Public Meeting Notice

Region 9 – Upper Colorado Regional Flood Planning Group
March 31, 2022
10:00 AM CST

Notice is hereby given of a regular meeting of the Region 9 – Upper Colorado Regional Flood Planning Group to be held March 31, 2022 at 10:00 AM at the McNease Convention Center – North Meeting Room, 501 Rio Concho Drive, San Angelo, Texas, for the purpose of considering the following agenda items. Masks and social distancing recommended for in-person meeting.

Phone participation is available for public and non-voting representatives by the conference call information below:

Call In: (325) 326–0870 *Passcode / ID: 532 107 88#*

The Meeting Agenda and the Agenda Packet are posted online at https://www.cosatx.us/departments-services/water-utilities/region-9-upper-colorado-flood-planning-region

A recording of the meeting will be available to the public in accordance with the Open Meetings Act upon written request.

Members of the public may also submit Public Comment on agenda items by sending their written comments via email to allison.strube@cosatx.us or rfpg9.lance@gmail.com by noon March 30, 2022. The subject line must be in the following format: "Public Comment, [item number] – March 31, 2022." All emails must include your name and address. Please note all Public Comment emails relevant to posted agenda items received by the deadline will be published as part of the agenda packet prior to the meeting and are therefore public record.

Agenda:

1. Call to Order
2. Welcome
3. Public comments – limit 3 minutes per person
4. Approval of minutes from the previous meeting.
5. Texas Water Development Board Update
6. Sponsoring Agency Update from City of San Angelo
7. Discussion and potential action to authorize the Planning Group Sponsor to negotiate and execute an amendment to the Regional Flood Planning Grant subcontract with the technical consultant, (HDR), to incorporate additional funding for the first cycle of regional flood planning, including necessary revisions to the contract scope of work and budget
8. Discussion and possible action on Consultant Team planning tasks:
    a. Presentation on Chapter 1 Planning Area Description
    b. Presentation on Regional Flood Plan development updates, schedule, and next steps
9. Public comments – limit 3 minutes per person
10. Consider date and agenda items for next meeting
11. Adjourn

Additional information may be obtained from: San Angelo, TX 76903
Allison Strube
allison.strube@cosatx.us
301 W. Beauregard Ave.,

Public Meeting Notice

Region 9 – Upper Colorado Regional Flood Planning Group
March 4, 2022
10:00 AM CST

Meeting held In person at McNease Convention Center – North Meeting Room, 501 Rio Concho Drive, San Angelo, Texas. Additionally, participation was available via conference call at (325) 326-0870.

Roll Call:

Voting Member	Interest Category	Present (x) /Absent ( ) / Alternate Present (*)
Kenneth Dierschke	*Agricultural interests*	X
Rick Bacon	*Counties*	X – Sammy Farmer (designated alternate present on Rick's behalf)
Henryk Alexander Olstowski	*Electric generating utilities*	X
Shannon McMillan	*Environmental interests*	X
Vacant	*Flood districts*	
Morse Haynes	*Industries*	
Lance Overstreet	*Municipalities*	X
David H. Loyd Jr.	*Public*	X
Scott McWilliams	*River authorities*	X
Chuck Brown	Small business	X
Cole D. Walker	*Water districts*	X
Allison Strube	*Water utilities*	X

Non-voting Member	Agency	Present(x)/Absent( )/ Alternate Present (*)
John McEachern	Texas Parks and Wildlife Department	
Tim Frere	Texas Division of Emergency Management	
Larissa Place	Texas Department of Agriculture	
Ben Wilde	Texas State Soil and Water Conservation Board	X-Virtual
Jet Hays	General Land Office	
Tressa Olsen	Texas Water Development Board (TWDB)	
Winona Henry	Texas Commission on Environmental Quality	
Anna Yakimovicz	Region 10 Liaison	

Others Present:
Paula Jo Lemonds – HDR (Consultant): In-Person
Heather Keister – Freese & Nichols (Consultant): In-Person
Rodrigo Vizcaino – HDR (Consultant): Virtual
Wade Barns – Freese & Nichols (Consultant): Virtual
David Ipano – HDR (Consultant): Virtual

Quorum:
Quorum: **Yes**
Number of voting members or alternates representing voting members present: 10
Number required for quorum per current voting positions of 12: 7

Meeting agendas, packets, information and recordings are available at the link https://www.cosatx.us/departments-services/water-utilities/region-9-upper-colorado-flood-planning-region

- **AGENDA ITEM NO. 1: Call to Order**
  Chair Strube called the meeting to order at 10:02 AM CST. A roll call of the planning group members was taken to record attendance, and a quorum was established prior to proceeding with the agenda.

- **AGENDA ITEM NO. 2: Welcome, Meeting Facilitation Information and Instructions**

- **AGENDA ITEM NO. 3: Public Comments**
  No Public Comments were made during this item.

- **AGENDA ITEM NO. 4: Approval of minutes from previous meeting.**
  Motion by Commissioner Kenneth Dierschke and seconded by David Lloyd. Motion passed unanimously.

- **AGENDA ITEM NO. 5: TWDB Update**
  Tressa Olsen with TWDB updated the group on tech memo was admin complete and reviewing in more detail currently. The contract amendment with TWDB and City of San Angelo was executed. Finally she updated in regards to future publication and updates provided to technical consultants.

- **AGENDA ITEM NO. 6: Sponsor agency update from the City of San Angelo Provided by chair Allison Strube**
  Chair Strube discussed that the main update is working through contract amendments and new technical consultant lead.

- **AGENDA ITEM NO. 7: Consider nominating and electing RFPG Chair, Vice Chair, Secretary, two members-at-large to serve on the Executive Committee, as applicable, per group bylaws**
  David Lloyd made the motion to reelect all committee members the same as current. The motion was seconded by Scott McWilliams. Motion passed unanimously.

- **AGENDA ITEM NO. 8: Consultant Presentation by HDR Engineering, Inc. for discussion, recommendation, and/or approval on the following items: (a) Task 4C Prepare and Submit Technical Memorandum, March 7, 2022, Deliverable to TWDB**

Paula Jo Lemonds introduced herself to Region 9 and provided an update and summary of Task 4C submission. Motion was made by Lance Overstreet to accept the report and submit to TWDB by the required timeframe. A second was made by Shannon McMillian. Motion passed unanimously.

- **AGENDA ITEM NO. 9: Consultant Presentation by HDR Engineering, Inc. for discussion of Regional Flood Plan development updates, schedule, and next steps**
  Mrs. Lemonds continued to discuss future steps and pathway forward to next submission on August 1, 2022 of the draft flood plan to TWDB.

- **AGENDA ITEM NO. 10: Public Comments – Limit 3 minutes per person**
  No Public Comments were made during this item.

- **AGENDA ITEM NO. 11: Consider Date and Agenda Items for Next Meeting**
  Next meeting was fully set, but stated to occur in early April.

- **AGENDA ITEM NO. 12: Adjourn**
  Motion by Scott McWilliams and seconded by Chuck Brown. Motion passed unanimously. Meeting was adjourned at 10:56 AM CST.

Approved by the Region 9 Upper Colorado RFPG at a meeting held on March 31, 2022.

_____
Lance Overstreet, SECRETARY

_____
Allison Strube, CHAIR

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL

Requestor: Allison Strube, Water Utilities Director, Water Utilities, 325-657-4209

Meeting Date: April 5, 2022

Item type: Consent Item

Caption:

Consider an amendment to WU-05-21 Professional Engineering Services - Upper Colorado Regional Flood Planning Technical Consultant to HDR Engineering, Inc. increasing the contract amount by $600,000, funded by Texas Water Development Board Grant, bringing the new contract total to $1,456,738 and authorizing the City Manager to negotiate and execute all related documents (Allison Strube)

Staff Recommendation:

Approve

Summary/History:

Section 16.061 of the Texas Water Code (TWC) requires the Texas Water Development Board (TWDB) to develop and adopt a comprehensive state flood plan every five years that incorporates the 15 regional flood plans developed by the regional flood planning groups (RFPGs) under TWC 16.062. San Angelo is located in Region 9 - Upper Colorado.

The RFPGs are beginning their first cycle (2020-2023) of the regional flood planning process that was created in 2019 by Senate Bill 8 (SB8), 86th Texas Legislature. The 2023 Regional Flood Plans that are due to TWDB on January 10, 2023 will be the basis for the 2024 State Flood Plan.

On April 9, 2020, The TWDB designated the Flood Planning Region boundaries that created 15 Flood Planning Regions in Texas required to implement the flood planning requirements of SB8. On May 21, 2020, the TWDB adopted new 31 Texas Administrative Code (TAC) Chapters 361 and 362 relating to Regional and State Flood Planning to implement the flood planning requirements of SB8. The Region 9 - Upper Colorado representatives are the following individuals:

1. Kenneth Dierschke, Agricultural Interests
2. Rick Bacon* (At-Large), Counties
3. Henryk Olstowski, Electric Generating Utilities
4. Shannon McMillan* (At-Large), Environmental Interests
5. Vacant, Flood Districts
6. Morse Haynes, Industries
7. Lance Overstreet* (Secretary), Municipalities
8. David Loyd Jr., Public
9. Scott McWilliams, River Authorities
10. Chuck Brown* (Vice-Chairman), Small Businesses
11. Cole Walker, Water Districts

12. Allison Strube* (Chairwoman), Water Utilities

*Executive Committee Members

On December 15, 2020, the City Council authorized the City of San Angelo to serve as the political subdivision and on May 4, 2021, the City Council voted to enter into a contract with HDR Engineering, Inc. to serve as the technical consultant for Region 9 Flood Planning. The RFPG has hosted 13 meetings since beginning this process, and will continue to host monthly meetings until the draft plan is submitted to TWDB.

Funding Source(s):

Financial Impact:

The 86th Texas Legislature appropriated $20,592,809 in planning grant funding. Of that amount Region 9 - Upper Colorado was allocated $946,200.

The funding allocations included a base funding amount for each region to cover basic public participation and flood planning document development, with additional variable funding, allocated by region, based on relative: estimated 2020 population; total stream miles with the region; the number of counties that fall within each region; the number of counties in the General Land Office coastal management zone within the region; the length of gulf coastline of each region; and, historic National Flood Insurance Program claims.

An additional $10 million in regional flood planning funding became available on September 1, 2021, for use in Fiscal Year (FY) 2022. TWDB ultimately approved $629,000 of these additional funds to go towards Region 9. $29,000 is being reserved for expenses the political subdivision may incur, while the remaining $600,000 is being requested in the agenda item to be contracted with HDR Engineering, technical consultant, to cover the additional scope of work items.

The additional proposed funding and approximately eight-month contract extension do not modify the existing contract requirements, schedule, and expectation that RFPGs will deliver their first regional flood plans by the January 10, 2023, deadline.
The primary emphasis of the additional funding is to support the RFPGs' technical work necessary to:

1. perform identified flood management evaluations (FMEs) to evaluate flood risks in areas with currently limited flood risk data;
2. perform identified FMEs to evaluate flood risk reduction solutions, including feasibility studies and preliminary engineering to identify and recommend flood management projects (FMPs);
3. use this information to evaluate additional FMPs for inclusion in the regional flood plan; and
4. perform related tasks necessary to incorporate/amend the work under 1-3 above into the regional plans.

Extending the contract length is needed due to insufficient time in identifying areas requiring flood risk evaluation and carrying out the necessary technical evaluations required to identify and recommend FMPs. The cumulative time required to carry out these steps is well beyond the January 2023 timeframe,

particularly for rural and other areas with limited information. Attached to the agenda item are the two tables to show how the additional funding is allocated.

Other Information/Recommendation:

The Region 9 Upper Colorado Regional Flood Planning Group (VOTE COUNT TO BE INSERTED HERE) on March 31, 2022 to approve the contract amendment with HDR Engineering, Inc. and the City of San Angelo (Region 9 Sponsor) to be negotiated and executed.

Attachments:

1.	Contract Amendment - Expense Budget Allocation	Contract Amendment - Expense Budget Allocation.pdf
2.	Contract Amendment - Sub Contract Task Budget	Contract Amendment - Sub Contract Task Budget.pdf

Presentation:

Allison Strube

Approvals/Reviews:

Allison Strube	Created
Allison Strube	
Shane Kelton	
Theresa James	
Jeffrey Tomlinson	
Tina Dierschke	
Theresa James	
Julia Antilley	

SUB-CONTRACT TASK BUDGET

Item No.	TASK	TASK DESCRIPTION	ORIGINAL BUDGET	REVISED BUDGET	AMOUNT CHANGED
1	1	Planning Area Description	**$47,310.00**	**$47,310.00**	**$0.00**
2	2A	Existing Condition Flood Risk Analysis	**$94,620.00**	**$94,620.00**	**$0.00**
3	2B	Future Condition Flood Risk Analysis	**$94,620.00**	**$94,620.00**	**$0.00**
4	3A	Evaluation and Recommendations on Floodplain Management Practices	**$18,924.00**	**$18,924.00**	**$0.00**
5	3B	Flood Mitigation and Floodplain Management Goals	**$9,462.00**	**$9,462.00**	**$0.00**
6	4A	Flood Mitigation Needs Analysis	**$28,386.00**	**$28,386.00**	**$0.00**
7	4B	Identification and Evaluation of Potential Flood Management Evaluations and Potentially Feasible Flood Management Strategies and Flood Mitigations Projects	**$141,930.00**	**$141,930.00**	**$0.00**
8	4C	Prepare and Submit Technical Memorandum	**$18,924.00**	**$18,924.00**	**$0.00**
9	5	Recommendation of Flood Management Evaluations and Flood Management Strategies and Associated Flood Mitigation Projects	**$189,240.00**	**$189,240.00**	**$0.00**
10	6A	Impacts of Regional Flood Plan	**$37,848.00**	**$37,848.00**	**$0.00**
11	6B	Contributions to and Impacts on Water Supply Development and the State Water Plan	**$9,462.00**	**$9,462.00**	**$0.00**
12	7	Flood Response Information and Activities	**$9,462.00**	**$9,462.00**	**$0.00**
13	8	Administrative, Regulatory, and Legislative Recommendations	**$9,462.00**	**$9,462.00**	**$0.00**
14	9	Flood Infrastructure Financing Analysis	**$18,924.00**	**$18,924.00**	**$0.00**
15	10	Public Participation and Plan Adoption	**$128,164.00**	**$128,164.00**	**$0.00**
16	11	Outreach and Data Collection to Support Tasks 1 – 9	**$45.00**	**$84,683.00**	**$84,638.00**
17	12	Perform Identified Flood Management Evaluations, Identify, Evaluate, and Recommend Additional Flood Mitigation Projects	**$0.00**	**$367,733.00**	**$367,733.00**
18	13	Preparation and Adoption of the Amended Regional Flood Plan	**$0.00**	**$147,584.00**	**$147,584.00**
		TOTAL:	**$856,783.00**	**$1,456,738.00**	**$599,955.00**

