

Glossary

Acre-foot

Volume of water needed to cover 1 acre to a depth of 1 foot. It equals 325,851 gallons.

Ad valorem taxes and other fees

Though less frequently a source of funding, these impact fees, permitting fees, or ad valorem taxes may be used to fund activities. For example, communities can fund their floodplain management program through floodplain development permitting fees. Impact fees are sometimes assessed as a one-time payment for new developments to offset their anticipated impact to communities. Another program is a fee-in-lieu in which developers pay a fee to the community rather than building a site-specific stormwater mitigation project in their development.

Aquifer

Geologic formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs. The formation could be sand, gravel, limestone, sandstone, or fractured igneous rocks.

Atlas 14

Dataset released in 2018 by the National Weather Service's Hydrometeorological Design Studies Center (under the National Oceanic and Atmospheric Administration) that provides precipitation frequency information for the U.S. states and territories.

Availability

Maximum amount of raw water available from a source during the drought of record, regardless of whether the supply is physically or legally available to water user groups.

Base flood elevation

Elevation of the 1 percent (100-year) annual chance flood, which is determined by statistical analysis for each local area. Base flood engineering is the basis of the insurance and floodplain management requirements of the National Flood Insurance Program.

Base level engineering

An automated riverine hydrologic and hydraulic modeling approach that builds on lessons learned to produce a baseline understanding of a community's flood risk.

Benefit-cost analysis

A benefit-cost analysis was required for each recommended flood management project and, as applicable, the method by which the future benefits of a hazard mitigation project are determined and compared to its costs. The end result is a benefit-cost ratio, which is calculated by a project's total benefits divided by its total costs. The benefit-cost ratio is a numerical expression of the "cost-effectiveness" of a project. A solution is generally considered to be cost effective when the benefit-cost ratio is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.

Bonds

Communities typically use either stormwater revenue bonds or general obligation bonds for this type of funding. Bonds can fund various activities, such as home buyouts, upgraded early warning systems, and infrastructure repairs.

Capital cost

Portion of the estimated cost of a flood risk reduction solution that includes both the direct costs of constructing facilities, such as materials, labor, and equipment, and the indirect costs associated with

construction activities, such as engineering studies, legal counsel, land acquisition, contingencies, environmental mitigation, interest during construction, and permitting.

Coastal flooding

Strong winds combined with changes in water surface elevation can produce a storm surge that drives ocean water inland across the flat coastal plain. High tide events also may cause frequent, localized flooding of low-lying coastal lands.

Coastal infrastructure

Structures, systems, and facilities built along coastlines for the purpose of flood protection.

Community rating system

A voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program.

Conditional Letter of Map Revision

FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations, or the Special Flood Hazard Area. The letter does not revise an effective National Flood Insurance Program map, it indicates whether the project, if built as proposed, would be recognized by FEMA.

Critical facilities

All public or private assets, systems, and functions vital to the security, governance, public health and safety, economy, or morale of the state or the nation.

Deficient infrastructure

The flood infrastructure or natural feature is in poor structural or non-structural condition and needs replacement, restoration, or rehabilitation.

Detention

Stormwater detention stores the water and is held for release at a restricted rate after the storm subsides. In stormwater retention, the runoff of stormwater is held for later use in irrigation or groundwater recharge as well as reducing pollution.

Drought

Generally applied to periods of less-than-average precipitation over a certain period of time. Associated definitions include meteorological drought (abnormally dry weather), agricultural drought (adverse impact on crop or range production), and hydrologic drought (below-average water content in aquifers and/or reservoirs).

Drought of record

The period of time when historical records indicate that natural hydrologic conditions provided the least amount of water supply.

Estuary

Bay or inlet, often at the mouth of a river and may be bounded by barrier islands, where freshwater and seawater mix providing for economically and ecologically important habitats and species and that also yields essential ecosystem services. Estuaries provide flood mitigation benefits by shielding the coast from storm surges and wave action.

Evergreen general obligation bond

Voter-approved authority to issue general obligation bonds that do not expire and replenishes as bonds are paid off.

Fill

Obstructive materials, including sand and soil, used to raise the level of the ground to change the flow of water or increase flood elevations.

Flash flood

A flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours.

Flash Flood Alley

Flash Flood Alley is the region that follows the curve of the Balcones Escarpment from Dallas to Austin and extends just southwest of San Antonio. This area is called Flash Flood Alley because of the area's steep terrain, shallow soil, and intense rainfall rates. Heavy rains can quickly transform into walls of fast-moving water with great destructive potential.

Flood

An overflow of water onto normally dry land.

Flood infrastructure

Natural or constructed systems and structures that manage flooding, including dams, levees, floodplains, and storm drain systems.

