

TEXAS WATER COMMISSION

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DRAINAGE AREAS OF TEXAS STREAMS
COASTAL AREAS BETWEEN THE BRAZOS
RIVER AND THE RIO GRANDE

Prepared by the U. S. Geological Survey
in cooperation with the
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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 Corps of Engineers, U. S. Army 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 U. S. 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.

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.

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, U. S. Army and the U. S. 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. Planimentering: 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 U. S. Geological Survey. Thus an exact check was provided between total planimetered area and actual area within each quadrilateral.

TABULATION OF DATA

Within the coastal areas between the Brazos River and the Rio Grande, 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 Federal Center Building, 300 East Eighth 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 U. S. Geological Survey and seek to reach an understanding and agreement between interested agencies represented in the area involved.

COASTAL AREAS BETWEEN THE BRAZOS RIVER
AND THE RIO GRANDE

The very flat coastal areas are a part of the Gulf Coastal Plain physiographic province. In general, elevations range from 100 feet to sea level. There are few defined stream channels in the sand dune area extending from Baffin Bay into northern Hidalgo and Willacy Counties; this area is largely noncontributing.

Over 90 percent of the drainage areas were delineated on recent large-scale topographic maps; the work is considered of permanent value. Drainage areas for the remainder were delineated on small-scale topographic maps which may be subject to minor revisions when large-scale topographic maps become available. Drainage-area determinations tabulated on the following pages were completed in October 1964.

Drainage-area determinations for other areas have been published in Circulars of the Texas Water Commission as follows:

Sabine River Basin and Sabine-Neches Coastal Area,
Circular No. 62-02.

Neches River Basin and Neches-Trinity Coastal Area,
Circular No. 62-03.

San Jacinto River Basin and San Jacinto-Brazos
Coastal Area, Circular No. 62-05.

Trinity River Basin and Trinity-San Jacinto
Coastal Area, Circular No. 63-01.

San Antonio River Basin,
Circular No. 63-07.

Table 1.--Brazos-Colorado Coastal Area

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Coastal Area	Intervening coastal area from mouth of Brazos River to mouth of San Bernard River	45.6
Little Bernard Creek	At mouth lat. 29°43'55", long. 96°12'42"	22.1
East Bernard Creek	At mouth lat. 29°37'20", long. 99°07'41"	68.5
Middle Bernard Creek	At mouth lat. 29°33'01", long. 96°02'34"	80.1
West Bernard Creek	At mouth lat. 29°22'54", long. 95°58'01"	179
Snake Creek	At mouth lat. 29°19'45", long. 95°55'22"	55.0
San Bernard River	Above mouth of Peach Creek lat. 29°20'06", long. 95°56'57"	659
Peach Creek	At mouth lat. 29°20'06", long. 95°56'57"	61.7
San Bernard River	U.S.G.S. gage 8-1175, San Bernard River near Boling lat. 29°18'47", long. 95°53'36"	727
Cedar Creek	At mouth lat. 29°14'15", long. 95°47'53"	45.2
San Bernard River	At mouth lat. 28°51'39", long. 95°26'12"	1,005
Coastal Area	Intervening coastal area from mouth of San Bernard River to mouth of Caney Creek	156
Caney Creek	At mouth lat. 28°45'40", long. 95°39'17"	317
Coastal Area	Intervening coastal area from mouth of Caney Creek to mouth of Live Oak Bayou	21.9
Peyton Creek	At mouth lat. 28°48'41", long. 95°49'14"	115

Table 1.--Brazos-Colorado Coastal Area--Continued

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Live Oak Bayou	At mouth lat. 28°44'39", long. 95°46'03"	188
Coastal Area	Intervening coastal area from mouth of Live Oak Bayou to mouth of Colorado River	97.4
Coastal Area	Intervening coastal area from mouth of Colorado River to mouth of West Branch of Colorado River	18.1
Coastal Area	Total area from mouth of Brazos River to mouth of West Branch of Colorado River	1,850

