

# Texana Groundwater Conservation District

## Annual Report of the District

Fiscal Year 2020 – 2021  
October 1, 2020 to September 30, 2021

Adopted: April 21, 2022

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### Section 1 - Review of management goals, objectives and performance standards of the District.

The Management Plan of the District, as revised on May 17, 2018, specifies the method for tracking progress in achieving the goals of the District. The management plans states "staff of the DISTRICT will prepare and present an annual report to the Texana Groundwater Conservation Board of Directors regarding the DISTRICT's performance in achieving management goals and objectives for the fiscal year. The report will be presented within 120 days following the completion of the DISTRICT's fiscal year. The DISTRICT will maintain the report on file for public inspection at the District's offices upon adoption at a meeting of the Texana Groundwater Conservation Board of Directors."

Based on the review of the activities and projects of the Texana Groundwater Conservation District Management Plan between October 1, 2020 and September 30, 2021, the District has determined that all of the goals and associated objectives have been fully achieved the fiscal year ending September 30, 2021.

#### **Goal 1: Providing the most efficient use of groundwater – TWC §36.1071(a)(1) and 31 TAC 356.52(a)(1)(A)**

**Objective 1:** Develop and maintain a water well registration program for tracking well information for wells within Jackson County.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the changes related to water well registration including the number of non-grandfathered and grandfathered wells registered.

The District provided for the efficient use of groundwater by maintaining a water well registration program for tracking well information for wells within Jackson County. The District registered 39 non-grandfathered wells and 10 grandfathered wells during the fiscal year.

**Achievement Level: FULL**

**Objective 2:** Develop and maintain a water well permitting program for processing and tracking all permits authorizing groundwater production.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the changes related to water well permitting including the number of new applications and the disposition of the applications.

The District provided for the efficient use of groundwater by maintaining a water well permitting program for processing and tracking all permits authorizing groundwater production within Jackson County.

The District received 21 requests for production permits during the fiscal year; the District received 2 requests to amend existing production permits during the fiscal year; the District received 2 requests for production permit renewal during the fiscal year; the District issued 19 production permits during the fiscal year; the District issued 6 production permit amendments during the fiscal year; and the District issued 3 production permit renewals during the fiscal year.

The total volume of permitted groundwater production for the permits totals 140,364.37 acre-feet per year for non-aggregate production permits. The total volume of permitted groundwater production for the permits totals 25,868.03 acre-feet per year for aggregate production permits. (Note: volumes of groundwater production authorized under aggregate production permits and volumes of groundwater production authorized under non-aggregate production permits are not necessarily mutually exclusive.)

**Achievement Level: FULL**

**Goal 2: Controlling and preventing waste of groundwater** – TWC §36.1071(a)(2) and 31 TAC 356.52(a)(1)(B)

**Objective 1:** Develop and maintain a water well inspection program for non-exempt wells.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the findings of the inspection activities including information regarding the number of wells that require improvement to control or prevent waste of groundwater.

The District addressed controlling and preventing waste of groundwater by maintaining a water well inspection program during the fiscal year. The District has performed 25 well inspections during the fiscal year. Of those wells inspected, none of wells require improvement to control or prevent waste of groundwater.

The District issued 68 Notices of Intent to Place Casing Receipts (NIPCRs) and observed casing placement for 5 wells.

**Achievement Level: FULL**

**Goal 3: Addressing conjunctive surface water management issues** – TWC §36.1071(a)(4) and 31 TAC 356.52(a)(1)(D)

**Objective 1:** Participate in the regional water planning process by attending at least one Lavaca Regional Water Planning Group (Region P) meeting per year.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the representatives of the DISTRICT, dates, and the number of meetings of the Lavaca Regional Water Planning Group attended.

The District addressed conjunctive surface water management issues by, through the attendance of meetings by district directors, participating in the regional water planning process by attending at least one Lavaca Regional Water Planning Group (Region P) meeting during the fiscal year. Mr. Skalicky, Director and Board President, attended a meeting of the Lavaca Regional Water Planning Group (Region P) on October 19, 2020.

**Achievement Level: FULL**

**Goal 4: Addressing natural resource issues which impact the use and availability of groundwater, and which are impacted by the use of groundwater** – TWC §36.1071(a)(5) and 31 TAC §356.52(a)(1)(E)

**Objective 1:** Develop and maintain a water quality monitoring program.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the monitoring activities including the number of wells monitored and the year-to-year change of water quality.

The District addressed natural resource issues which impact the use and availability of groundwater by maintaining a water quality monitoring program during the fiscal year. The District processed 91 separate water quality field measurements and 11 water quality lab measurements in the fiscal year. The District continues to collect valuable aquifer measurement to support the future assessment of water quality change on a county-wide basis.

The District maintained a continuous aquifer monitoring program in connection with waiver WV-20191219-01. The data collected during the fiscal year indicates that the water quality at the site, measured as conductivity, had significantly declined. The average conductivity measured in the East - Lower Fresh Designated Aquifer Monitoring Well increased from a low of 1,880  $\mu\text{S}/\text{cm}$  in December 2020 to a high of 2,945  $\mu\text{S}/\text{cm}$  in September 2021. In accordance with the provisions of waiver WV-20191219-01, groundwater production curtailed in response to the change in water quality.

The District collected field measurements for total dissolved solids from 14 wells during year 2021. The average total dissolved solids field measurement in year 2020 was 3.602 g/L. The average total dissolved solids field measurement in year 2021 was 1.658 g/L. The change in total dissolved solids in wells measured in year 2020 and wells measured in year 2021 was -1,654 g/L. The change in total dissolved solids in wells measured in year 2020 and year 2021 was -0.172 g/L.

**Achievement Level: FULL**

**Goal 5: Addressing drought conditions** – TWC §36.1071(a)(6) and 31 TAC 356.52(a)(1)(F)

**Objective 1:** Collect and review drought condition information related to Jackson County and the surrounding region of Texas.

**Performance Standard:** Each year, the District will summarize within the annual report the drought condition information collected and reviewed.

The District addressed drought conditions by collecting and reviewing drought condition information related to Jackson County and the surrounding region of Texas by considering drought monitoring index information during meetings of the Board of Directors during the fiscal year. Drought condition information was reviewed at the meetings held on the following dates: January 21, 2021; March 15, 2021; May 20, 2021; July 15, 2021; and September 23, 2021.

**Achievement Level: FULL**

**Goal 6: Addressing conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control, where appropriate and cost-effective** – TWC §36.1071(a)(7) and 31 TAC 356.52(a)(1)(G)

**Objective 1:** Promote conservation, rainwater harvesting or brush control within Jackson County.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the activities directly related to conservation, rainwater harvesting or brush control including participation in scientific investigations and studies, educational materials developed and delivered to local schools, cooperative educational contributions and grants, public speaking events and presentations, community event participation, and educational publications.

The District addressed and promoted conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control by updating the website of the District to include links to resources promoting rainwater harvesting, efficient use of groundwater, conjunctive use, subsidence prevention, brush management, and recharge enhancement.

**Achievement Level: FULL**

**Goal 7: Addressing the desired future conditions adopted by the district under Section 36.108** – TWC §36.1071(a)(8) and 31 TAC 356.52(a)(1)(H)

**Objective 1:** Develop and maintain a water level monitoring program.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the water level monitoring activities including the number of wells monitored and the year-to-year change of water level.

The District addressed the desired future conditions adopted by the District by maintaining a water level monitoring program during the fiscal year. The District collected 121 water level measurements from water wells during the fiscal year.

Based on the data collected for water levels within the District, the water levels appear to have increased with a decrease of 1.5 feet in depth to water in wells measured in year 2020 to well measured in year 2021. The change in depth to water level for wells measured in year 2020 and year 2021 is -1.22 feet (i.e., a recovery of water levels).

**Achievement Level: FULL**

**Objective 2:** Analyze water level monitoring information to evaluate water level trends and determine the degree to which the DISTRICT is complying with the desired future conditions of Gulf Coast Aquifer in Jackson County.

**Performance Standard:** Each year, the DISTRICT will summarize within the annual report the water level trends and the conclusions regarding the DISTRICT's compliance with the desired future condition of the Gulf Coast Aquifer in Jackson County.

The water level data collected by the District does not indicate that the Desired Future Condition of the Gulf Coast Aquifer is not being achieved. The comparison of year 2000 water level measurements to 2020 water level measurements, conducted by Intera, Inc., indicates a water levels have recovered by approximately of 2.5 feet in the depth to water from year 2000 to year 2020.

**Achievement Level: FULL**

# Texana Groundwater Conservation District

## Annual Report of the District

Fiscal Year 2020 – 2021

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### Section 2 - Evidence of Achievement

**Goal 1: Providing the most efficient use of groundwater** – TWC §36.1071(a)(1) and 31 TAC 356.52(a)(1)(A)

**Objective 1:** Develop and maintain a water well registration program for tracking well information for wells within Jackson County.

**Evidence of Achievement:** Water Well Registration Certificates created during FY2021.

Last Well Registration Certificates Created in FY2020

1. [TGCD - GMa - Pe - Well Registration Certificates - WRC - NW-00515 - 20200904](#)
2. [TGCD - GMa - Pe - Well Registration Certificates - WRC - GW-00557 - 20200812](#)

Last Well Registration Certificates Created in FY2021

1. [TGCD - GMa - Pe - Well Registration Certificates - WRC - NW-00554 - 20210720](#)
2. [TGCD - GMa - Pe - Well Registration Certificates - WRC - GW-00567 - 20210823](#)

**Objective 2:** Develop and maintain a water well permitting program for processing and tracking all permits authorizing groundwater production.

**Evidence of Achievement:** Production permit requests received in FY2021.

1. [TGCD - GMa - PR - Production Permit Requests - AOW-20201008-01 - Robert McCurdy, II - Administratively Complete](#)
2. [TGCD - GMa - PR - Production Permit Requests - AOW-20201008-02 - Robert McCurdy, II - Administratively Complete](#)
3. [TGCD - GMa - PR - Production Permit Requests - AOW-20201008-03 - Robert McCurdy, II - Administratively Complete](#)
4. [TGCD - GMa - PR - Production Permit Requests - AOW-20201008-04 - Robert McCurdy, II - Administratively Complete](#)
5. [TGCD - GMa - PR - Production Permit Requests - AOW-20201008-05 - Robert McCurdy, II - Administratively Complete](#)
6. [TGCD - GMa - PR - Production Permit Requests - AOW-20201012-01 - Russell K. Ring - Administratively Complete](#)
7. [TGCD - GMa - PR - Production Permit Requests - AOW-20201028-02 - MS Henke Family Limited Partnership - Administratively Complete](#)
8. [TGCD - GMa - PR - Production Permit Requests - AOW-20201106-02 - HMC Land Trust - Administratively Complete](#)
9. [TGCD - GMa - PR - Production Permit Requests - AOW-20201124-02 - Koge TX, LLC - Administratively Complete](#)

10. [TGCD - GMa - PR - Production Permit Requests - AOW-20201202-01 - M.S. Henke Family Limited Partnership - Administratively Complete](#)
11. [TGCD - GMa - PR - Production Permit Requests - AOW-20201228-01 - Wraxall Holdings, LP - Administratively Complete](#)
12. [TGCD - GMa - PR - Production Permit Requests - AVW-20201020-03 - HMC Land Trust - Administratively Complete](#)
13. [TGCD - GMa - PR - Production Permit Requests - AOW-20210225-02 - Rolando and Maria Salazar. - Administratively Incomplete](#)
14. [TGCD - GMa - PR - Production Permit Requests - AOW-20210318-01 - Ernest F. Roth - Administratively Complete](#)
15. [TGCD - GMa - PR - Production Permit Requests - AOW-20210510-03 - Frances Byrne - Administratively Complete](#)
16. [TGCD - GMa - PR - Production Permit Requests - AOW-20210512-02 - Punta de Vista, LLC - Administratively Complete](#)
17. [TGCD - GMa - PR - Production Permit Requests - AOW-20210618-02 - Black Sheep Ag. LLC - Administratively Complete](#)
18. [TGCD - GMa - PR - Production Permit Requests - AOW-20210816-02 - La Ward Lodging and RV Park LLC - Administratively Complete](#)
19. [TGCD - GMa - PR - Production Permit Requests - AOW-20210817-03- Lavaca-Navidad River Authority - Administratively Complete](#)
20. [TGCD - GMa - PR - Production Permit Requests - AOW-20210831-02 - Julie K. and Donnie J. Mercer - Administratively Complete](#)
21. [TGCD - GMa - PR - Production Permit Requests - AOW-20210901-01 - Serenity RV Resort LP - Administratively Complete](#)

**Evidence of Achievement:** Production permit amendment requests received in FY2021.

1. [TGCD - GMa - PR - Amend Permit or Certificate Requests - AAPC-20210824-01 - Serenity RV Resort - OPW-20170306-02/NW-000422 - Administratively Complete](#)
2. [TGCD - GMa - PR - Amend Permit or Certificate Requests - AAPC-20210826-01 - Tommy Lee Hoyt Estate Trust, Rogers Hoyt, Jr. Individual and Trustee - VPW-20170420-01/VPW-20170420-05-09/GW-00295/GW-00369-GW-00373 - Administratively Complete](#)

**Evidence of Achievement:** Production permit renewal requests received in FY2021.

1. [TGCD - GMa - PR - Production Permit Renewal Requests - ARPP-20210422-01 - OPW-20170424-02 - Kinder Morgan Tejas Pipeline, LLC - Administratively Complete](#)
2. [TGCD - GMa - PR - Production Permit Renewal Requests - ARPP-20210525-01 - OPW-20180925-01 - Tennessee Gas Pipeline Company, LLC - Administratively Complete](#)

**Evidence of Achievement:** Production permits approved in FY2021.

1. [TGCD - GMa - Pe - Production Permits - OPW-20201125-02 - HMC Land Trust - Executed](#)
2. [TGCD - GMa - Pe - Production Permits - OPW-20210115-01 - Koge Tx, LLC - Executed](#)
3. [TGCD - GMa - Pe - Production Permits - OPW-20210121-01 - Dugger Family Limited Partnership - Approved](#)
4. [TGCD - GMa - Pe - Production Permits - OPW-20210121-02 - Russell K. Ring - Approved/Executed](#)
5. [TGCD - GMa - Pe - Production Permits - OPW-20210121-04 - M.S. Henke Family Limited Partnership - Executed](#)
6. [TGCD - GMa - Pe - Production Permits - OPW-20210121-05 - Robert McCurdy, II - Executed](#)
7. [TGCD - GMa - Pe - Production Permits - OPW-20210121-06 - Robert McCurdy, II - Executed](#)
8. [TGCD - GMa - Pe - Production Permits - OPW-20210121-07 - Robert McCurdy, II - Executed](#)

9. [TGCD - GMa - Pe - Production Permits - OPW-20210121-08 - Robert McCurdy, II - Executed](#)
10. [TGCD - GMa - Pe - Production Permits - OPW-20210121-09 - Robert McCurdy, II - Executed](#)
11. [TGCD - GMa - Pe - Production Permits - OPW-20210121-10 - Wraxall Holdings, LP - Approved](#)
12. [TGCD - GMa - Pe - Production Permits - OPW-20210415-01 - Ernest F. Roth - Executed](#)
13. [TGCD - GMa - Pe - Production Permits - OPW-20210601-02 - Frances Byrne - Executed](#)
14. [TGCD - GMa - Pe - Production Permits - OPW-20210715-01 - Punta de Vista, LLC - Executed](#)
15. [TGCD - GMa - Pe - Production Permits - OPW-20210715-02 - Black Sheep Ag LLC - Approved](#)
16. [TGCD - GMa - Pe - Production Permits - OPW-20210927-01 - La Ward Lodging and RV Park, LLC - Approved/Unexecuted](#)
17. [TGCD - GMa - Pe - Production Permits - OPW-20210929-02 - Lavaca-Navidad River Authority - Approved](#)
18. [TGCD - GMa - Pe - Production Permits - OPW-20210929-03 - Julie K. and Donnie J. Mercer - Approved](#)
19. [TGCD - GMa - Pe - Production Permits - VPW-20210121-03 - HMC Land Trust - Executed](#)

**Evidence of Achievement:** Production permits amendments approved in FY2021.

1. [TGCD - GMa - Pe - Production Permits - PPA-20210916-01 - Tommy Lee Hoyt Estate Trust, Rogers Hoyt, Jr., Individual and Trustee - Approved/Unexecuted](#)
2. [TGCD - GMa - Pe - Production Permits - PPA-20210916-02 - Tommy Lee Hoyt Estate Trust, Rogers Hoyt, Jr., Individual and Trustee - Approved/Unexecuted](#)
3. [TGCD - GMa - Pe - Production Permits - PPA-20210916-03 - Tommy Lee Hoyt Estate Trust, Rogers Hoyt, Jr., Individual and Trustee - Approved/Unexecuted](#)
4. [TGCD - GMa - Pe - Production Permits - PPA-20210916-04 - Tommy Lee Hoyt Estate Trust, Rogers Hoyt, Jr., Individual and Trustee - Approved/Unexecuted](#)
5. [TGCD - GMa - Pe - Production Permits - PPA-20210916-05 - Tommy Lee Hoyt Estate Trust, Rogers Hoyt, Jr., Individual and Trustee - Approved/Unexecuted](#)
6. [TGCD - GMa - Pe - Production Permits - PPA-20210916-06 - Tommy Lee Hoyt Estate Trust, Rogers Hoyt, Jr., Individual and Trustee - Approved/Unexecuted](#)

**Evidence of Achievement:** Production permits renewals approved in FY2021.

1. [TGCD - GMa - Pe - Production Permit Renewal - OPWR-20210715-03 - OPW-20170424-02 - Kinder Morgan Tejas Pipeline, LLC - Approved/Unexecuted](#)
2. [TGCD - GMa - Pe - Production Permit Renewal - OPWR-20210715-04 - OPW-20180925-01 - Tennessee Gas Pipeline Company, LLC - Executed](#)
3. [TGCD - GMa - Pe - Production Permit Renewal - OPWR-20210819-01 - OPW-20170515-01 - Vanderbilt Farmers Co-op, Inc - Approved/Unexecuted](#)

**Goal 2: Controlling and preventing waste of groundwater– TWC §36.1071(a)(2) and 31 TAC 356.52(a)(1)(B)**

**Objective 1:** Develop and maintain a water well inspection program for non-exempt wells.

**Evidence of Achievement:** Well Inspections completed in FY2021.

1. [TGCD - GP - Insp - Well Inspections - WIF-20201102-01 - East UB-DAMW - NW-00487](#)
2. [TGCD - GP - Insp - Well Inspections - WIF-20201102-02 - East LF-DAMW - NW-00488](#)
3. [TGCD - GP - Insp - Well Inspections - WIF-20201102-03 - Center UB-DAMW - NW-00489](#)
4. [TGCD - GP - Insp - Well Inspections - WIF-20201102-04 - Center LF-DAMW - NW-00490](#)

5. [TGCD - GP - Insp - Well Inspections - WIF-20201102-05 - West UB-DAMW - NW-00491](#)
6. [TGCD - GP - Insp - Well Inspections - WIF-20201102-06 - West LF-DAMW - NW-00492](#)
7. [TGCD - GP - Insp - Well Inspections - WIF-20210209-01 - Melissa Gonzales](#)
8. [TGCD - GP - Insp - Well Inspections - WIF-20210312-01 - NW-00195 - Front Well](#)
9. [TGCD - GP - Insp - Well Inspections - WIF-20210312-02 - NW-00310](#)
10. [TGCD - GP - Insp - Well Inspections - WIF-20210312-03 - GW-00278](#)
11. [TGCD - GP - Insp - Well Inspections - WIF-20210312-04 - GW-00244 - Silo Well](#)
12. [TGCD - GP - Insp - Well Inspections - WIF-20210315-01 - GW-00251 - Barn Well](#)
13. [TGCD - GP - Insp - Well Inspections - WIF-20210315-02 - GW-00247 - Cattle Well](#)
14. [TGCD - GP - Insp - Well Inspections - WIF-20210316-01 - NW-00451](#)
15. [TGCD - GP - Insp - Well Inspections - WIF-20210428-01 - NW-00529](#)
16. [TGCD - GP - Insp - Well Inspections - WIF-20210721-01 - GW-00166 - West Ranch Monitoring Project](#)
17. [TGCD - GP - Insp - Well Inspections - WIF-20210721-02 - GW-00169 - West Ranch Monitoring Project](#)
18. [TGCD - GP - Insp - Well Inspections - WIF-20210721-03 - GW-00159 - West Ranch Monitoring Project](#)
19. [TGCD - GP - Insp - Well Inspections - WIF-20210721-04 - GW-00162 - West Ranch Monitoring Project](#)
20. [TGCD - GP - Insp - Well Inspections - WIF-20210721-05 - GW-00140 - West Ranch Monitoring Project](#)
21. [TGCD - GP - Insp - Well Inspections - WIF-20210721-06 - GW-00161 - West Ranch Monitoring Project](#)
22. [TGCD - GP - Insp - Well Inspections - WIF-20210721-07 - GW-00158 - West Ranch Monitoring Project](#)
23. [TGCD - GP - Insp - Well Inspections - WIF-20210722-01 - GW-00338 - West Ranch Monitoring Project](#)
24. [TGCD - GP - Insp - Well Inspections - WIF-20210726-01 - GW-00157 - West Ranch Monitoring Project](#)
25. [TGCD - GP - Insp - Well Inspections - WIF-20210805-01 - GW-00030 - West Ranch Monitoring Project](#)

**Evidence of Achievement:** Notices of Intent to Place Casing (NIPCRs) issued in FY2021.

1. First NIPCR issued in the fiscal year: [TGCD - GP - Insp - Permitting Receipts - NIPCR-000306 - DP-20200817-01 - Shaun J. Garza - Inspected: No](#)
2. Last NIPCR issued in the fiscal year: [TGCD - GP - Insp - Permitting Receipts - NIPCR-000374 - DP-20210805-01 - Dan Martino - Inspected: No](#)

**Evidence of Achievement:** Notices of Intent to Place Casing (NIPCRs) issued in FY2021 and site visited.

1. [TGCD - GP - Insp - Permitting Receipts - NIPCR-000307 - DP-20200819-02 - Shane and Jill Sklar - Inspected: Yes](#)
2. [TGCD - GP - Insp - Permitting Receipts - NIPCR-000318 - DP-20201019-01 - Kyle and Marissa Stignani - Inspected: Yes](#)
3. [TGCD - GP - Insp - Permitting Receipts - NIPCR-000326 - DP-20200521-01 - Ekstrom Aquaculture, LLC - Inspected: Yes](#)
4. [TGCD - GP - Insp - Permitting Receipts - NIPCR-000359 - DP-20210115-01 - Lavaca-Navidad River Authority - Inspected: Yes](#)
5. [TGCD - GP - Insp - Permitting Receipts - NIPCR-000367 - DP-20210513-01 - Joe and Denise Chaney - Inspected: Yes](#)

### **Goal 3: Addressing conjunctive surface water management issues**



**Objective 1:** Participate in the regional water planning process by attending at least one Lavaca Regional Water Planning Group (Region P) meeting per year.

**Evidence of Achievement:** Minutes of Meetings of the Lavaca Regional Water Planning Group

Source: <http://lnra.org/water/lavaca-regional-water-planning-group>

Source: <https://www.lnra.org/meeting-minutes/>

TGCD- Lavaca RWPG - Meeting Minutes for October 19, 2020.pdf



**Goal 4: Addressing natural resource issues which impact the use and availability of groundwater, and which are impacted by the use of groundwater – TWC §36.1071(a)(5) and 31 TAC §356.52(a)(1)(E)**

**Objective 1:** Develop and maintain a water quality monitoring program.

**Evidence of Achievement:** Water Quality Field Measurements collected in FY2021.

1. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201001.0945 - East UB-DAMW - NW-00487](#)
2. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201001.0955 - East LF-DAMW - NW-00488](#)
3. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201001.1015 - Center UB-DAMW - NW-00489](#)
4. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201001.1025 - Center LF-DAMW - NW-00490](#)
5. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201001.1056 - West UB-DAMW - NW-00491](#)
6. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201001.1110 - West LF-DAMW - NW-00492](#)
7. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201102.0958 - East UB-DAMW - NW-00487](#)
8. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201102.1008 - East LF-DAMW - NW-00488](#)
9. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201102.1033 - Center UB-DAMW - NW-00489](#)
10. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201102.1046 - Center LF-DAMW - NW-00490](#)
11. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201102.1110 - West UB-DAMW - NW-00491](#)
12. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201102.1122 - West LF-DAMW - NW-00492](#)
13. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201201.0956 - East UB-DAMW - NW-00487](#)
14. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201201.1012 - East LF-DAMW - NW-00488](#)
15. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201201.1022 - Center UB-DAMW - NW-00489](#)
16. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201201.1044 - Center LF-DAMW - NW-00490](#)
17. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201201.1108 - West UB-DAMW - NW-00491](#)

18. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201201.1124 - West LF-DAMW - NW-00492](#)
19. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201230.0950 - East UB-DAMW - NW-00487](#)
20. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201230.1000 - East LF-DAMW - NW-00488](#)
21. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201230.1025 - Center UB-DAMW - NW-00489](#)
22. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201230.1036 - Center LF-DAMW - NW-00490](#)
23. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201230.1114 - West UB-DAMW - NW-00491](#)
24. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20201230.1125 - West LF-DAMW - NW-00492](#)
25. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210202.0950 - East UB-DAMW - NW-00487](#)
26. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210202.0959 - East LF-DAMW - NW-00488](#)
27. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210202.1018 - Center UB-DAMW - NW-00489](#)
28. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210202.1028 - Center LF-DAMW - NW-00490](#)
29. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210202.1050 - West UB-DAMW - NW-00491](#)
30. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210202.1105 - West LF-DAMW - NW-00492](#)
31. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210305.0955 - East UB-DAMW - NW-00487](#)
32. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210305.1010 - East LF-DAMW - NW-00488](#)
33. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210305.1030 - Center UB-DAMW - NW-00489](#)
34. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210305.1039 - Center LF-DAMW - NW-00490](#)
35. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210305.1059 - West UB-DAMW - NW-00491](#)
36. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210305.1110 - West LF-DAMW - NW-00492](#)
37. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210401.1008 - East UB-DAMW - NW-00487](#)
38. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210401.1019 - East LF-DAMW - NW-00488](#)
39. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210401.1044 - Center UB-DAMW - NW-00489](#)
40. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210401.1051 - Center LF-DAMW - NW-00490](#)
41. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210401.1120 - West UB-DAMW - NW-00491](#)
42. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210401.1130 - West LF-DAMW - NW-00492](#)
43. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210503.1010 - East UB-DAMW - NW-00487](#)
44. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210503.1020 - East LF-DAMW - NW-00488](#)
45. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210503.1041 - Center UB-DAMW - NW-00489](#)
46. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210503.1051 - Center LF-DAMW - NW-00490](#)

47. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210503.1112 - West UB-DAMW - NW-00491](#)
48. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210503.1121 - West LF-DAMW - NW-00492](#)
49. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210507.1050 - East LF-DAMW - NW-00488](#)
50. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210507.1050- East LF-DAMW - NW-00488](#)
51. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210507.1252 - East LF-DAMW - NW-00488](#)
52. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210601.1000 - East UB-DAMW - NW-00487](#)
53. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210601.1010 - East LF-DAMW - NW-00488](#)
54. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210601.1034 - Center UB-DAMW - NW-00489](#)
55. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210601.1046 - Center LF-DAMW - NW-00490](#)
56. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210601.1112 - West UB-DAMW - NW-00491](#)
57. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210601.1124 - West LF-DAMW - NW-00492](#)
58. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210701.0948 - East UB-DAMW - NW-00487](#)
59. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210701.0958 - East LF-DAMW - NW-00488](#)
60. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210701.1025 - Center UB-DAMW - NW-00489](#)
61. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210701.1035 - Center LF-DAMW - NW-00490](#)
62. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210701.1059 - West UB-DAMW - NW-00491](#)
63. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210701.1109 - West LF-DAMW - NW-00492](#)
64. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210721.0932 - GW-00166 - West Ranch Monitoring Project](#)
65. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210721.0959 - GW-00169 - West Ranch Monitoring Project](#)
66. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210721.1039 - GW-00159 - West Ranch Monitoring Project](#)
67. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210721.1111 - GW-00162 - West Ranch Monitoring Project](#)
68. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210721.1141 - GW-00140 - West Ranch Monitoring Project](#)
69. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210721.1212 - GW-00161 - West Ranch Monitoring Project](#)
70. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210721.1237 - GW-00158 - West Ranch Monitoring Project](#)
71. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210722.1028 - GW-00566](#)
72. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210722.1156 - GW-00338 - West Ranch Monitoring Project](#)
73. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210726.1340 - GW-00157 - West Ranch Monitoring Project](#)
74. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210802.0950 - East UB-DAMW - NW-00487](#)
75. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210802.1001 - East LF-DAMW - NW-00488](#)

76. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210802.1024 - Center UB-DAMW - NW-00489](#)
77. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210802.1032 - Center LF-DAMW - NW-00490](#)
78. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210802.1101 - West UB-DAMW - NW-00491](#)
79. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210802.1115 - West LF-DAMW - NW-00492](#)
80. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210805.1205 - GW-00030 - West Ranch Monitoring Project](#)
81. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210816.1117 - GW-00562](#)
82. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210816.1145 - GW-00090](#)
83. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210816.1237 - NW-00451](#)
84. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210816.1332 - GW-00566](#)
85. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210817.1324 - GW-00251](#)
86. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210901.0950 - East UB-DAMW - NW-00487](#)
87. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210901.1001 - East LF-DAMW - NW-00488](#)
88. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210901.1024 - Center UB-DAMW - NW-00489](#)
89. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210901.1032 - Center LF-DAMW - NW-00490](#)
90. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210901.1101 - West UB-DAMW - NW-00491](#)
91. [TGCD - GMo - Mea - Water Quality Field Measurement - WQFM-20210901.1115 - West LF-DAMW - NW-00492](#)

**Evidence of Achievement:** Water Quality Lab Reports received in FY2021.

1. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210507.0100 - East LF-DAMW - NW-00488](#)
2. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210721.0950 - GW-00166 - West Ranch Monitoring Project](#)
3. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210721.1017 - GW-00169 - West Ranch Monitoring Project](#)
4. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210721.1056 - GW-00159 - West Ranch Monitoring Project](#)
5. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210721.1129 - GW-00162 - West Ranch Monitoring Project](#)
6. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210721.1159 - GW-00140 - West Ranch Monitoring Project](#)
7. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210721.1226 - GW-00161 - West Ranch Monitoring Project](#)
8. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210721.1255 - GW-00158 - West Ranch Monitoring Project](#)
9. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210722.1314 - GW-00338 - West Ranch Monitoring Project](#)
10. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210726.1521 - GW-00157 - West Ranch Monitoring Project](#)

11. [TGCD - GMo - Mea - Water Quality Lab Report - WQLR-20210805.1657 - GW-00030 - West Ranch Monitoring Project](#)

**Evidence of Achievement:** Water Quality Lab Measurements recorded in FY2021.

1. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210507.0100 - East LF-DAMW - NW-00488](#)
2. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210721.0950 - GW-00166 - West Ranch Monitoring Project](#)
3. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210721.1017 - GW-00169 - West Ranch Monitoring Project](#)
4. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210721.1056 - GW-00159 - West Ranch Monitoring Project](#)
5. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210721.1129 - GW-00162 - West Ranch Monitoring Project](#)
6. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210721.1159 - GW-00140 - West Ranch Monitoring Project](#)
7. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210721.1226 - GW-00161 - West Ranch Monitoring Project](#)
8. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210721.1255 - GW-00158 - West Ranch Monitoring Project](#)
9. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210722.1159 - GW-00338 - West Ranch Monitoring Project](#)
10. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210726.1400 - GW-00157 - West Ranch Monitoring Project](#)
11. [TGCD - GMo - Mea - Water Quality Lab Measurement - WQLM-20210805-01 - GW-00030 - West Ranch Monitoring Project](#)

[TGCD - GMa - Pe - Permit Reports - PR-20201231-01 - WV-20191219-01 - Ekstrom Aquaculture - CY2020M12 - Submitted/Unsigned](#)

Texana GCD Report 12.31.20.pdf



[TGCD - GMa - Pe - Permit Reports - PR-20211201-01 - WV-20191219-01 - Ekstrom Aquaculture - CY2021M12 - Submitted/Unsigned](#)

Texana GCD Report 12.31.2021.pdf



TGCD - Field TDS Values - 20220209.pdf



**Goal 5: Addressing drought conditions – TWC §36.1071(a)(6) and 31 TAC 356.52(a)(1)(F)**

**Objective 1:** Collect and review drought condition information related to Jackson County and the surrounding region of Texas.

**Evidence of Achievement:** Meeting Minutes with drought condition considered in FY2021.

1. [TGCD - Adm - MM - Meeting Minutes - 20210121](#)
2. [TGCD - Adm - MM - Meeting Minutes - 20210415](#)
3. [TGCD - Adm - MM - Meeting Minutes - 20210520](#)
4. [TGCD - Adm - MM - Meeting Minutes - 20210715](#)
5. [TGCD - Adm - MM - Meeting Minutes - 20210923](#)

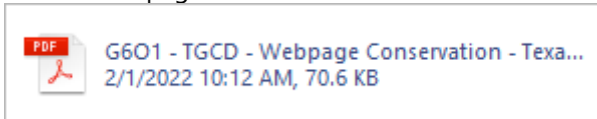
**Goal 6: Addressing conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control, where appropriate and cost-effective – TWC §36.1071(a)(7) and 31 TAC 356.52(a)(1)(G)**

**Objective 1:** Promote conservation, rainwater harvesting or brush control within Jackson County.

**Evidence of Achievement:** Meeting Minutes with promotion of groundwater conservation considered and website promotion of groundwater conservation in FY2021.

1. [TGCD - Adm - MM - Meeting Minutes - 20210121](#)
2. [TGCD - Adm - MM - Meeting Minutes - 20210415](#)

TGCD - Webpage Conservation - Texana Groundwater Conservation District - 20220201.pdf



**Goal 7: Addressing the desired future conditions adopted by the district under Section 36.108– TWC §36.1071(a)(8) and 31 TAC 356.52(a)(1)(H)**

**Objective 1:** Develop and maintain a water level monitoring program.

**Evidence of Achievement:** Water Level Measurements collected during FY2021.

1. [TGCD - GMo - Mea - Water Level - WLM-20201001-01 - East UB-DAMW - NW-00487](#)
2. [TGCD - GMo - Mea - Water Level - WLM-20201001-02 - East LF-DAMW - NW-00488](#)
3. [TGCD - GMo - Mea - Water Level - WLM-20201001-03 - Center UB-DAMW - NW-00489](#)
4. [TGCD - GMo - Mea - Water Level - WLM-20201001-04 - Center LF-DAMW - NW-00490](#)
5. [TGCD - GMo - Mea - Water Level - WLM-20201001-05 - West UB-DAMW - NW-00491](#)
6. [TGCD - GMo - Mea - Water Level - WLM-20201001-06 - West LF-DAMW - NW-00492](#)
7. [TGCD - GMo - Mea - Water Level - WLM-20201102-01 - East UB-DAMW - NW-00487](#)
8. [TGCD - GMo - Mea - Water Level - WLM-20201102-02 - East LF-DAMW - NW-00488](#)
9. [TGCD - GMo - Mea - Water Level - WLM-20201102-03 - Center UB-DAMW - NW-00489](#)
10. [TGCD - GMo - Mea - Water Level - WLM-20201102-04 - Center LF-DAMW - NW-00490](#)
11. [TGCD - GMo - Mea - Water Level - WLM-20201102-05 - West UB-DAMW - NW-00491](#)
12. [TGCD - GMo - Mea - Water Level - WLM-20201102-06 - West LF-DAMW - NW-00492](#)
13. [TGCD - GMo - Mea - Water Level - WLM-20201201-01 - East UB-DAMW - NW-00487](#)
14. [TGCD - GMo - Mea - Water Level - WLM-20201201-02 - East LF-DAMW - NW-00488](#)
15. [TGCD - GMo - Mea - Water Level - WLM-20201201-03 - Center UB-DAMW - NW-00489](#)
16. [TGCD - GMo - Mea - Water Level - WLM-20201201-04 - Center LF-DAMW - NW-00490](#)
17. [TGCD - GMo - Mea - Water Level - WLM-20201201-05 - West UB-DAMW - NW-00491](#)
18. [TGCD - GMo - Mea - Water Level - WLM-20201201-06 - West LF-DAMW - NW-00492](#)
19. [TGCD - GMo - Mea - Water Level - WLM-20201230-01 - East UB-DAMW - NW-00487](#)
20. [TGCD - GMo - Mea - Water Level - WLM-20201230-02 - East LF-DAMW - NW-00488](#)
21. [TGCD - GMo - Mea - Water Level - WLM-20201230-03 - Center UB-DAMW - NW-00489](#)
22. [TGCD - GMo - Mea - Water Level - WLM-20201230-04 - Center LF-DAMW - NW-00490](#)

23. [TGCD - GMo - Mea - Water Level - WLM-20201230-05 - West UB-DAMW - NW-00491](#)
24. [TGCD - GMo - Mea - Water Level - WLM-20201230-06 - West LF-DAMW - NW-00492](#)
25. [TGCD - GMo - Mea - Water Level - WLM-20210202-01 - East UB-DAMW - NW-00487](#)
26. [TGCD - GMo - Mea - Water Level - WLM-20210202-02 - East LF-DAMW - NW-00488](#)
27. [TGCD - GMo - Mea - Water Level - WLM-20210202-03 - Center UB-DAMW - NW-00489](#)
28. [TGCD - GMo - Mea - Water Level - WLM-20210202-04 - Center LF-DAMW - NW-00490](#)
29. [TGCD - GMo - Mea - Water Level - WLM-20210202-05 - West UB-DAMW - NW-00491](#)
30. [TGCD - GMo - Mea - Water Level - WLM-20210202-06 - West LF-DAMW - NW-00492](#)
31. [TGCD - GMo - Mea - Water Level - WLM-20210305-01 - East UB-DAMW - NW-00487](#)
32. [TGCD - GMo - Mea - Water Level - WLM-20210305-02 - East LF-DAMW - NW-00488](#)
33. [TGCD - GMo - Mea - Water Level - WLM-20210305-03 - Center UB-DAMW - NW-00489](#)
34. [TGCD - GMo - Mea - Water Level - WLM-20210305-04 - Center LF-DAMW - NW-00490](#)
35. [TGCD - GMo - Mea - Water Level - WLM-20210305-05 - West UB-DAMW - NW-00491](#)
36. [TGCD - GMo - Mea - Water Level - WLM-20210305-06 - West LF-DAMW - NW-00492](#)
37. [TGCD - GMo - Mea - Water Level - WLM-20210312-01 - NW-00195 - Front Well](#)
38. [TGCD - GMo - Mea - Water Level - WLM-20210312-02 - GW-00411 - Middle Well](#)
39. [TGCD - GMo - Mea - Water Level - WLM-20210312-03 - GW-00410 - Back Well](#)
40. [TGCD - GMo - Mea - Water Level - WLM-20210312-04 - NW-00310](#)
41. [TGCD - GMo - Mea - Water Level - WLM-20210312-05 - GW-00320](#)
42. [TGCD - GMo - Mea - Water Level - WLM-20210312-06 - GW-00274](#)
43. [TGCD - GMo - Mea - Water Level - WLM-20210312-07 - GW-00278](#)
44. [TGCD - GMo - Mea - Water Level - WLM-20210312-08 - GW-00244 - Silo Well](#)
45. [TGCD - GMo - Mea - Water Level - WLM-20210315-01 - GW-00251 - Barn Well](#)
46. [TGCD - GMo - Mea - Water Level - WLM-20210315-02 - GW-00247 - Cattle Well](#)
47. [TGCD - GMo - Mea - Water Level - WLM-20210315-03 - GW-00285](#)
48. [TGCD - GMo - Mea - Water Level - WLM-20210315-04 - GW-00284 - Silos Well](#)
49. [TGCD - GMo - Mea - Water Level - WLM-20210315-05 - GW-00283 - House Well](#)
50. [TGCD - GMo - Mea - Water Level - WLM-20210315-06 - GW-00385](#)
51. [TGCD - GMo - Mea - Water Level - WLM-20210315-07 - GW-00291](#)
52. [TGCD - GMo - Mea - Water Level - WLM-20210316-01 - NW-00451](#)
53. [TGCD - GMo - Mea - Water Level - WLM-20210316-02 - GW-00090 - House Well](#)
54. [TGCD - GMo - Mea - Water Level - WLM-20210316-03 - GW-00076 - Back Well](#)
55. [TGCD - GMo - Mea - Water Level - WLM-20210316-04 - GW-00075](#)
56. [TGCD - GMo - Mea - Water Level - WLM-20210316-05 - GW-00077](#)
57. [TGCD - GMo - Mea - Water Level - WLM-20210316-06 - GW-00073](#)
58. [TGCD - GMo - Mea - Water Level - WLM-20210316-07 - GW-00082 - Front Well](#)
59. [TGCD - GMo - Mea - Water Level - WLM-20210401-01 - East UB-DAMW - NW-00487](#)
60. [TGCD - GMo - Mea - Water Level - WLM-20210401-02 - East LF-DAMW - NW-00488](#)
61. [TGCD - GMo - Mea - Water Level - WLM-20210401-03 - Center UB-DAMW - NW-00489](#)
62. [TGCD - GMo - Mea - Water Level - WLM-20210401-04 - Center LF-DAMW - NW-00490](#)
63. [TGCD - GMo - Mea - Water Level - WLM-20210401-05 - West UB-DAMW - NW-00491](#)
64. [TGCD - GMo - Mea - Water Level - WLM-20210401-06 - West LF-DAMW - NW-00492](#)
65. [TGCD - GMo - Mea - Water Level - WLM-20210428-01 - GW-00563](#)
66. [TGCD - GMo - Mea - Water Level - WLM-20210503-01 - East UB-DAMW - NW-00487](#)
67. [TGCD - GMo - Mea - Water Level - WLM-20210503-02 - East LF-DAMW - NW-00488](#)
68. [TGCD - GMo - Mea - Water Level - WLM-20210503-03 - Center UB-DAMW - NW-00489](#)
69. [TGCD - GMo - Mea - Water Level - WLM-20210503-04 - Center LF-DAMW - NW-00490](#)
70. [TGCD - GMo - Mea - Water Level - WLM-20210503-05 - West UB-DAMW - NW-00491](#)
71. [TGCD - GMo - Mea - Water Level - WLM-20210503-06 - West LF-DAMW - NW-00492](#)
72. [TGCD - GMo - Mea - Water Level - WLM-20210507-01 - East LF-DAMW - NW-00488](#)
73. [TGCD - GMo - Mea - Water Level - WLM-20210510-01 - East LF-DAMW - NW-00488](#)
74. [TGCD - GMo - Mea - Water Level - WLM-20210601-01 - East UB-DAMW - NW-00487](#)
75. [TGCD - GMo - Mea - Water Level - WLM-20210601-02 - East LF-DAMW - NW-00488](#)
76. [TGCD - GMo - Mea - Water Level - WLM-20210601-03 - Center UB-DAMW - NW-00489](#)
77. [TGCD - GMo - Mea - Water Level - WLM-20210601-04 - Center LF-DAMW - NW-00490](#)
78. [TGCD - GMo - Mea - Water Level - WLM-20210601-05 - West UB-DAMW - NW-00491](#)
79. [TGCD - GMo - Mea - Water Level - WLM-20210601-06 - West LF-DAMW - NW-00492](#)
80. [TGCD - GMo - Mea - Water Level - WLM-20210701-01 - East UB-DAMW - NW-00487](#)

81. [TGCD - GMo - Mea - Water Level - WLM-20210701-02 - East LF-DAMW - NW-00488](#)
82. [TGCD - GMo - Mea - Water Level - WLM-20210701-03 - Center UB-DAMW - NW-00489](#)
83. [TGCD - GMo - Mea - Water Level - WLM-20210701-04 - Center LF-DAMW - NW-00490](#)
84. [TGCD - GMo - Mea - Water Level - WLM-20210701-05 - West UB-DAMW - NW-00491](#)
85. [TGCD - GMo - Mea - Water Level - WLM-20210701-06 - West LF-DAMW - NW-00492](#)
86. [TGCD - GMo - Mea - Water Level - WLM-20210802-01 - East UB-DAMW - NW-00487](#)
87. [TGCD - GMo - Mea - Water Level - WLM-20210802-02 - East LF-DAMW - NW-00488](#)
88. [TGCD - GMo - Mea - Water Level - WLM-20210802-03 - Center UB-DAMW - NW-00489](#)
89. [TGCD - GMo - Mea - Water Level - WLM-20210802-04 - Center LF-DAMW - NW-00490](#)
90. [TGCD - GMo - Mea - Water Level - WLM-20210802-05 - West UB-DAMW - NW-00491](#)
91. [TGCD - GMo - Mea - Water Level - WLM-20210802-06 - West LF-DAMW - NW-00492](#)
92. [TGCD - GMo - Mea - Water Level - WLM-20210816-01 - GW-00090 - House Well](#)
93. [TGCD - GMo - Mea - Water Level - WLM-20210816-02 - NW-00451](#)
94. [TGCD - GMo - Mea - Water Level - WLM-20210816-03 - GW-00082 - Front Well](#)
95. [TGCD - GMo - Mea - Water Level - WLM-20210816-04 - GW-00076 - Back Well](#)
96. [TGCD - GMo - Mea - Water Level - WLM-20210816-05 - GW-00077](#)
97. [TGCD - GMo - Mea - Water Level - WLM-20210816-06 - GW-00075](#)
98. [TGCD - GMo - Mea - Water Level - WLM-20210816-07 - GW-00073](#)
99. [TGCD - GMo - Mea - Water Level - WLM-20210817-01 - NW-00195 - Front Well](#)
100. [TGCD - GMo - Mea - Water Level - WLM-20210817-02 - GW-00411 - Middle Well](#)
101. [TGCD - GMo - Mea - Water Level - WLM-20210817-03 - GW-00410 - Back Well](#)
102. [TGCD - GMo - Mea - Water Level - WLM-20210817-04 - NW-00310](#)
103. [TGCD - GMo - Mea - Water Level - WLM-20210817-05 - GW-00278](#)
104. [TGCD - GMo - Mea - Water Level - WLM-20210817-06 - GW-00244 - Silo Well](#)
105. [TGCD - GMo - Mea - Water Level - WLM-20210817-07 - GW-00247 - Cattle Well](#)
106. [TGCD - GMo - Mea - Water Level - WLM-20210817-08 - GW-00251 - Barn Well](#)
107. [TGCD - GMo - Mea - Water Level - WLM-20210817-09 - GW-00274](#)
108. [TGCD - GMo - Mea - Water Level - WLM-20210817-10 - GW-00276](#)
109. [TGCD - GMo - Mea - Water Level - WLM-20210817-11 - GW-00320](#)
110. [TGCD - GMo - Mea - Water Level - WLM-20210818-01 - GW-00385](#)
111. [TGCD - GMo - Mea - Water Level - WLM-20210818-02 - GW-00291](#)
112. [TGCD - GMo - Mea - Water Level - WLM-20210818-03 - GW-00294](#)
113. [TGCD - GMo - Mea - Water Level - WLM-20210818-04 - GW-00285](#)
114. [TGCD - GMo - Mea - Water Level - WLM-20210818-05 - GW-00283 - House Well](#)
115. [TGCD - GMo - Mea - Water Level - WLM-20210818-06 - GW-00284 - Silos Well](#)
116. [TGCD - GMo - Mea - Water Level - WLM-20210901-01 - East UB-DAMW - NW-00487](#)
117. [TGCD - GMo - Mea - Water Level - WLM-20210901-02 - East LF-DAMW - NW-00488](#)
118. [TGCD - GMo - Mea - Water Level - WLM-20210901-03 - Center UB-DAMW - NW-00489](#)
119. [TGCD - GMo - Mea - Water Level - WLM-20210901-04 - Center LF-DAMW - NW-00490](#)
120. [TGCD - GMo - Mea - Water Level - WLM-20210901-05 - West UB-DAMW - NW-00491](#)
121. [TGCD - GMo - Mea - Water Level - WLM-20210901-06 - West LF-DAMW - NW-00492](#)

**Evidence of Achievement:** Minutes of Meeting with Board review of water levels in FY2021.

1. [TGCD - Adm - MM - Matter For Consideration - MFC-20210121-6.1 - Report regarding Groundwater Level Analysis](#)
2. [TGCD - Adm - MM - Matter For Consideration - MFC-20210415-6.1 - Report regarding Groundwater Level Analysis](#)
3. [TGCD - Adm - MM - Matter For Consideration - MFC-20210923-5.1 - Intera Proposals re Groundwater Monitoring](#)
4. [TGCD - Adm - MM - Meeting Minutes - 20210121](#)
5. [TGCD - Adm - MM - Meeting Minutes - 20210415](#)
6. [TGCD - Adm - MM - Meeting Minutes - 20210923](#)





TGCD - Field WLM Values - 20220201 - Water Level Change between CY2020 and CY2021 by Well.pdf



**Objective 2:** Analyze water level monitoring information to evaluate water level trends and determine the degree to which the DISTRICT is complying with the desired future conditions of Gulf Coast Aquifer in Jackson County.

**Evidence of Achievement:** Minutes of Meeting with Board review of water levels and DFC compliance

- 1. [TGCD - Adm - MM - Meeting Minutes - 20210121](#)
- 2. [TGCD - Adm - MM - Meeting Minutes - 20210415](#)
- 3. [TGCD - Adm - MM - Meeting Minutes - 20210923](#)

Intra - Application of Geostatistical Techniques to Quantify Changes in Water Levels - Draft - 20210407.pdf

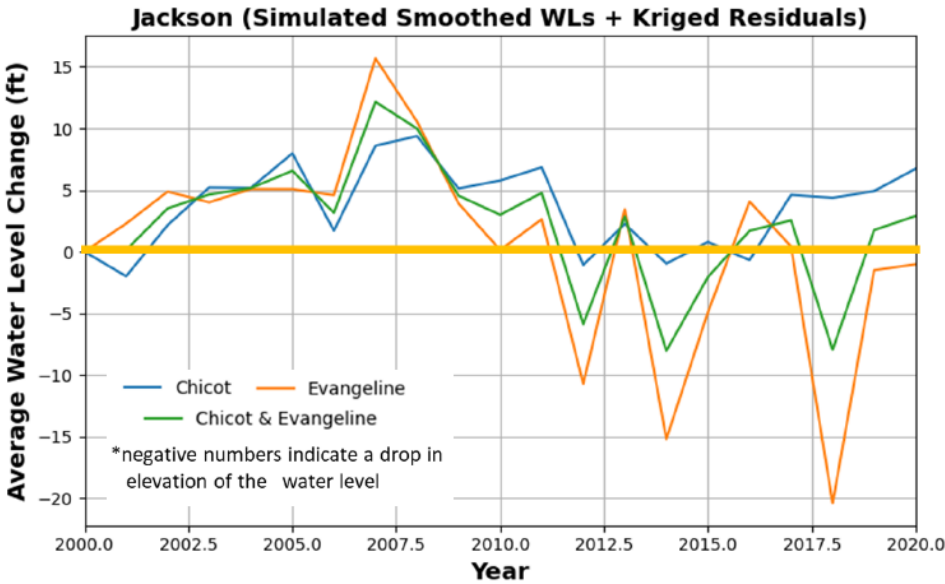
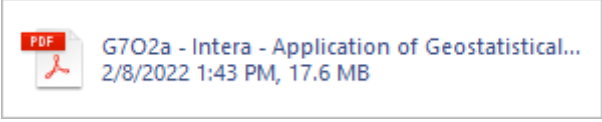


Figure 5-2 Change in the average annual water level calculated in Jackson County for the Chicot Aquifer, the Evangeline Aquifer, and the combination of Chicot and Evangeline aquifers based on the analysis of aquifer levels determined using GAM simulated smoothed water levels and Kriged residual for the measured water levels.

# Texana Groundwater Conservation District

## Annual Report of the District

Fiscal Year 2020 – 2021

October 1, 2020 to September 30, 2021

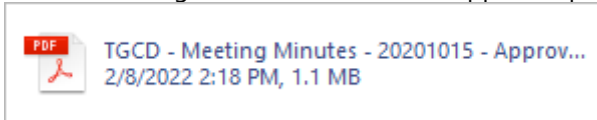
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### Section 3 - Minutes of the Meetings of the Board of Directors held during FY2021

1. [TGCD - Adm - MM - Meeting Minutes - 20201015](#)
2. [TGCD - Adm - MM - Meeting Minutes - 20210104](#)
3. [TGCD - Adm - MM - Meeting Minutes - 20210121](#)
4. [TGCD - Adm - MM - Meeting Minutes - 20210415](#)
5. [TGCD - Adm - MM - Meeting Minutes - 20210520](#)
6. [TGCD - Adm - MM - Meeting Minutes - 20210715](#)
7. [TGCD - Adm - MM - Meeting Minutes - 20210819](#)
8. [TGCD - Adm - MM - Meeting Minutes - 20210923](#)

PDF Files of Minutes of the Meetings of the Board of Directors held during FY2021:

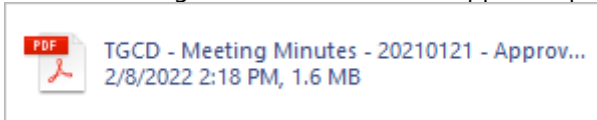
TGCD - Meeting Minutes - 20201015 - Approved.pdf



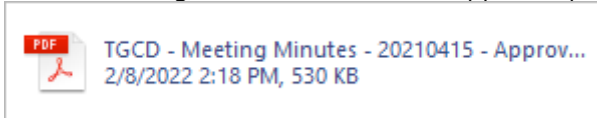
TGCD - Meeting Minutes - 20210104 - Approved.pdf



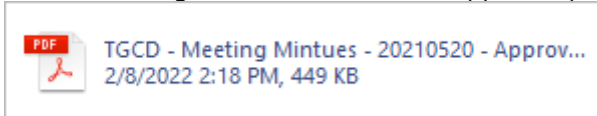
TGCD - Meeting Minutes - 20210121 - Approved.pdf




TGCD - Meeting Minutes - 20210415 - Approved.pdf




TGCD - Meeting Minutes - 20210520 - Approved.pdf




TGCD - Meeting Minutes - 20210715 - Approved.pdf

 TGCD - Meeting Minutes - 20210715 - Approv...  
2/8/2022 2:18 PM, 794 KB

TGCD - Meeting Minutes - 20210819 - Approved.pdf

 TGCD - Meeting Minutes - 20210819 - Approv...  
2/8/2022 2:18 PM, 481 KB

TGCD - Meeting Minutes - 20210923 - Approved.pdf

 TGCD - Meeting Minutes - 20210923 - Approv...  
2/8/2022 2:18 PM, 1.0 MB

**Minutes of Lavaca Regional Water Planning Group  
October 19, 2020  
Edna, Texas**

A meeting of the Lavaca Regional Water Planning Group was held on Monday, October 19, 2020 at 10:00 a.m. With respect to COVID-19, the meeting was held via video conference.

Voting Group Members present via video were Patrick Brzozowski, Jim Coleman, Steve Cooper, Neil Hudgins, Jack Maloney, Richard Ottis, Robert Shoemate, Michael Skalicky, Jill Sklar, Phillip Spenrath, and Ed Weinheimer.

Absent Voting Group Members were: Tom Chandler, Marie Day, Bart McBeth, Edward Pustka, and David Wagner.

Also present via video were: Texas Water Development Board Member Kathleen Jackson, Jean Devlin of Texas Water Development Board, Jaime Burke and Alicia Smiley of AECOM, Jami McCool of Texas Department of Agriculture, Leslie Hartman, Texas Parks and Wildlife, Rick Crabtree and Mike Rivet of Formosa Plastics, Rusty Ray of Texas State Soil & Water Conservation Board, Jerry Adelman, LNRA Board of Director, Karen Gregory, LNRA Deputy General Manager, Scott Hartl, LNRA Assistant Manager, Operations, Kimberly Rhodes, Jennifer White, and Lee Hafernack.

Chairman Spenrath called the meeting to order.

**Public Comments**

There were no public comments.

**Remarks by Texas Water Development Board Member**

Texas Water Development Board Member Kathleen Jackson addressed the Group. She commended the Region P members for their participation and involvement in the regional water planning process. Board Member Jackson also acknowledged Patrick Brzozowski and Judge Phillip Spenrath for their appointment to the Initial Regional Flood Planning Group. She also briefed the Group on the TWDB's Flood Infrastructure Fund (FIF) which provides financial assistance in the form of loans and grants for flood control, flood mitigation, and drainage projects.

**Minutes**

The minutes of the April 27, 2020 public hearing and the August 24, 2020 meeting were reviewed. Weinheimer moved to approve the minutes as presented. Ottis seconded the motion. Motion passed.

**Nominations for New Voting Members**

Brzozowski informed the Group that Robert Shoemate recommended Lee Hafernack be nominated to fill the voting member position, Agriculture, Jackson County, replacing Robert Martin who has retired.

Brzozowski moved to appoint Lee Hafernack as a voting member of the Lavaca Regional Water Planning Group, Agriculture, Jackson County. Ottis seconded the motion. Motion passed.

Remaining vacant positions include Agriculture, Jackson County to replace Gary Skalicky, Small Business, Lavaca County, and Municipalities, Lavaca County.

The Group will continue to seek new members to fill the vacancies.

### **Briefing and Update from Texas Water Development Board**

Devlin informed the Group as follows:

Update to Final 2021 Regional Water Plan Deadline and Deliverable

- Deadline to submit the final regional water plans to the TWDB is extended from October 14, 2020 to November 5, 2020.
- The data entry deadline is extended from September 14, 2020 to October 6, 2020.
- The requirement to submit nine (9) hard copy deliverables of the final regional water plan is eliminated.
- TWDB will follow up with instructions on how to submit the final regional water plan deliverables electronically.
- PDFs must pass the Acrobat accessibility full check.

### **Present and Discuss Edits to 2021 LRWP**

Burke briefed the Group on the minor edits made to the data base reports after discussion with the TWDB. The data base summary has been finalized and appears in the Executive Summary and Appendixes. The Group was presented copies prior to the meeting for their review.

Executive Summary

- Updated adopted plan due date from October 14, 2020 to November 5, 2020.
- Updated “will be” to “were” with respect to finalizing the plans.
- Database reports (DB22) updated.

Chapter 9

- Received Infrastructure Response Survey response from LNRA – Chapter updated accordingly.

Chapter 10

- Added meeting summary for meetings on August 24, 2020 and October 19, 2020.
- Appendix 10C, Public Agency Comments with Responses, was updated with signed letters.
- Will update Appendix 10A, Meeting Minutes, with approved and signed meeting minutes.

TWDB staff approved of all of our other previous changes with respect to addressing their comments.

### **Discuss and Consider Adoption of 2021 LRWP**

Cooper moved to adopt the 2021 Lavaca Regional Water Plan as presented. Hudgins seconded the motion. Motion passed.

### **Authorize Consultant to Make Edits After Adoption**

Brzowski moved to authorize Region P Consultant to make non-substantive edits after adoption as needed or as requested by Texas Water Development Board and submitting the deliverables to the Texas Water Development Board by November 5, 2020. Weinheimer seconded the motion. Motion passed.

**Present and Discuss Edits to Project Prioritization Spreadsheet**

Burke informed the Group of the edits to project prioritization as follows:

LNRA requested edits at previous meeting

- Uniform Standard 2A – Lavaca Off-Channel Reservoir projects have models suggesting a sufficient quantity of water, score changed from 0 to 3.
- Uniform Standard 2C – Lavaca Off-Channel Reservoir Projects and LNRA Desalination are now all rated 7 (meaning a preliminary engineering report has been completed).
- No other edits have been proposed.

Weinheimer moved to approve the Project Prioritization associated with the 2021 Lavaca Regional Water Plan as presented. Ottis seconded the motion. Motion passed.

**LNRA to Serve as Region P Political Subdivision**

Ottis moved to authorize LNRA to serve as the Region P Political Subdivision for the 6<sup>th</sup> cycle of regional water planning. Weinheimer seconded the motion. Motion passed.

**Authorize Political Subdivision to Perform Tasks for the 6<sup>th</sup> Cycle**

Cooper moved to authorize the Political Subdivision to provide public notice, submit a grant application to the TWDB, and execute a contract with the TWDB on behalf of the LRWPG for the initial funding of the 6<sup>th</sup> cycle of Regional Water Planning. Sklar seconded the motion. Motion passed.

**LNRA to Initiate Consultant Selection**

Maloney moved to authorize LNRA to initiate the process for consultant selection for the next Regional Planning Cycle. Weinheimer seconded the motion. Motion passed.

**Schedule Future Meetings**

The Group will tentatively meet in January or February 2021.

**Receive Public Comments**

There were no public comments.

Brzowski moved for the meeting to adjourn at 10:50 a.m. Weinheimer seconded the motion. Motion passed.

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Phillip Spenrath  
Chairman

**Ekstrom Aquaculture, LLC - Palacios Farm**

Permit Year: 2020  
 Report Period Start Date: 12/01/20  
 Report Period Stop Date: 12/30/20

**Evaluation of Cumulative Groundwater Production in CY2020**

Cumulative Produced Groundwater - Year to Date (Ac-Ft):	Aggregate Volume of Groundwater Production Authorized (Ac-Ft):	Is the cumulative groundwater production (PGW-YTD-AF) for the well field less than the aggregate volume of groundwater production authorized by the District under production permits associated with water wells within the well field?
1,418	5,884	YES

**Intitial Conditions**

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-WL: Average Water Level (FtBS)	AVG-COND: Average Conductivity (µS/cm)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	45.90	727
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	48.30	1,898
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	42.70	769
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	15.60	9,310
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	15.00	10,261
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	14.10	24,056

### Performance Criteria

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	Maximum Water Level Change from Initial Condition during Reporting Period (ft)	Minimum Initial Conductivity Condition (µS/cm)	Maximum Initial Conductivity Condition (µS/cm)	Maximum Allowable Conductivity during reporting period (µS/cm)	Maximum Allowable Conductivity Condition during reporting period (µS/cm)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	10		2,600	799	
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	10		2,600	2,087	
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	10		2,600	846	
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	15	7,000	28,000		33,000
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	15	7,000	28,000		33,000
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	15	7,000	28,000		33,000

### Performance Evaluation of Initial Conditions

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-COND: Initial Conductivity Condition (µS/cm)	Minimum Initial Conductivity Condition (µS/cm)	Is the minimum initial conductivity condition greater than minimum initial conductivity criteria?	Maximum Initial Conductivity Condition (µS/cm)	Is the maximum initial conductivity condition less than the maximum initial conductivity criteria?
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	727		N/A	2,600	YES
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	1,898		N/A	2,600	YES
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	769		N/A	2,600	YES
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	9,310	7,000	YES	28,000	YES
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	10,261	7,000	YES	28,000	YES
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	24,056	7,000	YES	28,000	YES



### Water Level Statistics

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-WL: Reporting Period Average Water Level (FtBS)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	50.39
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	54.27
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	48.03
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	19.03
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	19.43
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	17.85

### Performance Evaluation of Water Levels during Reporting Period

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-WL: Initial Water Level Condition (FtBS)	AVG-WL: Reporting Period Water Level Condition (FtBS)	AVG-WL-DIFF: Change from Initial Water Level Condition and Report Period Water Level Condition (ft)	Criteria for Maximum Water Level Change during Reporting Period (ft)	Is the criteria for maximum water level change during the reporting period satisfied?
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	45.90	50.39	4.49	10	YES
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	48.30	54.27	5.97	10	YES
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	42.70	48.03	5.33	10	YES
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	15.60	19.03	3.43	15	YES
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	15.00	19.43	4.43	15	YES
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	14.10	17.85	3.75	15	YES

### Water Conductivity Statistics

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-COND: Reporting Period Average Conductivity (µS/cm)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	708
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	1,881
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	753
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	10,809
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	11,154
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	22,219

### Performance Evaluation of Water Conductivity during Reporting Period

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-COND: Initial Conductivity (µS/cm)	AVG-COND: Reporting Period Conductivity (µS/cm)	AVG-COND-DIFF: Change from Initial Conductivity and Report Period Conductivity (µS/cm)	Maximum Allowable Conductivity during reporting period (µS/cm)	Is the criteria for maximum conductivity change during the reporting period satisfied?	Maximum Allowable Conductivity Condition during reporting period (µS/cm)	Is the criteria for maximum allowable conductivity during the reporting period satisfied?
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	727	708	(19)	799	YES		N/A
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	1,898	1,881	(16)	2,087	YES		N/A
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	769	753	(17)	846	YES		N/A
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	9,310	10,809	1,499		N/A	33,000	YES
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	10,261	11,154	894		N/A	33,000	YES
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	24,056	22,219	(1,837)		N/A	33,000	YES

I certify that this report was prepared under my direction or supervision; the information submitted is, to the best of my knowledge and belief, true, accurate and complete. Further, I certify that I am the well owner or I am authorized to act as the agent of the well owner.

