

San Jacinto
River Authority



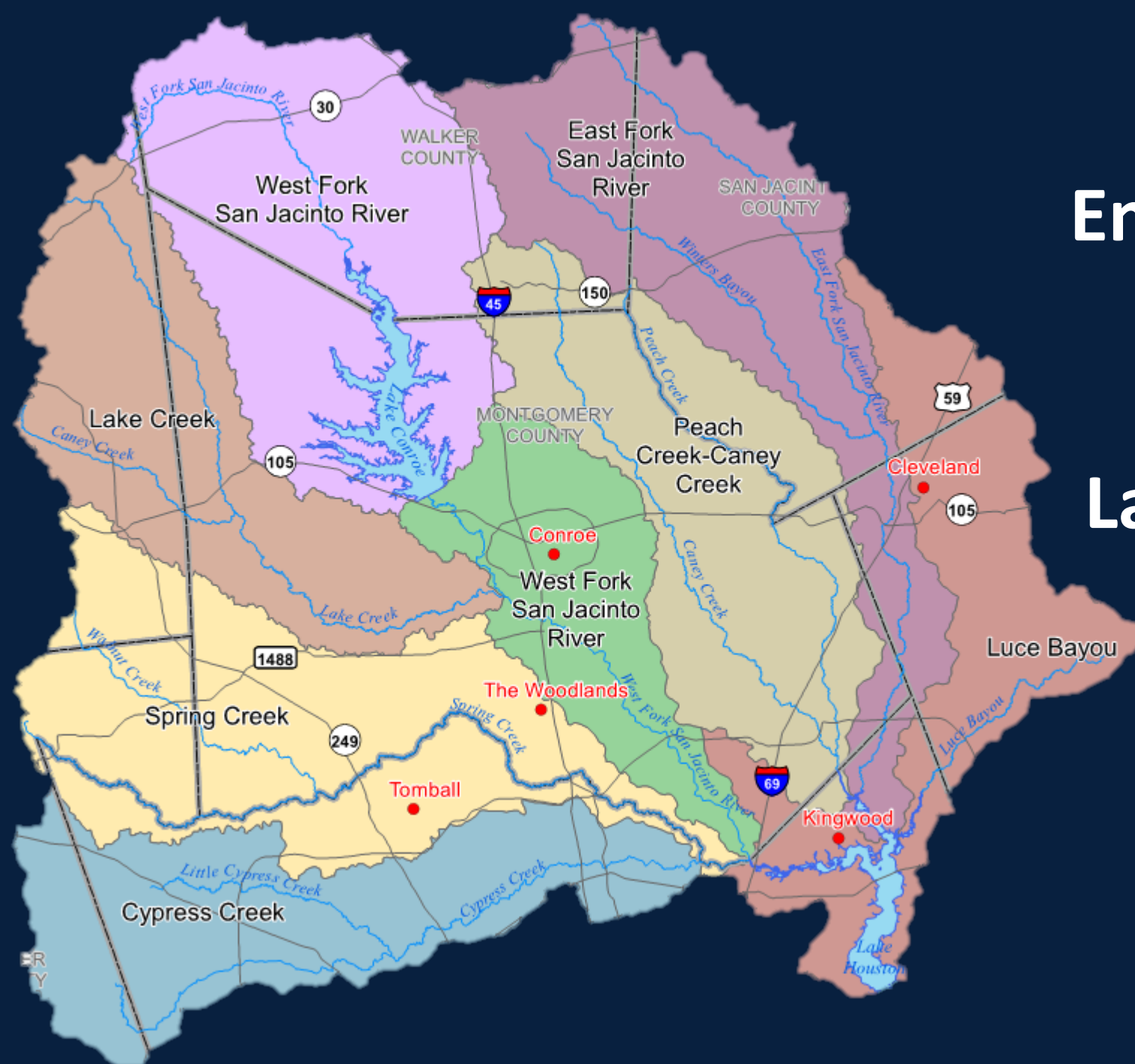
Temporary Seasonal Lake Lowering

Overview

- Pertinent facts and details about Lake Conroe, Lake Houston, and the temporary Seasonal Lake Lowering initiative
- Summary of the 2018 and 2019 Seasonal Lake Lowering
- Status of downstream mitigation projects

Overview

- Pertinent facts and details about Lake Conroe, Lake Houston, and the temporary Seasonal Lake Lowering initiative
- Summary of the 2018 and 2019 Seasonal Lake Lowering
- Status of downstream mitigation projects

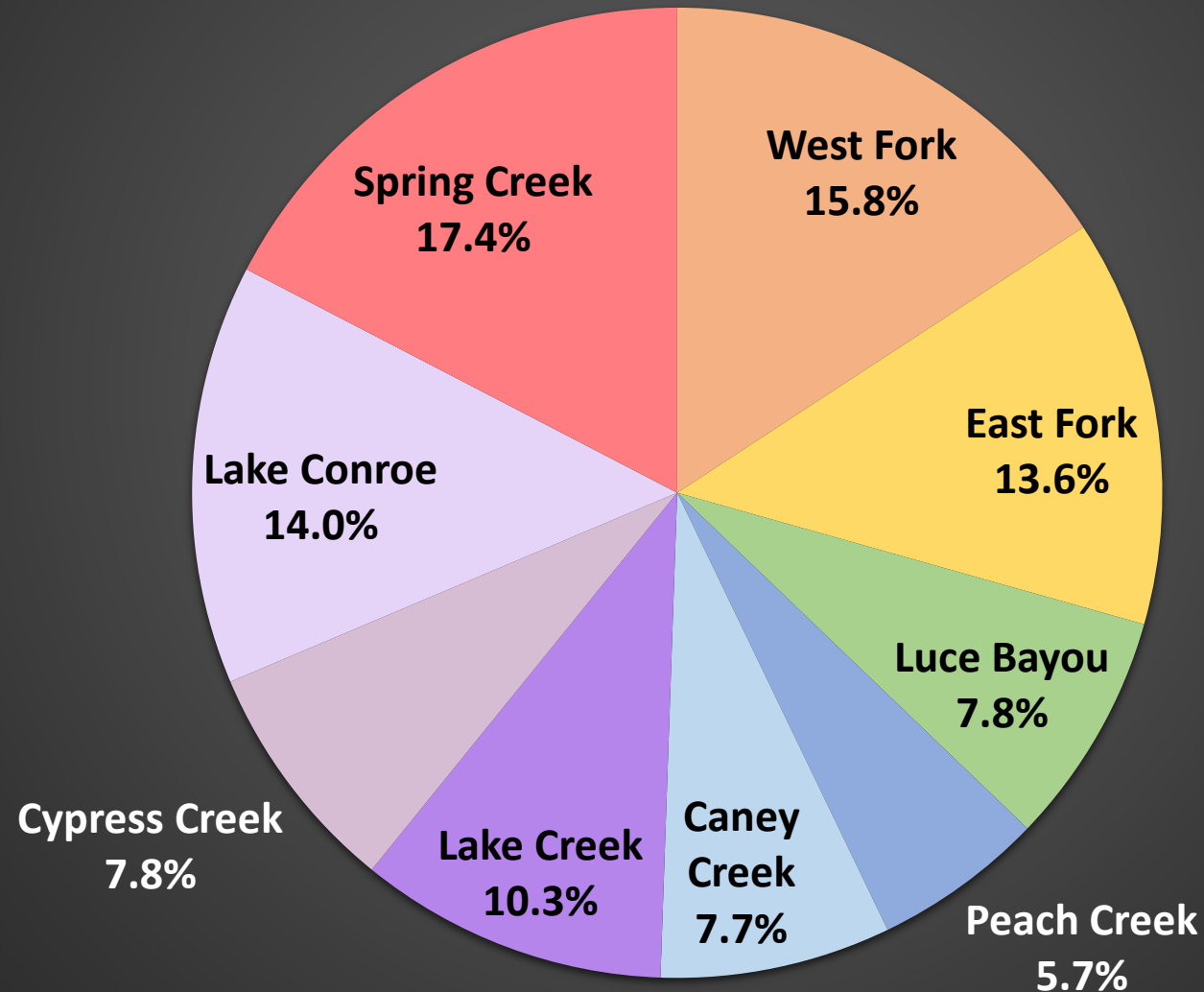


**Entire Upper Watershed:
2,800 square miles**

**Lake Conroe Watershed:
450 square miles**

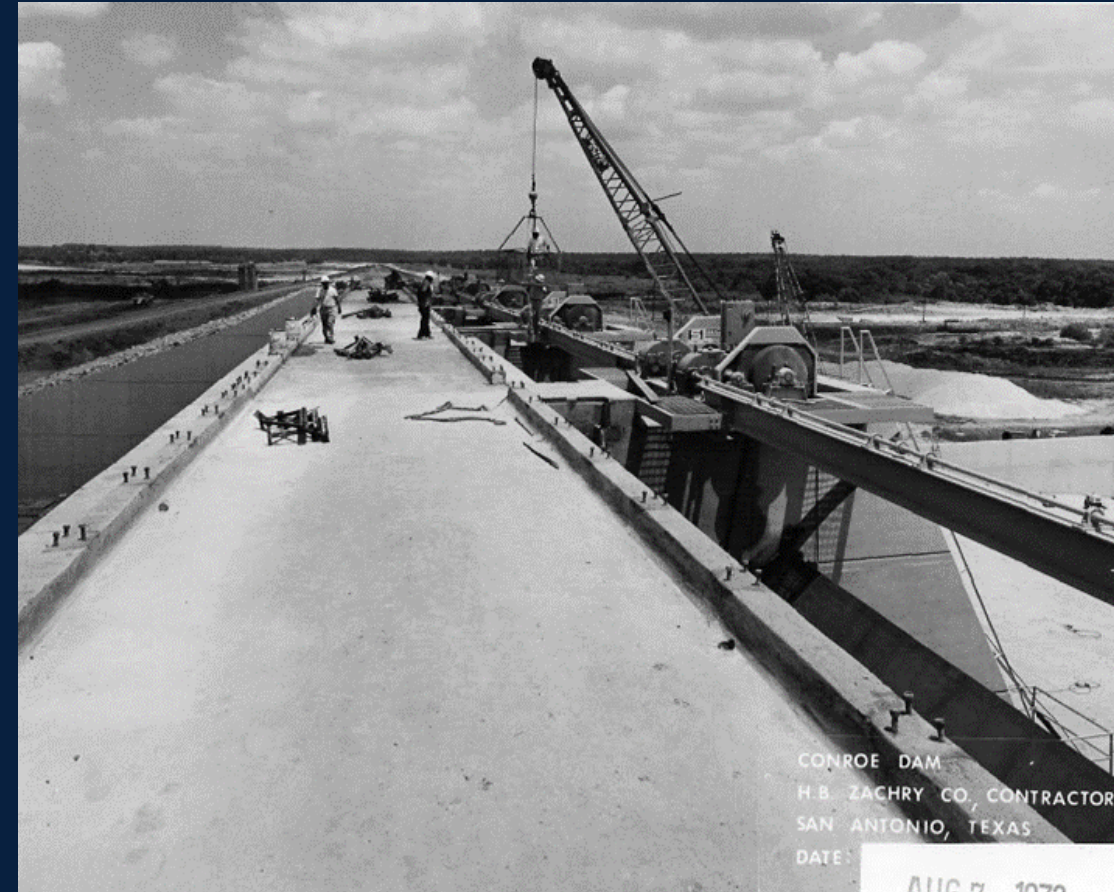
100-YR (ATLAS 14) Volume Percentages

Lake Houston Inflow Volume= 2.0 Million ac-ft



Facts about Lake Conroe

- Surface acres: 19,640
- Capacity: Not to exceed 430,260 acre-feet
- Permitted water: 100,000 acre-feet
- Conservation pool elevation: 201 ft msl
- Main spillway: five gates, 40 ft by 30 ft
- SJRA obtained a flowage easement around the reservoir up to elevation 207 ft msl
- All water stored above elevation 201 ft msl must be released



Facts about Lake Conroe

- Constructed as a water supply reservoir – not intended to be a “constant level lake”
- 1/3rd of permitted water belongs to SJRA
- 2/3rd of permitted water belongs to City of Houston
- City of Houston pays 2/3rd of the operating cost of Lake Conroe
- City of Houston has the ability to call for the release of their permitted water at any time, regardless of the water surface elevation of Lake Conroe

