

PROPOSED REGULATIONS FOR LAND USE CONTROL IN
RIVERINE FLOOD HAZARD AREAS IN MANHATTAN, KANSAS

by

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Chapter 1

INTRODUCTION

The Problem

The problem was, first, one of protecting the life and property of persons living and working near the major water courses in and near Manhattan, Kansas. This could be accomplished through the use of structures for flood protection and by channelizing the streams when possible. But both flood structures and channelizing would have involved a great deal of public funds, and both could have an undesirable environmental impact.

At the present time those parts of the city of Manhattan that would suffer the greatest loss in both life and property are protected by structures that will contain a flood having a predicted frequency of once in five hundred years. For the present, the city is probably as well protected from flood loss as can be justified by the economic benefit derived from the cost of the protective structures balanced against possible flood losses prevented by the structures. Now Manhattan is protected, but what about the future? The present structures will protect the presently developed area, but they cannot protect all possible future developments.

The real problem, then, was one of providing protection for life and property in flood hazard areas in which development may take place in the future, without great public expense or environmental harm. Because

control of the flood water itself was rejected, then the control of the use of the land in flood hazard areas was necessary to protect life and property. The end result of this paper is intended to be workable, realistic land use controls for flood hazard areas in Manhattan, Kansas.

The Approach to the Problem

The first step was to evaluate the extent of the flood hazard to presently developed areas of Manhattan. This was used to determine if the need for some form of flood protection is urgent. At the same time the areas that can be expected to develop in the near future were examined to determine future flood hazard. The extent of potential flood hazard in areas of future development determined the level of regulation necessary.

The development of meaningful land use controls for flood hazard areas in Manhattan required research into the present zoning ordinances. The measures now in effect for flood loss prevention were useful in determining the present attitude toward such measures.

The areas flooded by what became the "regulatory flood" was the most important single piece of data derived from engineering studies. It determines that area to be covered by the proposed regulations. Also desirable, but unavailable at this time, is data on that portion of the flood plain that would carry the high velocity currents and that which would hold backwater. Some of this information was available in the Flood Plain Information reports issued by the Corps of Engineers. Other sources are not presently available, but may be developed through the efforts of the City of Manhattan to obtain flood insurance.

Basic to this project was an examination of the several types of flood hazard area regulations through land use controls: one, two, or

three flood zones, case by case consideration of flood hazard, strictly defined and controlled flood zones, and so on. Each possible regulatory system was evaluated on the basis of the available information on floods, the staff available, both numbers and expertise, to administer the proposed regulations, and its compatibility with the present Kansas statutes.

It was helpful to examine flood hazard area regulations that are used in other Kansas cities. Such an examination showed the usual interpretation of the enabling legislation. This also helped expose weaknesses in both typical regulations and in the enabling legislation.

Necessary in any attempt to create new regulations is a review of the case law in the subject area. It was essential to have some idea of what is acceptable to the courts. It would probably be impossible to create a document that would be acceptable to every court under all circumstances. To ignore the area of case law would have been a grave mistake. Because of the complexity of such a case law review, it is hoped that the review presented in Chapter 5 is adequate. The review was developed through the use of specialized sources relating to planning and flood hazard area regulation.

Chapter 2

THE POTENTIAL HAZARD

Introduction

Before beginning a discussion of the potential hazard along the various major water courses in Manhattan a few terms should be defined as they are used in this chapter and throughout the paper.

The term "flood plain" will be used in the geological sense. That is, the flood plain is that area along a stream which has soil deposited by past floods. This usually will be an area much greater than that which will be covered by flood hazard area regulations.

Very important to this paper is the consideration of the 100 and 500 year floods. The 100 year flood is a flood event that can be expected to occur an average of once in 100 years. The 500 year flood is expected to occur an average of once in 500 years. These frequencies are usually determined by statistical analysis of stream gage records and meteorological records. The best way to express these frequencies is probably by stating the probability of such a flood occurring in a single year. For the 100 year flood the probability is 0.01, or a one percent chance of such a flood occurring in any year. For the 500 year flood the probability is 0.002 or a 0.2 percent chance of such a flood occurring in any year. It would be possible for two 100 year and/or 500 year floods to occur in two consecutive years. It would also be possible for no flood of such magnitude to occur in over 1000 years.

Wildcat Creek

Of all the major water courses in and near Manhattan, Wildcat Creek is the one that deserves the closest and most immediate attention. The city has been and will more than likely continue to grow in a westerly direction. Until recently, the Wildcat Creek flood plain has been the major barrier to development to the west and southwest of Manhattan. The improvement and extension of Seth Child's Road (K-113) which completed a beltway of sorts around on the east, north and west; and the widening of Anderson Avenue for Sunset to Seth Child's Road has given better access from the west to Kansas State University, the commercial areas on the east side of the city and the industrial park on the extreme eastern edge of the city. The improvements in transportation have allowed the development of residential areas on the hills just west of Wildcat Creek and have increased the development pressures on the Wildcat Creek flood plain.

An examination of the maps contained in the Flood Plain Information report with land uses overlaid shows that while by far the greatest portion of the flood plain for which land use information was available is not under urban development, there are two large areas of residential development.¹ One is the University Garden Apartments, just off Anderson Avenue. The other is a large mobile home park between the Chicago, Rock Island and Pacific Railroad tracks and Wildcat Creek. There are also three single family residences that lie within the flood plain delineated in the Flood Plain Information report. These residential uses create, of course, the greatest risk to human life when a flood occurs.

Because development of the Wildcat Creek watershed is relatively recent, no stream gage records are available.² Without these records it

was necessary for the U. S. Army Corps of Engineers to "analyze precipitation and stream flow records of basins in the nearby Big Blue River Basin having hydrologic, meteorologic, and physiographic characteristics similar to those of the Wildcat Creek Basin."³ It seems that this would cast some doubt on the accuracy of the results of the Corps of Engineers' study. This is not meant to degrade the study, but consideration of "similar" streams could not be the final word on the Wildcat Creek Basin.

The Division of Water Resources of the Kansas State Board of Agriculture has expressed the opinion, both publicly and privately, that the Corps of Engineers' estimates of 13,800 cubic feet per second for the discharge rate of a 100 year flood⁴ is low and that the discharge would actually be approximately 21,000 cubic feet per second.⁵ The Division of Water Resources' estimate for the discharge of a 100 year flood is closer to the Corps of Engineers' 500 year flood discharge estimate⁶ than to the Corps' 100 year flood estimate.

Because of the need for any proposed flood hazard area land use regulations to be based on proper technical data, the disparity between the Corps of Engineers and the Kansas Division of Water Resources figures for the discharge of the 100 year flood presents a problem in the evaluation of the present hazard. The most reasonable thing to do at this point would be to assume the Division of Water Resources estimates are correct so that any error in evaluating the hazard would, hopefully, be to overestimate the hazard. Unfortunately, no information is openly available from the Division of Water Resources on their estimate of the extent of the 100 year flood. This makes anything like an accurate

picture of the present flood hazard in the Wildcat Creek flood plain impossible.

At this point, it would seem that only general statements can be made about the present flood hazard in the Wildcat Creek flood plain. Firstly, there is a significant hazard to some residential uses. University Gardens apartments lie largely within 100 year flood limits.⁷ The mobile home park mentioned earlier has an appreciable portion of its area within the 100 year flood limits. There is one single-family residence that lies well within the 100 year flood limits. Secondly, there are several commercial uses that may occupy an area that will lie within the 100 year flood limits.

Also to be considered in the flood hazard evaluation is the amount of time for persons living or working in the flood plain to prepare and/or evacuate in the face of a flood event. Because of the small area of the Wildcat Creek watershed the flood to peak time⁸ is short. This would, allow very little warning for residents of the flood plain.⁹ Those persons living in the Garden Place apartments could seek refuge on the second floors of the buildings and there is probably little chance of loss of life, but the property damage would be large. Anyone living in the affected areas of the mobile home park would be exposed to great risk of life and property. The one single-family residence clearly affected would also be in an extremely dangerous situation.

Because of the pressures for development, the hazard to present development, and the short flood to peak time, the need for land use regulation in the Wildcat Creek flood plain is probably more critical than in any other flood hazard area in Manhattan. The controversy over the

flood discharges and flood limits should be settled before any attempt to finalize flood hazard area regulations for Manhattan. This is a serious discrepancy and could be grounds for the courts to find the regulations unreasonable. Also if flood hazard area regulations are to have any support from the public then there should be some final study which could be said to be the definitive statement on the flood hazard along Wildcat Creek. Only when such a final statement can be made will it be possible to implement flood hazard area regulations in Manhattan.

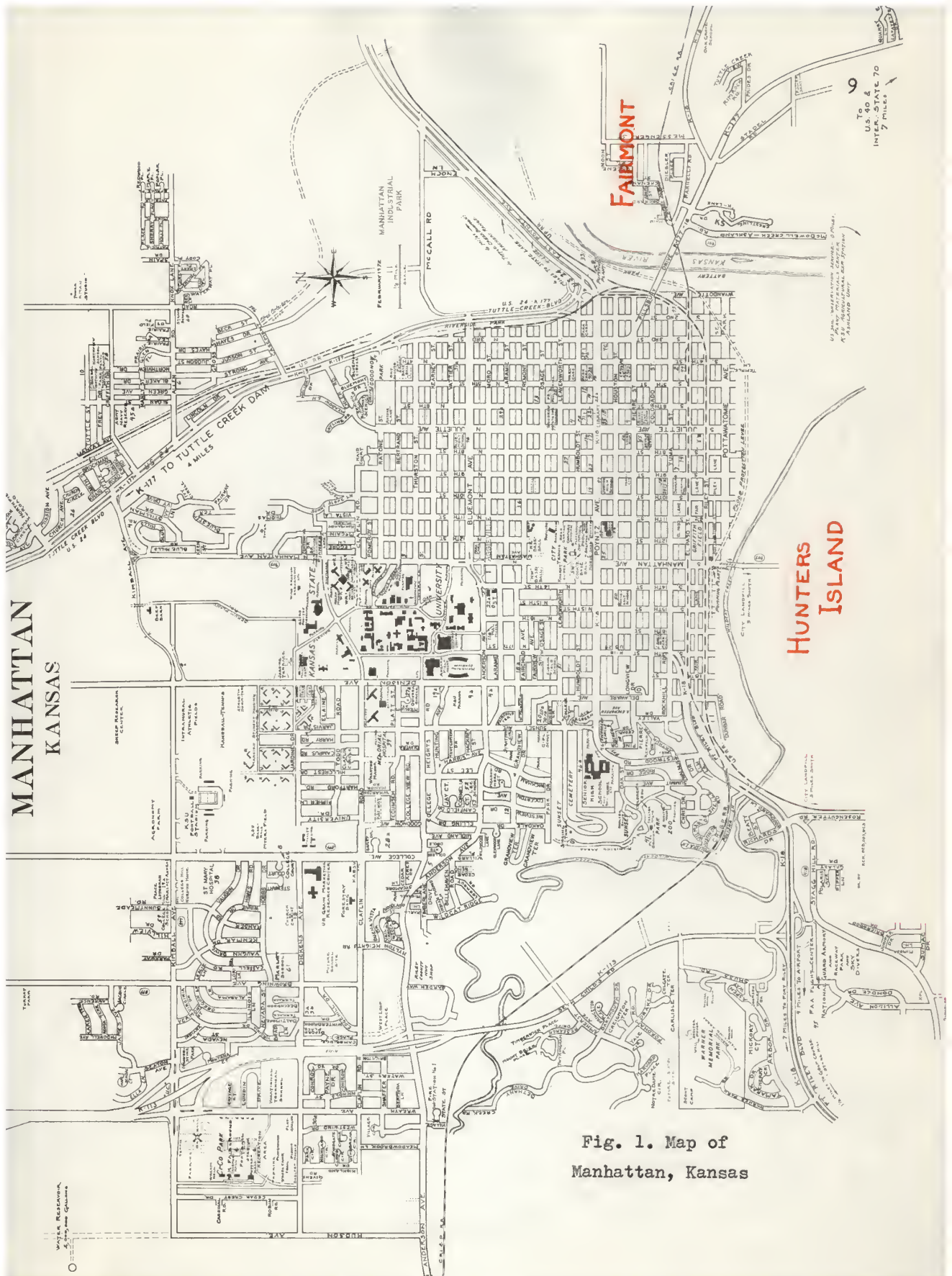
Big Blue River

The problem of questions about the accuracy of Corps of Engineers' figures for discharge and limits of flooding does not arise with respect to the Big Blue River flood plain. Stream gages have been in use on both the Big Blue and Kansas Rivers since 1887¹⁰ so records are available for these streams. These records allow for the direct study of the characteristics of the rivers which is not the case for Wildcat Creek.