\_\_\_\_\_  
Signature

James P. Ekstrom, President  
\_\_\_\_\_  
Printed Name

1/1/2021  
\_\_\_\_\_  
Date

**Ekstrom Aquaculture, LLC - Palacios Farm  
Production Well Report**

Permit Year: **01/01/20** to **12/31/20**  
 Report Period: **12/01/20** to **12/30/20**  
 Permitted Volume: **5,884** Ac-Ft/Yr

**Groundwater Production - Acre-Feet**

Parameter	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-YTD-AF
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total for Year
Date of Reading	01/31/20	02/29/20	03/31/20	04/30/20	05/31/20	06/30/20	07/31/20	08/31/20	09/30/20	10/31/20	11/30/20	12/31/20	
IW-1 (GW-00112)	0.000	0.000	55.756	6.951	7.255	8.758	0.000	6.726	14.309	0.000	0.000	0.000	99.755
IW-2 (GW-00115)	0.000	0.000	48.063	31.636	0.000	5.141	13.080	1.661	10.965	0.000	10.441	0.000	120.987
IW-3 (GW-00452)	0.000	0.000	0.000	0.000	12.960	0.000	0.000	0.000					12.960
BW-1 (GW-00113)	0.000	1.410	4.044	1.426	3.757	5.081	1.250	4.582	2.346	6.475	5.196	0.000	35.567
BW-2 (GW-00116)	0.000	0.000	20.985	5.360	13.389	0.180	15.951	17.349	9.383	24.091	19.512	0.000	126.200
BW-3 (NW-00145)	0.000	2.160	6.282	2.243	5.650	9.648	6.147	7.045	2.902	8.755	13.650	0.000	64.482
BW-4 (GW-00130)	0.000	1.860	5.316	1.902	4.783	8.196	4.704	5.946	3.362	8.433	6.792	0.000	51.294
BW-5 (NW-00146)	0.000	4.140	6.295	2.232	6.050	9.547	6.760	6.740	4.034	10.085	8.305	0.000	64.188
BW-6 (GW-00110)	0.000	3.200	1.733	1.352	1.617	5.413	4.751	5.667	3.223	8.097	6.481	3.430	44.964
BW-7 (GW-00114)	0.000	2.030	3.413	1.268	3.190	5.340	2.863	3.734	2.124	4.861	4.203	0.000	33.026
BW-8 (NW-00147)	0.000	3.160	3.181	1.100	2.238	9.005	5.156	6.735	3.869	9.414	7.845	0.000	51.703
BW-9 (NW-00144)	0.000	2.800	6.120	2.204	5.620	9.342	5.787	6.672	3.811	9.296	7.465	0.000	59.117
BW-10 (GW-00111)	0.000	1.900	4.268	1.523	3.977	6.436	1.266	0.006	0.000	0.000	4.892	0.000	24.268
BW-11 (NW-00143)	0.000	2.110	5.978	2.155	5.642	9.852	5.827	10.951	6.898	10.380	9.150	0.000	68.943
BW-12 (NW-00494)				11.308	24.308	30.161	23.017	0.000	0.020	33.022	21.301	0.000	143.137
BW-13 (NW-00495)				21.537	39.297	27.031	22.234	19.754	16.072	22.948	20.134	0.000	189.007
BW-14 ()													0.000
BW-15 ()													0.000
BW-16 ()													0.000
BW-17 (NW-00527)						1.893	27.511	23.649	22.051	27.174	19.729	0.000	122.007
BW-18 (NW-00498)							15.067	22.767	21.881	27.164	19.896	0.000	106.775
<b>Total for Month</b>	<b>0.000</b>	<b>24.770</b>	<b>171.434</b>	<b>94.197</b>	<b>139.733</b>	<b>151.024</b>	<b>161.371</b>	<b>149.984</b>	<b>127.250</b>	<b>210.195</b>	<b>184.992</b>	<b>3.430</b>	<b>1,418.380</b>
Monthly % of Permitted Volume	0.00%	0.42%	2.91%	1.60%	2.37%	2.57%	2.74%	2.55%	2.16%	3.57%	3.14%	0.06%	
Cumulative % of Permitted Volume	0.00%	0.42%	3.33%	4.94%	7.31%	9.88%	12.62%	15.17%	17.33%	20.90%	24.05%	24.11%	24.11%
% of Permit Period	8.33%	16.11%	25.00%	33.06%	41.67%	49.72%	58.33%	66.67%	74.72%	83.33%	91.39%	100.00%	100.00%

**Groundwater Production - Gallons**

Parameter	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW-YTD
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Total for Year
Date of Reading	01/31/20	02/29/20	03/31/20	04/30/20	05/31/20	06/30/20	07/31/20	08/31/20	09/30/20	10/31/20	11/30/20	12/31/20		
IW-1 (GW-00112)	0	0	18,168,148	2,264,990	2,364,049	2,853,803	0	2,191,674	4,662,602	0	0	0	0	32,505,267
IW-2 (GW-00115)	0	0	15,661,377	10,308,622	0	1,675,200	4,262,131	541,239	3,572,956	0	3,402,210	0	0	39,423,735
IW-3 (GW-00452)	0	0	0	0	4,223,029	0	0	0	0	0	0	0	0	4,223,029
BW-1 (GW-00113)	0	459,450	1,317,741	464,664	1,224,222	1,655,649	407,314	1,493,049	764,446	2,109,885	1,693,122	0	0	11,589,543
BW-2 (GW-00116)	0	0	6,837,983	1,746,561	4,362,819	58,653	5,197,649	5,653,189	3,057,460	7,850,076	6,358,005	0	0	41,122,396
BW-3 (NW-00145)	0	703,838	2,046,996	730,884	1,841,058	3,143,810	2,003,006	2,295,620	945,620	2,852,826	4,447,866	0	0	21,011,524
BW-4 (GW-00130)	0	606,083	1,732,224	619,769	1,558,545	2,670,675	1,532,803	1,937,510	1,095,511	2,747,901	2,213,180	0	0	16,714,201
BW-5 (NW-00146)	0	1,349,023	2,051,232	727,299	1,971,399	3,110,899	2,202,753	2,196,236	1,314,483	3,286,207	2,706,193	0	0	20,915,724
BW-6 (GW-00110)	0	1,042,723	564,700	440,551	526,901	1,763,831	1,548,118	1,846,598	1,050,218	2,638,416	2,111,840	1,117,669	0	14,651,564
BW-7 (GW-00114)	0	661,478	1,112,129	413,179	1,039,465	1,740,044	932,911	1,216,728	692,108	1,583,962	1,369,552	0	0	10,761,555
BW-8 (NW-00147)	0	1,029,689	1,036,532	358,436	729,255	2,934,288	1,680,088	2,194,606	1,260,718	3,067,561	2,556,301	0	0	16,847,474
BW-9 (NW-00144)	0	912,383	1,994,208	718,176	1,831,283	3,044,100	1,885,700	2,174,078	1,241,818	3,029,111	2,432,478	0	0	19,263,334
BW-10 (GW-00111)	0	619,117	1,390,732	496,271	1,295,909	2,097,177	412,527	1,955	0	0	1,594,063	0	0	7,907,752
BW-11 (NW-00143)	0	687,546	1,947,937	702,209	1,838,451	3,210,284	1,898,734	3,568,394	2,247,720	3,382,333	2,981,537	0	0	22,465,145
BW-12 ()	0	0	0	3,684,723	7,920,786	9,827,992	7,500,112	0	6,517	10,760,252	6,940,952	0	0	46,641,335
BW-13 ()	0	0	0	7,017,853	12,804,967	8,808,078	7,244,971	6,436,861	5,237,077	7,477,629	6,560,684	0	0	61,588,120
BW-14 ()	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW-15 ()	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW-16 ()	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW-17 (NW-00527)	0	0	0	0	0	616,836	8,964,487	7,706,050	7,185,340	8,854,675	6,428,714	0	0	39,756,103
BW-18 (NW-00498)	0	0	0	0	0	0	4,909,597	7,418,650	7,129,946	8,851,417	6,483,131	0	0	34,792,741
<b>Total for Month</b>	<b>0</b>	<b>8,071,329</b>	<b>55,861,940</b>	<b>30,694,187</b>	<b>45,532,138</b>	<b>49,211,321</b>	<b>52,582,902</b>	<b>48,872,436</b>	<b>41,464,540</b>	<b>68,492,251</b>	<b>60,279,828</b>	<b>1,117,669</b>	<b>0</b>	<b>462,180,541</b>
Monthly % of Permitted Volume	0.00%	0.42%	2.91%	1.60%	2.37%	2.57%	2.74%	2.55%	2.16%	3.57%	3.14%	0.06%		
Cumulative % of Permitted Volume	0.00%	0.42%	3.33%	4.94%	7.31%	9.88%	12.62%	15.17%	17.33%	20.90%	24.05%	24.11%		24.11%
% of Permit Period	8.33%	16.11%	25.00%	33.06%	41.67%	49.72%	58.33%	66.67%	74.72%	83.33%	91.39%	100.00%		100.00%

**Water Level Statistics**

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	Ekstrom Well ID	AVG-WL: January Average Water Level (FtBS)	AVG-WL: February Average Water Level (FtBS)	AVG-WL: March Average Water Level (FtBS)	AVG-WL: April Average Water Level (FtBS)	AVG-WL: May Average Water Level (FtBS)	AVG-WL: June Average Water Level (FtBS)	AVG-WL: July Average Water Level (FtBS)	AVG-WL: August Average Water Level (FtBS)	AVG-WL: September Average Water Level (FtBS)	AVG-WL: October Average Water Level (FtBS)	AVG-WL: November Average Water Level (FtBS)	AVG-WL: December Average Water Level (FtBS)
Center	Lower Fresh	Center - Lower Fresh	FMW-2						43.1	47.4	47.9	52.21	52.08	53.84	50.39
East	Lower Fresh	East - Lower Fresh	FMW-3						44.9	49.9	53.4	59.46	59.41	61.85	54.27
West	Lower Fresh	West - Lower Fresh	FMW-1						40.9	43.3	45.3	48.3	49.04	49.91	48.03
Center	Upper Brackish	Center - Upper Brackish	BMW-2						26.3	24.9	27	24.27	27.65	28.26	19.03
East	Upper Brackish	East - Upper Brackish	BMW-3						18.8	23.5	25.4	24.45	26.01	25.3	19.43
West	Upper Brackish	West - Upper Brackish	BMW-1						25.2	23	23.9	21.15	24.73	25.77	17.85

**Water Conductivity Statistics**

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	Ekstrom Well ID	AVG-COND: January Average Conductivity (µS/cm)	AVG-COND: February Average Conductivity (µS/cm)	AVG-COND: March Average Conductivity (µS/cm)	AVG-COND: April Average Conductivity (µS/cm)	AVG-COND: May Average Conductivity (µS/cm)	AVG-COND: June Average Conductivity (µS/cm)	AVG-COND: July Average Conductivity (µS/cm)	AVG-COND: August Average Conductivity (µS/cm)	AVG-COND: September Average Conductivity (µS/cm)	AVG-COND: October Average Conductivity (µS/cm)	AVG-COND: November Average Conductivity (µS/cm)	AVG-COND: December Average Conductivity (µS/cm)
Center	Lower Fresh	Center - Lower Fresh	FMW-2						708.2	707.8	707.1	708.21	709.29	708.25	708.25
East	Lower Fresh	East - Lower Fresh	FMW-3						1944.2	2112.5	2068.1	1973.53	1895.98	1880.79	1881.48
West	Lower Fresh	West - Lower Fresh	FMW-1						839.6	749.2	757.4	751.46	750.67	751.36	752.69
Center	Upper Brackish	Center - Upper Brackish	BMW-2						8263.2	8700.3	8675.6	9099.17	8780.87	8411.24	10808.88
East	Upper Brackish	East - Upper Brackish	BMW-3						9747.1	8874.8	9068.3	9366.15	8877.67	9251.49	11154.27
West	Upper Brackish	West - Upper Brackish	BMW-1						22702.1	22509.7	22260.4	22092.09	21983.08	21923.12	22218.71

**Ekstrom Aquaculture, LLC - Palacios Farm  
Production Well Report**

Permit Year: **01/01/21** to **12/31/21**  
 Report Period: **12/01/21** to **12/31/21**  
 Permitted Volume: **5,884** Ac-Ft/Yr

**Groundwater Production - Acre-Feet**

Parameter	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-AF	PGW-YTD-AF
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Total for Year
Date of Reading	01/31/21	02/28/21	03/31/21	04/30/21	05/31/21	06/30/21	07/31/21	08/31/21	09/30/21	10/31/21	11/30/21	12/31/21		
IW-1 (GW-00112)	0.000	49.833	0.000	17.737	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	67.570
IW-2 (GW-00115)	0.000	67.515	1.690	37.954	10.210	0.000	0.000	1.232	0.000	7.728	1.176	0.000	0.000	127.505
IW-3 (GW-00452)						0.288	0.000	0.000	0.000	0.000	0.000	61.602		61.890
BW-1 (GW-00113)	0.635	5.342	0.000	1.820	0.000	0.000	1.939	1.105	2.183	1.610	1.605	2.545		18.784
BW-2 (GW-00116)	2.615	19.942	0.000	6.836	0.001	0.000	6.086	4.592	8.882	6.800	6.563	10.986		73.303
BW-3 (NW-00145)	0.976	7.555	0.006	2.735	0.000	0.000	2.881	1.919	3.223	2.272	2.613	4.308		28.488
BW-4 (GW-00130)	0.835	7.301	0.000	2.547	0.000	0.000	2.643	1.674	2.775	1.954	2.235	3.728		25.692
BW-5 (NW-00146)	0.931	8.226	0.000	3.124	0.058	0.000	2.990	3.070	0.102	2.269	2.691	4.529		27.990
BW-6 (GW-00110)	0.796	6.943	0.000	2.399	0.000	0.000	2.539	1.586	2.614	1.862	2.149	1.390		22.278
BW-7 (GW-00114)	0.568	4.946	0.000	1.710	2.030	2.539	2.454	1.793	5.918	3.271	1.549	2.647		29.425
BW-8 (NW-00147)	0.968	8.270	0.000	2.619	0.000	0.000	2.834	1.919	3.567	1.088	1.991	2.587		25.843
BW-9 (NW-00144)	0.991	7.555	0.000	0.000	0.000	0.000	0.170	0.000	0.000	0.000	0.000	0.000		8.716
BW-10 (GW-00111)	0.735	7.301	0.000	0.000	0.000	0.000	1.450	1.805	2.442	17.543	1.868	3.061		36.205
BW-11 (NW-00143)	0.001	7.555	0.000	0.000	0.000	0.000	2.782	1.872	3.467	2.082	2.544	4.138		24.441
BW-12 (NW-00494)	2.375	19.450	0.000	4.232	0.000	0.003	3.225	13.978	1.458	23.610	17.118	0.000		85.449
BW-13 (NW-00495)	2.322	19.044	0.000	4.278	0.000	0.000	3.198	13.739	1.440	23.398	17.265	0.000		84.684
BW-14 (NW-00551)														0.000
BW-15 (NW-00552)														0.000
BW-16 (NW-00553)														0.000
BW-17 (NW-00527)	2.648	22.577	0.000	4.958	0.000	0.000	3.274	0.000	0.000	15.928	19.820	0.000		69.205
BW-18 (NW-00498)	2.646	22.911	0.000	4.934	0.000	0.000	3.511	15.957	1.717	26.337	19.241	0.000		97.254
<b>Total for Month</b>	<b>20.042</b>	<b>292.266</b>	<b>1.696</b>	<b>97.883</b>	<b>12.299</b>	<b>2.830</b>	<b>41.976</b>	<b>66.241</b>	<b>39.788</b>	<b>137.752</b>	<b>100.428</b>	<b>101.521</b>		<b>914.722</b>
Monthly % of Permitted Volume	0.34%	4.97%	0.03%	1.66%	0.21%	0.05%	0.71%	1.13%	0.68%	2.34%	1.71%	1.73%		
Cumulative % of Permitted Volume	0.34%	5.31%	5.34%	7.00%	7.21%	7.26%	7.97%	9.10%	9.77%	12.11%	13.82%	15.55%		15.55%
% of Permit Period	8.33%	15.83%	25.00%	33.06%	41.67%	49.72%	58.33%	66.67%	74.72%	83.33%	91.39%	100.00%		100.00%

**Groundwater Production - Gallons**

Parameter	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW	PGW-YTD
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Total for Year
Date of Reading	01/31/20	02/29/20	03/31/20	04/30/20	05/31/20	06/30/20	07/31/20	08/31/20	09/30/20	10/31/20	11/30/20	12/31/20		
IW-1 (GW-00112)	0	16,238,133	0	5,779,619	0	0	0	0	0	0	0	0	0	22,017,752
IW-2 (GW-00115)	0	21,999,830	550,688	12,367,349	3,326,939	0	0	401,448	0	2,518,177	383,201	0	0	41,547,632
IW-3 (GW-00452)	0	0	0	0	0	93,845	0	0	0	0	0	20,073,073	0	20,166,918
BW-1 (GW-00113)	206,915	1,740,696	0	593,049	0	0	631,825	360,065	711,333	524,620	522,991	829,291	0	6,120,785
BW-2 (GW-00116)	852,100	6,498,121	0	2,227,517	326	0	1,983,129	1,496,308	2,894,209	2,215,787	2,138,560	3,579,799	0	23,885,856
BW-3 (NW-00145)	318,031	2,461,804	1,955	891,202	0	0	938,777	625,308	1,050,218	740,333	851,449	1,403,766	0	9,282,843
BW-4 (GW-00130)	272,086	2,379,038	0	829,942	0	0	861,224	545,475	904,237	636,713	728,277	1,214,773	0	8,371,764
BW-5 (NW-00146)	303,367	2,680,450	0	1,017,959	18,899	0	974,294	1,000,363	33,237	739,356	876,865	1,475,779	0	9,120,569
BW-6 (GW-00110)	259,377	2,262,383	0	781,717	0	0	827,336	516,800	851,775	606,735	700,254	452,933	0	7,259,309
BW-7 (GW-00114)	185,083	1,611,659	0	557,205	661,478	827,336	799,638	584,251	1,928,386	1,065,859	504,743	862,528	0	9,588,166
BW-8 (NW-00147)	315,424	2,694,788	0	853,404	0	0	923,462	625,308	1,162,311	354,526	648,769	842,977	0	8,420,967
BW-9 (NW-00144)	322,918	2,461,804	0	0	0	0	55,395	0	0	0	0	0	0	2,840,117
BW-10 (GW-00111)	239,500	2,379,038	0	0	0	0	472,484	588,161	795,728	5,716,404	608,690	997,430	0	11,797,435
BW-11 (NW-00143)	326	2,461,804	0	0	0	0	906,517	609,993	1,129,725	678,422	828,965	1,348,371	0	7,964,124
BW-12 (NW-00494)	773,896	6,337,802	0	1,379,001	0	978	1,050,869	4,554,745	475,091	7,693,342	5,577,917	0	0	27,843,642
BW-13 (NW-00495)	756,626	6,205,506	0	1,393,991	0	0	1,042,071	4,476,867	469,225	7,624,262	5,625,818	0	0	27,594,366
BW-14 (NW-00551)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW-15 (NW-00552)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW-16 (NW-00553)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW-17 (NW-00527)	862,853	7,356,738	0	1,615,569	0	0	1,066,836	0	0	5,190,155	6,458,367	0	0	22,550,518
BW-18 (NW-00498)	862,202	7,465,572	0	1,607,749	0	0	1,144,063	5,199,604	559,486	8,581,938	6,269,699	0	0	31,690,313
<b>Total for Month</b>	<b>6,530,706</b>	<b>95,235,168</b>	<b>552,643</b>	<b>31,895,273</b>	<b>4,007,641</b>	<b>922,158</b>	<b>13,677,922</b>	<b>21,584,696</b>	<b>12,964,960</b>	<b>44,886,627</b>	<b>32,724,564</b>	<b>33,080,719</b>	<b>0</b>	<b>298,063,078</b>
Monthly % of Permitted Volume	0.34%	4.97%	0.03%	1.66%	0.21%	0.05%	0.71%	1.13%	0.68%	2.34%	1.71%	1.73%	0	
Cumulative % of Permitted Volume	0.34%	5.31%	5.34%	7.00%	7.21%	7.26%	7.97%	9.10%	9.77%	12.11%	13.82%	15.55%	0	15.55%
% of Permit Period	91.94%	83.61%	75.28%	66.94%	58.61%	50.28%	41.94%	33.61%	25.28%	16.94%	8.61%	0.28%	0	0.28%



**Water Level Statistics**

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	Ekstrom Well ID	AVG-WL: January Average Water Level (FtBS)	AVG-WL: February Average Water Level (FtBS)	AVG-WL: March Average Water Level (FtBS)	AVG-WL: April Average Water Level (FtBS)	AVG-WL: May Average Water Level (FtBS)	AVG-WL: June Average Water Level (FtBS)	AVG-WL: July Average Water Level (FtBS)	AVG-WL: August Average Water Level (FtBS)	AVG-WL: September Average Water Level (FtBS)	AVG-WL: October Average Water Level (FtBS)	AVG-WL: November Average Water Level (FtBS)	AVG-WL: December Average Water Level (FtBS)
Center	Lower Fresh	Center - Lower Fresh	FMW-2	46.45	53.22	46.63	48.72	45.18	42.18	42.39	45.89	50.03	48.26	46.91	46.88
East	Lower Fresh	East - Lower Fresh	FMW-3	49.16	51.99	46.96	51.03	46.14	43.43	44.14	50.53	55.33	52.05	48.97	52.4
West	Lower Fresh	West - Lower Fresh	FMW-1	44.73	47.18	46.29	44.63	42.88	40.73	40.13	44.13	48.19	46.63	44.09	43.7
Center	Upper Brackish	Center - Upper Brackish	BMW-2	16.39	26.86	16.5	18.34	14.5	13.8	14.71	17.57	18.57	21.18	25.3	16.7
East	Upper Brackish	East - Upper Brackish	BMW-3	16.78	24.57	17.46	17.69	14.13	14.21	14.7	16.41	16.9	20.93	22.24	16.2
West	Upper Brackish	West - Upper Brackish	BMW-1	15.74	24.82	15.82	17.92	16.13	14.81	12.45	15.38	15.73	14.81	18.01	16.53

**Water Conductivity Statistics**

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	Ekstrom Well ID	AVG-COND: January Average Conductivity (µS/cm)	AVG-COND: February Average Conductivity (µS/cm)	AVG-COND: March Average Conductivity (µS/cm)	AVG-COND: April Average Conductivity (µS/cm)	AVG-COND: May Average Conductivity (µS/cm)	AVG-COND: June Average Conductivity (µS/cm)	AVG-COND: July Average Conductivity (µS/cm)	AVG-COND: August Average Conductivity (µS/cm)	AVG-COND: September Average Conductivity (µS/cm)	AVG-COND: October Average Conductivity (µS/cm)	AVG-COND: November Average Conductivity (µS/cm)	AVG-COND: December Average Conductivity (µS/cm)
Center	Lower Fresh	Center - Lower Fresh	FMW-2	708.51	708.88	709.23	727.8	728.37	729.97	731.89	732.67	735.43	631.75	654.43	653.52
East	Lower Fresh	East - Lower Fresh	FMW-3	1881.57	2067.45	2008	2806.83	2935.03	2724.9	2641.95	2932.55	2945.26	2954.19	2930.23	2394.46
West	Lower Fresh	West - Lower Fresh	FMW-1	754.69	755.69	754.42	776.51	778.91	781.08	781.34	711.58	699	765.93	766.48	767.94
Center	Upper Brackish	Center - Upper Brackish	BMW-2	10644.3	9032.18	11207.87	11264.8	12002.33	11314.31	10464.69	9774.13	9729.26	9786.73	9567.63	11295.25
East	Upper Brackish	East - Upper Brackish	BMW-3	11321.04	9276.84	11625.43	11167.66	11872.48	11987	12674.58	12722.32	12321.63	10457.28	10791.86	12373.83
West	Upper Brackish	West - Upper Brackish	BMW-1	22096.79	21865.06	21894.09	21848.76	21759.08	21759.17	21589.49	21627.63	23098.23	22776.11	22899.51	22839.21

**Ekstrom Aquaculture, LLC - Palacios Farm**

Permit Year: 2021  
 Report Period Start Date: 12/01/21  
 Report Period Stop Date: 12/31/21

**Evaluation of Cumulative Groundwater Production in CY2020**

Cumulative Produced Groundwater - Year to Date (Ac-Ft):	Aggregate Volume of Groundwater Production Authorized (Ac-Ft):	Is the cumulative groundwater production (PGW-YTD-AF) for the well field less than the aggregate volume of groundwater production authorized by the District under production permits associated with water wells within the well field?
915	5,884	YES

**Intitial Conditions**

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-WL: Average Water Level (FtBS)	AVG-COND: Average Conductivity (µS/cm)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	45.90	727
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	48.30	1,898
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	42.70	769
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	15.60	9,310
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	15.00	10,261
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	14.10	24,056

### Performance Criteria

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	Maximum Water Level Change from Initial Condition during Reporting Period (ft)	Minimum Initial Conductivity Condition (µS/cm)	Maximum Initial Conductivity Condition (µS/cm)	Maximum Allowable Conductivity during reporting period (µS/cm)	Maximum Allowable Conductivity Condition during reporting period (µS/cm)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	10		2,600	799	
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	10		2,600	2,087	
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	10		2,600	846	
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	15	7,000	28,000		33,000
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	15	7,000	28,000		33,000
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	15	7,000	28,000		33,000

### Performance Evaluation of Initial Conditions

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-COND: Initial Conductivity Condition (µS/cm)	Minimum Initial Conductivity Condition (µS/cm)	Is the minimum initial conductivity condition greater than minimum initial conductivity criteria?	Maximum Initial Conductivity Condition (µS/cm)	Is the maximum initial conductivity condition less than the maximum initial conductivity criteria?
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	727		N/A	2,600	YES
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	1,898		N/A	2,600	YES
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	769		N/A	2,600	YES
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	9,310	7,000	YES	28,000	YES
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	10,261	7,000	YES	28,000	YES
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	24,056	7,000	YES	28,000	YES

### Water Level Statistics

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-WL: Reporting Period Average Water Level (FtBS)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	46.88
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	52.40
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	43.70
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	16.70
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	16.20
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	16.53

### Performance Evaluation of Water Levels during Reporting Period

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-WL: Initial Water Level Condition (FtBS)	AVG-WL: Reporting Period Water Level Condition (FtBS)	AVG-WL-DIFF: Change from Initial Water Level Condition and Report Period Water Level Condition (ft)	Criteria for Maximum Water Level Change during Reporting Period (ft)	Is the criteria for maximum water level change during the reporting period satisfied?
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	45.90	46.88	0.98	10	YES
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	48.30	52.40	4.10	10	YES
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	42.70	43.70	1.00	10	YES
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	15.60	16.70	1.10	15	YES
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	15.00	16.20	1.20	15	YES
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	14.10	16.53	2.43	15	YES

### Water Conductivity Statistics

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-COND: Reporting Period Average Conductivity (µS/cm)
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	654
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	2,394
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	768
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	11,295
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	12,374
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	22,839

### Performance Evaluation of Water Conductivity during Reporting Period

Aquifer Monitoring Site	Groundwater Zone	DAMW - Designated Aquifer Monitoring Well	AVG-COND: Initial Condition (µS/cm)	AVG-COND: Reporting Period Conductivity (µS/cm)	AVG-COND-DIFF: Change from Initial Conductivity Condition and Report Period Conductivity (µS/cm)	Maximum Allowable Conductivity during reporting period (µS/cm)	Is the criteria for maximum conductivity change during the reporting period satisfied?	Maximum Allowable Conductivity Condition during reporting period (µS/cm)	Is the criteria for maximum allowable conductivity during the reporting period satisfied?
Center	Lower Fresh (FMW-2)	Center - Lower Fresh (FMW-2)	727	654	(73)	799	YES		N/A
East	Lower Fresh (FMW-3)	East - Lower Fresh (FMW-3)	1,898	2,394	497	2,087	NO		N/A
West	Lower Fresh (FMW-1)	West - Lower Fresh (FMW-1)	769	768	(1)	846	YES		N/A
Center	Upper Brackish (BMW-2)	Center - Upper Brackish (BMW-2)	9,310	11,295	1,985		N/A	33,000	YES
East	Upper Brackish (BMW-3)	East - Upper Brackish (BMW-3)	10,261	12,374	2,113		N/A	33,000	YES
West	Upper Brackish (BMW-1)	West - Upper Brackish (BMW-1)	24,056	22,839	(1,216)		N/A	33,000	YES

I certify that this report was prepared under my direction or supervision; the information submitted is, to the best of my knowledge and belief, true, accurate and complete. Further, I certify that I am the well owner or I am authorized to act as the agent of the well owner.

\_\_\_\_\_  
Signature

James P. Ekstrom, President  
\_\_\_\_\_  
Printed Name

1/10/2022  
\_\_\_\_\_  
Date

**Ekstrom Aquaculture - Palacios Farm**

**Monitoring Well Data**

All Wells

Date Range >=3/1/2020 <=1/10/2022

EA Well ID	Texana Well ID	Date	Water Level (FtBToc)	Water Level (FtBS)	Temperature (°C)	Conductivity (µS/cm)	Total Dissolved Solids (mg/L)	Comments
BMW-1	NW-00491	03/07/20	16.10	14.10	23.58	24,056	15,636	Texana initial condition
BMW-2	NW-00489	03/07/20	17.40	15.60	23.09	9,310	6,052	Texana initial condition
BMW-3	NW-00487	03/07/20	17.70	15.00	23.42	10,261	6,670	Texana initial condition
FMW-1	NW-00492	03/07/20	44.56	42.70	25.11	769	500	Texana initial condition
FMW-2	NW-00490	03/07/20	47.65	45.90	25.25	727	473	Texana initial condition
FMW-3	NW-00488	03/07/20	51.05	48.30	24.76	1,898	1,234	Texana initial condition
BMW-1	NW-00491	03/27/20	17.00	15.00	23.60	4,372	2,842	Temp/Cond measurements not taken at same depth as Texana
BMW-2	NW-00489	03/27/20	16.70	14.90	24.00	3,414	2,219	Temp/Cond measurements not taken at same depth as Texana
BMW-3	NW-00487	03/27/20	17.60	14.90	23.30	4,037	2,624	Temp/Cond measurements not taken at same depth as Texana
FMW-1	NW-00492	03/27/20	46.30	44.44	23.70	750	488	Temp/Cond measurements not taken at same depth as Texana
FMW-2	NW-00490	03/27/20	52.60	50.85	23.70	692	450	Temp/Cond measurements not taken at same depth as Texana
FMW-3	NW-00488	03/27/20	56.30	53.55	23.40	1,687	1,097	Temp/Cond measurements not taken at same depth as Texana
BMW-1	NW-00491	04/03/20	19.50	17.50	23.60	4,264	2,772	Temp/Cond measurements not taken at same depth as Texana
BMW-2	NW-00489	04/03/20	19.90	18.10	23.10	3,293	2,140	Temp/Cond measurements not taken at same depth as Texana
BMW-3	NW-00487	04/03/20	17.20	14.50	23.30	3,597	2,338	Temp/Cond measurements not taken at same depth as Texana
FMW-1	NW-00492	04/03/20	45.80	43.94	23.60	745	484	Temp/Cond measurements not taken at same depth as Texana
FMW-2	NW-00490	04/03/20	50.90	49.15	23.60	685	445	Temp/Cond measurements not taken at same depth as Texana
FMW-3	NW-00488	04/03/20	53.60	50.85	23.30	1,660	1,079	Temp/Cond measurements not taken at same depth as Texana
BMW-1	NW-00491	04/10/20	17.20	15.20	23.60	16,000	10,400	Temp/Cond measurement taken at 160'.
BMW-2	NW-00489	04/10/20	17.40	15.60	24.00	3,170	2,061	
BMW-3	NW-00487	04/10/20	17.40	14.70	23.20	3,679	2,391	
FMW-1	NW-00492	04/10/20	46.00	44.14	23.70	706	459	
FMW-2	NW-00490	04/10/20	53.60	51.85	23.60	643	418	
FMW-3	NW-00488	04/10/20	54.25	51.50	23.40	1,630	1,060	
BMW-1	NW-00491	04/17/20	16.80	14.80	23.60	14,700	9,555	Temp/cond at same depth as TGCD probes. Meter calibrated, but procedure incorrect.
BMW-2	NW-00489	04/17/20	20.70	18.90	23.40	3,536	2,298	Temp/cond at same depth as TGCD probes. Meter calibrated, but procedure incorrect.
BMW-3	NW-00487	04/17/20	17.30	14.60	23.30	4,619	3,002	Temp/cond at same depth as TGCD probes. Meter calibrated, but procedure incorrect.
FMW-1	NW-00492	04/17/20	45.00	43.14	24.80	1,650	1,073	Temp/cond at same depth as TGCD probes. Meter calibrated, but procedure incorrect.
FMW-2	NW-00490	04/17/20	52.90	51.15	24.50	1,634	1,062	Temp/cond at same depth as TGCD probes. Meter calibrated, but procedure incorrect.
FMW-3	NW-00488	04/17/20	55.30	52.55	23.60	2,060	1,339	Temp/cond at same depth as TGCD probes. Meter calibrated, but procedure incorrect.
BMW-1	NW-00491	04/24/20	18.60	16.60	23.60	12,500	8,125	Meter calibrated with standard #1 and #3.
BMW-2	NW-00489	04/24/20	22.80	21.00	23.40	4,707	3,060	Meter calibrated with standard #1 and #3.
BMW-3	NW-00487	04/24/20	17.90	15.20	23.40	5,607	3,645	Meter calibrated with standard #1 and #3.
FMW-1	NW-00492	04/24/20	45.40	43.54	25.20	553	359	Meter calibrated with standard #1 and #3.
FMW-2	NW-00490	04/24/20	47.50	45.75	25.20	519	337	Meter calibrated with standard #1 and #3.
FMW-3	NW-00488	04/24/20	51.30	48.55	24.70	1,349	877	Meter calibrated with standard #1 and #3.
BMW-1	NW-00491	05/01/20	24.50	22.50	23.60	12,200	7,930	Meter calibrated with standard #1 and #3.
BMW-2	NW-00489	05/01/20	27.20	25.40	23.40	5,045	3,279	Meter calibrated with standard #1 and #3.
BMW-3	NW-00487	05/01/20	19.20	16.50	23.40	5,766	3,748	Meter calibrated with standard #1 and #3.
FMW-1	NW-00492	05/01/20	45.50	43.64	25.20	631	410	Meter calibrated with standard #1 and #3.
FMW-2	NW-00490	05/01/20	47.20	45.45	23.20	659	428	Meter calibrated with standard #1 and #3.
FMW-3	NW-00488	05/01/20	50.50	47.75	24.70	1,497	973	Meter calibrated with standard #1 and #3.
BMW-1	NW-00491	05/08/20	29.80	27.80	23.60	11,600	7,540	Meter calibrated with standard #1 and #2.
BMW-2	NW-00489	05/08/20	32.00	30.20	23.40	4,390	2,854	Meter calibrated with standard #1 and #2.
BMW-3	NW-00487	05/08/20	21.40	18.70	23.40	5,122	3,329	Meter calibrated with standard #1 and #2.
FMW-1	NW-00492	05/08/20	44.00	42.14	25.00	517	336	Meter calibrated with standard #1 and #2.
FMW-2	NW-00490	05/08/20	45.50	43.75	25.20	486	316	Meter calibrated with standard #1 and #2.
FMW-3	NW-00488	05/08/20	48.40	45.65	24.70	1,241	807	Meter calibrated with standard #1 and #2.
BMW-1	NW-00491	05/15/20	24.10	22.10	23.60	11,600	7,540	
BMW-2	NW-00489	05/15/20	28.50	26.70	23.40	1,385	900	
BMW-3	NW-00487	05/15/20	21.60	18.90	23.30	5,500	3,575	
FMW-1	NW-00492	05/15/20	44.10	42.24	25.00	530	345	
FMW-2	NW-00490	05/15/20	45.50	43.75	25.20	499	324	
FMW-3	NW-00488	05/15/20	48.90	46.15	24.60	1,272	827	
BMW-1	NW-00491	05/22/20	19.90	17.90	23.60	12,200	7,930	
BMW-2	NW-00489	05/22/20	25.10	23.30	23.30	4,930	3,205	IW-3 running for 5 days. Also BW-13.
BMW-3	NW-00487	05/22/20	29.70	27.00	23.30	4,586	2,981	IW-3 running for 5 days. Also BW-13.
FMW-1	NW-00492	05/22/20	42.90	41.04	25.00	529	344	
FMW-2	NW-00490	05/22/20	44.40	42.65	25.20	497	323	IW-3 running for 5 days. Also BW-13.

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FMW-3	NW-00488	05/22/20	47.20	44.45	24.60	1,257	817	IW-3 running for 5 days. Also BW-13.
BMW-1	NW-00491	05/29/20	19.50	17.50	23.40	12,100	7,865	
BMW-2	NW-00489	05/29/20	24.80	23.00	23.30	4,941	3,212	
BMW-3	NW-00487	05/29/20	20.00	17.30	23.30	5,973	3,882	
FMW-1	NW-00492	05/29/20	43.10	41.24	25.00	514	334	
FMW-2	NW-00490	05/29/20	44.50	42.75	25.20	484	315	
FMW-3	NW-00488	05/29/20	47.20	44.45	24.60	1,234	802	
BMW-1	NW-00491	06/05/20	21.50	19.50	23.60	12,100	7,865	
BMW-2	NW-00489	06/05/20	26.60	24.80	23.30	4,829	3,139	
BMW-3	NW-00487	06/05/20	19.90	17.20	23.30	5,895	3,832	
FMW-1	NW-00492	06/05/20	42.80	40.94	25.00	521	339	
FMW-2	NW-00490	06/05/20	44.50	42.75	25.20	490	319	
FMW-3	NW-00488	06/05/20	46.80	44.05	24.60	1,247	811	
BMW-1	NW-00491	06/12/20	30.70	28.70	23.40	12,000	7,800	
BMW-2	NW-00489	06/12/20	31.00	29.20	23.30	5,054	3,285	
BMW-3	NW-00487	06/12/20	21.80	19.10	23.30	5,950	3,868	
FMW-1	NW-00492	06/12/20	43.20	41.34	25.00	535	348	
FMW-2	NW-00490	06/12/20	44.30	42.55	25.20	503	327	
FMW-3	NW-00488	06/12/20	46.30	43.55	24.60	1,275	829	
BMW-1	NW-00491	06/19/20	31.20	29.20	23.60	11,700	7,605	
BMW-2	NW-00489	06/19/20	31.60	29.80	23.30	4,823	3,135	
BMW-3	NW-00487	06/19/20	21.70	19.00	23.30	5,724	3,721	
FMW-1	NW-00492	06/19/20	42.20	40.34	25.00	531	345	
FMW-2	NW-00490	06/19/20	44.00	42.25	25.20	499	324	
FMW-3	NW-00488	06/19/20	48.80	46.05	24.60	1,279	831	
BMW-1	NW-00491	06/26/20	22.00	20.00	23.40	11,500	7,475	
BMW-2	NW-00489	06/26/20	22.70	20.90	23.40	4,866	3,163	
BMW-3	NW-00487	06/26/20	21.50	18.80	23.30	5,702	3,706	
FMW-1	NW-00492	06/26/20	42.40	40.54	25.00	507	330	
FMW-2	NW-00490	06/26/20	44.30	42.55	25.20	475	309	
FMW-3	NW-00488	06/26/20	47.90	45.15	24.60	1,205	783	
BMW-1	NW-00491	07/03/20	18.80	16.80	23.40	11,400	7,410	
BMW-2	NW-00489	07/03/20	19.00	17.20	23.40	4,856	3,156	
BMW-3	NW-00487	07/03/20	19.70	17.00	23.30	6,020	3,913	
FMW-1	NW-00492	07/03/20	43.20	41.34	25.00	518	337	
FMW-2	NW-00490	07/03/20	45.00	43.25	25.20	487	317	
FMW-3	NW-00488	07/03/20	48.00	45.25	24.60	1,240	806	
BMW-1	NW-00491	07/10/20	22.90	20.90	23.40	11,500	7,475	
BMW-2	NW-00489	07/10/20	23.40	21.60	23.40	4,911	3,192	
BMW-3	NW-00487	07/10/20	23.90	21.20	23.30	5,704	3,708	
FMW-1	NW-00492	07/10/20	45.00	43.14	25.00	511	332	
FMW-2	NW-00490	07/10/20	47.30	45.55	25.20	480	312	
FMW-3	NW-00488	07/10/20	53.60	50.85	24.60	1,241	807	
BMW-1	NW-00491	07/17/20	26.20	24.20	23.40	11,400	7,410	No BW's running. Shutdown yesterday.
BMW-2	NW-00489	07/17/20	25.10	23.30	23.40	4,903	3,187	No BW's running. Shutdown yesterday.
BMW-3	NW-00487	07/17/20	23.10	20.40	23.30	5,869	3,815	No BW's running. Shutdown yesterday.
FMW-1	NW-00492	07/17/20	44.80	42.94	24.80	519	337	IW-1 and IW-2 running
FMW-2	NW-00490	07/17/20	52.60	50.85	25.20	487	317	IW-1 and IW-2 running
FMW-3	NW-00488	07/17/20	57.00	54.25	24.60	1,274	828	IW-1 and IW-2 running
BMW-1	NW-00491	07/24/20	30.60	28.60	23.40	11,200	7,280	
BMW-2	NW-00489	07/24/20	32.00	30.20	23.30	5,124	3,331	
BMW-3	NW-00487	07/24/20	28.10	25.40	23.30	5,451	3,543	
FMW-1	NW-00492	07/24/20	45.60	43.74	24.80	546	355	
FMW-2	NW-00490	07/24/20	49.00	47.25	25.20	513	333	
FMW-3	NW-00488	07/24/20	55.90	53.15	24.60	1,300	845	
BMW-1	NW-00491	07/31/20	21.70	19.70	23.40	11,500	7,475	
BMW-2	NW-00489	07/31/20	23.10	21.30	23.40	5,997	3,898	
BMW-3	NW-00487	07/31/20	23.50	20.80	23.30	5,798	3,769	
FMW-1	NW-00492	07/31/20	45.30	43.44	24.80	513	333	
FMW-2	NW-00490	07/31/20	48.10	46.35	25.20	482	313	
FMW-3	NW-00488	07/31/20	51.60	48.85	24.60	1,195	777	
BMW-1	NW-00491	08/07/20	29.30	27.30	23.40	11,200	7,280	
BMW-2	NW-00489	08/07/20	32.00	30.20	23.30	4,945	3,214	
BMW-3	NW-00487	08/07/20	29.50	26.80	23.30	4,951	3,218	
FMW-1	NW-00492	08/07/20	45.40	43.54	24.80	536	348	



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FMW-2	NW-00490	08/07/20	47.50	45.75	25.20	503	327	
FMW-3	NW-00488	08/07/20	51.30	48.55	24.60	1,258	818	
BMW-1	NW-00491	08/14/20	28.40	26.40	23.40	11,400	7,410	
BMW-2	NW-00489	08/14/20	31.30	29.50	23.30	4,953	3,219	
BMW-3	NW-00487	08/14/20	33.40	30.70	23.30	4,945	3,214	
FMW-1	NW-00492	08/14/20	46.60	44.74	24.80	520	338	
FMW-2	NW-00490	08/14/20	48.80	47.05	25.20	488	317	
FMW-3	NW-00488	08/14/20	55.90	53.15	24.60	1,238	805	
BMW-3	NW-00487	08/20/20	32.90	30.20	23.30	4,618	3,002	Immediately prior to shutting down BW-13, 17 & 18. Bower's center pivot running.
FMW-3	NW-00488	08/20/20	59.20	56.45	24.60	1,257	817	Immediately prior to shutting down BW-13, 17 & 18. Bower's center pivot running.
BMW-1	NW-00491	08/21/20	27.50	25.50	23.60	11,200	7,280	24-hours after shutting down BW-13, 17 & 18.
BMW-2	NW-00489	08/21/20	27.40	25.60	24.00	5,169	3,360	24-hours after shutting down BW-13, 17 & 18.
BMW-3	NW-00487	08/21/20	26.30	23.60	23.70	7,070	4,596	24-hours after shutting down BW-13, 17 & 18. Bower's center pivot running.
FMW-1	NW-00492	08/21/20	47.20	45.34	23.70	514	334	24-hours after shutting down BW-13, 17 & 18.
FMW-2	NW-00490	08/21/20	50.30	48.55	23.80	467	304	24-hours after shutting down BW-13, 17 & 18.
FMW-3	NW-00488	08/21/20	59.80	57.05	23.40	1,288	837	24-hours after shutting down BW-13, 17 & 18. Bower's center pivot running.
BMW-1	NW-00491	08/28/20	23.80	21.80	23.60	12,200	7,930	
BMW-2	NW-00489	08/28/20	23.40	21.60	23.40	5,110	3,322	
BMW-3	NW-00487	08/28/20	23.20	20.50	23.30	6,344	4,124	
FMW-1	NW-00492	08/28/20	48.30	46.44	25.00	546	355	
FMW-2	NW-00490	08/28/20	51.60	49.85	25.20	513	333	
FMW-3	NW-00488	08/28/20	60.70	57.95	24.60	1,240	806	
BMW-1	NW-00491	09/04/20	21.80	19.80	23.40	11,600	7,540	
BMW-2	NW-00489	09/04/20	28.00	26.20	23.30	5,139	3,340	
BMW-3	NW-00487	09/04/20	30.50	27.80	23.30	4,912	3,193	
FMW-1	NW-00492	09/04/20	51.90	50.04	24.80	532	346	Center pivot not running
FMW-2	NW-00490	09/04/20	55.60	53.85	24.70	493	320	Center pivot not running
FMW-3	NW-00488	09/04/20	62.30	59.55	24.60	1,213	788	Center pivot not running
BMW-1	NW-00491	09/11/20	32.90	30.90	23.40	11,200	7,280	All West BW's running
BMW-2	NW-00489	09/11/20	35.80	34.00	23.30	4,860	3,159	BW 12,13,17,18 running
BMW-3	NW-00487	09/11/20	33.60	30.90	23.30	4,848	3,151	BW 12,13,17,18 running
FMW-1	NW-00492	09/11/20	50.50	48.64	24.80	516	335	Bowers Center pivot running. IW1 ran 9/3-9/6.
FMW-2	NW-00490	09/11/20	54.40	52.65	25.20	484	315	Bowers Center pivot running. IW1 ran 9/3-9/6.
FMW-3	NW-00488	09/11/20	63.70	60.95	24.70	1,146	745	Bowers Center pivot running. IW1 ran 9/3-9/6.
BMW-1	NW-00491	09/18/20	20.80	18.80	23.40	11,900	7,735	All wells off, center pivot not running.
BMW-2	NW-00489	09/18/20	22.60	20.80	23.40	5,331	3,465	All wells off, center pivot not running.
BMW-3	NW-00487	09/18/20	24.00	21.30	23.30	6,044	3,929	All wells off, center pivot not running.
FMW-1	NW-00492	09/18/20	50.30	48.44	24.80	518	337	All wells off, center pivot not running.
FMW-2	NW-00490	09/18/20	53.90	52.15	24.80	481	313	All wells off, center pivot not running.
FMW-3	NW-00488	09/18/20	63.70	60.95	24.60	1,134	737	All wells off, center pivot not running.
BMW-1	NW-00491	09/25/20	19.70	17.70	23.40	11,700	7,605	All wells off, center pivot not running.
BMW-2	NW-00489	09/25/20	20.20	18.40	23.30	5,004	3,253	All wells off, center pivot not running.
BMW-3	NW-00487	09/25/20	22.40	19.70	23.30	6,562	4,265	All wells off, center pivot not running.
FMW-1	NW-00492	09/25/20	50.90	49.04	25.00	514	334	All wells off, center pivot not running.
FMW-2	NW-00490	09/25/20	54.40	52.65	25.20	483	314	All wells off, center pivot not running.
FMW-3	NW-00488	09/25/20	60.40	57.65	24.60	1,078	701	All wells off, center pivot not running.
BMW-1	NW-00491	10/02/20	18.30	16.30	23.40	11,200	7,280	All wells off, center pivot not running. IW2 ran 9/26-27 & 9/28-9/29.
BMW-2	NW-00489	10/02/20	20.20	18.40	23.40	5,039	3,275	All wells off, center pivot not running. IW2 ran 9/26-27 & 9/28-9/29.
BMW-3	NW-00487	10/02/20	22.50	19.80	23.30	5,824	3,786	All wells off, center pivot not running. IW2 ran 9/26-27 & 9/28-9/29.
FMW-1	NW-00492	10/02/20	50.60	48.74	25.00	521	339	All wells off, center pivot not running. IW2 ran 9/26-27 & 9/28-9/29.
FMW-2	NW-00490	10/02/20	53.80	52.05	25.00	491	319	All wells off, center pivot not running. IW2 ran 9/26-27 & 9/28-9/29.
FMW-3	NW-00488	10/02/20	60.10	57.35	24.60	1,145	744	All wells off, center pivot not running. IW2 ran 9/26-27 & 9/28-9/29.
BMW-1	NW-00491	10/09/20	31.00	29.00	23.40	11,500	7,475	East Farm BW's off, FW wells off, West Farm BW's on, Center Pivot running.
BMW-2	NW-00489	10/09/20	30.20	28.40	23.30	4,866	3,163	East Farm BW's off, FW wells off, West Farm BW's on, Center Pivot running.
BMW-3	NW-00487	10/09/20	26.00	23.30	23.30	5,704	3,708	East Farm BW's off, FW wells off, West Farm BW's on, Center Pivot running.
FMW-1	NW-00492	10/09/20	50.60	48.74	25.00	527	343	East Farm BW's off, FW wells off, West Farm BW's on, Center Pivot running.
FMW-2	NW-00490	10/09/20	53.30	51.55	25.20	495	322	East Farm BW's off, FW wells off, West Farm BW's on, Center Pivot running.
FMW-3	NW-00488	10/09/20	61.40	58.65	24.60	1,170	761	East Farm BW's off, FW wells off, West Farm BW's on, Center Pivot running.
BMW-1	NW-00491	10/16/20	30.00	28.00	23.40	11,500	7,475	No IW's running all week. East BWs all turned on mid morning 10/16. West BWs turned off 10/16 after 5 days running. Center pivot too far away to see if running
BMW-2	NW-00489	10/16/20	27.50	25.70	23.40	4,657	3,027	No IW's running all week. East BWs all turned on mid morning 10/16. West BWs turned off 10/16 after 5 days running. Center pivot too far away to see if running
BMW-3	NW-00487	10/16/20	23.50	20.80	23.30	5,568	3,619	No IW's running all week. East BWs all turned on mid morning 10/16. West BWs turned off 10/16 after 5 days running. Center pivot too far away to see if running
FMW-1	NW-00492	10/16/20	51.10	49.24	25.00	532	346	No IW's running all week. East BWs all turned on mid morning 10/16. West BWs turned off 10/16 after 5 days running. Center pivot too far away to see if running
FMW-2	NW-00490	10/16/20	53.60	51.85	25.20	499	324	No IW's running all week. East BWs all turned on mid morning 10/16. West BWs turned off 10/16 after 5 days running. Center pivot too far away to see if running
FMW-3	NW-00488	10/16/20	60.90	58.15	24.60	1,153	749	No IW's running all week. East BWs all turned on mid morning 10/16. West BWs turned off 10/16 after 5 days running. Center pivot too far away to see if running
BMW-1	NW-00491	10/23/20	22.30	20.30	23.40	12,500	8,125	East Farm BWs on since 10/16. West farm BWs off. Center pivot off.

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BMW-2	NW-00489	10/23/20	29.80	28.00	23.30	5,542	3,602	East Farm BWs on since 10/16. West farm BWs off. Center pivot off.	
BMW-3	NW-00487	10/23/20	33.20	30.50	23.30	5,175	3,364	East Farm BWs on since 10/16. West farm BWs off. Center pivot off.	
FMW-1	NW-00492	10/23/20	50.60	48.74	25.00	529	344	East Farm BWs on since 10/16. West farm BWs off. Center pivot off.	
FMW-2	NW-00490	10/23/20	53.80	52.05	25.20	496	322	East Farm BWs on since 10/16. West farm BWs off. Center pivot off.	
FMW-3	NW-00488	10/23/20	63.30	60.55	24.60	1,150	748	East Farm BWs on since 10/16. West farm BWs off. Center pivot off.	
BMW-1	NW-00491	10/30/20	30.20	28.20	23.40	11,700	7,605	All BWs running, no FWs running, center pivot running.	
BMW-2	NW-00489	10/30/20	33.40	31.60	23.30	4,931	3,205	All BWs running, no FWs running, center pivot running.	
BMW-3	NW-00487	10/30/20	29.20	26.50	23.30	4,870	3,166	All BWs running, no FWs running, center pivot running.	
FMW-1	NW-00492	10/30/20	51.60	49.74	25.00	543	353	All BWs running, no FWs running, center pivot running.	
FMW-2	NW-00490	10/30/20	54.70	52.95	25.20	508	330	All BWs running, no FWs running, center pivot running.	
FMW-3	NW-00488	10/30/20	64.40	61.65	24.60	1,162	755	All BWs running, no FWs running, center pivot running.	
BMW-1	NW-00491	11/06/20	32.30	30.30	23.40	11,600	7,540	BW12 & BW13 on 11/4. IW-2 on 11/5. All E. BWs on. Center Pivot off.	
BMW-2	NW-00489	11/06/20	30.10	28.30	23.40	4,858	3,158	BW12 & BW13 on 11/4. IW-2 on 11/5. All E. BWs on. Center Pivot off.	
BMW-3	NW-00487	11/06/20	24.60	21.90	23.30	6,160	4,004	BW12 & BW13 on 11/4. IW-2 on 11/5. All E. BWs on. Center Pivot off.	
FMW-1	NW-00492	11/06/20	51.90	50.04	25.00	526	342	BW12 & BW13 on 11/4. IW-2 on 11/5. All E. BWs on. Center Pivot off.	
FMW-2	NW-00490	11/06/20	59.90	58.15	25.20	492	320	BW12 & BW13 on 11/4. IW-2 on 11/5. All E. BWs on. Center Pivot off.	
FMW-3	NW-00488	11/06/20	67.50	64.75	24.60	1,137	739	BW12 & BW13 on 11/4. IW-2 on 11/5. All E. BWs on. Center Pivot off.	
BMW-1	NW-00491	11/13/20	24.20	22.20	23.40	11,700	7,605	All BWs off. All IW's off. Center pivot off.	
BMW-2	NW-00489	11/13/20	25.20	23.40	23.40	5,146	3,345	All BWs off. All IW's off. Center pivot off.	
BMW-3	NW-00487	11/13/20	24.30	21.60	23.30	4,977	3,235	All BWs off. All IW's off. Center pivot off.	
FMW-1	NW-00492	11/13/20	51.70	49.84	25.00	539	350	All BWs off. All IW's off. Center pivot off.	
FMW-2	NW-00490	11/13/20	55.20	53.45	25.20	505	328	All BWs off. All IW's off. Center pivot off.	
FMW-3	NW-00488	11/13/20	64.30	61.55	24.60	1,145	744	All BWs off. All IW's off. Center pivot off.	
BMW-1	NW-00491	11/20/20	21.60	19.60	23.40	11,800	7,670	No IWs running, all west farm BWs running, Center pivot running.	
BMW-2	NW-00489	11/20/20	29.60	27.80	23.30	5,182	3,368	No IWs running, all west farm BWs running, Center pivot running.	
BMW-3	NW-00487	11/20/20	31.40	28.70	23.30	4,946	3,215	No IWs running, all west farm BWs running, Center pivot running.	
FMW-1	NW-00492	11/20/20	51.90	50.04	25.00	539	350	No IWs running, all west farm BWs running, Center pivot running.	
FMW-2	NW-00490	11/20/20	55.30	53.55	25.20	505	328	No IWs running, all west farm BWs running, Center pivot running.	
FMW-3	NW-00488	11/20/20	65.10	62.35	24.60	1,135	738	No IWs running, all west farm BWs running, Center pivot running.	
BMW-1	NW-00491	11/27/20	32.70	30.70	23.40	11,200	7,280	All BWs running. No IWs running. Center pivot off.	
BMW-2	NW-00489	11/27/20	36.00	34.20	23.30	4,772	3,102	All BWs running. No IWs running. Center pivot off.	
BMW-3	NW-00487	11/27/20	31.80	29.10	23.30	4,943	3,213	All BWs running. No IWs running. Center pivot off.	
FMW-1	NW-00492	11/27/20	52.00	50.14	25.00	517	336	All BWs running. No IWs running. Center pivot off.	
FMW-2	NW-00490	11/27/20	55.20	53.45	25.20	484	315	All BWs running. No IWs running. Center pivot off.	
FMW-3	NW-00488	11/27/20	65.00	62.25	24.60	1,073	697	All BWs running. No IWs running. Center pivot off.	
BMW-1	NW-00491	12/04/20	21.20	19.20	23.40	11,700	7,605	No wells running. Center pivot off. Significant rainfall past week.	
BMW-2	NW-00489	12/04/20	23.40	21.60	23.60	6,267	4,074	No wells running. Center pivot off. Significant rainfall past week.	
BMW-3	NW-00487	12/04/20	24.90	22.20	23.30	6,003	3,902	No wells running. Center pivot off. Significant rainfall past week.	
FMW-1	NW-00492	12/04/20	52.10	50.24	25.00	526	342	No wells running. Center pivot off. Significant rainfall past week.	
FMW-2	NW-00490	12/04/20	54.40	52.65	25.20	492	320	No wells running. Center pivot off. Significant rainfall past week.	
FMW-3	NW-00488	12/04/20	60.90	58.15	24.60	1,046	680	No wells running. Center pivot off. Significant rainfall past week.	
BMW-1	NW-00491	12/11/20	20.80	18.80	23.40	11,300	7,345	No wells running. CP off.	
BMW-2	NW-00489	12/11/20	22.20	20.40	23.40	5,706	3,709	No wells running. CP off.	
BMW-3	NW-00487	12/11/20	22.60	19.90	23.40	6,455	4,196	No wells running. CP off.	
FMW-1	NW-00492	12/11/20	50.80	48.94	25.00	514	334	No wells running. CP off.	
FMW-2	NW-00490	12/11/20	53.70	51.95	25.20	481	313	No wells running. CP off.	
FMW-3	NW-00488	12/11/20	57.40	54.65	24.60	1,025	666	No wells running. CP off.	
BMW-1	NW-00491	12/18/20	18.20	16.20	23.45	11,200	7,280	No BWs running. No IWs running. CP off.	
BMW-2	NW-00489	12/18/20	19.30	17.50	23.40	6,088	3,957	No BWs running. No IWs running. CP off.	
BMW-3	NW-00487	12/18/20	21.90	19.20	23.40	6,349	4,127	No BWs running. No IWs running. CP off.	
FMW-1	NW-00492	12/18/20	49.40	47.54	25.00	516	335	No BWs running. No IWs running. CP off.	
FMW-2	NW-00490	12/18/20	51.50	49.75	25.20	483	314	No BWs running. No IWs running. CP off.	
FMW-3	NW-00488	12/18/20	55.80	53.05	24.60	1,034	672	No BWs running. No IWs running. CP off.	
BMW-1	NW-00491	12/25/20	17.90	15.90	23.40	11,100	7,215	No wells running. CP not running.	
BMW-2	NW-00489	12/25/20	18.50	16.70	23.40	6,318	4,107	No wells running. CP not running.	
BMW-3	NW-00487	12/25/20	20.10	17.40	23.40	6,389	4,153	No wells running. CP not running.	
FMW-1	NW-00492	12/25/20	49.10	47.24	25.00	533	346	No wells running. CP not running.	
FMW-2	NW-00490	12/25/20	50.40	48.65	25.00	501	326	No wells running. CP not running.	
FMW-3	NW-00488	12/25/20	54.50	51.75	24.60	1,073	697	No wells running. CP not running.	
BMW-1	NW-00491	01/01/21	18.00	16.00	23.40	11,500	7,475	No wells running. CP not running.	
BMW-2	NW-00489	01/01/21	19.50	17.70	23.40	6,588	4,282	No wells running. CP not running.	
BMW-3	NW-00487	01/01/21	20.30	17.60	23.54	6,720	4,368	No wells running. CP not running.	
FMW-1	NW-00492	01/01/21	48.40	46.54	25.00	516	335	No wells running. CP not running.	
FMW-2	NW-00490	01/01/21	50.00	48.25	25.20	483	314	No wells running. CP not running.	
FMW-3	NW-00488	01/01/21	54.60	51.85	24.60	1,046	680	No wells running. CP not running.	

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BMW-1	NW-00491	01/08/21	17.70	15.70	24.40	10,100	6,565	No wells running. CP not running.
BMW-2	NW-00489	01/08/21	18.20	16.40	23.40	6,973	4,532	No wells running. CP not running.
BMW-3	NW-00487	01/08/21	19.50	16.80	23.30	7,058	4,588	No wells running. CP not running.
FMW-1	NW-00492	01/08/21	48.10	46.24	25.80	562	365	No wells running. CP not running.
FMW-2	NW-00490	01/08/21	49.40	47.65	25.20	525	341	No wells running. CP not running.
FMW-3	NW-00488	01/08/21	54.30	51.55	24.60	1,151	748	No wells running. CP not running.
FMW-1	NW-00492	01/11/21	48.00	46.14	24.90	475	309	Re-checked reading taken on Friday 1/8.
BMW-1	NW-00491	01/15/21	18.00	16.00	23.40	11,100	7,215	No IWs running. All BWs on from 3 pm 1/11/21 to 10 am 1/12/21
BMW-2	NW-00489	01/15/21	18.50	16.70	23.40	6,325	4,111	No IWs running. All BWs on from 3 pm 1/11/21 to 10 am 1/12/21
BMW-3	NW-00487	01/15/21	19.80	17.10	23.40	6,624	4,306	No IWs running. All BWs on from 3 pm 1/11/21 to 10 am 1/12/21
FMW-1	NW-00492	01/15/21	47.40	45.54	25.00	511	332	No IWs running. All BWs on from 3 pm 1/11/21 to 10 am 1/12/21
FMW-2	NW-00490	01/15/21	48.60	46.85	25.00	491	319	No IWs running. All BWs on from 3 pm 1/11/21 to 10 am 1/12/21
FMW-3	NW-00488	01/15/21	52.00	49.25	24.60	1,055	686	No IWs running. All BWs on from 3 pm 1/11/21 to 10 am 1/12/21
BMW-1	NW-00491	01/22/21	18.80	16.80	23.40	11,100	7,215	No wells running. CP off.
BMW-2	NW-00489	01/22/21	18.00	16.20	23.60	6,276	4,079	No wells running. CP off.
BMW-3	NW-00487	01/22/21	19.50	16.80	23.40	6,428	4,178	No wells running. CP off.
FMW-1	NW-00492	01/22/21	47.40	45.54	25.00	529	344	No wells running. CP off.
FMW-2	NW-00490	01/22/21	48.30	46.55	25.20	494	321	No wells running. CP off.
FMW-3	NW-00488	01/22/21	51.80	49.05	24.60	1,070	696	No wells running. CP off.
BMW-1	NW-00491	01/29/21	17.40	15.40	23.40	11,500	7,475	No wells running. CP off.
BMW-2	NW-00489	01/29/21	18.80	17.00	23.40	5,037	3,274	No wells running. CP off.
BMW-3	NW-00487	01/29/21	19.10	16.40	23.40	6,462	4,200	No wells running. CP off.
FMW-1	NW-00492	01/29/21	45.50	43.64	25.00	521	339	No wells running. CP off.
FMW-2	NW-00490	01/29/21	46.90	45.15	25.00	482	313	No wells running. CP off.
FMW-3	NW-00488	01/29/21	50.00	47.25	24.60	1,059	688	No wells running. CP off.
BMW-1	NW-00491	02/05/21	24.00	22.00	23.40	11,300	7,345	Wrong calibration. All BW's running. No IWs running. CP off.
BMW-2	NW-00489	02/05/21	27.80	26.00	23.30	5,011	3,257	Wrong calibration. All BW's running. No IWs running. CP off.
BMW-3	NW-00487	02/05/21	26.20	23.50	23.30	4,945	3,214	Wrong calibration. All BW's running. No IWs running. CP off.
FMW-1	NW-00492	02/05/21	45.70	43.84	25.00	759	493	Wrong calibration. All BW's running. No IWs running. CP off.
FMW-2	NW-00490	02/05/21	47.00	45.25	25.20	708	460	Wrong calibration. All BW's running. No IWs running. CP off.
FMW-3	NW-00488	02/05/21	51.30	48.55	24.60	1,490	969	Wrong calibration. All BW's running. No IWs running. CP off.
BMW-1	NW-00491	02/09/21	30.50	28.50	23.40	11,500	7,475	All BWs running. New IW-3 jetted today.
BMW-2	NW-00489	02/09/21	28.90	27.10	23.40	4,747	3,086	All BWs running. New IW-3 jetted today.
BMW-3	NW-00487	02/09/21	26.90	24.20	23.30	5,881	3,823	All BWs running. New IW-3 jetted today.
FMW-1	NW-00492	02/09/21	46.00	44.14	25.00	529	344	All BWs running. New IW-3 jetted today.
FMW-2	NW-00490	02/09/21	46.50	44.75	25.10	494	321	All BWs running. New IW-3 jetted today.
FMW-3	NW-00488	02/09/21	52.20	49.45	24.60	1,083	704	All BWs running. New IW-3 jetted today.
BMW-1	NW-00491	02/12/21	31.70	29.70	23.40	12,300	7,995	All BWs running. New IW3 jetted 2/9 & 2/10. IW1 & IW2 started today. CP off.
BMW-2	NW-00489	02/12/21	35.40	33.60	23.30	5,116	3,325	All BWs running. New IW3 jetted 2/9 & 2/10. IW1 & IW2 started today. CP off.
BMW-3	NW-00487	02/12/21	32.10	29.40	23.40	5,158	3,353	All BWs running. New IW3 jetted 2/9 & 2/10. IW1 & IW2 started today. CP off.
FMW-1	NW-00492	02/12/21	46.80	44.94	25.00	498	324	All BWs running. New IW3 jetted 2/9 & 2/10. IW1 & IW2 started today. CP off.
FMW-2	NW-00490	02/12/21	48.00	46.25	25.20	470	306	All BWs running. New IW3 jetted 2/9 & 2/10. IW1 & IW2 started today. CP off.
FMW-3	NW-00488	02/12/21	50.90	48.15	24.60	1,015	660	All BWs running. New IW3 jetted 2/9 & 2/10. IW1 & IW2 started today. CP off.
BMW-1	NW-00491	02/19/21	34.50	32.50	23.60	11,300	7,345	All wells running. CP off.
BMW-2	NW-00489	02/19/21	38.80	37.00	23.40	4,953	3,219	All wells running. CP off.
BMW-3	NW-00487	02/19/21	32.90	30.20	23.40	4,986	3,241	All wells running. CP off.
FMW-1	NW-00492	02/19/21	55.20	53.34	25.00	523	340	All wells running. CP off.
FMW-2	NW-00490	02/19/21	72.20	70.45	25.20	487	317	All wells running. CP off.
FMW-3	NW-00488	02/19/21	64.80	62.05	24.70	1,070	696	All wells running. CP off.
BMW-1	NW-00491	02/26/21	26.80	24.80	24.90	11,500	7,475	Meter not functioning correctly, temps abnormal. No wells running. CP off.
BMW-2	NW-00489	02/26/21	23.50	21.70	24.80	5,990	3,894	Meter not functioning correctly, temps abnormal. No wells running. CP off.
BMW-3	NW-00487	02/26/21	24.90	22.20	24.70	6,346	4,125	Meter not functioning correctly, temps abnormal. No wells running. CP off.
FMW-1	NW-00492	02/26/21	51.80	49.94	26.60	550	358	Meter not functioning correctly, temps abnormal. No wells running. CP off.
FMW-2	NW-00490	02/26/21	55.00	53.25	26.80	514	334	Meter not functioning correctly, temps abnormal. No wells running. CP off.
FMW-3	NW-00488	02/26/21	56.00	53.25	26.40	1,422	924	Meter not functioning correctly, temps abnormal. No wells running. CP off.
BMW-1	NW-00491	03/05/21	17.90	15.90	23.70	11,400	7,410	No wells running. CP off.
BMW-2	NW-00489	03/05/21	18.80	17.00	23.70	6,252	4,064	No wells running. CP off.
BMW-3	NW-00487	03/05/21	21.10	18.40	23.70	6,522	4,239	No wells running. CP off.
FMW-1	NW-00492	03/05/21	48.80	46.94	25.40	562	365	No wells running. CP off.
FMW-2	NW-00490	03/05/21	50.10	48.35	25.20	520	338	No wells running. CP off.
FMW-3	NW-00488	03/05/21	52.10	49.35	24.90	1,434	932	No wells running. CP off.
BMW-1	NW-00491	03/12/21	17.80	15.80	23.70	11,500	7,475	No wells running. CP off.
BMW-2	NW-00489	03/12/21	19.10	17.30	23.70	6,206	4,034	No wells running. CP off.
BMW-3	NW-00487	03/12/21	20.80	18.10	23.60	6,386	4,151	No wells running. CP off.
FMW-1	NW-00492	03/12/21	47.70	45.84	25.30	524	341	No wells running. CP off.