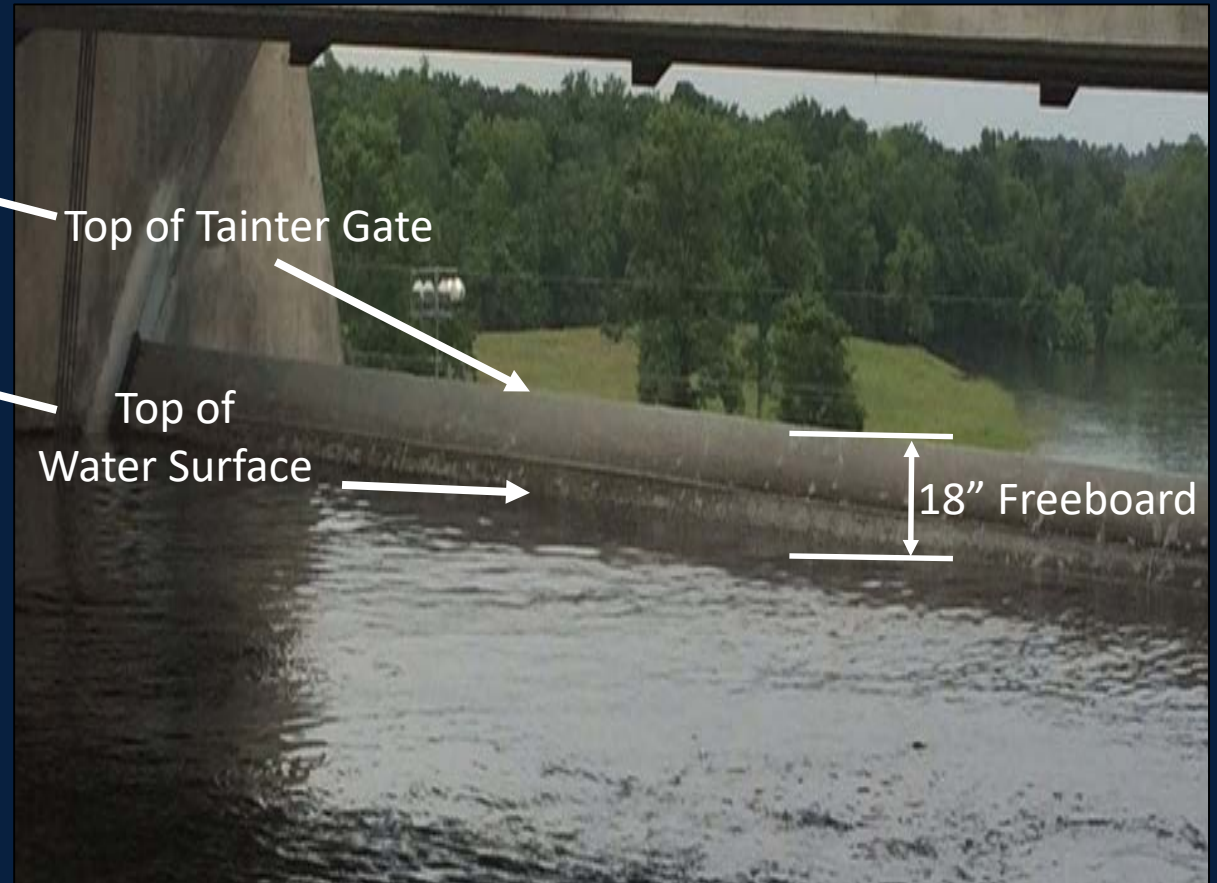


Key Points regarding Gate Operations

- Tainter gates must be raised as lake rises
- Cannot allow over-topping as it compromises the structure.



Downstream side of Gate



Upstream side of Gate

Seasonal Lake Lowering Initiative

- Conservation pool level is 201' msl
- Seasonal lowering will occur:
 - Spring: *April 1-May 31* to 200' msl
 - Gradual reduction starts *April 1st*
 - Recapturing starts on *June 1st*
 - Fall: *August 1-September 30* to 199' msl
 - Gradual reduction starts *August 1st*
 - Recapturing starts on *October 1st*





Joint Reservoir Operations Strategy with CoH

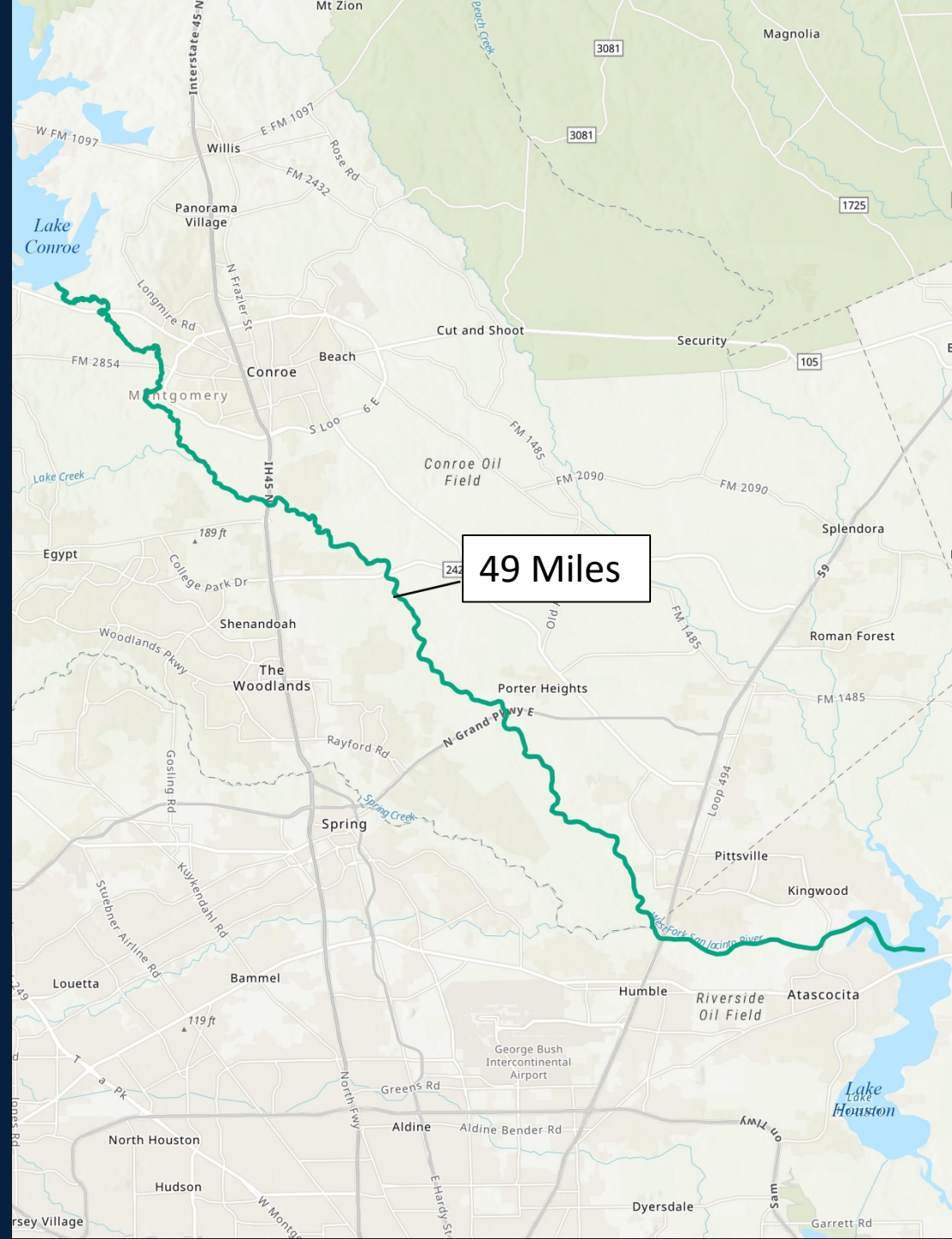
- Temporary Seasonal Lowering of Lake Conroe
- City of Houston lowers Lake Houston prior to major rainfall events:
 - Conservation Pool Elevation is 42.5' msl
 - Lake Level reduced to 41.5' msl when 3 inches or more of rainfall is forecasted
 - Lake Houston was lowered to elevation 41.5' msl or lower nine times in 2019

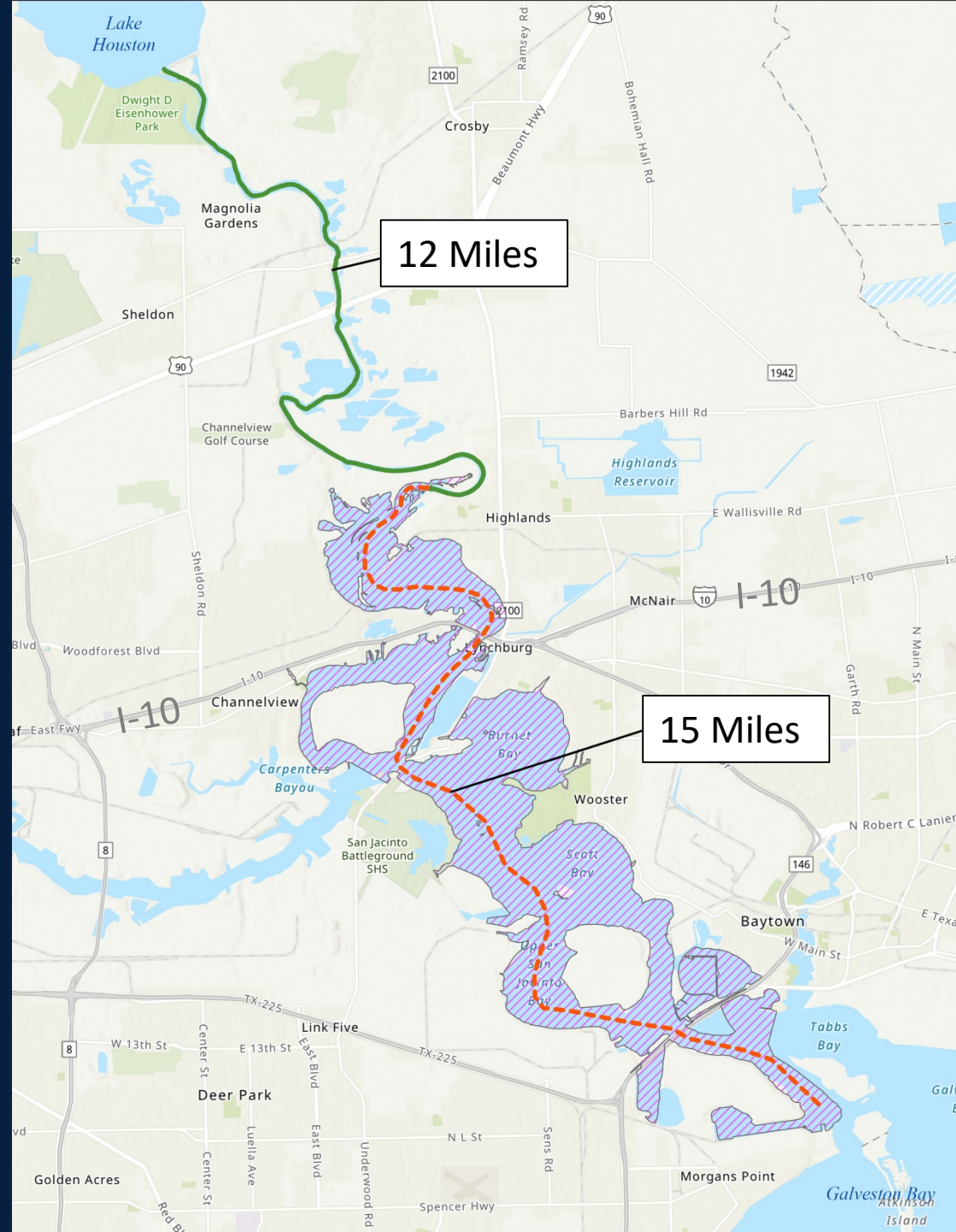


Why Not Pre-Release from Lake Conroe?

- Weather predictions not accurate enough
- Risk of making downstream conditions worse
- Downstream partners want empty rivers prior to a storm
- Potentially impacts properties immediately downstream of the dam







Decision Based on Engineering Studies

Two engineering studies were completed prior to the SJRA Board taking action on the seasonal lake lowering initiative.