Table 2.--Colorado-Lavaca Coastal Area

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Coastal Area	Intervening coastal area from mouth of West Branch of Colorado River to mouth of Tres Palacios Creek	113
Tres Palacios Creek	At mouth lat. 28°45'29", long. 96°10'21"	281
Coastal Area	Intervening coastal area from mouth of Tres Palacios Creek to mouth of Cashs Creek	0.44
Cashs Creek	At mouth lat. 28°45'31", long. 96°10'48"	27.0
Coastal Area	Intervening coastal area from mouth of Cashs Creek to mouth of Turtle Creek	10.3
Turtle Creek	At mouth lat. 28°43'14", long. 96°15'50"	43.4
Coastal Area	Intervening coastal area from mouth of Turtle Creek to mouth of Carancahua Creek	49.5
East Carancahua Creek	At confluence with West Carancahua Creek lat. 28°46'21", long. 96°25'13"	130
West Carancahua Creek	At confluence with East Carancahua Creek lat. 28°46'21", long. 96°25'13"	147
Carancahua Creek	At mouth lat. 28°45'12", long. 96°27'02"	291
Coastal Area	Intervening coastal area from mouth of Carancahua Creek to mouth of Lavaca River	123
Coastal Area	Total area from mouth of West Branch of Colorado River to mouth of Lavaca River	939

Table 3.--Lavaca-Guadalupe Coastal Area

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Coastal Area	Intervening coastal area from mouth of Lavaca River to mouth of Garcitas Creek	46.2
Marcado Creek	At mouth lat. 28°49'51", long. 96°44'36"	21.5
Arenosa Creek	At mouth lat. 28°49'31", long. 96°43'08"	178
Garcitas Creek	At Garcitas damsite lat. 28°48'58", long. 96°42'52"	341
Garcitas Creek	At mouth lat. 28°43'15", long. 96°39'40"	370
Coastal Area	Intervening coastal area from mouth of Garcitas Creek to mouth of Placedo Creek	0.22
Placedo Creek	At mouth lat. 28°42'05", long. 96°39'39"	120
Coastal Area	Intervening coastal area from mouth of Placedo Creek to mouth of Little Chocolate Bayou	23.4
Little Chocolate Bayou	At mouth lat. 28°35'10", long. 96°38'23"	9.93
Coastal Area	Intervening coastal area from mouth of Little Chocolate Bayou to mouth of Chocolate Bayou	0.15
Chocolate Bayou	At mouth lat. 28°34'47", long. 96°38'38"	84.2
Coastal Area	Intervening coastal area from mouth of Chocolate Bayou to mouth of North Channel of Guadalupe River	343
Coastal Area	Intervening coastal area from mouth of North Channel of Guadalupe River to mouth of South Channel of Guadalupe River	0.99
Coastal Area	Total area from mouth of Lavaca River to mouth of South Channel of Guadalupe River	998

Table 4.--San Antonio-Nueces Coastal Area

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Coastal Area	Intervening coastal area from mouth of South Channel of Guadalupe River to mouth of Burgentine Creek	104
Burgentine Creek	At Burgentine Dam lat. 28°16'13", long. 96°54'30"	36.0
Burgentine Creek	At mouth lat. 28°15'53", long. 96°54'42"	36.1
Coastal Area	Intervening coastal area from mouth of Burgentine Creek to mouth of Artesian Creek	0.05
Artesian Creek	At mouth lat. 28°16'09", long. 96°54'53"	80.2
Coastal Area	Intervening coastal area from mouth of Artesian Creek to mouth of Salt Creek	1.97
Salt Creek	At mouth lat. 28°15'21", long. 96°56'32"	54.1
Coastal Area	Intervening coastal area from mouth of Salt Creek to mouth of Cavasso Creek	10.8
Cavasso Creek	At mouth lat. 28°13'15", long. 96°59'14"	34.7
Coastal Area	Intervening coastal area from mouth of Cavasso Creek to mouth of Copano Creek	23.4
Copano Creek	At mouth lat. 28°12'05", long. 97°02'15"	135
Coastal Area	Intervening coastal area from mouth of Copano Creek to mouth of Mission River	37.0
Coastal Area	Intervening coastal area from mouth of South Channel of Guadalupe River to mouth of Mission River	517
Sarco Creek	At mouth lat. 28°24'19", long. 97°24'01"	80.1

