Water Management Plan

Participant Meeting

March 27, 2025

ENERGY • WATER • COMMUNITY SERVICES

Agenda

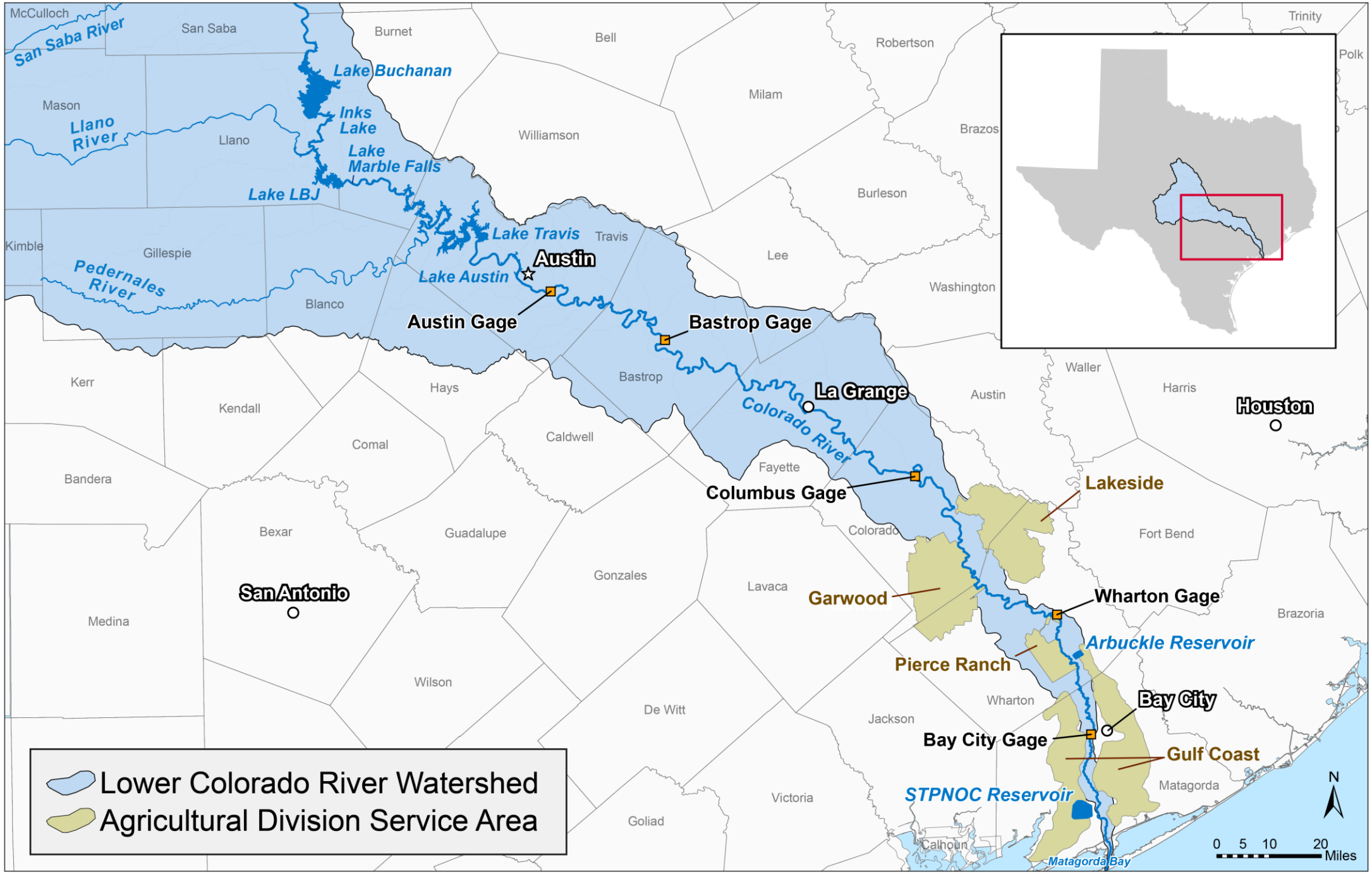
- **Water Management Plan presentation**
  - WMP background
  - Why we are updating the plan
  - Timeline
  - What will be updated
  - Approach for revising demands
  - Environmental flows
- **Discussion and questions**
- **Environmental flows short course**

LCRA's Water Management Plan

- Governs LCRA's operation of lakes Buchanan and Travis to supply water to users throughout the lower Colorado River basin

- Allows for supply of interruptible water provided we don't impair our ability to meet the needs of our firm customers

- Helps meet the environmental needs of the river and bay


McCulloch
San Saba River
San Saba
Burnet
Bell
Robertson
Trinity
Polk
Lake Buchanan
Mason
Llano River
Llano
Inks Lake
Lake Marble Falls
Lake LBJ
Milam
Williamson
Brazos
Burleson
Kimble
Gillespie
Pedernales River
Lake Travis
Travis
Austin
Lake Austin
Austin Gage
Bastrop Gage
Blanco
Lee
Washington
Kerr
Kendall
Hays
Bastrop
La Grange
Colorado River
Waller
Harris
Houston
Austin
Comal
Caldwell
Fayette
Columbus Gage
Lakeside
Bandera
Bexar
Guadalupe
Colorado
Fort Bend
San Antonio
Gonzales
Lavaca
Garwood
Wharton Gage
Brazoria
Medina
Arbuckle Reservoir
Pierce Ranch
Wilson
Wharton
Bay City
De Witt
Jackson
Bay City Gage
Gulf Coast
Victoria
STPNOC Reservoir
Matagorda
Goliad
Calhoun
Matagorda Bay
Lower Colorado River Watershed
Agricultural Division Service Area
N
0 5 10 20
Miles

