

REGION H
Water Planning Group

**NON-POPULATION DEMANDS
COMMITTEE
MEETING MATERIALS**

March 21, 2023

Common Region H Terms and Conversion Factors

List of Abbreviations

BEG	Bureau of Economic Geology
CRU	Collective Reporting Unit
DCP	Drought Contingency Plan
DFC	Desired Future Condition
DOR	Drought of Record
EA	Executive Administrator
EPA	Environmental Protection Agency
FWSD	Fresh Water Supply District
GAM	Groundwater Availability Model
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
GPCD	Gallons Per Capita Per Day
GRP	Groundwater Reduction Plan
IFR	Infrastructure Finance Report
IPP	Initially Prepared Plan
MAG	Modeled Available Groundwater
MPC	Master Planned Community
MUD	Municipal Utility District
MWP	Major Water Provider
PDSI	Palmer Drought Severity Index
PWS	Public Water Supply
RFPG	Regional Flood Planning Group
RHWPG	Region H Water Planning Group
ROR	Run-of-River
RWP	Regional Water Plan
RWPA	Regional Water Planning Area
RWPG	Regional Water Planning Group
SWIFT	State Water Implementation Fund for Texas
SWP	State Water Plan
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TWC	Texas Water Code
TWDB	Texas Water Development Board
UCM	Unified Costing Model
URS	Unique Reservoir Site
USS	Unique Stream Segment
WAM	Water Availability Model
WCID	Water Control and Improvement District
WCP	Water Conservation Plan
WMS	Water Management Strategy
WRAP	Water Rights Analysis Package
WUG	Water User Group
WWP	Wholesale Water Provider

Water Measurements

1 acre-foot (AF) = 43,560 cubic feet = 325,851 gallons

1 acre-foot per year (ac-ft/yr) = 325,851 gallons per year = 893 gallons per day

1 gallon per minute (gpm) = 1,440 gallons per day = 1.6 ac-ft/yr

1 million gallons per day (mgd) = 1,000,000 gallons per day = 1,120 ac-ft/yr

**Region H Water Planning Group
Non-Population Demands Committee
2:00 PM Tuesday
March 21, 2023
Freese and Nichols Houston Office
10497 Town and Country Way, Suite 500, Houston, TX 77024**

AGENDA

1. Call to order.
2. Introductions.
3. Review and approve minutes of September 22, 2017 meeting.
4. **Receive public comments on specific issues related to agenda items 5 through 7.** (Public comments limited to 3 minutes per speaker)
5. Discuss Committee activities and schedule.
6. Receive presentation on and discuss TWDB data, projections, and the process for requesting revised projections and make recommendations regarding revised projections.
7. Receive presentation on identification of Major Water Providers for Region H and consider recommendations to the Region H Planning group.
8. **Receive public comments.** (Public comments limited to 3 minutes per speaker)
9. Adjourn.

Persons with disabilities who plan to attend this meeting and would like to request auxiliary aids or services are requested to contact Philip Taucer at (713) 600-6835 at least three business days prior to the meeting so that appropriate arrangements can be made.

Agenda Item 3

Review and approve minutes of September 22, 2017 meeting.

**REGION H WATER PLANNING GROUP
NON-POPULATION DEMANDS COMMITTEE
MINUTES OF COMMITTEE MEETING
SEPTEMBER 22, 2017**

MEMBERS PRESENT: James Comin, Robert Istre, and Glenn Lord

MEMBERS ABSENT: John Howard and Pudge Willcox

CONSULTANT TEAM: Philip Taucer, Jason Afinowicz, Courtney Merket, Jeremy Rice, Glenda Callaway, and John Seifert

OTHER ATTENDEES: Ivan Langford, Tom Michel, and Mitchel Ramon

1. INTRODUCTIONS

Mr. Taucer welcomed the committee members and public to the meeting. Attendees introduced themselves.

2. RECEIVE PUBLIC COMMENTS ON SPECIFIC ISSUES RELATED TO AGENDA ITEMS 3 THROUGH 5.

There were no comments related to this item.

3. DISCUSS COMMITTEE ACTIVITIES AND SCHEDULE

Mr. Taucer presented the upcoming schedule for activities related to non-population demand projections. Ms. Callaway recommended adjusting the schedule slide for future Committee meetings to reflect the Initially Prepared Plan (IPP) review and to include a footnote that public comment is received throughout the Regional Water Plan (RWP) process.

4. RECEIVE PRESENTATION ON AND DISCUSS TWDB DATA, PROJECTIONS, AND THE PROCESS FOR REQUESTING REVISED PROJECTIONS AND MAKE RECOMMENDATIONS REGARDING REVISED PROJECTIONS.

Mr. Taucer provided a summary of historical water use survey data, draft Texas Water Development Board (TWDB) projections, and prior RWP projections at the county-level for non-municipal water use categories.

Mr. Langford and Mr. Lord noted that their organizations had manufacturing usage data which could be useful in evaluating the draft projections for Brazoria and Galveston Counties. The Committee discussed the draft TWDB manufacturing projections, noting that the level future demand projected did not appear reflective of manufacturing water use in Region H. Several revisions were recommended for consideration by the full Region H Water Planning Group (RHWPG), including adjustment of historical data for Galveston County based on local records and use of a new baseline demand value calculated from the maximum year 2010 through 2015 annual use with consideration for unaccounted-for volumes.

The Committee discussed the draft TWDB steam electric power projections, noting that electricity demands in the region have been growing. It was also noted that based on the available historic data,

not all generating facilities reached their recent maximum water usage in the same year. The Committee developed a revision recommended for consideration by the full RHWPG, including the removal of water demands associated with cogeneration facilities from steam electric power projections. The Committee also recommended use of maximum year 2010 through 2015 historical use by generation facility, summed to the county level.

The Committee discussed the draft TWDB irrigation projections. The members noted that use of an average condition was not reflective of recent dry-year demands in the region, particularly in light of the potential for supply curtailment in dry years to limit demands. The Committee developed a recommendation for RHWPG consideration to utilize the second highest demand from years 2010 through 2015 for irrigation projections.

The Committee did not recommend revisions to the draft TWDB livestock or mining water demand projections.

5. RECEIVE PRESENTATION ON IDENTIFICATION OF MAJOR WATER PROVIDERS FOR REGION H AND CONSIDER RECOMMENDATIONS TO THE REGION H PLANNING GROUP.

Mr. Taucer and Mr. Afinowicz briefed the committee on the new Major Water Provider (MWP) classification and presented the results of a proposed methodology for identifying potential MWPs based on intervals of projected water demand or supply allocation. Discussion ensued regarding the potential entities and intervals. The Committee indicated that it found the list of potential MWPs of greater than 10,000 acre-feet per year or 15,000 acre-feet per year of projected demand or allocated supply to be reasonable and recommended that the Planning Group consider the consultant team recommendation for approval.

6. RECEIVE PUBLIC COMMENTS

There were no public comments.

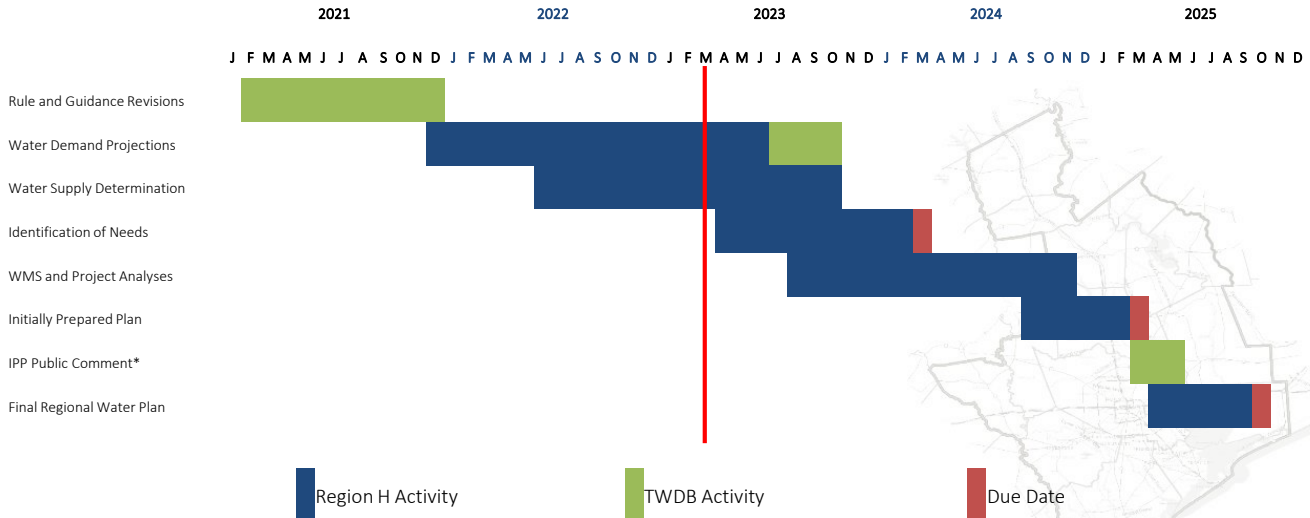
7. ADJOURN

The meeting was adjourned without objection.

Agenda Item 5

Discuss Committee activities and schedule.

Agenda Item 5 Committee Activities and Schedule



*Region H accepts public comment throughout the planning cycle and at each RWPG and committee meeting.

Agenda Item 5 Committee Activities and Schedule

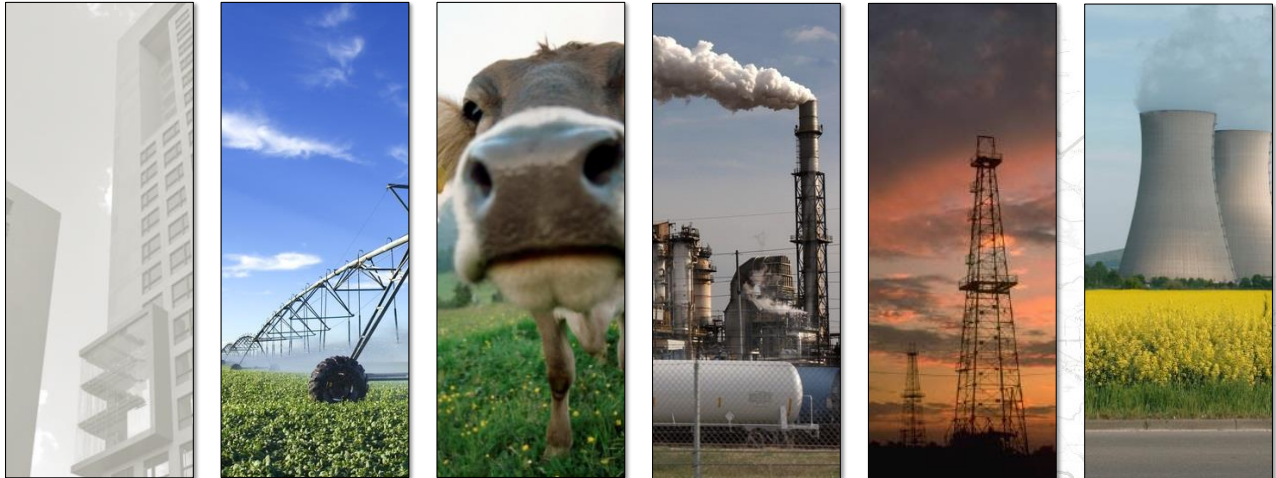
Date	Scheduled Events/Tasks
03/2023	Population Demands Committee Meeting
05/2023	RWPG Meeting
07/2023	Non-municipal adjustment requests due to TWDB
10/2023	TWDB adoption of projections
03/2024	Technical Memorandum due to TWDB

Agenda Item 6

Receive presentation on and discuss TWDB data, projections, and the process for requesting revised projections and make recommendations regarding revised projections.

Agenda Item 6 Projections and Revision Process

Non-Population Demands



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Agenda Item 6 Projections and Revision Process – Adjustment Criteria

Criteria for Adjustment

- Identified errors in projection data
- Evidence of substantially different demand
- Region-specific or county-specific studies
- Plans for new, expanded, or closing facility
- Other change in inventory or water requirements
- Evidence of long-term usage change of facility or industry

Data Requirements

- Historical usage data
- Documentation of new, expanded, or closing facility
- Corrections to facility location data
- Research on alternative trends or usage
- Alternative source constraint data
- Other

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Agenda Item 6 Projections and Revision Process - Irrigation



2021 RWP

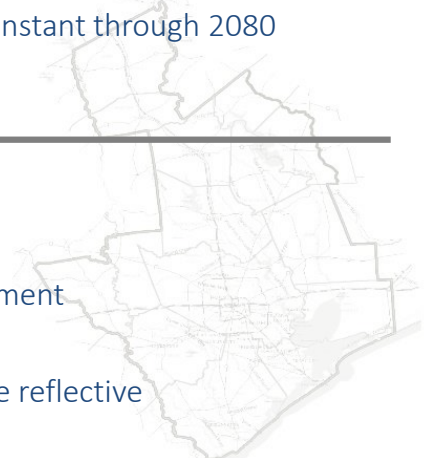
- Second highest demand from 2010-2015

2026 RWP

- 2015-2019 average as baseline
- Constant through 2080

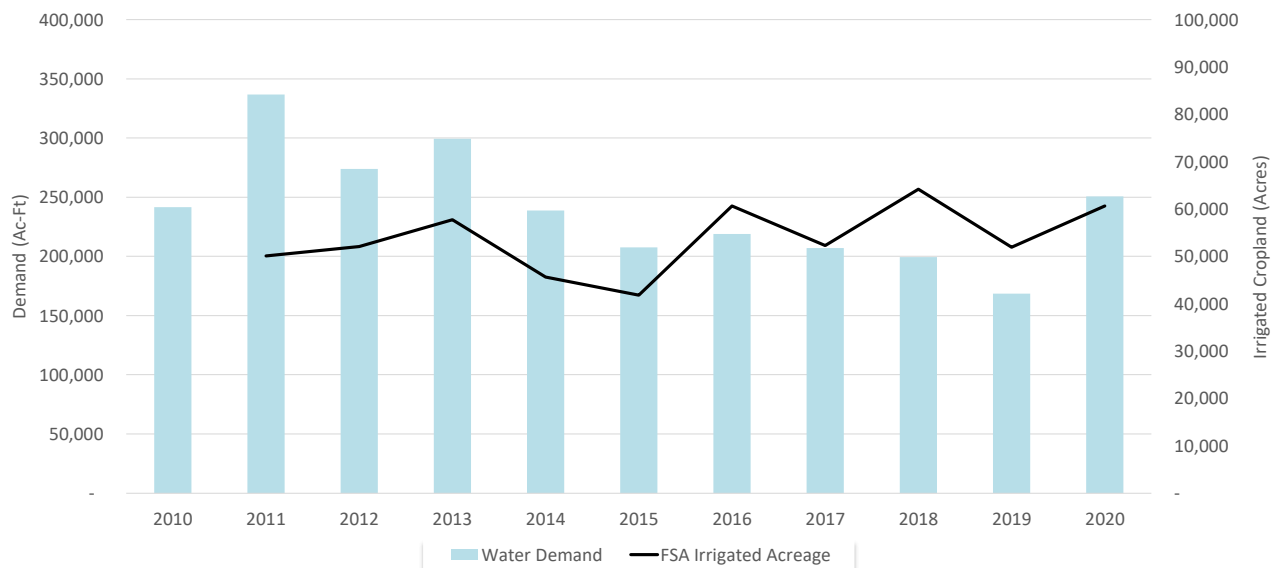
Potential Considerations

- Average not reflective of dry year
- Possible artificial lowering - supply curtailment
- 2020 data now available
- Maximum or near-maximum may be more reflective

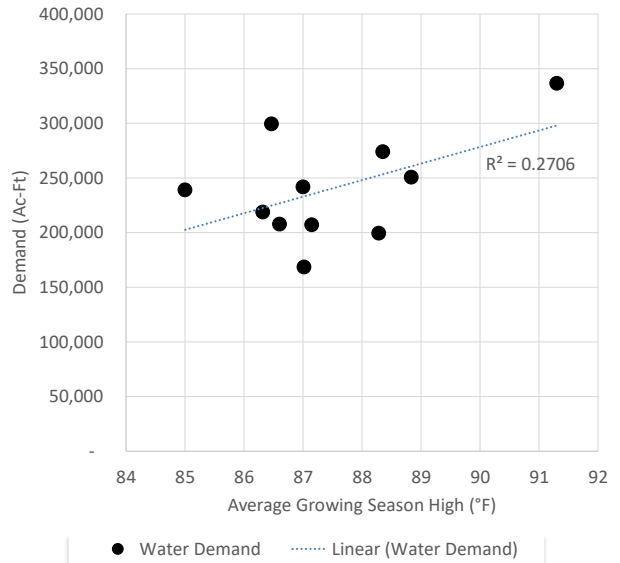
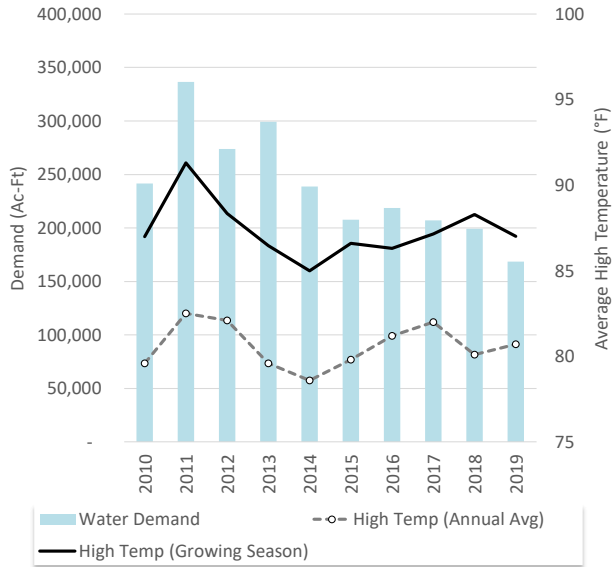


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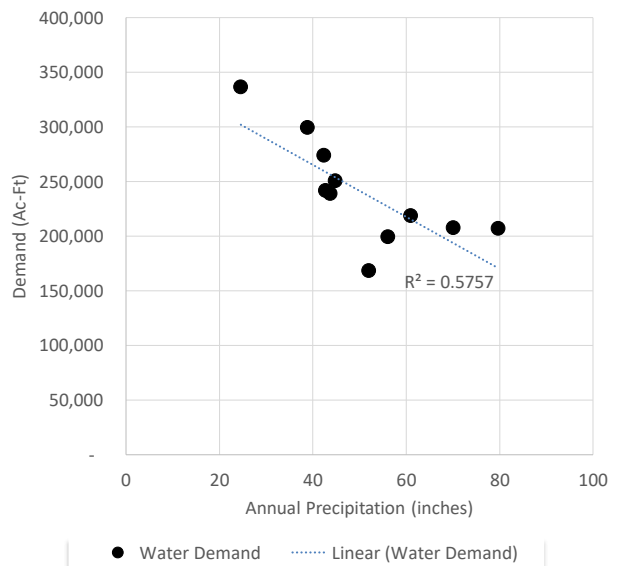
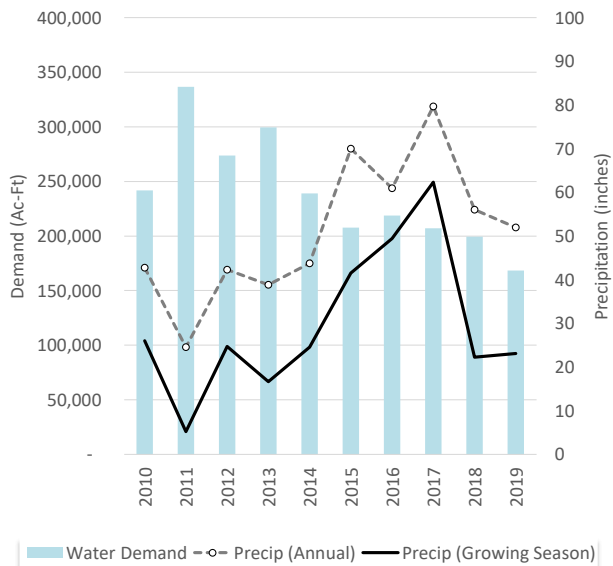
Agenda Item 6 Projections and Revision Process – Irrigation



Agenda Item 6 Projections and Revision Process – Irrigation

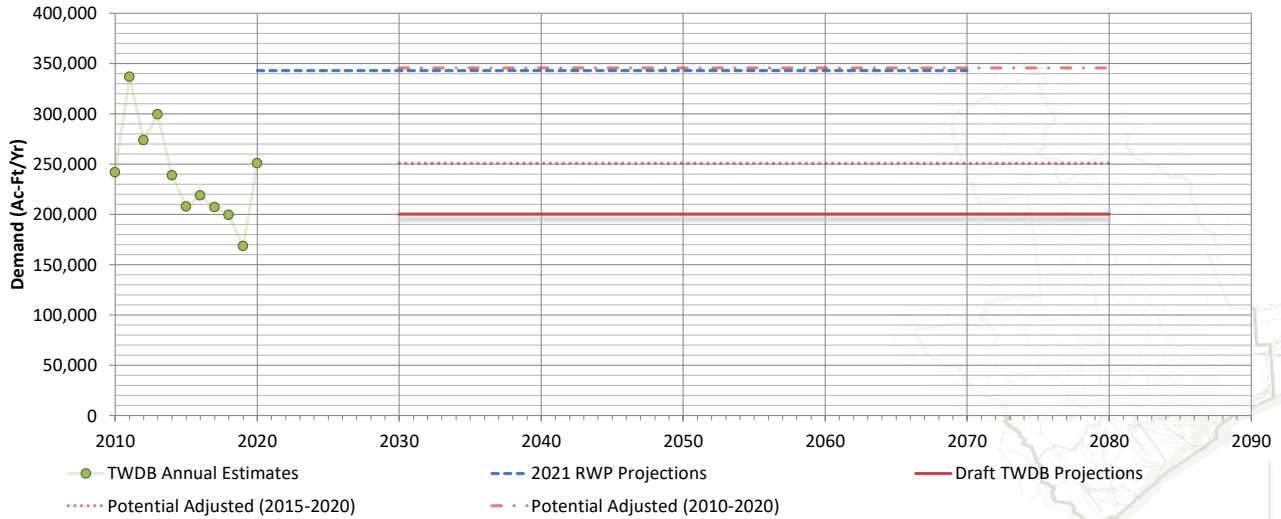


Agenda Item 6 Projections and Revision Process – Irrigation



Agenda Item 6 Projections and Revision Process – Irrigation

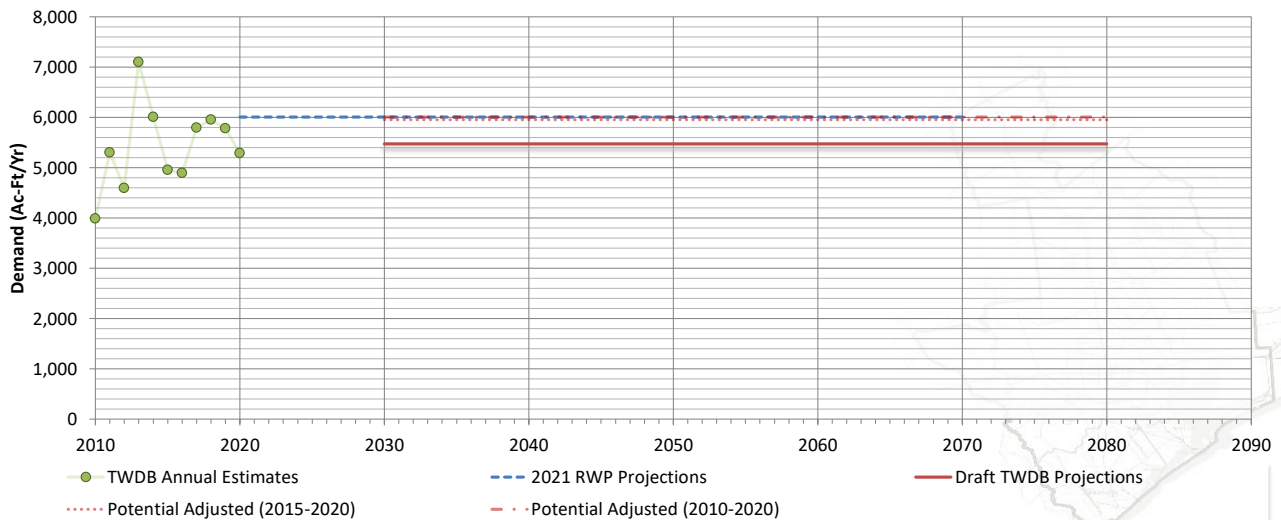
Region H Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

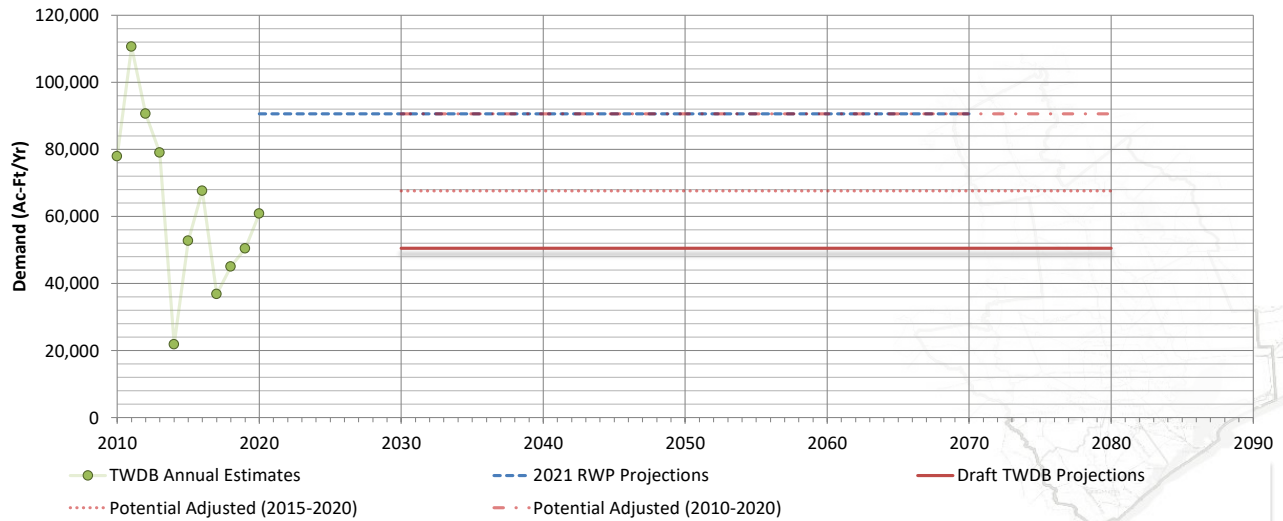
Austin County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

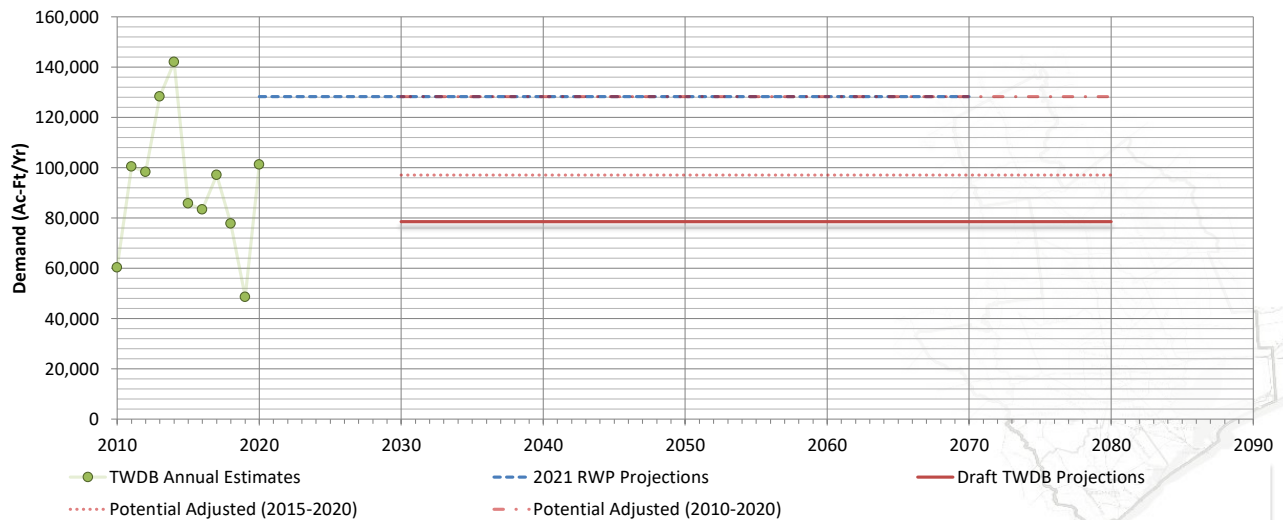
Brazoria County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

