9

Cost and financing needs

QUICK **FACTS**

- The total estimated cost of the 3,097 recommended flood management evaluations is more than $2.63 billion, and the regional flood planning groups identified $71 million in available funding (may include local, state, or federal).
- The total estimated cost of the 615 recommended flood mitigation projects is more than $49 billion, and the flood planning groups identified $10.5 billion in available funding (may include local, state, or federal).
- The total estimated cost of the 897 recommended flood management strategies is more than $2.84 billion, and the planning groups identified $84 million in available funding (may include local, state, or federal).
- The regional flood planning groups indicated that, overall, local sponsors of flood risk reduction solutions would require up to 80 to 90 percent in state and/or federal financial assistance to implement every recommended flood risk reduction solution included in this plan.

As part of the process of developing their plans, the regional flood planning groups were required to estimate the costs of their recommended flood risk reduction solutions. This included the costs for studies required to quantify flood risk in locations where the risk remains unknown and studies to identify associated mitigation projects. They were also required to assess the associated financial needs of the sponsors who will be responsible for implementing the recommended flood mitigation solutions.

Identifying investments in flood risk mitigation is approached from a very different perspective than efforts to plan for water supply or roadway investments. Whereas the need for public investments in additional water and road infrastructure typically grows over time with a growing population, the same is not necessarily true for public investments in flood mitigation. One of the key goals of flood planning is to avoid increasing flood risks, and thus costs, in the future. In theory—aside from environmental changes that may increase future flood risk, like changes in rainfall or sea level rise (see Section 4.2)—if we reduce all current flood risks and, more importantly, avoid increasing or creating new risks through strong floodplain management practices, the need for future flood mitigation investment could potentially be eliminated or focused on further reducing the level of residual flood risk (see Section 8.5).

Much of the total cost estimate for flood mitigation in this plan represents an accumulation of various flood risks over a long period of time combined with a lack of recognition and/or a backlog in investments to address it. In a perfect world with strong floodplain management and a stable climate pattern, this cost would not grow significantly larger.

9.1 Costs of implementing the state flood plan

The regional flood plans identified statewide flood risks and estimated the magnitude of the cost of potential mitigation solutions needed to reduce the risk and impact of flooding in Texas. Even after the first cycle of regional flood planning, not all flood risk or flood risk reduction solutions could be identified. As flood management evaluations are funded and performed,

additional flood mitigation projects will be identified. Those studies will, in turn, identify specific projects that can be implemented to reduce identified flood risk.

Aside from one-time costs for activities like studies, the estimated total **capital costs** of all flood risk reduction solutions recommended by the 15 regional flood planning groups in this plan amount to approximately $54.5 billion dollars. Note that approximately $24 billion of this cost is for the Galveston Bay Surge Protection Coastal Storm Risk Management project, towards which the Texas Legislature allocated $265 million between 2022 and 2023 (Gulf Coast Protection District, personal comm., 2024). The U.S. Congress allocated $500,000 in the U.S. Army Corps of Engineers' work plan in May 2024 towards the Galveston Bay Surge Protection Coastal Storm Risk Management project. Capital costs are those costs for which project sponsors typically would borrow funds and establish repayment through annual debt service.

9.2 Financial assistance required to implement the state flood plan

The flood planning groups were required to indicate how local governments, regional authorities, and other political subdivisions sponsoring efforts in their region propose to fund the region's flood plan recommendations. The planning groups administered a funding survey toward the end of the planning cycle to estimate the amount of state financial assistance that local or regional entities might require to implement the recommended flood risk solutions.

This effort required obtaining information from sponsors of the recommended flood management evaluations, flood mitigation projects, and flood management strategies, especially for projects with large capital costs. The resulting information was provided to the regional flood planning groups with an indication of potential funding needs required to implement the regional flood plans.

The survey response rate of project sponsors varied but was generally low, so some planning groups extrapolated the limited survey responses to all projects within their region. The range of financial assistance needs reported on individual projects varied from "100 percent other funding required" to "no funding assistance needed" (Table 9-1). Overall, the planning groups indicated that many local sponsors of flood risk reduction solutions may require 80 to 90 percent of the costs in financial assistance to implement projects (Figure 9-1 and Figure 9-2). This result is not surprising and generally in line with what the Texas Water Development Board (TWDB) learned when developing the 2019 State Flood Assessment.[48] Identified available funding included various bonds; ad valorem taxes; community development block grants; and drainage, permitting, and stormwater fees. Funding sources are described in Section 9.3.1.

