

LCRA WATER MANAGEMENT PLAN

Participant Meeting

Oct. 4, 2018



FOR DISCUSSION PURPOSES ONLY

Agenda

- Timeline
- Activity since last meeting on Sept. 6
- Comments received since Sept. 6
- Updates to WMP model
- Model results
- Combined firm yield of lakes Buchanan and Travis
- Discussion
- Naturalized flows workshop

Timeline

- May 21 – First participant meeting
- July 12 – Second participant meeting
- Sept. 6 – Third participant meeting
- **Oct. 4 – Fourth participant meeting**
- Oct. 25 – Fifth participant meeting
- Nov. 8 – Sixth participant meeting
- December – WMP before LCRA Board for approval
- Early 2019 – Plan submitted to TCEQ

Activity Since Last Meeting

- Meetings with participants
- Written responses to comments
- Technical paper on WAM model
- Update to naturalized flows
- Updated model and results

Comments Received – CWIC

- Reduce partial curtailments of first and second crops
- Modify drought and curtailment triggers to increase reliability of first and second crops
- Allow a portion of allocated but not used first crop stored water to be carried over for use in second crop
- Near-term demands may be lower than modeled
- Caps on stored water may dictate lower planted acres
- Concern about revision timeline

Comments Received – Environmental Interests

- Add a participant meeting

Comments Received – Jordan Furnans

- Update naturalized flows to reflect corrected end-of-month lake storage
- Provide information on QA/QC

Comments Received – CTWC

- Provide information on the firm yield
- Provide information on naturalized flows
- Address ordered-but-not-diverted water rates
- Update modeling to include operations of Arbuckle Reservoir
- Clarify how water is used in hydroelectric generation operations
- Show how potential emergency hydroelectric releases are accounted for in the model
- Explain daily operations

Comments Received – Tom Harrison

- Include ordered-but-not-diverted water in allocation of interruptible stored water

Protecting Firm Demands

- 2025 projected demands in all years
- Year 2011 conditions in 35 of 77 years
- Minimum combined storage

Updates to WAM Model Since Aug. 10

- Revised Austin direct reuse quantities
- Added weather variation for Austin return flow factors
- Revised lake release factors
- Revised Wharton criteria when below 900,000 acre-feet
- Updated naturalized flows

Model Results Recap

	Aug. 10 WAM	Oct. 4 WAM
Minimum combined storage (acre-feet)	610,221	624,654
Percent of months storage is above 900,000 acre-feet	97 percent	97 percent

Model Results Recap

Water for agricultural irrigation:

	Aug. 10 WAM	Oct. 4 WAM
	(years out of 77)	(years out of 77)
Full supply both 1st and 2nd season	51	51
Full supply 1st season	58	58
Curtailed 1st season	8	8
No stored water 1st season	11	11
Full supply second season	51	51
Curtailed 2nd season	12	12
No stored water second season	14	14

Model Results Recap

Attainment of instream flows at Wharton:

	Aug. 10 WAM (percent)	Oct. 4 WAM (percent)
Base-Average	55	56
Base-Dry	76	77
Subsistence	99.5	99.7

Attainment of bay inflows:

	Aug. 10 WAM (percent)	Oct. 4 WAM (percent)
MBHE 4	38	38
MBHE 3	43	43
MBHE 2	53	55
MBHE 1	68	69
Threshold	94	95

LAKES BUCHANAN AND TRAVIS COMBINED FIRM YIELD

Topics

- Firm yield definition
- WAM model logic and settings
- Combined firm yield of lakes Buchanan and Travis
- System firm yield

Firm Yield Definition

Texas Administrative Code defines firm yield as:

“That amount of water, that the reservoir could have produced annually if it had been in place during the worst drought of record. In performing this simulation, naturalized streamflows will be modified as appropriate to account for the full exercise of upstream senior water rights is assumed as well as the passage of sufficient water to satisfy all downstream senior water rights valued at their full authorized amounts and conditions as well as the passage of flows needed to meet all applicable permit conditions relating to instream and freshwater inflow requirements.” 30 TAC 297.1(20)