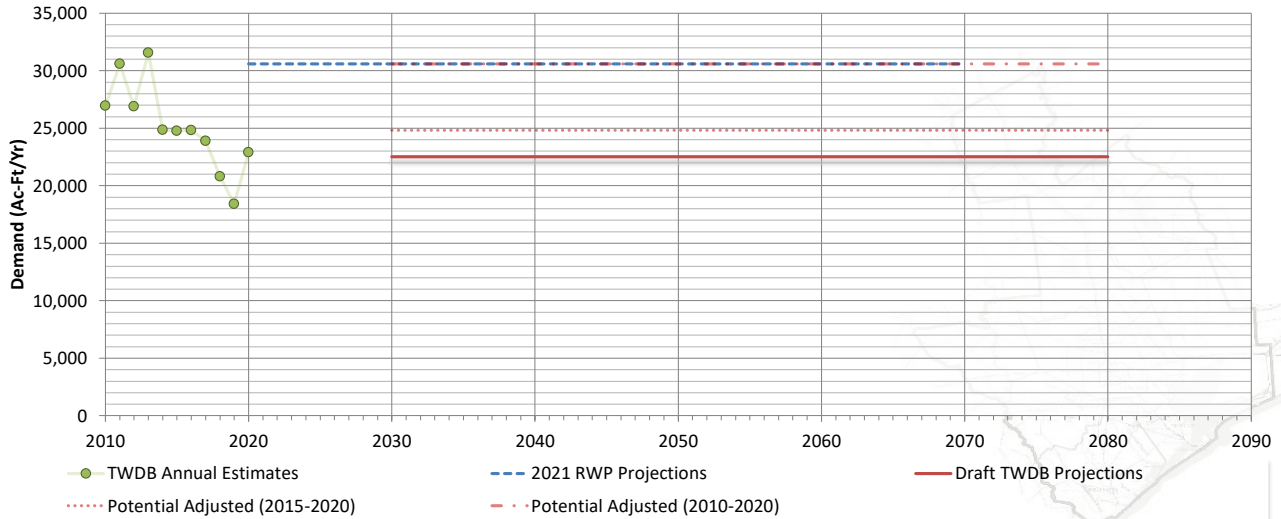
Chambers County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

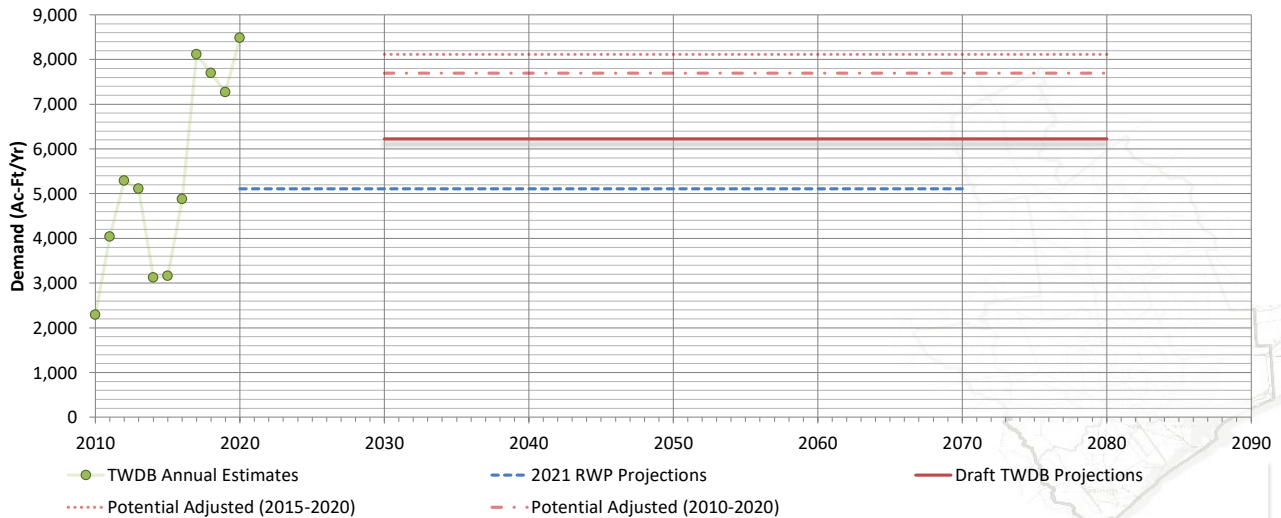
Fort Bend County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

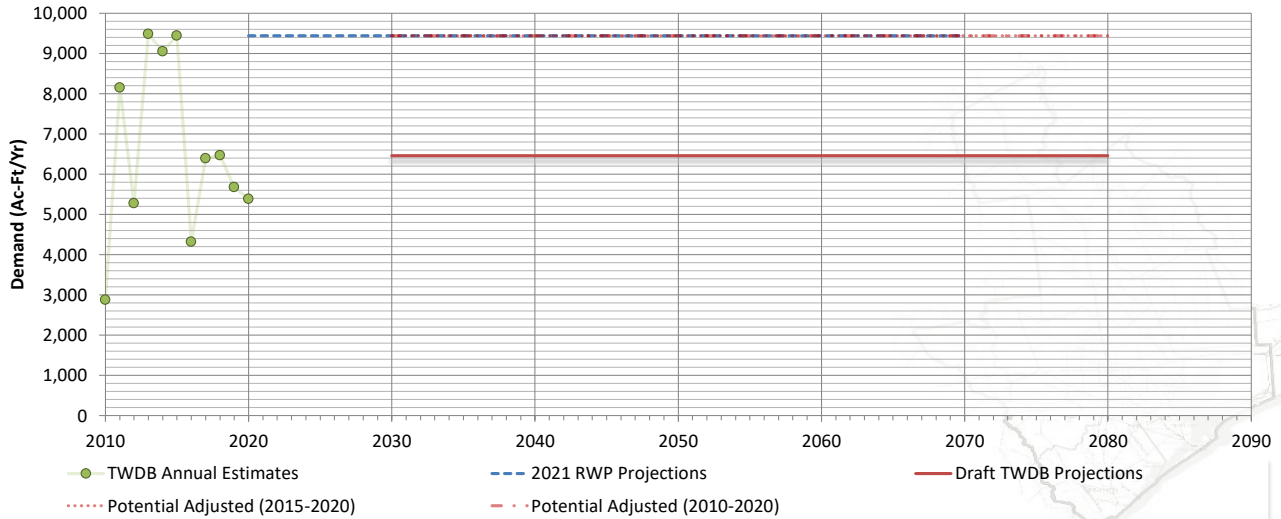
Galveston County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

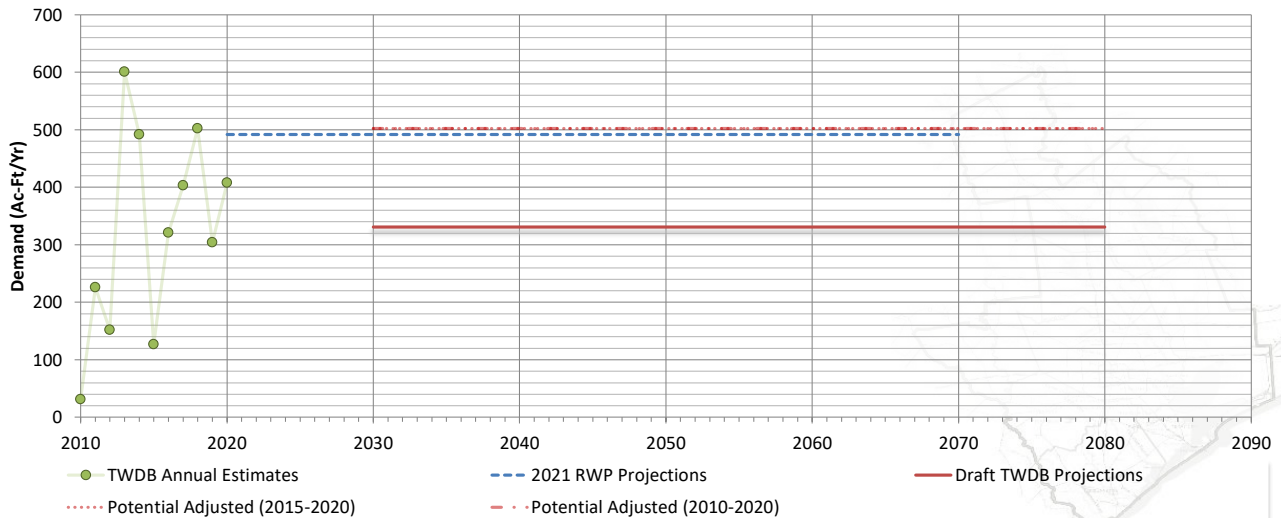
Harris County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

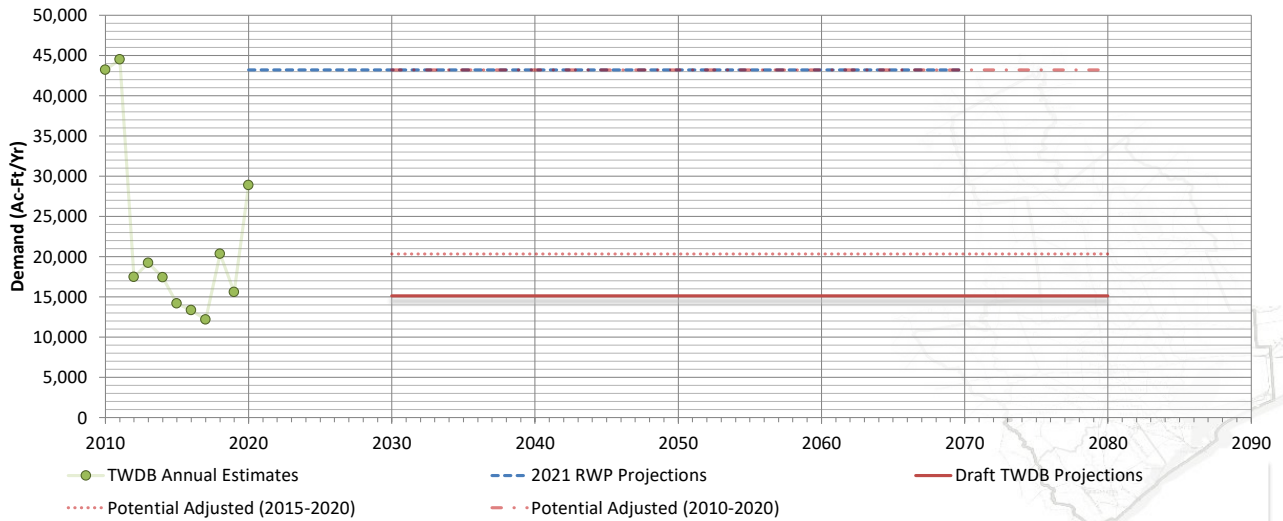
Leon County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

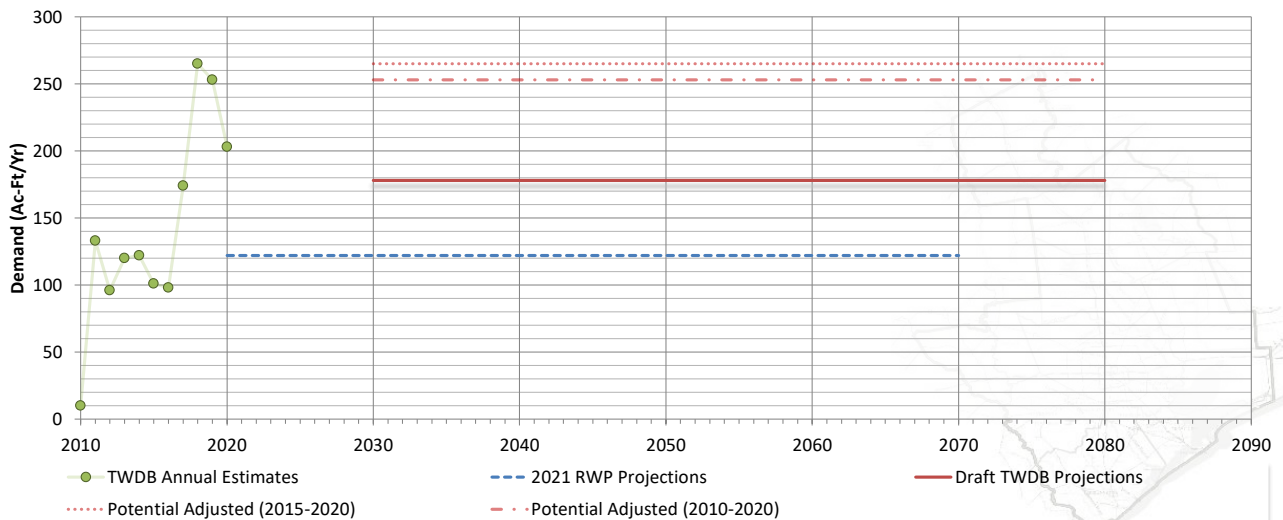
Liberty County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

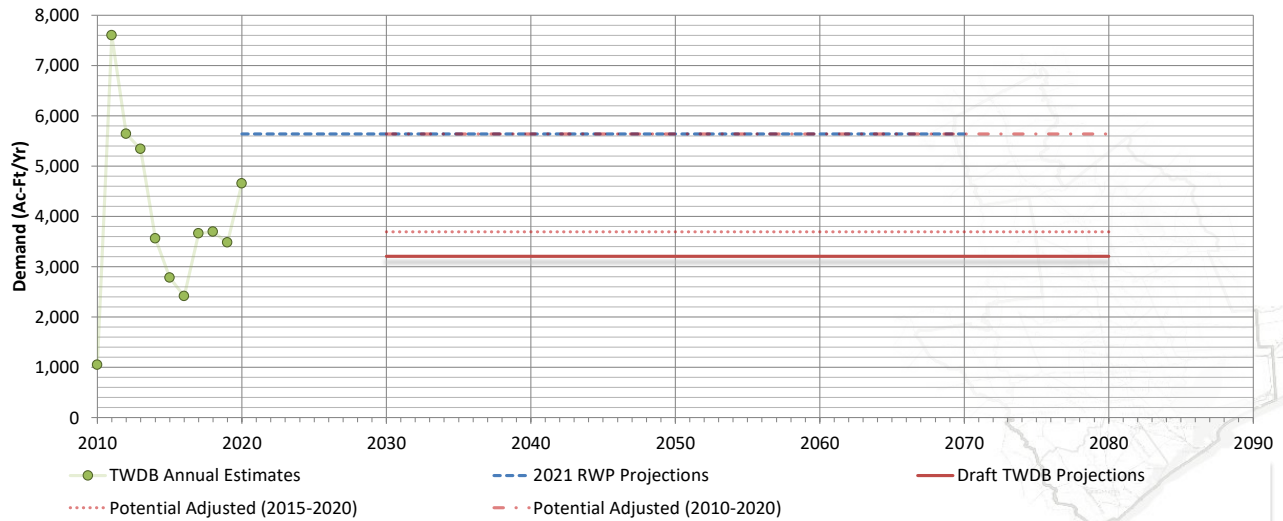
Madison County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

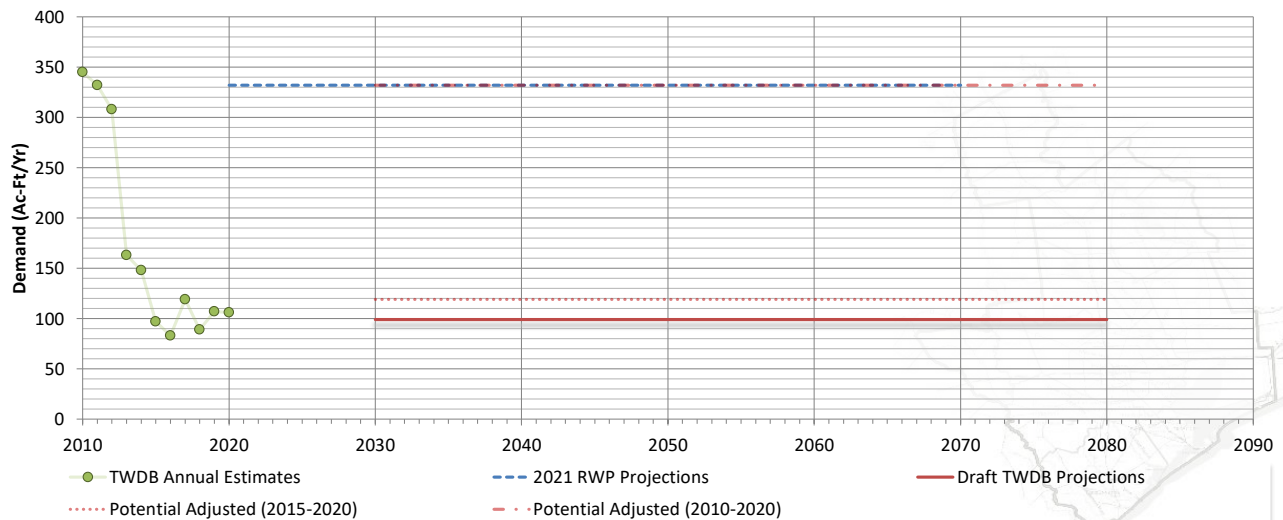
Montgomery County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

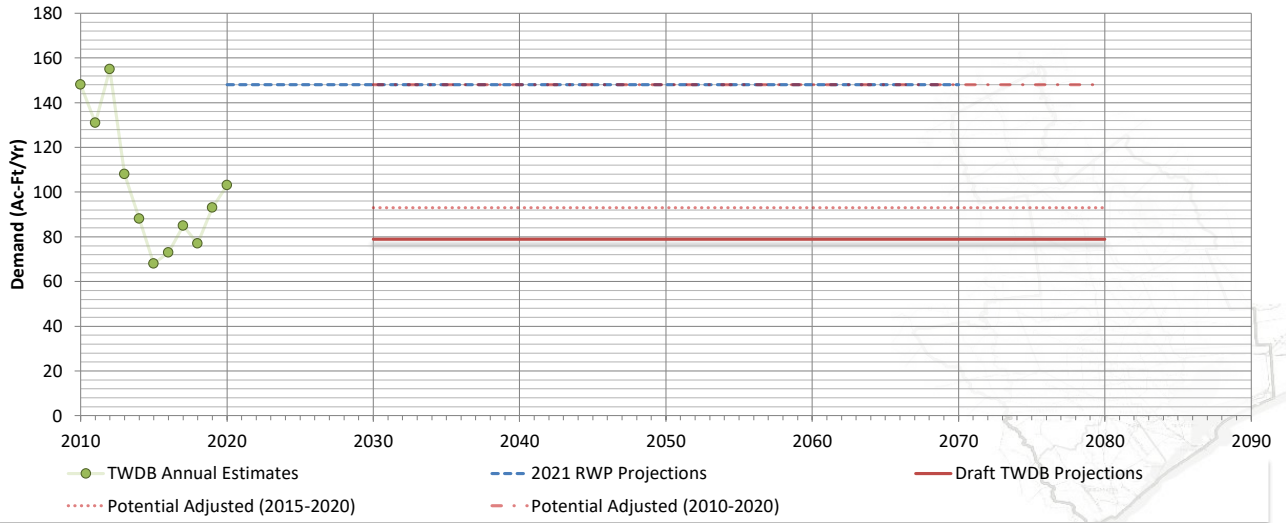
Polk County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

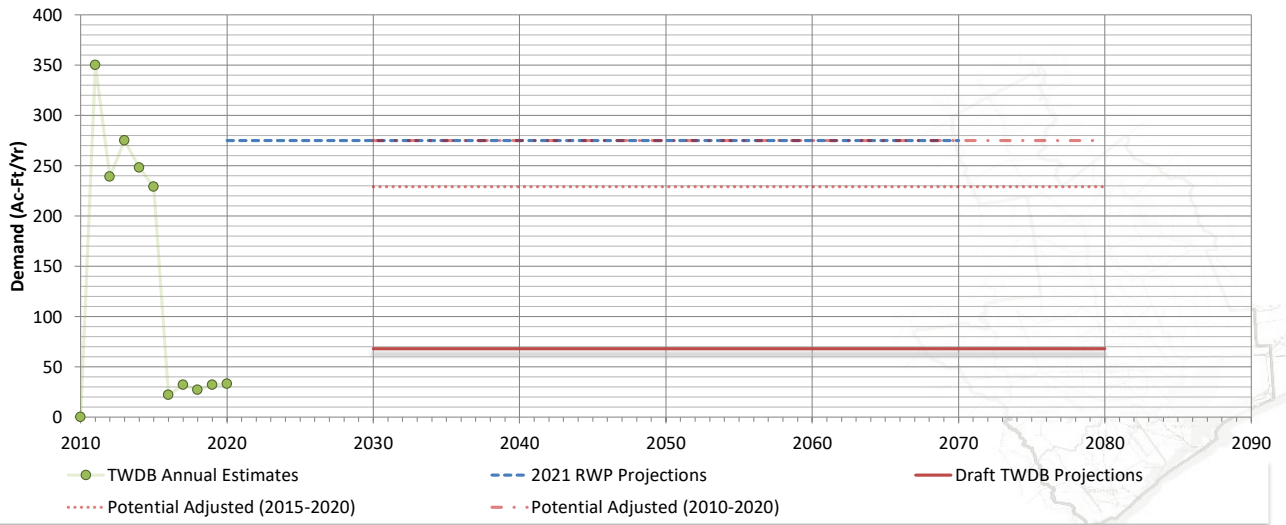
San Jacinto County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

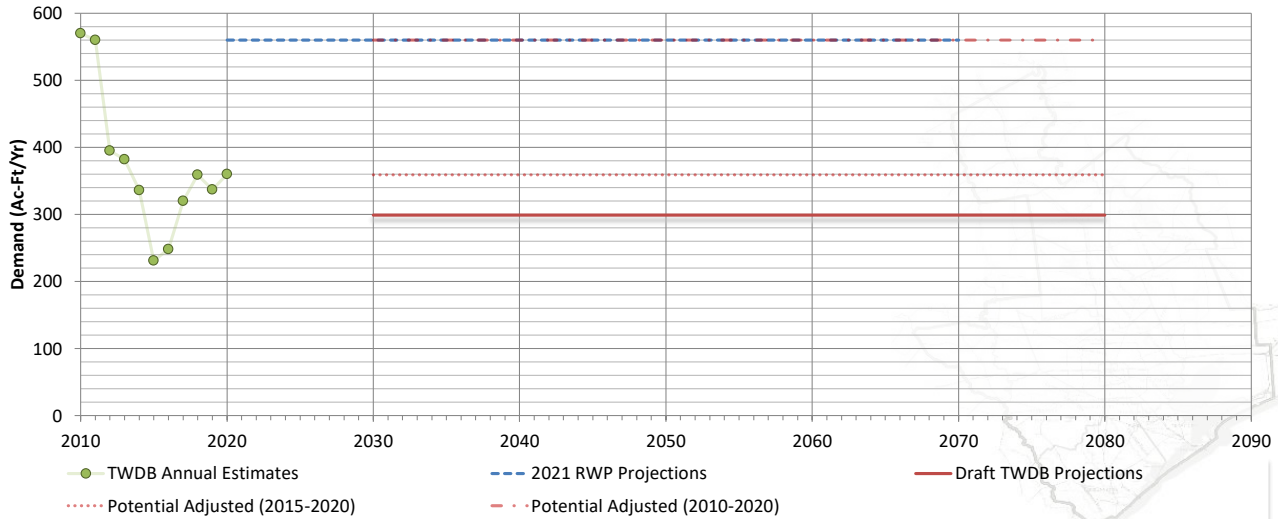
Trinity County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

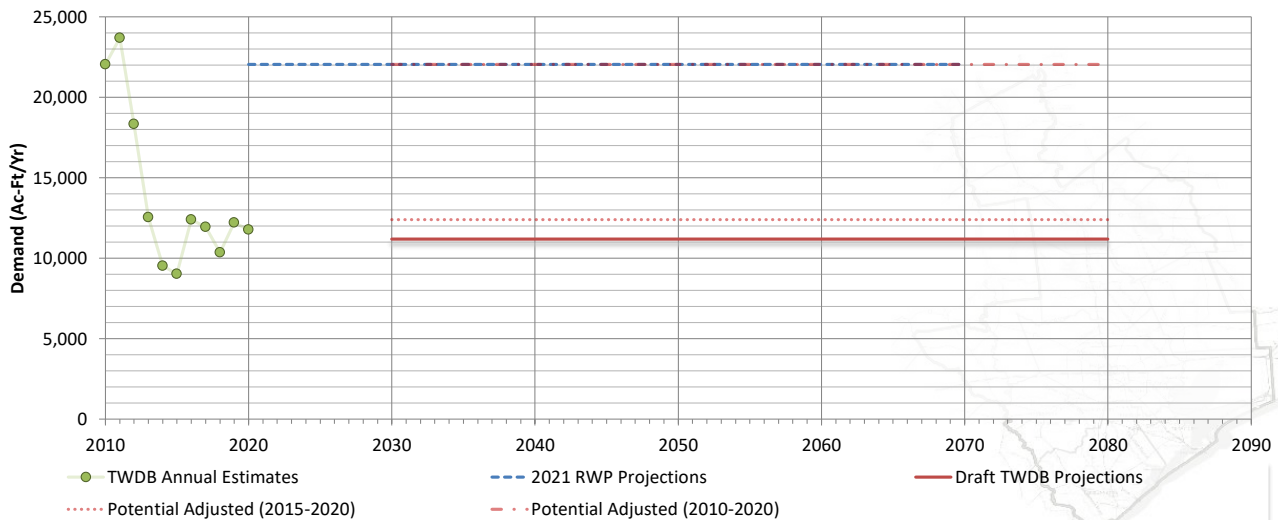
Walker County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process – Irrigation

Waller County Irrigation Demand Projections



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Agenda Item 6 Projections and Revision Process - Livestock



2021 RWP

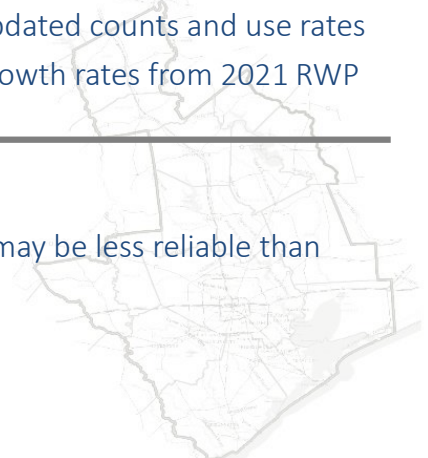
- 2009-2014 average as baseline
- TASS data, per-head use
- Trend from 2011 RWP

2026 RWP

- 2015-2019 average as baseline
- Updated counts and use rates
- Growth rates from 2021 RWP

Potential Considerations

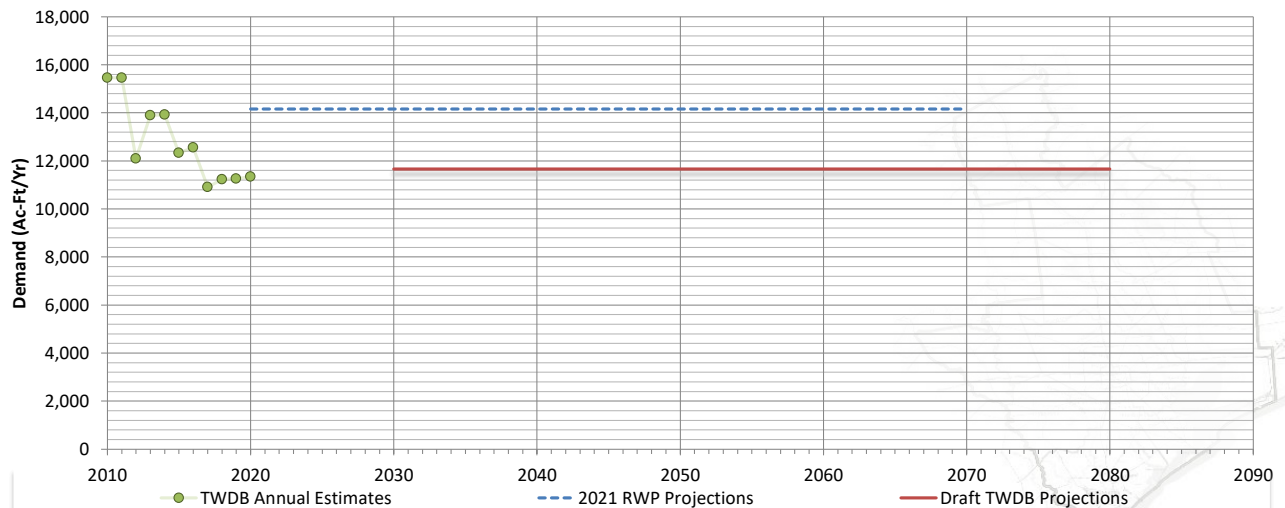
- Older historic data is higher demand but may be less reliable than newer information.