Development in the Big Blue River Flood plain below Tuttle Creek Dam is thin and does not encroach on the limits of the 100 year flood. Nearly all of this development is single family residential with several mobile home parks scattered over the flood plain.

The size of the Big Blue River, which makes quick flood to peak rises unlikely, combined with the presence of Tuttle Creek Lake which would be used to control the rate of rise of the Big Blue, adequate warning could be given to evacuate the residents of the flood plain. The hazard to human life would seem to be low, but the damage to property would probably be high.

An explanation of the lack of development in the Big Blue River flood



**MANHATTAN
KANSAS**

FAIRMONT

**HUNTERS
ISLAND**

9
TO
U.S. 40 &
INTER-STATE 70
7 MILES

Fig. 1. Map of
Manhattan, Kansas

plain would have two major points. Firstly, at present the major thrust of development in the Manhattan area is taking place on the west side of the city. There, expensive residential areas are developing, and along with them, large commercial areas. Secondly, many people in the Manhattan area can remember the flood in June, 1951, when the Big Blue River had a discharge that was only slightly less than that of a 500 year flood.¹¹ A great many people in Manhattan are aware of the flood hazard in the Big Blue River flood plain as a result of the 1951 flood.

At present, the danger to human life is low in the Big Blue River flood plain largely because of Tuttle Creek Lake. Also, the possible property damage is not large, but significant should a large flood occur. But, even for all its benefits to Manhattan, Tuttle Creek Lake could create overconfidence if a flood event of noticeable magnitude does not occur in the near future. Such an occurrence would serve as a reminder of the flood hazard that still exists. It would seem that the only other alternative is the adoption of some form of regulation.

Kansas River

As noted before, records have been kept on the Kansas River since 1887, and therefore, there is no conflict over discharge or flood limits.

The hazard to human life on the Kansas River flood plain is probably small. This is because the main stem of a major river has a long flood to peak period and warning and evacuation is possible. Property damage would be large because a number of persons live on Hunters Island, between Wildcat Creek and the Kansas River, in single family homes and mobile homes. Some damage would also occur to the sand extraction facility and to the automobile salvage yards on the south bank. Directly east of the

Manhattan CBD; across the Kansas River and north of the Chicago, Rock Island and Pacific Railroad tracks lies the Fairmont area. Fairmont is a community of single family residences that is nearly completely within the limits of the 100 year flood. Here also, the property damage would be high and the loss of life low.

Fairmont has a problem that could create an extra hazard. A levee exists which would appear to afford some protection, but is not sufficient to contain the 100 year flood. This condition could create a situation where there would be unnecessary loss of both life and property because of unjustified confidence in the levee.

Because of the 1951 flood experience, protection levees were constructed which will protect a large portion of the city from floods of the magnitude of the 1951 flood. The 1951 experience exceeded the discharge for a 500 year flood¹² and therefore, the city is more than protected from a 500 year flood. Also, because of the 1951 flood experience, there are a great many people who remember and have respect for the power of a river on the rampage and this has resulted in a reluctance to develop the Kansas River flood plain.

The hazard to human life in the Kansas River flood plain is probably low, but the potential property damage could be high in the Fairmont area and on Hunters Island. It is common knowledge that Hunters Island is a relatively high hazard area, but the Fairmont area is probably considered safe by the residents because of the inadequate levee. The need for regulation in the Kansas River flood plain is not acute at this time. However, regulation would continue to discourage flood damage prone uses on Hunters Island and make Fairmont residents aware of the hazard.

Footnotes to Chapter 2

- ¹Land use was taken from working maps of the Manhattan City Planning Department. The maps were compiled during the summer of 1972.
- ²U. S. Army Corps of Engineers, Flood Plain Information Wildcat Creek, Manhattan, Kansas, Kansas City District, 1971, p. 5.
- ³Ibid. p. 18.
- ⁴Ibid.
- ⁵The figure of 21,000 c. f. s. was mentioned in a conversation with Mr. J. W. Funk of the Kansas Board of Water Resources on March 6, 1973.
- ⁶Wildcat Creek, p. 18.
- ⁷This is based on the Board of Water Resources estimates.
- ⁸Flood to peak interval is defined as the time it takes for a stream to rise from flood stage to the crest. This time can be minutes or days.
- ⁹Wildcat Creek. p. 5.
- ¹⁰U. S. Corps of Engineers, Flood Plain Information Kansas and Big Blue Rivers, Kansas City District, 1972.
- ¹¹1951 flood discharge was approximately 98,000 c. f. s. (Kansas and Big Blue Rivers, p. 15).
- ¹²1951 flood discharge was approximately 300,000 c. f. s. (Kansas and Big Blue Rivers, p. 10) and the estimate for a 500 year flood is 250,000 c. f. s. (Kansas and Big Blue Rivers, p. 15).

Chapter 3

TYPES OF FLOOD HAZARD AREA REGULATIONS

A Model Scheme for Flood Plain Regulation

In writing flood hazard area regulations several types of regulations are possible. The type of regulation used depends on several factors. The most important of these factors is the data on which the regulations are to be based. After the technical data to be used is considered then several general regulation schemes can be applied with respect to boundaries to be set up in the regulations.

The most important of these boundaries is that of the floodway area. The floodway is generally defined as that part of an area subject to flooding which is necessary to carry the flow of the flood of such frequency as is being used to establish the regulations. This would be an area in which no obstructions are desired.

Other boundaries could be established on the basis of areas in which flooding would have a major effect on the community and areas where there would be little or no effect on the community as a result of floodings. The boundaries of these types of flood hazard areas could be called culturally defined lines or boundaries.¹

The boundaries discussed above can be used to describe three zones within the flood plain. The first would be a prohibitive zone where any encroachment without powerful justification would be against the public interest. This would be the floodway. A restrictive zone would be next.

Such a restrictive zone would further the general land use objectives of the community to restrict development sensitive to flooding. In this zone filling to a certain elevation or minimum floor elevation would be required along with some restrictions as to the type of land use allowed. A warning zone which would require some type of warning about flood risks would be the third zone. Here restrictions are not seen as necessary.² Examples of the use of these zones is shown in Figure 2.

As can be seen, the topography of flood plain affects the application of these standards greatly. A stream with a large flat flood plain would require the use of all three zones. A stream with a steeply sloping flood plain might have only a prohibitive zone applied. These types of variations can, of course, occur along the flood plain of a single stream.

Flood Plain Zoning Ordinances

In Sacramento City, California (1956) nearly all building in the flood plain is prohibited and only accessory buildings are allowed except in parks and playgrounds. In effect, only open space and agricultural uses are allowed. This is applied to "areas subject to inundation"³ and there are no conditional uses.

This is a very restrictive ordinance allowing no industrial or commercial uses and apparently based on elevations for the maximum flood of record. To attempt to institute such regulations in Manhattan would probably result in a great many court cases.

The Cincinnati, Ohio (1958) regulations allow, as uses by right: agriculture, seasonal residential uses, recreation facilities, outdoor advertising, storage of building materials, and restaurants. Amusement parks, airports, junk yards, mining, storage of liquid and explosives,

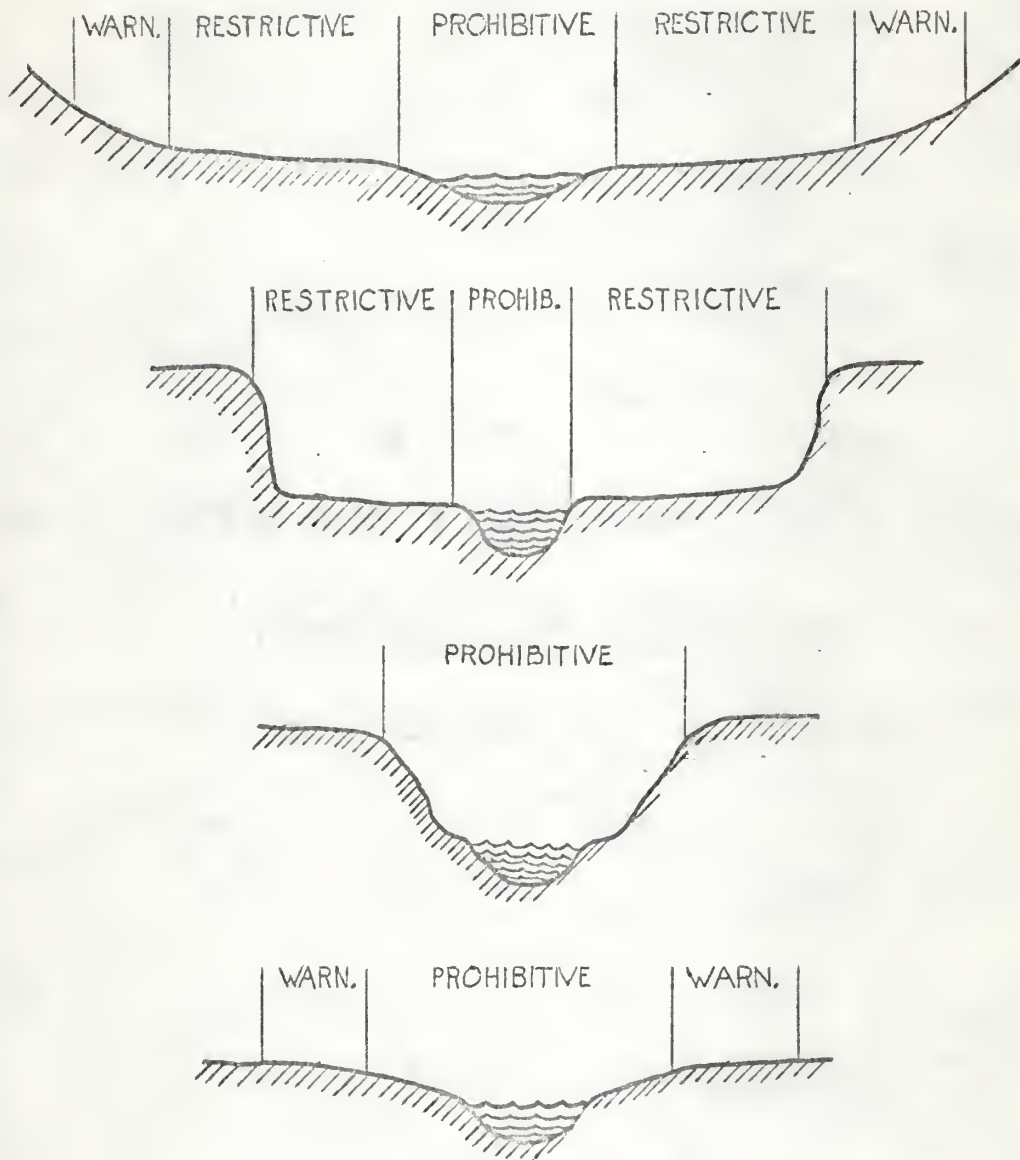


Fig. 2. Use of flood hazard zones

refuse disposal, and industrial uses are permitted conditional uses. For conditional uses reports are to be obtained from the Corps of Engineers in each case and the board of Zoning Appeals is bound by their findings on fills and other reclamation, and on safety of life and property. Also, any type of material stored must not be buoyant or a source of possible pollution.⁴

Here, again this is a single district ordinance, but it is flexible and built on a case by case examination of the effects of many uses based on good technical data. It would seem that the uses by right of seasonal residential and restaurants might better be conditional uses, but they may be required to have some form of protection in some other section of the zoning ordinance or in the subdivision regulations.