EXPENSE BUDGET ALLOCATION

CATEGORY	ORIGINAL ALLOCATION	REVISED BUDGET ALLOCATION	AMOUNT CHANGED
Salaries & Wages[1]	**$121,953.90**	**$304,384.90**	**$182,431**
Fringe[2]	**$59,172.03**	**$147,688.03**	**$88,516**
Overhead[5]	**$166,442.68**	**$415,424.68**	**$248,982**
Profit	**$57,414.71**	**$131,094.71**	**$73,680**
Travel	**$7,933.90**	**$13,124.90**	**$5,191**
Other Expenses[3]	**$4,544.86**	**$5,744.86**	**$1,200**
Subcontract Services	**$439,275.92**	**$439,275.92**	**$0**
TOTAL:	**$856,738.00**	**$1,456,738.00**	**$600,000.00**

Upper Colorado Regional Flood Plan

Chapter 1 - Planning Area Description

Agenda Item No. 8a

March 31, 2022

TWDB Guidelines – Planning Area Description

Regional flood plans shall include brief, general descriptions of the following:

1. social and economic character of the region such as information on development, population, economic activity and economic sectors most at risk of flood impacts;
2. the areas in the FPR that are flood-prone and the types of major flood risks to life and property in the region;
3. key historical flood events within the region including associated fatalities and loss of property;
4. political subdivisions with flood-related authority and whether they are currently actively engaged in flood planning, floodplain management, and flood mitigation activities;
5. the general extent of local regulation and development codes relevant to existing and future flood risk;
6. agricultural and natural resources most impacted by flooding; and
7. existing local and regional flood plans within the FPR.

TWDB Guidelines – Planning Area Description

Regional flood plans shall include an **assessment of existing infrastructure**. Regional flood plans shall include a general description of the location, condition, and functionality **of natural features and constructed major infrastructure** within the FPR including, but not limited to:

1. rivers, tributaries, and functioning floodplains;
2. wetlands;
3. playa lakes;
4. sinkholes;
5. alluvial fans;
6. vegetated dunes;
7. levees;
8. sea barriers, walls, and revetments;
9. tidal barriers and gates;
10. stormwater tunnels;
11. stormwater canals;
12. dams that provide flood protection;
13. detention and retention ponds;
14. weirs;
15. storm drain systems; and
16. any other flood-related infrastructure.

TWDB Guidelines – Planning Area Description

For **non-functional or deficient** natural flood mitigation features or major flood infrastructure:

1. explain, in general, the reasons for the features or infrastructure being non-functional or deficient.
2. provide a description of the condition and functionality of the feature or infrastructure including whether and when the natural flood feature or major flood infrastructure may become fully functional, and
3. provide the name of the owner and operator of the major flood infrastructure.

Regional flood plans shall include a general description of the location, source of funding, and anticipated benefits of **proposed or ongoing flood mitigation projects in the FPR** including:

1. new structural flood mitigation projects currently under construction;
2. non-structural flood mitigation projects currently being implemented; and
3. structural and non-structural flood mitigation projects with dedicated funding to construct and the expected year of completion.

Regional flood plans shall include a tabulated list and GIS map of existing infrastructure and their conditions. Regional flood plans shall include a tabulated list and GIS map of proposed or ongoing flood mitigation projects currently under construction, being implemented; and with dedicated funding to construct and the expected year of completion.

TWDB Guidelines – Planning Area Description

For **non-functional or deficient** natural flood mitigation features or major flood infrastructure:

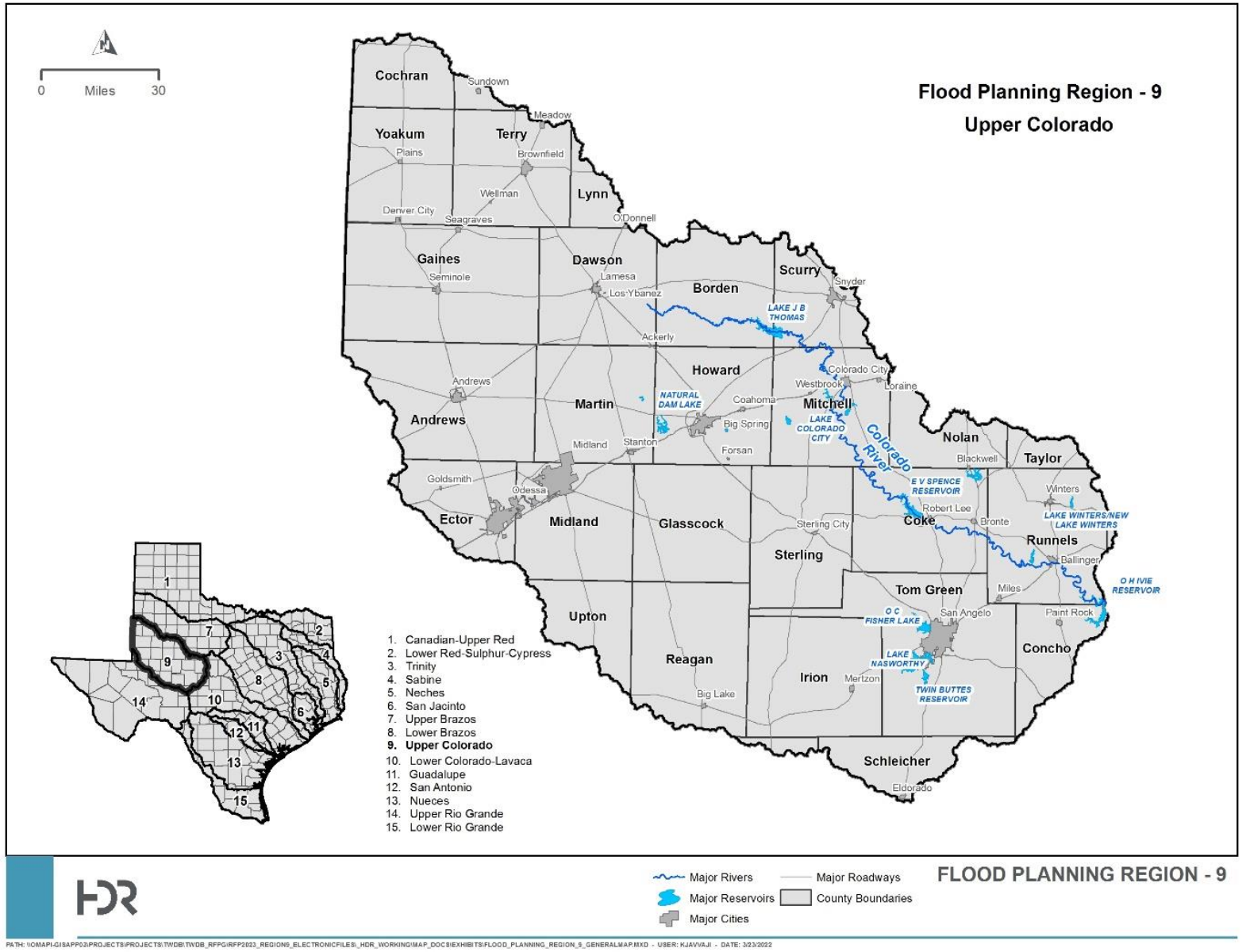
1. explain, in general, the reasons for the features or infrastructure being non-functional or deficient.
2. provide a description of the condition and functionality of the feature or infrastructure including whether and when the natural flood feature or major flood infrastructure may become fully functional, and
3. provide the name of the owner and operator of the major flood infrastructure.

Regional flood plans shall include a general description of the location, source of funding, and anticipated benefits of **proposed or ongoing flood mitigation projects in the FPR** including:

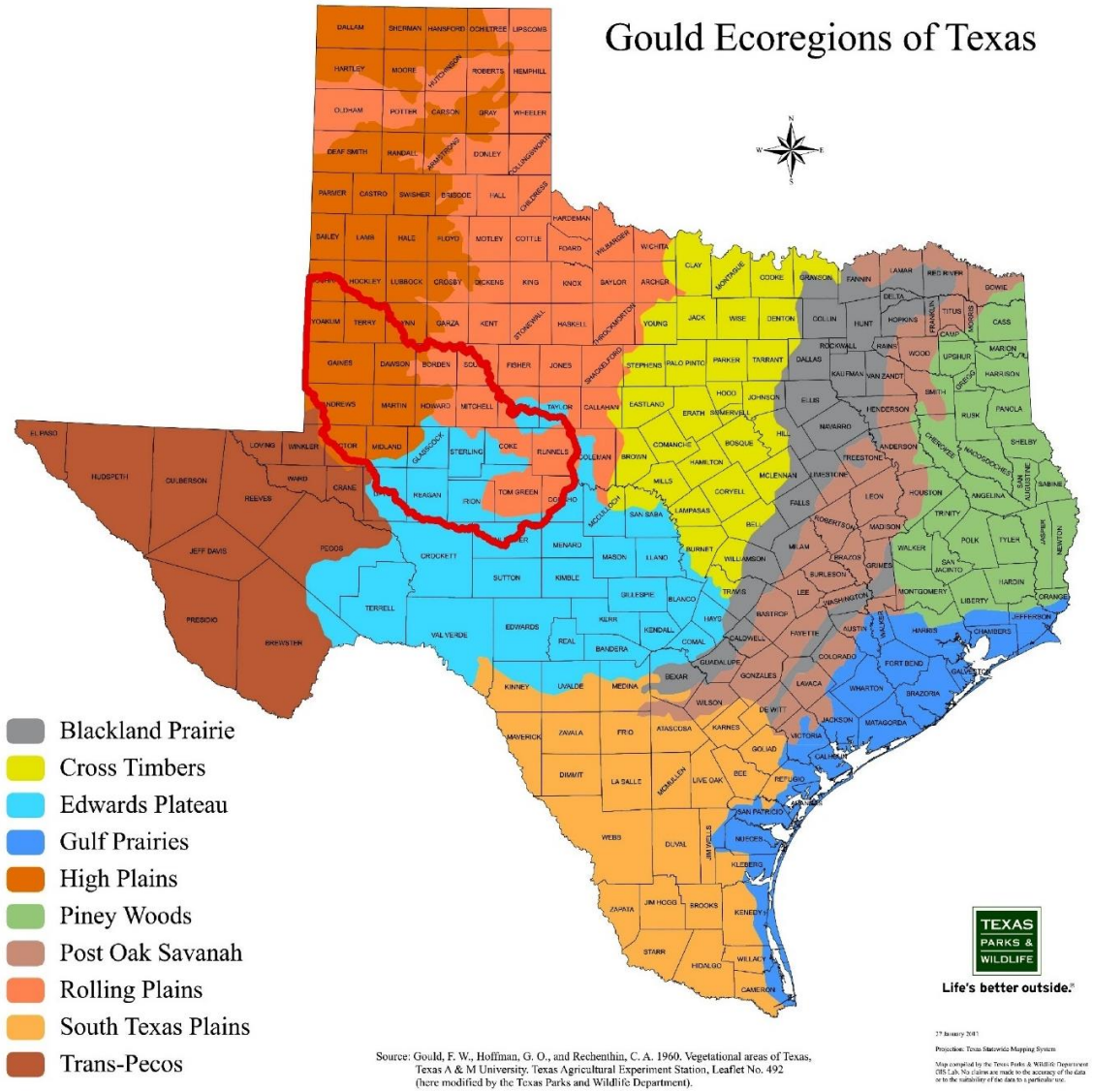
1. new structural flood mitigation projects currently under construction;
2. non-structural flood mitigation projects currently being implemented; and
3. structural and non-structural flood mitigation projects with dedicated funding to construct and the expected year of completion.

