FLOODPLAIN INFORMATION REPORT

147

UNCOMPAHGRE RIVER
OURAY TO DALLAS CREEK
OURAY COUNTY COLORADO

Ouray ~ 1909 ~ Portland Creek

Prepared for
OURAY COUNTY AND THE
COLORADO WATER CONSERVATION BOARD
By
A&S CONSULTANTS, INC.
Montrose, Colorado April, 1978

FLOODPLAIN INFORMATION REPORT

UNCOMPAHGRE RIVER

OURAY TO DALLAS CREEK
Ouray County, Colorado

Prepared By

A & S CONSULTANTS, INC.
746 Main Street
Montrose, Colorado 81401

Prepared For

OURAY COUNTY
and the
COLORADO WATER CONSERVATION BOARD
1313 Sherman Street
Denver, Colorado 80203

June, 1978

This Floodplain Information Report, Uncompahgre River, Ouray County, Colorado, was prepared under the supervision and direction of the undersigned whose seal as a professional engineer is affixed:

Robert J. Adams

The following members of A & S Consultants, Inc. staff and special consultants contributed to the preparation of this report:

Project Engineer	- Taylor C. Vest, P.E.
Hydrologist	- Neil S. Grigg, PhD., P.E. - Sellards & Grigg, Inc.
Hydraulic Engineer	- John Hamilton, M.S., P.E. - Sellards & Grigg, Inc.
Geologist/Historian	- Thomas E. Griepentrog, M.S., P.E.
Technician/Draftsman	- Robert A. Sigmier
Technical Typist	- Dorothy Hayes

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

- Photographs -

Preface

This floodplain information report presents the results of a study on the Uncompahgre River floodplain between the Town of Ouray, Colorado and Dallas Creek in Ouray County. The report was prepared by A & S Consultants, Inc. of Montrose, Colorado at the request of the Board of Commissioners of Ouray County in cooperation with the Colorado Water Conservation Board.

Copies of this report are available for public distribution for a nominal fee at the below listed offices. A Technical Addendum to this report is also available for review at the same offices; however, it has not been published in sufficient quantities for public distribution. The Technical Addendum includes all pertinent data and calculations used in the floodplain analysis.

Office of Land Administrator
County of Ouray
County Court House
Ouray, Colorado 81427

Colorado Water Conservation Board
823 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203

INTRODUCTION

Authorization

This report was authorized by the Colorado Water Conservation Board in joint sponsorship with Ouray County, Colorado.

The Board's power and duty is ...

> ..."to devise and formulate methods, means and plans for bringing about the greater utilization of the waters of the state and prevention of flood damages therefrom, and to designate and approve storm or floodwater runoff channels or basins, and to make such designations available to legislative bodies of cities and incorporated towns, to county planning commissions, and to boards of adjustment of cities, incorporated towns, and counties of this state"...

as stated in Section 37-60-106 (1) (c) of the Colorado Revised Statutes 1973.

The cities, incorporated towns, and counties within the study area may provide zoning regulations...

> ..."to establish, regulate, restrict, and limit such uses on or along any storm or floodwater runoff channel or basin, as such storm or floodwater runoff channel or basin has been designated and approved by the Colorado Water Conservation Board, in order to lessen or avoid the hazards to persons and damage to property resulting from the accumulation of storm or floodwaters"...

as stated in Section 30-28-111 for county governments and Section 31-23-201 for municipal governments of the Colorado Revised Statutes 1973.

Upon review and approval of this report, the Colorado Water Conservation Board will designate and approve as floodplain areas those areas inundated by the 100-year flood[1] as described by the floodwater surface elevations and profiles in this report. The use of the designated floodplain areas may then be regulated by the local government.

1. The terms "Intermediate Regional Flood," "100-year flood," and "one percent flood" can be used interchangeably as they are all defined by the same type of flood event (see Glossary). However, for brevity and clarity, the term "100-year flood" will be used exclusively throughout this report.

Purpose and Scope

This report was prepared to provide information relative to the occurrence of floods and to guide local officials in planning the use and regulation of the floodplain areas so that flood hazards and future flood damages are minimized. It includes information on historical floods, existing factors which influence the flood hazards, and the nature and extent of probable future floods.

The report data includes flooded area maps delineating the 100-year flood boundary, flood profiles and floodwater surface elevations for the 10, 50, 100 and 500 year floods at selected reference points. A Technical Addendum includes the supporting engineering and hydrologic data and computations (Reference 11).

Acknowledgements

The assistance and cooperation of the following agencies, firms and organizations in addition to numerous private citizens in supplying information and data is appreciated and gratefully acknowledged.

U. S. National Oceanic and Atmospheric Administration (NOAA) Weather Service
U. S. Department of the Interior, Geological Survey
Colorado Water Conservation Board
Colorado State Department of Highways
Ouray County Planning Department
U. S. Department of the Interior, Bureau of Reclamation
U. S. Department of Agriculture, Soil Conservation Service
Denver and Rio Grande Western Railroad
Ouray Herald
Montrose Daily Press
Ouray County Plaindealer
Marvin Gregory
Howard Williams
Larry Logan

Related Flood Studies

No comparable floodplain studies of record have been prepared on the Uncompahgre River in the reach covered by this study.

One study furnished by the Colorado Water Conservation Board for our review was completed by the U. S. Bureau of Reclamation. This study was completed in 1973 for the purpose of estimating stream flow in connection with possible pumping station sites on the Uncompahgre River and Dallas Creek near Ridgway. The information was useful for comparative purposes during our hydrology analysis.

The Federal Insurance Administration has published Flood Hazard Boundary Maps for the City and County of Ouray and the Town of Ridgway. These maps delineate the approximate areas that will be flooded during the 100-year flood, however the maps are not based on detailed technical studies. The flood information data and maps presented in this study are based on a technical study and are therefore more accurate than the Flood Hazard Boundary Maps.

Maps and Surveys

Aerial photography and topographic mapping for this study were provided by Ouray County in cooperation with the Colorado Water Conservation Board. The mapping was prepared by Pafford and Associates of Los Angeles, California, and A & S Consultants. The mapping furnished is at a scale of 1" = 200'; the contour interval is 5 feet, with 1' intervals dashed in the area in and around the Towns of Ridgway and Ouray.

One hundred thirteen digitized cross sections on the Uncompahgre River were selected by A & S Consultants. These cross sections are shown on the mapping and are designated by integer numbers. Because the digitized sections indicated water surface elevations rather than true channel bottom elevations, the cross sections were corrected by field measurement methods.

Flooded Area maps on a scale of 1" = 200' are available for review at the County Planning Department.

Flood Insurance

The National Flood Insurance Program is a Federal program that enables property owners to buy flood insurance at a reasonable, subsidized cost. In return, communities are required to carry out floodplain management measures to protect lives and new construction from future flooding.

Flood insurance through the National Flood Insurance Program is available to all residents of Ouray County and the City of Ouray under the Emergency Phase of the Program and to residents of Ridgway under the Regular Phase of the program.

The following amounts at the subsidized rates are available under the Emergency Phase:

	Total Amount Available	Subsidized Rate per $100 of Coverage
Single Family Residential	$ 35,000	$.25
Other Residential	100,000	.25
Contents, Residential	10,000	.35
Small Business	100,000	.40
Contents, Small Business	100,000	.75
Other Non-Residential	100,000	.40
Contents, Other Non-Residential	100,000	.75

Within the next two to three years, the County and the City of Ouray will be converted from the Emergency Phase to the Regular Phase of the program. At that time, substantially increased flood insurance coverage will be available. All property owners shown in this study to be within areas subject to flooding should consider the purchase of flood insurance.

Additional information on the Flood Insurance Program is available from local insurance agents or brokers and the:

Federal Insurance Administration
U. S. Department of Housing and
Urban Development
909 17th Street, Room 311
Denver, Colorado 80202

Telephone: 837-5041

STUDY AREA DESCRIPTION

Drainage Basin Characteristics

The Uncompahgre River is located in southwestern Colorado approximately 70 miles east of the western boundary of Colorado (Reference Plate 1 - Vicinity and Basin Maps). It's head waters rise on the northern slopes of the San Juan Mountains west of the Continental Divide at elevations higher than 13,000 feet. The river then flows in a northwesterly direction through Ouray, Montrose and Delta Counties for approximately 70 miles to its confluence with the Gunnison River near the City of Delta. The Uncompahgre River drains approximately 1,100 square miles at its confluence with the Gunnison River and contributes an annual average of approximately 200,000 acre-feet of water to the Gunnison River.

Most of the Uncompahgre River basin is semi-arid, but rainfall and temperature vary widely as a function of elevation. The prevailing wind is from the west, but a wide range of surface wind conditions exists as influenced by specific topographic features. Average annual precipitation ranges from 8 inches at Delta and 13 inches in the Colona-Ridgway area to as much as 40 inches in the mountainous areas, with approximately 30-40 percent of the precipitation being from snowfall. The frost-free period (consecutive days with minimum temperatures above 32°F) averages about 127 days annually and varies from 112 days at the higher elevations to 148 days in the valleys.

The San Juan Mountains at the south end of the Uncompahgre basin are a well defined group of high peaks, many of which rise above 14,000 feet in elevation. The Uncompahgre River heads in these mountains and has eroded a deep canyon varying greatly in width as it flows north to join the Gunnison River at Delta.

The valley bottom along the Uncompahgre River south of Ridgway and along Dallas Creek to the west is slightly rolling because of irregular surface weathering and stream erosion of the soft underlying Mancos Shale. Relatively smooth, flat terraces of alluvium up to one mile in width parallel these two streams. The terraces are from 5 to 50 feet above the stream channels. Near the confluence of Dallas Creek and the Uncompahgre River, a large terminal morraine marks the northern extremity of the glacial advance which formed the valley bottom north from Ridgway.

North of Ridgway at the confluence of Dallas Creek and the Uncompahgre River, the valley constricts to form two subdivisions separated by a canyon which extends to a point near Colona.

The soils in the study area are coarse grained, mostly of alluvial origin, in the valleys, to heavy rocks on the drainage slopes.

The vegetation in the Uncompahgre River basin ranges from desert shrubs in the lower valleys to alpine plants in the river headwaters. The basin contains five general vegetative zones which can be defined by elevation. These

include: (1) desert shrubs (4,900-5,500 feet), (2) pinon, juniper, sagebrush (5,500-8,500 feet), (3) oak brush, ponderosa pine, sagebrush (8,500-9,500 feet), (4) spruce, fir, aspen (9,500-12,000 feet) and (5) alpine plants (over 12,000 feet). Within each zone, vegetative variations occur as a result of localized differences in topography, precipitation, and land use.

Study Reach Description

The portion of the Uncompahgre River basin included in the detailed portion of this study has its lower limit (Plate 1) at the County Road Bridge 1.8 miles downstream from the Town of Ridgway which coincides with the southern edge (upstream) of the proposed Ridgway storage reservoir of the Dallas Creek project. Construction of elements of this project are scheduled to begin in 1978.

The detailed study area has its upper limit at the southeast edge of the Town of Ouray at an elevation of approximately 7,800 feet MSL. The total length of the detailed study reach of the Uncompahgre River is approximately 14.4 miles. Total contributory drainage area to the detailed study reach, is approximately 150 square miles.

All streams tributary to the Uncompahgre River within the study area drain minor areas and while many are subject to cloudburst type flooding, none drain areas large enough to individually materially affect the peak flows in the main channel of the Uncompahgre River.

Two streams, Canyon Creek and Red Mountain Creek are tributary to the Uncompahgre River above the upper limits of the study with a combined drainage area of approximately 45 square miles. Table 1 shows contributing drainage areas to the Uncompahgre River at selected locations referred to stationing on the floodplain maps, Plates 3 through 18.

The channel of the Uncompahgre River through the study reach follows a narrow valley in the upper 5 miles, beginning at the Town of Ouray, then breaks out into a wider valley where the flows are at times divided between the present main channel and an older channel shown on the floodplain maps as the "West Arm" which extends to 4½ miles south of Ridgway. The flows then are confined to one channel and enter a narrower valley which continues to the lower limits of the study reach.

Development within the detailed study reach has been limited to the areas in and near the Towns of Ouray and Ridgway with the exception of ranch type dwellings and buildings in the wider valley south of Ridgway. Lately, some mobile homes have been located in the wider valley west of Highway 550 which parallels the Uncompahgre River on the east. The 4-Js Trailer Park on the west side of the river at Ouray lies partially within the 100-year floodplain. The Radium Springs Swimming Pool development at the north end of Ouray lies within the 100-year floodplain of the Uncompahgre River and is also subject to damage from flash floods from Skyrocket Creek. Minor gravel operations exist near the stream channel at Ridgway.

TABLE 1

Drainage Areas Tributary To The Uncompahgre River

Sta.	Identification	Total Area Sq. Mi.
0+00	Above Dallas Creek	150
28+60	Cedar Creek	135
173+70	Cuddigan Gulch	125
271+70	Coal Creek	120
358+10	Unnamed Creek	110
482+30	Cutler Creek	95
589+10	Dexter Creek	85
712+30	Cascade Creek	75
756+80	Canyon Creek	45

In the wider valley where the West Arm exists an attempt has been made to confine flows, to the present newer channel, by the grading of berms with native alluvial material. These berms provide adequate protection during normal flows, but, consisting of permeable material, water will seep through during flows higher than normal and of several days duration and water will cover areas lower than the 50 and 100-year flood elevations. Erosion of berms during major flows may flood low lying areas. This water will not have noticeable velocity and should not be considered in the same hazard category as the flows in the main channel. These areas have been designated as "Areas subject to flooding but are not hydraulically connected to the floodway."

Natural obstructions to floodflows within the study reach exist such as brush, small trees and other streamland vegetation. Some man-made features such as bridges, culverts, fences and buildings exist which may act as obstructions by themselves or in combination with floating trees, brush or transported rocks cause interruption to flow. During floods these obstructions impede floodflows and cause backwater conditions that may increase the flood heights upstream of the obstruction and velocities downstream of the obstruction. The bridge heights are such that debris has not blocked the waterways previously and with the steep channel grades the velocities carry the debris through the openings without structural damage to the bridges.

Portland and Cascade Creeks

An analysis was made of Portland Creek and Cascade Creek in conjunction with the described Uncompahgre River study. The two creeks have documented histories of occasional flash flooding, and they represent a greater hazard to Ouray than does the Uncompahgre River. It was initially felt that a hydraulic analysis of backwater profiles would produce a valid representation of the flood hazards presented by the channels. As will be illustrated, conventional procedures of hydraulic analysis were unusable.

Cascade Creek and Portland Creek drain tributary watersheds of 1.3 and 2.8 square miles, respectively. The watersheds lie within a circular basin east of Ouray which is appropriately named "The Amphitheater." The area is encircled by jagged peaks reaching elevations of 12,700 feet which have essentially bare rock faces. More than one half the watersheds contain no vegetation, which combined with the steep slopes, results in extremely high rates of runoff when storm clouds are trapped in the watershed area. In the process of falling 4000 feet in elevation to the Town of Ouray, the flow in the creeks reaches violent velocities which carry sand, gravel, rocks, trees and large boulders into town. This process of violent fragmentation and erosion of the Amphitheater has, over a period of centuries, deposited an "alluvial fan" of boulders in the Uncompahgre Valley which resembles a large rock dome at the mouths of the two creeks. The Town of Ouray is constructed upon this "alluvial fan" and is exposed to flows which, when they reach the fan, attempt to spread out and flatten out and follow circuitous routes to the Uncompahgre, washing through town along frequently unpredictable paths. The Section "History of Flooding" illustrates several of the floods of this nature from the two creeks.

Within Ouray, the creeks flow through small concrete flumes, or channels, which traverse the alluvial fan in a westerly direction, as shown on Plate 18. The flumes are generally located at high points on the alluvium, such that flows exceeding the tops of the flumes flow away from the channel rather than being contained in a larger floodplain. In the case of the violent cloudbursts carrying debris, the boulders frequently clog the channel, thus creating flows out of the flumes at varying locations. The flows then seek their own paths through town to the Uncompahgre River, frequently leaving a boulder strewn pathway behind.

As the nature of flooding of Portland and Cascade Creeks was studied, it became increasingly apparent that the flooding did not follow patterns which could be evaluated by normal hydraulic methods. After evaluating other techniques which might be applied to rivers carrying high loads of silt or debris, a basic conclusion was reached -- the floodplains of Portland and Cascade Creeks were variable, unpredictable, and could not be defined.

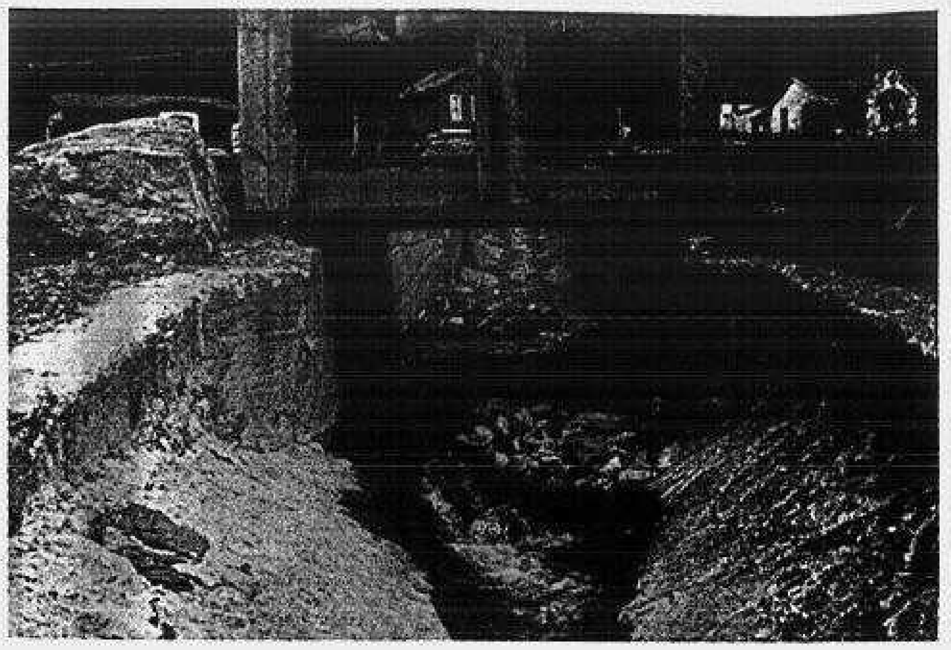
As a result, it was decided that envelopes describing the "Area of High Hazard due to Flooding" would be illustrated on Plate 18. These areas were delineated through use of photographs of past floods, discussions with residents, and the topographic mapping. It is unlikely that a single flood would pose a hazard to all areas within the envelopes for the described reasons. On the other hand, all areas within the envelopes are likely to be exposed to flash flooding during some future flood event.

Approximate Study Areas

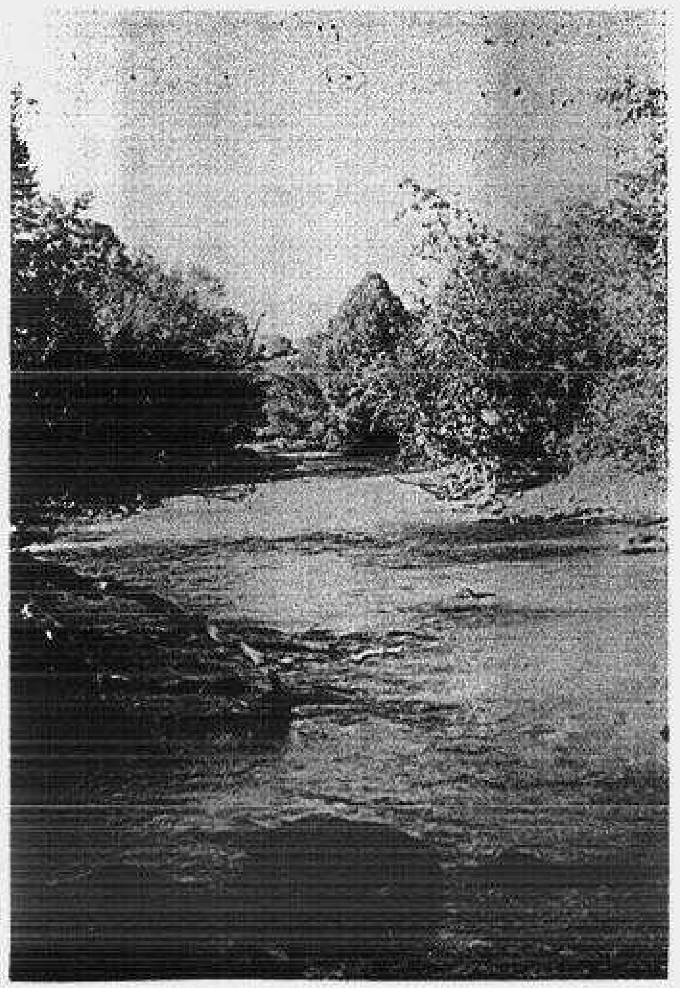
Dallas and Pleasant Valley Creeks

Outlines of flooding were determined along Dallas Creek for a distance of approximately 5.7 miles upstream from its confluence with the Uncompahgre River, and along Pleasant Valley Creek for a distance of 3.9 miles upstream from its confluence with Dallas Creek. These outlines were delineated using an "approximate method" which is suitable for defining general areas of flood hazard but does not provide the detail which is generated by a study such as that performed on the Uncompahgre River. The "approximate analysis" was made with the assistance of "Technical Manual No. 1, Manual for Estimating Flood Characteristics of Natural-Flow Streams in Colorado," prepared in 1976 by the Colorado Water Conservation Board. The basic steps included drawing profiles of the channels, selecting typical cross sections at 3000 to 6000 foot intervals, estimating depths of flow, and plotting flooded areas at the computed flow depths. Because of the approximate nature of the results, they are not reproduced in this report, but they are available from the Colorado Water Conservation Board and the Land Administrator's office of Ouray County. All work was based upon the use of the topographic maps.

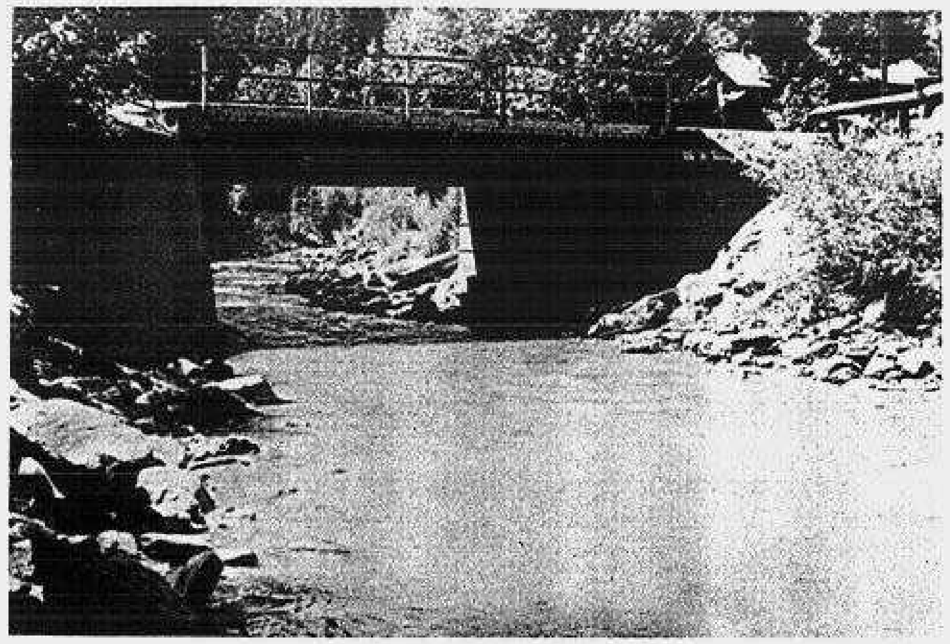
The following pictures show the Uncompahgre River stream character at several points.



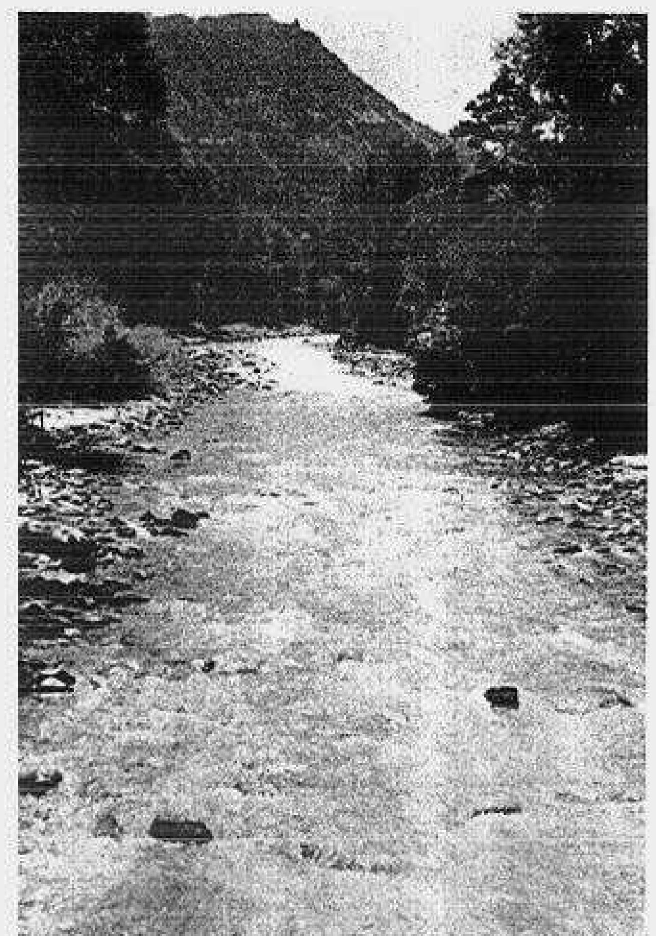
CASCADE CREEK - CONCRETE FLUME



UNCOMPAHGRE CHANNEL NEAR DALLAS TOWNSITE - STATION 10+



UNCOMPAHGRE CHANNEL AT 7th STREET BRIDGE



UNCOMPAHGRE CHANNEL NEAR PORTLAND TOWNSITE - STATION 510+

HISTORY OF FLOODING

Characteristics of the area, as described in earlier sections are reflected in the flood history of the area. The steep rocky tributaries within confined basins flood frequently, and intensely. These areas are notable in Oak, Canyon, Skyrocket, Portland, Cascade, Corbett, Forsman, Blowout, Plummer, Coal, Dexter, Cutler, Bridalveil and Cottonwood Creeks.

The broad, relatively gentle reaches of the Uncompahgre River north of Ouray have a much more timid pattern of flooding. Although influenced strongly by cloudbursts in the nearby mountains, the raging torrents of water are checked, their cargo of boulders, trees, stumps and other debris discharged, and their volume easily absorbed by the broad river channel.

The main populated centers within the study area are Ridgway and Ouray. Ridgway, located along the downstream broad gentle reach of the river, has very little serious flooding potential. In fact, no newspaper articles or other historic records were found to document flooding of the Uncompahgre River at Ridgway.

Ouray is completely different. Six of the aforementioned very steep and rocky drainages discharge in the immediate vicinity of the town. These drainages have had a long history of intense and devastating floods. The earliest documented report was in 1874 and incidents of serious flooding have been reported on at least 25 different occasions since. Unfortunately, flow records have not been kept but some measure of flooding intensity can be gleaned from resultant damages. A list of flood dates, data sources, peak annual discharges and damage estimates is shown in Table 2.

