in each state or territory.

FLOOD DAMAGE REDUCTION BY

CORPS SUPPORTED EMERGENCY OPERATIONS

The Corps emergency activities prevented an estimated \$5,000 in flood damages in FY 2003. See Table 1 for distribution by state. Corps emergency activities include providing technical assistance, sandbagging and use of Corps pumps and equipment to combat flood events. Often state and local governments perform the physical emergency effort and the Corps provided only technical assistance and/or materials (e.g. sandbags). When this occurs, the Corps claims no credit for damages prevented. If, however, the Corps provides physical assistance in addition to technical assistance and/or materials, then the damages prevented are considered a result of Corps efforts and the Corps claims damages prevented.

STATES WITH SIGNIFICANT AMOUNTS OF DAMAGE REDUCTION

Virginia

The event that most challenged the Virginia flood prevention projects was Hurricane Isabel in mid September 2003. Hurricane Isabel dropped up to 12 inches of rain as it tracked across eastern Virginia on 18 September 2003. The local protection project at Richmond Virginia prevented \$542,000 in flood damages. Further upstream on the James River, the Buena Vista, Virginia local protection project prevented \$3,873,000 in flood damages. The recurrence interval of this event was 5 years at Buena Vista and less than 5 years at Richmond. Hurricane Isabel also resulted in a storm surge of 5 feet above normal tide in the Hampton Roads area. The local protection project at Norfolk, Virginia prevented \$3,643,000 in flood damages. The recurrence interval of the still water level produced by Hurricane Isabel was approximately 25 years.

Total flood damages prevented by the Philpott Lake along the Smith River in Virginia during Fiscal Year 2003 resulted from three separate events, one each in February, April and June (a fourth event in March was not considered as a separate event due to its close occurrence to the February event). Ninety-five plus per-cent (\$150 million) of the total damages prevented were from the February event. This event resulted from a slow moving frontal system that produced intense rainfall amounts. Philpott Lake reduced the river stage, as measured at the Bassett, Virginia gage, by over seven feet thus preventing extensive flood damage to several furniture industries downstream.

Kentucky

During fiscal year 2003, four flood events occurred resulting in the prevention of significant flood damages being prevented in the State of Kentucky. The first event

occurred 8-18 February 2003, while the other events occurred 18-24 February, 8-13 April, and 14-19 April 2003, respectively. The most damaging flood of the year was 18-24 February while 8-18 February closely followed.

The first flood event was the result of moderate winter rainfall occurring 8-18 February 2003. Rainfall amounts ranged between 1.5 inches and 2.5 inches. The most significant flooding took place in the Big Sandy, Twelvepole, Guyandotte, and Little Sandy River Basins. Stages were reduced 13.1 feet at Paintsville, Kentucky, 7.8 feet at Wayne, West Virginia, 3.2 feet at Man, West Virginia, and 7.5 feet at Grayson, Kentucky. Grayson Lake (Kentucky) was 41.4 percent utilized and Paintsville (Kentucky) and Yatesville (Kentucky) Lakes were utilized 68.1 percent and 70.8 percent respectively. There were no record pools achieved or deaths recorded.

The most damaging flood event of the fiscal year in the States of Kentucky and West Virginia occurred 18-24 February 2003. Heavy rainfall and freezing rain occurred during this period with significant runoff. Precipitation amounts ranged from 3.0 to 5.0 inches. Significant flooding occurred in the Kanawha, Little Knawha, Guyandotte, and Big Sandy River Basins. Stages were reduced by 11.4 feet at Charleston, West Virginia, 9.5 feet at Burnsville, West Virginia, 8.2 feet at Logan, West Virginia, and 12.0 feet at Paintsville, Kentucky. Paintsville Lake (Kentucky) was utilized 70.0 percent and Bluestone Lake (West Virginia) utilized at 41.0 percent. There were no pools of record.

The third flood event during this year occurred 8-13 April 2003. Precipitation totals for this storm event were 1.5 to 3.5 inches. The only basin receiving any flooding was the Big Sandy River Basin. Stages were reduced by 9.1 feet at Pikeville, Kentucky and 12.5 feet at Paintsville, Kentucky. Flannagan Lake (Kentucky) was utilized 33.5 percent and Fishtrap Lake (Kentucky) at 25.8 percent. No pools of record were obtained.

The next flood event resulting in Kentucky damages prevented occurred 14-19 June 2003. The big Sandy and Little Sandy River Basin received 2-4 inches of rainfall from summer thunderstorms. The Paintsville, Kentucky stage was reduced by 8.6 feet and the stage at Grayson, Kentucky by 8.8 feet. Grayson Lake (Kentucky) was utilized at 24.7 percent of flood storage and Dewey Lake (Kentucky) at 10.5 percent and Paintsville Lake (Kentucky) at 16.0 percent. There were no pools of record.

South Carolina

(Savannah River Basin)

Fiscal Year 2003 yielded significant rainfall early in the year in the State of South Carolina that brought a four-year drought to a much needed close. During the period, the Savannah River Basin encountered fourteen significant rainfall events causing approximately \$13,832,000 in damages. Eight of these events would have resulted in unregulated flows exceeding the flood channel capacity at Augusta, the major damage

point. Four of the events would have pushed the unregulated flows to over twice the channel capacity. The Augusta levee breaches would have required closure if not for the flood storage capability of the projects. The maximum event during Fiscal Year 2003 reached an unregulated flow of 105,933 cubic feet per second. For these storms, the three projects (Hartwell, Russell, and Thurmond) stored a combined 2,997,411 Acre Feet.

Georgia

Approximately 1/2 of the benefits from the Savannah River Basin would be for Georgia in addition to the discussion below)

A major precipitation event occurring shortly after midnight on May 8, 2003 resulted in the Chattahoochee River cresting at 23.2 feet at the West Point, Georgia gage, which is more than four feet above flood stage. This was the highest level recorded since February 26, 1961 when the river rose to 24.9 feet. However, the situation would have been much worse had West Point Dam not been able to control the high flow of water coming downstream. West Point Lake reached 639.88 mean seal level (81% of flood storage filled). The Army Corp of Engineers calculated the peak flow at 170,000 cubic feet per second. If this flow had not been abated by the dam, it is estimated that the Chattahoochee River at West Point would have risen to around 34 feet.

As the result of another major precipitation event occurring in June 2003, led to West Point Lake rose to a level of 639.3 Mean Seal Level (72% of flood storage filled) with a peak inflow of about 102,000 cubic feet per second on June 18. However, the Corps was able to maintain releases at a level that prevented the West Point gage from reaching flood stage.

FLOOD RELATED LIVES LOST

DURING FISCAL YEAR 2003

Only 73 flood-related deaths occurred during Fiscal Year 2003, a less than normal number compared to the 10-year average of 83.5. Of these, 49 were vehicle related incidents. Twenty-two states reported one or more flood related deaths. North Carolina led the Nation in this unfortunate statistic with 8 fatalities. Annual fatalities have varied over the past twenty years from 29 in FY 2000 to 208 in FY 1986. The national trend is undeniably downward despite major flooding in 1983, 1986, 1993 and 1997. Flood-related lives lost have fallen over the past twenty years as indicated by the ten-year rolling average high of 142 in Fiscal Year 1984 to a low of 84 in Fiscal Year 2003. This reflects favorably on flood warning systems and the benefits of Corps flood control projects. See Figure 3 and Table 5 for details.

FLOOD DAMAGES SUFFERED

FISCAL YEAR 2003

Flood damages during Water Year 2003 (October 2002-September 2003) totaled \$2.43 billion. This was only half of the ten year average (1991-2000) of \$4.15 billion but is nearly twice last year's total, largely due to the continuation of drought conditions across parts of the Nation. Major events this year included significant flooding in Mississippi in April, flooding across much of Alabama in May, and a very wet July with Indiana and Ohio seeing serious flooding events. At the end of the water year, Hurricane Isabel did considerable damage to not only the coastal zone, but inland fresh water flooding as well. During Water Year 2003, there were 76 flood-related deaths, 98% of the 10-year average (1991-2000) of 74.2. Of these, 49 were vehicle related incidents.

COMPILATION OF FLOOD LOSS STATISTICS

The loss totals in this report can only be considered approximate. There is no one agency in the United States with specific responsibility for collecting and evaluating detailed flood loss information. The National Weather Service (NWS), through its many field offices, provides loss estimates for significant flooding events. However, this task is ancillary to the primary mission of the NWS that is to provide forecasts and warnings of hydrometeorological events. The National Weather Service's focus is on predicting the events that lead to death and damage, not on an assessment of the consequences of the events it predicts. The estimates provided here should only be considered approximate.

SUMMARY OF MAJOR EVENTS

A persistent series of storms marched across the eastern half of the nation this year, with the May - July period setting precipitation records. This was the wettest period on record for 4 states, with much of the nation east of the Mississippi and south of the Great Lakes ranked in the top 10. This wet pattern led to the serious flooding this year. The wet conditions across the South which in April produced major flooding in Mississippi, soaked much of Alabama as well, creating conditions that enhanced the effects of the heavy rain in May, producing the event with the largest dollar amount damage this year. Similarly, heavy rain across the Midwest in July caused major flooding in Indiana early in the month. The heavy rain also soaked Ohio, leading to the flooding late in July. An active hurricane season with 16 named storms produced Hurricane Isabel, which caused substantial damage from North Carolina to Pennsylvania after making landfall on September 18.

MAJOR FLOODING IN ALABAMA

On May 7, a series of large and severe thunderstorms moved across the northern two thirds of Alabama. By the end of the event, the storms would go on to produce several tornadoes, scattered areas of wind damage, some hail, and an incredible amount of rain, as much as 5 to 8 inches in a single hour. Nearly 10 inches of rain fell in just a few hours across northern portions of the Birmingham metro area, resulting in historic flooding. The Huntsville area was impacted by substantial flooding along the Tennessee River and its tributaries. One automated precipitation station in Northeast Huntsville reported 0.96" of rain in just five minutes, and over four inches in an hour. Flood related damages from this event are estimated at \$1 billion across all of Alabama. Additional rain through the month combined to make May 2003 the wettest month in more than a decade in many locations. Thirty-eight counties were declared eligible for federal disaster aid as a result of these early May severe storms.

APRIL MISSISSIPPI FLOODING

Torrential rain swept across central Mississippi April 6 - 7, causing widespread flooding and substantial damage. The heavy rainfall of between 5 to 10 inches within the Upper Chickasawhay and Chunky River Basins and the Okatibbee Creek in the Pascagoula River basin on the 6th resulted in record flooding on the Chickasawhay and Chunky Rivers. The 7.38 inch total rainfall on April 6th set the all-time daily rainfall record for Jackson, MS. Widespread totals of 7 to 12 inches caused extensive damage to homes, businesses and infrastructure, totaling nearly \$264 million, with a person in Scott County perishing while driving on a road with a bridge washed out. A federal disaster was declared for 31 counties.