Ekstrom Aquaculture - Palacios Farm								
FMW-2	NW-00490	03/12/21	49.50	47.75	25.00	482	313	No wells running. CP off.
FMW-3	NW-00488	03/12/21	51.30	48.55	24.80	1,323	860	No wells running. CP off.
BMW-1	NW-00491	03/19/21	18.00	16.00	23.70	11,300	7,345	No wells running. CP off.
BMW-2	NW-00489	03/19/21	19.00	17.20	23.70	6,429	4,179	No wells running. CP off.
BMW-3	NW-00487	03/19/21	20.30	17.60	23.60	6,568	4,269	No wells running. CP off.
FMW-1	NW-00492	03/19/21	47.70	45.84	25.20	521	339	No wells running. CP off.
FMW-2	NW-00490	03/19/21	49.00	47.25	25.30	487	317	No wells running. CP off.
FMW-3	NW-00488	03/19/21	50.40	47.65	24.80	1,314	854	No wells running. CP off.
BMW-1	NW-00491	03/26/21	18.40	16.40	23.70	12,000	7,800	No wells running. CP off.
BMW-2	NW-00489	03/26/21	18.10	16.30	23.70	6,695	4,352	No wells running. CP off.
BMW-3	NW-00487	03/26/21	20.40	17.70	23.70	6,816	4,430	No wells running. CP off.
FMW-1	NW-00492	03/26/21	46.60	44.74	25.30	534	347	No wells running. CP off.
FMW-2	NW-00490	03/26/21	46.80	45.05	25.30	499	324	No wells running. CP off.
FMW-3	NW-00488	03/26/21	48.20	45.45	24.80	1,341	872	No wells running. CP off.
BMW-1	NW-00491	04/02/21	16.50	14.50	23.70	12,100	7,865	No wells running. CP off.
BMW-2	NW-00489	04/02/21	16.90	15.10	23.70	6,588	4,282	No wells running. CP off.
BMW-3	NW-00487	04/02/21	18.40	15.70	23.60	6,762	4,395	No wells running. CP off.
FMW-1	NW-00492	04/02/21	44.00	42.14	25.20	522	339	No wells running. CP off.
FMW-2	NW-00490	04/02/21	45.00	43.25	24.80	481	313	No wells running. CP off.
FMW-3	NW-00488	04/02/21	46.80	44.05	24.80	1,303	847	No wells running. CP off.
BMW-1	NW-00491	04/09/21	16.70	14.70	23.70	11,500	7,475	No IW's running. BW 4,5,6,9,11,7 running. CP off.
BMW-2	NW-00489	04/09/21	18.10	16.30	23.70	6,542	4,252	No IW's running. BW 4,5,6,9,11,7 running. CP off.
BMW-3	NW-00487	04/09/21	18.80	16.10	23.60	6,623	4,305	No IW's running. BW 4,5,6,9,11,7 running. CP off.
FMW-1	NW-00492	04/09/21	44.50	42.64	25.30	518	337	No IW's running. BW 4,5,6,9,11,7 running. CP off.
FMW-2	NW-00490	04/09/21	45.70	43.95	25.30	485	315	No IW's running. BW 4,5,6,9,11,7 running. CP off.
FMW-3	NW-00488	04/09/21	49.20	46.45	24.80	1,298	844	No IW's running. BW 4,5,6,9,11,7 running. CP off.
BMW-1	NW-00491	04/16/21	21.10	19.10	23.70	11,800	7,670	All BW's off. IW-2 on. CP off.
BMW-2	NW-00489	04/16/21	20.70	18.90	23.60	5,109	3,321	All BW's off. IW-2 on. CP off.
BMW-3	NW-00487	04/16/21	19.50	16.80	23.60	6,694	4,351	All BW's off. IW-2 on. CP off.
FMW-1	NW-00492	04/16/21	46.70	44.84	25.20	503	327	All BW's off. IW-2 on. CP off.
FMW-2	NW-00490	04/16/21	54.80	53.05	25.30	473	307	All BW's off. IW-2 on. CP off.
FMW-3	NW-00488	04/16/21	56.30	53.55	24.80	1,267	824	All BW's off. IW-2 on. CP off.
BMW-1	NW-00491	04/23/21	19.00	17.00	23.70	11,500	7,475	CP off (was running 2 days ago. BW's off. IW2 running.
BMW-2	NW-00489	04/23/21	21.70	19.90	23.70	6,592	4,285	CP off (was running 2 days ago. BW's off. IW2 running.
BMW-3	NW-00487	04/23/21	23.10	20.40	23.60	5,962	3,875	CP off (was running 2 days ago. BW's off. IW2 running.
FMW-1	NW-00492	04/23/21	46.60	44.74	25.20	502	326	CP off (was running 2 days ago. BW's off. IW2 running.
FMW-2	NW-00490	04/23/21	49.30	47.55	25.30	471	306	CP off (was running 2 days ago. BW's off. IW2 running.
FMW-3	NW-00488	04/23/21	54.50	51.75	24.80	1,265	822	CP off (was running 2 days ago. BW's off. IW2 running.
BMW-1	NW-00491	04/30/21	16.60	14.60	23.70	11,900	7,735	No wells running. CP off.
BMW-2	NW-00489	04/30/21	17.40	15.60	23.70	6,630	4,310	No wells running. CP off.
BMW-3	NW-00487	04/30/21	20.00	17.30	23.60	6,670	4,336	No wells running. CP off.
FMW-1	NW-00492	04/30/21	47.20	45.34	25.20	509	331	No wells running. CP off.
FMW-2	NW-00490	04/30/21	55.10	53.35	25.30	476	309	No wells running. CP off.
FMW-3	NW-00488	04/30/21	58.20	55.45	24.80	1,276	829	No wells running. CP off.
BMW-1	NW-00491	05/07/21	17.40	15.40	23.70	11,100	7,215	No wells running. CP off.
BMW-2	NW-00489	05/07/21	17.20	15.40	23.70	6,267	4,074	No wells running. CP off.
BMW-3	NW-00487	05/07/21	18.70	16.00	23.70	5,997	3,898	No wells running. CP off.
FMW-1	NW-00492	05/07/21	46.60	44.74	25.30	504	328	No wells running. CP off.
FMW-2	NW-00490	05/07/21	48.30	46.55	25.30	472	307	No wells running. CP off.
FMW-3	NW-00488	05/07/21	51.00	48.25	24.80	1,568	1,019	No wells running. CP off.
BMW-1	NW-00491	05/14/21	17.20	15.20	23.60	11,400	7,410	IWs off. Only BW7 running. CP off.
BMW-2	NW-00489	05/14/21	17.10	15.30	23.60	6,256	4,066	IWs off. Only BW7 running. CP off.
BMW-3	NW-00487	05/14/21	18.50	15.80	23.70	6,741	4,382	IWs off. Only BW7 running. CP off.
FMW-1	NW-00492	05/14/21	45.20	43.34	25.30	520	338	IWs off. Only BW7 running. CP off.
FMW-2	NW-00490	05/14/21	46.80	45.05	25.00	480	312	IWs off. Only BW7 running. CP off.
FMW-3	NW-00488	05/14/21	48.70	45.95	24.80	1,603	1,042	IWs off. Only BW7 running. CP off.
BMW-1	NW-00491	05/21/21	14.70	12.70	23.80	11,100	7,215	No wells running. CP off.
BMW-2	NW-00489	05/21/21	15.70	13.90	23.80	6,275	4,079	No wells running. CP off.
BMW-3	NW-00487	05/21/21	17.00	14.30	23.70	6,532	4,246	No wells running. CP off.
FMW-1	NW-00492	05/21/21	43.70	41.84	25.30	534	347	No wells running. CP off.
FMW-2	NW-00490	05/21/21	45.20	43.45	25.40	498	324	No wells running. CP off.
FMW-3	NW-00488	05/21/21	47.30	44.55	24.90	1,650	1,073	No wells running. CP off.
BMW-1	NW-00491	05/28/21	15.90	13.90	23.80	11,100	7,215	No wells running. CP off.
BMW-2	NW-00489	05/28/21	16.30	14.50	23.80	6,290	4,089	No wells running. CP off.
BMW-3	NW-00487	05/28/21	17.90	15.20	23.70	6,520	4,238	No wells running. CP off.

Ekstrom Aquaculture - Palacios Farm								
FMW-1	NW-00492	05/28/21	44.00	42.14	25.70	520	338	No wells running. CP off.
FMW-2	NW-00490	05/28/21	45.20	43.45	25.40	485	315	No wells running. CP off.
FMW-3	NW-00488	05/28/21	47.10	44.35	24.80	1,594	1,036	No wells running. CP off.
BMW-1	NW-00491	06/04/21	15.90	13.90	23.80	11,100	7,215	No wells running. CP off.
BMW-2	NW-00489	06/04/21	15.80	14.00	23.80	6,272	4,077	No wells running. CP off.
BMW-3	NW-00487	06/04/21	17.40	14.70	23.70	6,580	4,277	No wells running. CP off.
FMW-1	NW-00492	06/04/21	43.50	41.64	25.30	514	334	No wells running. CP off.
FMW-2	NW-00490	06/04/21	44.80	43.05	25.40	473	307	No wells running. CP off.
FMW-3	NW-00488	06/04/21	47.50	44.75	24.80	1,547	1,006	No wells running. IW3B ran couple hours Wed. CP off.
BMW-1	NW-00491	06/11/21	16.20	14.20	23.80	11,000	7,150	Only BW7 running. CP off.
BMW-2	NW-00489	06/11/21	16.30	14.50	23.80	6,354	4,130	Only BW7 running. CP off.
BMW-3	NW-00487	06/11/21	17.80	15.10	23.70	6,658	4,328	Only BW7 running. CP off.
FMW-1	NW-00492	06/11/21	43.30	41.44	25.30	523	340	Only BW7 running. CP off.
FMW-2	NW-00490	06/11/21	45.10	43.35	25.40	470	306	ONLY BW7 running. CP off.
FMW-3	NW-00488	06/11/21	47.10	44.35	24.90	1,527	993	Only BW7 running. CP off.
BMW-1	NW-00491	06/25/21	15.90	13.90	23.70	12,300	7,995	New probe. No wells running. CP off.
BMW-2	NW-00489	06/25/21	16.20	14.40	23.70	6,686	4,346	New probe. No wells running. CP off.
BMW-3	NW-00487	06/25/21	17.20	14.50	23.60	6,815	4,430	New probe. No wells running. CP off.
FMW-1	NW-00492	06/25/21	42.30	40.44	25.20	528	343	New probe. No wells running. CP off.
FMW-2	NW-00490	06/25/21	44.60	42.85	25.30	494	321	New probe. No wells running. CP off.
FMW-3	NW-00488	06/25/21	46.90	44.15	24.80	1,615	1,050	New probe. No wells running. CP off.
BMW-1	NW-00491	07/02/21	16.10	14.10	23.70	12,000	7,800	No wells running. CP off.
BMW-2	NW-00489	07/02/21	15.80	14.00	23.70	6,550	4,258	No wells running. CP off.
BMW-3	NW-00487	07/02/21	17.50	14.80	23.60	6,760	4,394	No wells running. CP off.
FMW-1	NW-00492	07/02/21	42.40	40.54	25.20	540	351	No wells running. CP off.
FMW-2	NW-00490	07/02/21	44.90	43.15	25.30	504	328	No wells running. CP off.
FMW-3	NW-00488	07/02/21	47.20	44.45	24.89	1,622	1,054	No wells running. CP off.
BMW-1	NW-00491	07/09/21	15.50	13.50	23.60	12,100	7,865	No wells running. CP off.
BMW-2	NW-00489	07/09/21	16.10	14.30	23.70	6,520	4,238	No wells running. CP off.
BMW-3	NW-00487	07/09/21	17.80	15.10	23.60	6,990	4,544	No wells running. CP off.
FMW-1	NW-00492	07/09/21	41.50	39.64	25.20	519	337	No wells running. CP off.
FMW-2	NW-00490	07/09/21	44.40	42.65	25.30	485	315	No wells running. CP off.
FMW-3	NW-00488	07/09/21	47.10	44.35	24.80	1,544	1,004	No wells running. CP off.
BMW-1	NW-00491	07/16/21	15.90	13.90	23.70	12,000	7,800	No wells running. CP off.
BMW-2	NW-00489	07/16/21	16.40	14.60	23.70	6,291	4,089	No wells running. CP off.
BMW-3	NW-00487	07/16/21	17.80	15.10	23.60	6,629	4,309	No wells running. CP off.
FMW-1	NW-00492	07/16/21	42.50	40.64	25.20	506	329	No wells running. CP off.
FMW-2	NW-00490	07/16/21	45.40	43.65	25.30	474	308	No wells running. CP off.
FMW-3	NW-00488	07/16/21	47.70	44.95	24.80	1,490	969	No wells running. CP off.
BMW-1	NW-00491	07/23/21	16.10	14.10	23.70	12,900	8,385	No wells running. CP off. BW's 12, 13, 17 & 18 were running Tues am - Thur pm
BMW-2	NW-00489	07/23/21	18.00	16.20	23.70	7,015	4,560	No wells running. CP off. BW's 12, 13, 17 & 18 were running Tues am - Thur pm
BMW-3	NW-00487	07/23/21	19.20	16.50	23.70	6,645	4,319	No wells running. CP off. BW's 12, 13, 17 & 18 were running Tues am - Thur pm
FMW-1	NW-00492	07/23/21	42.80	40.94	25.20	522	339	No wells running. CP off. BW's 12, 13, 17 & 18 were running Tues am - Thur pm
FMW-2	NW-00490	07/23/21	45.00	43.25	25.30	488	317	No wells running. CP off. BW's 12, 13, 17 & 18 were running Tues am - Thur pm
FMW-3	NW-00488	07/23/21	47.50	44.75	24.90	1,518	987	No wells running. CP off. BW's 12, 13, 17 & 18 were running Tues am - Thur pm
BMW-1	NW-00491	07/30/21	20.60	18.60	23.70	11,900	7,735	No IWs running. 10 BWs running. CP off.
BMW-2	NW-00489	07/30/21	20.30	18.50	23.60	5,295	3,442	No IWs running. 10 BWs running. CP off.
BMW-3	NW-00487	07/30/21	19.00	16.30	23.60	6,411	4,167	No IWs running. 10 BWs running. CP off.
FMW-1	NW-00492	07/30/21	42.90	41.04	25.20	521	339	No IWs running. 10 BWs running. CP off.
FMW-2	NW-00490	07/30/21	45.30	43.55	25.30	487	317	No IWs running. 10 BWs running. CP off.
FMW-3	NW-00488	07/30/21	49.30	46.55	24.90	1,511	982	No IWs running. 10 BWs running. CP off.
BMW-1	NW-00491	08/06/21	17.50	15.50	23.70	12,400	8,060	No wells running. CP off.
BMW-2	NW-00489	08/06/21	17.40	15.60	23.60	5,736	3,728	No wells running. CP off.
BMW-3	NW-00487	08/06/21	18.60	15.90	23.70	6,722	4,369	No wells running. CP off.
FMW-1	NW-00492	08/06/21	44.50	42.64	25.20	530	345	No wells running. CP off.
FMW-2	NW-00490	08/06/21	47.50	45.75	25.30	496	322	No wells running. CP off.
FMW-3	NW-00488	08/06/21	52.50	49.75	25.20	1,536	998	No wells running. CP off.
BMW-1	NW-00491	08/13/21	16.20	14.20	23.70	12,000	7,800	No wells running. CP off.
BMW-2	NW-00489	08/13/21	16.40	14.60	23.70	6,100	3,965	No wells running. CP off.
BMW-3	NW-00487	08/13/21	17.90	15.20	23.60	6,530	4,245	No wells running. CP off.
FMW-1	NW-00492	08/13/21	44.30	42.44	25.20	523	340	No wells running. CP off.
FMW-2	NW-00490	08/13/21	47.00	45.25	25.20	490	319	No wells running. CP off.
FMW-3	NW-00488	08/13/21	52.00	49.25	24.90	1,517	986	No wells running. CP off.
BMW-1	NW-00491	08/20/21	15.10	13.10	23.60	12,600	8,190	No wells running. CP off.
BMW-2	NW-00489	08/20/21	15.50	13.70	23.70	6,767	4,399	No wells running. CP off.

Ekstrom Aquaculture - Palacios Farm								
BMW-3	NW-00487	08/20/21	17.00	14.30	23.60	6,922	4,499	No wells running. CP off.
FMW-1	NW-00492	08/20/21	45.80	43.94	25.20	533	346	No wells running. CP off.
FMW-2	NW-00490	08/20/21	47.30	45.55	25.30	495	322	No wells running. CP off.
FMW-3	NW-00488	08/20/21	53.30	50.55	24.90	1,545	1,004	No wells running. CP off.
BMW-1	NW-00491	08/27/21	18.00	16.00	23.60	12,600	8,190	IWs off. BWs 12,13,18 on. CP off.
BMW-2	NW-00489	08/27/21	24.30	22.50	23.60	5,409	3,516	IWs off. BWs 12,13,18 on. CP off.
BMW-3	NW-00487	08/27/21	23.20	20.50	23.60	5,385	3,500	IWs off. BWs 12,13,18 on. CP off.
FMW-1	NW-00492	08/27/21	47.30	45.44	25.20	541	352	IWs off. BWs 12,13,18 on. CP off.
FMW-2	NW-00490	08/27/21	49.20	47.45	25.30	507	330	IWs off. BWs 12,13,18 on. CP off.
FMW-3	NW-00488	08/27/21	57.00	54.25	24.80	1,542	1,002	IWs off. BWs 12,13,18 on. CP off.
BMW-1	NW-00491	09/03/21	28.60	26.60	23.60	12,200	7,930	IWs off. East Farm BWs off 9/2. West Farm BW's on. CP off.
BMW-2	NW-00489	09/03/21	27.40	25.60	23.60	5,111	3,322	IWs off. East Farm BWs off 9/2. West Farm BW's on. CP off.
BMW-3	NW-00487	09/03/21	22.50	19.80	23.60	6,036	3,923	IWs off. East Farm BWs off 9/2. West Farm BW's on. CP off.
FMW-1	NW-00492	09/03/21	48.40	46.54	25.20	543	353	IWs off. East Farm BWs off 9/2. West Farm BW's on. CP off.
FMW-2	NW-00490	09/03/21	50.80	49.05	25.30	508	330	IWs off. East Farm BWs off 9/2. West Farm BW's on. CP off.
FMW-3	NW-00488	09/03/21	59.40	56.65	24.80	1,487	967	IWs off. East Farm BWs off 9/2. West Farm BW's on. CP off.
BMW-1	NW-00491	09/10/21	21.90	19.90	23.70	12,500	8,125	No wells running. CP off.
BMW-2	NW-00489	09/10/21	22.00	20.20	23.60	5,316	3,455	No wells running. CP off.
BMW-3	NW-00487	09/10/21	20.70	18.00	23.60	6,648	4,321	No wells running. CP off.
FMW-1	NW-00492	09/10/21	49.60	47.74	25.20	518	337	No wells running. CP off.
FMW-2	NW-00490	09/10/21	52.30	50.55	25.30	485	315	No wells running. CP off.
FMW-3	NW-00488	09/10/21	61.00	58.25	24.80	1,291	839	No wells running. CP off.
BMW-1	NW-00491	09/17/21	18.10	16.10	23.70	12,400	8,060	No wells running. CP off.
BMW-2	NW-00489	09/17/21	18.00	16.20	23.60	6,406	4,164	No wells running. CP off.
BMW-3	NW-00487	09/17/21	19.30	16.60	23.60	6,798	4,419	No wells running. CP off.
FMW-1	NW-00492	09/17/21	51.70	49.84	25.20	546	355	No wells running. CP off.
FMW-2	NW-00490	09/17/21	53.20	51.45	25.30	512	333	No wells running. CP off.
FMW-3	NW-00488	09/17/21	59.00	56.25	24.80	1,520	988	No wells running. CP off.
BMW-1	NW-00491	09/24/21	16.70	14.70	23.60	11,800	7,670	No wells running. CP off.
BMW-2	NW-00489	09/24/21	17.10	15.30	23.60	6,478	4,211	No wells running. CP off.
BMW-3	NW-00487	09/24/21	18.70	16.00	23.60	6,689	4,348	No wells running. CP off.
FMW-1	NW-00492	09/24/21	51.70	49.84	25.20	508	330	No wells running. CP off.
FMW-2	NW-00490	09/24/21	52.10	50.35	25.30	476	309	No wells running. CP off.
FMW-3	NW-00488	09/24/21	57.40	54.65	24.90	1,668	1,084	No wells running. CP off.
BMW-1	NW-00491	10/01/21	16.00	14.00	23.60	12,400	8,060	No wells running. CP off.
BMW-2	NW-00489	10/01/21	16.20	14.40	23.70	6,683	4,344	No wells running. CP off.
BMW-3	NW-00487	10/01/21	18.40	15.70	23.60	6,706	4,359	No wells running. CP off.
FMW-1	NW-00492	10/01/21	47.70	45.84	25.20	513	333	No wells running. CP off.
FMW-2	NW-00490	10/01/21	50.70	48.95	25.30	481	313	No wells running. CP off.
FMW-3	NW-00488	10/01/21	55.10	52.35	24.80	1,676	1,089	No wells running. CP off.
BMW-1	NW-00491	10/08/21	25.20	23.20	23.70	12,400	8,060	IWs off. 13 BW's on. CP off.
BMW-2	NW-00489	10/08/21	29.90	28.10	23.60	5,209	3,386	IWs off. 13 BW's on. CP off.
BMW-3	NW-00487	10/08/21	24.70	22.00	23.60	5,433	3,531	IWs off. 13 BW's on. CP off.
FMW-1	NW-00492	10/08/21	47.50	45.64	25.20	517	336	IWs off. 13 BW's on. CP off.
FMW-2	NW-00490	10/08/21	50.40	48.65	25.30	484	315	IWs off. 13 BW's on. CP off.
FMW-3	NW-00488	10/08/21	55.80	53.05	24.90	1,688	1,097	IWs off. 13 BW's on. CP off.
BMW-1	NW-00491	10/15/21	18.60	16.60	23.60	12,600	8,190	IWs off. 4 BW's on. CP off.
BMW-2	NW-00489	10/15/21	24.20	22.40	23.60	5,278	3,431	IWs off. 4 BW's on. CP off.
BMW-3	NW-00487	10/15/21	26.40	23.70	23.60	5,024	3,266	IWs off. 4 BW's on. CP off.
FMW-1	NW-00492	10/15/21	47.80	45.94	25.20	509	331	IWs off. 4 BW's on. CP off.
FMW-2	NW-00490	10/15/21	50.60	48.85	25.30	477	310	IWs off. 4 BW's on. CP off.
FMW-3	NW-00488	10/15/21	56.00	53.25	24.80	1,652	1,074	IWs off. 4 BW's on. CP off.
BMW-1	NW-00491	10/22/21	19.70	17.70	23.70	12,300	7,995	East Farm BWs on. IWs off. CP off.
BMW-2	NW-00489	10/22/21	26.80	25.00	23.60	5,441	3,537	East Farm BWs on. IWs off. CP off.
BMW-3	NW-00487	10/22/21	31.00	28.30	23.60	5,156	3,351	East Farm BWs on. IWs off. CP off.
FMW-1	NW-00492	10/22/21	47.90	46.04	25.20	562	365	East Farm BWs on. IWs off. CP off.
FMW-2	NW-00490	10/22/21	50.70	48.95	25.30	527	343	East Farm BWs on. IWs off. CP off.
FMW-3	NW-00488	10/22/21	55.00	52.25	24.80	1,786	1,161	East Farm BWs on. IWs off. CP off.
BMW-1	NW-00491	10/29/21	19.00	17.00	23.60	12,300	7,995	No wells running. CP off.
BMW-2	NW-00489	10/29/21	20.40	18.60	23.60	6,990	4,544	No wells running. CP off.
BMW-3	NW-00487	10/29/21	22.50	19.80	23.60	6,563	4,266	No wells running. CP off.
FMW-1	NW-00492	10/29/21	49.60	47.74	25.20	526	342	No wells running. CP off.
FMW-2	NW-00490	10/29/21	52.70	50.95	25.30	490	319	No wells running. CP off.
FMW-3	NW-00488	10/29/21	56.00	53.25	24.90	1,694	1,101	No wells running. CP off.
BMW-1	NW-00491	11/05/21	17.00	15.00	23.60	13,400	8,710	No wells running. CP off.

Ekstrom Aquaculture - Palacios Farm								
BMW-2	NW-00489	11/05/21	18.20	16.40	23.60	6,813	4,428	No wells running. CP off.
BMW-3	NW-00487	11/05/21	19.70	17.00	23.60	7,118	4,627	No wells running. CP off.
FMW-1	NW-00492	11/05/21	47.30	45.44	25.20	532	346	No wells running. CP off.
FMW-2	NW-00490	11/05/21	49.70	47.95	25.30	493	320	No wells running. CP off.
FMW-3	NW-00488	11/05/21	53.60	50.85	24.80	1,722	1,119	No wells running. CP off.
BMW-1	NW-00491	11/12/21	18.80	16.80	23.60	12,700	8,255	IW's off. BWs 12,13,17,18 on. CP off.
BMW-2	NW-00489	11/12/21	26.10	24.30	23.60	5,123	3,330	IW's off. BWs 12,13,17,18 on. CP off.
BMW-3	NW-00487	11/12/21	22.41	19.71	23.60	6,460	4,199	IW's off. BWs 12,13,17,18 on. CP off.
FMW-1	NW-00492	11/12/21	47.20	45.34	25.20	533	346	IW's off. BWs 12,13,17,18 on. CP off.
FMW-2	NW-00490	11/12/21	49.00	47.25	25.30	500	325	IW's off. BWs 12,13,17,18 on. CP off.
FMW-3	NW-00488	11/12/21	52.50	49.75	24.90	1,760	1,144	IW's off. BWs 12,13,17,18 on. CP off.
BMW-1	NW-00491	11/26/21	22.50	20.50	23.60	12,300	7,995	No wells running. CP off.
BMW-2	NW-00489	11/26/21	22.90	21.10	23.60	5,472	3,557	No wells running. CP off.
BMW-3	NW-00487	11/26/21	22.90	20.20	23.60	6,330	4,115	No wells running. CP off.
FMW-1	NW-00492	11/26/21	46.30	44.44	25.20	523	340	No wells running. CP off.
FMW-2	NW-00490	11/26/21	48.70	46.95	25.30	488	317	No wells running. CP off.
FMW-3	NW-00488	11/26/21	51.40	48.65	24.80	1,754	1,140	No wells running. CP off.
BMW-1	NW-00491	12/03/21	17.70	15.70	23.70	12,100	7,865	IW3B running since 12/2. No BWs. CP off.
BMW-2	NW-00489	12/03/21	18.22	16.42	23.60	6,216	4,040	IW3B running since 12/2. No BWs. CP off.
BMW-3	NW-00487	12/03/21	19.75	17.05	23.60	6,729	4,374	IW3B running since 12/2. No BWs. CP off.
FMW-1	NW-00492	12/03/21	45.95	44.09	25.20	538	350	IW3B running since 12/2. No BWs. CP off.
FMW-2	NW-00490	12/03/21	48.21	46.46	25.30	503	327	IW3B running since 12/2. No BWs. CP off.
FMW-3	NW-00488	12/03/21	58.63	55.88	24.90	1,475	959	IW3B running since 12/2. No BWs. CP off.
BMW-1	NW-00491	12/10/21	16.36	14.36	23.60	12,400	8,060	IW-3B running. No other wells on.
BMW-2	NW-00489	12/10/21	17.30	15.50	23.60	6,903	4,487	IW-3B running. No other wells on.
BMW-3	NW-00487	12/10/21	18.49	15.79	23.60	6,987	4,542	IW-3B running. No other wells on.
FMW-1	NW-00492	12/10/21	46.13	44.27	25.20	540	351	IW-3B running. No other wells on.
FMW-2	NW-00490	12/10/21	50.90	49.15	25.30	504	328	IW-3B running. No other wells on.
FMW-3	NW-00488	12/10/21	61.50	58.75	24.70	1,182	768	IW-3B running. No other wells on.
BMW-1	NW-00491	12/17/21	16.55	14.55	23.70	11,700	7,605	No wells running.
BMW-2	NW-00489	12/17/21	16.70	14.90	23.70	6,629	4,309	No wells running.
BMW-3	NW-00487	12/17/21	17.91	15.21	23.70	6,871	4,466	No wells running.
FMW-1	NW-00492	12/17/21	47.40	45.54	25.20	534	347	No wells running.
FMW-2	NW-00490	12/17/21	50.12	48.37	25.30	498	324	No wells running.
FMW-3	NW-00488	12/17/21	53.14	50.39	24.90	1,189	773	No wells running.
BMW-1	NW-00491	12/31/21	24.20	22.20	23.70	12,400	8,060	No wells running. CP off.
BMW-2	NW-00489	12/31/21	23.55	21.75	23.70	4,714	3,064	No wells running. CP off.
BMW-3	NW-00487	12/31/21	19.48	16.78	23.70	6,358	4,133	No wells running. CP off.
FMW-1	NW-00492	12/31/21	44.75	42.89	25.30	473	307	No wells running. CP off.
FMW-2	NW-00490	12/31/21	46.57	44.82	25.50	441	287	No wells running. CP off.
FMW-3	NW-00488	12/31/21	49.13	46.38	24.90	1,050	683	No wells running. CP off.
BMW-1	NW-00491	01/07/22	18.00	16.00	23.70	12,300	7,995	BWs 3,4,6,10,11 running. No IWs. CP off.
BMW-2	NW-00489	01/07/22	17.90	16.10	23.70	6,084	3,955	BWs 3,4,6,10,11 running. No IWs. CP off.
BMW-3	NW-00487	01/07/22	18.90	16.20	23.60	6,475	4,209	BWs 3,4,6,10,11 running. No IWs. CP off.
FMW-1	NW-00492	01/07/22	45.30	43.44	25.20	517	336	BWs 3,4,6,10,11 running. No IWs. CP off.
FMW-2	NW-00490	01/07/22	46.20	44.45	25.30	481	313	BWs 3,4,6,10,11 running. No IWs. CP off.
FMW-3	NW-00488	01/07/22	48.40	45.65	24.80	1,147	746	BWs 3,4,6,10,11 running. No IWs. CP off.

Parameter Solids, Total Dissolved (g/L)

	<b>Count of Parameter Measurement</b>	<b>Min of Parameter Measurement</b>	<b>Average of Parameter Measurement</b>	<b>Max of Parameter Measurement</b>
2012	13	0.842	5.744	30.860
2013	7	0.456	0.608	0.709
2014	3	0.481	0.493	0.515
2015	13	0.414	0.890	2.594
2017	10	0.522	1.231	2.949
2018	43	0.434	3.174	17.320
2019	17	0.377	0.751	3.440
2020	10	0.571	3.602	7.556
2021	14	0.599	1.658	2.837



Parameter	Solids, Total Dissolved (g/L)									
Average of Parameter Measurement	2012	2013	2014	2015	2017	2018	2019	2020	2021	
(Texana GCD - GW-00030)					2.949	2.929			2.837	
(Texana GCD - GW-00159)						2.710			2.739	
(Texana GCD - GW-00338)	30.860					2.371			2.379	
(Texana GCD - GW-00161)									2.076	
(Texana GCD - GW-00169)	2.330					2.091			2.037	
(Texana GCD - GW-00166)						2.003			1.950	
(Texana GCD - GW-00158)					1.678	1.861			1.693	
(Texana GCD - GW-00162)						1.670			1.646	
(Texana GCD - GW-00157)					1.459	1.440			1.505	
(Texana GCD - GW-00140)	1.614					1.479			1.429	
(Texana GCD - NW-00488)							1.469	1.103		-0.366
(Texana GCD - GW-00090)						0.512	0.607		0.614	
(Texana GCD - NW-00251)									0.611	
(Texana GCD - NW-00451)						0.590	0.631	0.577	0.599	0.022
(Texana GCD - GW-00306)			0.482	0.426						
(Texana GCD - GW-00451)							0.463			
(Texana GCD - GW-00407)					1.050					
(Texana GCD - GW-00133)	0.991									
(Texana GCD - NW-00147)						17.070				
(Texana GCD - GW-00134)	1.034			1.027						
(Texana GCD - GW-00403)					0.522					
(Texana GCD - GW-00135)	1.124									
(Texana GCD - GW-00439)						0.434				
(Texana GCD - GW-00136)	1.611			1.361		1.250				
(Texana GCD - NW-00143)						6.610				
(Texana GCD - GW-00137)				0.945		0.908				
(Texana GCD - GW-00304)		0.465								
(Texana GCD - GW-00138)	0.842			0.835						
(Texana GCD - GW-00116)						7.322				
(Texana GCD - GW-00139)	2.616			2.594						
(Texana GCD - GW-00405)					1.384					
(Texana GCD - GW-00072)	13.930									
(Texana GCD - GW-00421)						0.450				
(Texana GCD - GW-00154)					0.948					
(Texana GCD - GW-00447)							0.572			
(Texana GCD - GW-00071)	13.870									
(Texana GCD - NW-00075)						0.494				
(Texana GCD - GW-00091)						0.457	0.476	0.571		
(Texana GCD - NW-00145)						8.170				
(Texana GCD - GW-00092)						3.501	3.440	3.576		
(Texana GCD - GW-00130)						6.980				
(Texana GCD - GW-00099)		0.573								
(Texana GCD - GW-00305)			0.481	0.414						
(Texana GCD - GW-00100)		0.456								
(Texana GCD - GW-00307)			0.515	0.443						
(Texana GCD - GW-00163)	2.911									
(Texana GCD - GW-00339)	0.942									
(Texana GCD - GW-00110)						7.710				
(Texana GCD - GW-00404)					0.575					
(Texana GCD - GW-00111)						7.070				
(Texana GCD - GW-00406)					0.695					
(Texana GCD - GW-00171)				0.710						
(Texana GCD - GW-00420)						0.484				
(Texana GCD - GW-00172)				0.701						
(Texana GCD - GW-00438)						0.484				
(Texana GCD - GW-00173)				0.720						
(Texana GCD - GW-00444)						0.623				

(Texana GCD - NW-00310)			0.706
(Texana GCD - GW-00450)			0.477
(Texana GCD - NW-00454)			2.684
(Texana GCD - GW-00452)			0.377
(Texana GCD - GW-00112)			0.600
(Texana GCD - NW-00140)			0.489
(Texana GCD - GW-00114)			17.320
(Texana GCD - NW-00144)			16.560
(Texana GCD - GW-00249)	0.698		
(Texana GCD - NW-00146)			4.900
(Texana GCD - GW-00253)			0.641
(Texana GCD - GW-00117)			0.520
(Texana GCD - GW-00302)	0.709		
(Texana GCD - GW-00303)	0.681		
(Texana GCD - GW-00175)		0.693	
(Texana GCD - NW-00487)			5.601
(Texana GCD - GW-00176)		0.705	
(Texana GCD - NW-00489)			5.778
(Texana GCD - GW-00244)	0.673		0.675
(Texana GCD - GW-00247)			0.672



3174	Texana GCD	Texana GCD - WQFM-20180905:1135	(Texana GCD - NW-00075)	9/5/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.494
3180	Texana GCD	Texana GCD - WQFM-20180905:1115	(Texana GCD - NW-00140)	9/5/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.489
3186	Texana GCD	Texana GCD - WQFM-20180905:1248	(Texana GCD - NW-00451)	9/5/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.59
3193	Texana GCD	Texana GCD - WQFM-20180906:0945	(Texana GCD - GW-00092)	9/6/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	3.501
3198	Texana GCD	Texana GCD - WQFM-20180906:0117	(Texana GCD - GW-00444)	9/6/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.623
3204	Texana GCD	Texana GCD - WQFM-20180906:1036	(Texana GCD - NW-00454)	9/6/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	2.684
3212	Texana GCD	Texana GCD - WQFM-20181008:1037	(Texana GCD - GW-00439)	10/8/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.434
3272	Texana GCD	Texana GCD - WQFM-20190103:1105	(Texana GCD - GW-00090)	1/3/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.625
3279	Texana GCD	Texana GCD - WQFM-20190103:0203	(Texana GCD - GW-00092)	1/3/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	3.44
3286	Texana GCD	Texana GCD - WQFM-20190103:1002	(Texana GCD - GW-00447)	1/3/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.572
3291	Texana GCD	Texana GCD - WQFM-20190103:0112	(Texana GCD - GW-00450)	1/3/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.477
3299	Texana GCD	Texana GCD - WQFM-20190103:1249	(Texana GCD - GW-00451)	1/3/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.463
3489	Texana GCD	Texana GCD - WQFM-20190312:1123	(Texana GCD - GW-00452)	3/12/2019 (Calibrated Probe)		Solids, Total Dissolved (g/L)	0.377
3500	Texana GCD	Texana GCD - WQFM-20190327:0128	(Texana GCD - GW-00244)	3/27/2019 (Calibrated Probe)		Solids, Total Dissolved (g/L)	0.665
3513	Texana GCD	Texana GCD - WQFM-20190327:0251	(Texana GCD - GW-00247)	3/27/2019 (Calibrated Probe)		Solids, Total Dissolved (g/L)	0.669
3520	Texana GCD	Texana GCD - WQFM-20190327:0933	(Texana GCD - NW-00310)	3/27/2019 (Calibrated Probe)		Solids, Total Dissolved (g/L)	0.706
3534	Texana GCD	Texana GCD - WQFM-20190327:1147	(Texana GCD - GW-00090)	3/27/2019 (Calibrated Probe)		Solids, Total Dissolved (g/L)	0.552
3540	Texana GCD	Texana GCD - WQFM-20180905:0135	(Texana GCD - GW-00091)	9/5/2018	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.457
3548	Texana GCD	Texana GCD - WQFM-20190327:1214	(Texana GCD - GW-00091)	3/27/2019 (Calibrated Probe)		Solids, Total Dissolved (g/L)	0.466
3549	Texana GCD	Texana GCD - WQFM-20200109:1055	(Texana GCD - NW-00487)	1/9/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	6.253
3550	Texana GCD	Texana GCD - WQFM-20200619:1010	(Texana GCD - NW-00487)	6/19/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	7.556
3551	Texana GCD	Texana GCD - WQFM-20200108:0953	(Texana GCD - NW-00487)	1/8/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	2.993
3552	Texana GCD	Texana GCD - WQFM-20200113:1025	(Texana GCD - NW-00488)	1/13/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.533
3553	Texana GCD	Texana GCD - WQFM-20200619:1106	(Texana GCD - NW-00488)	6/19/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.404
3554	Texana GCD	Texana GCD - WQFM-20200113:1048	(Texana GCD - NW-00489)	1/13/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	6.338
3555	Texana GCD	Texana GCD - WQFM-20200619:1137	(Texana GCD - NW-00489)	6/19/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	5.217
3556	Texana GCD	Texana GCD - WQFM-20200109:1502	(Texana GCD - NW-00451)	1/9/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.577
3557	Texana GCD	Texana GCD - WQFM-20190820:1238	(Texana GCD - NW-00451)	8/20/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.631
3558	Texana GCD	Texana GCD - WQFM-20190820:1145	(Texana GCD - GW-00090)	8/20/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.645
3559	Texana GCD	Texana GCD - WQFM-20200108:1336	(Texana GCD - GW-00092)	1/8/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	3.576
3560	Texana GCD	Texana GCD - WQFM-20200108:1423	(Texana GCD - GW-00091)	1/8/2020	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.571
3561	Texana GCD	Texana GCD - WQFM-20190820:1210	(Texana GCD - GW-00091)	8/20/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.485
3562	Texana GCD	Texana GCD - WQFM-20190820:1032	(Texana GCD - GW-00244)	8/20/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.684
3563	Texana GCD	Texana GCD - WQFM-20190820:0958	(Texana GCD - GW-00247)	8/20/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.675
3564	Texana GCD	Texana GCD - WQFM-20190820:0923	(Texana GCD - GW-00253)	8/20/2019	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.641
3565	Texana GCD	Texana GCD - WQFM-20210507:1252	(Texana GCD - NW-00488)	5/7/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.103
3566	Texana GCD	Texana GCD - WQFM-20210721:0932	(Texana GCD - GW-00166)	7/21/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.95
3567	Texana GCD	Texana GCD - WQFM-20210721:0959	(Texana GCD - GW-00169)	7/21/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	2.037
3568	Texana GCD	Texana GCD - WQFM-20210721:1039	(Texana GCD - GW-00159)	7/21/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	2.739
3569	Texana GCD	Texana GCD - WQFM-20210721:1111	(Texana GCD - GW-00162)	7/21/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.646
3570	Texana GCD	Texana GCD - WQFM-20210721:1141	(Texana GCD - GW-00140)	7/21/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.429
3571	Texana GCD	Texana GCD - WQFM-20210721:1212	(Texana GCD - GW-00161)	7/21/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	2.076
3572	Texana GCD	Texana GCD - WQFM-20210721:1237	(Texana GCD - GW-00158)	7/21/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.693
3573	Texana GCD	Texana GCD - WQFM-20210722:1156	(Texana GCD - GW-00338)	7/22/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	2.379
3574	Texana GCD	Texana GCD - WQFM-20210726:1340	(Texana GCD - GW-00157)	7/26/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	1.505
3575	Texana GCD	Texana GCD - WQFM-20210805:1205	(Texana GCD - GW-00030)	8/5/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	2.837
3576	Texana GCD	Texana GCD - WQFM-20210816:1145	(Texana GCD - GW-00090)	8/16/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.614
3577	Texana GCD	Texana GCD - WQFM-20210816:1237	(Texana GCD - NW-00451)	8/16/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.599
3578	Texana GCD	Texana GCD - WQFM-20210817:1324	(Texana GCD - NW-00251)	8/17/2021	Conductivity Conversion	Solids, Total Dissolved (g/L)	0.611

## Groundwater Conservation Program

The program enables the District to promote activities that conserve and preserve the water resources of Jackson County. The District promotes activities such as rainwater harvesting, efficient use of groundwater, conjunctive use of groundwater and surface water, prevention of subsidence, prevention of waste, brush management, and recharge enhancement.

Contact Tim Andruss, General Manager to discuss matters related to groundwater conservation at:

- phone: (361) 579-6863
- email: [tim.andruss@vcgcd.org](mailto:tim.andruss@vcgcd.org)

The Management Plan of the District defines groundwater conservation as "*the activity and practice of seeking to use a groundwater resource in a manner that appropriately balances the impacts associated with consuming the resource and preserving the resource for the future.*" The District undertakes many activities to achieve the "appropriate balance" between groundwater use and groundwater preservation including 1) establishing conservative [desired future conditions for Jackson County](#), 2) adopting [rules that allow for limited groundwater production](#), 3) [monitoring water levels and water quality of groundwater resources](#) in Jackson County, and 4) evaluating aquifer conditions using [scientifically-credible methods](#).

**Promotion of Rainwater Harvesting:** the District encourages all water users to investigate rainwater harvesting as a means of developing alternate water sources. Additional information regarding rainwater harvesting can be viewed at the following website of the Texas A&M Agrilife Extension: [rainwaterharvesting.tamu.edu/rainwater-basics/](http://rainwaterharvesting.tamu.edu/rainwater-basics/).

**Promotion of Efficient Use of Groundwater:** the District encourages all users of groundwater to investigate methods of increasing water usage efficiency. Additional information regarding water efficiency opportunities can be viewed at the following website of the Office of Energy Efficiency and Renewable Energy: [www.energy.gov/eere/femp/water-efficient-technology-opportunity-sprinkler-automatic-shut-devices](http://www.energy.gov/eere/femp/water-efficient-technology-opportunity-sprinkler-automatic-shut-devices).

**Promotion of Conjunctive Use of Groundwater and Surface Water:** the District encourages water users to examine conjunctive use practices when considering the development of water supply projects that involve groundwater resources. The combined use of groundwater resources with surface water may optimize the characteristics of each source and conserve and preserve groundwater resources. Additional information regarding innovative water technologies related to conjunctive use can be viewed at the following website of the Texas Water Development Board: [www.twdb.texas.gov/innovativewater/](http://www.twdb.texas.gov/innovativewater/)

**Promotion of Subsidence Prevention:** the District encourages groundwater producers to investigate causes of subsidence, the vulnerability of areas within the aquifer to subsidence caused by groundwater production, and methods of developing groundwater resources to prevent subsidence caused by or contributed to by groundwater production. Additional information regarding subsidence can be viewed at the following website of the Texas Water Development Board: [www.twdb.texas.gov/groundwater/models/research/subsidence/subsidence.asp](http://www.twdb.texas.gov/groundwater/models/research/subsidence/subsidence.asp)

**Promotion of Brush Management:** the District encourages landowners to investigate the brush management as a means of potentially enhancing recharge to groundwater resources. Additional information regarding brush management and the effect on water resources can be viewed at the following site of the United States Geological Survey: [www.usgs.gov/centers/ot-water/science/effects-huisache-removal-evapotranspiration?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects=0](http://www.usgs.gov/centers/ot-water/science/effects-huisache-removal-evapotranspiration?qt-science_center_objects=0#qt-science_center_objects=0)

**Promotion of Recharge Enhancement:** the District encourages large-scale groundwater producers to investigate strategies to enhance recharge, including storage and recovery projects, as a means of conserving and preserving groundwater resources through conjunctive use. Additional information regarding storage and recovery can be viewed at the following website of the Texas Water Development Board: [www.twdb.texas.gov/innovativewater/asr/index.asp](http://www.twdb.texas.gov/innovativewater/asr/index.asp)



Parameter	Water Level Depth Below Surface (ft)
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Row Labels	Count of Parameter Measurement	Average of Parameter Measurement2
2000	32	45.2
2010	27	38.1
2013	3	44.1
2014	45	42.5
2015	53	39.1
2016	48	41.8
2017	52	38.1
2018	71	36.4
2019	54	33.1
2020	215	33.9
2021	107	32.4











3081	Texana GCD	Texana GCD - WLM-20180808:0208	(Texana GCD - GW-00077)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	23.4
3082	Texana GCD	Texana GCD - WLM-20180808:0239	(Texana GCD - GW-00082)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	25.9
3083	Texana GCD	Texana GCD - WLM-20180808:1212	(Texana GCD - GW-00244)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	30.68
3084	Texana GCD	Texana GCD - WLM-20180808:1112	(Texana GCD - GW-00251)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	39.7
3085	Texana GCD	Texana GCD - WLM-20180808:0952	(Texana GCD - GW-00291)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	20.45
3086	Texana GCD	Texana GCD - WLM-20180808:0145	(Texana GCD - GW-00292)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	44.6
3087	Texana GCD	Texana GCD - WLM-20180808:0217	(Texana GCD - GW-00385)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	30.2
3088	Texana GCD	Texana GCD - WLM-20180808:0905	(Texana GCD - GW-00409)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	31
3703	Texana GCD	Texana GCD - WLM-20180808:0827	(Texana GCD - GW-00410)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	30.93
3089	Texana GCD	Texana GCD - WLM-20180808:0839	(Texana GCD - GW-00411)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	35.65
3090	Texana GCD	Texana GCD - WLM-20180808:1139	(Texana GCD - GW-00412)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	30.6
3091	Texana GCD	Texana GCD - WLM-20180808:0814	(Texana GCD - NW-00195)	8/8/2018	Steel Tape	Water Level Depth Below Surface (ft)	38.29
3188	Texana GCD	Texana GCD - WLM-20180905:1214	(Texana GCD - NW-00451)	9/5/2018	Steel Tape	Water Level Depth Below Surface (ft)	68.59
3350	Texana GCD	Texana GCD - WLM-20190211:1214	(Texana GCD - GW-00244)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	25.56
3351	Texana GCD	Texana GCD - WLM-20190211:1138	(Texana GCD - GW-00247)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	26.44
3352	Texana GCD	Texana GCD - WLM-20190211:1256	(Texana GCD - GW-00251)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	31.27
3353	Texana GCD	Texana GCD - WLM-20190211:1037	(Texana GCD - GW-00276)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	42.2
3354	Texana GCD	Texana GCD - WLM-20190211:0308	(Texana GCD - GW-00284)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	27.6
3355	Texana GCD	Texana GCD - WLM-20190211:0329	(Texana GCD - GW-00285)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	32.9
3356	Texana GCD	Texana GCD - WLM-20190211:0214	(Texana GCD - GW-00292)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	35.2
3357	Texana GCD	Texana GCD - WLM-20190211:0149	(Texana GCD - GW-00320)	2/11/2019	Steel Tape	Water Level Depth Below Surface (ft)	37.86
3360	Texana GCD	Texana GCD - WLM-20190212:1047	(Texana GCD - GW-00073)	2/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	29.6
3361	Texana GCD	Texana GCD - WLM-20190212:1022	(Texana GCD - GW-00075)	2/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	21.22
3362	Texana GCD	Texana GCD - WLM-20190212:0922	(Texana GCD - GW-00076)	2/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	31.1
3363	Texana GCD	Texana GCD - WLM-20190212:1052	(Texana GCD - GW-00077)	2/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	21.94
3364	Texana GCD	Texana GCD - WLM-20190212:1112	(Texana GCD - GW-00082)	2/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	24.7
3365	Texana GCD	Texana GCD - WLM-20190212:0242	(Texana GCD - GW-00274)	2/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	18.5
3366	Texana GCD	Texana GCD - WLM-20190212:1141	(Texana GCD - GW-00385)	2/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	24.7
3367	Texana GCD	Texana GCD - WLM-20190213:1220	(Texana GCD - GW-00278)	2/13/2019	Steel Tape	Water Level Depth Below Surface (ft)	44.99
3368	Texana GCD	Texana GCD - WLM-20190213:0149	(Texana GCD - GW-00283)	2/13/2019	Steel Tape	Water Level Depth Below Surface (ft)	30.5
3369	Texana GCD	Texana GCD - WLM-20190213:1257	(Texana GCD - GW-00291)	2/13/2019	Steel Tape	Water Level Depth Below Surface (ft)	28.45
3370	Texana GCD	Texana GCD - WLM-20190213:1142	(Texana GCD - NW-00310)	2/13/2019	Steel Tape	Water Level Depth Below Surface (ft)	40.6
3371	Texana GCD	Texana GCD - WLM-20190214:1135	(Texana GCD - GW-00090)	2/14/2019	Steel Tape	Water Level Depth Below Surface (ft)	39.6
3372	Texana GCD	Texana GCD - WLM-20190214:1040	(Texana GCD - NW-00075)	2/14/2019	Steel Tape	Water Level Depth Below Surface (ft)	38.6
3373	Texana GCD	Texana GCD - WLM-20190214:1018	(Texana GCD - NW-00141)	2/14/2019	Steel Tape	Water Level Depth Below Surface (ft)	47.6
3374	Texana GCD	Texana GCD - WLM-20190214:0115	(Texana GCD - NW-00195)	2/14/2019	Steel Tape	Water Level Depth Below Surface (ft)	33.29
3375	Texana GCD	Texana GCD - WLM-20190214:1111	(Texana GCD - NW-00451)	2/14/2019	Steel Tape	Water Level Depth Below Surface (ft)	34.75
3490	Texana GCD	Texana GCD - WLM-20190312:1040	(Texana GCD - GW-00452)	3/12/2019	Steel Tape	Water Level Depth Below Surface (ft)	12
3702	Texana GCD	Texana GCD - WQLM-20190515	(Texana GCD - GW-00120)	4/2/2019	Steel Tape	Water Level Depth Below Surface (ft)	41.14
3701	Texana GCD	Texana GCD - WQLM-20190515	(Texana GCD - GW-00121)	4/2/2019	Steel Tape	Water Level Depth Below Surface (ft)	43.49
3699	Texana GCD	Texana GCD - WLM-20190515	(Texana GCD - GW-00122)	4/2/2019	Steel Tape	Water Level Depth Below Surface (ft)	43.54
3576	Texana GCD	Texana GCD - WLM-20190808:0110	(Texana GCD - GW-00244)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	27.43
3577	Texana GCD	Texana GCD - WLM-20190808:0126	(Texana GCD - GW-00247)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	31.42
3578	Texana GCD	Texana GCD - WLM-20190808:0150	(Texana GCD - GW-00251)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	37.36
3582	Texana GCD	Texana GCD - WLM-20190808:1045	(Texana GCD - GW-00274)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	19.09
3583	Texana GCD	Texana GCD - WLM-20190808:1056	(Texana GCD - GW-00276)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	44.03
3584	Texana GCD	Texana GCD - WLM-20190808:1240	(Texana GCD - GW-00278)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	45.7
3581	Texana GCD	Texana GCD - WLM-20190808:0316	(Texana GCD - GW-00283)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	30.12
3580	Texana GCD	Texana GCD - WLM-20190808:0305	(Texana GCD - GW-00284)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	27.92
3579	Texana GCD	Texana GCD - WLM-20190808:0246	(Texana GCD - GW-00285)	8/8/2019	Steel Tape	Water Level Depth Below Surface (ft)	32.65
3588	Texana GCD	Texana GCD - WLM-20190809:0243	(Texana GCD - GW-00073)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	31.4
3590	Texana GCD	Texana GCD - WLM-20190809:0305	(Texana GCD - GW-00075)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	28.55
3594	Texana GCD	Texana GCD - WLM-20190809:0333	(Texana GCD - GW-00075)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	29.2
3589	Texana GCD	Texana GCD - WLM-20190809:0348	(Texana GCD - GW-00077)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	21.73
3587	Texana GCD	Texana GCD - WLM-20190809:0228	(Texana GCD - GW-00082)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	24.93
3603	Texana GCD	Texana GCD - WLM-20190809:1247	(Texana GCD - GW-00090)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	39.95
3586	Texana GCD	Texana GCD - WLM-20190809:0109	(Texana GCD - GW-00140)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	40.43
3601	Texana GCD	Texana GCD - WLM-20190809:1058	(Texana GCD - GW-00291)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	30.94
3600	Texana GCD	Texana GCD - WLM-20190809:1043	(Texana GCD - GW-00292)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	36.71
3595	Texana GCD	Texana GCD - WLM-20190809:0412	(Texana GCD - GW-00385)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	25.87
3597	Texana GCD	Texana GCD - WLM-20190809:0855	(Texana GCD - GW-00410)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	34.38
3598	Texana GCD	Texana GCD - WLM-20190809:0906	(Texana GCD - GW-00411)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	36.75
3585	Texana GCD	Texana GCD - WLM-20190809:0104	(Texana GCD - NW-00075)	8/9/2019	Electronic Tape	Water Level Depth Below Surface (ft)	39.4
3604	Texana GCD	Texana GCD - WLM-20190809:1258	(Texana GCD - NW-00141)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	48
3596	Texana GCD	Texana GCD - WLM-20190809:0846	(Texana GCD - NW-00195)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	34.39
3599	Texana GCD	Texana GCD - WLM-20190809:0948	(Texana GCD - NW-00310)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	42.93
3602	Texana GCD	Texana GCD - WLM-20190809:1230	(Texana GCD - NW-00451)	8/9/2019	Steel Tape	Water Level Depth Below Surface (ft)	34.45
4387	Texana GCD	Texana GCD - WLM-20200109-01	(Texana GCD - NW-00487)	1/9/2020	Electronic Tape	Water Level Depth Below Surface (ft)	14.3
4388	Texana GCD	Texana GCD - WLM-20200113-01	(Texana GCD - NW-00488)	1/13/2020	Electronic Tape	Water Level Depth Below Surface (ft)	48.15
4389	Texana GCD	Texana GCD - WLM-20200116-01	(Texana GCD - NW-00487)	1/16/2020	Electronic Tape	Water Level Depth Below Surface (ft)	14.15
4390	Texana GCD	Texana GCD - WLM-20200117-01	(Texana GCD - NW-00488)	1/17/2020	Electronic Tape	Water Level Depth Below Surface (ft)	47.95
4391	Texana GCD	Texana GCD - WLM-20200117-02	(Texana GCD - NW-00489)	1/17/2020	Electronic Tape	Water Level Depth Below Surface (ft)	15.1
4392	Texana GCD	Texana GCD - WLM-20200117-03	(Texana GCD - NW-00490)	1/17/2020	Electronic Tape	Water Level Depth Below Surface (ft)	45.6
4306	Texana GCD	Texana GCD - WLM-20200124-01	(Texana GCD - NW-00487)	1/24/2020	Electronic Tape	Water Level Depth Below Surface (ft)	13.88
4307	Texana GCD	Texana GCD - WLM-20200124-02	(Texana GCD - NW-00488)	1/24/2020	Electronic Tape	Water Level Depth Below Surface (ft)	46.84
4308	Texana GCD	Texana GCD - WLM-20200124-03	(Texana GCD - NW-00489)	1/24/2020	Electronic Tape	Water Level Depth Below Surface (ft)	17.65
4309	Texana GCD	Texana GCD - WLM-20200124-04	(Texana GCD - NW-00490)	1/24/2020	Electronic Tape	Water Level Depth Below Surface (ft)	43.1
4310	Texana GCD	Texana GCD - WLM-20200203-01	(Texana GCD - NW-00491)	1/24/2020	Electronic Tape	Water Level Depth Below Surface (ft)	14.45
4311	Texana GCD	Texana GCD - WLM-20200203-02	(Texana GCD - NW-00492)	1/24/2020	Electronic Tape	Water Level Depth Below Surface (ft)	43.01
4319	Texana GCD	Texana GCD - WLM-20200207-08	(Texana GCD - GW-00244)	2/7/2020	Steel Tape	Water Level Depth Below Surface (ft)	26.08











Parameter	Water Level Depth Below Surface (ft)											
Average of Parameter Measurement2												
	2000	2010	2013	2014	2015	2016	2017	2018	2019	2020	2021	CY21 - CY20
(Texana GCD - GW-00073)							21.8	30.7	30.5	25.9	23.5	-2.43
(Texana GCD - GW-00075)							30.0	31.3	26.3	29.8	27.5	-2.28
(Texana GCD - GW-00076)							32.2	32.0	31.1	29.9	28.3	-1.64
(Texana GCD - GW-00077)							33.3	23.1	21.8	22.2	28.5	6.29
(Texana GCD - GW-00082)							24.3	25.8	24.8	22.9	25.1	2.15
(Texana GCD - GW-00090)									39.8	47.2	44.7	-2.48
(Texana GCD - GW-00244)			33.6		28.8			28.4	26.5	28.1	24.3	-3.81
(Texana GCD - GW-00247)					29.9				28.9	31.3	24.8	-6.52
(Texana GCD - GW-00251)					33.5			39.7	34.3	31.2	29.2	-2.01
(Texana GCD - GW-00274)	21.0	20.8		22.6	21.6	19.2	18.7	19.5	18.8	21.1	21.0	-0.05
(Texana GCD - GW-00276)	47.5	43.8		46.5	44.5	43.5	40.6	44.2	43.1	44.0	42.6	-1.40
(Texana GCD - GW-00278)		46.3		54.7	50.9	48.6	45.8	52.6	45.3	49.3	49.9	0.60
(Texana GCD - GW-00283)	40.5			36.8	34.1	32.0	31.3	32.9	30.3	33.2	34.0	0.87
(Texana GCD - GW-00284)	29.4	28.7		30.9	30.3	31.1	27.9	32.7	27.8	28.3	28.0	-0.25
(Texana GCD - GW-00285)	39.9	33.6		36.2	35.5	33.9	32.5	32.3	32.8	33.6	31.8	-1.84
(Texana GCD - GW-00291)	56.0	31.2		35.4	31.4	28.9	27.7	24.2	29.7	33.9	38.2	4.32
(Texana GCD - GW-00320)	35.4	30.6		31.9	33.8	29.4	28.3	28.1	37.9	29.5	25.3	-4.25
(Texana GCD - GW-00385)	27.7							29.4	25.3	26.7	27.5	0.78
(Texana GCD - GW-00410)					32.9			30.2	34.4	35.0	37.3	2.29
(Texana GCD - GW-00411)					36.5			34.6	36.8	34.0	33.9	-0.03
(Texana GCD - NW-00195)								35.9	33.8	35.9	32.2	-3.75
(Texana GCD - NW-00310)					42.8	42.2	40.8	37.9	41.8	43.1	41.6	-1.45
(Texana GCD - NW-00451)								68.6	34.6	46.2	46.2	-0.07
(Texana GCD - NW-00487)										20.2	16.7	-3.49
(Texana GCD - NW-00488)										50.2	48.8	-1.47
(Texana GCD - NW-00489)										23.6	16.9	-6.65
(Texana GCD - NW-00490)										47.0	46.2	-0.74
(Texana GCD - NW-00491)										21.1	16.2	-4.88
(Texana GCD - NW-00492)										45.0	43.9	-1.13
<b>Average Water Level Change by Well from CY2020 to CY2021:</b>												<b>-1.22</b>





















# Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

## Prepared for:

Calhoun County Groundwater Conservation District  
Refugio Groundwater Conservation District  
Texana Groundwater Conservation District  
Victoria County Groundwater Conservation District



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# **Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels**

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## EXECUTIVE SUMMARY

The study accomplished the following tasks for Calhoun County Groundwater Conservation District (GCD), Refugio GCD, Texana GCD, and Victoria County GCD:

1. Assembled measured groundwater elevations from GCD and Texas Water Development Board (TWDB) databases over the interval from 2000 to 2020 and integrated them into a single data set;
2. Employed geostatistical methods for interpolating annual groundwater for the Chicot and Evangeline aquifers from 2000 to 2020;
3. Evaluated the annual changes in the measured groundwater elevations across the four counties and in selected wells;
4. Provided recommendations for future work.

