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Issue Analysis

Watery Marauders

How the Federal Government Retarded the Development of Private Flood Insurance

By Eli Lehrer

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Executive Summary

This paper describes how America's National Flood Insurance Program came into existence and seeks to answer the question of why private flood insurance never developed in the United States on a significant scale. It consists of three sections.

The first section attempts to provide a brief theoretical framework for thinking about flood insurance. It describes what flood insurance does and presents a theory as to how it ought to work.

The second section provides the early history of the flood insurance program. It outlines how the federal government first took on the responsibility of protecting the nation from flooding and how Congress failed in its first effort to offer federal flood insurance.

The third section explains how America got the system of flood insurance that it has today. It explains how the Tennessee Valley Authority, U.S. Geological Survey, and a variety of local governments gathered enough risk data to make federal flood insurance palatable to Congress, how Congress implemented a program, and then stripped it of its risk-based character.

The paper reaches a simple conclusion: Flood insurance, in its current form, did not emerge as a result of market failure. While some factors, including the role of state regulation, remain undetermined, the current situation represents an example of what economists call "government failure."

The federal government built levees that altered America's natural landscape and thus increased flooding, discouraged market entry by failing to repeal a calamitously impractical flood insurance law, supported mapping and zoning efforts that exacerbated flooding problems, and created a flood insurance program that priced policies well below market levels. Flood insurance exists as it does because political institutions sought to "correct" a perceived market failure and thereby made the emergence of private insurance unlikely, if not impossible.

A Theory of Flood Insurance

Floods and Civilization

Since civilization first arouse in the fertile river valleys of the Middle East, humans have clustered near water. Water irrigates fields, quenches livestock, and, of course, provides people drink. Nearly all major bodies of water overflow their banks at one time or another—major rivers tend to flood yearly, oceans and major lakes less often—so in time, nearly all flood. Humans have had to deal with floods since the dawn of civilization.

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Before the 20th century, however, people simply could not afford flood insurance. From the time of the Romans—who built enormous breakwaters to prevent the Tiber from flooding—some flood control efforts existed. Most people worked in subsistence agriculture and lived in crude structures that they themselves built. The wealthy, to vastly oversimplify things, either lived in areas unlikely to flood with any regularity or built flood protection mechanisms. When individuals, corporations, and governments erected flood control measures, they did so with the goal of preventing floods altogether: A mix of public and private efforts built flood walls around much of the Netherlands, raised the city of Chicago above Lake Michigan's water table, and erected walls to protect the Port of Boston.[1]

Flood insurance, broadly, represents an admission that human efforts cannot prevent floods altogether. They can, however, transfer and pool the risk in a particular way. All existing risk-transfer institutions provide some form of flood insurance. Lloyd's associations, catastrophe bonds, and reserving practices all provide flood insurance of a sort. For a variety of reasons stemming from marketing, regulation, and wealth—reasons that lie beyond the scope of this paper—these vehicles have not proven viable for providing the types of insurance policies that most American consumers seek to purchase.

This paper deals with "conventional flood insurance." People overwhelmingly insure their homes, automobiles, and valuable property using conventional insurance against a variety of risks, including fire, theft, and pests. It is reasonable to believe that they should be able to insure against floods in much the same way.

How Should Flood Insurance Work?

Conventional flood insurance transfers the risk of floods in the same manner as conventional homeowners' insurance transfers the risk of fires.

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Policies may differ slightly, but for the purposes of this paper, *under a conventional flood insurance policy, a corporation or cooperative prices a risk-transfer contract for flooding in a predictable fashion based on standardized rating mechanisms and maintains a large degree of price consistency between similarly situated insured.*

Insurance does not represent charity or government-provided welfare: It involves a mutually beneficial financial transaction to transfer risk. Insurance providers that fail to operate in a financially self-sustaining fashion convert themselves into conduits for relief payments. Following major floods, it is inevitable that some individuals and groups will need relief, particularly in the short term. Such provision of relief operates independently from conventional insurance.

From the consumer's perspective, flood insurance should function in much the same manner as other insurance in terms of pricing, availability, financial responsibility, its impact on patterns of development, and its status in the market economy.

Flood insurance should have six attributes.

- First, flood insurance should price like risks alike and different risks differently. Quite simply, people who face a lower flood risk should pay less for flood insurance, while people who face a significant flood risk should pay significant premiums for flood coverage.[2]
- Second, people who want flood insurance should have few problems buying it at reasonable prices. Such "reasonable prices" may be quite high—a house built on a sand dune will face severe flooding and erosion with some frequency—but they should provide a good value for people who buy coverage.
- Third, people who face increased flood risks because of where they live should pay for those risks themselves. People who live far away from areas that flood frequently should not have to pay the bills for those who live in those frequently flooded areas.
- Fourth, flood insurance pricing should provide incentives to do some combination of three things: 1) discourage development in areas likely to flood, 2) encourage mitigation against flooding, and 3) pay for a portion of the costs of periodic rebuilding in places where people can afford the cost *and* where mitigation is impossible.

- Fifth, flood insurance should impact development patterns in a way that either increases society's resistance to floods or creates a mechanism by which society finances rebuilding.
- Sixth, if flood insurance is to work like other types of insurance, it should work largely through private means. Governments might provide certain types of subsidies and even set up some sort of residual market, but the bulk of flood insurance should work through the same private market mechanisms that provide other types of property and casualty insurance.

Insurers seek three things: to remain financially solvent, subject themselves to a proper level of regulatory oversight, and price policy premiums based on risk.

Like consumers, insurers want the environment for providing flood insurance to look like the environment they experience for other types of insurance. In particular, they seek three things: to remain financially solvent, subject themselves to a proper level of regulatory oversight, and price policy premiums based on risk.

First, insurers need to make money so as to continue their work. They cannot be forced to operate at a long-term financial loss when insuring against floods. For example, homeowners' insurance does not typically produce underwriting profits—in other words, insurance companies typically pay out more in claims than they receive in premiums. By design, therefore, insurance companies make money on homeowners' insurance by investing the money that they receive in premiums. Many insurance companies operate as nonprofit mutual insurers, but even these companies cannot stay in business if they cannot make profits.

Second, like all other economic activity, insurance requires regulation. Because of the nature of the insurance business—companies promise to provide coverage against events that may or may not happen—it is vital that someone make sure companies remain solvent enough to pay likely claims. Insolvent companies engage in fraud if they sell insurance. Therefore, mechanisms—although not necessarily governmental ones—must exist to make sure that insurers remain solvent. Other types of regulation, from provisions specifying paperwork requirements to the manner in which insurance companies set rates, may also prove advantageous in certain cases. Insurance companies want a regulatory "sweet spot" that provides the appropriate level of regulation, no more and no less.

Third, insurance companies want to price based on risk. Risk-based pricing ensures the most efficient and largest market for insurance

and makes the largest number of people able to afford adequate insurance. Pricing on a basis other than risk—such as, for example, reducing prices for favored groups—almost always leads to corresponding increases for other groups. Externally mandated insurance rate cuts for given groups almost never save money for society as a whole. Instead, they tend to redistribute wealth from people who incur risks to those who do not. In the case of flood insurance—in modern times, people living near water are almost always wealthier than average—the wealth redistribution implicit in non-risk-based pricing will rarely serve egalitarian goals. While some individual consumers may benefit from pricing on a basis other than risk, risk-based pricing does the most to advance overall consumer welfare.