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Agenda Item 6 Projections and Revision Process – Livestock

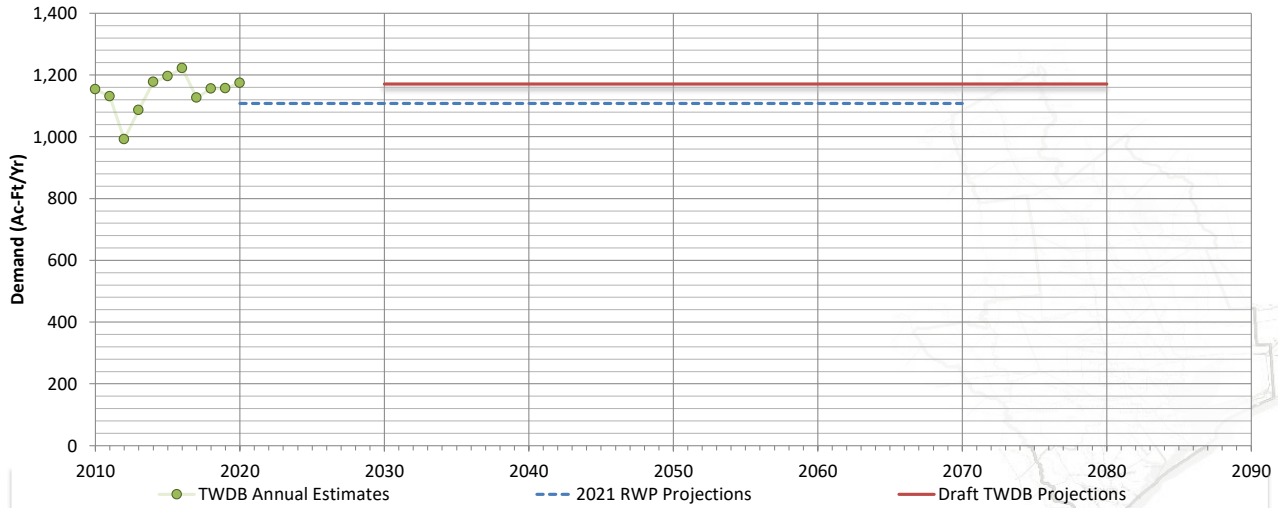
Region H Livestock Demand Projections



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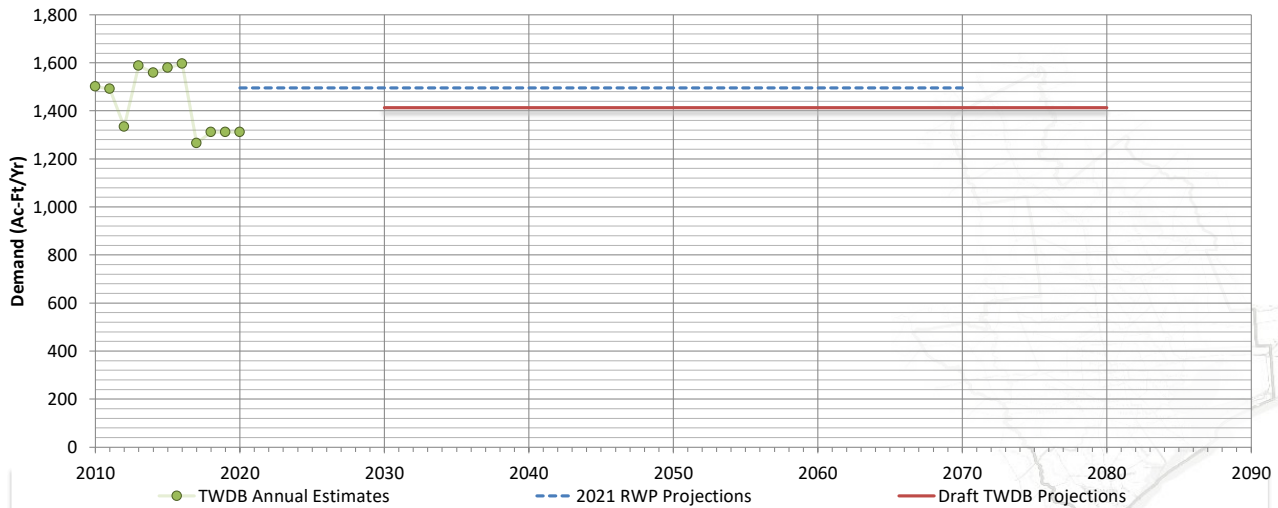
Agenda Item 6 Projections and Revision Process – Livestock

Austin County Livestock Demand Projections



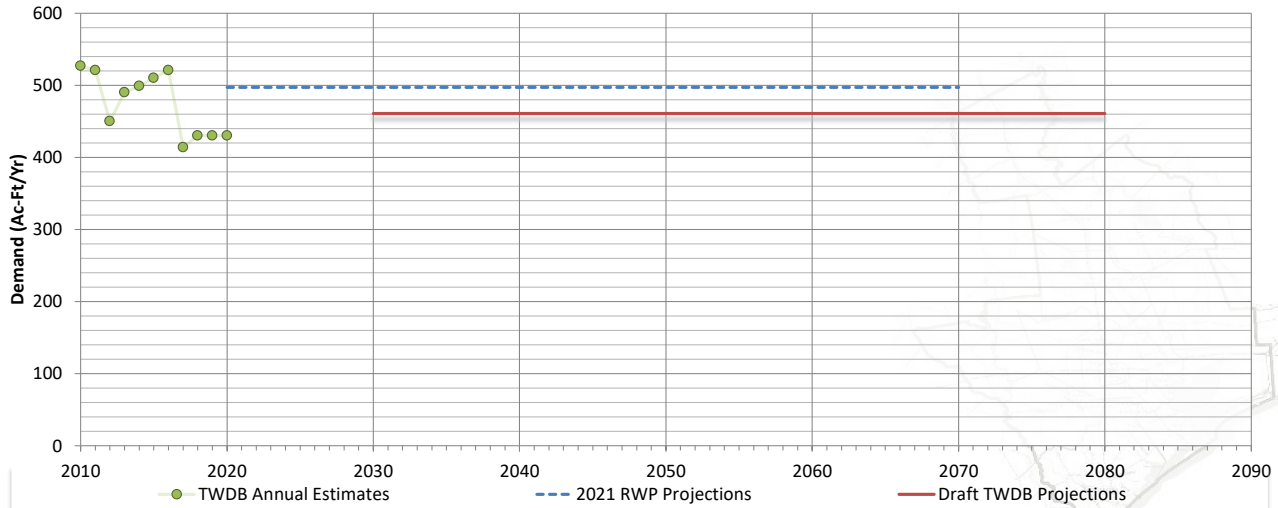
Agenda Item 6 Projections and Revision Process – Livestock

Brazoria County Livestock Demand Projections



Agenda Item 6 Projections and Revision Process – Livestock

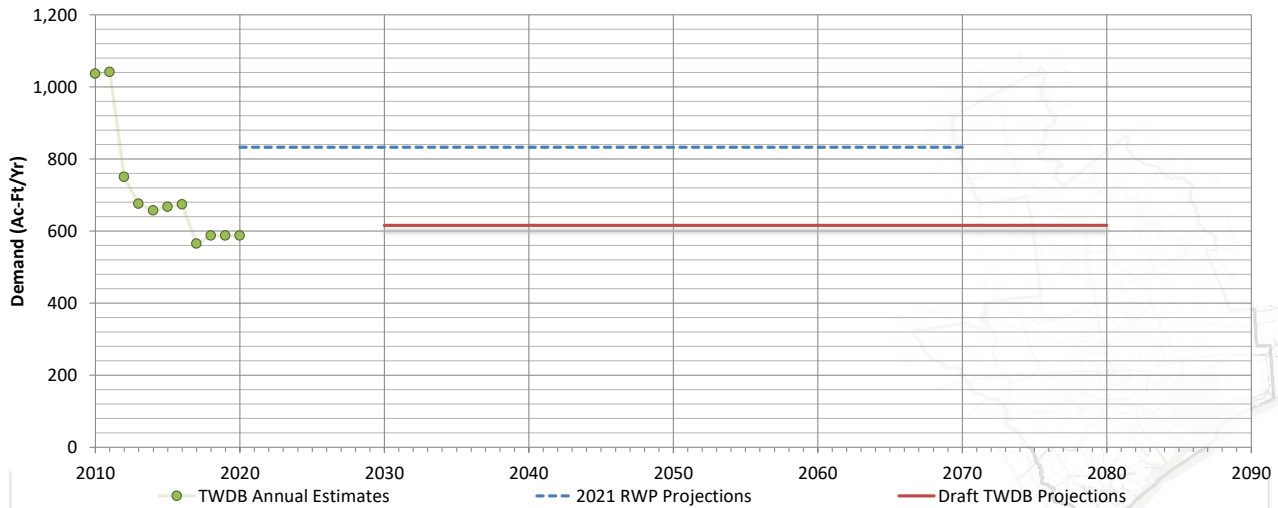
Chambers County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

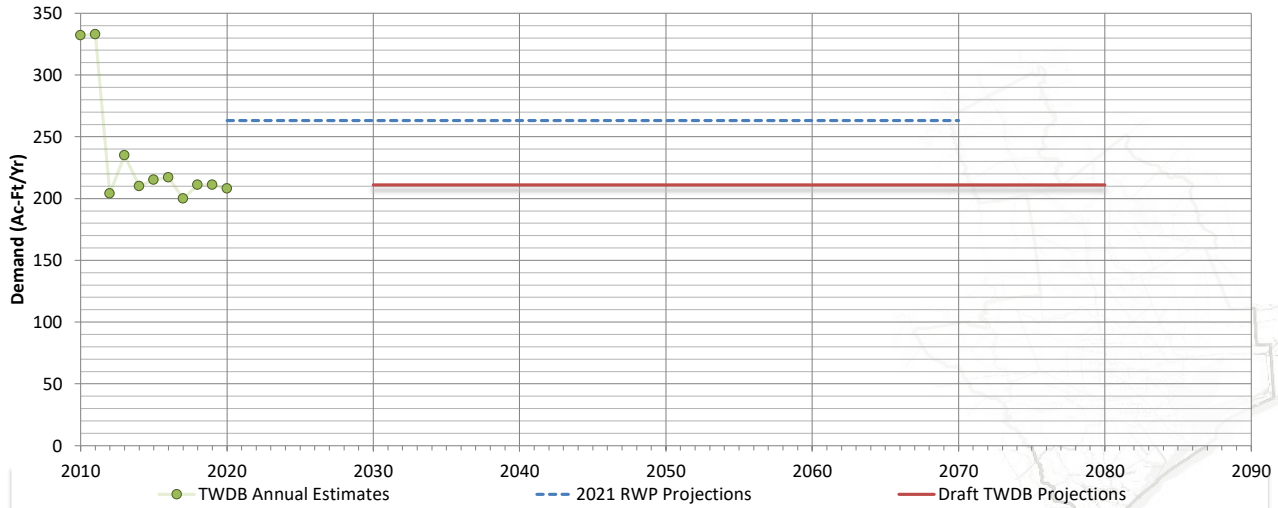
Fort Bend County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

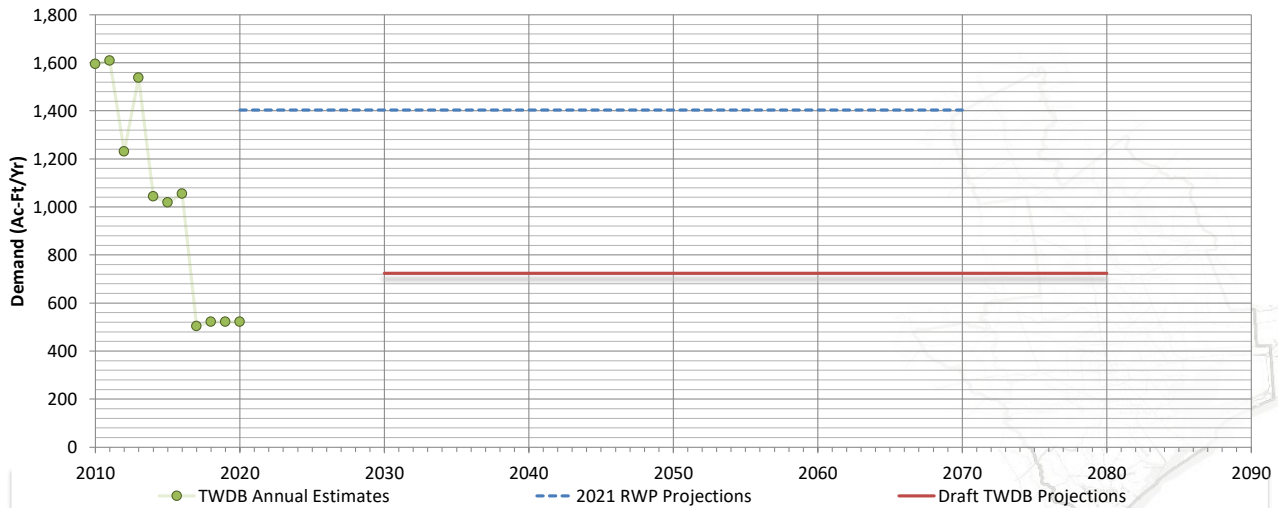
Galveston County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

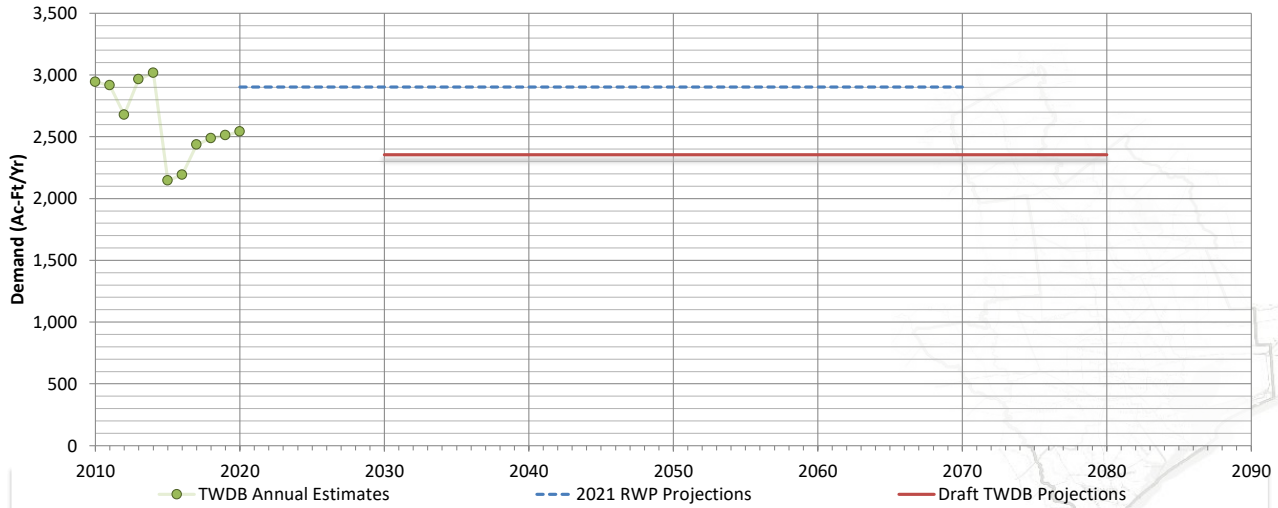
Harris County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

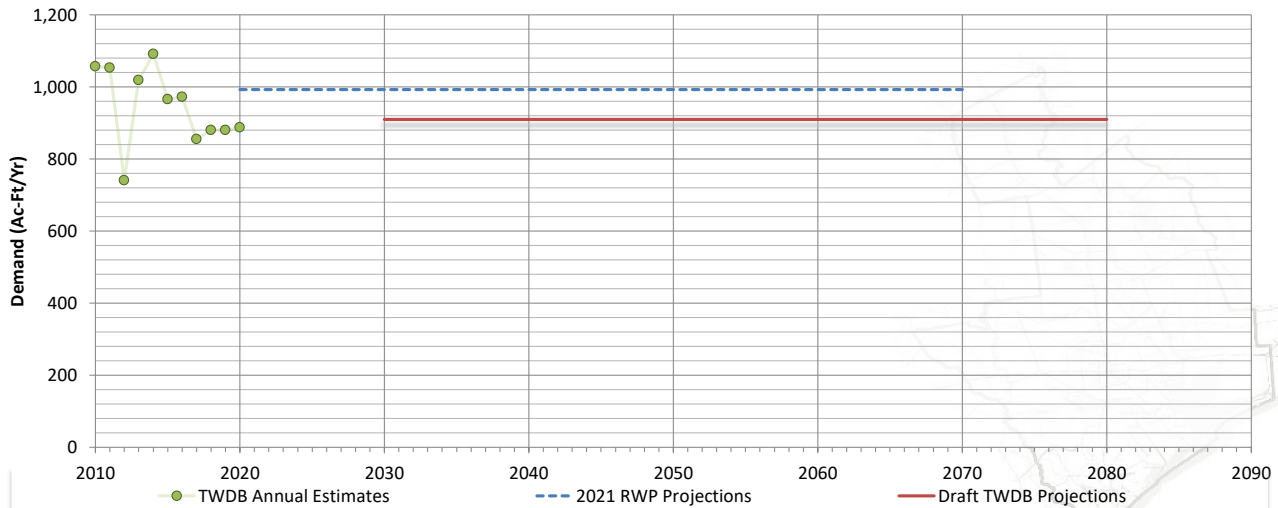
Leon County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

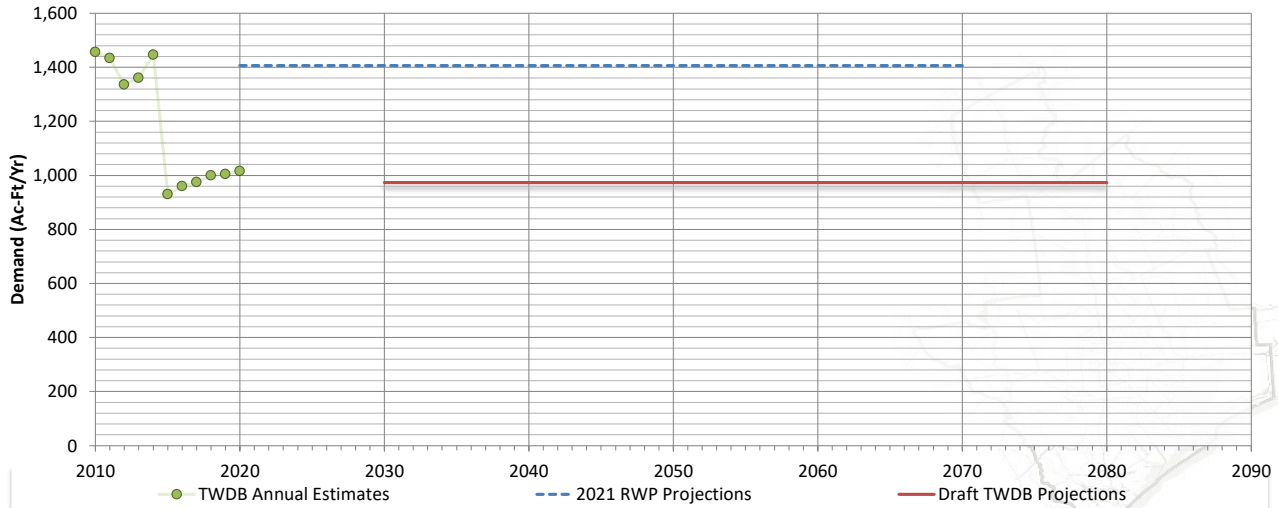
Liberty County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

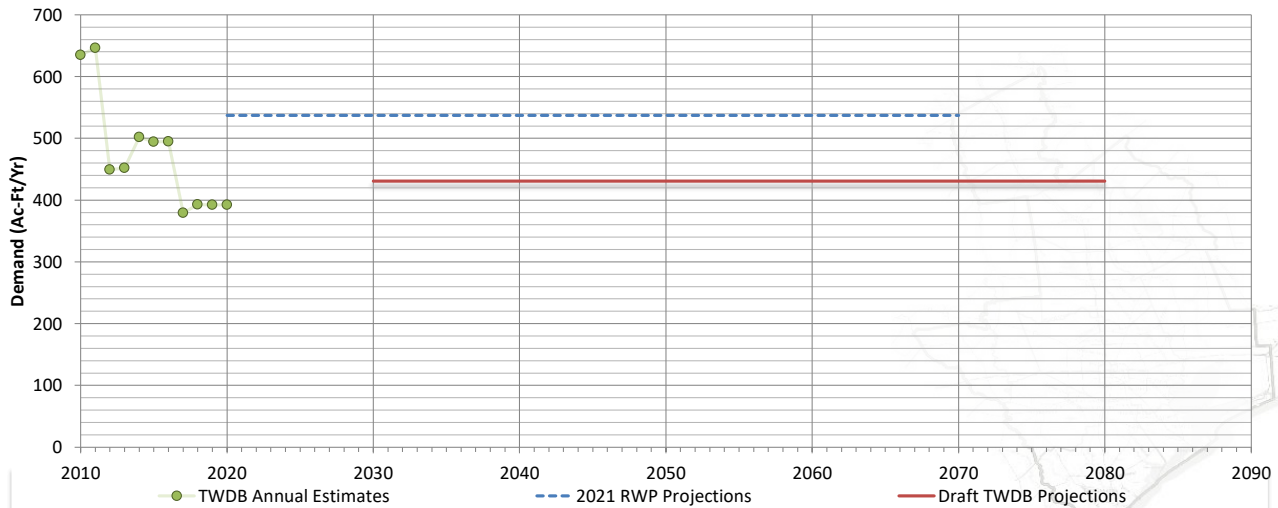
Madison County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

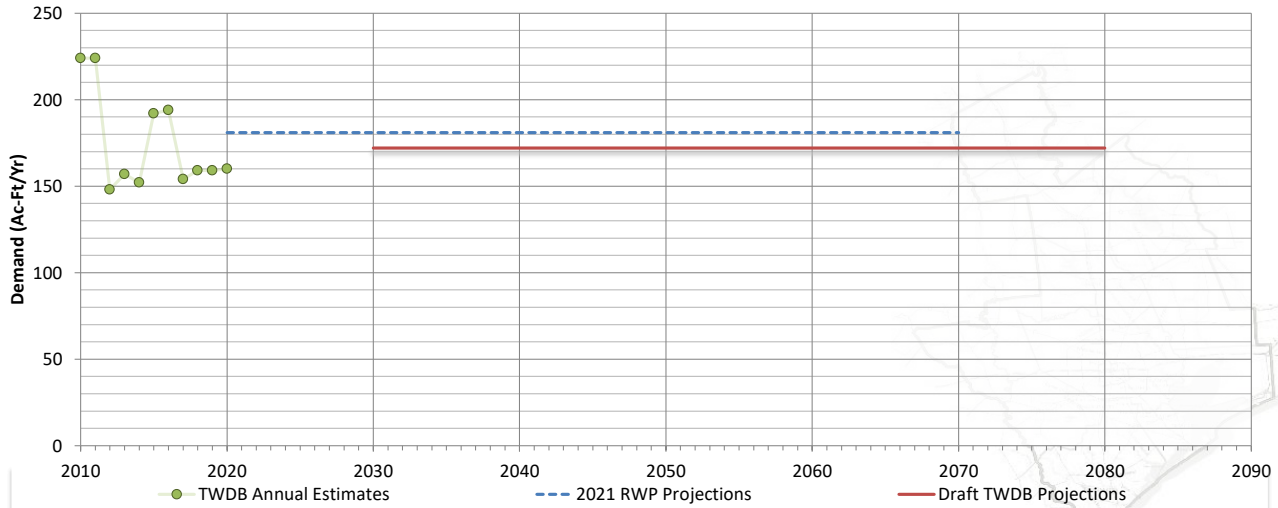
Montgomery County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

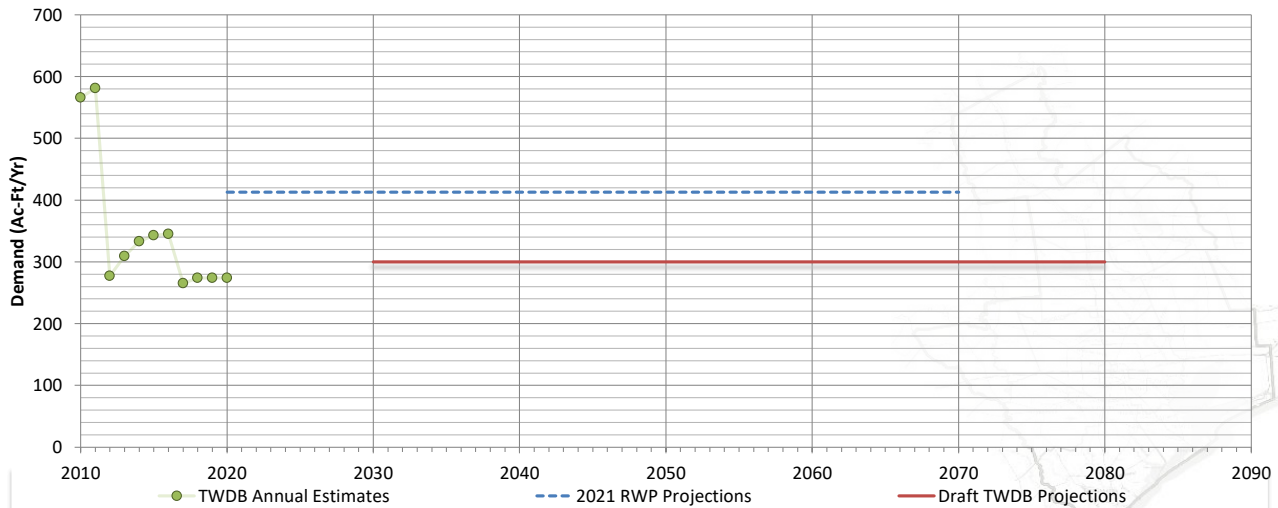
Polk County Livestock Demand Projections



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Agenda Item 6 Projections and Revision Process – Livestock

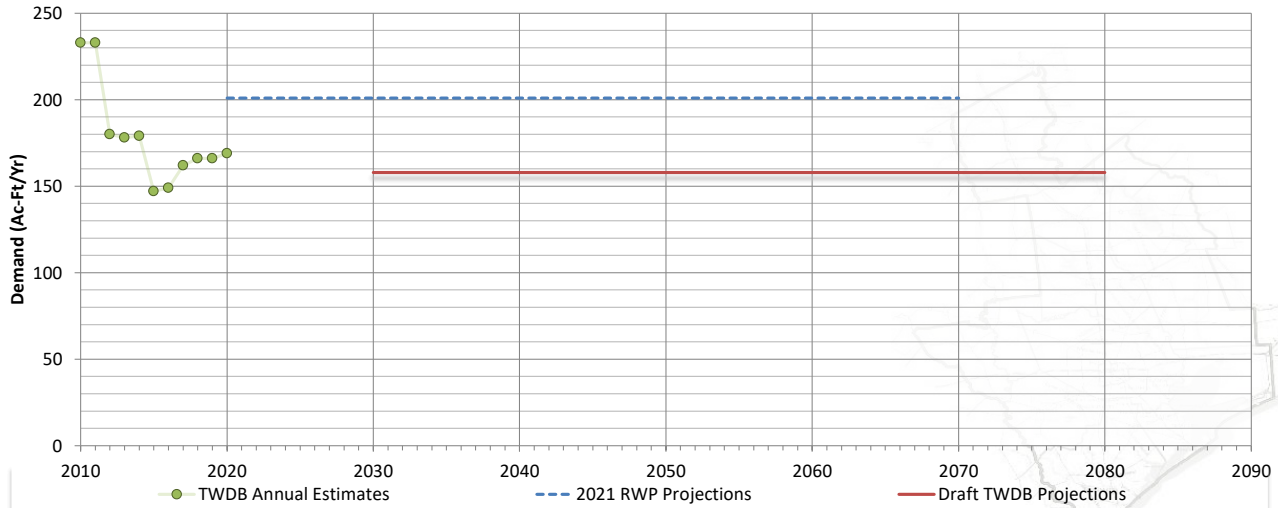
San Jacinto County Livestock Demand Projections