1. Analysis of potential impacts of lowering Lake Conroe conservation pool elevation on lake storage and elevation, available diversions from the lake (average and firm), and downstream water rights.
2. Analysis of potential impacts on lake levels and downstream maximum water surface elevation of a two-foot and three-foot reduction in the conservation pool level of Lake Conroe.

Engineering Study: Water Supply

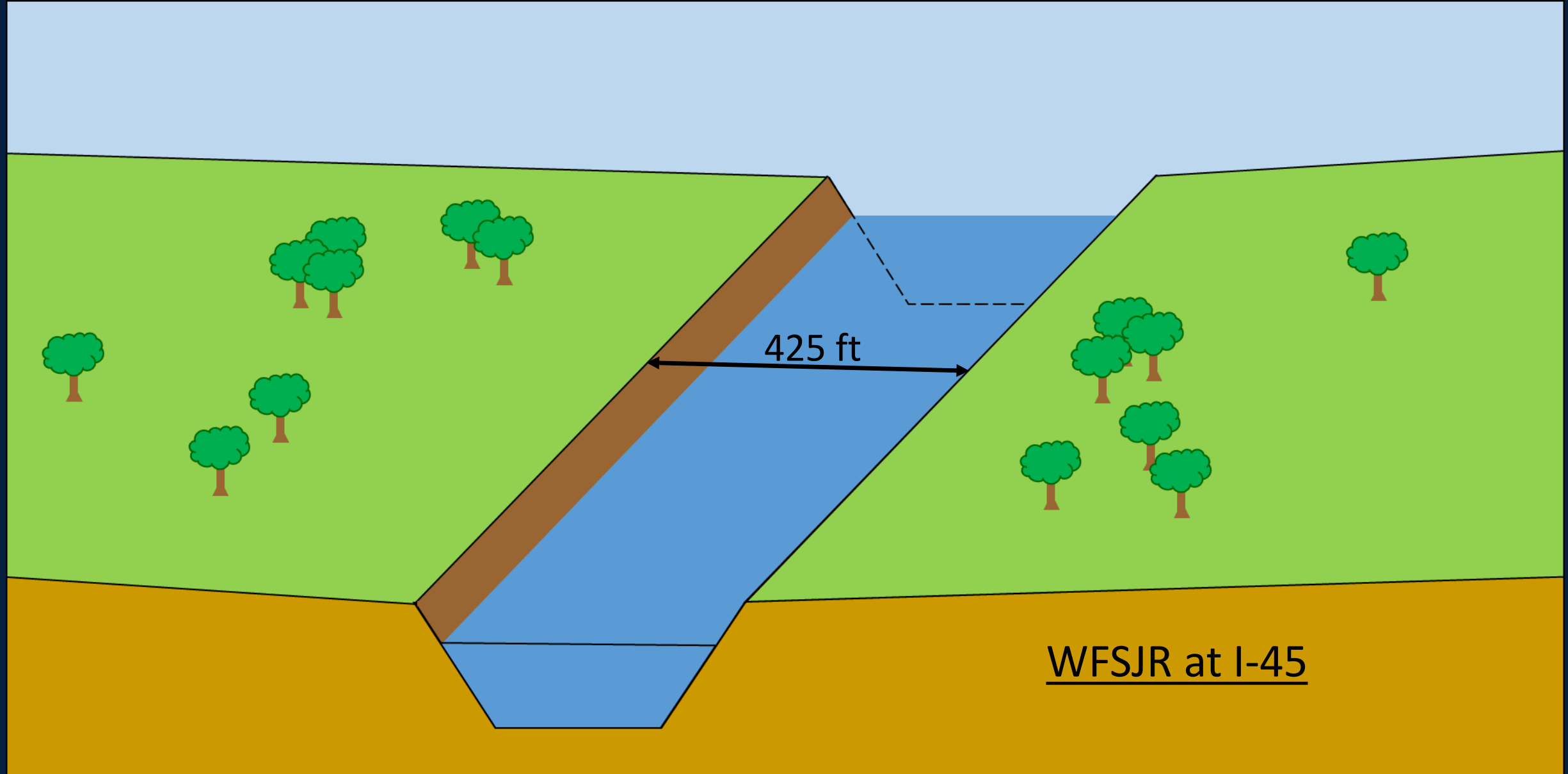
Scenario	Firm Yield (ac-ft/yr)	Change from Baseline (ac-ft/yr)
Conservation Pool	80,200	0
200' (temp)	80,200	0
199' (temp)	78,800	-1,400

*Models were developed based on an assumption that reductions of conservation storage for seasonal lake lowering were limited to August and September

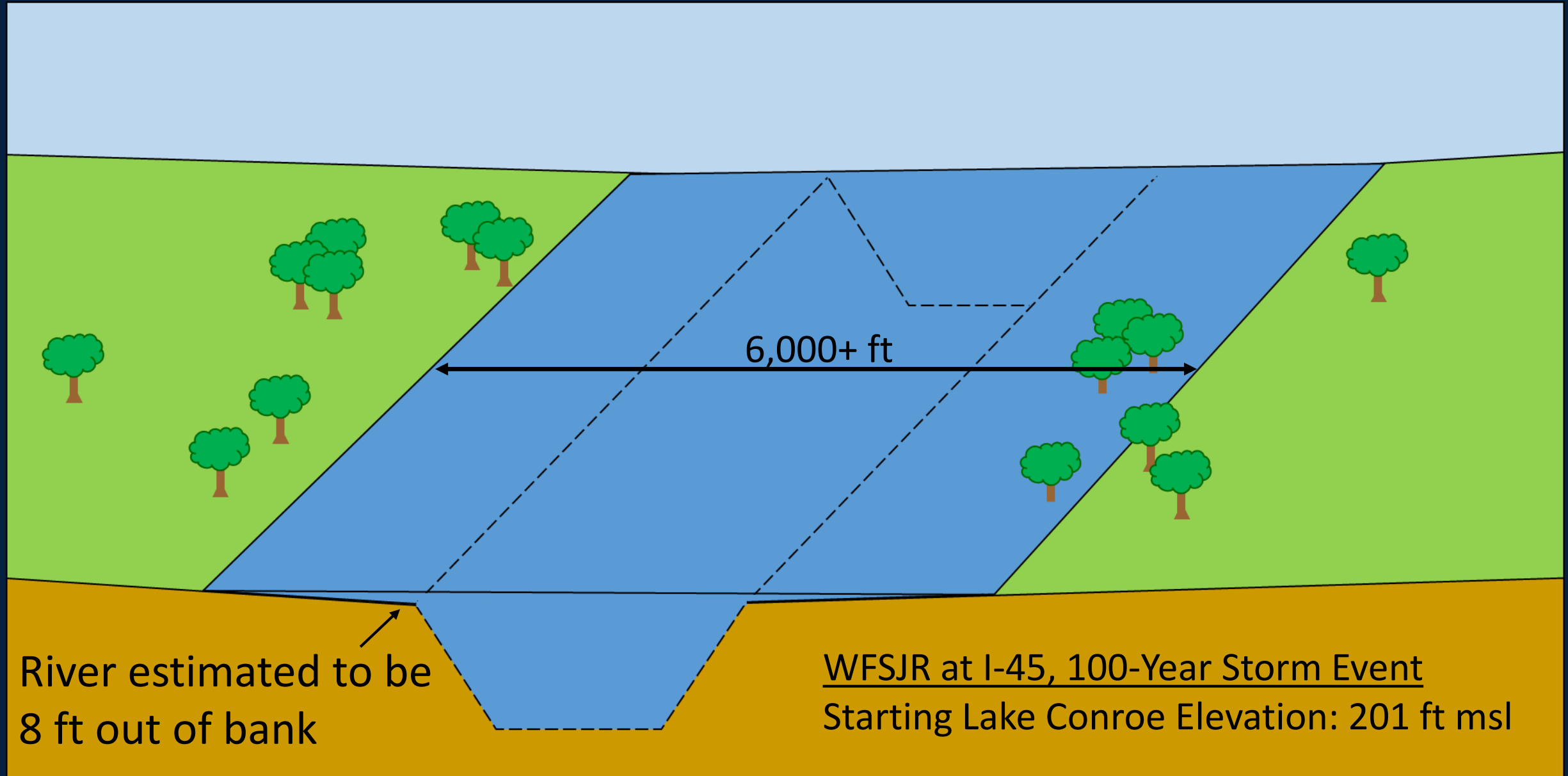
Engineering Study: Maximum Downstream WSEL

	201 (ft msl)	199 (ft msl)	Difference (ft)
100-year Water Surface Elevation at Cross Section, ft msl			
DS Lake Conroe	153.94	152.47	-1.47
US SH 105	149.57	148.10	-1.47
Lake Creek	136.88	136.36	-0.52
IH-45	124.44	123.70	-0.74
500-year Water Surface Elevation at Cross Section, ft msl			
DS Lake Conroe	159.31	157.74	-1.57
US SH 105	154.33	153.00	-1.33
Lake Creek	141.02	140.37	-0.65
IH-45	129.69	128.89	-0.80

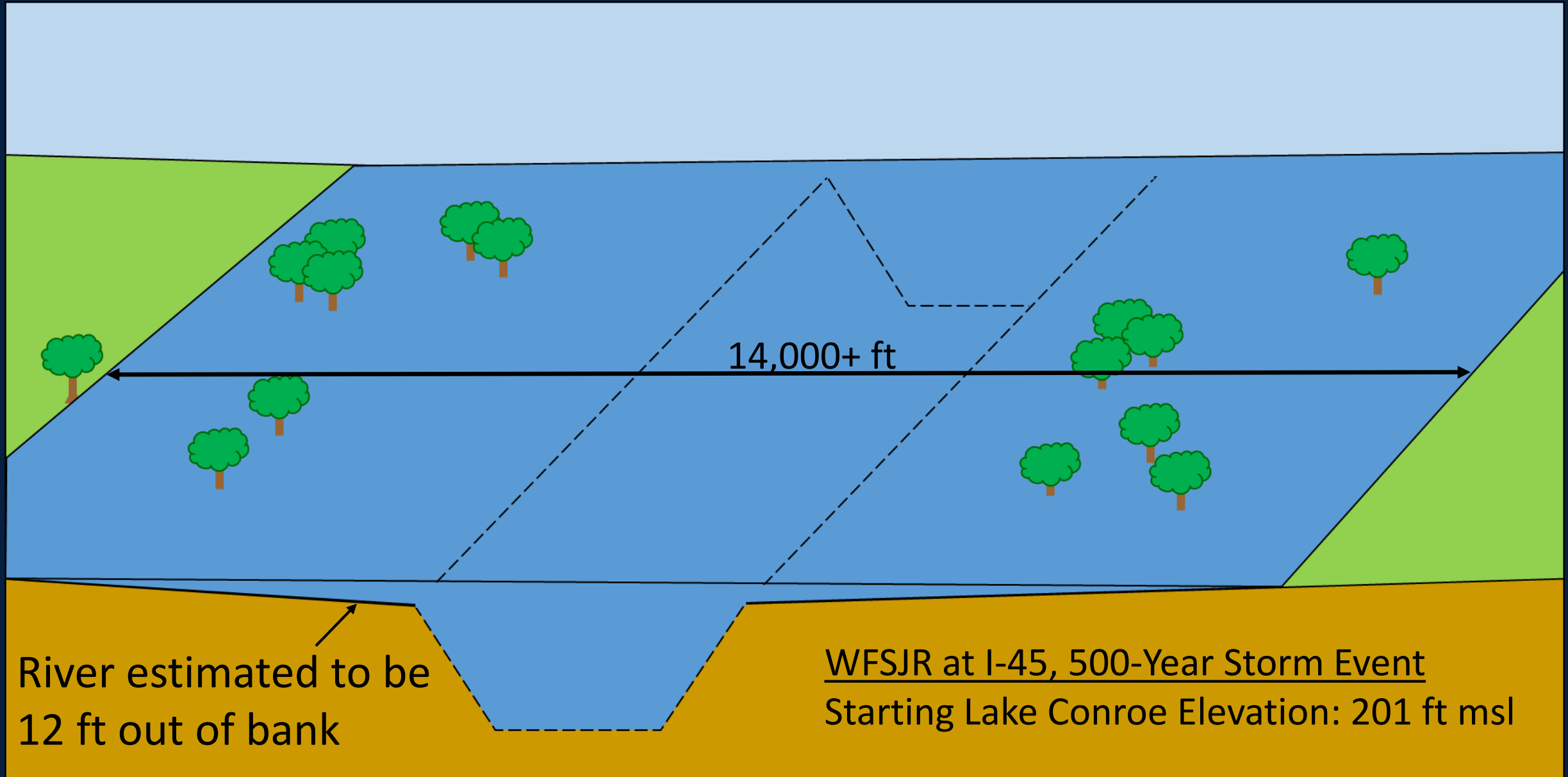
Engineering Study: Maximum Downstream WSEL