2020 Water Management Plan

- Approved by TCEQ in February 2020
- Used projected firm demands through 2025
- Maintained minimum combined storage above 600,000 acre-feet through repeat of period of record (1942-2016)
- Makes water available for interruptible agriculture and environmental flows based on water supply conditions

2020 WMP – Interruptible Agricultural Supply

- **Two evaluation dates for interruptible stored water**
- **Three water supply conditions: Normal, Less Severe Drought, Extraordinary Drought**
  - Based on storage and prior three months of inflows
- **Look-ahead tests**

2020 WMP – Environmental Flows

- **Obligation to provide water for environmental flows, other than Subsistence, limited to storable inflows to the Highland Lakes**
- **Three evaluation dates**
- **Instream flows levels:**
  - Base Average, Base Dry and Subsistence
    - Special Subsistence Criteria at Wharton
- **Matagorda Bay inflows:**
  - Monthly Threshold value
  - Four levels of conditions applied on two-month time step

Why Update the Plan

- **TCEQ required update process to begin no later than 2025**
- **WMP was first approved in 1989**
- **WMP updated periodically:**
  - In 1991, 1992, 1999, 2010, 2015 and 2020

Meetings and Communications

- Had initial discussion with Texas Commission on Environmental Quality in December
- Have met with interest groups
- Discussed update process with LCRA Board

Timeline

March 27, 2025	First participant meeting
April 23, 2025	Second participant meeting
May 2025	Third participant meeting
July 2025	Fourth participant meeting
August 2025	Fifth participant meeting
October 2025	Sixth participant meeting
January 2026	Present staff recommendation on WMP updates to LCRA Board
Spring 2026	Request LCRA Board approval
Summer 2026	Submit to TCEQ for approval

What Is Not Changing

- **The basic objectives:**
  - Meet firm demands without shortage
  - Maintain minimum combined storage

- **The basic WMP framework:**
  - Three water supply conditions – Normal, Less Severe Drought and Extraordinary Drought
  - Two evaluation dates for interruptible water availability for agriculture
  - Three evaluation dates for environmental flow criteria
  - Look-ahead tests

What Is Changing

- **Data in the mathematical model of the Highland Lakes and river system – the Water Availability Model, or WAM:**
  - Hydrology through 2023
    - Flow data in final review with TCEQ
  - Water demands projected to 2032
  - Water rights

What Might Change

- **Potential changes:**
  - Amounts of water available for interruptible agriculture and the environment
  - Curtailment triggers
  - How LCRA provides water for environmental flows in the river and the bay

Water Demands

- Updating for 2032 conditions
- Developed projections for:
  - Firm demands
    - Municipal and manufacturing
    - Steam-electric
  - Interruptible agricultural demands

Weather-Varied Demands

- **Demands influenced by weather**

- **Applied weather variation to:**
  - Municipal and manufacturing demands
  - Steam-electric demands
  - Interruptible agricultural demands

Municipal and Manufacturing Demands

- **Based on:**
  - Recent gallons per capita per day (GPCD) use
  - 2032 estimated population

- **High-use year demands based on average of highest three GPCD years after 2011**

- **Normal year demands based on median GPCD use**

- **Toggle between high-use and normal year demands in the WAM**

Preliminary Projected 2032 Demands – Municipal and Manufacturing

	Normal (a-f/year)	**High** (a-f/year)
Municipal/Manufacturing		
City of Austin	183,200	207,100
Other	168,400	183,700
Total	351,600	390,800

- Normal demands are about 27% higher than the 2020 WMP.
- High demands are about 13% higher than the 2020 WMP.

Steam-Electric Demands

- **Weather-varied demand:**
  - South Texas Project Nuclear Operating Company (STPNOC)
  - Ferguson Power Plant
  - Fayette Power Project

- **Fixed demand:**
  - Bastrop Energy Center

Preliminary Projected 2032 Demands – Steam-Electric

	Normal (a-f/year)	**High** (a-f/year)
Steam-Electric		
LCRA	14,500	19,700
City of Austin Power Plants	7,300	10,300
STP	39,400	39,400
Bastrop Energy Center	2,300	2,300
Total	63,500	71,700

Interruptible Agricultural Demands

- **Weather-varied based on recent per acre use data**
  - Reflects contracting practices and efficiency improvements

- **Based on Region K acreage**

Preliminary Projected 2032 Demands – Interruptible Agricultural

	Normal (a-f/year)	**High** (a-f/year)
Agriculture		
Lakeside	85,700	140,200
Garwood	81,900	100,000
Pierce Ranch	24,100	30,000
Gulf Coast	110,000	151,000
Total	301,700	421,200

- Normal demands are about 18% lower than the 2020 WMP.
- High demands are about the same as the 2020 WMP.