FLOODING ACROSS NORTHERN INDIANA

Relentless and violent storms from July 4th through the 11th caused record flooding across portions of northern Indiana. Areas which had been fairly dry, were rapidly soaked as 8 to more than 13 inches of rain fell early on the 5th on Howard, Cass, Miami and Carroll Counties. Additional storms dropped rain across nearly the same area every 18 to 24 hours for nearly a week. By the 11th, when the pattern moved rain out of the area, much of northern Indiana had received 8 to more than 16 inches of rain. Record floods occurred along the St. Marys and Iroquois Rivers in northern Indiana and the Wildcat and Deer Creeks somewhat further south. Near record flooding occurred along the Wabash River from Lafayette to Montezuma in Adams and Wells Counties. There was major agricultural flooding as well, with agricultural damage along the entire length of the White River. Unfortunately 3 persons perished in flooding related incidents. Damage estimates reached \$225 million, with a federal disaster declared for 46 counties.

NORTHEASTERN OHIO FLOODING

July was a very active month, with the persistent powerful, damaging storms extending across northeastern Ohio beginning July 21st. Thunderstorms dumped very heavy rains on Summit County causing catastrophic flooding in parts of the county. Rainfall rates exceeded two inches per hour at times during the evening hours. Many streams and creeks left their banks causing widespread flooding. Flooding in Boston Township was the worst since 1913. Over 300 homes in the county sustained enough damage to be declared destroyed or uninhabitable. As many as 1,000 other homes and businesses sustained lesser damages. Damage estimates for the county top \$100 million. Heavy thunderstorm rains on the 21st caused the Mahoning River to go into flood. Flooding occurred along the river in Trumbull County. Extensive damage was done in Leavittsburg, Warren and Niles and evacuations were conducted in all three cities. Most of Leavittsburg was under water at the river's crest. A 10 year old boy drowned while wading in a flooded ditch in Trumbull County in northeastern Ohio. Damage from these storms across northeastern Ohio reached \$225 million, with a federal disaster declared for 14 counties.

HURRICANE ISABEL

Hurricane Isabel is considered to be one of the most significant tropical cyclones to affect portions of northeastern North Carolina and east-central Virginia since Hurricane Hazel in 1954 and the Chesapeake-Potomac Hurricane of 1933. Isabel caused considerably over a billion dollars in storm surge damage across coastal North Carolina and up the Chesapeake Bay, including Annapolis and Baltimore, MD. This report focuses only on fresh water flooding, and Isabel caused over \$12 million in damage, primarily across the Shenandoah Valley.

TABLE - 1

| FLOOD DAMAGE REDUCTION | | | | | | |
|--|--|----------------------------------|--|--|--|---|
| BY STATE (THOUSANDS OF DOLLARS) During Fiscal Year 2003 | | | | | | |
| Location | Reduction by Corps Supported Reservoirs | Reduction by Corps Levees | Damages Prevented by Corps Supported Emergency Operations | Total Flood Damages Reduction by the Corps of Engineers | Average Damage Reduction FY 1994-2003 | *Comparison of 2003 to the Ten-Year Avg FY 1994-2003 |
| ALABAMA | 0 | 0 | 0 | 0 | 0 | Low |
| ALASKA | 11,000 | 0 | 0 | 11,000 | 2,880 | High |
| ARIZONA | 3,764 | 0 | 0 | 3,764 | 17,366 | Low |
| ARKANSAS | 10,110 | 830,111 | 0 | 840,221 | 1,306,811 | Medium |
| CALIFORNIA | 911,438 | 134,840 | 0 | 1,046,278 | 997,163 | Medium |
| COLORADO | 0 | 0 | 0 | 0 | 5,127 | Low |
| CONNECTICUT | 4,110 | 20,158 | 0 | 24,268 | 25,735 | Medium |
| DELAWARE | 0 | 0 | 0 | 0 | 0 | Low |
| FLORIDA | 0 | 44,686 | 0 | 44,686 | 52,138 | Medium |
| GEORGIA | 62,969 | 0 | 0 | 62,969 | 19,015 | High |
| GUAM & Am. Samoa | 0 | 0 | 0 | 0 | 16 | Low |
| HAWAII | 0 | 546 | 0 | 546 | 3,615 | Low |
| IDAHO | 161,261 | 1,150 | 0 | 162,411 | 102,530 | Medium |
| ILLINOIS | 12,617 | 50,086 | 0 | 62,703 | 544,998 | Low |
| INDIANA | 147,398 | 108,473 | 0 | 255,871 | 133,459 | Medium |
| IOWA | 13,406 | 17,826 | 0 | 31,232 | 158,882 | Low |
| KANSAS | 15,457 | 0 | 5 | 15,462 | 181,297 | Low |
| KENTUCKY | 356,882 | 43,686 | 0 | 400,568 | 184,294 | High |
| LOUISIANA | 1,455 | 7,546,672 | 0 | 7,548,127 | 8,613,030 | Medium |
| MAINE | 0 | 0 | 0 | 0 | 7 | Low |
| MARYLAND & DC | 21,552 | 1,878 | 0 | 23,430 | 24,010 | Medium |
| MASSACHUSETTS | 7,415 | 12,528 | 0 | 19,943 | 24,121 | Medium |
| MICHIGAN | 0 | 0 | 0 | 0 | 5,913 | Low |
| MINNESOTA | 1,584 | 24,235 | 0 | 25,819 | 54,145 | Low |
| MISSISSIPPI | 15,500 | 1,405,832 | 0 | 1,421,332 | 874,151 | Medium |
| MISSOURI | 10,214 | 171,565 | 0 | 181,779 | 2,252,427 | Low |
| MONTANA | 10,749 | 47 | 0 | 10,796 | 21,922 | Medium |

TABLE - 1

| FLOOD DAMAGE REDUCTION | | | | | | |
|--|--|----------------------------------|--|--|--|---|
| BY STATE (THOUSANDS OF DOLLARS) During Fiscal Year 2003 | | | | | | |
| Location | Reduction by Corps Supported Reservoirs | Reduction by Corps Levees | Damages Prevented by Corps Supported Emergency Operations | Total Flood Damages Reduction by the Corps of Engineers | Average Damage Reduction FY 1994-2003 | *Comparison of 2003 to the Ten-Year Avg FY 1994-2003 |
| NEBRASKA | 17,633 | 2,318 | 0 | 19,951 | 99,087 | Low |
| NEVADA | 2,835 | 0 | 0 | 2,835 | 94,827 | Low |
| NEW HAMPSHIRE | 200 | 0 | 0 | 200 | 443 | Low |
| NEW JERSEY | 0 | 16,288 | 0 | 16,288 | 14,466 | Medium |
| NEW MEXICO | 10 | 55 | 0 | 65 | 42,252 | Low |
| NEW YORK | 97,024 | 76,874 | 0 | 173,898 | 147,726 | Medium |
| N. CAROLINA | 101,643 | 1,208 | 0 | 102,851 | 109,060 | Medium |
| N. DAKOTA | 23,797 | 3,432 | 0 | 27,229 | 82,618 | Low |
| OHIO | 226,126 | 8,230 | 0 | 234,356 | 244,228 | Medium |
| OKLAHOMA | 65,074 | 0 | 0 | 65,074 | 86,136 | Medium |
| OREGON | 15,603 | 212,891 | 0 | 228,493 | 955,836 | Low |
| PENNSYLVANIA | 14,260 | 12,622 | 0 | 26,882 | 390,209 | Low |
| PUERTO RICO & VI | 0 | 0 | 0 | 0 | 48,310 | Low |
| RHODE ISLAND | 0 | 0 | 0 | 0 | 1,333 | Low |
| S. CAROLINA | 8,526 | 0 | 0 | 8,526 | 1,358 | Very High |
| S. DAKOTA | 116 | 469 | 0 | 585 | 7,838 | Low |
| TENNESSEE | 95,092 | 8,025 | 0 | 103,117 | 49,864 | High |
| TEXAS | 1,312,461 | 19,458 | 0 | 1,331,919 | 2,480,586 | Medium |
| UTAH | 7,440 | 0 | 0 | 7,440 | 3,805 | High |
| VERMONT | 2,708 | 352 | 0 | 3,060 | 3,838 | Medium |
| VIRGINIA | 249,983 | 114,683 | 0 | 364,666 | 58,680 | Very High |
| WASHINGTON | 14,463 | 324,989 | 0 | 339,452 | 345,003 | Medium |
| W. VIRGINIA | 438,185 | 13,128 | 0 | 451,313 | 253,421 | Medium |
| WISCONSON | 0 | 992 | 0 | 992 | 1,639 | Medium |
| WYOMING | 13,631 | 2,482 | 0 | 16,112 | 11,367 | Medium |
| TOTALS | 4,485,688 | 11,232,814 | 5 | 15,718,508 | 21,138,980 | Medium |
| FY 2003 Damages Prevented in the U.S. = 74% of the 10-year (1994-2003) Average | | | | | | |
| * LEGEND: | LOW = Less than 1/2 average. | | HIGH = Twice to five times average. | | | |
| | MED= 1/2 to twice average. | | VERY HIGH = More than five times average. | | | |