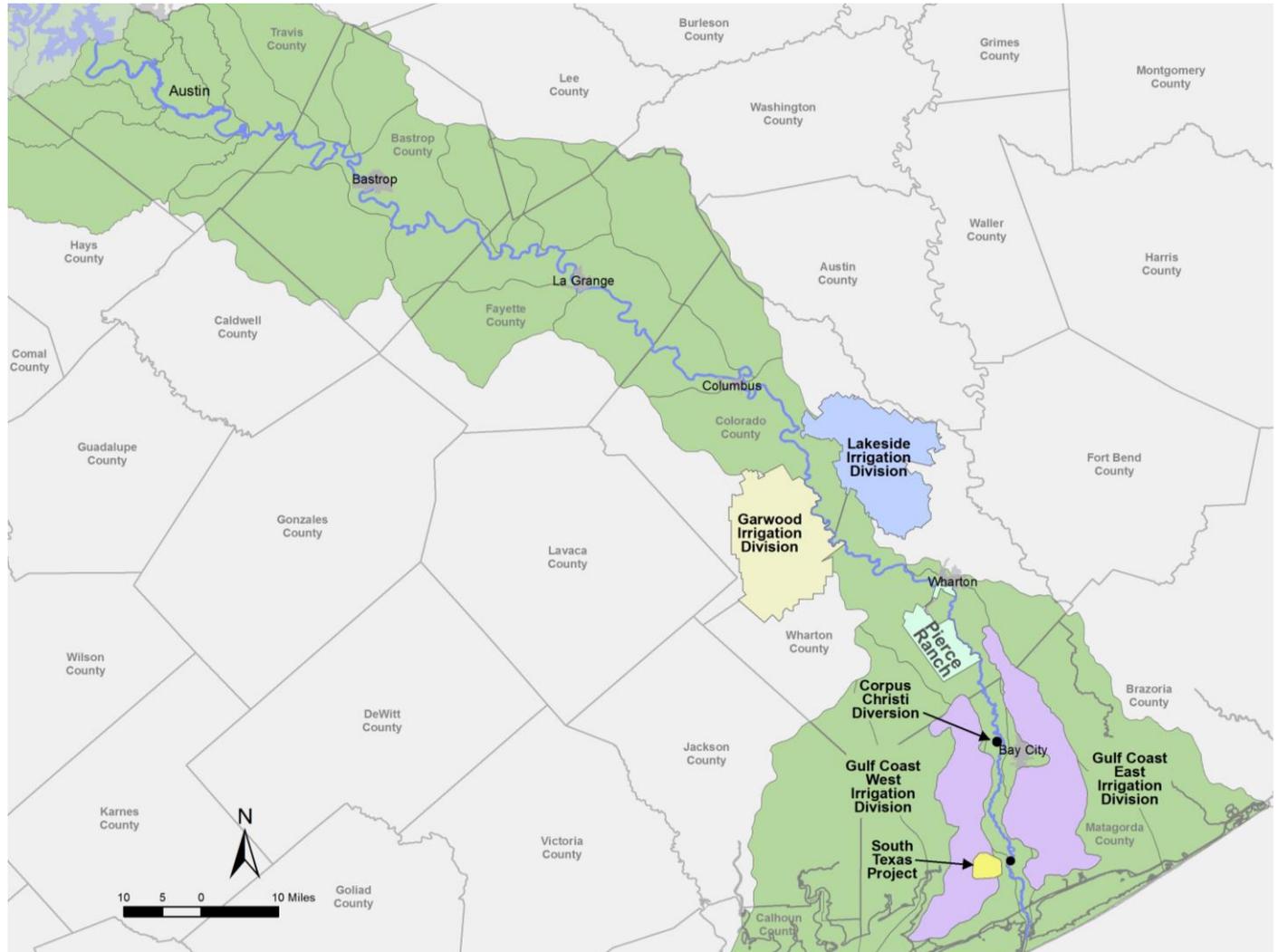
Combined Firm Yield of Lakes Buchanan and Travis