America has ended up with a flood insurance system that is quite a ways away from what either consumers or insurance companies would expect in a free market. Figuring out how we got here requires a look at how the federal government took over responsibility for managing floods across America.

Early History of Flood Insurance

Although one might trace the history of America's flood insurance program back to early 19th century efforts to provide disaster relief, the following analysis begins with events that resulted in the system we have today. This section describes how the federal government took on responsibility for protecting all Americans from flooding, seeks to explain how political forces and factors intrinsic to the industry made the development of flood insurance difficult, outlines America's first efforts at establishing flood insurance, and describes how these efforts further suppressed private market participation. Finally, it outlines the manner in which government agencies added a measure of risk awareness to America's flood planning, established floodplain zoning, and thus set the stage for the adoption of a politically palatable federal flood insurance program.

Setting the Tone

The path leading to America's current national flood insurance regime began in 1936 when Congress passed the National Flood Control Act, which was only 932 words long. Despite its brevity, it had enormous consequences for America's costal and riverine landscape. The most

important section, which would set the tone for national flood insurance, reads as follows:

> It is hereby recognized that destructive floods upon the rivers of the United States, upsetting orderly processes and causing loss of life and property. . .that it is the sense of Congress that flood control on navigational waters or their tributaries is a proper activity of the Federal Government in cooperation with States, their political sub-divisions and localities thereof; that investigations and improvements of rivers and other waterways, including watersheds thereof, for flood-control purposes are in the interest of the general welfare; that the Federal Government should improve or participate in the improvement of navigable waters or their tributaries including watersheds thereof, for flood-control purposes if the benefits to whomsoever they may accrue are in excess of the estimated costs, and if the lives and social security of people are otherwise adversely affected. [3]

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As the late geographer and flood control expert Gilbert Fowler White described it, this momentous act federalizing flood risk appears to have passed as an afterthought—a few words attached to a laundry list of flood control proposals of the sort that Congress would pass every year.[4] A massive flood in New England, White recounts, gave an extra push to write an overall policy into law. At the time, it did not appear as a major change. The Army Corps of Engineers had engaged in flood control efforts since the early 19th century, and Congress had appropriated disaster relief as early as 1803.[5] Torrential, deadly floods on the Mississippi-Missouri system in 1927 had destroyed enormous amounts of property, swept away many flood control structures, and resulted in a massive and then-unprecedented flood relief effort under Herbert Hoover's leadership. [6] The Corps had gained enormous new authority in the flood's wake and used it widely.

While it passed with little debate, the Act marks a clear dividing line. Before the 1936 Act, Congress provided relief but considered floods a largely local matter. Afterwards, it made an implicit promise: The federal government would prevent floods so long as "the benefits to whomsoever they may accrue are in excess of the estimated costs." The Act, in a sign of things to come, neither specifies nor requires any particular type of cost-benefit calculus. Its text, by calling for "flood control" rather than

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"management" or "mitigation," implicitly endorses what the Corps already did: treat floods, in White's words, as "watery marauders which do no good, and against which society wages a bitter battle."[7] Every one of the 250 projects funded following the Act's passage involves either "bank protection works" or "levees" along America's major river systems.

The Act had an immediate impact. Spending on flood control mechanisms doubled in the four years following the Act, declined during World War II, and then skyrocketed in 1946 as soon as the war ended.[8] Relief efforts moved forward at a similar pace. Each time cropland flooded, each time people died in a flood, each time a town found its doom in the waters of a rising river, the federal government would step in with help. There was no cost sharing from property owners and, with each major flood, the risk to the federal treasury grew larger.

Against this background, flood insurance did not develop the way one might have expected. The next section addresses three sets of factors that retarded the development of flood insurance: federal regulation, state regulation (about which little information is available), and the intrinsic nature of flood risk between the 1930s and 1950s.

Why Private Insurance (Mostly) Didn't Develop

Federal efforts retarded the development of flood insurance by building breakwaters that reduced the value of flood insurance over the life of a typical mortgage, by implicitly encouraging development in frequently flooded areas, and by implicitly preempting the need for private insurance.

By shielding much of the country against minor floods, the Army Corps of Engineers moved floods outside of ordinary experience. Neither the Corps nor any other agency guaranteed that the projects would guard against catastrophic losses, yet they did reduce the overall flood risk in any given year. This made it harder for private insurers to write insurance policies that they could market. For example, let's assume that, in a given town, the Corps of Engineers builds flood walls that engineers believe waters will breach only once in 100 years. After the wall goes up, a flood insurance policy purchased over the life of a 30-year mortgage would have only a 30-percent chance of ever proving useful at all. While some people might still buy such a policy, their willingness to pay a given premium declines significantly as the event becomes much more unlikely. For insurers, however, the risk of a catastrophic flood resulting in the maximum claim does not decrease. This makes flood insurance much harder to market: The product price falls by only a small amount since the

maximum claim does not fall, but the insurance becomes much less useful to homeowners.

Flood walls create moral hazards by making it relatively more attractive for private parties to build on land that is likely to flood. Over a period of years, this modifies the built environment considerably. While developers and property owners may take calculated risks building behind "100 year" flood walls, insurers have little upside in insuring such properties. Vigorous federal efforts to build flood walls thus resulted in construction that a private insurance industry could not insure using conventional insurance policies that it could market successfully.

Finally, federal relief efforts reduced the need for insurance. Certain types of floods certainly mandate external relief and, in many cases, preserving lives may require federal relief. But any relief beyond short-term efforts to meet basic human needs will likely reduce some amount of insurance. As John M. Barry documents, from the 1920s on, the federal government typically helped white Americans get back on their feet after floods while doing only the bare minimum to meet the basic needs of African Americans. Since nearly all people with assets significant enough to buy insurance were white, this further reduced the need for insurance.[9]

A preliminary review of the literature did not prove sufficient to determine the consequences of state regulation. The extent to which state regulations impeded or facilitated the development of private flood insurance remains difficult to determine. According to Edward Overman, former Assistant Dean of the Institute for Property and Liability Underwriters and a leading industry spokesman, at least 46 states had some form of insurance price regulation in 1951—the earliest compilation this author could find.[10] It is unclear what flood insurance programs, if any, existed before 1936: John M. Barry does not mention any particular insurers in his massive study of the 1927 Mississippi floods but this is not determinative. More research is needed in all of these areas. We can safely say, however, that the general climate in insurance was heavily regulatory during the 1930s and 1940s: Nearly all states passed rate regulatory laws of one sort or another—43 had them by 1952—and this discouraged risk-based pricing. The McCarran-Ferguson Act of 1945 required that insurance companies subject themselves to state regulation.[11]

However, a small handful of private flood insurance programs—all single-state domestic insurers—did exist. Gilbert Fowler White found that "more than 31 organizations wrote some type of policy covering

flood damages."[12] But coverage was scanty in one massive Los Angeles flood, after which private flood insurers paid out $320,000 to cover gross damages of $25 million.[13] Still, some evidence exists that the market was growing: In 1956, after President Eisenhower made the first serious proposals to offer flood insurance, at least five more companies were offering flood products than had 10 years earlier, during White's review.[14] In a limited sense, private flood insurance did exist and people did buy it, but Eisenhower was already too late. By the late 1930s a number of political factors were already hindering its development.