TABLE - 2

| TOTAL DAMAGES SUFFERED IN FY 2003, BY STATE (THOUSANDS OF DOLLARS) | | | | | | | |
|---|---|---|--|--|---|-----------------------------------|--|
| LOCATION | Damages Suffered FY 2003 | Damage Reduction FY 2003 | Potential Damages FY 2003 | Percent Damages Reduced FY 2003 | Average Damages Suffered 1994-2003 | Lives Lost FY 2003 | Lives Lost FY 1994-2003 |
| ALABAMA | 1,016,936 | 0 | 1,016,936 | 0.0 | 151,819 | 1 | 15 |
| ALASKA | 23760 | 11000 | 34,760 | 0.0 | 12,129 | 0 | 0 |
| ARIZONA | 1054 | 3764 | 4,818 | 78.1 | 3,685 | 2 | 33 |
| ARKANSAS | 3780 | 840221 | 844,001 | 99.6 | 16,193 | 0 | 5 |
| CALIFORNIA | 6763 | 1046278 | 1,053,041 | 99.4 | 425,455 | 7 | 45 |
| COLORADO | 3604 | 0 | 3,604 | 0.0 | 44,223 | 0 | 10 |
| CONNECTICUT | 70 | 24268 | 24,338 | 99.7 | 1,093 | 0 | 0 |
| DELAWARE | 33850 | 0 | 33,850 | 0.0 | 3,599 | 0 | 0 |
| FLORIDA | 22810 | 44686 | 67,496 | 66.2 | 244,794 | 0 | 7 |
| GEORGIA | 32286 | 62969 | 95,255 | 66.1 | 52,606 | 1 | 33 |
| GUAM | 10 | 0 | 10 | 0.0 | 559 | 0 | 0 |
| HAWAII | 168 | 546 | 714 | 0.0 | 7,902 | 3 | 7 |
| IDAHO | 85 | 162411 | 162,496 | 99.9 | 18,024 | 0 | 1 |
| ILLINOIS | 46094 | 62703 | 108,797 | 57.6 | 28,129 | 1 | 15 |
| INDIANA | 269380 | 255871 | 525,251 | 48.7 | 45,097 | 4 | 21 |
| IOWA | 10,882 | 31,232 | 42,114 | 74.2 | 53,039 | 0 | 5 |
| KANSAS | 12,399 | 15,462 | 27,861 | 55.5 | 10,620 | 6 | 13 |
| KENTUCKY | 32,995 | 400,568 | 433,563 | 92.4 | 63,659 | 5 | 32 |
| LOUISIANA | 9,500 | 7,548,127 | 7,557,627 | 99.9 | 316,698 | 1 | 9 |
| MAINE | 300 | 0 | 300 | 0.0 | 4,584 | 0 | 1 |
| MARYLAND & DC | 640 | 23,430 | 24,070 | 97.3 | 11,393 | 0 | 3 |
| MASSACHUSETT | 511 | 19,943 | 20,454 | 97.5 | 10,221 | 0 | 0 |
| MICHIGAN | 16,006 | 0 | 16,006 | 0.0 | 12,341 | 0 | 7 |
| MINNISOTA | 8,000 | 25,819 | 33,819 | 76.3 | 131,730 | 0 | 6 |
| MISSISSIPPI | 272,701 | 1,421,332 | 1,694,033 | 83.9 | 32,481 | 3 | 5 |
| MISSOURI | 842 | 181,779 | 182,621 | 99.5 | 25,017 | 3 | 55 |
| MONTANA | 1,190 | 10,796 | 11,986 | 90.1 | 1,390 | 0 | 4 |

TABLE - 2

| TOTAL DAMAGES SUFFERED IN FY 2003, BY STATE (THOUSANDS OF DOLLARS) | | | | | | | |
|---|---|---|--|--|---|-----------------------------------|--|
| LOCATION | Damages Suffered FY 2003 | Damage Reduction FY 2003 | Potential Damages FY 2003 | Percent Damages Reduced FY 2003 | Average Damages Suffered 1994-2003 | Lives Lost FY 2003 | Lives Lost FY 1994-2003 |
| NEBRASKA | 16,374 | 19,951 | 36,325 | 54.9 | 11,537.4 | 0 | 1 |
| NEVADA | 2,255 | 2,835 | 5,090 | 55.7 | 68,240.7 | 1 | 6 |
| NEW HAMPSHIRE | 3,500 | 200 | 3,700 | 0.0 | 2,078 | 0 | 1 |
| NEW JERSEY | 250 | 16,288 | 16,538 | 98.5 | 105,904 | 0 | 9 |
| NEW MEXICO | 50 | 65 | 115 | 56.6 | 1,409 | 0 | 5 |
| NEW YORK | 45,672 | 173,898 | 219,570 | 79.2 | 43,585 | 5 | 23 |
| N. CAROLINA | 18,062 | 102,851 | 120,913 | 85.1 | 326,258 | 8 | 54 |
| N. DAKOTA | 300 | 27,229 | 27,529 | 98.9 | 387,187 | 0 | 7 |
| OHIO | 319,713 | 234,356 | 554,069 | 42.3 | 68,460 | 1 | 33 |
| OKLAHOMA | 318 | 65,074 | 65,392 | 99.5 | 3,554 | 0 | 13 |
| OREGON | 7 | 228,493 | 228,500 | 100.0 | 339,688 | 0 | 9 |
| PENNSYLVANIA | 58,221 | 26,882 | 85,103 | 31.6 | 71,318 | 2 | 34 |
| PUERTO RICO & RHODE ISLAND | 25,485 10 | 0 0 | 25,485 10 | 0.0 0.0 | 30,425 302 | 3 0 | 30 0 |
| S. CAROLINA | 3,255 | 8,526 | 11,781 | 72.4 | 4,656 | 0 | 7 |
| S. DAKOTA | 100 | 585 | 685 | 85.4 | 14,841 | 0 | 0 |
| TENNESSEE | 29,095 | 103,117 | 132,212 | 78.0 | 16,921 | 6 | 37 |
| TEXAS | 28,270 | 1,331,919 | 1,360,189 | 97.9 | 695,487 | 3 | 164 |
| UTAH | 1,896 | 7,440 | 9,336 | 79.7 | 2,077 | 0 | 2 |
| VERMONT | 471 | 3,060 | 3,531 | 86.7 | 4,090 | 0 | 4 |
| VIRGINIA | 16,744 | 364,666 | 381,410 | 95.6 | 56,775 | 4 | 20 |
| WASHINGTON | 165 | 339,452 | 339,617 | 100.0 | 43,347 | 0 | 3 |
| W. VIRGINIA | 34,236 | 451,313 | 485,549 | 92.9 | 64,161 | 3 | 35 |
| WISCONSON | 55 | 992 | 1,047 | 94.7 | 60,939 | 0 | 5 |
| WYOMING | 60 | 16,112 | 16,172 | 99.6 | 203 | 0 | 1 |
| TOTALS | \$2,431,180 | \$15,718,508 | \$18,149,688 | 86.6 | \$4,151,922 | 73 | 835 |
| AVERAGE | | | | 64.8 | | | |

TABLE - 3

| FLOOD DAMAGE REDUCTION | | | | | | | | | | |
|---|-------------|--------------|-------------|-------------|-------------|-------------|---------------|---------------|---------------|----------------|
| FISCAL YEARS 1994 - 2003 (IN THOUSANDS OF DOLLARS) | | | | | | | | | | |
| LOCATION | FY94 | FY 95 | FY96 | FY97 | FY98 | FY99 | FY2000 | FY2001 | FY2002 | FY 2003 |
| ALABAMA | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 |
| ALASKA | 8,750 | 8,750 | 0 | 0 | 0 | 0 | 200.0 | 0 | 100 | 11,000 |
| ARIZONA | 0 | 140,456 | 5,202 | 13,219 | 4,180 | 5,018 | 0.0 | 1,820 | 0 | 3,764 |
| ARKANSAS | 861,023 | 1,350,558 | 1,066,854 | 5,733,106 | 712,907 | 680,519 | 33,729.0 | 690,579 | 1,098,615 | 840,221 |
| CALIFORNIA | 138 | 1,484,202 | 389,649 | 3,042,730 | 2,623,156 | 87,235 | 339,137.0 | 814,454 | 144,655 | 1,046,278 |
| COLORADO | 509 | 3,071 | 0 | 2,782 | 0 | 44,904 | 0.0 | 0 | 0 | 0 |
| CONNECTICUT | 25,746 | 305 | 74,414 | 11,518 | 55,971 | 27,303 | 375.0 | 37,364 | 83 | 24,268 |
| DELAWARE | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 |
| FLORIDA | 5,342 | 104,072 | 66,655 | 13,486 | 103,780 | 65,873 | 52,102.0 | 58,849 | 6,535 | 44,686 |
| GEORGIA | 3,771 | 3,889 | 50,305 | 6,952 | 31,263 | 30,979 | 0.0 | 0 | 25 | 62,969 |
| GUAM | 0 | 0 | 44 | 45 | 68 | 0 | 0.0 | 0 | 0 | 0 |
| HAWAII | 6,728 | 5,126 | 4,608 | 2,349 | 0 | 0 | 0.0 | 14,197 | 2,598 | 546 |
| IDAHO | 9,844 | 54,948 | 190,618 | 272,955 | 77,578 | 98,136 | 33,716.0 | 16,797 | 108,293 | 162,411 |
| ILLINOIS | 94,914 | 2,664,865 | 553,925 | 557,829 | 361,233 | 42,836 | 32,631.0 | 690,197 | 388,843 | 62,703 |
| INDIANA | 128,040 | 24,661 | 152,440 | 273,661 | 180,836 | 130,000 | 21,697.0 | 30,700 | 136,684 | 255,871 |
| IOWA | 41,110 | 75,133 | 97,882 | 653,984 | 144,879 | 110,252 | 5,479.5 | 413,414 | 15,454 | 31,232 |
| KANSAS | 32,293 | 849,044 | 65,443 | 87,605 | 16,614 | 511,726 | 18,947.0 | 205,117 | 10,715 | 15,462 |
| KENTUCKY | 178,350 | 79,609 | 216,292 | 675,177 | 62,976 | 13,938 | 14,538.0 | 18,287 | 183,202 | 400,568 |
| LOUISIANA | 7,903,263 | 9,683,360 | 5,311,449 | 12,264,278 | 5,271,162 | 11,219,104 | 1,292.0 | 12,149,905 | 14,778,361 | 7,548,127 |
| MAINE | 0 | 70 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 |
| MARYLAND & DC | 0 | 2 | 214,782 | 220 | 14 | 3 | 1,584.0 | 26 | 39 | 23,430 |
| MASSACHUSETTS | 26,276 | 135 | 57,870 | 19,238 | 55,218 | 2,043 | 5,746.0 | 50,709 | 4,031 | 19,943 |
| MICHIGAN | 0 | 867 | 344 | 23,345 | 20,690 | 2,419 | 2,160.0 | 8,913 | 391 | 0 |
| MINNESOTA | 10,980 | 8,978 | 19,949 | 167,250 | 3,208 | 6,248 | 9,057.6 | 278,971 | 10,991 | 25,819 |
| MISSISSIPPI | 121,003 | 1,059,468 | 628,384 | 1,380,714 | 843,968 | 779,525 | 4,420.0 | 1,050,918 | 1,451,781 | 1,421,332 |
| MISSOURI | 769,333 | 5,740,837 | 2,240,713 | 7,903,399 | 227,701 | 4,768,711 | 11,620.0 | 318,302 | 361,877 | 181,779 |
| MONTANA | 6,542 | 13,004 | 49,674 | 101,164 | 11,947 | 10,552 | 2,329.0 | 948 | 12,267 | 10,796 |