Flooding of the Uncompahgre River

The earliest reference to flooding on the Uncompahgre River is contained in the U. S. Geological Survey's Water Supply Paper #997. In reference to the widespread flooding which occurred during the spring and early summer of 1884, it states "the melting of the heavy snowfall of the winter of 1883-84 caused the highest flood known on the Colorado and Gunnison Rivers, in June 1884, and undoubtedly caused similar flooding on the Uncompahgre River. The only available reference to such a flood, however, is an item in the San Juan Prospector of May 17, 1884, which states that 'Uncompahgre is rising rapidly and an overflow is feared'."

Gaging stations at various points along the Uncompahgre show that, during the period of record (intermittently from 1903 to present), the highest peak annual flow occurred in 1921. This flow reached a volume of 2000 cfs at Ouray, 2400 cfs below Ouray, and 4080 cfs at Colona. Other years of unusually high flow in the Uncompahgre River were 1911, 1914, 1927, 1938, 1957 and 1973. Interestingly records from Dallas Creek near Ridgway, West Fork Dallas Creek near Ridgway, and Cow Creek near Ridgway are not consistent in showing coincident years of high flow. This indicates considerable variation of snowfall accumulation and/or other factors such as rainfall in a confined drainage that obscure the natural frequency of regional flooding events.

Also of considerable interest are the high flows recorded at Canyon Creek and the Uncompahgre River at Ouray during October of 1911. The precipitation producing these flows was apparently intense as at this time of year antecedent moisture from snowmelt is not usually extant with base flows being lower than the late spring and summer peak flows.

A 1963 report prepared by the U. S. Army Corps of Engineers entitled "Benefits from Flood Control Dallas Creek Project, Uncompahgre River, Colorado" made reference to flooding of the Uncompahgre River. This report cited accounts of damages claimed by residents along the river from 1919 to 1939. The estimated average annual damage amounted to $42,661. Records of individual testimony supporting this figure are not available nor is the criteria used in establishing the estimate.

Flash Floods Within the Study Area

The history of flooding of the tributaries to the Uncompahgre River within the study area is better documented because of their devastating effects on the Town of Ouray and its arterial roads and rails. Flooding on tributaries is almost entirely triggered by cloudbursts within steep, rocky, and confined drainage basins and the resultant damage is due to mud and debris flows more often than high water. The first mention of this type of flooding was found in the June 9, 1906 "Ouray Herald" which alluded to a flood in 1874. It stated, "When Geo. A. Scott, Jim McDonald and party of prospectors, came into Ouray in '75 from the Miguel, they noted that a flood had swept down Corbett Creek which is just this side of Forsman Creek, and that the water had reached a level ten feet above normal - probably the summer previous." Numerous other flash floods have been documented, as shown in Table 2, however, the most significant floods occurred in 1909, 1927, 1929, 1951, 1965, 1971 and 1973.

The 1909 flood was given the following headline in the August 23rd Montrose Daily Press. "Flood of Water Almost Wipes Town of Ouray Off Map, Cloudburst Which Eclipsed All Previous Ones Does Immense Damage." The August 26th Montrose Enterprise reported "the cloudburst which took place above Ouray last Sunday was responsible for damages estimated at $50,000. That portion of the city adjacent to the Portland Creek channel which extends east and west through the town between Fourth and Fifth Avenues was damaged the worst, although the flood extended down First, Second and Third Streets as far as Sixth Avenue." Photographs, compliments of Mr. and Mrs. Marvin Gregory, vividly portray the damage inflicted by this storm. Following this flood, concrete "flumes" were constructed to improve the capacity and, hopefully, confine the flow of both Cascade and Portland Creeks through the Town of Ouray. These flumes replaced the severely damaged wooden flumes which had been installed sometime earlier in an effort to restrict the streams flow and prevent their natural wanderings over the cumulative alluvial fans on which much of Ouray has been built.

1927 was a year of heavy runoff due to snowmelt which, combined with cloud-

burst, produced severe flood damages. The July 29, 1927 Montrose Enterprise headlined "FLOOD WASHES OUT HIGHWAY AND RAILROAD BELOW OURAY: DAMAGE FROM FLOOD $25,000 TO $40,000." Rainfall was evidently widespread as well as intense since it caused simultaneous flooding in Canyon, Skyrocket, Cascade, Corbett and Dexter Creeks. The paper reported that "the joining of the various creeks with the Uncompahgre sent it on a rampage down the valley which threatened all kinds of damage. The main loss is to the railroad and highway near the smelter (south of Portland). The Uncompahgre is reported to be flowing down the site of the highway at the foot of Stough Hill".

The Ouray Herald of July 29, 1927 also reported the following. "The heaviest rainfall since the memorable flood of 1908(9) hit Ouray last Wednesday evening between the hours of 8:30 and 10 PM washing out the highway between Ouray and Ridgway, undermining and flooding the Rio Grande tracks, filling the Cascade flume with rocks and dirt for a distance of three blocks and covering the road around the fish pond with debris. Canyon Creek and Oak Creek were also on a rampage, and the power company station was under water to the depth of a foot or more. The power company pipe line was under water and Oak Creek changed its course to enter Canyon Creek." On August 5, 1927 Dexter Creek flooded again and washed out a quarter mile of the newly rebuilt highway at Stough Hill.

The most devastating floods to strike Ouray were in 1929 when heavy rains fell on three consecutive days. The July 26, 1929 Montrose Daily Press had headlines "TERRIFIC STORM HITS OURAY REGION, OURAY IS ISOLATED AFTER WORST STORM IN HISTORY PUTS ALL CREEKS ON RAMPAGE; Bridges, Roads also Suffer, No Loss of Life". One of the most significant features of this storm was the speed with which it struck. The Press reported that "water within 10 minutes from the start of the cloudburst was running through 50 to 60 houses in the lower part of the City..... Oak Creek, Canyon Creek, Portland Creek, Dexter, Skyrocket, Cascade and all the others almost immediately sprang into raging torrents, forcing huge rocks weighing a ton and a ton and a half, logs and all kinds of debris along on their crests. Flumes were broken, bridges were washed away and within a few minutes indescribable chaos resulted." This storm evidently carried considerable more water than the 1909 flood since the Ouray power company was reported to be "under about 3 feet of water."

The town was busily digging out from under the debris when more rains fell the following day. The July 27, 1929 Montrose Daily Press ran the following headlines: "Second Storm Ravages Ouray Section, Friday's Catastrophe at Ouray Is Worse Than That of Day Before. Gem City of Rockies Suffers Another Flood as Cloudburst Sends the Streams Out of Banks Second Time in 24 hrs; Uncompahgre Does Great Damage to Business Concerns, Pool and Roads; Half of City Without Water Supply". The accompanying article included "the greatest damage this time seemed to have come from the Uncompahgre River as a terrific rain fell in the upper regions, especially in the Camp Bird area. That region contributed a large volume of water to the river which came down in a wall of water several feet high, the crest crowned with logs, trees, stumps and all kinds of debris..... The Uncompahgre River was 10 feet higher than it was the day before, the current covered the D&RG Railroad yard with several feet and filled the lower part of the station... The river flowed through and across the fish pond and swimming pool filling them with silt and sand".

The August 2, 1929 Ouray Herald added the following details, "two of the most terrific storms ever witnessed in the history of Ouray, coming less than two days apart, caused damage to property and roads estimated to be near $150,000, and Ouray today is digging out of piles of debris consisting of rocks, trees, lumber, bridges, logs and mud. A third storm on the third day was mild, but added to the damage done by the cloudbursts of the previous days."

Minor cloudburst and heavy rains continued to occur within the study area watershed but no major flooding was experienced until 1951. On August 4th of that year the Montrose Daily Press reported "The Gem City of the Rockies was clearing away the debris of its worst flood in 22 years Friday and its residents were somewhat apprehensive of a repeat performance of the water spout that struck late Thursday afternoon to send torrents of water, mud, rocks and logs rolling down normal dry washes and city thoroughfares."

It was then another 14 years until Ouray was once again struck by heavy flooding. The July 7, 1965 Ouray County Herald reported "A cloudburst high up Portland and Cascade Creeks Sunday night washed down tons of rocks, trees and mud from the mountain sides east of town. Both creeks run through town in cement flumes. These soon became plugged with debris and the water flowed across parts of town, through a number of homes. Ouray began cleaning up its mess late Sunday evening, work continued without interruption through the night and all day Monday. (Then on Tuesday), a heavy rain started falling at 9 o'clock and by 11 Portland Creek was again flooding. It burst out of its new channel and cut across town in several places, flooding many homes that had previously escaped." Damages from these storms was considerable and relief funds amounting to $20,292 for repair of the flumes and restoration of the affected areas were received from the Federal Office of Emergency Preparedness.

Although repairs were made they did not stem the tide of future floods as the area was hit hard in 1971 and again in 1973. The Ouray County Plaindealer's September 2, 1971 edition described the following flood. "Heavy cloudbursts Friday afternoon caused most of Whitehouse Mountain's east drainage to cut loose in a flooding rampage, down on Ouray and the area north of town. Considerable damage was done by Oak Creek, Corbett Creek, Coal Creek and Forsman Creek, to roads, water and sewer lines, though yards, patios, basements and hayfields got their share of flooding from various sources.... According to the oldtimers in Ouray, Oak Creek has kept its temper since 1929, but it did a good deal of damage Friday. At one time, it plugged the Uncompahgre with large boulders and debris, and made a temporary lake."

During this storm an interesting phenomenon was reported by a local resident, Tom Gallagher, when he observed the waters of Oak Creek running above its banks. His interpretation was that "the heaviness of the runoff of mucky,

rocky silt, caused it to rise without jumping the banks for a time."

On July 2, 1973, the Ouray County Plaindealer reported the most recent serious flooding. "It came in like gangbusters at 9:30 P.M. Sunday, a ripping, roaring, frightening cloudburst accompanied by lightning, thunder, wind and heavy hail. After less than a half hour of hellraising, the storm swept out again, having deposited 0.94 inches of precipitation which sent Cascade Flume into flooding chaos..... The heavy runoff from Cascade Creek thundered cleanly down the flume across town until the descent leveled off near the Uncompahgre River. There it clogged quickly, and debris backed up about 300 feet to the Main Street underpass. Vacant lots received the worst of it, and were flooded all the way to the river."

The observations of Mr. Gallagher were substantiated during this storm with the Plaindealer giving this account. "The flume blockage created a phenomenon not often seen. For some time after the flume became plugged all the way from the river to Main Street Bridge, water was running about two feet above ground level in a neat path as if between invisible walls, for twenty feet before it spread out where land leveled off. This apparently occurs because as the flume is filled with silt, gravel and other fine debris, the water is coming down with such force that it squeezed up through the gunk but its momentum keeps it running on course for a time, within walls that aren't there."

Despite the frequency and ferocity of the flash floods throughout the study area, loss of human life has been surprisingly rare. Only four incidents were uncovered, three in 1906 and one in 1927. The June 1, 1906 Ouray Herald recorded "A cloud is believed to have burst and swelled Forsman Creek into a raging flood that bore down logs, trees, and earth and tore out the frail bridge structure leaving the track suspended on ties twenty feet above." Train engineer James O'Neil died when his engine plunged into the chasm before he could bring it to a stop. Later that same year, two miners were found dead in a small adit. The August 3, 1906 Ouray Herald gave the following account: "Evidently they had taken refuge from the rain in this tunnel and a cloudburst on the mountain above had caused a torrent of water to come down the little gulch beside which the tunnel is located, carrying debris which filled the little tunnel almost to the breast..... The men could not possibly have lived but a few moments after the torrent washed in the debris, as the space remaining was quite small and was in all probability almost or completely filled with water."

The 1927 casualty was reported in the August 5th Montrose Enterprise as follows. "Believed to be a victim of the recent high waters, the body of Henry Cuddigan, 50, a rancher, was found in a field near his cabin. The field has been flooded by the creek (Uncompahgre), which had overflowed its banks Wednesday night."

TABLE 2

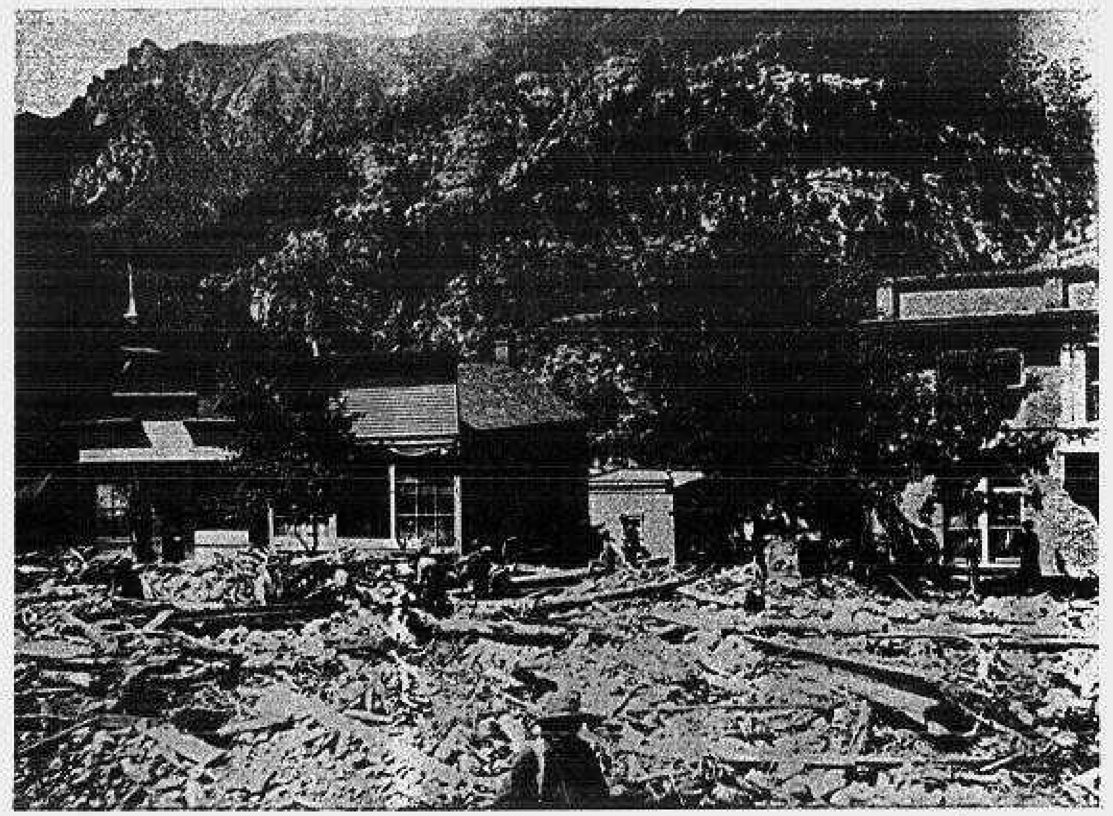
HISTORICAL PEAK FLOWS

Date	Source	ANNUAL PEAK RUNOFF CFS										ANNUAL PRECIPITATION					
		Uncomp. at Ouray	Canyon Creek	Uncomp. Below Ouray	Uncomp. Ridgway	W.F. Dallas	E.F. Dallas	Pleasant Valley	Dallas Creek	Cow Creek	Uncomp. Colona	Ouray	Telluride	Silverton	Event Precip.	Description	Damages
1874	Ouray Herald	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Flood on Corbett Cr.	-
1884	USGS W.S. P997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Widespread flooding due to snowmelt	-
6/8/05	D&RG RR	-	-	-	-	-	-	-	-	-	1980	-	-	-	-	2 Bridges washed out	(2,000)
5/28/06	Ouray Herald	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Bridge washed out Eng. O'Neil killed	(1,000)
6/26/06	D&RG RR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Ouray Skyd washed out	-
7/27/06	Ouray Herald	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 Miners drowned	-
8/21/09	Montrose Daily Press	-	-	-	-	-	-	-	-	-	-	-	-	29.30	4.51 S	Cloudburst Flooded Ouray	50,000
5/23/12	Montrose Enterprise	1980	680	-	-	-	-	-	-	-	-	-	24.04	27.44	0.70 T	High water due to snowmelt	-
10/-/12	D&RG RR	1980	680	-	-	-	-	-	-	-	-	-	24.04	27.44	3.50 S	RR washed out	(1,000)
-/-/14	USGS	1400	660	2260	-	-	-	-	-	-	2200	-	31.15	27.11	-	Heavy Spring Run-off	-
6/16/21	Ouray Herald	2000	-	2400	-	-	-	-	-	-	4080	-	27.05	31.66	3.10 S	Flood in Ouray	2,000
7/29/22	D&RG RR	845	-	1410	-	-	-	-	518	-	1610	-	18.12	18.42	1.72 T	Cloudburst on Corbett Creek	-
7/21/23	Montrose Daily Press	805	-	1780	-	-	-	-	1120	-	1720	-	17.31	26.15	3.91 S	28 RR washouts below Ouray	(5,000)
7/1/27	Montrose Enterprise	-	-	2150	-	-	-	-	478	-	3400	-	29.31	34.56	2.10 S	6.2' M&D Headgate	
7/27/27	Montrose Enterprise Ouray Herald	-	-	2150	-	-	-	-	478	-	3400	-	29.31	34.56	2.10 S	Heavy flooding in Ouray	40,000
7/27/29	Montrose Daily Press Ouray Herald	-	-	824	-	-	-	-	-	-	2920	-	22.56	26.88	4.72 S	Heavy flooding in Ouray	150,000
7/14/30	D&RG RR	-	-	-	-	-	-	-	-	-	1940	-	17.24	18.42	3.61 S	2 RR Bridges washed out	(2,000)
7/18/30	D&RG RR	-	-	-	-	-	-	-	-	-	1940	-	17.24	18.42	3.61 S	RR tracks flooded	-
8/10/30	Montrose Enterprise D&RG RR	-	-	-	-	-	-	-	-	-	1940	-	17.24	18.42	3.32 T	RR tracks flooded	-
8/8/31	D&RG RR	-	-	-	-	-	-	-	-	-	958	-	18.69	22.72	-	RR tracks flooded	-

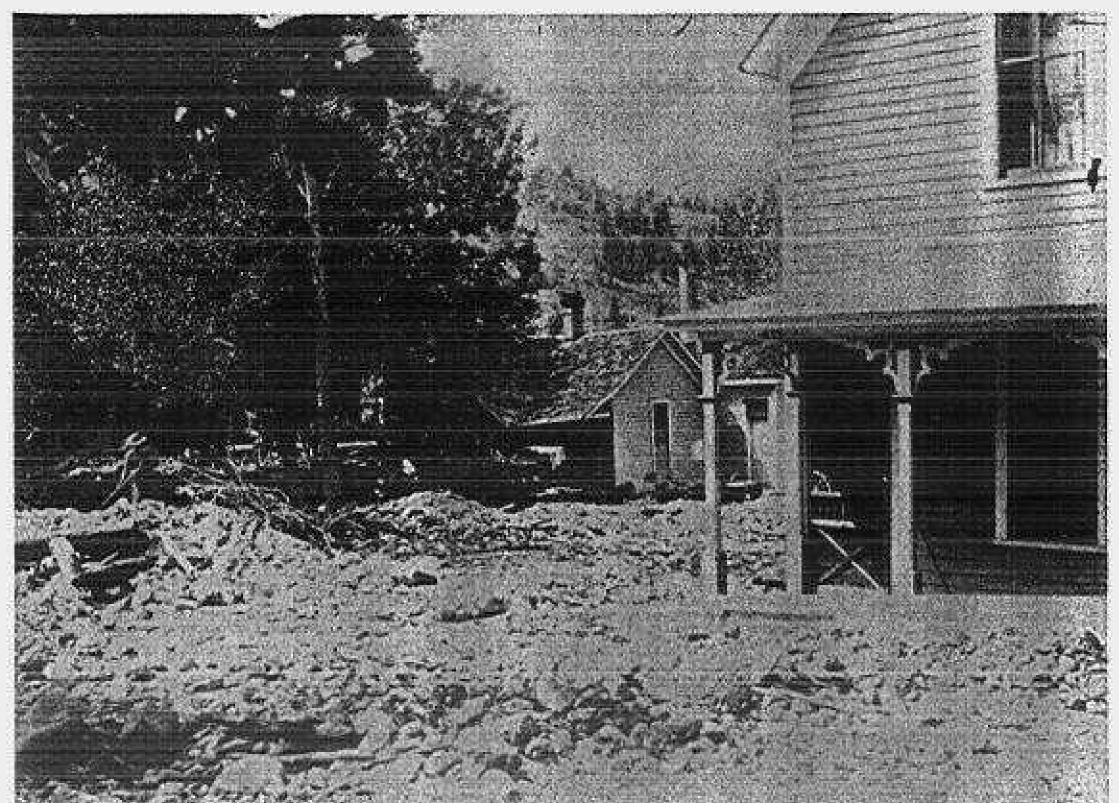
S = Silverton
T = Telluride

Date	Source	ANNUAL PEAK RUNOFF CFS										ANNUAL PRECIPITATION					
		Uncomp. at Ouray	Canyon Creek	Uncomp. Below Ouray	Uncomp. Ridgway	W.F. Dallas	E.F. Dallas	Pleasant Valley	Dallas Creek	Cow Creek	Uncomp. Colona	Ouray	Telluride	Silverton	Event Precip.	Description	Damages
9/9/33	D&RG RR	-	-	-	-	-	-	-	-	-	1900	-	18.87	21.69	-	Railroad blocked by debris	-
6/22/38	D&RG RR	-	-	-	-	-	-	-	-	-	3390	-	44.11	31.84	-	Numerous railroad washouts	-
5/-/50	Marvin Gregory	-	-	-	-	-	97	-	-	-	1260	-	22.45	18.63	-	Snowmelt caused flooding in Ouray	(5,000)
8/1/51	Montrose Daily Press	-	-	-	-	-	85	-	-	-	996	16.72	20.62	20.10	1.62 O	Cloudburst hit Ouray	(2,000)
-/-/57	USGS	-	-	-	-	187	-	500	509	1360	3300	29.52	30.45	29.04	-	Heavy spring runoff	-
9/-/58	Howard Williams	-	-	-	-	90	-	162	399	855	2400	18.90	17.82	-	2.67 O	Bridges washed out near Camp Bird	(3,000)
7/10/65	Ouray Herald	-	-	-	1500	200	224	322	556	903	1850	27.37	30.08	30.66	3.61 O	Cloudburst flooded Ouray	20,292
7/18/69	Larry Logan	-	-	-	912	126	175	-	355	467	1280	27.47	30.07	27.77	2.58 O	Debris over hwy	(1,000)
9/5/70	Ouray County Plaindealer	-	-	-	1890	132	278	-	491	682	2660	26.92	26.08	28.15	4.42 O	Cloudburst hit Ouray	9,000
9/2/71	Ouray County Plaindealer	-	-	-	1060	-	-	-	298	857	1520	21.29	22.73	24.68	1.88 O	Cloudburst on Whitehouse Mtn.	2,500
7/12/73	Ouray County Plaindealer	-	-	-	1720	-	-	-	-	1100	3200	25.19	21.07	20.01	2.97 O	Cloudburst hit Ouray	16,800
7/25/74	Ouray County Plaindealer	-	-	-	675	-	-	-	-	-	730	16.35	19.37	20.01	1.74 O	Mudslides block roads	(5,000)
									AVERAGES			20.62	23.41	22.53			

O = Ouray

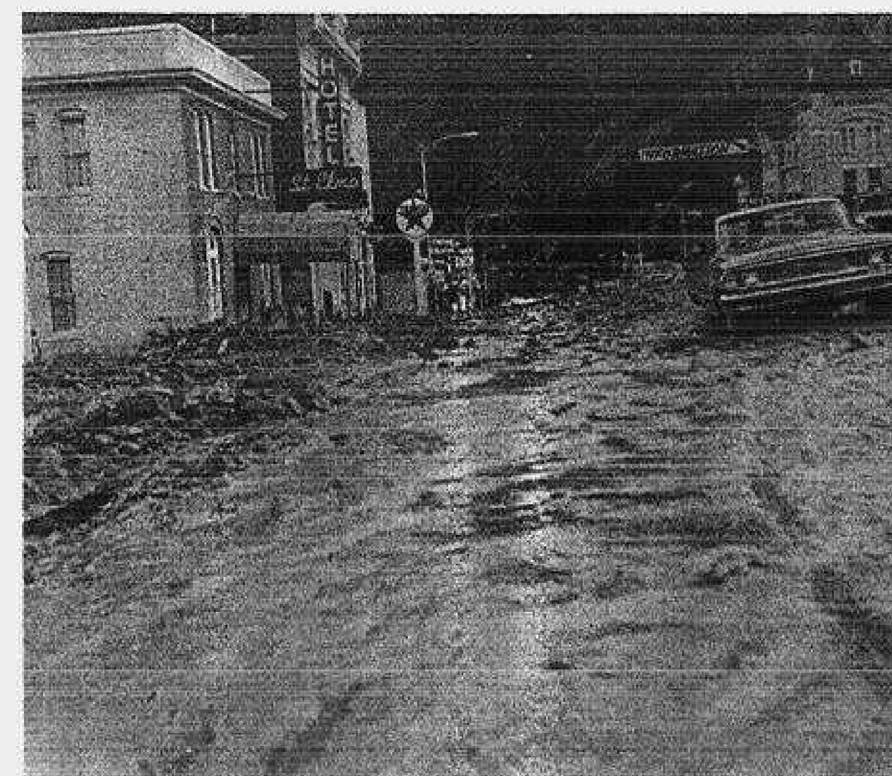


OURAY - 1909 - PORTLAND CREEK



OURAY - 1909 - PORTLAND CREEK

OURAY - 1952 - CASCADE CREEK



OURAY - 1965 - PORTLAND CREEK

HYDROLOGIC AND HYDRAULIC DETERMINATIONS

Flood Characteristics

Flood flows on the Uncompahgre River within the study reach result from the rapid melting of the mountain snowpack during the period from May to early July. Snowmelt may occasionally be augmented by rain. The runoff from snowmelt typically sustains periods of high flows and marked daily fluctuation. Although summer cloudbursts are a flood threat to occupied areas at the mouth of tributaries of the Uncompahgre River, examination of streamflow records reveal that the cloudbursts are not a flood threat to the main channel.

Hydrologic Analysis

A hydrologic analysis was carried out to establish the peak discharge-frequency relationships for floods of 10-, 50-, 100-, and 500-year recurrence intervals for the streams in the study area.

For the Uncompahgre River, Dallas Creek and Pleasant Valley Creek flood-flow frequency data were based on statistical analyses of stream flow records covering a 54-year period at gaging stations operated by the U. S. Geological Survey (Reference 3). These analyses followed the standard Log-Pearson Type III Method as outlined by the Water Resources Council (Reference 5). Discharges are shown in Table 3.

Discharges for Portland and Cascade Creek were determined by the SCS Method described in the SCS National Engineering Handbook (Reference 6) and SCS Publication "Procedures for Determining Peak Flows in Colorado" (Reference 8). Discharges and flood profiles are not shown in the report for Portland and Cascade Creek because of topographic condition explained in the section "Study Area Description." Discharges are discussed in the Technical Addendum. Discharges for the Approximate Study Areas on Pleasant Valley Creek and Dallas Creek were estimated by the methods described in Technical Manual No. 1, Colorado Water Conservation Board and U. S. Geological Survey (Reference No. 1), and are not shown in this report.