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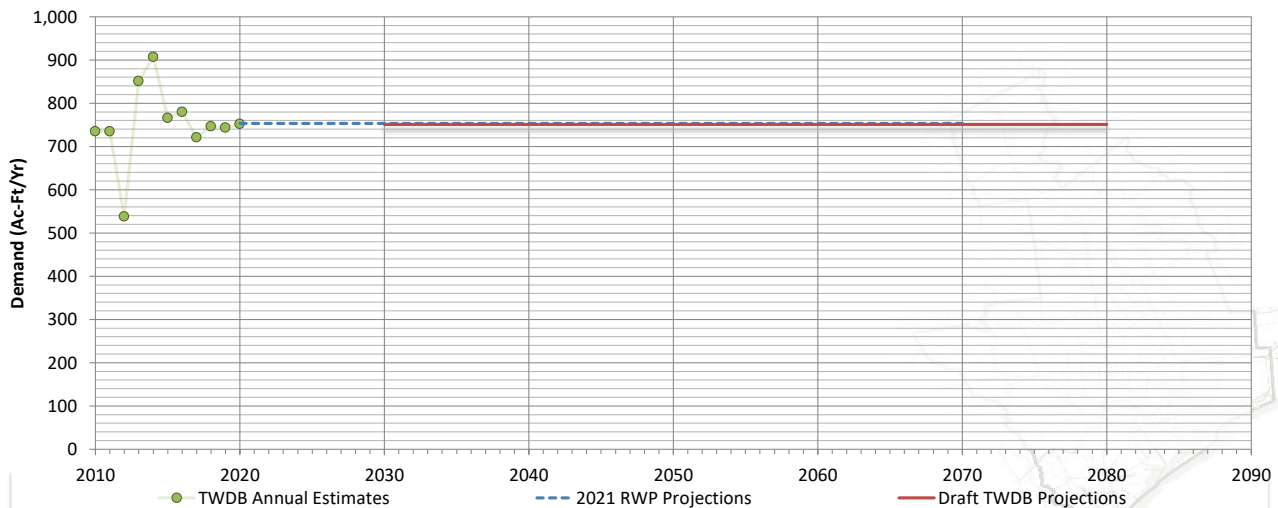
Agenda Item 6 Projections and Revision Process – Livestock

Trinity County Livestock Demand Projections

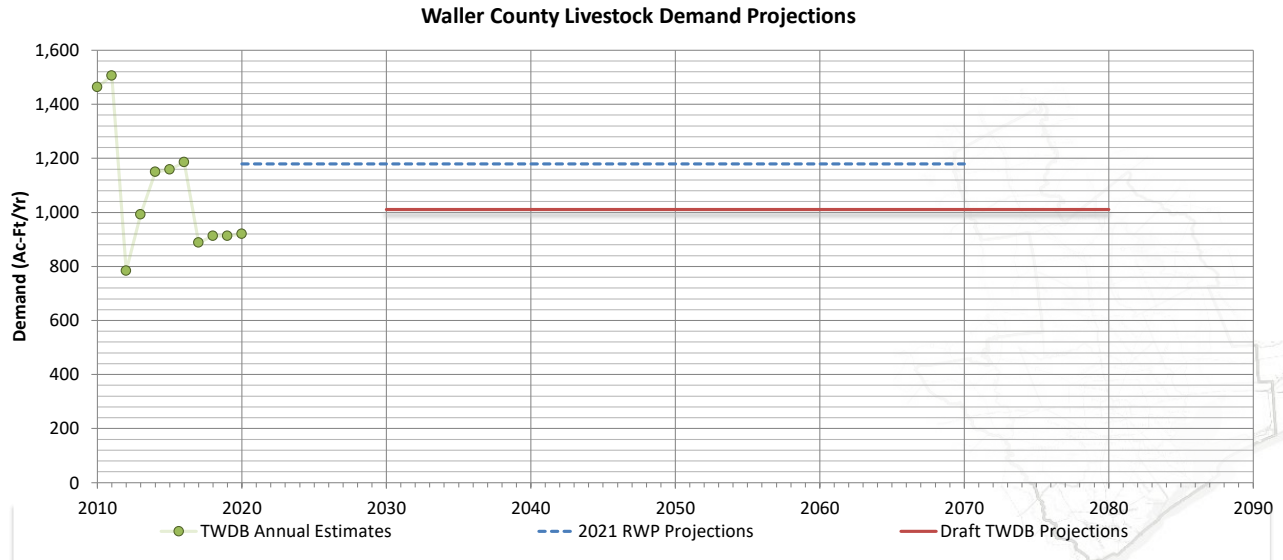


Agenda Item 6 Projections and Revision Process – Livestock

Walker County Livestock Demand Projections



Agenda Item 6 Projections and Revision Process – Livestock



Agenda Item 6 Projections and Revision Process - Manufacturing



2021 RWP

- 2010-2015 max as baseline
- RWPG requests for specific counties

2026 RWP

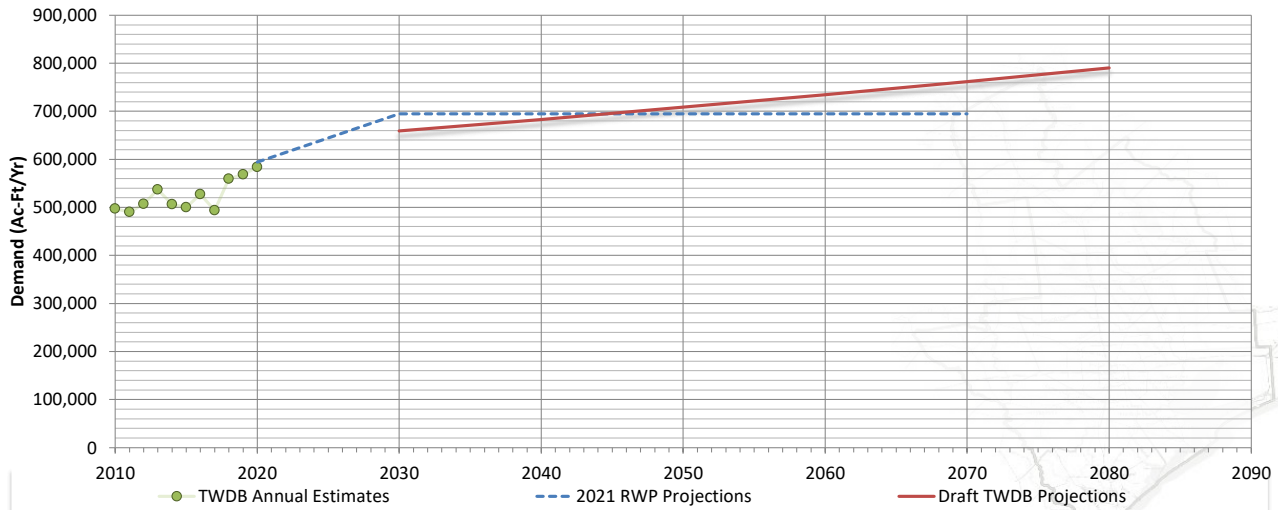
- 2015-2019 max as baseline
- 2030 based on statewide trend
- After 2030, based on 2010-2019 Census Bureau CBP facility counts

Potential Considerations

- Possible adjustment for Chambers and Fort Bend Counties.

Agenda Item 6 Projections and Revision Process - Manufacturing

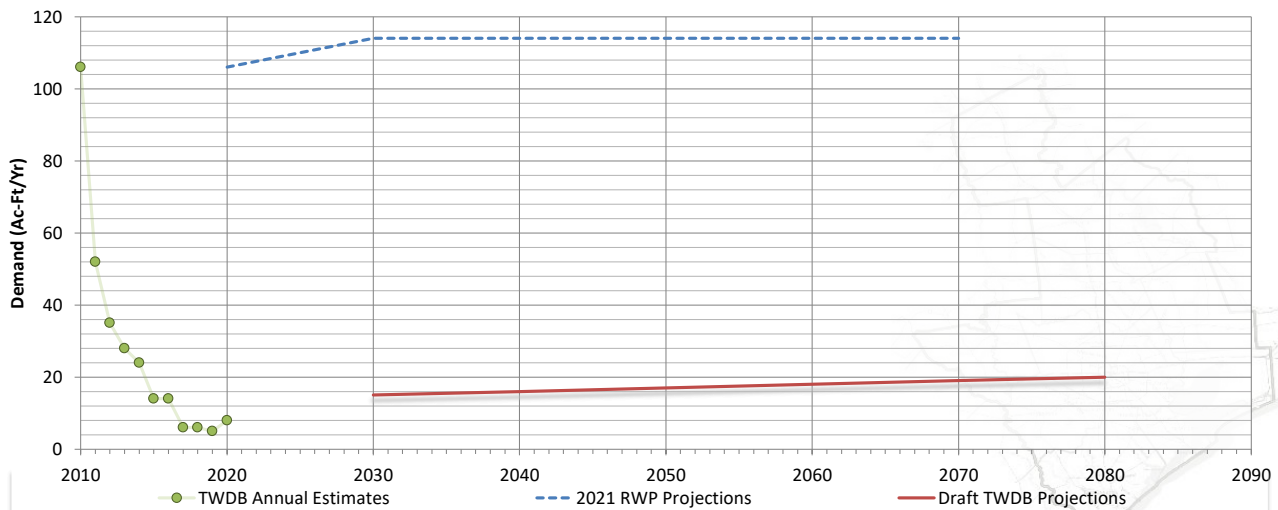
Region H Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

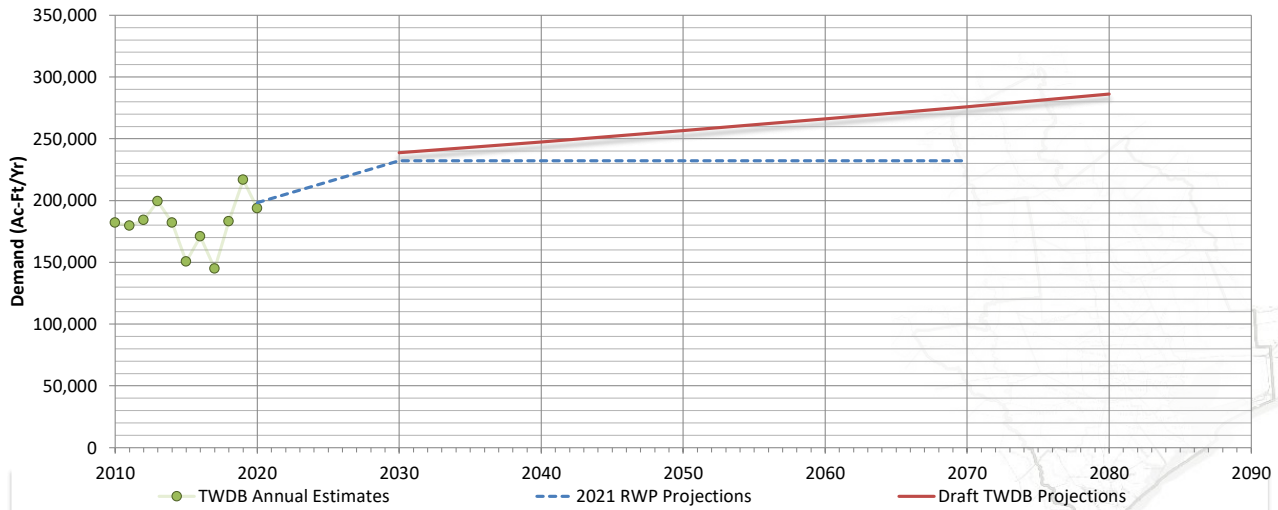
Austin County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

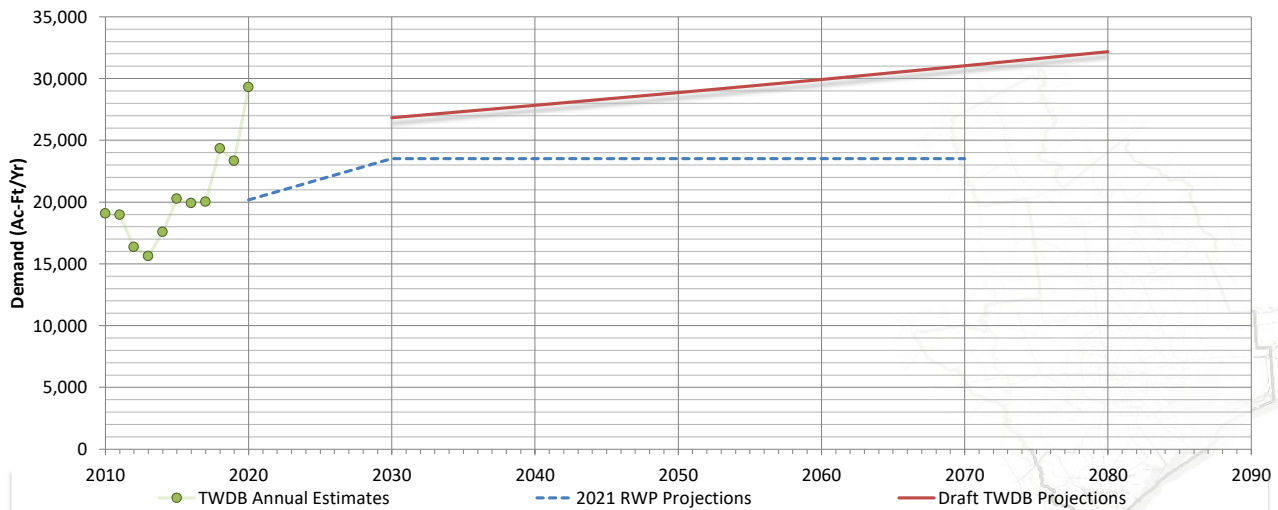
Brazoria County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

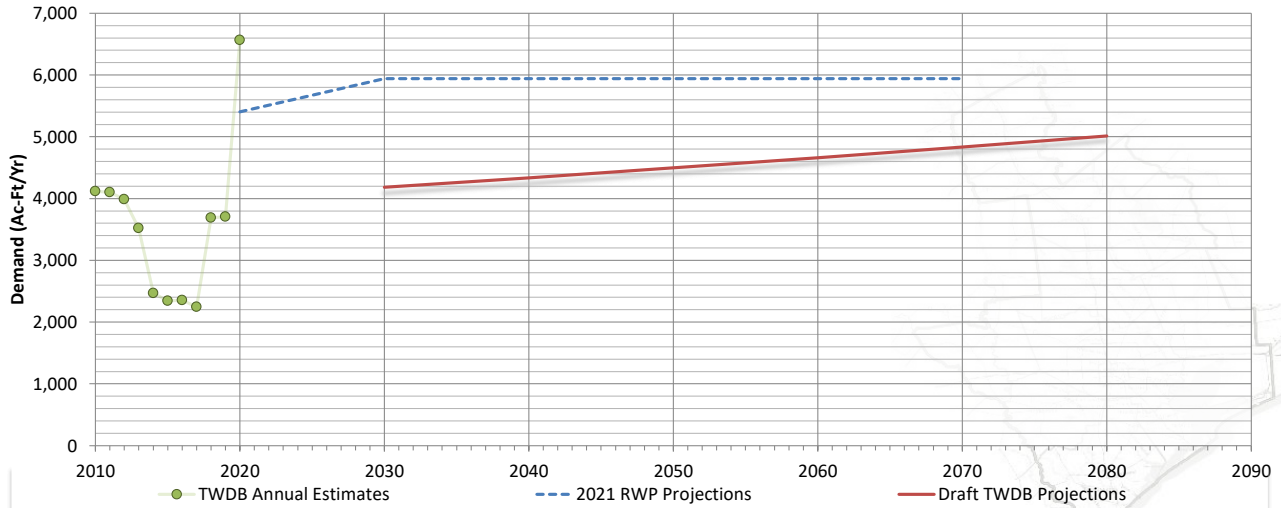
Chambers County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

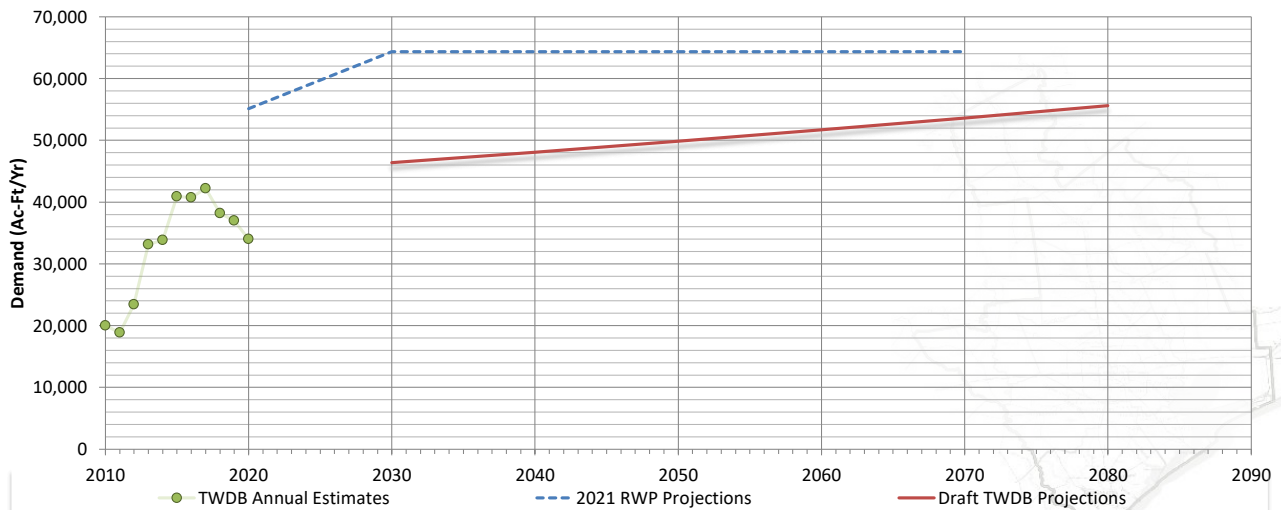
Fort Bend County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

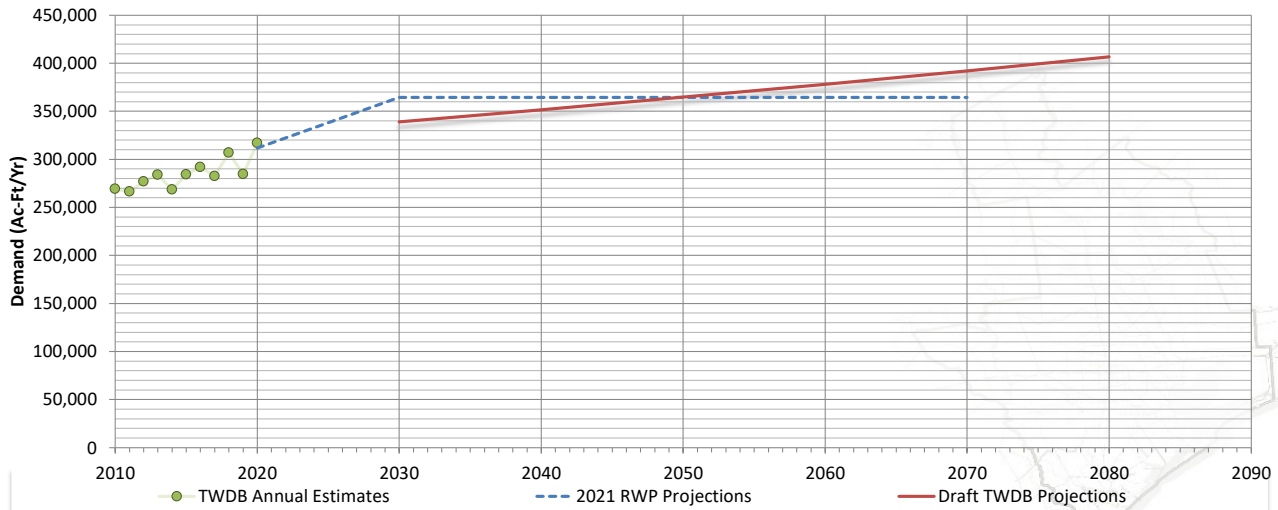
Galveston County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

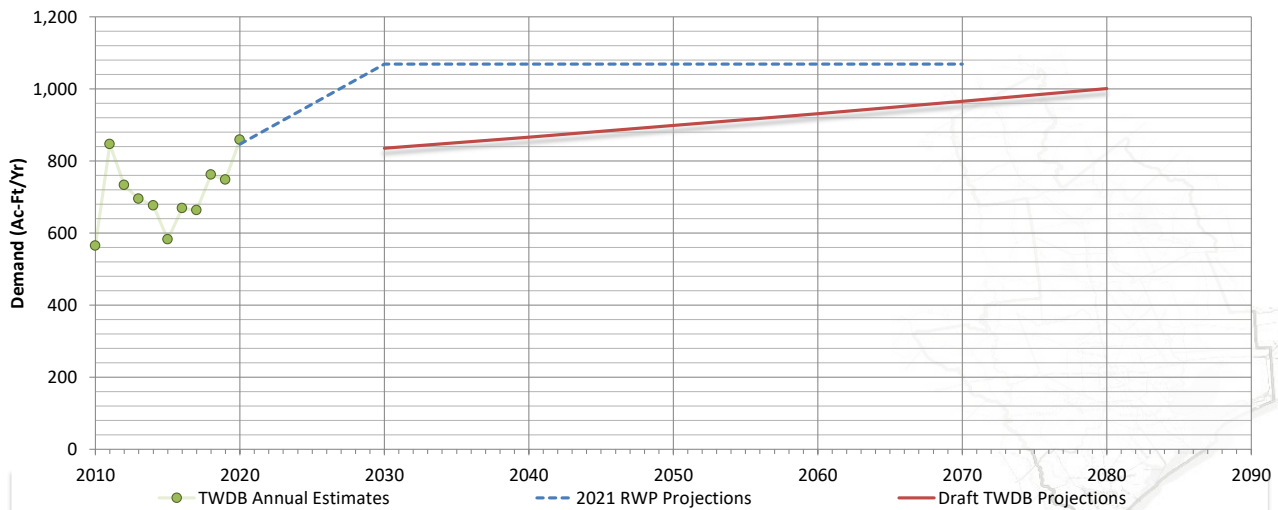
Harris County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

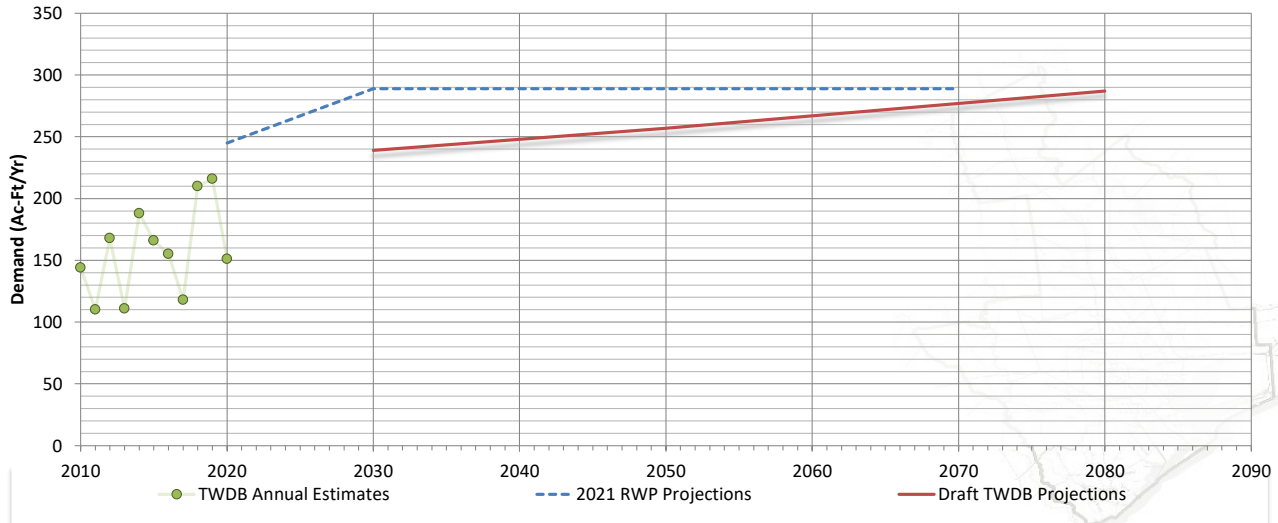
Leon County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

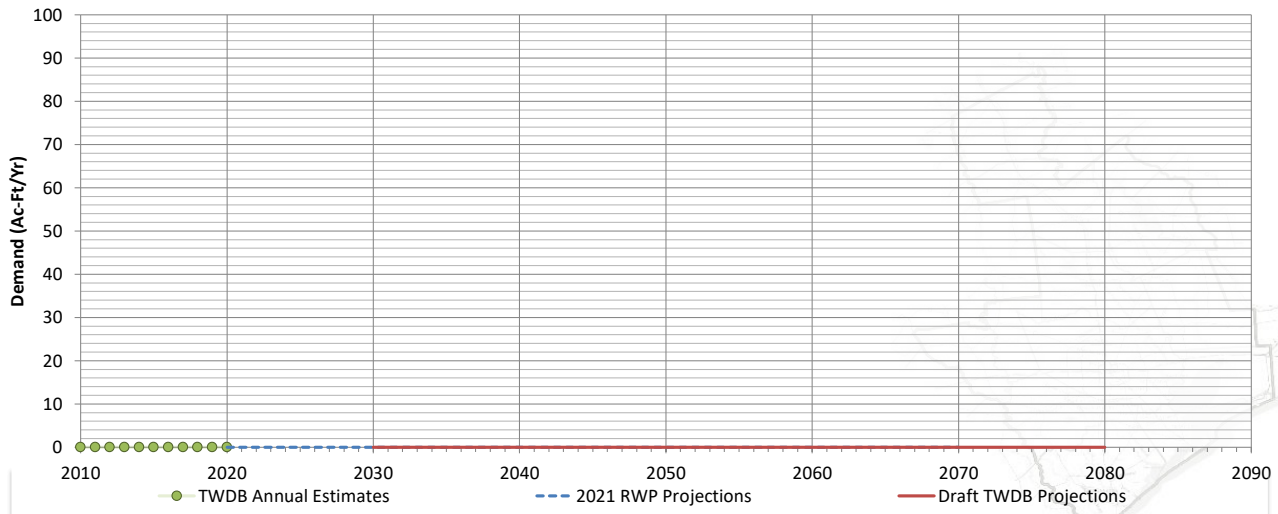
Liberty County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

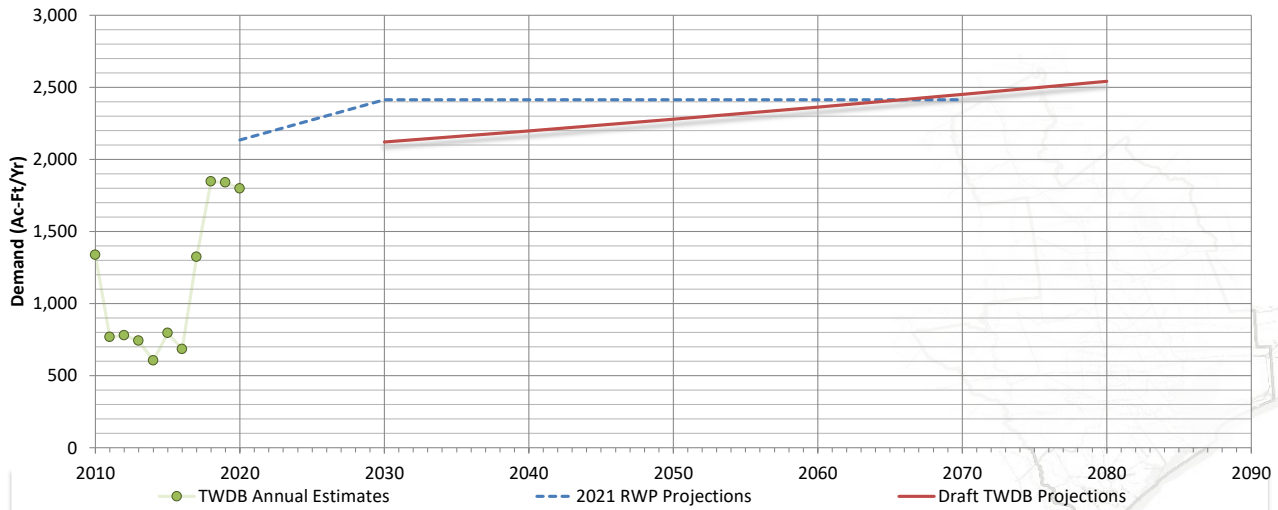
Madison County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