TABLE - 3

| FLOOD DAMAGE REDUCTION | | | | | | | | | | |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|
| FISCAL YEARS 1994 - 2003 (IN THOUSANDS OF DOLLARS) | | | | | | | | | | |
| LOCATION | FY94 | FY 95 | FY96 | FY97 | FY98 | FY99 | FY2000 | FY2001 | FY2002 | FY 2003 |
| NEBRASKA | 36,715 | 80,795 | 96,985 | 635,868 | 16,050 | 80,088 | 2,869.0 | 19,466 | 2,087 | 19,951 |
| NEVADA | 0 | 63,611 | 19,974 | 852,687 | 3,149 | 3,780 | 1,400.0 | 830 | 0 | 2,835 |
| NEW HAMPSHIRE | 250 | 0 | 1,250 | 943 | 916 | 171 | 0.0 | 703 | 0 | 200 |
| NEW JERSEY | 8,355 | 13,017 | 10,008 | 27,172 | 6,097 | 46,248 | 2,720 | 11,166 | 3,591 | 16,288 |
| NEW MEXICO | 164,439 | 29,195 | 116,598 | 52,598 | 453 | 7,799 | 50,076 | 983 | 311 | 65 |
| NEW YORK | 56,334 | 31,201 | 568,026 | 234,297 | 62,932 | 181,293 | 71,549 | 55,930 | 41,803 | 173,898 |
| N. CAROLINA | 54,536 | 26,823 | 558,461 | 65,769 | 114,667 | 158,248 | 556 | 8,689 | 2 | 102,851 |
| N. DAKOTA | 35,802 | 32,848 | 76,344 | 342,323 | 47,222 | 97,009 | 12,139 | 147,576 | 7,689 | 27,229 |
| OHIO | 312,590 | 47,934 | 828,586 | 397,145 | 318,700 | 96,744 | 93,672 | 61,978 | 50,572 | 234,356 |
| OKLAHOMA | 87,545 | 196,801 | 12,739 | 65,815 | 76,439 | 160,575 | 72,130 | 58,356 | 65,888 | 65,074 |
| OREGON | 83,039 | 1,342 | 2,755,876 | 4,203,503 | 419,550 | 666,153 | 945,434 | 44,139 | 210,830 | 228,493 |
| PENNSYLVANIA | 46,304 | 3,954 | 3,497,659 | 141,559 | 66,007 | 53,213 | 50,716 | 6,885 | 8,912 | 26,882 |
| PUERTO RICO & VI | 0 | 12,242 | 107,500 | 0 | 340,356 | 0 | 0 | 23,000 | 0 | 0 |
| RHODE ISLAND | 0 | 0 | 0 | 114 | 9,672 | 0 | 0 | 3,539 | 0 | 0 |
| S. CAROLINA | 2,268 | 943 | 955 | 149 | 735 | 0 | 0 | 0 | 0 | 8,526 |
| S. DAKOTA | 651 | 7,992 | 1,152 | 62,073 | 915 | 3,248 | 457 | 852 | 457 | 585 |
| TENNESSEE | 35,528 | 39,500 | 31,000 | 193,158 | 5,876 | 18,067 | 0 | 2,080 | 70,315 | 103,117 |
| TEXAS | 5,707,236 | 2,672,764 | 4,736 | 5,113,947 | 646,713 | 626,444 | 557,632 | 4,478,517 | 3,665,951 | 1,331,919 |
| UTAH | 4,553 | 0 | 0 | 8,120 | 0 | 10,361 | 0 | 7,573 | 0 | 7,440 |
| VERMONT | 3,006 | 3,304 | 4,200 | 3,355 | 3,752 | 1,760 | 9,917 | 2,523 | 3,502 | 3,060 |
| VIRGINIA | 3,621 | 5,736 | 135,894 | 5,598 | 41,446 | 16,956 | 7,836 | 132 | 4,912 | 364,666 |
| WASHINGTON | 65,935 | 6,228 | 732,293 | 1,120,921 | 353,805 | 281,780 | 212,441 | 72,022 | 265,150 | 339,452 |
| W. VIRGINIA | 103,464 | 129,065 | 1,272,486 | 395,426 | 62,851 | 5,491 | 79,348 | 20,823 | 13,943 | 451,313 |
| WISCONSON | 65 | 31 | 473 | 2,296 | 210 | 103 | 17 | 4,017 | 8,187 | 992 |
| WYOMING | 3,750 | 19,548 | 23,480 | 29,217 | 9,020 | 8,805 | 569 | 1,587 | 1,585 | 16,112 |
| TOTALS | 17,049,941 | 26,780,284 | 22,314,171 | 47,161,059 | 13,416,882 | 21,161,659 | 2,762,239 | 21,883,833 | 23,141,227 | 15,718,508 |

TABLE 4

| TOTAL FLOOD DAMAGES SUFFERED, BY STATE | | | | | | | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|--------------|----------------|----------------|----------------|----------------|--------------------|
| FISCAL YEARS 1994-2003 (IN THOUSANDS OF DOLLARS) | | | | | | | | | | | |
| LOCATION | FY 94 | FY 95 | FY 96 | FY 97 | FY 98 | FY 99 | FY 2000 | FY 2001 | FY 2002 | FY 2003 | 10 Yr. Avg. |
| ALABAMA | 112,696 | 0 | 1,649 | 1,354 | 368,938 | 4,663 | 3,087 | 1,645 | 7,220 | 1,016,936 | 151,819 |
| ALASKA | 74,000 | 10,025 | 0 | 1,271 | 314 | 0 | 110 | 702 | 11,110 | 23,760 | 12,129 |
| ARIZONA | 1,616 | 6,618 | 701 | 85 | 66 | 12796 | 90 | 13,659 | 163 | 1,054 | 3,685 |
| ARKANSAS | 2,024 | 0 | 205 | 12,874 | 2045 | 1777 | 2773 | 689 | 135,762 | 3,780 | 16,193 |
| CALIFORNIA | 1,792 | 1,495,960 | 13,205 | 2,086,125 | 621588 | 14176 | 9238 | 5,055 | 646 | 6,763 | 425,455 |
| COLORADO | 1,242 | 18,240 | 4,058 | 358,890 | 2550 | 50675 | 297 | 1,242 | 1,436 | 3,604 | 44,223 |
| CONNECTICUT | 1,316 | 0 | 2,092 | 52 | 40 | 1112 | 6010 | 237 | | 70 | 1,093 |
| DELAWARE | 741 | 0 | 300 | 0 | 0 | 0 | | 1,100 | | 33,850 | 3,599 |
| FLORIDA | 182,605 | 18,536 | 158,001 | 49,707 | 431311 | 60080 | 499080 | 1,023,900 | 1,910 | 22,810 | 244,794 |
| GEORGIA | 300,000 | 8,845 | 2,581 | 464 | 166291 | 8520 | 2101 | 3,431 | 1,545 | 32,286 | 52,606 |
| GUAM | 0 | 0 | 0 | 0 | 3725 | 400 | 650 | 250 | 555 | 10 | 559 |
| HAWAII | 3,700 | 0 | 1,935 | 0 | 0 | 0 | 400 | 70,000 | 2,820 | 168 | 7,902 |
| IDAHO | 0 | 2,096 | 49,400 | 125,060 | 1005 | 1297 | 85 | 0 | 1,215 | 85 | 18,024 |
| ILLINOIS | 32,606 | 27,240 | 107,585 | 4,295 | 2380 | 3666 | 3113 | 44,040 | 10,271 | 46,094 | 28,129 |
| INDIANA | 2,852 | 6,789 | 21,575 | 68,598 | 19611 | 50124 | 819 | 110 | 11,114 | 269,380 | 45,097 |
| IOWA | 9,124 | 3,498 | 165,265 | 3,680 | 168,101 | 111,221 | 14,877 | 33,250 | 10,490 | 10,882 | 53,039 |
| KANSAS | 10,437 | 8,874 | 3,969 | 102 | 4,888 | 60,030 | 250 | 2,635 | 2,620 | 12,399 | 10,620 |
| KENTUCKY | 2,544 | 17,673 | 21,323 | 470,915 | 16,639 | 506 | 17,631 | 17,986 | 38,376 | 32,995 | 63,659 |
| LOUISIANA | 675 | 3,097,250 | 121 | 4,359 | 17,845 | 5,979 | 153 | 30,219 | 878 | 9,500 | 316,698 |
| MAINE | 9,323 | 0 | 4,916 | 26,845 | 0 | 1,580 | 2,814 | 66 | | 300 | 4,584 |
| MARYLAND & DC | 4,524 | 1,620 | 90,481 | 198 | 334 | 9,715 | 2,452 | 3,460 | 505 | 640 | 11,393 |
| MASSACHUSETTS | 0 | 0 | 2,663 | 75,024 | 13,510 | 250 | 206 | 10,048 | 2 | 511 | 10,221 |
| MICHIGAN | 6,236 | 2,900 | 26,690 | 325 | 18,190 | 325 | 25,430 | 8,394 | 18,917 | 16,006 | 12,341 |
| MINNISOTA | 1,867 | 3,750 | 460 | 743,218 | 2,529 | 466 | 43,112 | 243,706 | 270,190 | 8,000 | 131,730 |
| MISSISSIPPI | 1,352 | 1,092 | 200 | 32,774 | 3,498 | 1,769 | 408 | 7,211 | 3,809 | 272,701 | 32,481 |
| MISSOURI | 37,864 | 25,415 | 871 | 692 | 10,227 | 36,862 | 109,760 | 1,842 | 25,796 | 842 | 25,017 |
| MONTANA | 3,392 | 510 | 2,243 | 2,874 | 3,001 | 184 | 30 | 80 | 396 | 1,190 | 1,390 |