Hydraulic Analysis

Based upon the hydrologic report, a study was made to estimate water surface profiles for floods of selected recurrence intervals. These were the 10-, 50-, 100-, and 500-year floods. Data supplied by aerial topographic mapping and field surveying were used to construct a river model of the study reach. The basis for this model was the HEC II, Water Surface Modeling Program of the U. S. Army Corps of Engineers (Reference 10). Location of cross sections used in the construction of the model are shown on the flooded area maps, Plates three through eighteen. Water surface profiles generated by the model for the selected floods have been plotted on the flood profiles, Plates 19 through 32, and the areal extent of flooding by the 100-year event is shown on the flooded areas maps, Plates 3 through 18.

Roughness coefficients, Manning's "n" values, were field determined by

stream measurements at three separate locations. The locations and values obtained are shown in the Technical Addendum. For purposes of defining n values for the remaining channel, a distinction was made between the steep, narrow river valley above station 500+00 and the wider valley and gentler river slopes below this point. Above this station an n of .072 was used while downstream of this point .051 was taken to be the value of n.

Some comments are in order on unusual topographical situations occurring within the study reach. The topographic maps of the valley indicated that the river may have had other channels besides the one presently occupied. In particular, that portion of the linked hydraulic channels called "The West Arm," appears at one time to have been the major river channel. At some locations, this channel is several feet below the present main channel and separated from it by an artificial dike. Since flooding on the river is caused primarily by snowmelt, floods may have flows at or near the peak lasting for several days. Due to this circumstance, two distinct stages of a 100-year flood were identified along the reach which included the West Arm: stage 1) early initial flooding which is contained by the existing river channel; and, stage 2) eventual erosion of the dike which produces significant flows into the West Arm. As the dike erodes, sheet flows occur into the West Arm as shown on the flooded areas maps. This sheet flooding will rarely exceed one foot in depth.

A second unusual feature of sections of the river valley within the study reach is large areas lying below the 100-year flood profile, but not having distinct surface hydraulic connection to the main flood channel. These areas play no part in the conveyance of the flood, but may be inundated due to groundwater flow or flow through small surface channels not easily defined. Areas of this nature have been identified separately as "areas below flood elevation".

A third feature unusual to most river valleys is the small steep tributaries which interest the main river valley at right angles. These occur along most of the study reach. Flooding from these tributaries usually occurs as a result of summer rainstorms. This flooding will be localized at the mouth of the tributary, but may be of extreme severity due to water and/or debris damage. An investigation of such flooding on Portland and Cascade Creeks was carried out using data from the hydrology report, topographic maps, field observations and interviews. The results of this portion of the report are shown on the flooded areas maps, Plate 18.

Table 3 shows the water surface elevations at selected reference points for the 10-, 50-, 100-, and 500-year floods, along with the discharges in CFS used in the hydraulic analysis. Water surface elevations shown are for clear water conditions. Debris accumulations from tributary streams, especially in the upper portion of the study reach near Portland and Cascade Creeks, and near bridges where the channel narrows, may cause blockage and raise the surface elevations above those shown.

Water surface elevations are not shown for Portland and Cascade Creeks for reasons explained before in the section "Study Area Description".

Water surface elevations are not tabulated for the approximate study reaches on Dallas Creek and Pleasant Valley Creek.

Floodplain Subdivisions

The 100-year floodplain in this study has been subdivided into a floodway (high hazard) area and a flood storage (low hazard) area.

The floodway area is the channel of a stream and those portions of the floodplain which are reasonably required to carry and discharge the floodwaters of a 100-year flood. The floodway area is characterized by high velocities and deeper flow and poses significant hazard to life and property. The floodway zone includes those areas where the depth of flow exceeds one and one-half (1.5) feet.

The flood storage area includes that portion of the floodplain area that may serve as a temporary storage area for floodwaters from the 100-year flood and includes those areas where the depth of the 100-year flood is less than one and one-half (1.5) feet. Included in the flood storage area are flood fringe, sheet flow areas and areas below the 100-year flood elevation as shown on the Flooded Area maps, Plates 3 through 18.

The use and development of floodway and flood storage areas are regulated by the Ouray County Floodplain Regulations.

TABLE 3

FLOOD FREQUENCY - ELEVATION AND DISCHARGE DATA

UNCOMPAHGRE RIVER, OURAY COUNTY, COLORADO

Ref. Point Number	Station From Mouth (Feet)	Identification	Stream Bed Elevation (Ft. MSL)	10-Year Flood Crest Elevation (Ft. MSL)	10-Year Flood Peak Discharge (cfs)	50-Year Flood Crest Elevation (Ft. MSL)	50-Year Flood Peak Discharge (cfs)	100-Year Flood Crest Elevation (Ft. MSL)	100-Year Flood Peak Discharge (cfs)	500-Year Flood Crest Elevation (Ft. MSL)	500-Year Flood Peak Discharge (cfs)
1	0+00	Downstream Study Units	6869.30	6874.7	2060	6876.1	3200	6877.2	4200	6879.0	6150
2	5+00		6874.9	6879.1	2060	6880.3	3200	6881.2	4200	6882.7	6150
3	7+90	Bridge	6877.5	6882.4	2060	6883.5	3200	6884.3	4200	6885.5	6150
4	8+10		6877.5	6883.5	2060	6885.0	3200	6886.2	4200	6888.1	6150
5	8+50		6877.5	6883.6	2060	6885.2	3200	6886.3	4200	6888.3	6150
6	16+00		6884.6	6889.4	2060	6890.8	3200	6891.8	4200	6893.5	6150
7	28+60		6892.2	6898.6	1900	6900.2	2920	6901.2	3860	6902.9	5780
8	36+30		6895.6	6902.6	1900	6904.2	2920	6905.3	3860	6907.2	5780
9	42+30		6899.2	6905.4	1900	6907.0	2920	6908.0	3860	6909.8	5780
10	50+00		6901.8	6908.3	1900	6909.9	2920	6911.1	3860	6913.1	5780
11	57+80		6906.7	6912.6	1900	6914.4	2920	6915.6	3860	6917.7	5780
12	62+30		6911.3	6917.5	1900	6919.2	2920	6920.5	3860	6922.7	5780
13	67+30		6915.5	6920.8	1900	6922.5	2920	6923.8	3860	6925.9	5780
14	74+60		6918.8	6925.5	1900	6927.1	2920	6928.3	3860	6930.4	5780
15	82+60		6922.7	6929.7	1900	6931.4	2920	6932.6	3860	6934.6	5780
16	85+70		6926.5	6931.7	1900	6933.2	2920	6934.2	3860	6936.1	5780
17	91+00		6927.2	6935.2	1900	6936.6	2920	6937.5	3860	6939.0	5780
18	96+50		6933.0	6937.7	1900	6938.9	2920	6939.9	3860	6941.4	5780
19	102+70		6937.4	6941.8	1900	6942.5	2920	6943.0	3860	6945.1	5780
20	109+50		6942.3	6948.6	1900	6949.9	2920	6950.8	3860	6952.2	5780
21	117+10		6948.4	6953.5	1900	6954.8	2920	6955.7	3860	6957.4	5780
22	121+60		6949.3	6957.3	1900	6959.0	2920	6960.3	3860	6962.2	5780
23	124+20		6953.6	6959.5	1900	6961.6	2920	6963.2	3860	6965.9	5780
24	128+20		6953.5	6960.5	1900	6962.6	2920	6963.8	3860	6966.4	5780
25	134+80		6957.1	6961.8	1900	6963.1	2920	6964.3	3860	6966.7	5780
26	143+70		6958.3	6964.2	1900	6964.8	2920	6966.2	3860	6967.6	5780
27	151+20		6964.8	6967.8	1900	6969.0	2920	6970.2	3860	6970.8	5780
28	157+40	Bridge	6965.0	6973.1	1900	6973.6	2920	6973.5	3860	6974.6	5780
29	158+10		6965.0	6973.5	1900	6974.3	2920	6974.8	3860	6976.2	5780
30	164+50		6974.0	6976.5	1900	6977.8	2920	6978.1	3860	6978.5	5780
31	173+70		6974.0	6981.0	1810	6981.9	2770	6982.9	3680	6984.1	5420
32	184+50		6979.8	6985.0	1810	6986.1	2770	6986.8	3680	6987.7	5420
33	193+70		6982.9	6988.5	1810	6989.4	2770	6990.0	3680	6990.8	5420
34	202+40		6985.3	6992.0	1810	6993.3	2770	6993.9	3680	6995.1	5420
35	211+10		6997.6	6999.9	1810	7000.6	2770	7001.1	3680	7002.7	5420
36	216+30		6999.1	7002.6	1810	7003.1	2770	7003.7	3680	7005.6	5420
37	241+80		7018.0	7020.5	1810	7021.0	2770	7021.4	3680	7021.9	5420
38	256+90		7023.2	7027.7	1810	7028.1	2770	7028.5	3680	7029.2	5420
39	271+70		7034.8	7036.8	1720	7037.3	2650	7037.7	3640	7038.1	5400
40	293+80		7047.2	7051.1	1720	7052.5	2650	7052.7	3640	7053.0	5400
41	308+40		7054.4	7058.2	1720	7059.1	2650	7060.6	3640	7061.1	5400

Ref. Point Number	Station From Mouth (Feet)	Identification	Stream Bed Elevation (Ft. MSL)	10-Year Flood Crest Elevation (Ft. MSL)	10-Year Flood Peak Discharge (cfs)	50-Year Flood Crest Elevation (Ft. MSL)	50-Year Flood Peak Discharge (cfs)	100-Year Flood Crest Elevation (Ft. MSL)	100-Year Flood Peak Discharge (cfs)	500-Year Flood Crest Elevation (Ft. MSL)	500-Year Flood Peak Discharge (cfs)
42	322+10	Bridge	7061.6	7066.5	1720	7068.2	2650	7068.0	3640	7069.8	5400
43	329+25		7067.1	7070.8	1720	7072.5	2650	7073.7	3640	7075.0	5400
44	342+90		7080.4	7083.7	1720	7083.5	2650	7084.7	3640	7085.5	5400
45	351+10		7084.8	7088.4	1720	7089.8	2650	7090.1	3640	7090.6	5400
46	358+10		7093.4	7095.6	1620	7096.2	2470	7095.7	3290	7096.5	4840
47	365+20		7097.0	7102.0	1620	7102.6	2470	7102.6	3290	7103.0	4840
48	373+20		7104.0	7107.8	1620	7107.9	2470	7108.7	3290	7109.3	4840
49	383+10	Begin West Arm Flow	7114.6	7117.3	1620	7117.9	2470	7118.1	3290	7118.5	4840
50	394+90		7120.0	7125.4	1620	7125.4	2470	7125.9	3290	7126.0	4840
51	402+40		7130.7	7131.8	1620	7132.1	2470	7132.5	3290	7132.5	4840
52	409+70		7136.6	7138.7	1620	7139.1	2470	7139.9	3290	7139.9	4840
53	417+40		7144.5	7145.8	1620	7146.1	2470	7146.6	3290	7146.6	4840
54	425+90		7151.1	7154.2	1620	7154.5	2470	7155.2	3290	7155.2	4840
55	433+90		7160.6	7161.8	1620	7162.1	2470	7162.5	3290	7162.5	4840
56	441+60		7169.6	7172.2	1620	7173.3	2470	7173.5	3290	7173.8	4840
57	450+00		7180.0	7181.7	1620	7181.8	2470	7184.2	3290	7184.4	4840
58	458+10		7190.2	7190.4	1620	7190.7	2470	7195.0	3290	7195.0	4840
59	466+50		7198.0	7199.4	1620	7199.6	2470	7204.6	3290	7204.8	4840
60	474+80		7207.0	7209.2	1620	7209.1	2470	7215.2	3290	7215.3	4840
61	482+30		7213.0	7218.6	1470	7219.6	2260	7226.2	2980	7226.8	4400
62	486+70		7221.0	7221.9	1470	7222.0	2260	7232.0	2980	7232.1	4400
63	488+50	End West Arm Flow	7226.0	7228.9	1470	7229.1	2260	7235.2	2980	7236.1	4400
64	495+90		7241.0	7244.3	1470	7244.4	2260	7245.8	2980	7245.6	4400
65	502+50	Bridge	7248.5	7252.6	1470	7253.0	2260	7253.8	2980	7256.3	4400
66	506+90		7250.6	7255.2	1470	7255.7	2260	7258.5	2980	7259.8	4400
67	512+90		7263.9	7267.1	1470	7267.5	2260	7269.6	2980	7271.0	4400
68	518+90		7275.50	7279.0	1470	7279.1	2260	7280.1	2980	7280.7	4400
69	525+20		7283.0	7286.7	1470	7287.5	2260	7289.0	2980	7289.9	4400
70	531+10		7293.9	7297.0	1470	7298.3	2260	7299.3	2980	7300.0	4400
71	536+80		7306.2	7308.3	1470	7308.8	2260	7310.3	2980	7311.1	4400
72	549+30		7327.8	7332.4	1470	7332.7	2260	7334.0	2980	7334.9	4400
73	560+20	Station Eq.: 562+00 BK = 560+20 AHD	7353.3	7357.3	1470	7357.5	2260	7358.3	2980	7358.9	4400
74	565+50		7367.0	7370.4	1470	7370.7	2260	7371.8	2980	7372.6	4400
75	571+50		7381.3	7383.3	1470	7383.6	2260	7384.9	2980	7386.3	4400
76	577+90		7396.6	7401.4	1470	7401.8	2260	7403.3	2980	7403.7	4400
77	584+40		7420.5	7422.5	1470	7422.9	2260	7424.2	2980	7425.3	4400
78	589+10		7435.3	7438.7	1330	7439.5	2040	7440.2	2720	7441.0	4000
79	590+40		7438.8	7442.2	1330	7443.3	2040	7444.	2720	7444.8	4000
80	594+00		7455.4	7458.5	1330	7459.0	2040	7459.3	2720	7460.1	4000
81	600+30		7479.5	7483.9	1330	7485.3	2040	7486.4	2720	7488.5	4000
82	605+80		7510.5	7515.2	1330	7516.5	2040	7517.5	2720	7519.0	4000
83	612+30		7537.7	7542.2	1330	7543.3	2040	7544.1	2720	7545.4	4000
84	618+80		7555.3	7560.6	1330	7562.2	2040	7563.5	2720	7565.3	4000
85	624+90		7558.7	7566.7	1330	7568.1	2040	7568.9	2720	7570.5	4000
86	631+10		7568.5	7572.2	1330	7572.8	2040	7573.4	2720	7574.1	4000

Ref. Point Number	Station From Mouth (Feet)	Identification	Stream Bed Elevation (Ft. MSL)	10-Year Flood Crest Elevation (Ft. MSL)	10-Year Flood Peak Discharge (cfs)	50-Year Flood Crest Elevation (Ft. MSL)	50-Year Flood Peak Discharge (cfs)	100-Year Flood Crest Elevation (Ft. MSL)	100-Year Flood Peak Discharge (cfs)	500-Year Flood Crest Elevation (Ft. MSL)	500-Year Flood Peak Discharge (cfs)
87	636+20		7569.9	7578.5	1330	7579.5	2040	7580.2	2720	7581.3	4000
88	642+70		7577.5	7583.5	1330	7584.9	2040	7585.8	2720	7587.0	4000
89	648+80		7583.6	7590.0	1330	7590.9	2040	7591.6	2720	7592.6	4000
90	655+20		7589.7	7595.2	1330	7595.8	2040	7596.3	2720	7597.2	4000
91	660+40		7594.3	7599.6	1330	7601.9	2040	7602.0	2720	7602.4	4000
92	667+10		7603.4	7606.5	1330	7607.2	2040	7607.8	2720	7608.0	4000
93	673+10		7610.8	7612.8	1330	7612.9	2040	7613.1	2720	7614.0	4000
94	679+40		7616.1	7620.6	1330	7621.3	2040	7621.7	2720	7622.1	4000
95	685+40		7622.8	7628.4	1330	7628.6	2040	7628.8	2720	7630.1	4000
96	685+80		7623.0	7629.6	1330	7630.6	2040	7631.3	2720	7632.0	4000
97	687+20		7624.8	7631.1	1330	7632.2	2040	7633.1	2720	7634.1	4000
98	693+70		7633.1	7638.6	1330	7640.2	2040	7641.0	2720	7640.1	4000
99	699+40		7641.3	7646.5	1330	7647.7	2040	7648.4	2720	7650.6	4000
100	706+00		7652.8	7658.4	1330	7659.8	2040	7660.7	2720	7660.9	4000
101	712+30		7665.1	7671.1	1280	7672.5	1940	7673.4	2590	7675.8	3800
102	719+30		7677.9	7683.3	1280	7684.3	1940	7684.9	2590	7685.6	3800
103	725+20		7681.5	7688.8	1280	7689.8	1940	7690.3	2590	7691.2	3800
104	730+20		7689.2	7692.9	1280	7694.2	1940	7695.3	2590	7696.7	3800
105	736+40	Bridge	7699.6	7706.9	1280	7708.3	1940	7709.3	2590	7710.8	3800
106	737+90		7702.6	7709.0	1280	7710.6	1940	7711.8	2590	7713.1	3800
107	743+00		7712.3	7718.2	1280	7719.5	1940	7720.6	2590	7722.3	3800
108	747+50		7722.4	7727.2	1280	7728.2	1940	7729.1	2590	7730.2	3800
109	751+80		7734.1	7740.3	1280	7741.8	1940	7742.9	2590	7744.6	3800
110	753+60	Bridge	7740.6	7745.6	1280	7746.8	1940	7747.8	2590	7749.2	3800
111	754+20		7741.0	7747.4	1280	7748.8	1940	7749.8	2590	7751.4	3800
112	756+80	Bridge	7753.5	7758.2	820	7759.5	1280	7760.5	1680	7762.4	2480
113	758+40	Upstream Limits of Study	7758.5	7762.4	820	7764.3	1280	7765.7	1680	7768.2	2480
WEST ARM FLOWS											
50	394+90		7124.0	7128.0	820	7128.5	1400	7128.8	2200	7129.3	3000
51	402+40		7132.0	7134.2	820	7134.9	1400	7135.6	2200	7136.3	3000
52	409+70		7141.0	7143.0	820	7143.2	1400	7143.4	2200	7143.6	3000
53	417+40		7146.0	7148.3	820	7149.0	1400	7149.5	2200	7149.9	3000
54	425+90		7152.0	7155.6	820	7156.0	1400	7156.4	2200	7157.3	3000
55	433+90		7163.0	7165.3	820	7165.8	1400	7166.4	2200	7166.8	3000
57	450+00		7180.0	7181.6	1200	7181.8	1770	7182.2	2690	7182.4	4240
58	458+10		7189.0	7190.4	1200	7190.6	1770	7190.8	2690	7191.2	4240
59	466+50		7198.0	7199.4	1200	7199.6	1770	7199.9	2690	7200.9	4240
60	474+80		7207.0	7209.0	1200	7209.2	1700	7209.8	2690	7210.3	4240
61	482+30		7213.0	7218.6	620	7219.6	870	7220.0	2380	7220.5	3800
62	486+70		7221.0	7221.9	620	7222.0	870	7223.3	2380	7223.9	3800
63	488+50		7226.0	7228.9	620	7229.1	870	7230.1	2380	7230.5	3800

INTERPRETATION AND USE OF REPORT DATA

Flood Frequency and Discharge

The 10-, 50-, 100-, and 500-year flood events were used as the flood frequencies for this floodplain analysis. Thus the data developed in this report will be compatible not only for regulation purposes, and H. B. 1041 designations but also for Federal Insurance Administration flood insurance rate studies.

These various flood events have an average occurrence of once in the number of years as indicated. For example, the 100-year flood occurs, on the average, once in a 100 year period, and has a one percent chance of being equaled or exceeded in any given year.

The particular uses for the various flood events in addition to those stated above are as follows:

10-Year and 50-Year Flood Events -

Information regarding these lower frequency floods is especially useful for future engineering studies and land use planning purposes related to minor road systems, minor channel improvements, the location of parks and recreatonal facilities, agricultural lands, and appurtenant structures. For structures and uses of this type on the smaller tributaries and in areas where the high risk of structural failure is economically feasible and the hazard to life and property nonexistent, the use of the lower frequency floods may be considered.

100-Year Flood Event -

The 100-year flood event may also be used for engineering design purposes where a lower risk of failure than the 10- or 50-year flood is desired. However, the most important use of the 100-year flood event lies in floodplain designation and land use regulation as set forth in the state statutes. The State of Colorado considers the 100-year frequency flood as the flood event to be used in designing and protecting structures and dwellings for human occupation. Therefore, all floodplain regulations are based upon the 100-year flood. Also, the area which would be inundated by the 100-year flood may be delineated as an area of state interest as set forth in H.B. 1041 -- the state's land use bill.

500-Year Flood Event -

The 500-year flood event is useful in making the public aware that floods larger than the 100-year flood can and do occur. Just because a person is living above the 100-year flood boundary does not mean that he is completely safe from flooding. The 500-year flood event can also be used for regulating high risk developments within the floodplain.

Table 3 lists the discharges and water surface elevations for the 10-, 50-, 100-, and 500-year flood events at selected reference points.

Flooded Areas

The 100-year frequency flood has been selected by the State of Colorado as the flood event to be used for floodplain delineation and regulation. Thus the Flooded Area plates show only the boundary of the 100-year floodplain. Since the base map for the Flooded Area plates is a 5' contour map the outlines of the other flood events, 10-, 50-, and 500-year, cannot be, in some areas, readily plotted using the information in Table 3.

The area delineated on the Flooded Area plates as the 100-year floodplain meets the requirements of H.B. 1041 as an area of state interest. Also upon official approval of this report by the Colorado Water Conservation Board the area outlined by the 100-year flood boundary will be designated a floodplain area and may be regulated accordingly by the local officials.

A portion of the 100-year floodplain between stations 160 and 540 is subject to flooding due to upstream conditions, caused by topographical characteristics which divert floodwaters to said lands as explained in the hydraulic section of this report. These areas have a different designation than the normal floodplain.

Due to the 5-foot contour interval there may be areas included within the 100-year floodplain which are above the 100-year water surface elevation.

Flood Elevations

Flood crest elevations for the 10-, 50-, 100-, and 500-year floods may be found in four separate locations in this report. The Flood Frequency-Elevation and Discharge Data Table, Table 3, list these elevations at selected reference points. The Flooded Area Plates 3 to 18 give the plan view of the flooded area on a contour base map and the high water elevations for the 100-year flood can be interpolated from this. The Flood Profile plates, Plates 19 through 32 show the stream-bed elevation and the high water elevations for all four frequency floods. Also the Cross Section plates, Plates 33 through 35 show a graphical representation of the high water elevations at typical valley cross sections throughout the study reach.

The Flood Profiles may be used in areas where controversy arises over the 100-year flood boundary on the Flooded Area plates. Since the Flood Profile plates give the elevations and distance or stationing from a known point the high water elevations can be surveyed on the ground to alleviate any discrepancies on the base map.

GLOSSARY

Backwater Effect. The rise in surface elevation of flowing water upstream from and as a result of an obstruction to flow.

Channel. A natural or artificial watercourse of perceptible extent with definite bed and banks to confine and conduct continuously or periodically flowing water.

Cloudburst. A sudden and extremely heavy downpour of rain that is small in areal extent; of short duration; and may be accompanied by lightning, thunder, and strong gusts of wind.

Conveyance Capacity.

a. Channel conveyance capacity is the rate of discharge, in cubic feet per second, which can flow in a water course with the water surface not greater than the height of the channel banks.

b. Floodway conveyance capacity is the rate of discharge in the overflow portion of the floodway which can pass through a specified area at depths and velocities governed by the hydraulic dimensions of the floodway.

Designated Floodplain. The area designated as a floodplain by official action of the board of county commissioners or city council with the prior concurrence of the Colorado Water Conservation Board.

Flood. An overflow on lands not normally covered by water and that are used or usable by man. Floods have two essential characteristics; the inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river or stream or an ocean, lake or other body of standing water.

Normally a flood is considered as any temporary rise in streamflow or stage, but not the ponding of surface water, that results in significant adverse effects in the vicinity. Adverse effects may include damages from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, use of ground water coincident with increased streamflow, and other problems.

Flood, 100-Year. A type of flood, including the water surface elevation and territorial occupation thereof, which can be expected to occur at any time in a given area based upon recorded historical precipitation and other valid data, but with an average statistical one percent chance of being equalled or exceeded during any one year. The term is used interchangeably with a one percent flood or Intermediate Regional Flood. (See definition for Intermediate Regional Flood.)

Flood Crest. The maximum stage or elevation reached by the waters of a flood at a given location.

Flood Frequency. (See Probability.) The average recurrence interval of specific discharges or water stages which cause flooding.

Flood Peak. The maximum instantaneous discharge of a flood at a given location. It usually occurs at or near the time of the flood crest.

Floodplain. An area in and adjacent to a stream, which area is subject to flooding as the result of the occurrence of a 100-year flood and which area thus is so adverse to past, current, or foreseeable construction or land use as to constitute a significant hazard to public health and safety or to property.

Flood Profile. A graph showing the relationship of water surface elevation to location, the latter generally expressed as distance above mouth for a stream of water flowing in an open channel. It is generally drawn to show surface elevation for the crest of a specific flood, but may be prepared for conditions at a given time or stage.

Flood Stage. The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

Floodway Zone. The channel of a stream and those portions of the adjoining floodplain which are reasonably required to carry and discharge the floodwaters of a 100-year flood. It is the designated floodplain less than the low hazard zone, if any such low hazard zone has been identified. If no low hazard zone has been identified, then the terms "designated floodplain" and "floodway zone" shall be considered as being synonymous.

Intermediate Regional Flood. A type of flood, including the water surface elevation and territorial occupation thereof, which can be expected to occur at any time in a given area based upon recorded historical precipitation and other valid data, but with an average statistical one percent chance of being equalled or exceeded during any one year. The term is used interchangeably with a one percent flood or one hundred year flood. (See definition for 100-year flood.)

Left Bank. The bank of the left side of a river, stream or water course as the observer looks downstream.

Low Hazard Zones. That area of the floodplain in which the waters of a 100-year flow will not attain a maximum depth greater than one and one-half feet.

Probability. The annual chance of occurrence of specific hydrologic events, such as rainfall over a specified area or peak discharge at a specified location expressed in percent, e.g., 5% representing one chance in 20 of the event occurring in any year or an average recurrence of once in twenty years.

Reference Point. A numbered point identifying a specific location for correlating the data shown in various forms throughout the report.

Right Bank. The bank on the right side of a river, stream or water course, looking downstream.

Runoff. The quantity of rainfall which flows over the surface to enter the stream as discharge volume. The difference in quantity between rainfall and runoff represents losses to infiltration and interception.

Sheet Flow. Broad, shallow overland flood flows varying from a few inches to two feet in depth.

Stream. Any natural channel or depression through which water flows either continuously, intermittently or periodically, including any artifical modification of the natural channel or depression.

Watershed. The drainage area situated above a specified point on a stream including the area drained by tributary streams which enter the main stream above this point.

