Region 6 - San Jacinto Regional Flood Planning Group Technical Committee Meeting

February 03, 2022

2:00 p.m.

Hybrid Meeting

Item 1:
Call to Order

Item 2:
Welcome and Roll Call

Item 3:
Registered Public Comments on Agenda Items (limit of 3 minutes per person)

Item 4:

Approval of minutes

a. October 27, 2021

San Jacinto Regional Flood Planning Group
Technical Committee Meeting Minutes
October 27, 2021 | 12:00 PM
Trini Mendenhall Community Center – 1414 Wirt Rd. Houston, TX 77055
Hybrid Meeting

Roll Call:

Committee Member	Interest Category	Present / Alternate Present
Elisa Macia Donovan (Chair)	Agricultural	X
Neil Gaynor (Secretary)	Upper Watershed	X
Marcus Stuckett	Flood Districts	X
Jenna Armstrong	Small Business	X
Stephen Costello (Vice Chair)	Municipalities	X

Quorum:
Quorum: Yes

Number of voting members or alternates representing voting members present: 5
Number required for quorum per current voting membership of 5:3

Other Meeting Attendees: **
Voting: None
Non-Voting: Megan Ingram, Hope Zubek

Alfred Garcia
Beto Moreno
Bob Kosar
Cory Stull
Danielle Goshen
Fatima Berrios
Greg Sevcik
James Bronikowski
Johana Clark
Kena Ware
Linda Shead
Maggie Puckett
Matt Nelson
Sally Bakko
Stephanie Zertuche
Unknown: 1

**Meeting attendee names were gathered from those who entered information for joining the Webex meeting.

All meeting materials are available for the public at: Flood Planning Group Meeting Schedule | Texas Water Development Board

AGENDA ITEM NO. 1: Call to Order
Ms. Donovan called the meeting to order at 12:00 pm.

AGENDA ITEM NO. 2: Welcome and Roll Call
Mr. Gaynor took roll call and a quorum was established.

AGENDA ITEM NO. 3: Registered Public Comments on Agenda Items (limit of 3 minutes per person)

- Ms. Danielle Goshen strongly urged the committee to consider two ways to improve goals as currently drafted. Ms. Goshen encouraged the use of nature-based solutions, specifically asking the SJRFPG to consider hybrid infrastructure and to be cognizant of project recommendation. Ms. Goshen stated goal #0101 should be expanded upon to address historical underinvestment areas and other vulnerable communities. Ms. Goshen recommended to the SJRFPG to consider using the Flood Benefits Index equity tool developed by Dr. Earthea Nance.
- Ms. Sally Bakko stated the Chief's Reports prepared by the US Army Corps. of Engineers, was signed and will be presented to Congress for consideration and authorization. She also stated that producing a regional flood plan that reinforced what was stated in the Chief's Report would be critical to secure funding. She stated Region 6 included the Port of Houston and other critical economic facilities and infrastructure that are highly impacted by floods and are critical for the national economy. Ms. Bakko stated it was crucial to get the project approvals to secure funding and go back to congress each year for appropriated funds. Ms. Bakko stated it was important to show the state how significant flood projects are for the state's economy.
- Ms. Linda Shead stressed the need for goal setting for nature-based solutions in flood mitigation, in particular long-term goal of % Percentage flood mitigation strategies and projects to be implemented, she reinforced 100% that incorporation by long-term goal 2053 not an unreasonable goal. FEMA, Army Corps of Engineers, Amer Society of Civil Engineers use Nature-based practices as best practice. Ms. Shead closed by stating that incorporating nature-based projects makes it more likely projects will get funded, as it's one of the criteria for much of the funding sources.
- Alisa Max stated (by written comment) that regarding goals #301 & #302: flooding of homes and businesses is far more disruptive to lives than flooding roadways. Ms. Max stated that roadways were designed to flood as secondary location. Ms. Max proposed that these goals be modified to either a.) change the focus to homes and businesses instead or b.) change verbiage to limit the scope to maintain at least one drivable lane on major roadways connecting critical facilities during a major flood. Goal #1001: good start to address the need to protect homes and businesses but it only focuses to reduce flooding in 100-year floodplain. Ms. Max stated in order to provide consideration to overland street flooding, consider adding another goal related to reduction of five (5) year average number of homes per year flooded. Using a five (5) year average of number comparison to lessen impact of differing numbers and magnitude of storms in a given year.

AGENDA ITEM NO. 4: Approval of minutes - September 29, 2021

Ms. Donovan opened the floor for any comments to the meeting minutes. Mr. Gaynor stated extensive discussion from the previous meeting was not captured in the meeting minutes. Ms. Donovan asked Mr. Gaynor if there was anything, he suggested revising. Mr. Gaynor stated just wished to see more discussion depicted that addressed comments made by other SJRPFG members or members of the public. Mr. Gaynor then moved to approve the minutes as presented. Mr. Costello seconded the motion, which carried unanimously.

AGENDA ITEM NO. 5: Discuss feedback received on the development of Floodplain Management Goals and revise goals for recommendation to the RFPG for approval.

Mr. Stull stated that the comments that have been received were very good. He stated he hoped today they would reach consensus of the goals for approval. He stated that if additional discussion was needed, they could table the goal and add it later after the submittal of the Technical Memo. Mr. Stull stated all comment received had been summarized on the slides for each goal. Mr. Stull then proceeded to review each goal. After each goal Mr. Stull asked the members for their comments. A consensus was reached for each goal, after discussions were held by the Technical Committee members to consider percentages and word selection. Mr. Stull went back to goal 401 and 402 to address and allow discussion for what entities exactly would be considered for the goal. Ms. Donovan suggested to change the verbiage to public entities and all member expressed their agreeance. Mr. Stull then thanked everyone for their participation and acknowledged their hard work. Mr. Stull then stressed the need for RFPG approval of goals at the next SJRFPG meeting scheduled to be on November 18, 2021. Mr. Stull then added that goals could be revisited and modified moving forward.

AGENDA ITEM NO. 6: Next Key Milestones and Important Dates

Ms. Donovan stated the next SJRFPG meeting would be November 18, 2021.

AGENDA ITEM NO. 7: Consider Agenda Items for the next Technical Committee Meeting

Mr. Costello suggested to defer the agenda item until the need to have another Technical Committee meeting came up. Ms. Donovan agreed.

AGENDA ITEM NO. 8: Public Comments – limit 3 minutes per person

Ms. Berrios stated no additional requests were made.

AGENDA ITEM NO. 9: Adjourn

Mr. Costello moved to adjourn the meeting. Mr. Gaynor seconded the motion and it carried unanimously. Ms. Donovan called the meeting adjourned at 1:44 p.m.

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Neil Gaynor, Secretary

_____

Elisa Donovan, Chair

SJRFPG REGIONAL GOALS DISCUSSED BY TECHNICAL COMMITTEE

(Note: this list has approved SJRFPG goals during - November 18, 2021 monthly meeting)

GOAL_ID	RFPG_NUM	RFPG_NAME	GOAL_DESC	TERM	TGT_YEAR	EXTENT	MEASURE	ASSC_GOALS
Goal ID	RFPG Number	RFPG Name	Goal Description	Term of goal	Target Year	Extent	Measurement Method	Other Associated Goals
0101	06	San Jacinto	There will be 0 flood-related fatalities annually within the San Jacinto Region by 2053.	Long Term (30-year)	2053	Entire RFPG	Number of direct flood-related fatalities	
0201	06	San Jacinto	Increase the value of state (grant and loan) funds awarded within the San Jacinto Region by 10%.	Short Term (10-year)	2033	Entire RFPG	State grant and loan funds awarded to communities within the San Jacinto Region	
0301	06	San Jacinto	Reduce the miles of major roadways subject to inundation during the 100-year event by 20% by 2033.	Short Term (10-year)	2033	Entire RFPG	Number of miles of major roadways subject to existing 100-year flood risk	0302
0302	06	San Jacinto	Reduce the miles of major roadways subject to inundation during the 100-year event by 40% by 2053.	Long Term (30-year)	2053	Entire RFPG	Number of miles of major roadways subject to existing 100-year flood risk	0301
0401	06	San Jacinto	Increase the number of entities that invest in stormwater infrastructure by 10% by 2033.	Short Term (10-year)	2033	Entire RFPG	Number of entities that dedicate funding towards stormwater infrastructure and planning	0402
0402	06	San Jacinto	Increase the number of entities that invest in stormwater infrastructure by 25% by 2053.	Long Term (30-year)	2053	Entire RFPG	Number of entities that dedicate funding towards stormwater infrastructure and planning	0401
0501	06	San Jacinto	All flood regulatory authorities within the Region will adopt minimum standards as recommended by the San Jacinto RFPG in the first cycle of regional flood planning.	Short Term (10-year)	2033	Entire RFPG	Number of flood-related authorities that adopt recommended minimum standards by the RFPG in the first cycle as well as number of authorities that already meet or exceed the recommended minimum standards	
0601	06	San Jacinto	Improve interjurisdictional coordination through participation in the San Jacinto Regional Flood Planning process. Target to ensure that 50% of identified stakeholders complete the SJRFP stakeholder survey and provide data for inclusion in the regional flood plan by 2033.	Short Term (10-year)	2033	Entire RFPG	Number of identified stakeholders who submit survey responses or provide data for inclusion in the San Jacinto Regional Flood Plan	0602
0602	06	San Jacinto	Improve interjurisdictional coordination through participation in the San Jacinto Regional Flood Planning process. Target to ensure that 90% of identified stakeholders complete the SJRFP stakeholder survey and provide data for inclusion in the regional flood plan by 2053.	Long Term (30-year)	2053	Entire RFPG	Number of identified stakeholders who submit survey responses or provide data for inclusion in the San Jacinto Regional Flood Plan	0601
0701	06	San Jacinto	Expand the understanding of flood risk in the San Jacinto Region.	Short Term (10-year)	2033	Entire RFPG	Percentage of the floodplain quilt, by studied stream length, that is based on NOAA Atlas 14 rainfall data	
0801	06	San Jacinto	Reduce the number of critical facilities subject to inundation during the 100-year event by 15% by 2033.	Short Term (10-year)	2033	Entire RFPG	Number of critical facilities subject to existing 100-year flood risk	0802
0802	06	San Jacinto	Reduce the number of critical facilities subject to inundation during the 100-year event by 25% by 2053.	Long Term (30-year)	2053	Entire RFPG	Number of critical facilities subject to existing 100-year flood risk	0801
0901	06	San Jacinto	At least 35% of all flood mitigation strategies (FMSs) and flood mitigation projects (FMPs) identified within the regional flood plan will incorporate nature-based practices by 2033.	Short Term (10-year)	2033	Entire RFPG	Number of FMSs and FMPs that incorporate nature-based practices as defined within the San Jacinto Regional Flood Plan	0902
0902	06	San Jacinto	At least 90% of flood mitigation strategies (FMSs) and flood mitigation projects (FMPs) identified within the regional flood plan will incorporate nature-based practices by 2053.	Long Term (30-year)	2053	Entire RFPG	Number of FMSs and FMPs that incorporate nature-based practices as defined within the San Jacinto Regional Flood Plan	0901
1001	06	San Jacinto	Reduce the number of structures within the 100-year floodplain by XX% by 2053.	Long Term (30-year)	2053	Entire RFPG	Number of structures removed from the 100-year floodplain	

Item 5:

Discussion and review of technical approaches pertinent to the development of Technical Memorandum deliverables due to the TWDB on March 7th

Approaches to Developing March 7th Deliverables

SAN JACINTO REGIONAL FLOOD PLANNING GROUP
REGION 6

February 3, 2022

Agenda

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- Identify Outstanding Major Discussion Items:
  - Approach to delineating future flood hazard (Task 2B)
  - Flood Exposure Analyses (Task 2B)
  - Defining critical infrastructure (Task 2A & 2B)
  - Approach to defining gaps in flood mapping (Task 2A & 2B)
- Discuss Technical Approaches
  - Background
  - Available data for analysis
  - Recommendations

Goal of this meeting:

- Gain understanding of future flood risk
- Gain consensus on approach to developing March 7th Deliverables
- Develop recommendations on technical approaches to make to the larger RFPG

Future Flood Risk (Task 2B)

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- Background (Hazard + Exposure + Vulnerability = Risk)
- Contributions to Future Flood Risk
- Future 100-year Approach
- Future 500-year Approach
- Coastal and Subsidence Considerations
- Flood Exposure Analyses

Background

Task 2B – Future Flood Risk Analysis

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TWDB Goals

Perform future condition flood risk analyses for the region comprising:

- Flood hazard analyses (location, magnitude, and frequency of flooding)
- Flood exposure analyses (who and what might be harmed)
- Vulnerability analyses (communities and critical facilities)

- Obtain a general understanding of future flood risk for planning purposes
- Not a regulatory product

Task 2B – Future Flood Risk Analysis

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- Define Future Condition Flood Hazard
  - Use available information, no H&H modeling
  - Rely on existing Floodplain Quilt (Task 2A)
  - TWDB identified four methods for determining hazard:
    1. Change in WSEL based on change in population
    2. Existing 0.2% becomes the Future 1%
    3. Combination of 1 and 2, or an RFPG proposed method
    4. Request TWDB to perform a desktop analysis
- Projections on changes over the next 30 years
- Summary and qualitative description of risk

Task 2B – Future Flood Risk Analysis

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TWDB Deliverables

- GIS
  - FutFldHazard
  - FutFldExpPol
  - FutFldExpLn
  - FutFldExpPt
  - FutFldExpAll

Extents of floodplain
&
Infrastructure at risk

- Maps
  - Future Condition Flood Hazard Map
  - Gaps and known flood prone areas
  - Flood Exposure
  - Critical Infrastructure

Task 2B Process

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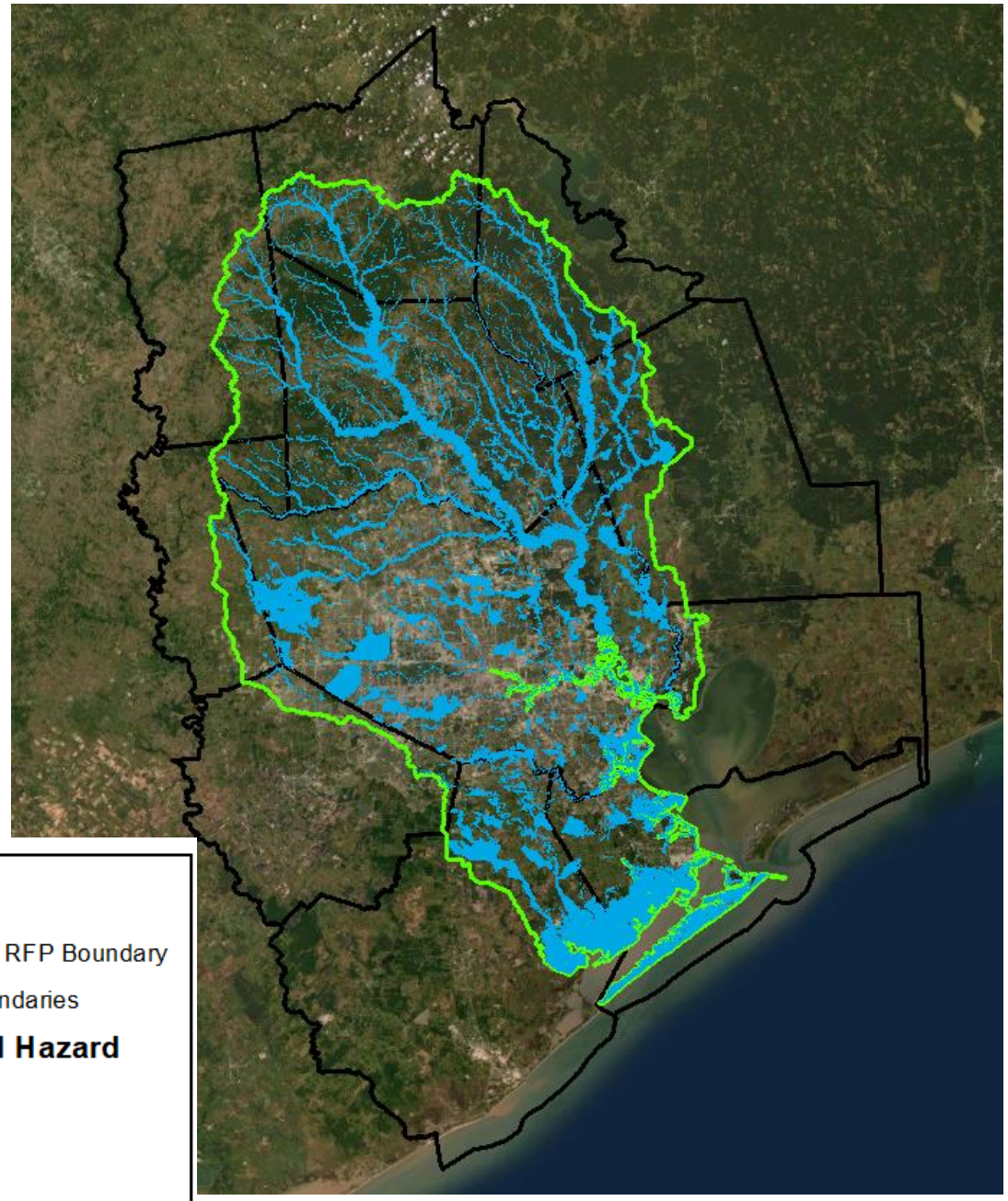
- Use existing flood quilt to develop future flood quilt
  - Existing flood quilt includes:
    - Areas with an annual likelihood of inundation of more than 1% and 0.2%
    - Aerial extent of inundation
    - Sources of flooding for each area
- Approach to create future flood quilt using the existing flood quilt is outlined in this presentation
  - Note that a memorandum summarizing the process will be provided to TWDB by March 7, 2022

Task 2B Process

- Existing Flood Quilt
  - Source Data:
    - NFHL Pending/Preliminary
    - NFHL Effective Detailed
    - Base Level Engineering (BLE)
    - NFHL Approximate
  - *All source data is based on pre-Atlas14 Rainfall**