Engineering Study: Maximum Downstream WSEL



Engineering Study: Maximum Downstream WSEL

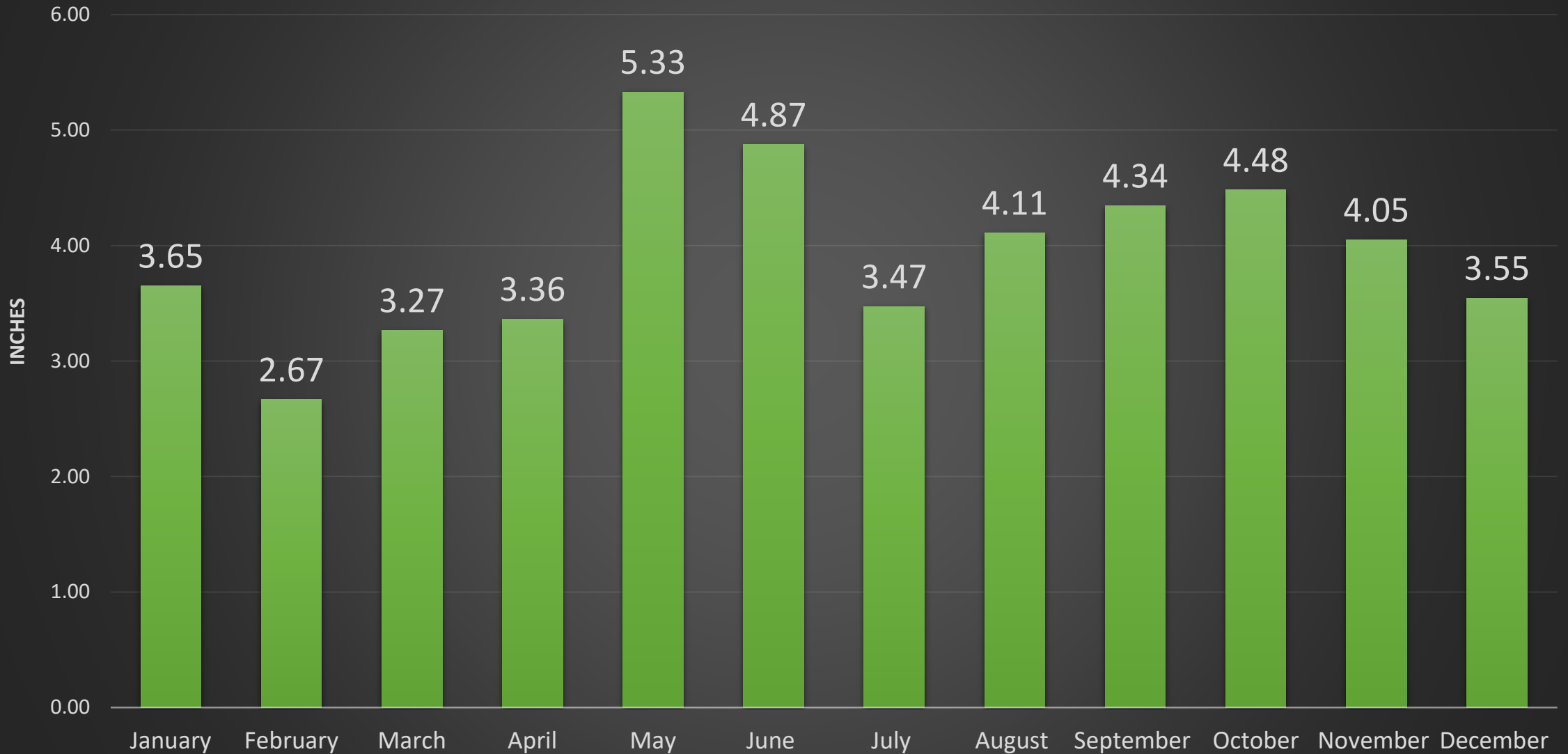


Overview

- Pertinent facts and details about Lake Conroe, Lake Houston, and the temporary Seasonal Lake Lowering initiative
- Summary of the 2018 and 2019 Seasonal Lake Lowering
- Status of downstream mitigation projects

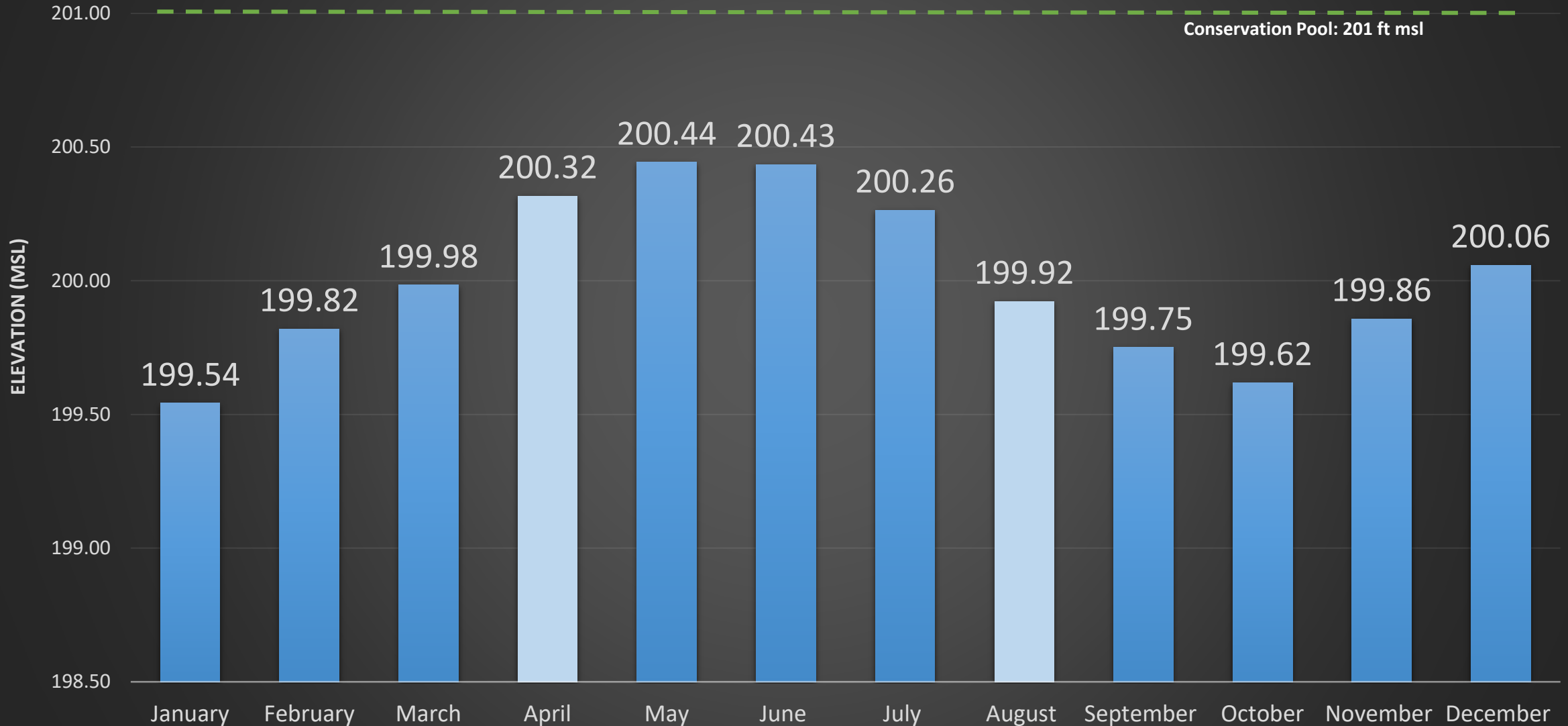
Rainfall Averages for Lake Conroe

1973-2019

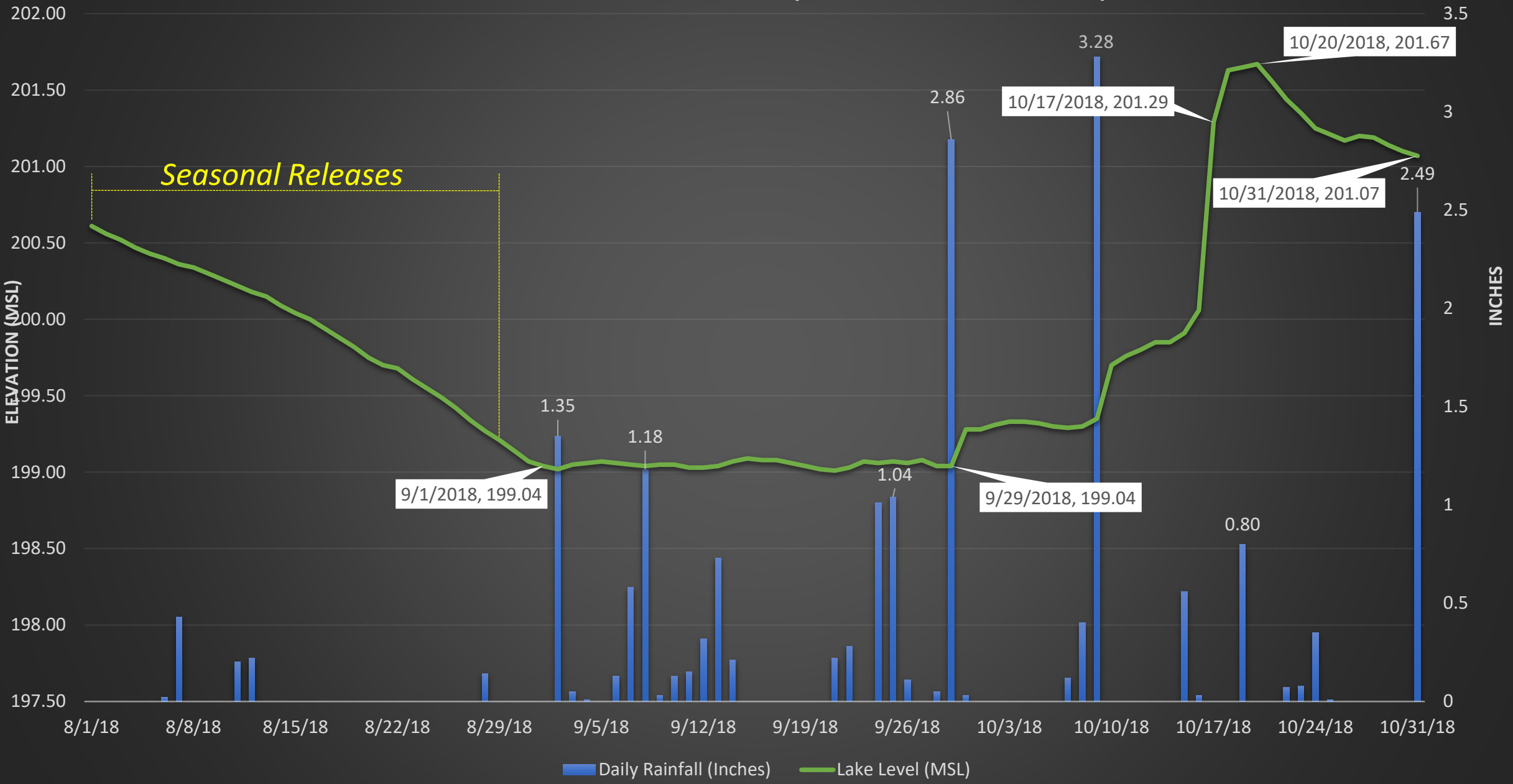


Lake Level Averages for Lake Conroe

1973-2019



FALL 2018 SEASONAL LAKE RELEASE
DAILY RAINFALL AND LAKE LEVEL (AUGUST-OCTOBER 2018)