- Required by the adjudication of the water rights
- Lakes operated as a system

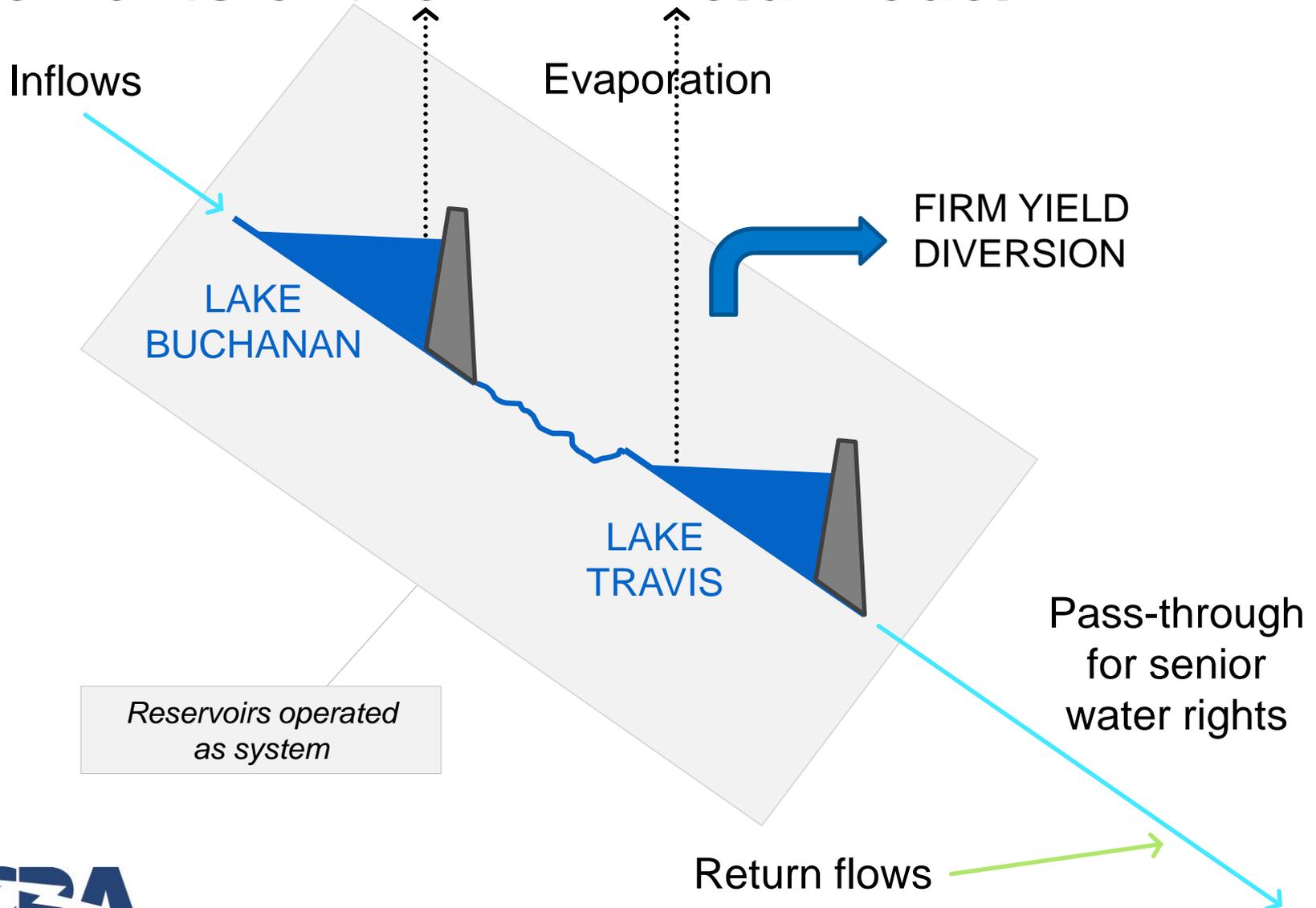
Firm Yield Water Availability Model

- Does not include Water Management Plan operation
 - No interruptible water
 - No environmental releases
- O.H. Ivie Reservoir and Lake Brownwood cutoff model
- Water rights at full authorization
- Estimated 2025 lake storage volumes
- Period of record is 1940-2016
- Includes City of Austin return flows