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Task 2B Process

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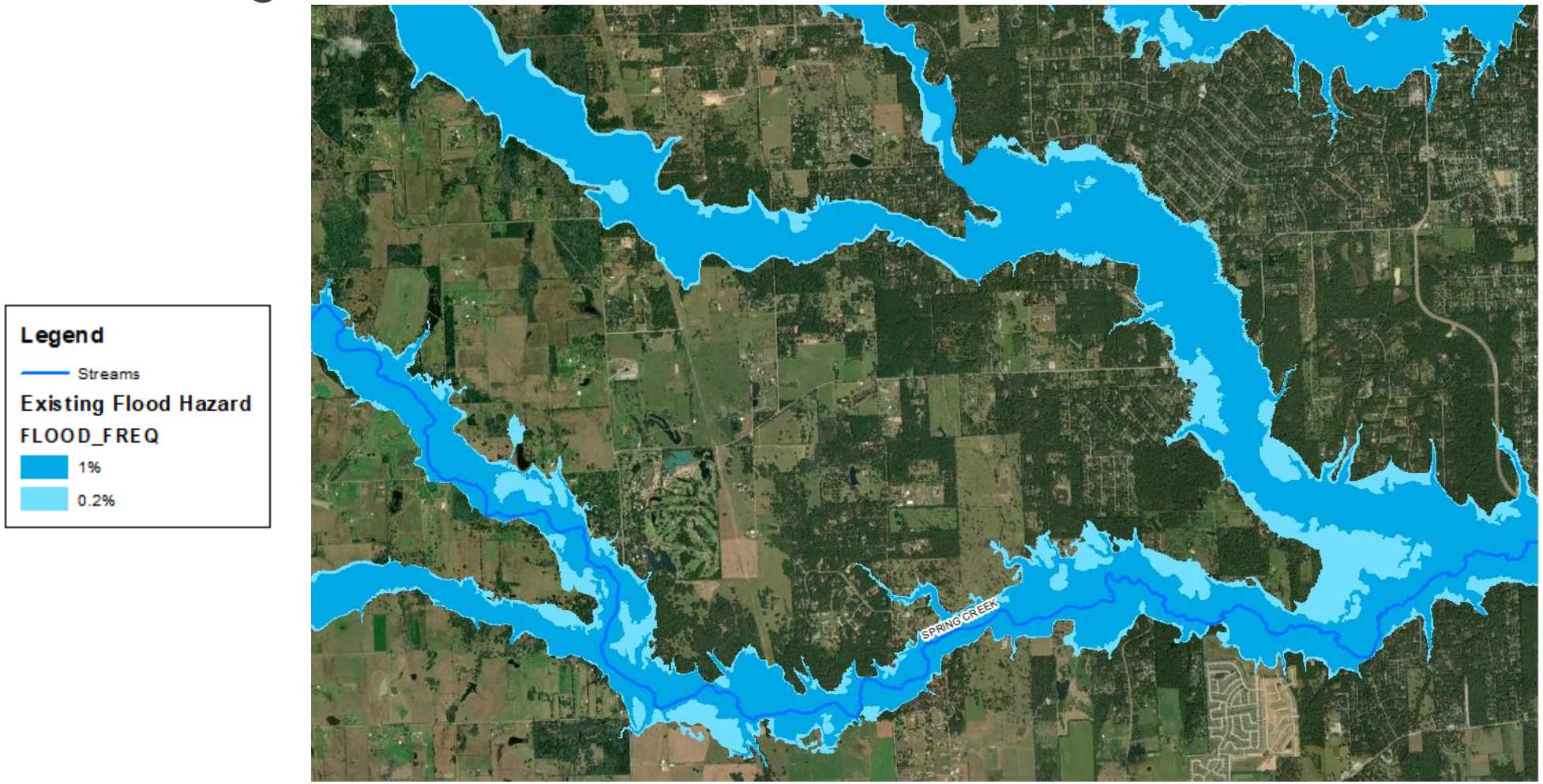
- Existing Flood Quilt



Future Flood Risk

What is Future Flood Risk?

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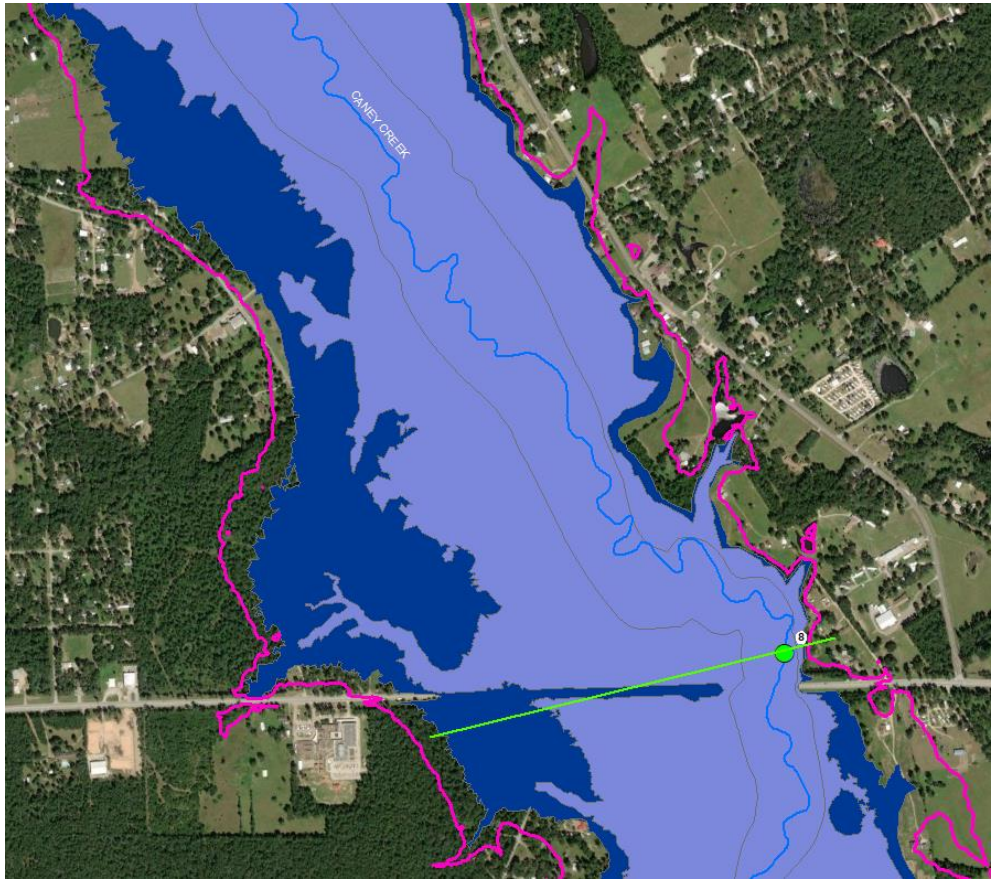
Change in flood risk due to variety of factors

Riverine Floodplain Extents

- Development
- Population growth
- Rainfall intensity
- Climate change

Coastal Zones

- Storm surge
- Sea level change
- Subsidence
- Coastal erosion



Development

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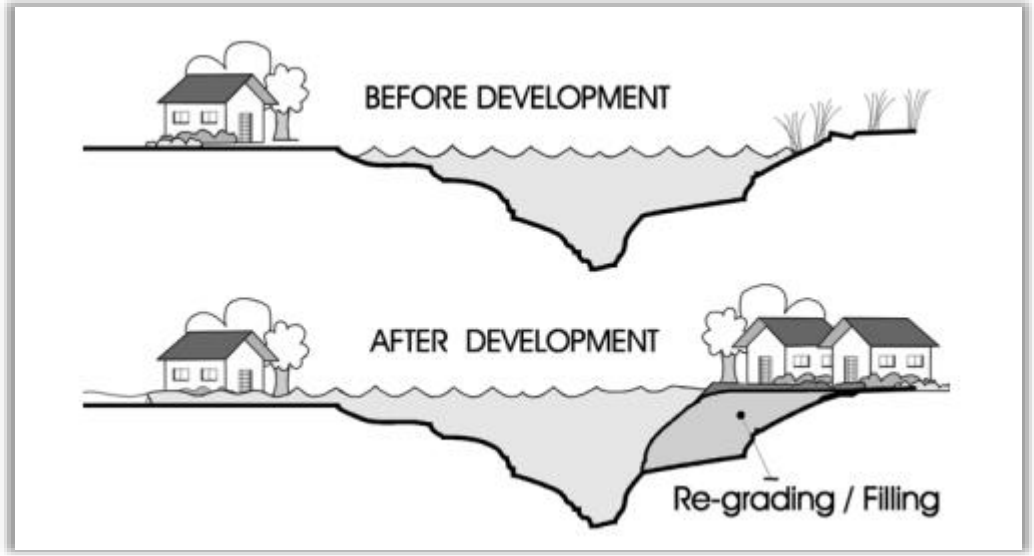
- Change of land use and existing drainage patterns may result in an increase in downstream flow rates
  - Increases in discharges and water surface elevations
  - Increases floodplain widths
  - Increases in runoff volumes
- Many municipalities and counties in the region have development retention/detention requirements to reduce and mitigate an increase in stormwater runoff



Source: FEMA; https://www.fema.gov/pdf/floodplain/nfip_sg_unit_1.pdf

Projected Population Growth

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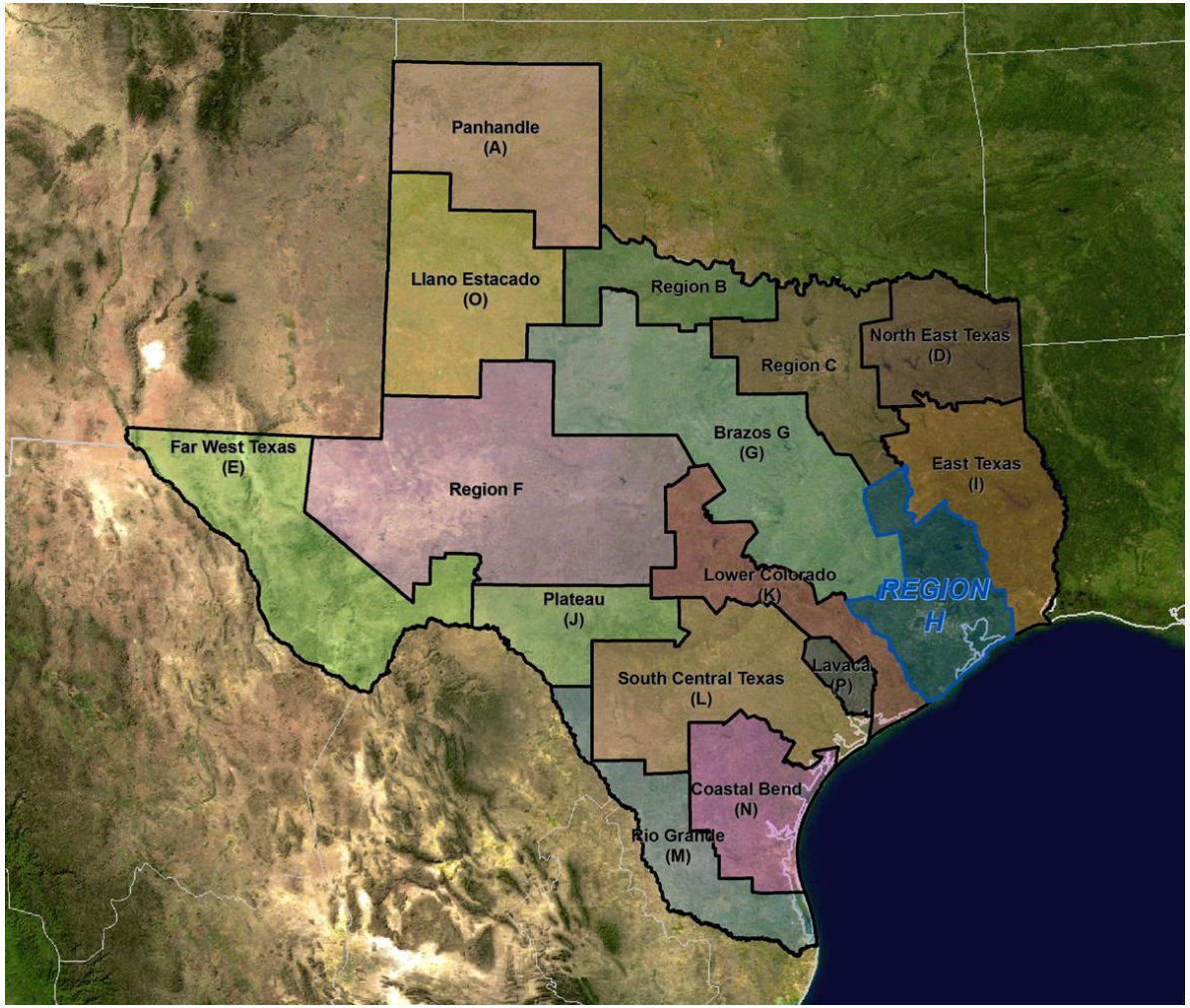
- Region H will see about 3.5 million more residents over the next 30 years (a 37% increase)[1]
- 1.9 million residents in Montgomery, Harris, Galveston and Brazoria Counties (a 30% increase)



[1] Source: TWDB 2022 Texas State Water Plan, Planning Region H
https://2022.texasstatewaterplan.org/region/H

Projected Population Growth

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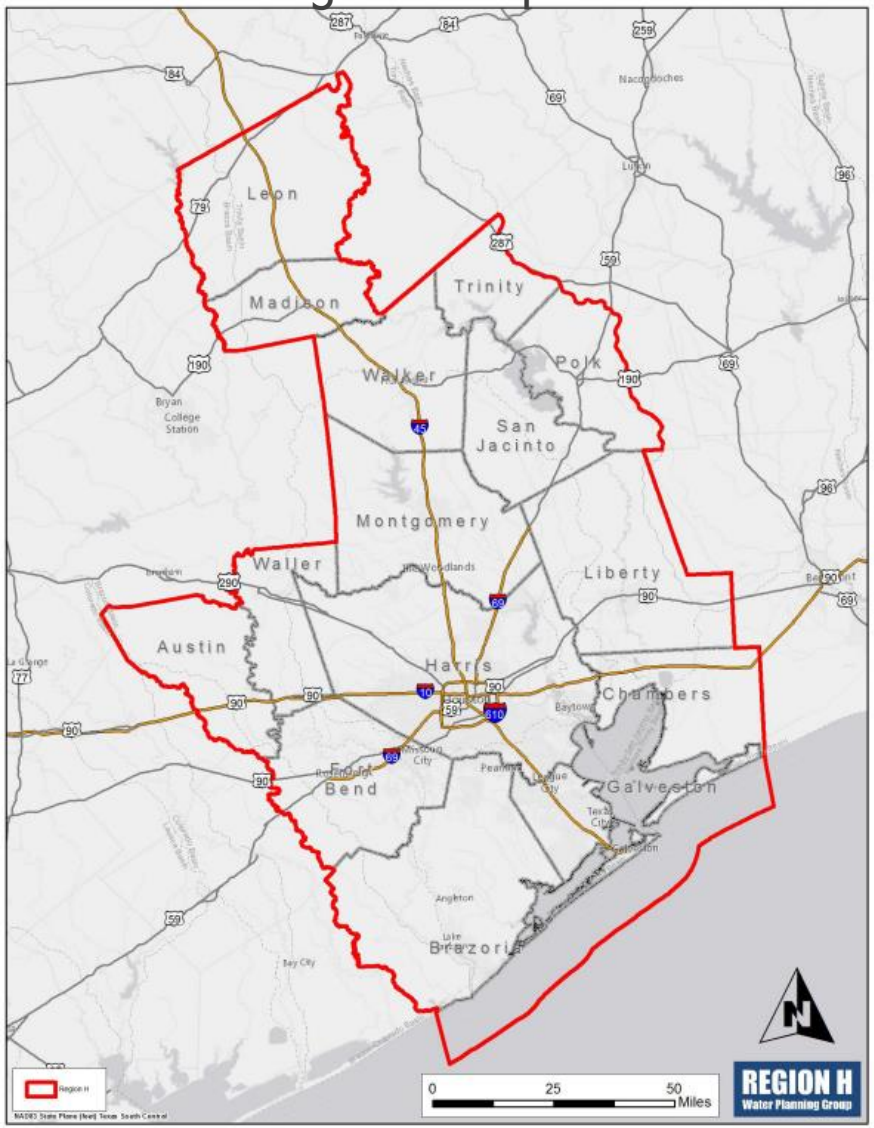
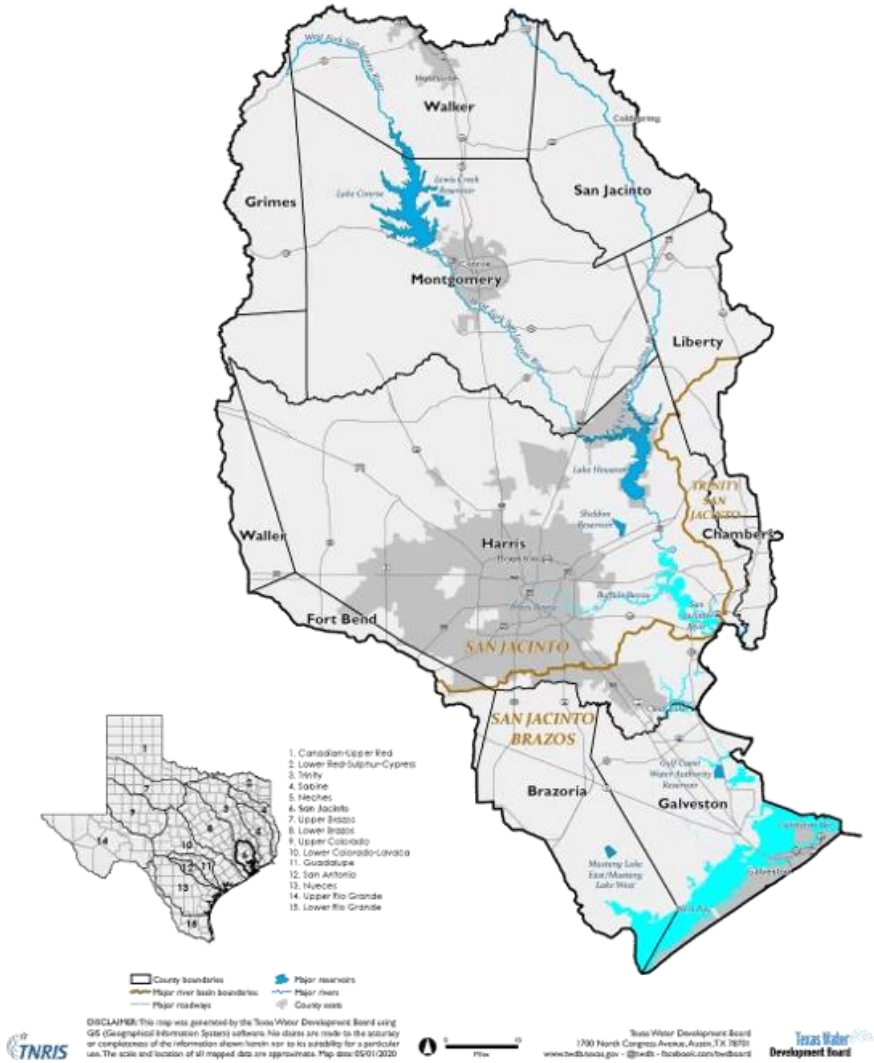
Region H Map



San Jacinto RFPG Map



Projected Population Growth

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County	Projected Population in			
	2020	2030	2040	2050
Austin	33,014	38,257	43,886	50,483
Brazoria	359,935	411,387	463,886	519,696
Chambers	42,162	50,543	59,210	68,541
Fort Bend	881,966	1,095,123	1,259,307	1,421,933
Galveston	343,570	377,373	403,820	427,547
Harris	4,707,870	5,058,144	5,376,099	5,678,242
Leon	18,211	19,536	20,603	22,071
Liberty	86,303	97,227	107,618	118,048
Madison	14,753	15,817	16,786	17,872
Montgomery	627,917	811,252	1,019,278	1,267,916
Polk	42,911	47,935	51,888	55,259
San Jacinto	29,610	32,627	34,996	37,614
Trinity	12,754	13,793	13,897	13,504
Walker	71,800	75,243	77,724	80,050
Waller	52,538	63,443	75,535	88,736
TOTAL	7,325,314	8,207,700	9,024,533	9,867,512

Note: Population projects are listed for Region H, which does not have the same boundaries as the San Jacinto RFP.