Preliminary Projected 2032 Demands

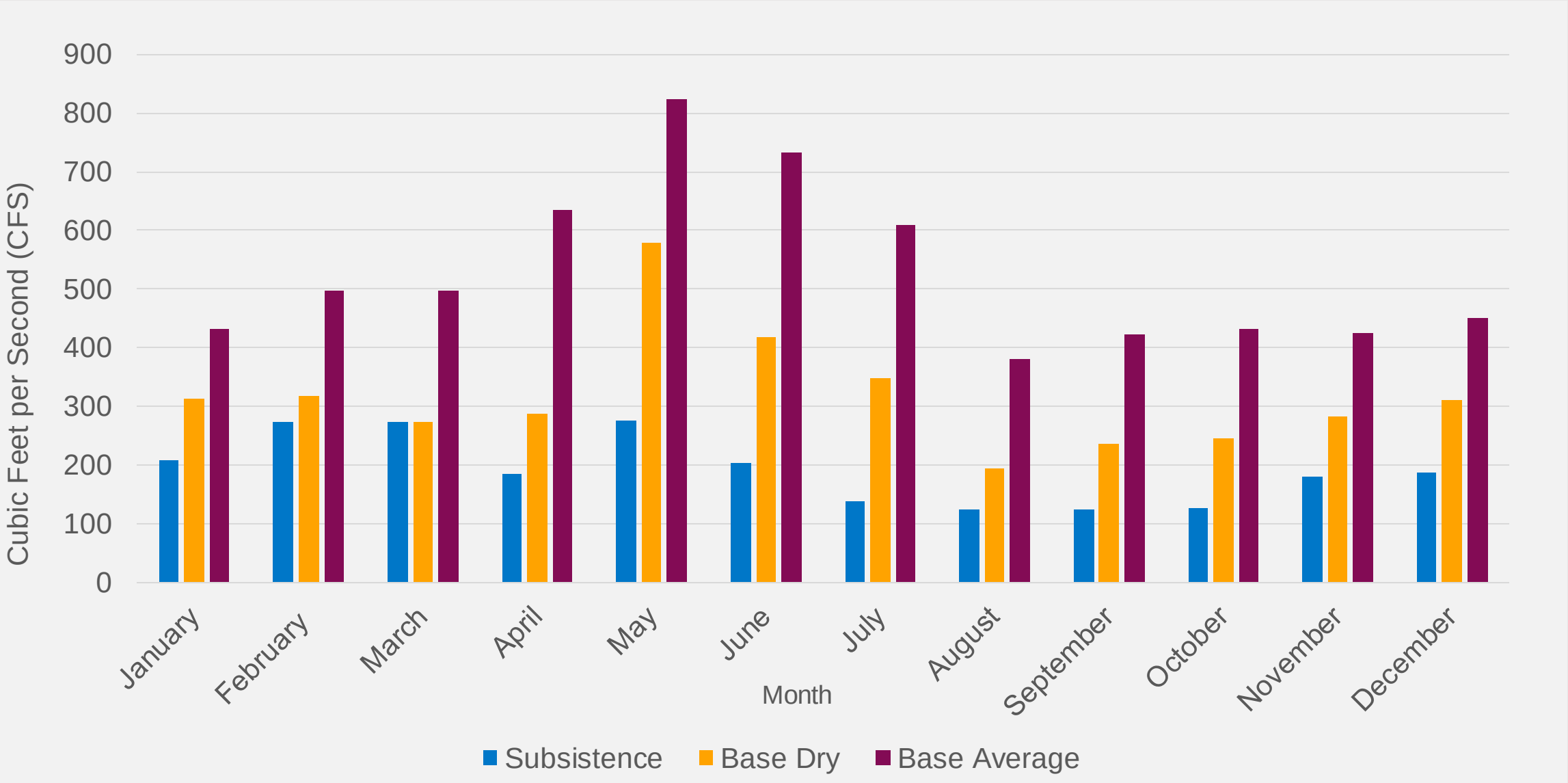
	Normal (a-f/year)	High (a-f/year)
Municipal/Manufacturing		
City of Austin	183,200	207,100
Other	168,400	183,700
Steam-Electric		
LCRA	14,500	19,700
COA Power Plants	7,300	10,300
STP	39,400	39,400
Bastrop Energy Center	2,300	2,300
Agriculture		
Lakeside	85,700	140,200
Garwood	81,900	100,000
Pierce Ranch	24,100	30,000
Gulf Coast	110,000	151,000

Environmental Flows

- **Instream flows**
  - Austin, Bastrop, Columbus and Wharton gauges

- **Matagorda Bay inflows**

Sample Instream Flows



Matagorda Bay Inflows (acre-feet)

Inflow Category	Spring (Three-month total)	Fall (Three-month total)	Intervening (Six-month total)	Monthly
Threshold	-	-	-	15,000
MBHE-1	114,000	81,000	105,000	-
MBHE-2	168,700	119,900	155,400	-
MBHE-3	246,200	175,000	226,800	-
MBHE-4	433,200	307,800	399,000	-

Next Steps

- **Comment period open throughout the update process**
  - Submit comments to **LCRAWMP@lcra.org** by April 11

- **April 23 – Second participant meeting**
  - Discuss modeling approach and how naturalized flows are used during modeling
  - Naturalized flows short course to follow the meeting

Questions?