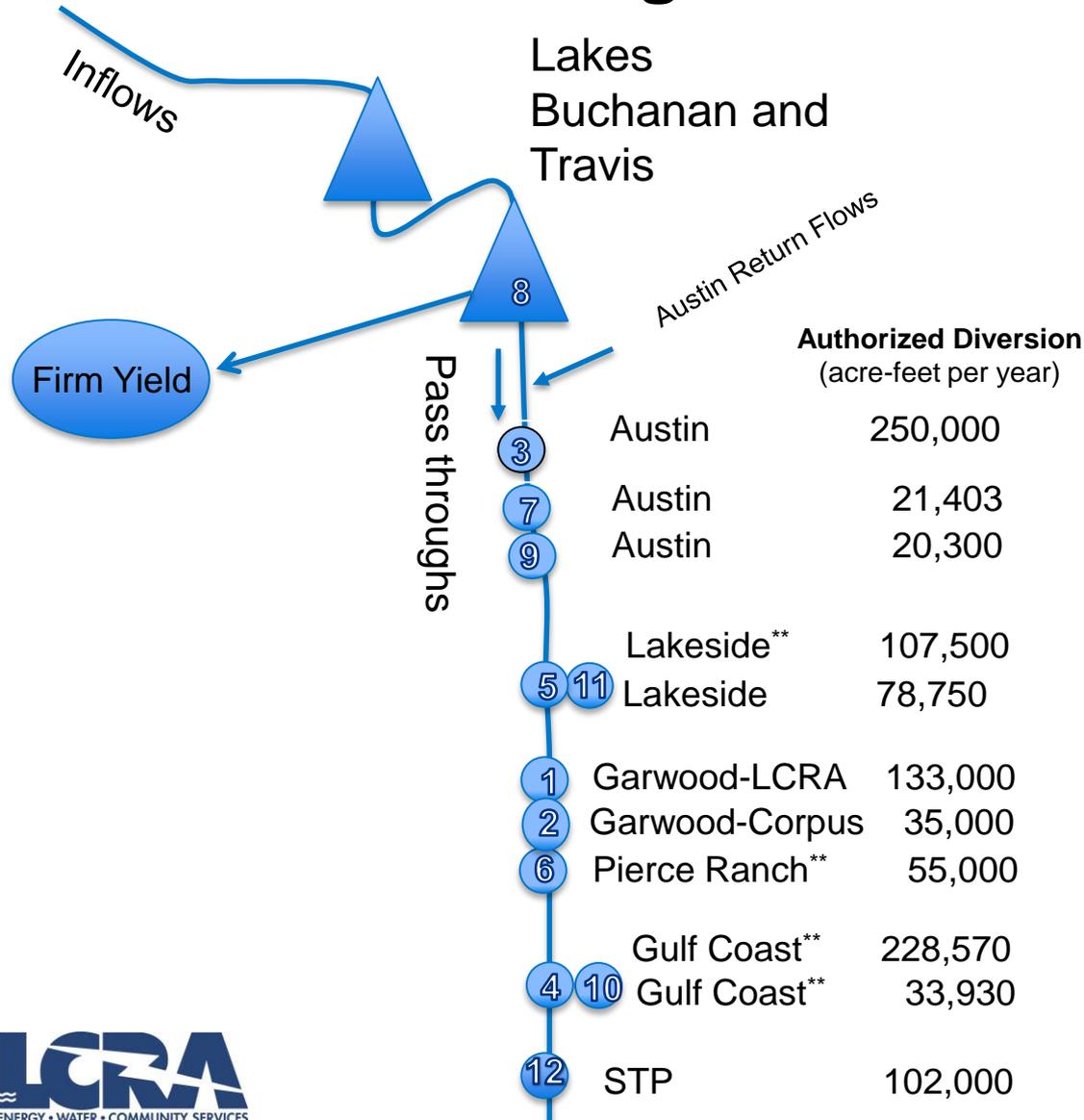
Lower Basin Watershed and Downstream Diversion Locations



Elements of the Firm Yield Model



Firm Yield Modeling* – Water Rights Priorities



Numbers in circles represent relative priorities of water rights.
 * Some details are not represented or are represented in aggregate.
 ** Run-of-river diversions are subordinated to City of Austin water rights.

Combined Firm Yield of Lakes Buchanan and Travis

- 418,800 acre-feet per year (for 1940-2016 period)
- New critical period (most recent drought)
- Reduction of about 15,000 acre-feet from prior firm yield based on 1950s drought