### Dataset of Measured Water Levels

Water level data were assembled from 658 wells from the TWDB groundwater database for Calhoun, Jackson, Refugio, and Victoria counties and for nine surrounding counties. Groundwater data were also assembled from 258 wells from the four GCDs that manage groundwater in Calhoun, Jackson, Refugio, and Victoria counties. The integration of the two data sets included identifying wells that were shared in both data sets but were assigned different names. One hundred twenty-seven wells were matched between the two data sets based on well depths, well location, and measured water levels. Annual water levels were determined for each year using measured water levels over a 6-month period. A total of 6,081 annual water levels were created from 2000 through 2020 at 801 wells for the 13 counties. Out of the 801 wells, 253 of the wells were located in Calhoun, Jackson, Refugio, and Victoria counties.

### Spatial Interpolation of Measured Groundwater Elevations

Ordinary Kriging was used to interpolate the annual water levels. Kriging is a geostatistical interpolation technique that considers both the distance and the degree of variation between known data points when estimating values in unknown areas. Ordinary Kriging provides the best linear unbiased prediction at unsampled locations and reproduces the measured values at all sampled locations exactly. To meet underlying assumptions to apply Kriging, the measured water levels were detrended prior to the application of Kriging using water levels simulated by the central Gulf Coast Groundwater Availability Model (GAM). Ordinary Kriging was implemented using a six-step process described below:

Step #1 - Assemble and inspect the data for evidence of a trend.

Step #2 – Develop a trend surface based on a smoothing the water levels simulated by the GAM.

Step #3 – Calculate the residual at each well location -- a residual is the difference between the measured value and value produced by the trend. Check whether the set of calculated residuals are normally distributed. If the residuals do not resemble a normal distribution, then repeat Step #2.

Step #4 – Construct an experimental and a theoretical semivariogram for the set of residuals for the Chicot Aquifer and for the Evangeline Aquifer.

Step #5 – Krige the residuals to produce a continuous surface across the area of interest.

Step #6 – Combine the trend surface and the Kriged surface to generate the final surface.

The residuals calculated in Step #3 were shown to approximate a normal distribution based on visual comparisons of the theoretical and actual distribution function and by statistical comparison using Liffiefors test for normality based on the Kolmogorov-Smirnov test. All of the experimental semivariograms generated from the analysis were fitted to spherical theoretical variogram models.

Ordinary Kriging was used to interpolate the water level residuals for the years 2000 through 2020 for both the Chicot Aquifer, the Evangeline Aquifer, and the Chicot and Evangeline Aquifer, which is created by combing the Chicot and Evangeline aquifers into single aquifer. The interpolation generated interpolated surfaces with a resolution of 1,000 feet (ft) for each year from 2000 to 2020. Using these surfaces, the average water levels were calculated by county and by year. The tabulation below shows results for the results at five-year intervals.

County	Aquifer	Water Level Metric	2000	2005	2010	2015	2020
Calhoun County	Chicot	avg. WL (ft, msl)	-7.0	1.9	-2.6	-7.7	-2.6
		WL change (ft)*	0.0	8.9	4.4	-0.6	4.5
	Evangeline	avg. WL (ft, msl)	17.7	13.3	18.1	3.6	16.4
		WL change (ft)*	0.0	-4.4	0.4	-14.2	-1.3
	Chicot & Evangeline	avg. WL (ft, msl)	-3.2	3.3	0.4	-6.1	0.5
		WL change (ft)*	0.0	6.6	3.6	-2.8	3.7
Jackson County	Chicot	avg. WL (ft, msl)	21.3	29.3	27.1	22.1	28.0
		WL change (ft)*	0.0	8.0	5.8	0.8	6.7
	Evangeline	avg. WL (ft, msl)	17.0	22.0	17.1	12.0	15.9
		WL change (ft)*	0.0	5.1	0.1	-4.9	-1.0
	Chicot & Evangeline	avg. WL (ft, msl)	19.0	25.6	22.0	16.9	21.9
		WL change (ft)*	19.1	6.6	3.0	-2.1	2.9
Refugio County	Chicot	avg. WL (ft, msl)	24.8	28.3	22.7	14.5	18.4
		WL change (ft)*	0.0	3.5	-2.1	-10.3	-6.4
	Evangeline	avg. WL (ft, msl)	32.5	40.7	21.7	22.3	30.9
		WL change (ft)*	0.0	8.1	-10.8	-10.3	-1.7
	Chicot & Evangeline	avg. WL (ft, msl)	26.3	31.8	20.7	16.7	22.6
		WL change (ft)*	0.0	5.6	-5.5	-9.5	-3.7
Victoria County	Chicot	avg. WL (ft, msl)	49.8	52.6	52.8	48.2	47.9
		WL change (ft)*	0.0	2.8	3.0	-1.6	-1.9
	Evangeline	avg. WL (ft, msl)	29.8	48.9	44.8	41.4	39.1
		WL change (ft)*	0.0	19.1	15.0	11.5	9.3
	Chicot & Evangeline	avg. WL (ft, msl)	41.3	52.2	50.2	46.3	45.1
		WL change (ft)*	0.0	10.9	8.9	5.0	3.8

Note: WL=water level elevation, change is measured relative to 2000; ft = feet; msl = mean sea level  
negative numbers indicate a decline in groundwater elevation over time

### Alternative Water Level Maps

Because the method used to detrend and Krig the measured water levels has not been used in Texas prior to this study, the method was compared to several alternative methods for constructing water level maps to investigate the sensitivity of the results to changes in the method's implementation and to compare the results produced by alternative methods. Among some of the notable observations are:

- The Kriged values results are not very sensitive to the amount the GAM-simulated water levels are smoothed to generate the trend surface used for detrending.
- The Kriged results can be very sensitive if the trend surface is updated to account for annual differences in the GAM simulations that account for different pumping rates.
- The Kriging of water levels without detrending can produce significantly different results than Kriging with detrending.
- The results for the Evangeline Aquifer are more sensitive to changes in how Kriging is performed than results for the Chicot Aquifer.

### Spatial and Temporal Changes in Water Levels

The surfaces generated by Kriging the measured water levels were used to generate maps showing the spatial distribution of water level change across Calhoun, Jackson, Refugio, and Victoria counties. The maps were generated for the Chicot Aquifer and the Evangeline Aquifer for 20-, 10-, and 5-year intervals. Notable changes from 2000 to 2020 are:

#### *Calhoun County*

- Chicot Aquifer: Water levels rose across about 80% of the county. The largest increase of about 20 ft occurred in northeast. Areas of decrease occurred in northwest and north regions.
- Evangeline Aquifer: Water levels dropped across about 70% of the county. The largest decrease of about 7 ft occurred in the northeast.

#### *Jackson County*

- Chicot Aquifer: Water levels rose across about 90% of the county. Increases of about 25 ft occurred in northeast and of about 20 ft occurred in south. In the remaining areas, water levels dropped less than 5 ft.
- Evangeline Aquifer: Water levels increased across about 50% of the county with the largest increase of about 12 ft occurring in the northern region. Water levels dropped across the remaining county with the greatest decline of 10 ft occurring in the southern region.

#### *Refugio County*

- Chicot Aquifer: Water levels dropped across about 70% of the county and in the northwest region where the largest decrease of about 27 ft occurred near the Goliad county line. An increase of less than 5 ft occurred across most of the southeastern portion of the county.
- Evangeline Aquifer: Water levels decreased across about 75% of the county with the largest decline of 15 ft in the north-central region of the county.

#### *Victoria County*

- Chicot Aquifer: Water levels increased across about 50% of the county and primarily in the northeast region. The largest increase of about 25 ft occurred at the center of the county. Water levels dropped in the southwest region where the largest decrease was about 15 ft.

- Evangeline Aquifer: Water levels rose across about 60% of the county and primarily in the northwest portion of the county. The largest increase of about 70 ft occurred at the center of the county. In southwest region of the county, changes in the groundwater levels ranged from about a 10 ft increase to a 20 ft decrease.

Hydrographs were generated for wells with annual water levels that are located in Calhoun, Jackson, Refugio, and Victoria counties. Hydrographs with more than four measured water level are presented and discussed in Section 6. In about half of the wells, the changes in the measured water levels over time are relatively flat (stable) over time. At about 60% of these wells, the GAM simulated water levels also were characterized as being relatively flat over time. For the wells, where there was a recognizable increase or decrease in the measured water levels over time, only about 30% of GAM -simulated water levels matched the temporal trend associated with measured water levels.

#### Recommendations for Future Work

Recommendations for future work were grouped into three general categories: (1) coordinating with the TWDB to integrate the GCD well information into the TWDB groundwater database; (2) expanding the monitoring well network and monitoring programs; and (3) expanding and improving on the geostatistical analysis provided in this study.



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## **ACROYNMS AND ABBREVIATIONS**

CDF cumulative density function

DFC desired future condition

DEM digital elevation model

ft feet

GAM groundwater availability model

GCD groundwater conservation district

GMA groundwater management area

TWC Texas Water Code

TWDB Texas Water Development Board

## 1.0 INTRODUCTION

As stated in §36.1005 of the Texas Water Code (TWC), groundwater conservation districts (GCDs) are the state's preferred method of groundwater management. The responsibilities of GCDs include the monitoring and analysis of groundwater levels to assess the conditions of the groundwater resource. In recognizing the value of using best science available to develop and implement their rule-making, four GCDs in Groundwater Management Area (GMA) 15 funded this study to use geostatistical techniques to interpret measured water levels for the purpose of quantifying change across an aquifer and evaluating compliance with Desired Future Conditions (DFCs). The four GCDs are: Calhoun County GCD, Refugio GCD, Texana GCD, and Victoria County GCD.

### 1.1 Project Overview

The project overview provides a brief introduction to the study area and lists the project objectives.

#### 1.1.1 Study Area

**Figure 1-1** shows the location of Calhoun County GCD, Refugio GCD, Texana GCD, and Victoria County GCD. The four GCDs are part of GMA 15. Figure 1-1 shows the boundary for GMA 15, which includes all or parts of fourteen counties. GMAs were created by the Texas legislature "in order to provide for the conservation, preservation, protection, recharging, and prevention of waste of the groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions" (TWC §35.001).

The primary groundwater reservoir in GMA 15 is the Gulf Coast Aquifer System. GMA 15 is currently using the central Gulf Coast Groundwater Availability Model (GAM) (Chowdhury and others, 2004) for assessing impacts of pumping on groundwater levels in the Gulf Coast Aquifer System. The central Gulf Coast GAM represents the Gulf Coast Aquifer System as four major hydrogeologic units. These four units are, from youngest to oldest, the Chicot Aquifer, the Evangeline Aquifer, the Burkeville Confining Unit, and the Jasper Aquifer. As a general rule, the Burkeville Confining Unit is considered as a clay-rich unit with low potential for producing groundwater.

**Figure 1-2** shows three vertical cross-sections through the GMA 15 GAM. The cross-sections show the upper and lower boundaries for the four units. As shown in Figure 1-2, all four units dip to the coast. Along the coastline, there are few water wells that penetrate below the lower portion of the Evangeline Aquifer because of relatively saline groundwater and because the depth is greater than 1000 feet (ft).

#### 1.1.2 Study Objectives

This study has the three study objectives for Calhoun County GCD, Refugio GCD, Texana GCD, and Victoria County GCD:

- Employ appropriate geostatistical methods for interpolating water level conditions across the Chicot and Evangeline aquifers from each year from 2000 to 2020;

- Employ appropriate geostatistical methods for interpolating water level conditions over time for the Chicot and Evangeline aquifers;
- Develop technical reports documenting condition assessments and evaluations, data sources, methods, assumptions and rationale for selected methods and assumptions.

## 1.2 Report Outline

The report contains seven sections after this introduction (Section one). Section two describes the methods used to assemble the measured water levels for evaluating groundwater level conditions in the Chicot and Evangeline aquifers. Section three introduces geostatistical techniques, explains how geostatistical methods can be used to interpolate water levels, and discusses several potential benefits offered by geostatistics over conventional interpolation methods. Section four documents the application of detrending and ordinary Kriging to interpolate measured water levels and generate maps of contoured groundwater elevations for the Chicot and the Evangeline aquifers. Section five provides the change in annual average in water levels per county and measured water levels using well hydrographs. Section seven provides suggestions for future work. Section eight provides the references.



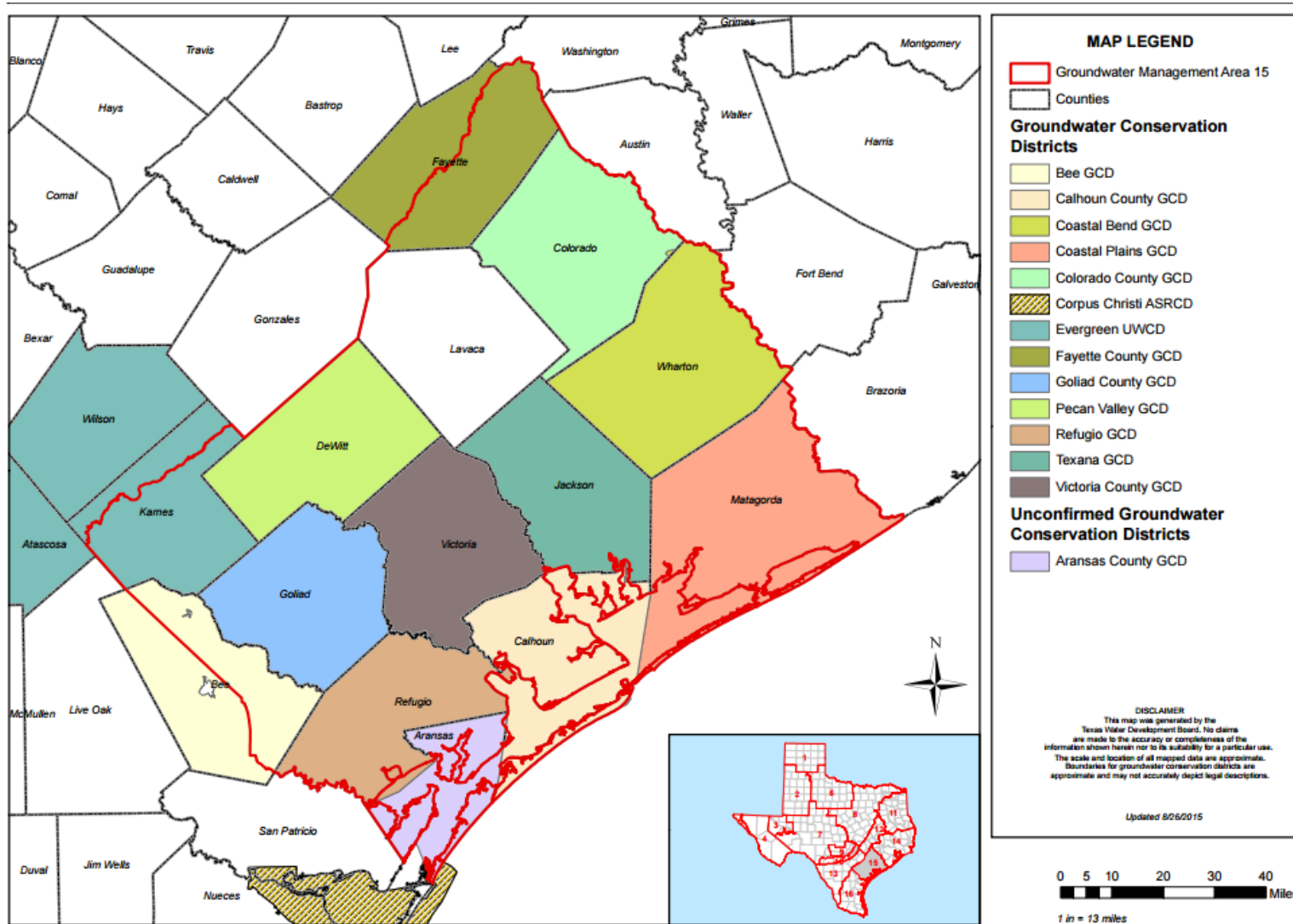


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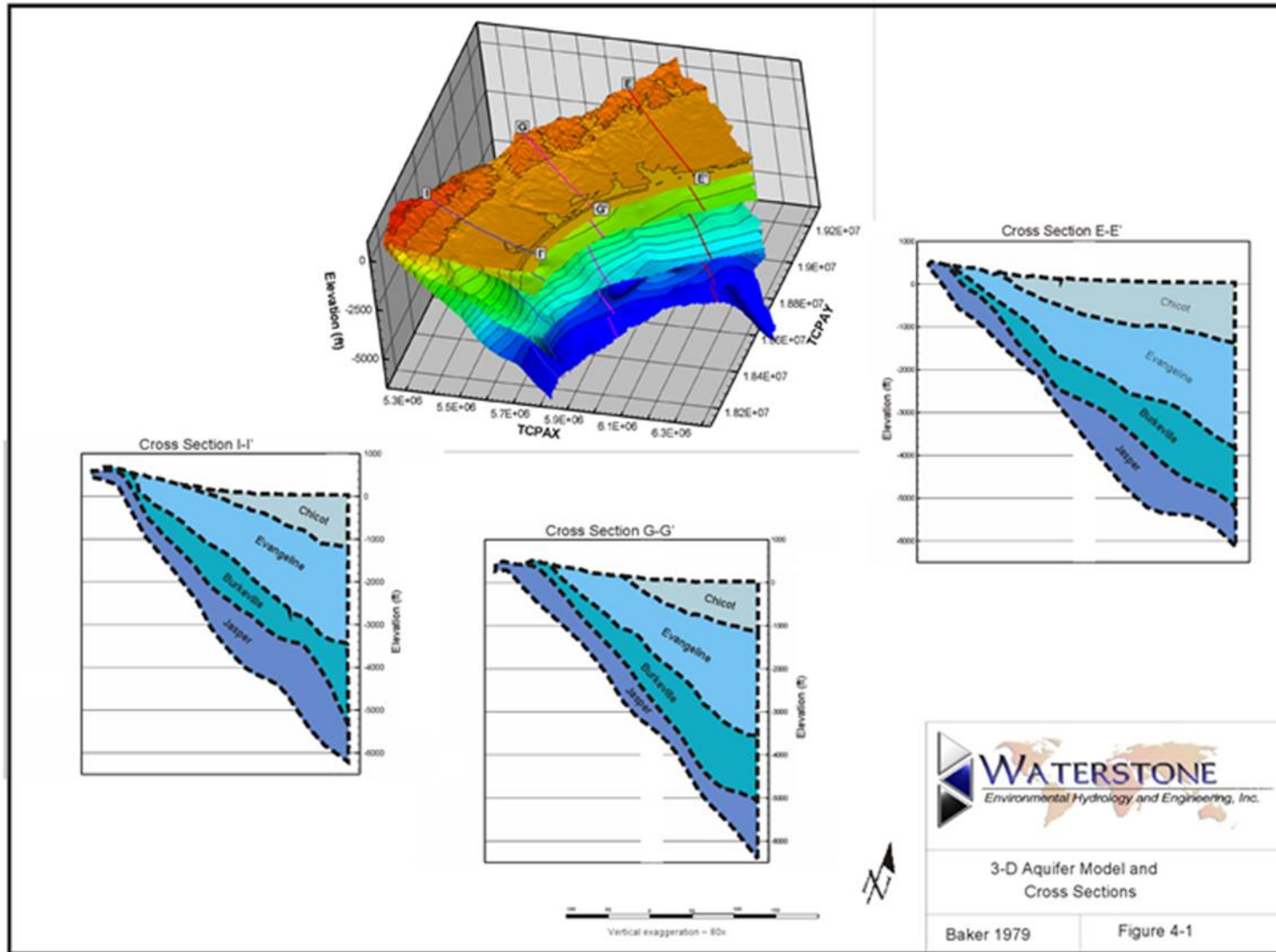


Figure 1-2 Vertical cross-sections through GMA 15 showing the four geological units that comprise the Gulf Coast Aquifer System: Chicot Aquifer, Evangeline Aquifer, Burkeville Unit, and the Jasper Aquifer (Waterstone and Parsons, 2003)

## 2.0 MEASURED WATER LEVELS

This section discusses the development of the measured water levels database used for the groundwater analysis.

### 2.1 Data Sources

Two sources of measured water levels were used for this study. Both data sets contained measured water levels for the period from 2000 to 2020. One data set was obtained from Calhoun County GCD, Refugio GCD, Texana GCD, and Victoria County GCD. The GCD data set consisted of 1,809 depth to water measurements at 256 wells for Calhoun, Jackson, Refugio, and Victoria counties. The second data set was the Texas Water Development Board (TWDB) groundwater data set. The TWDB data set consisted of 13,800 depth to water measurements at 658 wells. The TWDB data set was filtered to remove water levels that may have been affected by pumping by using appropriate flags in the TWDB data set. **Figure 2-1** shows the location of the wells associated with the GCD and TWDB data sets.

### 2.2 Merging of TWDB and GCD Datasets

As shown in **Figure 2-1**, the TWDB and GCD data sets include several of the same wells but with different names. INTERA's investigation method to verify 96 well pairs identified in the GCD data set was based on comparing well location, well depth, and water level data. Based on a comparison of these three attributes, INTERA identified 127 well pairs between the two data sets.

**Appendix A** lists the names and locations for the GCD and TWDB wells that are matched. Except for one well pair, the GCD and the TWDB data sets have different values for the location of the matched wells. **Appendix A** provides the distance calculated between the two well locations in the TWDB and the GCD data sets for each of the 127 well pairs. The locations of the matched wells in the GCD and TWDB are within 100 ft of each other for 105 of the 127 well pairs. For eight of the well pairs, the locations in the GCD and TWDB data sets are greater than 200 ft apart.

An important part of the process of identifying well pairs was the comparison of water levels in the GCD and the TWDB data sets. This comparison was performed visually using the type of plots shown in **Figure 2-2**. **Figure 2-2** shows plots of water levels for four well pairs. Each plot shows measured water levels over time using the same datum. The TWDB water levels are shown using blue dots and the GCD water levels are shown using red dots that are slightly smaller than the blue dots. Potential well pairs were identified using information provided by the GCDs and a comparison of well locations and well depths in the two data sets. The final decision on whether two wells were determined to be a well pair was based on whether or not red dots plotted inside the blue dots for water levels measured on the same date. Merging of the two data water level data sets was achieved by augmenting the TWDB data set with any new data provided in the GCD data set.

The 127 well pairs include 88 of the 96 well pairs identified in the GCD database. **Table 2-1** shows the eight well pairs that were not confirmed based on the INTERA analysis. For four of the eight well pairs,

INTERA did not have sufficient information to confirm or reject the GCD well pair because the matched wells did not have measured water levels for the same date. For the other four well pairs identified by the GCD, INTERA had matched the GCD well with different TWDB well than the well provided in the GCD data set.

Table 2-1 List of eight well pairs in the GCD data set that were not confirmed by INTERA

GCD Well ID	TWDB Well ID	
	Paired by INTERA	Paired in GCD Data Set
Refugio GCD - NW-00475	7946803	7946810
Victoria County GCD - GW-000950	8018601	8016601
Victoria County GCD - GW-000603	7916703	7916603
Refugio GCD - NW-00340	8033203	8033205
Texana GCD - GW-00284	NA	8011502
Victoria County GCD - GW-000310	NA	8018404
Texana GCD - GW-00385	NA	8012502
Victoria County GCD - GW-000189	NA	7915306

The data set generated by merging the GCD and the TWDB data used the GCD-provided location and well depth instead of the TWDB-provided information where possible. The data used for land surface elevations for each well were obtained from three sources. The order of priority used for selecting the land surface elevation were: the GCD data set (if available), the TWDB data set (if available), and then the 30-meter Digital Elevation Model (DEM) for the Texas Gulf Coast.

The merging of the GCD and the TWDB data sets generated 889 unique wells. Each of the 889 wells were assigned a unique INTERA ID. **Appendix B** lists the 889 wells in the numerical order of their INTERA ID. For each well, Appendix B lists the GCD name (if assigned), the TWDB State well number (if assigned), the land surface elevation, the well depth, and the assigned aquifer.

Each well was assigned to a geologic unit based on the elevation of the bottom of the well. The bottom elevation was determined by subtracting the well depth from the ground surface elevation. The aquifer assignment was determined by where the well’s bottom elevation is located in the three-dimensional numerical grid of the central Gulf Coast GAM (Chowdhury and others 2004). Wells with no well depth information were not assigned to a geologic unit and were instead assigned the category of “Shallow”. Conversely, wells whose bottom elevation plotted below the lowest layer in the GAM were also not assigned to a geologic unit and were instead assigned the category of “Deep”.

### 2.3 Average annual water level

A single annual water level average was calculated each year using measurements that were made over a 6-month period that spanned from October through December of the year before and from January through March of the current year. A total of 6,081 average winter water level averages are available from 2000 through 2020 at 801 wells. **Appendix C** lists the number of water level measurements that are available for the 6-month period from the TWDB data set and the GCD data set for 127 well pairs.

For 80 of these well pairs, the addition of the GCD data set increased the number of annual water level measurements.

## 2.4 Average annual water level

**Table 2-2** lists the number of wells in Calhoun, Jackson, Refugio, and Victoria counties that were used in the study. These wells were assigned to an aquifer and have at least one annual water level calculated from 2000 to 2020. The locations of these wells are shown in **Figures 2-3** through **2-6**.

Table 2-2 Number of wells with measured water levels in Calhoun, Jackson, Refugio, and Victoria counties that were used in the study

County	Number of Wells		
	Chicot	Evangeline	Total
Calhoun	19	0	19
Jackson	68	8	76
Refugio	26	9	35
Victoria	53	70	123
Total	166	87	253

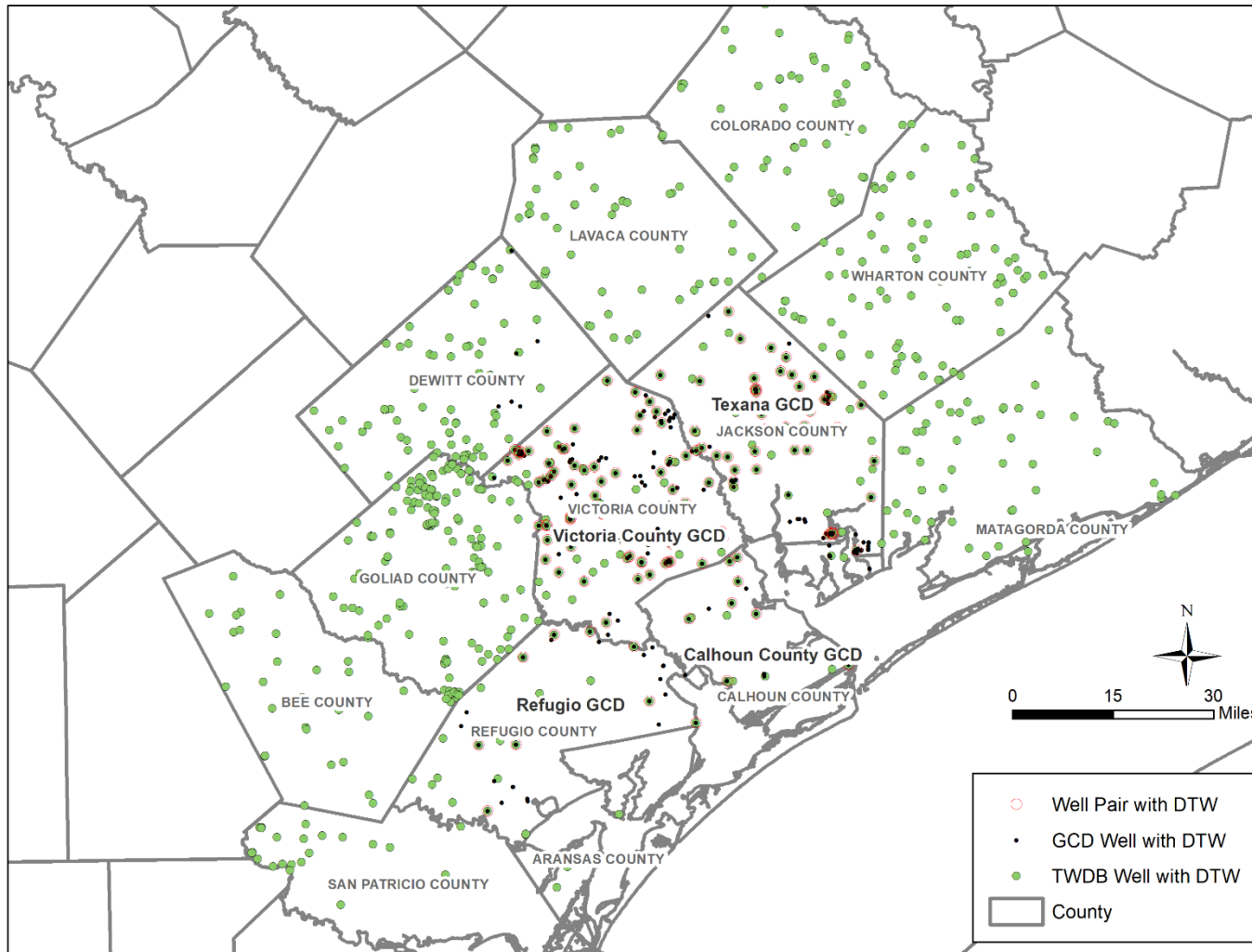


Figure 2-1 Location of the wells with measured depth to water (DTW) that were evaluated for this study

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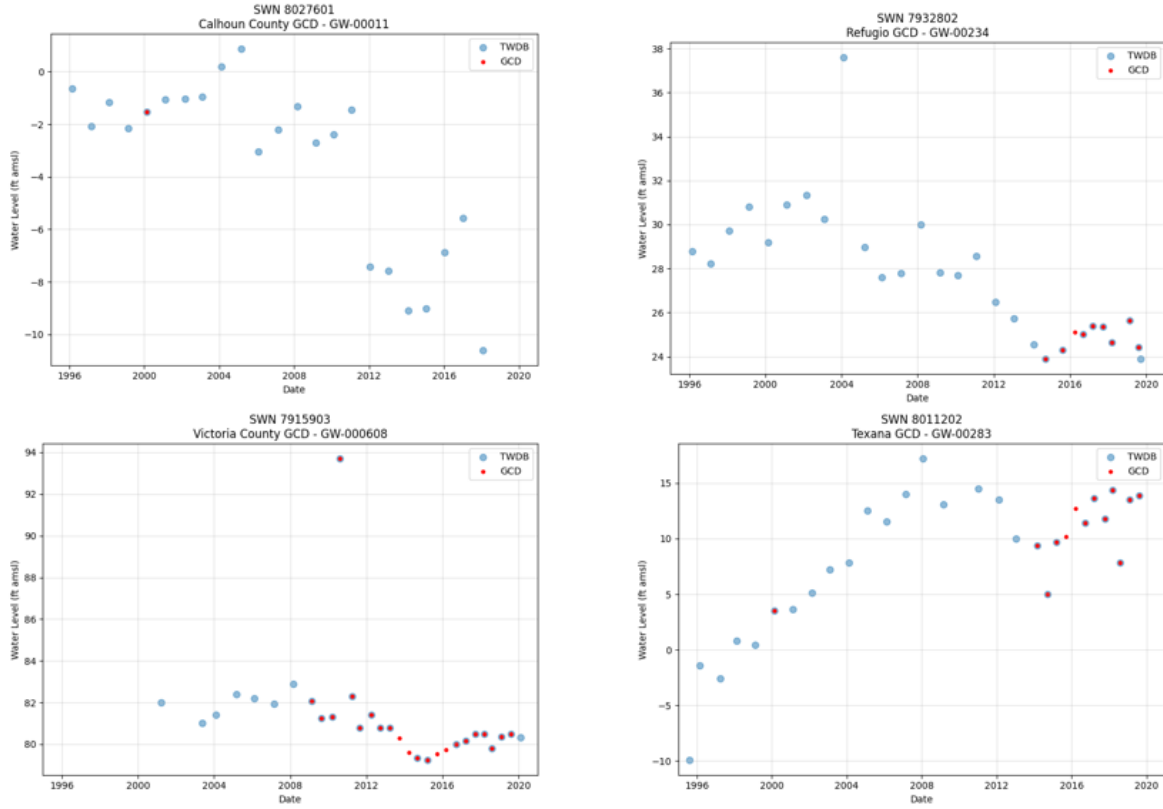
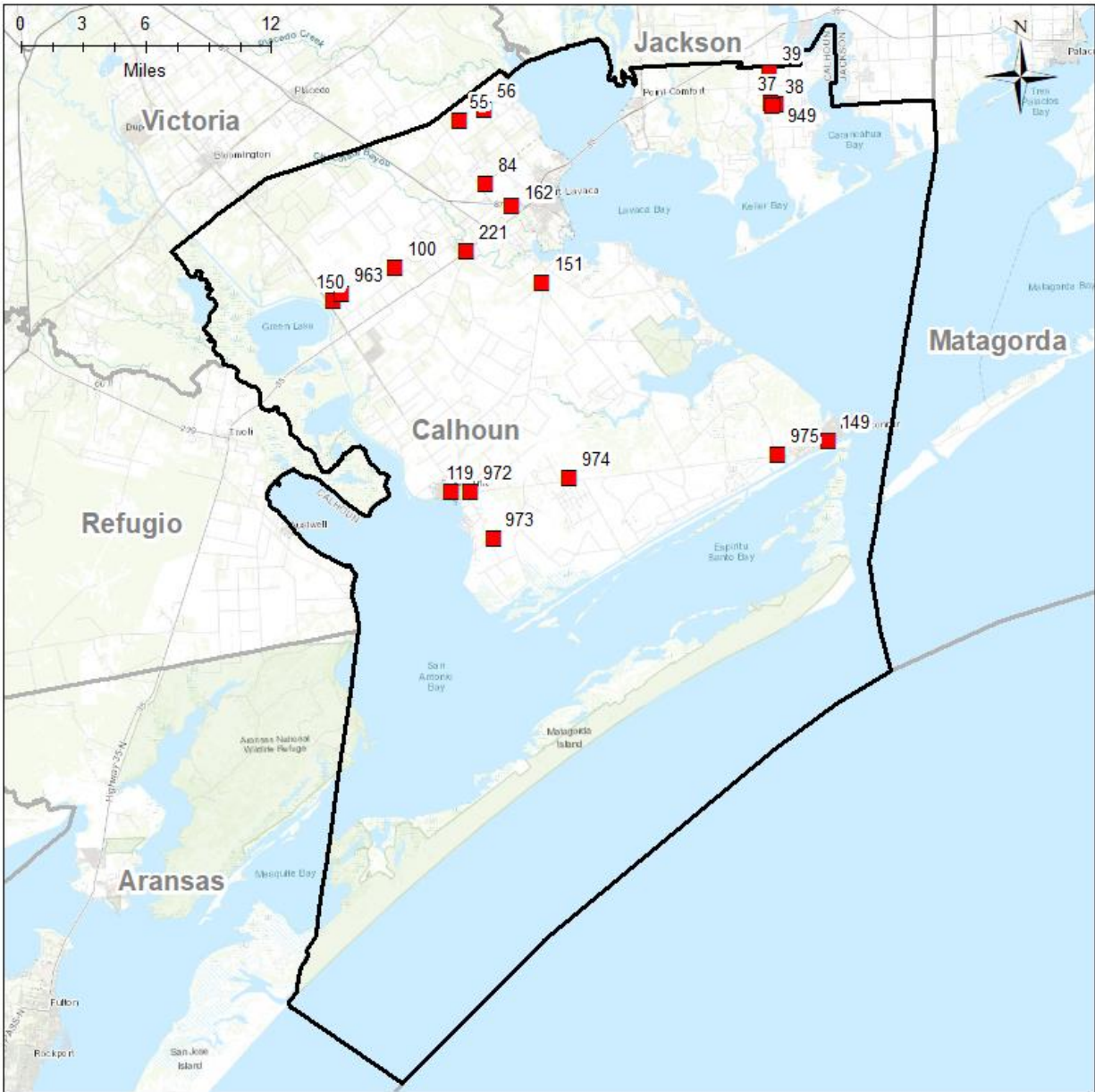


Figure 2-2 Comparison of measured water levels from the GCD and the TWDB data sets for four well pairs

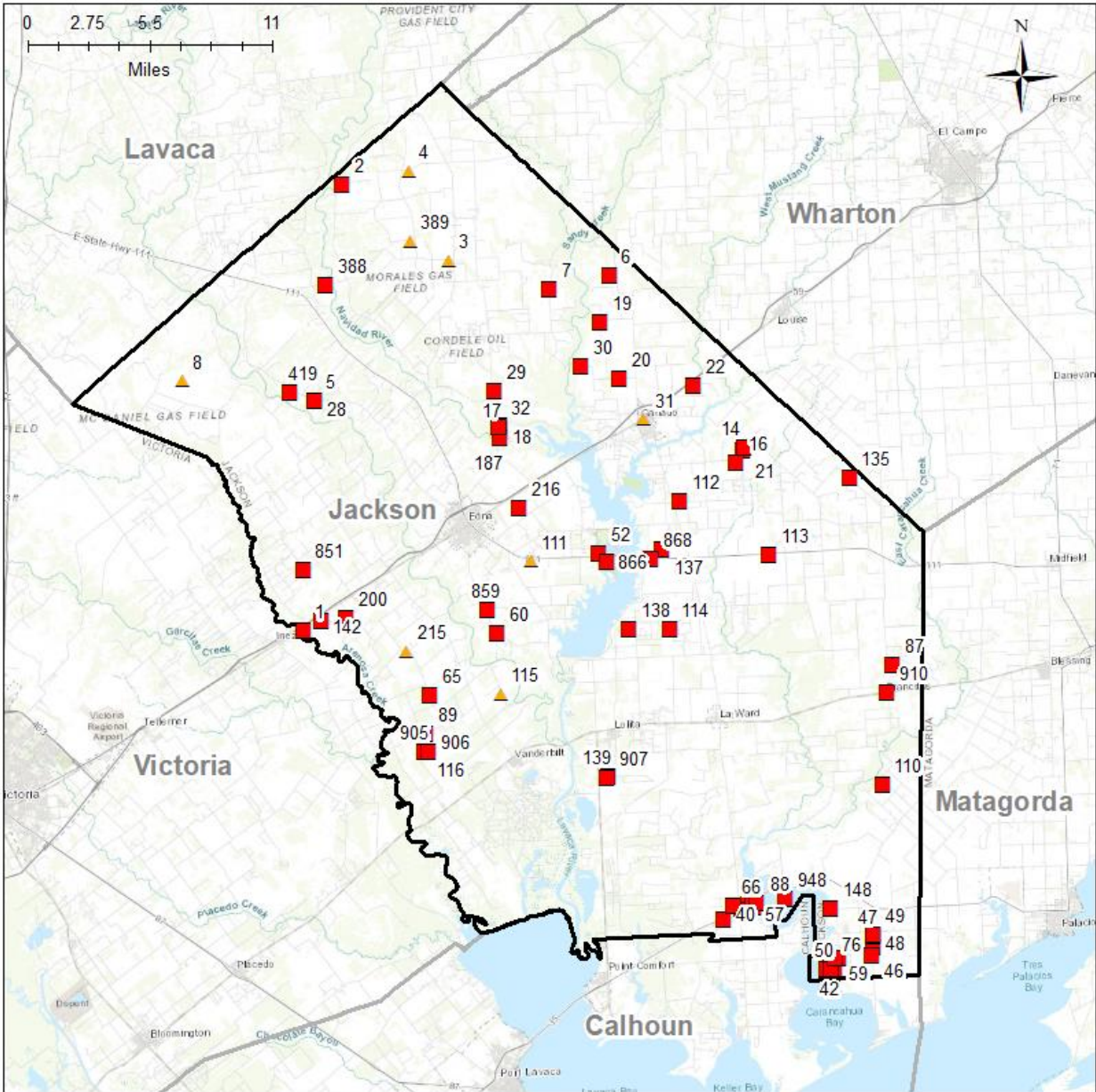


**Calhoun Monitoring Well Network**

- Chicot Aquifer
- ▭ Calhoun County
- ▭ County Line

Figure 2-3 Location and INTERA IDs for water wells in Calhoun County used for this study

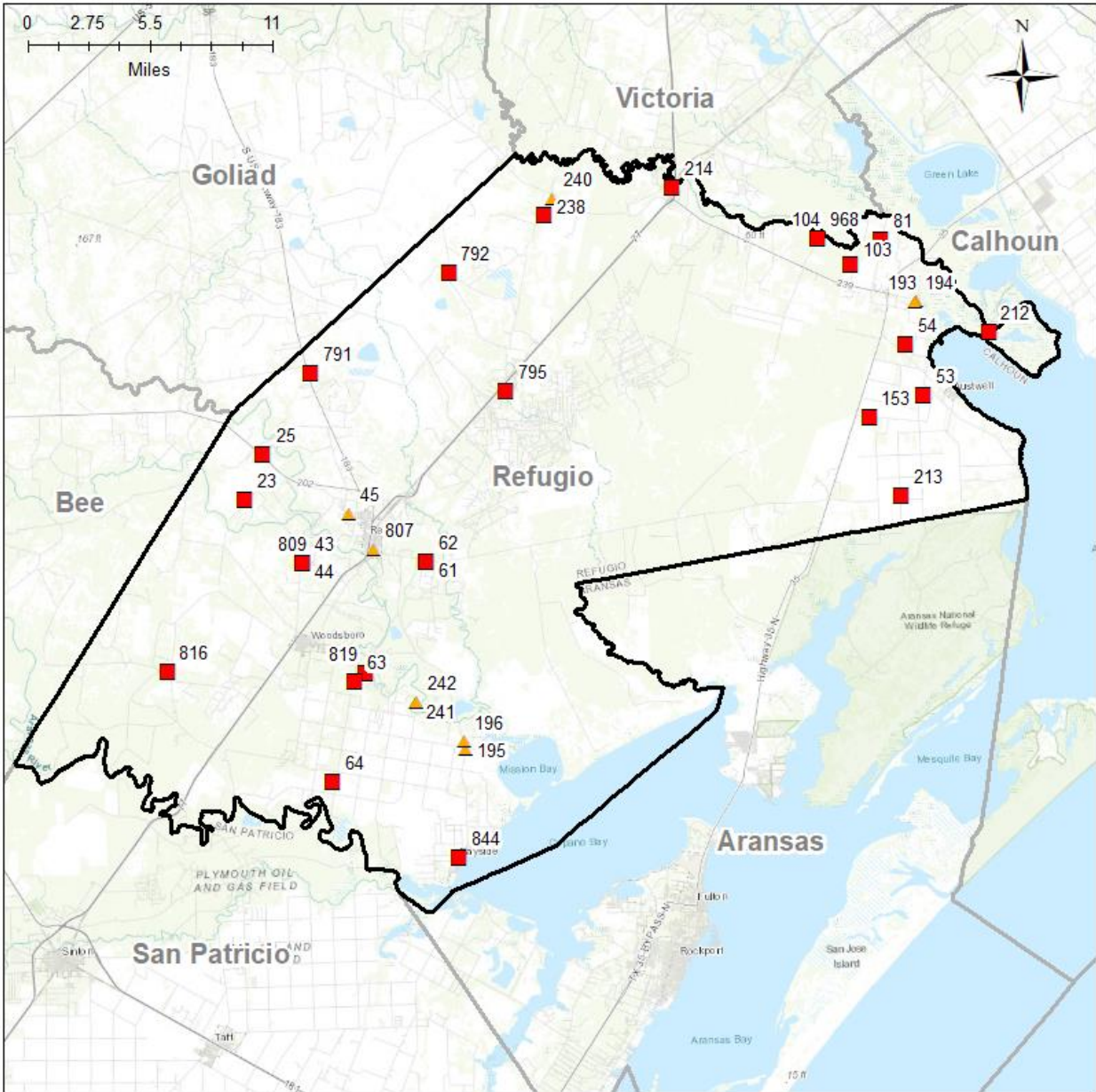




**Jackson Monitoring Well Network**

- Chicot Aquifer
- ▲ Evangeline Aquifer
- ▭ Jackson County
- ▭ County Line

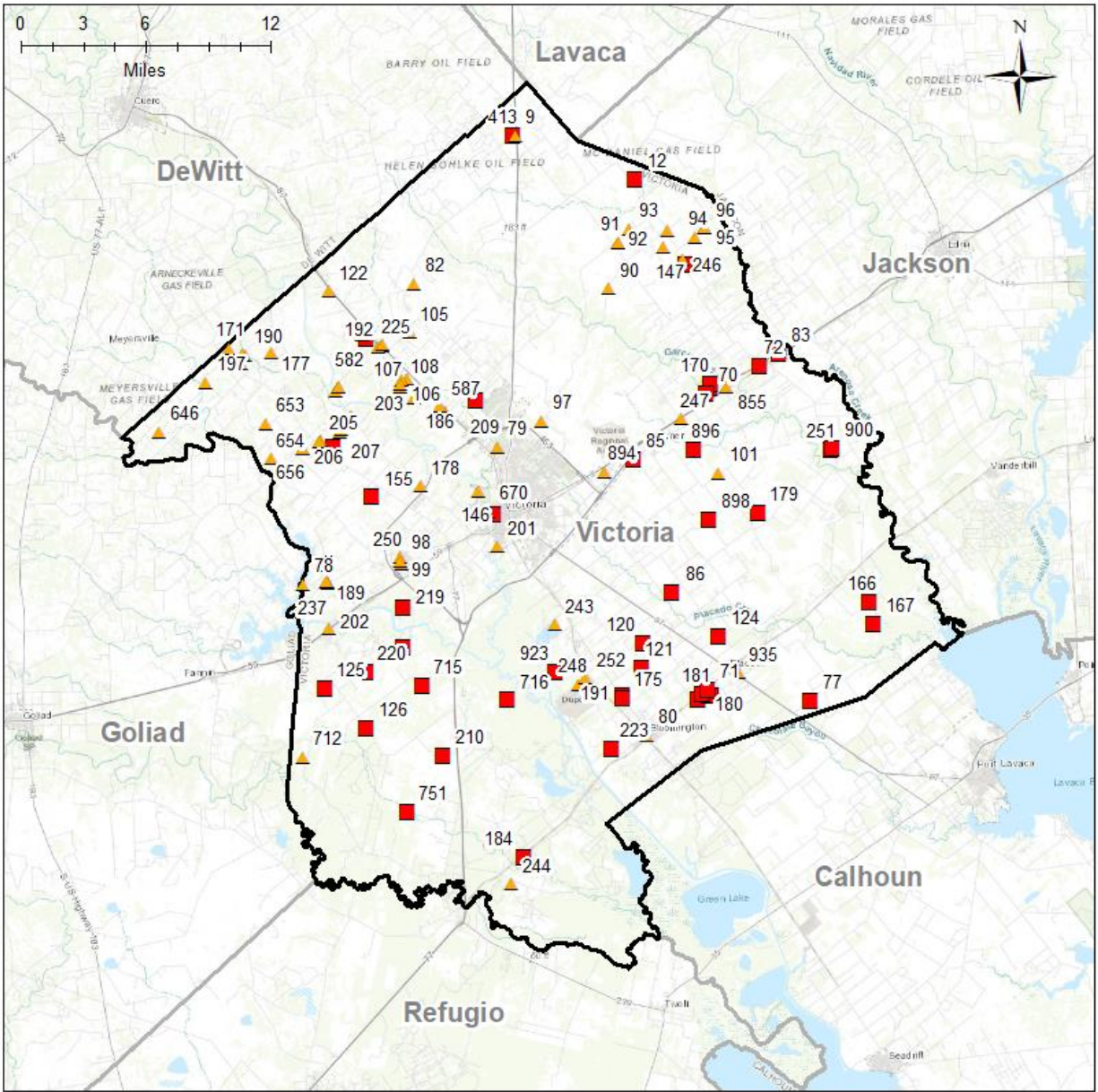
Figure 2-4 Location and INTERA IDs for water wells in Jackson County used for this study



**Refugio Monitoring Well Network**

- Chicot Aquifer
- ▲ Evangeline Aquifer
- Refugio County
- County Line

Figure 2-5 Location and INTERA IDs for water wells in Refugio County used for this study



**Victoria Monitoring Well Network**

- Chicot Aquifer
- ▲ Evangeline Aquifer
- Victoria County
- County Line

Figure 2-6 Location and INTERA IDs for water wells in Victoria County used for this study

## 3.0 GEOSTATISTICAL APPROACH FOR INTERPOLATION

### 3.1 Spatial Interpolation

When making decisions involving aquifer data across one or more counties, GCDs generally lack the resources to establish a robust monitoring network of adequate spatial and temporal resolution. As a result, there is a need for GCDs to find reliable and technically defensible approaches to interpolate water levels to answer questions associated with changes in aquifer conditions over time. Interpolation techniques can be classified as one of two types: deterministic or geostatistical. Deterministic methods rely on using mathematical equations with fitting parameters to generate values at unsampled locations. Examples of deterministic functions are spline interpolation routines, which apply smoothing and inverse distance routines based on the extent of data set similarity. Geostatistical methods rely on using both statistical correlations and mathematical methods to generate values at unsampled locations. The most common geostatistical interpolation method is Kriging. Kriging algorithms are rooted in the principles of spatial autocorrelation, which quantifies the correlation between variables relative to varying spatial extents (distance). As a general rule, if the variable of interest does exhibit spatial correlation, then application of geostatistical methods would provide a relatively robust and viable option for interpolation compared to deterministic methods.

### 3.2 Geostatistical Techniques

Statistics is the science of collecting, pooling, and making inferences from quantitative data. Geostatistics is the branch of science that focuses on geoscientific data. Geostatistics attempts to quantify the spatial relationship between data and the uncertainty in that relationship. The first notable papers on geostatistics were generated in the 1950s by Georges Matheron, who was working for the French Geological Survey on estimating ore resources.

#### 3.2.1 Semivariogram

The semivariogram plays a central role in the analysis of geostatistical analysis and Kriging, which is the most common geostatistical interpolation method. The semi-variogram is a measure of the spatial continuity of the data and how quickly the data values change on the average. **Figure 3-1** provides a schematic of a semivariogram.

Conceptually, a semivariogram shows how the semivariance (i.e. half of the variance) of the data changes with an increase in the distance between the paired data values. In geostatistics, the distances between paired data at which the semivariance is calculated are called lags. For instance, if the lag is set at 100 ft, then the bins for which semivariances would be calculated at 100 ft, 200 ft, 300 ft, 400 ft, etc.,. Because points may not be spaced exactly at distances at intervals of 100 ft apart, the lag settings include a lag tolerance value that is typically set to half of the distance between lags. For the previous example, that would mean that the first lag of 100 ft would include all pairs of points that are between 50 and 150 ft from each other.

In general, two observations closer together are more similar than two observations further apart. The underlying reason for generating a semivariogram is to characterize the spatial correlation between data points. There are two types of semivariogram: experimental and theoretical. The experimental semivariogram is constructed based on the analysis of the field data, which is expressed by the dots in Figure 3-1. The theoretical semivariogram is generated by fitting a semivariogram model to the data, which is shown by the black line in Figure 3-1.

Introductions to semivariogram modeling and geostatistics are found in literature such as Isaaks and Srivastava (1989), American Society of Civil Engineers (1990), and Kitanidis (1997). The mathematical foundation and derivation of the semivariogram are beyond the scope of this report. The experimental variograms that will be calculated later in this report for water elevations is based on **Equation 3-1**.

$$\gamma(\mathbf{h}) = \frac{1}{2N(\mathbf{h})} \sum_{i=1}^{N(\mathbf{h})} [z(\mathbf{u}_i) - z(\mathbf{u}_i + \mathbf{h})]^2 \quad \text{Eq 3-1}$$

Where:

- $\gamma(\mathbf{h})$  = semivariance as a function of lag distance  $h$ , (ft<sup>2</sup>)
- $\mathbf{h}$  = the lag spacing vector (ft)
- $z(\mathbf{u}_i)$  = the elevation water level (ft) at spatial location  $\mathbf{u}_i$ ,
- $\mathbf{u}_i$  = a vector of spatial coordinates (x,y) for the sample locations of each measured water level

The experimental variogram must be modeled for two reasons: (1) there is a need to interpolate the variogram function for  $h$  values where too few or no experimental data pairs are available, and (2) the variogram measure  $\gamma(h)$  must have the mathematical property of “positive definiteness” for the corresponding covariance model. The three most commonly used theoretical variogram models are Gaussian, exponential, and spherical. The theoretical variogram has three attributes that summarize important aspects of the spatial data. These three attributes are described in Figure 3-1 and below.

- **Range** – the maximum distance between points up to which there is information on the correlation/spatial relationship between two data points.
- **Sill** – the sample variance, which is a measure of the spread or variability in the data points that are not correlated.
- **Nugget Effect** – reflects measurement error and the discontinuity in the variogram at distances below the minimum lag distance

### 3.2.2 Kriging

Kriging is a geostatistical interpolation technique that considers both the distance and the degree of variation between known data points when estimating values in unknown areas. Kriging accounts for the degree of variation, or spatial correlation, among the data points through a semivariogram model. The basic idea of Kriging is to predict the value of a function at a given point by computing a weighted average of the known values of the function in the neighborhood of the point.

Kriging is named for Dr. Krige, who published an early (Krige, 1951) application of kriging to the estimation of the extent and volume of a mineral ore body. Kriging methods have been studied and applied extensively since 1970 and have been adapted, extended, and generalized. There are many forms of Kriging. The different forms of Kriging are detailed in Goovaerts (1997). The most commonly used forms of Kriging include: simple Kriging, ordinary Kriging, universal Kriging, cokriging, and Kriging

with external drift. Ordinary Kriging is among the most commonly used types of Kriging and is the basis of geostatistics (Ryu and others, 2002). Ordinary Kriging gives the optimal prediction under the assumption of second-order stationary, a normal distribution for the modeled variable, and the absence of any trend in the data. By optimal prediction, what is meant is that Kriging provides the best linear unbiased prediction at unsampled locations and reproduces the measured values at all sampled locations exactly.

A concern with using ordinary Kriging to interpolate water level data is how best to account for the trends in the water level data. The existence of trends is evident in **Figure 3-2**, which shows contours of groundwater levels simulated by the GMA 15 GAM for the Chicot Aquifer. Among the causes for trends in the water level data is large regional effects associated with flow toward the ocean and moderate regional effects associated hydraulic impacts from rivers, lakes, and large well fields. The process to account for a trend in the data consists of six steps which are described below and are illustrated in **Figure 3-3**. The example application described in Figure 3-3 is for annual precipitation amounts measured across Texas (Gimond, 2021).

Step #1 - Assemble and inspect the data for evidence of a trend.

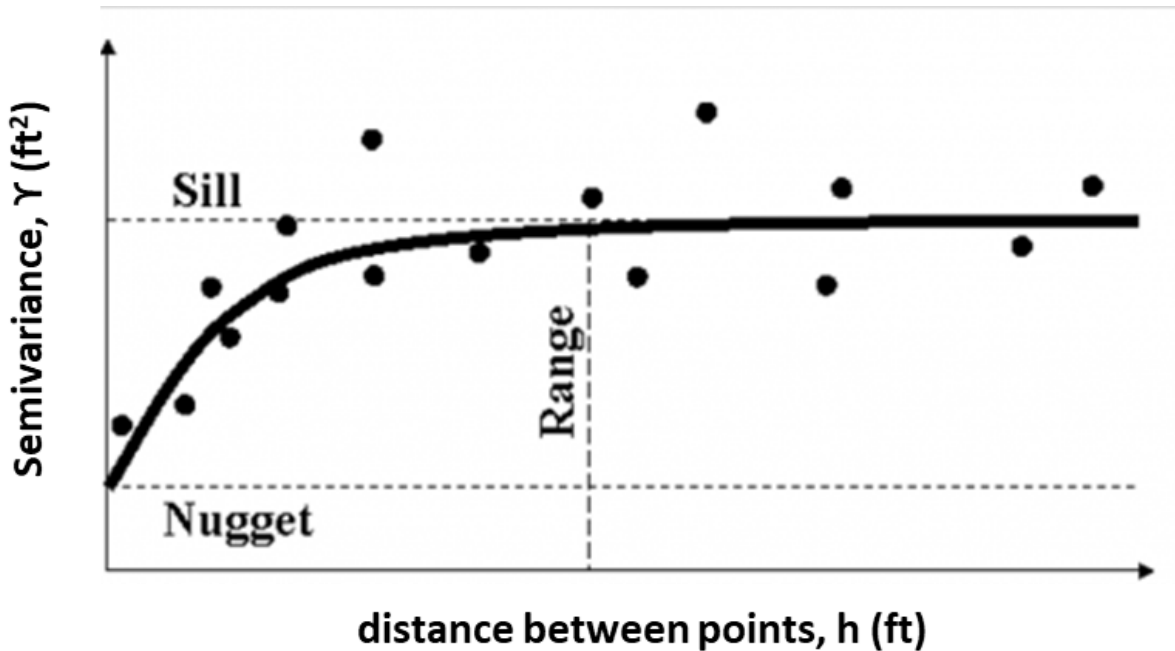
Step #2 – Develop a trend surface based on fitting the data and a conceptual understanding of the factors responsible for the trend.

Step #3 – Calculate the residual at each data location. A residual is the difference between the measured value and value produced by the trend at the location of the measured data. Check whether the set of calculated residuals are normally distributed. If the residuals do not resemble a normal distribution, then repeat Step #2.

Step #4 – Construct an experimental and a theoretical semivariogram for the set of residuals.

Step #5 – Krige the residuals to produce a continuous surface across the area of interest.

Step #6 – Combine the trend surface and the Kriged surface to generate the final surface.



- values calculated from the data points and used to construct the experimental semivariogram
- theoretical variogram

**Range** – the maximum distance between points up to which there is information on the correlation/spatial relationship between two data points

**Sill** – the sample variance, which is a measure of the spread or variability in the data points that are not correlated

**Nugget Effect** – reflects measurement error and the discontinuity in the variogram at distances below the minimum lag distance

Figure 3-1 Schematic of an experimental and theoretical semivariogram

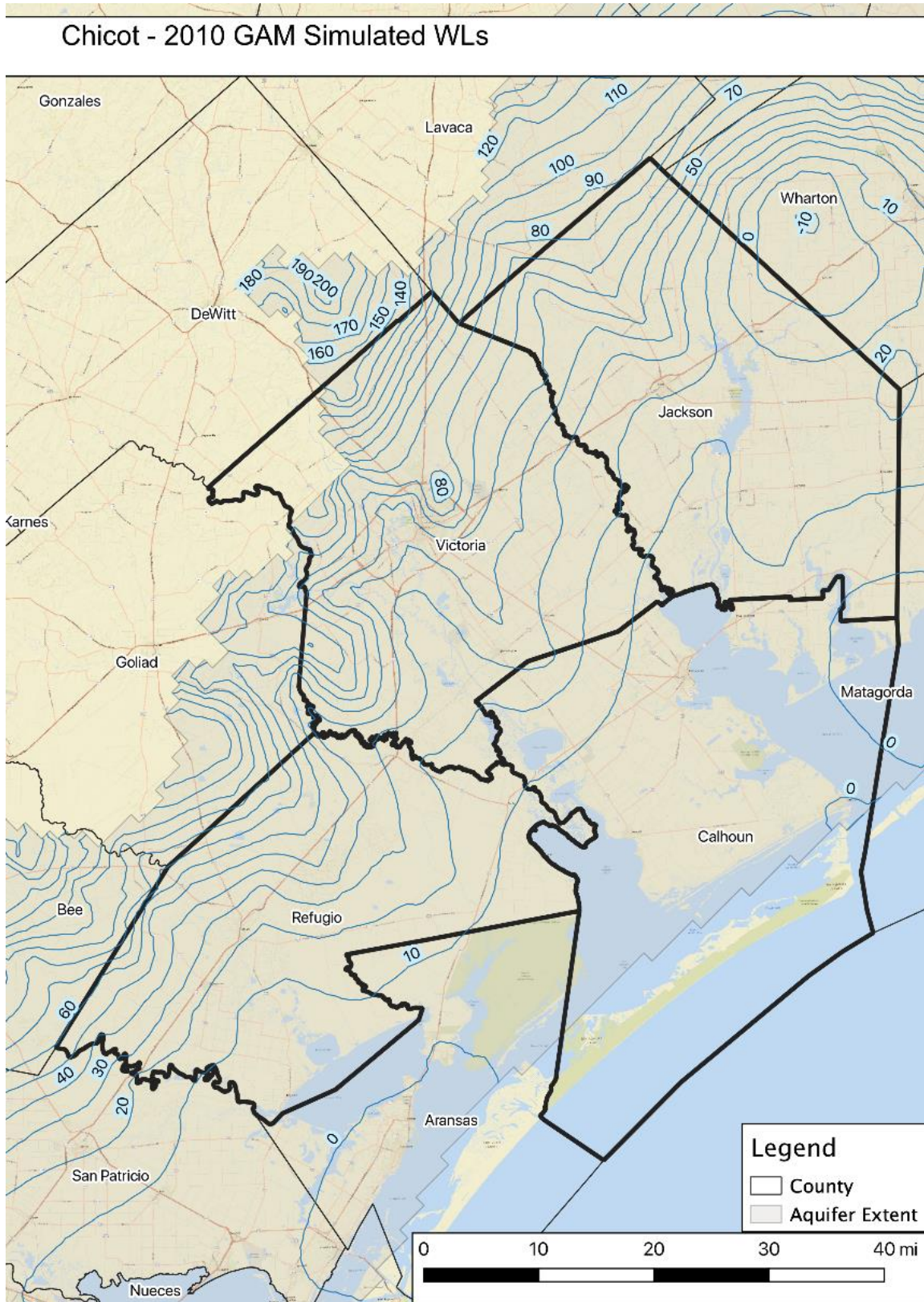


Figure 3-2 Contours of 2010 groundwater levels simulated by the GMA 15 GAM for the Chicot Aquifer



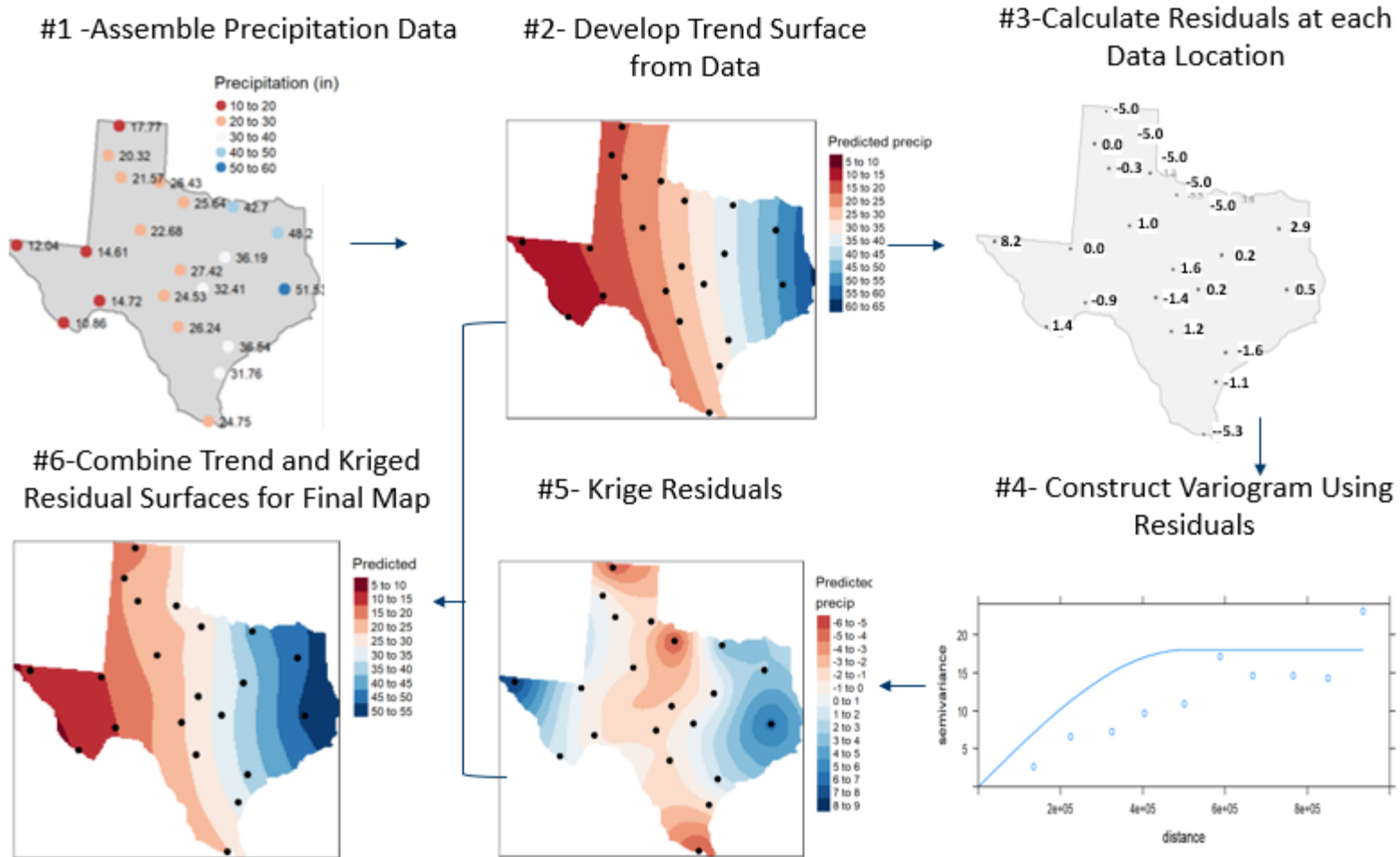


Figure 3-3 Workflow showing the a six-step process for using ordinary Kriging in develop a continuous surface for a data set that contains a trend

## 4.0 APPLICATION OF KRIGING WITH DETRENDING TO GENERATE WATER LEVEL MAPS

This section presents application of detrending and ordinary Kriging to interpolate measured water levels and to generate yearly water level maps for 2000 to 2020. The section documents the process of detrending the measured water levels, calculating the water level residuals, creating experimental variograms and fitting them to theoretical variogram models, Kriging the water level residuals, and constructing the final water level maps.