9.3 Financing the state flood plan and other flood-related projects

Financing public projects generally involves the expenditure or borrowing of funds through loans or the sale of bonds, for example, that must be repaid by the sponsoring entity. The ability to raise funds for flood projects, including debt repayment, is an ongoing challenge for many public entities and is at least partially responsible for what might be considered a significant backlog of flood mitigation studies and project implementation.

The financial assistance programs summarized in this chapter are categorized as state or federal based on the original source of funds. Some federal programs are administered at the state level

[48] texasfloodassessment.org

*Table 9-1. Estimated cost, reported available funding, and unmet need for all recommended flood risk reduction solutions as identified by the regional flood planning groups**

	Flood management evaluations[a]			Flood mitigation projects			Flood management strategies		
Region	Estimated cost	Available funding	Unmet need	Estimated cost	Available funding	Unmet need	Estimated cost	Available funding	Unmet need
1	$89.0M	$24.5M	$64.5M	$121.0M	$34.4M	$86.6M	$13.4M	$175.0K	$13.2M
2	$37.9M	$0.0	$37.9M	$52.2M	$0.0	$52.2M	$4.5M	$0.0	$4.5M
3	$220.6M	$24.9M	$195.6M	$703.5M	$70.3M	$633.1M	$745.4M	$81.2M	$664.2M
4	$81.3M	$0.0	$81.3M	$3.3B	$836.5M	$2.4B	$112.4M	$0.0	$112.4M
5	$88.9M	$12.5M	$76.4M	$4.3B	$1.0B	$3.3B	$175.0M	$0.0	$175.0M
6[b]	$905.4M	$2.3M	$903.0M	$31.7B	$8.5B	$23.2B	$1.2B	$2.4M	$1.2B
7	$84.3M	$1.0M	$83.3M	$48.8M	$15.5M	$33.3M	$13.2M	$0.0	$13.2M
8	$29.6M	$0.0	$29.6M	$4.3B	$0.0	$4.3B	$366.4M	$0.0	$366.4M
9	$73.0M	$440.0K	$72.5M	$184.7M	$1.5M	$183.2M	$7.6M	$0.0	$7.6M
10[c]	$62.2M	$0.0	$62.2M	$379.2M	$0.0	$379.2M	$0.0	$0.0	$0.0
11	$85.7M	$0.0	$85.7M	$394.2M	$0.0	$394.2M	$33.5M	$0.0	$33.5M
12	$349.4M	$0.0	$349.4M	$739.0M	$0.0	$739.0M	$999.0K	$0.0	$999.0K
13	$284.5M	$4.8M	$279.7M	$1.2B	$0.0	$1.2B	$20.3M	$0.0	$20.3M
14	$7.6M	$636.2K	$7.0M	$507.8M	$4.8M	$502.9M	$3.6M	$263.1K	$3.3M
15	$227.2M	$0.0	$227.2M	$1.1B	$0.0	$1.1B	$145.0M	$0.0	$145.0M
Total	**$2.6B**	**$71.2M**	**$2.6B**	**$49.1B**	**$10.5B**	**$38.6B**	**$2.8B**	**$84.1M**	**$2.8B**

** Zero or low available reported funding may be partially due to lack of survey responses.*

[a] For flood management evaluations, estimated cost includes only the non-construction costs. However, for some flood management evaluations in Regions 1, 5, 7 and 9, available funding includes the local sponsor share for the total of non-construction and construction costs.

[b] Value includes the Region 6 San Jacinto-recommended Galveston Bay Surge Protection Coastal Storm Risk Management project with an estimated cost of $24 billion.

[c] Region 10 did not include cost information for its recommended flood management strategies.

and may include a state contribution. Appendix C contains a list of key federal and state funding sources.

9.3.1 Common local sources for funding flood mitigation

Flood infrastructure is often difficult to fund locally and, in many cases, may be under-funded at least partly because, unlike water supply projects, drainage and flood mitigation projects do not generate revenue. Local and regional governments often need multiple public and private funding sources to finance expensive projects and support wider implementation of flood mitigation, including projects and floodplain management strategies.