[1] Source: TWDB 2022 Texas State Water Plan, Planning Region H
https://2022.texasstatewaterplan.org/region/H

Rainfall Intensity

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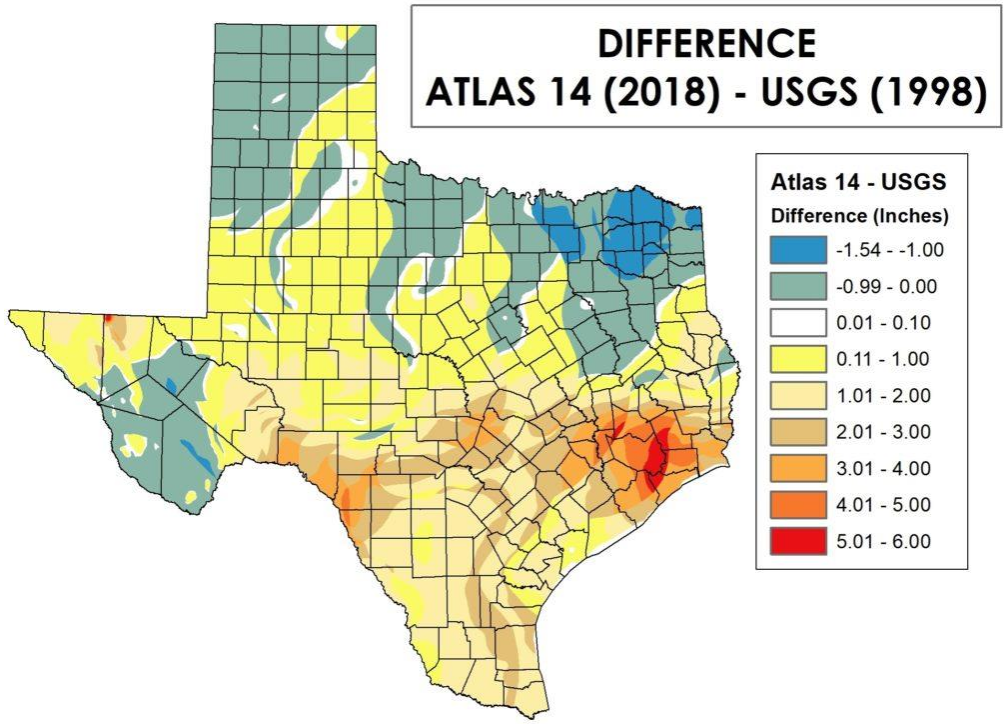
- Rainfall intensity values are anticipated to be influenced by climate change
- Redefined rainfall amounts are published by NOAA
- Rainfall intensity changes were reflected in the Atlas 14 precipitation estimates
- Texas coast saw a 10-15% increase in annual precipitation between 1991 and 2012 compared to 1901 and 1960[1]

24-hour, 100-year
Atlas 14 Precipitation



Source: NOAA Atlas 14

1 Source: "Climate Change and Sea-Level Rise Effects for the HSC ECIP Feasibility Study", USACE https://www.swg.usace.army.mil/Portals/26/docs/Planning/Public%20Notices-Civil%20Works/HSC-ECIP%20FIFR-EIS/App%20C%20%20Att%203%20Climate-SLR%20Effects%20(30Oct2019).pdf?ver=2020-01-21-080804-863

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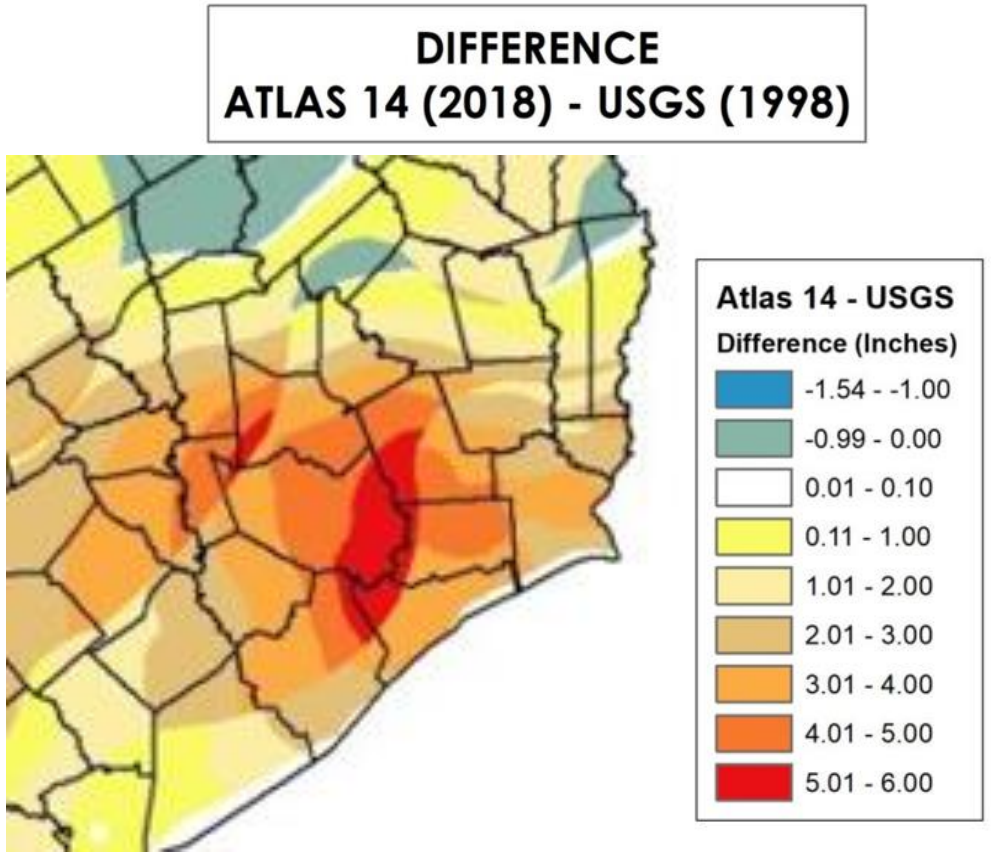

Source: NOAA Atlas 14

1 Source: "Climate Change and Sea-Level Rise Effects for the HSC ECIP Feasibility Study", USACE https://www.swg.usace.army.mil/Portals/26/docs/Planning/Public%20Notices-Civil%20Works/HSC-ECIP%20FIFR-EIS/App%20C%20%20Att%203%20Climate-SLR%20Effects%20(30Oct2019).pdf?ver=2020-01-21-080804-863

Climate Change

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- Guidance from Office of the Texas State Climatologist to TWDB[1]
- Climate change can impact rainfall depth throughout Texas
- The guidance given to TWDB assumes observed trends continue and Atlas 14 is an accurate estimate
- Current trends for the Gulf Coast area are around 12%

Recommended Ranges for 25- to 500-year Climate Change Rainfall				
	2021		2050-2060	
Location	Minimum	Maximum	Minimum	Maximum
Urban Areas	5%	12%	12%	20%
Rural Areas/River	-2%	5%	-5%	10%

Inherent uncertainty in the data

[1] Source: "Climate Change Recommendations for Regional Flood Planning"; https://climatexas.tamu.edu/files/CliChFlood.pdf

Sea Level Rise Considerations

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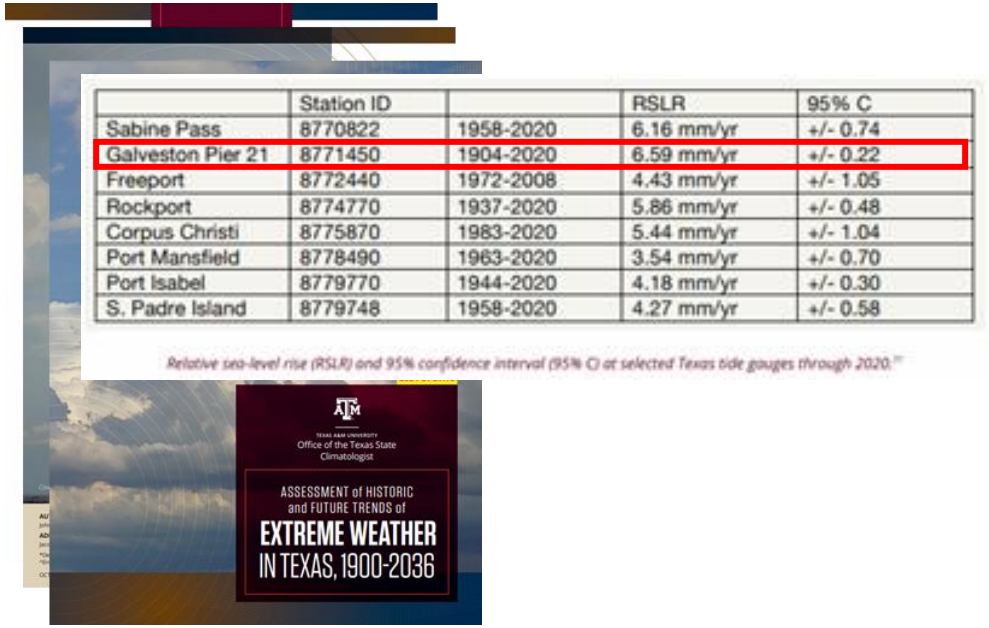
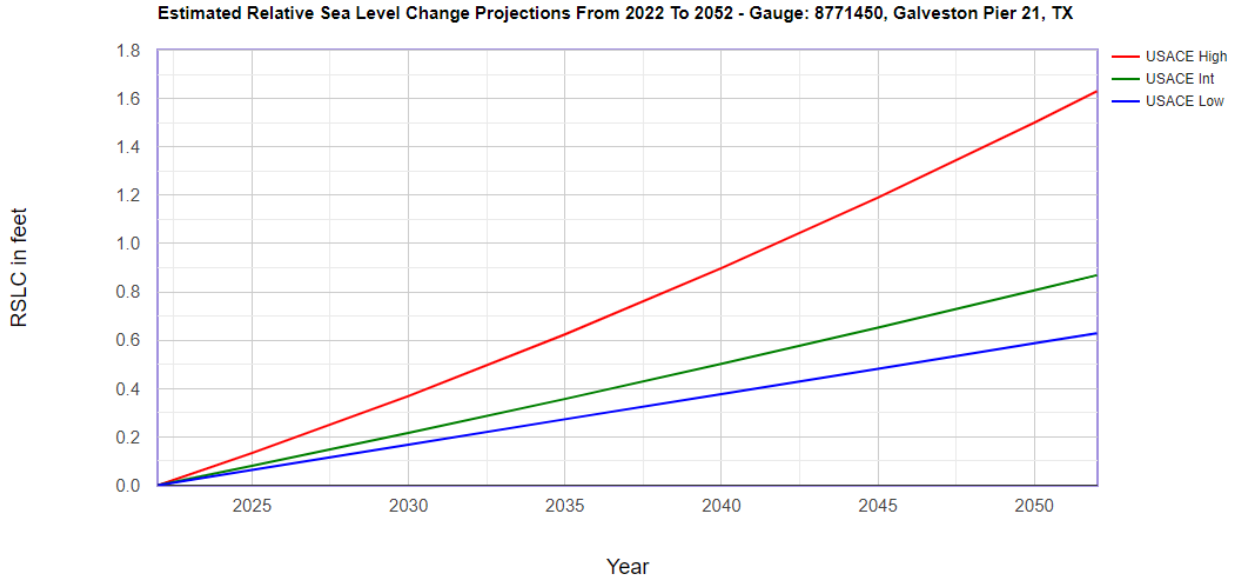
- Estimated SLR in Galveston Bay next 30 years - 0.85 feet (source: USACE 2021)
  - High (1.6 feet), Intermediate (0.85 feet), Low (0.6 feet)
- Historical Rates from Texas State Climatologist yield rate of 6.59 mm/yr [0.65 feet of SLR in 30 years]
- *Recommend* intermediate approach from USACE (0.85 feet) for SLR



	Station ID		RSLR	95% C
Sabine Pass	8770822	1958-2020	6.16 mm/yr	+/- 0.74
Galveston Pier 21	8771450	1904-2020	6.59 mm/yr	+/- 0.22
Freeport	8772440	1972-2008	4.43 mm/yr	+/- 1.05
Rockport	8774770	1937-2020	5.86 mm/yr	+/- 0.48
Corpus Christi	8775870	1983-2020	5.44 mm/yr	+/- 1.04
Port Mansfield	8778490	1963-2020	3.54 mm/yr	+/- 0.70
Port Isabel	8779770	1944-2020	4.18 mm/yr	+/- 0.30
S. Padre Island	8779748	1958-2020	4.27 mm/yr	+/- 0.58

Relative sea-level rise (RSLR) and 95% confidence interval (95% C) at selected Texas tide gauges through 2020.



Source: USACE Sea-Level Curve Calculator (army.mil)

Sea Level Rise Considerations

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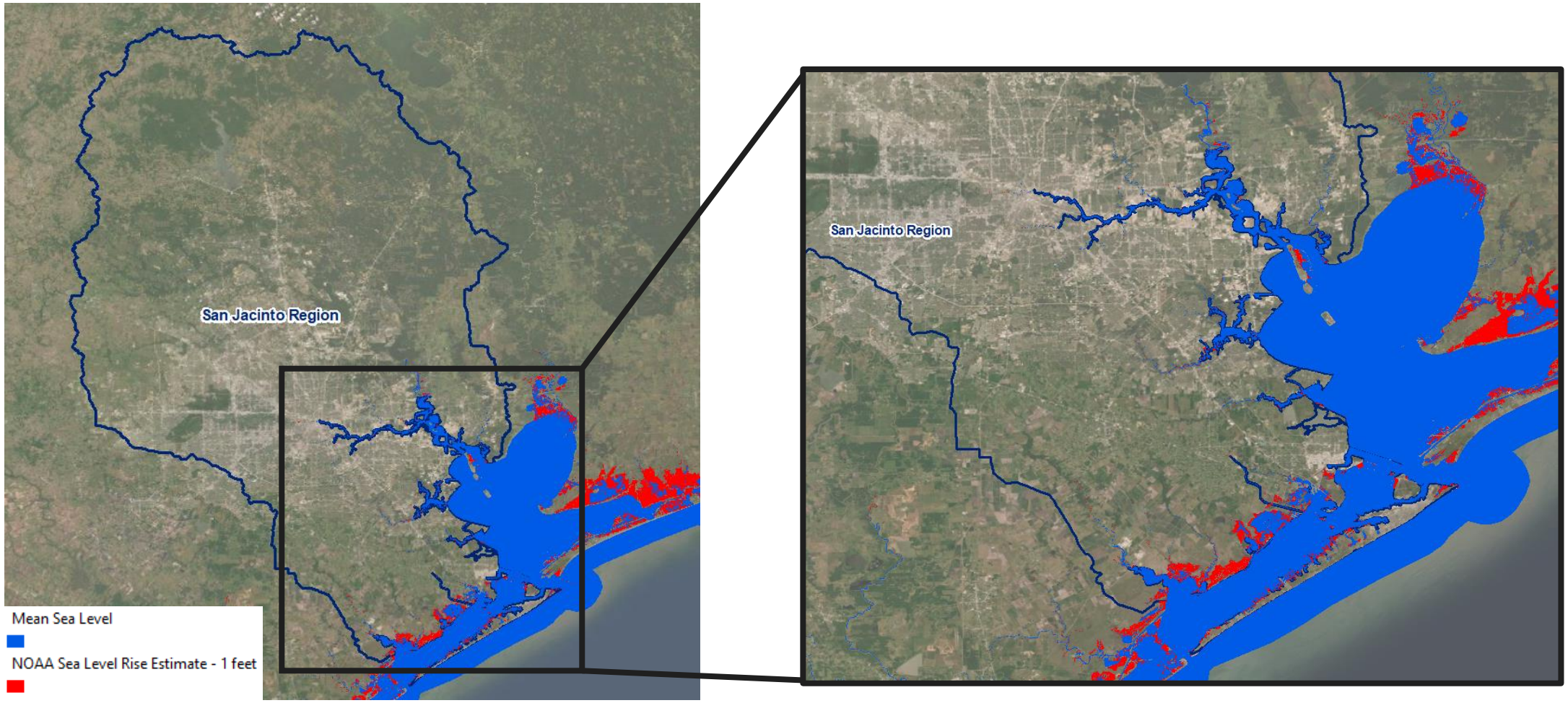

Source: Sea Level Rise and Coastal Flooding Impacts (noaa.gov)