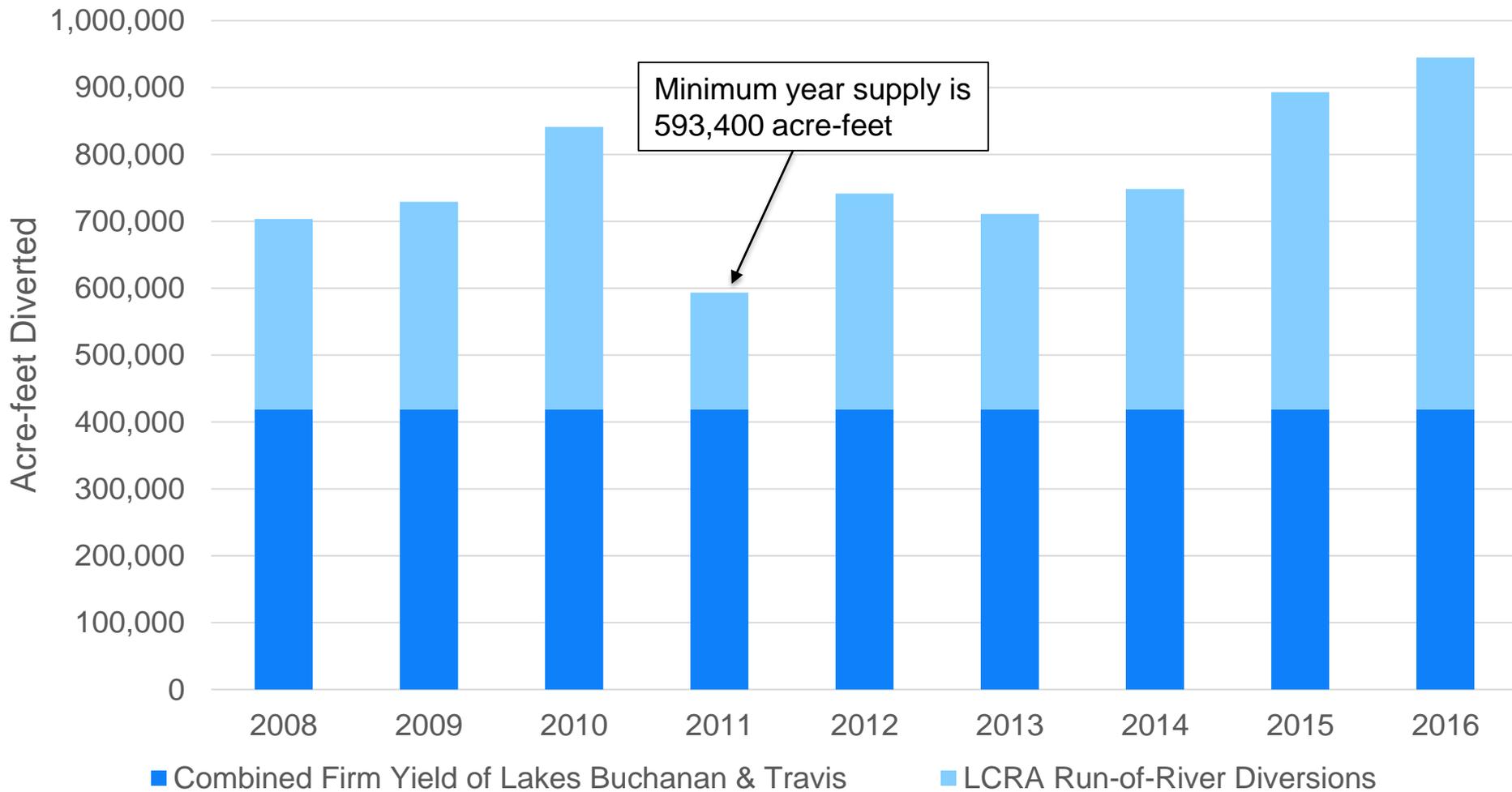
System Firm Yield Calculation

$$\begin{array}{r} \text{Lakes Buchanan \& Travis Combined Firm Yield} \\ + \text{ Other LCRA Firm Supply} \\ \hline \text{System Firm Yield} \end{array}$$

Calculating Run-of-River Firm Supply

- Determine annual diversion available to each LCRA run-of river water right at its authorized diversion points
- Find the minimum annual diversion in a year coincident with the lakes' drought

LCRA System Supply* Through Drought of Record



*Includes Arbuckle Reservoir. Does not include 100,000 acre-feet per year under the Garwood Purchase Agreement

System Firm Yield Calculation

Lakes Buchanan & Travis CFY	418,800 acre-feet/year
+ Other LCRA Firm Supply	174,600 acre-feet/year
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= System Firm Yield (w/ Arbuckle)	593,400 acre-feet/year

DISCUSSION



Next Steps

- Comments requested by Friday, Oct. 12.
 - Submit comments to LCRAWMP@lcra.org
- Oct. 25 – Fifth participant meeting
 - Drought worse than drought of record
 - Updated model