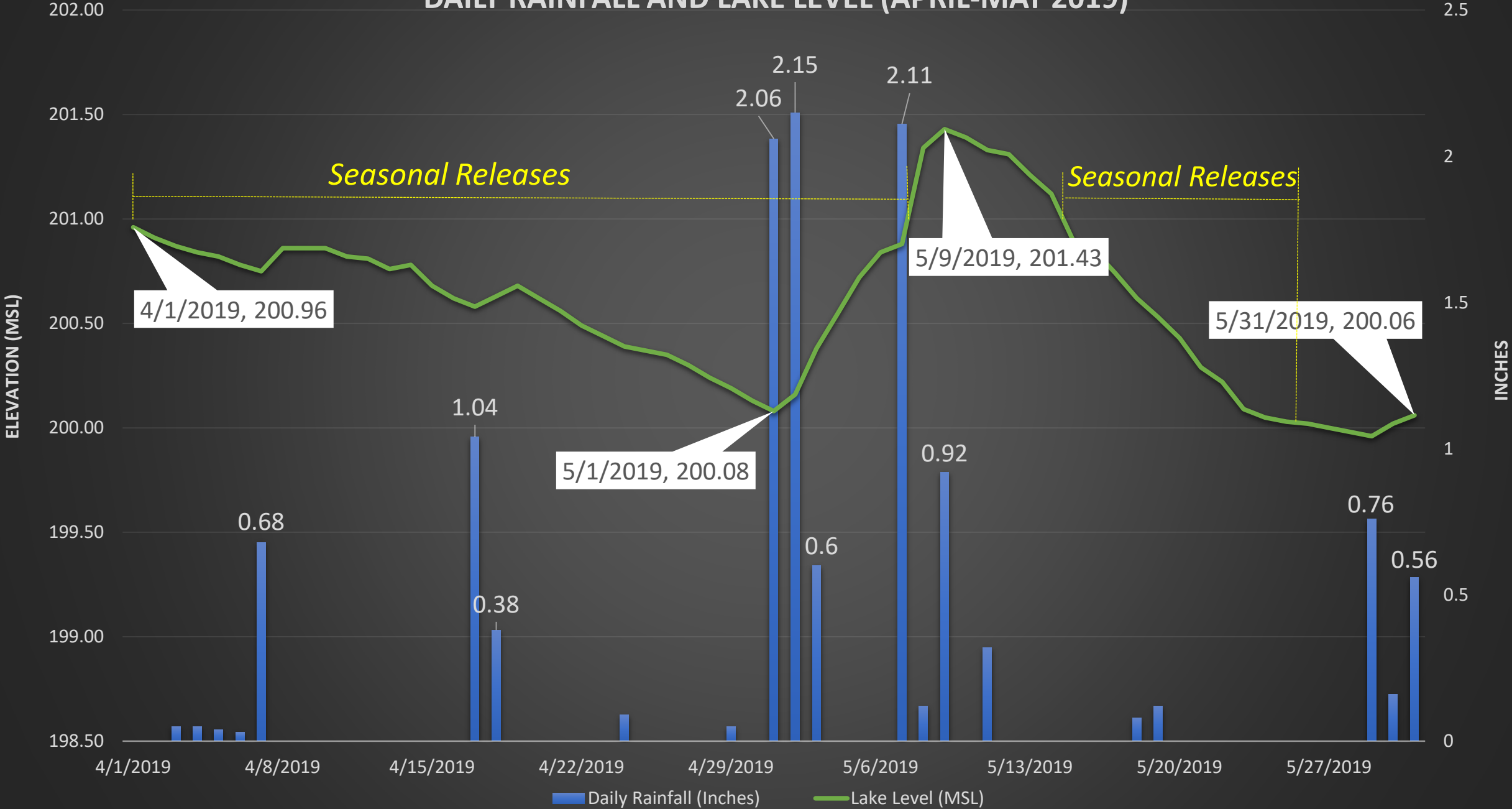


Fall 2018 Summary

- Lake Conroe conservation pool elevation = 201.00 ft msl
- The lake level was 0.40 feet below conservation pool elevation prior to August 1st due to external losses (i.e. evaporation, customer sales)
- Seasonal releases ended on August 31, 2018
- 18,265 acre-feet of Houston's water was released
- Reached conservation pool elevation October 17, 2018

SPRING 2019 SEASONAL LAKE RELEASE

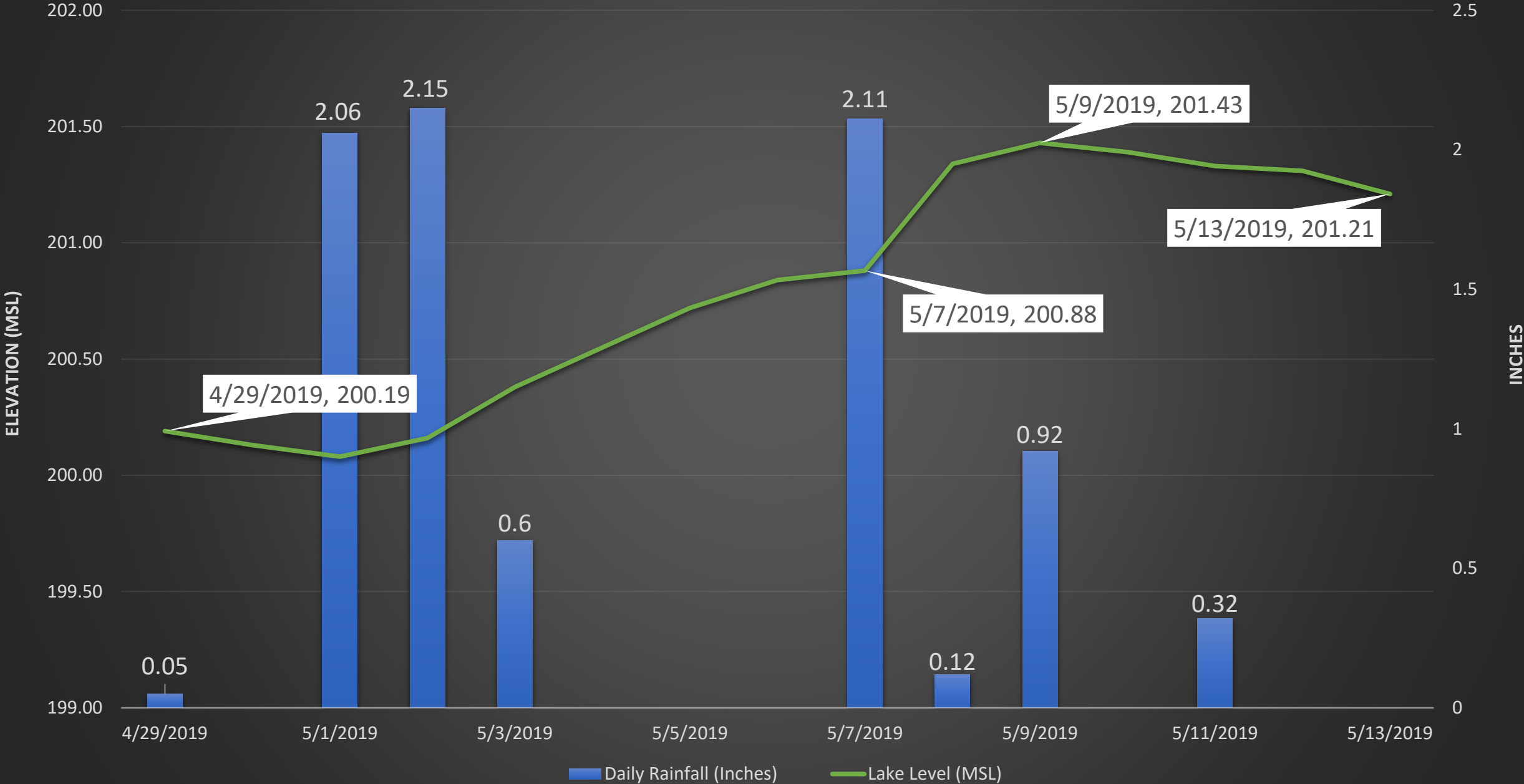
DAILY RAINFALL AND LAKE LEVEL (APRIL-MAY 2019)



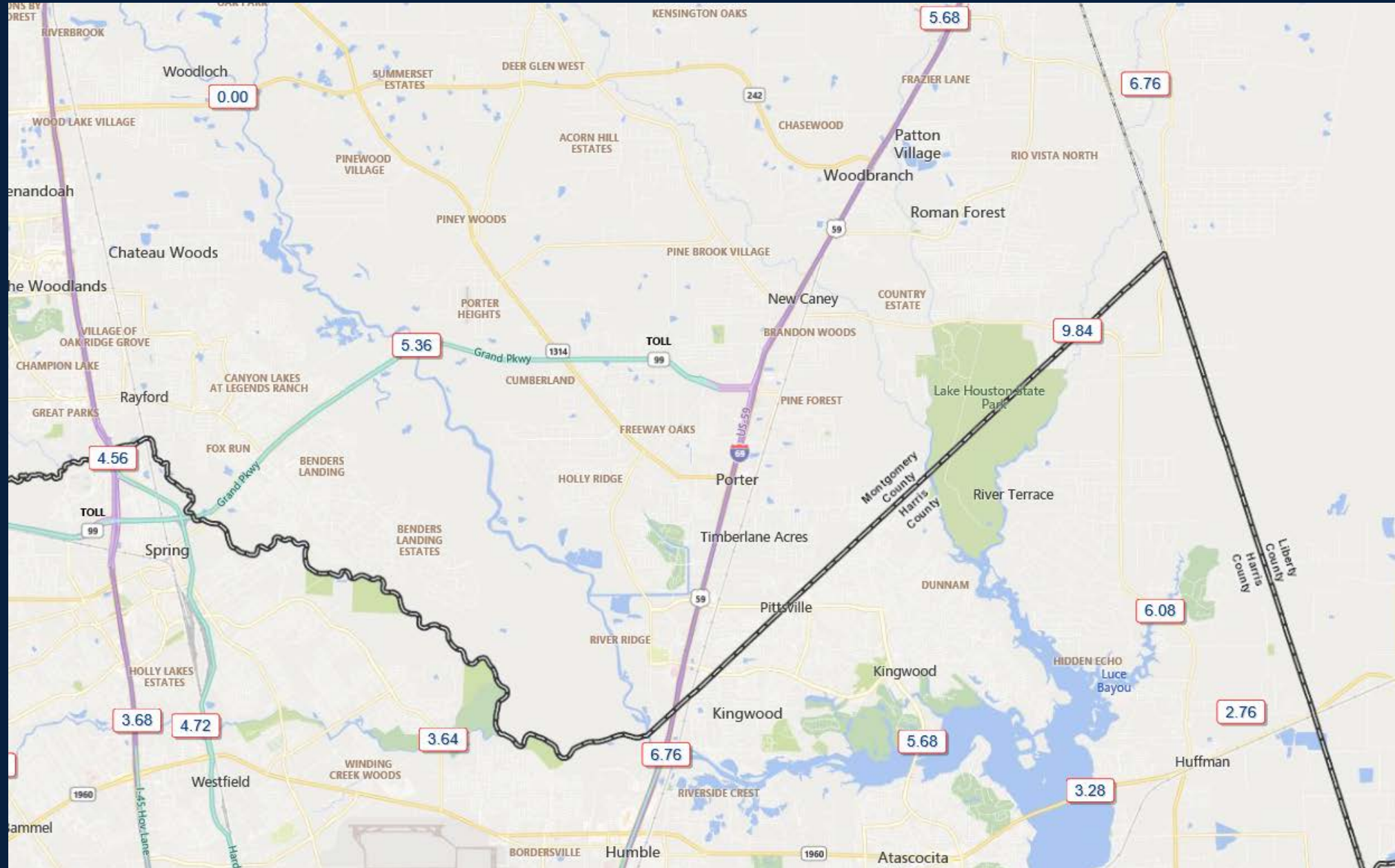
Spring 2019 Summary

- The lake level was at conservation pool elevation prior to April 1st
- Seasonal releases ended on May 24, 2019
- 49,069 acre-feet of Houston's water was released
- Did not return to conservation pool between end of May and August 1st

MAY 2019 EVENT
DAILY RAINFALL AND LAKE LEVEL (APRIL 29 - MAY 13, 2019)