Subsidence Considerations

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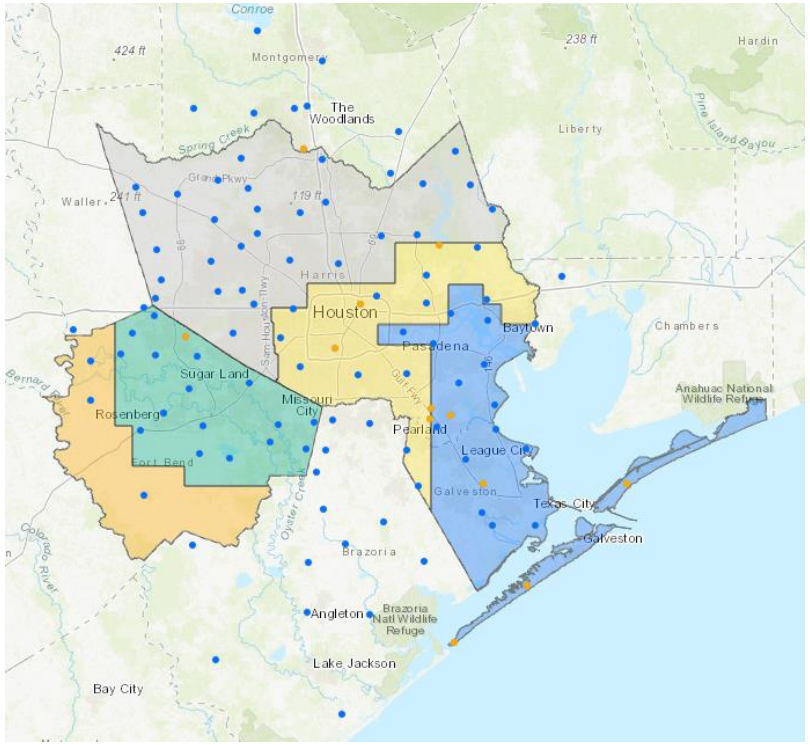
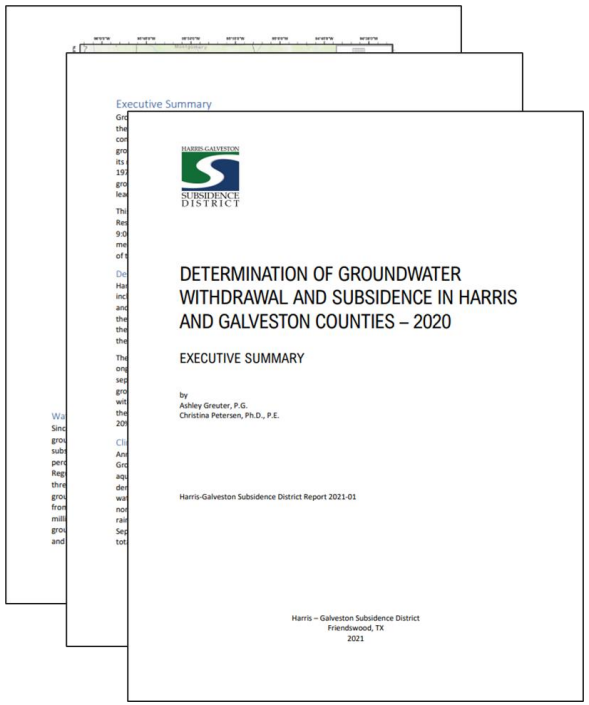
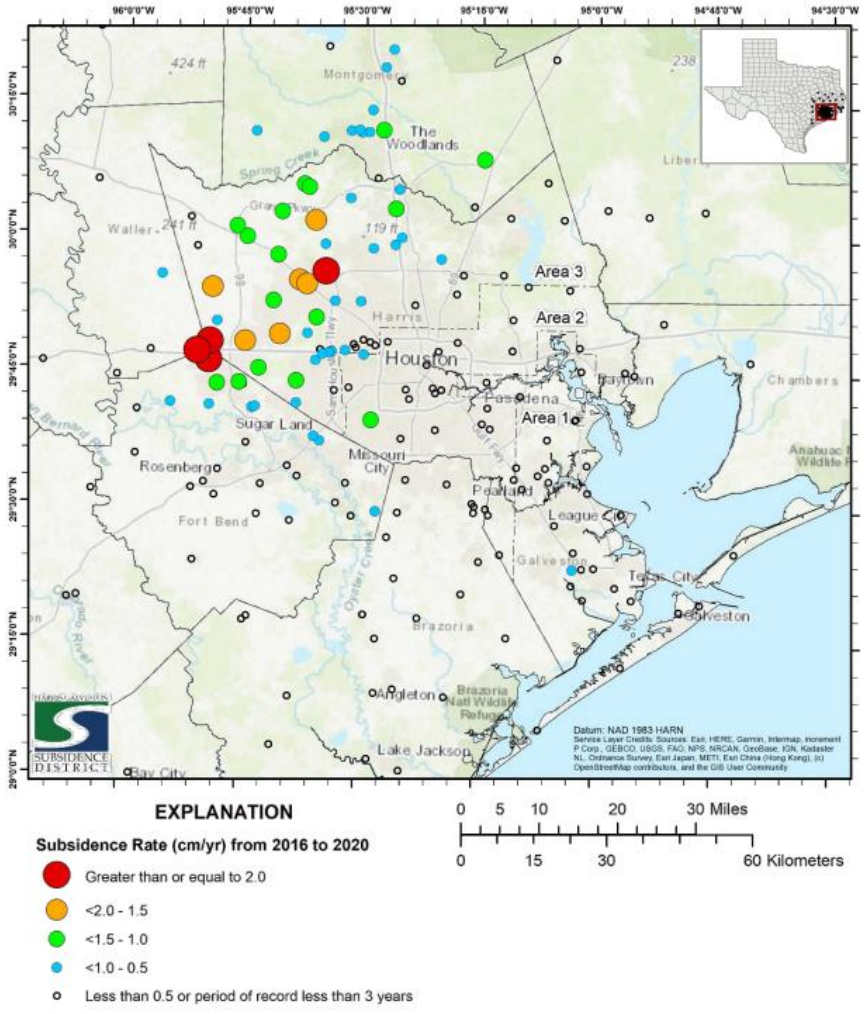
- *Recommend* projecting average rate for each subsidence area over 30 years
- Future floodplain WSE is increased by the average subsidence value







Source: H-GSD (2021)

Source: Measuring Subsidence - Harris Galveston Subsidence District (hgsubsidence.org)

Future 100-Year Approach

Future 100-Year Determination

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- Available Data
  - Existing conditions flood hazard
  - Existing studies within upper and mid watersheds
    - San Jacinto River Master Drainage Plan
    - Harris County FEMA Effective Modeling
- Recommendation
  - Existing 0.2% becomes Future 1%

Future 100-Year Determination

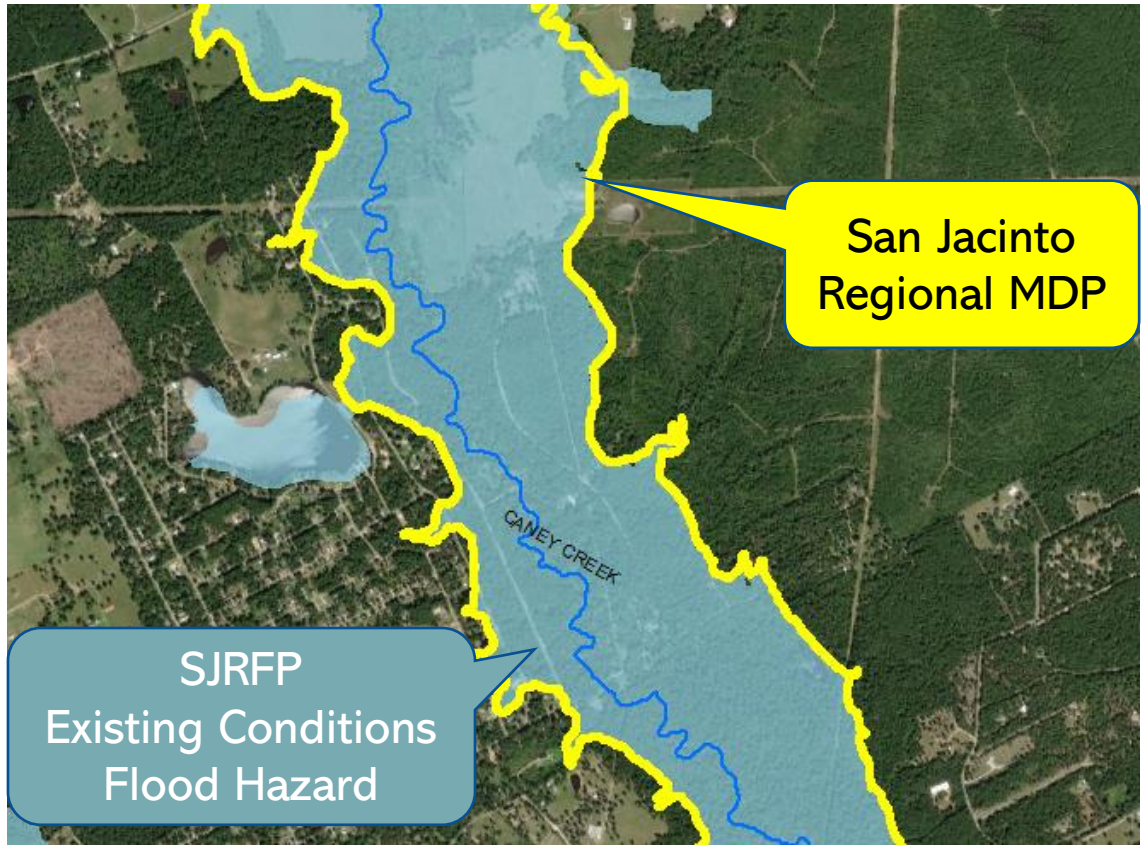
SAN JACINTO REGIONAL FLOOD PLANNING GROUP
REGION 6

- San Jacinto River Master Drainage Plan
  - Study of the upper San Jacinto River basin
  - Consisted of both updated existing conditions and a “future” conditions scenario
    - Future conditions accounted for population growth through increased impervious cover
  - Existing conditions included Atlas 14 rainfall
  - Future conditions included 50-year population outlook
- Harris County Flood Control District FEMA Modeling
  - Effective models consisted of pre-Atlas 14 rainfall
  - Updated modeling to include Atlas 14 rainfall
- San Jacinto River Regional Flood Planning
  - Combination of FEMA effective floodplains and base level engineering