Environmental Flows

WMP Short Course
March 27, 2025

Overview

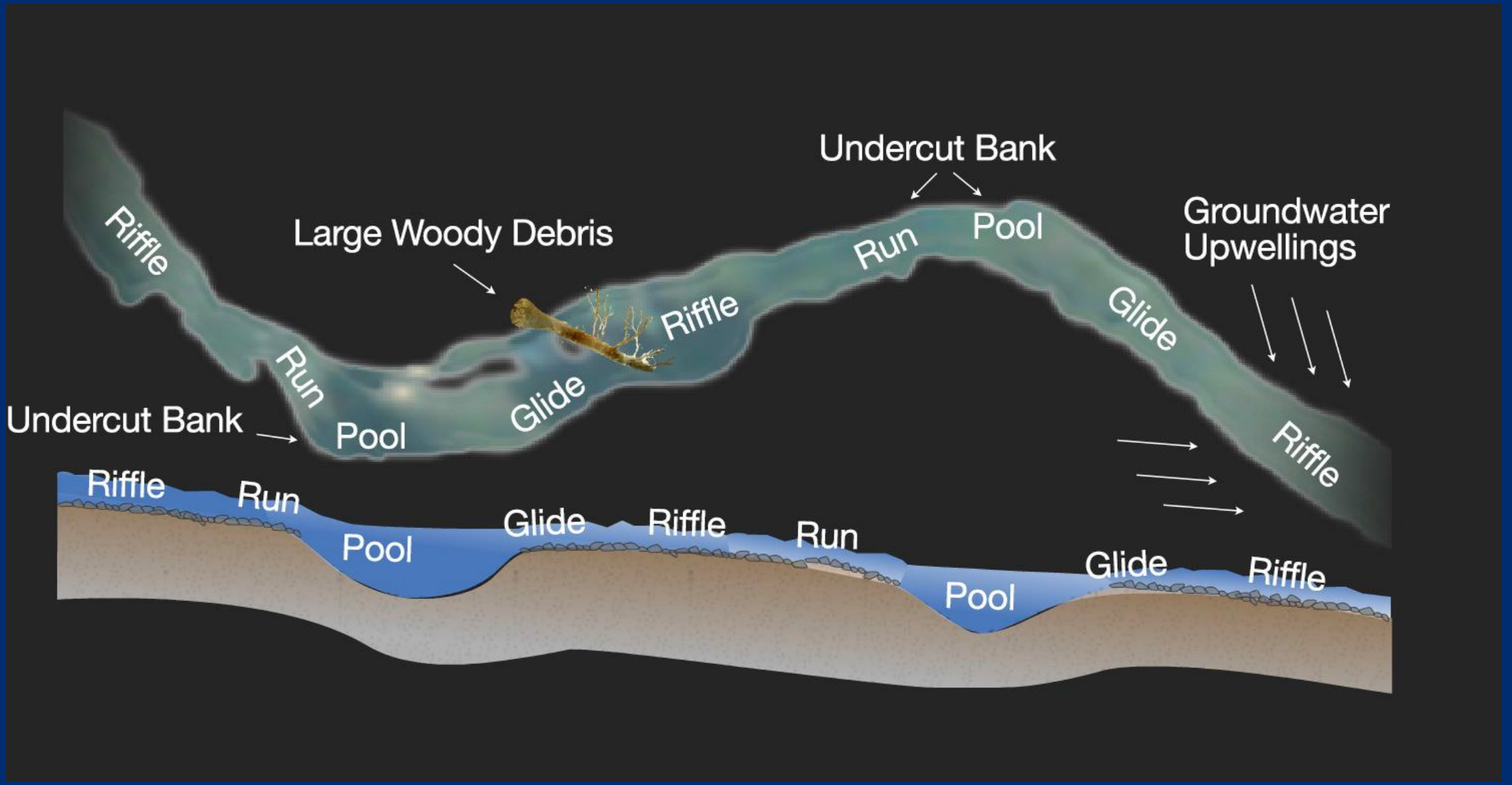
- Ecology of lower Colorado River and Matagorda Bay
- Definition of environmental flows
- Why LCRA considers environmental flows
- Developing and incorporating environmental flow criteria

Ecology – Colorado River Below Austin

- **Diverse aquatic habitat**
  - Riffles, runs and pools
  - Multiple eco-regions
- **Healthy aquatic ecosystem**
  - 60+ fish species
  - 23+ native mussel species*, three endangered
  - Species of special interest Blue Suckers, American eels
- **Good water quality**
  - High dissolved oxygen level

*Number of species updated after March 27 meeting

River Habitats



https://fwrconline.csktnrd.org/Explore/ExploreTheRiver/CenturyOfChange/FourCs/

Ecology – Matagorda Bay

- **Second largest estuary in Texas**
  – Diverse estuarine habitat
- **Supports a commercial fishery**
  – Shrimp, crabs, oysters
- **Robust recreational fishery**
  – Red drum, speckled trout
- **Birds birds birds!**

ENVIRONMENTAL FLOWS

Flow of water (both quantity and timing of flow) needed to maintain ecologically healthy streams and rivers, as well as the bays they flow into.

