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IMPACT OF FLOODS UPON OCCUPANCE OF THE
BIG BLUE BOTTOMS, NEBRASKA AND KANSAS

by
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A THESIS

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IMPACT OF FLOODS UPON OCCUPANCE OF THE BIG BLUE BOTTOMS,

NEBRASKA AND KANSAS

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Edward J. Weinzierl

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CHAPTER I

INTRODUCTION

Man has looked toward flood plains for subsistence since the beginning of recorded history. Although it is probable that agriculture did not originate in alluvial flood plains,¹ it has been established that agriculture was practiced at an early date in the valleys of the Nile, the Euphrates, and the Tigris.² These valleys as well as other Asiatic river valleys have maintained their status as centers of food production throughout history. The present-day significance of flood plains was pointed out by Kellogg when he estimated that over a third of the world's people obtain their food from soils developed on alluvium.³

Regardless of the significance of alluvial soils to man, flood plains are clearly distinguished from other lands in that they

¹C. O. Sauer, Agricultural Origins and Dispersals (New York: The American Geographical Society, 1952), p. 21.

²W. L. Thomas, editor, Man's Role in Changing the Face of the Earth (Chicago: The University of Chicago Press, 1956), p. 138

³W. G. Hoyt and W. B. Langbein, Floods (Princeton, New Jersey: Princeton University Press, 1955), p. 12.

are subject to inundation by overflow from rivers. Because of the spectacular nature of outstanding flood events, few natural phenomena have been so well recorded. Examples are the Deluge of the Old Testament, the first recorded flood on the Yellow River in 2,297 B. C., and the maximum floods on the Danube and Seine Rivers which occurred in 1501 and 1658 respectively.⁴

For the most part, Old World flood-plain occupance has been plagued by recurring floods which have resulted in devastation and death. However, floods in some river valleys have been turned into a decided economic advantage through meticulous human adjustment. In Egypt for example, floods on the Nile have been utilized in irrigation agriculture for centuries. Initially, local water storage basins and distribution ditches were constructed by village labor forces.⁵ Earlier forms of human adjustment to floods probably involved the selection and adaptation of crops and the development of work patterns dependent upon seasonal flooding.

In other river valleys, human adjustment was primarily concerned with protection through flood control. Canals to divert flood water were utilized on the Fuchun River in China well before

⁴Ibid., p. 6

⁵Thomas, op. cit., p. 156.

the thirteenth century.⁶ In France, where floods on mountain streams were related to clearing of the forests, a law passed in 1859 provided for the regulation of woodland clearing and the organization of a police for forest protection. In 1860, the French legislative body approved funds for the restoration of privately controlled forests.⁷

Notwithstanding centuries of Asiatic and European history as background, flood plains in the United States were occupied and developed. The steady encroachment of industrial and community development near the channels of many rivers has resulted in destructive floods on numerous occasions.

The present flood problem in this country is rather paradoxical. According to White, the mean annual flood losses have not declined since passage of the Flood Control Act in 1936 and may equal the average amount spent yearly in behalf of flood control. Continual pressure to develop lands subject to flood in urban areas, particularly after flood protection is anticipated,

⁶Hoyt and Langbein, op. cit., p. 141.

⁷G. P. Marsh, Man and Nature; or Physical Geography as Modified by Human Action (Originally published in 1864), (Cambridge, Massachusetts: Belknap Press of the Harvard University Press, 1965), p. 335.

appears to be the principal factor which contributes to the over-all flood problem in the United States.⁸

The paradox outlined by White was largely responsible for drawing the attention of the author to floods and man. This interest, fostered by personal observations and readings, has gradually developed into an assumption which holds that the effects of flood hazard can be detected by mapping cultural features within a given flood plain.

Although flooding and its consequences to man are most widely recognized in connection with large rivers, floods are also significant to the occupants of flood plains associated with small rivers. The Big Blue River in southeastern Nebraska serves as an excellent example of a small river which has been beset by floods.

THE PROBLEM

The chief objective of this study is to uncover and interpret the interrelationships between flood hazard and occupancy, and the relationship between adjustment to floods and types of occupancy in the Big Blue River bottoms. In order to best achieve this goal, the following facets will be considered:

⁸Lecture by Gilbert F. White at the University of Colorado, Boulder, Spring semester, 1957.

(1) to describe and analyze the major physical features of the flood plains in terms of a resource base;

(2) to survey and analyze major flood events together with resulting damages in order to characterize the general nature of the flood hazard;

(3) to specify and explain the measurable properties of a flood event (properties such as magnitude, frequency, and seasonality) for the purpose of demonstrating the significance of each factor to human occupancy;

(4) to describe and interpret selected aspects of rural and urban flood-plain occupancy together with methods of human adjustment to floods;

(5) to utilize the facts obtained in 1, 2, 3, and 4 above as the basis for discussing and explaining the effects of floods and the changes in occupancy, particularly those changes which exemplify response to flood hazard, that are taking place within the area shown in Plates I, II, III, IV, V, and VI.

Thus, the problem is centered about the identification of physical and cultural circumstances which motivate or suppress human change and adjustment on the flood plain. Because of the flood history of the study area, attention will be directed chiefly toward changes which are in progress or which have taken place during the last twenty-five years. Major changes which have

occurred prior to 1941, however, will not be neglected if related to the flood hazard.

STUDY AREA

Selection of area

The flood plains of the Big Blue River were selected as the field area to test the author's hypothesis for several reasons. The foremost reason was the outstanding flood history of the Big Blue River. Recorded data indicate that a short-term increase in the number of major floods has been in progress since about 1940. Thus, information concerning the impact of floods upon occupancy and any subsequent changes therein should be readily available from local sources. The fact that both the Corps of Engineers and the Bureau of Reclamation are studying dam sites on streams tributary to the Big Blue River in Nebraska indicates the significance and general concern of floods in the selected area.

In addition, the study area is well-covered by recent (1957-1964) U. S. G. S. topographic maps of the 7.5 minute series or advance prints thereof. An exception is the distance of 7.5 minutes of latitude extending from Wymore to the Nebraska-Kansas state line.

The practical aspects of the proposed objective appear to represent a rich field which requires geographic cultivation.

White has noted:

On the side of ignorance, the statistics on actual flood losses still are subject to large error because of the method of collecting them. More important, knowledge of the character of land use and other forms of adjustments in the flood plains is widely lacking, and there is little information about the occupance changes that are in process.⁹

This study is designed to explore certain facets of the void indicated by White. Doctoral dissertations in geography have not treated floods and men in the Big Blue bottoms.

Location

The Big Blue Basin is located in southeastern Nebraska and northeastern Kansas (See Plate I). It occupies a total area of 9,600 square miles in the Kansas River drainage system. Three-fourths of the total area lies within the political boundaries of Nebraska. In shape and orientation, the basin resembles an irregular keystone whose major axis trends from northwest to southeast. The maximum west-east distance of 145 miles is equal to the greatest north-south dimension. The surface of the basin descends from an average elevation of 1,700 feet in the far west to about 1,350 feet in the south.

The Big Blue River originates in the north central portion

⁹G.F. White, et al., Changes in Urban Occupance of Flood Plains in the United States, Department of Geography Research Paper No. 57, University of Chicago (Chicago: Department of Geography, 1958), p. 11.