TABLE 4

| TOTAL FLOOD DAMAGES SUFFERED, BY STATE | | | | | | | | | | | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------------|--------------------|--------------------|--------------------|
| FISCAL YEARS 1994-2003 (IN THOUSANDS OF DOLLARS) | | | | | | | | | | | |
| LOCATION | FY 94 | FY 95 | FY 96 | FY 97 | FY 98 | FY 99 | FY 2000 | FY 2001 | FY 2002 | FY 2003 | 10 Yr. Avg. |
| NEBRASKA | 2,710 | 5,129 | 31,233 | 10,273 | 1,483 | 22,765 | 23,456 | 391 | 1,560 | 16,374 | 11,537 |
| NEVADA | 160 | 11,970 | 370 | 640,110 | 1,300 | 25,009 | 221 | 12 | 1,000 | 2,255 | 68,241 |
| NEW HAMPSHIRE | 0 | 110 | 4,000 | 10,952 | 700 | 1,002 | 515 | 0 | | 3,500 | 2,078 |
| NEW JERSEY | 3,520 | 0 | 36,720 | 38,700 | 750 | 800,000 | 179,100 | 0 | | 250 | 105,904 |
| NEW MEXICO | 2,000 | 954 | 1,285 | 380 | 713 | 3,980 | 160 | 4,260 | 305 | 50 | 1,409 |
| NEW YORK | 25,707 | 1,485 | 220,011 | 55,909 | 38,627 | 18,715 | 18,498 | 7,290 | 3,939 | 45,672 | 43,585 |
| N. CAROLINA | 2,032 | 26,596 | 42,119 | 17,994 | 16,135 | 3,117,160 | 7,605 | 11,780 | 3,097 | 18,062 | 326,258 |
| N. DAKOTA | 58,552 | 44,366 | 220 | 3,408,298 | 2,583 | 100,355 | 191,177 | 65,209 | 812 | 300 | 387,187 |
| OHIO | 39,913 | 28,511 | 22,721 | 66,666 | 181,409 | 963 | 8,839 | 13,647 | 2,214 | 319,713 | 68,460 |
| OKLAHOMA | 166 | 3,275 | 0 | 155 | 262 | 9,578 | 11,691 | 9,847 | 245 | 318 | 3,554 |
| OREGON | 0 | 11,320 | 3,203,500 | 173,200 | 10 | 2,100 | 5,734 | 5 | 1,001 | 7 | 339,688 |
| PENNSYLVANIA | 16,194 | 10,385 | 494,862 | 3,136 | 1,103 | 27,642 | 27,476 | 63,506 | 10,650 | 58,221 | 71,318 |
| PUERTO RICO & VI | 160 | 115 | 131 | 157 | 28,190 | 4,488 | 1,341 | 150,358 | 93,825 | 25,485 | 30,425 |
| RHODE ISLAND | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,005 | | 10 | 302 |
| S. CAROLINA | 6,228 | 28,169 | 668 | 1,105 | 4,044 | 75 | 2,885 | 75 | 52 | 3,255 | 4,656 |
| S. DAKOTA | 20,399 | 12,270 | 360 | 100,541 | 50 | 619 | | 13,567 | 500 | 100 | 14,841 |
| TENNESSEE | 51,039 | 1,264 | 2,740 | 23,479 | 25,427 | 554 | 230 | 2,153 | 33,226 | 29,095 | 16,921 |
| TEXAS | 1,721 | 85,050 | 407,066 | 136,472 | 163,407 | 612,634 | 25,130 | 5,178,895 | 316,227 | 28,270 | 695,487 |
| UTAH | 0 | 1,500 | 312 | 10,100 | 4,485 | 1,314 | 679 | 184 | 300 | 1,896 | 2,077 |
| VERMONT | 1,502 | 5,150 | 5,123 | 170 | 23,805 | 1,036 | 1,845 | 1,459 | 338 | 471 | 4,090 |
| VIRGINIA | 16,169 | 66,759 | 153,516 | 898 | 2,381 | 255,062 | 1,368 | 19,484 | 35,368 | 16,744 | 56,775 |
| WASHINGTON | 160 | 250 | 370,060 | 54,675 | 3,120 | 2,371 | 488 | 1,790 | 392 | 165 | 43,347 |
| W. VIRGINIA | 5,397 | 8,595 | 224,172 | 18,391 | 35,506 | 363 | 11,003 | 211,688 | 92,256 | 34,236 | 64,161 |
| WISCONSIN | 62,052 | 675 | 218,025 | 93,346 | 82,825 | 9,305 | 74,298 | 24,928 | 43,884 | 55 | 60,939 |
| WYOMING | 0 | 0 | 181 | 192 | 22 | 0 | 20 | 818 | 734 | 60 | 203 |
| TOTALS | 1,120,309 | 5,110,829 | 6,121,884 | 8,935,080 | 2,496,963 | 5,455,263 | 1,338,735 | \$7,309,308 | \$1,199,671 | \$2,431,180 | 4,151,922 |

TABLE - 5

| TOTAL LIVES LOST, BY STATE | | | | | | | | | | | |
|----------------------------|---------|---------|---------|---------|---------|---------|--------|--------|--------|---------|-------------|
| FISCAL YEARS 1994-2003 | | | | | | | | | | | |
| LOCATION | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY2000 | FY2001 | FY2002 | FY 2003 | 10-Yr Total |
| ALABAMA | 2 | 0 | 2 | 0 | 9 | 1 | 0 | 0 | 0 | 1 | 15 |
| ALASKA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ARIZONA | 0 | 1 | 0 | 12 | 4 | 0 | 0 | 14 | 0 | 2 | 33 |
| ARKANSAS | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 5 |
| CALIFORNIA | 2 | 8 | 2 | 7 | 16 | 3 | 0 | 0 | 0 | 7 | 45 |
| COLORADO | 0 | 0 | 3 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 10 |
| CONNECTICUT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DELAWARE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FLORIDA | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 7 |
| GEORGIA | 29 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 33 |
| GUAM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HAWAII | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 7 |
| IDAHO | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| ILLINOIS | 2 | 1 | 2 | 1 | 1 | 0 | 4 | 1 | 2 | 1 | 15 |
| INDIANA | 1 | 3 | 2 | 1 | 2 | 4 | 1 | 1 | 2 | 4 | 21 |
| IOWA | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 5 |
| KANSAS | 1 | 0 | 2 | 0 | 0 | 3 | 0 | 1 | 0 | 6 | 13 |
| KENTUCKY | 0 | 2 | 2 | 16 | 2 | 2 | 1 | 1 | 1 | 5 | 32 |
| LOUISIANA | 0 | 6 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 9 |
| MAINE | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| MARYLAND & DC | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| MASSACHUSETTS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MICHIGAN | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 7 |
| MINNISOTA | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 3 | 0 | 0 | 6 |
| MISSISSIPPI | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 5 |
| MISSOURI | 11 | 3 | 7 | 4 | 4 | 14 | 0 | 4 | 5 | 3 | 55 |
| MONTANA | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| NEBRASKA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| NEVADA | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 1 | 6 |

TABLE - 5

| TOTAL LIVES LOST, BY STATE | | | | | | | | | | | |
|----------------------------|---------|---------|---------|---------|---------|---------|--------|--------|--------|---------|-------------|
| FISCAL YEARS 1994-2003 | | | | | | | | | | | |
| LOCATION | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY2000 | FY2001 | FY2002 | FY 2003 | 10-Yr Total |
| NEW HAMPSHIRE | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| NEW JERSEY | 2 | 0 | 1 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 9 |
| NEW MEXICO | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| NEW YORK | 3 | 0 | 10 | 0 | 3 | 1 | 0 | 1 | 0 | 5 | 23 |
| N. CAROLINA | 0 | 9 | 1 | 3 | 0 | 32 | 0 | 0 | 1 | 8 | 54 |
| N. DAKOTA | 0 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 7 |
| OHIO | 1 | 5 | 3 | 5 | 8 | 2 | 4 | 3 | 1 | 1 | 33 |
| OKLAHOMA | 0 | 4 | 0 | 3 | 4 | 2 | 0 | 0 | 0 | 0 | 13 |
| OREGON | 0 | 0 | 6 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 9 |
| PENNSYLVANIA | 1 | 4 | 25 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 34 |
| PUERTO RICO & VI | 0 | 1 | 19 | 0 | 1 | 3 | 0 | 3 | 0 | 3 | 30 |
| RHODE ISLAND | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| S. CAROLINA | 0 | 3 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 7 |
| S. DAKOTA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TENNESSEE | 3 | 0 | 3 | 4 | 13 | 0 | 0 | 0 | 8 | 6 | 37 |
| TEXAS | 0 | 48 | 0 | 19 | 19 | 28 | 4 | 22 | 21 | 3 | 164 |
| UTAH | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 |
| VERMONT | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| VIRGINIA | 2 | 2 | 9 | 0 | 0 | 0 | 1 | 1 | 1 | 4 | 20 |
| WASHINGTON | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| W. VIRGINA | 5 | 0 | 12 | 5 | 2 | 0 | 3 | 5 | 0 | 3 | 35 |
| WISCONSON | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |
| WYOMING | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTALS | 70 | 103 | 131 | 98 | 102 | 105 | 29 | 72 | 52 | 73 | 835 |

TABLE - 6

| REGIONAL DISTRIBUTION | | | | | | | | | | | | | |
|--|------------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|-------------------|-------------------|------------------|
| FLOOD DAMAGES PREVENTED BY THE U.S. ARMY CORPS OF ENGINEERS | | | | | | | | | | | | | |
| FISCAL YEARS 1980-2003 (IN THOUSANDS OF DOLLARS) | | | | | | | | | | | | | |
| REGION | FY80 | FY81 | FY82 | FY83 | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | FY91 | FY92 |
| NEW ENGLAND | 75,911 | 53,661 | 239,970 | 9,496 | 839,029 | 625 | 665 | 463,321 | 0 | 250 | 63,094 | 11,010 | 4,528 |
| MID-ADLANTIC | 16,740 | 24,171 | 10,419 | 25,703 | 2,486,292 | 18,823 | 357,665 | 30,340 | 26,450 | 24,802 | 16,607 | 8,993 | 97,947 |
| GULF & S. ATLANTIC | 28,086 | 2,499 | 24,398 | 49,384 | 27,756 | 21,301 | 41,774 | 219,938 | 11,438 | 30,014 | 57,057 | 31,003 | 150,717 |
| OHIO | 289,655 | 231,431 | 188,802 | 207,363 | 556,603 | 268,796 | 633,658 | 172,866 | 63,538 | 285,510 | 248,699 | 655,077 | 102,832 |
| TENNESSEE | 0 | 0 | 0 | 0 | 0 | 45 | 570 | 4,376 | 0 | 16,176 | 3,082 | 334,809 | 18,920 |
| GREAT LAKES | 9,594 | 9,842 | 27,836 | 5,856 | 24,953 | 30,107 | 28,071 | 51,245 | 9,587 | 24,982 | 16,849 | 19,100 | 5,702 |
| UPPER MISSISSIPPI | 0 | 11,622 | 96,150 | 251,594 | 66,209 | 57,941 | 113,777 | 430,592 | 1,576 | 6,761 | 516,506 | 27,200 | 19,043 |
| SOURIS-RED-RAINY | 0 | 0 | 0 | 2,700 | 1,314 | 1,721 | 18,966 | 52,015 | 411 | 68,814 | 7,156 | 4,700 | 517 |
| MISSOURI | 2,243 | 89,862 | 370,993 | 435,296 | 1,077,828 | 32,555 | 860,513 | 1,504,538 | 2,669 | 176,066 | 250,873 | 272,237 | 609,640 |
| ARKANSAS-RED-WHITE | 108,025 | 11,617 | 55,960 | 161,010 | 88,788 | 168,558 | 174,737 | 996,615 | 161,923 | 186,727 | 456,041 | 43,396 | 87,792 |
| LOWER MISSISSIPPI | 4,087,675 | 3,067 | 552,850 | 20,386,036 | 10,294,428 | 9,820,704 | 9,336,140 | 666,758 | 1,453,371 | 5,970,206 | 10,820,837 | 15,457,393 | 1,213,731 |
| RIO GRANDE | 46,260 | 889 | 2,526 | 29,918 | 98,419 | 127,698 | 87,139 | 113,621 | 21,528 | 2,755 | 42,531 | 91,189 | 39,619 |
| TEXAS AND GULF | 14,910 | 83,436 | 441,874 | 17,537 | 8,513 | 28,840 | 208,168 | 190,914 | 6,026 | 535,689 | 4,105,103 | 13,717 | 5,184,633 |
| COLORADO | 117,761 | 0 | 0 | 13,000 | 90,630 | 14,300 | 0 | 0 | 0 | 0 | 0 | 0 | 3,945 |
| GREAT BASIN | 0 | 0 | 8,000 | 15,015 | 18,600 | 2,200 | 16,300 | 0 | 0 | 500 | 500 | 1,500 | 700 |
| CALIFORNIA | 1,981,428 | 680 | 307,013 | 1,075,869 | 102,360 | 72,800 | 13,910,920 | 154,858 | 98 | 4,770 | 9,500 | 64,022 | 406,036 |
| COLUMBIA N PACIFIC | 514,257 | 633,016 | 1,939,909 | 547,510 | 979,308 | 94,350 | 1,521,659 | 125,995 | 296,159 | 918,874 | 962,433 | 432,754 | 102,776 |
| ALASKA | 2,117 | 4,473 | 4,741 | 4,885 | 5,055 | 6,846 | 6,828 | 17,000 | 0 | 8,000 | 0 | 8,100 | 10,000 |
| HAWAII & GUAM | 4,254 | 220 | 800 | 624 | 0 | 0 | 220 | 220 | 8,540 | 82 | 1,085 | 5,457 | 194 |
| TOTALS | 7,298,916 | 1,160,486 | 4,272,241 | 23,238,796 | 16,766,085 | 10,768,210 | 27,317,770 | 5,195,212 | 2,063,314 | 8,260,978 | 17,577,953 | 17,481,657 | 8,059,272 |