Calvert City, Kentucky (1953) simply requires a minimum floor elevation for residential and commercial buildings. There are no specific flood hazard zones.⁵

This type of approach would be easy for a small community to apply because it would not require much technical knowledge to enforce such a regulation. It places most human activities at a presumed safe level, but it does not allow for the preservation of a channel or floodway for high velocity flood water.

A plan for flood drainage channels is the basis for the Albuquerque, New Mexico (1955) flood plain regulations. Any plans for any structure within 150 feet of the centerline of a flood channel must be approved by the city engineer. All buildings adjacent to a flood channel must have the floor elevations five feet higher than the bed of the channel. There also cannot be any obstruction to the natural flow of flood waters within

the channel.⁶

This type of regulation establishes definite floodways which are not to be obstructed and creates a flood fringe area which is dealt with on a case by case basis. The effectiveness of this ordinance is based on the plan developed for flood drainage channels.

Proposed regulations for Iowa City, Iowa use a two district approach with one district being a floodway and only open space type land uses being allowed. The second zone is one in which no streets or alleys are to be built below an elevation less than that of the regulatory flood and no first floor or basement floor may be constructed at an elevation lower than one foot above the regulatory flood height.⁷

This type of regulation allows for a floodway with the adjacent land being filled above the regulatory flood limits. Here there is a prohibitive and a restrictive zone but no warning zone.

Milwaukee County, Wisconsin (1927) has a three district ordinance: Upland District, Valley District and Channel District. The Upland and Valley Districts are overlay districts, with the Upland District serving as a warning district and the Valley District serving as a restrictive district requiring fill to minimum elevations and minimum floor elevations. The Channel District forms the floodway and no construction of any type except bridges and dams is allowed.⁸

As has already been observed, this type of ordinance closely follows the model discussed at the beginning of this chapter. The only difference being that the Upland District is applied to all land outside incorporated areas in the county. This would greatly lessen the usefulness as a warning of possible flood hazard. It should be restricted

to those areas that have some threat of flood.

A General Scheme of Regulations for Manhattan

Use of a three zone type of regulation for the flood plains in Manhattan would seem to be desirable. It would be flexible in the sense that development would not be an all or nothing kind of thing and therefore, landowners would be allowed reasonable use of their land. Also, it would set up boundaries which, backed up by technical data, would be logical and easily understood and not require in-depth studies every time a building permit was requested for a structure in the flood plain.

In some areas it would not be necessary to use all three zones. Along the left bank of the Kansas River by the CBD there would be need only for a prohibitive zone because of the levee. Along Wildcat Creek there are places where only the prohibitive and restrictive zones would be used. Along most of the Big Blue River all three zones would be used, but with a narrow restrictive zone and a wide warning zone. The exact boundaries will have to be established through the use of the Corps of Engineers' Flood Plain Information reports and studies that should be requested by the City of Manhattan under the federal flood insurance program.

Footnotes to Chapter 3

¹Gilbert F. White, ed., et al, Papers on Flood Problems, (University of Chicago, Department of Geography, Chicago, Illinois, 1961), p. 141.

²Ibid., pp. 141-142.

³Francis C. Murphy, Regulating Flood-Plain Development, (University of Chicago, Department of Geography, Chicago, Illinois, 1958), p. 175.

⁴Ibid., pp. 182-183.

⁵Ibid., p. 184.

⁶Ibid., pp. 184-185.

⁷White, et al, Papers on Flood Problems, pp. 177-179

⁸Murphy, Regulating Development, pp. 187-188.

Chapter 4

KANSAS ENABLING LEGISLATION AND FLOOD HAZARD AREA

REGULATIONS IN OTHER KANSAS CITIES

The Enabling Legislation

The Kansas zoning enabling legislation allows a city to divide itself into zones and regulate or restrict the use of land and buildings within each zone. These zones may be created to restrict the uses for residential, commercial, industrial, conservation, flood plain or for other uses determined to be necessary. Also, the authority is given to zone unincorporated flood prone land within three miles of the city limits. This may be done without regard for county zoning ordinances as long as there is no flood plain district in the county zoning ordinance.¹

The enabling legislation also contains a definition of a flood plain that restricts the area legally considered a flood plain to the land which would be covered by a 100 year flood. This section of the law also indicates that only in the legally defined flood plain may restrictions be imposed on land use through the establishment of districts. Also, this same section requires that "all resolutions, ordinances and regulations relating to flood plains shall be submitted to the chief engineer, Division of Water Resources, Kansas State Board of Agriculture, for review and approval."²

Such proposed regulations submitted to the chief engineer of the Division of Water Resources are required to meet certain minimum

standards. Firstly, unless well protected, human habitation is prohibited. Secondly, flood proofing of some type is required of all new construction. Thirdly, encroachments on the flood plain will not be permitted if they have an unreasonable effect on other persons or property. Finally, those uses not prohibited explicitly, and not causing unnecessary restriction of flood discharge are permissible.³

At first glance, this would seem to restrict the number of permissible flood hazard districts to one. Such is not the case because the only restriction is the fact that only the 100 year flood limits may be used to establish regulations that restrict the use of land. This does not exclude the use of two or more restrictive districts, the prohibitive and restrictive zones discussed in chapter three. It also would not seem to exclude the warning zone also discussed in chapter three. The real restriction then, would seem to be in the use of only the 100 year flood limits and not in the type of approach taken in establishing regulations.

Flood Hazard Area Regulations of

Selected Kansas Cities

The purpose of this section is to examine several flood hazard area regulations currently in use in Kansas cities and towns. These regulations are ones passed after the enactment of the state provisions requiring review of all proposed flood hazard area regulations by the Chief Engineer of the Kansas Division of Water Resources. Because there are no published guidelines or policy statements, this type of examination is necessary to determine what is acceptable to the Division of Water Resources Chief Engineer.

The Dodge City Ordinance uses a two district approach. The most

restrictive district is called the Floodway District and allows only agricultural uses or lawns, parking areas, or play areas as uses by right. Conditional uses in the Floodway District consist of recreational types of uses and storage yards. Also listed as conditional are streets, bridges, utilities and railroads. Standards for conditional uses are based on projected effect of floodway capacity or increase in flood height.⁴

The second district is called the Flood-Fringe Overlay District. The permitted uses are the same as the Floodway District with the addition of structures constructed on fill with basement floor not lower than the "regulatory flood protection elevation." Conditional uses are those uses which, by nature of the existing streets or utilities, must be elevated by means other than fill. Application must be made for the granting of such a conditional use and engineering and construction information must be transmitted to the city engineer so that he may evaluate the adequacy of the provisions for protection from the flood hazard. The Board of Zoning Appeals is required to base its decision on an application on the basis of the City Engineers' reports plus consideration of possible alternative locations, requirements for water front location and the relationship to present development and to the land use plan. The Board may attach special conditions dealing with flood proffing, waste disposal and water supply, and may request deed restrictions.⁵

Nowhere in the ordinance is the "regulatory flood protection elevation" specified. No relationship is established between the ordinance and technical studies on which the ordinance is based which would specify the "regulatory flood protection elevation".

Evaluation of Acceptable Regulations

The use of two district regulations indicate that it is not felt that the enabling legislation limits flood hazard area regulations to a single district. The use of two districts allows for the use of a well defined floodway, the purpose of which is easily understood, and is easily recognized on a zoning map. Also, the use of a two district type of regulation should reduce the possibility of court action on the basis that all reasonable uses of the land are excluded. It would be very unlikely that the boundaries of a parcel of land would fall entirely within the area designated as the floodway. Also, if the area designated to be the floodway is the minimum area necessary to carry the flow of the regulatory flood, then any obstruction constructed in the floodway could be prohibited on the basis of protection of the general health, safety and welfare of the community outside the floodway. With a single district regulation it would be much harder to clearly define the floodway and the chances of having the ordinance considered confiscatory would be greater.

In the Dodge City ordinance there is a list of factors for the Board of Zoning Appeals to consider based on the City Engineer's evaluation of the plans submitted for construction in the Flood-Fringe District when existing streets and utilities make filling impractical. One of these is consideration of the possibility of increased danger to life and property caused by such an encroachment's effect of flood characteristics. Since structures are required to be elevated, it would seem that the effect on flood characteristics would be less because flood waters would have a greater area to occupy at a lower elevation that would be the case if the area occupied by structures were totally filled. This would seem to be a

restatement of the objective of establishing the floodway: to determine areas where protected uses may be placed with minimum damage to community and themselves.

Two more of the items on this list could be questioned. First is the relationship of the proposed use to existing development and to future development. The second is the relationship of the use that is proposed and the comprehensive plan for the community. Because this is an "overlay district" there should be a basic type of use district on which the Flood Fringe District is placed. This basic use district should restrict the developer to a use compatible with surrounding uses. Also, because the total zoning ordinance should be based on a comprehensive plan, there should be little question of the compatibility with the plan.

In general, the type of flood hazard area regulations found to be acceptable to the Chief Engineer of the Division of Water Resources are reasonable in that they seem to be based on sound data and are enforceable. The restriction to the 100 year flood would seem to be rather limiting in view of the fact that the 100 year flood has been exceeded in Manhattan five times on the Big Blue River and three times on the Kansas River since 1837.⁶ While statistics may show that the 100 year flood level has only a one per cent chance of occurring in any year, the fact that that level has been exceeded so many times in eighty-six years can be unsettling. This serves as an illustration of the fact that even though it can be said we are protecting against floods, such protection is only effective to a certain level.

Footnotes to Chapter 4

- ¹Kansas, Kansas Statutes Annotated, (1963) Section 12-707.
- ²Kansas, Kansas Statutes Annotated, (1972 Supplement), Section 12-734.
- ³Ibid., Section 12-735.
- ⁴Dodge City, Kansas, Zoning Ordinance, (Revised 1972) Sections 4-501 through 4-503, (see below, Appendix B).
- ⁵Ibid.
- ⁶Kansas and Big Blue Rivers, p. 9.

Chapter 5

FLOOD HAZARD AREA REGULATIONS IN THE COURTS

Introduction

As in planning law in general the case law in flood hazard area regulation is rather limited. This is especially true of federal court cases. Only a few of the cases noted below are from the federal courts. The majority of the cases come from the state courts of states other than Kansas. This lack of federal or Kansas cases means that only a general view of the type of regulations that are acceptable in the United States can be given here. Decisions of courts of other states are not directly applicable to Kansas even though the arguments presented might be considered by Kansas courts. It is very difficult to know what is acceptable to the courts largely because of the lack of directly applicable cases.

The conclusions drawn in this chapter are not to be considered either legal opinions or predictive of decisions of Kansas courts. This review was carried out without benefit of extensive legal training and could not be considered the last word on the questions considered.

Use of Flood Hazard Area Regulations

to Reduce Government Costs

In Mansfield and Swett, Inc. v. Town of West Orange 198 Atl. 225 (1938), it was found that before the municipality could prohibit a development, it must be able to show that some abnormal hazard to the

community will result from the construction of the development.¹ It would seem to follow that the hazard which is created by encroachment on the flood plain, in the form of higher elevations of floods after the encroachment takes place could be defined as an abnormal hazard. There rises here a question of when do individual, small encroachments create an abnormal hazard. Also, is treatment of landowners uniform if encroachments are allowed at random and then cut off at the arbitrarily set last increment of increased flood elevation?