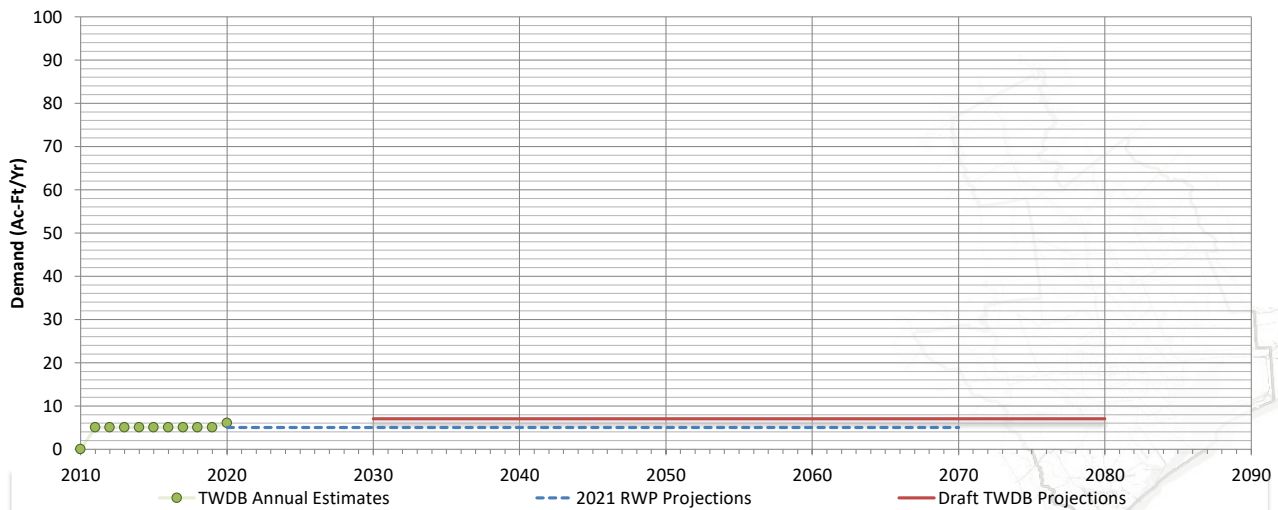
Montgomery County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

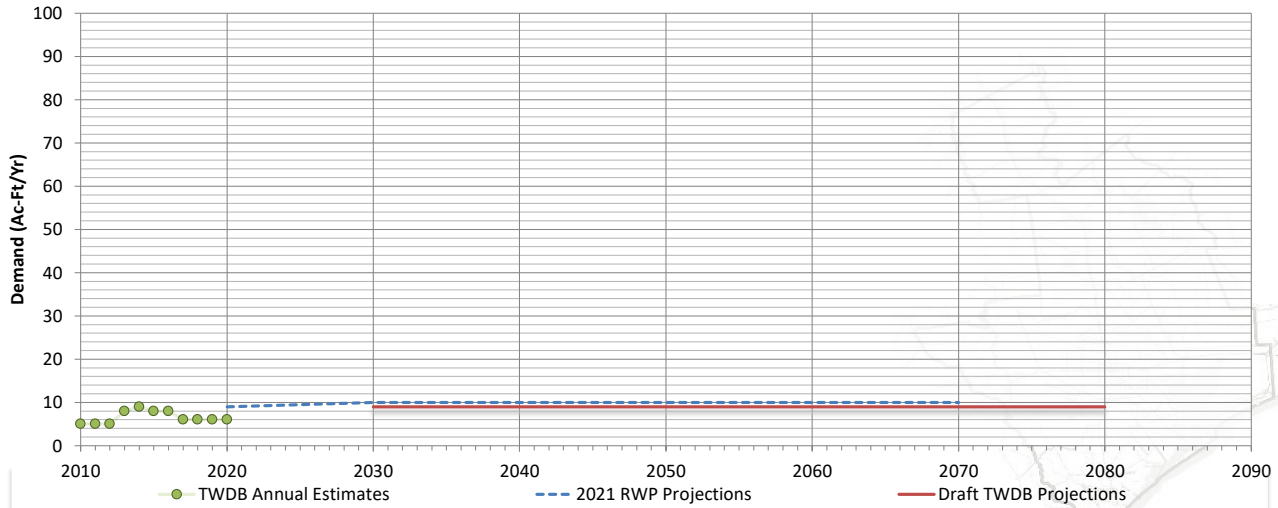
Polk County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

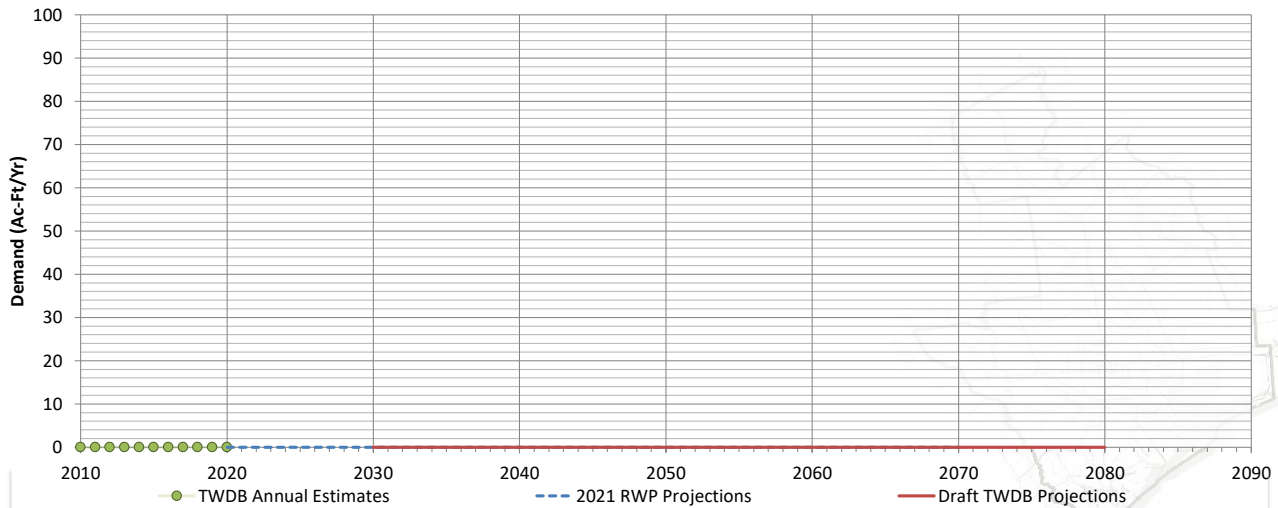
San Jacinto County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

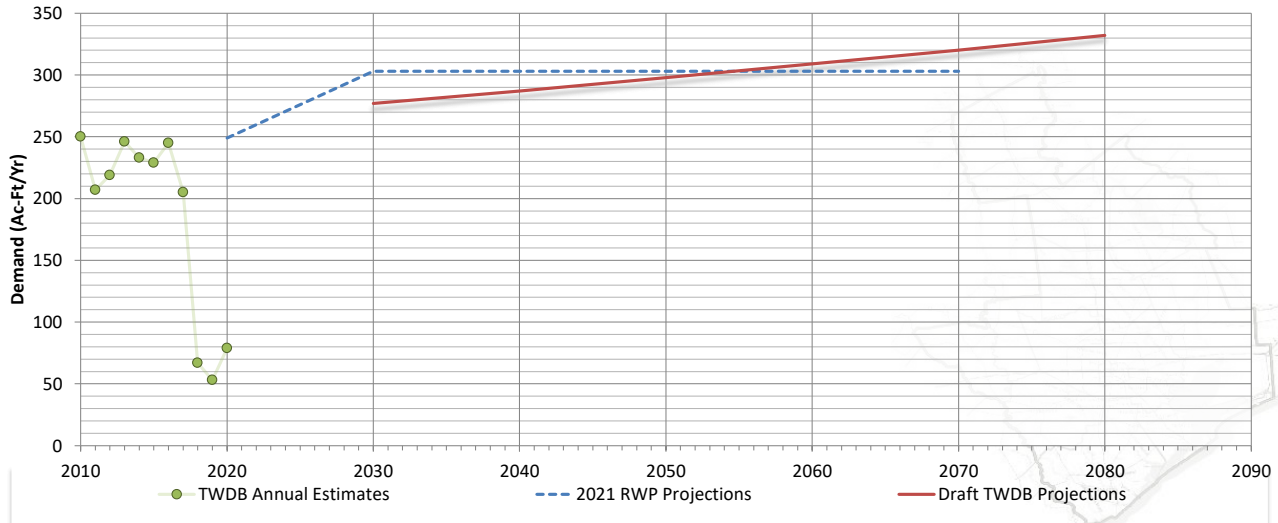
Trinity County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

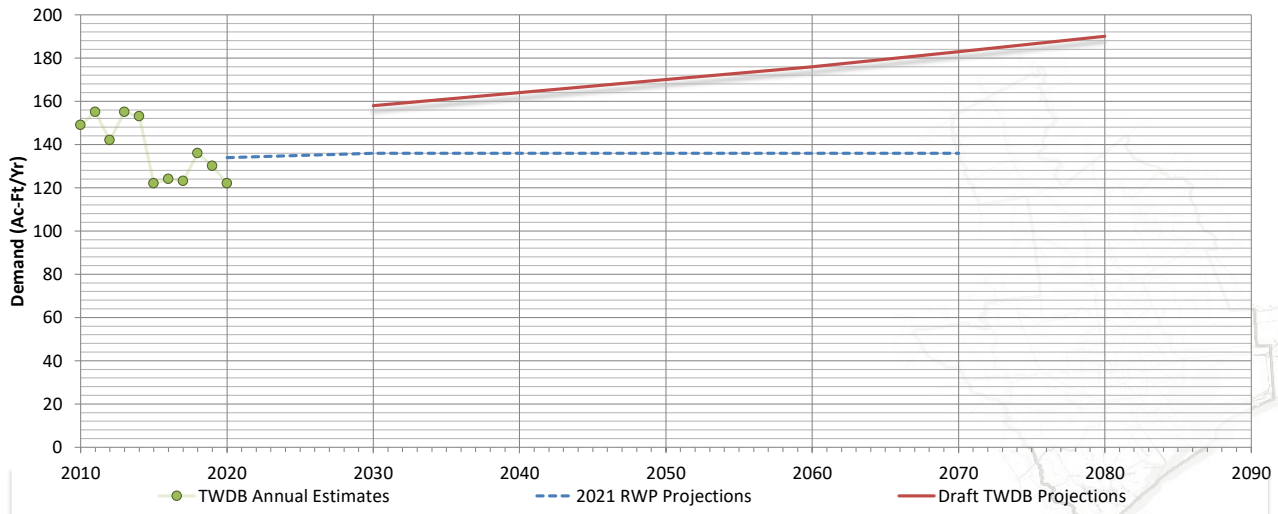
Walker County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process - Manufacturing

Waller County Manufacturing Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining



2021 RWP

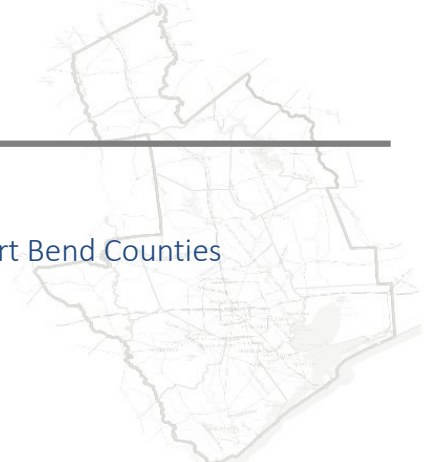
- Retained from 2016 RWP
- Revision requests due to Reuse & Brackish GW, changed conditions

2026 RWP

- BEG study for TWDB

Potential Considerations

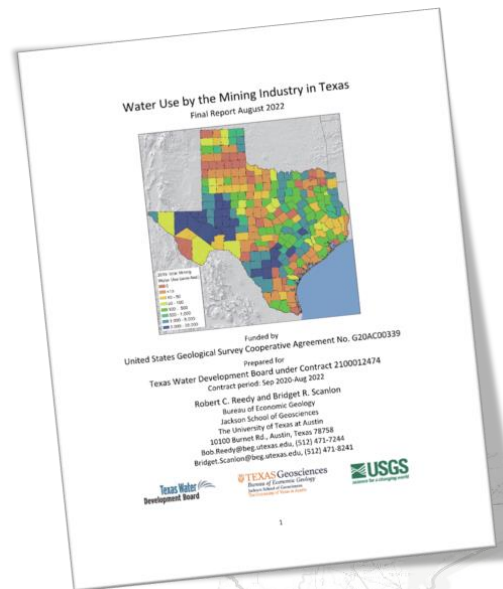
- Possible adjustment for Chambers and Fort Bend Counties



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Agenda Item 6 Projections and Revision Process – Mining

- BEG study for TWDB
- Detailed look at mining demands
 - Historical use by mining type
 - Demand locations and water sources
 - Industry and agency data
- Available on TWDB Website
 - Report
 - Data dashboard
 - Summary video

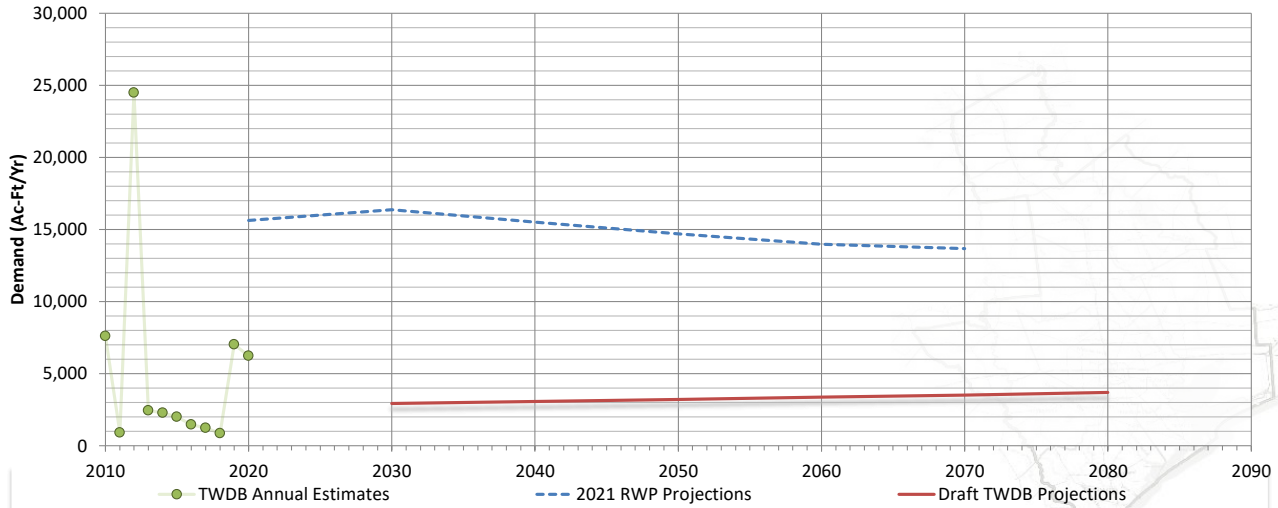


- www.twdb.texas.gov/waterplanning/data/projections/MiningStudy/

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Agenda Item 6 Projections and Revision Process – Mining

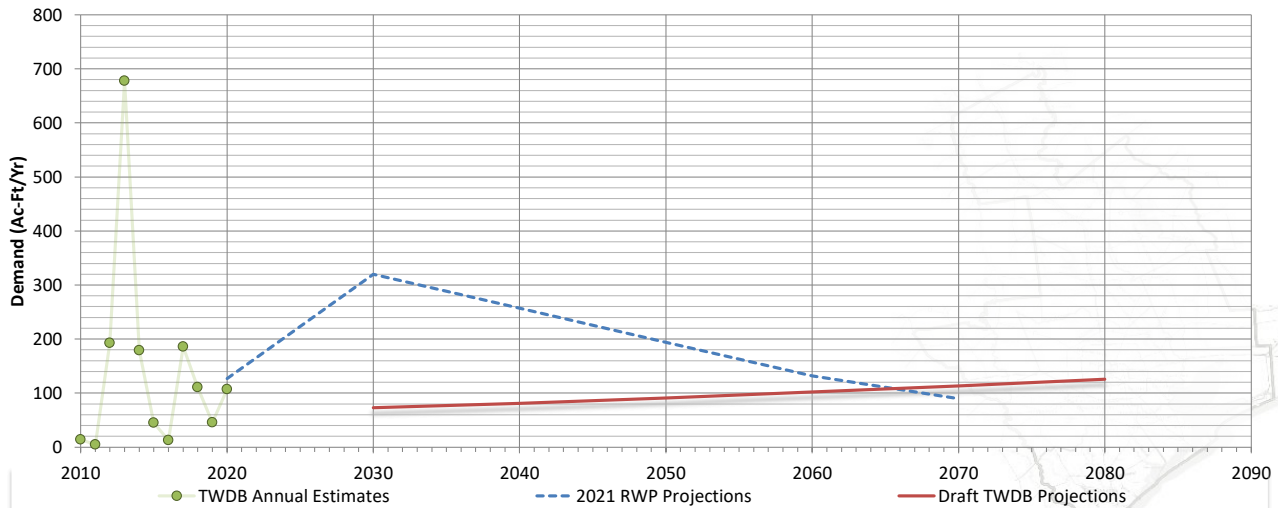
Region H Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

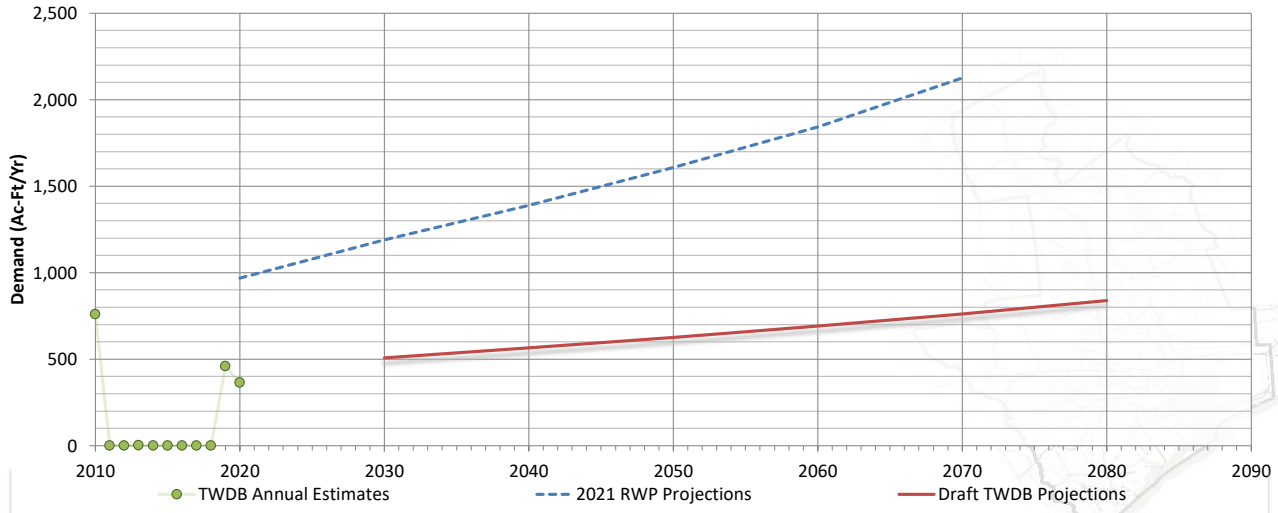
Austin County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

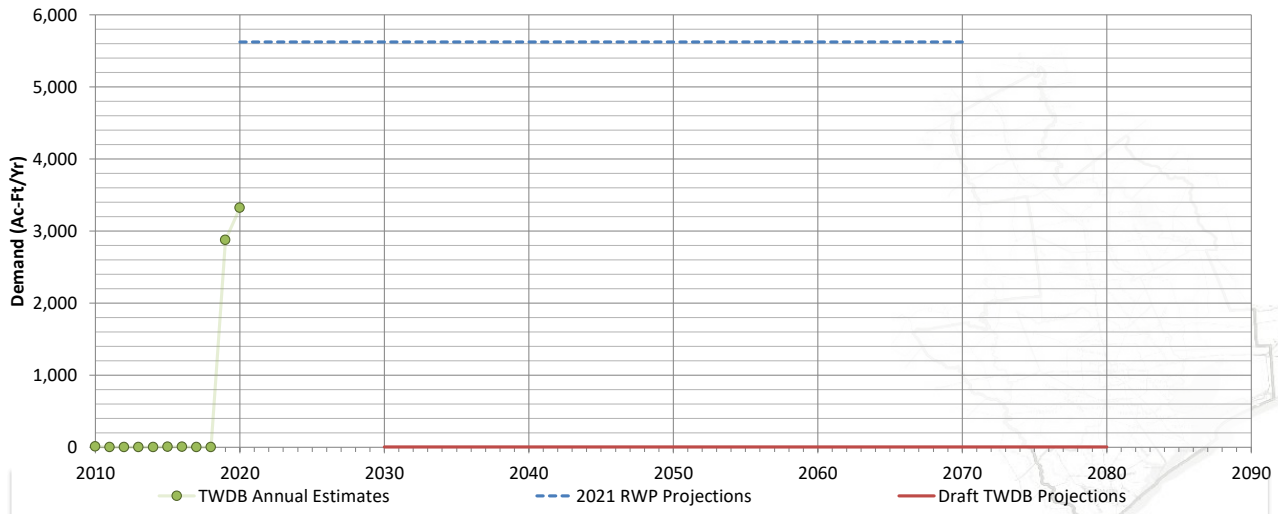
Brazoria County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

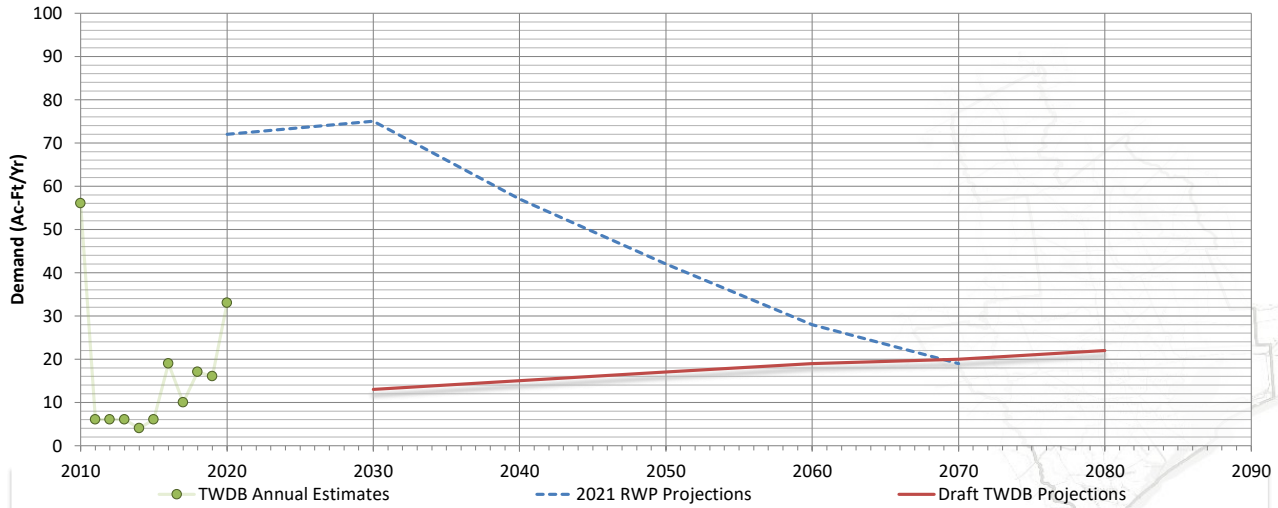
Chambers County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

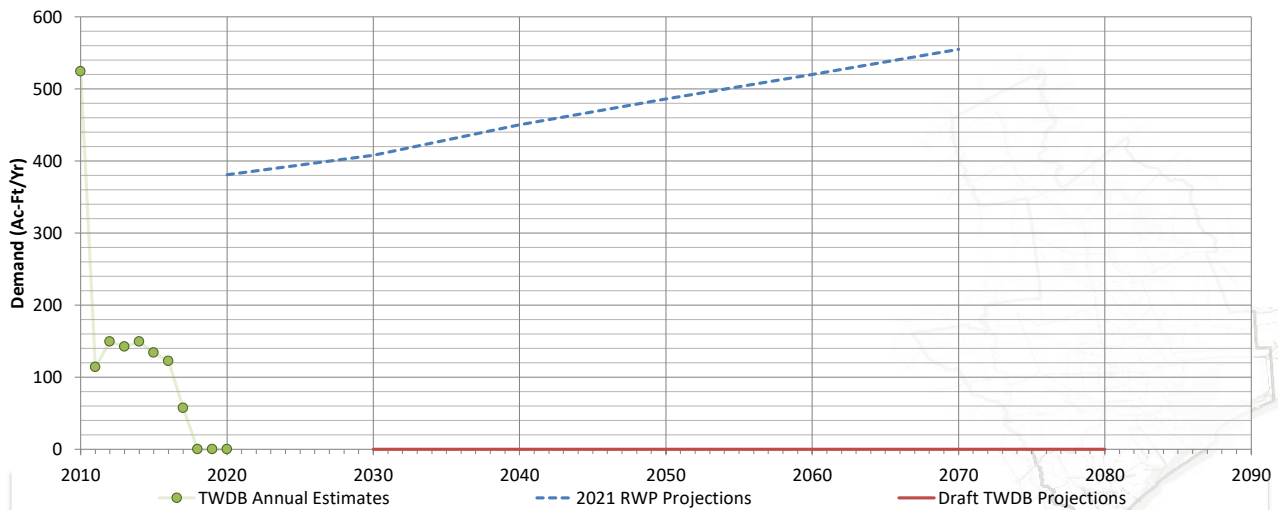
Fort Bend County Mining Demand Projections



Freese and Nichols, Inc. | INTERA Inc.

Agenda Item 6 Projections and Revision Process – Mining

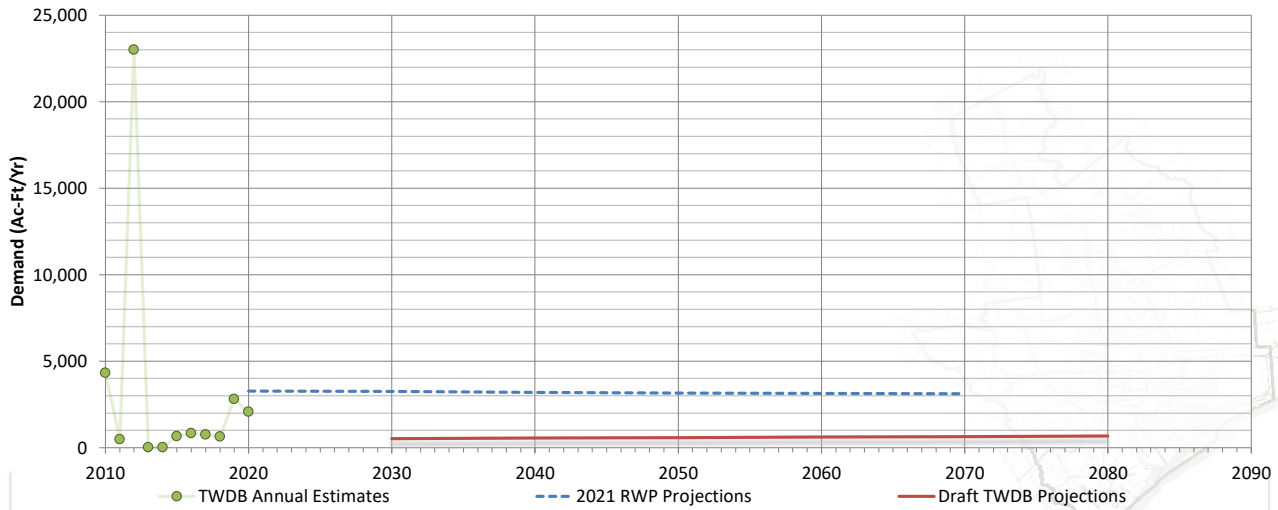
Galveston County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

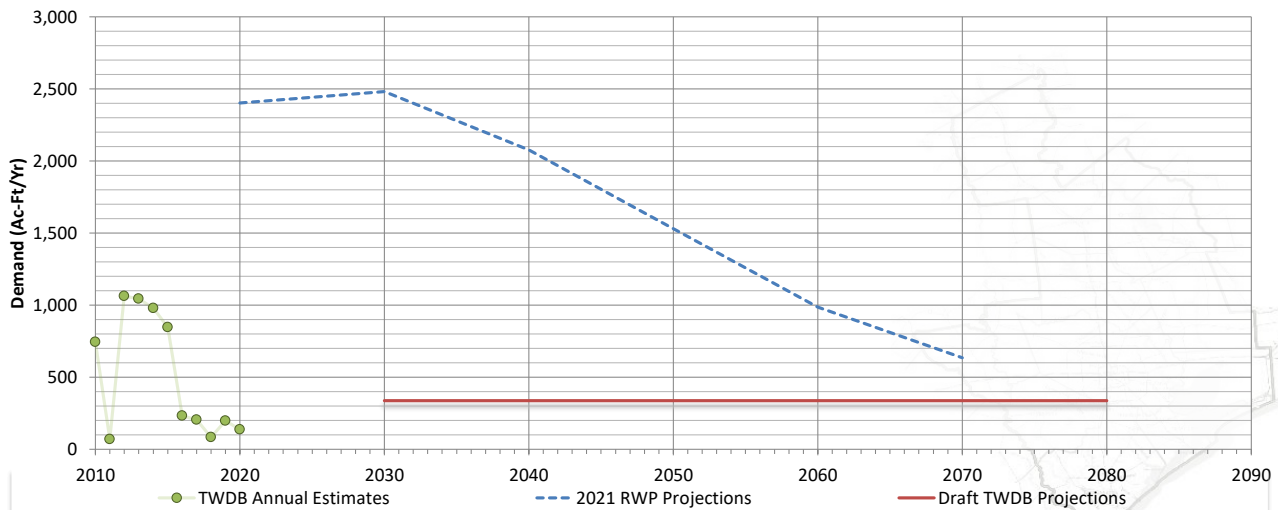
Harris County Mining Demand Projections



Freese and Nichols, Inc. | INTERA Inc.