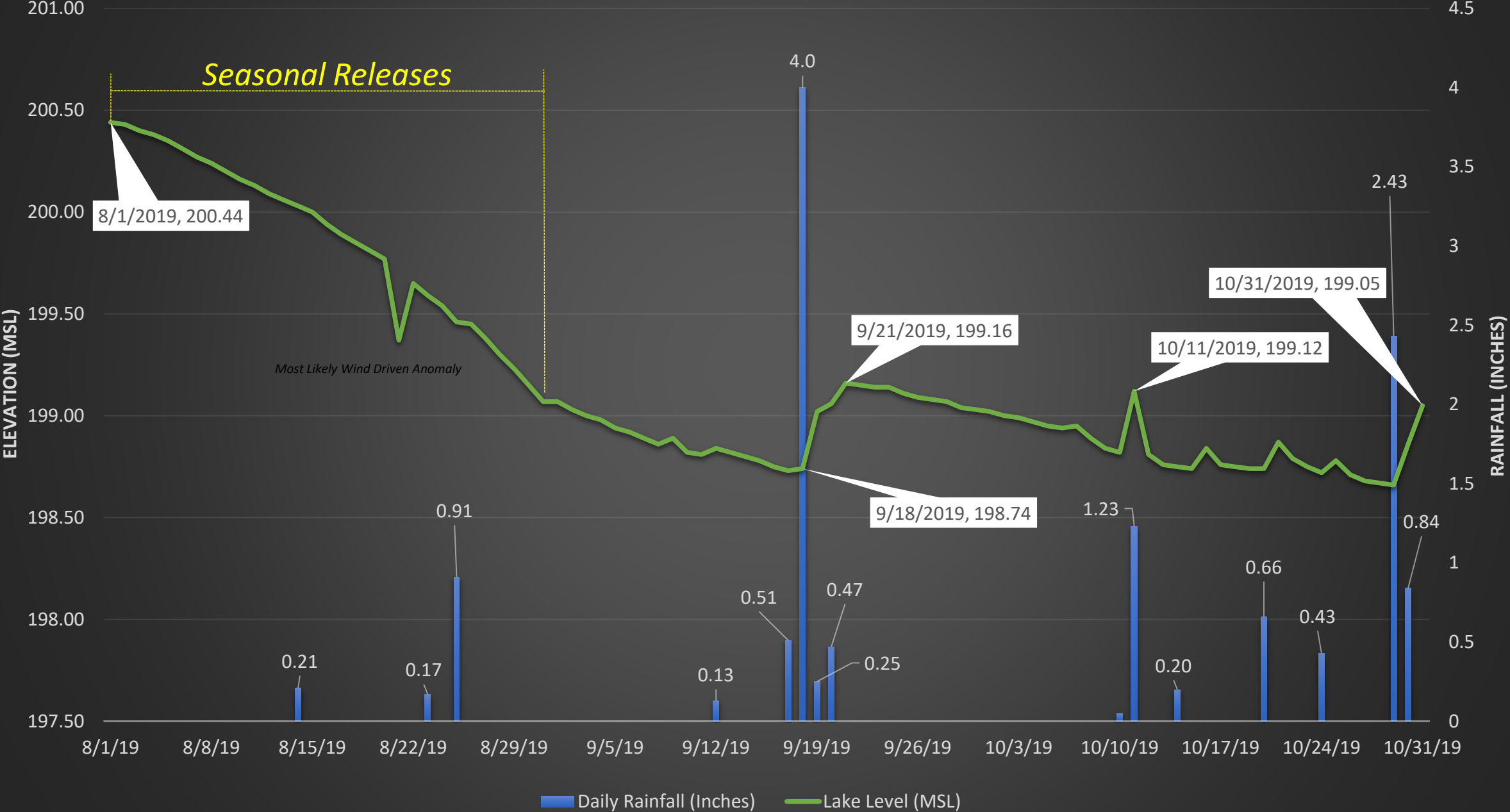


May 2019 Event



FALL 2019 SEASONAL LAKE RELEASE

DAILY RAINFALL AND LAKE LEVEL (AUGUST-OCTOBER 2019)

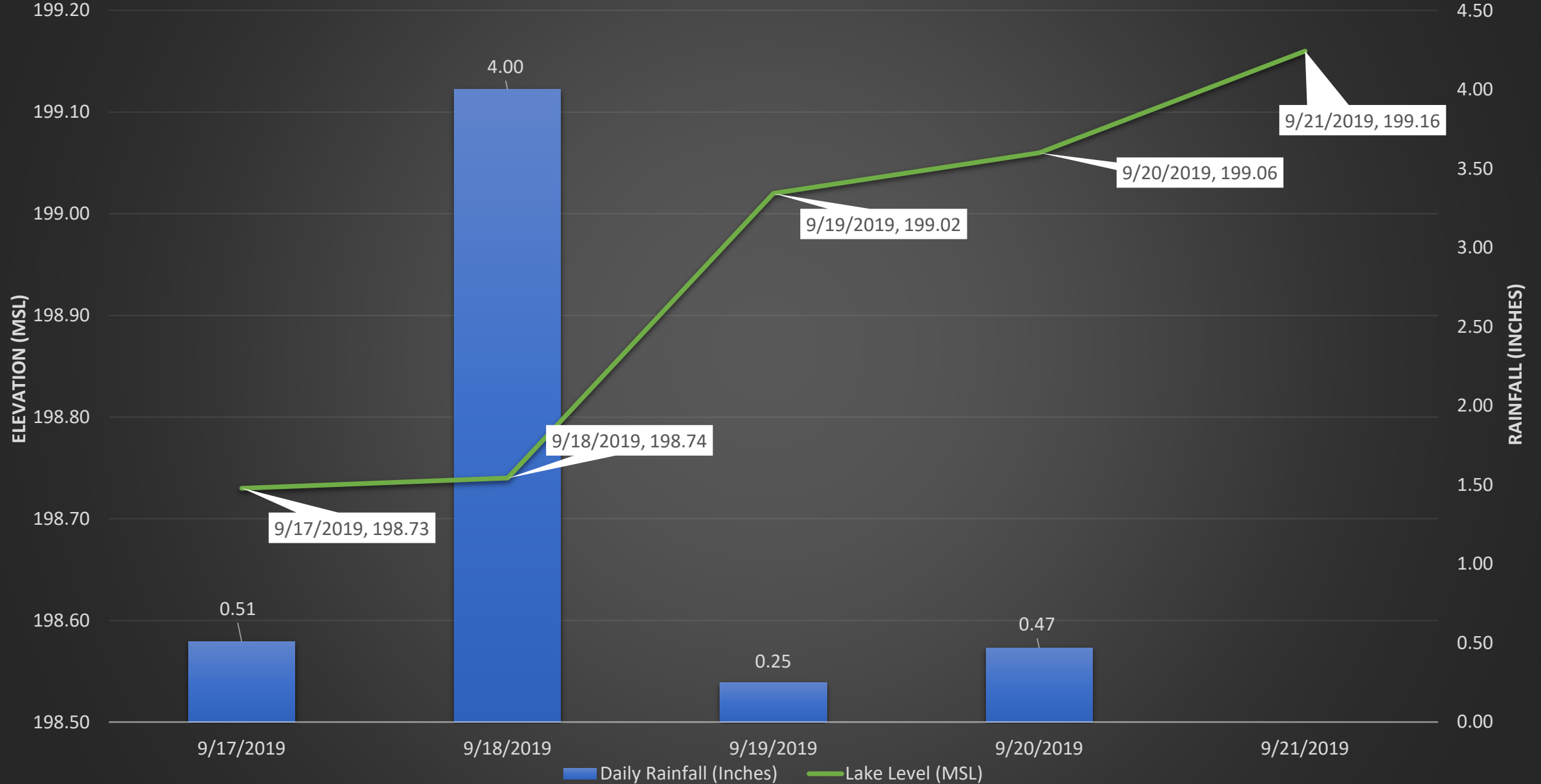


Fall 2019

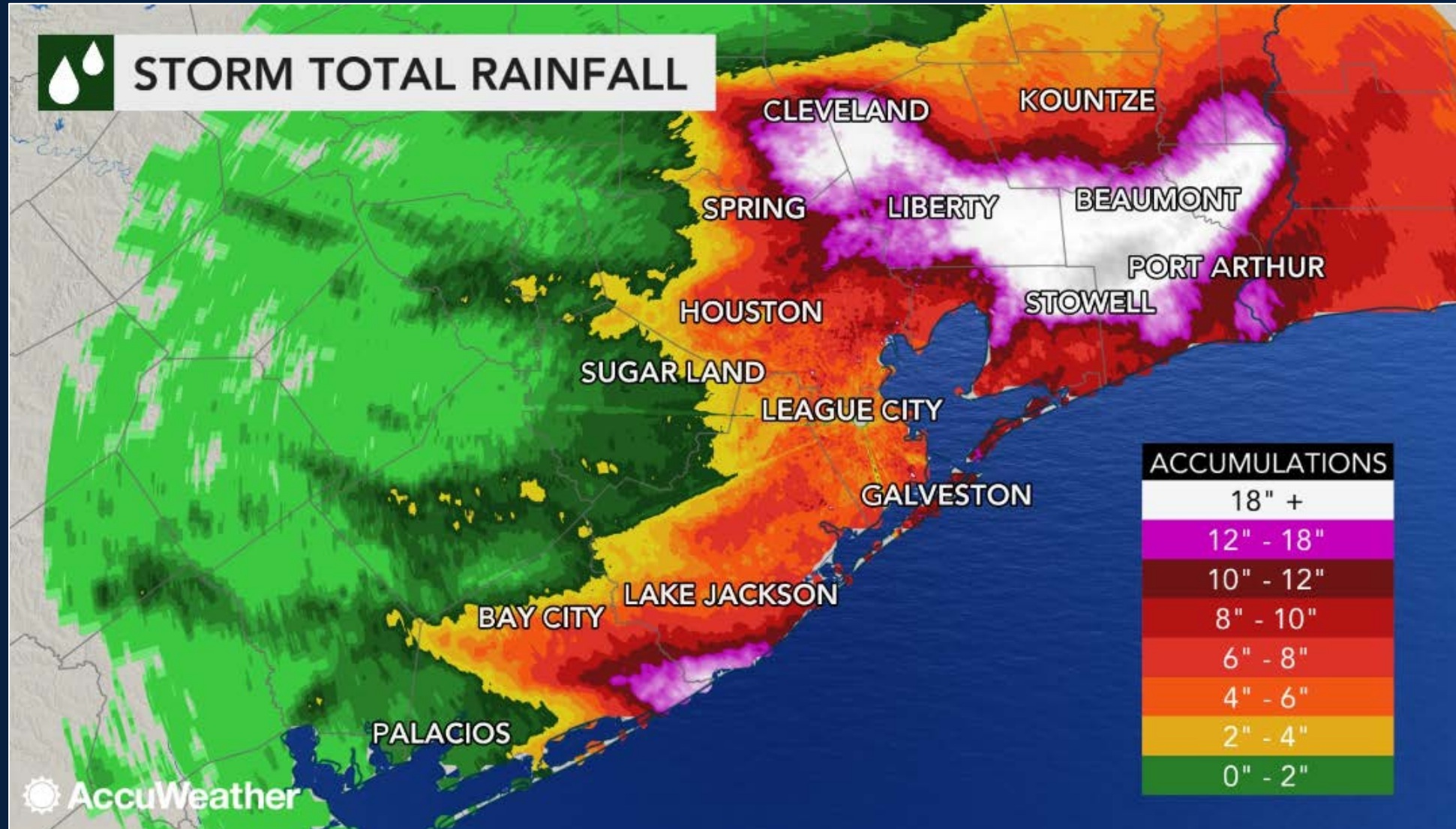
- The lake level was 0.56 feet below conservation pool prior to August 1st due to external losses (i.e. evaporation, customer sales)
- Seasonal releases ended on August 31, 2019
- 17,098 acre-feet of Houston's water was released
- Lake Conroe has not been at, or above, elevation 201.00 ft msl since May 9, 2019