Instream flows

Flows in a river or stream

Freshwater inflows

Flows of fresh water that make it down the river or stream into an estuary system

Why LCRA Includes Environmental Flows in the WMP (1 of 2)

- 1988 adjudication order required LCRA to consider the flow needs of the Colorado River below Longhorn Dam and Matagorda Bay
- Initial WMP included placeholder criteria

Why LCRA Includes Environmental Flows in the WMP (2 of 2)

- **WMP updates included updated instream flows and freshwater inflow criteria based on studies**
  - 1990s: LCRA along with TPWD, TWDB and TCEQ
  - 2000s: LCRA studies

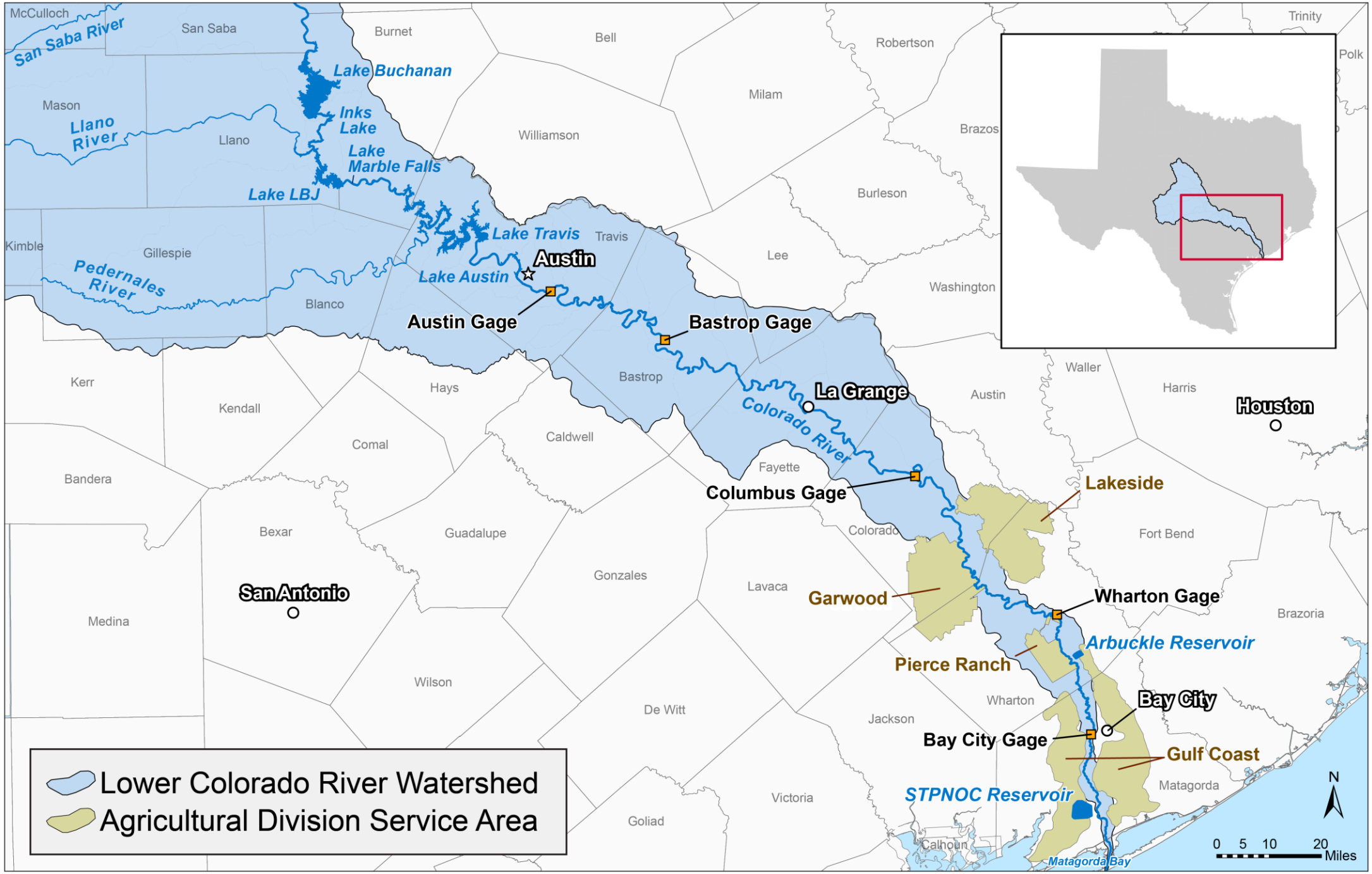
Instream Flow Criteria

Instream flow levels

- Base-Average
- Base-Dry
- Subsistence
- Special Subsistence

Instream flow gauge locations

- Austin
- Bastrop
- Columbus