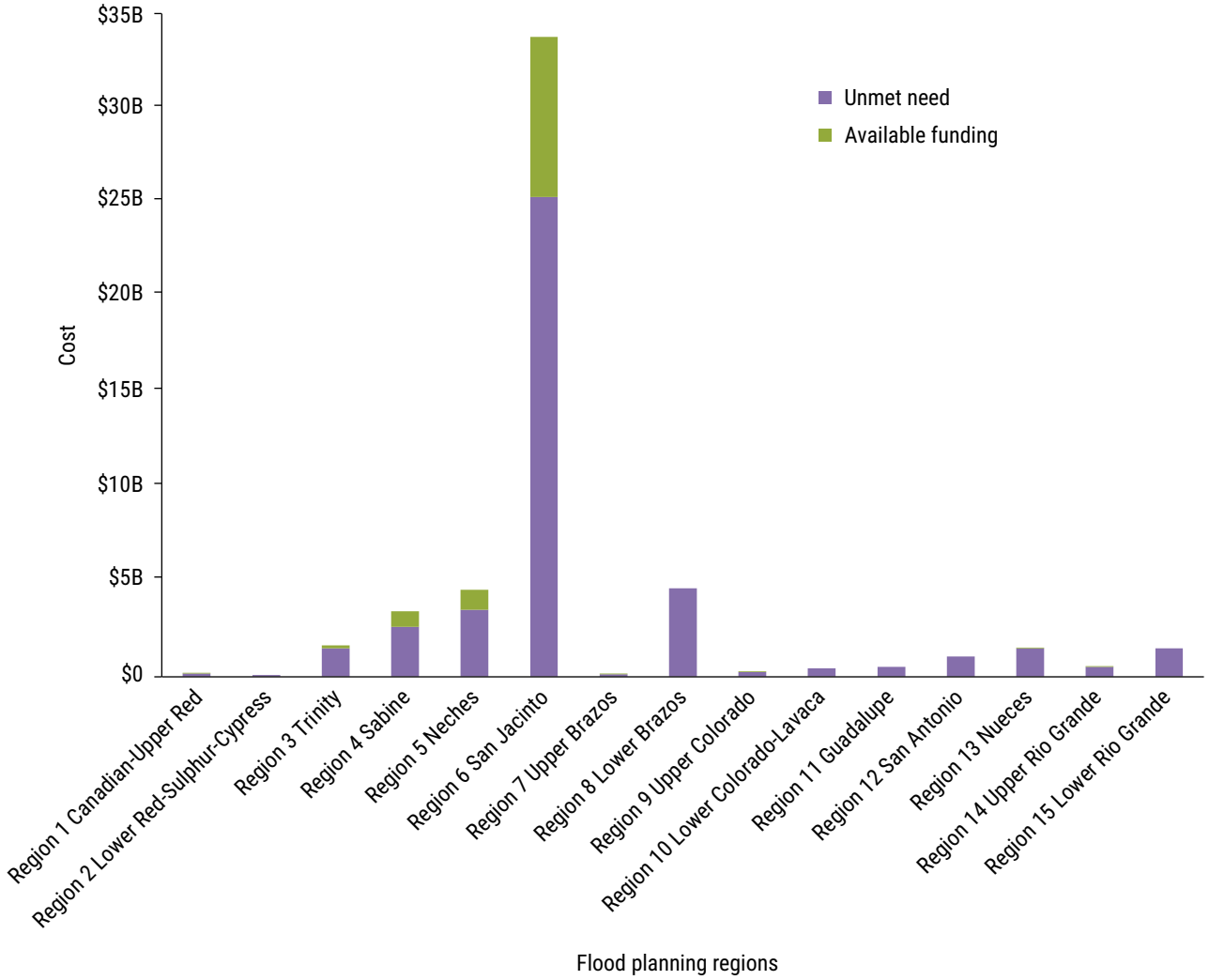
Common sources of local funds used to pay for flood activities, including debt repayments, vary by entity and may include the following:

General funds: General fund revenue is largely from property, sales, and other taxes and provides a substantial amount of funding for all municipal programs but often limited portions for drainage maintenance and flood mitigation.

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 in Texas and across the United States. Creation of a stormwater utility 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.