TROPICAL STORM IMELDA

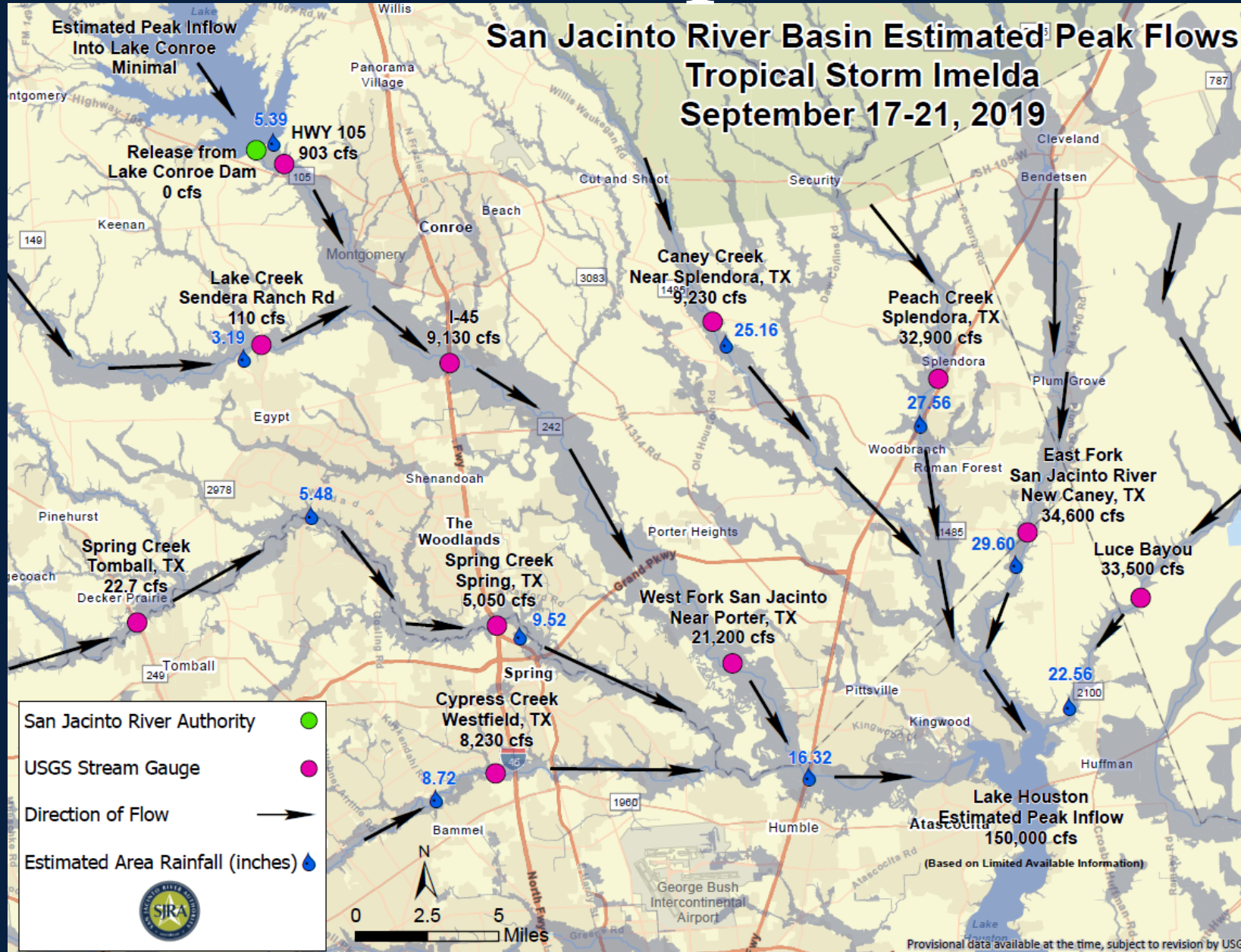
DAILY RAINFALL AND LAKE LEVEL (SEPTEMBER 17-21, 2019)



September 2019 – Tropical Storm Imelda



September 2019 – Tropical Storm Imelda

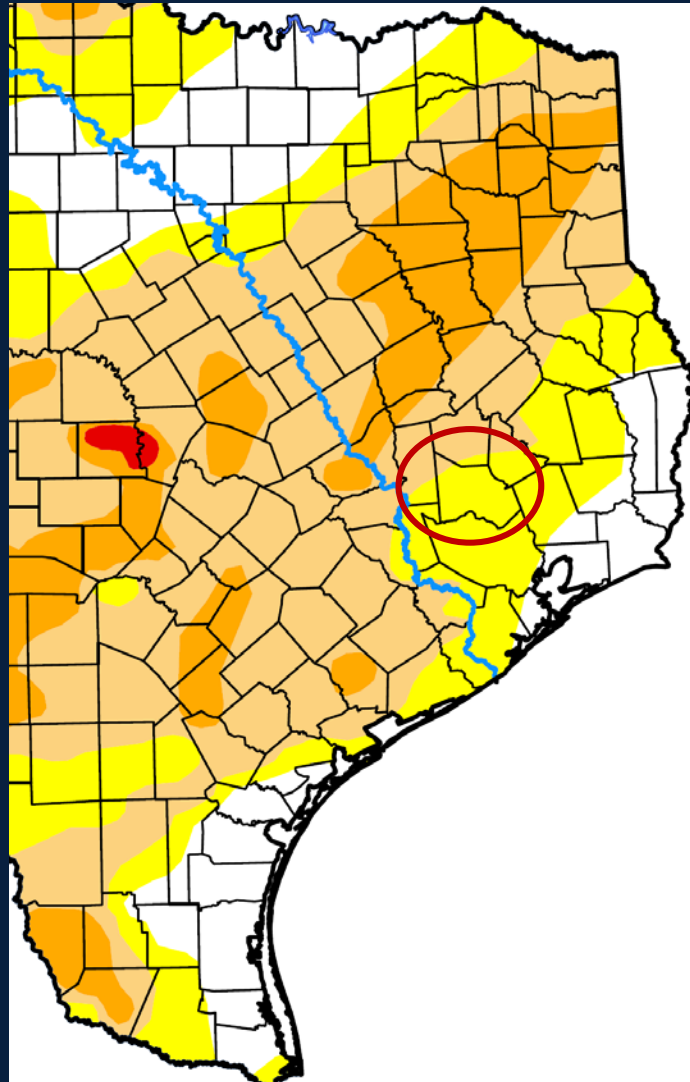


Rainfall in late 2019

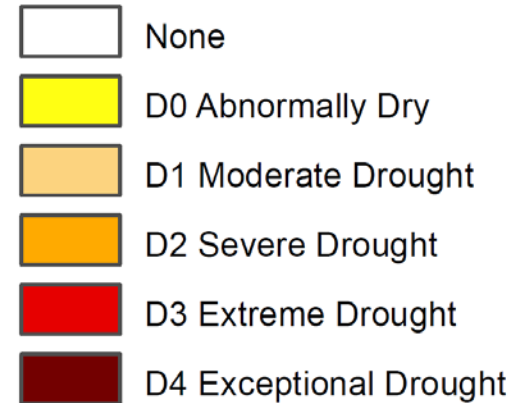
Month	1973-2019 Rainfall Averages (Inches)	2019 Observed Rainfall (Inches)	Rainfall Difference (Inches)
July	3.47	5.72	2.25
August	4.11	1.29	-2.82
September	4.34	1.76	-2.58
October	4.48	5.84	1.36
November	4.05	2.30	-1.75
December	3.55	1.20	-2.35

* During the last 6-months of 2019 Lake Conroe received 5.89 inches less rainfall than normal.

Drought Monitor – January 16, 2020



Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Curtis Riganti
National Drought Mitigation Center

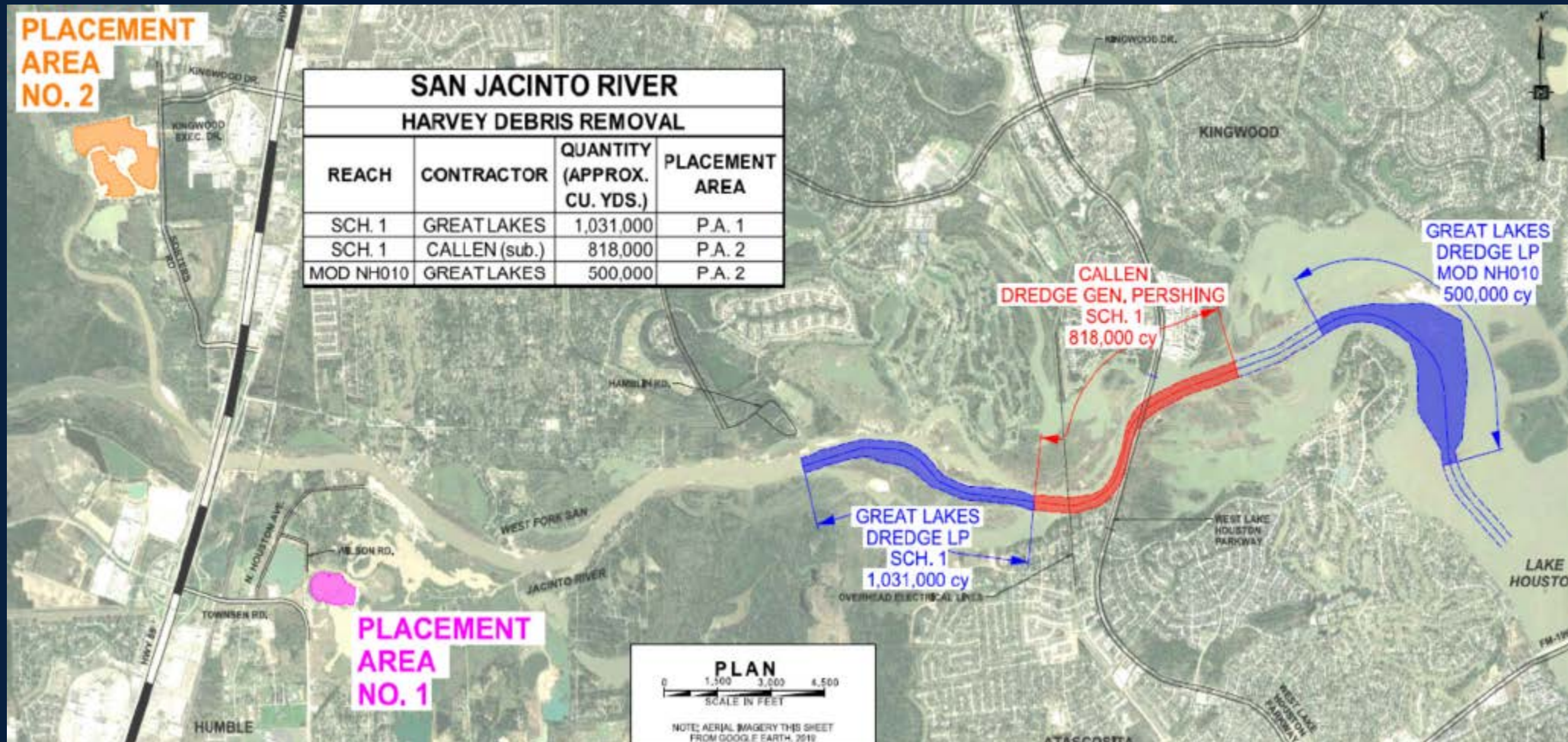


Overview

- Pertinent facts and details about Lake Conroe, Lake Houston, and the temporary Seasonal Lake Lowering initiative
- Summary of the 2018 and 2019 Seasonal Lake Lowering
- Status of downstream mitigation projects