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Flood Insurance's First Mover Disadvantage

Politics played a major role in the suppression of flood insurance, but the intrinsic nature of the market made it relatively unattractive for insurers to enter. Flood insurance's risk profile, weather patterns, and the nature of the insurance market all retarded its development.

Quite simply, the distribution of flood risk is different from that of other kinds of risk that people purchase insurance to protect against. Most other risks exist along a continuum that follows a normal, bell curve, distribution: A 17-year-old male with a new sports car may represent a high auto insurance risk, a 40-year-old man with a few speeding tickets a moderate risk, and a 50-year-old woman with a perfect record a low one. In between these points insurers find all sorts of other drivers. In general, most people are average risks. Flood insurance, on the other hand, tends to be an all-or-nothing game: Many areas have a risk of flooding that is essentially zero while most people who have any risk of flooding will have a sizeable risk. This means that risk pools will likely be smaller and, thus, coverage more costly than that for other financially equivalent risks. The construction of breakwaters—which reduced the likelihood of minor floods—further increased the possibility that when a loss did happen it would be catastrophic. This made market entry less attractive.

Weather may have also had an impact. Most major floods correlate with hurricanes, which appear to come in cycles. Between 1944 and 1954, the years when one might have expected a private flood insurance market to develop, no major hurricanes struck anywhere on the American mainland.[15] This further reduced the apparent market for flood insurance. Disasters provide very good advertising for insurance, but for a 10-year period, America avoided major flood disasters.

Finally, flood coverage simply presents a smaller market than other types of property and casualty coverage. Nearly every home runs

a risk of damage from fire, wind, and falling trees. Many, however, will never flood. A rational insurance company would likely work to exploit these other opportunities before investing capital in trying to enter a flood market. Between the beginning of the Depression in 1929 and the end of World War II in 1945, Americans had few opportunities to buy many types of consumer goods. In the late 1940s and mid-1950s, the nation had enormous unmet consumer needs. Millions of new housing units were built and Americans bought new cars in droves. These things needed insurance and the mechanisms for writing this insurance already existed. Because not a lot of people lived near water in significant numbers, however, no unified mechanism existed for writing flood insurance across the country. Offering it simply wasn't a priority for insurance companies who saw growth opportunities elsewhere.

A First, Failed Effort

In 1951, following a particularly severe flood season in the Southwest, President Harry Truman laid down the first serious national proposal for flood insurance intended to force property owners to pay a portion of their own relief bills. "At present," the President claimed "insurance against flood damage is...unobtainable from private insurance companies."[16] Truman, as discussed above, wasn't entirely correct and the proposal went nowhere.

Four years later, however, President Dwight Eisenhower made a similar proposal; this time Congress acted. In the wake of a particularly active 1955 hurricane season that saw 12 storms hit the Eastern seaboard, causing a record amount of damage, Congress created America's first residential flood insurance program at the President's request.[17] In his January 10, 1957 State of the Union address, Eisenhower explicitly presented flood protection as a part of a plan for cooperative water use planning:

> The whole matter of making the best use of each drop of water from the moment it touches our soil until it reaches the oceans, for such purposes as irrigation, flood control, power production, and domestic and industrial uses clearly demands the closest kind of cooperation and partnership between municipalities, States and the Federal Government. Through partnership of Federal, state and local authorities in these vast projects we can obtain the economy and efficiency of development and operation that springs from a lively sense of local responsibility.

> Until such partnership is established on a proper and logical basis of sharing authority, responsibility and costs, our country will never have both the fully productive use of water that it so obviously needs and protection against disastrous flood.[18]

Eisenhower's other communications on the topic never explicitly mention the word insurance—although he uses the term "indemnity" once. Nonetheless, the bill that resulted from Eisnehower's policy—largely shaped through the efforts of Sen. Prescott Bush (R-Conn.)—set up what appeared to be an actual insurance program.

Congress, however, left things vague and the program never even had a director named. The bill Eisenhower signed, the 1956 Federal Flood Insurance Act, provided little guidance and offered short-term borrowing authority rather than appropriations, and required Congress to approve funding after the agency established a premium structure.[19] Written in very broad language, the bill authorized the creation of a Federal Flood Indemnity Administration to "make available flood insurance."

The Act offers a flat 40-percent subsidy to homeowners on "risk-based insurance premiums" and requires states that want to participate to put up half of the money for that subsidy.[20] It requires the federal government to pay the program's overhead in full and contains no provision for allowing private companies to sell or service policies. It sets caps for coverage but allows the Housing and Home Finance Administrator (HHFA) to set premiums and "provide for floodplain management." The bill promised to encourage the private sector to write insurance policies above its statutory cap of $10,000—according to the bill's preamble, a sum that covered the structure value of about 75 percent of all homes standing in 1957. It did not, however, provide any inducement for the private sector to do so. While it gives borrowing authority to stand up the Administrator and begin operations, it does not actually authorize the sale of products or provide operating funds.

Nevertheless, with a vague mandate and no assurance for its future, the Federal Flood Indemnity Administration set up office space and began developing its approach; the plan it proposed—but never even published in the *Federal Register*—had severe flaws.[21] Under the 1957 plan, all property owners desiring insurance would be subject to a so-called "postage stamp" premium—a flat even-rate premium within each state. The only adjustments would exist for construction type (for example, brick buildings would receive lower premiums than wooden ones) and

properties directly abutting a stream or river.[22] Given that the legislation did not authorize it, no mapping would take place.

As David Grossman, a Kentucky floodplain administrator, explains, this system is absurd: It takes only two risks—construction type and immediate proximity to water—into account and then only very crudely. Such a program would almost certainly attract only the people facing the greatest risks. In other words, it would have had a significant adverse selection bias, so the system could never achieve the self-sufficiency the legislation promised.

Even worse, Grossman observes, many states could not have participated at all due the mandatory subsidy structure that provided direct subsidies to individual homeowners and would thus violate state prohibitions on appropriating public money for private purposes. While the guidelines did anticipate land-use planning efforts going forward, the HHFA decided that the program would launch without any land-use guidelines in place, and proposed no mechanisms to implement them.

The insurance industry opposed this plan for both practical and self-interested reasons. Edward Overman of the Institute for Property and Liability Underwriters explained the industry's position. He described insurers' argument against the program as "somewhat paradoxical".