- Wharton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Milam
Williamson
Brazos
Burleson
Kimble
Gillespie
Pedernales River
Lake Travis
Travis
Austin
Lake Austin
Austin Gage
Bastrop Gage
Blanco
Lee
Washington
Waller
Harris
Houston
Kerr
Kendall
Hays
Bastrop
La Grange
Colorado River
Austin
Comal
Caldwell
Fayette
Columbus Gage
Lakeside
Bandera
Bexar
Guadalupe
Colorado
Fort Bend
San Antonio
Gonzales
Lavaca
Garwood
Wharton Gage
Brazoria
Medina
Arbuckle Reservoir
Pierce Ranch
Wilson
Wharton
Bay City
De Witt
Jackson
Bay City Gage
Gulf Coast
Victoria
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Matagorda
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Matagorda Bay
Lower Colorado River Watershed
Agricultural Division Service Area
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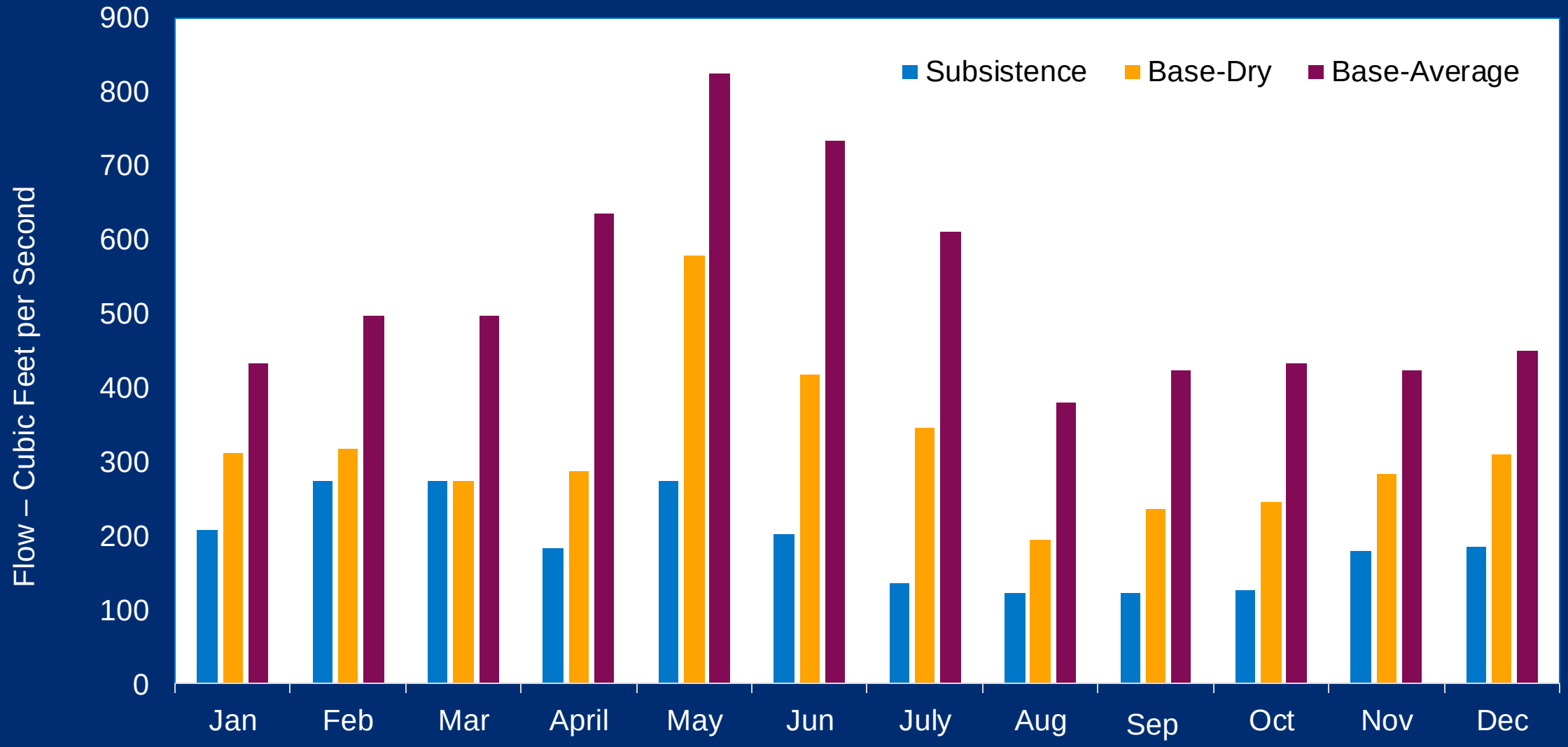
Instream Flow Criteria at Bastrop