### 4.1 Detrending Approach

An inspection of Figure 3-2 shows evidence that the water levels simulated by the GAM contains trends at several different spatial scales. The trends are evident in the gradual decrease in elevation of the contours in the southeast direction toward the ocean, the distortion in water levels contours near large rivers such as the Guadalupe River in Victoria County and Lavaca River in Jackson County, and the cones of depression (i.e. circular contours) caused by pumping from large well fields near the City of Victoria and in southeast Wharton County.

Our review of the simulated waters for multiple years indicates that there are mathematical equations that can be used to detrend the data. Among the concerns associated with detrending the water levels using an inappropriate surface is that biases would be introduced into the residuals because the equations are not properly capturing the physics responsible for the underlying trends. Our assessment of the water level data found that the best tool for generating possible surfaces to detrend the measured water levels was the central Gulf Coast GAM (Chowdhury and others, 2004). The version of the GAM used for the study was obtained from Mr. Mike Keester from LRE Water, who is the consultant for GMA 15 that is developing GAM runs for the joint planning process. Because the GAM is known not to be the perfect predictor of the impacts of surface water features and pumping on water levels, there is a concern of introducing biases into the detrending process if the GAM-simulated water levels were used without some tempering to help to minimize bias into the water level residuals. Several options were investigated for spatially smoothing the simulated water levels.

The software selected for smoothing the GAM simulated water is part of SciPy (Virtanen and others, 2021). SciPy is a free and open-source Python library used for scientific computing and technical computing. The smoothing function is called "ndimage" and part of the class called "uniform\_filter". Ndimage is a type of moving average filter that smooths in two dimensions (northing and easting). After multiple iterations using Ndimage, a smoothing interval of 64,000 ft was selected. **Figures 4-1 and 4-2** shows the effect of this smoothing interval on the GAM simulated water levels for 2015 in the Chicot and Evangeline aquifers. The criteria used to select the interval of 64,000 ft include visual changes in the water level contours and a statistical evaluation of the residual for normality.

## 4.2 Water Level Residuals

**Figures 4-3** and **4-4** illustrate the process of detrending the measured water levels to create the water level residuals. Figure 4-3a shows the location of the 2015 measured water levels superimposed onto the smoothed GAM simulated water levels for 2015. Figure 4-3b shows the calculated water level residuals at each of the well locations. Figure 4-4 shows the similar data sets for the smoothed GAM simulated water levels and measured water levels for the Evangeline Aquifer in 2015.

The method used to generate the water level residuals in **Figures 4-3** and **4-4** was used to calculate water level residuals for the years 2000 to 2020. Each set of annual water level residuals by aquifer was checked for normality using three criteria. One criterion was visual inspection of the histograms of water levels; residuals are compared to a normal distribution based on the mean and standard deviation of the water level residuals. The visual inspection was to assess whether or not the histogram mimics the shape and magnitude of the bell-shaped curve. **Figure 4-5** shows an example of this comparison using the 2015 water levels residuals. These figures provided useful information for identifying outliers that could impact a quantitative analysis of normality. Another criterion was visual inspection of the probability plots of the empirical cumulative density function (CDF) to the theoretical CDF for the water level residuals. The visual inspection was to assess whether or not the plotted points approximated a straight line, where the empirical and theoretical CDFs are equal. These figures provide useful information on whether there were any meaningful shifts in the distribution away from normality. **Figure 4-6** shows an example of this visual test for normality using the 2015 water levels residuals. The last criterion was to use the Liffiefors test (Liffiefors, 1967) for normality based on the Kolmogorov-Smirnov test.

The Liffiefors test provides a quantitative assessment of normality. The test evaluates the null hypothesis that data derive from a normally distributed population, when the null hypothesis does not specify the expected value and variance of the distribution. The Liffiefors test evaluated the likelihood that the data set was generated from a random distribution at the 95% confidence limit. The majority of both the Chicot and the Evangeline residual data sets passed the Liffiefors test for normality at the 95% confidence limit without any adjustments. All of the residual data sets passed the Liffiefors test at the 95% confidence limit after several of the largest residuals were removed. The average of one residual value needed to be removed per data set for all 42 data sets to pass the Liffiefors test for normality at the 95% confidence limit. The 42 data sets are comprised of 21 data sets for the Chicot Aquifer and 21 data sets for the Evangeline Aquifer. Based on results from both the visual inspections and from the Liffiefors tests, the water level residuals data sets were considered to approximate a normal distribution.

## 4.3 Semivariogram analysis

Semivariogram analyses were performed on all 42 water level residual data sets. The lag distance was set to 25,000 ft (4.7 miles) and the maximum distance was set to 450,000 ft (85.2 miles). The total number of bins was 18. All the experimental semivariograms were fitted to a spherical theoretical variogram. **Figures 4-7** and **4-8** show the experimental (points) and theoretical (lines) variograms water level residuals for the Chicot and Evangeline aquifers for six of the 21 annual data sets (e.g., 2000 through 2020). The median value for the range, which is the maximum distance at which the residuals

are no longer spatially correlated, for the 21 variograms for the Chicot Aquifer is about 190,000 ft (36.0 miles). The media value for the range for the 21 variograms for the Evangeline Aquifer is about 430,000 ft (81.4 miles).

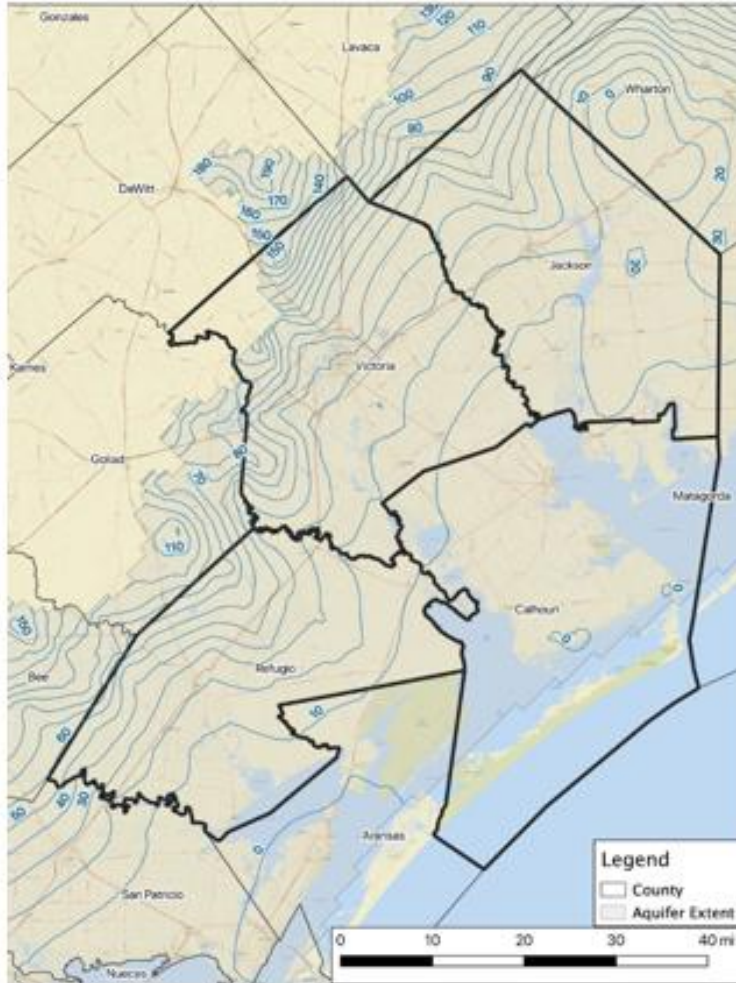
#### 4.4 Final Map of the Water Levels

Ordinary Kriging was used to interpolate the water level residuals for the years 2000 through 2020 for both the Chicot and the Evangeline aquifers. The semivariograms developed in section 4.3 were used to determine the weight assigned to the sampled locations. The Kriging was implemented in **R**. **R** is a programming language and free software environment for statistical computing and graphics supported by the R Foundation for Statistical Computing. The interpolation generated a raster composed of pixels measuring 1,000 by 1,000 ft. **Figures 4-9** and **4-10** show examples of the Kriged surfaces. Figure 4-9 shows contours of the Kriged values and the location of the water level residuals at the sampled locations for the Chicot Aquifer in 2015. Figure 4-10 shows contours of the Kriged values and the location of the water level residuals at the sampled locations for the Evangeline Aquifer in 2015.

The final map of for the Kriged water levels were constructed by combining the surface of the Kriged residuals with the trend surface, which is the smoothed GAM simulated water levels. **Figure 4-11** shows the process of adding together the surfaces for the Kriged water levels and the trend surface to create the final map of the 2015 Chicot water levels. **Figure 4-12** shows the process of adding together the surfaces for the Kriged water levels and the trend surface to create the final map of the 2015 Evangeline water levels.

**Figures 4-13** through **4-17** shows the final maps of the Kriged water levels for the years 2000, 2005, 2010, 2015, and 2020 for the Chicot and the Evangeline aquifers. Interpolated water levels are truncated at the boundaries of the aquifers defined in the GAM 15 GAM. The extent of the Chicot and the Evangeline aquifers are marked by shading the area corresponding to each aquifer. Although the interpolated water levels cover the 13 counties in Figure 2-1, the figures focused on an area containing Calhoun, Jackson, Refugio, and Victoria counties.

a) GAM Simulated WLs



b) GAM Simulated Smoothed WLs

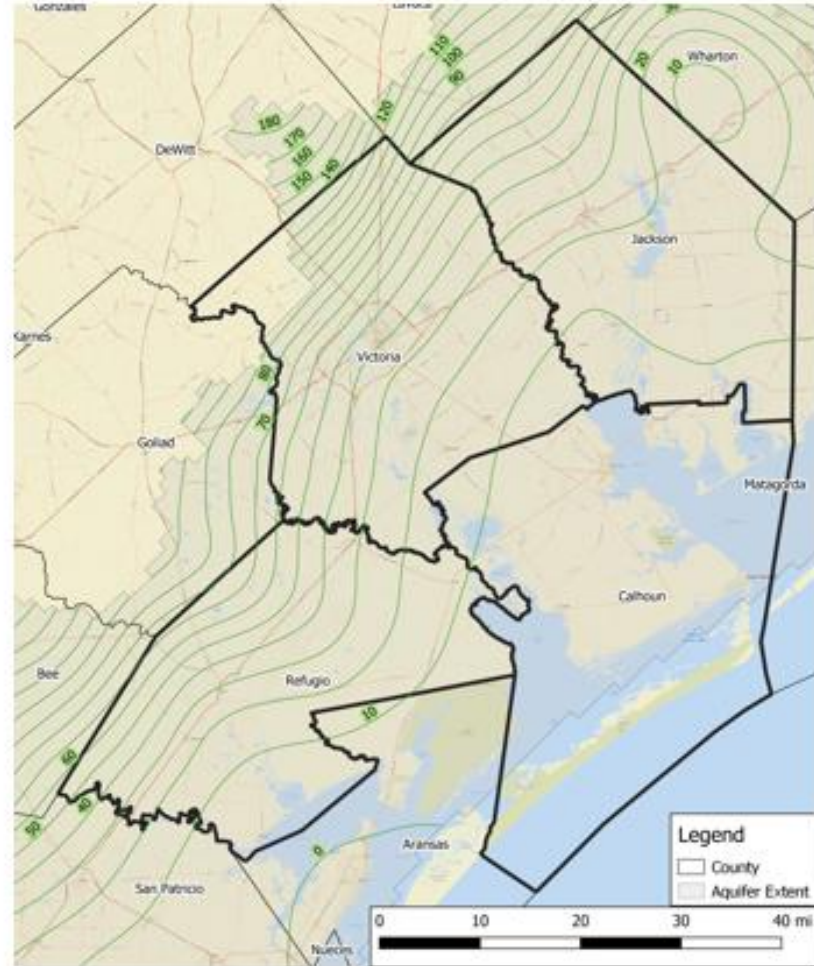
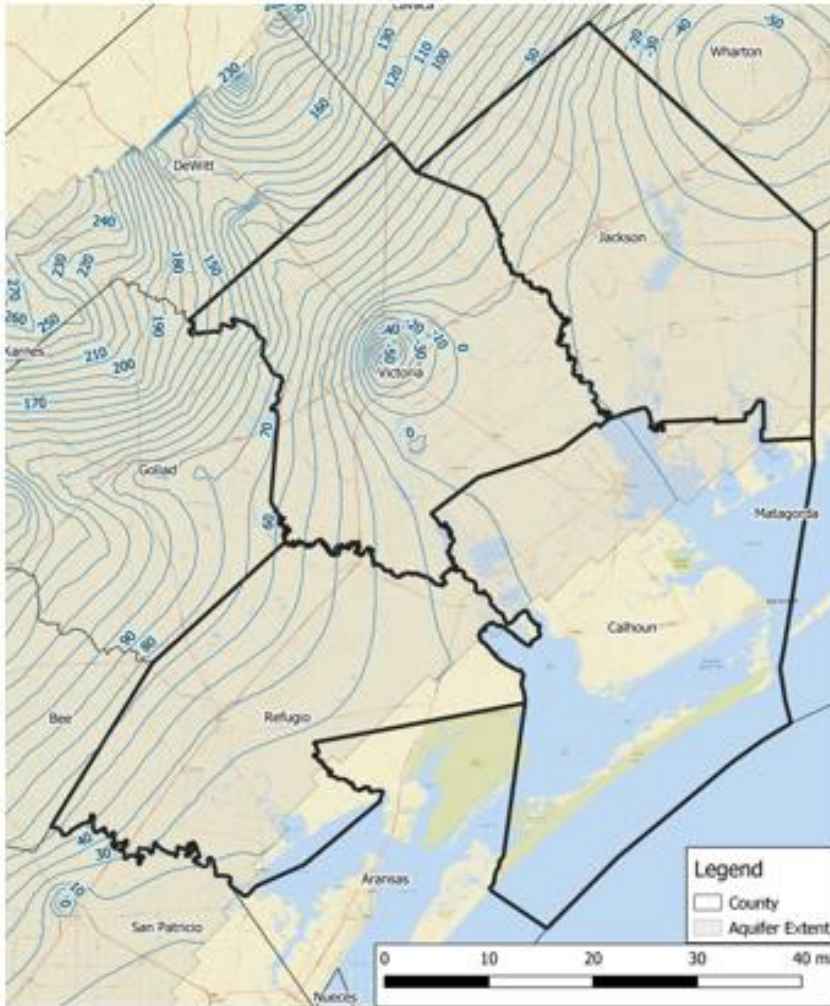


Figure 4-1 GMA simulated 2015 water levels for the Chicot Aquifer, a) actual values; b) smoothed using SciPy function ndimage with a distance of 64,000 feet

a) GAM Simulated WLs



b) GAM Simulated WLs Smoothed

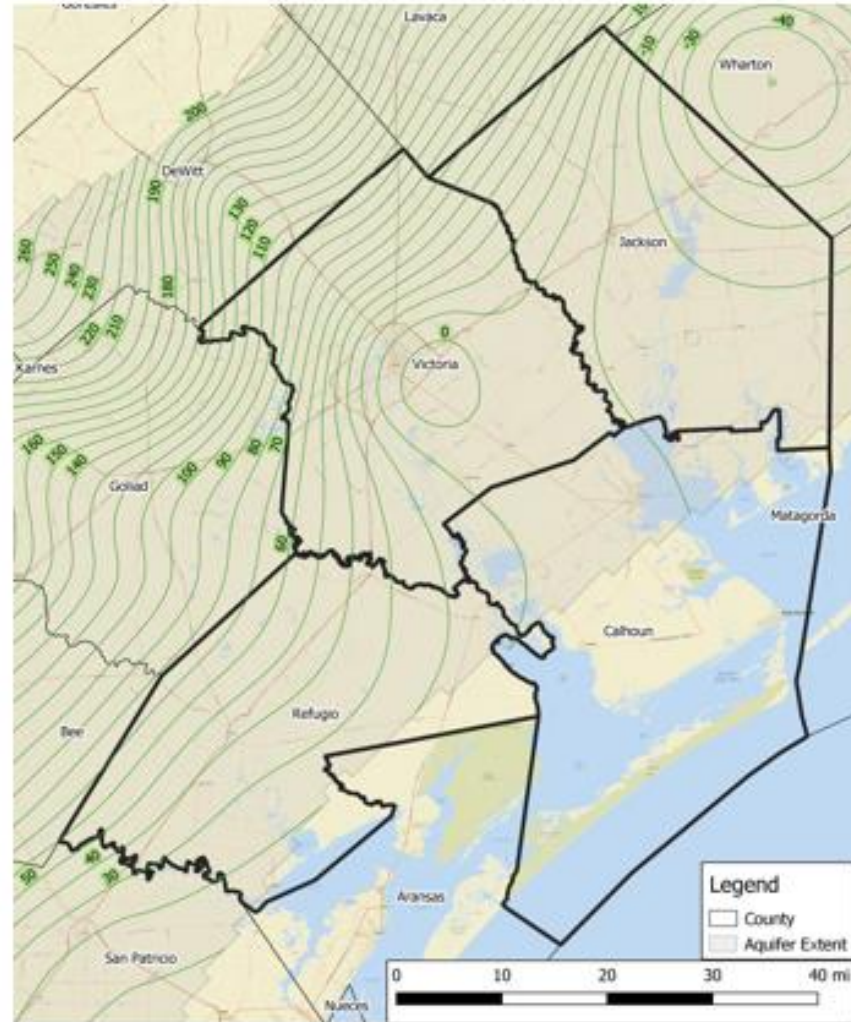
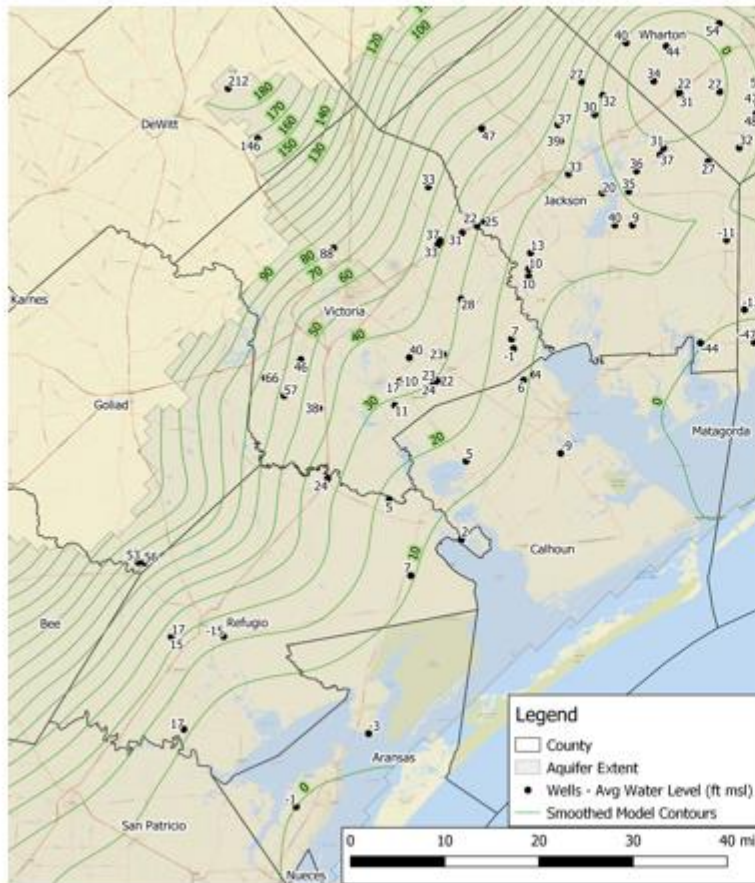


Figure 4-2 GMA simulated 2015 water levels for the Evangeline Aquifer, a) actual values; b) smoothed using SciPy function ndimage with a distance of 64,000 feet

a) 2015 Chicot Smoothed Simulated WLs and Measured WLs



b) 2015 Chicot Residuals

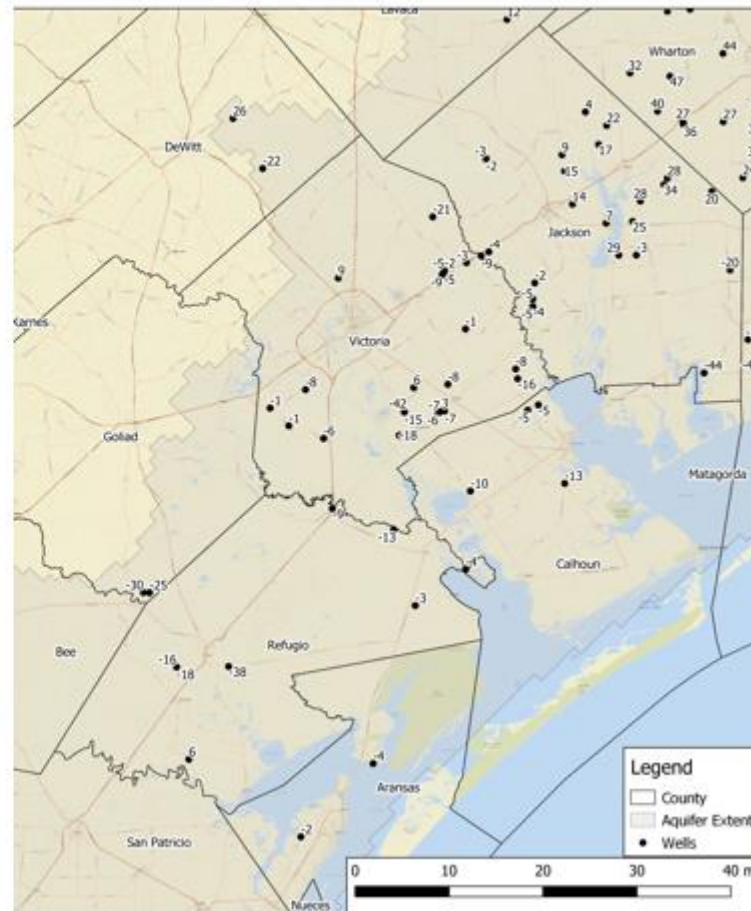
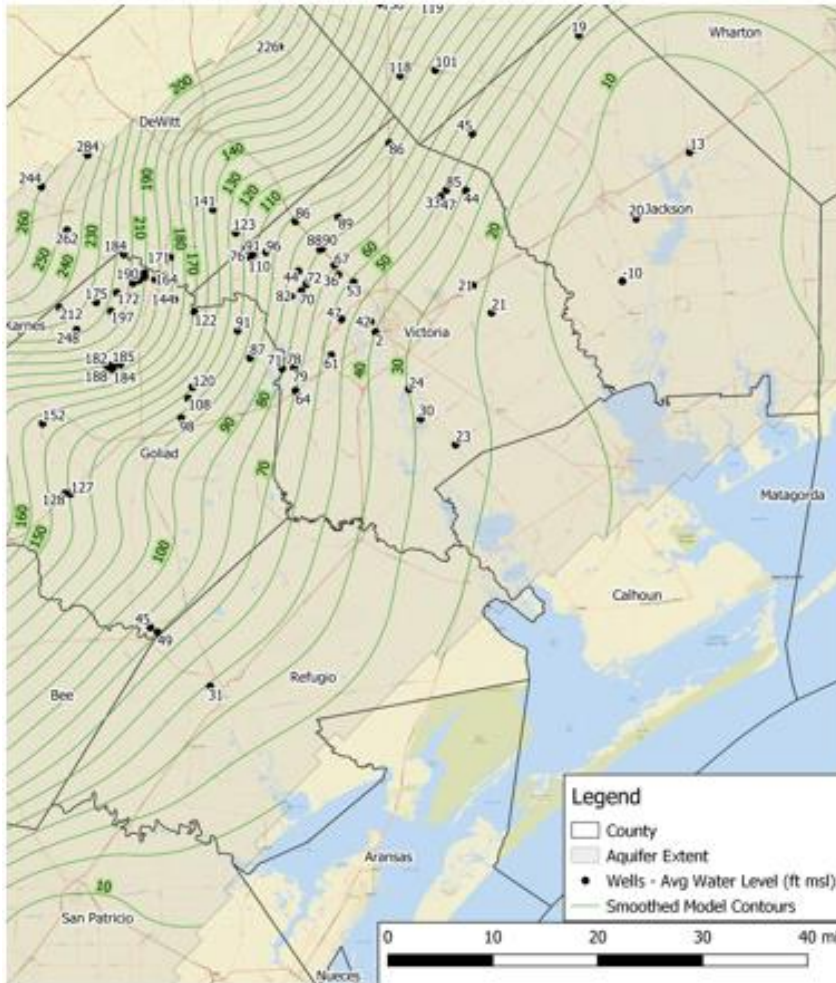


Figure 4-3 Example calculation of residuals Chicot Aquifer, a) 2015 smoothed simulated water levels and 2015 measured Chicot water levels; b) calculated 2015 Chicot residuals posted at well locations

a) 2015 Evangeline Smoothed Simulated WLs and Measured WLs



b) 2015 Evangeline Residuals

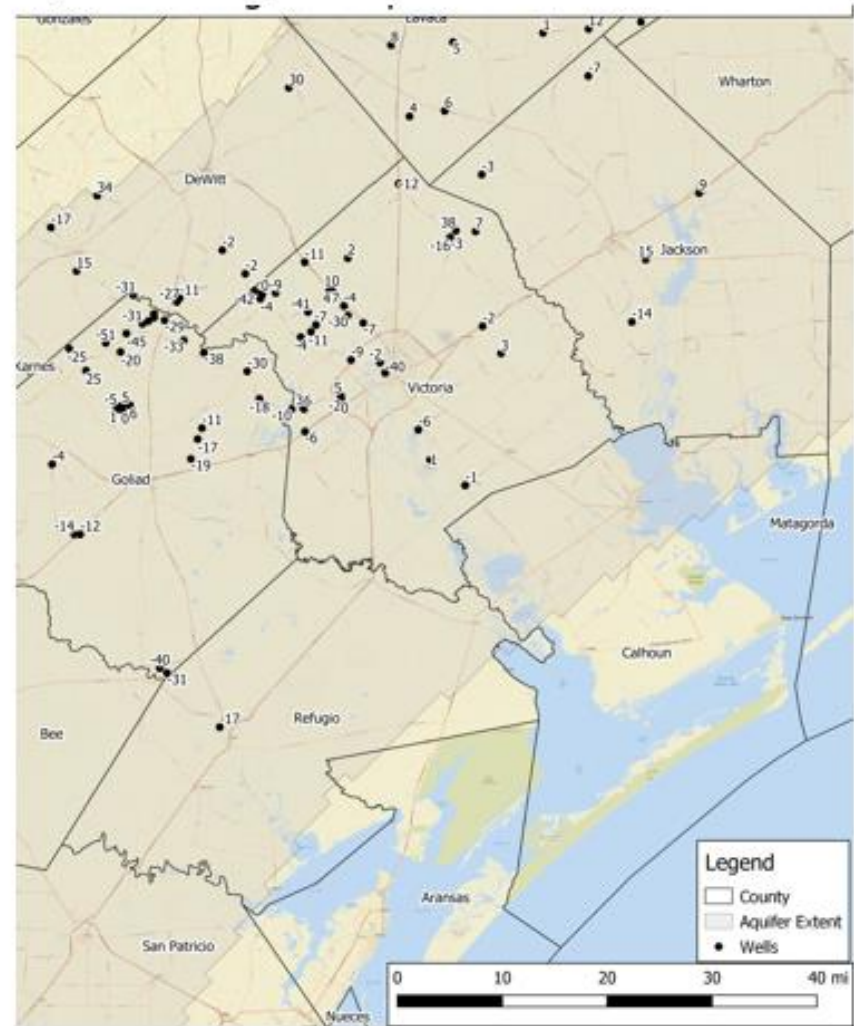


Figure 4-4 Example calculation of residuals Evangeline Aquifer, a) 2015 smoothed simulated water levels and 2015 measured Evangeline water levels; b) calculated 2015 Evangeline residuals posted at well locations



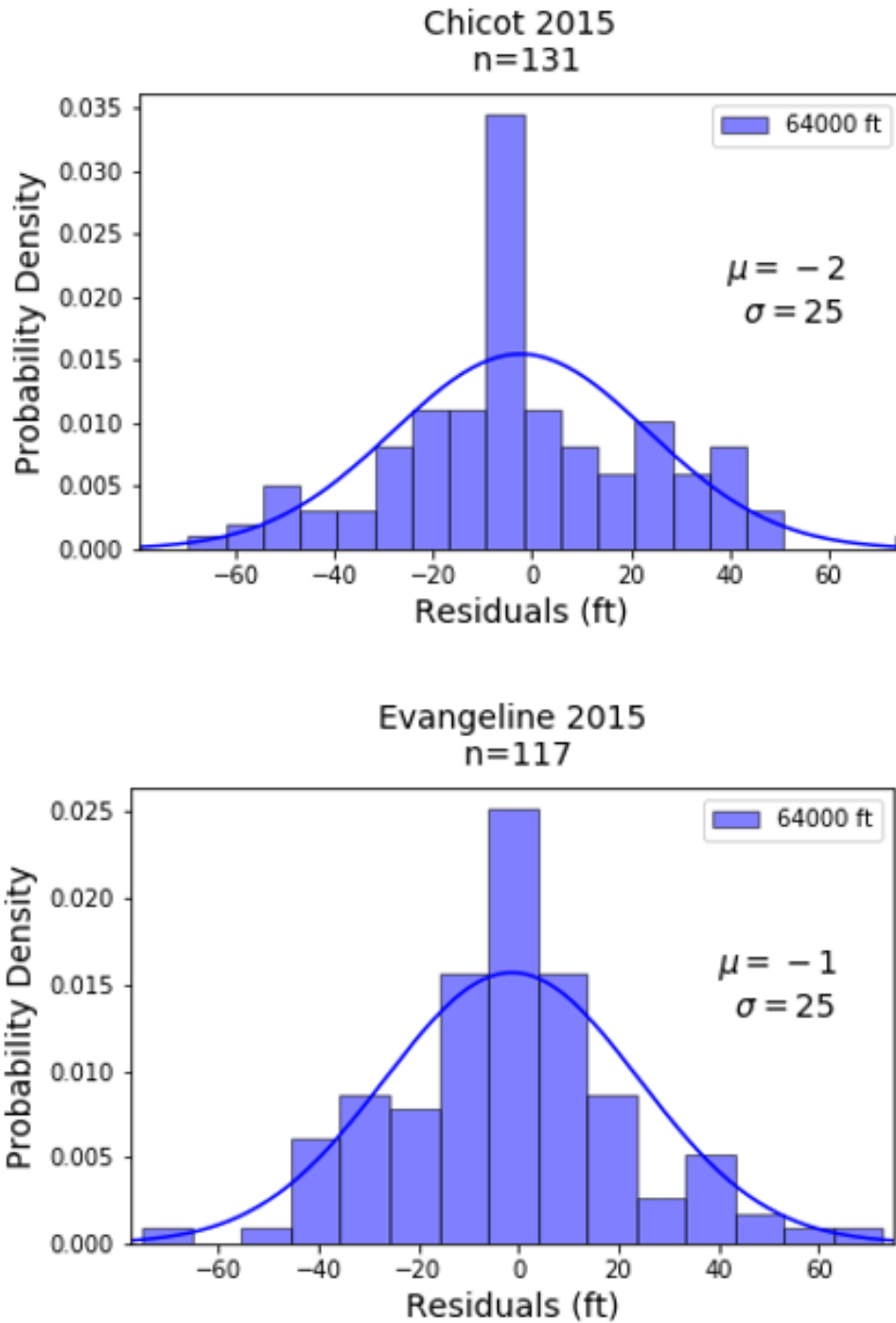


Figure 4-5 Histograms of 2015 water levels residuals for the Chicot and the Evangeline aquifers that are compared to a normal distribution based on the mean and standard deviation of the water level residuals

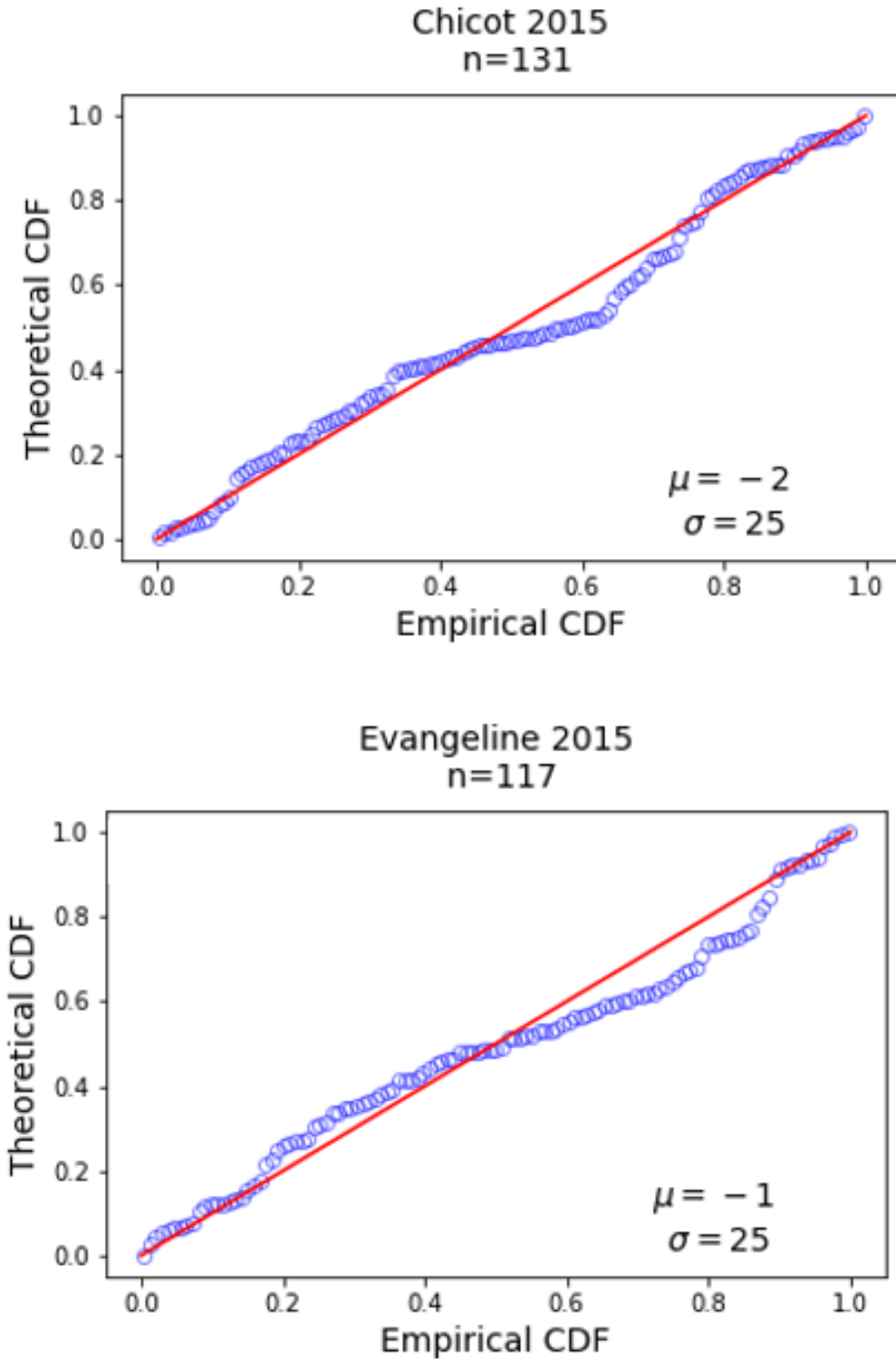


Figure 4-6 Probability plots of the 2015 water levels residuals for the Chicot and the Evangeline aquifers that compares the empirical cumulative density function (CDF) to the theoretical CDF

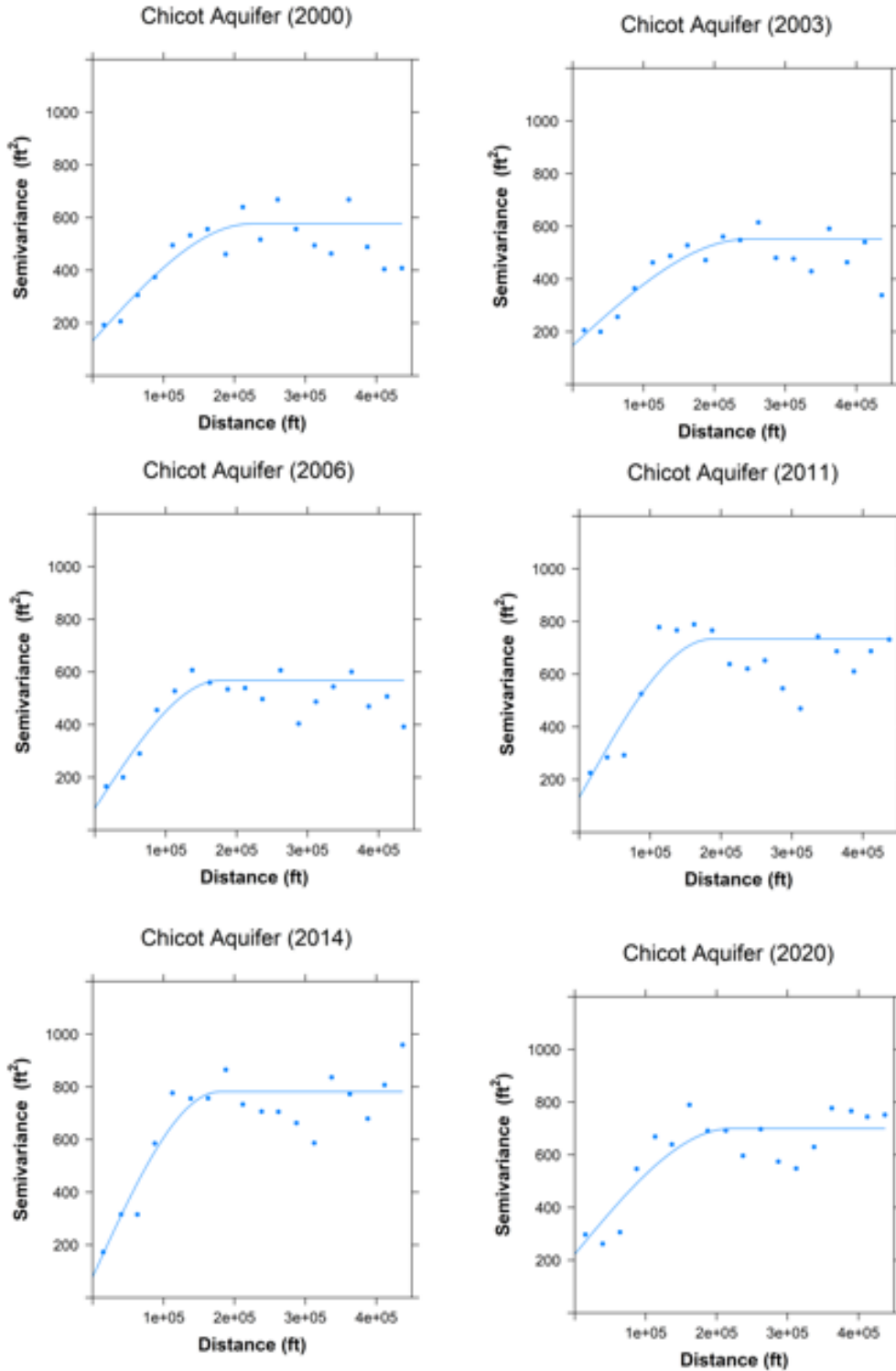


Figure 4-7 Experimental and theoretical spherical semivariograms for the residuals for 2000, 2003, 2006, 2011, 2014, and 2015 generated by detrending the measured groundwater levels in the Chicot Aquifer

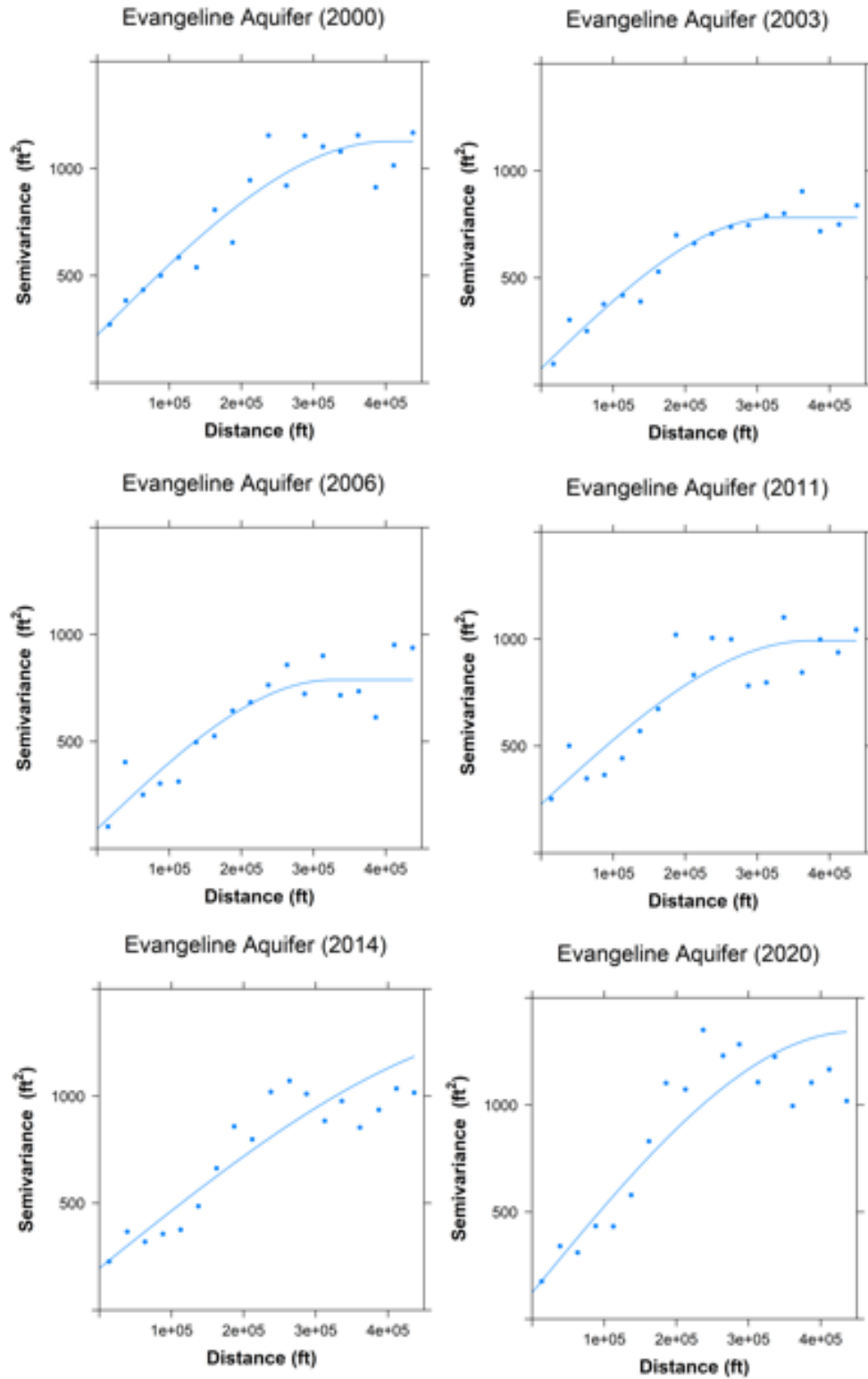


Figure 4-8 Experimental and theoretical spherical semivariograms for the residuals for 2000, 2003, 2006, 2011, 2014, and 2015 generated by detrending the measured groundwater levels in the Evangeline Aquifer

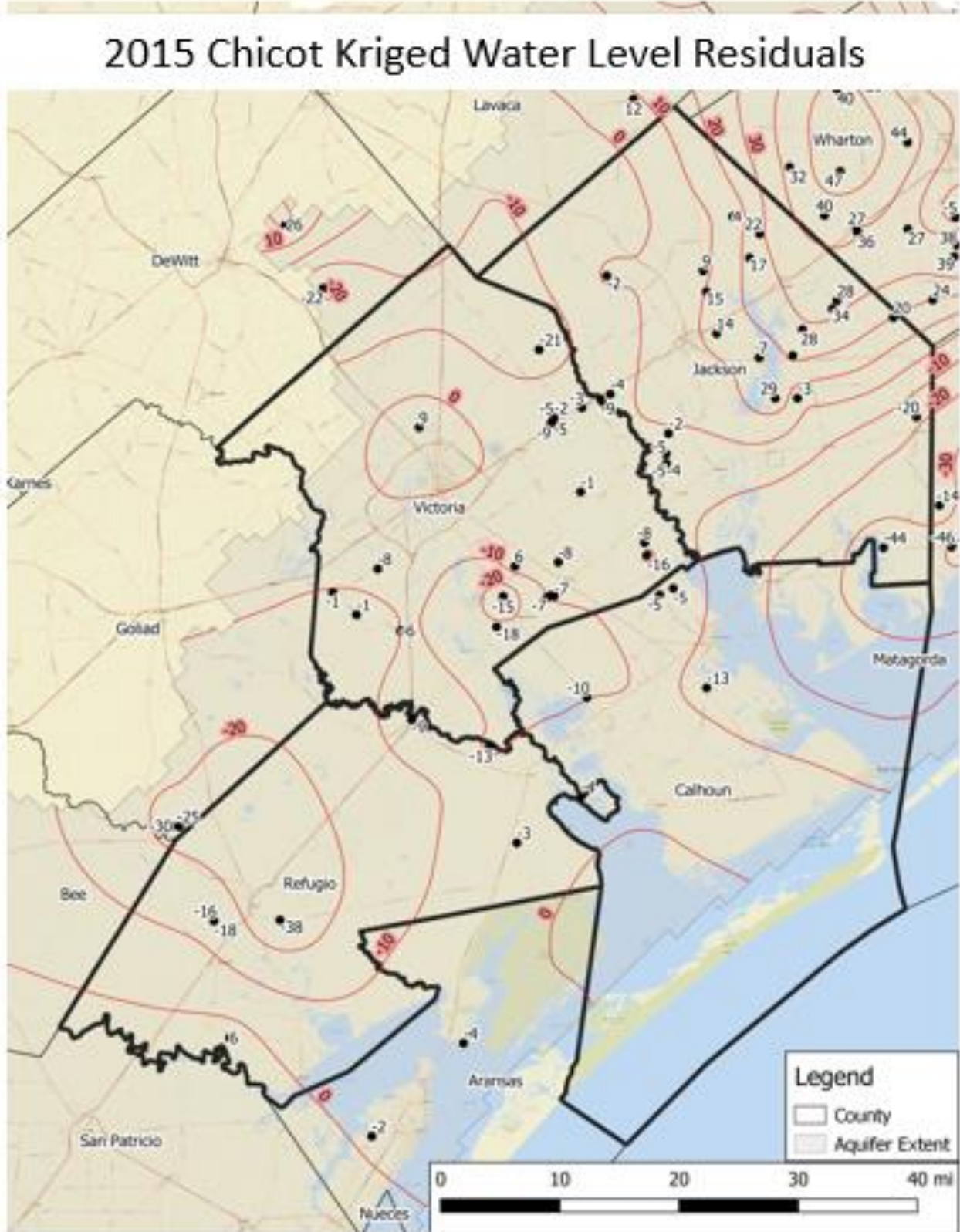


Figure 4-9 Contours for the Kriged 2015 water level residuals for the Chicot Aquifer

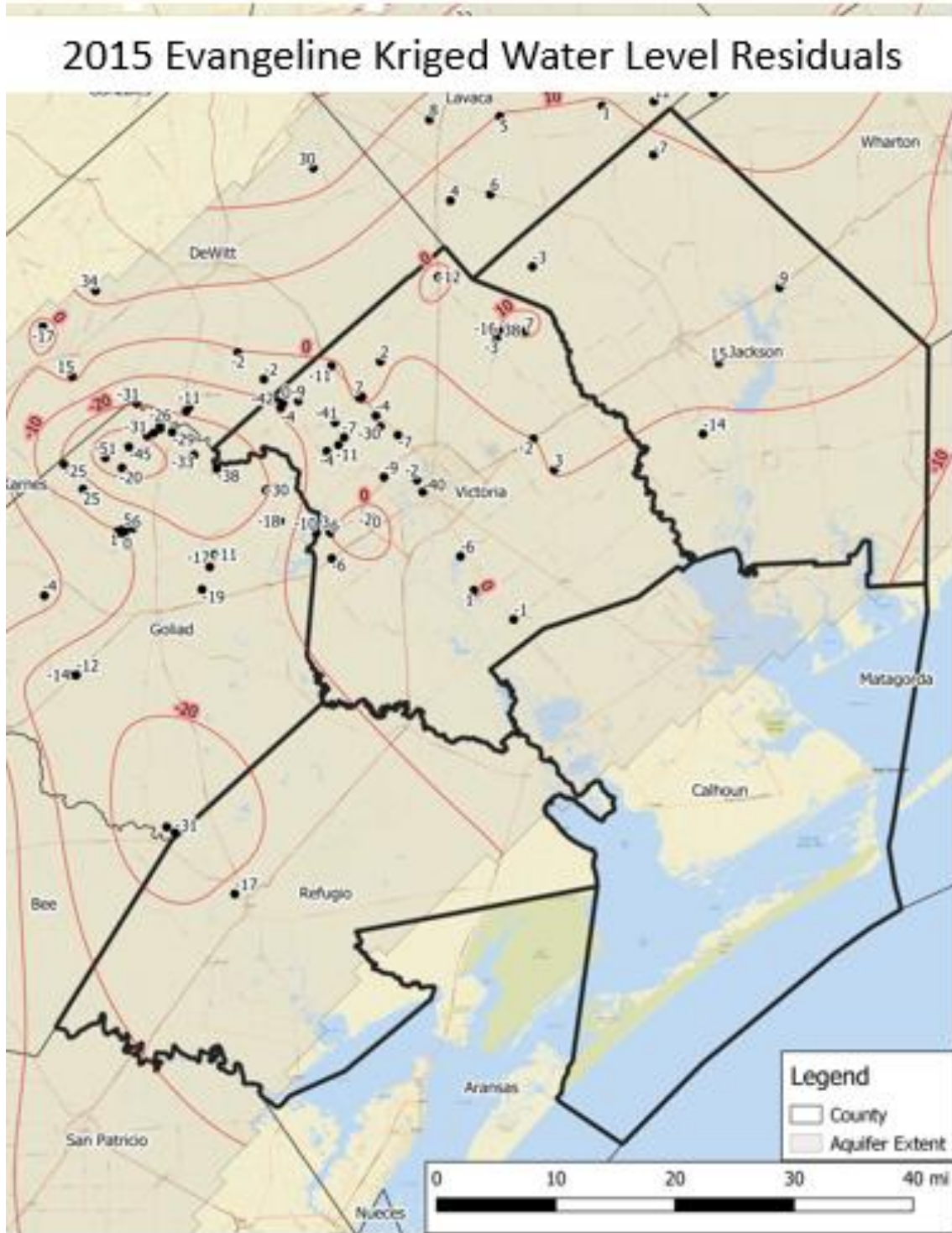


Figure 4-10      Contours for the Kriged 2015 water level residuals for the Evangeline Aquifer

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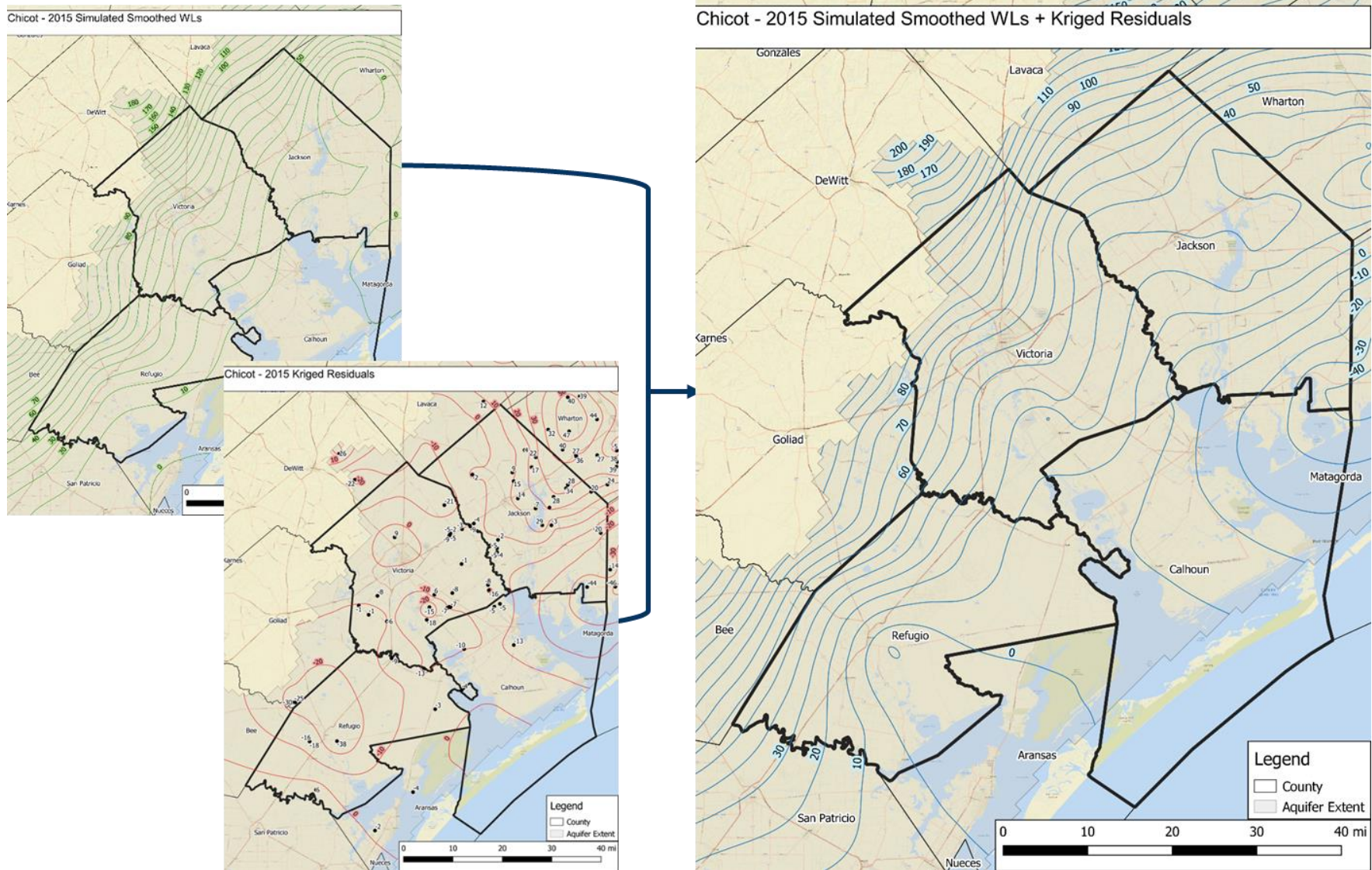


Figure 4-11 Combining the trend water level surface and the Kriged water level residual surface to produce the final surface for the 2015 Chicot water levels

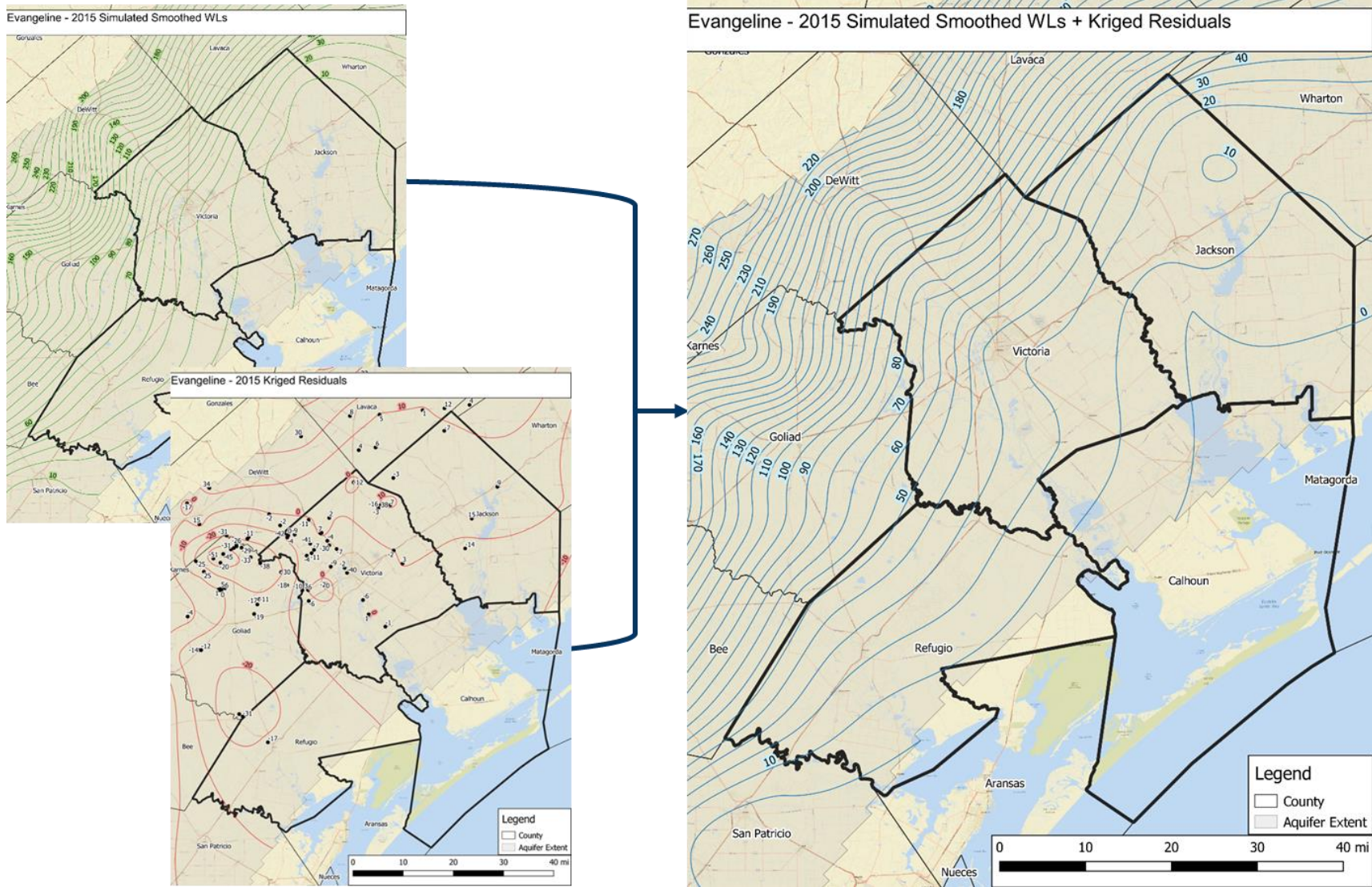


Figure 4-12 Combining the trend water level surface and the Kriged water level residual surface to produce the final surface for the 2015 Evangeline water levels



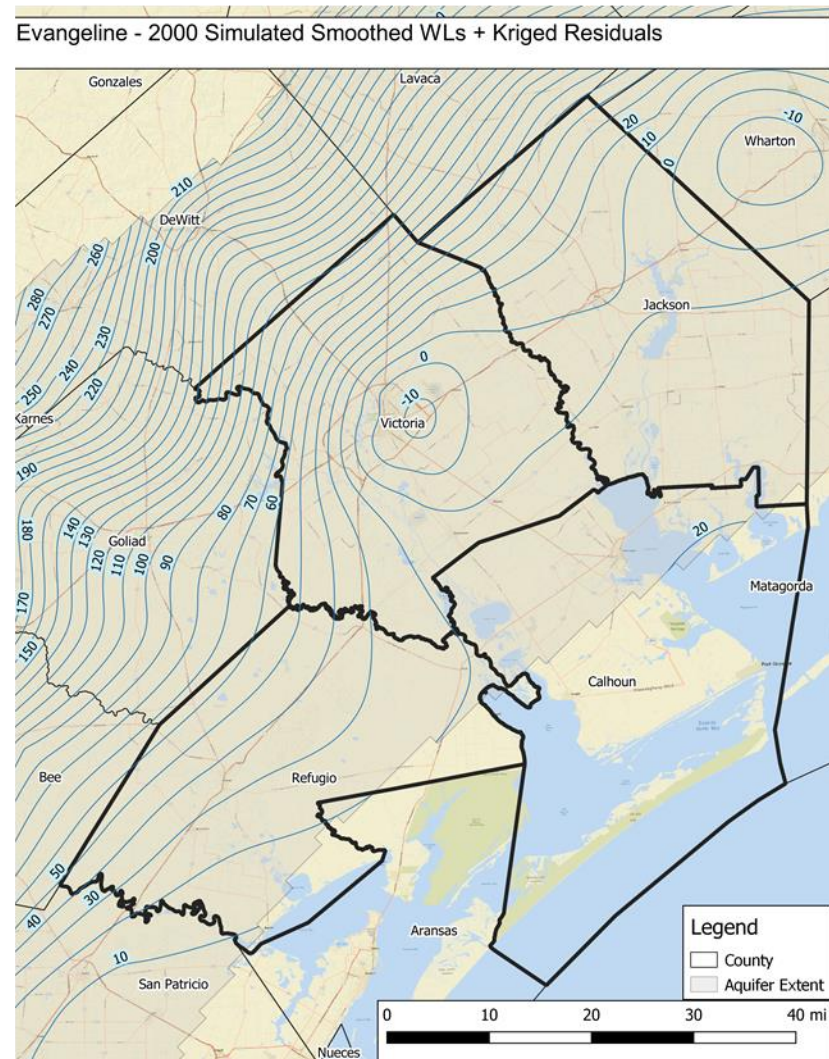
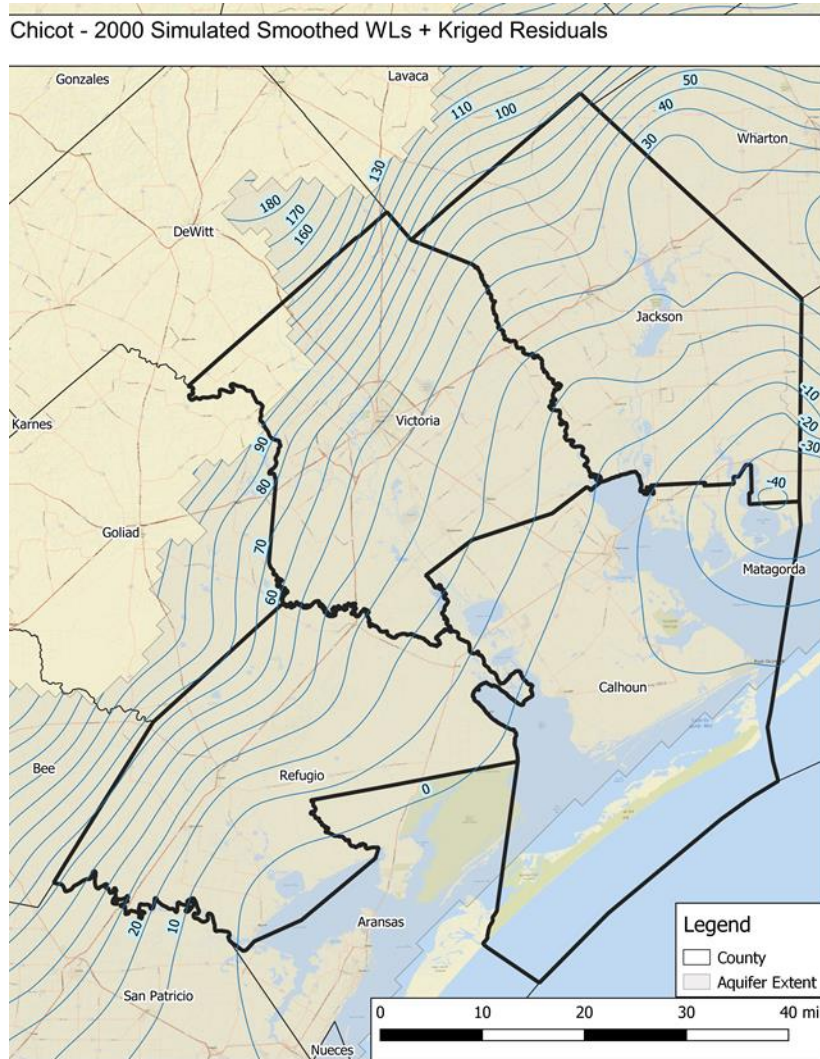


Figure 4-13 Contours of water levels for the Chicot and the Evangeline Aquifer in 2000 based on combining GAM simulated smoothed water levels and Kriged residual for the measured water levels.