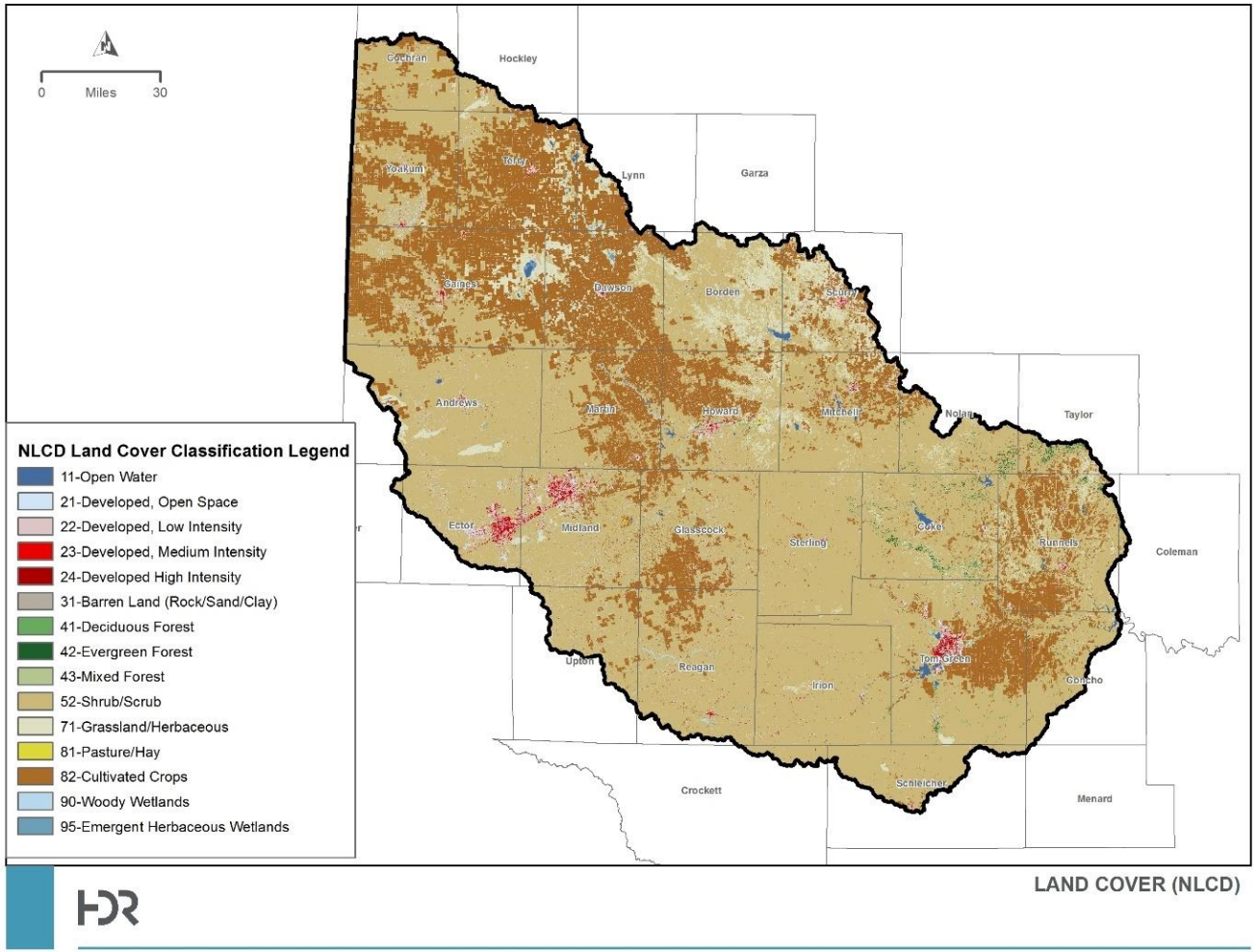
Regional flood plans shall include a tabulated list and GIS map of existing infrastructure and their conditions. Regional flood plans shall include a tabulated list and GIS map of proposed or ongoing flood mitigation projects currently under construction, being implemented; and with dedicated funding to construct and the expected year of completion.

Planning Area Description – General Overview



Planning Area Description – General Overview





Planning Area Description – General Overview

Table 1-8. Flood Events by County, 1993 – 2010 as Summarized by the WCTCOG

County	Total Reported Events	Annualized Events	Deaths	Injuries	Property Damage (in Dollars)	Crop Damage (in Dollars)	Annual Loss Estimates (in Dollars)
Mitchell	15	0.9	0	0	846,526	72,499	54,060
Nolan	15	0.9	0	0	2,179,810	138,256	136,357
Runnels	14	0.8	0	0	2,973,916	3,114,529	358,144
Scurry	20	1.2	1	0	3,550,969	540,119	240,652
Taylor	36	2.1	1	0	54,984,848	453,736	3,261,093

Table 1-9. Flood Events by County, 1993 – 2010 as Summarized by the CVCOG

County	Events	Deaths	Injuries
Coke	16	0	0
Concho	9	0	0
Irion	16	0	1
Reagan	13	0	0
Schleicher	14	0	0
Tom Green	60	0	3

Planning Area Description – General Overview

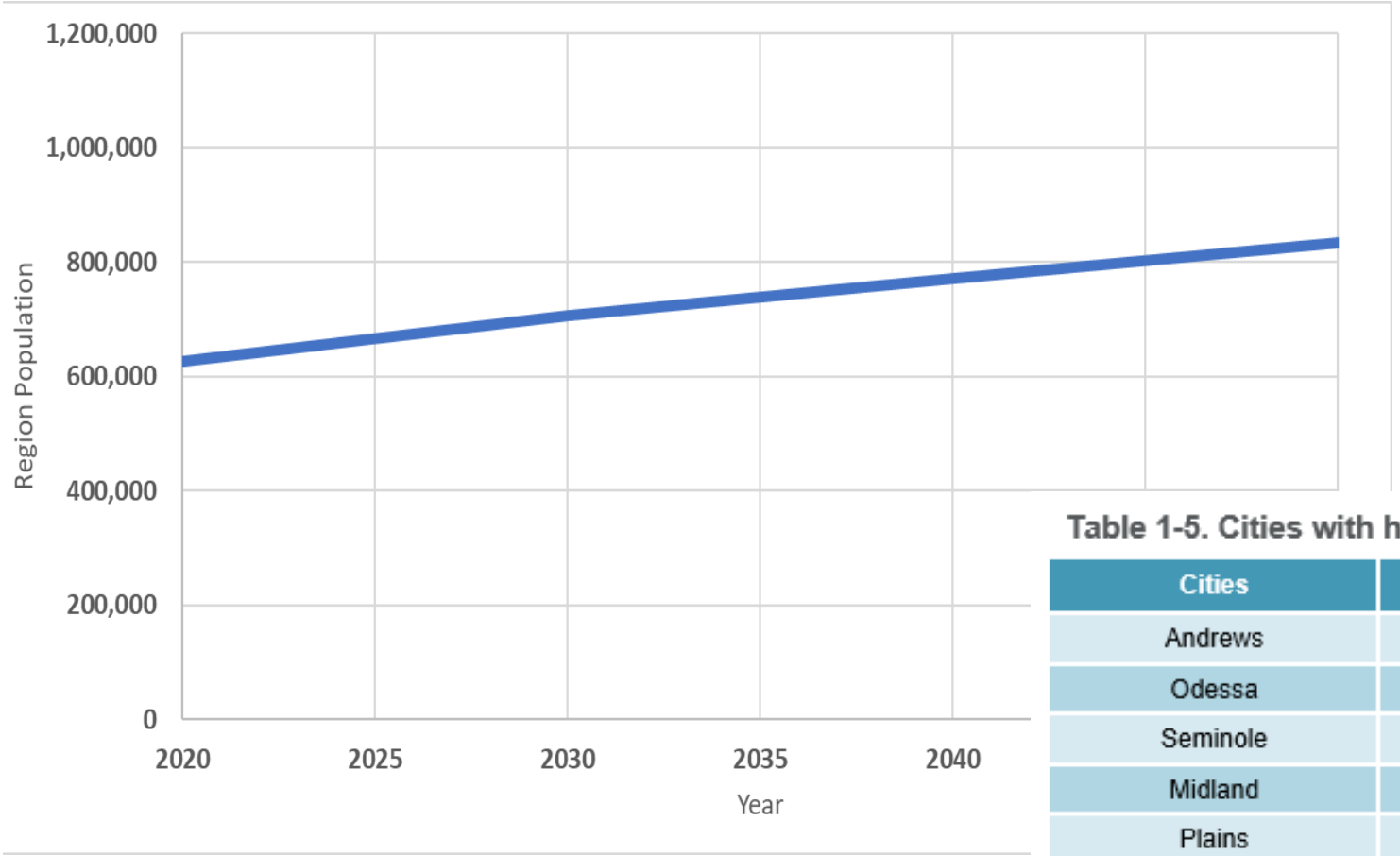


Table 1-5. Cities with highest projected growth rate, 2020-2050

Cities	2020	2050	% Growth
Andrews	14,661	24,171	65%
Odessa	127,558	185,428	45%
Seminole	7,102	9,855	39%
Midland	141,690	194,767	38%
Plains	1,702	2,335	37%
Denver City	5,072	6,955	37%
Snyder	13,307	17,855	34%
San Angelo	103,243	131,315	27%
Big Lake	3,357	4,193	25%
Stanton	2,693	3,339	24%
Brownfield	10,000	12,250	23%

Suggested Planning Group Action

Please review draft 2023 RFP Planning Area Description text and provide comments / ideas.

Questions

1

Planning Area Description

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1 Planning Area Description

[31 TAC §361.30-32]

The 30-county Upper Colorado Region has an area of 21,254 square miles (13,602,560 acres), approximately 7.9 percent of the state's land area (Figure 1-1). The region is bounded on the west by the Texas-New Mexico border, on the north by TWDB Flood Planning Region 7 (Upper Brazos), on the south by TWDB Flood Planning Region 14 (Upper Rio Grande), and on the east by TWDB Planning Region 10 (Lower Colorado-Lavaca). In 2020, this region had a population of approximately 637,000.

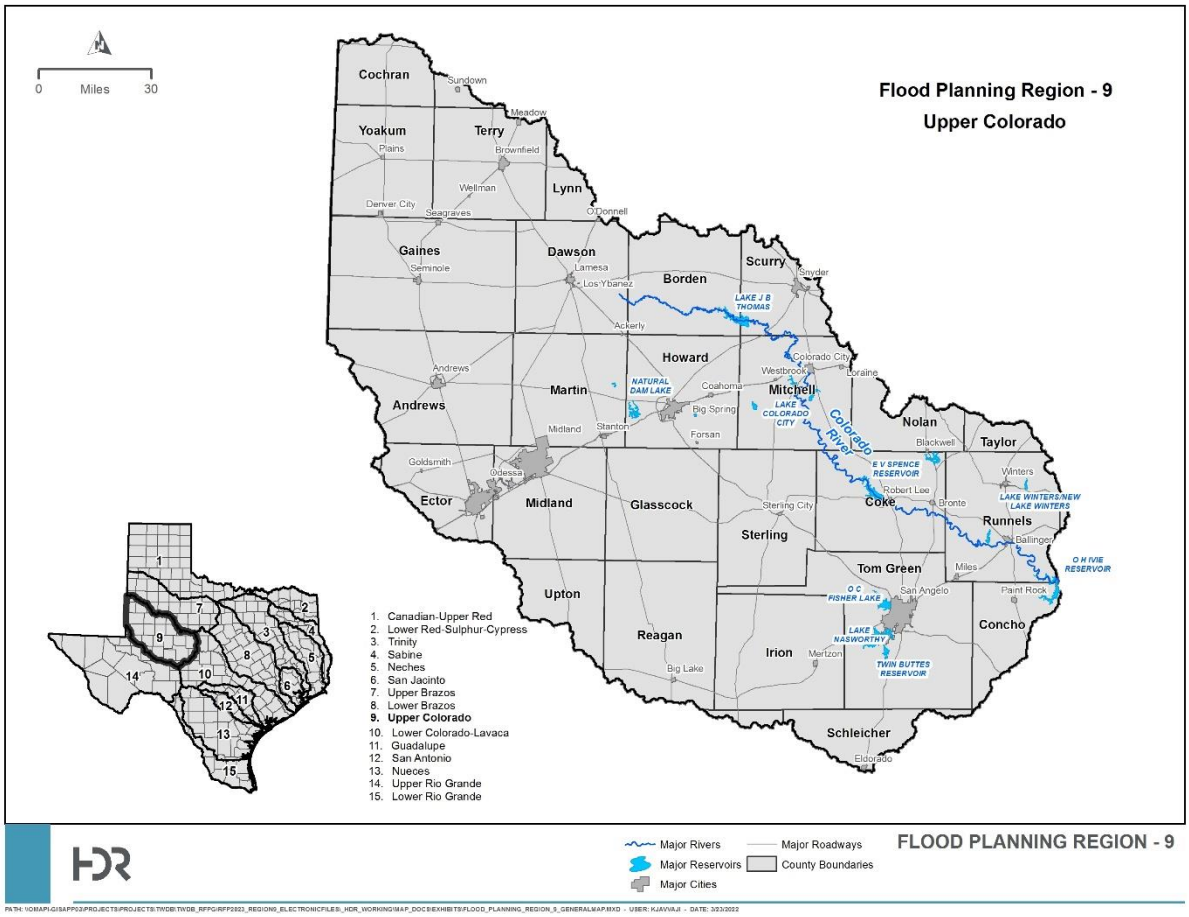


Figure 1-1. Upper Colorado (Region 9) Flood Planning Region

1.1 Background

In 2019, the Texas Legislature and Governor Abbott adopted changes to Texas Water Code §16.061 which established a regional and state flood planning process for 15-identified flood planning regions across the state. Information from each of the 15 Regional Flood Plans will be compiled in the 2024 State Flood Plan. The Texas Water Development Board (TWDB) was charged with overseeing the development of each regional plan and compiling the state flood plan. The

TWDB was also charged with providing funding for investments in flood science and mapping efforts to support development of the plans.

This investment and planning efforts represent an important step in flood planning in Texas, because:

- Flood risks, impacts and mitigation costs have never been assessed at a statewide level for Texas
- Flood risks pose a serious threat to lives and livelihoods across the state
- Much of the flood risk in Texas in unmapped or is based on out-of-date maps.

Regional Flood Plans (RFP) are required to be based on the best available science, data, models, and flood risk mapping. When complete, the plans will focus both on reducing existing risk to life and property and on enhancing floodplain management to avoid increasing flood risk in the future. The first RFP must be submitted to the TWDB by January 10, 2023. The TWDB will then compile these regional plans into a single statewide flood plan and will present it to the Legislature in 2024. An updated version of the State Flood Plan (SFP) will be due every five years thereafter.

The TWDB has appointed a Reginal Flood Planning Group (RFPG) for each region and has provided them with funding to prepare their plans. The TWDB administers the regional flood planning process through a contract with the planning group's sponsor who is selected by the RFPG. The UCFPR sponsor is the City of San Angelo. The Texas Legislature also allocated funding to be distributed by the TWDB for the procurement of technical assistance to develop the regional flood plans. HDR Engineering was selected through a competitive process to serve as the technical consultant for the UCFPR flood planning effort.

Stakeholders residing in and representing various interest categories were appointed for each region to provide representation and lead a bottom-up approach to developing a 2023 Regional Flood Plan. The RFPG's responsibilities include directing the work of the technical consultant, soliciting, and considering public input, identifying specific flood risks, and identifying and recommending flood management evaluations, strategies and projects to reduce risk in their regions. To ensure a diversity of perspectives are included, members represent a wide variety of stakeholders potentially affected by flooding. Interest categories include:

1. Public
2. Counties
3. Municipalities
4. Industries
5. Agriculture
6. Environment
7. Small Business
8. Electric-generating utilities
9. River Authorities
10. Water Districts
11. Water Utilities

12. Flood Districts

The members of the RFPG for the first flood planning cycle are listed in Table 1-1.