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10. HEC-2, Water Surface Profiles, U. S. Army Corps of Engineers, Hydrologic Engineering Center, October 1973 and revisions.
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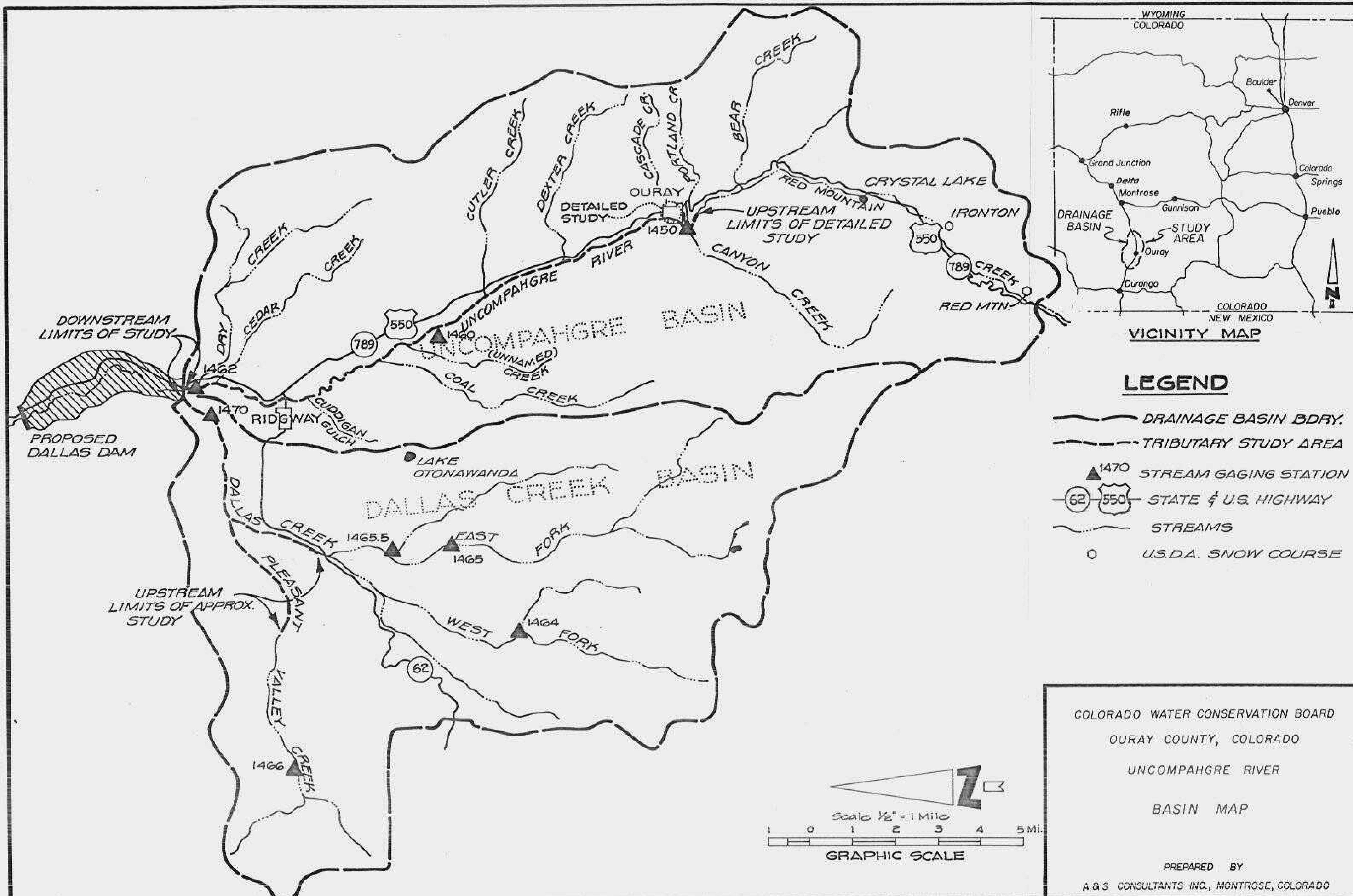
NOTE

TOPOGRAPHY, INCLUDING CONTOURS, SHOWN ON PLATES 3 THROUGH 18 WAS COMPILED BY PHOTOGRAMMETRIC METHODS. DATE OF PHOTOGRAPHY WAS MAY AND JUNE, 1975.



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

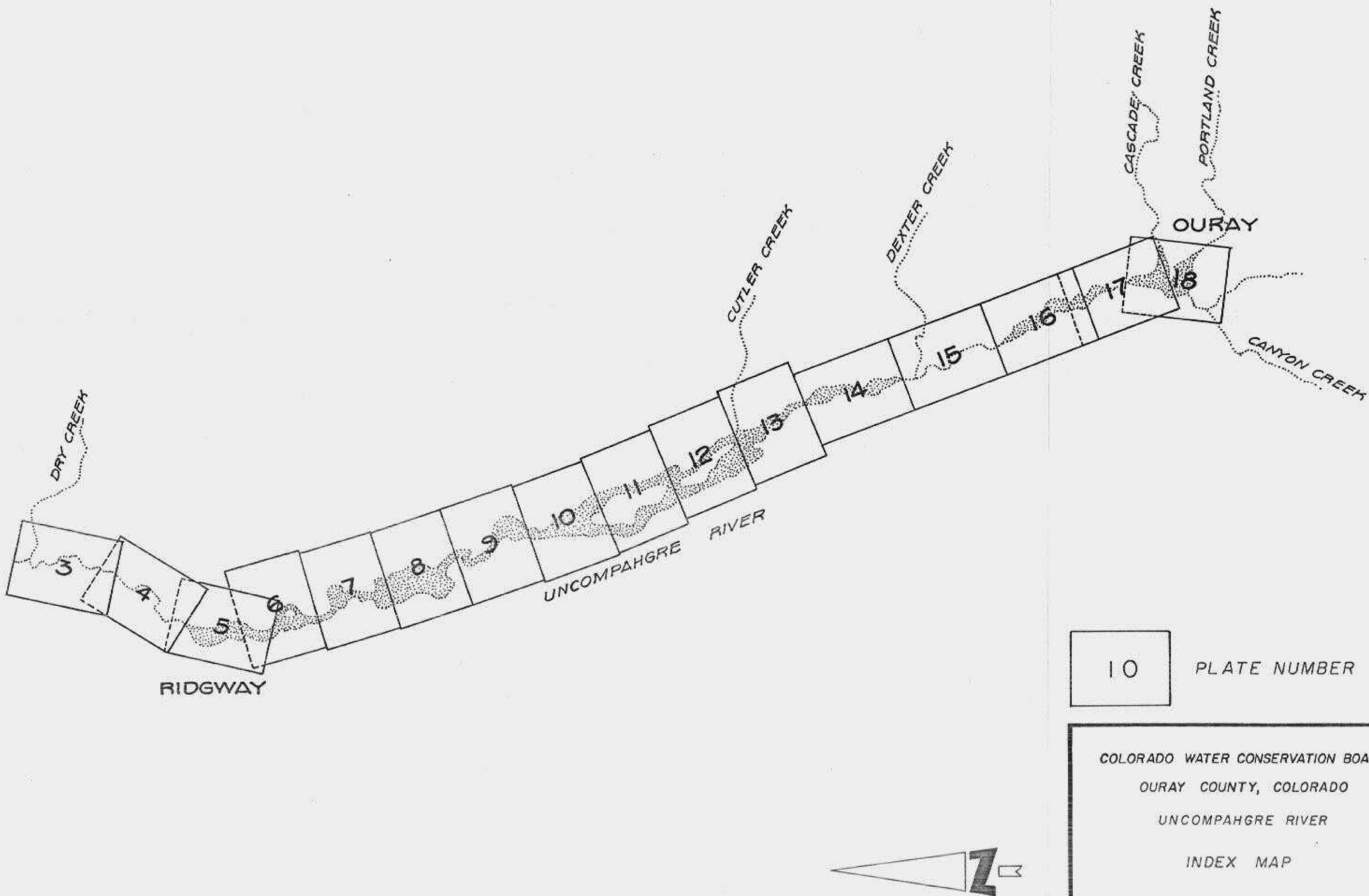
UNCOMPAHGRE RIVER

BASIN MAP

PREPARED BY

A&S CONSULTANTS INC., MONTROSE, COLORADO

PLATE I



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

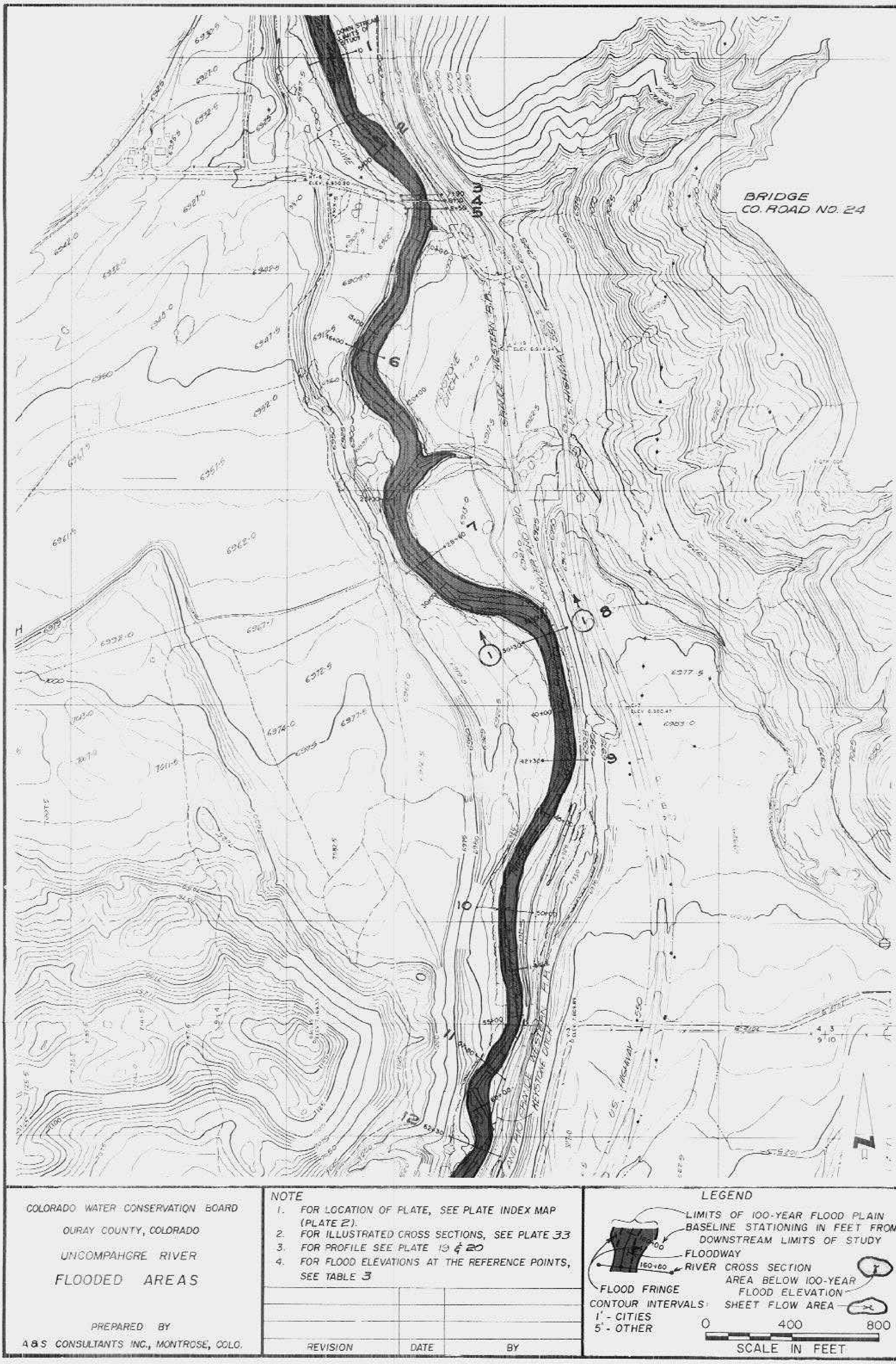
UNCOMPAHGRE RIVER

INDEX MAP

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLORADO

PLATE 2



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 33
3. FOR PROFILE SEE PLATE 13 & 20
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND

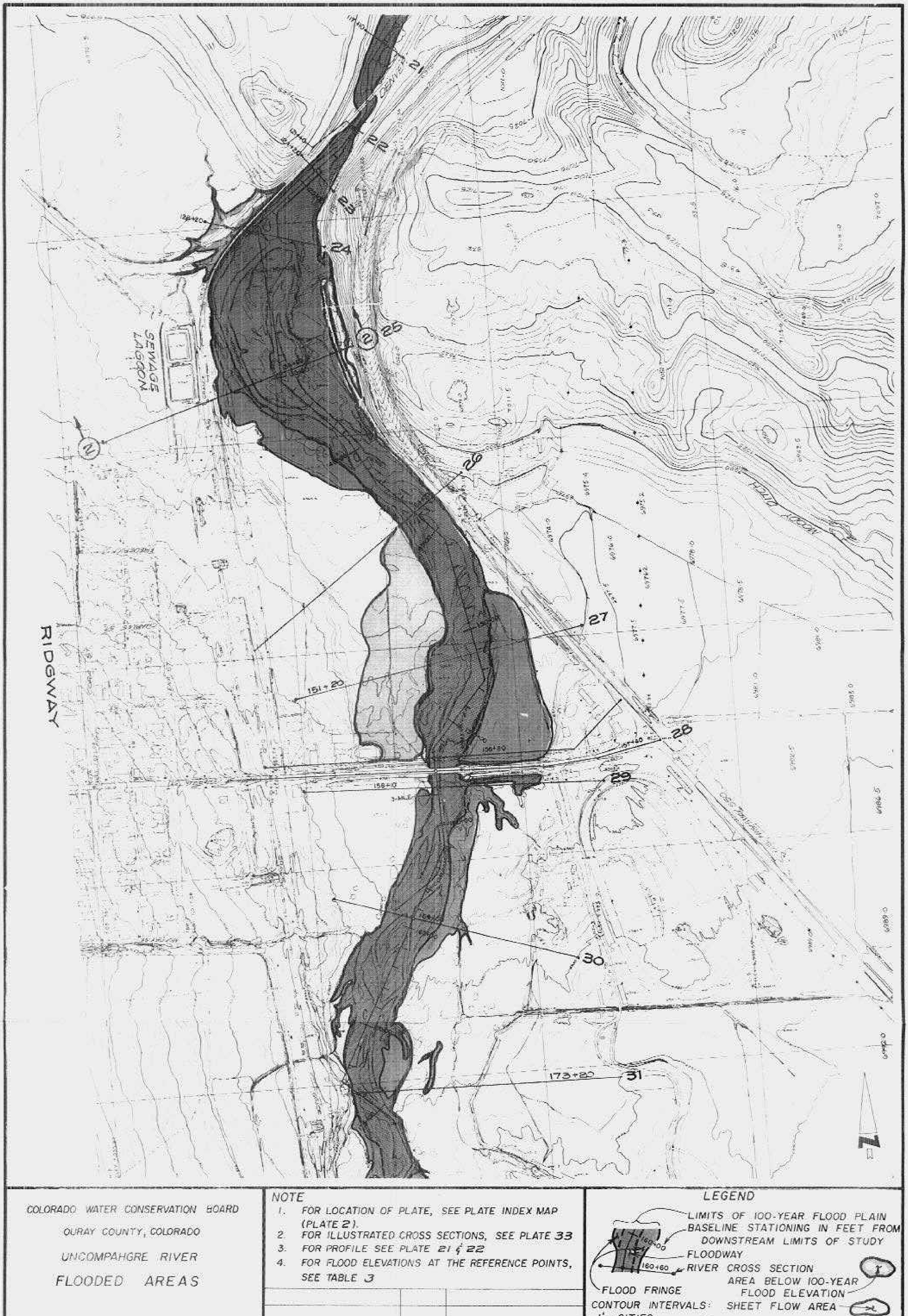
- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
- FLOODWAY
- RIVER CROSS SECTION
- AREA BELOW 100-YEAR FLOOD ELEVATION
- FLOOD FRINGE
- SHEET FLOW AREA

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

COLORADO WATER CONSERVATION BOARD OURAY COUNTY, COLORADO UNCOMPAHGRE RIVER FLOODED AREAS PREPARED BY A&S CONSULTANTS INC., MONTROSE, COLO.	NOTE 1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2). 2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 3. FOR PROFILE SEE PLATE 20 & 21 4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3 REVISION / DATE / BY	LEGEND LIMITS OF 100-YEAR FLOOD PLAIN BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY FLOODWAY RIVER CROSS SECTION AREA BELOW 100-YEAR FLOOD ELEVATION FLOOD FRINGE SHEET FLOW AREA CONTOUR INTERVALS: 1' - CITIES, 5' - OTHER 0 400 800 SCALE IN FEET

PLATE 4



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

A&S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 33
3. FOR PROFILE SEE PLATE 21 & 22
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND

LIMITS OF 100-YEAR FLOOD PLAIN
BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
FLOODWAY
RIVER CROSS SECTION
AREA BELOW 100-YEAR FLOOD ELEVATION
FLOOD FRINGE
CONTOUR INTERVALS: 1' - CITIES, 5' - OTHER
SHEET FLOW AREA

0 400 800
SCALE IN FEET

COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

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NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 33
3. FOR PROFILE SEE PLATE 22
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

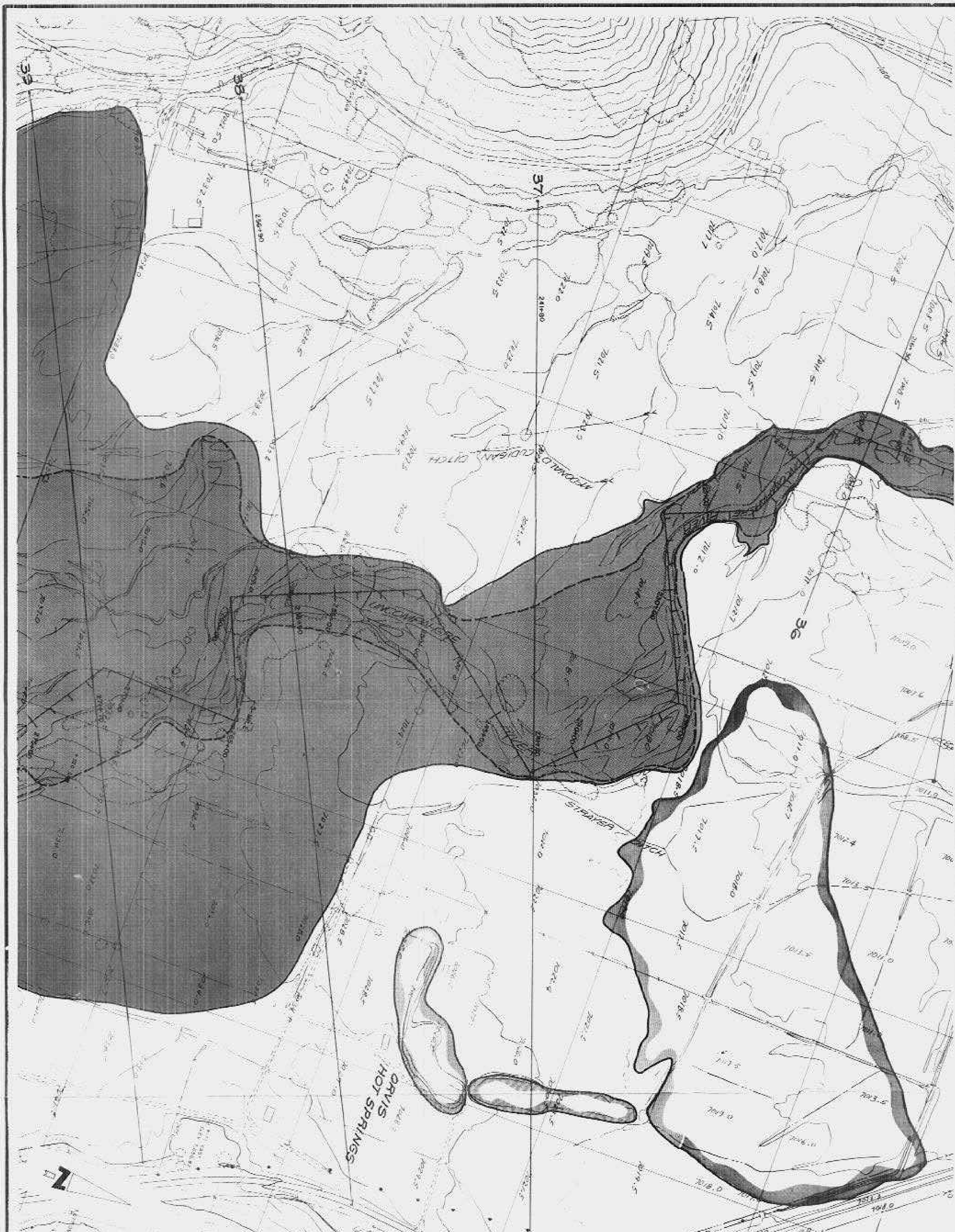
REVISION	DATE	BY

LEGEND

- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
- FLOODWAY
- RIVER CROSS SECTION
- AREA BELOW 100-YEAR FLOOD ELEVATION
- FLOOD FRINGE
- SHEET FLOW AREA

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

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NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR PROFILE SEE PLATE 22 & 23
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND

LIMITS OF 100-YEAR FLOOD PLAIN
BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
FLOODWAY
RIVER CROSS SECTION
AREA BELOW 100-YEAR FLOOD ELEVATION
FLOOD FRINGE
SHEET FLOW AREA
160+00
160+60

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

PLATE 7

COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

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NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 34
3. FOR PROFILE SEE PLATE 23 & 24
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND

- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
- FLOODWAY
- RIVER CROSS SECTION
- FLOOD FRINGE
- AREA BELOW 100-YEAR FLOOD ELEVATION
- SHEET FLOW AREA

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

PLATE 8

COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

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NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR PROFILE SEE PLATE 24 & 25
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

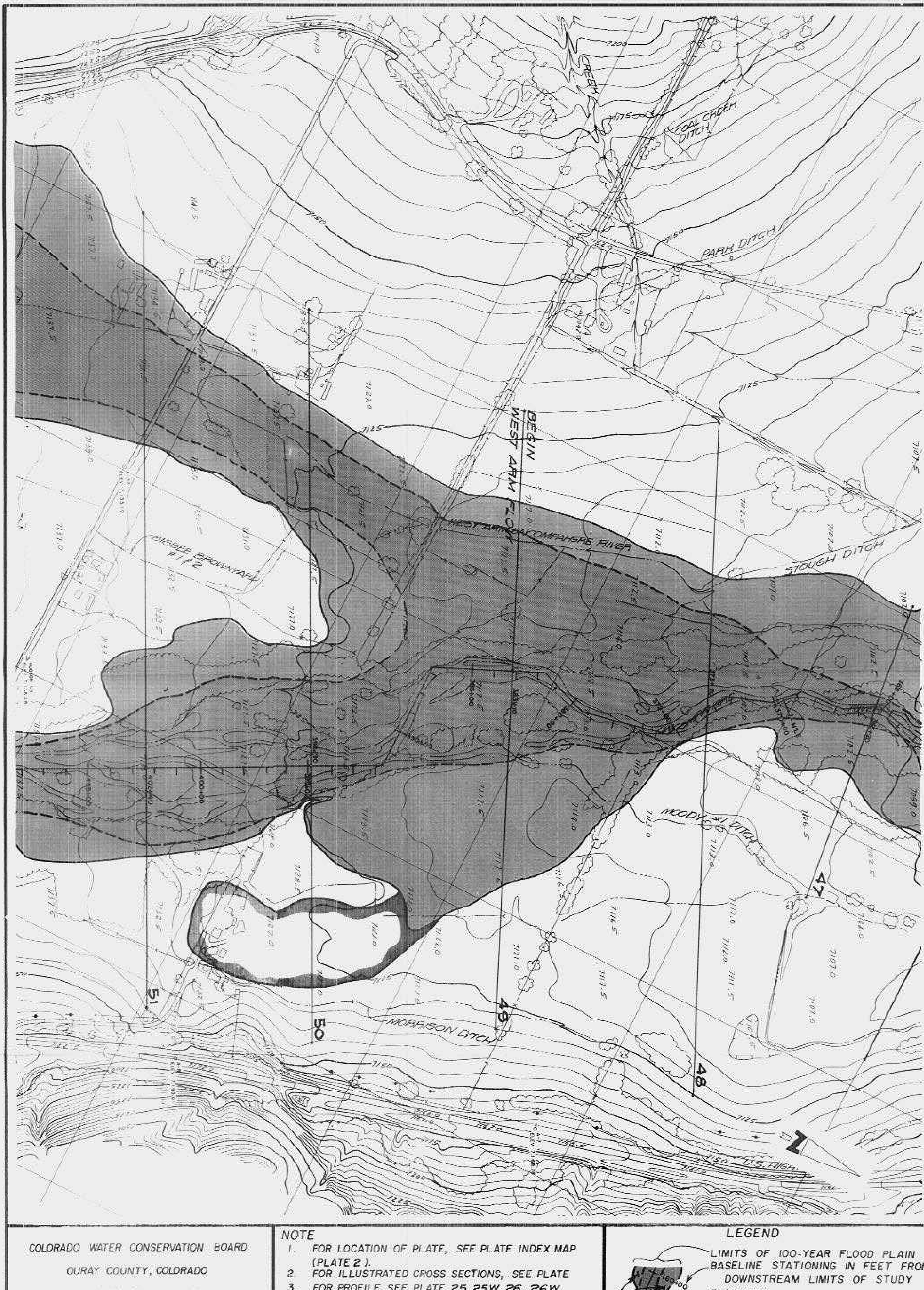
REVISION	DATE	BY

LEGEND

LIMITS OF 100-YEAR FLOOD PLAIN
BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
FLOODWAY
RIVER CROSS SECTION
AREA BELOW 100-YEAR FLOOD ELEVATION
FLOOD FRINGE
SHEET FLOW AREA
CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

PLATE 9



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

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NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR PROFILE SEE PLATE 25, 25W, 26, 26W
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

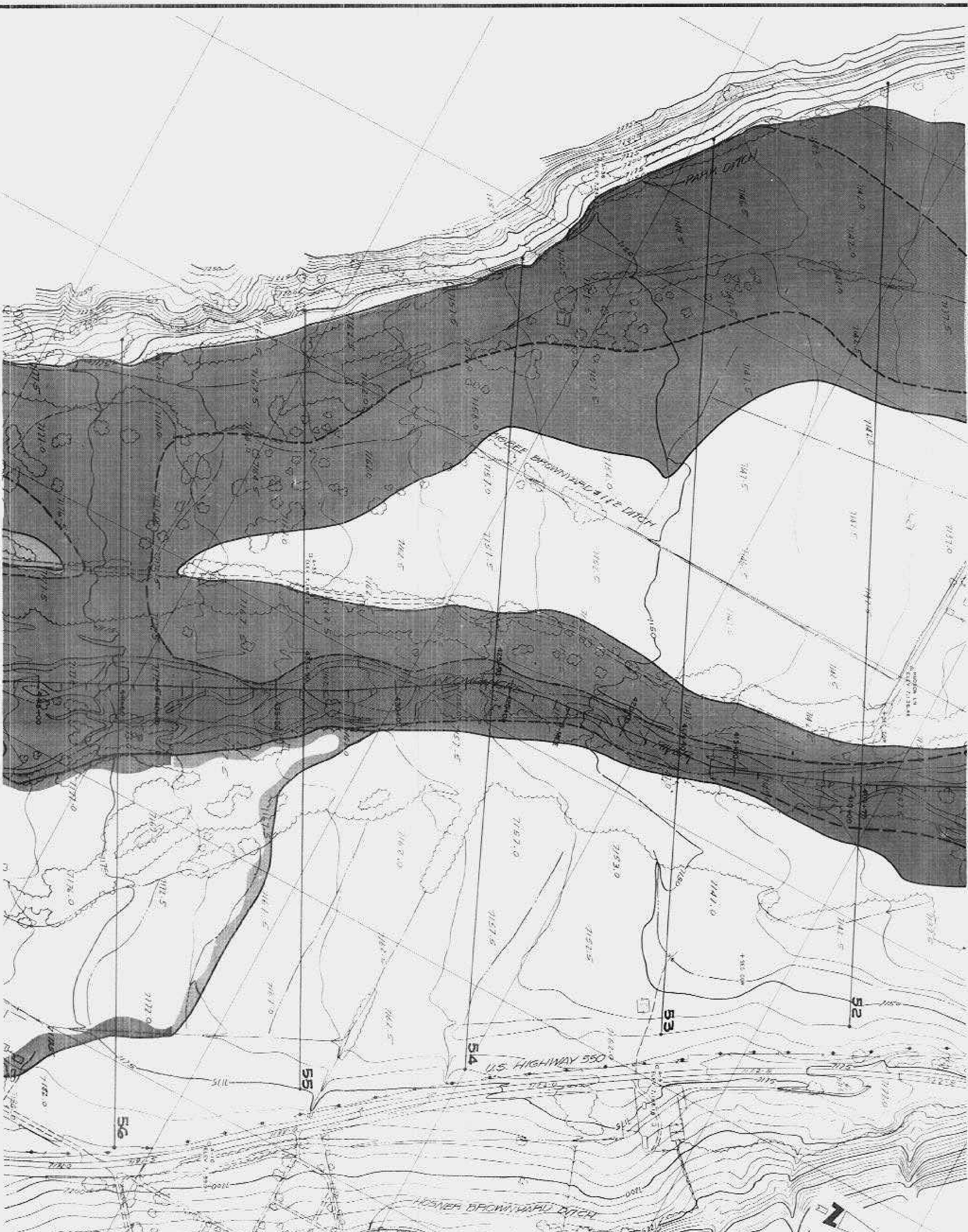
LEGEND

LIMITS OF 100-YEAR FLOOD PLAIN
BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
FLOODWAY
RIVER CROSS SECTION
AREA BELOW 100-YEAR FLOOD ELEVATION
FLOOD FRINGE
SHEET FLOW AREA