Flood Infrastructure Fund

The TWDB's Flood Infrastructure Fund program⁶⁷ was passed by the legislature and approved by Texas voters through a constitutional amendment in 2019. The program offers financial support through loans and grants for a range of flood studies and mitigation projects. Flood intended use plans outline the structure of each associated funding cycle. Only flood risk reduction solutions (flood management evaluations, flood mitigation projects, and flood management strategies) recommended in the regional flood plans are eligible for Flood Infrastructure Funding.

Flood Insurance Rate Map

Official map of a community on which FEMA has delineated the special flood hazard areas, the base flood elevations, and the risk premium zones.

Flood risk

A combination of the probability (likelihood or chance) of a flood event happening and the impact if it occurred.

Flood management evaluation

A proposed flood study of a specific, flood prone area needed to assess flood risk and/or determine whether there are potentially feasible flood mitigation projects or flood management strategies.

Flood mitigation project

A proposed project, either structural or non-structural, that has nonzero capital costs or other non-recurring cost and when implemented will reduce flood risk, mitigate flood hazards to life or property.

⁶⁷ www.twdb.texas.gov/financial/programs/FIF/index.asp

Flood management strategy

A proposed plan to reduce flood risk or mitigate flood hazards to life or property. The regional flood planning group has some flexibility on how they choose to utilize strategies in the regional flood planning process. For example, regional flood planning groups could choose not to recommend any strategies. At a minimum, regional flood planning groups should include as flood management strategies any proposed action that the group would like to identify, evaluate, and recommend that does not qualify as either a flood management evaluation or flood mitigation project.

Floodplain

The land adjacent to a water body that is subject to inundation during a flood.

Floodproofing

Any combination of structural and non-structural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real estate, water and sanitary facilities, structures and their contents.

Floodplain quilt

An initial ranking or hierarchy of flood planning data sets provided by the TWDB for flood risk analyses.

Fluvial (or riverine) flooding

Flooding that occurs when rivers overflow their banks and flow into surrounding areas.

Fluvial geomorphology

A subdiscipline of geomorphology that investigates how flowing water shapes and modifies Earth's surface through erosional and depositional processes.

Freeboard

An additional amount of height above the base flood elevation used as a factor of safety in determining the height at which structure's lowest floor must be elevated.

Functional infrastructure

The flood infrastructure is serving its intended design level of service.

General fund

General fund revenue is largely from property, sales, and other taxes, that provides a substantial amount of money

Hydrologic unit code

A hydrologic unit system used to identify any hydrologic area using a two- to 12-digit number that uniquely identifies each of the six levels of classification within six two-digit fields.

Interactive state flood plan viewer

TWDB website ([Texasstatefloodplan.org](https://www.texasstatefloodplan.org)) which allows users statewide take an up-close look at data in the 2024 State Flood Plan.

Levee

Man-made structures comprised of long mounds of earth, concrete, and other materials built up along the banks of rivers to contain flood flows within a restricted floodplain.

Living levee

Sometimes called “horizontal levees,” these are earthen levees that slope gently downwards to allow for natural, gradual transitions down to open water.

Low water crossing

Roadway creek crossings that are subject to frequent inundation during storm events or to inundation during a 50 percent (2-year) annual chance storm event.

Major reservoir

Reservoir with a storage capacity of 5,000 acre-feet or more.

National Flood Hazard Layer

Geospatial database that contains current effective flood hazard data.

National Flood Insurance Program

A program created by Congress in 1968 and managed by FEMA to reduce future flood damage through floodplain management and to provide people with flood insurance through individual agents and insurance companies.

Natural feature

Referring to the ecological characteristics and functions of the physical landscape that mitigate flood risk.

Natural floodplain

A floodplain whose boundaries can change with each flood event as sediments are scoured and deposited within the river channel and upon adjacent lands.

Nature-based solution

Sustainable planning, design, environmental management and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience.

Navigable waters

Waters of the United States that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Non-functional infrastructure

The flood infrastructure is not providing its intended or design level of service.

Non-deficient infrastructure

The flood infrastructure or natural feature is in good structural or non-structural condition.

Non-recurring, non-capital costs

Costs necessary to develop and/or implement the strategy. Examples include a program development cost, education campaign cost, non-engineering studies such as floodplain regulation development, flood authority or revenue raising studies, and public awareness programs.

Non-structural flood mitigation projects

Actions that reduce the impact of flooding without relying solely on physical infrastructure solutions. These projects focus on strategies that do not involve constructing physical barriers or altering the natural flow of water.

Playa lakes

Shallow, clay-lined depressions in the otherwise flat landscape act as natural water detention areas of rainfall and irrigation runoff.