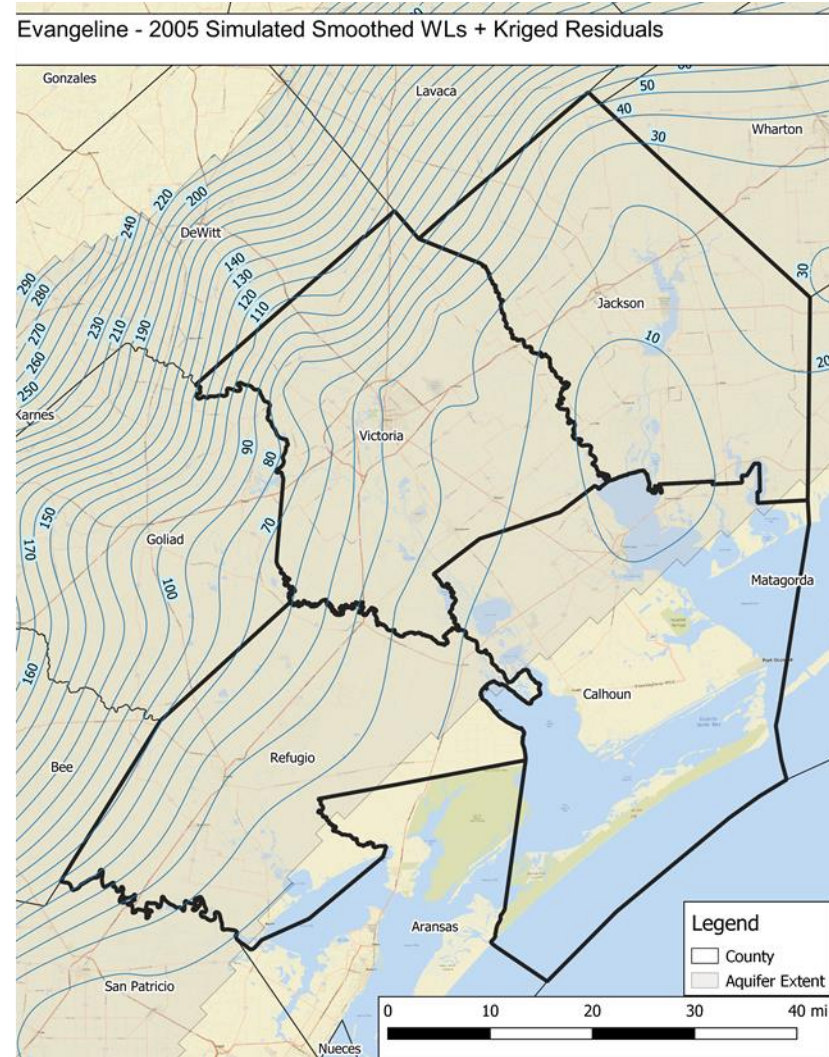
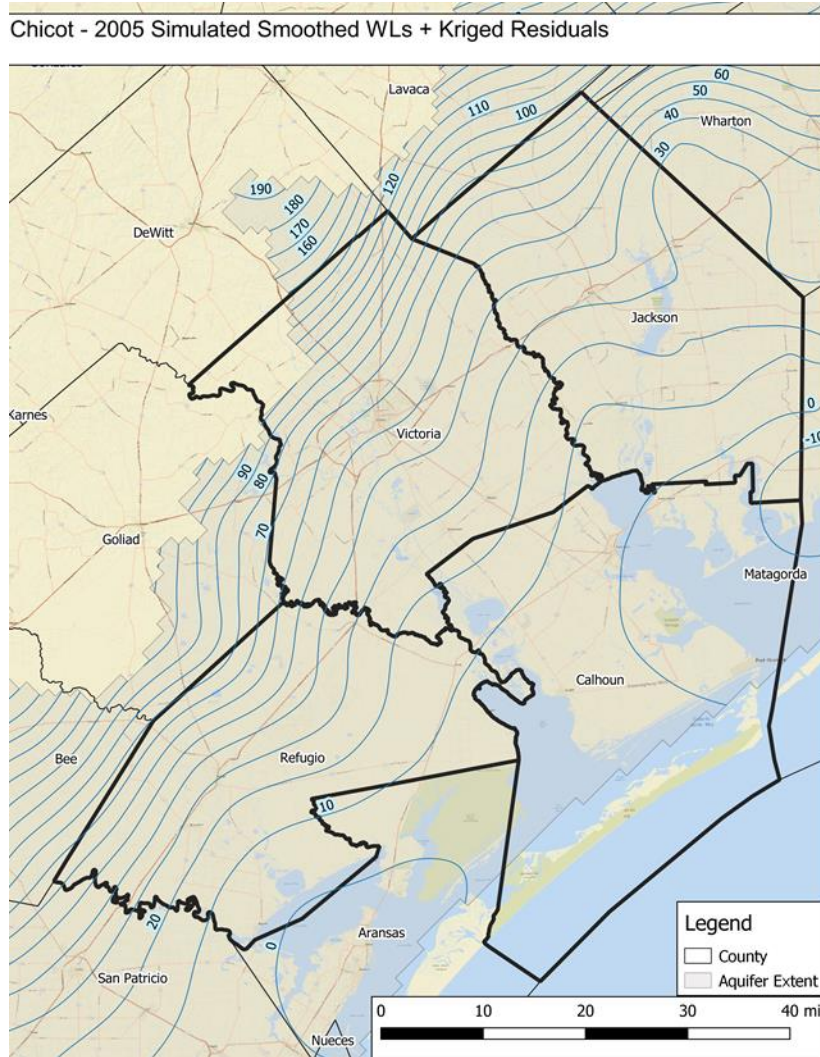


Figure 4-14 Contours of water levels for the Chicot and the Evangeline Aquifer in 2005 based on combining GAM simulated smoothed water levels and Kriged residual for the measured water levels.

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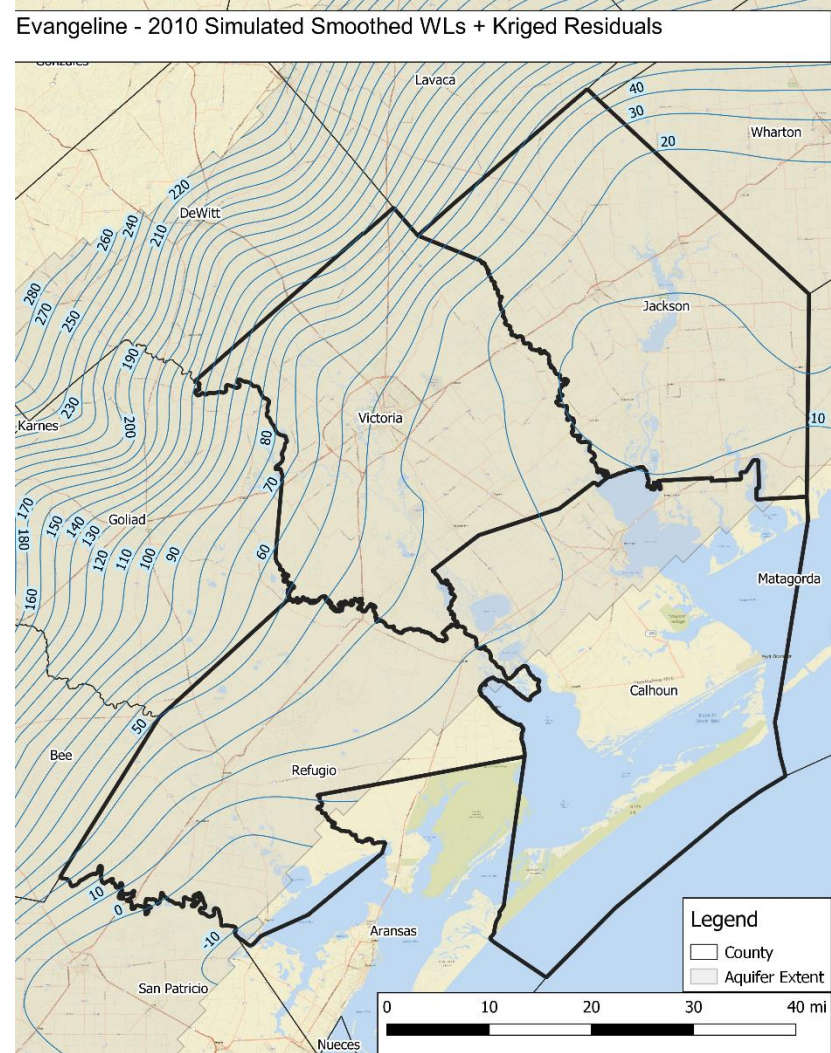
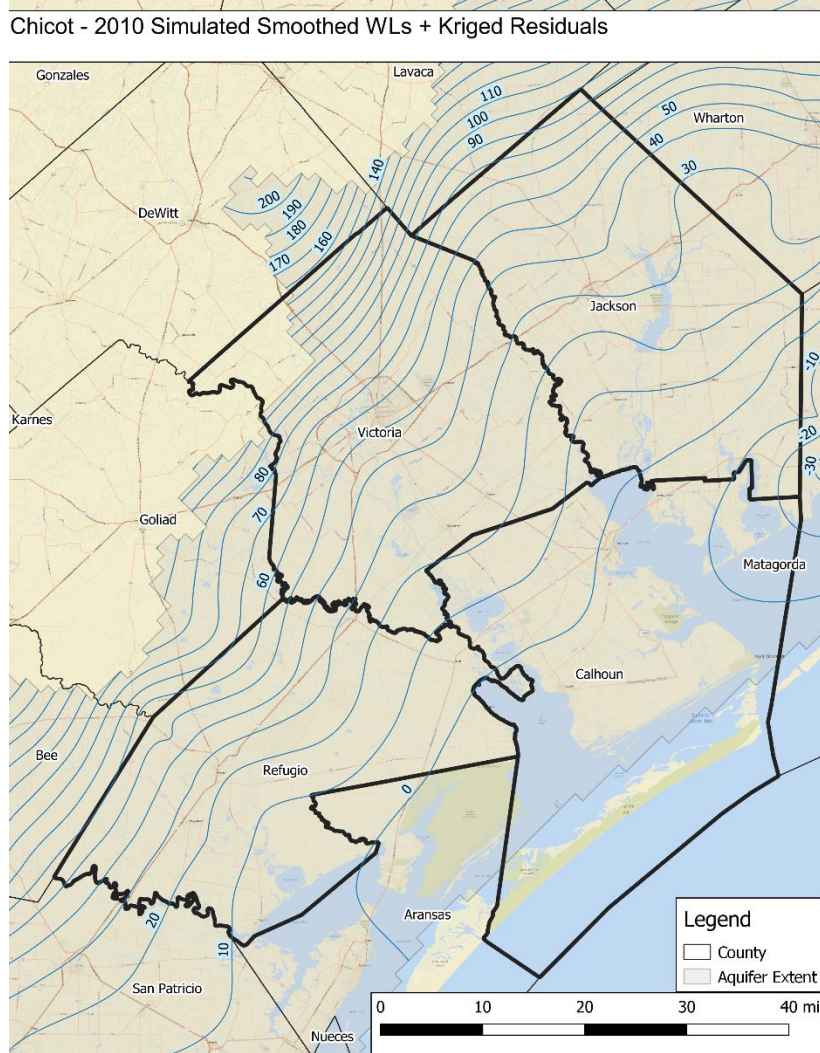


Figure 4-15 Contours of water levels for the Chicot and the Evangeline Aquifer in 2010 based on combining GAM simulated smoothed water levels and Kriged residual for the measured water levels.

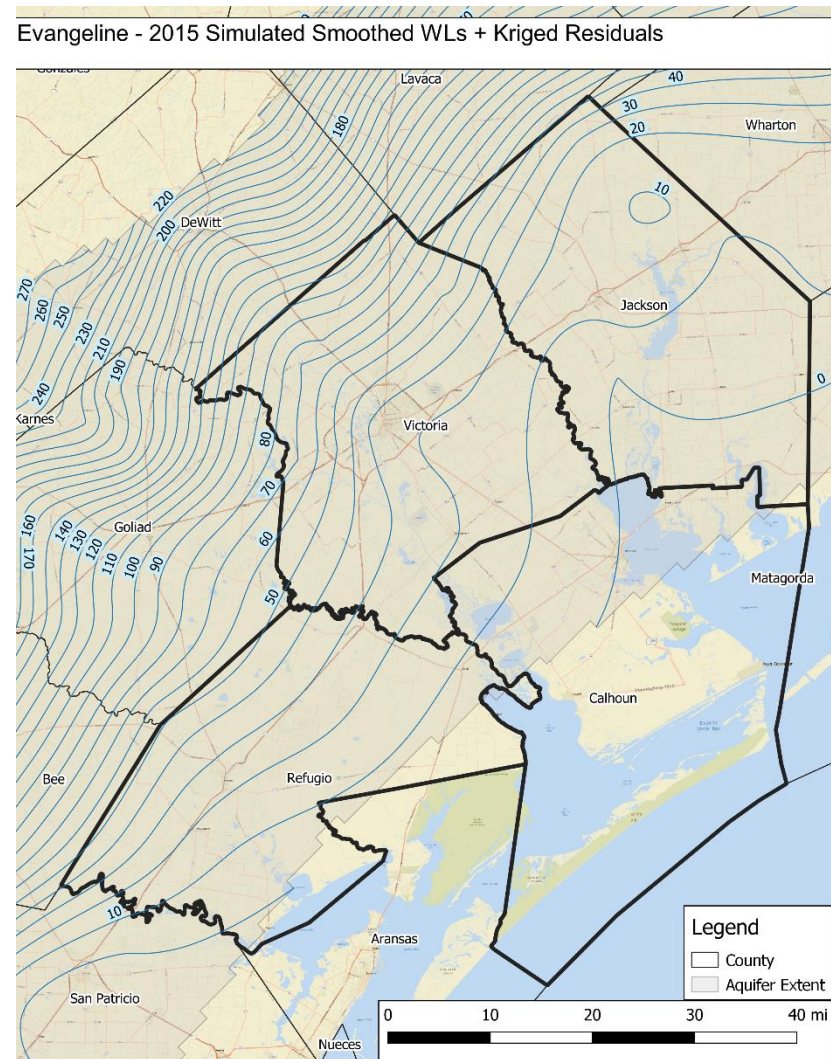
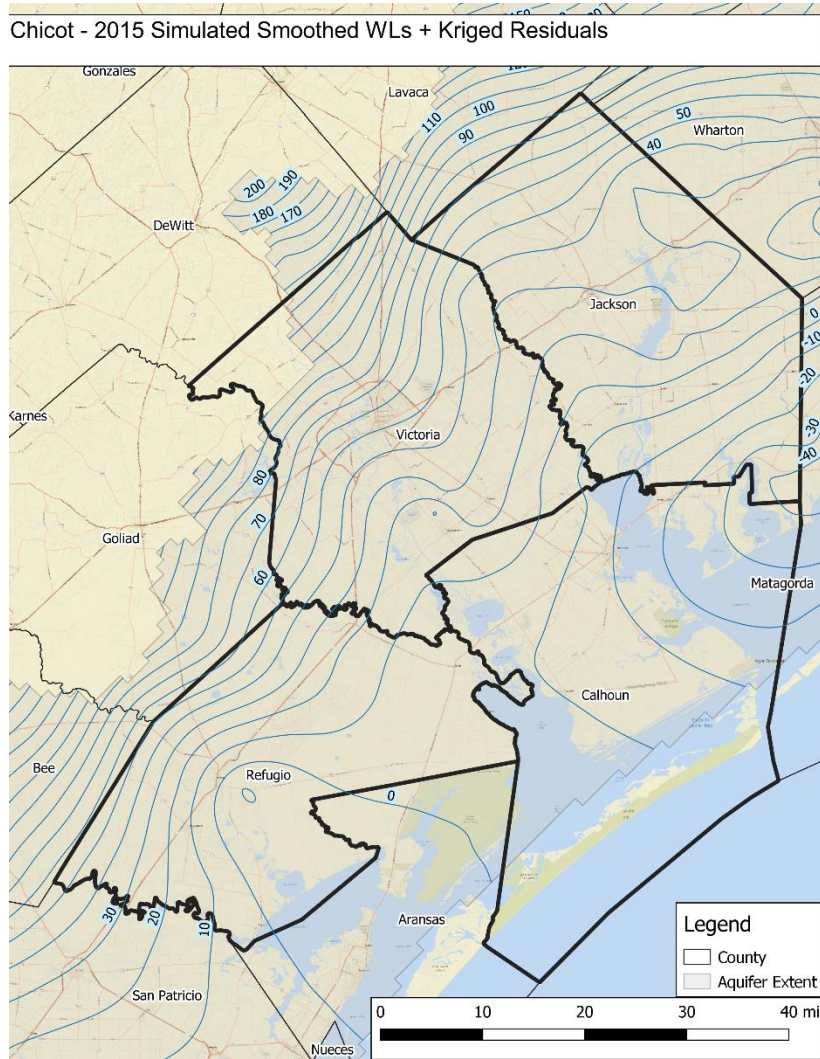


Figure 4-16 Contours of water levels for the Chicot and the Evangeline Aquifer in 2015 based on combining GAM simulated smoothed water levels and Kriged residual for the measured water levels.

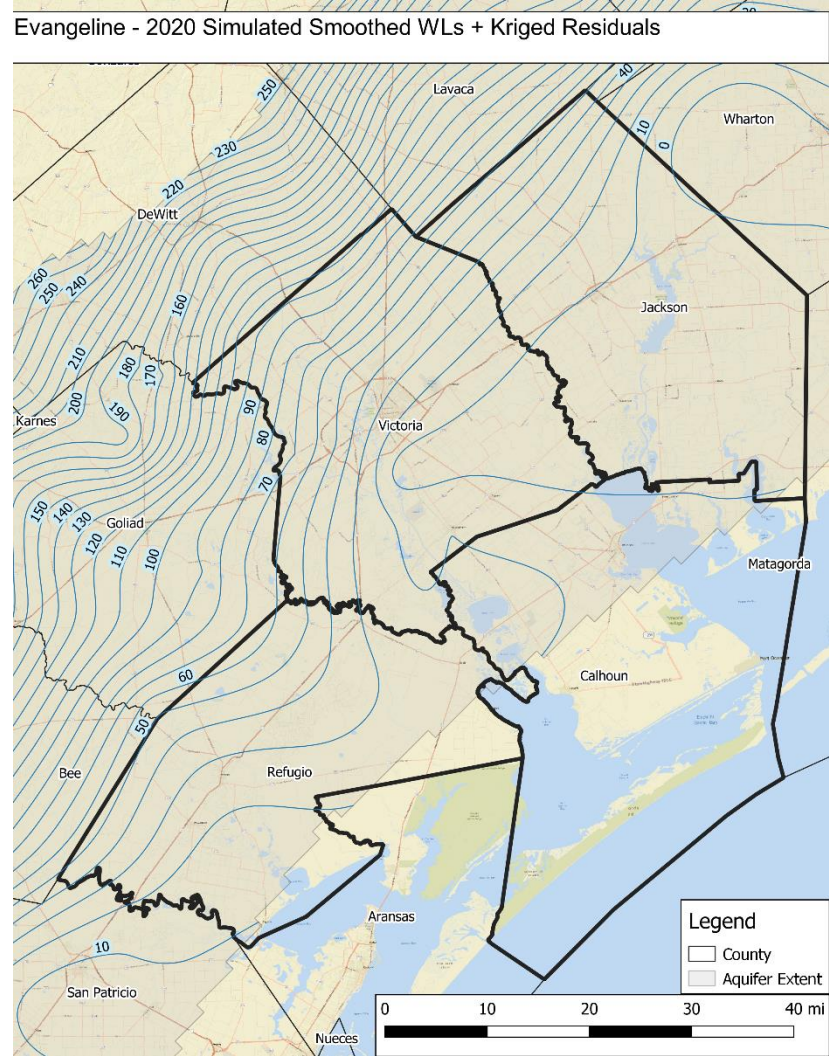
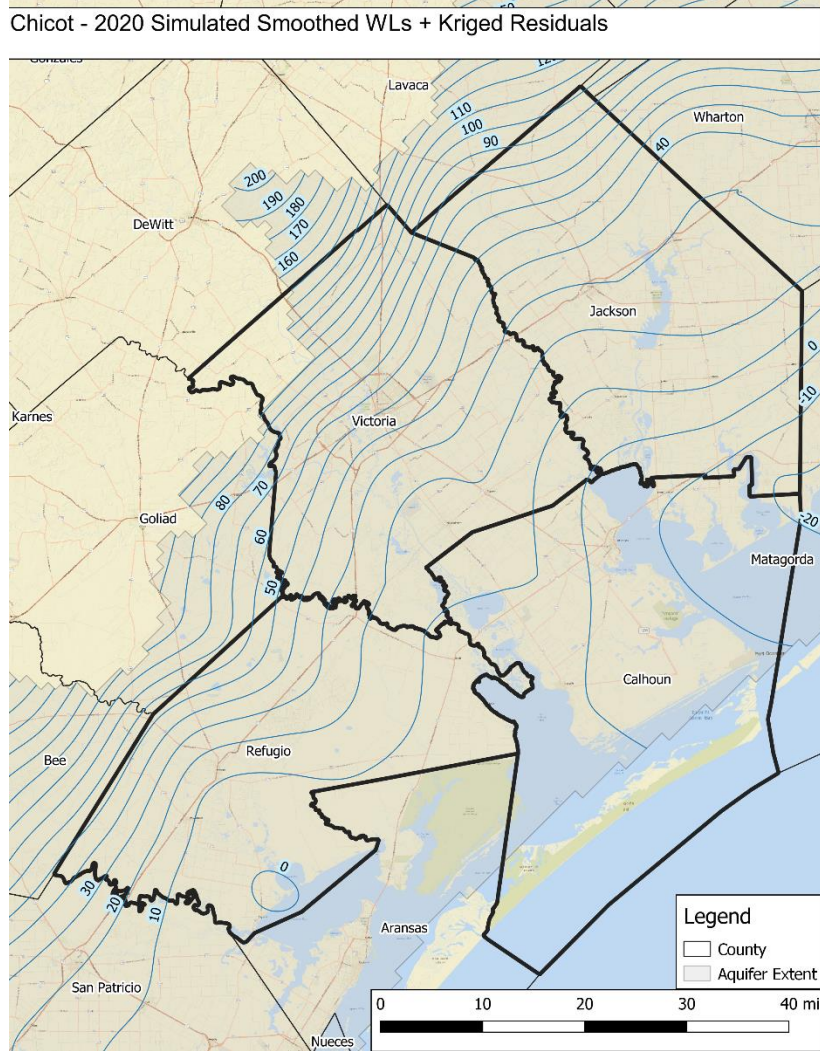


Figure 4-17 Contours of water levels for the Chicot and the Evangeline Aquifer in 2020 based on combining GAM simulated smoothed water levels and Kriged residual for the measured water levels.

## 5.0 CHANGE IN ANNUAL AVERAGE WATER LEVELS

This section presents provides graphs and tables that show how the average annual water level changes in Calhoun, Jackson, Refugio, and Victoria counties from 2000 to 2020. A useful metric for assessing changes in water levels across a county is a single number that represents the average water level elevation for the entire county. For this study, all water level maps are generated using grid cells that measure 1,000 by 1,000 ft. Therefore, each grid cell has an area of 1 million ft<sup>2</sup>, which is the equivalent to about 23 acres or 0.36 mile<sup>2</sup>. To determine the average water level for an area, one averages the water levels associated with the grid cells that comprise the area.

**Tables 5-1 through 5-4** provide the average annual water levels calculated for the Chicot Aquifer, Evangeline Aquifer, and for a Chicot & Evangeline Aquifer from 2000 to 2020 for Calhoun, Jackson, Refugio, and Victoria counties using the SSWL+KR method. The average for the Chicot & Evangeline aquifers is calculated as if the Chicot and Evangeline aquifers were fused into a single aquifer. Tables 5-1 through 5-4 also provide the change in the average annual water levels relative to 2000. **Figures 5-1 through 5-4** plot the annual change in for the Chicot Aquifer, the Evangeline Aquifer, and the Chicot & Evangeline Aquifer. For all four counties, the Evangeline Aquifer has greater variability in the average water level change than does the Chicot Aquifer. From 2000 to 2020, the net changes in water level elevation that occurred in the Chicot Aquifer, the Evangeline Aquifer, and the Chicot & Evangeline Aquifer are:

- 4.5, -1.3, and 3.7 ft, respectively, for Calhoun County;
- 6.7, -1.0, and -2.9 ft, respectively, for Jackson County;
- -6.4, -1.7, and -3.7 ft, respectively, for Refugio County;
- -1.9, 9.3, and 3.8 ft, respectively, for Victoria County

**Appendix D** provides a sensitivity analysis of how changes in the method for constructing the water level maps impacts the amount of the average annual water levels. Among the notable observations from this sensitivity analysis are:

- The Kriged values results are not very sensitive to the amount the GAM simulated water level are smoothed to generate the trend surface used for detrending.
- The Kriged results can be very sensitive if the trend surface trend surface is updated to account for annual differences in the GAM simulations that account for different pumping rates.
- The Kriging of water levels without detrending can produce significantly different results than Kriging with detrending.
- The results for the Evangeline Aquifer are more sensitive to changes how Kriging is performed than results for the Chicot Aquifer.

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Table 5-1 Average annual water level (ft, msl) and change in the average annual water level for Calhoun County for the Chicot Aquifer, the Evangeline Aquifer and the Chicot & Evangeline aquifers

Aquifer	Water Level/ Change	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
		Chicot	avg. WL (ft)	-7.0	-5.9	-4.9	-0.3	-1.8	1.9	-4.5	-1.0	0.8	-2.6	-2.6	-1.2	-7.6	-5.1	-6.8	-7.7	-7.8	-2.6	-4.2
	change (ft)*	0.0	1.1	2.1	6.7	5.2	8.9	2.5	6.1	7.8	4.4	4.4	5.8	-0.6	2.0	0.2	-0.6	-0.8	4.4	2.8	4.1	4.5
Evangeline	avg. WL (ft)	17.7	11.3	8.1	25.2	13.7	13.3	21.8	28.0	15.1	16.5	18.1	14.6	18.7	10.3	1.2	3.6	3.6	11.6	-8.0	15.2	16.4
	change (ft)*	0.0	-6.4	-9.6	7.5	-4.0	-4.4	4.1	10.3	-2.6	-1.2	0.4	-3.1	1.0	-7.4	-16.5	-14.2	-14.1	-6.1	-25.8	-2.5	-1.3
Chicot & Evangeline	avg. WL (ft)	-3.2	-3.7	-3.5	3.7	0.2	3.3	-0.2	3.7	3.1	0.2	0.4	1.0	-3.1	-2.8	-5.7	-6.1	-6.2	-0.4	-5.7	-0.1	0.5
	change (ft)*	0.0	-0.5	-0.3	7.0	3.4	6.6	3.1	6.9	6.3	3.4	3.6	4.2	0.1	0.4	-2.5	-2.8	-3.0	2.8	-2.5	3.1	3.7

\* change is measured relative to the year 2000; avg WL is measured relative to mean sea level

Table 5-2 Average annual water level (ft, msl) and change in the average annual water level for Jackson County for the Chicot Aquifer, the Evangeline Aquifer and the Chicot & Evangeline aquifers

Aquifer	Water Level/ Change	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
		Chicot	avg. WL (ft)	21.3	19.3	23.4	26.5	26.5	29.3	23.0	29.9	30.7	26.4	27.1	28.1	20.2	23.6	20.3	22.1	20.6	25.9	25.7
	change (ft)*	0.0	-2.0	2.1	5.2	5.2	8.0	1.7	8.6	9.4	5.1	5.8	6.8	-1.1	2.2	-1.0	0.8	-0.7	4.6	4.4	4.9	6.7
Evangeline	avg. WL (ft)	17.0	19.2	21.8	21.0	22.0	22.0	21.5	32.6	27.5	20.9	17.1	19.6	6.2	20.4	1.7	12.0	21.0	17.4	-3.5	15.4	15.9
	change (ft)*	0.0	2.3	4.9	4.0	5.1	5.1	4.6	15.7	10.6	3.9	0.1	2.6	-10.7	3.4	-15.2	-4.9	4.1	0.4	-20.4	-1.5	-1.0
Chicot & Evangeline	avg. WL (ft)	19.0	19.1	22.5	23.6	24.2	25.6	22.2	31.2	29.0	23.5	22.0	23.8	13.1	21.9	11.0	16.9	20.7	21.5	11.0	20.8	21.9
	change (ft)*	19.1	0.1	3.5	4.6	5.2	6.6	3.1	12.2	10.0	4.5	3.0	4.8	-5.9	2.8	-8.1	-2.1	1.7	2.5	-8.0	1.7	2.9

\* change is measured relative to the year 2000; avg WL is measured relative to mean sea level

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Table 5-3 Average annual water level (ft, msl) and change in the average annual water level for Refugio County for the Chicot Aquifer, the Evangeline Aquifer and the Chicot & Evangeline aquifers

Aquifer	Water Level/ Change	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Chicot	avg. WL (ft)	24.8	23.6	28.3	27.2	24.5	28.3	24.6	27.4	29.0	24.3	22.7	23.5	23.0	19.4	4.5	14.5	19.6	19.2	19.0	20.0	18.4
	change (ft)*	0.0	-1.2	3.6	2.5	-0.2	3.5	-0.1	2.6	4.3	-0.5	-2.1	-1.2	-1.8	-5.4	-20.2	-10.3	-5.2	-5.6	-5.8	-4.8	-6.4
Evangeline	avg. WL (ft)	32.5	31.7	34.2	39.8	37.9	40.7	38.3	35.4	31.2	31.7	21.7	31.6	33.1	27.0	23.9	22.3	24.6	30.4	20.5	28.2	30.9
	change (ft)*	0.0	-0.8	1.6	7.2	5.3	8.1	5.8	2.8	-1.3	-0.9	-10.8	-1.0	0.5	-5.5	-8.6	-10.3	-7.9	-2.2	-12.0	-4.3	-1.7
Chicot & Evangeline	avg. WL (ft)	26.3	25.4	29.1	31.0	28.8	31.8	28.9	29.0	28.5	26.1	20.7	25.6	25.8	21.4	11.9	16.7	20.4	22.8	18.6	22.4	22.6
	change (ft)*	0.0	-0.9	2.8	4.7	2.5	5.6	2.6	2.7	2.2	-0.1	-5.5	-0.7	-0.5	-4.9	-14.4	-9.5	-5.8	-3.5	-7.7	-3.9	-3.7

\* change is measured relative to the year 2000; avg WL is measured relative to mean sea level

Table 5-4 Average annual water level (ft, msl) and change in the average annual water level for Victoria County for the Chicot Aquifer, the Evangeline Aquifer and the Chicot & Evangeline aquifers

Aquifer	Water Level/ Change	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Chicot	avg. WL (ft)	49.8	49.2	47.8	48.8	49.6	52.6	51.8	52.0	52.4	50.9	52.8	48.0	43.5	50.1	45.5	48.2	49.9	51.4	52.0	49.9	47.9
	change (ft)*	0.0	-0.6	-2.0	-1.0	-0.2	2.8	2.0	2.2	2.6	1.1	3.0	-1.7	-6.3	0.3	-4.3	-1.6	0.1	1.6	2.2	0.1	-1.9
Evangeline	avg. WL (ft)	29.8	32.0	40.6	48.8	51.0	48.9	47.6	53.4	53.0	47.7	44.8	41.3	32.4	45.3	40.9	41.4	45.6	46.1	30.6	38.0	39.1
	change (ft)*	0.0	2.2	10.8	19.0	21.2	19.1	17.7	23.5	23.1	17.8	15.0	11.5	2.5	15.4	11.0	11.5	15.7	16.3	0.7	8.2	9.3
Chicot & Evangeline	avg. WL (ft)	41.3	42.4	46.0	50.6	51.9	52.2	51.2	54.2	54.2	50.7	50.2	46.2	39.3	49.3	44.8	46.3	49.3	50.4	42.7	45.6	45.1
	change (ft)*	0.0	1.0	4.6	9.2	10.5	10.9	9.9	12.9	12.9	9.4	8.9	4.9	-2.0	7.9	3.4	5.0	7.9	9.0	1.4	4.2	3.8

\* change is measured relative to the year 2000; avg WL is measured relative to mean sea level



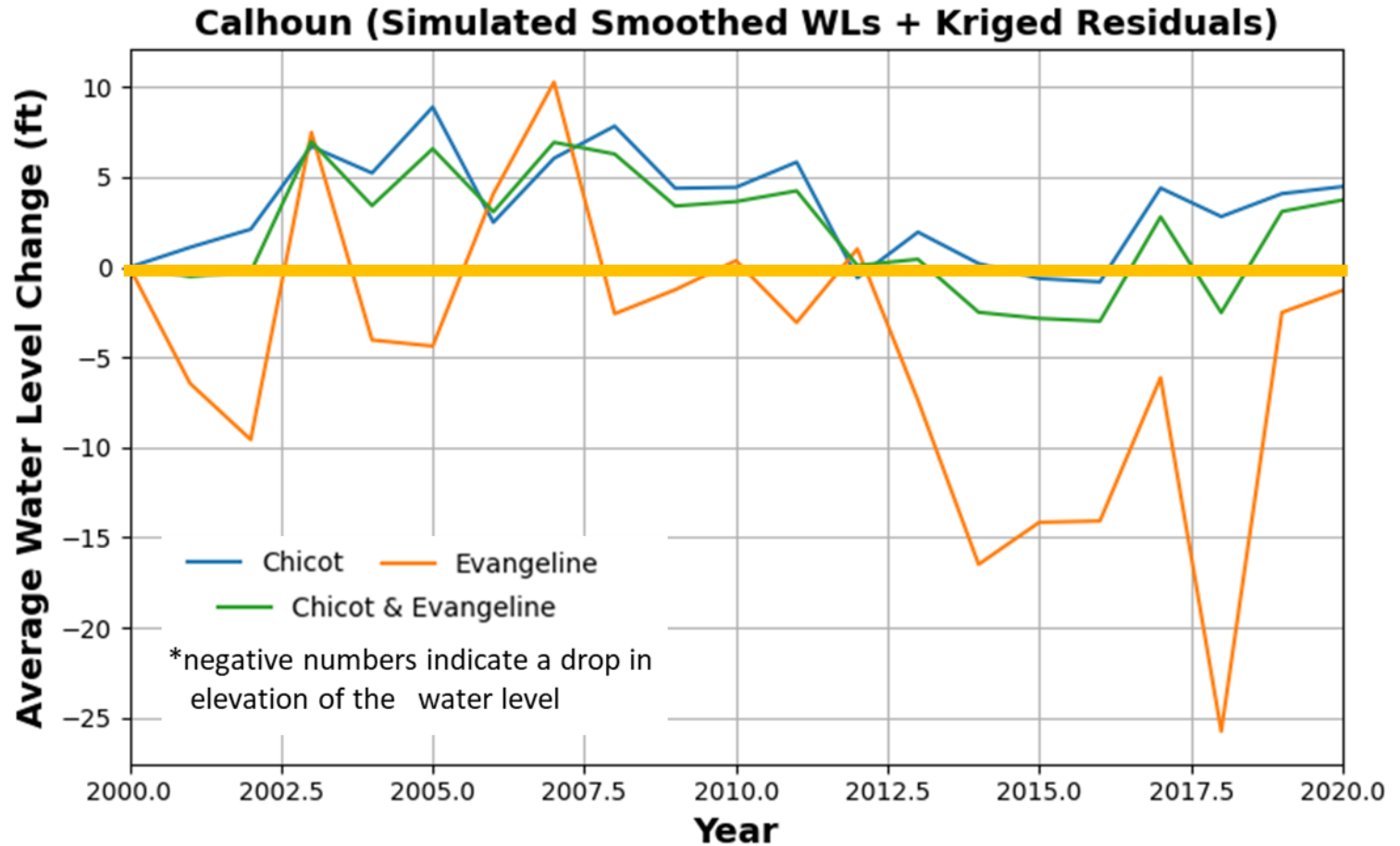


Figure 5-1 Change in the average annual water level calculated in Calhoun County for the Chicot Aquifer, the Evangeline Aquifer, and the combination of Chicot and Evangeline aquifers based on the analysis of aquifer levels determined using GAM simulated smoothed water levels and Kriged residual for the measured water levels.

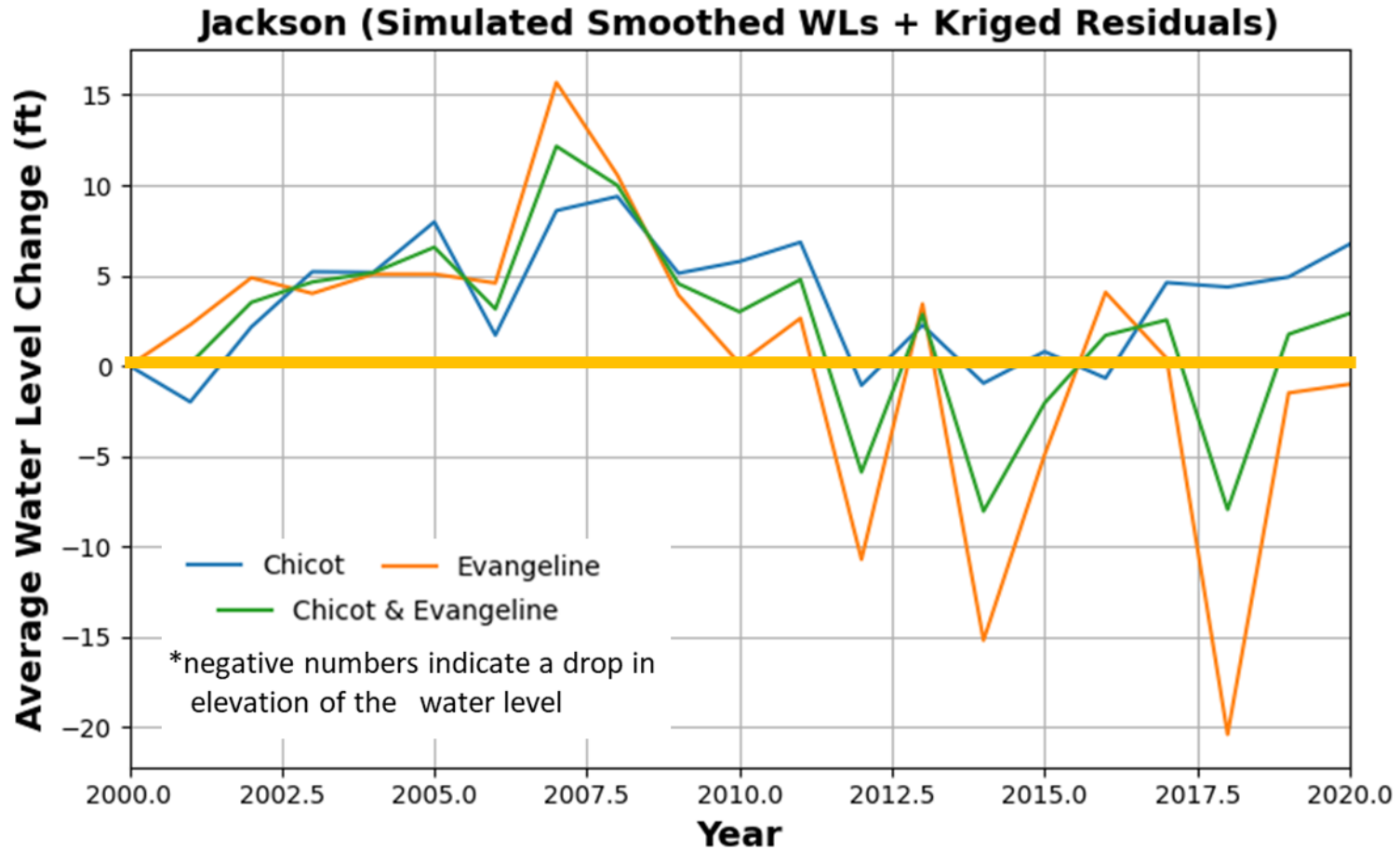


Figure 5-2 Change in the average annual water level calculated in Jackson County for the Chicot Aquifer, the Evangeline Aquifer, and the combination of Chicot and Evangeline aquifers based on the analysis of aquifer levels determined using GAM simulated smoothed water levels and Kriged residual for the measured water levels.

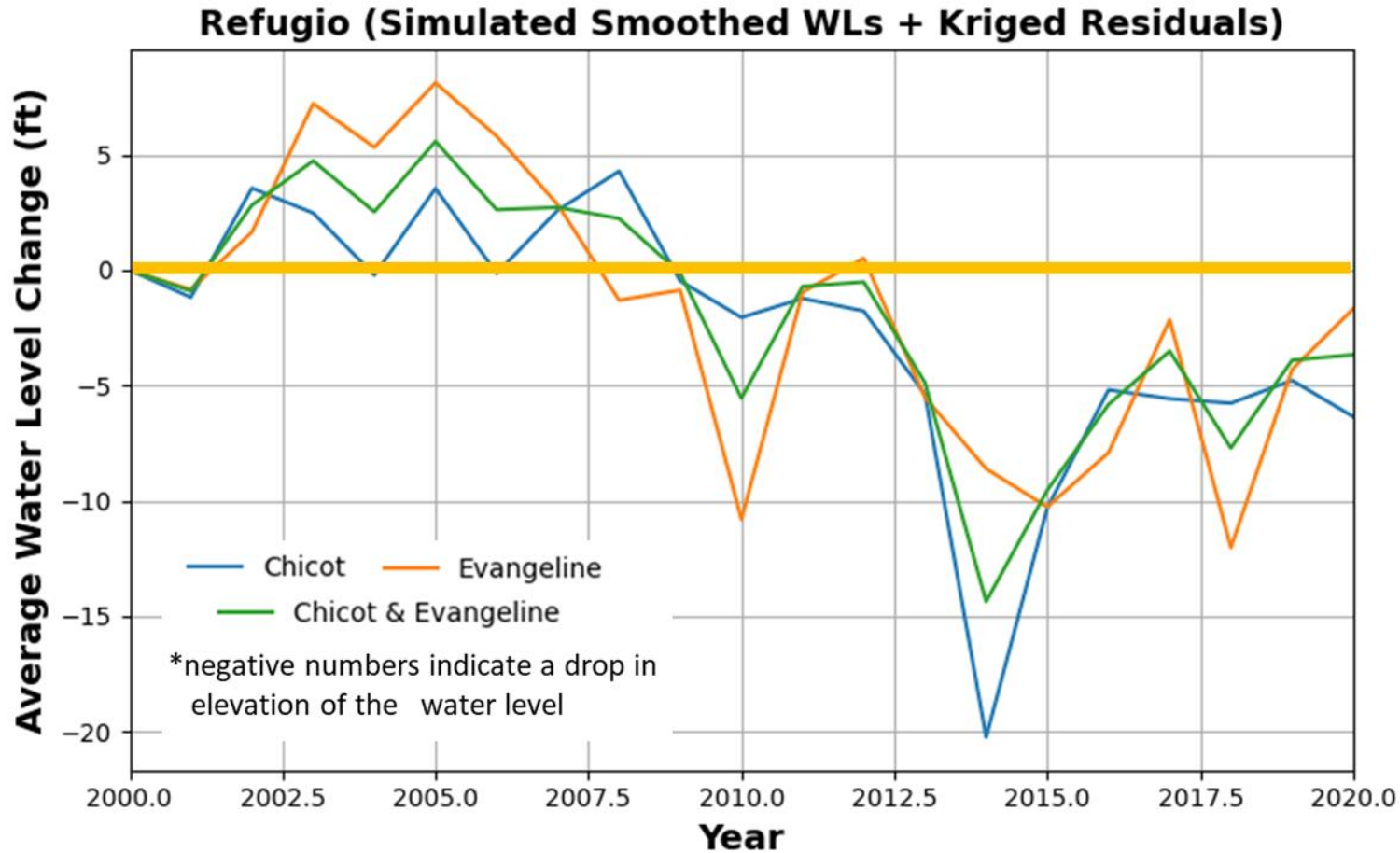


Figure 5-3 Change in the average annual water level calculated in Refugio County for the Chicot Aquifer, the Evangeline Aquifer, and the combination of Chicot and Evangeline aquifers based on the analysis of aquifer levels determined using GAM simulated smoothed water levels and Kriged residual for the measured water levels.

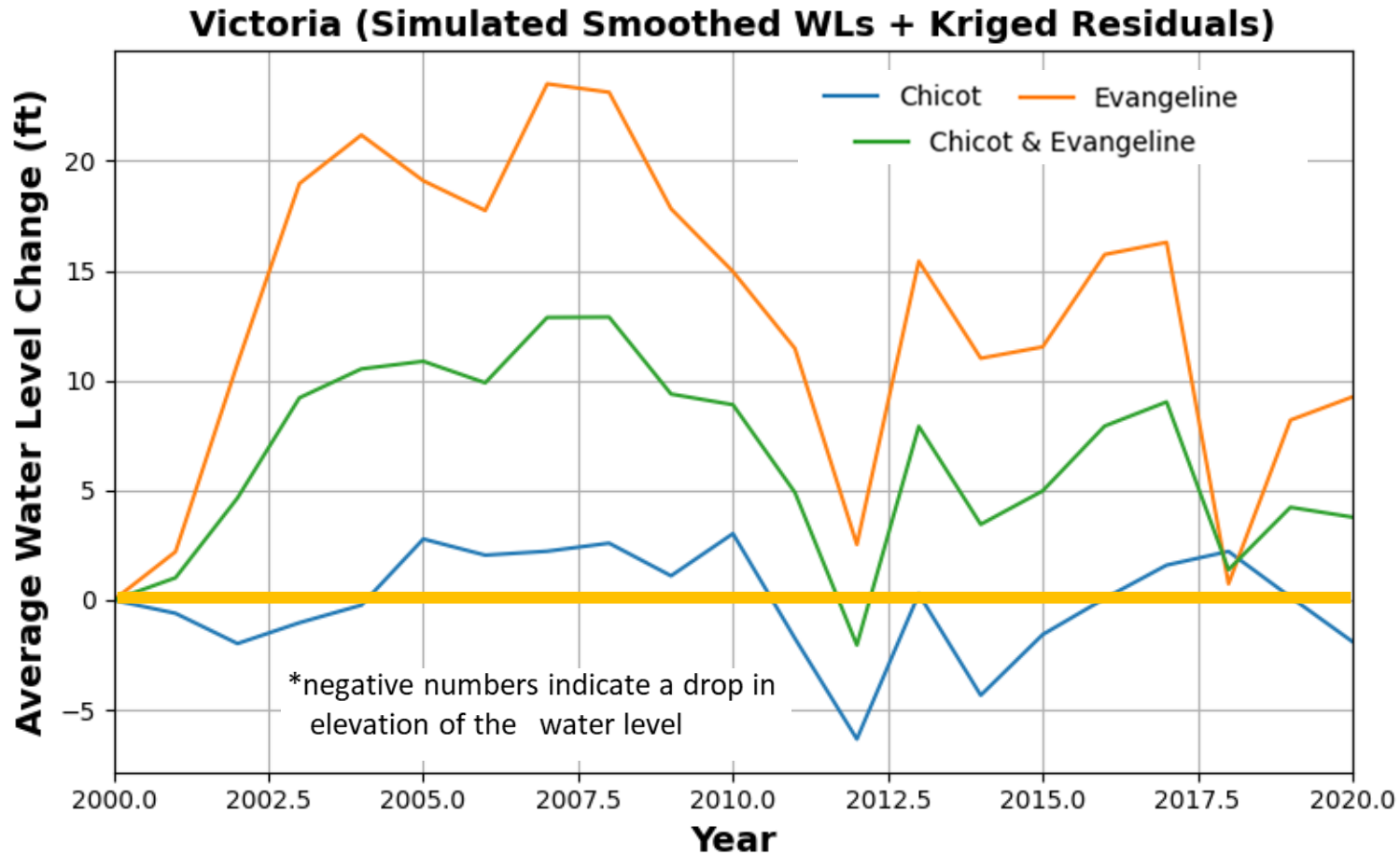


Figure 5-4 Change in the average annual water level calculated in Victoria County for the Chicot Aquifer, the Evangeline Aquifer, and the combination of Chicot and Evangeline aquifers based on the analysis of aquifer levels determined using GAM simulated smoothed water levels and Kriged residual for the measured water levels.

## 6.0 SPATIAL AND TEMPORAL CHANGES IN WATER LEVELS

This section presents tables and figures that illustrate changes in the water levels across the counties and at wells. The maps showing contours of water level change across counties are based on the differences in the mapped annual water levels determined for the Chicot Aquifer, Evangeline Aquifer, and the Chicot & Evangeline Aquifer in Section 5. The groundwater elevation changes at wells are based on hydrographs of the measured water levels.

### 6.1 Water Level Changes Across Counties

Figures 6-1 through 6-4 show the net change in water levels in from 2000 to 2020 in Calhoun, Jackson, Refugio, and Victoria counties. Maps are provided for both the Chicot and the Evangeline aquifers. The coverages for both aquifers are truncated to the aquifer boundaries delineated in the central Gulf Coast GAM (Chowdhury and others, 2004). The water level changes are delineated using contours and color floods. Positive numbers and blue and green colors show where water level elevations increased over time. Negative numbers and yellow and orange colors indicate where water level elevations have decreased over time. **Appendix E** provides figures that divides the twenty-year interval into 10-year and 5-year periods. Several notable observations made from Figures 6-1 through 6-4 and Appendix E are listed below.

#### Calhoun County

- Chicot Aquifer
  - 2000-2020: Water levels increased across about 80% of the county. The largest increase of about 20 ft occurred in northeast region. Areas of decrease occurred in northwest and north regions.
  - 2000-2010: Water levels increased across about 80% of the county. The largest increase was of 23 ft in water levels with greatest increase occurring in northeast. Areas of decreased water levels occurred in southwest with maximum declines of about 5 ft.
  - 2010-2020: Water levels decreased in about 60% of the county. The decreases occurred primarily in the northeast. The largest decrease of about 12 ft occurred in northeast. Areas of decreased water levels occurred in southwest with maximum declines of about 5 ft.
- Evangeline Aquifer
  - 2000-2020: Water levels decreased across about 70% of the county. The largest decrease of about 7 ft occurred in the northeast.
  - 2000-2010: Water levels decreased across the county except for about 10% of the county in the northwest corner of the county. Decreased water levels were generally less than 5 ft and the increased water levels were generally less than 2.5 ft.
  - 2010-2020: Water levels increased in about 90% of the county. The largest increase was about 5 ft. Water levels decreased along the Jackson county line. The largest decrease was 2.5 ft.

### Jackson County

- Chicot Aquifer
  - 2000-2020: Water levels increased across about 90% of the county. Increases of about 25 ft occurred in the northeast and of about 20 ft occurred in south. In the remaining areas, water levels decreased less than 5 ft.
  - 2000-2010: Water levels increased across about 90% of county. Increased water levels of 20 ft occurred in the northeast and southwest corners of the county.
  - 2010-2020: Water levels across most of the county changed less than 5 ft. The largest increase in water levels of 10 ft occurred in southeast; the largest decrease in water levels of about 15 ft occurred in southwest.
- Evangeline Aquifer
  - 2000-2020: Water levels increased across about 50% of the county with the largest increase of about 12 ft occurring in the northern region. Water levels decreased across the remaining county with the greatest decline of 10 ft occurring in the southern region.
  - 2000-2010: Water levels increased 5 ft across most of the central and northern part of the county. In the southeast part of the county, the water levels decreased averaged about 5 ft also.
  - 2010-2020: Across about 90% of the county, the water levels changed less than 5 ft.

### Refugio County

- Chicot Aquifer
  - 2000-2020: Water levels decreased across about 70% of the county and in the northwest region where the largest decrease of about 27 feet occurred near the Goliad county line. An increase of less than 5 ft occurred across most of the remaining southeastern portion of the county.
  - 2000-2010: Water levels in northeast that cover about 60% decreased. The largest groundwater elevation decrease of 17 ft occurred along the Goliad county line. Water levels increased between 0 to 10 ft in southwestern region of the county.
  - 2010-2020: Water levels decreased across about 80% of the county with greatest decrease of about 18 ft near center of the county. Water levels in the remaining portion of the county increased 2 to 7 ft.
- Evangeline Aquifer
  - 2000-2020: Water levels decreased across about 75% of the county with the largest decline of 15 ft in the north-central region of the county.
  - 2000-2010: Water levels decreased across the entire county. The declines ranged from about 5 ft in the northeast to about 25 ft in the southeast.
  - 2010-2020: Water levels increased across 95% of the county. Most of the increases were between 7 and 17 ft. The largest increase of about 22 ft occurred in the southwest corner of the county.

### Victoria County

- Chicot Aquifer
  - 2000-2020: Water levels increased across about 50% of the county and primarily in the northeast region. The largest increase of about 25 ft occurred at the center of the county. Water levels decreased in the southwest region where the largest decrease was about 15 ft.

- 2000-2010: Water levels increased across about 65% of the county and primarily in the northeast and east regions. The largest increase in water levels of about 25 ft occurred at center of the county. In southwest portion of the county, the water levels decreased. The declines range between 5 and 10 ft.
- 2010-2020: Water levels decreased across about 60% of the county and primarily in the southeast portion of the county. The groundwater level declines were primary between 2 and 10 ft. In the northeast corner of the county, the groundwater levels increased about 5 to 10 ft.
- Evangeline Aquifer
  - 2000-2020: Water levels increased across about 60% of the county and primarily in the northwest portion of the county. The largest increase of about 70 ft occurred at the center of the county. In southwest region of the county, changes in the groundwater levels ranged from about a 10 ft increase to a 20 ft decrease.
  - 2000-2010: Water levels increased across about 85% of the county. The largest increase of about 80 ft occurred at the center of the county and lessen radially outward.
  - 2010-2020: Water levels decreased across about 80% of county. The largest declines of 20 to 25 ft occurred near the center and near the southwest corner of the county. Groundwater levels increased about 5 to 10 ft in northwest region of the county.

## 6.2 Water Level Changes at Wells

**Appendices F and G** provide hydrographs for wells located in Calhoun, Jackson, Refugio, and Victoria counties. Appendix F shows hydrographs for the Chicot Aquifer. Appendix G shows hydrographs for the Evangeline Aquifer. Each hydrograph shows the measured water level as blue dots and the corresponding water levels associated with the trend surface created using the smoothed GAM simulated water levels as red dots. The blue lines were constructed by performing a linear regression on the measured water levels. **Figures 6-5 through 6-11** show selected hydrographs by aquifer and by county. Only wells with at least four annual measurements were considered. Each hydrograph is assigned a color dot to indicate whether the water levels were increasing, relatively flat, or decreasing over time. Also, simulated water levels were rated from 1 to 10 based on their similarity to the measured water levels. A score of 10 indicates the simulated water level accurately reflects both the values and the temporal trend in the measured water levels. Notable observations are listed below by county.

### Calhoun County

- Chicot Aquifer
  - Six hydrographs are provided. They are located in the half of the county closest to Victoria county. Four of the hydrographs show a relatively flat trend over time for the measured groundwater elevations.
  - The smoothed simulated water levels are within 10 ft of the measured water levels. However, for five out of the six wells, the simulated water levels exhibit increases of 5 to 10 ft from 2000 to 2020 whereas the measured groundwater levels indicate a change of less than a few feet. The GAM-simulated water levels are rated an 8 out of 10.
- Evangeline Aquifer
  - No hydrographs are available for review.

### Jackson County

- Chicot Aquifer
  - Twelve hydrographs are provided. They are located across the county except for near the Calhoun County line. Eight of the hydrographs show a relatively flat trend over time for the measured water levels. The remaining four hydrographs show an increase in the measured water levels.
  - A comparison between simulated and measured water levels at the twelve well locations produced mixed results. For several wells, such as wells #907 and #5, the simulated elevations are within a few feet and have a similar temporal trend as the measured elevations but there are other wells such as wells #137 and #112 where, the simulated elevations are differed by as much as 40 ft and have a dissimilar temporal trend than do the measured elevations. The GAM-simulated water levels are rated a 4 out of 10.
- Evangeline Aquifer
  - Seven hydrographs are provided. They are located across the county. Three hydrographs indicate nearly flat temporal trends in the measured water levels, and three hydrographs indicate an increase in the measured water levels. The GAM-simulated water levels are rated a 5 out of 10.
  - A comparison between simulated and measured water levels at the twelve well locations produce mixed results. The comparisons are generally better for years closer to 2000 than for the years closer to 2020. For 2020, four of the wells have differences between 20 and 40 ft between the measured and simulated water levels. The GAM-simulated water levels are rated a 6 out of 10.

### Refugio County

- Chicot Aquifer
  - Eight hydrographs are provided. They are located across the county. Four of the hydrographs show a relatively flat temporal trend in the measured water levels and three hydrographs show a decreasing trend in the measured elevations. Wells # 44 and #61 may have unrepresentative measured water levels. The shift of about 20 ft in 2014 at Well #44 may have occurred because of a change in the datum used in the field.
  - A comparison between simulated and measured water levels at the twelve well locations produce mixed results. The GAM-simulated water levels are rated a 5 out of 10.
- Evangeline Aquifer
  - Two hydrographs are provided. One shows a relatively flat trend in the measured water levels and the other shows a decreasing trend in the measured water levels.
  - The simulated and measured water levels are similar for the one well but are notably different for the other well. The GAM simulated water levels are rated a 6 out of 10.

### Victoria County

- Chicot Aquifer
  - Twelve hydrographs are provided. They are located across the county except in the center of the county. Seven of the hydrographs show a relatively flat temporal trend in the measured water levels. Three hydrographs show an increasing trend in the measured water levels.
  - The measured and simulated water levels compare favorably at four wells. At five other wells, the simulated and measured water levels have similar trends but the data sets are



offset by 10 to 30 ft. At three wells, notable trends of increasing water levels with the measured data are not provided in the simulated values. The GAM-simulated water levels are rated a 5 out of 10.

- Evangeline Aquifer
  - Twelve hydrographs are provided. They are located across the county. Seven of the hydrographs show a relatively flat temporal trend in the measured water levels. Three hydrographs show an increasing trend in the measured water levels.
  - The measured and simulated water levels compare favorably at five wells. At four other wells, the simulated and measured water levels have similar trends but the data sets are offset by 10 to 30 ft. At two wells, notable trends in the measured water levels are not reproduced in the simulated values. The GAM-simulated water levels are rated a 6 out of 10.

