

TEXAS WATER COMMISSION

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DRAINAGE AREAS OF TEXAS STREAMS

NECHES RIVER BASIN AND

NECHES-TRINITY COASTAL AREA

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DRAINAGE AREAS OF TEXAS STREAMS

INTRODUCTION

An accurate figure for drainage area is one of the most significant factors used in hydrologic investigations of a river basin and in the hydraulic computations for the design of structures on a stream. This report is being compiled so that drainage-area information of uniform accuracy and reliability will be available to all users of these data for any foreseeable hydraulic, hydrologic, or general engineering use.

In 1951 the Subcommittee on Hydrology, Federal Inter-Agency River Basin Committee, delegated the U. S. Corps of Engineers as the official coordinating agency for drainage areas in the Arkansas and Red River basins, and the U. S. Geological Survey as the official coordinating agency for all other river basins in Texas.

In November 1954 the data for the Red and Arkansas Rivers were published by the Corps of Engineers in a pamphlet entitled "Drainage Area Data, Arkansas, White, and Red River Basins".

ADMINISTRATION AND ACKNOWLEDGMENTS

In December 1960 the Sabine River Compact Administration requested the U. S. Geological Survey to update drainage-area determinations in the Sabine River Basin. The Administration made funds available to match the Geological Survey on a dollar for dollar basis. The work was done by the Surface Water District offices in Texas and Louisiana, and the pamphlet, "Drainage Area Data for Sabine River Basin, Texas and Louisiana" was released August 1961.

The compilation of drainage-area data for the balance of the State is a result of a cooperative agreement between the U. S. Geological Survey and the Texas Water Commission [formerly the Board of Water Engineers].

Computations were made in the District Office of the U. S. Geological Survey in Austin, Texas, under the general direction of Trigg Twichell, District Engineer of the Surface Water Branch.

The U. S. Corps of Engineers, Fort Worth District, and the U. S. Bureau of Reclamation, Austin Area Office, made field checks to verify delineation of non-contributing areas in the upper Colorado River Basin.

TOPOGRAPHY

The topography of Texas generally reflects the surface geology of the State. The northwestern part of the State is occupied by the High Plains, with a general surface gradient dipping in a southeasterly direction. Elevations range above 4,000 feet along the Texas-New Mexico state line and above 2,500 feet along the east escarpment. From the High Plains the land surface drops by successive steps,

generally in a southeasterly direction, to sea level along the coast of the Gulf of Mexico. The greatest abrupt change in elevation is along the High Plains Cap Rock Escarpment where in places the elevation of the land surface drops nearly 1,000 feet in just a few miles. In the El Paso-Trans-Pecos Region of west Texas, topographic features include the southern extension of the Rocky Mountain Range.

Figure 1 is a contour map of Texas which shows the four principal physiographic provinces: (1) the Gulf Coastal Plain, (2) the Central Lowland, (3) the Great Plains province, and (4) the Basin and Range province. These four principal physical divisions with the many subdivisions give the State a wide variety of surface aspects.

The drainage pattern of the State is unique, in that between the Rio Grande, which forms the southwestern border, and the Red River, which forms most of the northern border, lie nine large river basins which run approximately parallel courses from northwest to southeast. Of these, only two, the Brazos and Colorado Rivers, have their origin (small segment of total area) outside the State--the remaining lie wholly within the State, with the Sabine River forming a part of the eastern border along its lower reaches. With the exception of the Red and Canadian Rivers, all of the streams in Texas flow directly into the Gulf of Mexico--the Canadian River is a tributary to the Arkansas River which, along with the Red River, flows into the Mississippi River and thence into the Gulf of Mexico. River basins and coastal areas of Texas are shown on Figure 2.

CONCEPTS OF DRAINAGE AREAS

The drainage area of a stream at a specified location ordinarily may be defined as that area, measured in a horizontal plane, which is enclosed by a topographic divide such that direct surface runoff from precipitation normally would drain by gravity into the river basin above the specified point.

The concept of what constitutes noncontributing areas varies for individuals and for intended purpose of use. It is not susceptible to precise definitions because of judgment that must be used in determinations of what part of an area is totally noncontributing and what part contributes surface runoff only during extreme rainfall.

For this report a noncontributing area is defined as an area that contributes no direct surface runoff to a stream at any time. There may be runoff within the noncontributing area, but this runoff drains to natural surface depressions, playa lakes, and does not flow directly to the stream network that drains to the Gulf of Mexico.

The accuracy of delineating most of the noncontributing areas is considered to be a lower accuracy than that of the other work.