Agenda Item 6 Projections and Revision Process – Mining

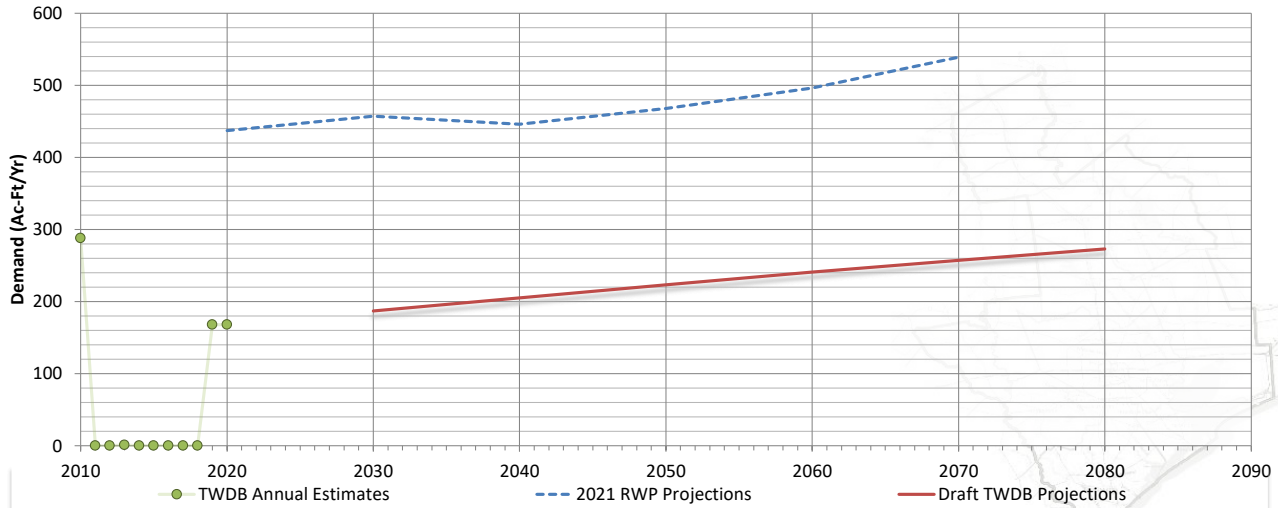
Leon County Mining Demand Projections



Freese and Nichols, Inc. | INTERA Inc.

Agenda Item 6 Projections and Revision Process – Mining

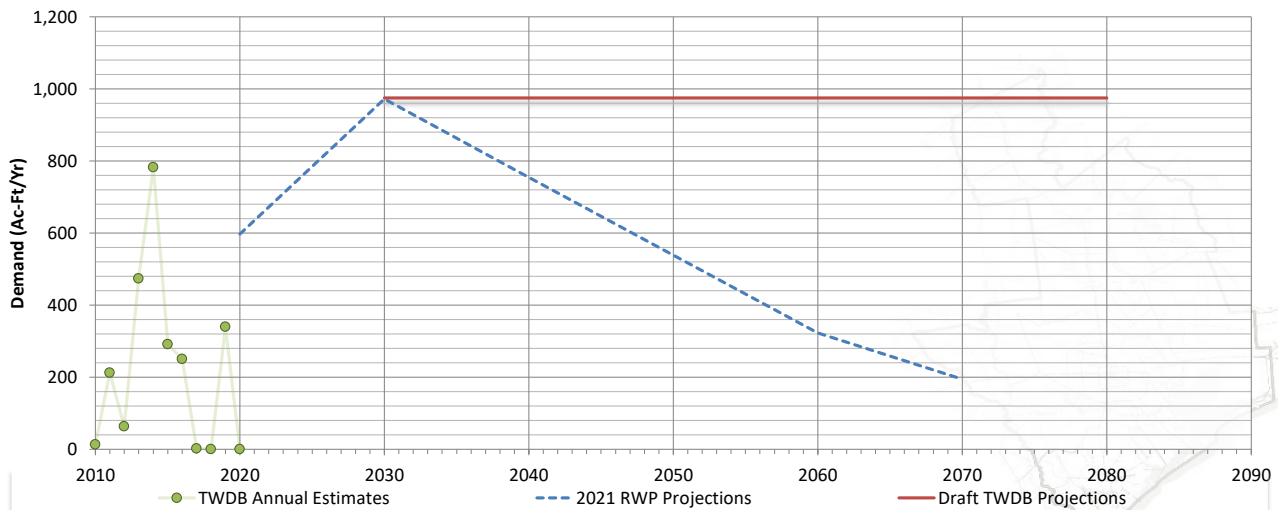
Liberty County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

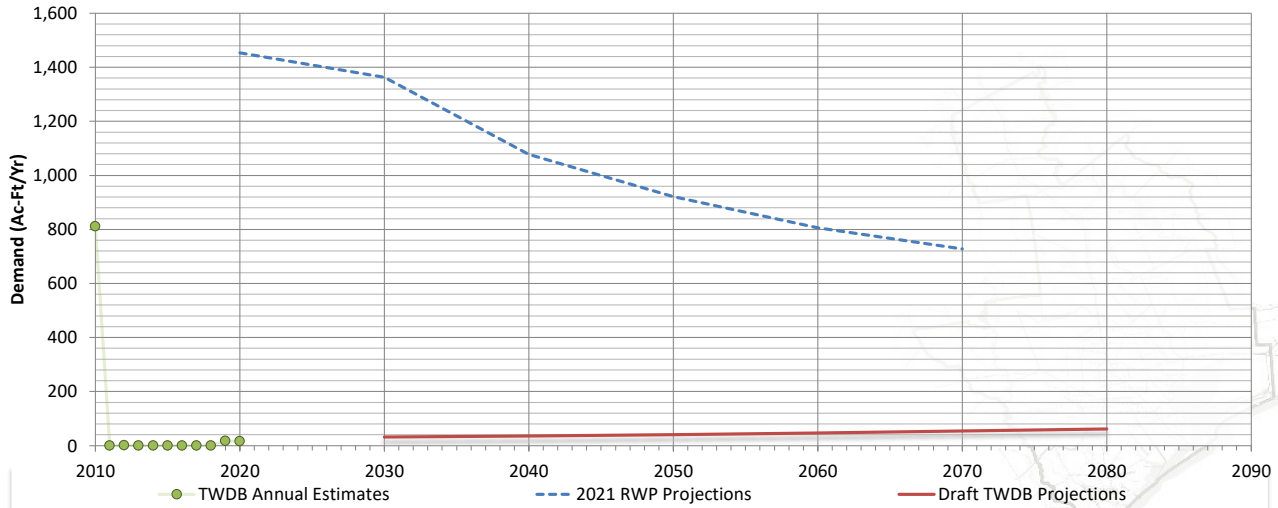
Madison County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

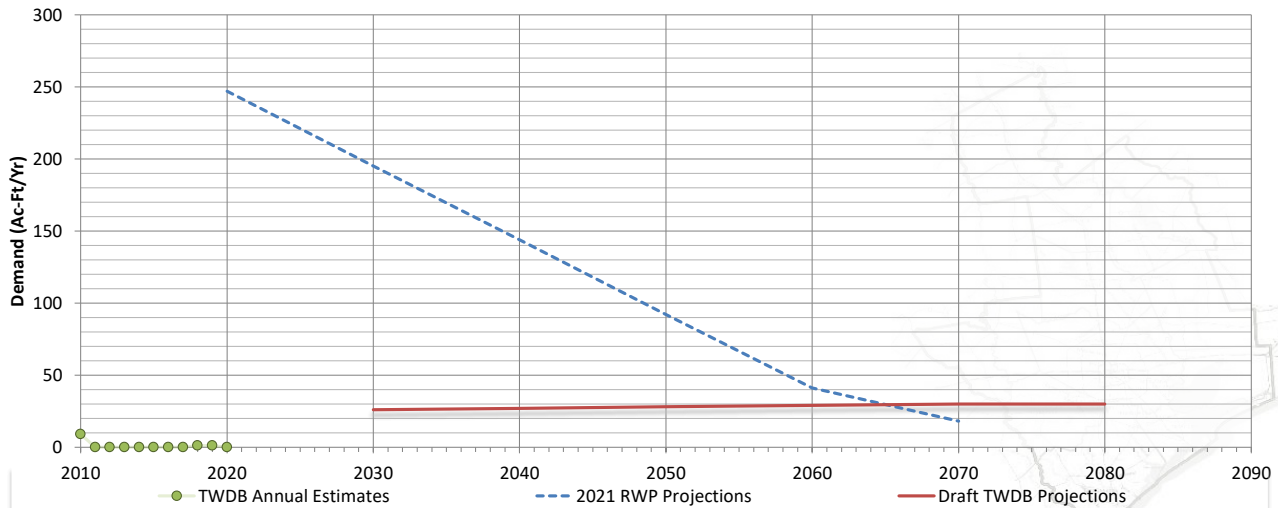
Montgomery County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

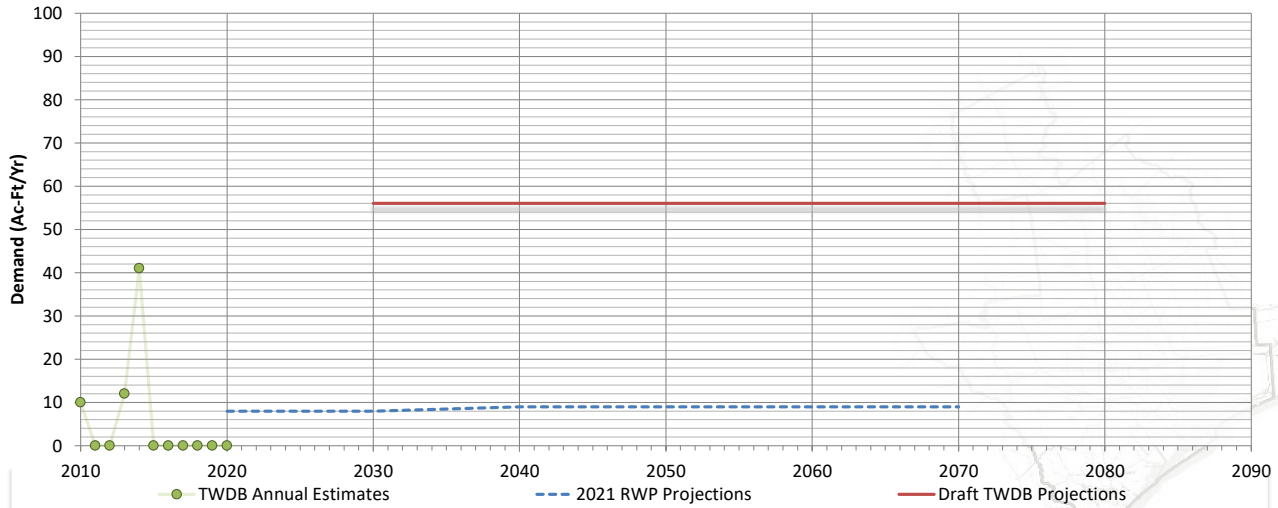
Polk County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

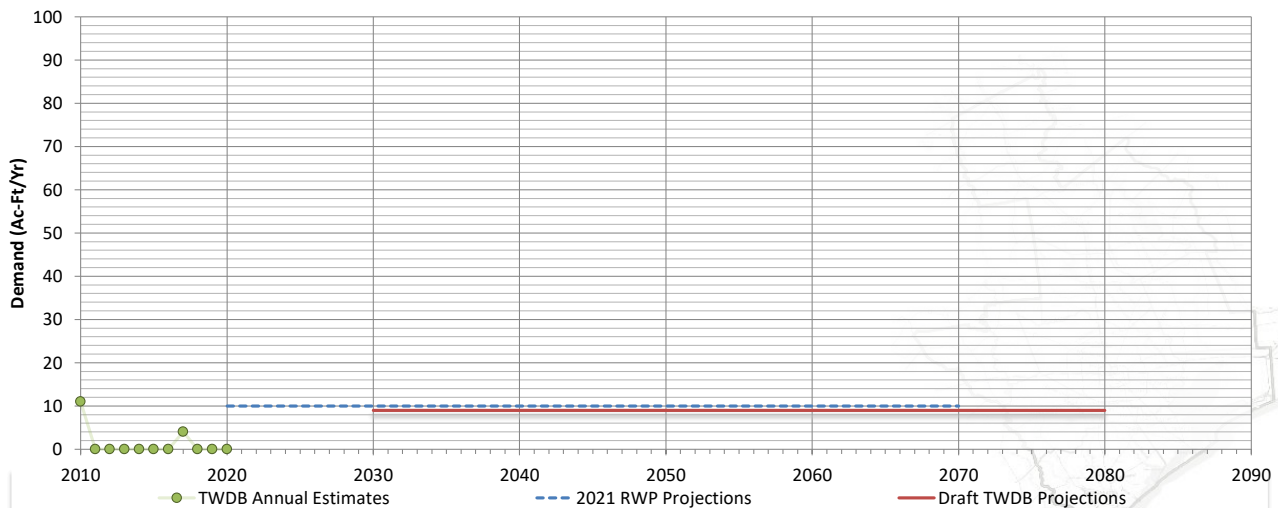
San Jacinto County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

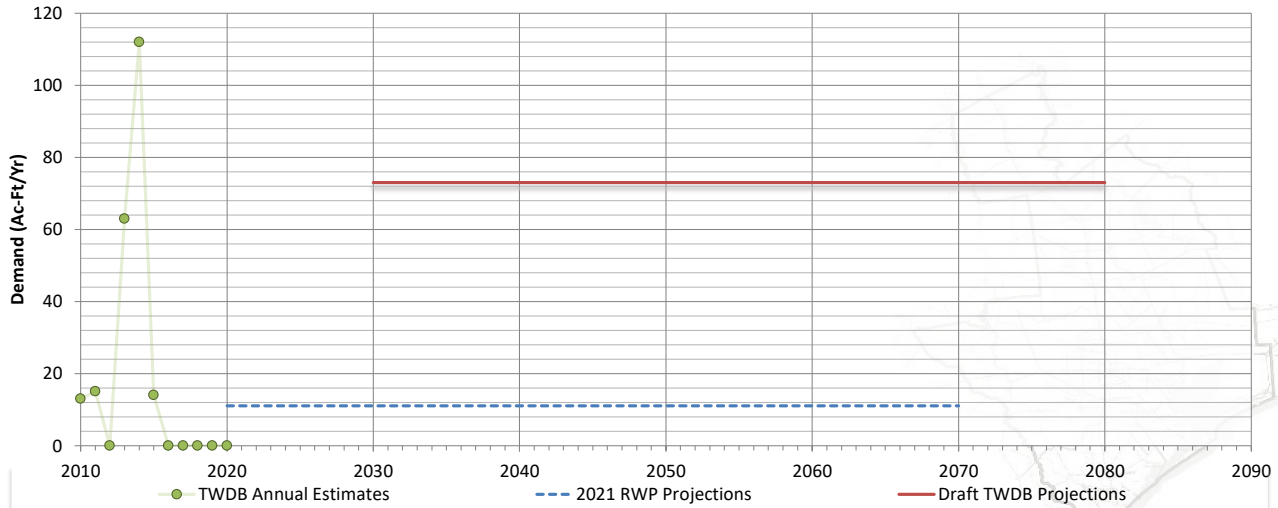
Trinity County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Mining

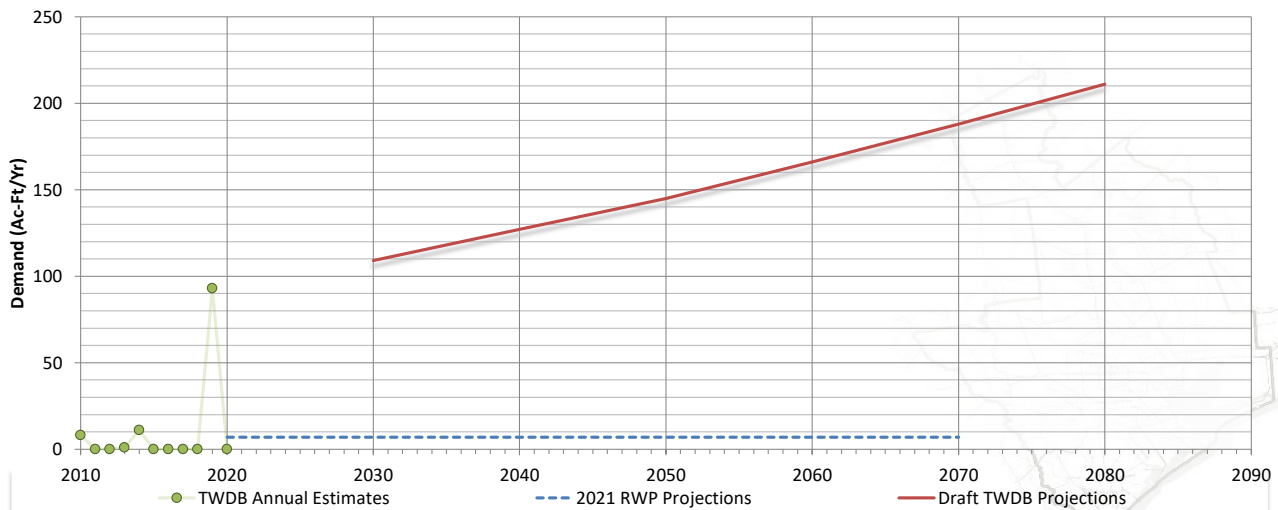
Walker County Mining Demand Projections



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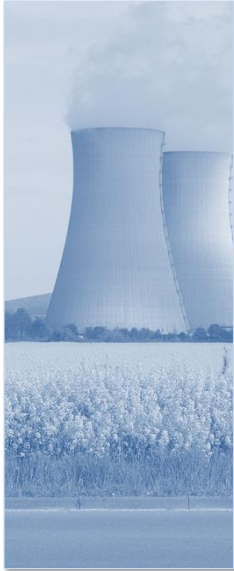
Agenda Item 6 Projections and Revision Process – Mining

Waller County Mining Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric



2021 RWP

- 2010-2015 max as baseline
- Regional requests

2026 RWP

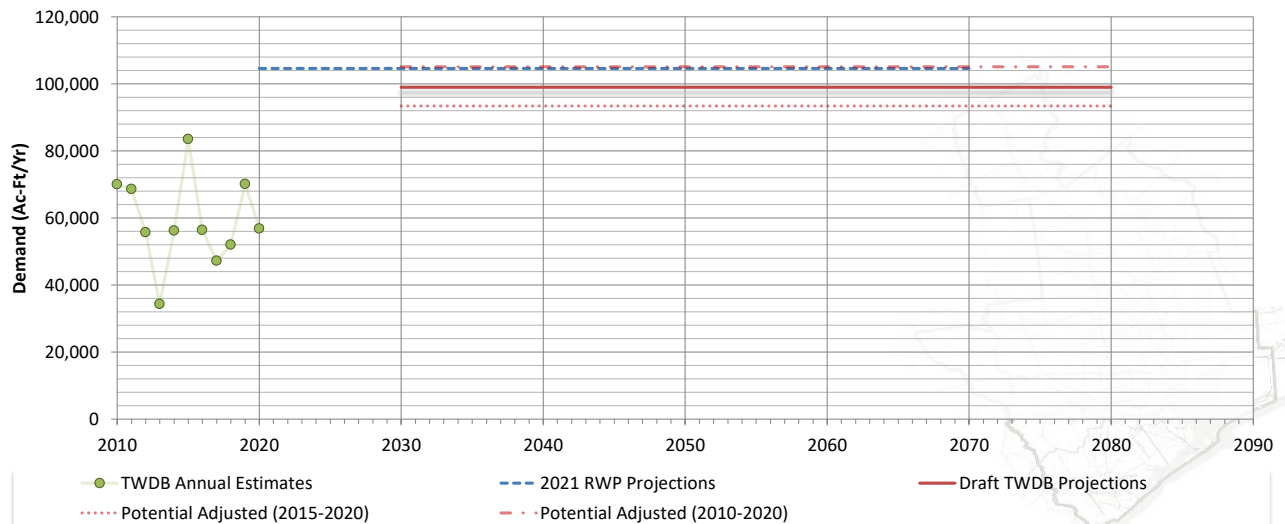
- 2015-2019 max as baseline
- 2030 based on statewide trend
- After 2030, constant

Potential Considerations

- Individual facilities may not reach max in same year
- Use max historical use (2010-2020 or 2015-2020) by generation facility and summing the total for the county
- All cogeneration should be removed from steam electric power projections

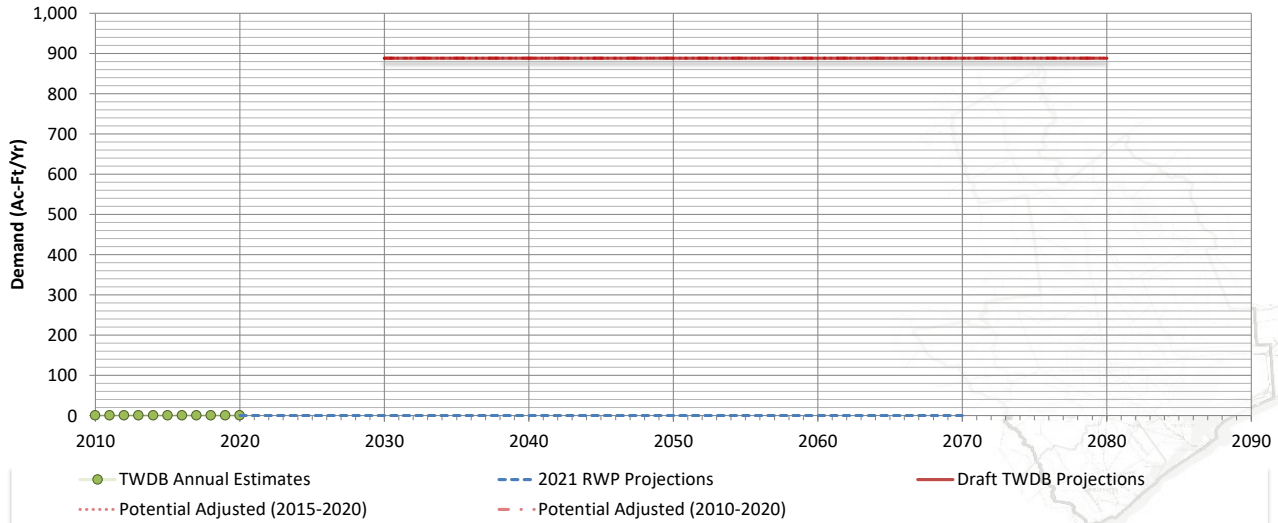
Agenda Item 6 Projections and Revision Process – Steam Electric

Region H Steam Electric Demand Projections



Agenda Item 6 Projections and Revision Process – Steam Electric

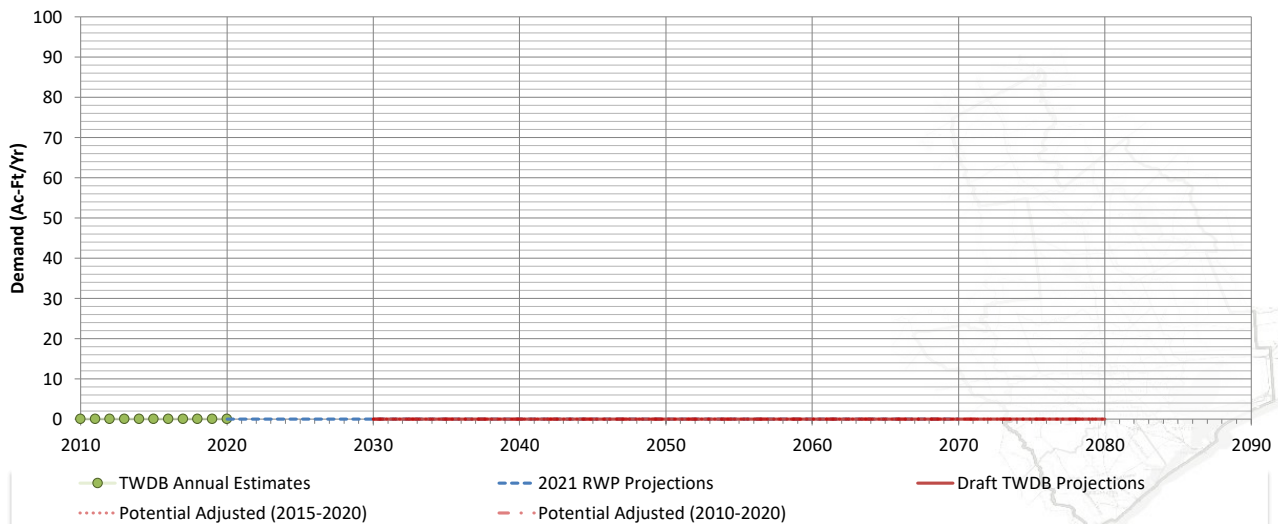
Austin County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

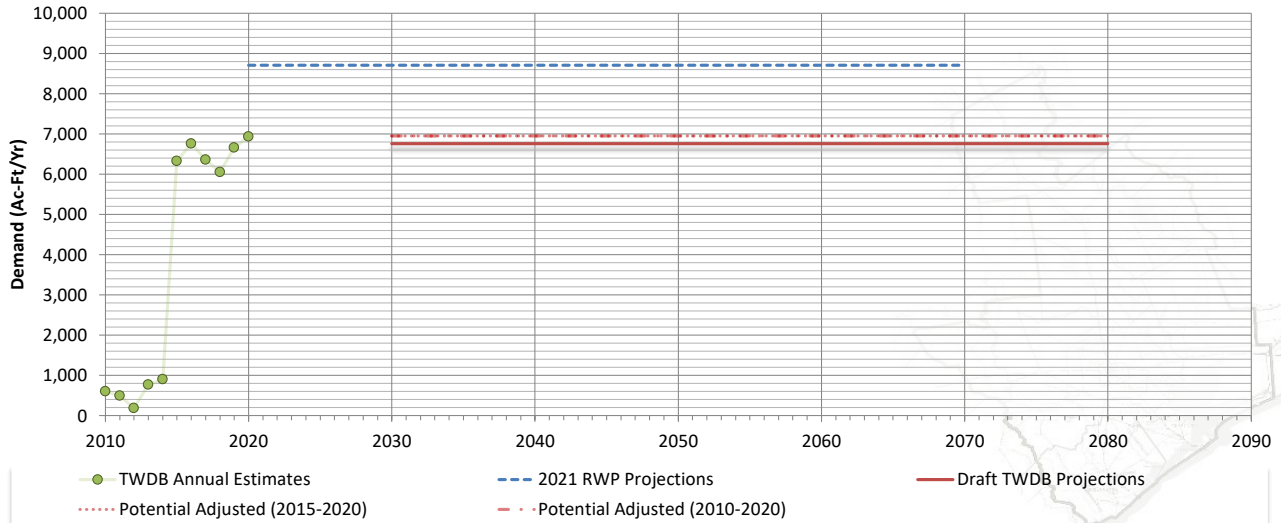
Brazoria County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