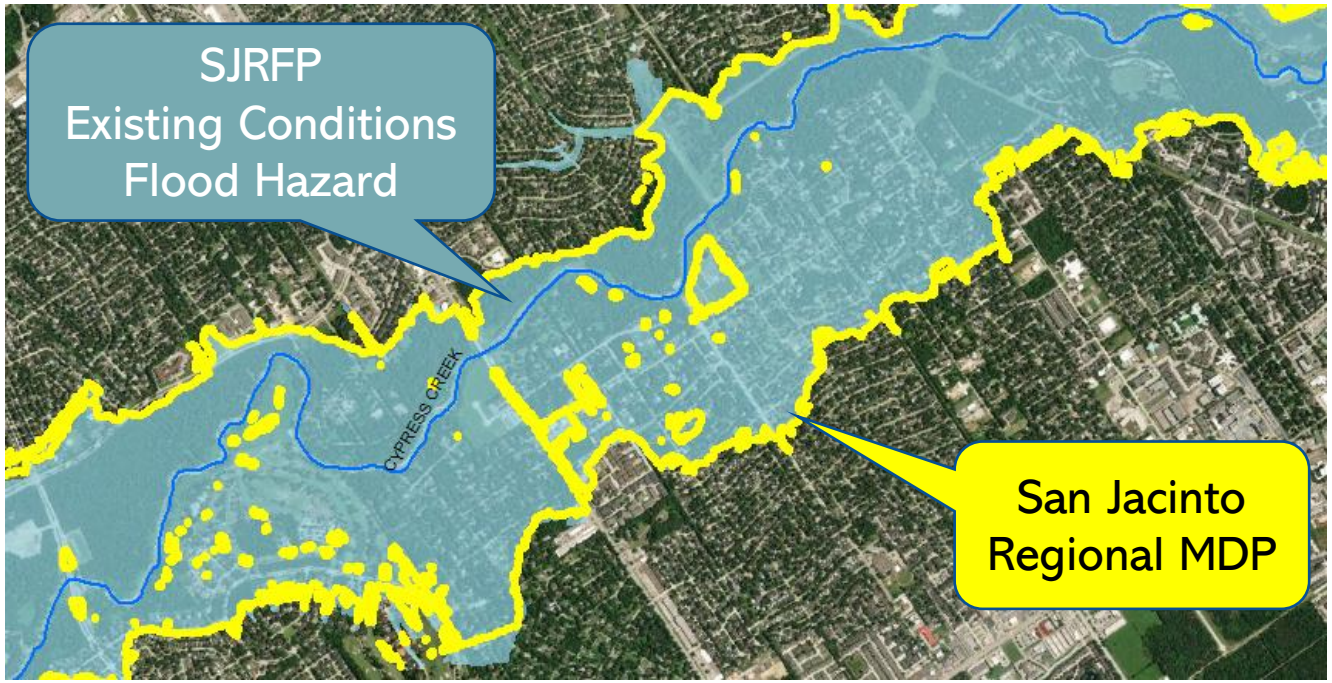
Future 100-Year Determination

SAN JACINTO REGIONAL FLOOD PLANNING GROUP
REGION 6

Caney Creek



Cypress Creek



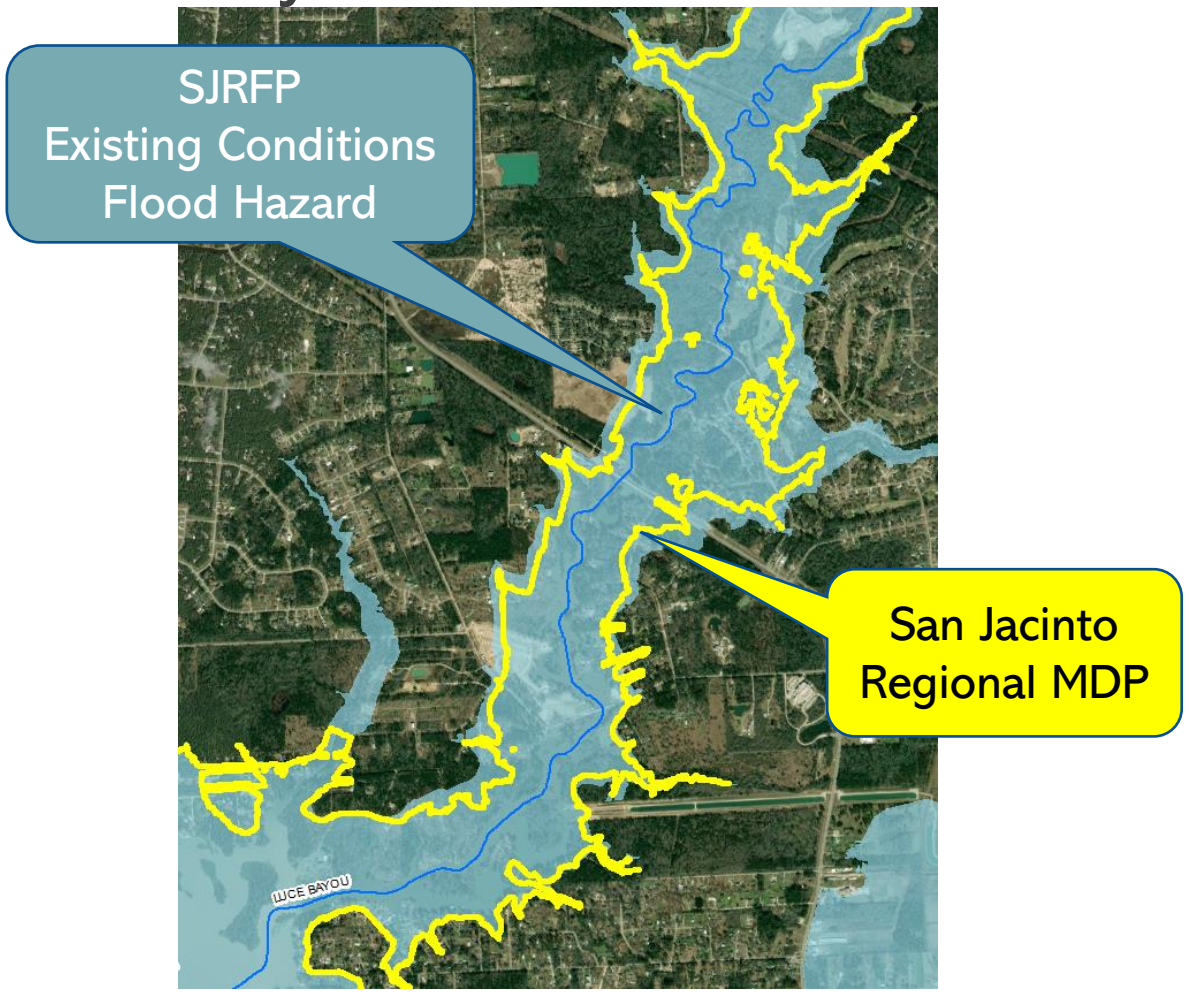
Legend

- Stream
- Future Inundation Boundary 100YR
- Existing Inundation Boundary 500YR

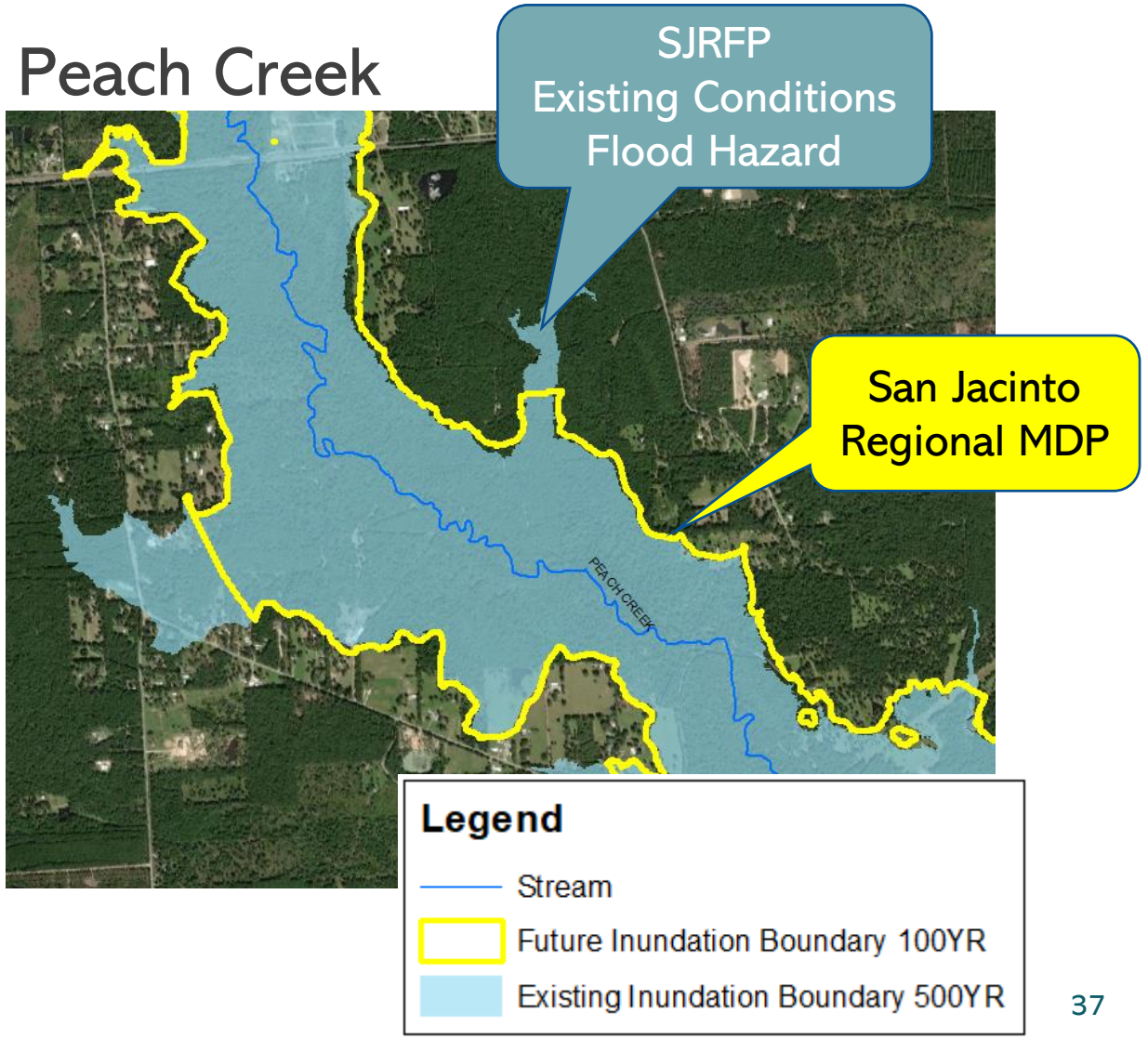
Future 100-Year Determination

SAN JACINTO REGIONAL FLOOD PLANNING GROUP
REGION 6

Luce Bayou



Peach Creek



Future 100-Year Determination

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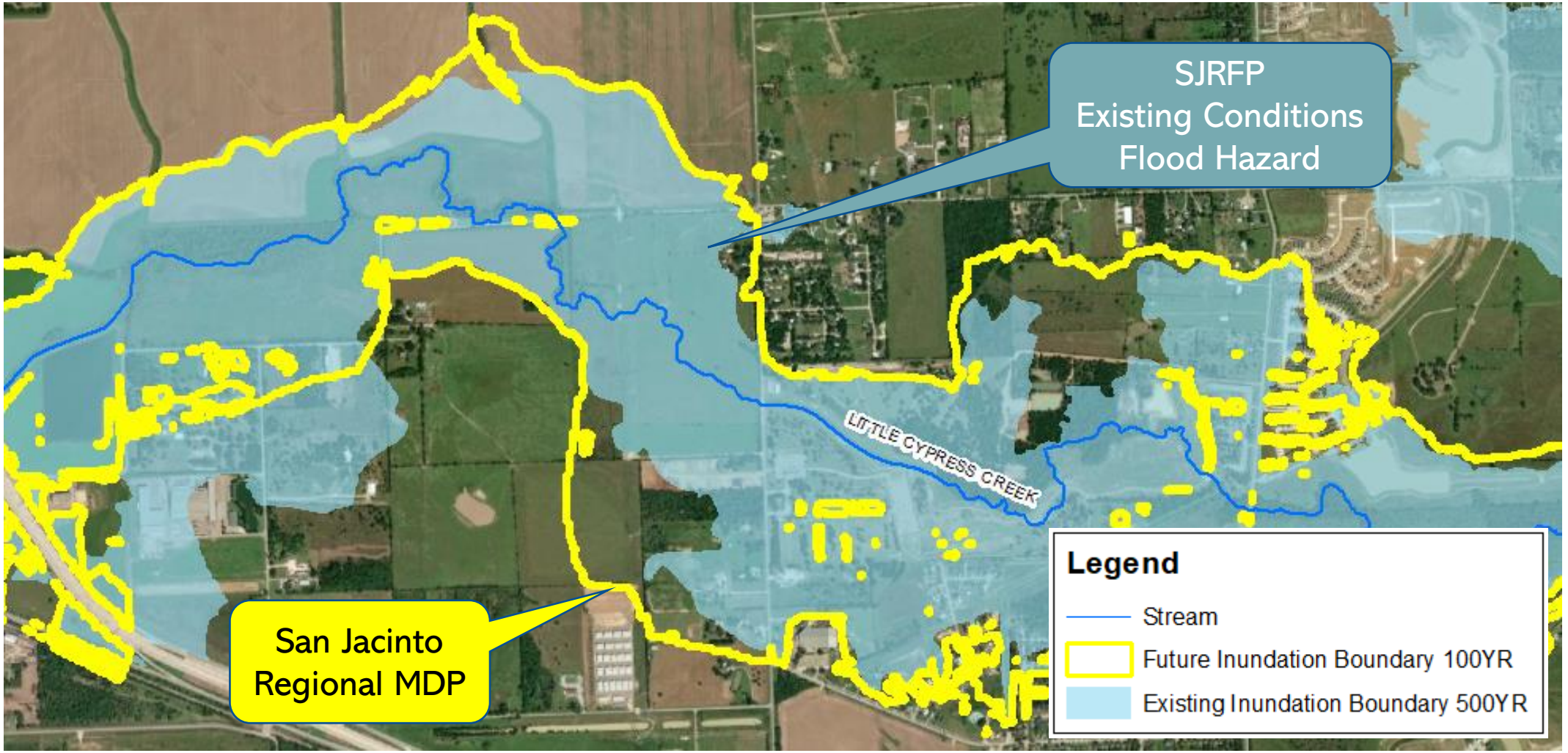

Greens Bayou Comparison

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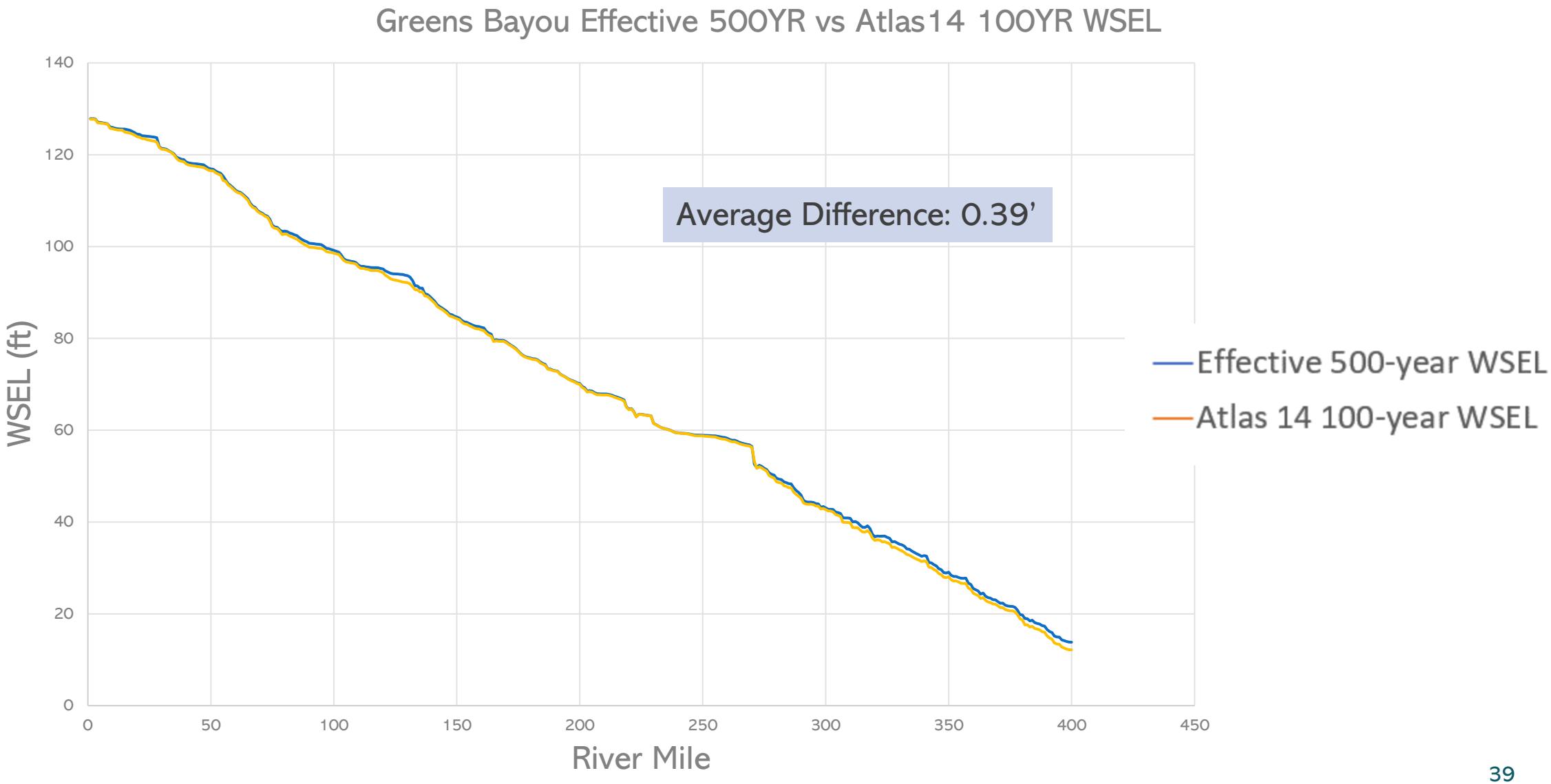

White Oak Bayou Comparison

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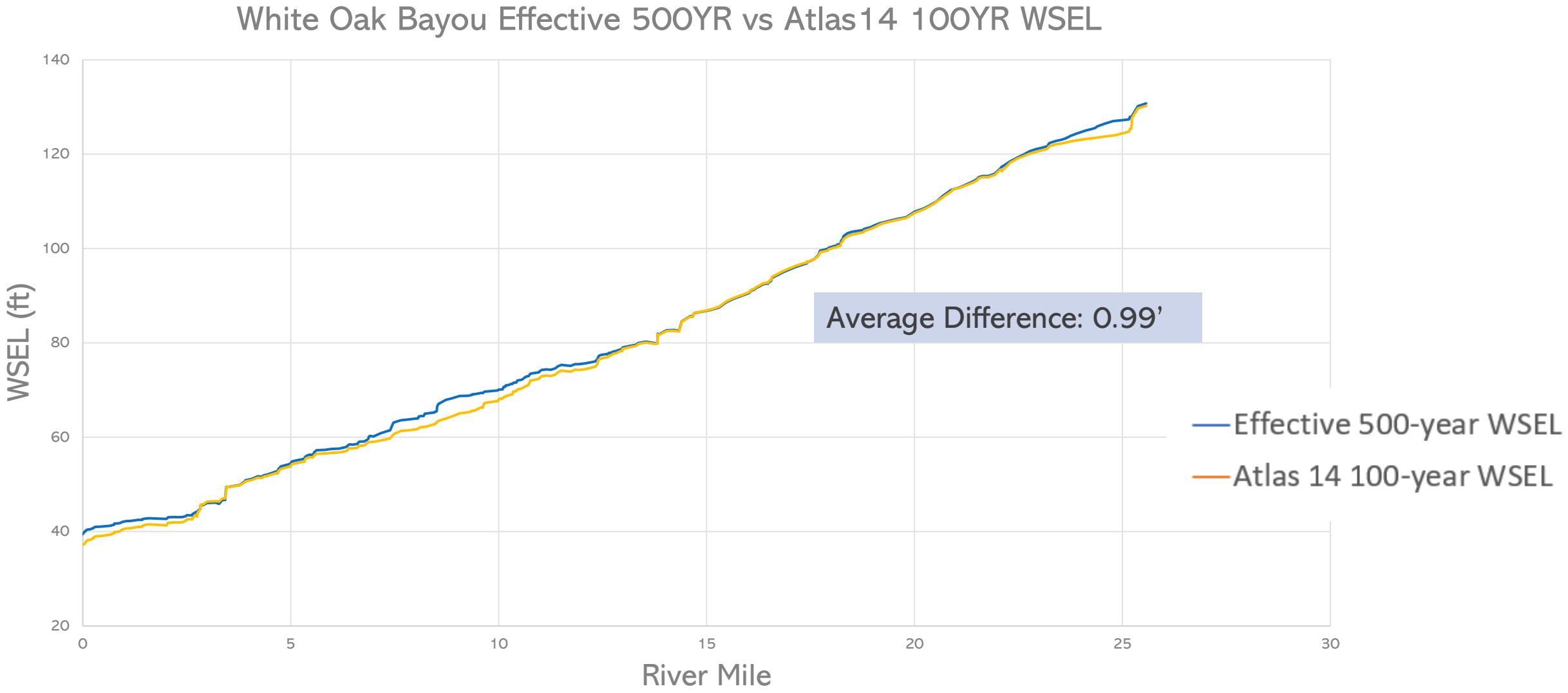

Sims Bayou Comparison

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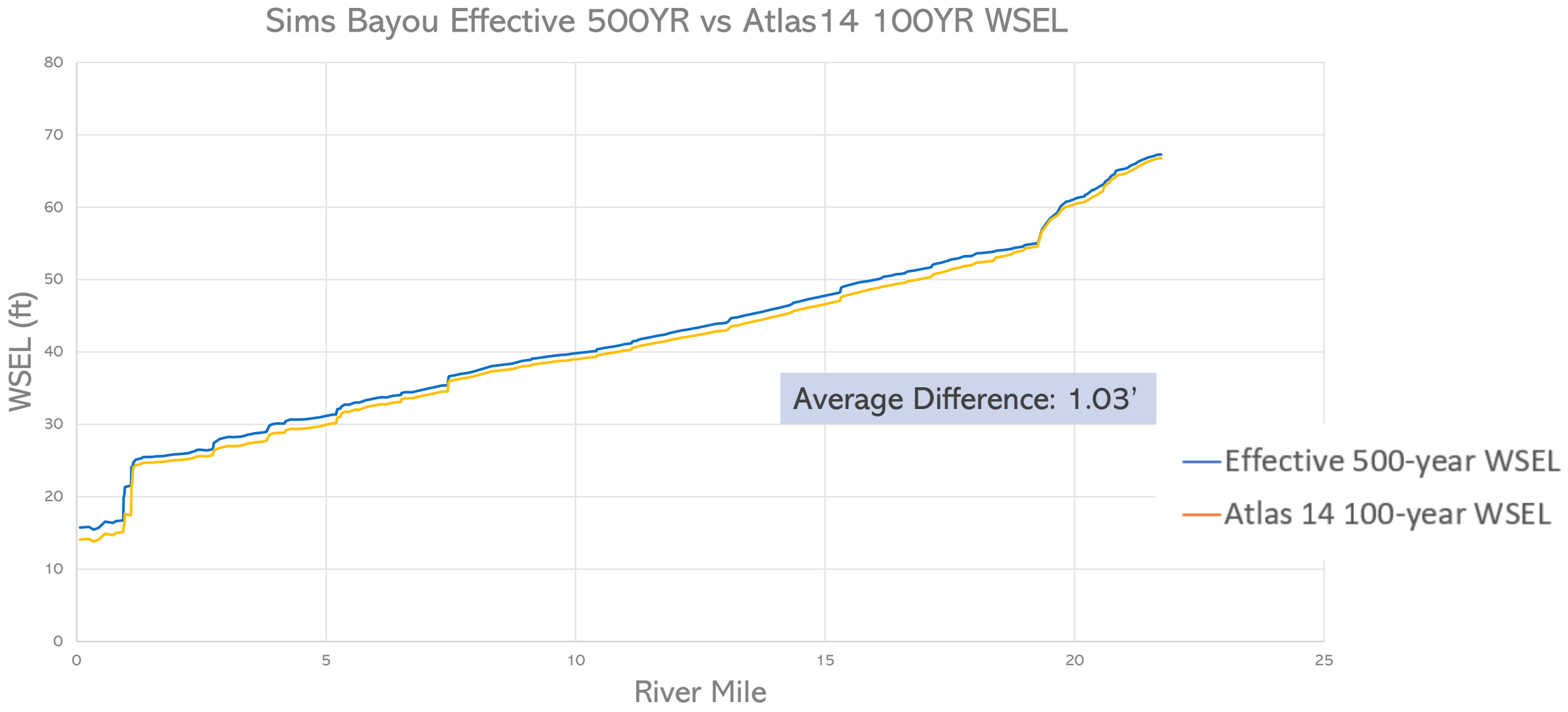

Buffalo Bayou Comparison

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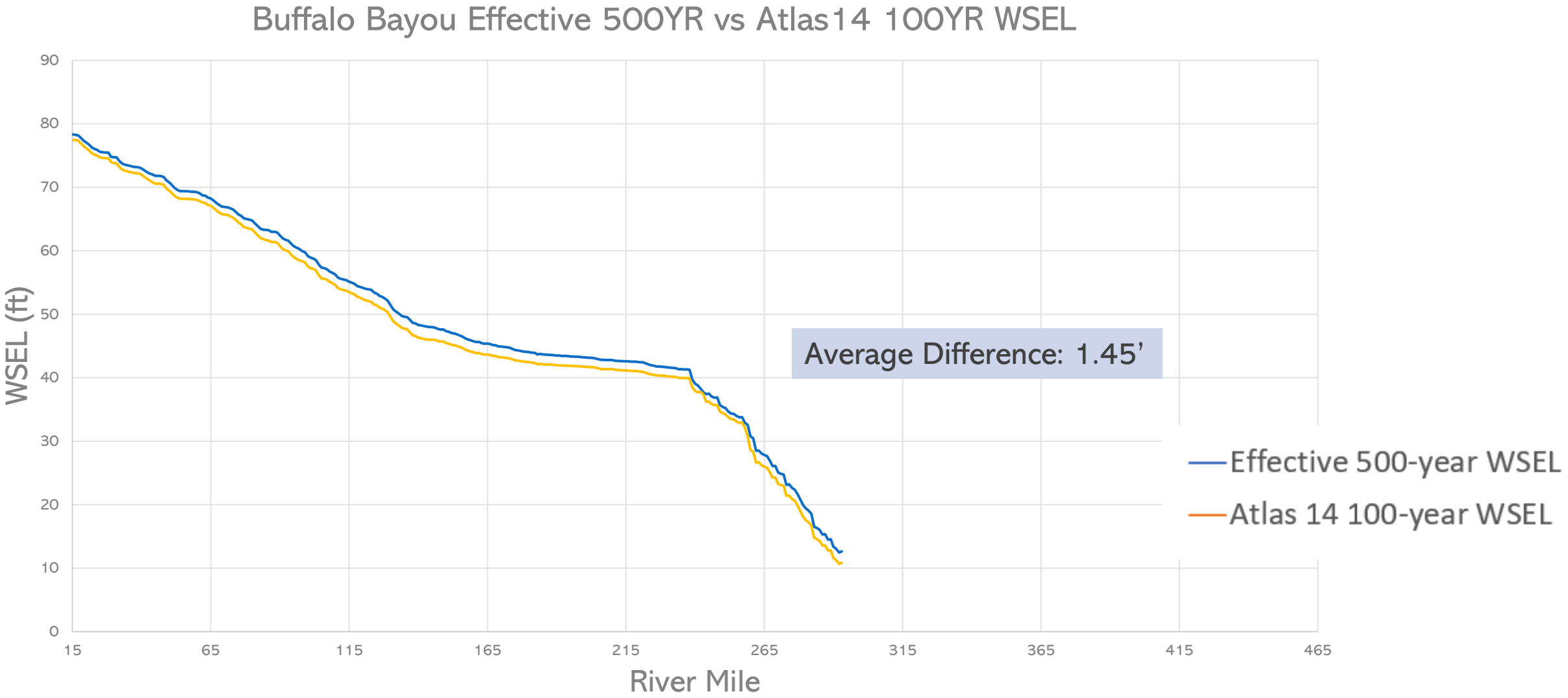

Conclusions – 100-year

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- SJRMDP modeling shows anticipated future 100-year flood hazard is reasonably consistent with the existing conditions 500-year flood hazard
- Atlas 14 100-year water surface elevations within Harris County models are reasonably consistent with the existing conditions 500-year flood hazard
- Differences in water surface elevations and floodplain extents (boundaries) are attributed to different modeling approaches and the approximate nature of the comparison analysis
- While these differences exist, they are typically within an acceptable range for the purpose of Task 2B and support the general agreement between 100-year and 500-year flood hazard

Conclusions made during this analysis align with the findings of other agencies such as Harris County and HCFCD

Recommendations – 100-year

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*The **current effective 500-year floodplain** is an appropriate approximation for the **future 100-year floodplain***

Consider the opportunity for inclusion of existing data and studies that have analyzed future flood risk when amending the plan as part of the additional funding allocation.