> They are in general agreement that private carriers cannot provide insurance against the peril of flood on fixed property. At the same time, they object to the government's entry into the field. The objection is based not only on the fact that the flood peril is such that it cannot be insured properly by any institution. They contend also that the government's entry into the field marks a step in a movement towards greater government activity in what has been recognized as the private sector of the economy.[23]

One insurance industry-supported study attacked the very idea of such insurance. Flood insurance, the study concluded, could never work under the plan and would, in fact, amount to "relief in the guise of insurance."[24] Political support ebbed quickly once the specifics of the bill became clear. A partial review of Senate floor debates shows three speeches against the bill and only one, by Prescott Bush, for it. Thanks in large part to the insurance industry's persistent lobbying against it, as well as the plan's absurd structure, no funding bill for the program ever made it to the House or Senate floor. But Congress never repealed the statute creating it.[25]

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Insurers Ask: Why Bother?

Although it did nothing to begin the federal provision of flood insurance, the 1956 Flood Act surely chilled the market. By 1960, according to Best, the insurance industry news service, only 21 companies were writing flood policies—a decline of almost 50 percent, and from a very low base.[26] A portion of this may have resulted from a general trend towards consolidation in the industry, but, in any case, flood coverage remained unavailable in most of the country. When Gilbert White again surveyed the flood insurance landscape in 1962 he found that things had gotten worse for those seeking insurance. In one town he studied *no one* had flood insurance. He could not find anybody besides Lloyd's of London willing to write it: "Although a few...thought they were covered under all risk policies, none was supported by the fine type of his policy."[27]

This likely happened for a simple reason: Not only did companies continue to face all the risks described above but they knew that an existing law would let the federal government take away all of their resources at any moment. Hydrologic data collection to support the setting of premiums was inadequate after 1956: Even with the vast resources of the federal government, the HHFA had decided that it would not compile any risk data before it began writing policies.

Of course, creating a feasible flood insurance program without the manifest flaws of the 1956 proposal was difficult. To make a program politically palatable, Congress needed some assurance that the program would have a relationship to the risk involved and thus needed to collect some risk data.

Making Flood Insurance Feasible

Just as the 1956 Flood Insurance Act was unraveling, a series of government actions created a body of risk data that would later facilitate the creation of a non-postage-stamp premium system. Although government agencies developed some useful scientific methodologies, these efforts did not improve the nation's resistance to hydrologic disasters. Instead, they replaced efforts to calculate the actual risk of flooding with mapping efforts that avoided collecting data that would prevent development. Rather than improving risk-transfer mechanisms, thus, these new calculations existed to facilitate economic development goals disconnected from the risks they were creating. The Tennessee Valley Authority (TVA) led these efforts, while local and other federal efforts helped build the necessary body of data.

Since the Tennessee Valley Authority, a federally chartered power company with a broad social mission, represented the high water mark for explicit regional economic planning in the United States, it appears obvious in retrospect that government efforts at massive land-use planning would begin at the TVA. During the 1950s, a variety of TVA projects coined the term "floodplain management" and contributed a great deal to the environment that made flood insurance feasible.[28] Beginning in 1953 the TVA funded an all-out effort to map the flood plains of 150 frequently flooded communities in its service area.[29] At first, TVA efforts, although free of direct cost to charge, faced enormous resentment from local communities that saw them as federal meddling in local land-use decisions.

TVA managed to overcome this resistance by changing methodologies in a manner that likely reduced the nation's resistance to floods. In the beginning of their efforts, TVA engineers used a "maximum probable flood" standard drawn from the Army Corps of Engineers. This calculation essentially consisted of an engineering estimate of the worst possible case scenario flood whether or not such a flood had ever actually taken place.[30] While the creation of such a model provided the best estimate of what a community had to do to protect itself against flooding, its widespread use in planning would have almost certainly foreclosed development in many towns that wanted that development. As an agency charged with improving a region's economy, the TVA found its mandates conflicting: It could not simultaneously promote short-term economic development and act to reduce flood risk.

As an agency charged with improving a region's economy, the TVA found its mandates conflicting: It could not simultaneously promote short-term economic development and act to reduce flood risk.

Thus, in catering to local opinion and promoting its own economic development goals, the TVA decided on another model: Rather than calculate hypothetical future flooding, it would make planning estimates based on "regional floods" that had actually occurred during recorded history within 60 or 100 miles of areas where development was proposed. As James Wright notes, this flood area was almost always "significantly smaller and [thus] became the standard for floodplain regulations."[31] During the 1950s and 1960s, the TVA produced flood studies for most of its service area. While they did not have any legal force, communities throughout the TVA service area, as well as the TVA itself, began to make use of these maps in zoning and planning. In 1959, the TVA itself even submitted a report to Congress calling for a national floodplain management agenda.[32]

On balance, the TVA's mapping effort made it harder to write useful, financially viable insurance policies: It wanted to transfer water rather than risks. Since mechanisms used for flood control tend to shift water rather than remove it, they simply reduce the risks of flooding in some areas while increasing it in others. They do not transfer risks in any real sense. Flood insurance, on the other hand, shifts the financial risks associated with flooding rather than moving water itself. Although one could use its maps in setting relative insurance premium levels—they include risk data—these maps were not developed using the methodologies an insurer would use.

Coincident with the TVA's work—and partly supported by the "regional flood" techniques it developed—communities both inside and outside of its service area began implementing formal flood plain zoning ordinances. These laws, today virtually universal in littoral settlements, specify when, how, and even if, development can take place in an area that is likely to flood. By definition, their enforcement requires mapping where floods would take place. Many communities now had these maps, thanks to the TVA's efforts. Between 1955 and 1958, the number of governmental jurisdictions with floodplain zoning rose from eight to 49.[33] Furthermore, beginning with Washington State in 1962, states began implementing statewide flood control policies.[34] The growth of these mechanisms and the techniques for replicating them made it possible for more and more communities to implement floodplain ordinances.

At the same time, the United States Geological Survey, in cooperation with the Army Corps of Engineers, began producing a series of flood atlases and maps for areas outside of the TVA service area.[35] Although presented in a different form, these maps followed the TVA's pattern of basing predictions on floods that had actually taken place rather than floods that might one day occur. While maps did include "500 year floods" roughly equivalent to the Army Corps' "maximum probable flood," the analysis included always emphasized mitigations against the "100 year" regional flood. This was essentially the same standard used by the TVA.[36]

By the mid-1960s the combination of these efforts gave the United States the rudiments of a national flood plain map for high-risk areas. Localities had data upon which they could write useful zoning ordinances to keep structures away from the worst flooding. Experts, moreover, had calculated the relative risk of a variety of different types of floods. Based on this data, the government could write flood insurance without resorting

to the impractical and uniform "postage stamp" premiums. However, this did nothing to spur the creation of a private market.

Government Failure

Government mapping efforts provided fatally flawed data, distorted development patterns, and made market entry even more unattractive for private insurers.

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Because they stemmed from the TVA's "regional flood" model, nearly all risk assessments compiled by the mid-1960s and the floodplain zoning ordinances which they inspired had a laughably fatal flaw: They assumed that flooding would never get worse than it had in the past. While government data existed, in other words, the great bulk of it was worse than useless for private insurers who were worried about whether risks were declining or increasing. A different data collection effort might have jump-started the creation of a private insurance market, but the existing data collection effort actually retarded it.