The Kentucky Court of Appeals found in Johnson v. Reasor 392 S. W. 2d 54(1965), that a municipality has the right to withhold services from an area previously unserved within its boundaries. This may be done if the basis for such a refusal to supply services is in any way reasonable and does not involve any arbitrary or fraudulent action. There is an obligation, however, to provide services to those whose situation is similar to persons already being served.² Under this ruling it would seem reasonable that if a city were to decide that it would not provide services to any area which was subject to flooding at a certain frequency and no development had yet taken place, then the city could refuse to provide streets, water and sewers to such areas. However, if such development has occurred then services must be provided to new development that takes place in the same or similar areas. Manhattan would not be able to restrict flood plain development in this way because development has occurred within the 100 year flood limits along Wildcat Creek. Another, more acute type of regulation is necessary for Manhattan to control encroachment on flood plains and reduce the costs which would be involved in emergency flood operations.

Use of Flood Hazard Area Regulations to Minimize
the Threat to Public Safety

In Biffer v. Chicago 278Ill. 562 (1917), the Illinois Supreme Court ruled that if the legislative body of the city considers an act or thing dangerous to health or safety of the community and passes a law to prevent that hazard, then the policy of the law is to support such legislation. The factor of greatest importance is the health and safety of the community. The most important part of the police powers is the maintenance of the health of the community.³

The United States Supreme Court has ruled that a legislative body may adopt the most conservative methods of protection of public health and safety which is technically feasible - Queenside Hills Realty Co. v. Saxl 328 U. S. 80 (1946).⁴

In Chicago and Alton Railroad Co. v. Tranbarger 238 U. S. 67 (1915), the Supreme Court held that limitation on construction which will impede the flow of a stream and there by cause damage which would not have occurred without the new structure is constitutional. This is simply prevention of a nuisance and is therefore, clearly related to the police powers.⁵

In 1959 the Connecticut Supreme Court, in Vartelas v. Water Resources Commission 146 Conn. 650 (1959), upheld the validity of a state-levee encroachment control program. The legislation had been passed after destructive floods in August, 1955. The court held that the legislation was valid exercise of the police power of the state and was in the interest of public welfare.⁶

Use of Flood Hazard Area Regulations

to Prevent Fraud

In American Land Co. v. Keene 41 F2d. 484 (1930), a Federal court upheld the validity of an ordinance which prohibited the construction of dwellings in a flood hazard area adjacent to a river. The court held that although the ground was suitable for construction of residences, the threat of flood was sufficient reason to prohibit residential uses. One dissenting opinion, which agreed that the ordinance was valid but disagreed on other grounds, noted that it was a proper exercise of the police power to protect those persons, who might purchase the dwellings, from being victimized.⁷

A California appeals court held that a California statute requiring that notice be sent to the State Real Estate Commission describing any subdivided land being sold or leased with the description of the land and any defects was valid in Westbrook v. Summerfield, Roberts and McArthur, Inc. 154 Cal. App. 2d 761 (1957). The court felt that the statute's purpose was to protect the individual members of the public who might purchase homes or lots from subdividers. In doing this the statutes required full information be given the prospective buyer concerning public utilities and other facts about the land. It is reasonable for the commissioner to forbid sale or lease to prevent fraud.⁸

Use of Regulations to Protect the

Individual from His Own Acts

The most common of this type of regulation to find its way into the courts is the "crash helmet" laws requireing motorcyclists to wear helmets. In People v. Carmichael 288 N. Y. S. 2d. 931 (1968), a New York court

held that the state has an interest in maintaining citizens who could support themselves, bear arms and add to the resources of the country. In State v. Lambardi 241 A. 2d 625 (1968), a Rhode Island court expressed the feeling that it was the concern of the legislature that individuals be prevented from behaving in a manner which could make them dependent on the state. A New Jersey court simply held that the state has an interest in protecting individuals from the consequences of their own acts in State v. Mele 103 N. J. Super. 353 (1968).⁹

In 1953, the Connecticut Supreme Court held that in Corthouts v. Newington 140 Conn. 284 (1953), that it was reasonable to exclude residential uses from an industrial area. The danger, because of the possible proximity to industries using explosives or poisonous substances, would have a direct relation to the health, safety and welfare of both the individual and the public.¹⁰

Restrictions of building in the area along the shore line subject to storm damage were upheld by the New Jersey Supreme Court in Spiegle v. Beach Haven 46 N. J. 479 (1966). The court found that because of the possibility of destruction of dwellings, something which had occurred in a 1962 storm, the regulations were only what would be reasonable actions that the plaintiffs themselves should take on their own.¹¹ This use would seem to have a strong relationship to riverine flood hazard area regulations.

Conclusions

The general thrust of all the cases reviewed here would appear to relate the regulations to health, safety, or general welfare of the community. A person killed by his own acts reduces the productivity of

the community by the amount of his contribution. If the individual is only injured, the community loses his productivity until he returns to work and may have to give financial assistance or special public services to the individual or his family. This reasoning always returns to the effect of the individual's actions on the welfare of the community.

It might also be argued that in creating legislation which will result in lower costs to the community, the legislative body is improving the welfare of the community. Money not spent on rescue, relief or emergency protective measures might be spent on the provision of more or higher quality services to the community. Likewise, money not spent in special technical requirements for provision of services to flood hazard areas might be spent on other projects to improve the quality or quantity of other services. Also, it could well be that in this age of tax revolts these savings would simply be passed on to the taxpayers as a reduction in the mill levy or, at least, not as great an increase. For the most part, though, these savings would be invisible. It would mean that the extraordinary expenses connected with flooding would be reduced in so far as the protective measures are effective.

There seems to be no questions as to the right of the governing body to create regulations to prevent fraud. There appears to be general agreement on this point. The right of a municipality to protect its citizens from unknowingly buying or leasing land or a structure which may be threatened by periodic flooding seems to be clear.

There is also little question that the community, through its governing body has the right to protect itself from unreasonable increases in possible flood damage due to encroachments on the flood plain. The

community may, to stabilize the flood hazard, regulate encroachments. Such regulations may include the establishment of floodways where no encroachment is allowed and the establishment of strict requirements for construction and use of areas adjacent to the floodway. The preservation of public safety is the most obvious and most important of the police powers.

It would not be unreasonable to state again that the above review and discussion of case law is not to be considered a legal basis for the establishment of flood hazard regulations. The review and discussion was undertaken with extremely limited legal training and was used only as a general guide by the author. Professional legal advice should be sought before any use beyond this paper is made of the above review and discussion.

Footnotes to Chapter 5

¹Allison Dunham, "Flood Control Via the Police Power", University of Pennsylvania Law Review, Volume 107, No. 8, June 1959, p. 1126.

²United States Water Resources Council, Regulation of Flood Hazard Areas to Reduce Flood Losses, Volume One, Parts I-IV, pp. 302-303.

³Ibid., p. 298.

⁴Ibid.

⁵Robert K. Anderson, American Law of Zoning, Volume II (The Lawyers Co-operative Publishing Company, Rochester, New York, 1968), p. 21.

⁶Regulation of Flood Hazard Areas, p. 301.

⁷Ibid., pp. 305-306.

⁸Ibid., p. 307.

⁹Ibid., p. 310.

¹⁰Ibid., p. 311.

¹¹Ibid., p. 312.

Chapter 6

PROPOSED FLOOD HAZARD AREA REGULATIONS

FOR MANHATTAN, KANSAS

Introduction

The regulations proposed here are not to be construed as legally sound in the form that they are presented. The basis for these proposed regulations is that material which has been presented in the first five chapters of this paper. No claim is made that these proposed regulations are based on a background of legal training. A review of similar ordinances in other Kansas cities and a light review of court cases which pertain to the rights and responsibilities of a municipality with respect to the police powers and flood hazard areas is not sufficient training in law to enable a person to formulate legislation which would meet the requirements of a court of law. Again, this is not intended to be a precise legal document.

The scheme of flood hazard area district will be a three district approach. This approach was discussed in Chapter 3. There will be three districts: 1) Floodway (FW); 2) Flood Fringe Overlay (FF); 3) Flood Hazard Overlay (FH). The Floodway District will stand on its own. Land which lies within a designated Floodway District area may carry no other classification. Both the Flood Fringe and Flood Hazard Districts will be used in combination with other districts, and may not stand alone. A parcel of land may be zoned R2/FF or R2/FH, but a parcel may not be zoned

only Flood Fringe or Flood Hazard.

The following proposed additions to the Manhattan zoning ordinance will be given Article and section numbers consistent with that ordinance. Where existing sections need additions or changes, a statement of the necessary changes will be given rather than a re-writing of the section.

Because of a lack of proper data for the determination of encroachment lines consistent with the requirements of the enabling legislation, no maps have been prepared. Suggestions will be made for general standards for the delineations of Flood Fringe and Flood Hazard Districts.

The proposed regulations are largely based on a model two district ordinance found in the United States Water Resources Council's Regulation of Flood Hazard Areas. There are modifications to the model both to specifically fit the established framework and some changes in concept. There is also the addition of the Flood Hazard District.

Recommended Changes to City of Manhattan

Zoning Ordinance

Section 2-101, Intent and Purpose, would have to be changed to include reference to Sections 12-734 and 12-735 of the Kansas Statutes Annotated. These sections concern the definition of a flood plain and the requirements for the establishment of flood hazard area regulations. Reference is already made to Section 12-707 of the Kansas Statutes Annotated which is the enabling section for zoning by municipalities.

The language of Section 2-101 should be changed to include purposes relating to flood losses and flood hazards. This should include:

Restrict or prohibit uses which are dangerous to health, safety or

property in times of flood or cause excessive increases in flood heights or velocities;
 Require that uses vulnerable to flood, including public facilities which serve such uses, shall be protected against flood damage at the time of construction;
 Protect individuals from buying lands which are unsuited for intended purposes because of flood hazard.

Section 3-401(A) should state that the City of Manhattan is divided into 21 districts. The Floodway, Flood Fringe, and Flood Hazard Districts should be added to the listing of districts.

The following proposed regulations for the flood hazard areas in Manhattan will be put in a form as similar as possible to the form of the present Manhattan Zoning Ordinance.

ARTICLE 4

DISTRICT REGULATIONS

PART 4. FLOOD HAZARD AREA DISTRICTS

4-401 FW. Floodway District: The FW. District is designed to maintain, without unnecessary obstructions, the area required to carry the flow of the regulatory flood without excessive increase in flood heights or velocity.

(A) Permitted Uses:

- (1) Agriculture as defined in these regulations.
- (2) Industrial and Commercial uses such as loading areas, parking lots and airport landing strips and taxiways.
- (3) Private and public recreational uses such as tennis courts, golf courses, picnic grounds, boat launching ramps, parks, wildlife and nature preserves, hiking and horse back riding trails.
- (4) Residential uses such as lawns, gardens, parking areas and play areas.

(B) Conditional Uses: These uses are subject to the provisions of Section 4-401(C) in addition to the provisions of Sections 10-601 through 10-607.

- (1) Uses or structures accessory to open space or Conditional Uses.
- (2) Circuses, carnivals, and similar transient amusement enterprises.
- (3) Drive-in theaters, new and used car lots, signs and billboards.

- (4) Extraction of sand, gravel, and other materials.
- (5) Marinas, boat rentals, docks, piers and wharves.
- (6) Railroads, streets, bridges, utility transmission lines and pipelines.
- (7) Storage yards for equipment or machinery.
- (8) Kennels and stables.