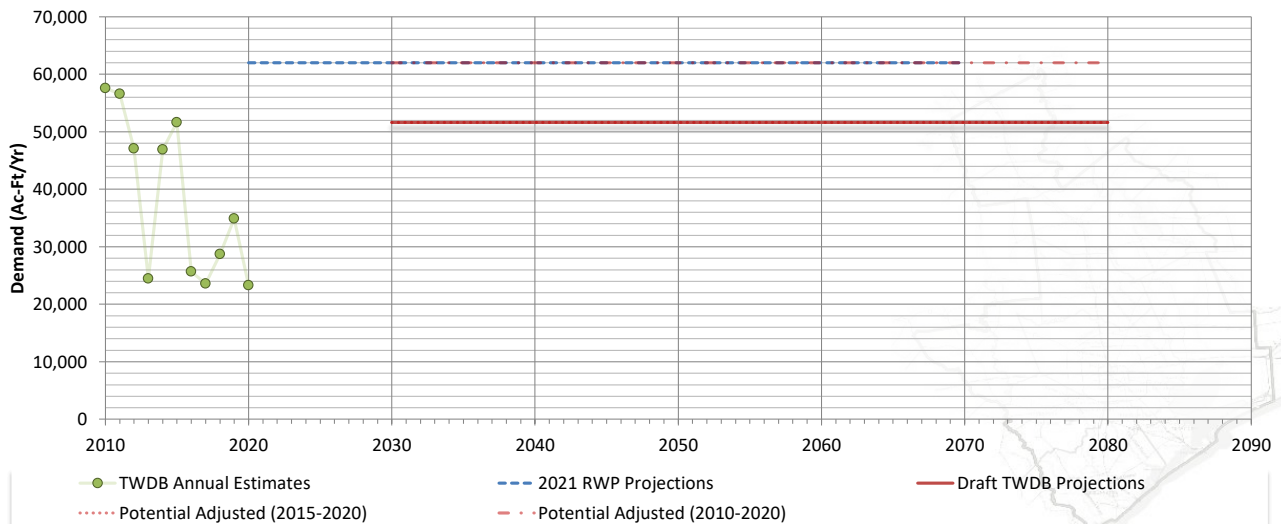
Chambers County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

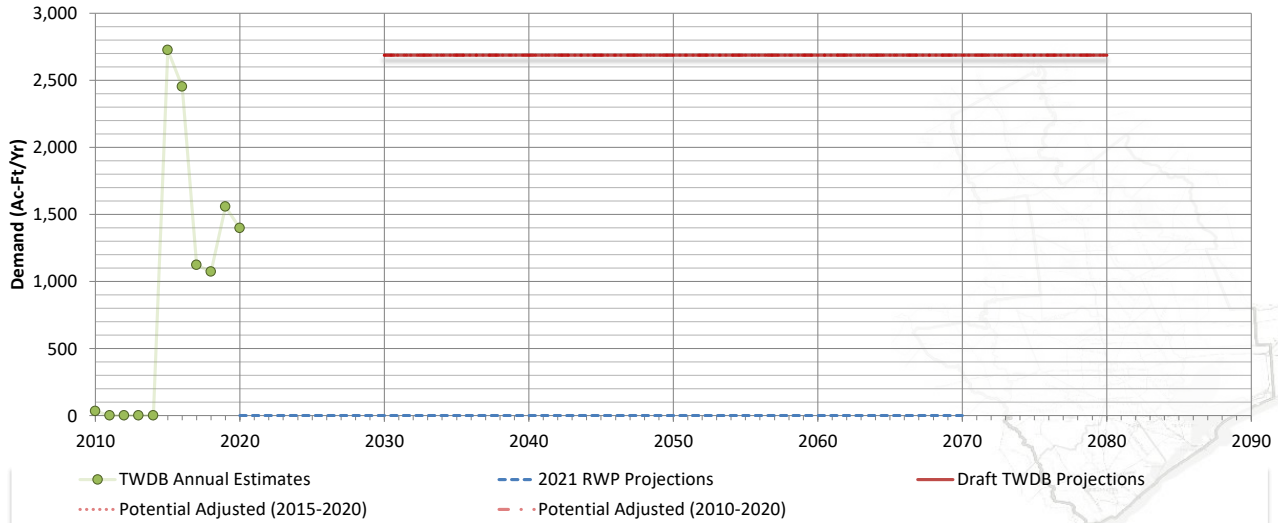
Fort Bend County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

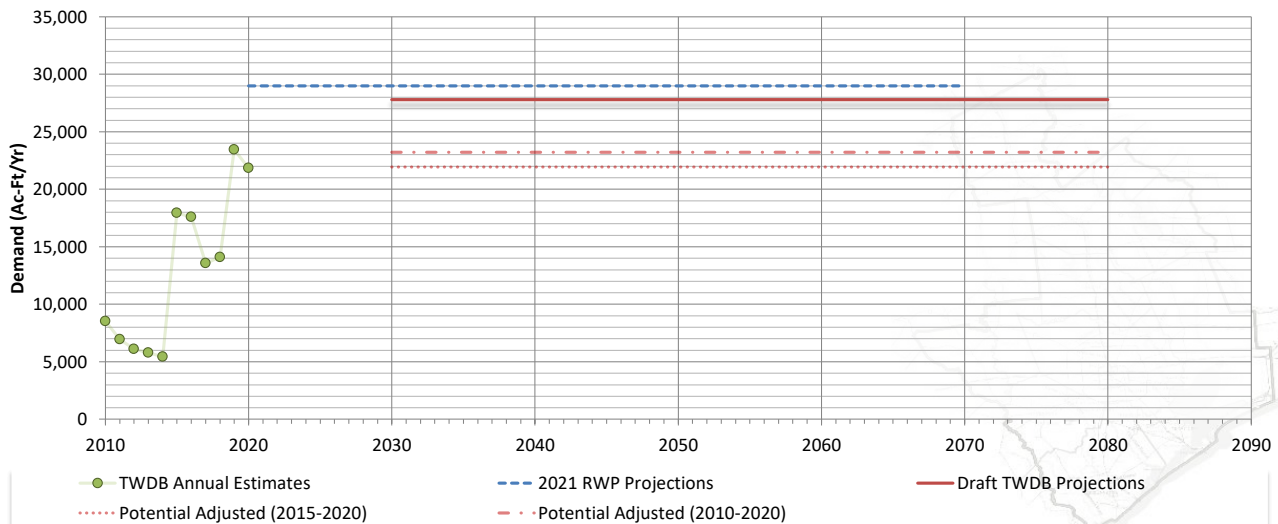
Galveston County Steam Electric Demand Projections



Freese and Nichols, Inc. | INTERA Inc.

Agenda Item 6 Projections and Revision Process – Steam Electric

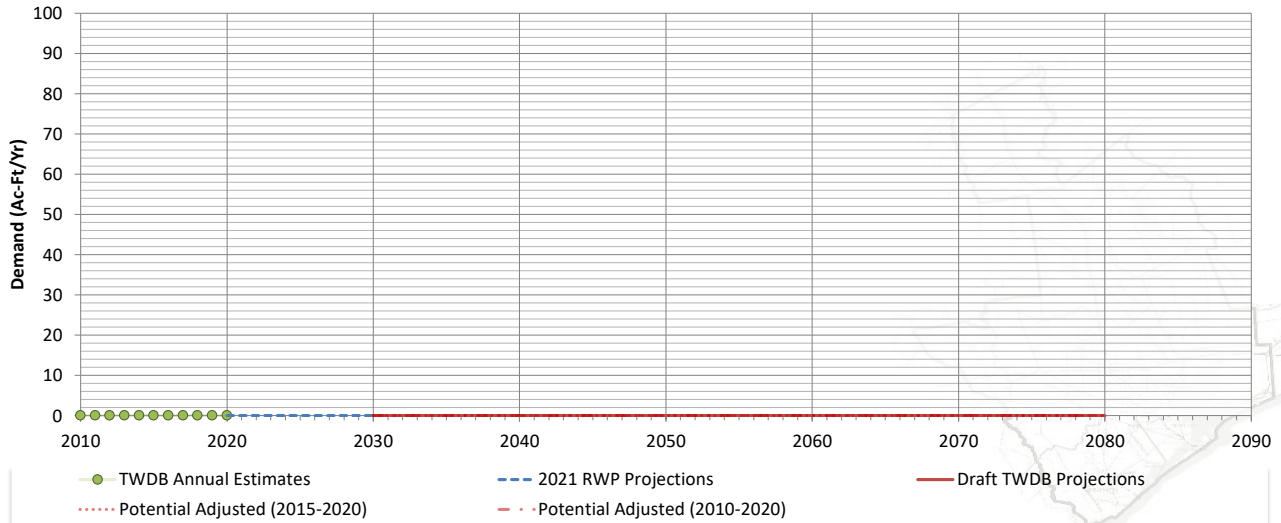
Harris County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

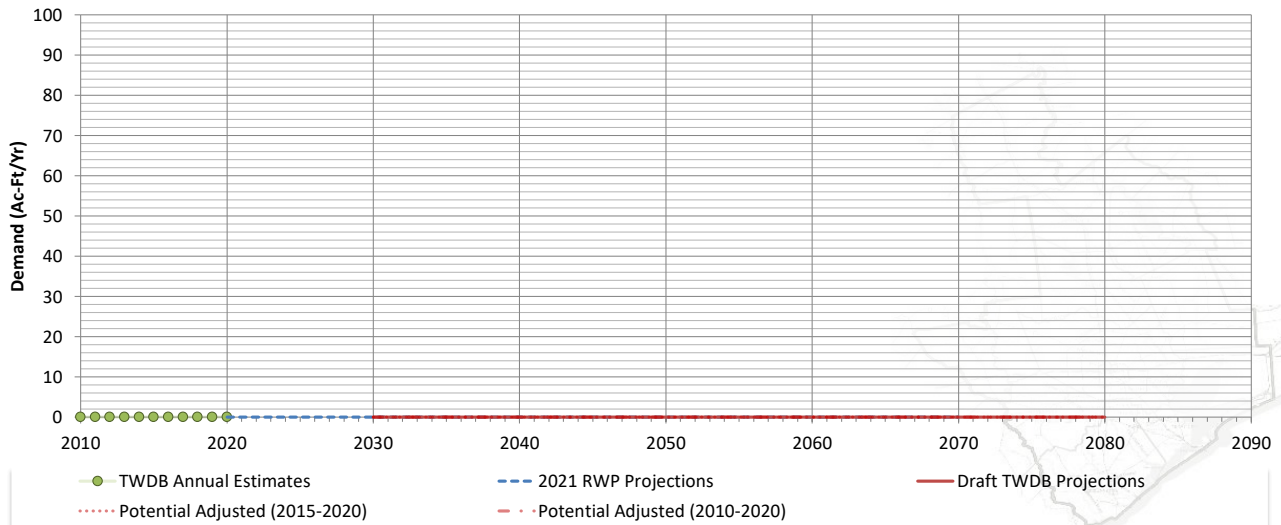
Leon County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

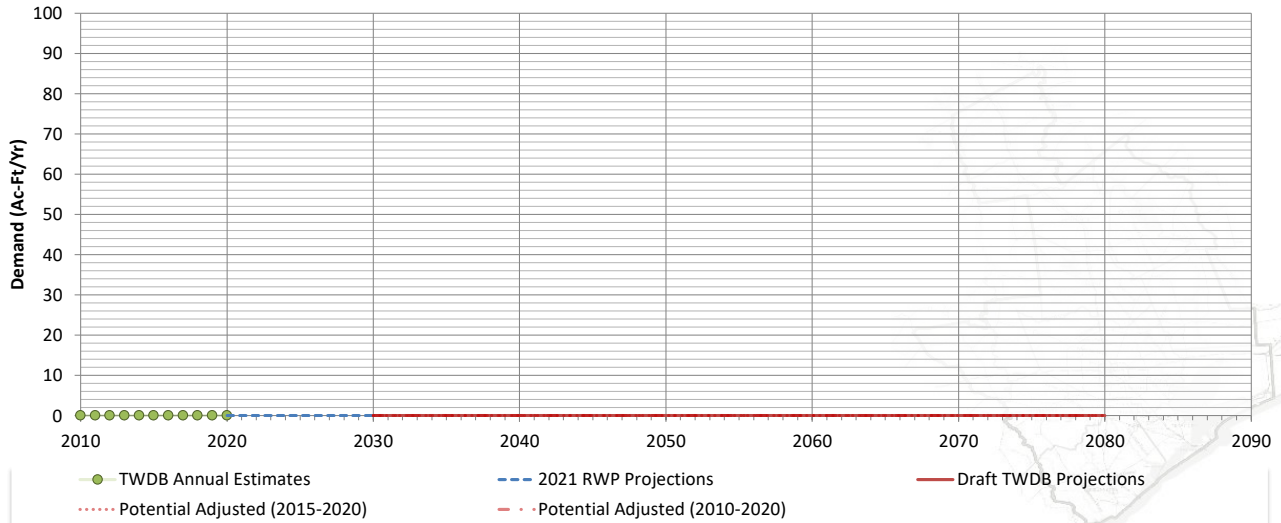
Liberty County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

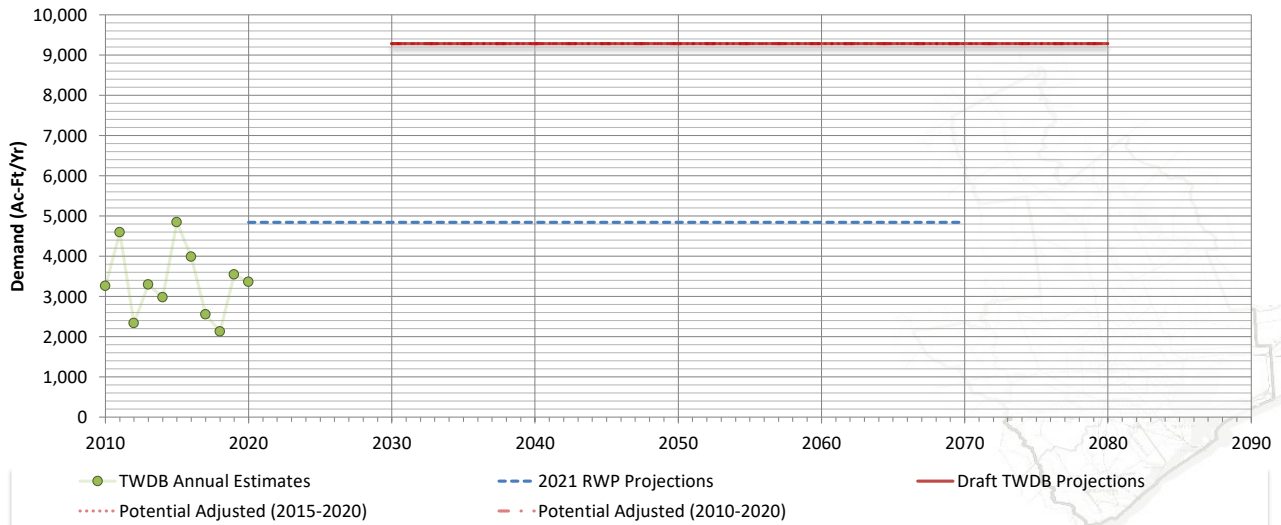
Madison County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

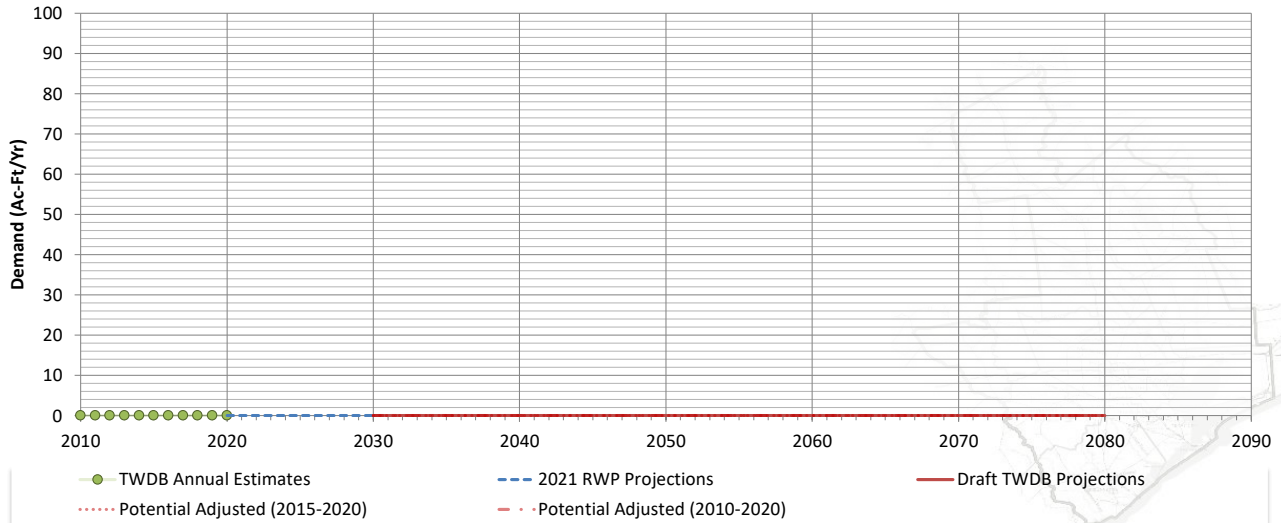
Montgomery County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

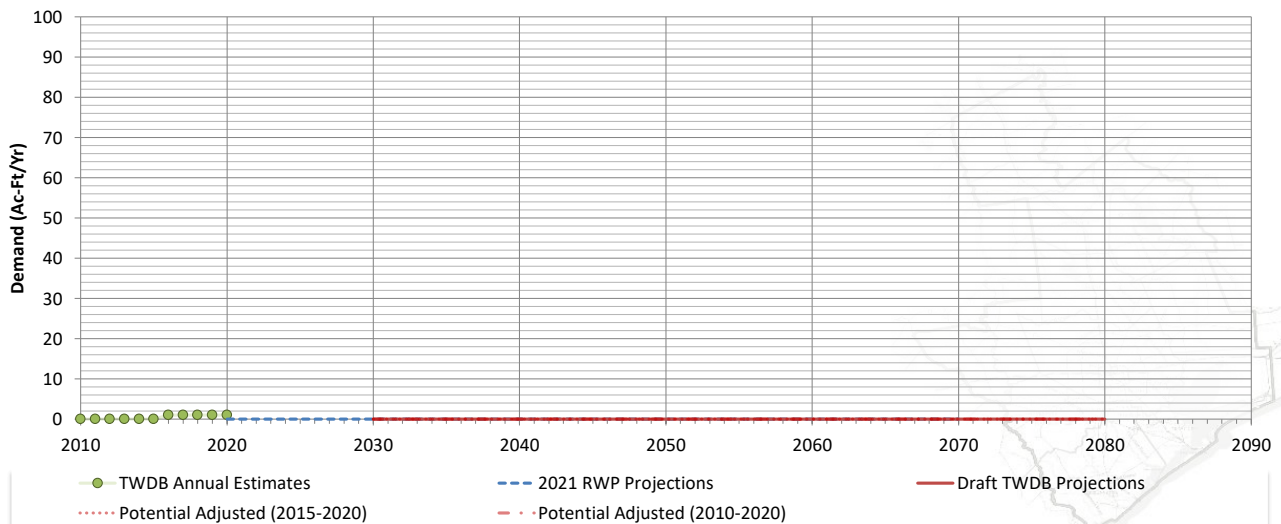
Polk County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

San Jacinto County Steam Electric Demand Projections

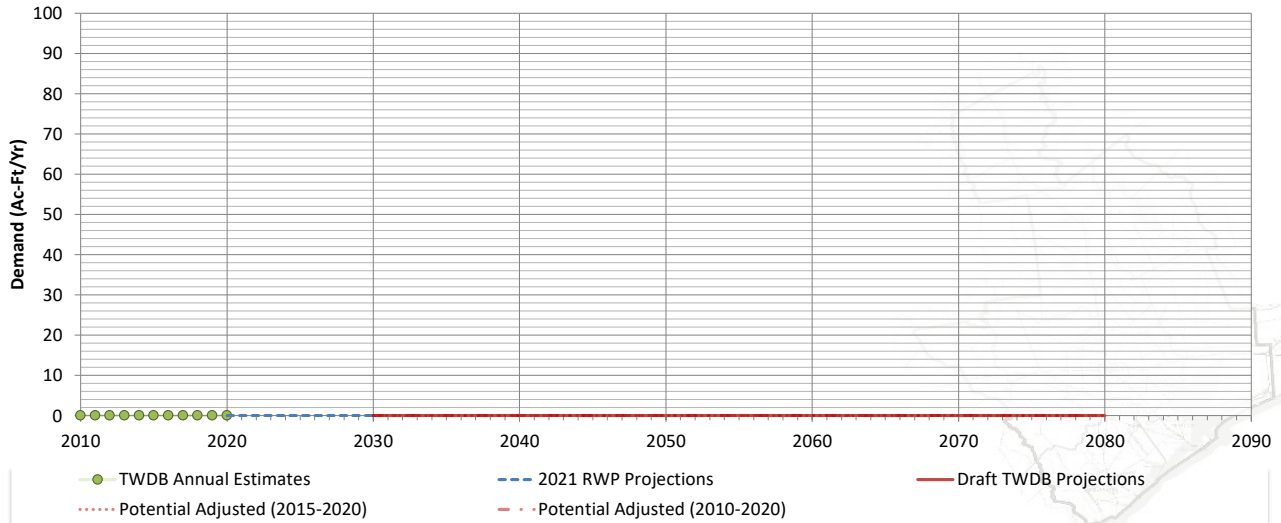


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Agenda Item 6

Projections and Revision Process – Steam Electric

Trinity County Steam Electric Demand Projections

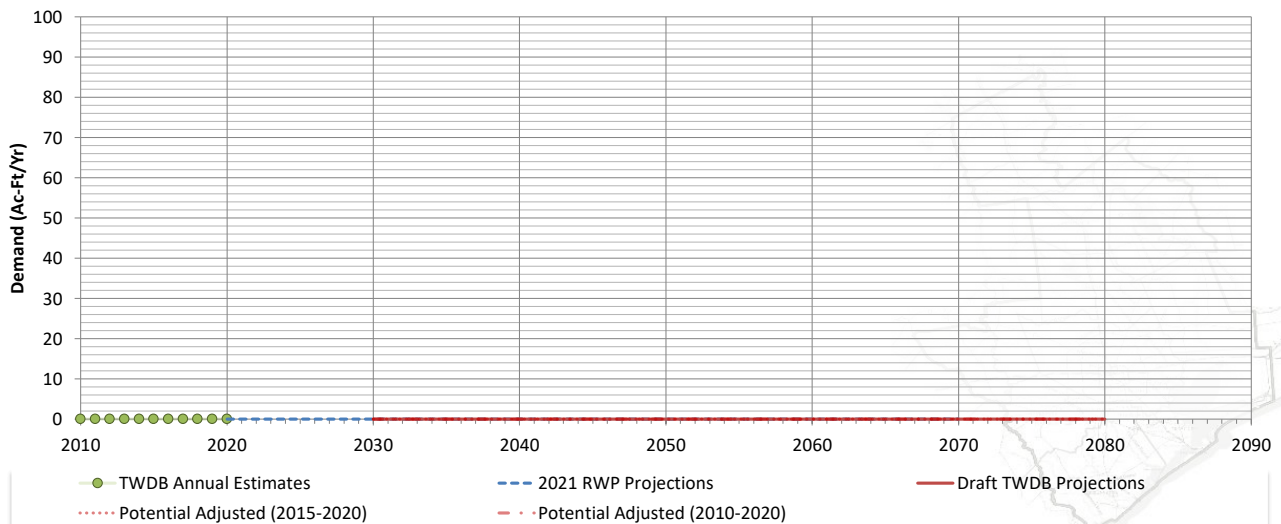


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Agenda Item 6

Projections and Revision Process – Steam Electric

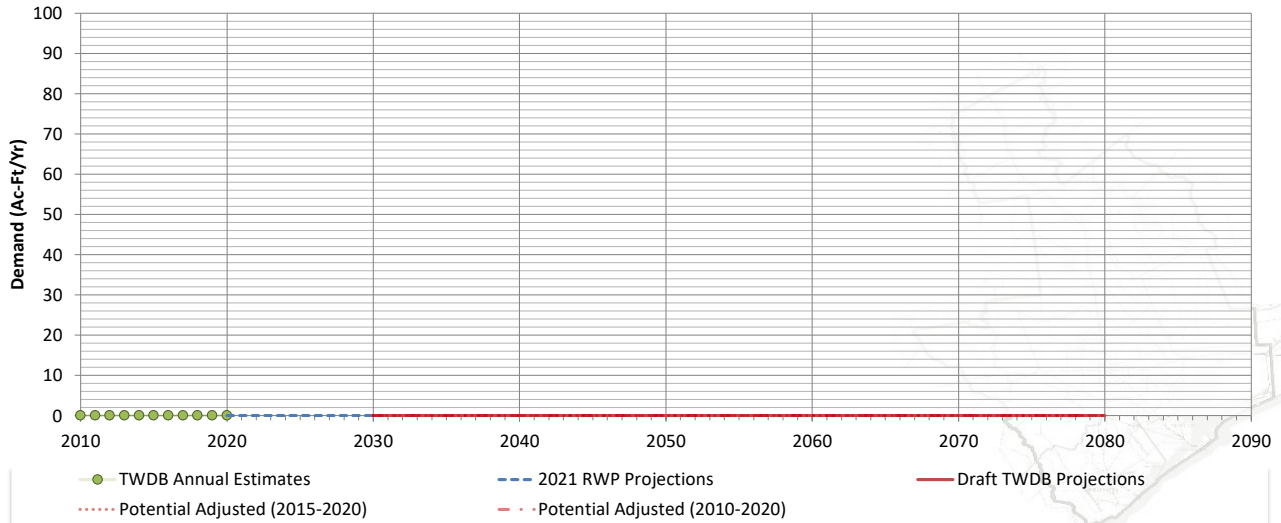
Walker County Steam Electric Demand Projections



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Agenda Item 6 Projections and Revision Process – Steam Electric

Waller County Steam Electric Demand Projections



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Agenda Item 6 Preliminary WUG Data – Potential Revisions



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Irrigation Water Demand Projections Methodology for the 2026 Regional and 2027 State Water Plans

Methodology summary

The draft irrigation water demand projections are based upon the average of the most recent five-years of water use estimates (2015 through 2019) for each region-county and either:

- held constant between 2030 and 2080 or
- in counties where the total groundwater availability over the planning period is projected to be less than the groundwater-portion of the baseline water demand projections, the irrigation water demand projections are held constant for 10 years beyond the point that the groundwater availability falls below the baseline demand, in most cases 2030 to 2040, after projected demands will begin to decline, depending on and commensurate with the groundwater availability.

After draft projections (decades 2030 through 2080) for each region-county are provided to the Regional Water Planning Groups (RWPGs), the RWPGs may request alterations to the draft projections, subject to adequate justification, documentation, and EA approval per guidance in *Exhibit C: General Guidelines for Development of the 2026 Regional Water Plans*.

Key changes from the previous planning cycle's projection methodology: None

Major Assumptions/Updates

- Baseline use calculated as average of five years of TWDB annual region-county level estimates (2015 - 2019).
- Irrigation water demands will be held constant unless constrained by modeled available groundwater (MAG), then, after a single decade delay, the demands will decline at the same rate as the groundwater availability. This is to both acknowledge the decline in availability and yet allow for a need to be reflected that can be addressed with strategies such as conservation. This is the same method used to develop irrigation projections for the 2021 Regional Water Plans.

Baseline default projection methodology

Data Sources:

- TWDB historical water use estimates by region and county (2015-2019), including reuse.
- Projected total groundwater availability volumes including the most recent MAG volumes from the 2021 Joint Groundwater Planning process (some MAG data is under review and is subject to change). At the time these draft irrigation projections were developed, updated MAG data was not available from Groundwater Management Areas 1, 8, 9, 10 and 12.

Each year, the TWDB Agricultural Conservation department develops annual irrigation water use estimates at the county level by applying a calculated evapotranspiration-based "crop water need"

estimate to reported irrigated acreage from the Farm Service Agency. These estimates are then adjusted based on surface water release data from the Texas Commission on Environmental Quality and comments from groundwater conservation districts, irrigation districts, and river authorities.

As part of the regional and state water plans, the TWDB Projections and Socioeconomic Analysis department develops irrigation projections. Future water demands for irrigation purposes are significantly impacted by commodity prices, production costs, federal agricultural policies, and federal energy policies. Any attempt to forecast such factors and their impact on water use over a 50-year period would be impractical. A more credible methodology is to focus on recent historical irrigation water use data as an indicator of future use. Therefore, the baseline dry-year irrigation demand projection for most areas will be the average of the annual irrigation water use estimates over the most recent five years of water use data and that average volume will then be held constant over the planning period.