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

PLATE 10



COLORADO WATER CONSERVATION BOARD OURAY COUNTY, COLORADO UNCOMPAHGRE RIVER FLOODED AREAS PREPARED BY A & S CONSULTANTS INC., MONTROSE, COLO.	NOTE 1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2). 2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 3. FOR PROFILE SEE PLATE 26 & 26W 4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

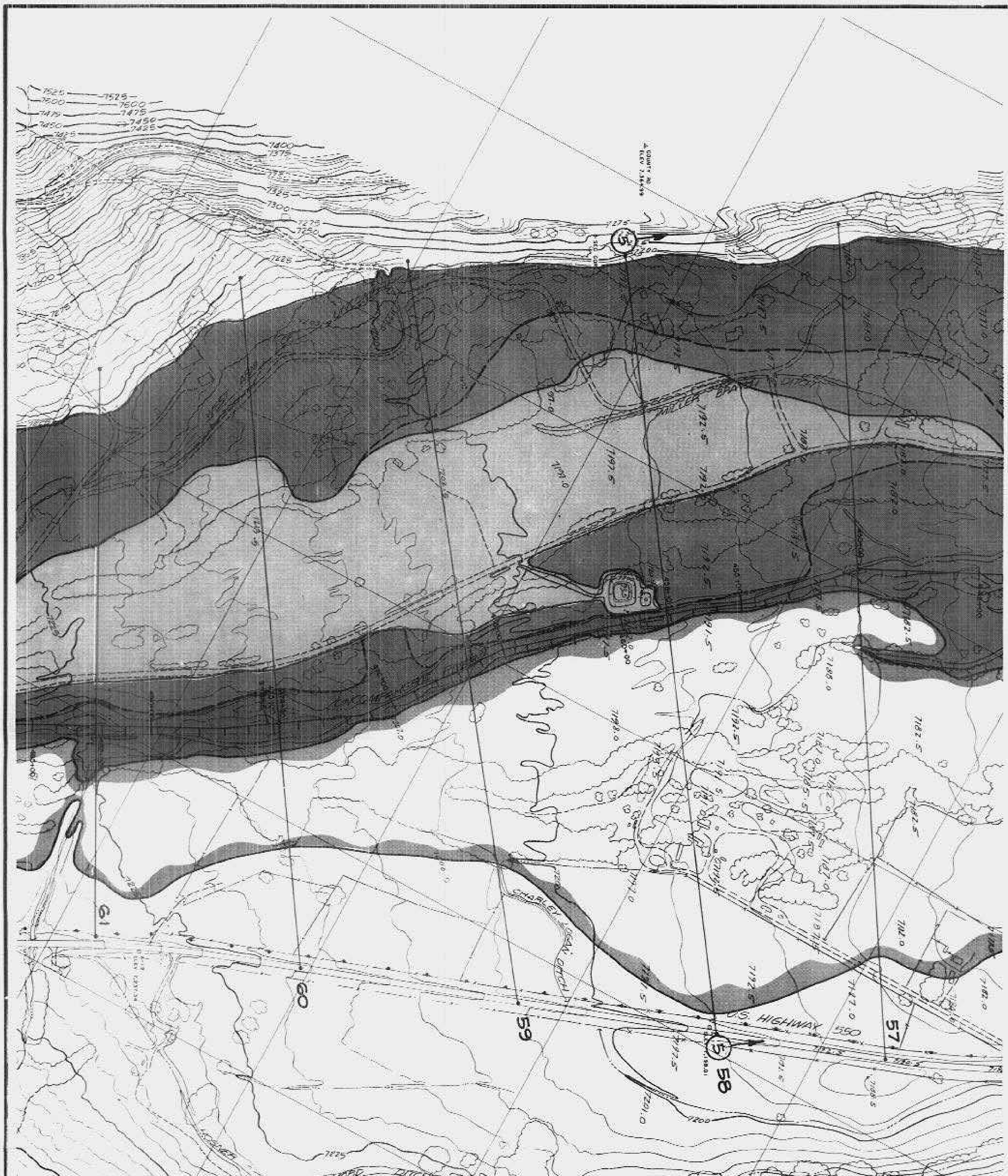
REVISION	DATE	BY

LEGEND

- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY (160+00, 160+60)
- FLOODWAY
- RIVER CROSS SECTION
- FLOOD FRINGE
- AREA BELOW 100-YEAR FLOOD ELEVATION
- SHEET FLOW AREA

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

SCALE IN FEET: 0, 400, 800



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

A&S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 34
3. FOR PROFILE SEE PLATE 26, 26W, 27, 27W
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

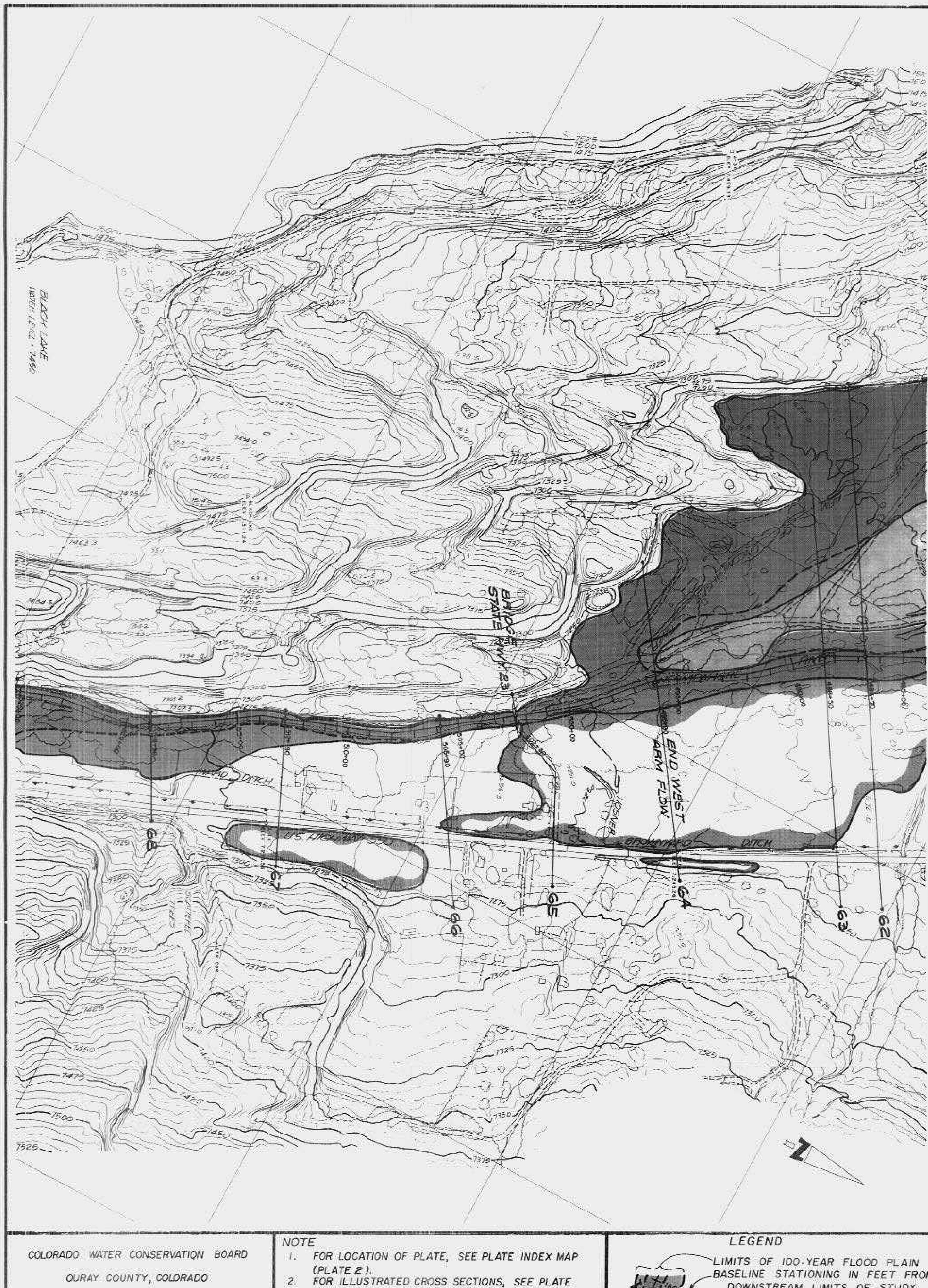
REVISION	DATE	BY

LEGEND

- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
- FLOODWAY
- RIVER CROSS SECTION
- AREA BELOW 100-YEAR FLOOD ELEVATION
- SHEET FLOW AREA
- FLOOD FRINGE

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

A&S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR PROFILE SEE PLATE 27, 27W, 25
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

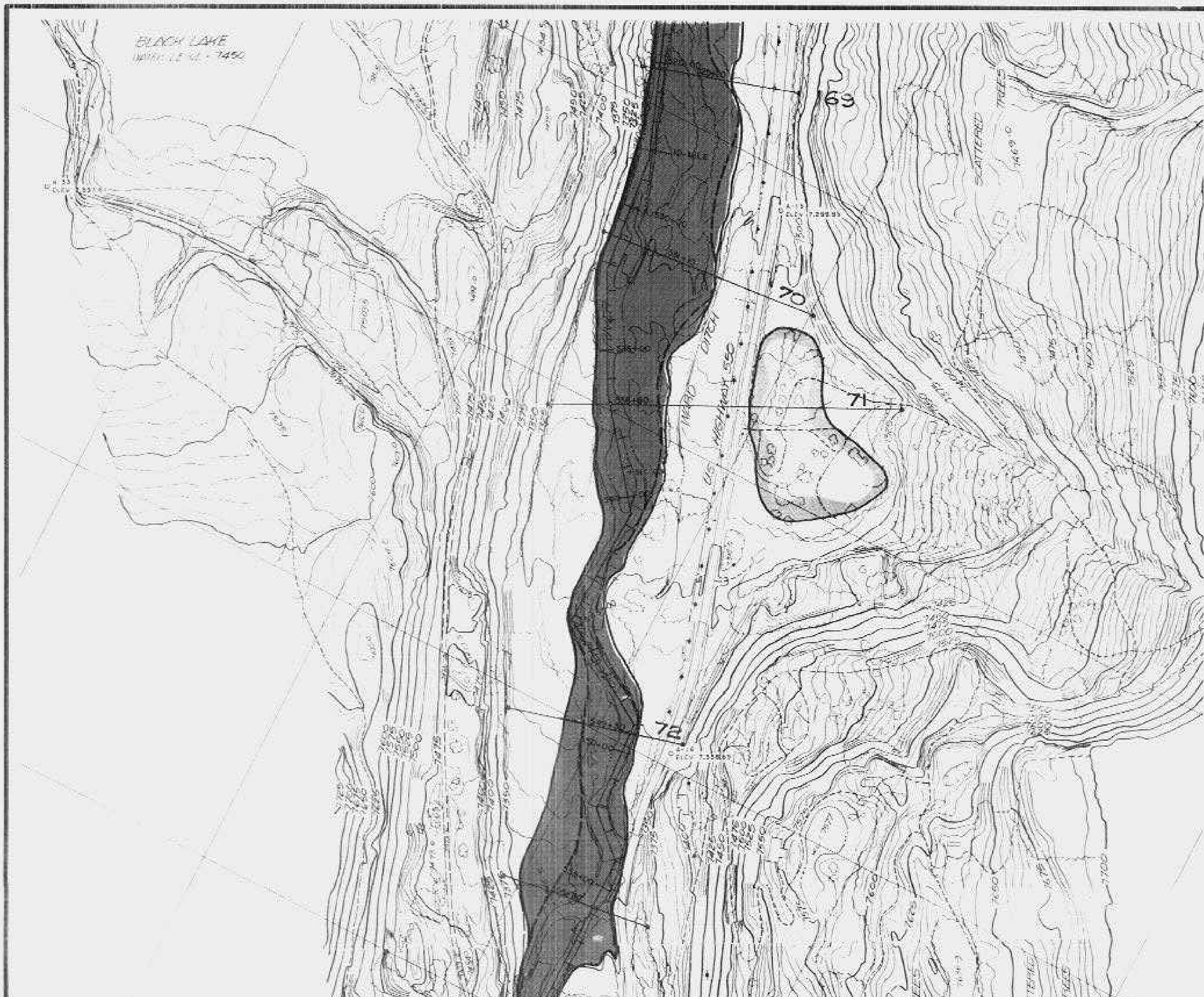
LEGEND

- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
- FLOODWAY
- RIVER CROSS SECTION
- AREA BELOW 100-YEAR FLOOD ELEVATION
- FLOOD FRINGE
- SHEET FLOW AREA

160+00
160+60

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

A&S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR PROFILE SEE PLATE 28 & 29
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND

LIMITS OF 100-YEAR FLOOD PLAIN
BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
FLOODWAY
RIVER CROSS SECTION
FLOOD FRINGE
AREA BELOW 100-YEAR FLOOD ELEVATION
SHEET FLOW AREA
CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

COLORADO WATER CONSERVATION BOARD OURAY COUNTY, COLORADO UNCOMPAHGRE RIVER FLOODED AREAS PREPARED BY A&S CONSULTANTS INC., MONTROSE, COLO.	NOTE 1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2). 2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 3. FOR PROFILE SEE PLATE 29 & 30 4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3	LEGEND

REVISION	DATE	BY

LEGEND

- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
- FLOODWAY
- RIVER CROSS SECTION
- AREA BELOW 100-YEAR FLOOD ELEVATION
- SHEET FLOW AREA
- FLOOD FRINGE

160+00
160+60

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

PLATE 15

COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

A&S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 35
3. FOR PROFILE SEE PLATE 30 & 31
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND

- LIMITS OF 100-YEAR FLOOD PLAIN
- BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY (160+00)
- FLOODWAY
- RIVER CROSS SECTION (160+60)
- FLOOD FRINGE
- AREA BELOW 100-YEAR FLOOD ELEVATION
- SHEET FLOW AREA

CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET

COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOODED AREAS

PREPARED BY

A&S CONSULTANTS INC., MONTROSE, COLO.

NOTE

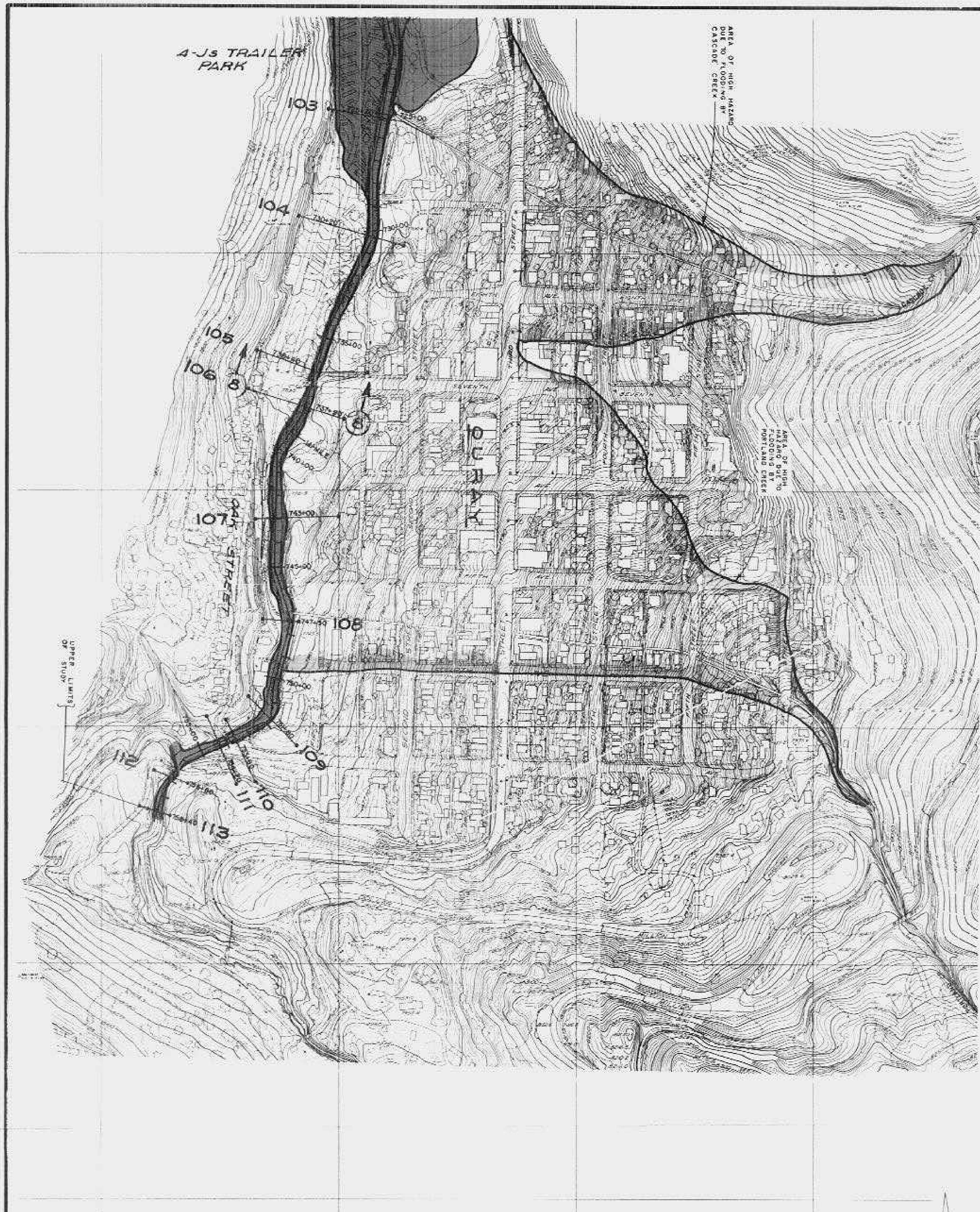
1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR PROFILE SEE PLATE 31
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND

LIMITS OF 100-YEAR FLOOD PLAIN
BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY (160+00)
FLOODWAY
RIVER CROSS SECTION (160+60)
AREA BELOW 100-YEAR FLOOD ELEVATION
FLOOD FRINGE
SHEET FLOW AREA
CONTOUR INTERVALS:
1' - CITIES
5' - OTHER

0 400 800
SCALE IN FEET



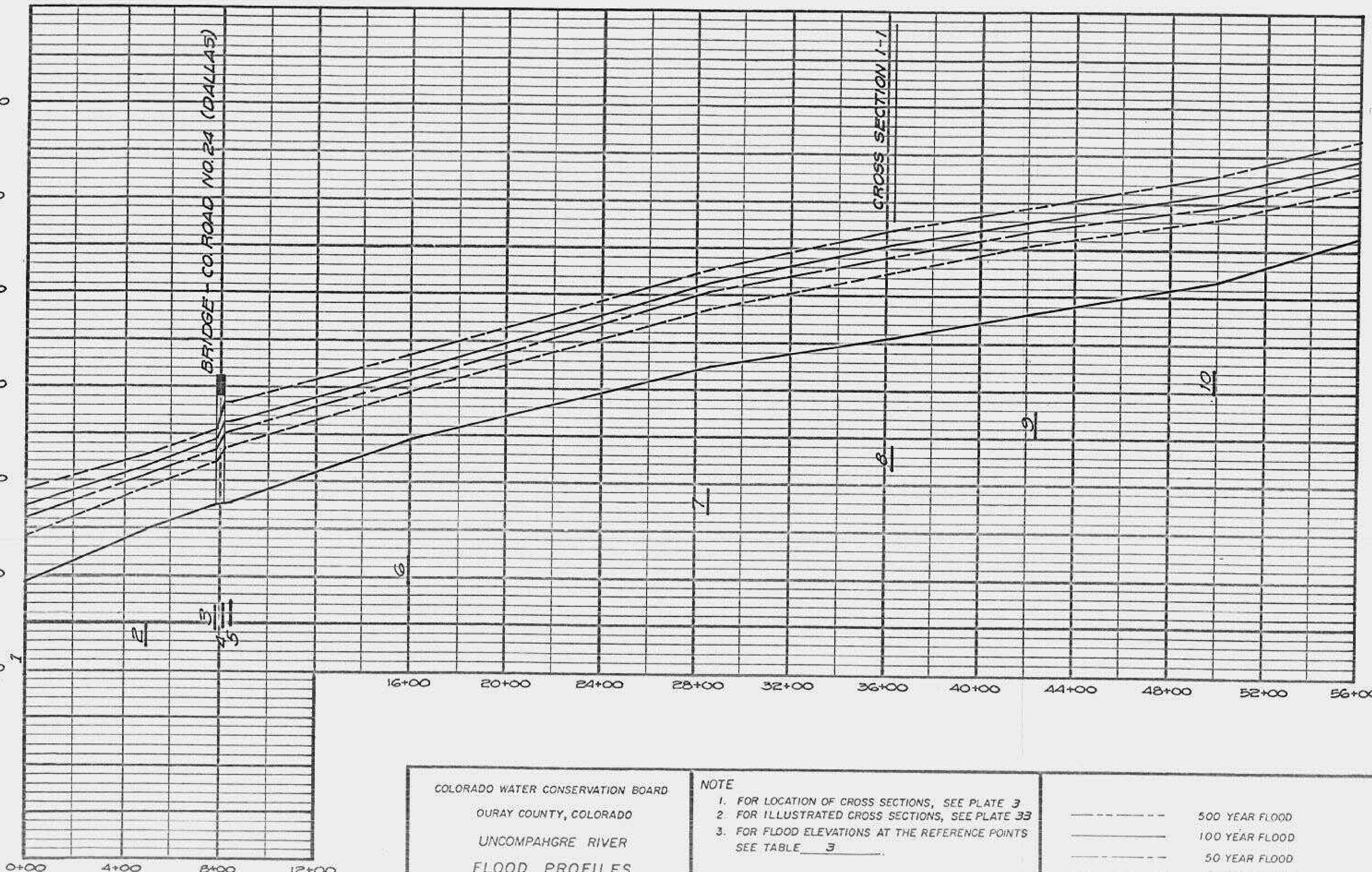
COLORADO WATER CONSERVATION BOARD
OURAY COUNTY, COLORADO
UNCOMPAHGRE RIVER
FLOODED AREAS

PREPARED BY
A&S CONSULTANTS INC., MONTROSE, COLO.

NOTE
1. FOR LOCATION OF PLATE, SEE PLATE INDEX MAP (PLATE 2).
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 35
3. FOR PROFILE SEE PLATE 31 & 32
4. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS, SEE TABLE 3

REVISION	DATE	BY

LEGEND
LIMITS OF 100-YEAR FLOOD PLAIN
BASELINE STATIONING IN FEET FROM DOWNSTREAM LIMITS OF STUDY
FLOODWAY
RIVER CROSS SECTION
FLOOD FRINGE
AREA BELOW 100-YEAR FLOOD ELEVATION
SHEET FLOW AREA
CONTOUR INTERVALS:
1' - CITIES
5' - OTHER
0 400 800
SCALE IN FEET



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

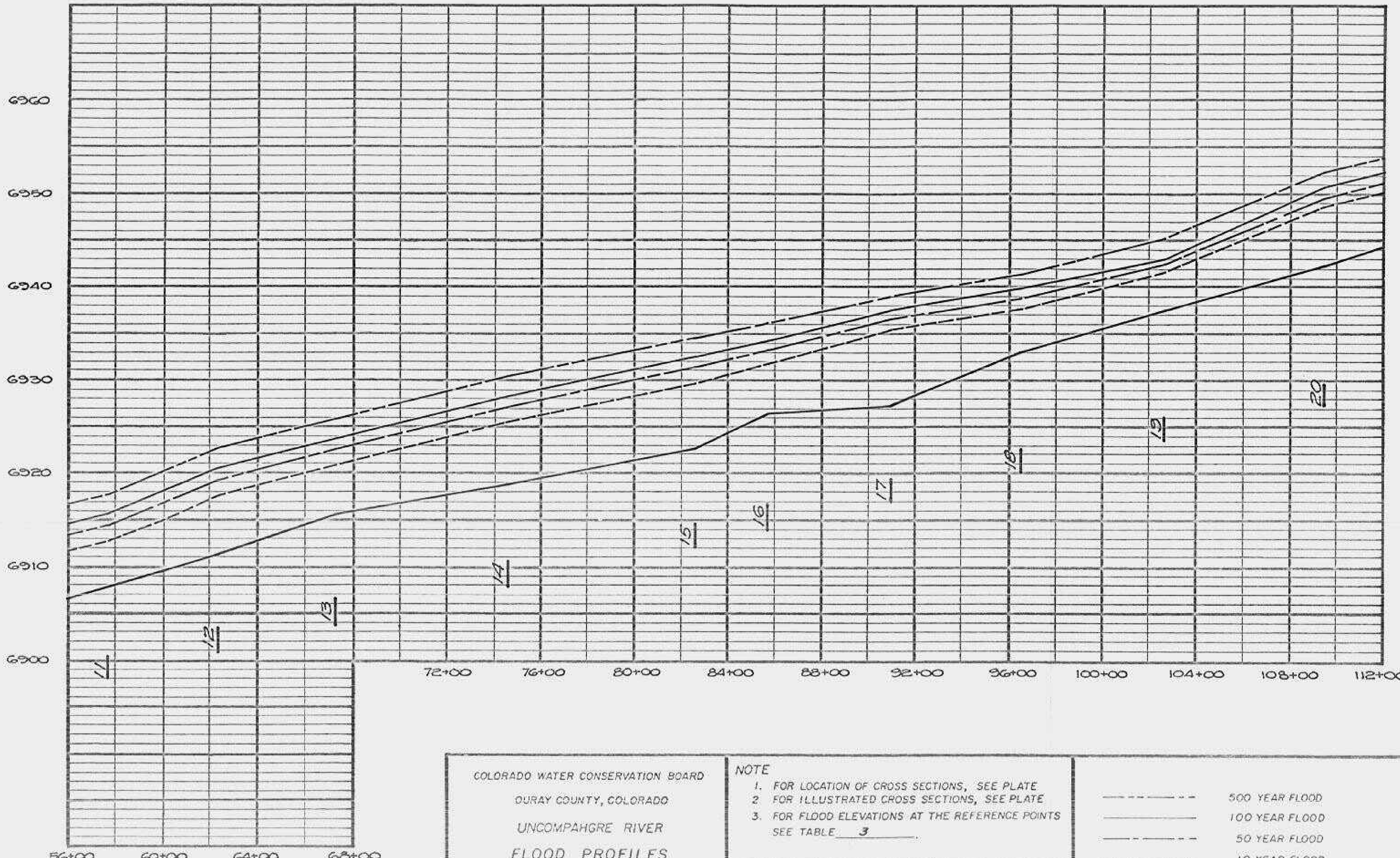
A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 3
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 33
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.