(C) Standards for Conditional Uses:

- (1) All Uses: No structure (temporary or permanent), fill (including fill for roads and levees), deposit, obstruction, storage of materials or equipment, or other use may be allowed as a conditional use, which, acting alone or in combination with existing or future uses, unduly affects the capacity of the floodway or unduly increases flood heights. Consideration of the effects of a proposed use shall be based on a reasonable assumption that there will be an equal degree of encroachment extending for a significant reach on both sides of the stream. In addition all Floodway Conditional Uses shall be subject to the standards contained in Section 4-403(D).
- (2) Fill:
 - (a) Any fill proposed to be deposited in the floodway must be shown to have some beneficial purpose and the amount thereof not greater than is necessary to achieve that purpose, as demonstrated by a plan submitted by the owner showing the uses to which the filled land will be put and the final dimensions of the proposed fill or other materials.
 - (b) Such fill or other materials shall be protected against erosion by rip-rap, vegetative cover or bulkheading.
- (3) Structures (temporary or permanent)
 - (a) Structures shall not be designed for human habitation.
 - (b) Structures shall have a low flood damage potential.
 - (c) The structure or structures, permitted, shall be constructed and placed on the building site so as to offer the minimum obstruction to the flow of flood waters.
 - (1) Whenever possible, structures shall be constructed with the longitudinal axis parallel to the direction of flood flow, and
 - (2) So far as is practicable, structures shall be placed approximately on the same flood-flow lines as those of adjoining structures.
 - (d) Structures shall be firmly anchored to prevent flotation which may result in damage to other structures, restriction of bridge openings and

other narrow sections of the stream or river;
and

- (e) Service facilities such as electrical and heating equipment shall be constructed at or above the regulatory flood protection elevation for the particular area or flood proofed.
- (4) Storage of Equipment and Materials
- (a) The storage or processing of materials that are in time of flooding buoyant, flammable, explosive or could be injurious to human, animal or plant life is prohibited.
 - (b) Storage of other material or equipment may be allowed if not subject to major damage by floods and firmly anchored to prevent flotation or readily removable from the area within the time available after flood warning.

4-402

FF. Flood Fringe District: This overlay district provides special regulations designed to reduce flood losses. The requirements of this district are in addition to those contained in the basic underlying district.

- (A) Permitted Uses: The following uses shall be permitted uses within the Flood Fringe District to the extent that they are not prohibited by any other ordinance.
- (1) Any use permitted in Section 4-401(A).
 - (2) Structures constructed on fill so that the first floor and basement floor are above the regulatory flood protection elevation. The fill shall be at a point no lower than one (1) foot below the regulatory flood protection elevation for the particular area and shall extend at such elevation at least fifteen (15) feet beyond the limits of any structure or building erected there on. However, no use shall be constructed which will adversely affect the capacity of channels or floodways of any tributary to the main stream, drainage ditch, or any other drainage facility or system.

- (B) Conditional Uses: Where existing streets or utilities are at elevations which make compliance with provision 4-402(A)(2) impractical or in other special circumstances the Board of Zoning Appeals may authorize other techniques for elevation of residences. Structures other than residences shall ordinarily be elevated on fill as provided in 4-402(A)(2), but may, in special circumstances be otherwise elevated or protected as provided in Section 4-403(E) to a point above the regulatory flood protection elevation.

4-403

Conditional Use Applications: The following requirements are in addition to those set out in Article 10, Part 6 of the Zoning

Ordinance.

- (A) The applicant shall submit the following information with applications involving the use of fill, construction of structures or storage of materials:
- (1) Plans in triplicate drawn to scale showing the nature, location, dimensions and elevation of the lot, existing or proposed structures, fill, storage of materials, floodproofing measures, and the relationship of the above to the location of the channel floodway and regulatory flood protection elevation.
 - (2) A typical valley cross-section showing the channel of the streams elevation of land areas adjoining each side of the channel, cross-sectional areas to be occupied by the proposed development, and high water information.
 - (3) Plan (surface view) showing elevations or contours of the ground; pertinent structure, fill, or storage elevations; size, location and spatial arrangement of all proposed and existing structures on the site; location and elevations of streets, water supply, sanitary facilities, photographs showing existing land uses and vegetation upstream and downstream, soil types, and other pertinent information.
 - (4) Profile showing the slope of the bottom of the channel or flow line of the stream.
 - (5) Specifications for building construction and materials, floodproofing, filling, dredging, grading, channel improvement, storage of materials, water supply, and sanitary facilities.
- (B) One copy of the information required in Section 4-503(A) shall be transmitted to the City Engineer for evaluating the proposed project in relation to flood heights and velocities; the seriousness of flood damage to the use, the adequacy of the plans for protection and other technical matters.
- (C) Based upon the technical evaluation of the City Engineer, the Board shall determine the specific flood hazard at the site and shall evaluate the suitability of the proposed use in relation to the flood hazard.
- (D) Factors Upon Which the Decision of the Board Shall Be Based: In passing upon such applications, the Board shall consider all relevant factors specified in other sections of this ordinance, and
- (1) The danger to life and property due to increased flood heights or velocities caused by encroachments.

- (2) The danger that materials may be swept on to other lands or downstream to the injury of others.
- (3) The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination and unsanitary conditions.
- (4) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
- (5) The importance of the services provided by the proposed facility to the community.
- (6) The requirements of the facility for a waterfront location.
- (7) The availability of alternative locations not subject to flooding for the proposed use.
- (8) The compatibility of the proposed use with existing development within adjacent districts.
- (9) The safety of access to the property in times of flood for ordinary and emergency vehicles.
- (10) The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters expected at the site.
- (11) Such other factors which are relevant to the purposes of this ordinance.

- (E) Conditions Attached to Special Permits: Upon consideration of the factors listed above and the purposes of this ordinance, the Board may attach such conditions to the granting of Conditional Uses as it deems necessary to further the purposes of this ordinance. Among such conditions without limitation because of specific enumeration may be included:
- (1) Modification of waste disposal and water supply facilities.
 - (2) Limitations on periods of use and operation.
 - (3) Imposition of operational controls, sureties, and deed restrictions.
 - (4) Requirements for construction of channel modification, dikes, levees, and other protective measures.
 - (5) Floodproofing measures. Floodproofing measures such as the following shall be designed consistent with the flood protection elevation for the particular area, flood velocities, durations, rate of rise, hydrostatic and hydrodynamic forces, and other factors associated with the regulatory flood. The Board shall require that the applicant submit a plan or document certified by a licensed professional engineer that the floodproofing measures are consistent with the regulatory flood protection elevation and associated flood factors for the particular area. The following floodproofing measures may be required without limitation because

of specific enumeration:

- (a) Anchorage to resist flotation and lateral movement.
- (b) Installation of watertight doors, bulkheads, and shutters, or similar methods of construction.
- (c) Reinforcement of walls to resist water pressures.
- (d) Use of points, membranes, or mortars to reduce seepage of water through walls.
- (e) Addition of mass or weight to structures to resist flotation.
- (f) Installation of pumps to lower water levels in structures.
- (g) Construction of water supply and waste treatment systems so as to prevent the entrance of floodwaters.
- (h) Pumping facilities or comparable practices for subsurface drainage systems for buildings to relieve external foundation wall and basement flood pressures.
- (i) Construction to resist rupture or collapse caused by water pressure of floating debris.
- (j) Installation of valves or controls on sanitary and storm drains which will permit the drains to be closed to prevent backup of sewage and storm waters into the buildings or structures. Gravity draining of basements may be eliminated by mechanical devices.
- (k) Location of all electrical equipment, circuits and installed electrical appliances in a manner which will assure they are not subject to flooding and to provide protection from inundation by the regulatory flood.
- (l) Location of any structural storage facilities for chemicals, explosives, buoyant materials, flammable liquids or other toxic materials which could be hazardous to public health, safety, and welfare in a manner which will assure that the facilities are situated at elevations above the height associated with the regulatory flood protection elevation or are adequately floodproofed to prevent flotation of storage containers, or damage to storage containers which could result in the escape of toxic materials into floodwaters.

4-404

FH. Flood Hazard District: The purpose of this overlay district is to serve as a warning to land owners, developers, builders and buyers that the land in this district is subject to periodic flooding. This district carries no restrictions and applies to those areas adjacent to regulatory flood limits, as determined

in the U. S. Army Corps of Engineers' Flood Plain Information reports for Wildcat Creek and Kansas and Big Blue Rivers, whose elevation is less than five (5) feet higher than the elevation of the regulatory flood.

Because of the use of terms not used elsewhere in the zoning ordinance, the following definitions should be either added to the list of definitions in Section 12-201 or a special definitions section should be added following the proposed Section 4-404.

Channel - A natural or artificial watercourse of perceptible extent, with a definite bed and banks to confine and conduct continuously or periodically flowing water. Channel flow thus is that water which is flowing within the limits of the defined channel.

Equal Degree of Encroachment - A standard applied in determining the location of encroachment limits so that flood plain lands on both sides of a stream are capable of conveying a proportionate share of floodflows. This is determined by considering the effect of encroachment on the hydraulic efficiency of the flood plain along both sides of a stream for a significant reach.

Flood - A temporary rise in stream level that results in inundation of areas not ordinarily covered by water.

Flood Frequency - The average frequency, statistically determined, for which it is expected that a specific flood level or discharge may be equaled or exceeded.

Flood Fringe - That portion of the flood plain outside the floodway.

Flood Plain - The land adjacent to a body of water which has been or may be hereafter covered by flood water including, but not limited to, the regulatory flood.

Floodway - The channel of a stream and those portions of the flood plain adjoining the channel that are required to carry and discharge the flood water or flood flows of any river or stream including, but not limited to, flood flows associated with the regulatory flood.

Flood Profile - A graph or a longitudinal profile showing the relationship of the water surface elevation of a flood event to location along a stream or river.

Flood-Proofing - A combination of structural provisions, changes, or adjustments to properties and structures subject to flooding primarily for the reduction or elimination of flood damages to properties, water and sanitary facilities, structures, and contents of buildings in a flood-hazard area.

Obstruction - Any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel rectification, bridge, conduit, culver, building, wire, fence, rock, gravel, refuse, fill, structure or matter in, along, across, or projecting into any channel, watercourse, or regulatory flood-hazard area which may impede, retard, or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water,

or that is placed where the flow of water might carry the same downstream to the damage of life or property.

Reach - A hydraulic engineering term to describe longitudinal segments of a stream or river. A reach will generally include the segment of the flood hazard area where flood heights are influenced by a man-made or natural obstruction. In an urban area, the segment of a stream or river between two consecutive bridge crossings would typically constitute a reach.

Regulatory Flood - A flood having a one percent (1%) chance of occurring in any single year determined from an analysis of floods on a particular stream and other streams in the same general region.

Regulatory Flood Protection Elevation - The elevation to which uses regulated by this ordinance are required to be elevated or floodproofed as determined in (name of study in which regulatory flood protection elevation was determined).

Suggested Changes in the Manhattan

Subdivision Regulations

Because of the complexity of the proposed zoning regulations for flood hazard areas in Manhattan, the changes necessary in the subdivision regulations can be stated rather generally and briefly. One desirable change would be to require that those areas which are subject to inundation by the 100 year flood be clearly shown on the final plat. Also, no preliminary plat should be approved if it shows areas which are within the limits of the 100 year flood as residential uses unless there is some type of clear statement of the amount of fill required to fulfill the requirements of the Flood Fringe Districts. No plat should be approved which would place residential lots in an area identified as a floodway. The zoning district or districts in which the land to be plated lies should be required to be shown on the final plat. A certificate should be required which would describe those lots plated which lie within any of the flood hazard area districts. If it is claimed that no part of the land to be plated lies within a flood hazard district, then this fact should also be certified. The elevations of streets should also be consid-

ered carefully. None of these suggestions could be considered a critical need because the proposed zoning regulations would maintain the level of flood protection. But, changes in the subdivision regulations would give the subdivider notice that these factors must be considered and could save both the subdivider and the Planning Board considerable time and effort.

Footnotes to Chapter 6

¹Regulating Flood Hazard Areas, p. 522.

Chapter 7

CONCLUSIONS

The enactment of flood hazard area regulations such as the proposed zoning ordinance in Chapter 6 is dependent on the active interest of the City of Manhattan in two areas. The first would be to encourage a full discussion between the Corps of Engineers and the Division of Water Resources to determine the limits and the discharge of the 100 year flood on Wildcat Creek. Secondly, the City of Manhattan should make the necessary applications to participate in the National Flood Insurance Program.