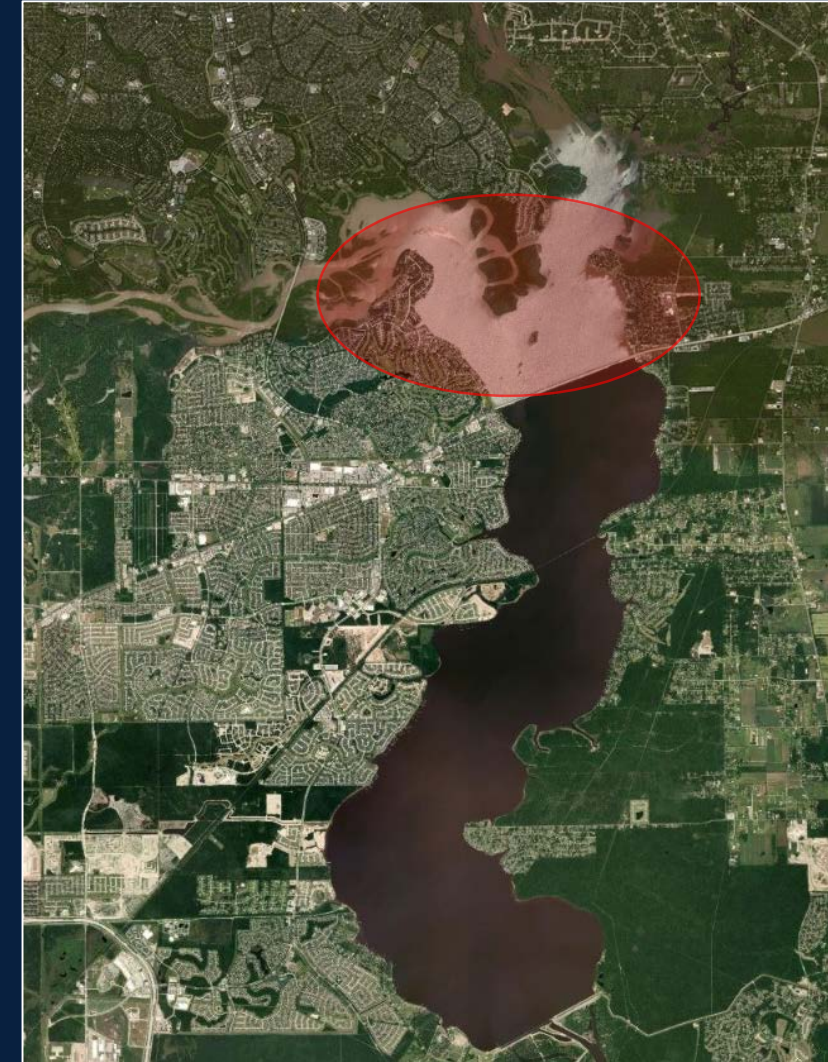
San Jacinto River Dredging

- Dredging completed on August 30, 2019. Original contract removed approximately 1.8 million cubic yards (CY). Contract modification removed additional 500,000 CY from mouth bar in Lake Houston area.

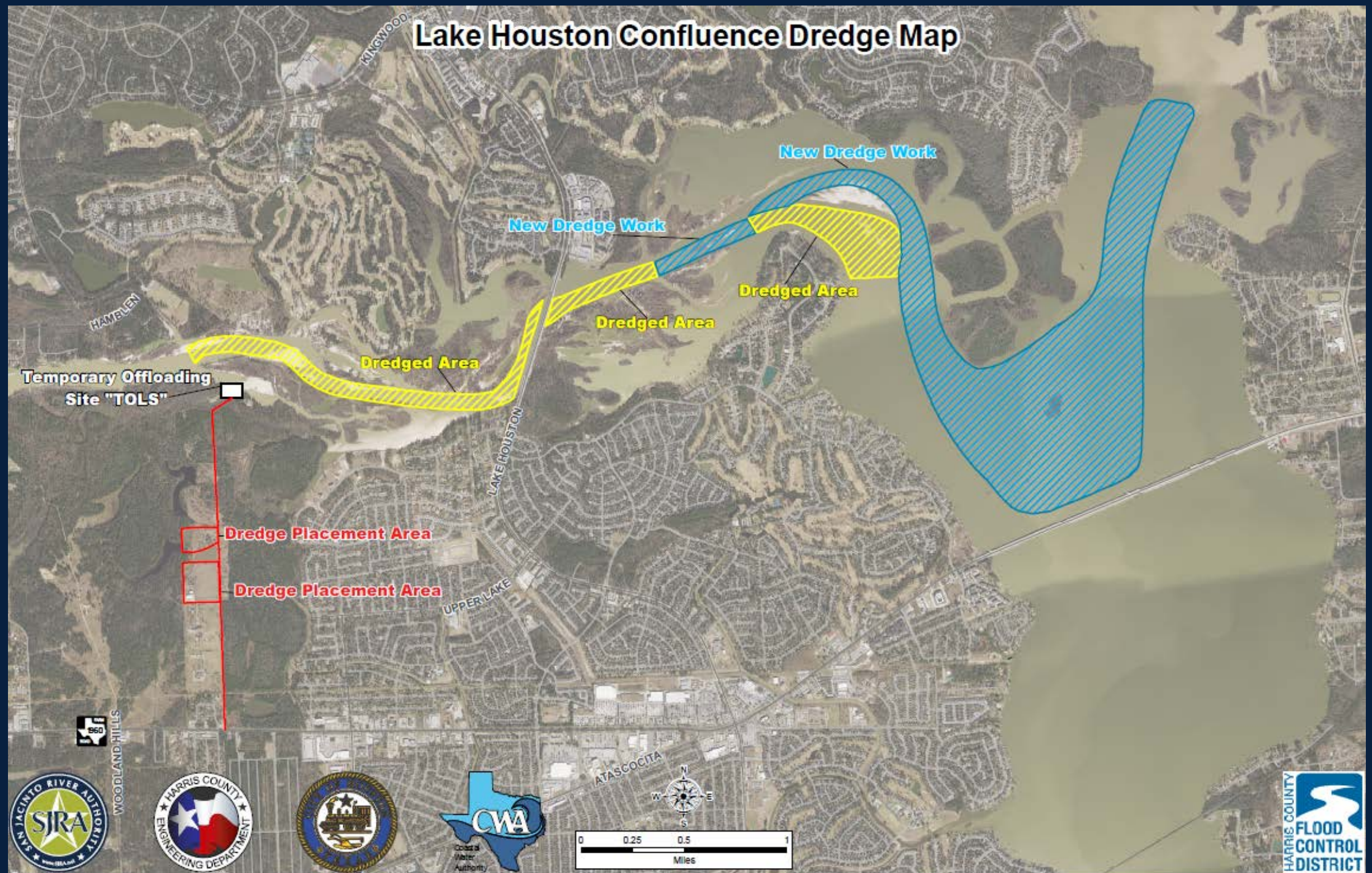


San Jacinto River Dredging

- The CoH issued a Notice to Proceed for additional dredging in Lake Houston near WFSJR the week of January 6, 2020
- The total cost of this phase of the dredging effort is \$40 million
 - City of Houston
 - Harris County Flood Control District
 - Texas Water Development Board
- Expected to remove additional 400,000 CY of material over the next 12 months



Lake Houston Confluence Dredge Map



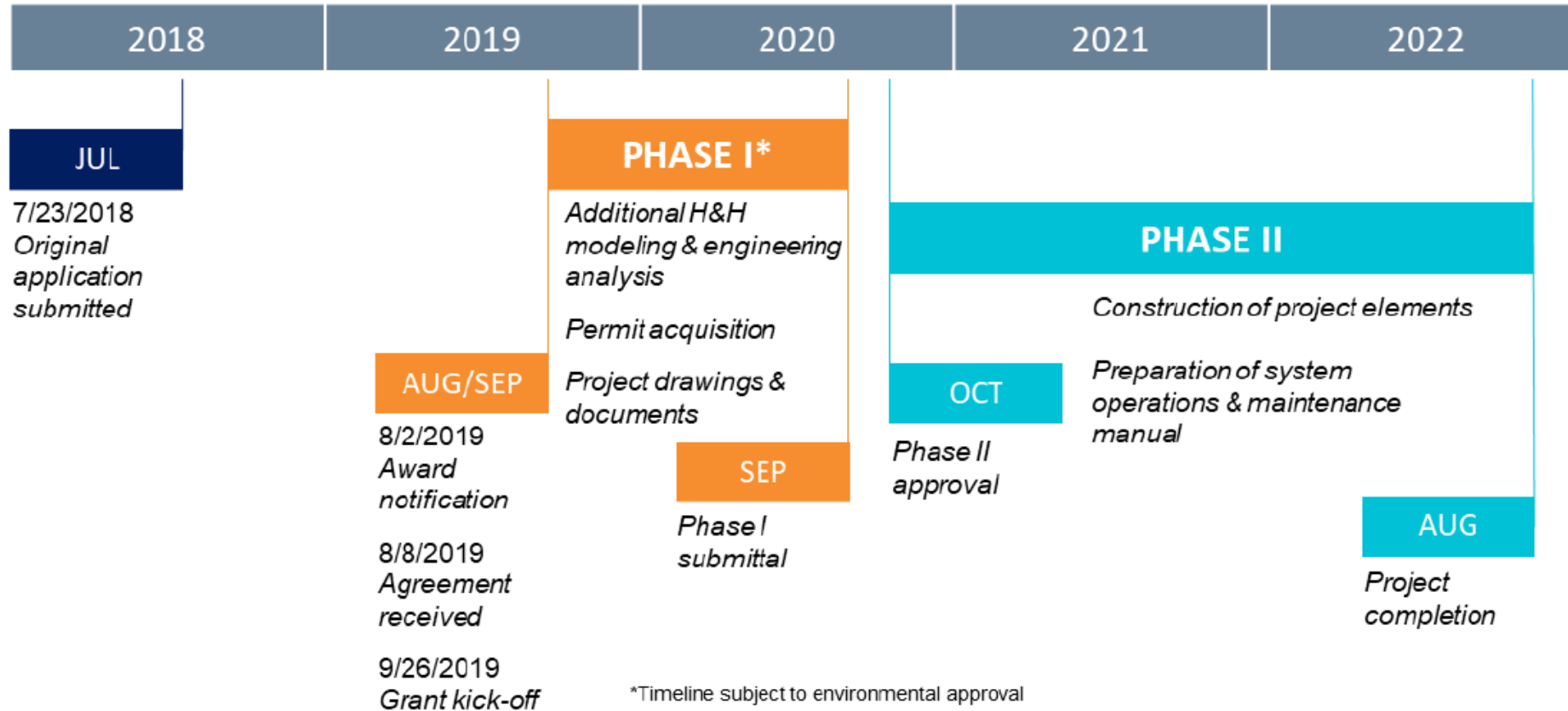
Lake Houston Spillway



Gates on Lake Houston Dam

The Lake Houston Dam Spillway project, located on Lake Houston along the San Jacinto River, will increase outflow capacity of the Lake Houston Dam. The project proposes rehabilitating existing bays that do not currently have gated structures with 10 additional gates. This will allow for rapid decrease of water levels in Lake Houston in advance of storm events to prevent or reduce upstream flooding.

	Total Cost	Federal Share	Local Share
Lake Houston Dam Spillway	\$47,170,953	\$35,378,215	\$11,792,738
Phase I: Design	\$4,375,199	\$3,281,399	\$1,093,800
Phase II: Construction	\$42,795,754	\$32,096,816	\$10,698,938



Other Mitigation Projects

The following mitigation projects were included in the Harris County Bond Election and may have a direct benefit on the Lake Houston Area:

- Multiple Channel Maintenance, Conveyance Improvements, and/or Restoration Projects
- Multiple Detention Basin Construction/Improvements Projects
- Multiple Subdivision and General Drainage Improvements Projects
- Multiple Right-of-Way Acquisition and Floodplain Preservation Projects
- Spring Creek Reservoir Construction
- Countywide Storm Repairs

San Jacinto Regional Watershed Master Drainage Plan

- Develop H&H models that will help predict flood risks in the study areas
- Evaluate flood mitigation measures
- Evaluate sediment management strategies
- Analyze existing watershed conditions
- Identify flood mitigation projects that will potentially reduce the flood risk in the study area
- Study Goal: to identify vulnerabilities to flood hazards and develop a comprehensive flood mitigation plan

3,000 SQUARE MILES OF STUDY AREA

The watershed for the streams to be studied covers an expanse of nearly 3,000 square miles, located in seven different counties:

- Grimes County
- Harris County
- Liberty County
- Montgomery County
- San Jacinto County
- Walker County
- Waller County

The study includes approximately 535 miles of stream, including West Fork San Jacinto River, East Fork San Jacinto River, San Jacinto River, Lake Creek, Cypress Creek, Little Cypress Creek, Spring Creek, Willow Creek, Caney Creek, Peach Creek, Luce Bayou, Tarkington Bayou, and Jackson Bayou.

Schedule

- Staff will continue to coordinate with the City of Houston on their plans related to the release of the city's water from Lake Conroe
- The SJRA Board will further consider this initiative on February 20th at 6:00pm at the Lone Star Convention Center

Online Resources

- KnowYourWatershed.com
- SanJacinto.onerain.com
- HarrisCountyfws.org
- SanJacStudy.org