TABLE - 6

| REGIONAL DISTRIBUTION FLOOD DAMAGES PREVENTED BY THE U.S. ARMY CORPS OF ENGINEERS FISCAL YEARS 1980-2003 (IN THOUSANDS OF DOLLARS) | | | | | | | | | | | | |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|----------------------|
| REGION | FY93 | FY94 | FY95 | FY96 | FY97 | FY98 | FY99 | FY2000 | FY2001 | FY2002 | FY 2003 | 1994-2003 Avg |
| NEW ENGLAND | 95,580 | 51,906 | 375 | 132,805 | 31,243 | 121,825 | 29,147 | 680 | 89,058 | 195 | 41,848 | 49,908 |
| MID-ADLANTIC | 277,641 | 34,455 | 33,530 | 1,881,703 | 224,560 | 79,819 | 250,493 | 97,647 | 61,760 | 29,960 | 258,907 | 295,283 |
| GULF & S. ATLANTIC | 70,326 | 68,517 | 149,705 | 830,955 | 88,877 | 598,430 | 257,000 | 52,668 | 91,978 | 6,584 | 377,973 | 252,269 |
| OHIO | 369,414 | 714,206 | 248,096 | 4,809,346 | 1,706,408 | 726,721 | 281,676 | 253,742 | 128,756 | 280,287 | 1,280,124 | 1,042,936 |
| TENNESSEE | 13,304 | 52,909 | 12,480 | 2,305 | 131,135 | 8,326 | 5,017 | 0 | 4,280 | 175,824 | 255,688 | 64,796 |
| GREAT LAKES | 124,935 | 50,981 | 24,810 | 141,824 | 112,230 | 25,977 | 19,190 | 13,979 | 28,643 | 39,729 | 104,179 | 56,154 |
| UPPER MISSISSIPPI | 1,303,564 | 14,979 | 7,147 | 22,160 | 570,094 | 390,463 | 99,151 | 45,675 | 1,320,098 | 402,904 | 98,203 | 297,087 |
| SOURIS-RED-RAINY | 91,473 | 6,875 | 28,686 | 67,053 | 154,001 | 36,316 | 76,877 | 8,153 | 217,695 | 11,059 | 8,150 | 61,487 |
| MISSOURI | 11,573,040 | 206,912 | 4,466,330 | 2,199,478 | 7,207,086 | 177,769 | 5,111,491 | 21,228 | 521,933 | 39,721 | 93,262 | 2,004,521 |
| ARKANSAS-RED-WHITE | 949,112 | 206,387 | 469,242 | 60,386 | 187,332 | 183,987 | 688,697 | 122,313 | 98,473 | 153,942 | 90,824 | 226,158 |
| LOWER MISSISSIPPI | 13,538,946 | 9,589,003 | 16,904,365 | 7,925,144 | 22,033,170 | 6,933,597 | 12,507,805 | 6,217 | 13,869,161 | 17,592,228 | 9,965,990 | 11,732,668 |
| RIO GRANDE | 109,486 | 164,439 | 29,195 | 116,598 | 52,598 | 453 | 52,570 | 50,076 | 983 | 311 | 65 | 46,729 |
| TEXAS AND GULF | 2,621,230 | 5,705,933 | 2,632,986 | 4,425 | 5,113,613 | 646,241 | 626,317 | 557,532 | 4,478,069 | 3,662,754 | 1,331,318 | 2,475,919 |
| COLORADO | 147,326 | 0 | 204,067 | 25,176 | 31,616 | 7,329 | 8,931 | 1,400 | 2,650 | 0 | 6,599 | 28,777 |
| GREAT BASIN | 0 | 4,553 | 0 | 0 | 842,730 | 0 | 10,361 | 0 | 7,573 | 0 | 7,440 | 87,266 |
| CALIFORNIA | 750,435 | 138 | 1,484,202 | 389,649 | 3,042,730 | 2,623,156 | 87,235 | 339,137 | 814,454 | 144,655 | 1,046,278 | 997,163 |
| COLUMBIA N PACIFIC | 248,997 | 162,270 | 71,192 | 3,700,512 | 5,629,242 | 856,406 | 1,049,702 | 1,191,591 | 134,072 | 590,375 | 740,114 | 1,412,548 |
| ALASKA | 0 | 8,750 | 8,750 | 0 | 0 | 0 | 0 | 200 | 0 | 100 | 11,000 | 2,880 |
| HAWAII & GUAM | 10 | 6,728 | 5,126 | 4,652 | 2,394 | 68 | 0 | 0 | 0 | 2,598 | 546 | 2,211 |
| TOTALS | 32,284,819 | 17,049,941 | 26,780,284 | 22,314,171 | 47,161,059 | 13,416,883 | 21,161,659 | 2,762,239 | 21,869,636 | 23,133,226 | 15,718,508 | 21,136,761 |

TABLE 7

| 2003 ATLANTIC OCEAN TROPICAL CYCLONES AND THEIR EFFECTS | | | | | | | | |
|--|----------------|----------|----------------|----------------|-------------------|--------------------------------|----------------------|---------------------|
| NAME | CLASS | Category | DATES | Max Wind (Kt.) | Min Pressure (MB) | Damages In U.S.A. (\$ Million) | Lives Lost in U.S.A. | State Most Effected |
| Ana | Tropical Storm | -- | 20 - 24 Apr | 50 | 994 | 0 | 0 | off shore |
| Bill | Tropical Storm | -- | 29 Jun - 2 Jul | 50 | 997 | 50 | 4 | Louisiana |
| Claudette | Hurricane | 1 | 8 - 17 Jul | 80 | 979 | 180 | 1 | Texas |
| Danny | Hurricane | 1 | 16 - 21 Jul | 65 | 1000 | 0 | 0 | off shore |
| Erika | Hurricane | 1 | 14 - 17 Jul | 65 | 986 | minor | 0 | Texas |
| Fabian | Hurricane | 4 | 27 Aug - 8 Sep | 115 | 939 | 0 | 0 | off shore |
| Grace | Tropical Storm | -- | 30 Aug - 2 Sep | 35 | 1007 | minor | 0 | Texas |
| Henri | Tropical Storm | -- | 3 - 8 Sep | 50 | 997 | minor | 0 | Florida |
| Isabel | Hurricane | 5 | 6 - 19 Sep | 145 | 915 | 3,370 | 16 | Virginia |
| Juan | Hurricane | 2 | 17 - 19 Sep | 90 | 969 | 0 | 0 | Canada |
| Kate | Hurricane | 3 | 25 Sep - 7 Oct | 110 | 952 | 0 | 0 | off shore |
| Larry | Tropical Storm | -- | 1 - 6 Oct | 55 | 993 | 0 | 0 | Mexico |
| Mindy | Tropical Storm | -- | 10 - 14 Oct | 40 | 1002 | minor | 0 | Puerto Rico |
| Nicholas | Tropical Storm | -- | 13 - 23 Oct | 60 | 990 | 0 | 0 | off shore |
| Odett | Tropical Storm | -- | 4 - 7 Dec | 50 | 993 | 0 | 0 | Dom. Rep. |
| Peter | Tropical Storm | -- | 7 - 11 Dec | 60 | 990 | 0 | 0 | off shore |
| TOTAL | | | | | | \$3,600 | 21 | |