The difference between the Corps of Engineers' estimate of the 100 year flood and the Division of Water Resources' estimates creates a problem that the city can do little about except urge resolution of the differences. Little can be accomplished toward determining encroachment lines for Wildcat Creek until a reliable estimate of the discharge is made. It is unlikely that the Chief Engineer of the Division of Water Resources will accept encroachment lines based on the Corps of Engineers' figures. A member of the Division of Water Resources staff has indicated that the Division of Water Resources would make no figures available on its estimates of the placement of the encroachment lines. It was indicated that the Division would have no public policy on the requirements for approval of flood hazard area regulations or on what was felt to be a reasonable increase in flood elevation for the establishment

of encroachment lines.¹ Before flood hazard area regulations can be implemented in Manhattan, this discrepancy in discharge estimates for Wildcat Creek must be resolved.

To participate in the National Flood Insurance Program the city must first pass a resolution stating that it intends to regulate land use in flood hazard areas. This resolution must be transmitted to the Department of Housing and Urban Development's Federal Insurance Administration (FIA). The FIA will initiate studies to determine encroachment lines and to establish actuarial tables for insurance purposes. During the time the studies are underway the city has the obligation to inform persons who apply for building permits of any flood hazard. Also, while studies are being made insurance may be purchased at subsidized rates. This subsidized insurance applies only to existing structures, not to new structures. Once the studies then the city must enact flood hazard area regulations based on the FIA studies. Also, after the studies are complete, individuals may obtain additional flood insurance by paying the actuarial rates for the second increment of coverage. The city must enact the regulations to maintain eligibility for flood insurance. The Kansas enabling legislation requires that all resolutions, and proposed ordinances dealing with regulation of flood hazard areas be submitted to Division of Water Resources for their approval. The city must deal with both the FIA and the Division of Water Resources in obtaining flood insurance eligibility.

There are also provisions in the legislation creating the National Flood Insurance Program which would eliminate disaster assistance for those items that could be covered by flood insurance in areas eligible for

flood insurance. Then, the city would seem to be obligated to make the fact known that disaster assistance in event of a flood would not be adequate unless the individual has flood insurance. People who would suffer losses in a flood should be thoroughly informed on the flood insurance program.²

One thing that must be mentioned in any work on flood protection is the fact that all flood protection measures are limited. A levee is designed to contain the waters of a flood of a certain frequency and therefore, will be inadequate when a larger flood occurs. It can also be said that the encroachment line established in the flood hazard area regulations is also a levee of sorts. "A line marking a flood-zone on a map is a levee in reverse, barring channelward expansion of human occupancy."³ Such lines or levees give a feeling of safety to the areas which are "protected" by them. This feeling can lead to extremely high flood losses when that larger than design flood occurs and damages the uses in the "safe" area. This type of occurrence is the reason behind the Flood Hazard District proposed in Chapter 6. It is simply to make people aware that they are not completely protected from all floods. All flood damage prevention programs are an attempt to balance the losses incurred in restraining development and the productivity to be gained and losses not incurred in flood relief. In other words, flood protection programs are supposed to reduce the probability of flood losses enough to make occasional flooding economically acceptable.

The Kansas enabling legislation for flood plain zoning makes the 100 year flood the regulatory flood. While this may be reasonable, it may not be sufficient in a local situation. The following quote illustrates this

point using a situation where the 50 year flood is the standard.

In Northern Illinois a regional flood graph shows the 50-year flood as one point on a fairly lineal relationship between discharge and frequency. Some 150 miles to the south the relationship is curvilinear and the 50-year flood is a point on a curve where discharge sharply increases relative to frequency.⁴

Because of this type of possibility, it would seem that some flexibility would be needed on the local level. It might be better if the enabling legislation required that the 100 year flood be the minimum regulatory flood.

It would be in the interest of the cities and counties in Kansas who desire flood hazard area regulations for the enabling legislation to require the Chief Engineer of the Division of Water Resources to establish general guidelines on which the decisions on proposed regulations would be based. This should make the process much easier for all concerned.

The proposed regulations for the City of Manhattan are as complete as they can be. Only the restriction to the 100 year flood is seen as any possible problem and that may well not be a problem in Manhattan. The technical expertise to determine if such a problem exists was not available to the author.

If flood hazard area regulations are adopted by Manhattan, they should be enforced within the three mile limit allowed by Section 12-707 of the Kansas Statutes Annotated. This would afford the city control over some of the most important areas of potential growth and afford protection to those persons who will buy or lease homes, or establish businesses in the flood hazard areas.

Footnotes to Chapter 7

- ¹Mr. J. W. Funk, a hydrologist with the Division of Water Resources, made statements to this effect in a conversation on March 6, 1973.
- ²This information on the Federal Flood Insurance Program was contained in a paper received from Mr. J. W. Funk on March 6, 1973. The text of this paper can be found in Appendix C.
- ³White, et. al., Papers on Flood Problems, p. 139.
- ⁴Ibid.

APPENDIX A

K. S. A. 12-707

The governing body of any city is hereby authorized by ordinance to divide such city into zones or districts, and regulate and restrict the location and use of buildings and the uses of the land within each district or zone. Such zones or districts may be created for the purpose of restricting the use of buildings and land located within the same for dwellings, business, industry, conservation, floodplain or for other purposes deemed necessary. The use of buildings and land and the regulations and restrictions upon the use of the same shall be uniform as to each zone or district but the uses and regulations and restrictions in any one zone or district may differ from those in other zones or districts.

Any floodplain zone or district shall include the floodplain area within any incorporated area of the city and may include any unincorporated territory lying outside of but within three (3) miles of the nearest point on the city limits, when the unincorporated territory has not been designated a floodplain zone or district by any other governmental unit or subdivision.

K. S. A. 12-734

A "floodplain" for the purposes of establishing a zone or district or for imposing restrictions upon the use of land under the provisions of this act shall include land adjacent to a watercourse subject to inundation from a flood having a chance occurrence in any one year of one percent (1%): Provided, That any county or city may establish floodplain zones and districts and restrict the use of land therein and may restrict the application thereof to lands, adjacent to watercourses, subject to floods of a lesser magnitude than that having a chance occurrence in any one year of one percent (1%) and nothing in this act or any floodplain zoning regulation adopted hereunder shall be construed as affecting the eligibility of any existing structure located within such area for flood insurance under the national flood insurance act of 1968.

All resolutions, ordinances and regulations relating to floodplains shall be submitted to the chief engineer, division of water resources, Kansas state board of agriculture, for review and approval prior to adoption, and all proposed changes or variations from such approved resolutions, ordinances and regulations shall be approved by such chief engineer prior to adoption.

K. S. A. 12-735

From and after the passage of this act, the governing body of any city or political subdivision within this state shall submit to the chief engineer of the division of water resources any ordinance, resolution, regulation or plan of that body that proposes to create or to effect any change or variation in a floodplain zone or district, or that proposes to regulate or restrict the location and use of structures, encroachments, and uses of land within such an area, which floodplain zone or district shall be that defined and fixed under the provisions of K. S. A. 12-707,

as amended. Each submission hereunder to the chief engineer shall be accompanied by complete maps, plans, profiles, specifications, textual matter, and such other data and information as the chief engineer may require.

The chief engineer is hereby authorized to hold a public hearing or hearings and based thereon to make such rules and regulations that are consistent with this act and that he deems necessary to carry out his duties under it. Before any proposed floodplain zoning ordinance, resolution, regulation or plan referred to herein shall become effective, it must be approved in writing by the chief engineer as being in accord with the following minimum standards, and the rules and regulations of the chief engineer consistent with them:

(a) Human habitation shall be prohibited unless adequately protected within the floodplain zone or district.

(b) Suitable flood proofing to the elevation level established by the county or city and approved by the chief engineer shall be required for new construction or reconstruction subsequent to this act.

(c) Structures and other encroachments shall not be permitted on a floodplain if they will raise the flood height so as to unreasonably affect another.

(d) Uses that are not specifically prohibited, that will not cause undue restriction of flood flows upon a floodplain, and that are not inconsistent with the purposes and requirements of this act shall be permitted.

APPENDIX B

PROPOSED AMENDMENT TO DODGE CITY REGULATIONS

FLOOD PLAIN ZONING

PART 5. FLOOD PLAIN DISTRICT REGULATIONS

4-500. (A) Findings of Fact:

- (1) Flood Losses Resulting from Periodic Inundation -- The flood hazard areas of Dodge City, Kansas, are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.
- (2) General Causes of These Flood Losses -- These flood losses are caused by: (1) the cumulative effect of obstructions in flood plains causing increases in flood heights and velocities; (2) the occupancy of flood hazard areas by uses vulnerable to floods or hazardous to other lands which are inadequately elevated or otherwise protected from flood damages.
- (3) Methods Used to Analyze Flood Hazards -- This ordinance is based upon flood hazard information contained in the reports titled "Flood Plain Information, Arkansas River Dodge City" and "Special Flood Hazard Information, Arkansas River, Dodge City" prepared by the Corps of Engineers.

4-500. (B) Statement of Purpose: It is the purpose of this ordinance to:

- (1) Control flood plain uses such as fill, dumping, storage of materials, structures, buildings, and any other works which acting alone or in combination with other existing or future uses which will cause damaging flood heights and velocities by obstructing flows and reducing valley storage.
- (2) Protect human life and health.
- (3) Minimize public and private property damage.

- (4) Protect individuals from buying lands and structures which are unsuited for intended purposes because of flood hazards.
- (5) Minimize surface and ground-water pollution which will affect human, animal, or plant life.
- (6) Control development which will, when acting alone or in combination with similar developments, create an unjustified demand for public investment in flood-control works by requiring that uses vulnerable to floods, including public facilities which serve such uses, shall be protected against flood damage at the time of initial construction.
- (7) Control development which will, when acting alone or in combination with similar development, cause flood losses if public streets, sewer, water, and other utilities must be extended below the flood level to serve the development.
- (8) Control development which will, when acting alone or in combination with similar development, create an additional burden to the public to pay the costs of rescue, relief, emergency preparedness measures, sandbagging, pumping, and temporary dikes or levees.
- (9) Control development which will, when acting alone or in combination with similar development, create an additional burden to the public for business interruptions, factory closings, disruption of transportation routes, interference with utility services, and other factors that result in loss of wages, sales, production, and tax write-offs.
- (10) Provide for public awareness of the flooding potential.
- (11) Help maintain a stable tax base by the preservation or enhancement of property values for future flood-plain development. In addition, development of future flood-blight areas on flood plains will be minimized and property values and the tax base adjacent to the flood plain will be preserved.

4-500. (C) Rules for Interpretation of District Boundaries: The boundaries of the zoning districts shall be determined by scaling distances on the Official Zoning Map. Where

interpretation is needed as to the exact location of the boundaries of the district as shown on the Official Zoning Map (for example, where there appears to be a conflict between a mapped boundary and actual field conditions), the Board of Adjustment shall make the necessary interpretation. The person contesting the location of the district boundary shall be given a reasonable opportunity to present his case to the Board and to submit his own technical evidence if he so desires.

- 4-500. (D) Warning and Disclaimer of Liability: The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on engineering and scientific methods of study. Larger floods may occur on rare occasions. Flood heights may be increased by man-made or natural causes, such as ice jams and bridge openings restricted by debris. This ordinance does not imply that areas outside the flood plain districts or land uses permitted within such districts will be free from flooding or flood damages. This ordinance shall not create liability on the part of Dodge City or any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.
- 4-501. (FW) Floodway District:
- 4-501. (A) Permitted Uses: The following uses having a low flood damage potential and not obstructing flood flows shall be permitted within the Floodway District to the extent that they are not prohibited by any other ordinance and provided they do not require structures, fill or storage of materials or equipment. But no use shall adversely affect the capacity of the channels or floodways of any tributary to the main stream, drainage ditch, or any other drainage facility or system.
- (1) Agricultural uses such as general farming, pasture, grazing, outdoor plant nurseries, horticulture, viticulture, truck farming, forestry, sod farming, and wild crop harvesting.
 - (2) Residential uses such as lawns, gardens, parking areas and play areas.