These mapping projects also created a false sense of security on the part of builders, businesses, and homeowners. While they impeded the most obviously unwise development—development that few lenders, even public ones, would have funded in the first place—early TVA-inspired efforts at floodplain zoning introduced a significant moral hazard problem. In many cases, they encouraged development in areas where it otherwise would not have happened, which led to large numbers of people moving into floodplain areas.

The data, furthermore, presented insurers with a massive political risk if they did enter the market. Even if an insurer were to spend millions of dollars to redo the TVA's work mapping floodplain areas, it would face major political problems if it sought to price risks in ways that differed markedly from the government data. Homeowners hit with high rates to insure property that the government had said was "safe" would likely have protested and quite probably managed to secure favorable government-set rates. And because the zoning ordinances were new, no useful experience-based risk data existed, so insurers would have had to charge sizeable risk premiums to secure a return on investment. This made the market even more difficult to enter.

In a different situation, insurers might well have entered the market and priced policies using a variety of deductibles, risk premiums, and the like to protect themselves and market their product. But, as discussed

above, given the nature of the regulatory climate, the growth the market was experiencing anyway, and the risks associated with government data collection, it became far less attractive for insurers to enter the market. Thus, the market remained greatly underserved.

The System We Have

The modern flood insurance system emerged in the wake of the Tennessee Valley Authority's mapping efforts. As initially passed, the National Flood Insurance Program required the use of a fair amount of risk-based data, but, in the first four years of its existence, a series of congressional actions gutted the program's risk-based character altogether. Even potentially effective flood maps required under the program were essentially ignored. The result was what we have today: a program that takes risk into account but does so in a way far different from how the private sector might.

Towards the NFIP

In 1965, Hurricane Betsy scoured the Gulf Coast leaving $1.42 billion ($9 billion in 2006 dollars) of damage in its wake. In a foreshadowing of 2005's much more severe Hurricane Katrina, "billion dollar Betsy" dumped millions of gallons of water into Lake Pontchartrain, breaching several levees and inundating much of New Orleans. Shortly after the hurricane, the Army Corps of Engineers began to focus explicitly on hurricanes, creating its own hurricane protection programs.[37] Congress, following a long-established pattern, quickly appropriated over $500 million to repair the damage through the Southeast Hurricane Disaster Relief Act of 1965.[38] In his signing statement for the bill, President Lyndon Johnson described what he saw as its objectives: immediate relief "to those victims of the hurricane who suffered losses for which no insurance was obtainable" and study of "programs which could be established to help provide financial assistance in the future to those suffering property losses in floods and other natural disasters, including but not limited to disaster insurance or reinsurance."[39]

Two studies emerged from the bill: a Presidential Commission of floodplain management experts, and a Department of Housing and Urban Development commission operating under the direction of the Senate Banking and Insurance Committee. Both considered the creation of flood insurance programs and came to strikingly different conclusions about how such programs should be structured. The former report proved prophetic

about the problems of flood insurance; the latter had enormous impacts on the policies that Congress approved. Both merit examination.

The White Commission

Under the leadership of the omnipresent Gilbert Fowler White, the Presidential Commission far exceeded its legislative mandate and proposed a major rethinking of floodplain management policy that did not include a national flood insurance program in the short term.[40] Rather than simply considering the flood insurance question the President emphasized, the Commission issued 16 recommendations. Among other things, the White Commission called for greater attention to flood hazards in all nearly all land-related federal programs, increased state and local cost sharing for flood control projects, and land acquisition efforts to prevent unwise floodplain development.[41] Its report emphasizes personal responsibility. "Floods are acts of God," notes the Commission report, "flood damages result from the actions of men."[42] Further, the White Commission expressed skepticism about the Corps' work. "Individual beneficiaries from engineering protection do not, in many instances, bear an adequate share of the cost," it writes. On page after page, in fact, the report attacks the Corps' efforts to prevent floods, pointing out that, since the 1936 Flood Control Act, the nation had spent nearly $6 billion of federal funds on levees and less than $500 million on other measures to prevent erosion and redirect development.

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The White Commission Report says that a flood insurance system—implicitly private—is "theoretically ideal" but that "further study must be completed" before taking any concrete action.[43] Specifically, the Commission recommends a five-phase flood insurance pilot program to begin with the construction of new flood risk models based on "Hydrological and statistical studies [that] evaluate average annual damages and their variance, geographic distribution and required rates." The studies, the Commission notes "also should investigate differences in land use, age of structures, type of hazard, local planning, and other factors as they affect the feasibility of insurance coverage."[44]

Only after rigorous measures to verify these studies with "a range of areas, types of structures, and other conditions" did the Commission say that it would even be wise to "recommend a course of action."[45] Contrary to what some authors have said, the White Commission *did not* recommend that the government fund a program of national flood

insurance. It proposed that the government simply begin collection of the data that the private sector likely would have eventually collected absent the Corps' persistent flood control efforts and the TVA's poorly conceived mapping schemes.

While the existence of federal statutes creating a federal flood insurance program and the Corps of Engineers' ongoing efforts to prevent floods would have certainly retarded market entry, no federal regulation has stood in the way of the creation of a private market.

If implemented and coupled with land use policies that moved away from the TVA's "regional" flood model, the White Commission's proposal could have encouraged a private or largely private market for flood insurance in states where the regulatory climate allowed it.[46] While the existence of federal statutes creating a federal flood insurance program and the Corps of Engineers' ongoing efforts to prevent floods would have certainly retarded market entry, no federal regulation has stood in the way of the creation of a private market. Some state regulations may have retarded market entry in some states, but they would not have prevented market entry *everywhere*. The studies envisioned—which included a long period of testing—would have allowed the setting of true risk-based premiums on floodplain land.

As White noted two years earlier, any flood insurance system would work best if information about flood coverage is "available and known to financial officers, [so that] they will automatically inquire about it each time a property is transferred or that a mortgage is negotiated. [And thus] force direct decision on flood adjustment."[47] Today's flood insurance system, as the next paper in this series discusses, still lacks an effective way to do this.

While it proves prescient in many respects, White's Commission had little influence at the time. The nature of America's built environment and the public demand for some sort of flood insurance, coupled with the Commission proposal's long time horizon and policy ambivalence, made the proposal a political non-starter.

The Evans Commission

Instead, the national flood insurance program found itself shaped by a far more political commission under the leadership of resource economist Marion Evans. The commission, supervised by the Senate Banking and Insurance Committee, came to a strikingly different conclusion than that of the White Commission,[48] which was issued the same year.

The Evans Commission report recommends "A national system of flood insurance...with government assistance or participation to the extent necessary" on its fourth page and then devotes the bulk of its length

to exploring the theoretical benefits and detriments of such a program. Unlike the White Commission's cautious recommendation of numerous studies to determine risk-based flood premiums, the Evans report simply says, "It has been estimated that the Corps of Engineers with the assistance of other Federal and State agencies, could [map] all flood prone areas (costal as well as riverine) in ten years at a total cost of $60 million."[49] In making this estimate, the report cites a passage on page 22 of the White Commission report that makes this estimate.