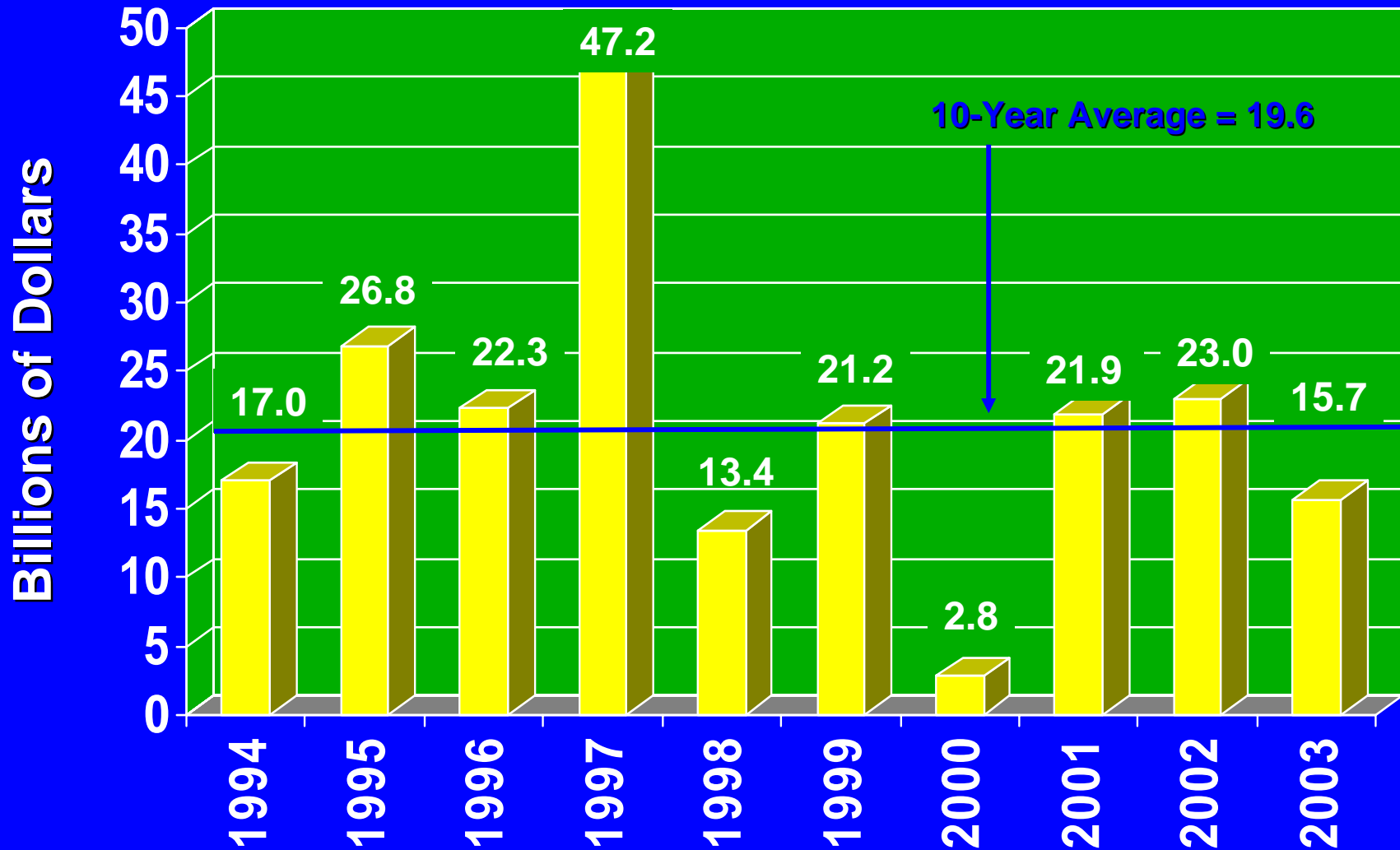
Saffin-Simpson Scale for Wind Speed

- Tropical Storm: 34-63 kt (39-73mph)
- Hurricane Cat 1: 64-83 kt (74-95 mph)
- Hurricane Cat 2: 84-96 kt (96-110 mph)
- Hurricane Cat 3: 97-113 kt (111-130 mph)
- Hurricane Cat 4: 114-135 kt (131-155 mph)
- Hurricane Cat 5: Greater than 135kt (155 mph)

Detailed information available at

<http://www.nhc.noaa.gov/2003atlan.shtml>

Figure 1 Flood Damage Reduction



Flood Damages Prevented in the U.S.A. by the U.S. Army Corps of Engineers

Figure 2

Potential Flood Damages

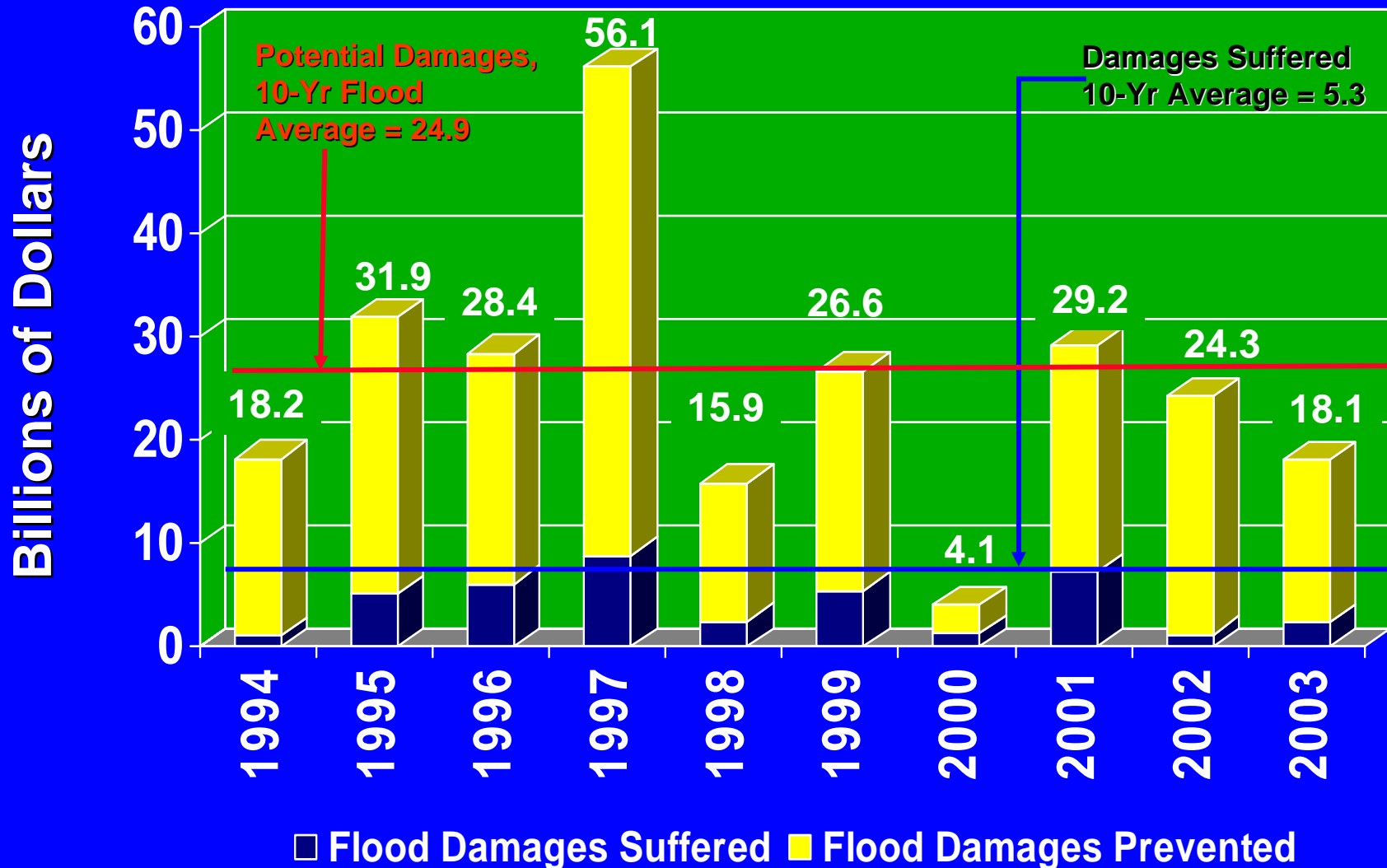
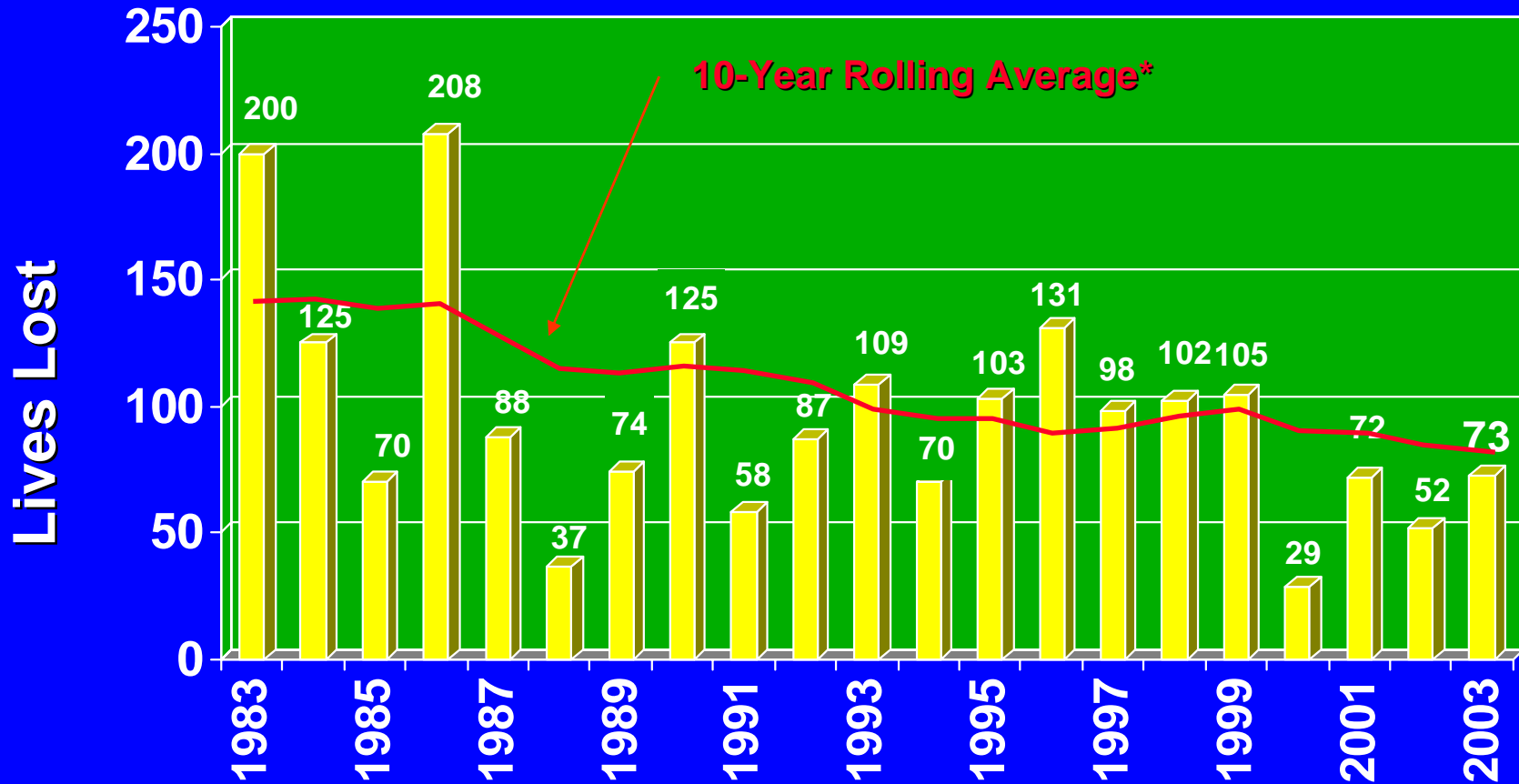