- 4-501. (B) Conditional Uses: The following uses which may involve structures (temporary or permanent), fill or storage of materials or equipment may be permitted only upon application to and approval by the Board of Zoning Appeals.
- (1) Uses or structures accessory to open space or Conditional Uses.
 - (2) Private and public recreational uses such as golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, parks, wildlife and nature preserves, game farms, fish hatcheries, shooting preserves, target ranges, trap and skeet ranges, hunting and fishing areas, hiking, horse-back riding, motorcycle and all-terrain vehicle trails.
 - (3) Circuses, carnivals, and similar transient amusement enterprises.
 - (4) Drive-in theaters, new and used car lots, roadside stands, signs, and billboards.
 - (5) Extraction of sand, gravel, and other materials.
 - (6) Marinas, boat rentals, docks, piers, wharves.
 - (7) Railroads, streets, bridges, utility transmission lines, and pipelines.
 - (8) Storage yards for equipment, machinery, or materials.
 - (9) Kennels and stables.
- 4-501. (C) Standards for Floodway Conditional Uses:
- (1) All Uses -- No structure (temporary or permanent), fill (including fill for roads and levees), deposit, obstruction, storage of materials or equipment, or other use may be allowed as a conditional use which, acting alone or in combination with existing or future uses, unduly affects the capacity of the floodway or unduly increases flood heights. Consideration of the effects of a proposed use shall be based on a reasonable assumption that there will be an equal degree of encroachment extending for a significant reach on both sides of the stream. In addition, all floodway conditional uses

shall be subject to the standards contained in Section 4-503 (D) and the following standards.

(2) Fill --

- (a) Any fill proposed to be deposited in the floodway must be shown to have some beneficial purpose and the amount thereof not greater than is necessary to achieve that purpose, as demonstrated by a plan submitted by the owner showing the uses to which the filled land will be put and the final dimensions of the proposed fill or other materials.
- (b) Such fill or other materials shall be protected against erosion by rip-rap, vegetative cover or bulkheading.

(3). Structures (temporary or permanent) --

- (a) Structures shall not be designed for human habitation.
- (b) Structures shall have a low flood damage potential.
- (c) The structure or structures, if permitted, shall be constructed and placed on the building site so as to offer the minimum obstruction to the flow of floodwaters.
 - (1) Whenever possible, structures shall be constructed with the longitudinal axis parallel to the direction of flood flow, and
 - (2) So far as practicable, structures shall be placed approximately on the same flood flow lines as those of adjoining structures.
- (d) Structures shall be firmly anchored to prevent flotation which may result in damage to other structures, restriction of bridge openings and other narrow sections of the stream or river; and
- (e) Service facilities such as electrical and heating equipment shall be constructed at or above the regulatory flood protection elevation for the particular area or floodproofed.

(4) Storage of Material and Equipment --

(a) The storage or processing of materials that are in time of flooding buoyant, flammable, explosive or could be injurious to human, animal or plantlife is prohibited.

(b) Storage of other material or equipment may be allowed if not subject to major damage by floods and firmly anchored to prevent flotation or readily removable from the area within the time available after flood warning.

4-502. (FF) Flood-Fringe Overlay District: This overlay district provides special regulations designed to reduce flood losses. The requirements of this district are in addition to those contained in the basic underlying zoning district.

4-502. (A) Permitted Uses: The following uses shall be permitted uses within the Floodway Fringe District to the extent that they are not prohibited by any other ordinance.

(1) Any use permitted in Section 4-501 (A).

(2) Structures constructed on fill so that the first floor and basement floor are above the regulatory flood protection elevation. The fill shall be at a point no lower than one (1) foot below the regulatory flood protection elevation for the particular area and shall extend at such elevation at least fifteen (15) feet beyond the limits of any structure or building erected thereon. However, no use shall be constructed which will adversely affect the capacity of channels or floodways of any tributary to the main stream, drainage ditch, or any other drainage facility or system.

4-502. (B) Conditional Uses:

(1) Where existing streets or utilities are at elevations which make compliance with provision 4-502(A) (2) impractical or in other special circumstances the Board of Zoning Appeals may authorize other techniques for elevation of residences. Structures other than residences shall ordinarily be elevated on fill as provided in 4-502(A) (2), but may, in special circumstances, be otherwise elevated or protected as provided in Section 4-503 (E) to a point above the regulatory flood protection elevation.

- 4-503. Conditional Use Applications: The following requirements are in addition to those set out in Article 10, Part 6 of the Zoning Ordinance.
- 4-503. (A) The applicant shall submit the following information with applications involving the use of fill, construction of structures or storage of materials:
- (1) Plans in triplicate drawn to scale showing the nature, location, dimensions and elevation of the lot, existing or proposed structures, fill, storage of materials, floodproofing measures, and the relationship of the above to the location of the channel floodway and regulatory flood protection elevation.
 - (2) A typical valley cross-section showing the channel of the stream, elevation of land areas adjoining each side of the channel, cross-sectional areas to be occupied by the proposed development, and high water information.
 - (3) Plan (surface view) showing elevations or contours of the ground; pertinent structure, fill, or storage elevations; size, location and spatial arrangement of all proposed and existing structures on the site; location and elevations of streets, water supply, sanitary facilities, photographs showing existing land uses and vegetation upstream and downstream, soil types, and other pertinent information.
 - (4) Profile showing the slope of the bottom of the channel or flow line of the stream.
 - (5) Specifications for building construction and materials, floodproofing, filling, dredging, grading, channel improvement, storage of materials, water supply, and sanitary facilities.
- 4-503. (B) One copy of the information required in Section 4-503 (A) shall be transmitted to the City Engineer for evaluating the proposed project in relation to flood heights and velocities; the seriousness of flood damage to the use, the adequacy of the plans for protection and other technical matters.
- 4-503. (C) Based upon the technical evaluation of the city engineer, the Board shall determine the specific flood

hazard at the site and shall evaluate the suitability of the proposed use in relation to the flood hazard.

- 4-503. (D) Factors upon Which the Decision of the Board Shall Be Based: In passing upon such applications, the Board shall consider all relevant factors specified in other sections of this ordinance, and
- (1) The danger to life and property due to increased flood heights or velocities caused by encroachments.
 - (2) The danger that materials may be swept on to other lands or downstream to the injury of others.
 - (3) The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination and unsanitary conditions.
 - (4) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
 - (5) The importance of the services provided by the proposed facility to the community.
 - (6) The requirements of the facility for a waterfront location.
 - (7) The availability of alternative locations not subject to flooding for the proposed use.
 - (8) The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.
 - (9) The relationship of the proposed use to the comprehensive plan and flood plain management program for the area.
 - (10) The safety of access to the property in times of flood for ordinary and emergency vehicles.
 - (11) The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters expected at the site.

- (12) Such other factors which are relevant to the purposes of this ordinance.

- 4-503. (E) Conditions Attached to Special Permits: Upon consideration of the factors listed above and the purposes of this ordinance, the Board may attach such conditions to the granting of Conditional Uses as it deems necessary to further the purposes of this ordinance. Among such conditions without limitation because of specific enumeration may be included:
- (1) Modification of waste disposal and water supply facilities.
 - (2) Limitations on periods of use and operation.
 - (3) Imposition of operational controls, sureties, and deed restrictions.
 - (4) Requirements for construction of channel modifications, dikes, levees, and other protective measures.
 - (5) Floodproofing measures. Floodproofing measures such as the following shall be designed consistent with the flood protection elevation for the particular area, flood velocities, durations, rate of rise, hydrostatic and hydrodynamic forces, and other factors associated with the regulatory flood. The Board shall require that the applicant submit a plan or document certified by a licensed professional engineer that the floodproofing measures are consistent with the regulatory flood protection elevation and associated flood factors for the particular area. The following floodproofing measures may be required without limitation because of specific enumeration:
 - (a) Anchorage to resist flotation and lateral movement.
 - (b) Installation of watertight doors, bulkheads, and shutters, or similar methods of construction.
 - (c) Reinforcement of walls to resist water pressures.
 - (d) Use of paints, membranes, or mortars to reduce seepage of water through walls.
 - (e) Addition of mass or weight to structures to resist flotation.

- (f) Installation of pumps to lower water levels in structures.
- (g) Construction of water supply and waste treatment systems so as to prevent the entrance of floodwaters.
- (h) Pumping facilities or comparable practices for subsurface drainage systems for buildings to relieve external foundation wall and basement flood pressures.
- (i) Construction to resist rupture or collapse caused by water pressure or floating debris.
- (j) Installation of valves or controls on sanitary and storm drains which will permit the drains to be closed to prevent backup of sewage and storm waters into the buildings or structures. Gravity draining of basements may be eliminated by mechanical devices.
- (k) Location of all electrical equipment, circuits and installed electrical appliances in a manner which will assure they are not subject to flooding and to provide protection from inundation by the regulatory flood.
- (l) Location of any structural storage facilities for chemicals, explosives, buoyant materials, flammable liquids or other toxic materials which could be hazardous to public health, safety, and welfare in a manner which will assure that the facilities are situated at elevations above the height associated with the regulatory flood protection elevation or are adequately floodproofed to prevent flotation of storage containers, or damage to storage containers which could result in the escape of toxic materials into floodwaters.

4-504. (A) Definitions: Unless specifically defined below or in Article 12, Part 2 of the Zoning Ordinance, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

- (1) Channel -- A natural or artificial watercourse of perceptible extent, with a definite bed and banks to confine and conduct continuously or periodically flowing water. Channel flow thus is that water which is flowing within the limits of the defined channel.
- (2) Equal Degree of Encroachment -- A standard applied in determining the location of encroachment limits so that flood plain lands on both sides of a stream are capable of conveying a proportionate share of flood-flows. This is determined by considering the effect of encroachment on the hydraulic efficiency of the flood plain along both sides of a stream for a significant reach.
- (3) Flood -- A temporary rise in stream level that results in inundation of areas not ordinarily covered by water.
- (4) Flood Frequency -- The average frequency, statistically determined, for which it is expected that a specific flood level or discharge may be equaled or exceeded.
- (5) Flood Fringe -- That portion of the flood plain outside the floodway.
- (6) Flood Plain -- The land adjacent to a body of water which has been or may be hereafter covered by flood water including but not limited to the regulatory flood.
- (7) Floodway -- The channel of a stream and those portions of the flood plain adjoining the channel that are required to carry and discharge the flood water or flood flows of any river or stream including but not limited to flood flows associated with the regulatory flood.
- (8) Flood Profile -- A graph or a longitudinal profile showing the relationship of the water surface elevation of a flood event to location along a stream or river.
- (9) Flood-Proofing -- A combination of structural provisions, changes, or adjustments to properties and structures subject to flooding primarily for the reduction or elimination of flood damages to properties, water and sanitary facilities, structures, and contents of buildings in a flood-hazard area.

- (10) Obstruction -- Any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel rectification, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure or matter in, along, across, or projecting into any channel, watercourse, or regulatory flood-hazard area which may impede, retard, or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water, or that is placed where the flow of water might carry the same downstream to the damage of life or property.
- (11) Reach -- A hydraulic engineering term to describe longitudinal segments of a stream or river. A reach will generally include the segment of the flood hazard area where flood heights are influenced by a man-made or natural obstruction. In an urban area, the segment of a stream or river between two consecutive bridge crossings would typically constitute a reach.
- (12) Regulatory Flood -- A flood which is representative of large floods known to have occurred generally in the area and reasonably characteristic of what can be expected to occur in a particular stream. The regulatory flood generally has a frequency of approximately 100 years determined from an analysis of floods on a particular stream and other streams in the same general region.
- (13) Regulatory Flood Protection Elevation -- The elevation to which uses regulated by this ordinance are required to be elevated or floodproofed.