Instream Flow Criteria in the WMP

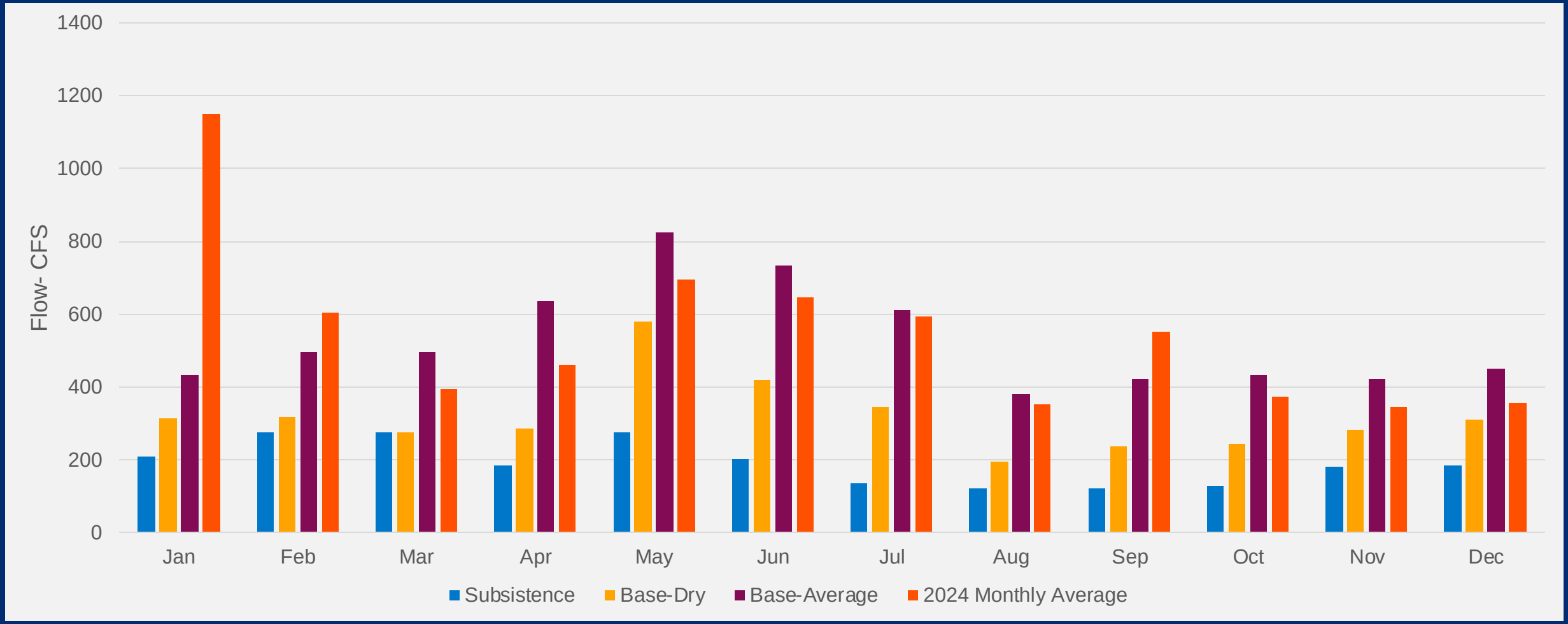
- Three evaluation dates: March 1, July 1, Nov. 1
- Provide inflows to Highland Lakes to help meet all levels of criteria
- For Subsistence, also provide previously stored water
  - Unique provision for Wharton

Combined Storage on Evaluation Date (acre-feet)	Instream Flow Criteria
Above 1,960,000	Base-Average
1,960,000 to 1,800,000	Base-Dry
Below 1,800,000	Subsistence

Instream Flow Criteria – Implementation (cubic feet per second (cfs))

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AUSTIN REACH												
Subsistence	50	50	50	50	50	50	50	50	50	50	50	50
BASTROP REACH												
Subsistence	208	274	274	184	275	202	137	123	123	127	180	186
Base-Dry	313	317	274	287	579	418	347	194	236	245	283	311
Base-Average	433	497	497	635	824	733	610	381	423	433	424	450
COLUMBUS REACH												
Subsistence	340	375	375	299	425	534	342	190	279	190	202	301
Base-Dry	487	590	525	554	966	967	570	310	405	356	480	464
Base-Average	828	895	1020	977	1316	1440	895	516	610	741	755	737
WHARTON REACH												
Special Subsistence	158	152	102	135	152	186	107	107	107	107	107	107
Subsistence	315	303	204	270	304	371	212	107	188	147	173	202
Base-Dry	492	597	531	561	985	984	577	314	410	360	486	470
Base-Average	838	906	1036	1011	1397	1512	906	522	612	749	764	746