Table 1-1. UCFPR RFPG Membership

Voting Members		
Member Name	**Interest Category**	**Organization**
Kenneth Dierschke	Agriculture	Dierschke Farms
Rick Bacon (At-Large)	Counties	Tom Green County
Henryk Olstowski	Electric Generating Utilities	Luminant
Shannon McMillan	Environmental	Centurion Planning & Design
Vacant	Flood Districts	
Morse Haynes	Industries	Andrews Economic Development Corporation
Lance Overstreet (Secretary)	Municipalities	U.S. Air Force
David H. Loyd Jr.	Public	Retired Physics Professor and Dean – Angelo State University
Scott McWilliams	River Authorities	Upper Colorado River Authority
Chuck Brown (Vice-Chairman)	Small Business	Hydro Corporation
Cole D. Walker	Water Districts	Colorado River Municipal Water District
Allison Strube (Chairman)	Water Utilities	City of San Angelo
Non-Voting Members		
Member Name	**Title**	**Entity**
John McEachern	Natural Resources Specialist	Texas Parks and Wildlife
Tim Frere	Hazard Mitigation Planner	Texas Division of Emergency Management
Larissa Place	Field Representative	Texas Department of Agriculture
Ben Wilde	Field Representative	Texas State Soil and Water Conservation Board
Jet Havs	Deputy Director	General Land Office
Tressa Olsen	Regional Flood Planner	Texas Water Development Board
Winona Henry	Regional Director	Abilene, Texas Commission on Environmental Quality
Anne Yakimovicz	Region 10 Liason	Lower Colorado River Authority

1.2 Goal and Purpose of the 2023 Upper Colorado Regional Flood Plan

All Regional Flood Plans are to be developed according to 39 guiding principles (see 31 TAC 362.3). The 2023 Upper Colorado (Region 9) Regional Flood Plan will focus on identifying both existing and

future condition flood risks within the Upper Colorado basin, evaluate flood hazard exposure to life and property, identify and evaluate potentially feasible flood management strategies and flood mitigation projects, and present recommended strategies and projects that minimize residual flood risk and provide effective and economical management of flood risk to people, properties, and communities, and associated environmental benefits amongst other information.

1.3 Upper Colorado Flood Planning Region

The counties considered in the development of the Regional Flood Plan are listed in Table 1-2 below. Small unincorporated portions of Coleman (10), Garza (7), Menard (10) and Winkler (14) counties are also located in the UCFPR, but they were not considered during the development of the Upper Colorado Regional Flood Plan since the vast majority of each of these counties are in other regions and they are unlikely to enact county-wide actions specific to the UCFPR.

Table 1-2. Counties in the UCFPR

Entity	Entity	Entity	Entity
Andrews County	Ector County	Martin County	Scurry County
Borden County	Gaines County	Midland County	Taylor County
Cochran County	Glasscock County	Mitchell County	Tom Green County
Coke County	Hockley County	Nolan County	Upton County
Concho County	Howard County	Reagan County	Yoakum County
Crockett County	Irion County	Runnells County	
Dawson County	Lynn County	Schleicher County	

The municipalities considered in the development of the Regional Flood Plan are listed in Table 1-3 below.

Table 1-3. Municipalities in the UCFPR

Entity	Entity	Entity	Entity
City of Ackerly	City of Denver City	City of Odessa	City of Sterling City
City of Andrews	City of El Dorado	City of O'Donnell	City of Sundown
City of Ballinger	City of Forsan	City of Plains	City of Westbrook
City of Big Lake	City of Goldsmith	City of Robert Lee	City of Winters
City of Big Spring	City of Lamesa	City of San Angelo	Town of Blackwell
City of Bronte	City of Los Ybanez	City of Seagraves	Town of Loraine
City of Brownfield	City of Mertzon	City of Seminole	Town of Meadow
City of Coahoma	City of Midland	City of Snyder	Town of Paint Rock
City of Colorado City	City of Miles	City of Stanton	Town of Wellman

A total of 29 other entities were considered in the development of the Regional Flood Plan are provided in Table 1-4 below.

Table 1-4. Other Flood or Water-Related Entities in the UCFPR

Entity	Type
Upper Colorado River Authority	River Authority
Colorado River MWD	River Authority
Brazos River Authority	River Authority
Central Colorado River Authority	River Authority
Lower Colorado River Authority	River Authority
Canadian River Municipal Water Authority	River Authority
Concho Valley Council of Governments	Other (COG)
Permian Basin Regional Planning Commission	Other (COG)
South Plains Association of Governments	Other (COG)
West Central Texas Council of Governments	Other (COG)
Coke County Kickapoo WCID 1	Other
Ector County Utility District	Other
Gaines County SWMD	Other
Howard County WCID 1	Other
Martin County FWSD 1	Other
Midland County FWSD 1	Other
Midland County Utility District	Other
Downtown Midland Management District	Other
Nolan County FWSD 1	Other
Reagan County WSD	Other
Red Creek MUD	Other
Salt Fork Water Quality District	Other
Tom Green County FWSD 1	Other
Tom Green County FWSD 2	Other
Tom Green County FWSD 3	Other
Tom Green County WCID 1	Other
Upton County Water District	Other
Valley Creek Water Control District	Other
Willow Creek Water Control District	Other

The Upper Colorado Flood Planning Region (UCFPR) includes an area that drains to the Colorado River and associated tributaries. The Colorado River is the largest of major river systems in the region, beginning in Dawson County in the northwest part of the region. In the southern portion of Mitchell County, the Colorado River reaches its confluence with Beals Creek. It then continues southeast, flowing through Ed Spence Reservoir, proceeding through Ballinger until it reaches the southeast edge of the region where the Concho River joins it at O.H. Ivie Reservoir. In the southeast part of the region, the North Concho, South Concho, Middle Concho River, and Spring Creek combine to form the Concho River near San Angelo. The Concho River then flows northeast, combining with Lipan and Kickapoo Creeks before joining the Colorado River.

The UCFPR contains the following major reservoirs:

- Champion Creek Reservoir
- E V Spence Reservoir
- Lake Ballinger/Lake Moonen
- Lake Colorado City
- Lake J B Thomas
- Lake Nasworthy
- Lake Winters / New Lake Winters
- Mitchell County Reservoir
- Natural Dam Lake
- O C Fisher Lake
- O H Ivie Reservoir
- Oak Creek Reservoir
- Red Draw Reservoir
- Sulphur Springs Draw Storage Reservoir
- Twin Buttes Reservoir

The UCFPR includes three of the 10 ecoregions identified by Texas Parks and Wildlife Department. These ecoregions are the High Plains, Edwards Plateau, and the Rolling Plains (Figure 1-2).

Most of the UCFPR is dominated by clayey and alkaline soils, restricting the species of trees that flourish here.[1] In the portion of the High Plains of the UCFPR, the surface is dominated by clays that sit on top of caliche, a natural cement of lime, gravel and sand. Further south lies the Trans-Pecos ecoregion. While The UCFPR is not located in the Trans-Pecos ecoregion, some southern portions of the region retain characteristics of this ecoregion. This ecoregion is more arid and mountainous, characteristic of the Chihuahuan desert. Soils are derived from igneous and sedimentary rock. Caliche is common here as well. Downstream of the High Plains lies the Rolling Plains ecoregion. Rainfall is more plentiful, and the terrain is less rugged than in the High Plains. Soils here are less alkaline and more fertile. Downstream of the Rolling Plains is the Edwards Plateau, informally referred to as the Texas Hill Country. This region receives more rainfall than the Rolling Plains, making the soil loamier than upstream. Clays dominate the surface, with limestone bedrock underneath.

Most precipitation comes from violent spring and early summer thunderstorms. These thunderstorms produce short, intense rainfall over very limited areas. These intermittent storms punctuate periods of drought. Average annual rainfall over the region lies between 14.7 inches in Odessa and 21.3 inches of rain in San Angelo with rainfall increasing downstream.

[1] Service, T. A. (2021). Texas Ecoregions. Retrieved from Trees of Texas: http://texastreeid.tamu.edu/content/texasEcoRegions/

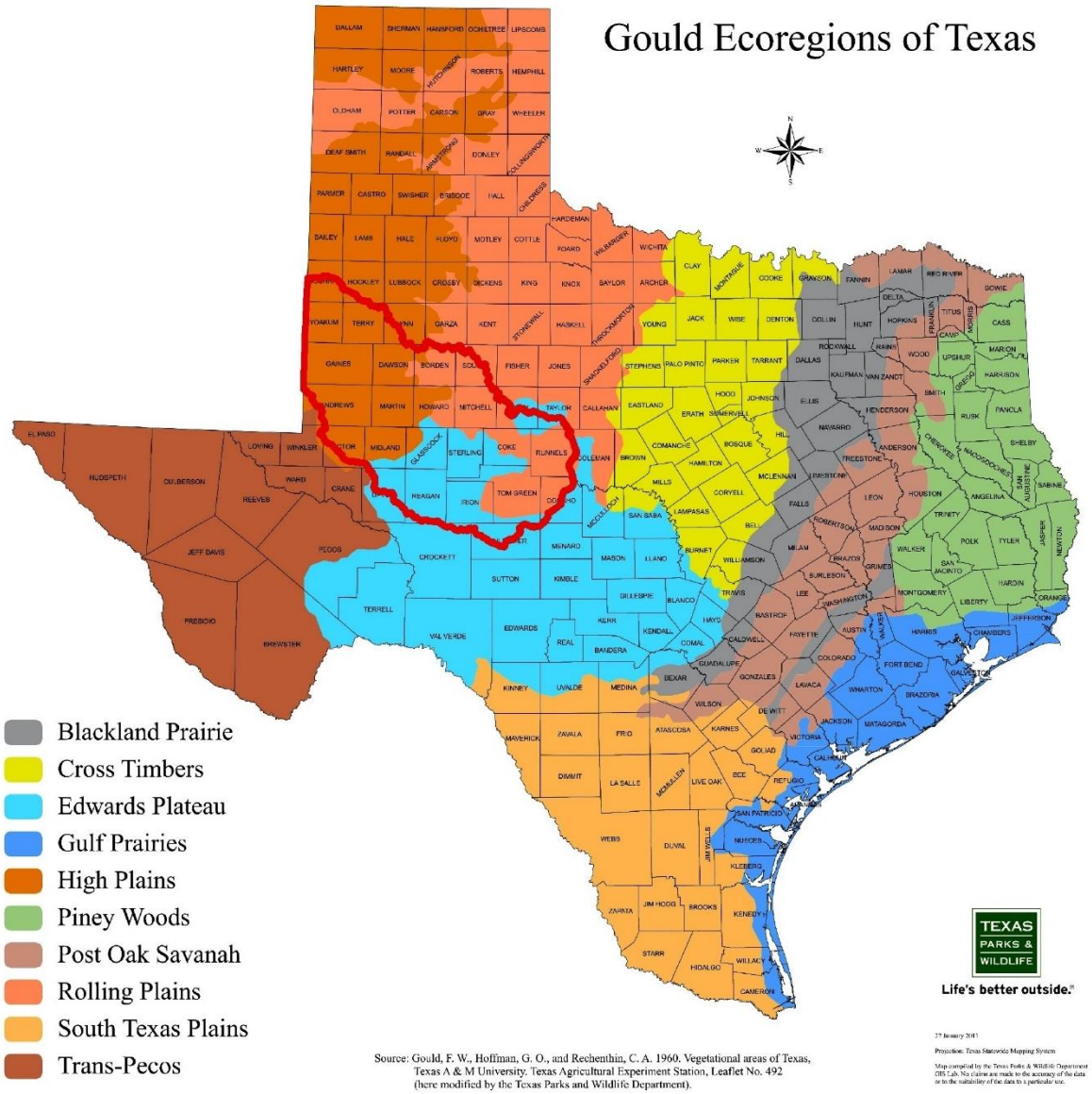


Figure 1-2. UCFPR Ecoregions

The Upper Colorado Region is a very productive agricultural region with many ties to farming and ranching. Although fewer individuals are exposed to flood hazards in rural areas, the impact of flooding on agriculture and ranching can be sever. Floods can delay planting and ruin crops, kill livestock, and damage barns or other structures, causing significant economic hardship to the farmers and ranchers.

Ranchland and farmland are the predominant use of working lands across the UCFPR, as shown in Figure 1-3. Together these land use types account for 94.3% of the total land area with ranchland being 70.0% and farmland being 24.4%.