APPENDIX C

FLOOD INSURANCE - A PLANNING PROGRAM

Although it may be stretching the imagination somewhat to put flood insurance and planning program together, that is exactly the combination that exists in a joint government-private industry program of making flood insurance available for purchase by private individuals or other entities to cover flood risk to residential and other types of structures and contents. This flood insurance program provides a subsidy to the insurance rates for existing structures, but requires floodplain land use regulations to be met for future construction. In areas where the flood hazard is either unknown or ill-defined the Flood Insurance Administration will provide the engineering information on which to base required regulations at no cost to the local government. The intent is to provide completely useful tools to local government for the administration of the floodplain land use regulations.

Participation by a city or county government in the National Flood Insurance Program is a no local cost means of obtaining a useful floodplain planning tool, and of making subsidized flood insurance available on existing structures for their constituents. No other suitable means for similar protection is available.

Flood damages have been a significant part of the development history in the United States because of the desirability in the frontier days of locating near a stream for water supply, transportation and other purposes. The exposure to flood hazard was tolerated but means to control the floods were sought. The 1936 Flood Control Act was a significant step toward federal activity in the construction of reservoirs for flood control purposes. Although

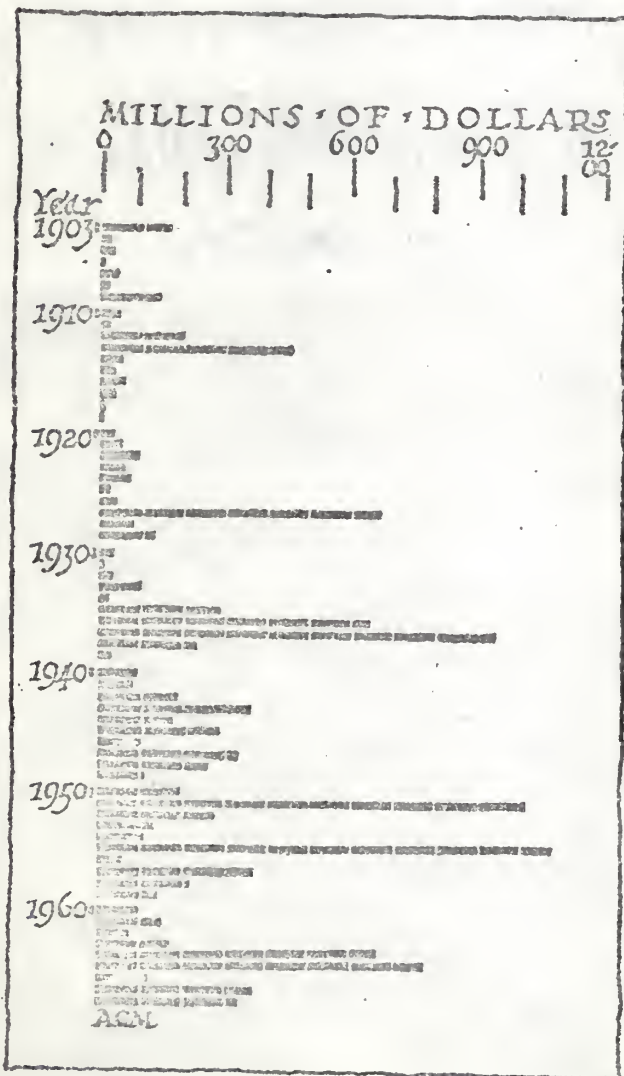
flood control has a basic purpose of reducing flood damages, this has not been accomplished as is shown in Figure 1. The annual flood damages shown in dollars are expressed on the common economic basis of dollar value in 1957-9. It is apparent from these data that the time trend of flood damages in the United States is upward. The flood news of this summer indicates that even on the adjusted dollar base, 1972 will be the year of the largest flood damage to date. This is true in spite of more than 7 billion dollars spent for flood control since 1936.

Many people recognize that the construction of flood control facilities created development opportunity on land, for which the flood hazard had been materially changed. Since there existed no restrictions on the development of the land, the construction of flood control facilities sometimes encouraged creation of new damage potential susceptible to damage when the design capacity of the flood control system was exceeded. This is the cycle of flood control breeding a need for more flood control. Federal agencies could not control floodplains since land use control exists only with the states, or, as authorized by them for cities and counties to exercise that authority. Both cities and counties in Kansas are authorized to regulate land use in floodplains.

From the data of Figure 1 a conclusion might be drawn that the flood control program as a separate entity has not been effective in reducing flood damages. Legislative recognition of the need to avoid development in unduly hazardous areas was given in 1960, when a floodplain information program was authorized. Five (5) floodplain information reports have been prepared for extensive stream reaches in Kansas and fifteen (15) have been published concerning urban area streams. Although this information might be used for

FIGURE 1

ANNUAL FLOOD DAMAGES ADJUSTED TO BASE YEARS 1957-59*
1903-1968



U. S. Weather Bureau

*Years 1965-1968 in current dollars.

zoning and other floodplain regulations, it has not truly met the planning needs. The information on flood hazards contained in these reports was made available to financial interests, who might discourage development in unduly hazardous locations.

The floodplain information program was not very effective because the information was often forgotten or overlooked at the appropriate time in development plans. On August 12, 1966 President Johnson issued an Executive Order, which requires federal agencies to consider flood hazard in federal acquisition or disposal actions, and also requires federal agencies involved in the guaranteeing of private mortgage risk to consider flood hazard. Within their rules and regulations these federal agencies consider the 100 year flood (a flood having a 1% chance of occurring in any one year) as a regulatory flood for administrative purposes.

These programs do not provide any assistance to the person exposed to flood hazards and the emergency system programs are not geared to provide personal financial assistance in general. The flood insurance program is designed to meet that deficiency. The National Flood Insurance Act was passed in 1968. The findings upon which Congress based that act are in part:

Sec. 1302. (a) The Congress finds that (1) from time to time flood disasters have created personal hardships and economic distress which have required unforeseen disaster relief measures and have placed an increasing burden on the Nation's resources; (2) despite the installation of preventive and protective works and the adoption of other public programs designed to reduce losses caused by flood damage, these methods have not been sufficient to protect adequately against growing exposure to future flood losses; (3) as a matter of national policy, a reasonable method of sharing the risk of flood losses is through a program of flood insurance which can complement and encourage preventive and protective measures; and (4) if such a program is initiated and carried out gradually, it can be expanded as

knowledge is gained and experience is appraised, thus eventually making flood insurance coverage available on reasonable terms and conditions to persons who have need for such protection.

(c) The Congress further finds that (1) a program of flood insurance can promote the public interest by providing appropriate protection against the perils of flood losses and encouraging sound land use by minimizing exposure of property to flood losses; and (2) the objectives of a flood insurance program should be integrally related to a unified national program for flood plain management.

The purposes of the act are to authorize a flood insurance program and to provide a flexible program of pooling risks as well as to further a national floodplain management objective. This recognizes that floodplain management is a means to reduce the development of new flood damage potential. The management tool of floodplain land use regulations necessary to achieve a suitable land control for flood damage management purposes must be applied equally to all situations situated in a like manner---a common requirement of zoning. The exposure of land to flood hazard is a characteristic of stream and floodplain hydraulics at the site, and is not dependent upon site development, except that development affects hydraulic characteristics. In other words, an equal treatment of like situations is not dependent upon the state of development of the floodplain. Therefore, the application of floodplain zoning---an important floodplain management tool---in an area containing both developed and undeveloped floodplain areas leads to considerable local turmoil. A large part of the developments in that floodplain would be nonconforming to the likely floodplain zoning ordinance. This is an unpopular position for the owner to be placed in, and the objections might be considerable. The owner might cease to object, or object less strenuously, if there is a financial inducement available. The flood insurance program is designed to provide that financial inducement for the adoption of floodplain zoning.

As can be seen from Congressional findings on which the National Flood Insurance Act of 1968 is based, the flood insurance program is to be integrally related to a unified national program for floodplain management. To accomplish this the program requires a city or county to adopt suitable floodplain land use regulations in order to establish program eligibility. Area eligibility makes possible the private purchase through regular insurance channels of flood insurance for structures that existed or were under construction on the date of eligibility. That insurance purchase is at common rates regardless of exposure to flood hazard. These are the subsidized rates, which were reduced effective July 10, 1972. The financial inducement is in the form of rates which are considerably lower than the actuarial cost of the flood insurance. Flood insurance for structures built or substantially improved after the eligibility date will be available only at the actuarial rates.

Since flood insurance offers considerably more financial assistance to the private individual than other assistance forms in the case of flood damage, the availability of the flood insurance is a significant manner of covering the financial risk of flood damage. However, flood insurance is not now available in general except in communities which establish eligibility under the National Flood Insurance Program. Presently in Kansas, the cities of Fairway, Topeka, Dodge City, Garden City, Coffeyville, Wichita and El Dorado are eligible for the Flood Insurance Program. Since area eligibility requires floodplain land use regulations, only a governmental unit with authority to adopt these regulations may apply for eligibility in their area of jurisdiction. The land use regulations require a considerable accumulation of hydrologic and hydraulic facts. Although this requires a complex study, the financial obligation is

accepted by HUD's Federal Insurance Administration. During the first phase of participation eligibility requires a building permit system and an information program concerning flood hazards. There need not be floodplain zoning at that time, but the building permit applicant must be informed, if the proposed site is not reasonably safe from flooding.

When a community accepts the floodplain management principles and receives flood insurance eligibility, the Federal Insurance Administration will undertake both the preparation of actuarial tables and maps, and the delineation of floodplains and preliminary floodways on the maps. These will be the factual basis for the eventual floodplain land use regulations necessary later to retain program eligibility. During the time that the actuarial study is in progress, subsidized insurance may be purchased by individuals and other entities. The amount of coverage is somewhat limited. After completion of the study coverage may be doubled by paying actuarial rates for the second increment of insurance coverage. Of course, new structures can be covered only at actuarial rates, so no coverage is available until the actuarial tables and maps are available. In Kansas the time required for this study has been approximately 15 months.

If flood hazard in the community is quite sizeable, the appropriate legislative body could do a favor for many of their citizens by applying for flood insurance eligibility and thereby allowing those citizens to protect themselves against most of the financial problems of floods. In general, the experience is that federal emergency assistance is not nearly as adequate financial assistance for the individual as is flood insurance. Statute provisions concerning ineligibility for federal disaster assistance coverable by flood

insurance in flood insurance eligible areas have been deferred in enforcement until after December 31, 1973.

This joint effort by government and the private insurance industry will require considerable participation by private individuals exercising a responsibility toward their own problems of flood risk. The federal responsibility to provide a subsidy should decrease with time. This appears to be a step toward less government---a long time into the future.

Governor Docking has appointed the Division of Water Resources of the State Board of Agriculture as the coordinating agency for the National Flood Insurance Program. That agency is quite willing to present detailed information about the program to appropriate planning commissions or legislative bodies. For further information contact J. W. Funk, Hydrologist in that agency at 1026 State Office Building, Topeka, Kansas 66612.

DIRECTOR RESIGNS

John P. Halligan, Director of the Planning Division, Kansas Department of Economic Development recently resigned to accept the position of Executive Director of the Oil Shale Regional Planning Commission. This tri-county region in Colorado includes the counties of Mesa, Garfield and Rio Blanco with offices located at Rifle. Mr. Halligan will be responsible for coordinating all planning activities in this tri-county region and the local units of government therein. Among his immediate responsibilities will be the preparation of regional development plans for the area; the supervision of the oil shale impact study; and the coordination of the A-95 review responsibilities.

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