However, the White Commission Report recommended for the maps produced to be used as a preliminary tool to help localities improve floodplain zoning and move away from the TVA-influenced model, *not* as a tool for setting insurance premiums, which the White Commission believed wasn't possible in the short term. But the Evans report goes on to assume that these maps would be useful for setting risk-adjusted premiums even though the White Commission—which included actual flood plain management experts—knew that they would provide little more than a rough baseline.

The Evans report also suggests that the program be limited to communities that adopt floodplain zoning. Although it does not explicitly recommend a particular way of administering the program, it gives its most favorable assessment to the option that Congress would adopt in the end: "Private Insurance Industry Operates a Federal Flood Insurance Program."

The Program

In 1968, in the wake of the Evans report, Congress passed legislation[50] establishing the outlines of the program that still exists today—what University of Massachusetts geographer and land use expert Rutherford Platt has aptly called "two programs rolled into one."[51] One part of the flood program (Section 1331 and 1332 of the original Act) provides federally backed insurance against flooding. The rest of the Act encourages municipal, county, and occasionally state-level "permanent land use and control measures"—floodplain zoning—to direct flooding away from high-risk areas. The two parts work in tandem: Only communities with floodplain zoning ordinances that meet administratively determined federal standards can get insurance. Although the statutory language allows the program to cover nearly anything, the 1968 legislation and all updates since then make the program's primary objective the coverage of

single family homes and apartment buildings with four or fewer units.[52] With a few small exceptions, this is all the program has ever covered. The legislation also sets a coverage limit—$30,000 in 1969, $250,000 today. The Flood Insurance Program's initial authorizing legislation lets the Administrator contract out nearly all sales and servicing activities: Through what is today called the "write your own" program, private insurers market and service policies that the National Flood Insurance Program prices
and underwrites.

The program had a number of limitations and flaws that seem obvious in retrospect. Neither the initial legislation nor any succeeding legislation places substantial limits on the number of times a property could be rebuilt. Structures built before 1970 in floodplain zoning communities were grandfathered into the program.

Under the original program, the Corps of Engineers would produce data about the relative risk of property codified into Flood Insurance Rate Maps (FIRMs).[53] Although existing FIRMs have some serious problems, there is no reason to think that they are particularly biased. The methodologies used to create them, in fact, offer a reasonable semblance of what private insurance companies would use, and, at least in the short term, it's likely that insurance companies would contract with the same private companies that currently work for the National Flood Insurance Program. Rather than attempt to interfere with the FIRMs themselves, forces seeking to create less stringent floodplain zoning have simply substituted other, less-rigorous methods of determining flood risk. FIRMs themselves, however, have remained reasonably scientific. Within the last decade, in fact, FEMA staff has opposed a FEMA director's efforts to modify FIRMs to appease a politically connected developer.[54]

Although the Evans report had said that floodplain studies for the nation could be completed within 10 years, the Act's section 1361 offered a leisurely 15-year timetable for preliminary mapping of the nation's floodplain. To pay for the insurance coverage, the Act requires insurers to deposit premiums into a special fund at the Treasury and authorizes an initial borrowing limit of $1 billion to cover whatever premiums they could not cover (currently $22.3 billion). States and localities must enact zoning codes to take part but do not have any actual financial responsibility for the program.[55] To encourage purchase, section 1314 of the Act denies any federal disaster relief to people eligible to purchase

flood insurance who do not do so.

From an administrative standpoint, the program appears rather clever: It creates a strong local interest in flood plain zoning throughout the country without having the federal government impose it. Communities that do not want to take part in the program can avoid enacting ordinances but would thus leave their citizens without any viable flood insurance coverage options. Since the program was voluntary and did not explicitly require any tax revenue or local match, nobody had a vested interest in opposing it.[56] In theory, the program contains a strong enforcement mechanism: the denial of disaster relief to anyone who can purchase flood insurance but does not.

This approach had obvious appeal and, in the main, broad support in 1968. Although dozens of minor modifications were suggested in congressional testimony, executives from the National Association of Independent Insurers, State Farm, National Association of Mutual Insurers, Travelers, the Hartford Insurance Group, and dozens of other companies and organizations all expressed support for the program's broad outlines as described above. T. Lawrence Jones, president of the American Insurance Association was typical in his stated support: "The need for flood insurance is too great, and the present governmental flood relief programs too costly, wasteful, and inefficient to permit further delay."[57]

Few spoke against the program in principle. One who did—one G. Richard Challinor, president of a small wholly private Missouri flood insurance mutual insurer—warned that the subsidy structure proposed could "make it very much like running a national lottery or gambling at Las Vegas."[58] People like Challinor, who said in his testimony that his company has only 50 policy holders, seem rare. Only two private flood insurers testified and, according to Jones, none of the AIA's large members were writing flood insurance for homeowners in 1967.

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Although the program probably would have had to either borrow from the Treasury or engage in the profit-seeking investments common to private insurers, well-designed FIRMs based on the research of the sort that White had recommended and the legislation envisioned could have made risk-based pricing a reality. Although White himself later expressed regrets about the program, the 1968 legislation was potentially consistent with his vision of piloting flood insurance toward true risk-based pricing. The NFIP could have simply delayed the issuance of FIRMs and refused to write policies until it had sufficient risk data. In its outlines, the original

1968 program appears as sound as one could reasonably expect—but politics quickly got in the way.

By using Flood Hazard Boundary Maps, extending relief to people who failed to purchase flood insurance, and engaging in reckless across-the-board premium cuts the program transformed itself from an insurance product to a voluntary tax intended to fund some portion of relief efforts.

The Flight from Risk

The National Flood Insurance Program began with a whimper, as might be expected given its heavy requirements for risk-based pricing and the need to enact special ordinances and create special maps. In 1968, the first year of the program's existence, only 16 property owners purchased policies and only four sizeable communities—Fairbanks, Alaska; Alexandria, Virginia; Metairie, Louisiana; and Mobile, Alabama—developed the maps and zoning ordinances needed to take part. Not surprisingly, all are among the nation's most flood-prone cities. Progress seemed slow and, in August of that year, Hurricane Camille slammed the Gulf Coast, causing over $1 billion in damage and killing 250. The storm resulted in another legislative frenzy—even though no one with flood insurance suffered any storm damage and the program had done nothing to mitigate the damage.

In addition to sending a by-then customary relief package, Congress also changed the flood insurance program in Camille's wake. These reforms gutted the 1968 program's risk-based nature. Through Section 408 of the Housing and Urban Development Act of 1969 (PL 91-152)—which was passed without detailed hearings—Congress backed off the fundamental financial attributes of the 1968 design while leaving the insurance legislation otherwise intact. Under the law, Flood Hazard Boundary Maps (FHBMs) replaced FIRMs on a "temporary" basis to let communities without risk programs enter the program. Although they have a slightly different form, FHBMs are essentially updated versions of the TVA Regional Flood Estimates: Rather than modeling potential future floods, they simply record boundaries of past actual floods. They provide an element of risk awareness, but, unlike FIRMs, do not even vaguely resemble the types of data private companies might use.