Future 500-Year Approach

Future 500-Year Determination

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Considerations

- Increased rainfall may increase floodplain extents
- Varying floodplain widths dependent on stream size and topography
- Limited mapping outside the 500-year floodplain
- Limited available "future" modeling and results
- Recommendation
  - Existing 0.2% + buffer becomes Future 0.2%

Also applies to Future 100-year determination

- Obtain a general understanding of future flood risk
- Not a regulatory product

Future 500-Year Determination

SAN JACINTO REGIONAL FLOOD PLANNING GROUP
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- San Jacinto River Master Drainage Plan
  - Study of the upper San Jacinto River basin
  - Consisted of both updated existing conditions and a “future” conditions scenario
  - Existing conditions included Atlas 14 rainfall
  - Future conditions included 50-year population outlook
- Harris County Flood Control District FEMA Modeling
  - Effective models consisted of pre-Atlas 14 rainfall
  - Updated modeling to include Atlas 14 rainfall
- San Jacinto River Regional Flood Planning
  - Combination of FEMA effective floodplains and base level engineering

Future 500-Year Determination

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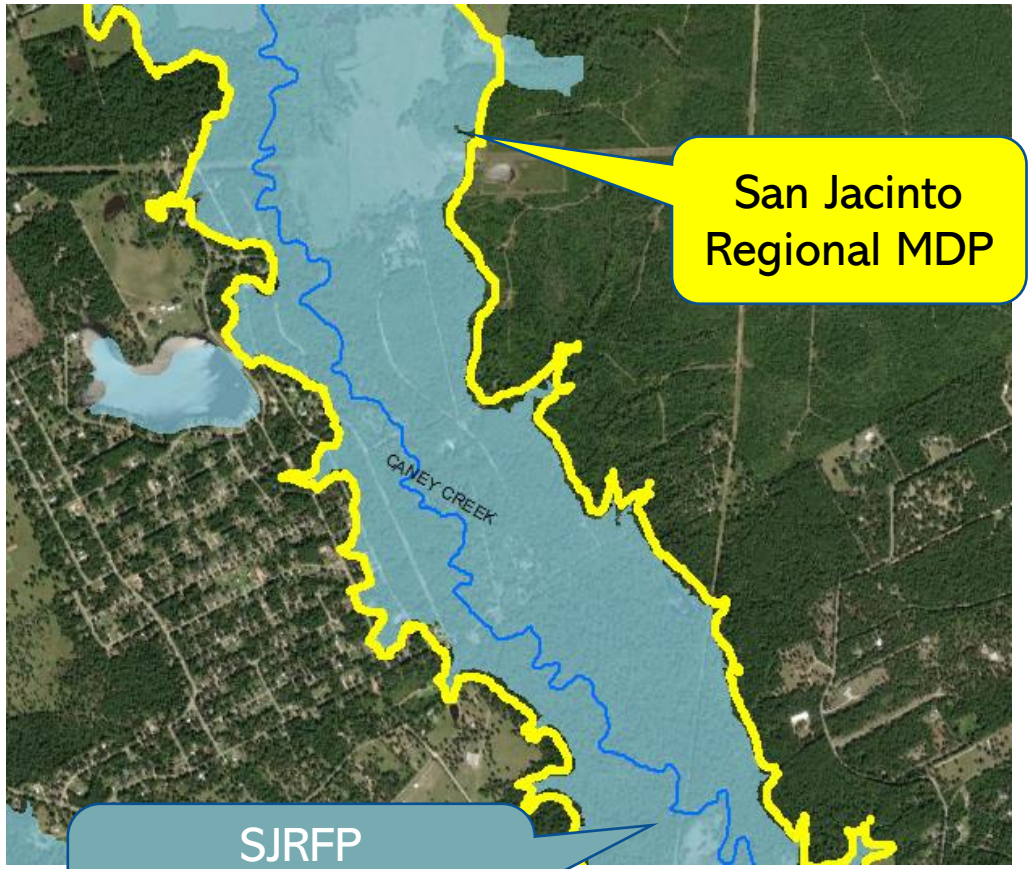
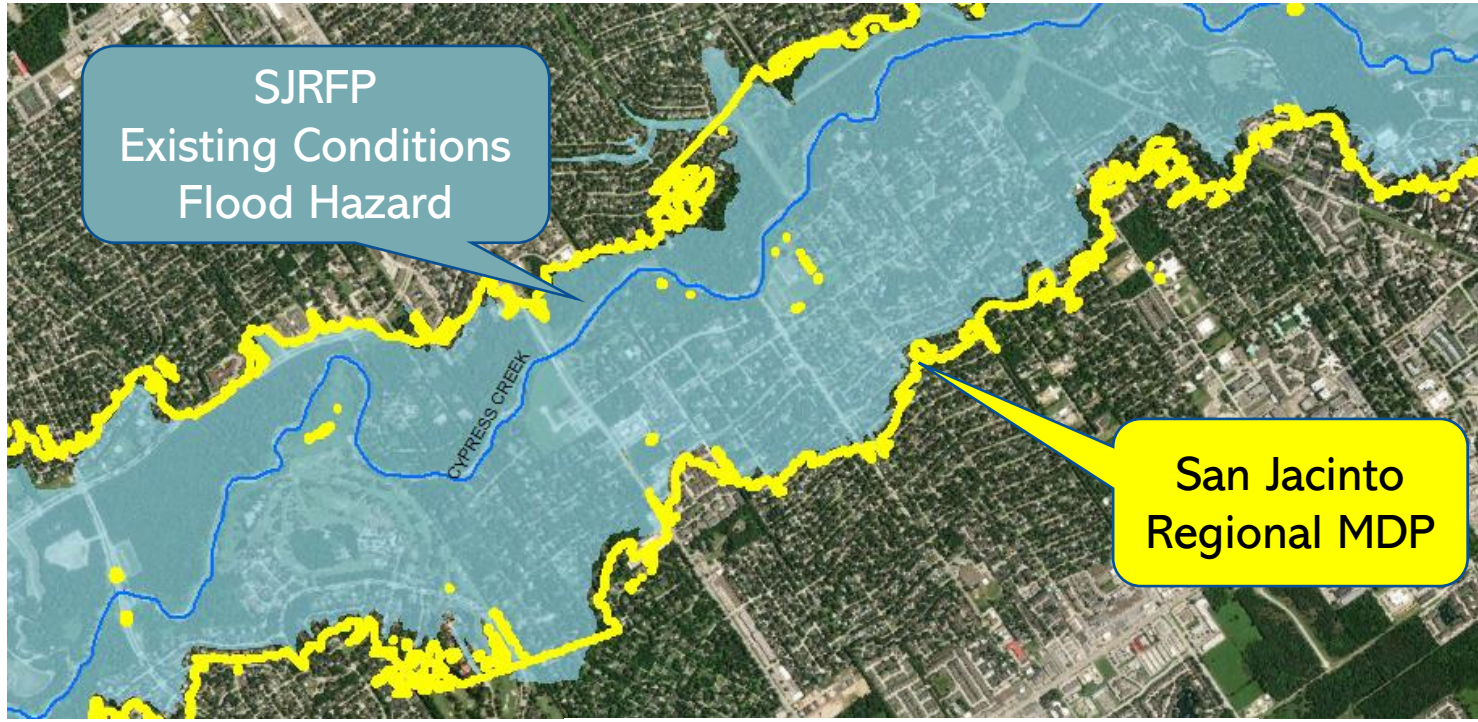
Caney Creek



Cypress Creek



Legend

- Stream
- Future Inundation Boundary 500YR
- Existing Inundation Boundary 500YR

Future 500-Year Determination

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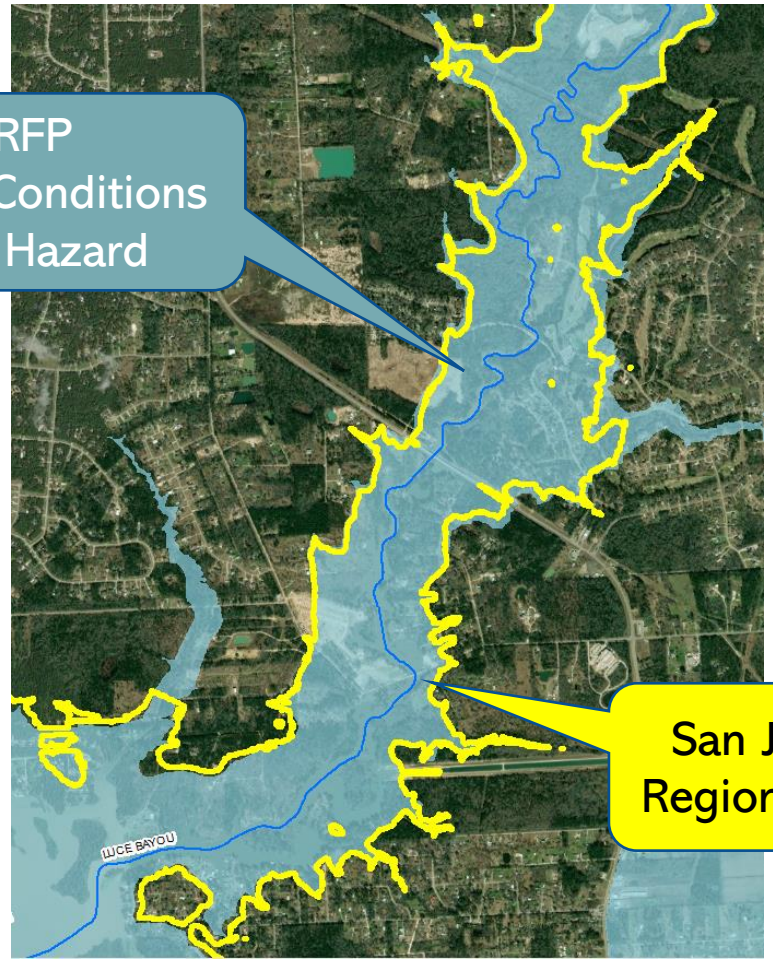
REGION 6