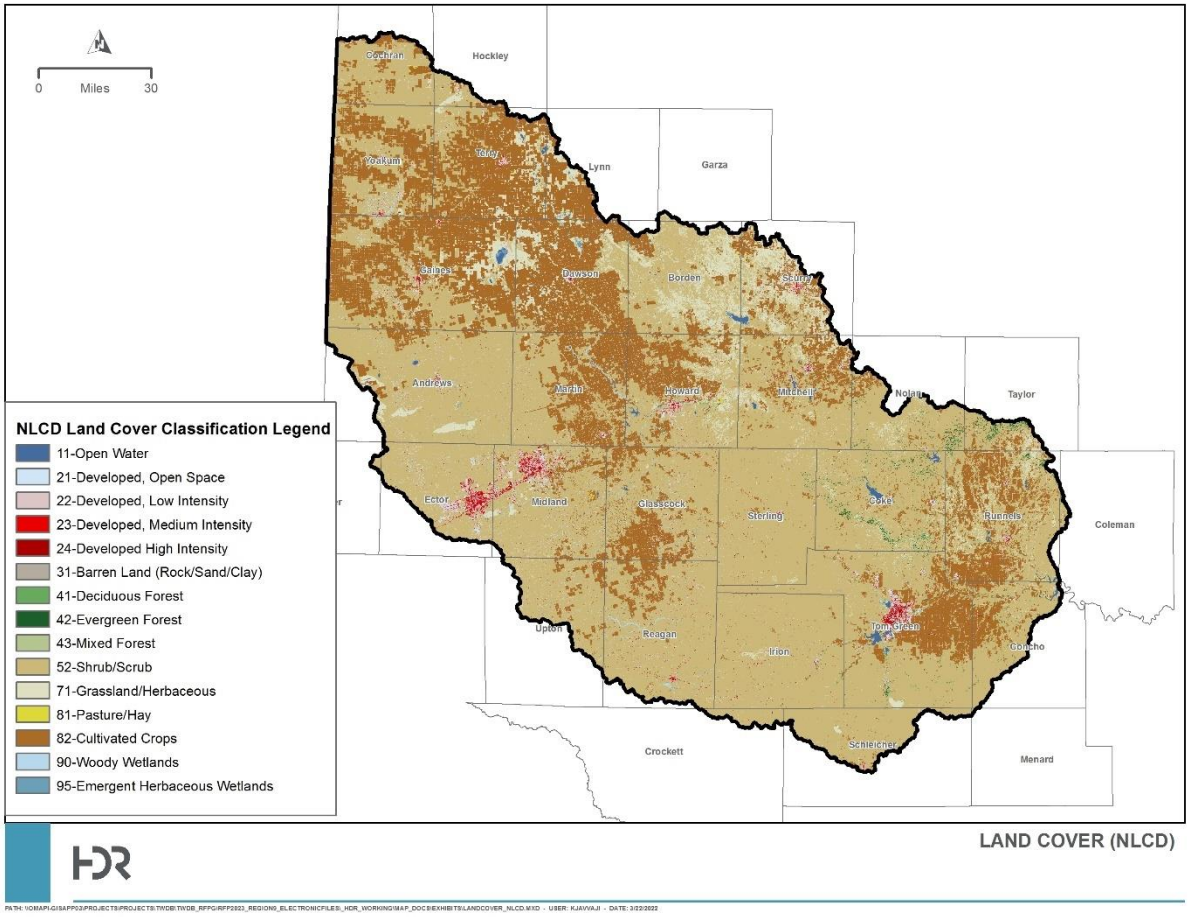


Figure 1-3. UCFPR Land Cover (NLCD)

The vegetative cover in the UCFPR aligns closely with the land cover. The top vegetative cover types by land area are native grasslands (24.7%), row crops (21.4%), Edwards Plateau (15.4%), High Plains (12.1%), and Rolling Plains (11.6%). Only 1.2% of the land area is in urban development with low intensity development the predominate type of development within the region.

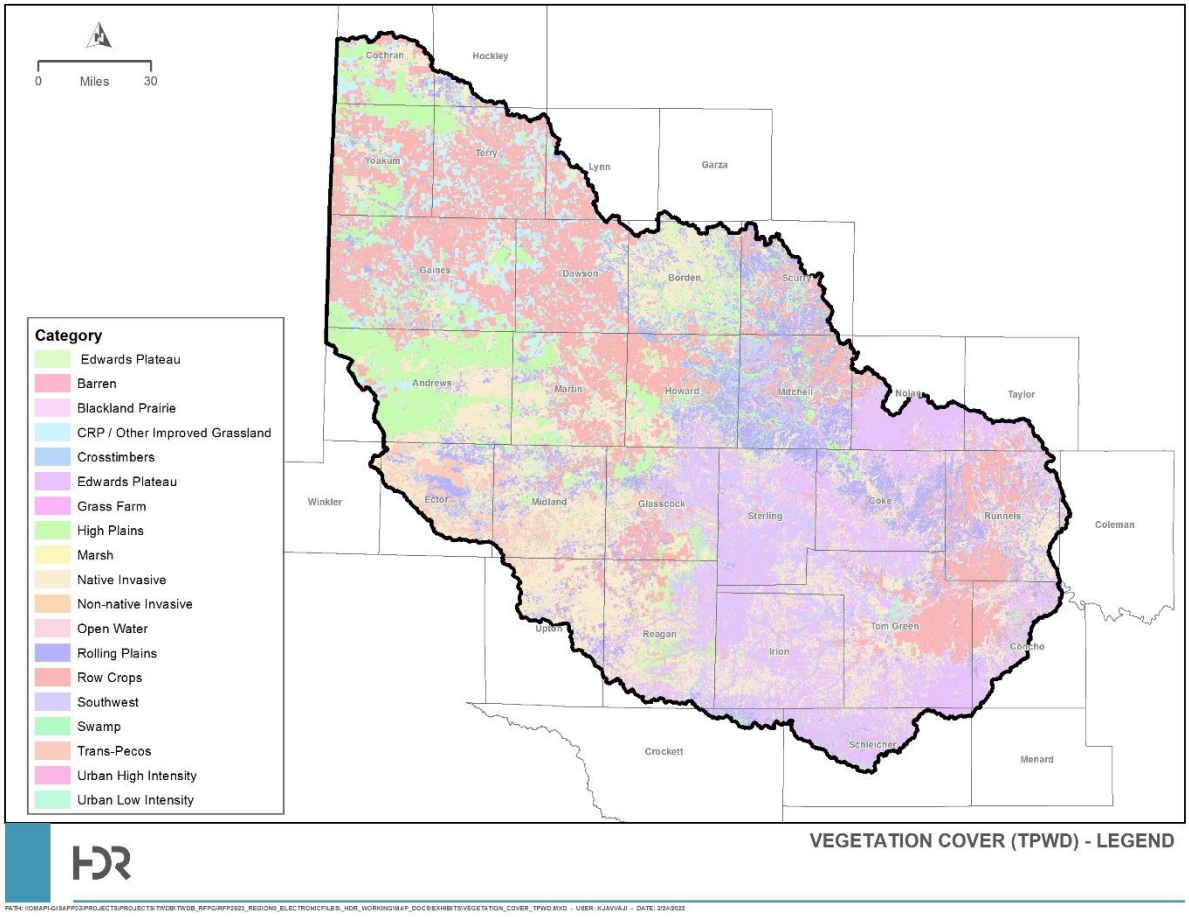


Figure 1-4. UCFPR Vegetation Cover (TPWD)

1.1.1 Socioeconomic Characteristics

The Upper Colorado Region is largely rural in nature with three major population centers (Midland, Odessa, and San Angelo). The three cities combined contain almost 60% of the total population of the region. This population diversity within the region means that the needs of rural stakeholders must be balanced with those of the urban population centers.

Overall, the region is expected to grow by 33% between 2020 and 2050 to a population of about 834,000 (Figure 1-6). Most of this growth is expected to be centralized within cities and towns that will add areas of new development and see some redevelopment of existing areas to provide housing and businesses to support the growing population. As the region experiences population growth, more people will be exposed to flooding events and flooding events may be more extreme as permeable land surfaces are replaced with impermeable services associated with development.

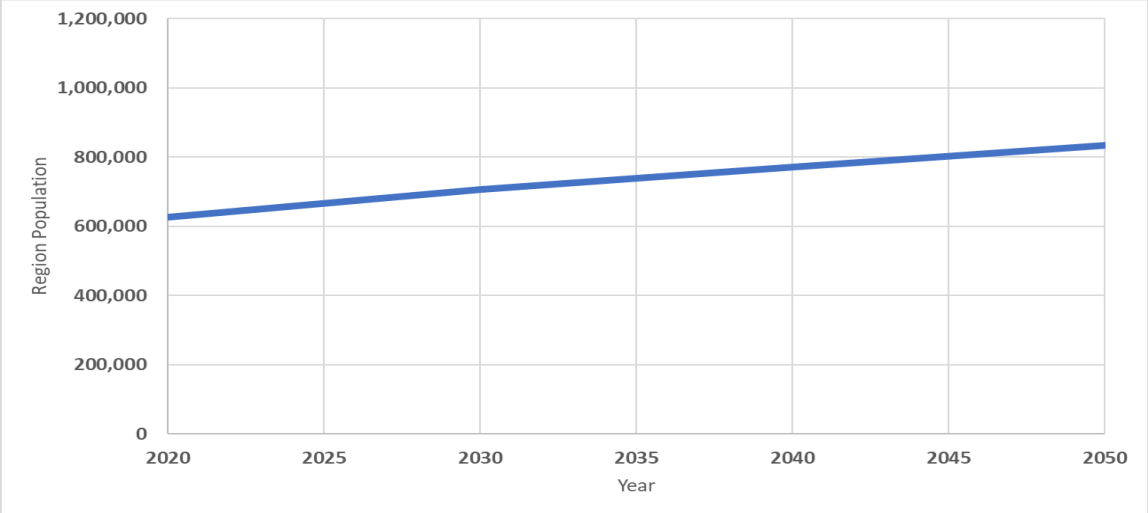


Figure 1-5. UCFPR population projection

There are 11 cities projected to grow by at least 20% between 2020 and 2050. The fastest growing city in the region is projected to be Andrews with a projected growth rate of 65% over that time. All three large metro areas are expected to growth by more than 20%, with Odessa being the fastest growing large city with a projected growth rate of 45%.

Table 1-5. Cities with highest projected growth rate, 2020-2050

Cities	2020	2050	% Growth
Andrews	14.661	24.171	65%
Odessa	127,558	185,428	45%
Seminole	7.102	9.855	39%
Midland	141.690	194.767	38%
Plains	1.702	2.335	37%
Denver City	5,072	6,955	37%
Snyder	13,307	17,855	34%
San Angelo	103,243	131,315	27%
Big Lake	3,357	4,193	25%
Stanton	2,693	3,339	24%
Brownfield	10,000	12,250	23%

The five counties with the projected highest growth rates are Gaines, Andrews, Ector, Midland, and Yoakum (Table 1-2).

Table 1-6. Counties with highest projected growth rate, 2020-2050

Counties	2020	2050	% Growth
Gaines	21,316	36,654	72%
Andrews	19,076	30,094	58%
Ector	163,387	231,782	42%
Midland	169,062	232,357	37%
Yoakum	8,920	12,232	37%

The Midland-Odessa metro area is home to more than 260,000 people, making it the largest metropolitan area in the Upper Colorado Region. Energy production is the most prominent industry in the Region, with 2020 earnings totaling $13,493,750,000. Traditionally, Odessa holds the industrial facilities of the energy companies while Midland houses the corporate offices. Midland and Odessa also hold three of the region's major colleges: Midland College, Odessa College and The University of Texas Permian Basin.

San Angelo is in the Concho Valley. The city contains many oil field service companies, which support drilling in the Permian basin. The agricultural industry is also prominent in San Angelo, as well as many meat processing plants and one of the nation's top livestock auctions. The largest employer in San Angelo is Goodfellow Air Force Base. San Angelo is also home to San Angelo State University.

In the UCFPR, mining and energy production produced the most earnings, with Midland being the center of oil and gas activity in the region. In the Midland-Odessa metro area, transportation and warehousing are the next most prominent industries, followed by construction. In the San Angelo metro area, the State, Local and Federal Government accounts for the largest share of earnings. Outside of the government institutions, retail, energy production and hospitals are the largest earners.

Outside of the large cities, the largest source of earnings is energy production. Agriculture, government, wholesale trade and retail are all significant economic sectors.

Agriculture is a significant part of the economy of the UCFPR. Commonly cultivated crops are cotton, wheat, corn, grain, sorghum, peanuts, soybeans, and hay. The main livestock raised are feedlot animals, cattle, calves, beef cows, milk cows, swine, sheep, lambs, and poultry. The amount of land dedicated to pasture is far greater than the amount of land devoted to crops. The market value of crops and livestock is about equal in this region.

The median household income in the UCFPR ranged from $79,421 in Midland County to $40,962 in Cochran County, a difference of $38,459. The average household median income of the Region is $56,732, with 17 counties having median household income values less that the State average. The median household income for the State of Texas is $61,874. The UCFPR contained several outliers in the statistic of median household income (Midland, Glasscock, and Andrews Counties all have median household incomes above $75,000). All three counties were among the highest exporters of oil and gas in the State, with Midland ranked 1st and Glasscock ranked 11th among 254 counties in Texas.

Median household income levels can be affected by many factors, including education levels, opportunity of employment, and location. Overall, the lower median income in the UCFPR indicates

that average individual affected by floods in this region may be at a financial disadvantage compared to their state counterparts. Even within the basin, individuals with higher income levels may be able to recover faster and more fully than others with a lower income.

The per capita income of the cities of Midland, Odessa and San Angelo account for 61% of the total personal income earned in the counties included in the UCFPR.

1.1.2 Flood Prone Areas and Major Flood Risks

The 1% and 0.2% annual chance flood risk boundaries were defined for all waterways with contributing drainage areas larger than one square mile for the entire basin. This complete coverage was due in part to the availability of 'Fathom' flood risk boundaries for the entire basin. Where multiple data sets were available, the most accurate risk boundaries were applied.

The initial 'flood risk quilt' was obtained from TWDB. The 'flood risk quilt' consists of multiple layers of data from various sources available throughout the state to 'quilt' together a single flood hazard dataset. The 'flood risk quilt' does not typically include localized flooding or complex urban flooding problems. Additional flood risk boundaries were obtained from the Fort Worth District USACE and some flood prone areas were identified from public comments. The following is a list of the various flood risk data sets used in their order of accuracy from most accurate to least accurate, with data sets including the Base Flood Elevation (BLE) data and above considered accurate.

- National Flood Hazard Layer (NFHL) Pending Data
- NFHL Preliminary Data
- USACE Section 205 Study
- NFHL Effective Data
- Base Flood Elevations (BLE)
- NFHL Approximate Study Areas
- First American Flood Data Services (FAFDS)
- Fathom Cursory Data – October 29, 2021
- Public Comments

A large portion of the Regional Flood Planning Area contains 'approximate' 1% annual chance flood risk boundaries but no 0.2% annual chance flood risk boundaries (NFHL Approximate Study Areas). However, the Fathom Cursory Data has both the 1% and 0.2% annual chance flood risk boundaries. had to be estimated for 'approximate' areas by buffering the 1% annual chance inundation boundary by 100 feet to each side. This 100-foot buffer was approximated by evaluating portions of the region that had available detailed studies that defined both the 1% and 0.2% annual chance flood inundation boundary using a similar offset between the 1% and 0.2% annual chance flood inundation boundary.

As part of their Deep Creek Section 205 Study, the Fort Worth District USACE developed updated risk boundaries through the City of Snyder. The updated 1% and 0.2% annual chance flood risk boundaries for existing conditions were obtained from the USACE in GIS shapefile format and were stitched into the flood inundation quilt of the surrounding area in Scurry County. In addition, flood risks are described in further detail in Chapter 2.