METHOD OF DRAINAGE-AREA DETERMINATION

Discrepancies existing in drainage-area figures determined by various agencies result in confusion. To reduce confusion and promote uniformity, the Subcommittee on Hydrology, Federal Inter-Agency River Basin Committee, recommended the procedures which were used for this report and are briefly described below:

1. Selection of Maps: First preference is the national topographic series of quadrangle maps of the U. S. Geological Survey published on the scale of 1:24,000 or 1:62,500. Second preference is advance prints or manuscript prints of the

national series of quadrangle maps, and third preference is Army Map Service topographic maps, scale 1:250,000. About half of the State is mapped with large-scale, modern topographic maps.

2. Establishment of Boundaries: The delineation of the boundary is the most important step in the process of drainage-area determinations and the biggest single factor affecting the accuracy of final results. Drainage boundaries were delineated with utmost care by personnel experienced in hydrology and cartography. Delineations were reviewed by the engineering staff of the Texas Water Commission, and for some basins by the engineering staffs of the Corps of Engineers and the Bureau of Reclamation.

3. Continuity Between Maps: An index map of the entire area was prepared to show the relative position of the different maps used. To assure accurate determinations, the maps were checked for gaps or overlaps between adjacent sheets, continuity of topographic or cultural detail between adjacent sheets, and agreement of latitude and longitude at borders of adjacent maps.

4. Planimetering: All areas and subareas within a quadrilateral were measured by planimeter. A quadrilateral encompasses the area bounded by latitude and longitude lines within a quadrangle. Actual areas within each quadrilateral have been computed accurately and are available from Smithsonian Geographical Tables, and from Bulletin 650 and other publications of the Geological Survey. Thus an exact check was provided between total planimetered area and actual area within each quadrilateral.

TABULATION OF DATA

In this report the drainage areas determined in each major river basin are tabulated in separate sections devoted to that particular basin. Within each major basin, drainage areas were determined at sites of existing and discontinued continuous-record gaging stations and partial-record gaging stations, at sites of existing and authorized major dams, and at the mouths of principal tributaries.

Points at which drainage areas were determined are tabulated sequentially in the downstream direction along the main stem, with a point on a tributary that enters between two main-stem points tabulated between them. A similar order is followed for all tributaries. The tabulation includes the name of the stream at the point where the drainage area was determined; identification of the point, such as gaging station, dam or mouth; and the latitude and longitude of the point. As an added means of identification, the permanently assigned station number is shown for each gaging station and partial-record station. These numbers were assigned using the same criteria as above for downstream direction.

Drainage areas are given in square miles. Although areas are measured to the nearest hundredth of a square mile, the areas are rounded off in the listings to the nearest square mile for areas of more than 100 square miles, to tenths for areas from 10 to 100 square miles, and to hundredths for areas of less than 10 square miles.

FUNCTION OF COORDINATING OFFICE

The U. S. Geological Survey at 807 Brazos Street, Austin, Texas, as coordinating agency, serves as a repository for work maps and computations and also serves as a clearing house for dissemination of drainage-area data.

Anyone cognizant of a significant discrepancy or contradiction between figures of drainage areas now in use should consult the Geological Survey and seek to reach an understanding and agreement between interested agencies represented in the area involved.

NECHES RIVER BASIN

The headwaters of the Neches River are in Van Zandt County. The river flows southeasterly into Sabine Lake which discharges into the Gulf of Mexico through Sabine Pass. Elevation ranges from about 550 feet in the headwaters to sea level at the mouth.

The entire basin is in the Texas Gulf Coastal Plain. The topography ranges from hilly in the upper portion to gently rolling in the middle portion and flat in the coastal area.

About 97 percent of the drainage areas of the basin were delineated on recent large-scale topographic maps; the remainder was delineated on either a small-scale topographic map or on a small portion on the Van Zandt County General Highway Map. The accuracy of the maps justifies the precise methods used and the work is to be considered of permanent value. Drainage areas tabulated on the following pages were determined in November 1961.

Drainage area is 10,011 square miles at the mouth where the river enters Sabine Lake.

Drainage areas in the Neches River Basin and the Neches-Trinity Coastal Area are shown in Tables 2 and 2a on the following pages. Tables 1 and 1a, containing drainage-area data for the Sabine River Basin and the Sabine-Neches Coastal Area, were published in Circular No. 62-02.