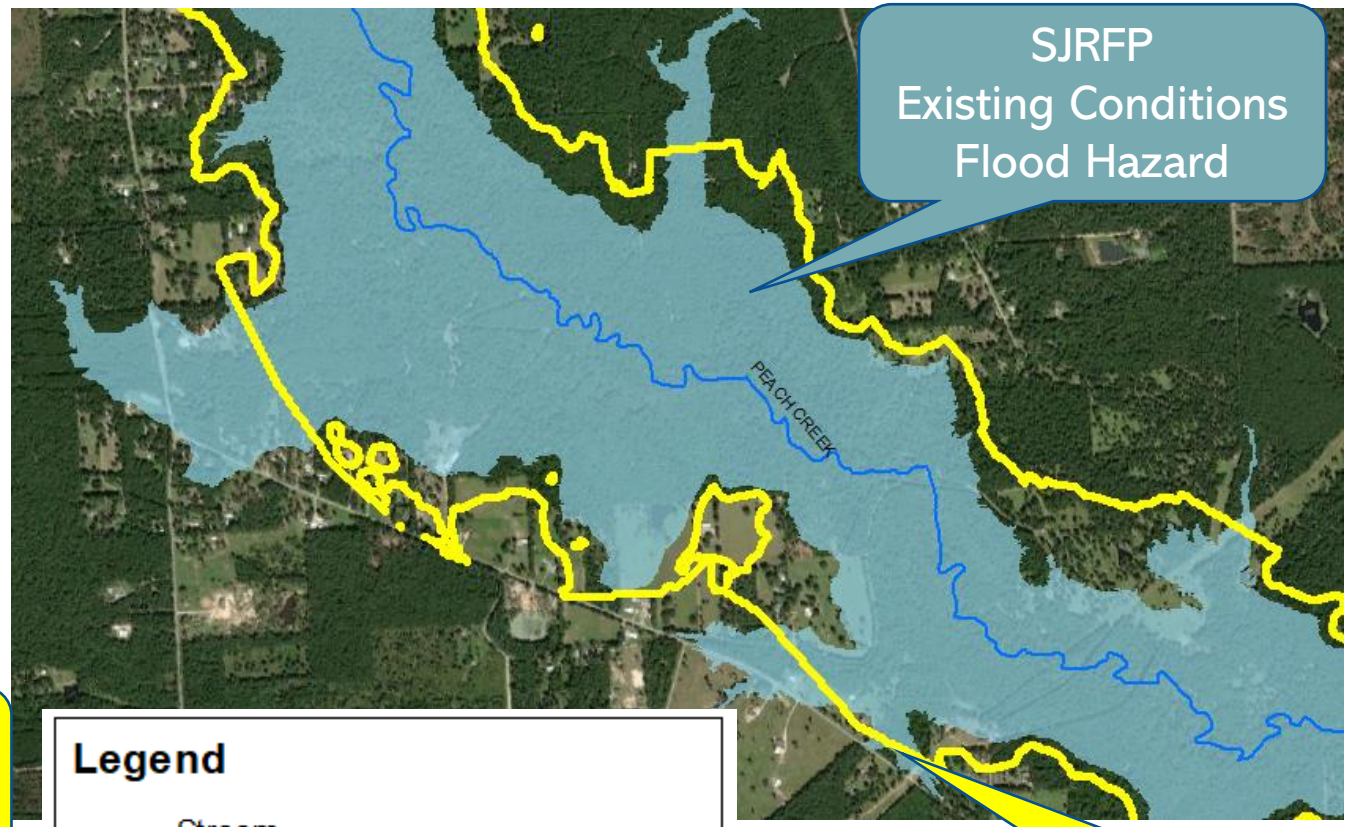
Luce Bayou



SJRFP
Existing Conditions
Flood Hazard

San Jacinto
Regional MDP

Peach Creek



SJRFP
Existing Conditions
Flood Hazard

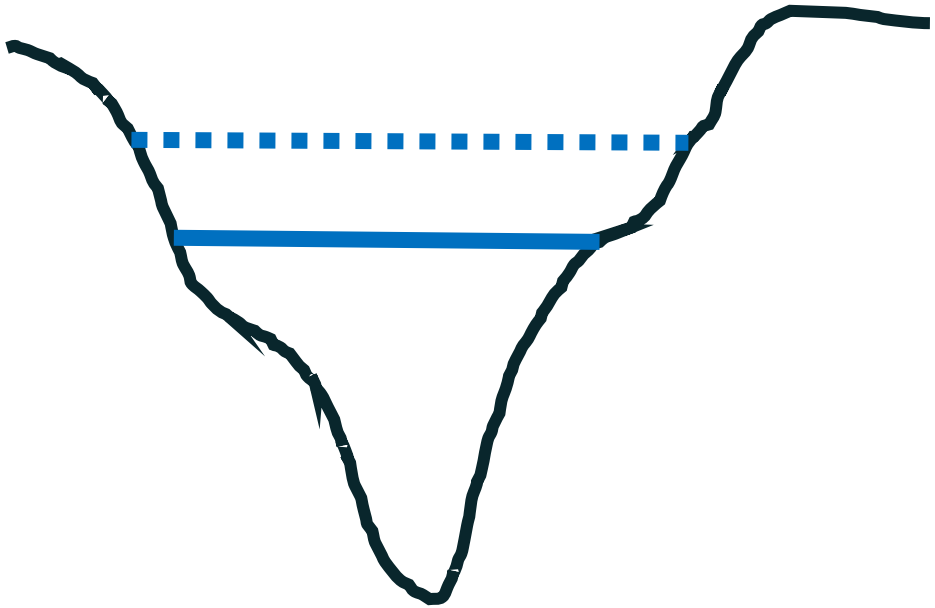
San Jacinto
Regional MDP

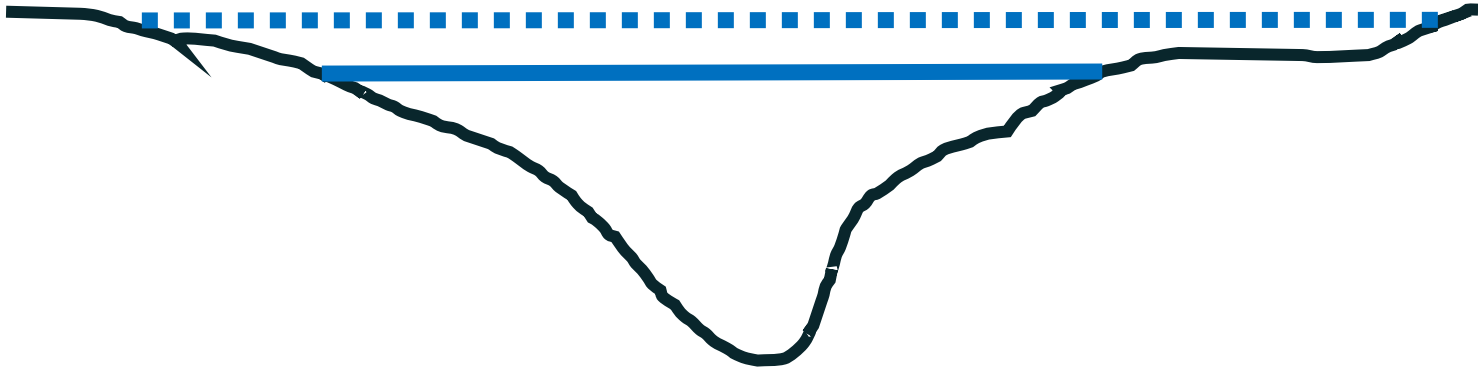
Legend

- Stream
- Future Inundation Boundary 500YR
- Existing Inundation Boundary 500YR

Future 500-Year Determination

SAN JACINTO REGIONAL FLOOD PLANNING GROUP
REGION 6



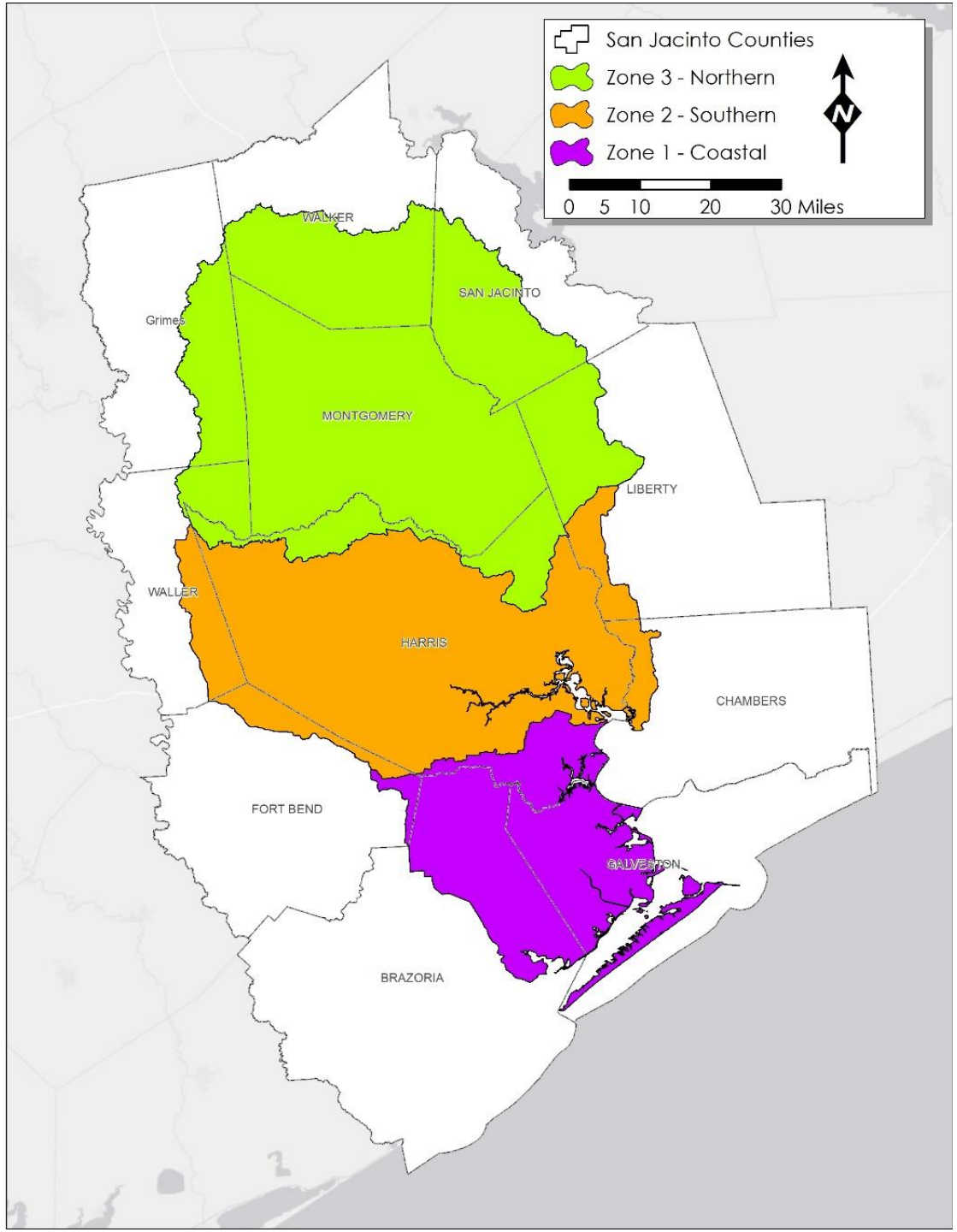


Steep Terrain
- Increased flow due to rainfall
- Larger change in WSEL
- Limited change in floodplain extents

Flat Terrain
- Increased flow due to rainfall
- Smaller change in WSEL
- Larger change in floodplain extents

Zone Designation

- Varying terrain throughout the watershed requires a differing approach
- Three “zones” for 500-year buffers based on topography



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Riverine Modeling – Northern Zone

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Effective 500-year storm compared to Future Modeled* 500-year storm	
Channel	Average Difference of Floodplain Top Width (ft)
Lake Creek	343
Peach Creek	488
Willow Creek	497
Spring Creek	565
Caney Creek	612
Recommendation	**500**

**Future Modeled storm includes future development + Atlas 14 rainfall values*

Riverine Modeling – Southern Zone

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Effective 500-year storm compared to Future Modeled* 500-year storm	
Channel	Average Difference of Floodplain Top Width (ft)
Greens Bayou	701
Buffalo Bayou	817
White Oak Bayou	843
Sims Bayou	1,096
Recommendation	**850**

**Future Modeled includes Atlas 14 rainfall values*

Applying the Buffer - Tributaries

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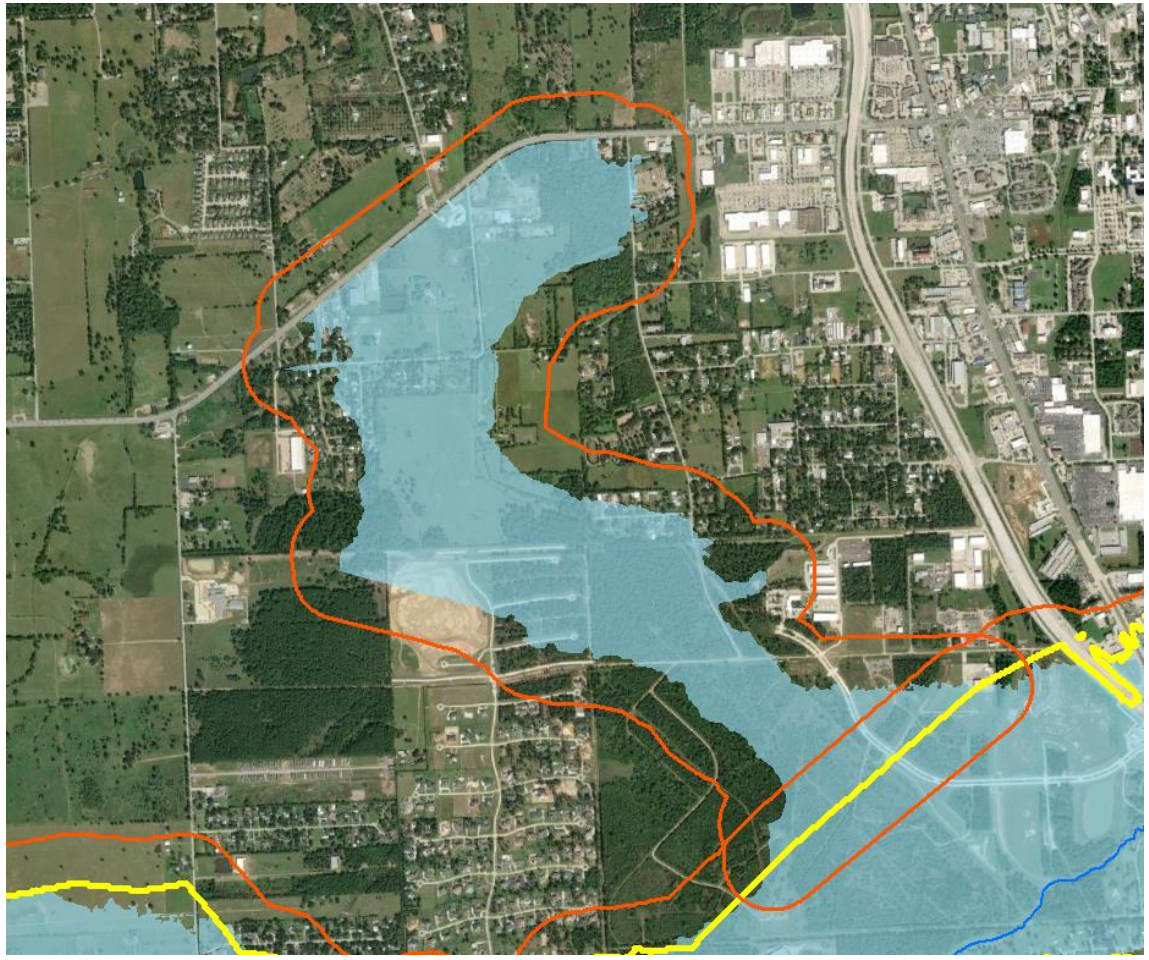
- Tributaries vary in floodplain width and characteristics
  - Urbanization
  - Topography
  - Channelization
  - Level of service
- Limited available future conditions tributary modeling



Applying the Buffer - Tributaries

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Three Potential Options

	Advantages	Disadvantages
Option 1: No tributary buffer	Tributary buffers may differ and removes assumptions	May not necessarily reflect future conditions for the tributaries
Option 2: Same buffer for main stems and tributaries	Uses available information	Floodplain buffer could be different from the main stems since detailed hydraulic modeling is not available.
Option 3: Differing buffer for tributaries	Most accurate option	Large data gaps – no data on the tributary buffer

Recommendations – 500-year

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Northern Zone

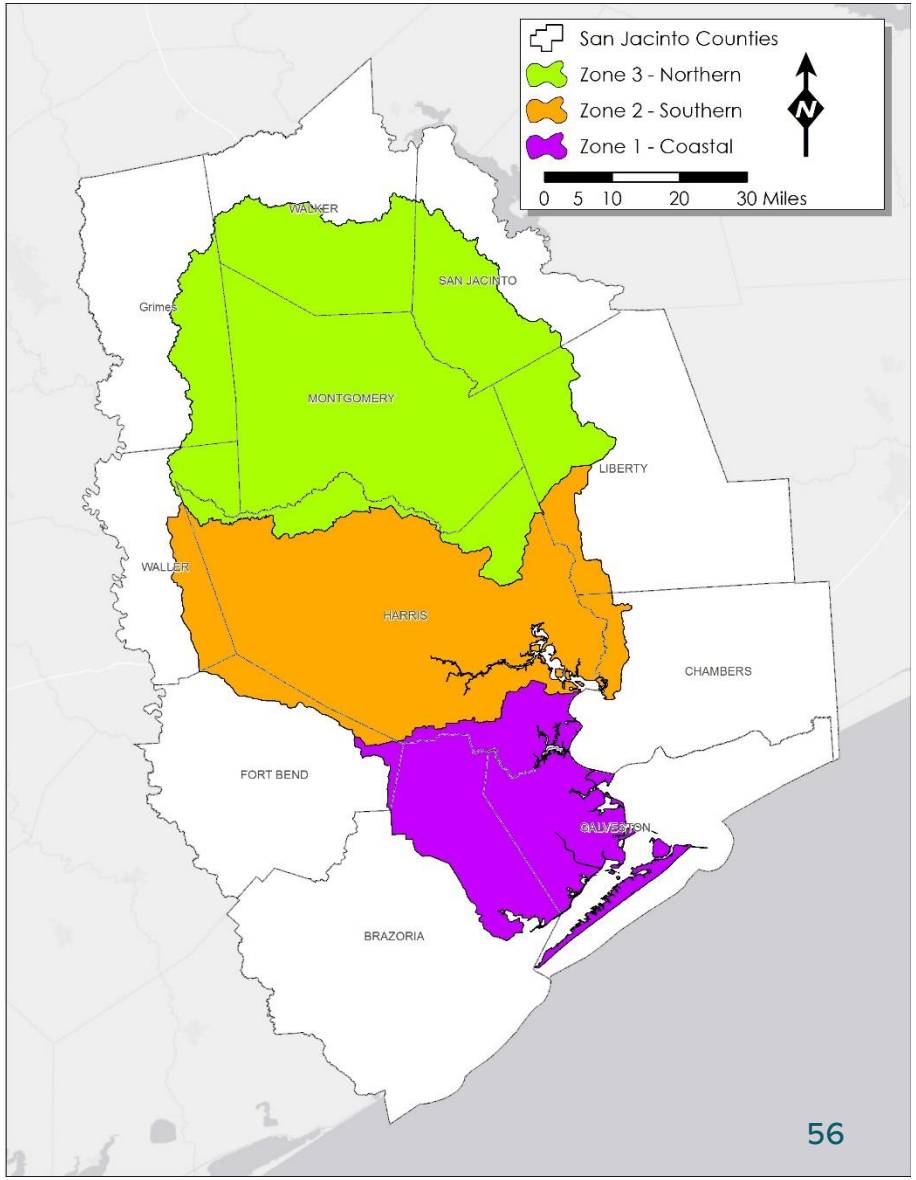
Present Conditions: Effective 500-year + 500’ = Future Conditions: Future 500-year

Southern Zone

Present Conditions: Effective 500-year + 850’ = Future Conditions: Future 500-year

Coastal Zone

Present Conditions: Effective 500-year + Coastal Buffer = Future Conditions: Future 500-year



Willow Creek with Buffer

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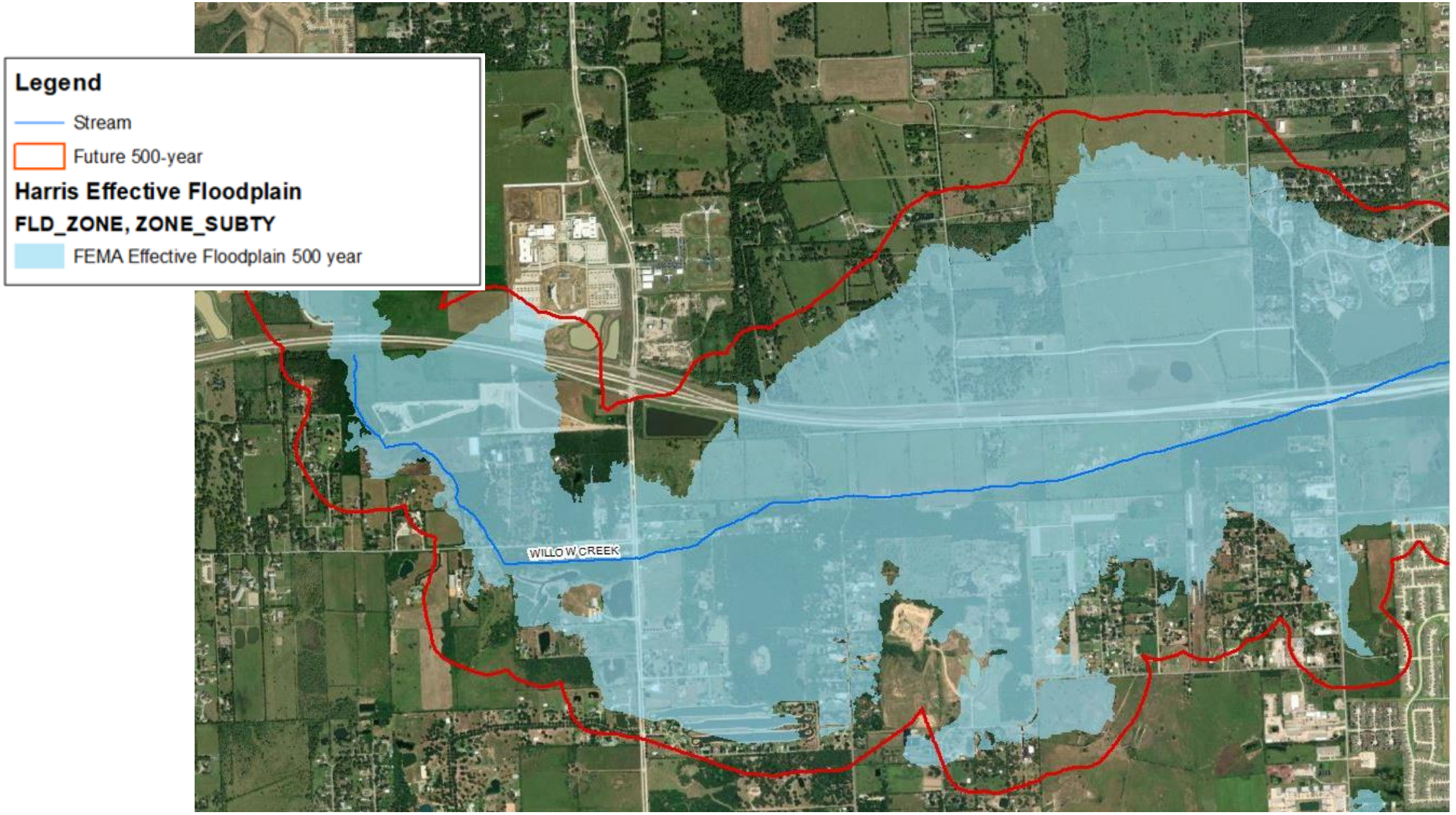