Deadlines for moving away from FHBMs and mapping the nation's entire floodplain were repeatedly extended and some communities continue to use them FHBMs today, instead of FIRMs.[59] Many FIRMs remain significantly out of date and efforts to update them have fallen behind. Although a series of reforms in the 1990s limited communities' ability to do so, buildings insured under FHBMs that would be uninsurable under FIRMs can still qualify for flood insurance indefinitely. This creates just what the insurance industry feared in 1957: a charity—an open-ended

entitlement to be made whole after a flood—in the guise of insurance.

Even with these changes, flood insurance remained slow to catch on. Premiums in communities that drew FIRMs were almost always high largely because the first communities to enter the program were among those most at risk for flooding. In smaller communities, the cost of compiling FIRMs also added to the premiums. In the first three years of the program's existence, only about 500 communities signed up and all but 17 used FHBMs. In July of 1972, the National Flood Insurance Program simply cut premiums across the board by 37.5 percent to encourage participation.[60] Thus, even in communities using FIRMs, flood insurance premiums no longer correlated with risk in any way that private insurers would use. As could be expected, participation soared in the wake of this rate cut—by the end of 1973, over 2,850 communities had joined the National Flood Insurance Program.[61] Over 80 percent used FHBMs.[62] The program had altogether lost its risk-based character.

Although it had begun to expand nicely, Congress again revisited the program in 1973 and passed a series of "reforms" that proved the last gasp for risk-based pricing. Under the 1973 changes, Congress extended the "emergency" program allowing the use of FHBMs until 1980 and removed the provisions denying emergency relief to people eligible to purchase flood insurance who did not do so.[63] The following year, the flood program again cut insurance rates—an additional 10 percent for most policy holders but as much as 20 for same some communities where few had signed up to encourage participation.

By using Flood Hazard Boundary Maps, extending relief to people who failed to purchase flood insurance, and engaging in reckless across-the-board premium cuts the program transformed itself from an insurance product to a voluntary tax intended to fund some portion of relief efforts. While private "write your own" carriers—private companies that serviced policies and reaped profits from doing so while still leaving actual risks and pricing decisions to the government—continued to provide a "free market" patina, the 1973 amendments snuffed out the last possibility that the private market would ever take an interest in the product.

The program's evolution over the subsequent three decades would result in numerous changes and even some moves towards greater risk awareness. But flood insurance would remain a largely political creature disconnected from risk calculations.

Conclusion: Government Failure

A recent study's definition of "government failure" provides a good summary of how the National Flood Insurance program emerged in the way that it did:

> Government failures appear to be explained by the self-correcting nature of some market failures, which makes government intervention unnecessary; by the shortsightedness, inflexibility, and conflicting policies of government agencies...officials initiate and maintain inefficient policies.[64]

A very limited market failure did slow the emergence of flood insurance. Quite simply, insurers were busy doing other things and consumers did not demand flood insurance. As described above, the very nature of the flood insurance market, its small size, the market conditions under which flood insurance might have emerged, and the need to prepare complex hydrologic studies in order to price conventional insurance on a large scale meant that flood insurance would emerge more slowly than did other types of insurance. Although it is impossible to know for certain, these problems do not appear irremediable: In the long term, with the right database, no enormous problems seem to exist for writing flood insurance. Today, in fact, both AIG and Chubb write flood insurance policies that cover damages above the National Flood Insurance Program's $250,000 limit. In the long term, floods are not uninsurable. As a subsequent paper will outline, market failure alone cannot explain the failure of private flood insurance.

Instead, four major factors resulted in this government failure: the Army Corps of Engineers' massive levee building project, the Tennessee Valley Authority's mapping efforts and the spin-off zoning ordinances they spawned, market suppression via an enacted-but-unfunded flood insurance statute, and Congress's decision to remove risk-based pricing from the flood program to encourage participation.

The Army Corps of Engineers' levee system gave Americans living in frequently flooded areas a sense that they had a right to near-total freedom from flooding—that the government could always keep them safe from Mother Nature's worst. This system of levees also often served to reduce the value of insurance without resulting in a significant reduction in the premiums that insurance companies would have to charge to break even on underwriting. Further, the levee system encouraged development in flood-prone areas that would not have taken place absent the levees. Finally, Congress's heavy use of earmarking—the 1936 Flood Control

Act named 250 particular projects—ensured that nearly all decisions on whether and where levees should be built came about as a result of political pressures rather than from economic or scientific concerns. America's built landscape thus changed drastically with little regard to the danger of flooding involved.[65]

The Tennessee Valley Authority's regional flood modeling and the Flood Hazard Boundary Maps that followed made an already bad situation worse. Rather than mapping based on the best possible hydrological engineering estimates, the TVA distorted mapping to achieve its economic development objectives. This created an even greater moral hazard and resulted in even more development in areas that would not have developed on their own. The spread of the TVA's methods across the nation resulted in floodplain zoning ordinances that, in many cases, replicated the worst aspects of the TVA's efforts.

The 1956 Flood Insurance Act further discouraged private participation in flood insurance markets. Since Congress never actually repealed the Act, its very existence on the books made the expensive, risky process of market entry much less likely.

The TVA's efforts, while useless from a private insurance standpoint, made possible the setting of risk-aware policy premiums for the National Flood Insurance Program. These premiums made the program politically palatable for Congress while making it a foregone conclusion that the program would lose money year after year. While the initial program passed in 1968 required superficially strong risk-based pricing, Congress quickly gutted the program's risk-based character by allowing the use of deeply flawed FHBMs, removing penalties for failing to purchase flood insurance, and allowing across-the-board premium cuts that undermined the program's financial stability.

It is impossible to know for certain, of course, how or even if the private market would have developed flood insurance products. The evidence relating to flood policy, however, indicates that the government efforts made the emergence of private flood insurance—however slowly it may have come about—more problematic. Politicians saw a small market failure and greatly overcompensated. America ended up with a system of political insurance that has placed an enormous burden on the Treasury and created a moral hazard. The creation of such a system did not result from inevitable market failures but, rather, from several deliberate, interconnected government actions.

America ended up with a system of political insurance that has placed an enormous burden on the Treasury and created a moral hazard.