Figure 3 Flood Related Lives Lost

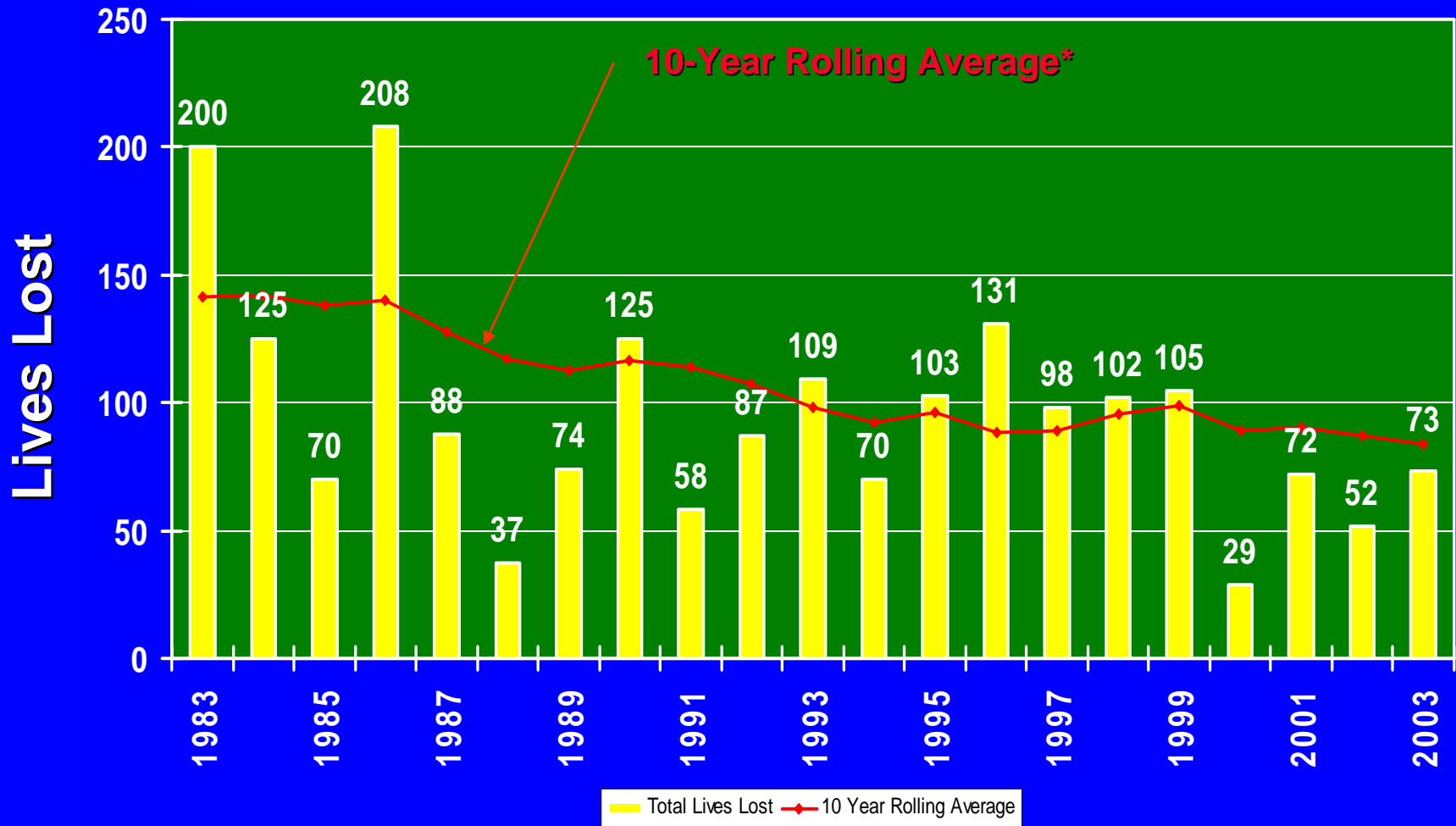


* Average for the previous 10-years.

Fiscal Year

Figure 3 Flood Related Lives Lost

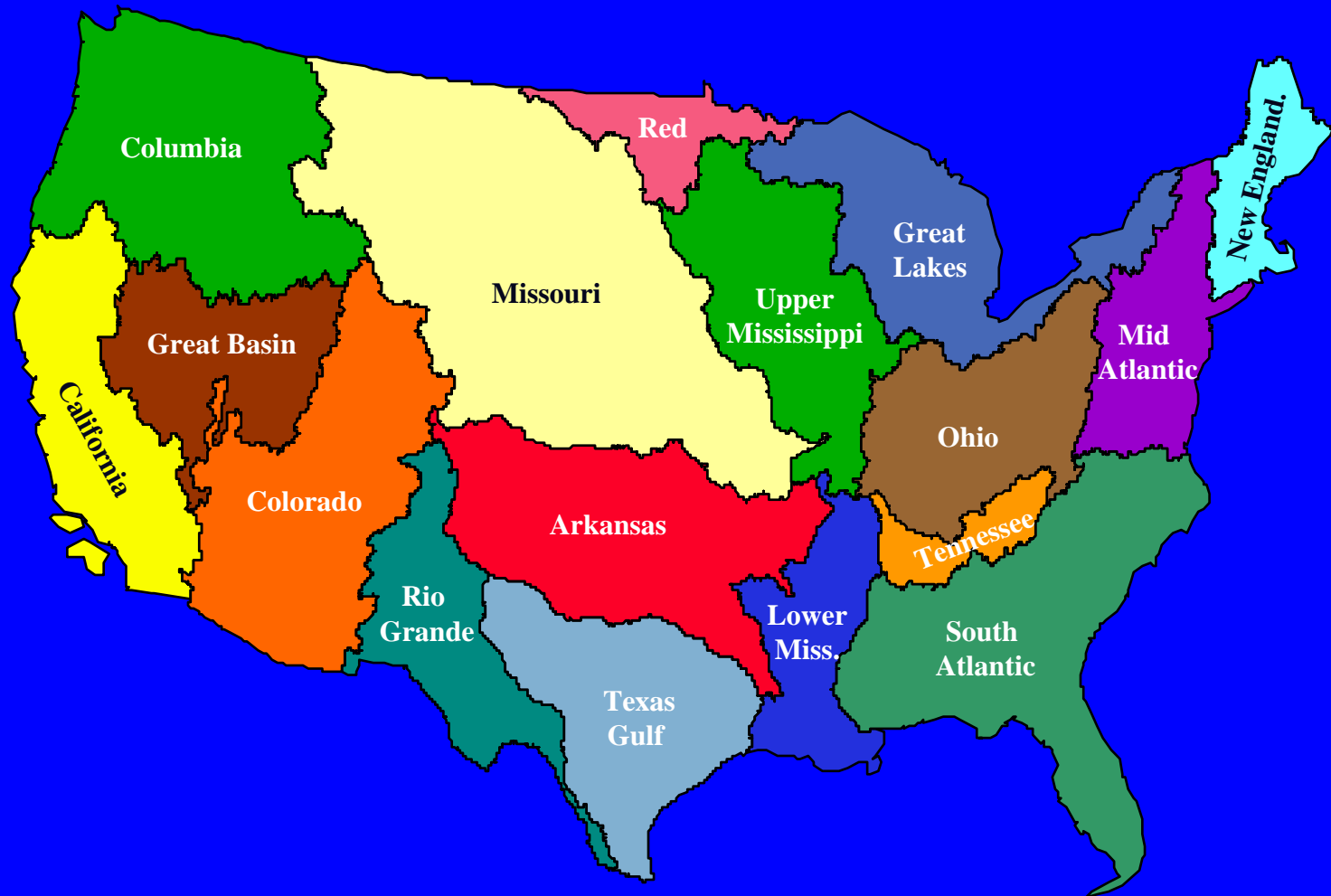
THIS IS THE MICROSOFT EXCEL VERSION – just double click & edit



* Average for the previous 10-years.

Fiscal Year

Figure 4 Continental U.S. River Basins



For use with Table 6

Figure 5

Benefits of Federal Projects (Damages Prevented) Accumulative Corps Expenditures (Principle plus O&M)

Adjusted to 2000 using Construction Cost Index EM 1110-2-1304

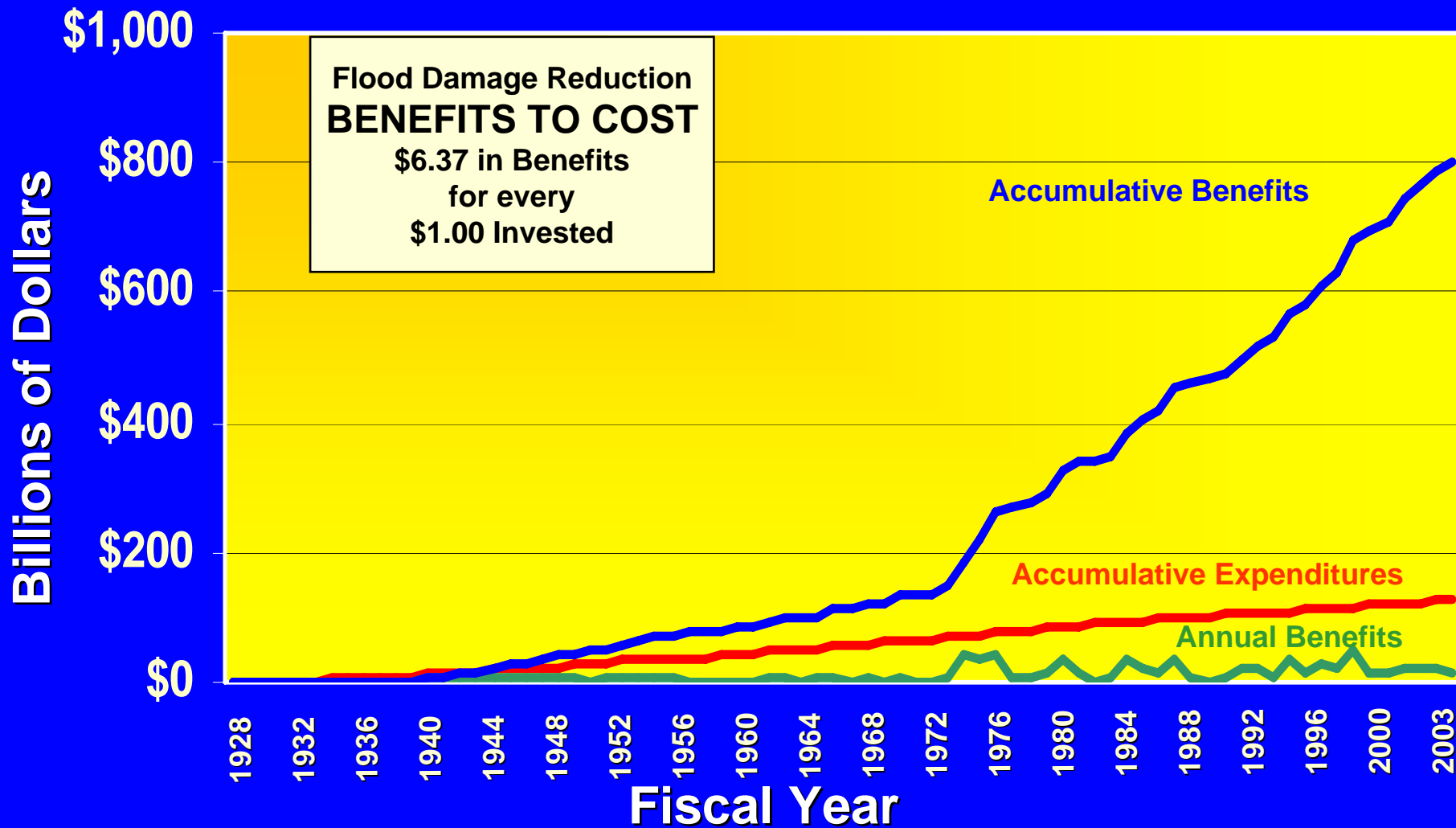


Figure 6

Atlantic Tropical Cyclones