1.1.3 Key Historical Flood Events

Historical Flood Events

The UCFPR has generally fewer and less intense flooding events compared to other areas of Texas. Table 1-7 summarizes past flooding events. In addition to these events, the West Central Texas Council of Governments (WCTCOG) and the Concho Valley Council of Governments (CVCOG) have compiled summary data on past flooding events. These are summarized in Tables 1-8 (WCTCOG) and 1-9 (CVCOG).

Table 1-7. Listing of Historical Flood Events

Area	Flood Experience Description
Dawson County	The floods of 1954 and 1955 caused significant flooding in the City of Lamesa. In addition to the floodplain of Sulphur Springs Draw, there are several other flood-prone areas within the city. They are in the vicinity of playa lakes where flooding occurs as a result of runoff into the lakes
Ector County	Major storms experienced in the Odessa area are characterized by heavy rainfall from frontal-type storms. Major flooding can be produced by these localized thunderstorms, which may occur at any time during the year but are more prevalent in the spring and summer months. Significant flooding occurred in 1936, 1959, 1978, 1979, and 1986. In September 2004, flash flooding in the City of Odessa caused the closure of many city roads. A significant flood event occurred in May 2007 that damaged homes and closed roads throughout the county.
Howard County	The storm of May 10, 1957, produced heavy rains throughout Howard County over a 24-hour period. At one location 4.5 inches of rainfall was recorded. This storm caused flooding on Beals Creek at Big Spring (Reference 9). The flood was the maximum recorded during the period of record for stream flow measurements at and above Big Spring by the USGS. The U.S. Army Corps of Engineers (USACE) estimated the discharge of this flood to be 6,600 cubic feet per second (cfs) with an estimated recurrence interval of approximately 30 years. Flooding that occurs on the tributaries of Beals Creek in and around Big Spring is often elevated by flooding from Beals Creek, due to the backwater effect that results. The City of Big Spring has constructed nine flood detention reservoirs on small tributaries south of the central business district.
Midland County	Most of Midland County's flood problems occur because of the combination of intense localized storms and the flat topography. Based on interviews with local residents, major flooding occurred in 1936. Other floods of note occurred in 1959, 1978, 1979 and 1986.
Scurry County	Three major floods in Snyder occurred on June 19,1938, June 12, 1967, and August 13, 1972. The flood of June 19,1938 was the largest and most destructive of the three. The peak flow of the August 13, 1972, flood was measured to be 37,000 cfs at the 37th Street bridge at an elevation of 2,109.16 feet MSL. The calculated 0.2% annual chance profile for Deep Creek at the 37th Street bridge has a peak discharge of 37,200 cfs at an elevation of 2,109.31 feet MSL.
Tom Green County	Tom Green County, particularly San Angelo, has experienced loss of life and physical property due to flooding along its major streams. The earliest flood of considerable size of which definite knowledge is available occurred in June 1853. Other large floods known to have occurred include the disastrous Ben Ficklin flood of 1882, which destroyed that community; and floods in May 1884, October 1896. April 1900, August 1906, September 1936, July 1938, April-June 1957, and September to October 1959. The flood of September 14-19, 1936, was the most damaging flood on record on the Concho River at San Angelo. The 1906 flood with an estimated discharge of 246,000 cubic feet per second (cfs) was the largest flood of record. The 1957 flood with a peak discharge of 106,000 on May 9 at the San Angelo stream gage was partially reduced by the O.C. Fisher Lake, which allowed no discharge from the North Concho River.

Table 1-8. Flood Events by County, 1993 – 2010 as Summarized by the WCTCOG

County	Total Reported Events	Annualized Events	Deaths	Injuries	Property Damage (in Dollars)	Crop Damage (in Dollars)	Annual Loss Estimates (in Dollars)
Mitchell	15	0.9	0	0	846,526	72,499	54,060
Nolan	15	0.9	0	0	2,179,810	138,256	136,357
Runnels	14	0.8	0	0	2,973,916	3,114,529	358,144
Scurry	20	1.2	1	0	3,550,969	540,119	240,652
Taylor	36	2.1	1	0	54,984,848	453,736	3,261,093

Table 1-9. Flood Events by County, 1993 – 2010 as Summarized by the CVCOG

County	Events	Deaths	Injuries
Coke	16	0	0
Concho	9	0	0
Irion	16	0	1
Reagan	13	0	0
Schleicher	14	0	0
Tom Green	60	0	3

The WCTCOG and CVCOG also have summarized vulnerability to flooding in their Hazard Mitigation Plans. The results of this analysis are summarized in Table 1-10.

Table 1-10. WCTCOG and CVCOG Hazard Mitigation Plans flooding vulnerability summary

Jurisdiction	2010 Population		2010 Housing Units		Bldg. Values 2000/2006	
	By Jurisdiction	Vulnerable to Flood	By Jurisdiction	Vulnerable to Flood	By Jurisdiction	Vulnerable to Flood
Mitchell County	9,403	560	4,064	166	$494,000,000	$19,100,000
City of Colorado City	4,146	63	1,997	41	$253,000,000	$5,000,000
Town of Loraine	602	4	301	4	$34,200,000	$360,000
City of Westbrook	253	0	114	0	$9,800,000	$0
Nolan County	15,216	1,346	7,152	598	$936,300,000	$78,900,000
Runnels County	10,501	N/A	5,298	N/A	$690,800,000	N/A
Town of Ballinger	3,767	248	1,765	162	$279,900,000	$48,200,000
City of Miles	829	64	343	28	$38,200,000	$2,700,000
City of Winters	2,562	N/A	1,272	N/A	$145,500,000	N/A
Scurry County	16,921	629	6,963	312	$993,200,000	$62,600,000
City of Snyder	11,202	384	4,787	160	$693,100,00	$47,800,000
Coke County	3,320		2,667		$291,400,000	
City of Bronte	999	82	473	44	$54,900,000	$6,600,000
City of Robert Lee	1,049	35	636	19	$70,800,000	$2,600,000
Concho County	4,087		1,637		$187,200,000	
Irion County	1,599		856		$112,300,000	
City of Mertzon	781	62	358	39	$38,600,000	$3,300,000
Reagan County	3,367		1,372		$178,800,000	
City of Big Lake	2,936		1,089			
Schleicher County	3,461		1,489		$163,700,000	
City of Eldorado	1,951	27	838	10	$95,800,000	$1,300,000
Tom Green County	110,224	5,145	46,571	2,360	$6,423,000,000	$320,200,000
City of San Angelo	93,200	2,707	39,548	1,304	$5,600,000	$195,800,000

1.1.4 Political Subdivisions with Flood-Related Authority

A total of 71 entities have authority to enact floodplain management regulations in the UCFPR. The extents of floodplain management regulations within the basin are shown below in **Figure 2-1.**

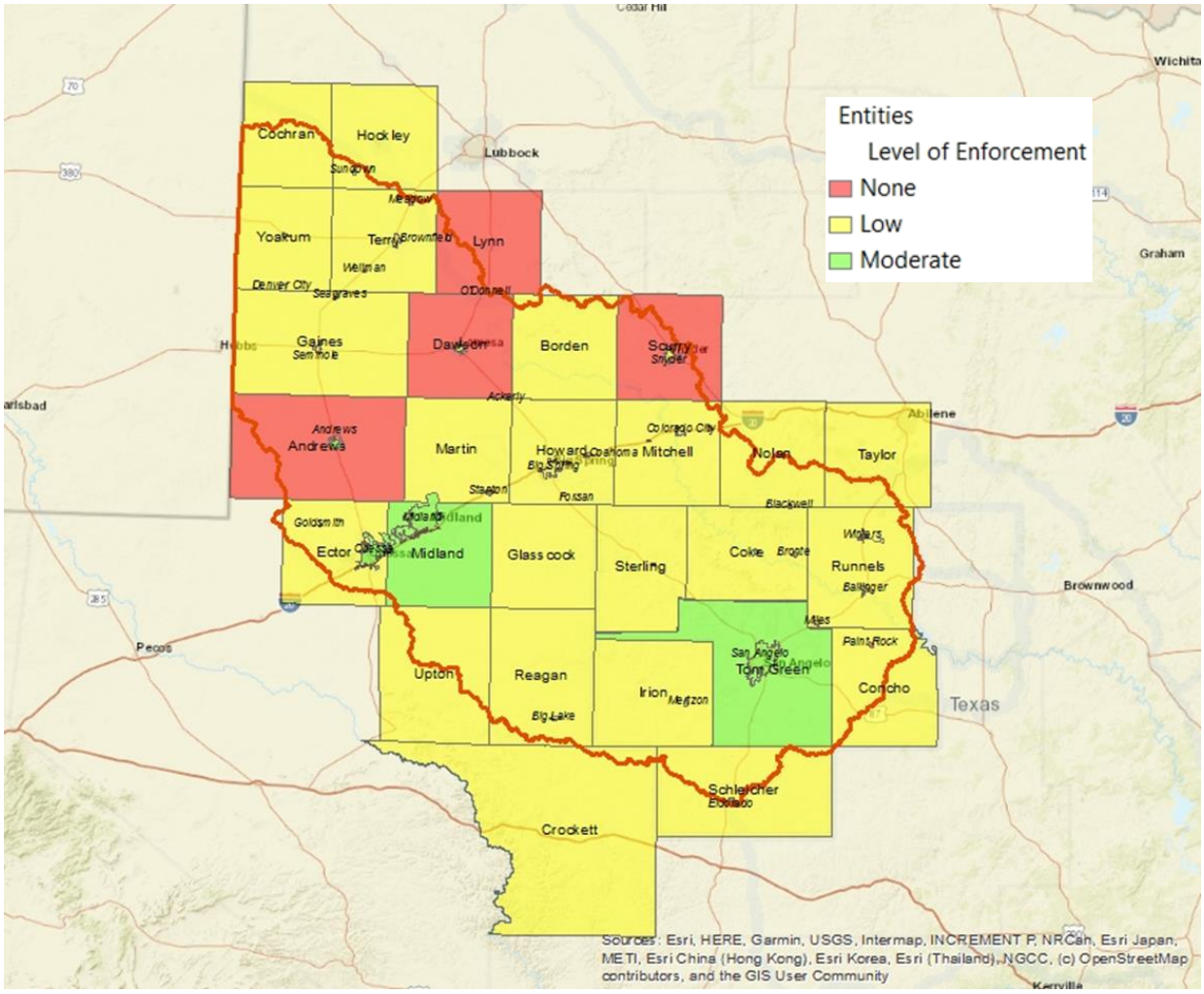
A total of 51 entities are participants of the National Flood Insurance Program (NFIP), consisting of 28 counties and 27 municipalities. Six entities in the UCFPR (Ballinger, Levelland, Midland, Odessa, San Angelo, Tom Green County and Taylor County) have adopted higher standards according to the TMFA 2016 higher standards survey. Two entities in the UCFPR (San Angelo and Midland) have an existing stormwater or drainage fee.

The level of floodplain management practices and enforcement was identified as 'high', 'moderate', 'low', or 'none', as defined below, within the UCFPR.

- 'High' Level – Actively enforces the entire ordinance, performs many inspections throughout the construction process, issues fines, violations, and Section 1316s where appropriate, and enforces substantial damage and substantial improvement.
- 'Moderate' Level – Enforces much of the ordinance, performs limited inspections and is limited in issuance of fines and violations.
- 'Low' Level – Provides permitting of development in the floodplain, may not perform inspections, may not issue fines or violations.
- 'None' Level – Does not enforce floodplain management regulations.

No entities reported having a 'high' level, 7 entities reported having a 'moderate' level, 45 entities reported having a 'low' level, and 20 entities reported have 'none' level of floodplain management practices and enforcement. **Figure 2-1** below shows the locations of moderate and strong floodplain management practices.

Figure 2-1. Degree of Floodplain Management Practices



1.1.5 Flood Risk Local Regulation and Development Codes

Using policies and regulations to reduce the exposure of people and properties to flood risk are forms of non-structural flood control. By encouraging or requiring communities to avoid developing in flood prone areas altogether, or to take precautions such as increasing building elevation, preserving overflow areas through buffering and avoiding sensitive natural areas such as wetlands, communities can reduce the likelihood and extent of damages to existing and new development. Local regulations and development codes pertaining to flooding include:

- **Floodplain Ordinances** – Floodplain ordinances regulate development and the impact new development has on a community's floodplain. Community regulations are typically based on FEMA provided flood hazard information but can be based on other local sources of data as well. Participation in the National Flood Insurance Program (NFIP) requires a community to have adopted a floodplain ordinance with minimum requirements established by FEMA.
- **Building Standards** – Building standards may include considerations for structures located within a floodplain, including minimum finish floor elevations and flood proofing requirements. NFIP requirements also set standards for property owners seeking to renovate structures in a floodplain including those that experience repetitive or server flood losses.
- **Drainage Design Standards** – Adopted drainage design standards set the minimum standards for stormwater management that must be met prior to the approval of construction plans. Drainage criteria in the region are typically adopted by municipalities but are also used by counties.
- **Zoning and Land Use Policies** – Planning and zoning ordinances regulate acceptable types of land uses within a community to promote appropriate development, safety, and general welfare. Some communities use zoning and land use ordinances to establish open space requirements, conservation easements, and minimum setbacks from creeks and wetlands to preserve floodplain function and promote sustainable and resilient development.
- **Local and Regional Flood Plans** – Local and regional flood plans analyze a community's flood risk and present how that entity will improve its resiliency. Drainage master plans describe a community's physical and institutional planning environment and establish interjurisdictional roles and responsibilities when many drainage entities are present. Capital Improvement Plans (CIP) identify capital project alternatives for an entity, provide economic analysis for alternatives, and often rank alternatives based on feasibility. The Cities of Midland, Odessa, and San Angelo have completed drainage master plans to develop a drainage CIP organizing future projects.

Local regulations and development codes, as well as their prevalence in the UCFPR, are discussed in detail in Chapter 3.

1.1.6 Agricultural and Natural Resources Impacted by Flooding

The Upper Colorado basin is a productive agricultural region with many ties to farming and ranching. Although fewer individuals are exposed to flood hazards in rural areas, the impact of flooding on agriculture and ranching can be sever. Floods can delay planting and ruin crops, kill livestock, and damage barns or other structures, causing significant economic hardship to the farmers and ranchers.