Transportation fees: While transportation fees are focused on maintaining the transportation system, many drainage systems are often contained within the transportation right-of-way,

*Figure 9-1. Available funding versus unmet need for recommended flood risk reduction solutions by region**



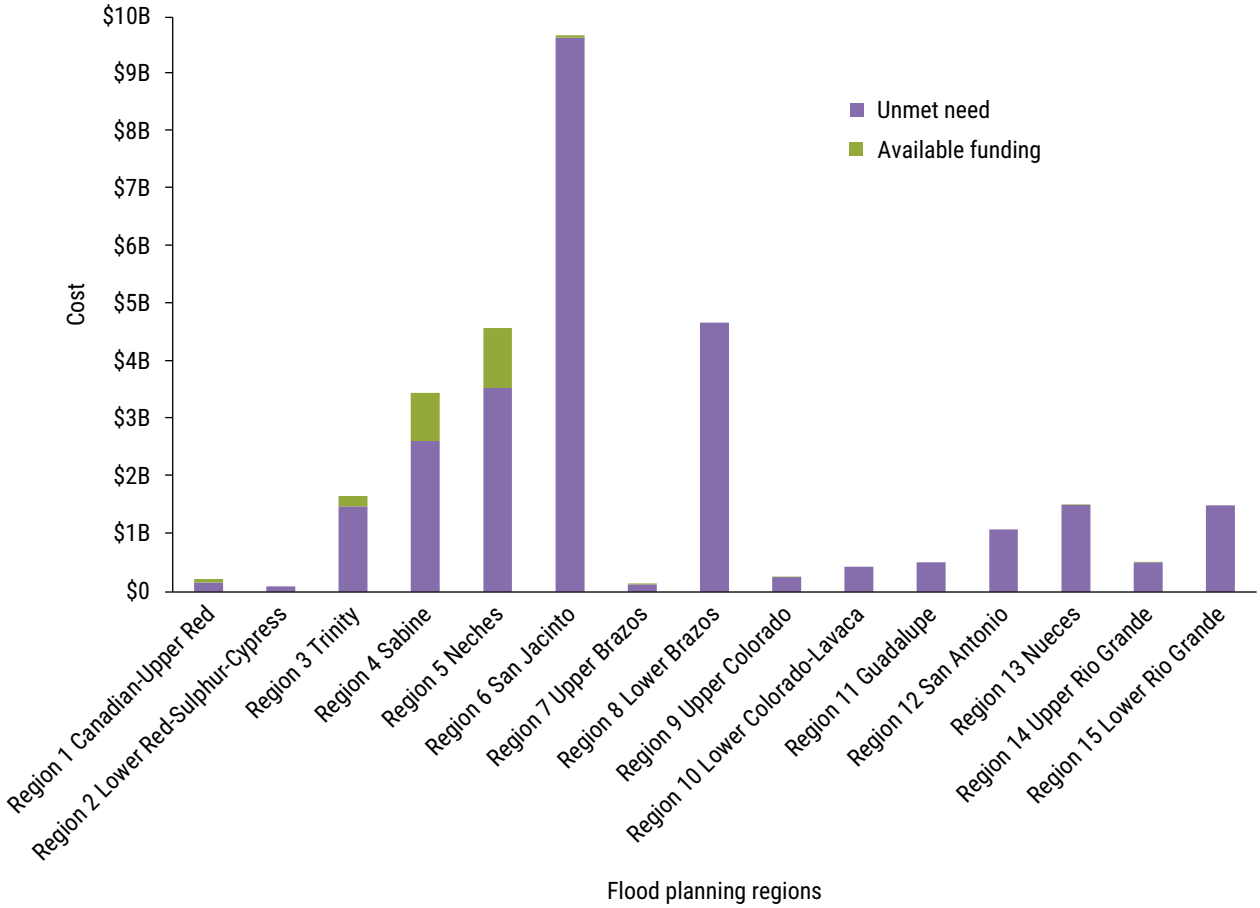
** Figure includes information on the Region 6 San Jacinto-recommended Galveston Bay Surge Protection Coastal Storm Risk Management project with an estimated cost of $24 billion.*

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 part of the overall transportation system budgets.