Colorado River at Bastrop- 2024 Monthly Flow Comparison

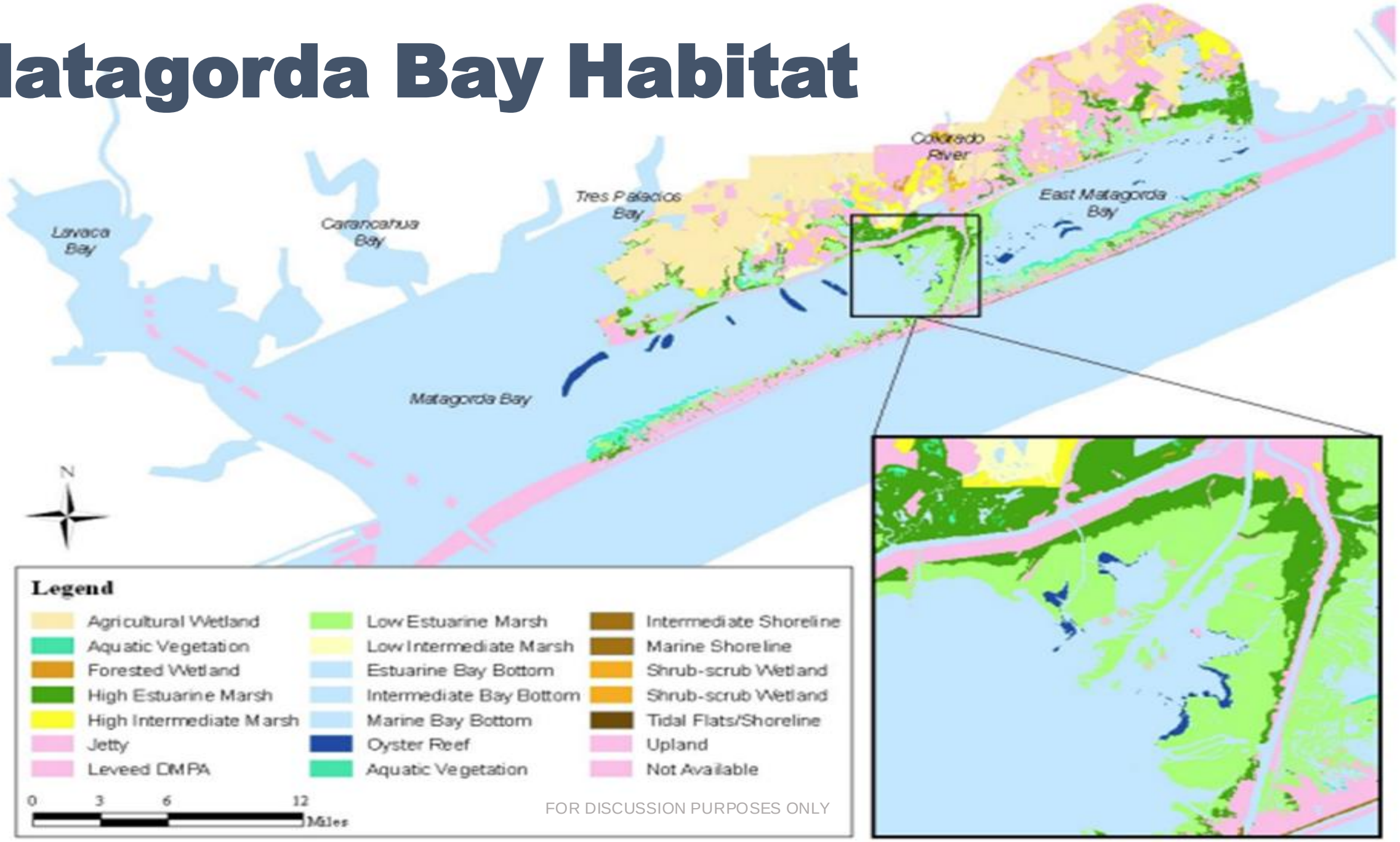


Freshwater Inflows to Bay

Freshwater Inflow Criteria

- **Freshwater inflows provide:**
  - Lower salinity
  - Nutrients
  - Sediments
- **Two types of desired inflows:**
  - Freshet
  - Monthly Threshold

Matagorda Bay Habitat



Matagorda Bay Health Evaluation

Inflow Category	Inflow Criteria	Description
LONG-TERM	Long-term Average Volume and Variability	provide adequate bay food supply to maintain the essential food supply and existing primary productivity of the bay system
MBHE INFLOW REGIME	MBHE 4	provide inflow variability and support high levels of primarily productivity, and high quality oyster reef health, benthic condition, low estuarine marsh, and shellfish and forage fish habitat.
	MBHE 3	provide inflow variability and support quality oyster reef health, benthic condition, low estuarine marsh, and shellfish and forage fish habitat.
	MBHE 2	provide inflow variability and sustain oyster reef health, benthic condition, low estuarine marsh, and shellfish and forage fish habitat
	MBHE 1	maintain tolerable oyster reef health, benthic character, and habitat conditions
MINIMUM	Threshold	refuge conditions for all species and habitats

MBHE Freshet Recommendations

Inflow Category	Seasonal Three-Month Freshet (acre-feet)	
	Spring	Fall
MBHE-4	433,200	307,800
MBHE-3	246,200	175,000
MBHE-2	168,700	119,900
MBHE-1	114,000	81,000

Freshwater Inflow Criteria in the WMP

Table 4-7. Operational and Threshold Criteria for Colorado River Freshwater Inflows to Matagorda Bay

Inflow Category	Two-Month Operational Criteria Applicable in the Individual Months (acre-feet)			Monthly (acre-feet)
	Spring March-June	Fall July-October	Intervening November-February	-
OP-4	289,000	205,000	133,000	-
OP-3	164,000	117,000	76,000	-
OP-2	112,000	80,000	52,000	-
OP-1	76,000	54,000	35,000	-
Threshold	-	-	-	15,000

Freshwater Inflow Criteria in the WMP

- Three evaluation dates: March 1, July 1, Nov. 1
- Provide inflows to Highland Lakes to help meet all levels of criteria

Combined Storage on Evaluation Date (million acre-feet)	**Freshwater Inflow Criteria**
1.95 and above for March 1 and July 1; 1.85 and above on Nov. 1	OP-4
1.5 to 1.949 for March 1 and July 1; 1.5 to 1.849 for Nov. 1	OP-3
1.3 to 1.499	OP-2
1.0 to 1.299	OP-1
Less than 1.0	Threshold only

WMP Limits on Required Releases for the Bay

- Limited to the extent of storable inflows to lakes Buchanan and Travis
- Caps on monthly releases
- Limit on percentage of lakes Buchanan and Travis inflows
- In Threshold any time interruptible agricultural water is cut off
- Up to 5,000 acre-feet carryover to help meet Threshold in following month

Questions?

FOR DISCUSSION PURPOSES ONLY