Ranchland and farmland are the predominant use of working lands across the UCFPR, as shown in Figure 1-3. Together these land use types account for 94.3% of the total land area with ranchland being 70.0% and farmland being 24.4%.

The Upper Colorado basin is a productive agricultural area with ranchland and farmland comprising about 94% of the total land area. The basin has experienced impacts to agricultural lands and natural resources because of flooding. Some of these impacts have been identified and quantified in previous sections and additional qualitative impacts are described in the following sections.

Farming

Flooding or excess precipitation can cause delays in and reduction of crop harvest and erosion of sediment and nutrients downstream result that results in complete or partial loss of crops. The impact that flooding has on farming depends on factors including crop type, stage of the growing or harvesting season when the flood event occurs, and the magnitude of flooding. The numerous crop types grown in the Upper Colorado basin region have varying resiliency to excess precipitation and prolonged standing water. Permanent crops, such as trees, tend to be more resilient to excess precipitation and standing water than row crops, such as corn or cotton. In the Upper Colorado basin, row crops comprise most of the farming production. Heavy rain before planting can delay planting or prevent planting for the season. In addition, flooding damages can occur after a crop, like cotton or hay, has been harvested but not bailed or processed.

Ranching

Ranching activities in the region are also impacted by flooding. Livestock can be swept away, drowned, or injured by flash floods. After a flood, livestock can be particularly susceptible to certain types of parasites and diseases. Excessive rain may cause an increase in vectors, including flies and mosquitos, and cases of footrot, which is a foot disease of cattle, sheep and goats[2]. Flood events can cause delays in building back livestock herds. Flood damages to livestock silage can reduce livestock head counts.

Natural Resources

The Upper Colorado region contains numerous natural resources that can be impacted by flood events. As with livestock, wildlife can be injured or killed by flash floods. Severe flood conditions can degrade stream health and impact ecosystems in the region.

In some ways, flooding can be a benefit for fields, wetlands, riparian areas to flood if limited in depth, duration, and velocity. However, typically in this region where flash floods are common, flooding causes erosion of sediment and nutrients, which can cause nutrient overgrowth and algal blooms in water bodies and nutrient deficiencies in agricultural producing lands.

1.1.7 Existing Local and Regional Flood Plans

A list of previous flood studies considered by the Regional Flood Planning Group to be relevant to the development of the Regional Flood Plan is provided in Table 1-11 below.

[2] https://www.mla.com.au/research-and-development/dealing-with-natural-disasters/flood-recovery/. Accessed on March 18, 2022.

Table 1-11. Previous Local and Regional Relevant Flood Plans

Flood Study	Description	Jurisdictions	Counties	Year
Midland Master Drainage Plan	This effort was initiated in 1991 to develop hydrologic and hydraulics models of the 6 major watersheds for Existing 1993, Future – No Action and Future – Playas conditions. The Playas model was refined to also include in-line channel detention and bridge/culvert improvements. The opinion of probable cost to fully realize the MDP was $62,889,750 in 1996 dollars.	Midland	Midland	1996
Odessa Master Drainage Plan	This effort was initiated in 2001 to develop hydrologic and hydraulics models of the watershed for Existing 1993, Future – No Action and Future – Playas conditions.	Odessa	Ector	2001
JAL and Midland Draw Watershed Study	This effort was initiated in 2015 to develop updated detailed hydrologic and hydraulic analyses of the Jal and Midland Draw watersheds for existing and fully developed conditions, along with a master plan and conceptual design of drainage improvements projects to help guide development adjacent to the draws.	Midland	Midland	2017
San Angelo Master Drainage Plan	This effort was initiated in 2019 to evaluate regional detention opportunities in the Red Arroyo watershed and update the Drainage CIP list. Six regional detention opportunities in the Red Arroyo were evaluated for potential benefits at College Hills Boulevard. A total of 38 problem areas were evaluated and prioritized, and Drainage CIP projects were developed to address the top 10 problem areas, including conceptual design and capital cost estimates. Potential funding alternatives were also identified and described.	San Angelo	Tom Green	2021
Deep Creek Section 205 Study	This effort was initiated in 2017 to evaluate flood risk management (FRM) actions aimed at providing the coastal communities of Texas with multiple lines of defense to reduce impacts from a wide array of coastal hazards. This study falls under the USACE's Civil Works Mission.	Snyder	Scurry	2021

Table 1-11. Previous Local and Regional Relevant Flood Plans

Flood Study	Description	Jurisdictions	Counties	Year
Concho Valley Hazard Mitigation Action Plan	The Concho Valley Council of Governments Hazard Mitigation Plan is a multi-jurisdictional plan covering 7 counties and 8 cities in the UCFPR. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area.	Bronte, Mertzon, Robert Lee, Sterling City, Paint Rock, San Angelo, Eldorado, Big Lake	Coke, Concho, Sterling, Reagan, Irion, Tom Green, Schleicher	2013-2018
Tom Green County Hazard Mitigation Action Plan	The Plan was prepared by Tom Green County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan is to protect people and structures and to minimize the costs of disaster response and recovery. The goal of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards by identifying and implementing cost-effective hazard mitigation actions.	San Angelo	Tom Green	2020-2025
West Central Texas COG Regional Hazard Mitigation Action Plan Update	The West Central Texas Council of Governments Hazard Mitigation Plan is a multi-jurisdictional plan covering 5 counties and 8 cities in the UCFPR. The mitigation strategies seek to identify potential loss-reduction opportunities. The goal of this effort is to work towards more disaster-resistant and resilient communities.	Snyder, Colorado City, Loraine, Westbrook, Blackwell, Ballinger, Miles and Winters	Scurry, Mitchell, Nolan, Taylor and Runnells	2020-2025
Ector County Multi-Jurisdictional Hazard Mitigation Action Plan	The Plan was prepared by Ector County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area."	Odessa and Goldsmith	Ector	2011-2016
Cochran County Multi-Jurisdictional Hazard Mitigation Action Plan	The Plan was prepared by Cochran County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area."	None are in the UCFPR	Cochran	2014
Terry County Multi-Jurisdictional Hazard Mitigation Action Plan	The Plan was prepared by Terry County, participating jurisdictions, TDEM and LAN, Inc. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area."		Terry	
Lynn County Multi-Jurisdictional Hazard Mitigation Action Plan	The Plan was prepared by Lamb and Lynn County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area."	O'Donnell	Lynn	2020

1.4 Assessment of Existing Infrastructure

Background knowledge of the UCFPR's existing natural and structural flood infrastructure provides context in identifying strategies and flood planning recommendations throughout the planning process. This section details the natural flood mitigation features and major flood infrastructure in the UCFPR. Natural Features and infrastructure included, as applicable, are summarized in Table 1-12.

Table 1-12. –Natural Features and Constructed Major Flood Infrastructure

Flood Infrastructure	Source / Description	Non-Functional / Deficient
Natural Features[3]		
Rivers, Tributaries, and functioning floodplains	National Hydrography Dataset (NHD)	Functional
Functioning Floodplains	Floodplains from TWDB compiled 'flood quilt'	Functional
Wetlands	National Wetland Inventory	Functional
Sinkholes	NHD and HDR, many others not defined	Functional
Alluvial Fans	None known	n/a
Playa Lakes	TBD	n/a
Constructed Major Infrastructure		
Levees	TBD	Unknown
Stormwater Tunnels	None known	n/a
Stormwater Canals	None known	n/a
Dams that Provide Flood Protection	TCEQ and NRCS	Functional
Detention and Retention Ponds	Numerous sources, including TCEQ and individual municipalities and counties	Unknown
Weirs	None known	Unknown
Storm Drain Systems	Undefined / TBD	Unknown

Existing flood infrastructure in the UCFPR consists of both natural features and constructed features, which are owned and managed by numerous entities, including governmental entities to individual property owners. Flood infrastructure may include non-structural measures, such as natural area preservation, buyout of repetitive flood loss properties, or flood warning systems, and includes major public infrastructure, like flood control dams. The TWDB Flood Data Hub[4] provides data to assist with the identifying flood management infrastructure. The UCFPR's geodatabase was populated with available information from the TWDB and other state and federal sources. The multiple data sources

[3] 31 TAC §361.31 states that regional flood plans include a general description of the location, condition, and functionality of natural features and constructed major infrastructure within the FPR. Several of these do not exist within the UCFPR, including vegetated dunes; sea barriers, walls, and revetments; and tidal barriers and gates

[4] https://www.twdb.texas.gov/flood/planning/data.asp, Accessed March 18, 2022.

were reviewed and amended to include one data point per location if duplication occurred across datasets.

1.1.8 Natural Features

As land uses change and rangeland is, for example, overgrazed and soils compacted, the permeability of the soil can decrease, making land less efficient at detaining stormwater and allowing for infiltration into unsaturated soils. In more urban areas, drainage infrastructure is designed to collect stormwater. This concentration of stormwater increases the velocity and intensity of runoff, which can lead to higher and faster flood flow peaks.

As land fragmentation in some areas of the UCFPR increases due to urbanization, oil and gas development, and other factors, focused land management efforts will be necessary to continue to receive the flood control benefits of certain natural features of open land. The U.S. Army Corps of Engineers' program Engineering with Nature[5] aims to bring natural and engineered processes together to deliver more efficient and sustainable projects. In the UCFPR, local, state, and federal governments manage local, state, and regional parks and lands, and wildlife management areas that form part of the region's natural infrastructure.

When left in their natural state, open lands are typically efficient at managing rainfall. Rainfall is slowed by vegetation, which allows rainfall an opportunity to infiltrate into the soil. Rangeland performs this function effectively. However, rainfall on cropland may pool and runoff comparatively more quickly. Well-designed parklands in more urban areas can attain nearly the same rate of capture and detention of stormwater as lands in undeveloped areas. For engineered natural features to achieve flood mitigation effectively, they are often designed to form part of an interconnected network of open space consisting of natural areas, which is known as low impact development[6] or green infrastructure. These practices can be defined as replicating natural processes to capture stormwater runoff where even small changes in developed areas can lessen downstream flooding.

Rivers, Tributaries and Functioning Floodplains

Streams and rivers and their associated floodplains have the natural flood storage capacity to contribute significantly to overall flood control and management. The natural hydrologic features operate as a single integrated natural system. When this system is disrupted, effects can cascade through the watershed, increasing the flood risk. Floodplain maintenance in an undeveloped state provides rivers and streams the ability to store the maximum volume of floodwater and reduce flood peak volumes. Preservation of a natural integrated system of waterways and floodplains serves a valuable function in urban areas, as well.

With a length of approximately 862 miles, the Colorado River is the longest river with both its source and its mouth within Texas. The Colorado River's watershed drains an area of about 39,900 square miles, including almost 15% of Texas. It flows generally southeast from Dawson County through Ballinger in the UCFPR before emptying into the Gulf of Mexico at Matagorda Bay. The long-term average flow at the USGS gaging station USGS 08126380 Colorado Rv nr Ballinger, TX[7], in the UCFPR is 62,000 acre-ft/year. Other significant rivers and streams within the basin include the

[5] https://ewn.erdc.dren.mil/, Accessed March 21, 2022.

[6] https://lowimpactdevelopment.org/, Accessed March 21, 2022.

[7] USGS 08126380 Colorado Rv nr Ballinger, TX. https://waterdata.usgs.gov/nwis/uv?08126380, Accessed on March 21, 2022.

Concho, Red Draw, South Concho, and Middle Concho rivers and Beals, Grape, Brushy, Spring, Dove and Deep creeks.

The UCFPR's lakes, reservoirs, parks, and preserves serve as important components of the ecosystem as they encompass a wide variety of plants, animals and physical features that are imperative for the continued ecological health of the UCFPR. These water bodies and natural areas retain water during flood events. These types of natural flood infrastructure are generally located in or close to floodplain areas throughout the basin with higher concentrations of them being located along or close to the major rivers and tributaries.

Karst Features

Recharge-related sinkhole flooding, flow-related flooding, and discharge-related flooding are associated with karst. Even if there are no sinkholes visible in a karst region, continuing karstic development under urban areas can affect building foundations. Rapid urban development on karst usually increases the mass on the land surface, which increases the chance of surface collapse. In addition, impervious paved surface of urban areas can block infiltration, altering native groundwater flow paths. In some situations, karst features can rapidly infiltrate surface flood waters and provide flood reduction capabilities. Water quality control measures and flood management should occur simultaneously to prevent groundwater contamination.

1.1.9 Constructed Flood Infrastructure

Major constructed flood infrastructure can range from dams and levees to municipal drainage systems, which consist of constructed channels and storm drain systems. Dams serve many purposes, including flood risk reduction and water supply for numerous uses, from water supply to irrigation and recreation.

Dams, Reservoirs, Levees, and Weirs

Impounded water features such as reservoirs serve many purposes including recreation, flood risk reduction, irrigation, water supply and fire protection, among others. The dataset used to identify major reservoirs is maintained by the TWDB. Fifteen major reservoirs were identified in the UCFPR, as shown in Table 1-13.

Table 1-13. Major reservoirs in the UCFPR

Reservoir	Location	Reservoir	Location
Champion Creek Reservoir	Mitchell County, seven miles south of Colorado City	Natural Dam Lake	Howard County, 10 miles from Stanton
E V Spence Reservoir	Coke County, 2 miles west of Robert Lee	O C Fisher Lake	
Lake Ballinger/Lake Moonen	Runnels County, four miles northwest of Ballinger	O H Ivie Reservoir	Tom Green County, west side of San Angelo
Lake Colorado City	Mitchell County, four miles southwest of Colorado City	Oak Creek Reservoir	Coke County, 8 miles north of Bronte
Lake J B Thomas	Scurry County, 16 miles from Snyder	Red Draw Reservoir	Howard County, six miles southeast of Big Spring
Lake Nasworthy	Tom Green County, southwest of San Angelo	Sulphur Springs Draw Storage Reservoir	Martin County, fourteen miles northeast of Stanton
Lake Winters / New Lake Winters	Runnels County, five miles east of Winters	Twin Buttes Reservoir	Tom Green County, 6 mi southwest of San Angelo
Mitchell County Reservoir	Mitchell County, nine miles southwest of Westbrook		

Additional dams on smaller tributaries exist across the UCFPR and were identified from several sources, including the Texas State Soil and Water Conservation Board (TWSSWB), the Texas Commission on Environmental Quality (TCEQ), and the United States Army Corps of Engineers (USACE). Several dams were designed and constructed by the National Resource Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), and although not available in the readily available documentation, the function of these dams often was for flood control. All identified dams have been included as part of the UCFPR's infrastructure inventory.