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

Ad valorem taxes and permitting or impact fees: Though less frequently a source of funding, ad valorem taxes, impact fees, or permitting fees may be used to fund flood mitigation 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 on the community. Another program is a fee-in-lieu system in which developers pay a fee to the community rather than building a site-specific stormwater mitigation project within their development. The accumulated fees may

*Figure 9-2. Available local funding versus unmet need for recommended flood risk reduction solutions by region**



** Figure excludes information on the Region 6 San Jacinto-recommended Galveston Bay Surge Protection Coastal Storm Risk Management project with an estimated cost of $24 billion.*

be saved on a watershed or community-wide basis for larger, regional stormwater mitigation projects.

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.

Private sector funding: With limited funding sources, communities may seek funding from the private sector to make flood mitigation projects possible. This could include donation of land, resources, and services or funding a portion of the mitigation activity through mechanisms like development agreements and public-private partnerships.

9.3.2 TWDB financial assistance

Through its state and federally supported financial assistance programs, the TWDB provides financial assistance for eligible water-related projects, including components of water supply, wastewater (sewage) conveyance and treatment, flood control, and agricultural water conservation. Prior to the creation of the state's Flood Infrastructure Fund program in 2019, the TWDB's ability to finance flood mitigation activities was very limited.

In addition to its administration of the Flood Infrastructure Fund, the TWDB facilitates the Flood Information Clearinghouse Committee,[49] which is an ongoing multi-agency effort to maximize the effective utilization of public funding resources and help communities identify the funding source(s) they would like to pursue for a given project. The TWDB works collaboratively with the Texas General Land Office, Texas Division of Emergency Management, and other state agencies to assist communities in determining which of the available funding sources for flood-related projects is the best fit for them.

Flood Infrastructure Fund

The 86th Texas Legislature passed several bills entrusting the TWDB with new responsibilities related to funding flood mitigation projects and planning for future flood events. On November 5, 2019, Texas voters approved Proposition 8, a constitutional amendment providing for the creation of the Flood Infrastructure Fund to assist with financing drainage, flood mitigation, and flood control projects, including

- planning and design activities;
- work to obtain necessary regulatory approvals; and
- construction and/or implementation of flood projects.

In accordance with statute, only recommended flood management evaluations, flood management strategies, and flood mitigation projects included in this state flood plan, including future amendments, are eligible for funding from the Flood Infrastructure Fund once the state flood plan has been adopted.[50] Prior to adopting this first state flood plan, the TWDB had already committed approximately $643 million to 140 projects through the first cycle of the Flood Infrastructure Fund.

In 2023, the 88th Texas Legislature appropriated an additional $625 million in funding that will go towards new Flood Infrastructure Fund projects under the 2024–2025 Flood Infrastructure Fund Intended Use Plan.

The Flood Infrastructure Fund provides financial assistance through loans and grants for a wide variety of flood-related projects by eligible applicants, including cities, counties, and any district or authority created under Article III, Section 52, or Article XVI, Section 59, of the Texas Constitution,[51] Flood Infrastructure Fund program funding is allocated using an application and multi-factor prioritization process that determines the projects to receive funding and the relative grant allocation each project may be eligible to receive.

Flood Infrastructure Fund statutes, rules, and the intended use plan allow for a wide range of eligible flood projects, including structural and non-structural projects as well as nature-based solutions.

Other TWDB state-funded programs

Texas Water Development Fund

The Texas Water Development Fund has funding available through the agency's existing $6 billion **evergreen general obligation bonding** authority. Financial assistance for flood control may include structural and non-structural flood protection improvements. Since 2013, approximately $9 million has been distributed to projects with flood-related components through the Texas Water Development Fund program.

[49] www.texasfloodclearinghouse.org/

[50] Texas Water Code § 15.534(c)

[51] Specific to Flood Infrastructure Fund Category 1, "Flood Protection Planning for Watersheds" only, eligible political subdivision applicants include a city, county, district, or authority created under Article III, Section 52, or Article XVI, Section 59, of the Texas Constitution, any other political subdivision of the state, any interstate compact commission to which the state is a party, and any nonprofit water supply corporation created and operating under Chapter 67

TWDB federally funded programs

State Revolving Funds

The TWDB administers the Clean Water State Revolving Fund and Drinking Water State Revolving Fund, programs that were established to provide low-cost financing for wastewater and water infrastructure projects. The Clean Water State Revolving Fund can fund flood-related (pre-disaster) mitigation projects, but applicants must compete with wastewater projects. The TWDB has also allocated funds in the Clean Water and Drinking Water State Revolving Funds since 2017 to provide post-disaster funding options to communities for projects related to water supply, wastewater, or stormwater management facilities with urgent need situations. Since 2013, approximately $138.7 million of funding has been distributed to projects with flood-related components through the Clean Water State Revolving Fund and approximately $72.8 million through the Drinking Water State Revolving Fund.