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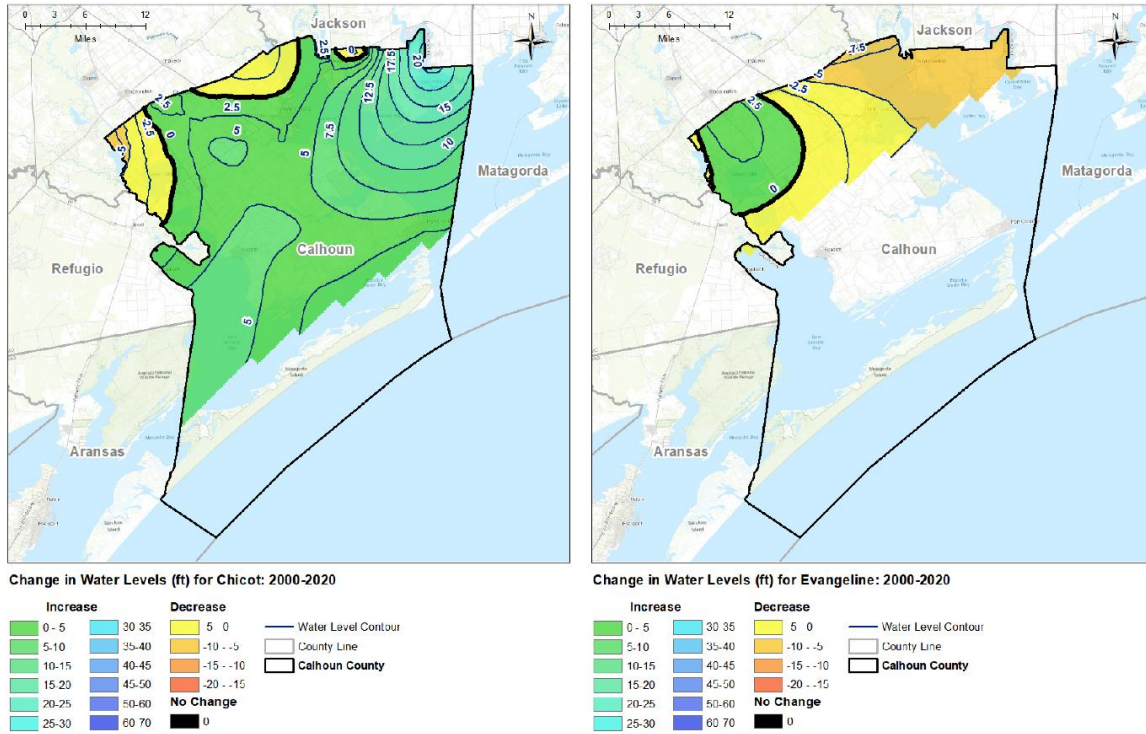


Figure 6-1 Water level elevation change in Chicot and Evangeline Aquifers across Calhoun County for 2000 - 2020

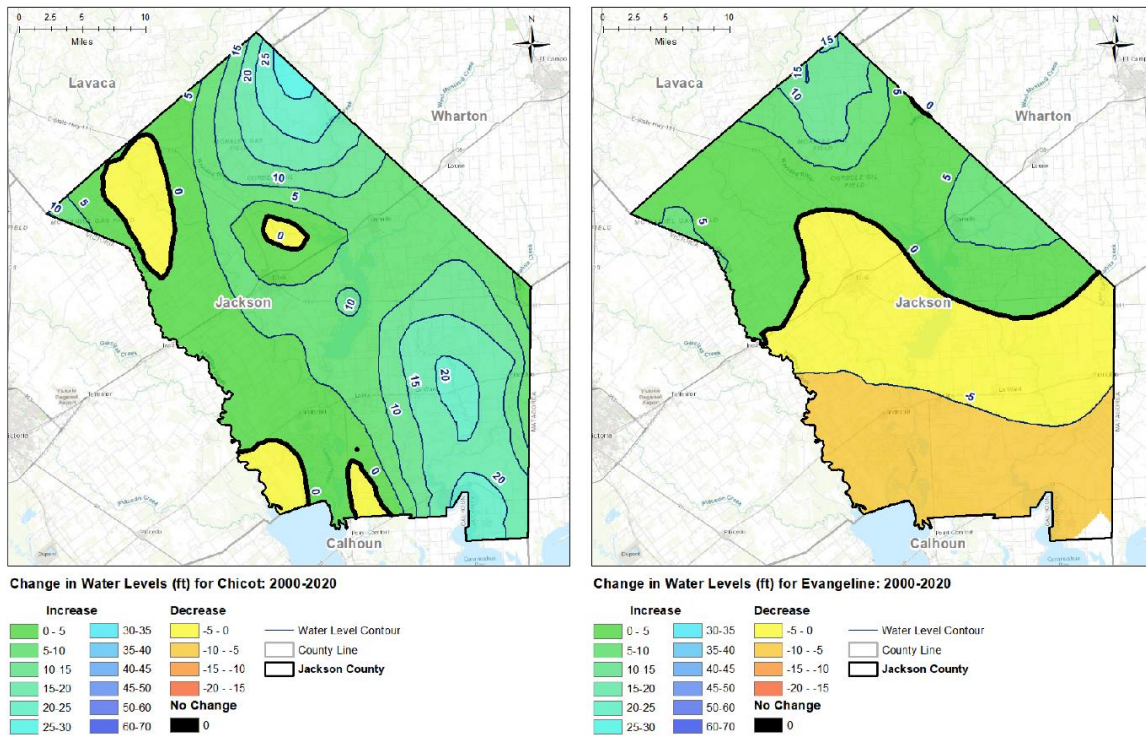


Figure 6-2 Water level elevation change in Chicot and Evangeline Aquifers across Jackson County for 2000 - 2020

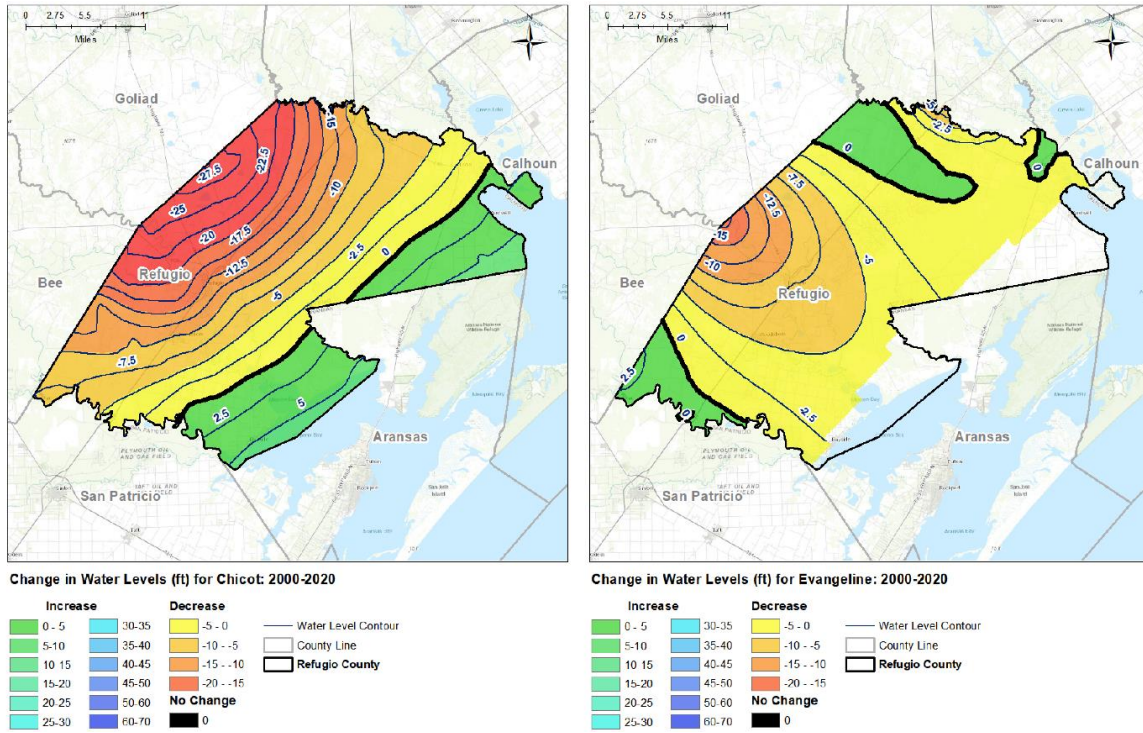


Figure 6-3 Water level elevation change in Chicot and Evangeline Aquifers across Refugio County for 2000 - 2020

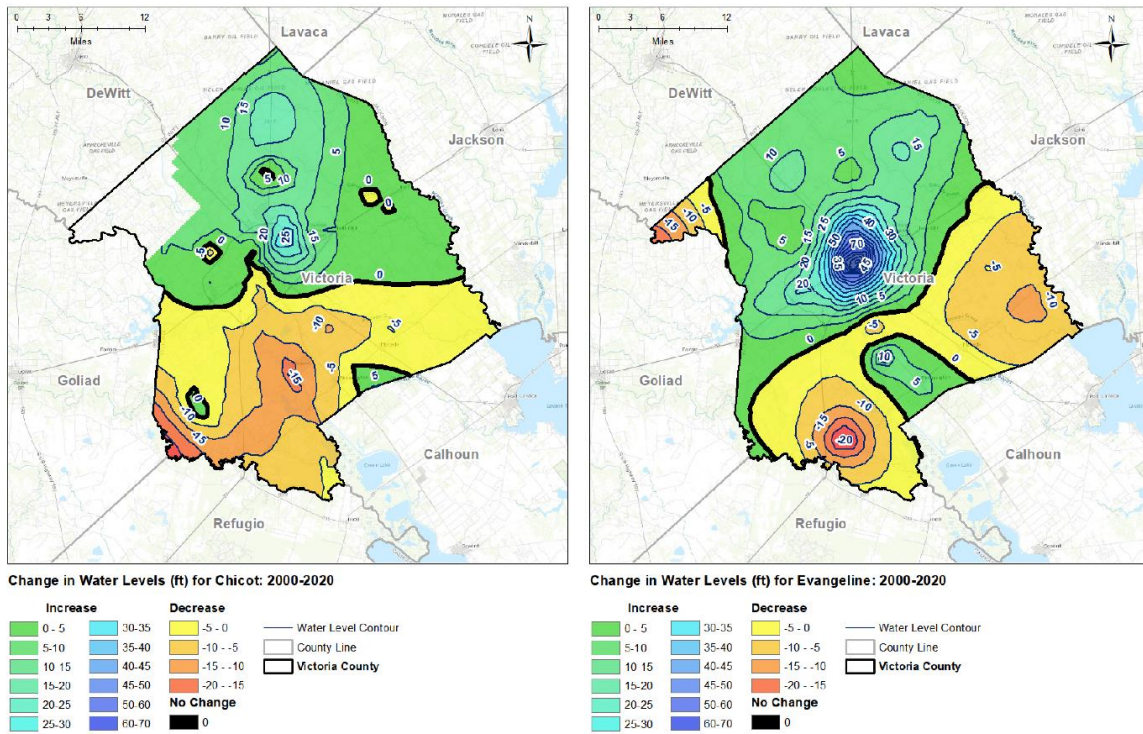


Figure 6-4 Water level elevation change in Chicot and Evangeline Aquifers across Victoria County for 2000 - 2020

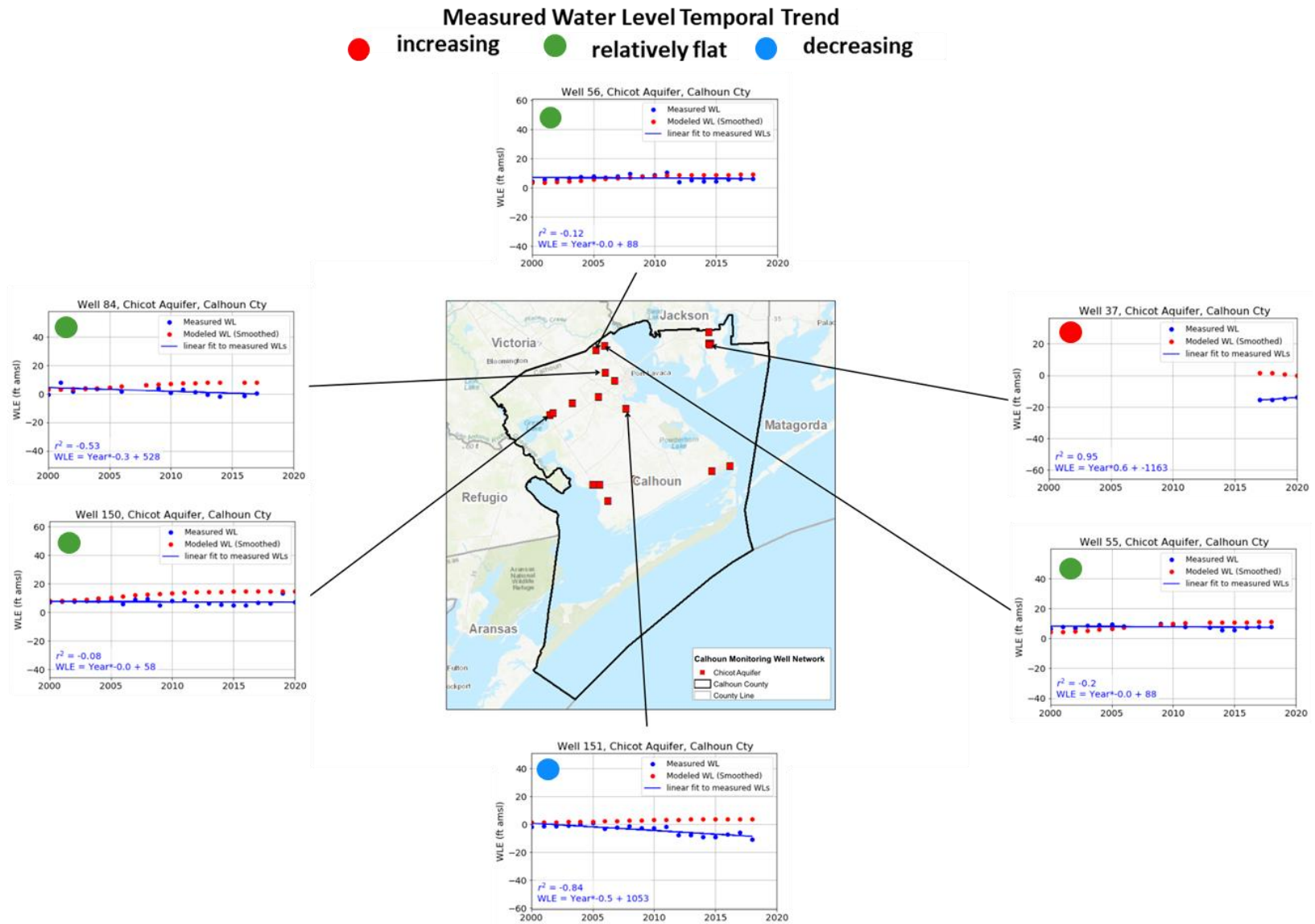


Figure 6-5 Hydrographs for Chicot wells with four or more measured water levels in Calhoun County

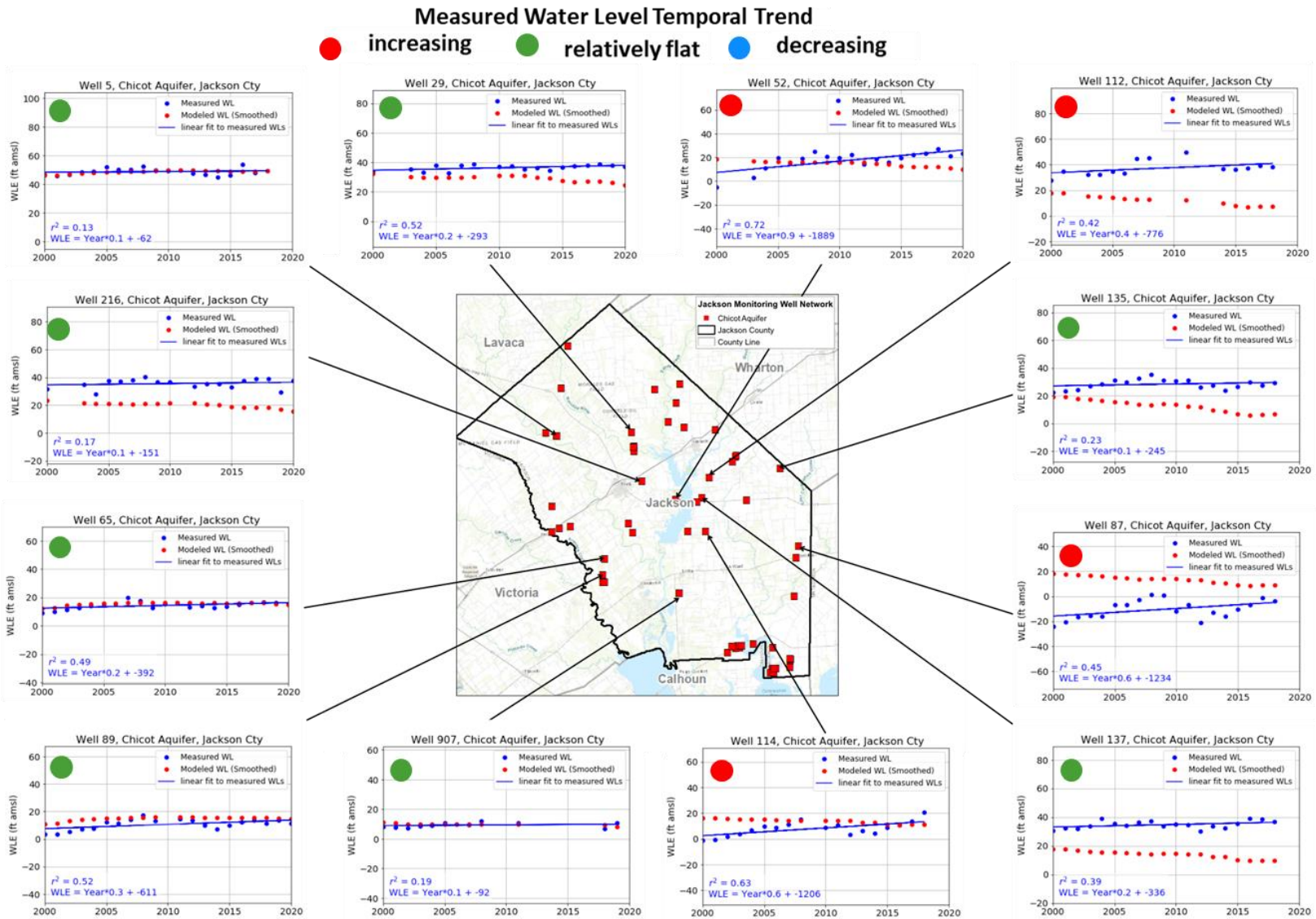


Figure 6-6 Hydrographs for Chicot wells with four or more measured water levels in Jackson County

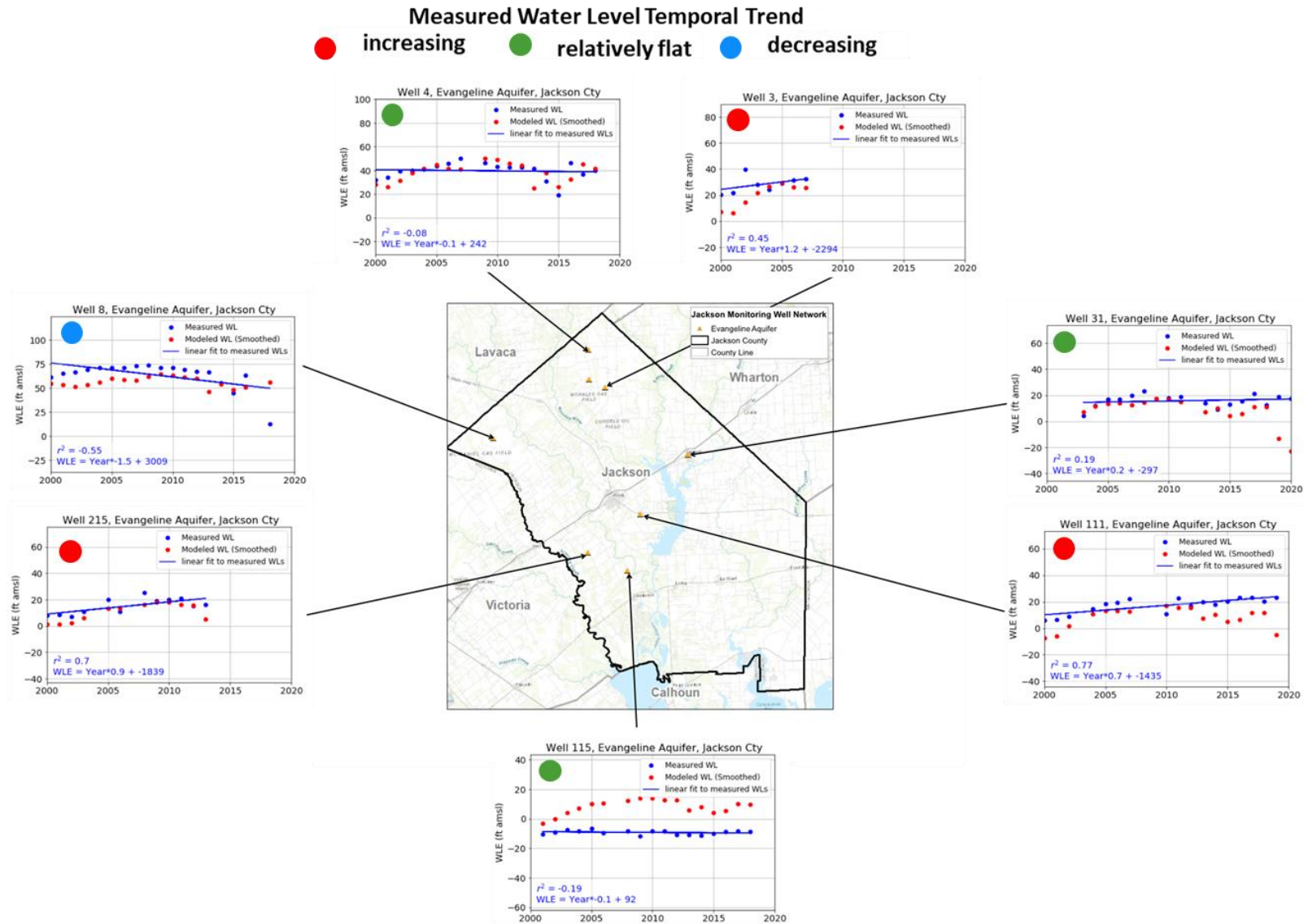


Figure 6-7 Hydrographs for Evangeline wells with four or more measured water levels in Jackson County

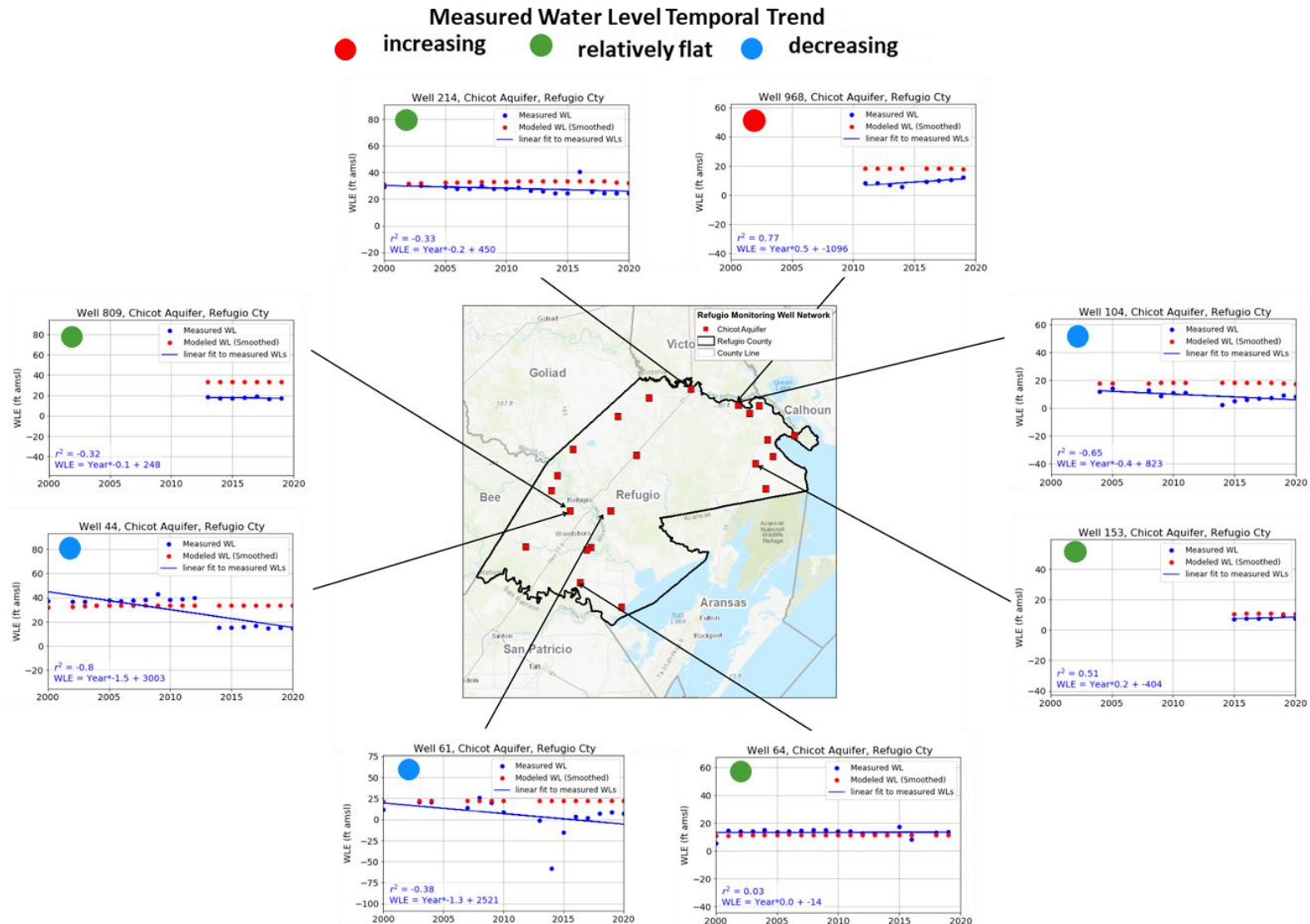


Figure 6-8 Hydrographs for Chicot wells with four or more measured water levels in Refugio County

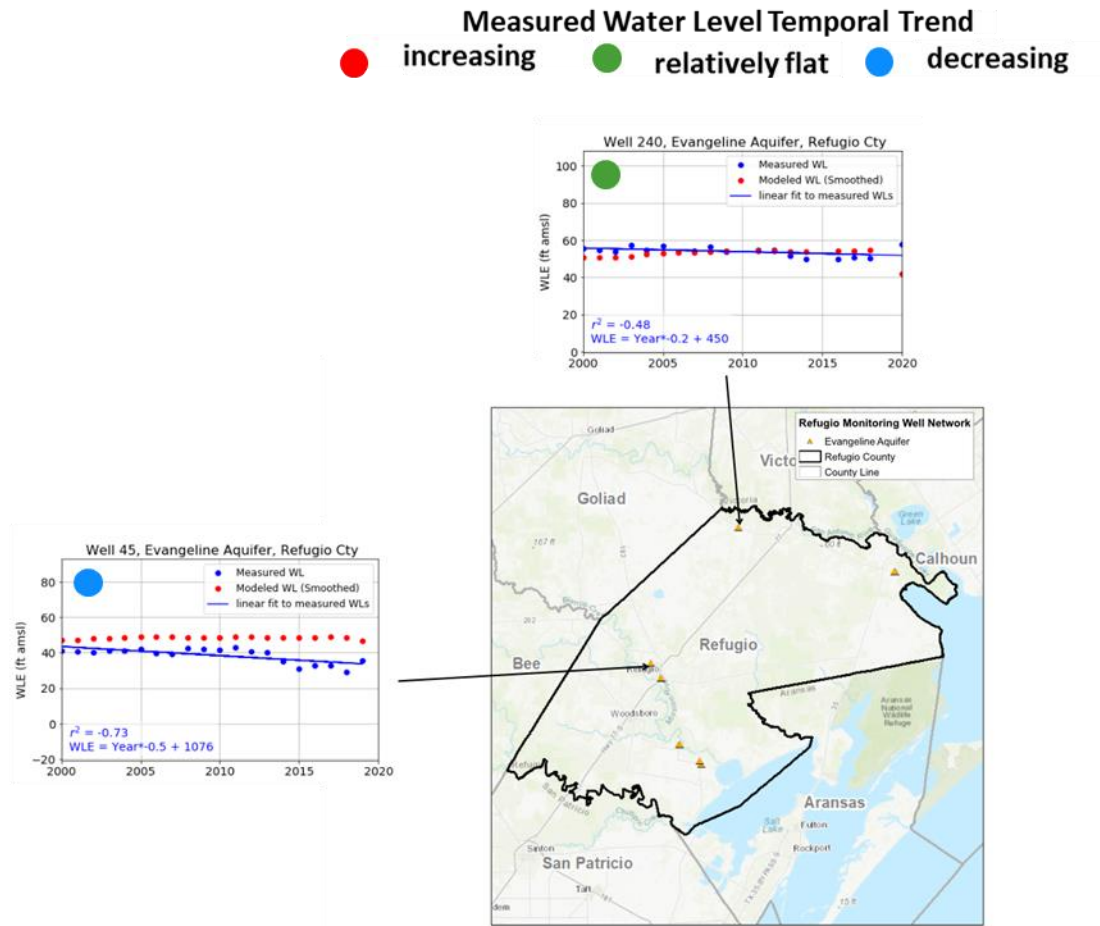


Figure 6-9 Hydrographs for Evangelina wells with four or more measured water levels in Refugio County



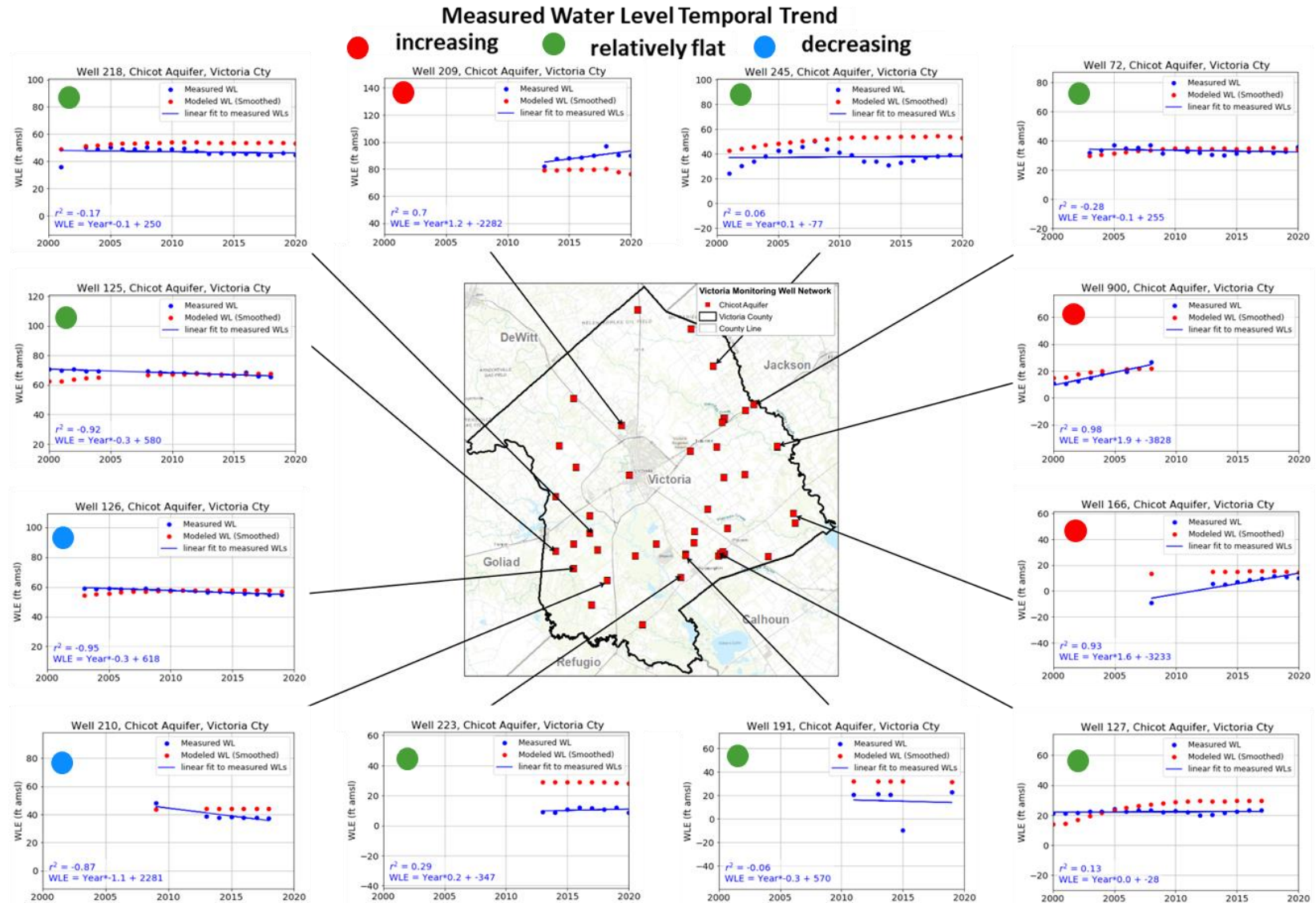


Figure 6-10 Hydrographs for Chicot wells with four or more measured water levels in Victoria County

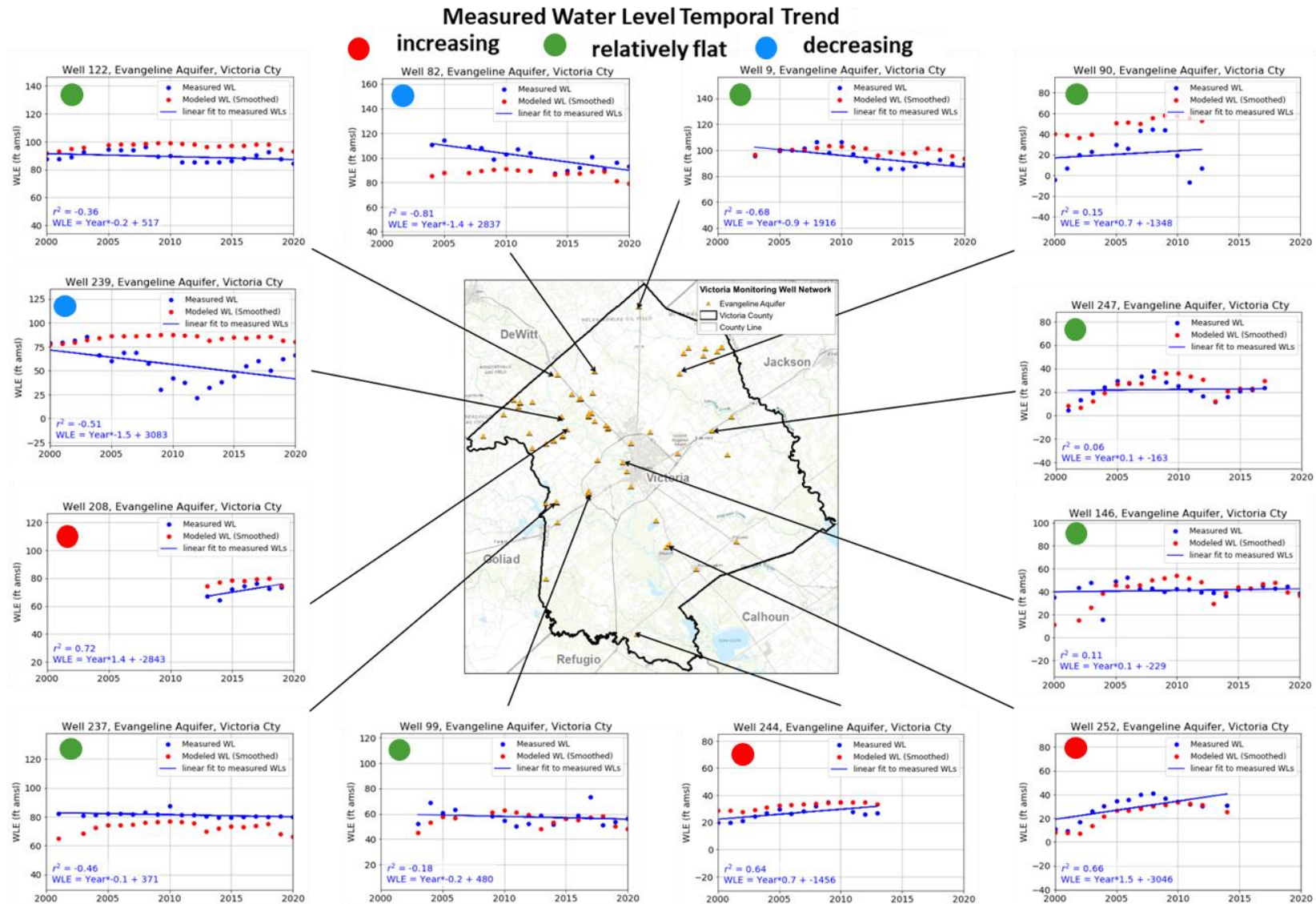


Figure 6-11 Hydrographs for Evangeline wells with four or more measured water levels in Victoria County

## 7.0 RECOMMENDATIONS FOR FUTURE WORK

This section presents recommendations for future work that includes coordinating with the TWDB to integrate the GCD well information into the TWDB groundwater database, expanding and improving the monitoring well network and monitoring programs, and performing additional geostatistical analysis.

### 7.1 Incorporation of GCD well information into the TWDB Groundwater Database

The data mining and analysis performed in Section 2 documents two points. One point is that there is a considerable amount of water level data in the GCD data sets that is not included in the TWDB groundwater database. The second point is that, for most of the 127 wells identified in both the GCD and the TWDB data sets, the two data sets have different locations. Recommendations for future work with coordinating with the TWDB on the well information include:

- Select a common set of latitude and longitude for the 127 wells that shared between the GCD data set and the TWDB groundwater database.
- Survey the location of wells whose locations are in question after a review of the existing data
- Compare well depth and screen information between the GCD data set and the TWDB groundwater database for the purpose of making the two sets of values consistent
- Agree on a methodology with the TWDB for assigning an aquifer to a well and implement it for all wells located in Calhoun, Jackson, Refugio, and Victoria counties.

### 7.2 Expand the Monitoring Well Network and Monitoring Program

There are not studies that have evaluated whether the GCD monitoring well programs are measuring sufficient water level data to provide the resolution and accuracy that the GCDs need to adequately determine average water level conditions and how these water levels change over time. However, it is evident from Figures 2-3 to 2-6 there are areas where the monitoring well density appears sparse and likely too few wells to provide a clear picture of how pumping is affecting water levels over time. Recommendations for future work with expanding and improving the GCD monitoring well network include:

- Establish criteria for assessing the adequacy of well coverage in the Chicot and Evangeline aquifers to address the needs of the GCDs. Possible criteria include well density, spatial distribution of historical and future pumping, and reducing the uncertainty with the interpolated water levels.
- Priority-rank the existing wells for as candidate to augment the existing well network.
- Develop a program of expanding the monitoring network over time.
- Develop protocols for measuring water levels and for establishing criteria for develop protocols for flagging measured water levels that appear to be unrepresentative of actual aquifer conditions.

### 7.3 Expand and Build on the Geostatistical Analysis

Geostatistical techniques include a robust set of algorithms that extend beyond the interpolation of water levels using Kriging. A primary benefit of geostatistical techniques is that they can provide quantification of uncertainty. As illustrated in **Figure 7-1**, the quantification of uncertainty supports two types of analyses that are important to groundwater monitoring. One analysis is estimating the uncertainty associated with the Kriged values calculated for unsampled location. Knowledge of the predictive uncertainty provides useful information regarding: (1) the potential benefits of gathering additional monitoring data, and (2) the likelihood that the interpolated water level at a location (or many locations) exceeds a specified value. The other analysis that geostatistics can provide is determining the best location for a future monitoring well for reducing the predictive uncertainty associated with the interpolation. Knowledge of the optimum monitoring locations to reduce predictive uncertainty is useful information regarding: (1) deciding on the where to add new locations to the monitoring well network, and (2) determining how to expand the monitoring well network to achieve a specific level of confidence associated with the predicted water levels. Recommendations for future work coordinating with the TWDB on the well information include:

- Identify and evaluate potential benefits to groundwater monitoring of quantifying the predictive uncertainty with the Kriged interpolation values in Section 4 and the average annual water levels provided in Section 5.
  - Pending results from the previous task, quantify the predictive uncertainty of the Kriged interpolation values in Section 4 and the average annual water levels provided in Section 5 to best achieve the GCD monitoring goals.
- Develop an approach for determining the best locations for adding new wells to the groundwater monitoring networks and determine there are potential benefits for incorporating geostatistics into the decision-making process.
  - Pending results from the previous task, use geostatistics to help determine the future monitoring well locations that provide the most cost-effective approach for achieve the GCD goals for the monitoring well network.

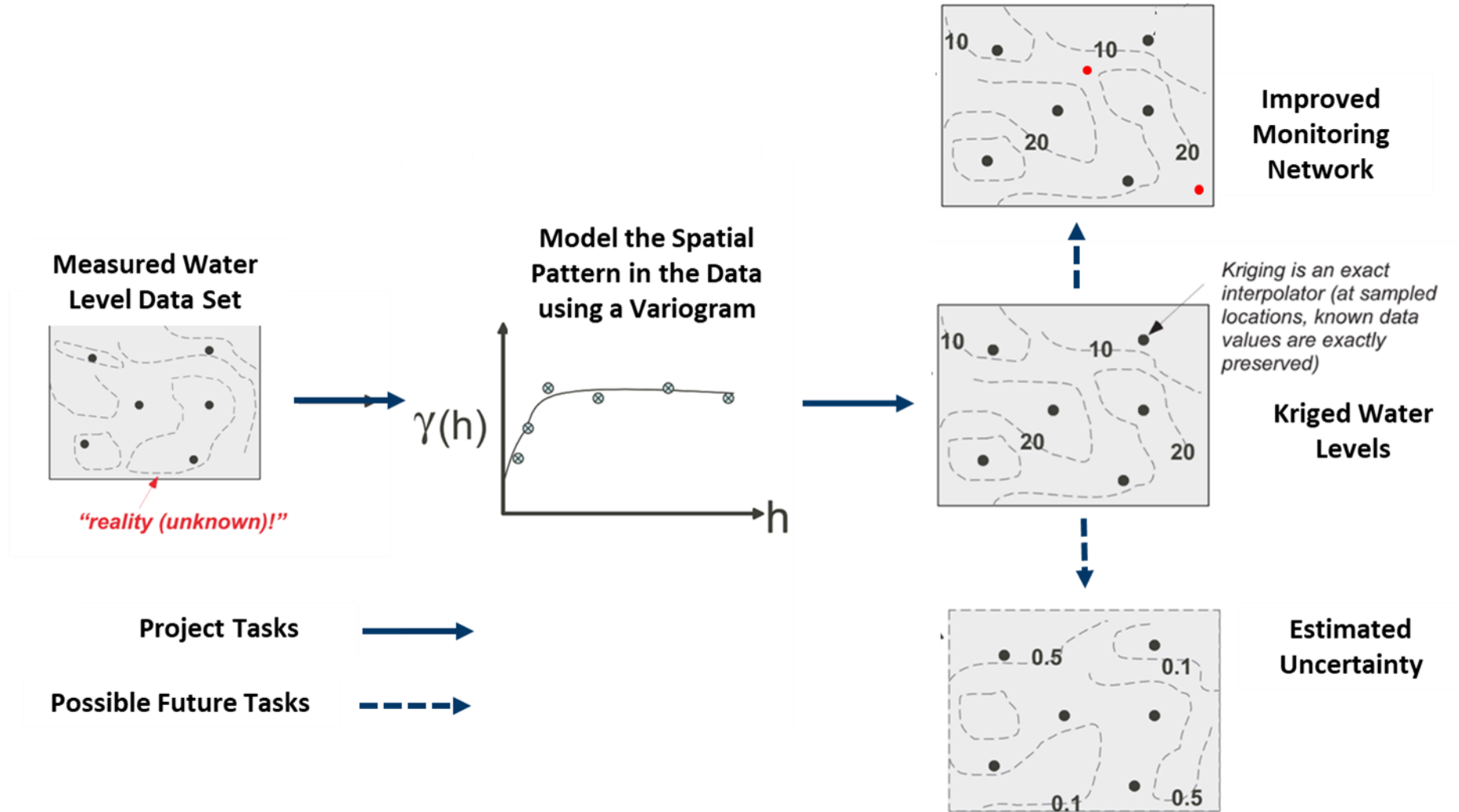


Figure 7-1 Schematic showing the application of geostatistical technique to interpolate water levels, to estimated uncertainty associated with the interpolated water levels, and to improve the design of monitoring well networks

## 8.0 REFERENCES

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**APPENDIX A**  
**NAMES AND LOCATIONS FROM THE GCD AND TWDB WELL DATA SETS**  
**FOR 127 WELL PAIRS**

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Table A-1 Names and Location Wells that have been Paired

GCD Well ID	TWDB Well ID	from TWDB		from GCD		Distance (ft)
		Latitude	Longitude	Latitude	Longitude	
Calhoun County GCD - GW-00007	8019506	28.6788	-96.6787	28.6789	-96.6789	49.7
Calhoun County GCD - GW-00008	8019802	28.6270	-96.6790	28.6269	-96.6792	69.1
Calhoun County GCD - GW-00009	8026501	28.5491	-96.8023	28.5492	-96.8025	68.1
Calhoun County GCD - GW-00010	8027501	28.5808	-96.6958	28.5808	-96.6958	0.0
Calhoun County GCD - GW-00011	8027601	28.5566	-96.6363	28.5567	-96.6369	183.6
Calhoun County GCD - GW-00012	8035704	28.4133	-96.7133	28.4133	-96.7133	0.8
Calhoun County GCD - GW-00013	8037601	28.4406	-96.4144	28.4406	-96.4145	26.8
Calhoun County GCD - GW-00014	8019503	28.6712	-96.6978	28.6711	-96.6978	33.8
Refugio GCD - GW-00079	7954803	28.1472	-97.3072	28.1472	-97.3072	0.5
Refugio GCD - GW-00085	7947702	28.2889	-97.2339	28.2889	-97.2339	0.5
Refugio GCD - GW-00124	7931901	28.5236	-97.1339	28.5236	-97.1339	0.5
Refugio GCD - GW-00234	7932802	28.5281	-97.0453	28.5281	-97.0453	0.5
Refugio GCD - GW-00235	7946601	28.3219	-97.2900	28.3219	-97.2900	0.6
Refugio GCD - GW-00370	8042507	28.3253	-96.7922	28.3253	-96.7922	0.5
Refugio GCD - GW-00439	8033901	28.3750	-96.9047	28.3751	-96.9047	35.5
Refugio GCD - NW-00340	8033203	28.4931	-96.9389	28.4931	-96.9389	0.5
Refugio GCD - NW-00474	7939105	28.4764	-97.2117	28.4764	-97.2117	0.4
Refugio GCD - NW-00475	7946803	28.2900	-97.3250	28.2900	-97.3250	0.5
Texana GCD - GW-00112	8021601	28.6861	-96.3853	28.6863	-96.3855	84.8
Texana GCD - GW-00119	8021214	28.7211	-96.4522	28.7212	-96.4524	73.0
Texana GCD - GW-00120	8021204	28.7222	-96.4444	28.7223	-96.4439	180.9
Texana GCD - GW-00121	8021203	28.7250	-96.4411	28.7249	-96.4410	50.1
Texana GCD - GW-00122	8021201	28.7250	-96.4444	28.7251	-96.4445	44.8
Texana GCD - GW-00123	8021213	28.7253	-96.4481	28.7255	-96.4477	138.9
Texana GCD - GW-00247	6661808	29.0133	-96.4525	29.0133	-96.4525	0.4
Texana GCD - GW-00251	6661809	29.0219	-96.4397	29.0219	-96.4397	0.2
Texana GCD - GW-00274	6660708	29.0389	-96.6211	29.0379	-96.6206	396.3
Texana GCD - GW-00275	6660701	29.0394	-96.6225	29.0396	-96.6224	67.8
Texana GCD - GW-00276	6660401	29.0628	-96.6239	29.0633	-96.6241	194.4
Texana GCD - GW-00277	6660601	29.0683	-96.5308	29.0684	-96.5309	34.4
Texana GCD - GW-00278	6660613	29.0419	-96.5131	29.0420	-96.5131	36.7
Texana GCD - GW-00279	6661407	29.0622	-96.4756	29.0628	-96.4756	195.5
Texana GCD - GW-00280	6660501	29.0769	-96.5589	29.0772	-96.5589	87.0
Texana GCD - GW-00281	6660205	29.1061	-96.5436	29.1061	-96.5439	89.0
Texana GCD - GW-00283	8011202	28.8419	-96.6833	28.8423	-96.6831	150.0
Texana GCD - GW-00285	8011201	28.8669	-96.6783	28.8670	-96.6789	170.4
Texana GCD - GW-00286	8003909	28.9061	-96.6272	28.9061	-96.6273	41.5
Texana GCD - GW-00287	8004908	28.9053	-96.5300	28.9058	-96.5296	232.8
Texana GCD - GW-00288	8004601	28.9567	-96.5036	28.9572	-96.5035	182.6
Texana GCD - GW-00289	8006101	28.9978	-96.3636	28.9992	-96.3623	665.3
Texana GCD - GW-00290	8005102	28.9878	-96.4892	28.9882	-96.4887	224.3
Texana GCD - GW-00291	8004504	28.9556	-96.5500	28.9558	-96.5501	88.0
Texana GCD - GW-00292	8004403	28.9525	-96.6006	28.9523	-96.6007	96.4
Texana GCD - GW-00293	8006703	28.8778	-96.3350	28.8775	-96.3348	108.8



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GCD Well ID	TWDB Well ID	from TWDB		from GCD		Distance (ft)
		Latitude	Longitude	Latitude	Longitude	
Texana GCD - GW-00294	6651505	29.2083	-96.6825	29.2083	-96.6825	7.5
Texana GCD - GW-00295	6658402	29.0764	-96.8553	29.0764	-96.8553	7.3
Texana GCD - GW-00296	6652801	29.1281	-96.5806	29.1281	-96.5806	7.5
Texana GCD - GW-00297	6658601	29.0608	-96.7581	29.0608	-96.7581	7.1
Texana GCD - GW-00298	8003803	28.8961	-96.6947	28.8962	-96.6947	15.6
Texana GCD - GW-00299	8011301	28.8664	-96.6253	28.8665	-96.6255	94.4
Texana GCD - GW-00320	8004101	28.9867	-96.6083	28.9866	-96.6083	29.6
Texana GCD - GW-00323	8005701	28.9053	-96.4989	28.9050	-96.4989	101.2
Texana GCD - GW-00340	8002607	28.9536	-96.7744	28.9536	-96.7744	4.3
Texana GCD - GW-00354	8005502	28.9514	-96.4239	28.9516	-96.4236	133.1
Texana GCD - GW-00366	6651903	29.1494	-96.6544	29.1494	-96.6551	213.8
Texana GCD - GW-00409	8003704	28.8992	-96.7225	28.8992	-96.7224	21.7
Texana GCD - GW-00410	802904	28.9111	-96.7717	28.9112	-96.7716	31.9
Texana GCD - GW-00411	8002608	28.9169	-96.7581	28.9169	-96.7580	18.8
Texana GCD - GW-00412	6661810	29.0122	-96.4461	29.0122	-96.4462	43.8
Texana GCD - GW-00415	6660707	29.0331	-96.6208	29.0330	-96.6208	4.2
Texana GCD - GW-00416	6660709	29.0406	-96.6211	29.0405	-96.6211	18.8
Texana GCD - GW-00417	8014405	28.7997	-96.3453	28.7997	-96.3453	12.5
Victoria County GCD - GW-000021	6657801	29.0408	-96.9181	29.0410	-96.9181	54.1
Victoria County GCD - GW-000028	8010401	28.8283	-96.8333	28.8284	-96.8328	159.7
Victoria County GCD - GW-000047	7916102	28.8747	-97.1228	28.8748	-97.1229	45.1
Victoria County GCD - GW-000085	7915904	28.7597	-97.1642	28.7590	-97.1646	287.5
Victoria County GCD - GW-000101	8019104	28.7353	-96.7167	28.7353	-96.7167	24.9
Victoria County GCD - GW-000102	8019105	28.7203	-96.7139	28.7202	-96.7138	33.5
Victoria County GCD - GW-000150	8010502	28.7992	-96.8031	28.7992	-96.8029	47.3
Victoria County GCD - GW-000158	7907504	28.9200	-97.2075	28.9199	-97.2075	23.3
Victoria County GCD - GW-000181	8018105	28.7119	-96.8400	28.7119	-96.8400	21.7
Victoria County GCD - GW-000192	8018103	28.7142	-96.8361	28.7146	-96.8367	244.5
Victoria County GCD - GW-000239	8010101	28.8667	-96.8608	28.8667	-96.8608	29.9
Victoria County GCD - GW-000244	7916903	28.7817	-97.0097	28.7815	-97.0095	77.5
Victoria County GCD - GW-000271	7916203	28.8456	-97.0814	28.8455	-97.0814	38.5
Victoria County GCD - GW-000308	7916302	28.8506	-97.0075	28.8505	-97.0076	48.3
Victoria County GCD - GW-000311	8017905	28.6475	-96.8953	28.6474	-96.8951	54.8
Victoria County GCD - GW-000320	8017501	28.6883	-96.9425	28.6884	-96.9427	50.4
Victoria County GCD - GW-000321	8017502	28.6842	-96.9489	28.6842	-96.9490	13.4
Victoria County GCD - GW-000339	6657406	29.0669	-96.9867	29.0670	-96.9865	43.2
Victoria County GCD - GW-000364	8002101	28.9981	-96.8675	28.9981	-96.8676	38.1
Victoria County GCD - GW-000366	8002102	28.9733	-96.8550	28.9734	-96.8549	40.3
Victoria County GCD - GW-000375	8017101	28.7261	-96.9664	28.7261	-96.9663	43.9
Victoria County GCD - GW-000377	8002804	28.9014	-96.7978	28.9013	-96.7978	34.6
Victoria County GCD - GW-000489	8018402	28.6739	-96.8436	28.6737	-96.8437	83.2
Victoria County GCD - GW-000494	7915305	28.8586	-97.1472	28.8585	-97.1473	49.4
Victoria County GCD - GW-000510	7916608	28.8208	-97.0236	28.8206	-97.0236	102.4
Victoria County GCD - GW-000544	7907902	28.8936	-97.1353	28.8931	-97.1350	221.6
Victoria County GCD - GW-000552	7907505	28.9203	-97.1853	28.9204	-97.1852	50.6
Victoria County GCD - GW-000576	8002701	28.8900	-96.8375	28.8901	-96.8374	46.4

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GCD Well ID	TWDB Well ID	from TWDB		from GCD		Distance (ft)
		Latitude	Longitude	Latitude	Longitude	
Victoria County GCD - GW-000577	7908404	28.9239	-97.0964	28.9238	-97.0965	67.0
Victoria County GCD - GW-000578	7908403	28.9233	-97.0967	28.9232	-97.0967	50.5
Victoria County GCD - GW-000589	7908807	28.8867	-97.0722	28.8868	-97.0723	40.3
Victoria County GCD - GW-000592	8011105	28.8419	-96.7431	28.8419	-96.7431	28.0
Victoria County GCD - GW-000595	8017801	28.6381	-96.9244	28.6382	-96.9244	60.3
Victoria County GCD - GW-000599	7907703	28.9128	-97.2094	28.9130	-97.2095	69.9
Victoria County GCD - GW-000601	7916702	28.7756	-97.0867	28.7757	-97.0867	70.3
Victoria County GCD - GW-000602	7916701	28.7733	-97.0867	28.7735	-97.0867	62.3
Victoria County GCD - GW-000603	7916703	28.7708	-97.0867	28.7709	-97.0866	37.1
Victoria County GCD - GW-000606	7908201	28.9658	-97.0700	28.9659	-97.0701	43.7
Victoria County GCD - GW-000607	7908805	28.8758	-97.0483	28.8758	-97.0483	13.4
Victoria County GCD - GW-000608	7915903	28.7589	-97.1450	28.7590	-97.1451	59.3
Victoria County GCD - GW-000609	7923303	28.7278	-97.1444	28.7278	-97.1444	3.3
Victoria County GCD - GW-000610	7923601	28.6856	-97.1497	28.6855	-97.1497	2.4
Victoria County GCD - GW-000611	7924102	28.7125	-97.0869	28.7125	-97.0867	90.2
Victoria County GCD - GW-000612	7924702	28.6575	-97.1178	28.6575	-97.1178	4.3
Victoria County GCD - GW-000613	7932602	28.5467	-97.0056	28.5466	-97.0055	17.5
Victoria County GCD - GW-000614	8001301	28.9908	-96.9078	28.9908	-96.9078	7.1
Victoria County GCD - GW-000615	8001302	28.9592	-96.9161	28.9590	-96.9160	52.8
Victoria County GCD - GW-000616	8018401	28.6711	-96.8550	28.6711	-96.8550	2.4
Victoria County GCD - GW-000617	7907305	28.9619	-97.1381	28.9619	-97.1380	5.7
Victoria County GCD - GW-000620	6657903	29.0194	-96.8831	29.0196	-96.8829	52.4
Victoria County GCD - GW-000687	7908406	28.9222	-97.1003	28.9222	-97.1002	38.9
Victoria County GCD - GW-000713	7915902	28.7597	-97.1456	28.7597	-97.1455	28.7
Victoria County GCD - GW-000722	7915905	28.7600	-97.1464	28.7599	-97.1464	25.6
Victoria County GCD - GW-000948	7915301	28.8533	-97.1617	28.8530	-97.1618	134.6
Victoria County GCD - GW-000949	8009101	28.8681	-96.9719	28.8681	-96.9719	1.5
Victoria County GCD - GW-000950	8018601	28.6675	-96.7653	28.6675	-96.7653	13.2
Victoria County GCD - NW-000016	7907503	28.9186	-97.2061	28.9186	-97.2061	0.3
Victoria County GCD - NW-000030	7924802	28.6367	-97.0572	28.6367	-97.0572	0.3
Victoria County GCD - NW-000097	7907707	28.9011	-97.2372	28.9010	-97.2372	49.0
Victoria County GCD - NW-000122	8017602	28.6736	-96.9144	28.6738	-96.9145	55.5
Victoria County GCD - NW-000165	7915306	28.8656	-97.1311	28.8656	-97.1311	4.0
Victoria County GCD - NW-000310	8018404	28.6744	-96.8483	28.6745	-96.8484	17.7
Victoria County GCD - NW-000333	7908903	28.8831	-97.0242	28.8831	-97.0242	1.0
Victoria County GCD - NW-000425	8017603	28.6753	-96.9142	28.6752	-96.9143	48.0
Victoria County GCD - NW-000426	7907404	28.9242	-97.2186	28.9241	-97.2186	15.0

**APPENDIX B**  
**LISTING OF 890 WELLS THAT COMPRISED THE INTEGRATED WELL**  
**DATABASE**

Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
1	Texana GCD - GW-00410	802904	55	200	Chicot	Jackson
2	Texana GCD - GW-00394		137	400	Chicot	Jackson
3	Texana GCD - GW-00366	6651903	109	618	Evangeline	Jackson
4	Texana GCD - GW-00294	6651505	128	627	Evangeline	Jackson
5	Texana GCD - GW-00297	6658601	90	76	Chicot	Jackson
6	Texana GCD - GW-00301		89	214	Chicot	Jackson
7	Texana GCD - GW-00296	6652801	91	620	Chicot	Jackson
8	Texana GCD - GW-00295	6658402	116	702	Evangeline	Jackson
9	Victoria County GCD - GW-000339	6657406	185	270	Evangeline	Victoria
10	Victoria County GCD - GW-000021	6657801	128	na	Shallow	Victoria
11	Victoria County GCD - GW-000620	6657903	111	na	Shallow	Victoria
12	Victoria County GCD - GW-000212		110	137	Chicot	Victoria
13	Texana GCD - GW-00195		54	na	Shallow	Jackson
14	Texana GCD - GW-00251	6661809	64	200	Chicot	Jackson
15	Texana GCD - GW-00247	6661808	65	na	Shallow	Jackson
16	Texana GCD - GW-00412	6661810	64	200	Chicot	Jackson
17	Texana GCD - GW-00274	6660708	61	38	Chicot	Jackson
18	Texana GCD - GW-00416	6660709	62	42	Chicot	Jackson
19	Texana GCD - GW-00281	6660205	83	224	Chicot	Jackson
20	Texana GCD - GW-00277	6660601	72	61	Chicot	Jackson
21	Texana GCD - GW-00300		65	527	Chicot	Jackson
22	Texana GCD - GW-00279	6661407	66	175	Chicot	Jackson
23	Refugio GCD - GW-00424		86	55	Chicot	Refugio
24	Refugio GCD - GW-00434		35	6520	Jasper	Refugio
25	Refugio GCD - GW-00430		87	108	Chicot	Refugio
26	Texana GCD - GW-00077		30	na	Shallow	Jackson
27	Texana GCD - GW-00082		29	na	Shallow	Jackson
28	Texana GCD - NW-00310		90	124	Chicot	Jackson
29	Texana GCD - GW-00276	6660401	81	286	Chicot	Jackson
30	Texana GCD - GW-00280	6660501	77	200	Chicot	Jackson
31	Texana GCD - GW-00278	6660613	64	850	Evangeline	Jackson
32	Texana GCD - GW-00275	6660701	73	63	Chicot	Jackson
33	Texana GCD - GW-00244		60	na	Shallow	Jackson
34	Texana GCD - NW-00144		10	190	Chicot	Jackson
35	Texana GCD - GW-00110		13	120	Chicot	Jackson
36	Texana GCD - GW-00117		10	na	Shallow	Jackson
37	Calhoun County GCD - GW-00005		15	490	Chicot	Calhoun
38	Calhoun County GCD - NW-00024		15	490	Chicot	Calhoun
39	Texana GCD - GW-00310		15	490	Chicot	Jackson
40	Texana GCD - GW-00311		15	490	Chicot	Jackson
41	Texana GCD - NW-00143		11	210	Chicot	Jackson
42	Texana GCD - NW-00147		11	160	Chicot	Jackson
43	Refugio GCD - GW-00180	7946803	53	365	Chicot	Refugio
44	Refugio GCD - NW-00475		53	365	Chicot	Refugio
45	Refugio GCD - GW-00235	7946601	64	525	Evangeline	Refugio

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
46	Texana GCD - GW-00452		10	630	Chicot	Jackson
47	Texana GCD - GW-00140		12	520	Chicot	Jackson
48	Texana GCD - NW-00075		12	520	Chicot	Jackson
49	Texana GCD - NW-00141		12	520	Chicot	Jackson
50	Texana GCD - GW-00111		10	120	Chicot	Jackson
51	Texana GCD - GW-00340	8002607	74	na	Shallow	Jackson
52	Texana GCD - GW-00291	8004504	51	277	Chicot	Jackson
53	Refugio GCD - NW-00570		25	320	Chicot	Refugio
54	Refugio GCD - NW-00539		30	300	Chicot	Refugio
55	Calhoun County GCD - GW-00014	8019503	27	265	Chicot	Calhoun
56	Calhoun County GCD - GW-00007	8019506	23	280	Chicot	Calhoun
57	Texana GCD - GW-00122	8021201	20	468	Chicot	Jackson
58	Texana GCD - GW-00112	8021601	12	635	Chicot	Jackson
59	Texana GCD - NW-00146		12	635	Chicot	Jackson
60	Texana GCD - GW-00286	8003909	49	61	Chicot	Jackson
61	Refugio GCD - GW-00085	7947702	40	200	Chicot	Refugio
62	Refugio GCD - GW-0085		40	200	Chicot	Refugio
63	Refugio GCD - GW-00423		25	260	Chicot	Refugio
64	Refugio GCD - GW-00079	7954803	35	331	Chicot	Refugio
65	Texana GCD - GW-00285	8011201	49	579	Chicot	Jackson
66	Texana GCD - GW-00312		20	590	Chicot	Jackson
67	Victoria County GCD - GW-000980		76	na	Shallow	Victoria
68	Victoria County GCD - GW-000562		84	na	Shallow	Victoria
69	Victoria County GCD - GW-000195		85	na	Shallow	Victoria
70	Victoria County GCD - GW-000717		71	80	Chicot	Victoria
71	Victoria County GCD - NW-001349		58	51	Chicot	Victoria
72	Victoria County GCD - GW-000377	8002804	63	92	Chicot	Victoria
73	Texana GCD - GW-00253		65	na	Shallow	Jackson
74	Texana GCD - GW-00076		28	na	Shallow	Jackson
75	Texana GCD - GW-00090		13	na	Shallow	Jackson
76	Texana GCD - NW-00451		14	384	Chicot	Jackson
77	Victoria County GCD - GW-000950	8018601	42	300	Chicot	Victoria
78	Victoria County GCD - GW-000085	7915904	107	100	Evangeline	Victoria
79	Victoria County GCD - GW-000308	7916302	85	772	Evangeline	Victoria
80	Victoria County GCD - GW-000311	8017905	55	1010	Evangeline	Victoria
81	Refugio GCD - GW-00418		38	55	Chicot	Refugio
82	Victoria County GCD - GW-000606	7908201	185	350	Evangeline	Victoria
83	Victoria County GCD - GW-000734		62	100	Chicot	Victoria
84	Calhoun County GCD - GW-00008	8019802	24	243	Chicot	Calhoun
85	Victoria County GCD - GW-000971		95	60	Chicot	Victoria
86	Victoria County GCD - GW-000732		57	40	Chicot	Victoria
87	Texana GCD - GW-00293	8006703	35	590	Chicot	Jackson
88	Texana GCD - GW-00121	8021203	17	482	Chicot	Jackson
89	Texana GCD - GW-00283	8011202	44	500	Chicot	Jackson
90	Victoria County GCD - GW-000615	8001302	115	752	Evangeline	Victoria

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
91	Victoria County GCD - GW-000614	8001301	119	670	Evangeline	Victoria
92	Victoria County GCD - GW-000735		119	670	Evangeline	Victoria
93	Victoria County GCD - R1GW-000738		119	670	Evangeline	Victoria
94	Victoria County GCD - GW-000934		92	600	Evangeline	Victoria
95	Victoria County GCD - GW-000938		92	600	Evangeline	Victoria
96	Victoria County GCD - GW-000939		92	600	Evangeline	Victoria
97	Victoria County GCD - GW-000949	8009101	115	851	Evangeline	Victoria
98	Victoria County GCD - GW-000602	7916701	103	578	Evangeline	Victoria
99	Victoria County GCD - GW-000603	7916703	107	516	Evangeline	Victoria
100	Calhoun County GCD - GW-00003		35	75	Chicot	Calhoun
101	Victoria County GCD - GW-000028	8010401	66	654	Evangeline	Victoria
102	Victoria County GCD - GW-000713	7915902	128	298	Evangeline	Victoria
103	Refugio GCD - GW-00419		40	60	Chicot	Refugio
104	Refugio GCD - NW-00340	8033203	45	150	Chicot	Refugio
105	Victoria County GCD - GW-000484		135	109	Evangeline	Victoria
106	Victoria County GCD - GW-000789		122	287	Evangeline	Victoria
107	Victoria County GCD - GW-000791		122	287	Evangeline	Victoria
108	Victoria County GCD - GW-000803		122	287	Evangeline	Victoria
109	Victoria County GCD - GW-000190		187	65	Chicot	Victoria
110	Texana GCD - GW-00417	8014405	25	370	Chicot	Jackson
111	Texana GCD - GW-00292	8004403	59	681	Evangeline	Jackson
112	Texana GCD - GW-00290	8005102	60	410	Chicot	Jackson
113	Texana GCD - GW-00354	8005502	56	345	Chicot	Jackson
114	Texana GCD - GW-00323	8005701	49	429	Chicot	Jackson
115	Texana GCD - GW-00299	8011301	33	1050	Evangeline	Jackson
116	Texana GCD - GW-00284		41	400	Chicot	Jackson
117	Refugio GCD - GW-00417		78	2343	Burkeville	Refugio
118	Texana GCD - GW-00120	8021204	20	590	Chicot	Jackson
119	Calhoun County GCD - GW-00012	8035704	10	341	Chicot	Calhoun
120	Victoria County GCD - GW-000310		64	305	Chicot	Victoria
121	Victoria County GCD - NW-000116		64	305	Chicot	Victoria
122	Victoria County GCD - GW-000617	7907305	163	419	Evangeline	Victoria
123	Victoria County GCD - GW-000700		145	80	Chicot	Victoria
124	Victoria County GCD - GW-000192	8018103	52	120	Chicot	Victoria
125	Victoria County GCD - GW-000610	7923601	114	115	Chicot	Victoria
126	Victoria County GCD - GW-000612	7924702	107	180	Chicot	Victoria
127	Victoria County GCD - GW-000616	8018401	57	450	Chicot	Victoria
128	Victoria County GCD - GW-000767		57	450	Chicot	Victoria
129	Refugio GCD - GW-00370	8042507	18	na	Shallow	Refugio
130	Victoria County GCD - GW-000489	8018402	56	336	Chicot	Victoria
131	Victoria County GCD - GW-000824		56	336	Chicot	Victoria
132	Victoria County GCD - NW-000944		56	336	Chicot	Victoria
133	Victoria County GCD - NW-001006		56	336	Chicot	Victoria
134	Victoria County GCD - NW-001007		56	336	Chicot	Victoria
135	Texana GCD - GW-00289	8006101	65	550	Chicot	Jackson