No individual weir structures were identified. However, dam spillways can act as weirs during flood events that overtop the spillway.

Levees are man-made embankments that artificially contain flood flows to a restricted floodplain. More than one million Texans and $127 billion dollars' worth of property are protected by levees, including 51 USACE levee systems. Two levees constructed as part of the Twin Buttes Reservoir were identified in the UCFPR.

Stormwater Management Systems

Stormwater management systems serve to manage both the quantity and quality of the water that drains into natural waterways. The TCEQ regulates the discharge of municipal separate storm sewer systems (MS4) s through the two sets of permits administered under the Texas Pollutant Discharge Elimination System (TPDES), known as Phase I (large) or Phase II (small) MS4 permits. To be subject to MS4 permit requirements, a municipality must own and operate storm drainage infrastructure. Phase I MS4s are cities that had populations exceeding 100,000 as of the 1990 census. In the UCFPR, San Angelo, Midland, and Odessa, as well as Tom Green, Ector, and Midland counties, are subject to the Phase II MS4 permit requirements.

1.5 Assessment of Condition and Functionality of Existing Infrastructure

The general location, description, level of service, functionality, deficiency, and owning/operating entities for each identified natural flood mitigation features and constructed major flood infrastructure are summarized in Table 1 in Appendix A (to be determined and completed) and the GIS geodatabase attached in Appendix B. Additional information for significant or deficient/non-functioned features or infrastructure are detailed in subsequent sections as necessary.

The TWDB defines infrastructure functionality as follows.

- Functional infrastructure is defined as serving its intended design level of service.
- Non-functional infrastructure is defined as not providing its intended or design level of service.
- Deficient is defined as infrastructure or natural features in poor structural or non-structural condition and needs replacement, restoration, or rehabilitation.

Non-Functional or Deficient

Information compiled and responses provided to stakeholder outreach has been limited to date. Two explanations for non-functional and deficient infrastructure include lack of funding for a stormwater utility and higher design standards since the construction of existing stormwater drainage systems. Many municipalities lack a dedicated funding source for stormwater projects, operations, and maintenance. Texas state law does provide a mechanism for municipalities to establish a dedicated revenue source for drainage through the implementation of a stormwater utility fee. In the UCFPR, San Angelo, Midland, and Odessa, as well as Midland County have existing drainage fees.

Dam Safety Assessment

In 2019, the Association of State Dam Safety Officials (ASDSO) estimated the cost to rehabilitate all non-federal dams in Texas at around $5 billion. The TSSWCB estimates about $2.1 billion is needed to repair or rehabilitate dams included in the Small Watershed Programs. A dam is classified as high hazard if its failure could cause significant loss of life, serious damage to structures, or disruption to important public utilities or transportation facilities. A dam's hazard classification is not an assessment of condition. Information about the condition of many dams is not publicly available. The TCEQ maintains condition data for non-federal dams as part of the Texas Dam Safety Program. However, of the 7,200 non-federal dams in our state, more than 3,200 Texas are exempt from dam safety requirements, representing almost half of these dams.

1.6 Proposed or Ongoing Flood Mitigation Projects

Table 2 in Appendix A (to be completed) and the attached GIS database in Appendix B include a general description of the location, source of funding, and anticipated benefits of proposed or ongoing flood mitigation projects in the UCFPR including:

1. New structural flood mitigation projects currently under construction,
2. Non-structural flood mitigation projects currently being implemented, and
3. Structural and non-structural flood mitigation projects with dedicated funding to construct and the expected year of completion.

The data for this section is derived from two primary sources: the UCFPR's existing Hazard Mitigation Plans and a stakeholder survey. Gaps and limitations exist within the data. Overall, it only represents a small number of the communities within the basin and little data was provided on individual projects. Additional information for proposed or ongoing flood mitigation projects are detailed in subsequent sections as necessary.

Structural Projects under Construction

The Cities of San Angelo, Midland, and Odessa have developed recent drainage master plans with lists of drainage capital improvement projects, some of which have been constructed and others that are still awaiting funding. Responses from other communities regarding projects under construction were insufficient to provide additional details regarding these projects. Chapter 4 provides a more detailed assessment of current and potential projects.

Implementation of Nonstructural Flood Mitigation Projects

Information provided in response to stakeholder outreach has been limited to date. The top goal of respondents has been implementation of protective standards and policies, followed by identification and communication of flood risk, restoring failing infrastructure, and implementation of flood warnings and responses. Chapter 3 includes further information regarding the region's goals and practices, and Chapter 4 describes implementation of nonstructural flood mitigation projects.

Appendix A. Tables

Appendix B. Digital Data

File Name	Description
Ch1.gdb	GIS geodatabase of Existing, Proposed, or Ongoing Flood Infrastructure

Upper Colorado Regional Flood Plan

Regional Flood Plan Development Schedule and Next Steps

Agenda Item No. 8b

March 31, 2022

TWDB Working Schedule

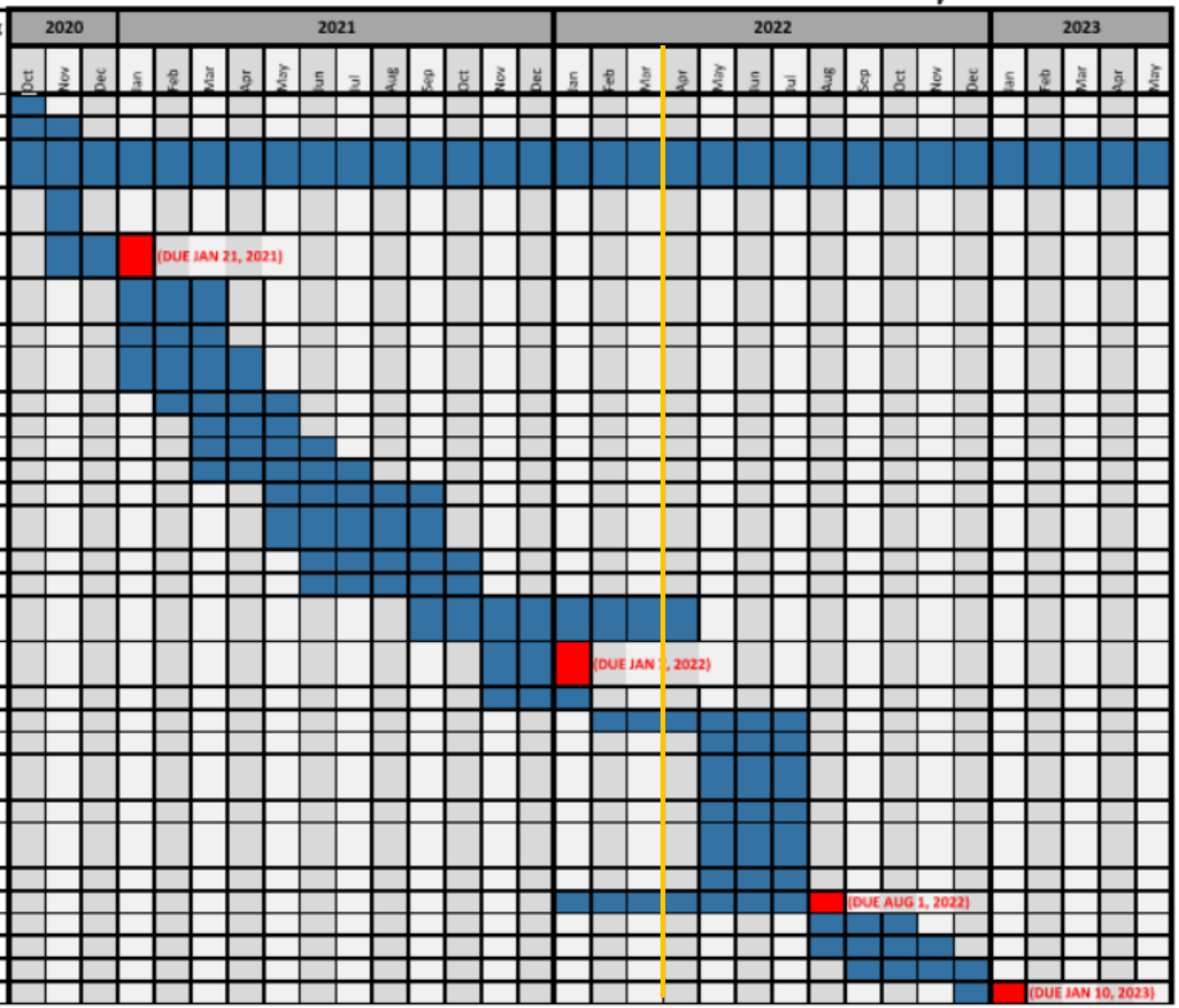
Working Conceptual Schedule**

First Cycle of Regional Flood Planning

As of December 2020

Texas Water Development Board

Item	Entity	Activity	Planning SOW Task #
1	TWDB	Designation of RFPG members	
2	RFPG	RFPG First Meetings	
3	RFPG	Public participation, stakeholder input, post notices, hold meetings, maintain email lists and website.	10
4	TWDB	Publish Request for Regional Flood Planning Grant Applications	
5	RFPG/Sponsor	Submission of Applications for Regional Flood Planning Grants to TWDB	
6	TWDB/Sponsor	Review and Execution of Regional Flood Planning Grant Contracts	
7	RFPG/Sponsor	Solicitation for Technical Consultant by RFQ process	
8	RFPG	Pre-Planning Meetings for Public Input on Development of RFP	
9	RFPG	Selection of Technical Consultant	
10	RFPG/Sponsor	Execution of Technical Consultant Subcontract	
11	RFPG	Planning Area Description	1
12	RFPG	Existing Condition Flood Risk Analyses	2A
13	RFPG	Future Condition Flood Risk Analyses	2B
14	RFPG	Evaluation and Recommendations on Floodplain Management Practices	3A
15	RFPG	Flood Mitigation and Floodplain Management Goals	3B
16	RFPG	Flood Mitigation Need Analysis	4A
17	RFPG	Identification and Evaluation of Potential FMEs and Potentially Feasible FMSs and FMPs	4B
18	RFPG	Preparation and Submission of Technical Memorandum to the TWDB	4C
18	TWDB	Issue Notice-to-Proceed on Task 5	
20	RFPG	Recommendation of FMEs, FMSs, and FMPs	5
21	RFPG	Impacts of Regional Flood Plan	6A
22	RFPG	Contributions to and Impacts on Water Supply Development and the State Water Plan	6B
23	RFPG	Flood Response Information and Activities	7
24	RFPG	Administrative, Regulatory, and Legislative Recommendations	8
25	RFPG	Flood Infrastructure Financing Analysis	9
26	RFPG	Preparation and Submission of Draft RFP to the TWDB	10
27	RFPG	Public Input on Draft RFP	10
28	TWDB	TWDB Review and Comment on the Draft RFP	
29	RFPG	Incorporate TWDB & Public Input into Final RFP	10
30	RFPG	Adopt and Submit the 2023 RFP to the TWDB	All



TWDB Working Schedule
Current UCRFPG Responsibilities

Working Conceptual Schedule**
First Cycle of Regional Flood Planning

As of December 2020

Texas Water Development Board

Item	Entity	Activity	Planning SOW Task #	2020			2021											2022											2023				
				Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
18	TWDB	Issue Notice-to-Proceed on Task 5																																
20	RFPG	Recommendation of FMEs, FMSs, and FMPs	5																															
21	RFPG	Impacts of Regional Flood Plan	6A																															
22	RFPG	Contributions to and Impacts on Water Supply Development and the State Water Plan	6B																															
23	RFPG	Flood Response Information and Activities	7																															
24	RFPG	Administrative, Regulatory, and Legislative Recommendations	8																															
25	RFPG	Flood Infrastructure Financing Analysis	9																															
26	RFPG	Preparation and Submission of Draft RFP to the TWDB	10																							(DUE AUG 1, 2022)								
27	RFPG	Public Input on Draft RFP	10																															
28	TWDB	TWDB Review and Comment on the Draft RFP																																
29	RFPG	Incorporate TWDB & Public Input into Final RFP	10																															
30	RFPG	Adopt and Submit the 2023 RFP to the TWDB	All																											(DUE JAN 10, 2023)				

Planning Updates

- March 7th – Technical memo supplement submitted to TWDB
- March 10th – TWDB communication: The need to include future mapping gaps as well as existing gaps has been brought to our attention. Please add a Fut_Map_Gaps feature class to the region's geodatabase.
- March 23rd – TWDB communication: Clarification given for Title 31 TAC §361.50(a) The RFPGs shall approve each recommended FME, FMS, and FMP by a separate vote…"

Flood Plan Development Schedule

Timeframe	TWDB Flood Plan Scope of Work Tasks/Actions
January 26, 2022	**Task 5 Notice to Proceed**
March 7, 2022	**Technical Memo GIS Submitted to TWDB**
March	Task 10 Public Participation and Plan Adoption - Will be ongoing throughout RFP development Task 4 Needs Analysis and Refined FME, FMP, FMS List Task 5 Recommendations
April	Task 5 Recommendations Task 7 Flood Response
May	Task 5 Recommendations Task 8 Administrative, Regulatory, and Legislative Recommendations Task 9 Flood Infrastructure Financing Analysis
June	Tasks 6a, 6b Impacts of the Regional Flood Plan & Impacts to Water Plan Task 12 Identify FMEs to complete
July	Discuss Draft Flood Plan Refinements
August 1, 2022	**August 1, 2022, Draft Flood Plan Submitted to TWDB**

Next Steps

- Begin Task 5. Recommendation of Flood Management Evaluations and Flood Management Strategies and Associated Flood Mitigation Projects
- Stakeholder Outreach
- Continue Regional Flood Plan development
  - Draft Chapters to be provided to Planning Group
  - Planning group
    - Provide comments via email
    - Discussion items to planning group meeting

- Chapter 2 – Flood risk analyses
- Chapter 3 – Floodplain management practices and flood protection goals

Questions