Coastal Flood Hazard Analysis

Coastal Flood Hazard Analysis

Sea Level Rise Considerations

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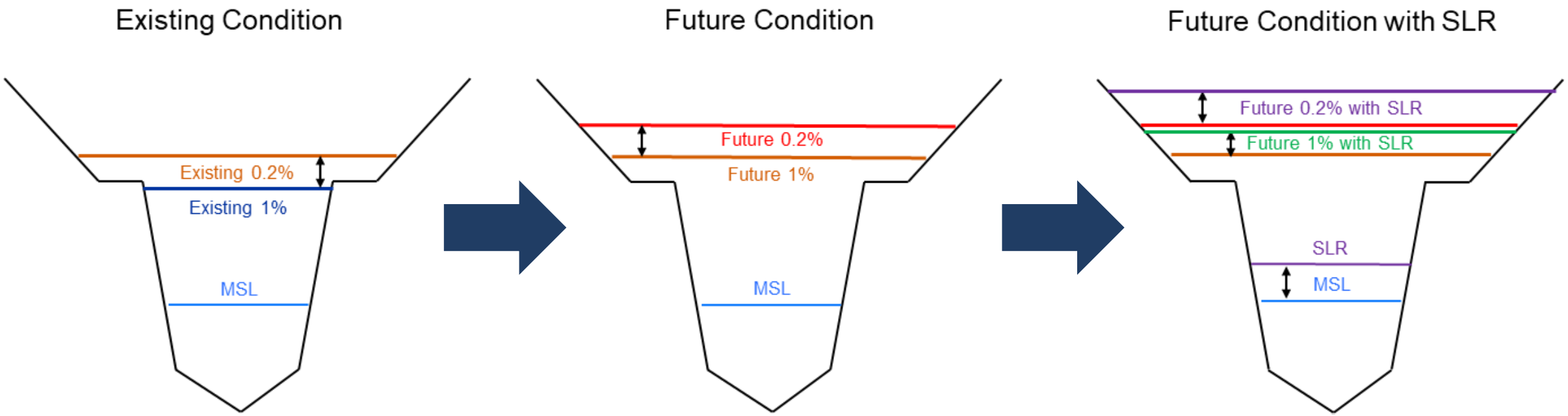

Estimated SLR ≈ 0.85 feet

Coastal Flood Hazard Analysis

Sea Level Rise Considerations

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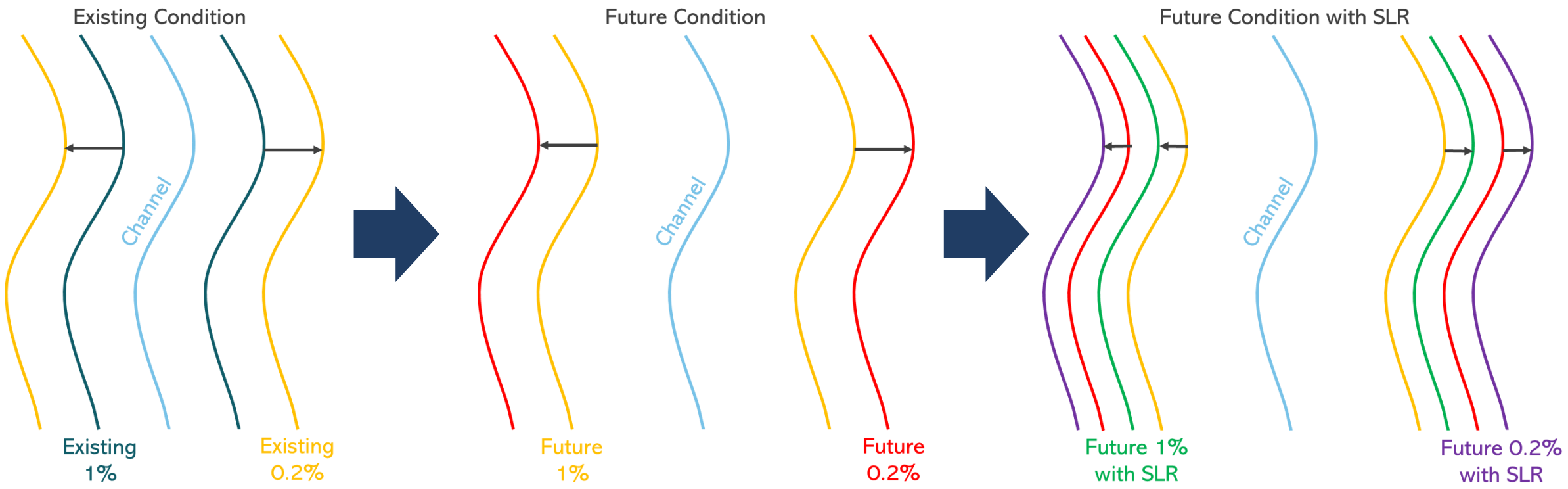

Coastal Flood Hazard Analysis

Sea Level Rise Considerations

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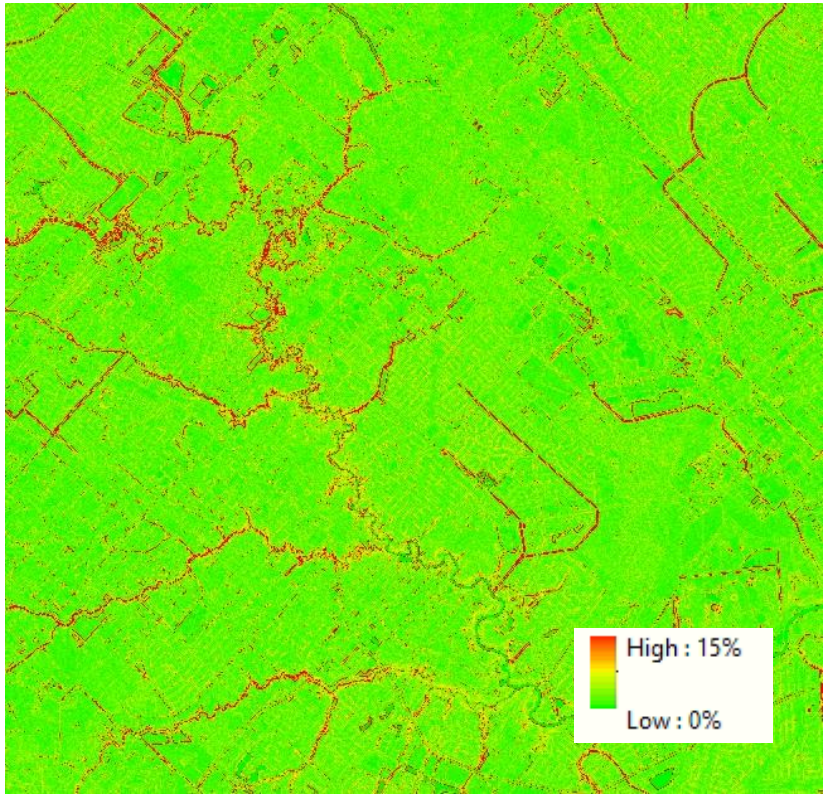
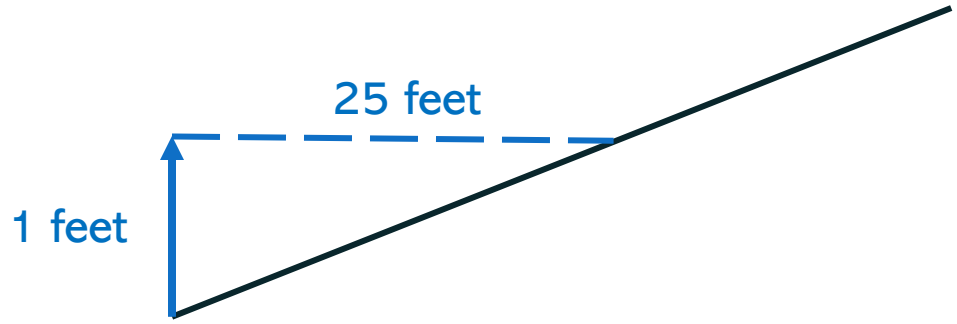
- Average Slope of Coastal Region is approximately 4%
- *Recommend* Buffer of 25 feet per 1 feet of SLR



Slope Raster generated from 2018 LIDAR



Buffer Recommendation – Coastal Zone

Sea Level Rise Considerations

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Scenario	Recommended Buffer in Coastal Zone
Future 1% AEP with SLR (Coastal Zone)	Existing 0.2% AEP Floodplain + SLR Buffer
Future 0.2% AEP with SLR (Coastal Zone)	Existing 0.2% AEP Floodplain + 850 feet + SLR Buffer
Recommended SLR Buffer	**For every 1 feet in SLR, Buffer increases by 25 feet [SLR of 0.85 feet yields a buffer of 20 feet]**

Coastal Flood Hazard Analysis

Subsidence Considerations

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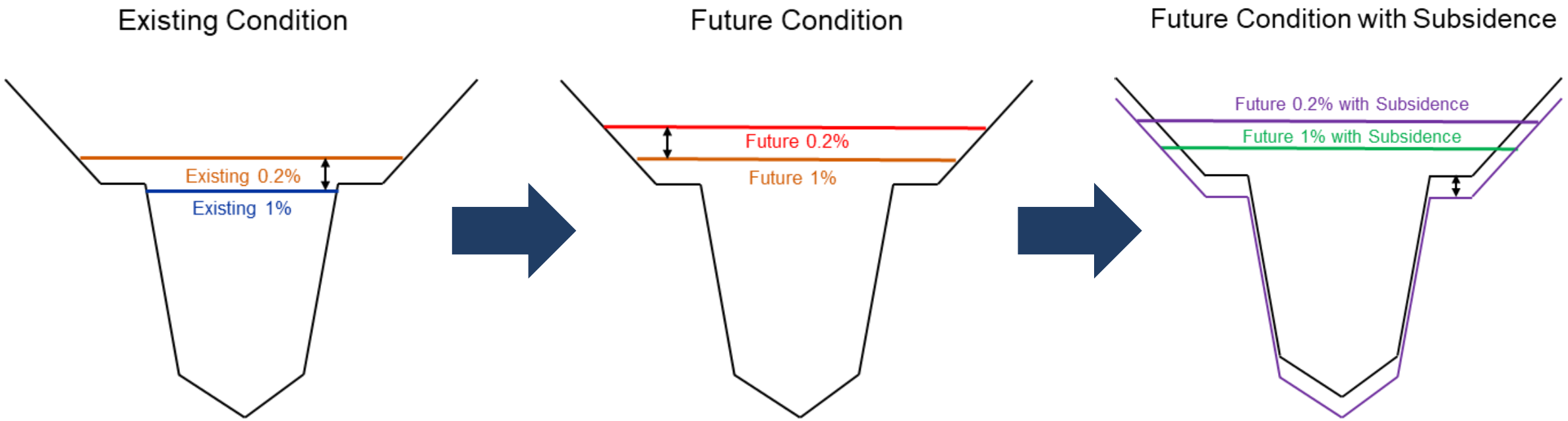

Subsidence varies by Subsidence Zone

Coastal Flood Hazard Analysis

Subsidence Considerations

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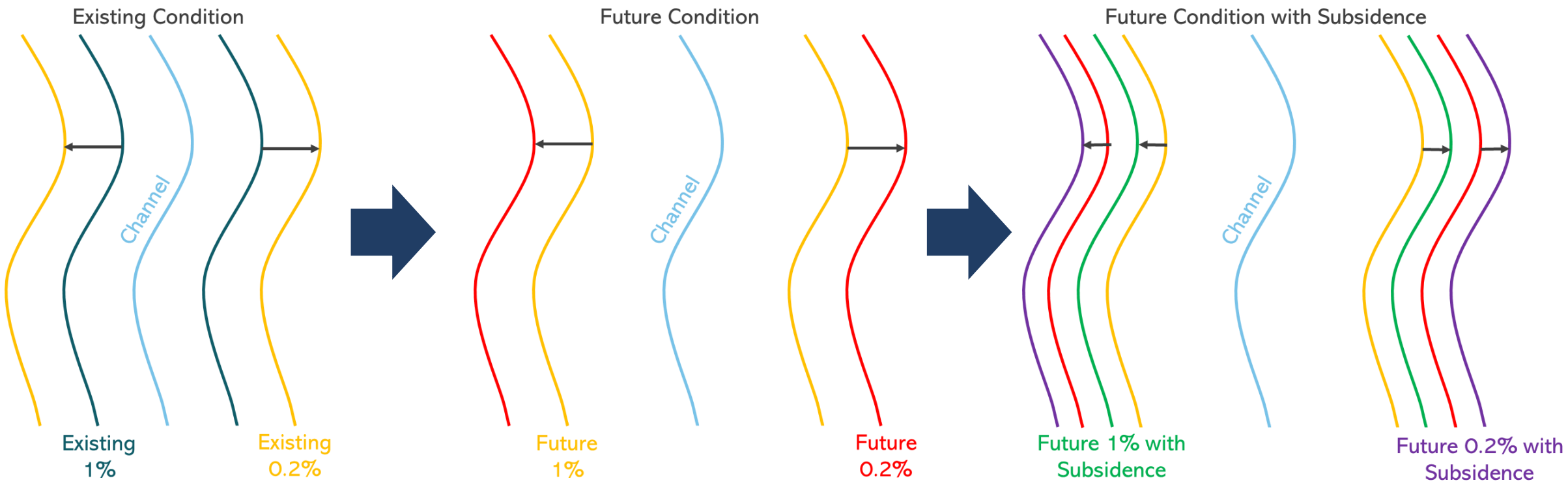

Buffer Recommendation – Regional

Subsidence Considerations

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Scenario	Recommended Buffer for Subsidence
Future 1% AEP with Subsidence (Northern Zone)	Existing 0.2% AEP Floodplain + Subsidence Buffer
Future 0.2% AEP with Subsidence (Northern Zone)	Existing 0.2% AEP Floodplain + 500 feet + Subsidence Buffer
Future 1% AEP with Subsidence (Southern Zone)	Existing 0.2% AEP Floodplain + Subsidence Buffer
Future 0.2% AEP with Subsidence (Southern Zone)	Existing 0.2% AEP Floodplain + 850 feet + Subsidence Buffer
Future 1% AEP with Subsidence (Coastal Zone)	Existing 0.2% AEP Floodplain + Subsidence Buffer
Future 0.2% AEP with Subsidence (Coastal Zone)	Existing 0.2% AEP Floodplain + 850 feet + Subsidence Buffer
Recommended Subsidence Buffer	**For every 1 feet in Subsidence, Buffer increases by 25 feet [Buffer will vary by Subsidence Zone]**

What are other regions doing?

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Region	Future 1% Floodplain	Future 0.2% Floodplain
Lower Brazos*	Existing 0.2%	Existing 0.2% + (Delta or Buffer)
Trinity	Existing 0.2%	Existing 0.2% + (Delta or Buffer)
Neches	Existing 0.2%	Existing 0.2% + (Delta or Buffer)
Sabine	Existing 0.2%	Existing 0.2% + (Delta or Buffer)
Guadalupe	Existing 0.2%	Existing 0.2% + (Delta or Buffer)
San Jacinto	Existing 0.2%	Existing 0.2% + (Delta or Buffer)

*The Lower Brazos region is recommending no change for the future floodplains along large rivers. The recommendations listed for this region are for tributaries.

Flood Exposure Analysis

Flood Exposure Analysis

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- Exposure analysis to identify who and what might be harmed within the region for the 0.2% and 1% storm events
  - Existing development
  - Future development
  - Flood mitigation projects in construction
  - Critical infrastructure
  - Low water crossings at risk of flooding
- Utilize a GIS intersect to determine structures in the future flood quilt

Recommendation - Flood Exposure

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- Utilize previously developed flood exposure dataset
- Include *existing* structures in the future conditions hazard areas
- Identify critical infrastructure

Defining Critical Infrastructure

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Structure types already captured:

- Medical Facilities
- Government Buildings
- Emergency Ops/Shelters
- Law Enforcement/Fire Stations
- Schools
- Nursing Homes
- Airports/Railyards/Ports
- Power Generating/Transmission
- W/WW Treatment

To facilitate alignment with concurrent GLO and USACE Coastal Studies, structure types to be added would include:

- Chemical Plants/Refineries
- Chemical Storage
- Oil & Gas Infrastructure
- Correctional Facilities

Defining Flood Map Gaps

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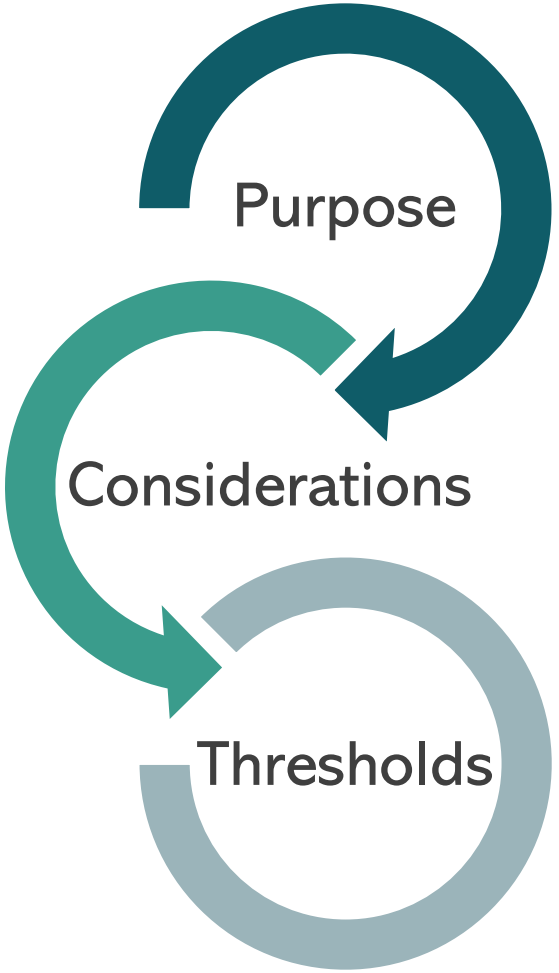
- Existing modeling/mapping
- Ongoing modeling/mapping
- Areas that have seen rapid development and landcover change
- Change in rainfall (regionwide*)
- Source of flooding (regionwide*)



- Inform analyses **internal** to the Region (Task 4A Needs Analysis); no statewide comparison
- Defined at a HUC12 level

- Define thresholds for considerations:
  - % of watershed that is mapped
  - % of land cover change

Recommendation – Flood Map Gaps

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- Focus considerations on availability of:
  - FEMA Detailed Effective Mapping
  - Base Level Engineering *(consider presence of development*)*
  - Land Cover Change
- Exclude considerations that are regionwide in GIS spatial feature
  - Does NOT indicate that hazard mapping cannot be improved
  - Will speak to considerations for Atlas14 and non-riverine sources of flooding within Chapter documentation

Next Steps

Next Steps

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- Technical Memorandum March Submittal
  - GIS Datasets
    - FutFldHazard: Locations/Magnitudes of potential 1% and 0.2% annual chance floods
    - FutFldExp: Future flood exposure analysis
  - Push Datasets to GIS Dashboard for RFPG Review
  - Maps
    - Future Flood Condition Hazard
    - Future Condition Flood Hazard – Gaps in Inundation Boundary Mapping
    - Future Condition Flood Exposure
    - Future Condition Vulnerability and Critical Infrastructure
  - Write-up
    - Discuss assumptions and data gaps

Item 6:

Possible recommendation to allow the Technical Consultant to proceed with the development of Technical Memorandum deliverables due to the TWDB on March 7th

Item 7:
Next Key Milestones and Important Dates

Item 8:
Consider Agenda Items for the next Technical Committee Meeting

Item 9:
Public Comments – limit 3 minutes per person

Item 10:
Adjourn