Flood Mitigation Assistance

The Flood Mitigation Assistance grant program under the Federal Emergency Management Agency (FEMA) provides annual federal funding to help states and communities pay for cost-effective ways to reduce or eliminate the long-term risk of flood damage to repetitive loss and severe repetitive loss structures that are insured under the National Flood Insurance Program. The TWDB administers the Flood Mitigation Assistance grant program for the state of Texas on behalf of FEMA. Since 2015, the program has provided more than $526.1 million of total funding benefitting 129,000 structures.[52]

Goals of the Flood Mitigation Assistance program include reducing or eliminating

- repeated claims under the National Flood Insurance Program and
- the dependence on taxpayer-funded federal disaster assistance for disaster recovery.

The Flood Mitigation Assistance program is a nationally competitive grant program with an annual application cycle. FEMA announces the opening of each application cycle with the issuance of a "Notice of Funding Opportunity" on grants.gov. Eligible cities, counties, special districts, and other political subdivisions develop an application (referred to as a sub-application) on behalf of the entity and its citizens for submission to the TWDB through the FEMA GO grant system. Property owners cannot apply directly to the TWDB or FEMA for a Flood Mitigation Assistance grant. Interested property owners may contact their local floodplain official or other area representatives to find out about their community's interest in applying for a Flood Mitigation Assistance grant.

9.4 Other flood mitigation funding opportunities

Historically, federal grant programs related to floodplain management, planning, mitigation, and mapping activities typically offer greater financial assistance than what is available at the local or state level. Some federal programs are not tied to a specific disaster and are open annually as the U.S. Congress authorizes funding. Texas competes with other states for funds from programs such as Cooperating Technical Partners, Flood Mitigation Assistance, and Building Resilient Infrastructure and Communities. In some cases, flood-related projects also compete with other types of non-flood-related projects, such as wildfire management, earthquake preparedness, and backup power generation. Other funding programs are tied to specific declared disasters (e.g., Hurricane Harvey), such as the Hazard Mitigation Grant Program and the Community Development Block Grant – Disaster Recovery program.

The following list includes examples of other state and federal flood funding programs, but it is not an exhaustive list of potential state and federal funding sources for flood mitigation.

[52] www.twdb.texas.gov/financial/programs/FMA/index.asp

There are many other programs that focus on different areas of need in communities, such as transportation, research, or public education, but the funding may also support activities associated with flood mitigation. Additional references to seek more information on potential funding sources include the Texas Flood Information Clearinghouse,[53] American Flood Coalition,[54] and the Texas General Land Office's MATCH Tool[55] that is currently under development.

Building Resilient Infrastructure and Communities - Administered by the Texas Division of Emergency Management, the Building Resilient Infrastructure and Communities program supports states, local communities, tribes, and territories as they undertake hazard mitigation projects reducing the risks of disasters and natural hazards. Building Resilient Infrastructure and Communities is a FEMA pre-disaster hazard mitigation grant program that replaced the Pre-Disaster Mitigation program.

Community Development Block Grant (Disaster Recovery) - Administered by the Texas General Land Office, Community Development Block Grant - Disaster Recovery funds are used to address unmet recovery needs that contribute to the long-term recovery and restoration of housing as well as the repair and enhancements of local infrastructure.

Community Development Block Grants (Mitigation) - The Texas General Land Office is administering more than $4 billion in U.S. Department of Housing and Urban Development Community Development Block Grants – Mitigation funding for areas of the state impacted by Hurricane Harvey and the 2015, 2016, and 2018 flood events. The funding is being used to build and implement structural and non-structural projects, programs, and partnerships throughout Texas that reduce the risks and impacts of future natural disasters.

Community Development Block Grant program for rural Texas - The Texas Community Development Block Grant program, administered by the Texas Department of Agriculture, provides grants for community planning and small infrastructure projects, including water, wastewater, stormwater, and street infrastructure.