REVISION	DATE	BY

PLATE 19



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.

REVISION	DATE	BY

500 YEAR FLOOD

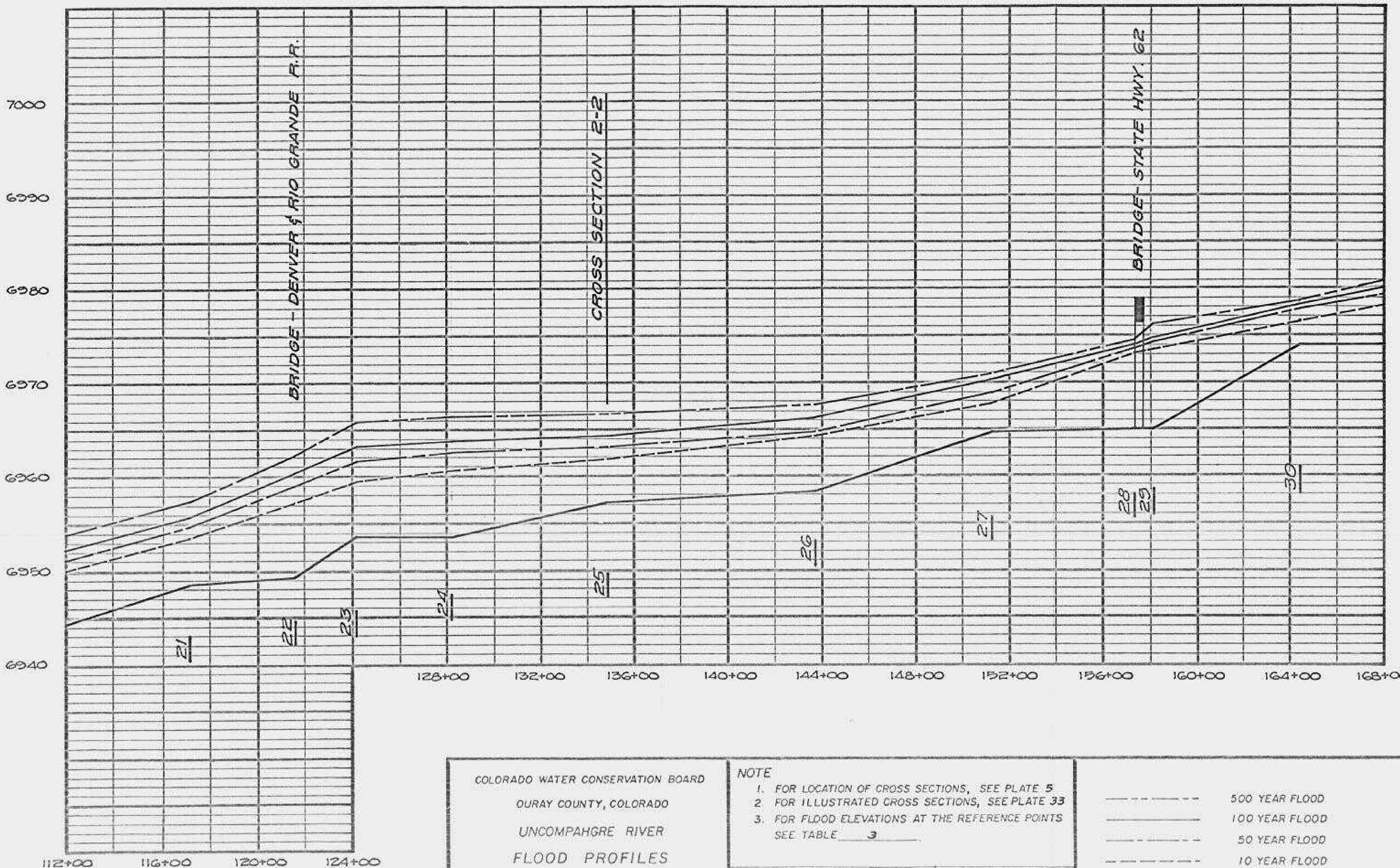
100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

2 REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

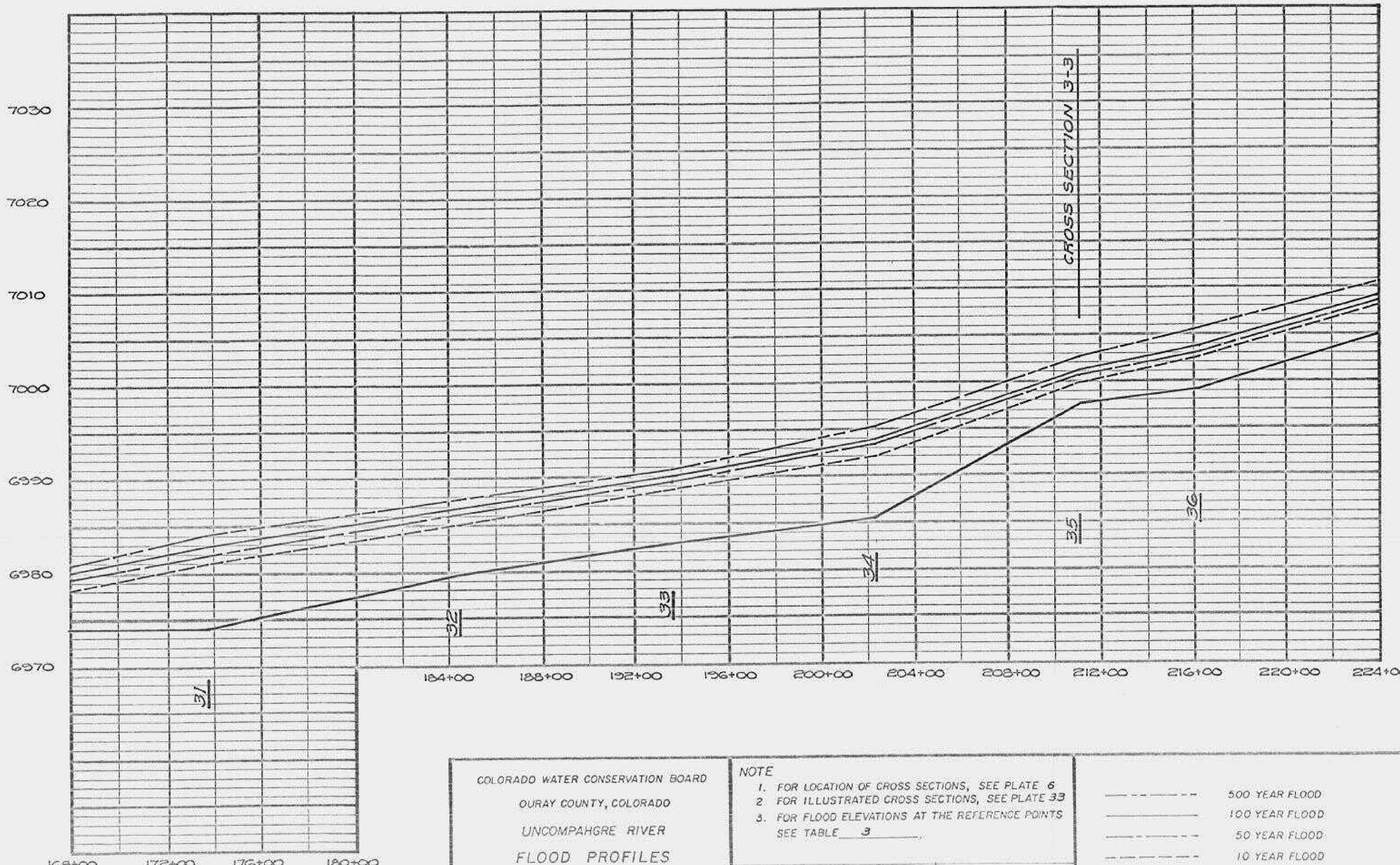
A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 5
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 33
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3

REVISION	DATE	BY

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
2 REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 6
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 33
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3

REVISION	DATE	BY

500 YEAR FLOOD

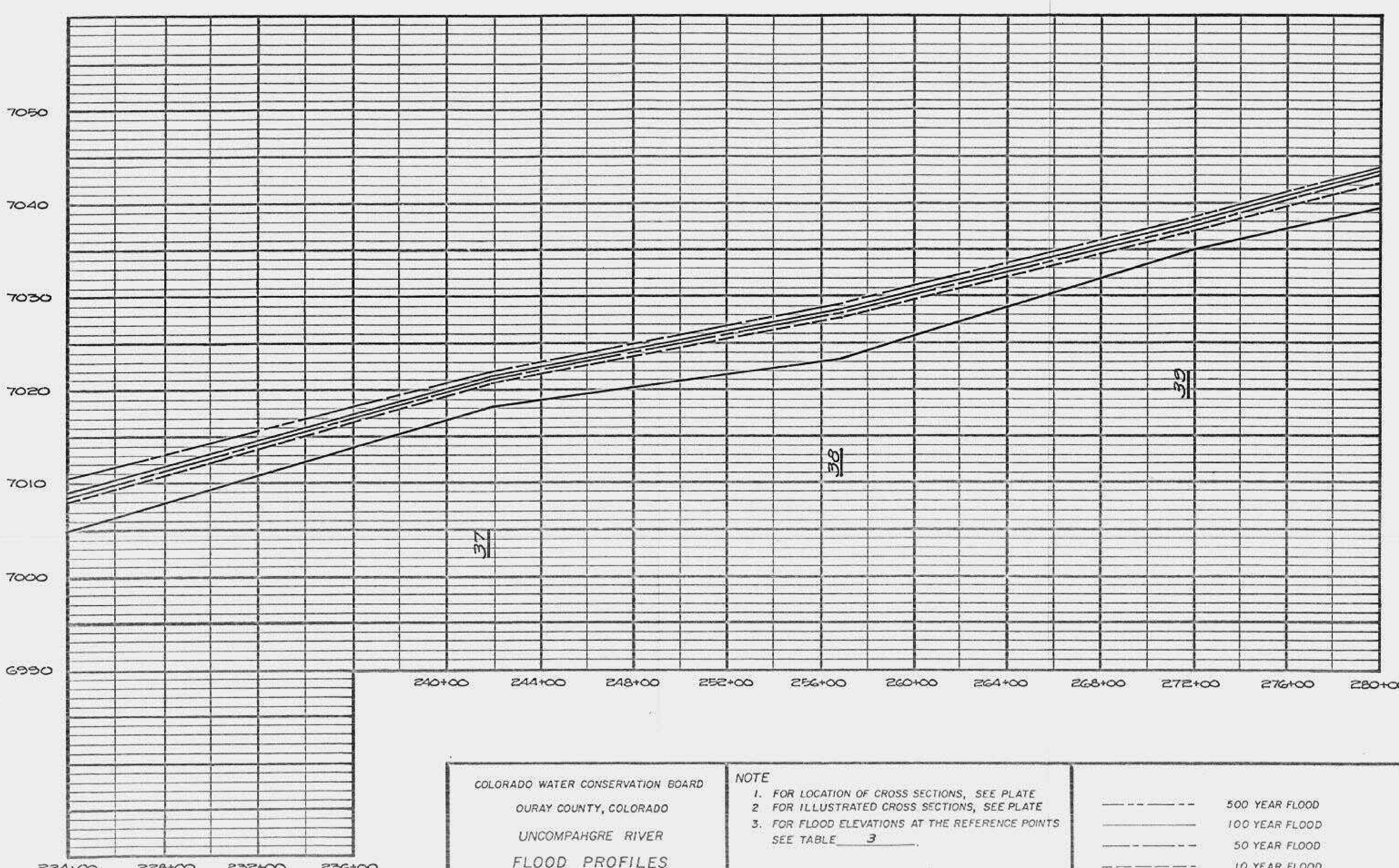
100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

2 REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

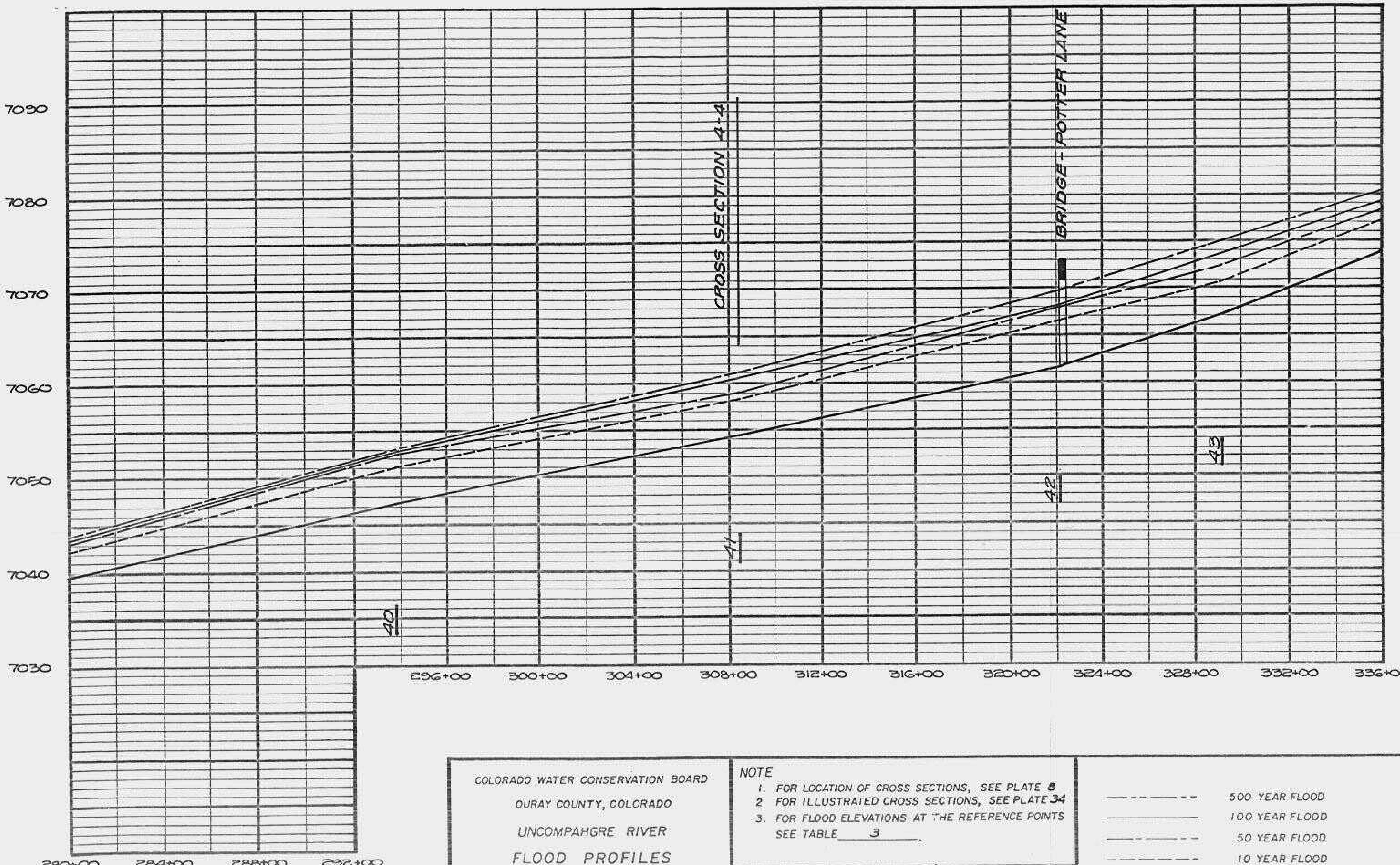
PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3 .

REVISION	DATE	BY



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

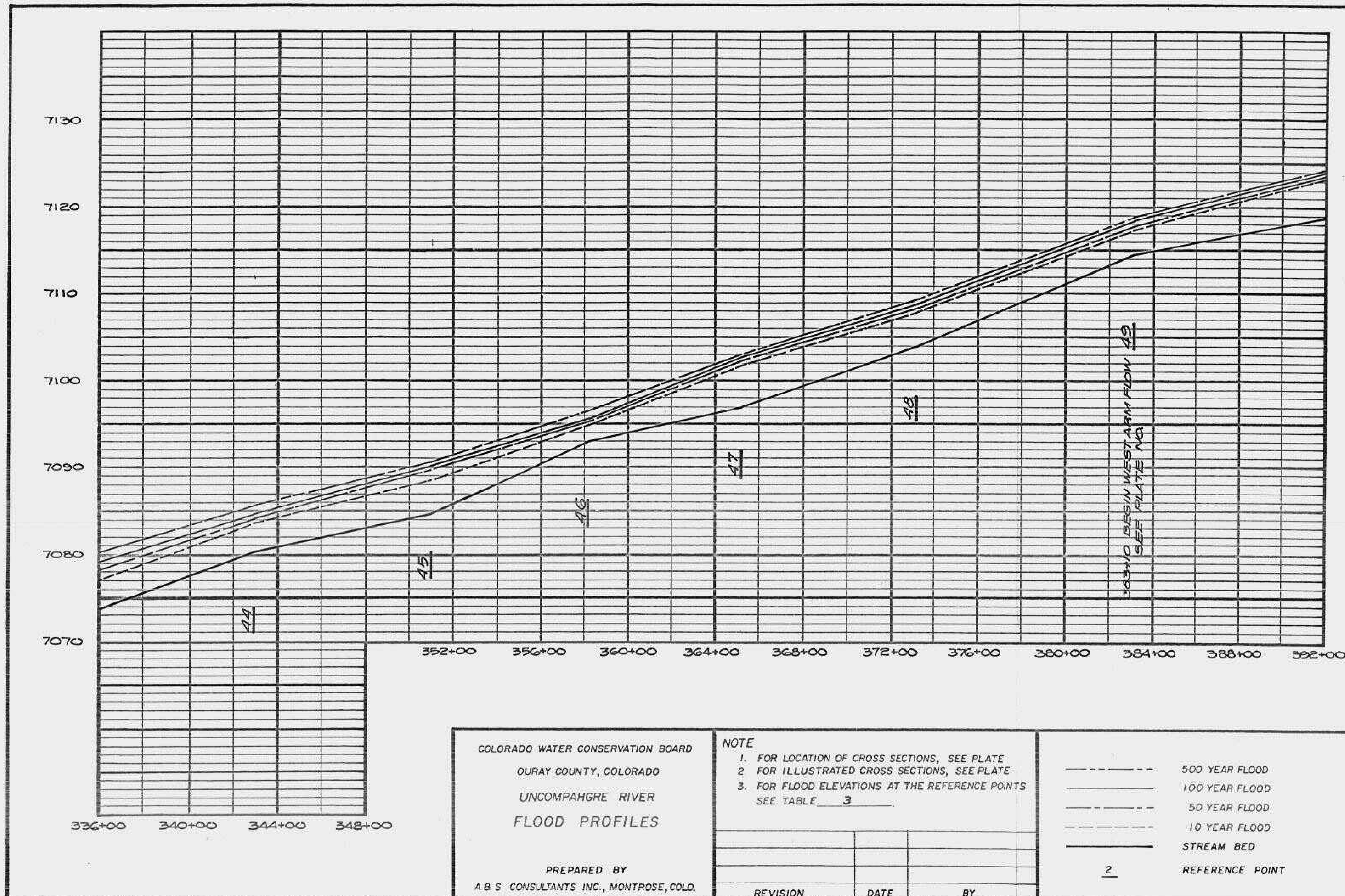
A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

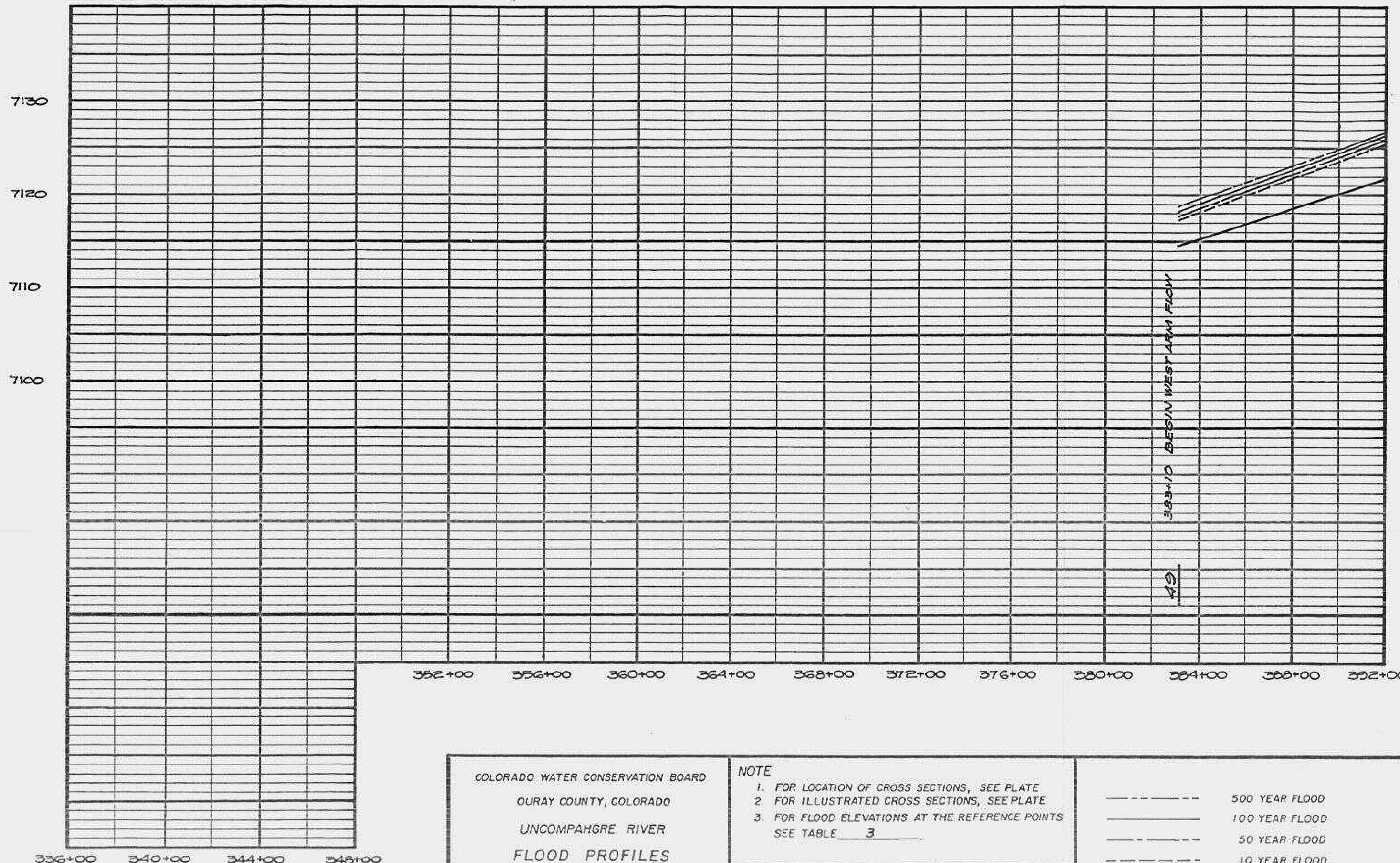
1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 8
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 34
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.