Table 2.--Neches River Basin

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Neches River	Neches River above Prairie Creek lat. 32°21'57", long. 95°27'11"	127
Prairie Creek	Prairie Creek at mouth lat. 32°21'57", long. 95°27'11"	90.7
Kickapoo Creek	U.S.G.S. gage 8-312, Kickapoo Creek near Brownsboro, lat. 32°18'34", long. 95°36'19"	232
Kickapoo Creek	Kickapoo Creek at mouth lat. 32°15'28", long. 95°28'00"	288
Neches River	Neches River below mouth of Kickapoo Creek, lat. 32°15'28", long. 95°28'00"	571
Flat Creek	Flat Creek at mouth lat. 32°08'41", long. 95°28'19"	140
Neches River	Neches River at Blackburn Crossing Dam lat. 32°03'12", long. 95°26'12"	839
Neches River	Discontinued U.S.G.S. gage 8-315, Neches River near Reese lat. 32°01'27", long. 95°25'38"	883
Caddo Creek	Caddo Creek at Fred J. Agnich Reservoir lat. 32°04'48", long. 95°38'08"	16.0
Neches River	U.S.G.S. gage 8-320, Neches River near Neches, lat. 31°53'32", long. 95°25'50"	1,145
Hurricane Creek	Hurricane Creek at mouth lat. 31°49'33", long. 95°24'44"	105
Neches River	Neches River below mouth of Tails Creek lat. 31°44'04", long. 95°20'30"	1,468
San Pedro Creek	San Pedro Creek at mouth lat. 31°34'23", long. 95°13'55"	135
Neches River	U.S.G.S. gage 8-325, Neches River near Alto, lat. 31°34'45", long. 95°09'55"	1,945
Neches River	Neches River at Weches dam site lat. 31°34'09", long. 95°09'00"	1,952

Table 2.--Neches River Basin--Continued

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Hickory Creek	Hickory Creek at mouth lat. 31°29'04", long. 95°06'37"	90.0
Cochino Bayou	Cochino Bayou at mouth lat. 31°20'23", long. 94°57'02"	92.8
Neches River	Neches River below mouth of Buncombe Creek, lat. 31°20'21", long. 94°55'02"	2,401
Neches River	U.S.G.S. gage 8-330, Neches River near Diboll, lat. 31°07'55", long. 94°48'30"	2,724
Piney Creek	U.S.G.S. gage 8-333, Piney Creek near Groveton lat. 31°08'30", long. 95°05'10"	79.0
Piney Creek	Piney Creek at mouth lat. 31°03'30", long. 94°33'30"	376
Neches River	Neches River below mouth of Piney Creek lat. 31°03'30", long. 94°33'30"	3,317
Neches River	Neches River at Rockland dam site lat. 31°01'36", long. 94°26'36"	3,557
Neches River	U.S.G.S. gage 8-335, Neches River near Rockland lat. 31°01'45", long. 94°23'46"	3,637
Neches River	Neches River at proposed site Dam A lat. 31°00'12", long. 94°14'22"	3,758
Striker Creek	Discontinued U.S.G.S. gage 8-337, Striker Creek near Summerfield lat. 32°00'10", long. 94°59'30"	146
Striker Creek	Striker Creek at Striker Creek dam lat. 31°56'05", long. 94°58'40"	182
Striker Creek	Striker Creek at mouth lat. 31°52'37", long. 94°56'34"	202
Angelina River	Angelina River below mouth of Striker Creek, lat. 31°52'37", long. 94°56'34"	426
East Fork Angelina River	East Fork Angelina River at mouth lat. 31°50'27", long. 94°56'09"	182

Table 2.--Neches River Basin--Continued

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Prairie Creek	U.S.G.S. gage 8-340, Lake Tyler near Whitehouse, lat. 32°14'42", long. 95°10'20", at pumphouse 2.0 mi. upstream from Whitehouse Dam	45.3
Mud Creek	U.S.G.S. gage 8-345, Mud Creek near Jacksonville, lat. 31°58'35", long. 95°09'38"	376
Mud Creek	Mud Creek at Ponta dam site lat. 31°54'27", long. 32°06'28"	449
Mud Creek	Discontinued U.S.G.S. gage 8-350, Mud Creek at Ponta lat. 31°53'20", long. 95°05'19"	475
Mud Creek	Mud Creek at mouth lat. 31°47'34", long. 94°58'41"	554
Angelina River	Angelina River below mouth of Mud Creek lat. 31°47'34", long. 94°58'41"	1,193
Angelina River	U.S.G.S. gage 8-365, Angelina River near Alto, lat. 31°40'10", long. 94°57'24"	1,276
Bayou Loco	Bayou Loco at mouth lat. 31°29'25", long. 94°48'14"	103
Angelina River	U.S.G.S. gage 8-370, Angelina River near Lufkin, lat. 31°27'26", long. 94°43'34"	1,600
Bayou La Nana	Bayou La Nana at mouth lat. 31°27'33", long. 94°43'14"	83.1
Bayou Carrizo	Bayou Carrizo at mouth lat. 31°24'42", long. 94°30'41"	110
Naconiche Creek	Naconiche Creek at mouth lat. 31°41'27", long. 94°24'31"	114
Attoyac Bayou	Attoyac Bayou below mouth of Naconiche Creek, lat. 31°41'27", long. 94°24'31"	263
Arenoso Creek	Discontinued U.S.G.S. gage 8-375, Arenoso Creek near San Augustine lat. 31°35'48", long. 94°16'04"	75.3
Attoyac Bayou	U.S.G.S. gage 8-380, Attoyac Bayou near Chireno lat. 31°30'15", long. 94°18'15"	503