Pluvial flooding

Inflow of stormwater in urban areas that exceeds the capacity of drainage systems to infiltrate stormwater or carry it away, often caused by heavy rainfall, land development, and undersized stormwater systems.

Ponds

Land depressions that store water and can facilitate natural infiltration of water into the ground.

Recharge

Water that infiltrates to the water table of an aquifer.

Regional flood planning group

Group designated pursuant to Texas Water Code § 16.053. There are 15 flood planning groups in Texas responsible for developing regional flood plans that are guided by statute, rules, contracts, members of the planning groups, and the general public. Each group has diverse members with various economic, social, and environmental interests in their areas.

Regulatory floodplain

A floodplain whose boundaries are determined by modeling a specific storm event and depicting the boundaries of inundation.

Resilience

The capacity of individuals, communities, businesses, institutions, and governments to adapt to changing conditions and to prepare for, withstand, and rapidly recover from disruptions to everyday life, such as hazard events.

Reservoir

Man-made lakes often created by installing dams across rivers or tributaries to capture and store water for a variety of purposes, including water supply.

Revetment

Components of flood protection infrastructure incorporated along riverbanks and coastal areas to reduce flood risk by preventing erosion and stabilizing the water's edge.

Riverine flooding

Rivers exceed flow capacity resulting in overtopping and large volumes of runoff, often caused by high-intensity rainfall.

Roadway stream crossing

A location where a road or highway interacts with a stream or watercourse that may be susceptible to floodwater during periods of heavy rain or other flood events.

Sedimentation

The action or process of depositing sediment in a reservoir - usually silts, sands, or gravel.

Sinkholes

Geological formations characterized by the collapse or subsidence of the Earth's surface, often caused by the dissolution of soluble rocks, such as limestone.

Structural flood mitigation projects

Building or modifying infrastructure to reduce flood risk. These projects typically include advanced analysis with 30 to 100 percent level of design, including project objectives, scope, timelines, cost estimates, and deliverables.

Social vulnerability index

A numerical value intended as the proxy for resilience, or the capacity to weather, resist, or recover from the impacts of a hazard in the long term as well as the short term. Vulnerability depends upon many factors such as land use, extent and type of construction, contents and use, the nature of populations (mobility, age, health), and warning of an impending hazardous event and willingness and ability to take responsive actions.

Special flood hazard areas

Flood hazard areas identified on FEMA Flood Insurance Rate Maps that will be inundated by the 1 percent (100-year) annual chance flood event.

Special tax districts

Special tax districts are sometimes used to tax only the portion of the population that will benefit from a specific project. However, only a few communities in Texas have implemented such tax districts for flood mitigation.

Storage

Natural or artificial impoundment and accumulation of water in surface or underground reservoirs, usually for later withdrawal or release.

Stormwater detention

Basins that store and hold the water for release at a restricted rate after the storm subsides.

Stormwater retention

Stormwater runoff is held for later use in irrigation or groundwater recharge as well as reducing pollution.

Stormwater utility fees

Over the past several decades, the stormwater utility model has increasingly been used as a tool to raise local funding for stormwater management both in Texas and the country. Creating a stormwater utility that requires fees allows a municipality to have a dedicated revenue stream for stormwater management that is directly based on how much a property contributes to stormwater runoff.

Stormwater management systems

Designed to manage the excess water generated during rainfall events to prevent flooding, erosion, and water pollution.

Structural failure flooding

Failure of man-made infrastructure, such as dams or levees, when intense or extensive rainfall results in the uncontrolled release of floodwaters.

Transportation fees

While transportation fees are focused on maintaining the transportation system, many drainage systems are often contained within the transportation right-of-way, such as roadside ditches, inlets, and storm sewer systems. Costs associated with maintenance and upgrades of the drainage systems in the right-of-way are often mixed in and part of the overall transportation system budgets.

Urban flooding (also: stormwater or pluvial flooding)

Localized flooding that occurs when rainfall overwhelms the capacity of engineered drainage systems to carry away rapidly accumulating volumes of water.

Vulnerability

The susceptibility to physical injury, harm, damage, or economic loss. It depends on an asset's construction, contents, and economic value of its functions.

Weir

Low-lying barriers built across waterways that gauge the volume of water flowing through a canal and can serve as flood management infrastructure by capturing water upstream and slowing its downstream flow during times of peak discharge.

Wetlands, marshes, and swamps

Natural systems found near lakes, rivers, and oceans that are often inundated by water, either permanently or seasonally during rainy seasons.

Zone A

Other special flood hazard areas without base flood elevations.

Zone AE

The base floodplain where base flood elevations are provided.

Zone VE

Coastal areas with 1 percent or greater chance of flooding and an additional hazard associated with storm waves.