REVISION	DATE	BY

— - — - —	500 YEAR FLOOD
———	100 YEAR FLOOD
— - — -	50 YEAR FLOOD
— — — —	10 YEAR FLOOD
———	STREAM BED
2	REFERENCE POINT



7130
7120
7110
7100
7090
7080
7070
44
45
46
47
48
49
363+10 BEGIN WEST ARM FLOW
SEE PLATE NO.
336+00
340+00
344+00
348+00
352+00
356+00
360+00
364+00
368+00
372+00
376+00
380+00
384+00
388+00
392+00
COLORADO WATER CONSERVATION BOARD
OURAY COUNTY, COLORADO
UNCOMPAHGRE RIVER
FLOOD PROFILES
PREPARED BY
A & S CONSULTANTS INC., MONTROSE, COLO.
NOTE
1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2 FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3
REVISION
DATE
BY
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
2
REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE
1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3

REVISION	DATE	BY

- - - — - -	500 YEAR FLOOD
———	100 YEAR FLOOD
— - — -	50 YEAR FLOOD
— — —	10 YEAR FLOOD
━━━	STREAM BED
2	REFERENCE POINT

PLATE 25W

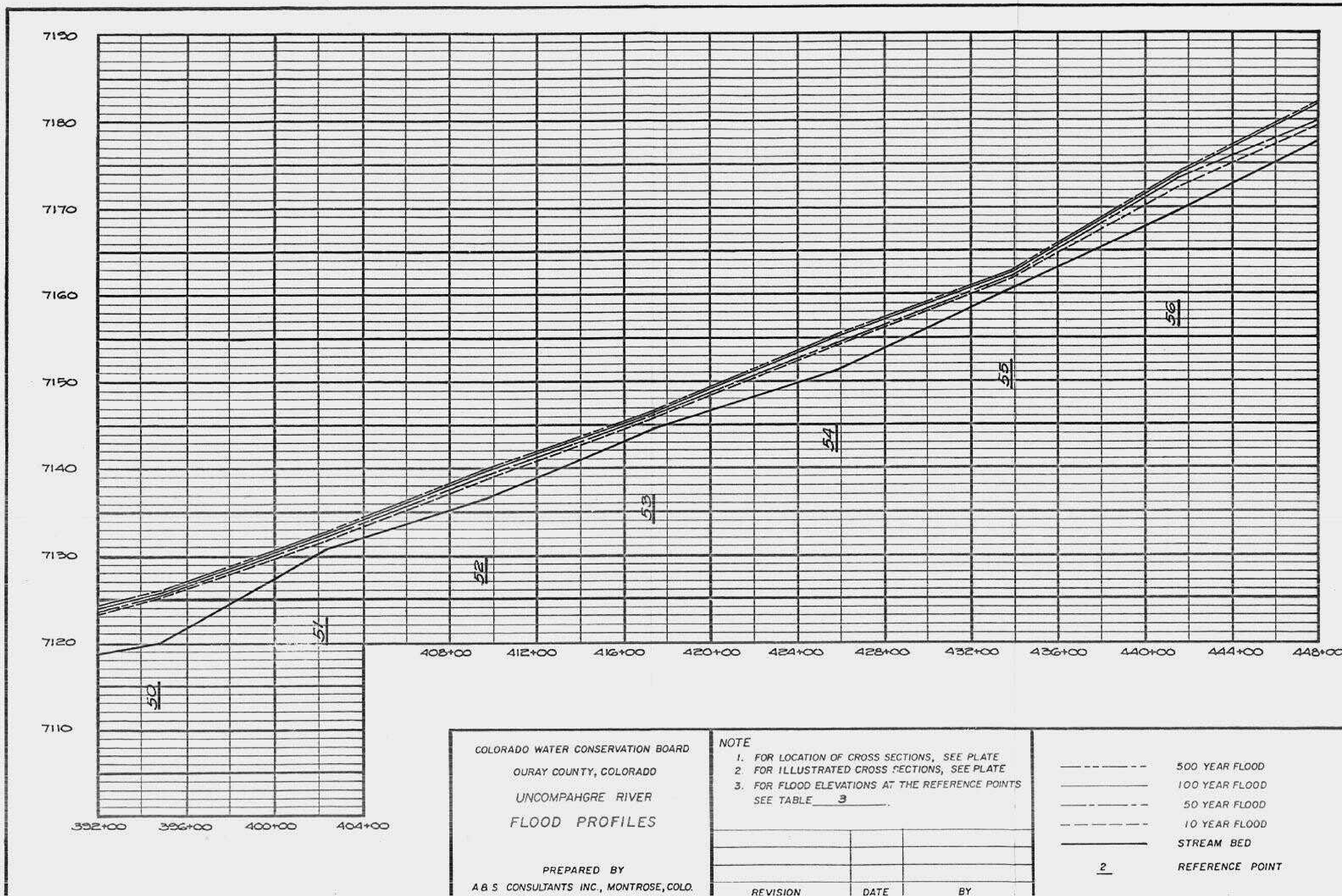
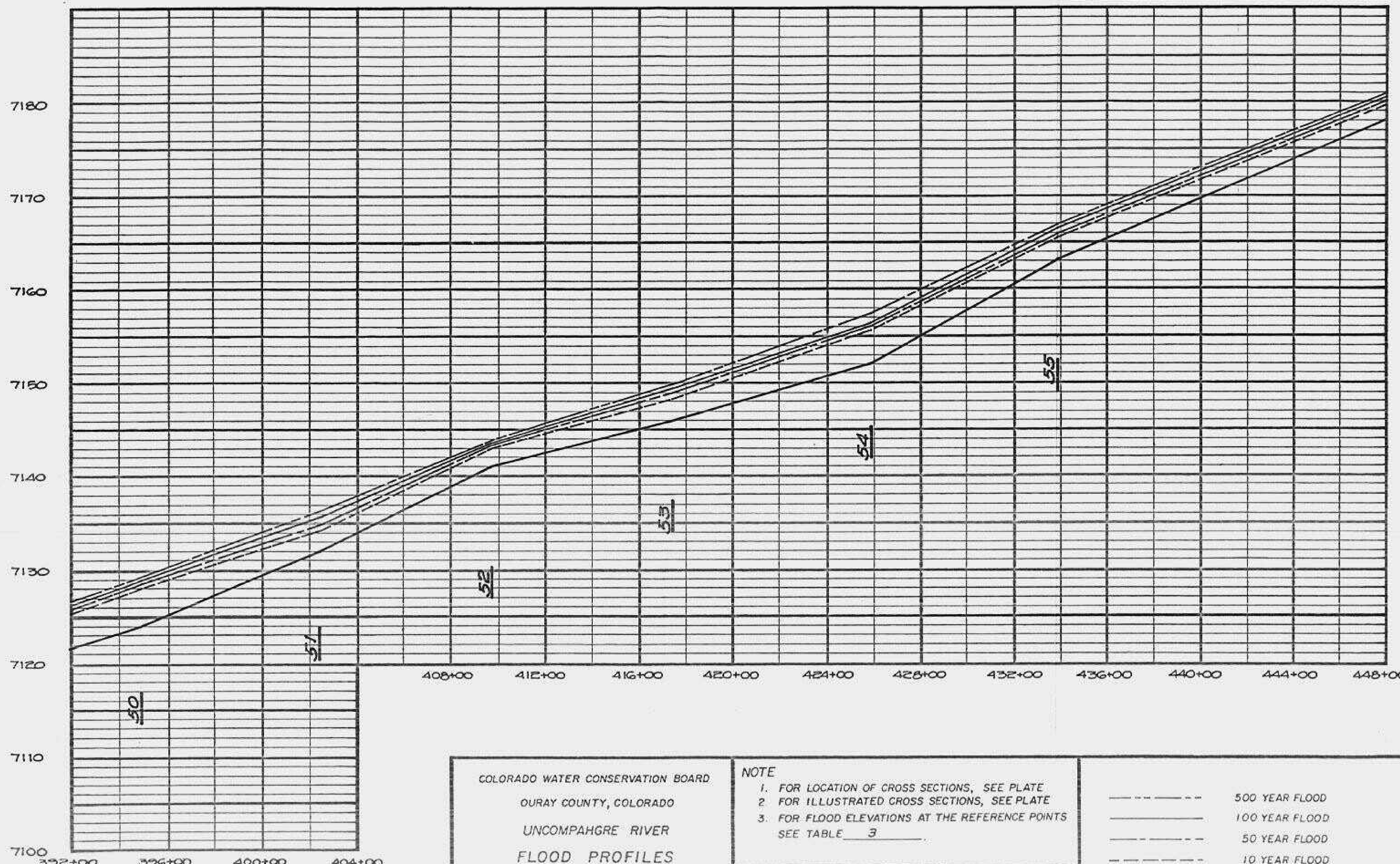

7190
7180
7170
7160
7150
7140
7130
7120
7110
392+00
396+00
400+00
404+00
408+00
412+00
416+00
420+00
424+00
428+00
432+00
436+00
440+00
444+00
448+00
50
51
52
53
54
55
56
COLORADO WATER CONSERVATION BOARD
OURAY COUNTY, COLORADO
UNCOMPAHGRE RIVER
FLOOD PROFILES
PREPARED BY
A & S CONSULTANTS INC., MONTROSE, COLO.
NOTE
1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.
REVISION
DATE
BY
500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
2
REFERENCE POINT

PLATE 26



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

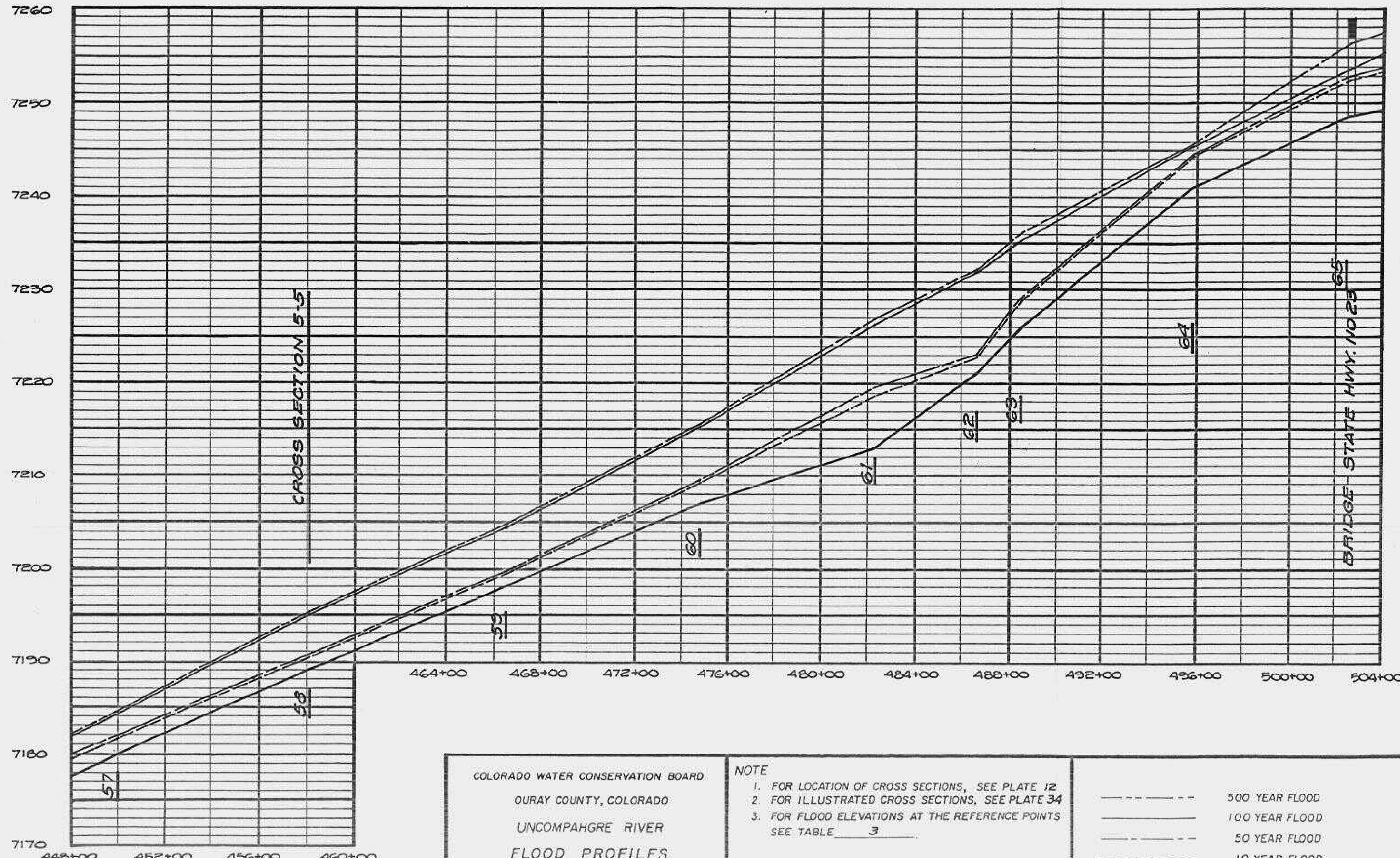
NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.

REVISION	DATE	BY

— — — — —	500 YEAR FLOOD
————	100 YEAR FLOOD
— - — - —	50 YEAR FLOOD
— — — —	10 YEAR FLOOD
▬▬▬▬	STREAM BED
2	REFERENCE POINT

PLATE 26W



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 12
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 34
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3

REVISION	DATE	BY

500 YEAR FLOOD

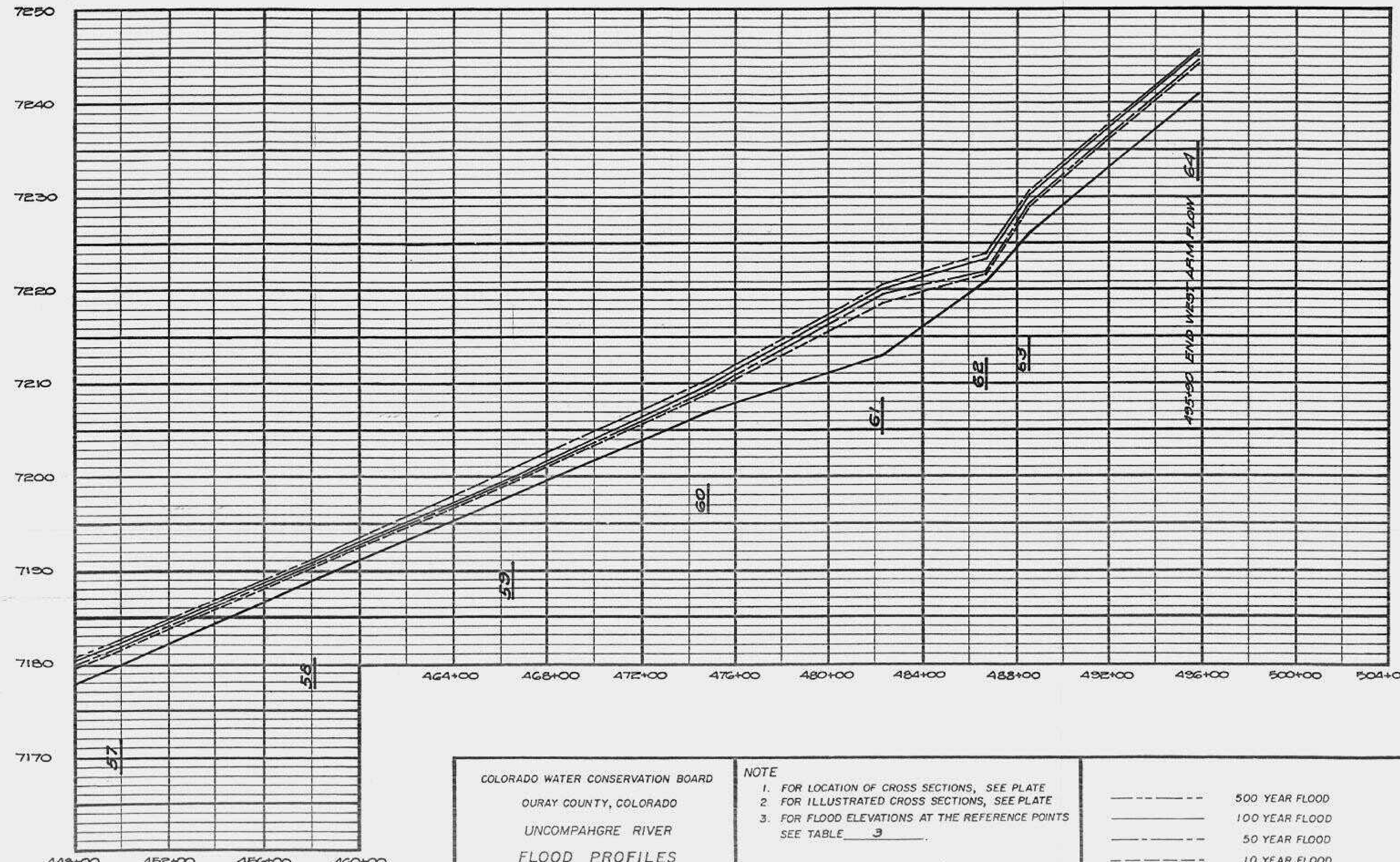
100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

2 REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

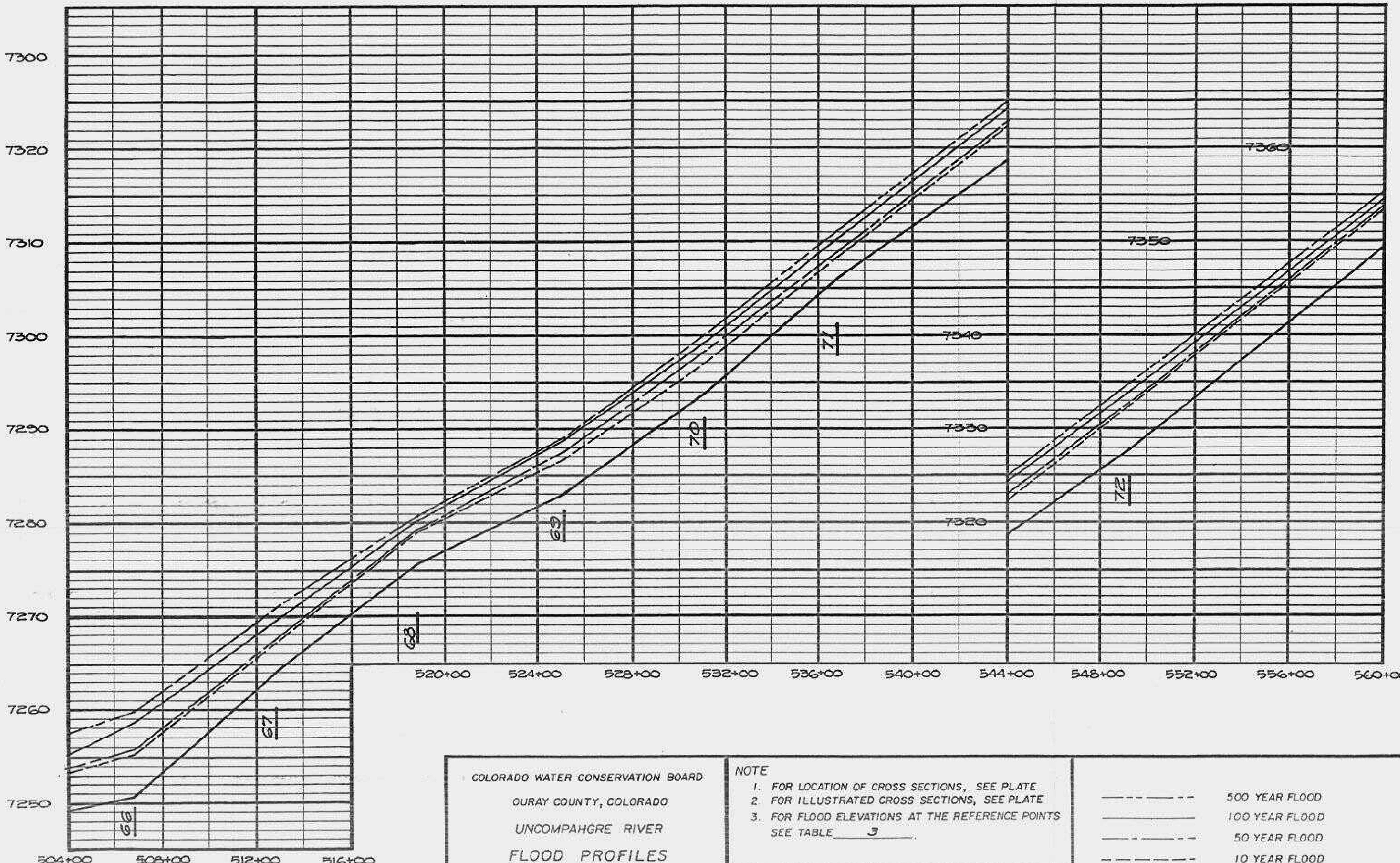
NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.

REVISION	DATE	BY

— — — — —	500 YEAR FLOOD
————	100 YEAR FLOOD
— · — · —	50 YEAR FLOOD
— — — —	10 YEAR FLOOD
━━━━	STREAM BED
2	REFERENCE POINT

PLATE 27W



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

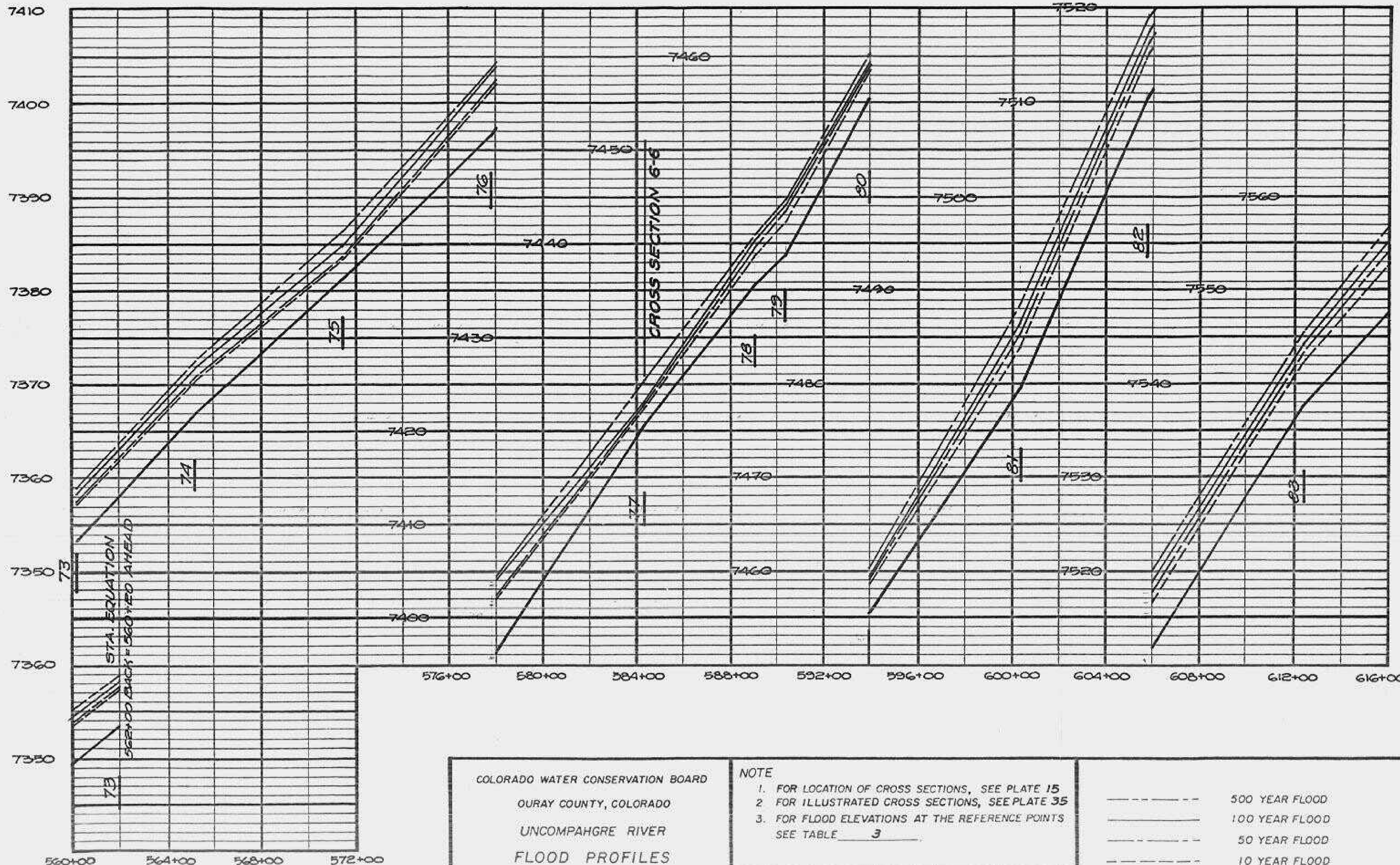
A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.

REVISION	DATE	BY

— - - — - -	500 YEAR FLOOD
———	100 YEAR FLOOD
— - — -	50 YEAR FLOOD
— — — —	10 YEAR FLOOD
———	STREAM BED
2	REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

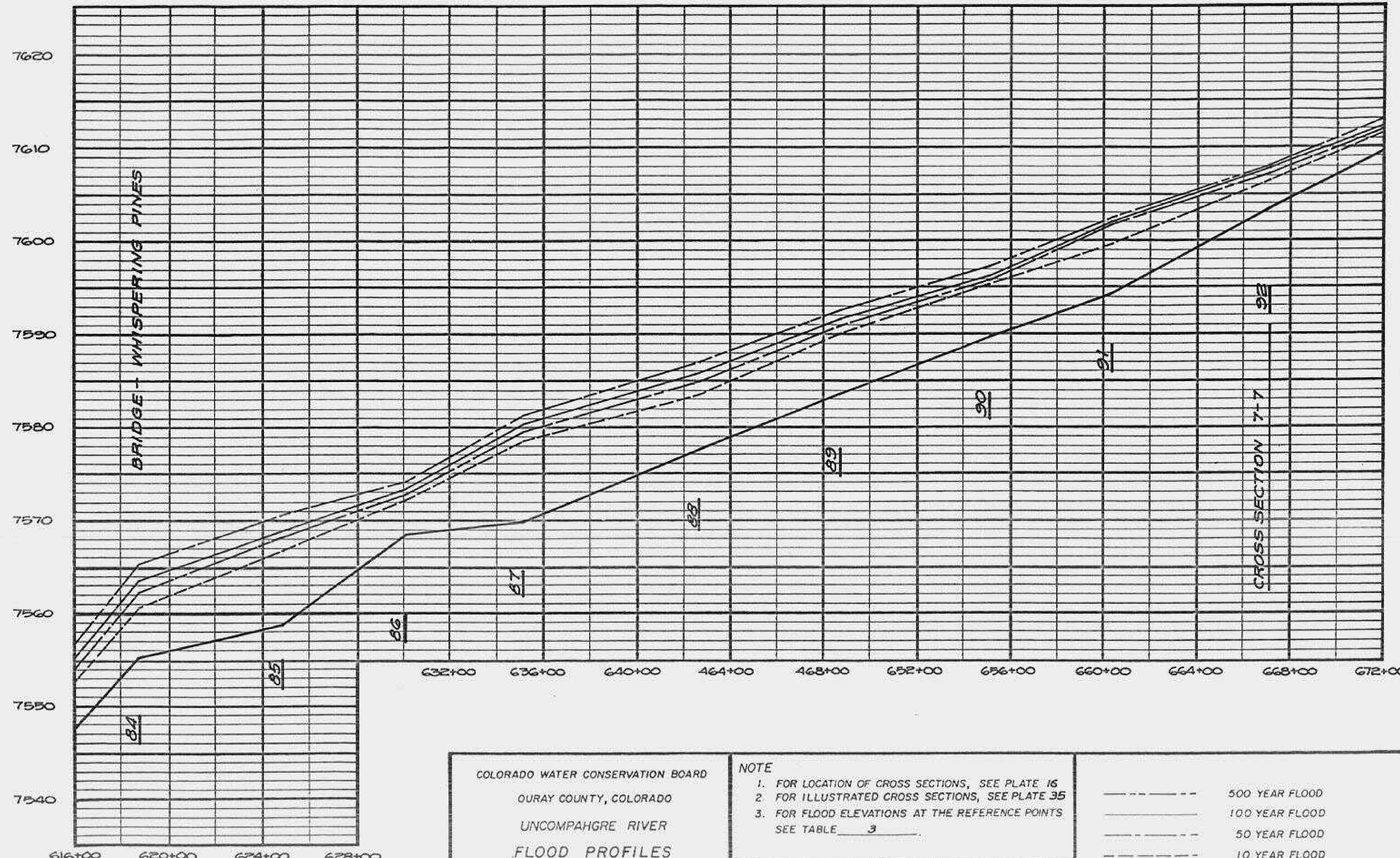
A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 15
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 35
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3

REVISION	DATE	BY

PLATE 29



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 16
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 35
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3.