Table 4.--San Antonio-Nueces Coastal Area--Continued

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Blanco Creek	At Blanco damsite lat. 28°22'17", long. 97°21'01"	327
Blanco Creek	At confluence with Medio Creek lat. 28°18'46", long. 97°19'08"	357
Dry Medio Creek	At mouth lat. 28°35'16", long. 97°48'54"	30.3
Toro Creek	At mouth lat. 28°33'09", long. 97°48'08"	28.7
San Domingo Creek	At mouth lat. 28°31'10", long. 97°47'01"	45.0
Medio Creek	At Beeville damsite lat. 28°29'26", long. 97°40'04"	202
Medio Creek	U.S.G.S. gage 8-1893, Medio Creek near Beeville lat. 28°28'58", long. 97°39'23"	204
Medio Creek	At confluence with Blanco Creek lat. 28°18'46", long. 97°19'08"	328
Mission River	U.S.G.S. gage 8-1895, Mission River at Refugio lat. 28°17'30", long. 97°16'44"	690
Melon Creek	At mouth lat. 28°11'28", long. 97°11'49"	156
Mission River	At mouth lat. 28°09'47", long. 97°10'16"	1,015
Coastal Area	Intervening coastal area from mouth of Mission River to mouth of Aransas River	24.0
Poesta Creek	At confluence with West Aransas Creek lat. 28°16'49", long. 97°40'16"	123
West Aransas Creek	At confluence with Poesta Creek lat. 28°16'49", long. 97°40'16"	112
Aransas River	U.S.G.S. gage 8-1897, Aransas River near Skidmore lat. 28°16'56", long. 97°37'14"	247

Table 4.--San Antonio-Nueces Coastal Area--Continued

Name of stream	Point of determination of drainage area	Total drainage area (sq. mi.)
Papalote Creek	At mouth lat. 28°09'52", long. 97°32'27"	129
Aransas River	At Woodsboro damsite lat. 28°09'51", long. 97°28'30"	476
Chiltipin Creek	At mouth lat. 28°04'26", long. 97°15'34"	236
Aransas River	At mouth lat. 28°04'27", long. 97°13'15"	856
Coastal Area	Intervening coastal area from mouth of Aransas River to mouth of Nueces River	240
Coastal Area	Total area from mouth of San Antonio River to mouth of Nueces River	2,652

Table 5.--Nueces-Rio Grande Coastal Area

Name of stream	Point of determination of drainage area	Drainage area (sq. mi.)	
		Probable non-contributing	Total
Coastal Area	Intervening coastal area from mouth of Nueces River to mouth of Oso Creek	--	57.9
Oso Creek	At mouth lat. 27°38'25", long. 97°20'37"	--	202
Pintas Creek	At mouth lat. 27°44'05", long. 97°45'55"	--	51.8
Petronila Creek	At mouth lat. 27°28'27", long. 97°32'15"	--	570
Chiltipin Creek	At mouth lat. 27°29'37", long. 97°36'09"	--	11.8
Tunas Creek	At mouth lat. 27°28'25", long. 97°32'22"	--	78.4
Coastal Area	Intervening coastal area from mouth of Nueces River to mouth of San Fernando Creek	--	1,238
Rosita Creek	At mouth lat. 27°45'26", long. 98°14'55"	--	138
San Diego Creek	U.S.G.S. gage 8-2118, San Diego Creek at Alice lat. 27°45'59", long. 98°04'31"	--	319
San Diego Creek	At mouth lat. 27°46'31", long. 98°02'24"	--	351
San Fernando Creek	At State Hwy 44 near Alice lat. 27°46'20", long. 98°02'00"	--	507
San Fernando Creek	Discontinued U.S.G.S. gage 8-2120, San Fernando Creek near Alice lat. 27°43'30", long. 97°59'15"	--	515
Tranquitas Creek	At mouth lat. 27°31'06", long. 97°48'18"	--	53.2
Santa Gertrudis Creek	At mouth lat. 27°27'11", long. 97°46'18"	--	522
San Fernando Creek	At mouth lat. 27°25'20", long. 97°44'43"	14.1	1,279

Table 5.--Nueces-Rio Grande Coastal Area--Continued

Name of stream	Point of determination of drainage area	Drainage area (sq. mi.)	
		Probable non-contributing	Total
Coastal Area	Intervening coastal area from mouth of San Fernando Creek to mouth of Los Olmos Creek	164	393
Macho Creek	At mouth lat. 27°24'00", long. 98°18'25"	--	255
Los Olmos Creek	At U.S. Hwy 281, Brooks County, Texas lat. 27°15'51", long. 98°08'08"	4.49	480
Los Olmos Creek	At mouth lat. 27°16'21", long. 97°48'09"	95.4	668
Arroyo Colorado	At intersection with Arroyo Colorado cutoff lat. 26°20'15", long. 97°26'10"	1.62	323
Coastal Area	Intervening coastal area from mouth of Los Olmos Creek to mouth of Rio Grande	4,906	6,866
Coastal Area	Total area from mouth of Nueces River to mouth of Rio Grande	5,179	10,442