Corps Water Infrastructure Financing Program - The U.S. Army Corps of Engineers' Corps Water Infrastructure Financing Program is authorized by the Water Infrastructure Finance and Innovation Act to provide long-term, low-cost loans for non-federal dam safety projects to maintain, upgrade, remove, and repair dams identified in the National Inventory of Dams. Projects must be creditworthy, technically sound, economically justified, and environmentally acceptable. To be eligible for a Corps Water Infrastructure Financing Program loan, project costs must be a minimum of $20 million; however, numerous small projects may be bundled together to meet the minimum.

Emergency Watershed Protection Program - The U.S. Department of Agriculture's Natural Resources Conservation Service administers the Emergency Watershed Protection Program, a federal emergency recovery program that responds to emergencies created by natural disasters. The program offers technical and financial assistance to help communities alleviate imminent threats to life and property caused by floods, fires, windstorms, and other natural disasters that impair a watershed. The Emergency Watershed Protection Program does not require a disaster declaration by federal or state government officials for program assistance to begin. The Natural Resources Conservation Service state conservationist can declare a local watershed emergency and initiate Emergency Watershed Protection Program assistance in cooperation with an eligible sponsor.

[53] www.texasfloodclearinghouse.org/

[54] www.floodcoalition.org/fundingfinder/#home

[55] www.match-tool-hub-dewberry.hub.arcgis.com/

Flood control dam infrastructure projects (supplemental funding) - The 86th Texas Legislature appropriated funding to the Texas State Soil and Water Conservation Board to repair and rehabilitate flood control structures through grants to local sponsors of flood control dams, including soil and water conservation districts.

Hazard Mitigation Grant Program - Following a presidential disaster declaration, the FEMA Hazard Mitigation Grant Program, administered by the Texas Division of Emergency Management, provides disaster response and recovery assistance to prevent or reduce future loss of lives and property through identifying and funding cost-effective mitigation measures and to minimize the costs of future disaster response and recovery. All applicants must have a FEMA-approved Hazard Mitigation Plan at the time the project is submitted to FEMA, with the exception of planning projects.

Public Assistance Program - FEMA's Public Assistance Program provides grants to state, territorial, local, and federally recognized tribal governments and certain private non-profit entities to assist with responding to and recovering from disasters. Specifically, the program provides assistance for debris removal, emergency protective measures, and permanent repair, restoration, reconstruction, or replacement of eligible public facilities and infrastructure damaged or destroyed in a disaster.

Rehabilitation of High Hazard Potential Dam Grant Program - FEMA's Rehabilitation of High Hazard Potential Dam Grant Program, administered by the Texas Commission on Environmental Quality, provides technical, planning, design, and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams.

Structural Dam Repair Grant Program - Administered by the Texas State Soil and Water Conservation Board, the program provides state grant funds for 100 percent of the cost of allowable repair activities on dams constructed by the U.S. Department of Agriculture - Natural Resources Conservation Service, including match funding for federal projects through the National Dam Rehabilitation Program, administered by FEMA, and the Emergency Watershed Protection Program of the Texas Natural Resources Conservation Service.

Watershed Protection and Flood Prevention Operations Program - The U.S. Department of Agriculture's Natural Resources Conservation Service administers the Watershed Protection and Flood Prevention Operations Program, which helps project sponsors from federal, state, local, and federally recognized tribal governments protect and restore watersheds. The program provides technical and financial assistance to states, local governments, and tribal organizations to help plan and implement authorized watershed projects for the purpose of flood prevention, watershed protection, public recreation, public fish and wildlife, agricultural water management, municipal and industrial water supply, and water quality management.

Watershed Rehabilitation Program - The U.S. Department of Agriculture's Natural Resources Conservation Service administers the Watershed Rehabilitation Program, which helps project sponsors rehabilitate aging dams that are reaching the end of their design life and/or no longer meet federal or state safety criteria or performance standards. Since 1948, the Natural Resources Conservation Service has assisted local sponsors in constructing more than 11,850 dams. These rehabilitation efforts, authorized by Public Law 83-566 and 78-534, address critical public health and safety concerns should a dam failure occur.

References

TWDB (Texas Water Development Board), 2019, State flood assessment: Report to the 86th Texas Legislature, 58p. www.twdb.texas.gov/publications/reports/special_legislative_reports/doc/State-Flood-Assessment-report-86th-Legislation.pdf