Notes

1 See e.g. Land Use and Society: Geography, Law, and Public Policy, 4-5.
2 As the chances of a disaster hitting approach 100 percent, the premiums necessary become equal to the cost of the property insured. While it's still possible to market insurance policies in this situation, the insurance policies do not serve to transfer any risk.
3 49 USC 15 1.
4 Gilbert Fowler White. *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States*. U. of Chicago, Dept. of Geography, 1942 (1945), 11-12.
5 In 1803, Congress passed America's first disaster relief bill, primarily a system of tax supports and Tariff Relief for Portsmouth, New Hampshire, following a disastrous fire there. "Bills and Resolutions, House of Representatives, 9th Congress, 2nd Session, Read the first and second time, and committed to a committee of the whole House, to-morrow. A Bill, For the relief of the sufferers by fire, in the tow of Portsmouth, New Hampshire," http://memory.loc.gov/cgi-bin/query/D?hlaw:1:./temp/~|ammem_aL2o
6 John M. Barry. *Rising Tide.* New York: Simon and Schuster, 1998.
7 White, 1942, 1.
8 Author's calculations based upon data in A. Willis Robertson et al. "Insurance and Other Programs for Financial Assistance to Flood Victims: A Report from the Secretary of HUD as required by the Southeast Hurricane Disaster Relief Act of 1965," Washington: U.S. Government Printing Office, 1966, 3.
9 Barry, Ibid.
10 Edward Overman. "Flood Peril and the Federal Flood Insurance Act of 1956." The Annals of the American Academy of Political and Social Science, Vol. 309, No. 1, 98-106 (1957)
11 15 USC 20
12 White, 1942, 201.
13 Ibid.
14 A.M. Best and Company, *Best's Directory of Insurers and Underwriters, 1953.*
15 National Oceanic and Atmospheric Administration. "Hurricane History, 2007," http://www.nhc.noaa.gov/HAW2/english/history.shtml
16 Harry Truman. "119 - Special Message to the Congress Transmitting Proposed Legislation on a National System of Flood Disaster Insurance," May 5, 1952, http://www.presidency.ucsb.edu/ws/index.php?pid=14105.
17 On the Hurricane season see: Jerry D. Jarrell et al. "The Deadliest, Costliest, and Most Intense Hurricanes from 1900 to 2000," National Oceanic and Atmospheric Administration, 2001. http://www.aoml.noaa.gov/hrd/Landsea/deadly/index. For Eisenhower's request, see
18 President. "Annual Message to Congress on the State of the Union," January 10, 1957, http://www.presidency.ucsb.edu/ws/index.php?pid=11029.
19 PL 566 (1955)
20 In theory, here is how it worked: The flood program would set a premium identical to the one a private company would charge for the same risk. The homeowner would pay 60 percent of that amount, the homeowner's state would pay 20 percent, and the federal government would pay 20 percent. The legislation did not provide guidance as to how this premium might be set.
21 The information about the proposed regulations is drawn from: David Grossman. "Flood Insurance: Can a Feasible Program Be Created?" *Land Economics*, Vol. 34, No. 4 (Nov., 1958), pp. 352-357
22 Most existing private risk-transfer mechanisms, it should be noted, were not much more sophisticated.
23 Edward Overman. "Flood Peril and the Federal Flood Insurance Act of 1956," *Annals of the American Academy of Political and Social Science*, Vol. 309, No. 1, 98-106 (1957)
24 American Insurance Institute. "Studies of Floods and Flood Damage, 1952-1955. New York, 1956.
25 Overman, 105.
26 A.M. Best and Company, *Best's Directory of Insurers and Underwriters, 1961.*
27 Gilbert White. *Choice of Adjustment to Floods.* University of Chicago, Department of Geography, Research Paper No. 93, 1964, 78. (White, it should be noted, did the actual research two years before the publication date.)
28 For a history of the TVA flood program, see: James M. Wright. *The Nation's Responses to Flood Disasters: A Historical Account.* Association of State Floodplain Managers, 2000, 16-21. http://www.floods.org/PDF/hist_fpm.pdf.
29 Ibid, 18.
30 The TVA, of course, faced no market forces to make sure it got these estimates right. Given the extreme difficulty of making them—even today—it's likely that initial estimates would not have been very good.
31 Ibid, 19.
32 "A Program for Reducing the National Flood Damage Potential: Memorandum of the Chairman to Members of the Committee on Public Works," U.S. Senate, 86 th Cong., 1st Sess., 31 Aug. 1959

33 American Institute for Research et al. "A Chronology of Major Events Affecting the National Flood Insurance Program," FEMA, 2002, 8.
34 Ibid, 27.
35 The first in the series: *Floods of the Kansas River, Topeka, Kansas, in 1935 and 1951: U.S. Geological Survey Hydrologic Investigations,* Atlas HA-14, Government Printing Office, 1959.
36 More research is needed to determine the exact shape of the TVA's influence on the USGS process for developing maps.
37 Greg Brouwer. "The Creeping Storm," in *Civil Engineering, Vol. 73, No. 6, June 2003.* http://www.pubs.asce.org/ceonline/ceonline03/0603ce.html
38 79 Stat. 1301 (1965).
39 Lyndon Johnson. "605 - Statement by the President Upon Signing the Southeast Hurricane Disaster Relief Act of 1965," November 8, 1965.
40 Task Force on Federal Flood Control Policy, *A Unified National Program for Managing Flood Losses,* August 10, 1966, Washington: U.S. Government Printing Office.
41 Ibid, 1-2.
42 Ibid, 14.
43 Ibid, 38-39.
44 Ibid, 39
45 Ibid.
46 As noted above, more research is needed on the nature of state regulatory climates.
47 White, 1964 , 78.
48 U.S. Congress. *Insurance and Other Programs for Assistance to Flood Victims: A Report from the Secretary of Housing and Urban Development as required by the Southeast Hurricane Disaster Relief Act of 1965.* 89th Congress, Second Session. Washington: U.S. Government Printing Office, 1966.
49 Ibid. 128.
50 H.R. 11197, 1967, PL-90 448 codified in Title XII of the Housing and Urban Development Act. Note that nearly all significant hearing on the program took place during 1967 and both chambers passed the great bulk of the program. Despite agreement in principle, several differences between the House and Senate bills held up establishment of the program for a year.
51 Rutherford Platt, *Land Use and Society: Geography, Law, and Public Policy*, New York: Island Press, 2004, 391.
52 Separate SBA programs provide low-interest loans to small businesses damaged by flood.
53 Today, private companies create the FIRMs under contract with the National Flood Insurance Programs. The process seems reasonably immune from political pressure because the contracts for writing the FIRMs get assigned by means of random selection and even the FEMA administrator cannot overturn FIRMS. Joseph Albaugh, in fact, tried to do so during early 2001 and found himself rebuffed and publicly embarrassed for doing so.
54 Michael Grunwald, "For S.C. Project, a Torrent of Pressure; Developer Wins Reprieve From FEMA on $4 Billion Project in Columbia Flood Plain," *The Washington Post*, July 13, 2001.
55 As Edward Overman discusses above, many states would have had a difficult time participating in a program that so blatantly provided grants to purely private homeowners.
56 It's interesting to note that no environmental groups appear to have testified for or against the program.
57 U.S. Congress, Committee on Banking and Insurance. "Hearings Before the Subcommittee on Banking and Insurance on H.R. 11197," Ninetieth Congress, First Session, 166.
58 Ibid, 74.
59 American Institute for Research, 2002, 14
60 Ibid, 15.
61 Ibid, 16.
62 Ibid, 18.
63 The law passed as Public Law 93-288. It did, however, continue to deny participation in some particular programs—such as SBA loans—to flood-insurance eligible individuals who did not purchase. Even this requirement, however, has been obeyed only in the breach.
64 Clifford Winston, *Government Failure Versus Market Failure: Microeconomics Policy Research and Government Performance.* Washington: AEI-Brookings Joint Center for Regulatory Studies, 2006, 4.
65 As Gilbert White observed, lenders' lack of information about flooding also made it hard to include it in their calculations.

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