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REPORT ON

FLOOD AND EROSION PROBLEMS AND CONTROL

KIOWA AND BIJOU CREEK BASINS IN COLORADO

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F. L. Boydston, Jr., Engineer

Colorado Water Conservation Board

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During the latter part of September, 1949 the author, representing the Colorado Water Conservation Board, in the company of other interested parties made a comprehensive tour of the Kiowa and Bijou Creek basins. The purposes of the inspection of the basins were three-fold: (1) to determine the extent of damage to crop and grazing lands, roads, bridges, towns and communities by uncontrolled floodwaters, and wind and rain erosion; (2) to inspect the types of erosion control measures practiced in the area by the Soil Conservation Service, other constructing agencies and private landowners; and (3) to determine generally the most critical areas in which conservation measures are needed to protect the basins.

In the northern portion of the basin, from approximately U. S. Highway 36 to the South Platte River, damage is caused principally by excessive flood waters which arise in the upper basin and inundate the fields and highways, washing out bridges, fences, livestock and buildings. These floodwaters contain such debris as trees and portions of wrecked buildings which accumulate at bridges and act as dams, causing inundation of much fertile grazing and crop lands. The pressure on the bridges from the water thus backed up, aggravated by eddying currents set up near the bridge approaches, seriously damages or completely washes out the bridges. Under such conditions families are often completely isolated.

Upon recession of the floodwaters, enormous quantities of silt are deposited on the flooded lands, at times to a depth of as much as one foot. The silt originates mainly in the headwaters areas and is carried in suspension by the floodwaters to areas where the flow is detained sufficiently to cause the deposition of much of the silt load. At times of flood, the waters often are 50 percent silt laden.

In addition to such described damage, scouring takes place on the eastern banks of the main channels of Kiowa and Bijou Creeks during periods of excessive runoff and floods, which has resulted in the shifting of the channel to the east as far as a quarter of a mile in places. It is thought that the principal reasons for this movement of the channel is the scouring action of high velocity

waters followed by very dry periods during which the winds, which have a predominantly easterly direction, deposit silt and sand on the western banks, thus gradually pushing the waters into a channel farther to the east.

In 1909 a large diversion dam and off-channel reservoir, known as the West Nile, was constructed in Adams County approximately five miles below the confluence of the East and West Bijou Creeks. Considerable private capital was invested in this irrigation project, which might have been successful except for the fact that a large amount of silt accumulated above the dam and around the gates, and after only a few years of not too successful operation the diversion dam was completely washed out during a flood and the project was abandoned.

There has been some individual effort on the part of ranchers and landowners in this lower basin to control the bank cutting, but in general the problem is too great to be met by measures such individuals are able to install without the aid of heavy equipment and technical advice. Further, it is recognized that the source of the destruction is in the upper part of the basins and must be controlled in those areas before successful conservation measures can be accomplished downstream.

In the upper basins of the Kiowa and Bijou Creeks the problem is somewhat different. Although floodwaters here also menace life and property as in the lower basins, the almost constant process by which rainfall and snow runoff is removing the fertile topsoil and depositing it farther downstream constitutes the major problem of the upper basins. Much irreparable damage has also been done in this area by the sanding of meadow lands during floods.

Following a major flood in 1945 the Corps of Engineers constructed dikes along the main channel in the vicinity of the towns of Kiowa and Elbert on Kiowa Creek to protect the properties and citizens of those towns. These dikes are apparently soundly engineered and constructed, but it is not inconceivable that a flood of similar proportions to that experienced in 1935 would not only skirt the upstream boundaries of the dikes but also overtop them and again inundate the towns.

Many soil stabilization and runoff control practices have been carried out in the headwaters regions of the two creeks and their tributary drainages. The Soil Conservation Service of the Department of Agriculture reports that since 1941, 241 stockwater and flood control dams have been constructed, 14 miles of terracing and 24 miles of diversions by ditches and dikes have been built, 966 acres of land contoured with heavy furrows, and 4676 acres of land seeded to grasses. In addition, the Civilian Conservation Corps completed some similar work, although there is no available record of its extent.

All of this conservation work was accomplished in small drainage areas tributary to the main streams, and the dams and dikes average about seven to ten feet in height and 150 to 200 feet in length. The capacity of the reservoirs ranges between one and ten acre feet. Those classified as flood control dams

have controlled outlets. In order to fully control the waters and erosion of the upper basins, with resultant alleviation of much of the damage to the lower basins, experts working in the region advise: (1) proper grazing practices on the watershed; (2) better farming practices including terracing, contour and stubble mulch farming; and (3) the use of retention dams whenever possible.

Individual conservation efforts are being made in areas within the boundaries of soil conservation districts, but they are insufficient for complete control. Soil Conservation Districts in the basins are as follows: Kiowa District, which includes the areas of Kiowa and Comanche Creeks from the headwaters to the Arapahoe-Elbert County line; Agate District, which covers the Bijou Creek basin from the headwaters to the Arapahoe-Elbert County line; and Deertrail District, which extends from the Arapahoe-Elbert County line in the Bijou basin to U. S. Highway 36.

There have been six major floods on these creeks since 1920, which have caused the loss of at least eleven lives and untold destruction and suffering. Assuming that precipitation in the future will approximate past conditions, it is logical to expect recurring floods in this area at intervals averaging five years.

The Department of Agriculture through its agencies has demonstrated the methods for control in these basins, and is prepared to give suitable professional advice and assistance. It would appear advantageous to town and rural dwellers alike to strive for an accelerated program of control such as has been outlined above. Extensive planning, through cooperation between residents of the area and State and Federal agencies, is necessary before the economic life of this area will be safe from the ravages of floods and erosion, and such a program can be accomplished.

A program which would furnish federal assistance to these and other subbasins contributing waters to the Missouri River has been presented to the Congress of the United States as "House Document No. 373, 81st Congress, 1st Session" entitled "Missouri River Basin Agricultural Program". On page 83 of this document is a request that immediate approval be given "A Program for Stabilizing Measures for Small Watercourses" and "-- an authorization for appropriation for the initial stage of the program for the installation of such stabilization measures." The Kiowa and Bijou Creek basins would benefit by the initial phases of the program to such an extent that damages due to floods and erosion would become negligible. The State of Colorado has indicated its approval of the program as necessary to the economic welfare of the state and the nation.

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