Table 2.--Neches River Basin--Continued

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Attoyac Bayou	Attoyac Bayou at mouth lat. 31°13'30", long. 94°19'35"	670
Angelina River	U.S.G.S. gage 8-385, Angelina River near Zavalla, lat. 31°12'41", long. 94°17'40"	2,892
Ayish Bayou	Discontinued U.S.G.S. gage 8-390, Ayish Bayou at San Augustine lat. 31°31'52", long. 94°06'56"	15.8
Ayish Bayou	U.S.G.S. gage 8-391, Ayish Bayou near San Augustine lat. 31°23'46", long. 94°09'03"	89.0
Angelina River	Angelina River at McGee Bend Dam lat. 31°03'55", long. 94°04'52"	3,449
Angelina River	U.S.G.S. gage 8-395, Angelina River at Horger, lat. 31°00'09", long. 94°10'37"	3,510
Angelina River	Angelina River at mouth lat. 30°53'54", long. 94°11'26"	3,556
Neches River	CE gage 8-400, Dam B. Reservoir at Town Bluff, lat. 30°47'43", long. 94°10'48"	7,573
Neches River	U.S.G.S. gage 8-405, Neches River at Town Bluff, lat. 30°47'36", long. 94°10'28"	7,573
Neches River	U.S G.S. gage 8-410, Neches River at Evadale lat. 30°20'55", long. 94°05'00"	7,952
Hickory Creek	Hickory Creek at mouth lat. 30°28'26", long. 94°21'00"	149
Village Creek	Village Creek below mouth of Hickory Creek, lat. 30°28'26", long. 94°21'00"	426
Turkey Creek	Turkey Creek at mouth lat. 30°28'18", long. 94°20'33"	162
Beech Creek	Beech Creek at mouth lat. 30°26'20", long. 94°15'48"	212
Village Creek	U.S.G.S. gage 8-415, Village Creek near near Kountze (1939 -) lat. 30°23'43", long. 94°15'45"	861

Table 2.--Neches River Basin--Continued

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Village Creek	U.S.G.S. gage 8-415, Village Creek near Kountze (Prior to 1939) lat. 30°23'00", long. 94°15'54"	862
Cypress Creek	Cypress Creek at mouth lat. 30°22'09", long. 94°15'55"	197
Village Creek	Village Creek at mouth lat. 30°14'30", long. 94°07'06"	1,113
Neches River	Neches River below mouth of Village Creek lat. 30°14'31", long. 94°07'04"	9,110
Neches River	Neches River above Neches Canal lat. 30°13'04", long. 94°07'02"	9,112
Little Pine Island Bayou	Little Pine Island Bayou at mouth lat. 30°10'02", long. 94°16'39"	134
Pine Island Bayou	Pine Island Bayou below mouth of Little Pine Island Bayou lat. 30°10'02", long. 94°16'39"	487
Pine Island Bayou	Pine Island Bayou at mouth lat. 30°09'42", long. 94°06'54"	657
Neches River	Neches River at mouth lat. 29°58'10", long. 93°51'24"	10,011

Table 2a.--Neches-Trinity Coastal Area

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Taylor Bayou	U.S.G.S. gage 8-420, Taylor Bayou near LaBelle lat. 29°52'30", long. 94°09'34"	262
Hillebrandt Bayou	U.S.G.S. gage 8-425, Hillebrandt Bayou at Lovell Lake lat. 29°55'44", long. 94°06'35"	128
Hillebrandt Bayou	Hillebrandt Bayou at State Farm Road 365 lat. 29°54'49", long. 94°04'07"	144
Hillebrandt Bayou	Hillebrandt Bayou at mouth lat. 29°53'35", long. 94°03'58"	147
Taylor Bayou	Taylor Bayou below mouth of Hillebrandt Bayou, lat. 29°53'35", long. 94°03'58"	437
Taylor Bayou	Taylor Bayou near Port Acres, Auxiliary gage at State Highway 73 lat. 29°52'55", long. 94°03'03"	453
Taylor Bayou	Taylor Bayou at mouth lat. 29°51'33", long. 93°58'56"	530
Spindletop Bayou	Spindletop Bayou at State Highway 124 lat. 29°45'12", long. 94°22'34"	89.8
Coastal area	Coastal area between Neches River and Trinity Bay, no defined stream pattern. This area includes the distributary area of Spindletop Bayou below State Highway 124.	769