REVISION	DATE	BY

500 YEAR FLOOD

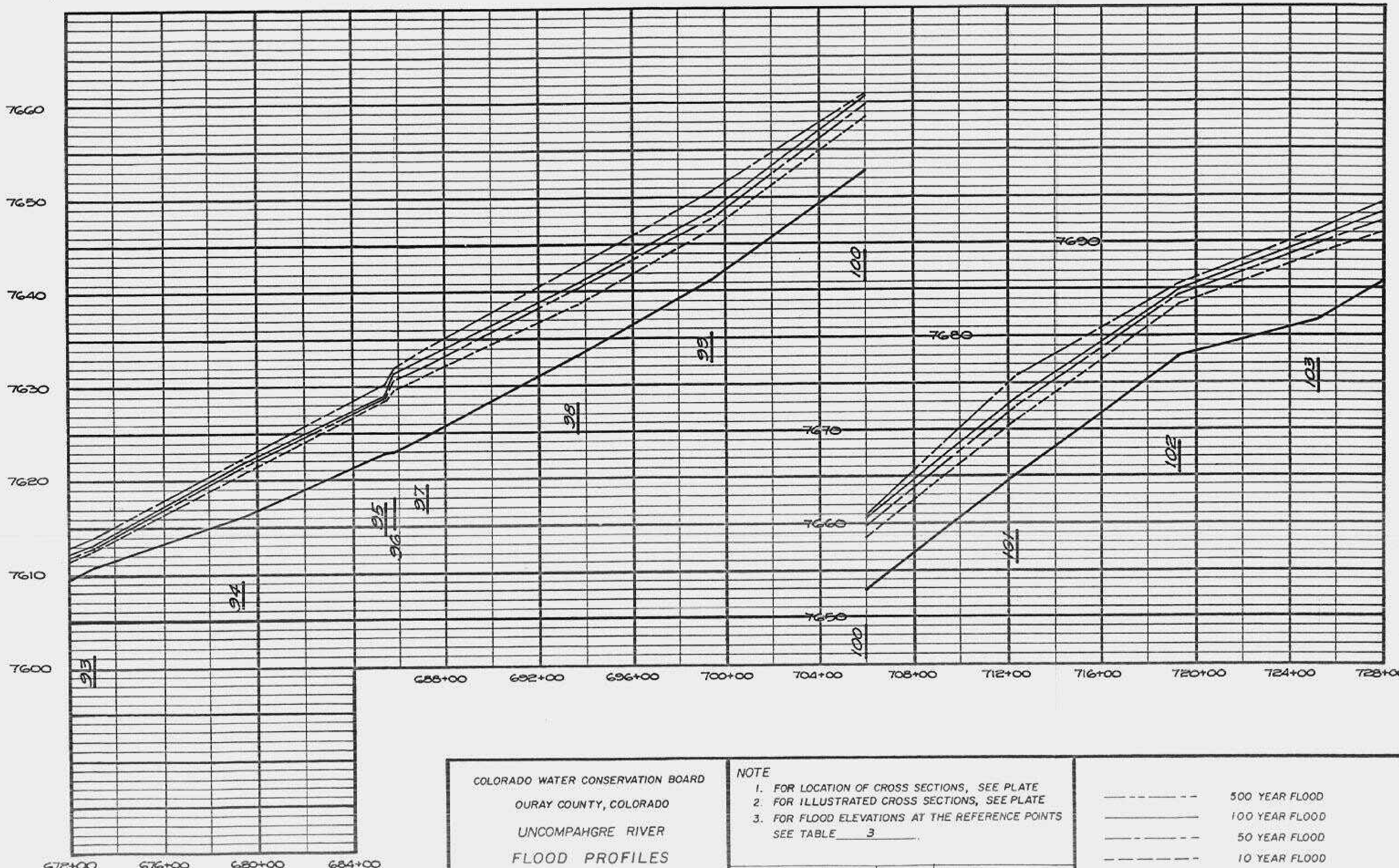
100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

2 REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

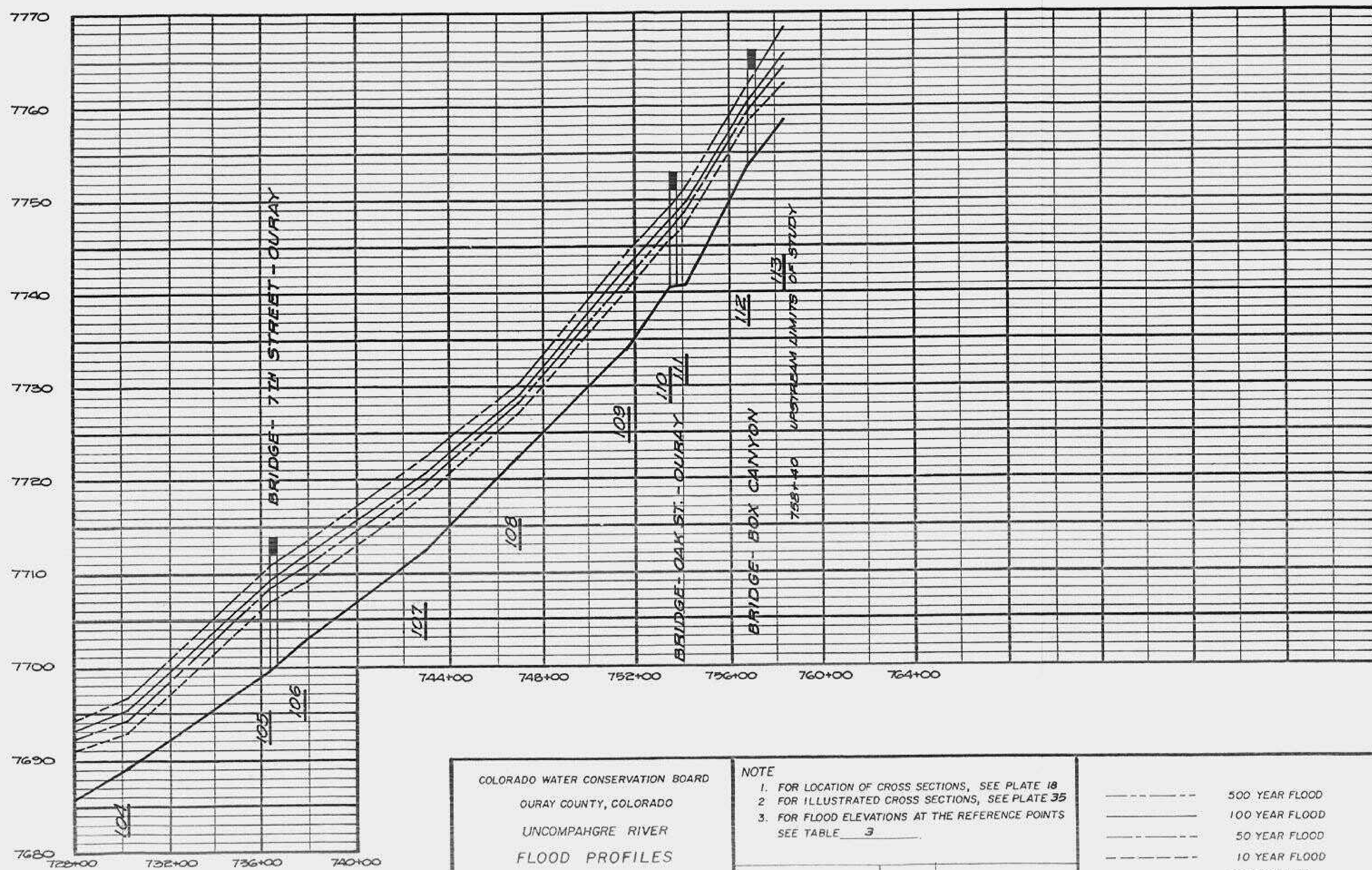
A & S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3

REVISION	DATE	BY

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- 2 REFERENCE POINT



COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

FLOOD PROFILES

PREPARED BY

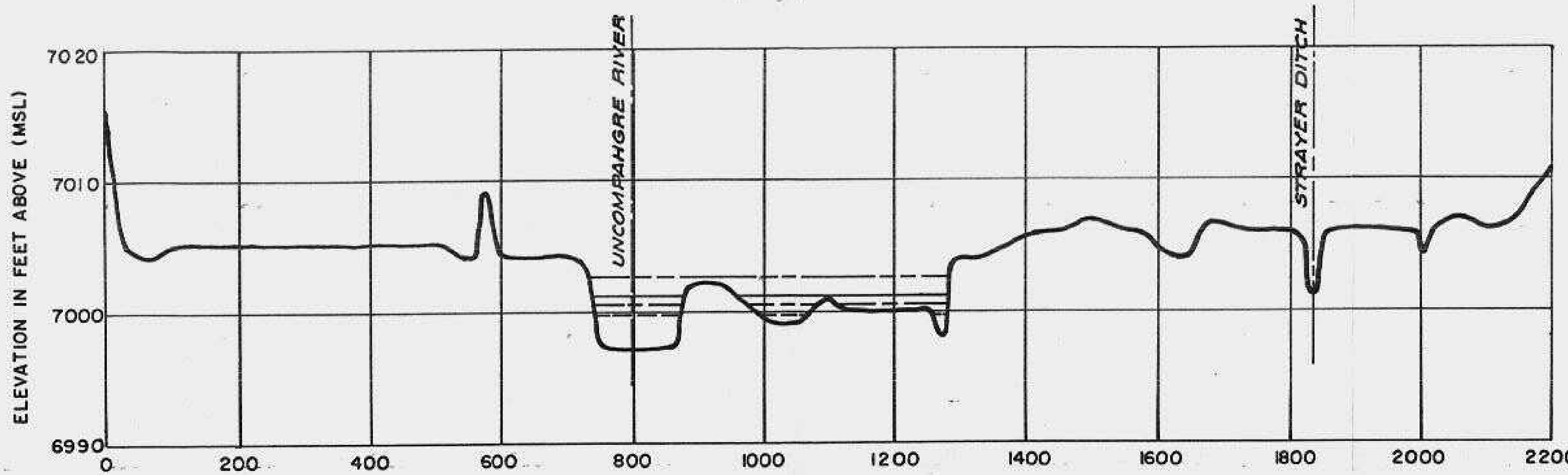
A B S CONSULTANTS INC., MONTROSE, COLO.

NOTE

1. FOR LOCATION OF CROSS SECTIONS, SEE PLATE 18
2. FOR ILLUSTRATED CROSS SECTIONS, SEE PLATE 35
3. FOR FLOOD ELEVATIONS AT THE REFERENCE POINTS SEE TABLE 3

REVISION	DATE	BY

— - — - —	500 YEAR FLOOD
————	100 YEAR FLOOD
— - - — - -	50 YEAR FLOOD
— — — —	10 YEAR FLOOD
————	STREAM BED
2	REFERENCE POINT

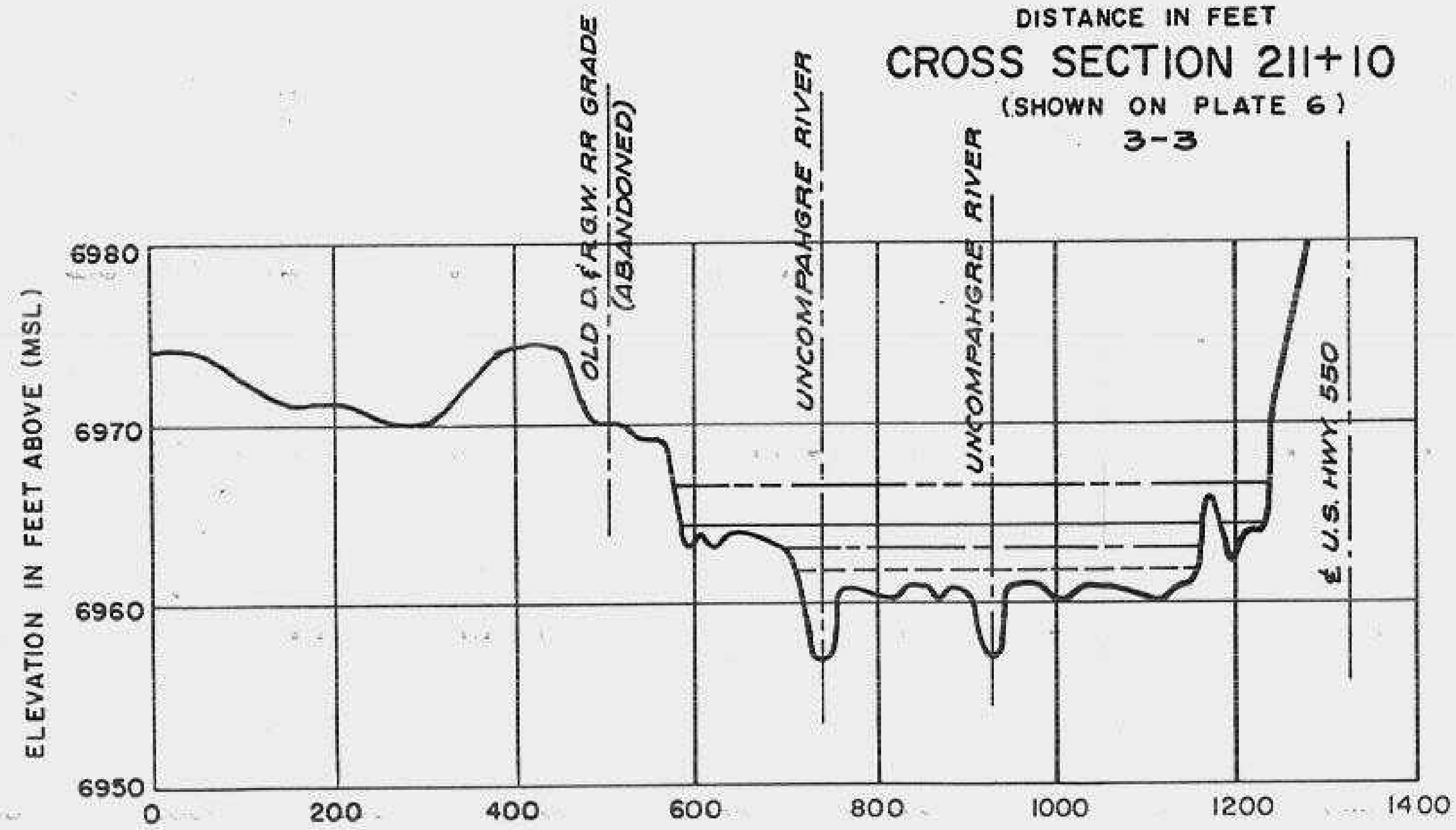


DISTANCE IN FEET

CROSS SECTION 211+10

(SHOWN ON PLATE 6)

3-3

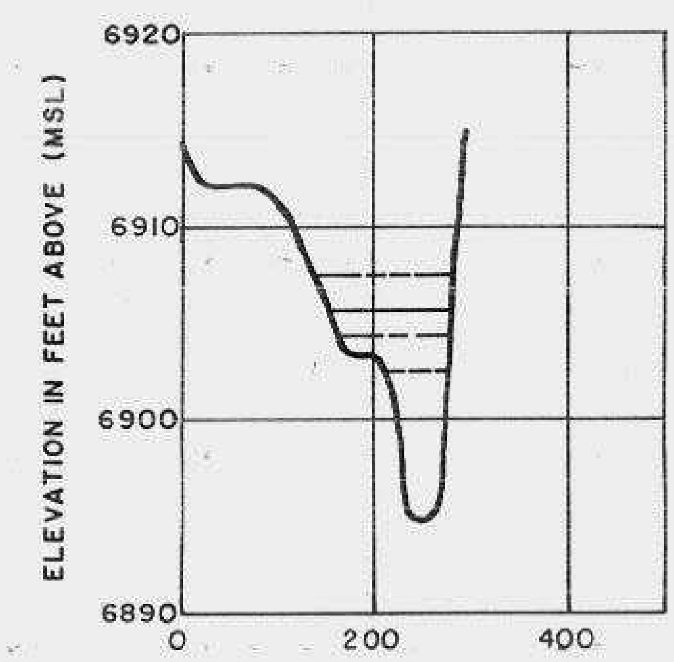


DISTANCE IN FEET

CROSS SECTION 134+80

(SHOWN ON PLATE 5)

2-2



DISTANCE IN FEET

CROSS SECTION 36+30

(SHOWN ON PLATE 3)

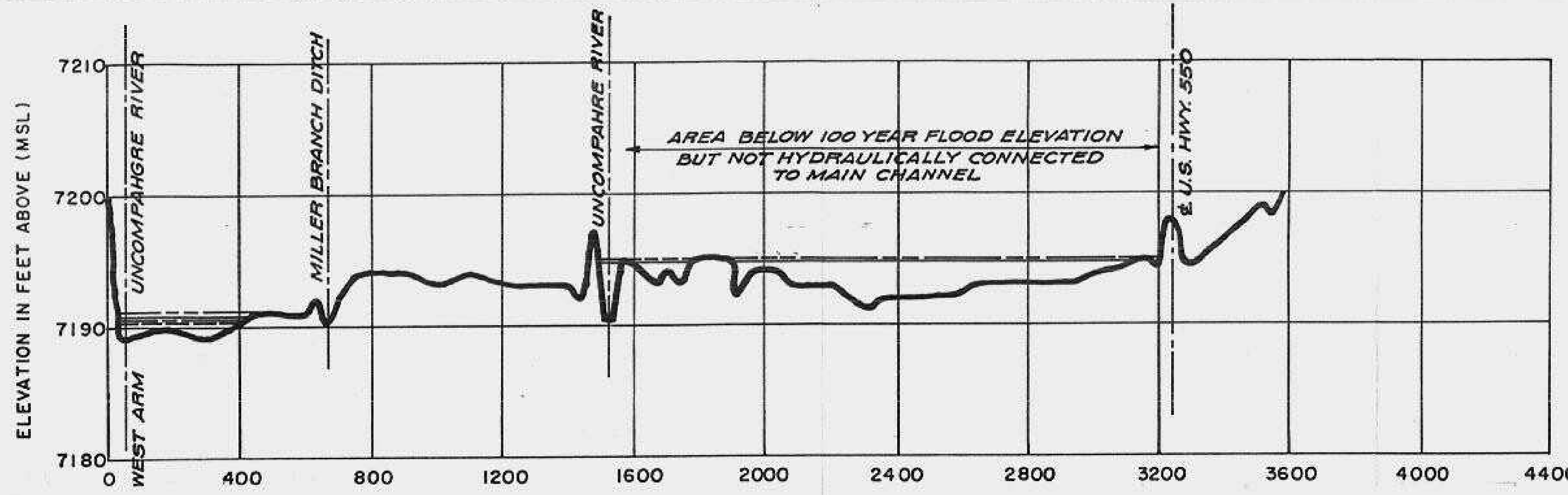
1-1

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

NOTE
1. FOR LOCATIONS OF CROSS SECTIONS SEE PLATES 3, 5 & 6
2. CROSS SECTIONS ARE VIEWED IN DIRECTION OF FLOW.

REVISION	DATE	BY

COLORADO WATER CONSERVATION BOARD
OURAY COUNTY, COLORADO
UNCOMPAHGRE RIVER
CROSS SECTIONS
PREPARED BY
A B S CONSULTANTS INC., MONTROSE, COLO.

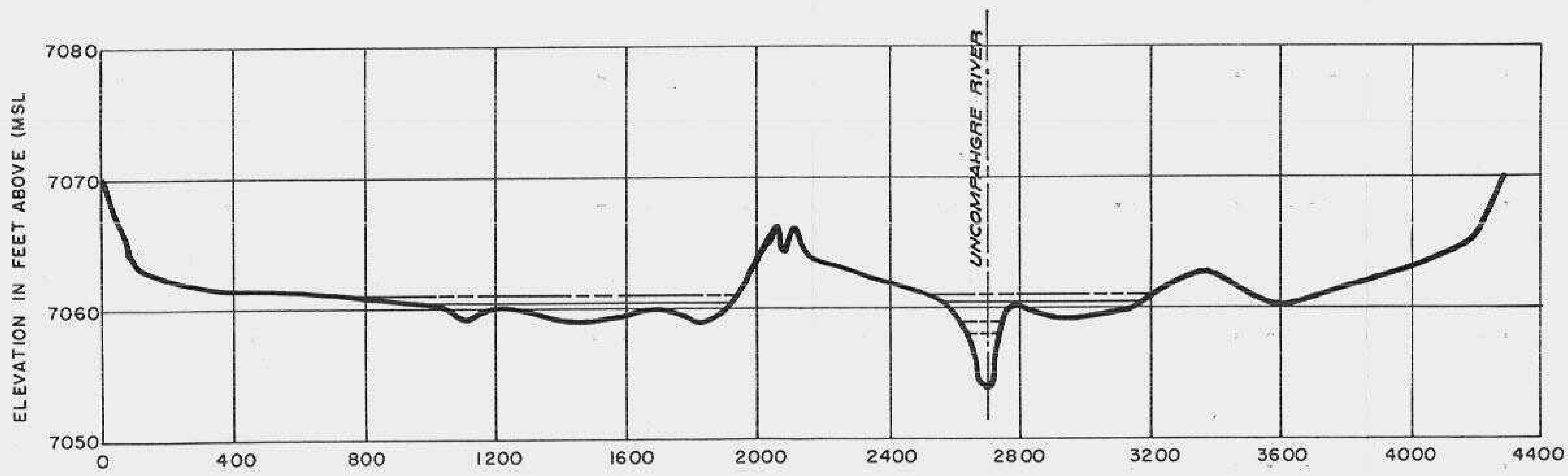


DISTANCE IN FEET

CROSS SECTION 458+10

(SHOWN ON PLATE 12)

5-5



DISTANCE IN FEET

CROSS SECTION 308+40

(SHOWN ON PLATE 8)

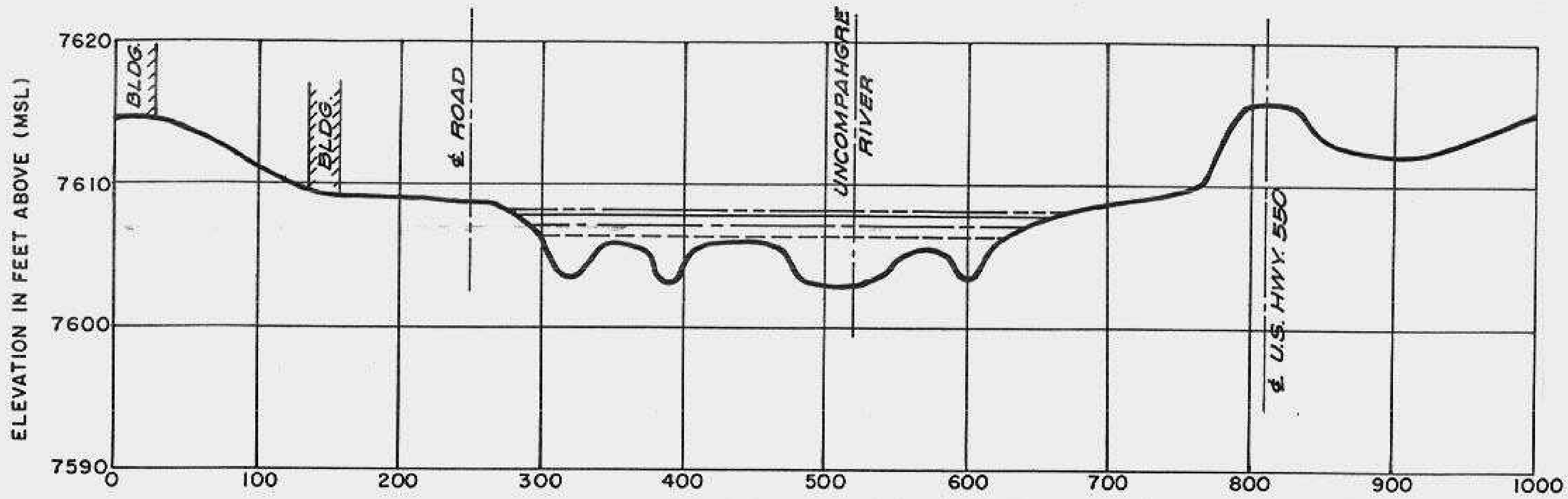
4-4

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED

NOTE
1. FOR LOCATIONS OF CROSS SECTIONS SEE PLATES 8 & 12
2. CROSS SECTIONS ARE VIEWED IN DIRECTION OF FLOW.

REVISION	DATE	BY

COLORADO WATER CONSERVATION BOARD
OURAY COUNTY, COLORADO
UNCOMPAHGRE RIVER
CROSS SECTIONS
PREPARED BY
A&S CONSULTANTS INC., MONTROSE, COLO.

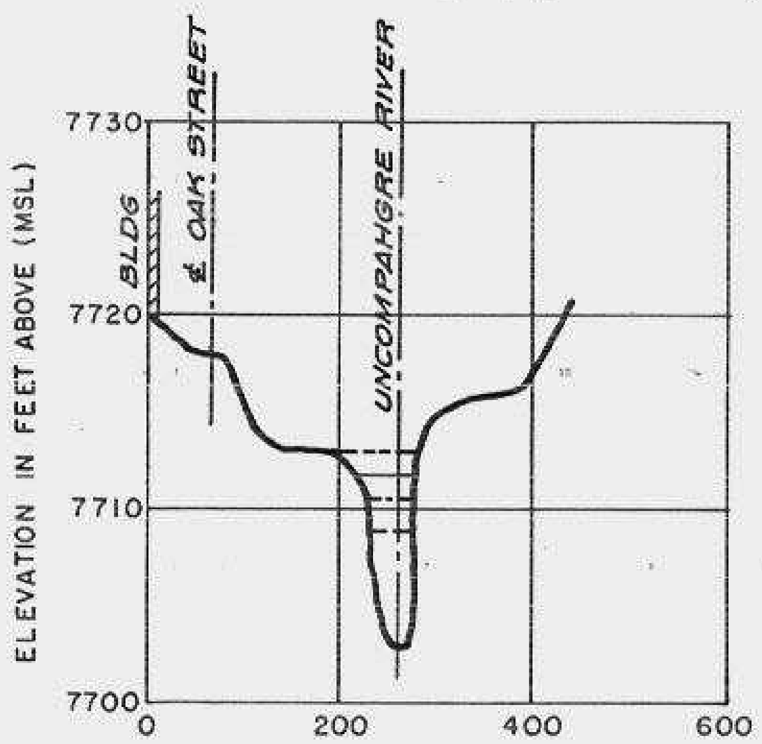


DISTANCE IN FEET

CROSS SECTION 667+10

(SHOWN ON PLATE 16)

7-7

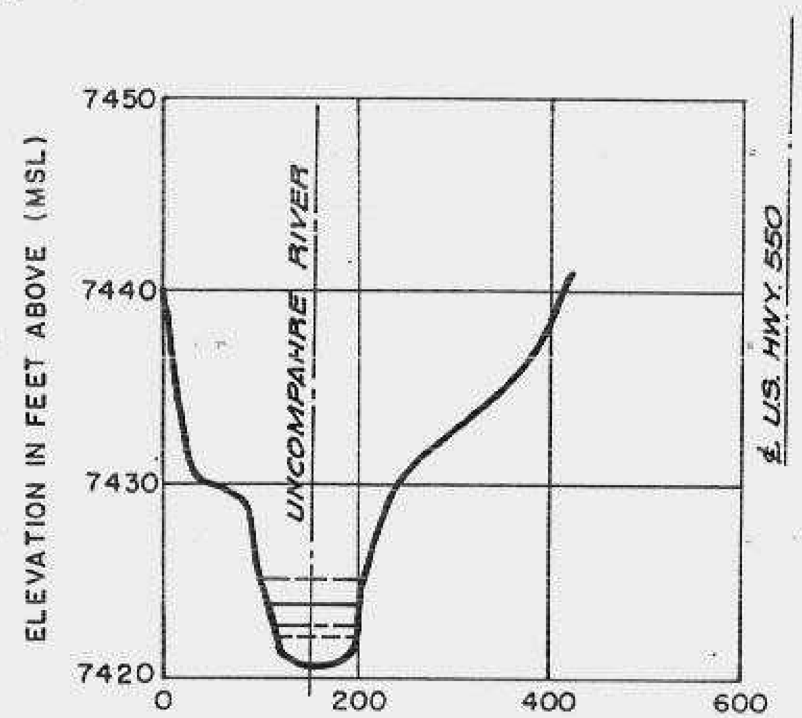


DISTANCE IN FEET

CROSS SECTION 737+90

(SHOWN ON PLATE 18)

8-8

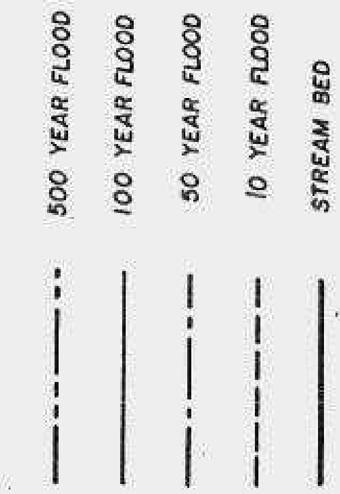


DISTANCE IN FEET

CROSS SECTION 584+40

(SHOWN ON PLATE 15)

6-6



NOTE

1. FOR LOCATIONS OF CROSS SECTIONS SEE PLATES 15, 16 & 18
2. CROSS SECTIONS ARE VIEWED IN DIRECTION OF FLOW.

REVISION	DATE	BY

COLORADO WATER CONSERVATION BOARD

OURAY COUNTY, COLORADO

UNCOMPAHGRE RIVER

CROSS SECTIONS

PREPARED BY
A B S CONSULTANTS INC., MONTROSE, COLO.