However, much of the projected irrigation demands of the state are supplied by groundwater sources that are projected to decline significantly over 50 years. If the baseline irrigation water demand projections associated with groundwater and summed over 50 years, exceeds the projected groundwater resource (modeled available groundwater volume) summed over 50 years, then the water demand projections will reflect groundwater availability constraints as described below.

Constrained water demand projections

Starting at the year 2030 baseline projection, the demand volume will be held constant for at least one decade. If the annual groundwater availability is lower than the baseline projection at the beginning of the planning period (2030), then beginning in 2040, the subsequent demands will parallel the trend of the groundwater availability (MAG). See Figure 1. If the annual groundwater availability equals or exceeds the default baseline annual groundwater projection at the beginning of the planning period (2030) but then falls below the baseline projection at a later point, then the irrigation water demand projections will not begin to parallel the groundwater availability until the following decade, after the point at which groundwater availability has fallen below the baseline demand projections. See Figure 2.

Figure 1- Potential Draft Irrigation Water Demand Projections: Declining Groundwater Example

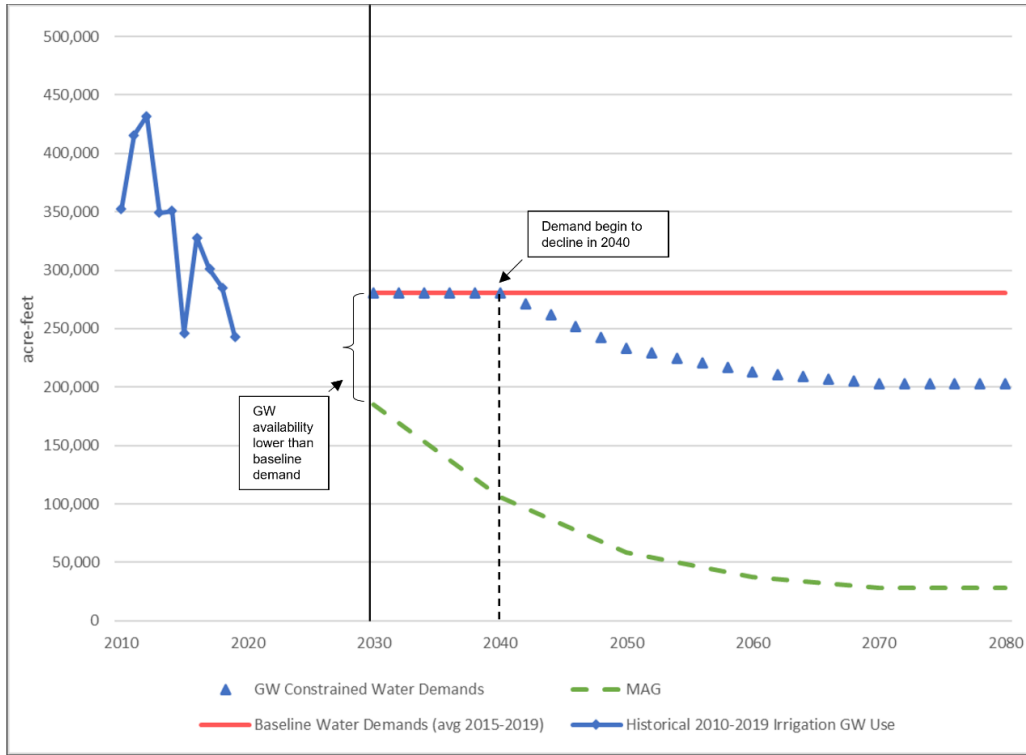
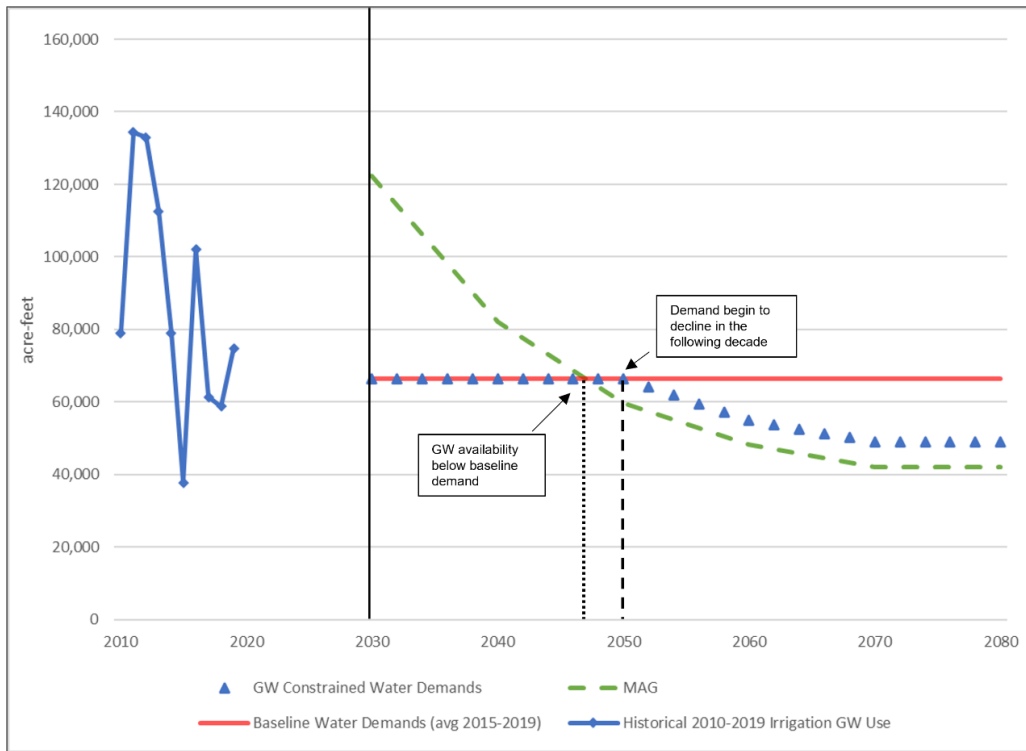


Figure 2- Potential Draft Irrigation Water Demand Projections: Declining Groundwater Example



While constraining water demand projections based on water resource availability would most likely occur in areas primarily utilizing groundwater, such constraints could also occur in areas with limitations of surface water rights or contracts. At this stage however, TWDB does not have sufficient information to attempt to constrain surface water demands and will defer to RWPGs to identify such instances, if appropriate. The portion of the baseline irrigation water demand projection anticipated to be supplied by surface water and reuse, based on recent water use data, will be added to the constrained groundwater demand.

Key Data Sources

Links to the key data sources in developing the projections:

1. Historical water use (county):

https://www3.twdb.texas.gov/apps/reports/WU/SumFinal_CountyReportWithReuse

2. 2021 RWP Projections (county):

https://www3.twdb.texas.gov/apps/reports/Projections/2022%20Reports/demand_county

Livestock Water Demand Projections Methodology for the 2026 Regional and 2027 State Water Plans

Methodology Summary

The draft livestock water demand projections for the 2026 Regional Water Plans (RWP) were based upon the region-county five-year average annual water use estimates (2015 through 2019) developed by the TWDB. Decade-specific water use trends from the previous water planning cycle were applied to the five-year estimate average baseline. For example, if the 2021 RWP data reflects a five percent increase in projected demand for Travis County from 2020 to 2030, then the projected change in demands for the year 2030 in the new plan are also a five percent increase from the baseline (which is the five-year average value). Subsequent decade-specific projections were obtained using the same procedures for decades 2040 through 2070. Thus, the new draft projections use the existing TWDB-approved water use projection decadal growth rates from the 2021 RWPs. Year 2070 projections were held constant through the draft year 2080 projections.

Draft projections (decades 2030 through 2080) for each region-county are provided to the Regional Water Planning Groups (RWPGs), and the RWPGs may request alterations to the draft projections, subject to adequate documentation, justification, and EA approval per guidance in *Exhibit C: General Guidelines for Development of the 2026 Regional Water Plans*.

Key changes from the previous planning cycle's projection methodology: None

Major Assumptions

- Baseline use calculated as average of five years of TWDB annual region-county-level estimates (2015 - 2019).
- Historical TWDB annual water use estimates consist of species-specific water use per head values, multiplied by annual inventory estimates, plus surveyed water use for non-standard livestock production such as fish hatcheries.
- Trend factors for projecting demands through the planning horizon use the percent changes from the most recently approved 2021 RWPs.
- Draft year 2080 projections are held constant from the year 2070 projections.

Primary Data Changes Reflected in the 2026 RWP Projections

Several changes in the baseline data were incorporated into the 2026 RWP draft projections. These include the following:

- Update of the region-county splits. In 2019, TWDB staff performed a state-wide geographic analysis of likely grazing lands for the various species as well as the locations of permitted Concentrated Animal Feeding Operations (CAFOs). This resulted in updates to the water use geographic splits (region/county/ basin), which were applied retroactively to annual water use estimates from 2015 forward.

- Additional review of the published literature and expert opinion concerning livestock water use (gallons/head/day) resulted in changes in the assumed water use parameters for five types of livestock (Table 1 below, changes highlighted in grey). Updates were incorporated to better reflect changes in the values statewide. The water use estimates were updated for years 2015 through 2019 based on the new water use per head coefficients (see Key Data Sources No. 3 listed below).
- Changes in broiler chicken inventory estimates were also considered and updated from 2015 through 2019.

Table 1. Water use parameter comparison, 2021 and 2026 RWPs.

TWDB category	Subcategory	2021 RWP water use (gal/head/day)	2026 RWP water use (gal/head/day)
Cattle	Milk	75	55
	Fed & other cattle	15	15
Chickens	Non-broilers	0.086	0.09
	Broilers	0.077	0.09
Turkeys	Turkeys	0.2	0.2
Equine	Horses, ponies, mules, burros, & donkeys	12	12
Hogs	Hogs	11	5
Sheep	Sheep	2	2
Goats	Milk	0.5	2
	Meat		
	Angora		

In order to address changes in the livestock industry and any changes in water use patterns, the draft livestock water demands are re-estimated as part of each 5-year planning cycle. As with any methodology applied statewide, there may be specific cases for which modifications to this general methodology are warranted. In such cases, TWDB staff may adjust the methodology as necessary while being consistent with the original intent.

Key Data Sources

Links to the key data sources in developing the projections:

1. Historical water use (county):
https://www3.twdb.texas.gov/apps/reports/WU/SumFinal_CountyReportWithReuse
2. 2021 RWP Projections (county):
https://www3.twdb.texas.gov/apps/reports/Projections/2022%20Reports/demand_county
3. Non-Surveyed Annual Livestock Inventory and Water Use Estimates Methodology Summary:
https://www3.twdb.texas.gov/waterplanning/data/dashboard/Sources/LivestockSummary_Final.PDF

Manufacturing Water Demand Projections Methodology for the 2026 Regional and 2027 State Water Plans

Methodology Summary

The draft manufacturing water demand projections were based upon the highest region-county manufacturing water use in the most recent five years of aggregated data (2015 through 2019) for manufacturing water users from the annual water use survey (WUS). Values from the WUS used in the max year calculation consist of gross intake (withdrawals and purchases) minus any sales to other entities. Within this context, such values are referred to as net use. Similar to the demand projections for the 2021 Regional Water Plans and the 2022 State Water Plan, fresh surface water and groundwater were included in net use. Additionally, volumes of reuse water, such as treated effluent, and brackish groundwater used by manufacturing facilities were included in the historical water use estimates and the water demand projections. However, saline surface water was not included in draft projections. The full intake was included in the baseline (minus sales), not consumptive use. The planning horizon for the sixth planning cycle is 2030 – 2080 and the projected demands apply the 2010-2019 U.S. Census Bureau’s County Business Patterns (CBP)¹ statewide rate of change to project future water demands, as described below.

After draft projections (decades 2030 through 2080) for each region-county are provided to the Regional Water Planning Groups (RWPGs), the RWPGs may request alterations to the draft projections, subject to adequate justification, documentation, and EA approval per guidance in *Exhibit C: General Guidelines for Development of the 2026 Regional Water Plans*.

Key changes from the previous projection methodology:

Demands were projected linearly using County Business Patterns historical number of manufacturing establishments, rather than holding projected demands constant for the long-term planning horizon.

Baseline Manufacturing Water Demand Projections

Using the highest water use year (2015 – 2019), the reported facility water use volumes were subtotaled by region and county. This max year amount, plus the calculated unaccounted water use as described below, is the baseline for the projections. Because the WUS focuses on the major water users within the manufacturing category, it may not capture all firms with significant water use. Given this, the baseline water demand was adjusted to add potential non-surveyed water use, i.e. unaccounted water use. This latter value was determined using a combination of the CBP and WUS data. The CBP provides the number of firms within various number of employee categories for nine manufacturing sectors statewide. This data was used to determine the potential number and size of missing firms from the WUS. Once the number of firms for possible addition was determined, an average water use per firm value, which is based on the 2019 WUS, was assigned for each manufacturing sector and firm size. The average water use value was multiplied by the potential number of missing firms in each NAICS sector to determine the statewide unaccounted water use. The unaccounted water use by NAICS was then

¹ <https://www.census.gov/programs-surveys/cbp/data/datasets.html>

distributed to each county based on percentage of number of employees estimated from the 2019 CBP data.

As an example, the historical manufacturing water use (intake minus sales) plus the calculated unaccounted water use in Hays County, is displayed as Baseline Water Demand in Table 1.

Table 1. Historical manufacturing water use for Hays County, TWDB water use survey

		Net Use Summary from Water Use Survey (acre-feet per year)							
Region	County	2015	2016	2017	2018	2019	Highest County Use (2015)	Unaccounted water use	Baseline Water Demand
K	Hays	134	106	119	119	131	134	+31	165
L	Hays	45	36	32	35	31	45	+7	52
	Total	179	142	151	154	162	179		217

Near-term (2030) Draft Projection Methodology

Once the baseline volume was established, the draft projections were developed using a statewide production growth proxy representing consistent incremental change to ensure the accommodation of potential near-term economic and manufacturing sector production growth. Since the first projected decade (2030) of the full planning horizon (2030 – 2080) is more than ten years from the baseline water use data, the statewide annual historical water use rate of change from 2010 - 2019 was chosen as the proxy to adjust the baseline value to the initial year of projections value (2030). This is to account for potential changes in production and water use that may occur between the baseline water use value and the first projected decade. Examples of how the near-term water use proxy (associated with manufacturing production growth) for annual rate of water use change is applied to baseline water use are in Table 2.

Table 2. Baseline water use and 2030 projections

Region	County	Baseline (acft)	WUS Average Annual Rate of Change (production growth proxy delta)	2030 (acft)
H	BRAZORIA	217,737	0.96%	238,640
D	CASS	32,985	0.96%	36,152
C	DALLAS	18,420	0.96%	20,188
K	HAYS	165	0.96%	181
L	HAYS	52	0.96%	57
G	MCLENNAN	4,166	0.96%	4,566
A	POTTER	8,272	0.96%	9,066

Long-term (2040 - 2080) Draft Projection Methodology

For each planning decade after 2030, a statewide manufacturing growth proxy was applied annually to project increases in manufacturing water demands. For the 2026 Regional Water Plans and the 2027 State Water Plan, the growth proxy was based on the CBP historical number of establishments in the manufacturing sector from 2010-2019 (Table 3). The statewide rate of change was applied to all region-county projections for each decade following 2030 (Table 4).

Table 3. Region-County 2030 projections multiplied by the CBP annual growth rate to project 2040 demands

Region	County	2030 (acft)	CBP Historical Average Annual Rate of Change (economic proxy delta)	2040 (acft)
H	BRAZORIA	238,640	0.37%	247,470
D	CASS	36,152	0.37%	37,490
C	DALLAS	20,188	0.37%	20,935
K	HAYS	181	0.37%	188
L	HAYS	57	0.37%	59
G	MCLENNAN	4,566	0.37%	4,735
A	POTTER	9,066	0.37%	9,401

Table 4. Region-County manufacturing water demand projections (acft)

Region	County	2030	2040	2050	2060	2070	2080
H	BRAZORIA	238,640	247,470	256,626	266,121	275,967	286,178
D	CASS	36,152	37,490	38,877	40,315	41,807	43,354
C	DALLAS	20,188	20,935	21,710	22,513	23,346	24,210
K	HAYS	181	188	195	202	209	217
L	HAYS	57	59	61	63	65	67
G	MCLENNAN	4,566	4,735	4,910	5,092	5,280	5,475
A	POTTER	9,066	9,401	9,749	10,110	10,484	10,872

In order to address changes in the manufacturing industry and any changes in water use patterns, the draft manufacturing water demands are re-estimated as part of each 5-year planning cycle. As with any methodology applied statewide, there may be specific cases for which modifications to this general methodology are warranted. In such cases, TWDB staff may modify the methodology as necessary while being consistent with the original intent.

Major Assumptions

- Baseline considered to be the highest single-year region-county manufacturing water use in the most recent five years of aggregated data (2015 through 2019).
- Historical TWDB annual water use estimates do not capture all manufacturing facilities in Texas, therefore, estimated water use is adjusted using CBP establishment and employee data, and added to the baseline.
- A statewide manufacturing water use growth proxy, including 2010-2019 historical water use estimates and 2010-2019 CBP number of manufacturing establishments, are used to project manufacturing water demands to ensure the accommodation of potential economic and manufacturing sector production growth.

Key Data Sources

Links to the key data sources in developing the projections:

1. Historical water use (county):

https://www3.twdb.texas.gov/apps/reports/WU/SumFinal_CountyReportWithReuse

2. 2021 RWP Projections (county):

https://www3.twdb.texas.gov/apps/reports/Projections/2022%20Reports/demand_county

3. U.S. Census Bureau's County Business Pattern Data:

<https://www.census.gov/programs-surveys/cbp.html>

Steam-Electric Water Demand Projections Methodology for the 2026 Regional and 2027 State Water Plans

Methodology Summary

The draft steam-electric power water demand projections for each region-county were developed based upon:

- 1) The highest single-year county water use from within the most recent five years of data for steam-electric power water users from the annual water use survey (WUS),
- 2) Near-term additions and retirements of generating facilities, and
- 3) Holding the projected water demand volume constant through 2080.

Draft projections (decades 2030 through 2080) for each region-county are provided to the Regional Water Planning Groups (RWPGs), and the RWPGs may request alterations to the draft projections, subject to adequate documentation, justification, and EA approval per guidance in *Exhibit C: General Guidelines for Development of the 2026 Regional Water Plans*.

Key changes from the previous planning cycle's projection methodology: None

Historical Steam-Electric Power Water Use

The TWDB conducts an annual WUS of power-generating facilities throughout the state to estimate the volume of water *consumed* for generating steam-electric power. The water use volumes in the water planning process include volumes consumed by operable power generation facilities that sell power on the open market and also exclude facilities which the RWPGs have requested to be included with manufacturing estimates. The water use estimates are composed of the reported intake volume of self-supplied groundwater, water purchased from a provider, and/or water withdrawn from a surface water source and not returned to the source. The volume of water withdrawn from a surface water source and not returned is referred to as consumptive use. Additionally, reuse volumes, such as treated effluent, were included in the historical water use intake estimates and water demand projections. Any water sales from the surveyed facility to other entities are subtracted from the intake volume.

If any known power generation facility was not surveyed in the TWDB's annual WUS, then that facility's water use was obtained from the operator or estimated using average water use per kilowatt-hour output for the associated fuel-type and added to the historical highest water use for that county.

Facility Review

The U.S. Energy Information Administration (EIA) releases an annual database called EIA-860, which includes data about power generating facilities and infrastructure across the nation. Each year, TWDB staff review data from the EIA-860 tables for new operational facilities meeting the specifications for a WUS.

In preparation for the water demand projections for the 2027 State Water Plan (SWP), staff thoroughly reviewed attribute data for steam-electric facilities, including location and NAICS classification, developed a list of active facilities to be included in the projections, and identified any facilities scheduled to come online within the planning horizon. Staff also acquired a list of facilities included in the 2022 SWP steam-electric power water demand projections, along with revision comments from the RWPGs. All facilities from the 2019 EIA-860 database, 2022 SWP projections, and any additional power generating facilities reporting use to the WUS between 2015-2019, were compiled and reviewed for inclusion in the draft water use baseline.

Some facilities were removed from the baseline estimates based on the following criteria:

- Facilities with confirmed retirement: any facility which was listed as retired in the 2019 EIA-860 database **and** reporting 0 use to the WUS by 2019.
- Manufacturing power facilities: facilities which were confirmed to have water use in a manufacturing survey or which the RWPG requested to be removed from 2022 SWP projections.

Near-term (2030) Draft Projection Methodology

Region-county baseline estimates were established using water use data from the final facility list created. Historical water use for 2015-2019 from the WUS for each facility was then aggregated by county and region. The highest year for each region-county was considered as the baseline water use. If a facility within the county retired between 2015-2019, then the baseline was re-estimated as the highest year for non-retired facilities.

For the near-term projected decade (2030), proposed or existing, *non-surveyed* facilities identified in the EIA-860 reports or from other sources, staff estimated the anticipated annual water use based upon their fuel type, generation capacity, average water use per fuel type, and average operational time. For proposed facilities, the estimated water use was added to the corresponding online decade. The average water use per kilowatt hour assumed for those soon to be online facilities was based on water demand factors presented in the TWDB contracted study “Evaluation of Water Projection Methodologies & Options for Agency Consideration” (Table 1).¹ The average percentage of operation time for near-term future facilities is based upon the historical equivalent forced outage rates (Table 2), noted in a year 2016 study funded by the TWDB.² Data within that study was based upon historical reports from the Electric Reliability Council of Texas (ERCOT).

Table 1 Water use factors by fuel type in Texas, 2010

Fuel Type ^a	Facility Count	Net Generation (TWh ^b)	Volume Consumed (kaf ^c)	Gallons per KWh ^d
Coal	38	150.7	248.4	0.53
Natural Gas	65	109.3	94.7	0.28
Nuclear	4	41.3	59	0.46

¹ “Evaluation of Water Projection Methodologies & Options for Agency Consideration”, CDM Smith, TWDBContract 1600011921, Table 4-7, page 4-20

² Evaluation of Water Demand Projection Methodologies & Options for Agency Consideration, CDM Smith inconjunction with the University of Texas, Bureau of Economic Geology, 2016, page 4-20, Table 4-7.

^aIncludes steam turbine and combined cycle generator technology and once-through and tower cooling systems. Cogeneration is not included in this analysis.

^bTerawatt hour

^cThousand acre-feet of water

^dKilowatt hour

Table 2 Average percentage of operation time for near-term future facilities

Fuel and Generation Types	Average Percentage of Operation Time
Coal Steam Turbine	70%
Natural Gas Combined Cycle	59%
Natural Gas Steam Turbine	14%
Natural Gas Turbine	7%
Nuclear	85%

Long-term (2040 - 2080) Draft Projection Methodology

The baseline steam-electric power water demand projections include the highest region-county water use in the most recent five years of data plus the anticipated water use of new facilities as described above. Projections for the 2030-decade account for expected new facility construction for facilities proposed to come online between 2020 and 2030. For decades 2040 and beyond, the draft water demand projections are held constant at their year 2030 levels through 2080.

Major Assumptions

Such constant projections for planning purposes are considered reasonable for the following reasons:

- 1) Basing projections on the highest power generation water use of the most recent five years of data ensures that we are planning for water use that has already occurred in the recent past.
- 2) To model a projection of steam-electric power water use would require the inclusion of a multitude of potential water-use drivers – each with an individual probability of occurring and level of impact – including, but not limited to the following: the facility replacement schedule, anticipation of generation efficiency and cooling systems, carbon capture activities, cost of various fuels and federal environmental/regulatory policies. Such an effort is resource prohibitive and, due to many assumptions regarding uncertain future outcomes and events that would be required, would not guarantee results in water use estimates that are demonstrably more probable than those generated by the methodology used.
- 3) The projected general increase in wind and solar generation capacity off-sets the necessity to run water-consuming power facilities and may thereby not increase the overall amount of water required to meet future power demands.
- 4) While water-consuming coal, oil, and natural gas facilities will still be required in the future, any such facilities replacing an older facility are expected to be more water efficient, either using less

water or producing more power with a similar volume of water that had already been required at the same facility site.

- 5) Any assumed increase in water demand from fossil fuel facilities between 2040 and 2080 would require a distribution of additional water use to the county level. Based on discussions with power generating company contacts, distributing to the county-level is a difficult exercise, as the locations of new facilities not listed in governmental reports cannot be identified or otherwise predicted. To distribute anticipated additional water use to counties with existing facilities will result in over-projections in most counties and under-projection in others.
- 6) The steam-electric power water demand projections will be updated with each planning cycle with the most recent data.

In order to address changes in the power generation industry and any changes in water use patterns, the draft steam-electric power water demands are re-estimated as part of each 5-year planning cycle. As with any methodology applied statewide, there may be specific cases for which for which modifications to this general methodology are warranted. In such cases, TWDB staff may adjust the methodology as necessary while being consistent with the original intent.

Key Data Sources

Links to the key data sources in developing the projections:

1. Historical water use (county):

https://www3.twdb.texas.gov/apps/reports/WU/SumFinal_CountyReportWithReuse

2. 2021 RWP Projections (county):

https://www3.twdb.texas.gov/apps/reports/Projections/2022%20Reports/demand_county

3. U.S. Energy Information Administration Form EIA-860:

<https://www.eia.gov/electricity/data/eia860/>

Agenda Item 7

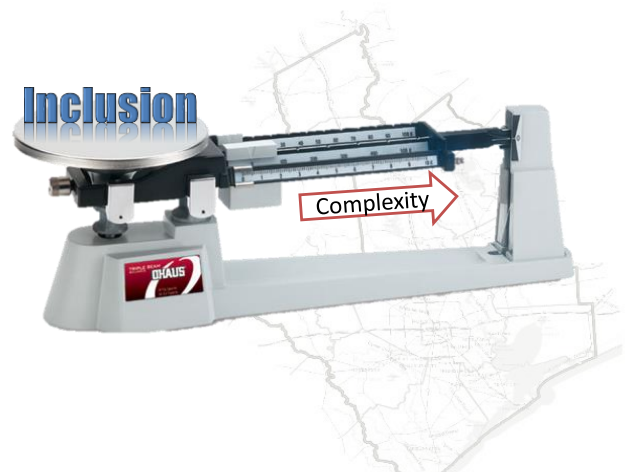
Receive presentation on identification of Major Water Providers for Region H and consider recommendations to the Region H Planning Group.

Agenda Item 7 Major Water Providers

- Key significance to Region's supplies
- Determined by RWPG
- Not necessarily just old MWP list
- Used in select Plan and Database summaries

Agenda Item 7 Major Water Providers

- Supply volume most viable metric
- More than single year sales
- Not just existing contracts
- Legacy MWPs and municipal WUGs
 - 2021 RWP data
 - Post-WMS self-supply and transfers
- New municipal WUGs
 - Draft projections
 - Maximum demand
- Look for break points



Agenda Item 7 Major Water Providers

Range (ac-ft)	Entity	Type
100,000 (11 MWP)	Houston	WUG
	Gulf Coast Water Authority	WWP
	Trinity River Authority	WWP
	San Jacinto River Authority	WWP
	Dow Inc	WWP
	Brazos River Authority	WWP
	North Harris County Regional Water Authority	WUG
	NRG	WWP
	West Harris County Regional Water Authority	WUG
	North Fort Bend Water Authority	WUG
	Lower Neches Valley Authority	WWP

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Agenda Item 7 Major Water Providers

Range (ac-ft)	Entity	Type
40,000 (18 MWP)	Pearland	WUG
	Pasadena	WUG
	Sugar Land	WUG
	Sienna Plantation	WUG
	League City	WUG
	The Woodlands	WUG
	Chambers-Liberty Counties Navigation District	WWP
35,000 (20 MWP)	Galveston	WUG
	Huntsville	WUG
30,000 (23 MWP)	Missouri City	WUG
	Brazosport Water Authority	WWP
	Quadvest	WUG

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Major Water Providers

Range (ac-ft)	Entity	Type
25,000 (26 MWP)	Conroe	WUG
	Clear Lake City Water Authority	WUG
	Texas City	WUG
15,000 (32 MWP)	Mont Belvieu	WUG
	Fort Bend County WCID 2	WUG
	Katy	WUG
	Baytown Area Water Authority	WWP
	Baytown	WUG
	Friendswood	WUG
10,000 (36 MWP)	North Channel Water Authority	WUG
	Rosenberg	WUG
	Central Harris County Regional Water Authority	WUG
	Lake Jackson	WUG