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
136	Texana GCD - GW-00123	8021213	22	490	Chicot	Jackson
137	Texana GCD - GW-00288	8004601	54	378	Chicot	Jackson
138	Texana GCD - GW-00287	8004908	49	82	Chicot	Jackson
139	Texana GCD - GW-00385		36	330	Chicot	Jackson
140	Texana GCD - GW-00075		27	na	Shallow	Jackson
141	Texana GCD - GW-00114		11	140	Chicot	Jackson
142	Texana GCD - GW-00411	8002608	61	200	Chicot	Jackson
143	Texana GCD - GW-00172		44	na	Shallow	Jackson
144	Texana GCD - GW-00171		44	na	Shallow	Jackson
145	Texana GCD - GW-00409	8003704	53	na	Shallow	Jackson
146	Victoria County GCD - GW-000510	7916608	65	327	Evangelina	Victoria
147	Victoria County GCD - GW-000927		101	783	Evangelina	Victoria
148	Texana GCD - GW-00305		5	520	Chicot	Jackson
149	Calhoun County GCD - GW-00013	8037601	4	228	Chicot	Calhoun
150	Calhoun County GCD - GW-00009	8026501	39	267	Chicot	Calhoun
151	Calhoun County GCD - GW-00011	8027601	16	273	Chicot	Calhoun
152	Refugio GCD - GW-00422		22	na	Shallow	Refugio
153	Refugio GCD - GW-00439	8033901	22	200	Chicot	Refugio
154	Victoria County GCD - GW-000948	7915301	150	150	Evangelina	Victoria
155	Victoria County GCD - NW-001014		147	55	Chicot	Victoria
156	Victoria County GCD - GW-000395		80	na	Shallow	Victoria
157	Victoria County GCD - GW-000779		85	na	Shallow	Victoria
158	Victoria County GCD - GW-000780		85	na	Shallow	Victoria
159	Victoria County GCD - GW-000942		85	na	Shallow	Victoria
160	Victoria County GCD - GW-000943		85	na	Shallow	Victoria
161	Victoria County GCD - GW-000944		85	na	Shallow	Victoria
162	Calhoun County GCD - GW-00001		19	175	Chicot	Calhoun
163	Victoria County GCD - GW-000989		59	na	Shallow	Victoria
164	Victoria County GCD - GW-000682		115	na	Shallow	Victoria
165	Victoria County GCD - GW-000590		103	na	Shallow	Victoria
166	Victoria County GCD - GW-000101	8019104	31	180	Chicot	Victoria
167	Victoria County GCD - GW-000102	8019105	22	170	Chicot	Victoria
168	Victoria County GCD - GW-000576	8002701	71	100	Chicot	Victoria
169	Victoria County GCD - NW-000438		71	100	Chicot	Victoria
170	Victoria County GCD - NW-000550		71	100	Chicot	Victoria
171	Victoria County GCD - NW-000426	7907404	205	360	Evangelina	Victoria
172	Victoria County GCD - GW-000587		138	na	Shallow	Victoria
173	Victoria County GCD - GW-000271	7916203	87	na	Shallow	Victoria
174	Victoria County GCD - GW-000591		101	na	Shallow	Victoria
175	Victoria County GCD - NW-000122	8017602	61	140	Chicot	Victoria
176	Victoria County GCD - NW-000016	7907503	160	250	Evangelina	Victoria
177	Victoria County GCD - GW-000552	7907505	161	112	Evangelina	Victoria
178	Victoria County GCD - GW-000723		103	205	Evangelina	Victoria
179	Victoria County GCD - GW-000150	8010502	57	140	Chicot	Victoria
180	Victoria County GCD - GW-000967		56	185	Chicot	Victoria

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
181	Victoria County GCD - GW-000970		56	185	Chicot	Victoria
182	Victoria County GCD - NW-000310	8018404	56	185	Chicot	Victoria
183	Victoria County GCD - GW-000227		57	na	Shallow	Victoria
184	Victoria County GCD - NW-000779		65	190	Chicot	Victoria
185	Victoria County GCD - GW-000578	7908403	139	100	Evangeline	Victoria
186	Victoria County GCD - GW-000589	7908807	88	220	Evangeline	Victoria
187	Texana GCD - GW-00415	6660707	56	24	Chicot	Jackson
188	Victoria County GCD - GW-000588		201	na	Shallow	Victoria
189	Victoria County GCD - GW-000722	7915905	128	120	Evangeline	Victoria
190	Victoria County GCD - GW-000158	7907504	189	na	Evangeline	Victoria
191	Victoria County GCD - NW-000425	8017603	63	100	Chicot	Victoria
192	Victoria County GCD - GW-000687	7908406	125	152	Evangeline	Victoria
193	Refugio GCD - GW-00420		33	907	Evangeline	Refugio
194	Refugio GCD - GW-00421		33	907	Evangeline	Refugio
195	Refugio GCD - GW-00426		7	900	Evangeline	Refugio
196	Refugio GCD - NW-00277		7	900	Evangeline	Refugio
197	Victoria County GCD - NW-000097	7907707	189	208	Evangeline	Victoria
198	Texana GCD - GW-00073		29	na	Shallow	Jackson
199	Texana GCD - GW-00113		10	120	Chicot	Jackson
200	Texana GCD - NW-00195		56	330	Chicot	Jackson
201	Victoria County GCD - GW-000244	7916903	50	770	Evangeline	Victoria
202	Victoria County GCD - GW-000609	7923303	100	194	Evangeline	Victoria
203	Victoria County GCD - GW-000718		122	200	Evangeline	Victoria
204	Victoria County GCD - GW-000494	7915305	178	190	Evangeline	Victoria
205	Victoria County GCD - GW-000955		178	190	Evangeline	Victoria
206	Victoria County GCD - GW-000189		138	180	Evangeline	Victoria
207	Victoria County GCD - NW-000165	7915306	138	180	Evangeline	Victoria
208	Victoria County GCD - GW-000047	7916102	129	227	Evangeline	Victoria
209	Victoria County GCD - NW-000333	7908903	127	105	Chicot	Victoria
210	Victoria County GCD - NW-000030	7924802	88	120	Chicot	Victoria
211	Refugio GCD - NW-00474	7939105	87	na	Shallow	Refugio
212	Refugio GCD - GW-00438		2	429	Chicot	Refugio
213	Refugio GCD - NW-00176		14	503	Chicot	Refugio
214	Refugio GCD - GW-00234	7932802	72	165	Chicot	Refugio
215	Texana GCD - GW-00298	8003803	55	919	Evangeline	Jackson
216	Texana GCD - GW-00320	8004101	67	383	Chicot	Jackson
217	Victoria County GCD - GW-000599	7907703	220	170	Evangeline	Victoria
218	Victoria County GCD - GW-000611	7924102	98	100	Chicot	Victoria
219	Victoria County GCD - NW-000681		88	83	Chicot	Victoria
220	Victoria County GCD - NW-001050		109	64	Chicot	Victoria
221	Calhoun County GCD - GW-00010	8027501	17	258	Chicot	Calhoun
222	Texana GCD - GW-00119	8021214	24	470	Chicot	Jackson
223	Victoria County GCD - GW-000595	8017801	60	305	Chicot	Victoria
224	Victoria County GCD - GW-000159		177	na	Shallow	Victoria
225	Victoria County GCD - GW-000577	7908404	147	100	Evangeline	Victoria



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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
226	Victoria County GCD - GW-000138		137	na	Shallow	Victoria
227	Victoria County GCD - GW-000728		137	na	Shallow	Victoria
228	Victoria County GCD - GW-000729		137	na	Shallow	Victoria
229	Victoria County GCD - NW-000580		137	na	Shallow	Victoria
230	Victoria County GCD - GW-000030		64	na	Shallow	Victoria
231	Victoria County GCD - GW-000533		45	na	Shallow	Victoria
232	Victoria County GCD - GW-000716		437	na	Shallow	Victoria
233	Victoria County GCD - GW-000181	8018105	57	na	Shallow	Victoria
234	Victoria County GCD - GW-000492		56	na	Shallow	Victoria
235	Victoria County GCD - GW-000583		24	na	Shallow	Victoria
236	Victoria County GCD - GW-000607	7908805	111	169	Evangeline	Victoria
237	Victoria County GCD - GW-000608	7915903	125	112	Evangeline	Victoria
238	Refugio GCD - GW-00375		85	200	Chicot	Refugio
239	Victoria County GCD - GW-000544	7907902	105	853	Evangeline	Victoria
240	Refugio GCD - GW-00124	7931901	91	946	Evangeline	Refugio
241	Refugio GCD - GW-00427		5	900	Evangeline	Refugio
242	Refugio GCD - GW-00428		5	900	Evangeline	Refugio
243	Victoria County GCD - GW-000375	8017101	37	703	Evangeline	Victoria
244	Victoria County GCD - GW-000613	7932602	63	798	Evangeline	Victoria
245	Victoria County GCD - GW-000366	8002102	95	366	Chicot	Victoria
246	Victoria County GCD - GW-000778		95	366	Evangeline	Victoria
247	Victoria County GCD - GW-000239	8010101	78	880	Evangeline	Victoria
248	Victoria County GCD - GW-000321	8017502	67	1026	Evangeline	Victoria
249	Victoria County GCD - GW-000364	8002101	104	600	Evangeline	Victoria
250	Victoria County GCD - GW-000601	7916702	103	588	Evangeline	Victoria
251	Victoria County GCD - GW-000592	8011105	49	200	Chicot	Victoria
252	Victoria County GCD - GW-000320	8017501	68	1026	Evangeline	Victoria
254		6541401	86	90	Chicot	Wharton
255		6541402	80	338	Chicot	Wharton
256		6541707	88	499	Chicot	Wharton
257		6541805	75	50	Chicot	Wharton
258		6541807	83	612	Chicot	Wharton
259		6541920	75	475	Chicot	Wharton
260		6549110	79	525	Chicot	Wharton
261		6549111	79	525	Chicot	Wharton
262		6549901	58	375	Chicot	Matagorda
263		6557802	54	315	Chicot	Matagorda
264		6604504	389	184	Shallow	Colorado
265		6611509	275	856	Deep	Colorado
266		6611903	297	92	Evangeline	Colorado
267		6612204	317	140	Shallow	Colorado
268		6612603	298	188	Evangeline	Colorado
269		6613805	302	285	Chicot	Colorado
270		6614403	279	153	Chicot	Colorado
271		6614703	266	71	Chicot	Colorado

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
272		6618601	411	602	Jasper	Colorado
273		6618609	403	803	Jasper	Colorado
274		6618611	403	822	Jasper	Colorado
275		6618612	392	868	Jasper	Colorado
276		6619804	349	140	Chicot	Colorado
277		6620307	217	142	Chicot	Colorado
278		6620412	248	202	Evangeline	Colorado
279		6620602	203	312	Evangeline	Colorado
280		6620608	200	325	Evangeline	Colorado
281		6620901	246	800	Burkeville	Colorado
282		6621201	300	304	Evangeline	Colorado
283		6621206	279	318	Evangeline	Colorado
284		6621404	190	598	Evangeline	Colorado
285		6621603	239	812	Evangeline	Colorado
286		6621902	216	800	Evangeline	Colorado
287		6621903	220	504	Evangeline	Colorado
288		6622201	234	995	Evangeline	Colorado
289		6622203	225	216	Chicot	Colorado
290		6622401	231	812	Evangeline	Colorado
291		6625103	294	43	Evangeline	Lavaca
292		6625203	325	287	Jasper	Lavaca
293		6626102	223	120	Evangeline	Colorado
294		6626202	260	126	Evangeline	Colorado
295		6627905	273	617	Evangeline	Colorado
296		6628607	210	604	Evangeline	Colorado
297		6628608	208	530	Evangeline	Colorado
298		6628702	255	565	Evangeline	Colorado
299		6628804	245	650	Evangeline	Colorado
300		6628902	207	850	Evangeline	Colorado
301		6629101	222	608	Evangeline	Colorado
302		6629401	210	382	Chicot	Colorado
303		6629501	181	na	Shallow	Colorado
304		6630101	168	527	Evangeline	Colorado
305		6630103	187	490	Evangeline	Colorado
306		6630104	186	400	Chicot	Colorado
307		6631106	160	900	Evangeline	Colorado
308		6631107	155	450	Chicot	Wharton
309		6631504	142	178	Chicot	Wharton
310		6632402	127	222	Chicot	Wharton
311		6632809	121	320	Chicot	Wharton
312		6633407	282	182	Evangeline	Lavaca
313		6633507	273	620	Jasper	Lavaca
314		6633510	272	636	Jasper	Lavaca
315		6633512	260	644	Jasper	Lavaca
316		6633513	280	998	Jasper	Lavaca

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
317		6634201	197	48	Evangeline	Lavaca
318		6634202	210	61	Evangeline	Lavaca
319		6634207	227	120	Evangeline	Lavaca
320		6634803	272	230	Evangeline	Lavaca
321		6634902	160	30	Chicot	Lavaca
322		6634903	179	41	Chicot	Lavaca
323		6635210	280	237	Chicot	Colorado
324		6635901	211	840	Evangeline	Lavaca
325		6636902	158	100	Chicot	Colorado
326		6637601	166	200	Chicot	Colorado
327		6637607	163	318	Chicot	Colorado
328		6637608	151	336	Chicot	Colorado
329		6637614	157	360	Chicot	Colorado
330		6637615	160	200	Chicot	Colorado
331		6638105	148	320	Chicot	Colorado
332		6638106	156	250	Chicot	Colorado
333		6638201	155	408	Chicot	Wharton
334		6638202	155	65	Chicot	Wharton
335		6638301	154	288	Chicot	Wharton
336		6638302	157	698	Evangeline	Wharton
337		6638304	150	113	Chicot	Wharton
338		6638801	127	116	Chicot	Wharton
339		6639106	146	200	Chicot	Wharton
340		6639701	119	214	Chicot	Wharton
341		6639801	118	300	Chicot	Wharton
342		6640401	110	442	Chicot	Wharton
343		6640505	113	200	Chicot	Wharton
344		6640803	101	312	Chicot	Wharton
345		6640804	105	303	Chicot	Wharton
346		6640902	98	94	Chicot	Wharton
347		6641202	219	333	Evangeline	Lavaca
348		6641203	234	80	Evangeline	Lavaca
349		6641703	222	164	Evangeline	Lavaca
350		6641903	205	335	Evangeline	Lavaca
351		6642205	211	210	Evangeline	Lavaca
352		6642902	165	576	Evangeline	Lavaca
353		6642904	152	210	Chicot	Lavaca
354		6643201	172	856	Evangeline	Lavaca
355		6643703	135	31	Chicot	Lavaca
356		6643704	139	34	Chicot	Lavaca
357		6643803	151	1023	Evangeline	Lavaca
358		6644402	164	880	Evangeline	Lavaca
359		6644702	139	676	Evangeline	Colorado
360		6645201	152	257	Chicot	Wharton
361		6645601	143	429	Chicot	Wharton

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
362		6645802	126	188	Chicot	Wharton
363		6645916	129	125	Chicot	Wharton
364		6646201	144	200	Chicot	Wharton
365		6646402	134	366	Chicot	Wharton
366		6646601	131	186	Chicot	Wharton
367		6646802	124	203	Chicot	Wharton
368		6647101	123	319	Chicot	Wharton
369		6647201	120	244	Chicot	Wharton
370		6647414	114	350	Chicot	Wharton
371		6647703	111	242	Chicot	Wharton
372		6647904	99	340	Chicot	Wharton
373		6648402	100	537	Chicot	Wharton
374		6648404	100	760	Evangeline	Wharton
375		6648502	95	70	Chicot	Wharton
376		6648601	90	255	Chicot	Wharton
377		6648701	98	90	Chicot	Wharton
378		6648802	94	564	Chicot	Wharton
379		6648907	90	630	Chicot	Wharton
380		6648908	90	55	Chicot	Wharton
381		6648909	90	300	Chicot	Wharton
382		6649103	177	174	Evangeline	Lavaca
383		6649701	173	1082	Evangeline	Lavaca
384		6649803	150	260	Evangeline	Lavaca
385		6649901	168	272	Evangeline	Lavaca
386		6650207	165	142	Chicot	Lavaca
388		6651704	106	120	Chicot	Jackson
389		6651801	117	616	Evangeline	Jackson
391		6652207	114	242	Chicot	Wharton
392		6652304	113	650	Evangeline	Wharton
393		6652504	98	98	Chicot	Wharton
394		6652603	106	515	Chicot	Wharton
395		6652604	103	275	Chicot	Wharton
397		6653307	109	282	Chicot	Wharton
398		6653406	108	348	Chicot	Wharton
399		6653503	94	338	Chicot	Wharton
400		6653804	82	495	Chicot	Wharton
401		6653903	88	304	Chicot	Wharton
402		6654108	105	360	Chicot	Wharton
403		6654202	115	200	Chicot	Wharton
404		6654306	115	90	Chicot	Wharton
405		6654906	91	461	Chicot	Wharton
406		6655104	106	114	Chicot	Wharton
407		6655603	90	100	Chicot	Wharton
408		6656302	81	490	Chicot	Wharton
409		6656304	91	356	Chicot	Wharton

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
410		6656401	80	229	Chicot	Wharton
411		6656403	84	275	Chicot	Wharton
412		6656901	75	194	Chicot	Wharton
413		6657403	182	87	Chicot	Victoria
419		6658606	96	165	Chicot	Jackson
429		6661302	82	528	Chicot	Wharton
430		6661305	81	600	Chicot	Wharton
431		6661309	82	410	Chicot	Wharton
433		6661803	63	317	Chicot	Jackson
437		6662104	87	371	Chicot	Wharton
438		6662307	88	180	Chicot	Wharton
439		6662309	84	421	Chicot	Wharton
440		6662313	88	480	Chicot	Wharton
441		6662415	72	458	Chicot	Wharton
442		6662603	82	310	Chicot	Wharton
443		6662805	62	398	Chicot	Wharton
444		6663105	80	342	Chicot	Wharton
445		6663112	84	60	Chicot	Wharton
446		6663504	68	687	Chicot	Wharton
447		6663507	68	48	Chicot	Wharton
448		6663508	69	140	Chicot	Wharton
449		6663509	68	688	Chicot	Wharton
450		6663605	77	209	Chicot	Wharton
451		6663610	70	857	Chicot	Wharton
452		6664401	71	1057	Evangeline	Matagorda
453		6731601	403	364	Deep	Lavaca
454		6731602	401	320	Deep	Lavaca
455		6731604	371	380	Deep	Lavaca
456		6731606	384	350	Deep	Lavaca
457		6731610	382	1051	Deep	Lavaca
458		6731612	416	na	Shallow	Lavaca
459		6732105	452	265	Deep	Lavaca
460		6732106	434	275	Deep	Lavaca
461		6732201	440	170	Jasper	Lavaca
462		6732704	424	130	Jasper	Lavaca
463		6732903	340	45	Shallow	Lavaca
464		6739306	418	100	Jasper	Lavaca
465		6739507	389	245	Jasper	Lavaca
466		6739517	360	988	Deep	Lavaca
467		6739518	357	90	Jasper	Lavaca
468		6739603	303	150	Jasper	Lavaca
469		6739605	331	844	Deep	Lavaca
470		6740301	284	45	Evangeline	Lavaca
471		6740503	360	320	Jasper	Lavaca
472		6740504	362	155	Evangeline	Lavaca

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
473		6740702	340	52	Burkeville	Lavaca
474		6746409	261	130	Jasper	DeWitt
475		6746502	215	132	Jasper	DeWitt
476		6746510	214	na	Shallow	DeWitt
477		6746605	334	80	Jasper	DeWitt
478		6746606	347	140	Jasper	DeWitt
479		6746607	347	140	Jasper	DeWitt
480		6746704	260	146	Jasper	DeWitt
481		6746705	260	260	Jasper	DeWitt
482		6746706	263	na	Shallow	DeWitt
483		6747103	372	na	Shallow	DeWitt
484		6747403	380	180	Jasper	DeWitt
485		6747606	325	641	Jasper	Lavaca
486		6747607	293	708	Jasper	Lavaca
487		6747608	331	1050	Jasper	Lavaca
488		6747911	282	819	Jasper	DeWitt
489		6747912	268	592	Jasper	DeWitt
490		6748203	288	200	Evangeline	Lavaca
491		6752904	321	350	Deep	DeWitt
492		6753401	260	62	Jasper	DeWitt
493		6753706	319	230	Jasper	DeWitt
494		6753707	372	240	Jasper	DeWitt
495		6753803	285	160	Burkeville	DeWitt
496		6753902	302	180	Burkeville	DeWitt
497		6754205	227	205	Jasper	DeWitt
498		6754406	210	na	Jasper	DeWitt
499		6754701	230	136	Burkeville	DeWitt
500		6754811	267	220	Jasper	DeWitt
501		6754812	251	na	Shallow	DeWitt
502		6754813	206	215	Jasper	DeWitt
503		6754814	191	610	Jasper	DeWitt
504		6755404	340	420	Jasper	DeWitt
505		6755601	235	240	Evangeline	DeWitt
506		6755803	221	75	Chicot	DeWitt
507		6756601	207	87	Evangeline	Lavaca
508		6756605	199	246	Evangeline	Lavaca
509		6759702	409	505	Deep	DeWitt
510		6760903	320	570	Jasper	DeWitt
511		6760904	326	252	Jasper	DeWitt
512		6760905	321	na	Evangeline	DeWitt
513		6761402	388	142	Evangeline	DeWitt
514		6761804	320	60	Evangeline	DeWitt
515		6762217	171	838	Jasper	DeWitt
516		6762304	214	1353	Deep	DeWitt
517		6762308	214	510	Jasper	DeWitt

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
518		6762404	270	na	Shallow	DeWitt
519		6762704	282	350	Burkeville	DeWitt
520		6762905	232	138	Evangeline	DeWitt
521		6763605	245	125	Chicot	DeWitt
522		7903204	421	160	Burkeville	DeWitt
523		7903302	403	160	Burkeville	DeWitt
524		7903603	377	200	Jasper	DeWitt
525		7903905	331	260	Burkeville	DeWitt
526		7904103	307	220	Jasper	DeWitt
527		7904104	307	235	Jasper	DeWitt
528		7904202	311	130	Burkeville	DeWitt
529		7904307	278	954	Deep	DeWitt
530		7905303	244	140	Evangeline	DeWitt
531		7905304	247	44	Evangeline	DeWitt
532		7905305	298	200	Evangeline	DeWitt
533		7905406	277	160	Evangeline	DeWitt
534		7905407	279	130	Evangeline	DeWitt
535		7905408	252	187	Evangeline	DeWitt
536		7905502	225	200	Evangeline	DeWitt
537		7905606	200	154	Evangeline	Goliad
538		7905801	272	466	Evangeline	Goliad
539		7905802	262	895	Jasper	Goliad
540		7905803	245	na	Shallow	Goliad
541		7905903	217	280	Evangeline	Goliad
542		7905904	199	164	Evangeline	Goliad
543		7905905	217	314	Evangeline	Goliad
544		7905906	269	277	Evangeline	Goliad
545		7905907	235	261	Evangeline	Goliad
546		7905908	271	118	Evangeline	Goliad
547		7905909	258	143	Evangeline	Goliad
548		7906101	288	585	Burkeville	DeWitt
549		7906102	301	73	Evangeline	DeWitt
550		7906303	219	55	Evangeline	DeWitt
551		7906306	232	138	Evangeline	DeWitt
552		7906407	260	315	Evangeline	DeWitt
553		7906411	271	230	Evangeline	DeWitt
554		7906506	219	120	Evangeline	DeWitt
555		7906508	239	170	Evangeline	DeWitt
556		7906703	232	73	Evangeline	DeWitt
557		7906706	221	152	Evangeline	Goliad
558		7906707	202	260	Evangeline	DeWitt
559		7906708	220	300	Evangeline	DeWitt
560		7906709	219	120	Evangeline	DeWitt
561		7906710	230	135	Evangeline	DeWitt
562		7906712	212	103	Evangeline	Goliad

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
563		7906714	199	136	Evangelina	DeWitt
564		7906715	238	150	Evangelina	Goliad
565		7906716	238	80	Evangelina	Goliad
566		7906807	241	113	Evangelina	DeWitt
567		7906808	201	140	Evangelina	DeWitt
568		7906809	199	125	Evangelina	DeWitt
569		7906810	193	180	Evangelina	Goliad
571		7907402	229	217	Evangelina	DeWitt
579		7907904	101	307	Evangelina	Victoria
580		7907906	104	870	Evangelina	Victoria
582		7908402	151	250	Evangelina	Victoria
587		7908806	109	220	Evangelina	Victoria
590		7912304	330	239	Evangelina	DeWitt
591		7912305	299	166	Evangelina	Goliad
592		7912602	285	350	Evangelina	Goliad
593		7912704	265	na	Evangelina	Goliad
594		7912902	314	850	Burkeville	Goliad
595		7913109	266	200	Evangelina	Goliad
596		7913110	281	na	Shallow	Goliad
597		7913111	283	300	Evangelina	Goliad
598		7913112	278	240	Evangelina	Goliad
599		7913202	291	137	Evangelina	Goliad
600		7913212	246	50	Evangelina	Goliad
601		7913223	240	93	Evangelina	Goliad
602		7913224	230	24	Evangelina	Goliad
603		7913225	230	65	Evangelina	Goliad
604		7913226	290	210	Evangelina	Goliad
605		7913227	242	30	Evangelina	Goliad
606		7913229	233	152	Evangelina	Goliad
607		7913230	250	282	Evangelina	Goliad
608		7913231	235	28	Evangelina	Goliad
609		7913304	246	317	Evangelina	Goliad
610		7913404	271	126	Evangelina	Goliad
611		7913405	313	324	Evangelina	Goliad
612		7913406	329	87	Evangelina	Goliad
613		7913407	300	176	Evangelina	Goliad
614		7913501	303	390	Evangelina	Goliad
615		7913507	270	250	Evangelina	Goliad
616		7913508	310	250	Evangelina	Goliad
617		7913509	287	76	Evangelina	Goliad
618		7913510	285	250	Evangelina	Goliad
619		7913511	305	na	Evangelina	Goliad
620		7913512	270	263	Evangelina	Goliad
621		7913513	229	230	Evangelina	Goliad
622		7913608	228	180	Evangelina	Goliad



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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
623		7913609	264	200	Evangelina	Goliad
624		7913610	250	120	Evangelina	Goliad
625		7913611	254	275	Evangelina	Goliad
626		7913612	265	180	Evangelina	Goliad
627		7913802	305	99	Evangelina	Goliad
628		7913803	253	188	Evangelina	Goliad
629		7913804	245	291	Evangelina	Goliad
630		7913805	285	197	Evangelina	Goliad
631		7913806	233	222	Evangelina	Goliad
632		7913807	262	222	Evangelina	Goliad
633		7913808	252	331	Evangelina	Goliad
634		7913809	249	183	Evangelina	Goliad
635		7913810	259	186	Evangelina	Goliad
636		7913811	225	143	Evangelina	Goliad
637		7913812	271	105	Evangelina	Goliad
638		7913813	271	210	Evangelina	Goliad
639		7913901	232	101	Evangelina	Goliad
640		7914102	209	108	Evangelina	Goliad
641		7914201	167	450	Evangelina	Goliad
642		7914202	182	88	Evangelina	Goliad
643		7914203	172	380	Evangelina	Goliad
644		7914204	230	122	Evangelina	Goliad
645		7914205	169	346	Evangelina	Goliad
646		7914303	204	222	Evangelina	Victoria
647		7914603	195	na	Shallow	Goliad
648		7914702	242	320	Evangelina	Goliad
649		7914703	209	300	Evangelina	Goliad
650		7914804	169	270	Evangelina	Goliad
651		7915101	127	133	Evangelina	Goliad
652		7915102	125	132	Evangelina	Goliad
653		7915205	189	300	Evangelina	Victoria
654		7915206	147	110	Evangelina	Victoria
656		7915302	188	157	Evangelina	Victoria
659		7915401	170	145	Evangelina	Goliad
660		7915702	142	174	Evangelina	Goliad
661		7915901	126	70	Chicot	Victoria
667		7916202	104	240	Evangelina	Victoria
670		7916603	53	612	Evangelina	Victoria
671		7916607	75	110	Chicot	Victoria
677		7917801	506	150	Evangelina	Bee
678		7919305	232	na	Evangelina	Goliad
679		7920203	252	na	Evangelina	Goliad
680		7920204	257	na	Evangelina	Goliad
681		7920205	285	na	Shallow	Goliad
682		7920304	300	na	Shallow	Goliad

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
683		7920502	192	187	Evangelina	Goliad
684		7920602	254	120	Evangelina	Goliad
685		7920603	254	150	Evangelina	Goliad
686		7920704	229	na	Shallow	Goliad
687		7920705	262	na	Shallow	Goliad
688		7921307	210	284	Evangelina	Goliad
689		7921605	207	578	Evangelina	Goliad
690		7921705	152	563	Evangelina	Goliad
691		7921706	141	243	Evangelina	Goliad
692		7921912	197	260	Evangelina	Goliad
693		7922201	170	550	Evangelina	Goliad
694		7922206	167	226	Evangelina	Goliad
695		7922207	151	226	Evangelina	Goliad
696		7922208	163	na	Evangelina	Goliad
697		7922210	188	160	Evangelina	Goliad
698		7922211	205	225	Evangelina	Goliad
699		7922302	131	200	Chicot	Goliad
700		7922505	150	92	Evangelina	Goliad
701		7922508	155	263	Evangelina	Goliad
702		7922509	157	160	Evangelina	Goliad
703		7922510	152	na	Evangelina	Goliad
704		7922511	133	na	Evangelina	Goliad
705		7922701	150	259	Evangelina	Goliad
706		7922703	141	192	Evangelina	Goliad
707		7922805	160	na	Shallow	Goliad
708		7922806	155	na	Shallow	Goliad
709		7922903	130	52	Evangelina	Goliad
712		7923803	114	170	Evangelina	Victoria
713		7924101	102	260	Evangelina	Victoria
715		7924502	75	80	Chicot	Victoria
716		7924601	25	40	Chicot	Victoria
719		7924902	86	125	Chicot	Victoria
720		7925103	356	90	Burkeville	Bee
721		7925303	383	55	Evangelina	Bee
722		7925505	366	297	Burkeville	Bee
723		7925506	366	52	Evangelina	Bee
724		7925608	426	252	Burkeville	Bee
725		7925611	339	100	Evangelina	Bee
726		7926207	318	483	Jasper	Bee
727		7926804	325	295	Evangelina	Bee
728		7927202	310	150	Evangelina	Goliad
729		7927301	308	150	Evangelina	Goliad
730		7927306	264	280	Evangelina	Goliad
731		7928110	265	295	Evangelina	Goliad
732		7928302	216	235	Evangelina	Goliad

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
733		7928303	217	95	Evangelina	Goliad
734		7928304	236	320	Evangelina	Goliad
735		7928501	237	163	Evangelina	Goliad
736		7928503	171	294	Evangelina	Goliad
737		7928721	188	na	Evangelina	Goliad
738		7928722	201	195	Evangelina	Goliad
739		7929701	185	198	Evangelina	Goliad
740		7929903	145	192	Evangelina	Goliad
741		7930201	150	302	Evangelina	Goliad
742		7930301	113	300	Evangelina	Goliad
743		7930701	128	235	Evangelina	Goliad
744		7931103	115	150	Evangelina	Goliad
745		7931302	107	113	Chicot	Victoria
746		7931501	96	125	Chicot	Goliad
747		7931502	105	204	Evangelina	Goliad
748		7931701	105	60	Chicot	Goliad
749		7931702	99	218	Evangelina	Goliad
751		7932103	90	142	Chicot	Victoria
754		7933501	350	153	Evangelina	Bee
755		7934202	371	175	Evangelina	Bee
756		7934409	347	145	Evangelina	Bee
757		7934811	295	282	Evangelina	Bee
758		7934903	210	1554	Jasper	Bee
759		7935101	267	130	Evangelina	Bee
760		7935305	226	150	Evangelina	Bee
761		7935609	190	300	Evangelina	Bee
762		7935912	189	555	Evangelina	Bee
763		7936906	117	na	Shallow	Bee
764		7937305	126	na	Shallow	Goliad
765		7937306	105	na	Evangelina	Goliad
766		7937307	111	na	Evangelina	Goliad
767		7937308	95	na	Evangelina	Goliad
768		7937309	118	na	Evangelina	Goliad
769		7937310	109	na	Evangelina	Goliad
770		7937607	103	260	Evangelina	Goliad
771		7937901	87	105	Evangelina	Goliad
772		7937905	85	811	Evangelina	Goliad
773		7937909	67	200	Chicot	Goliad
774		7937910	75	na	Shallow	Bee
775		7937911	89	146	Evangelina	Goliad
776		7937912	86	61	Chicot	Goliad
777		7937913	91	na	Shallow	Goliad
778		7937914	87	200	Chicot	Goliad
779		7937915	85	186	Evangelina	Goliad
780		7937917	65	124	Evangelina	Bee

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
781		7937918	92	96	Chicot	Goliad
782		7937919	88	160	Evangeline	Goliad
783		7938201	115	106	Evangeline	Goliad
784		7938202	100	60	Chicot	Goliad
785		7938203	103	200	Chicot	Goliad
786		7938301	89	62	Chicot	Goliad
787		7938303	102	80	Chicot	Goliad
788		7938704	86	200	Chicot	Goliad
789		7938705	81	200	Chicot	Goliad
790		7938706	75	325	Evangeline	Goliad
791		7938806	86	160	Chicot	Refugio
792		7939101	83	200	Chicot	Refugio
793		7939104	91	110	Chicot	Goliad
795		7939803	62	170	Chicot	Refugio
796		7940502	56	295	Chicot	Refugio
797		7942702	245	110	Chicot	Bee
798		7942703	255	230	Evangeline	Bee
799		7943102	188	715	Evangeline	Bee
800		7943334	193	558	Evangeline	Bee
801		7943401	208	840	Evangeline	Bee
802		7943821	150	188	Evangeline	Bee
803		7943903	141	260	Evangeline	Bee
804		7944103	156	150	Evangeline	Bee
805		7945601	75	120	Chicot	Refugio
807		7946612	51	890	Evangeline	Refugio
809		7946810	55	173	Chicot	Refugio
811		7950606	163	650	Evangeline	Bee
812		7950909	148	701	Evangeline	San Patricio
813		7952405	87	63	Chicot	Bee
814		7952407	78	220	Chicot	Bee
815		7953103	78	100	Chicot	Refugio
816		7953205	56	245	Chicot	Refugio
817		7953504	61	1150	Evangeline	Refugio
818		7953602	45	255	Chicot	Refugio
819		7954303	25	260	Chicot	Refugio
821		7957605	133	198	Evangeline	San Patricio
822		7957606	102	410	Evangeline	San Patricio
823		7958105	100	na	Evangeline	San Patricio
824		7958106	110	na	Evangeline	San Patricio
825		7958107	110	270	Evangeline	San Patricio
826		7958108	80	na	Evangeline	San Patricio
827		7958201	162	521	Evangeline	San Patricio
828		7958302	137	610	Evangeline	San Patricio
829		7958407	110	570	Evangeline	San Patricio
830		7958505	82	698	Evangeline	San Patricio

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
831		7958602	75	701	Evangeline	San Patricio
832		7958603	100	637	Evangeline	San Patricio
833		7958708	73	694	Evangeline	San Patricio
834		7958812	82	700	Evangeline	San Patricio
835		7959103	121	372	Evangeline	San Patricio
836		7959304	109	356	Evangeline	San Patricio
837		7959402	131	600	Evangeline	San Patricio
838		7960401	85	497	Evangeline	San Patricio
839		7960503	65	457	Evangeline	San Patricio
840		7960802	58	325	Chicot	San Patricio
841		7961901	49	294	Chicot	San Patricio
842		7962114	40	320	Chicot	San Patricio
843		7963107	12	568	Chicot	Refugio
844		7963108	17	630	Chicot	Refugio
845		7964701	9	130	Chicot	Aransas
850		8002605	64	175	Chicot	Jackson
851		8002606	70	85	Chicot	Jackson
855		8002801	65	610	Evangeline	Victoria
856		8002802	62	711	Evangeline	Victoria
858		8003206	71	126	Chicot	Jackson
859		8003603	55	135	Chicot	Jackson
866		8004505	50	310	Chicot	Jackson
868		8004612	49	240	Chicot	Jackson
869		8004710	50	300	Chicot	Jackson
872		8005311	62	na	Shallow	Jackson
876		8006407	47	925	Chicot	Jackson
878		8006903	40	421	Chicot	Matagorda
879		8006906	37	765	Chicot	Matagorda
880		8007102	59	1020	Evangeline	Matagorda
881		8007203	55	453	Chicot	Matagorda
882		8007312	51	350	Chicot	Matagorda
883		8007404	50	510	Chicot	Matagorda
884		8007415	47	710	Chicot	Matagorda
885		8007501	50	820	Chicot	Matagorda
886		8007901	40	106	Chicot	Matagorda
887		8008105	54	406	Chicot	Matagorda
888		8008106	50	64	Chicot	Matagorda
889		8008302	50	630	Chicot	Matagorda
890		8008306	52	365	Chicot	Matagorda
891		8008504	51	690	Chicot	Matagorda
892		8008505	49	100	Chicot	Matagorda
894		8009506	94	525	Evangeline	Victoria
896		8010104	62	67	Chicot	Victoria
898		8010402	66	80	Chicot	Victoria
900		8011101	49	470	Chicot	Victoria

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
905		8011502	40	300	Chicot	Jackson
906		8011504	41	282	Chicot	Jackson
907		8012502	36	330	Chicot	Jackson
908		8013814	25	2550	Jasper	Jackson
909		8014102	32	560	Chicot	Jackson
910		8014104	36	200	Chicot	Jackson
912		8014801	16	719	Chicot	Matagorda
913		8014901	25	460	Chicot	Matagorda
914		8014903	12	320	Chicot	Matagorda
915		8015102	40	645	Chicot	Matagorda
916		8015301	31	570	Chicot	Matagorda
917		8015402	31	295	Chicot	Matagorda
918		8015405	31	270	Chicot	Matagorda
919		8015502	27	776	Chicot	Matagorda
920		8016301	34	823	Chicot	Matagorda
921		8016904	15	430	Chicot	Matagorda
923		8017401	36	260	Chicot	Victoria
935		8018501	51	1100	Evangeline	Victoria
939		8019404	27	na	Shallow	Victoria
948		8021216	16	616	Chicot	Jackson
949		8021501	18	269	Chicot	Calhoun
950		8021502	8	185	Chicot	Calhoun
952		8022204	15	360	Chicot	Matagorda
953		8022501	16	370	Chicot	Jackson
954		8023101	21	776	Chicot	Matagorda
955		8023202	16	70	Chicot	Matagorda
956		8023301	15	770	Chicot	Matagorda
957		8023401	13	590	Chicot	Matagorda
958		8024201	11	490	Chicot	Matagorda
959		8024406	7	360	Chicot	Matagorda
960		8024601	4	275	Chicot	Matagorda
961		8024802	2	380	Chicot	Matagorda
963		8026502	36	80	Chicot	Calhoun
964		8027401	25	110	Chicot	Calhoun
968		8033205	48	98	Chicot	Refugio
970		8035703	7	340	Chicot	Calhoun
972		8035811	10	225	Chicot	Calhoun
973		8035812	14	80	Chicot	Calhoun
974		8036401	14	250	Chicot	Calhoun
975		8037509	8	780	Chicot	Calhoun
978		8049702	8	63	Chicot	Aransas
979		8101101	51	768	Chicot	Matagorda
980		8101102	50	1032	Evangeline	Matagorda
981		8101205	36	480	Chicot	Matagorda
982		8101701	43	400	Chicot	Matagorda

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INTERA Master ID	GCD Well ID	TWDB Well ID	Land Surface Elevation (ft)	Well Depth (ft)	Assigned Unit	County
983		8102404	31	450	Chicot	Matagorda
984		8102605	25	525	Chicot	Matagorda
985		8102901	19	294	Chicot	Matagorda
986		8103406	26	530	Chicot	Matagorda
987		8109204	35	120	Chicot	Matagorda
988		8109504	28	721	Chicot	Matagorda
989		8109701	15	800	Chicot	Matagorda
990		8111604	6	560	Chicot	Matagorda
991		8111901	3	527	Chicot	Matagorda
992		8111902	4	535	Chicot	Matagorda
993		8112705	13	290	Chicot	Matagorda
994		8117405	5	472	Chicot	Matagorda
995		8117408	6	802	Chicot	Matagorda
996		8303506	98	267	Chicot	San Patricio
997		8305301	53	343	Chicot	San Patricio
998		8307319	10	140	Chicot	Aransas
999	Calhoun County GCD - NW-00033		4	226	Deep	Calhoun
1000	Calhoun County GCD - NW-00009		9	235	Deep	Calhoun
1001	Calhoun County GCD - NW-00043		9	240	Deep	Calhoun
1002	Texana GCD - NW-00487 - East UB - DAMW		11	185	Deep	Jackson
1003	Texana GCD - NW-00488 - East LF - DAMW		11	330	Deep	Jackson
1004	Texana GCD - NW-00489 - Center UB - DAMW		11	208	Deep	Jackson
1005	Texana GCD - NW-00490 - Center LF - DAMW		11	402	Deep	Jackson
1006	Texana GCD - NW-00491 - West UB - DAMW		13	204	Deep	Jackson
1007	Texana GCD - NW-00492 - West LF - DAMW		13	355	Deep	Jackson
1008	Texana GCD - NW-00488		11	330	Deep	Jackson
1009	Victoria County GCD - GW-001016		186	na	Deep	Victoria
1010	Victoria County GCD - GW-001010		178	190	Deep	Victoria
1011	Pecan Valley GCD - INTERA-1011		405	na	Deep	Pecan
1012	Pecan Valley GCD - INTERA-1012		278	na	Deep	Pecan
1013	Pecan Valley GCD - INTERA-1013		224	na	Deep	Pecan
1014	Pecan Valley GCD - INTERA-1014		233	na	Deep	Pecan
1015	Pecan Valley GCD - INTERA-1015		171	na	Deep	Pecan
1016	Pecan Valley GCD - INTERA-1016		151	na	Deep	Pecan

**APPENDIX C**  
**THE NUMBER OF MEASURED WATER LEVELS IN THE TWDB,  
THE GCD, AND THE MERGED DATA SETS FOR WINTER MONTHS**



GCD Well ID	TWDB Well ID	Number (#) of Depth to Water Measurements over the 6-month averaging period		
		TWDB data set	GCD data set	Merged data set
Calhoun County GCD - GW-00007	8019506	19	2	19
Calhoun County GCD - GW-00008	8019802	16	2	16
Calhoun County GCD - GW-00009	8026501	21	4	21
Calhoun County GCD - GW-00010	8027501	2	1	2
Calhoun County GCD - GW-00011	8027601	19	1	19
Calhoun County GCD - GW-00012	8035704	1	1	2
Calhoun County GCD - GW-00013	8037601	3	1	3
Calhoun County GCD - GW-00014	8019503	16	2	16
Refugio GCD - GW-00079	7954803	17	5	18
Refugio GCD - GW-00085	7947702	9	7	13
Refugio GCD - GW-00124	7931901	16	4	17
Refugio GCD - GW-00234	7932802	16	5	18
Refugio GCD - GW-00235	7946601	17	5	18
Refugio GCD - GW-00370	8042507	10	1	10
Refugio GCD - GW-00439	8033901	3	4	4
Refugio GCD - NW-00340	8033203	6	6	11
Refugio GCD - NW-00474	7939105	9	4	10
Refugio GCD - NW-00475	7946803	12	5	16
Texana GCD - GW-00112	8021601	3	1	3
Texana GCD - GW-00119	8021214	0	0	0
Texana GCD - GW-00120	8021204	0	0	0
Texana GCD - GW-00121	8021203	0	0	0
Texana GCD - GW-00122	8021201	0	0	0
Texana GCD - GW-00123	8021213	0	0	0
Texana GCD - GW-00247	6661808	1	2	2
Texana GCD - GW-00251	6661809	1	2	2
Texana GCD - GW-00274	6660708	20	10	22
Texana GCD - GW-00275	6660701	14	3	14
Texana GCD - GW-00276	6660401	15	10	19
Texana GCD - GW-00277	6660601	14	3	14
Texana GCD - GW-00278	6660613	15	9	17
Texana GCD - GW-00279	6661407	14	2	14
Texana GCD - GW-00280	6660501	16	4	16
Texana GCD - GW-00281	6660205	19	8	21
Texana GCD - GW-00283	8011202	19	9	21
Texana GCD - GW-00285	8011201	20	10	22
Texana GCD - GW-00286	8003909	14	3	14

GCD Well ID	TWDB Well ID	Number (#) of Depth to Water Measurements over the 6-month averaging period		
		TWDB data set	GCD data set	Merged data set
Texana GCD - GW-00287	8004908	14	6	15
Texana GCD - GW-00288	8004601	19	8	20
Texana GCD - GW-00289	8006101	18	7	19
Texana GCD - GW-00290	8005102	14	7	15
Texana GCD - GW-00291	8004504	15	9	18
Texana GCD - GW-00292	8004403	17	9	18
Texana GCD - GW-00293	8006703	19	8	20
Texana GCD - GW-00294	6651505	17	7	18
Texana GCD - GW-00295	6658402	16	6	19
Texana GCD - GW-00296	6652801	16	5	16
Texana GCD - GW-00297	6658601	18	8	20
Texana GCD - GW-00298	8003803	12	2	12
Texana GCD - GW-00299	8011301	16	6	17
Texana GCD - GW-00320	8004101	16	10	21
Texana GCD - GW-00323	8005701	16	6	17
Texana GCD - GW-00340	8002607	1	1	1
Texana GCD - GW-00354	8005502	13	2	13
Texana GCD - GW-00366	6651903	8	1	8
Texana GCD - GW-00409	8003704	0	0	0
Texana GCD - GW-00410	802904	1	2	2
Texana GCD - GW-00411	8002608	1	2	2
Texana GCD - GW-00412	6661810	0	0	0
Texana GCD - GW-00415	6660707	13	2	13
Texana GCD - GW-00416	6660709	4	1	4
Texana GCD - GW-00417	8014405	3	1	3
Victoria County GCD - GW-000021	6657801	7	10	10
Victoria County GCD - GW-000028	8010401	15	8	16
Victoria County GCD - GW-000047	7916102	4	3	4
Victoria County GCD - GW-000085	7915904	6	7	8
Victoria County GCD - GW-000101	8019104	5	6	6
Victoria County GCD - GW-000102	8019105	4	5	5
Victoria County GCD - GW-000150	8010502	6	7	7
Victoria County GCD - GW-000158	7907504	6	8	8
Victoria County GCD - GW-000181	8018105	4	5	5
Victoria County GCD - GW-000192	8018103	4	4	4
Victoria County GCD - GW-000239	8010101	13	6	14
Victoria County GCD - GW-000244	7916903	3	1	3

GCD Well ID	TWDB Well ID	Number (#) of Depth to Water Measurements over the 6-month averaging period		
		TWDB data set	GCD data set	Merged data set
Victoria County GCD - GW-000271	7916203	3	3	3
Victoria County GCD - GW-000308	7916302	8	1	8
Victoria County GCD - GW-000311	8017905	12	7	12
Victoria County GCD - GW-000320	8017501	11	2	11
Victoria County GCD - GW-000321	8017502	691	1	691
Victoria County GCD - GW-000339	6657406	12	9	13
Victoria County GCD - GW-000364	8002101	3	4	4
Victoria County GCD - GW-000366	8002102	18	14	22
Victoria County GCD - GW-000375	8017101	13	9	16
Victoria County GCD - GW-000377	8002804	12	8	13
Victoria County GCD - GW-000489	8018402	17	10	18
Victoria County GCD - GW-000494	7915305	5	8	8
Victoria County GCD - GW-000510	7916608	13	7	14
Victoria County GCD - GW-000544	7907902	15	9	17
Victoria County GCD - GW-000552	7907505	6	8	8
Victoria County GCD - GW-000576	8002701	3	5	4
Victoria County GCD - GW-000577	7908404	6	7	7
Victoria County GCD - GW-000578	7908403	6	7	7
Victoria County GCD - GW-000589	7908807	6	7	7
Victoria County GCD - GW-000592	8011105	1	2	2
Victoria County GCD - GW-000595	8017801	5	7	7
Victoria County GCD - GW-000599	7907703	12	8	13
Victoria County GCD - GW-000601	7916702	9	8	10
Victoria County GCD - GW-000602	7916701	8	7	9
Victoria County GCD - GW-000603	7916703	6	8	11
Victoria County GCD - GW-000606	7908201	12	9	13
Victoria County GCD - GW-000607	7908805	14	10	15
Victoria County GCD - GW-000608	7915903	13	9	15
Victoria County GCD - GW-000609	7923303	13	9	14
Victoria County GCD - GW-000610	7923601	11	7	12
Victoria County GCD - GW-000611	7924102	13	9	14
Victoria County GCD - GW-000612	7924702	12	8	13
Victoria County GCD - GW-000613	7932602	11	3	11
Victoria County GCD - GW-000614	8001301	15	10	18
Victoria County GCD - GW-000615	8001302	10	5	12
Victoria County GCD - GW-000616	8018401	14	5	14
Victoria County GCD - GW-000617	7907305	15	9	16

GCD Well ID	TWDB Well ID	Number (#) of Depth to Water Measurements over the 6-month averaging period		
		TWDB data set	GCD data set	Merged data set
Victoria County GCD - GW-000620	6657903	2	2	2
Victoria County GCD - GW-000687	7908406	4	6	6
Victoria County GCD - GW-000713	7915902	1	1	1
Victoria County GCD - GW-000722	7915905	3	8	8
Victoria County GCD - GW-000948	7915301	9	1	9
Victoria County GCD - GW-000949	8009101	5	1	5
Victoria County GCD - GW-000950	8018601	9	1	9
Victoria County GCD - NW-000016	7907503	6	7	7
Victoria County GCD - NW-000030	7924802	3	4	4
Victoria County GCD - NW-000097	7907707	0	0	0
Victoria County GCD - NW-000122	8017602	9	9	10
Victoria County GCD - NW-000165	7915306	3	3	3
Victoria County GCD - NW-000310	8018404	5	4	6
Victoria County GCD - NW-000333	7908903	5	6	6
Victoria County GCD - NW-000425	8017603	3	3	3
Victoria County GCD - NW-000426	7907404	7	9	10

## **APPENDIX D SENSITIVITY ANALYSIS**

Appendix D provides a sensitivity analysis of how changes in the method for constructing the water level maps impacts the amount of the average annual water levels.

## D.1 Alternative Water Level Maps

The authors are unaware of any previous application of the smoothed simulated water levels and Kriged residuals (SSWL+KR) method for interpolating measured water levels. Because of the SSWL+KR method has not been used in Texas prior to this study, the method was compared to several alternative methods for constructing water level maps in order to investigate the sensitivity of the results to changes in the method’s implementation and to compare the results produced by alternative methods. These alternative methods are listed in **Table D-1**.

Table D-1 Methods used to Generate Water Level Maps other than the SSWL+KR Method

Method		Reason for Consideration / (How it was Implemented)
#	Name /(Alias)	
1	Simulated smoothed WLs + Kriged residuals (SSWL+KR)	<ul style="list-style-type: none"> <li>• Considered Best Science Available</li> <li>• (Detrended annual measured WLs using smoothed GAM simulated WLs for each year and Kriged the residuals)</li> </ul>
2	Simulated smoothed 2000 WLs + Kriged residuals (SSWL2000+KR)	<ul style="list-style-type: none"> <li>• Evaluate the sensitivity trend selection</li> <li>• (Same as SSWL+KR but used the GAM simulated 2000 WLs to detrend all measured WLs from 2000 to 2020)</li> </ul>
3	Simulated WLs + Kriged WLs residuals (SWLs+KR)	<ul style="list-style-type: none"> <li>• Evaluate sensitivity of using smoothed or actual the GAM simulated WLs</li> <li>• (Same as SSWL+KR but GAM simulated WLs were not smoothed)</li> </ul>
4	Kriged Measured WLs (KWL)	<ul style="list-style-type: none"> <li>• Evaluate sensitivity of detrending and not detrending WLs</li> <li>• (Kriged measured water levels using ordinary Kriging)</li> </ul>
5	Smoothed Simulated WLs from GAM (GAM_SSWL)	<ul style="list-style-type: none"> <li>• Determine the results from the trend surface used in SSWL+KR and to determine the impact of smoothing on the trend in the GAM simulated WLs</li> <li>• (Only account for the trend surface; do not consider the Kriged residuals)</li> </ul>
6	Simulated WLs from GAM (GAM_SWL)	<ul style="list-style-type: none"> <li>• Determine the results from the GAM simulation</li> <li>• (Linearly interpolated GAM results from 1 mile to 1000 ft resolution)</li> </ul>

Like the SSWL+KR method, methods #2 (SSWL2000+KR) and #3 (SWLs+KR) involve detrending and semivariogram analyses of water levels residuals. In practice, methods #2 and #3 are variants of method #1 and therefore serve as a type of sensitivity analysis for method #1 (SSWL+KR). **Figures D-1** and **D-2** provide examples of the experimental and theoretical semivariograms for Chicot and Evangeline aquifers for 2000, 2013, and 2020 for methods #2 and #3. The spherical theoretical model provided a relatively good fit through to the data and the values for the range are similar to those obtained for method #1 (SSWL+KR). Analysis of the residuals indicates that their distribution approximates a normal distribution. As a result, the application of methods #2 and #3 are technically justified. Method #4 (KWL) does not involve any detrending of the water levels, so Kriging is performed directly on the measured water levels, which are known to contain trends. As a result, the underlying assumptions for ordinary Kriging are not fully met. Nonetheless, the method #4 is presented because it provides useful information regarding whether or not detrending affects the final map of water levels. The impact of ignoring the trend with method #4 (KWL) is evident in the semivariogram analysis for the measured

water levels in Chicot Aquifer in **Figure D-3**. That is, despite fitting a spherical variogram model to the experiment variogram, the portion of the theoretical variogram shown in the plots is nearly linear. The line is a result of the trend in the data, which cause the semivariance to continual increase with an increase in the distance between two data points. Method #5 (GAM\_SWL) and Method #6 (GAM\_SSWL) use simulated water levels values from the GAM. Results from these two methods are provided primarily for reference.

**Figure D-4** compares the 2015 water level contours generated for the Chicot Aquifer by the six methods. All six images provide similar patterns to the contours. **Figure D-5** compares the 2015 water level contours generated for the Evangeline Aquifer by the six methods. All six images provide similar patterns to the contours. In both Figures D-1 and D-2, the plots with contours that have the most bends and irregularities are for methods #5 (GAM\_SSWL) and #6 (GAM\_SWL), which are the only two methods that incorporate the GAM simulated water levels without any smoothing. The water level contours with the least bends and irregularities occur in the plots for methods #1 (SSWL+KR), #2 (SSWL2000+KR) and #3 (SWLs+KR), all three of which that incorporate the GAM smooth simulated water levels; and the plots with contours with the moderate bends and irregularities are for the method #4 (KWL) that incorporates the Kriged water levels.

## D.2 Sensitivity of Annual Change in Water Levels

**Figures D-6** through **D-9** provide the change in average annual water levels measurements for the Chicot Aquifer, Evangeline Aquifer, and the Chicot & Evangeline Aquifer from 2000 to 2020 for Calhoun, Jackson, Refugio, and Victoria counties for the six methods for generating water levels surfaces. The difference among the methods varied considerably in regard to county and to the year. Two conclusions deduced from the three figures are:

- All of the method that involved Kriging had similar patterns in the direction of the fluctuations but the magnitude of those fluctuations greatly varied.
- The average annual water levels determined for (GAM\_SSWL) (Method #5) and the GAM simulated water levels (GAM\_SWL) were consistently very similar for all counties and aquifers – their lines usually differed by less than 1 foot and they exhibited considerably less fluctuations than the other methods.

**Table D-2** was assembled to assess the sensitivity of the annual changes in the average water levels against the annual changes for the SSWL+KR (Method #1), which are provided in Tables 5-1 to 5-4. The average differences in Table D-2 were determined by averaging the absolute value of the difference the annual change between a method and Method #1. Among some of the notable observations from Table D-2 are:

- The Kriged values results are not very sensitive to the amount the GAM simulated water level are smoothed to generate the trend surface used for detrending.
- The Kriged results can be very sensitive if the trend surface trend surface is updated to account for annual differences in the GAM simulations that account for different pumping rates.
- The Kriging of water levels without detrending can produce significantly different results than Kriging with detrending.
- The results for the Evangeline Aquifer are more sensitive to changes how Kriging is performed than results for the Chicot Aquifer.

Table D-2 Average difference between Methods #2 through #6 with Method #1 (SSWL+KR) for the change in annual average water level from 2000 to 2020.

	#2 Simulated smoothed 2000 WLs + Kriged WL residuals	#3 Simulated WLs + Kriged WL residuals	#4 Kriged Measured WLs	#5 Simulated WLs from GAM	#6 Smoothed simulated WLs from GAM	Average of the Five Alternative Methods
<b>County</b>	<b>Chicot Aquifer</b>					
Calhoun	1.1	0.8	3.4	3.3	3.2	2.3
Jackson	1.0	1.4	2.2	5.5	5.3	3.1
Refugio	0.9	1.5	4.3	4.7	4.8	3.3
Victoria	6.7	1.2	2.9	8.4	7.9	5.4
Average	<b>2.4</b>	<b>1.2</b>	<b>3.2</b>	<b>5.5</b>	<b>5.3</b>	<b>3.5</b>
<b>County</b>	<b>Evangeline Aquifer</b>					
Calhoun	15.4	4.3	16.6	11.2	11.5	11.8
Jackson	17.3	1.4	5.0	13.6	14.0	10.2
Refugio	4.9	2.3	8.0	5.0	5.0	5.0
Victoria	12.0	3.4	3.5	4.4	4.4	5.5
Average	<b>12.4</b>	<b>2.9</b>	<b>8.3</b>	<b>8.5</b>	<b>8.7</b>	<b>8.2</b>
<b>County</b>	<b>Chicot &amp; Evangeline Aquifer</b>					
Calhoun	3.4	1.0	2.8	2.9	2.9	2.6
Jackson	8.4	1.2	2.9	5.3	5.6	4.7
Refugio	2.4	1.7	5.0	4.2	4.2	3.5
Victoria	9.3	1.4	2.8	3.3	3.1	3.9
Average	<b>5.9</b>	<b>1.3</b>	<b>3.4</b>	<b>3.9</b>	<b>3.9</b>	<b>3.7</b>



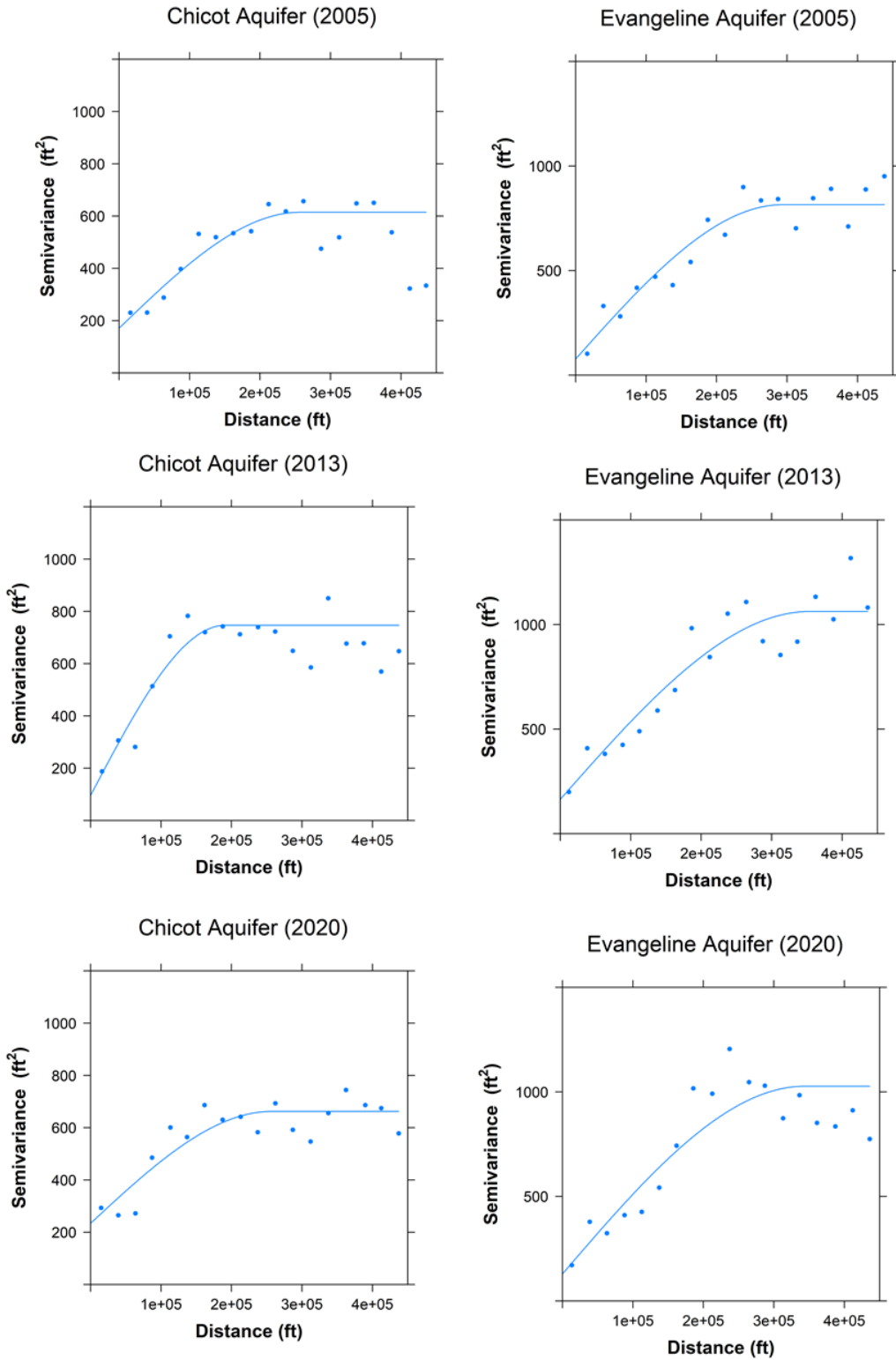


Figure D-1 Example experimental and theoretical semivariograms for the Simulated smoothed 2000 WLs + Kriged residuals (SWSL2000+KR)

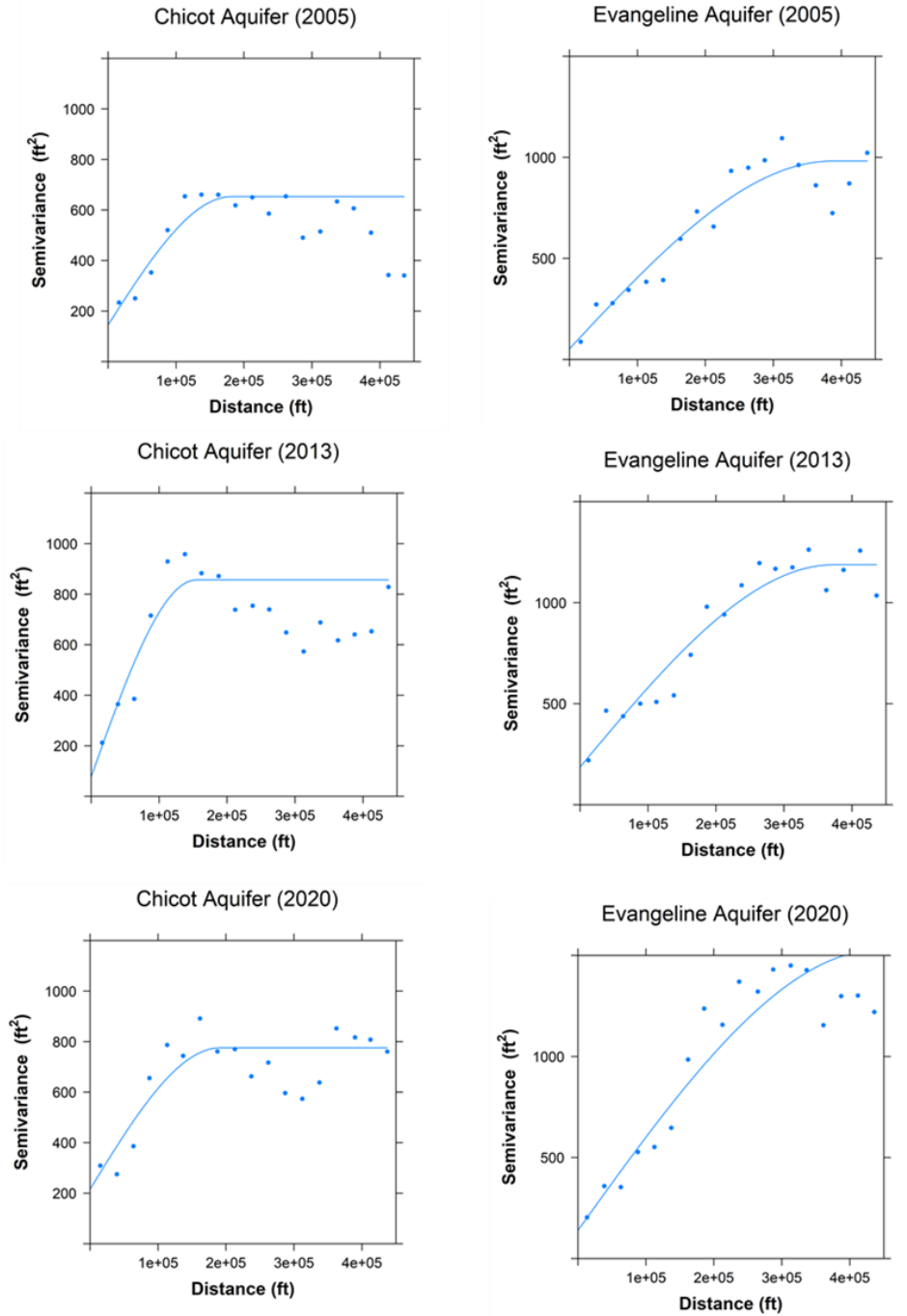


Figure D-2 Example experimental and theoretical semivariograms for the Simulated WLS + Kriged WLS residuals (SWLS+KR) method

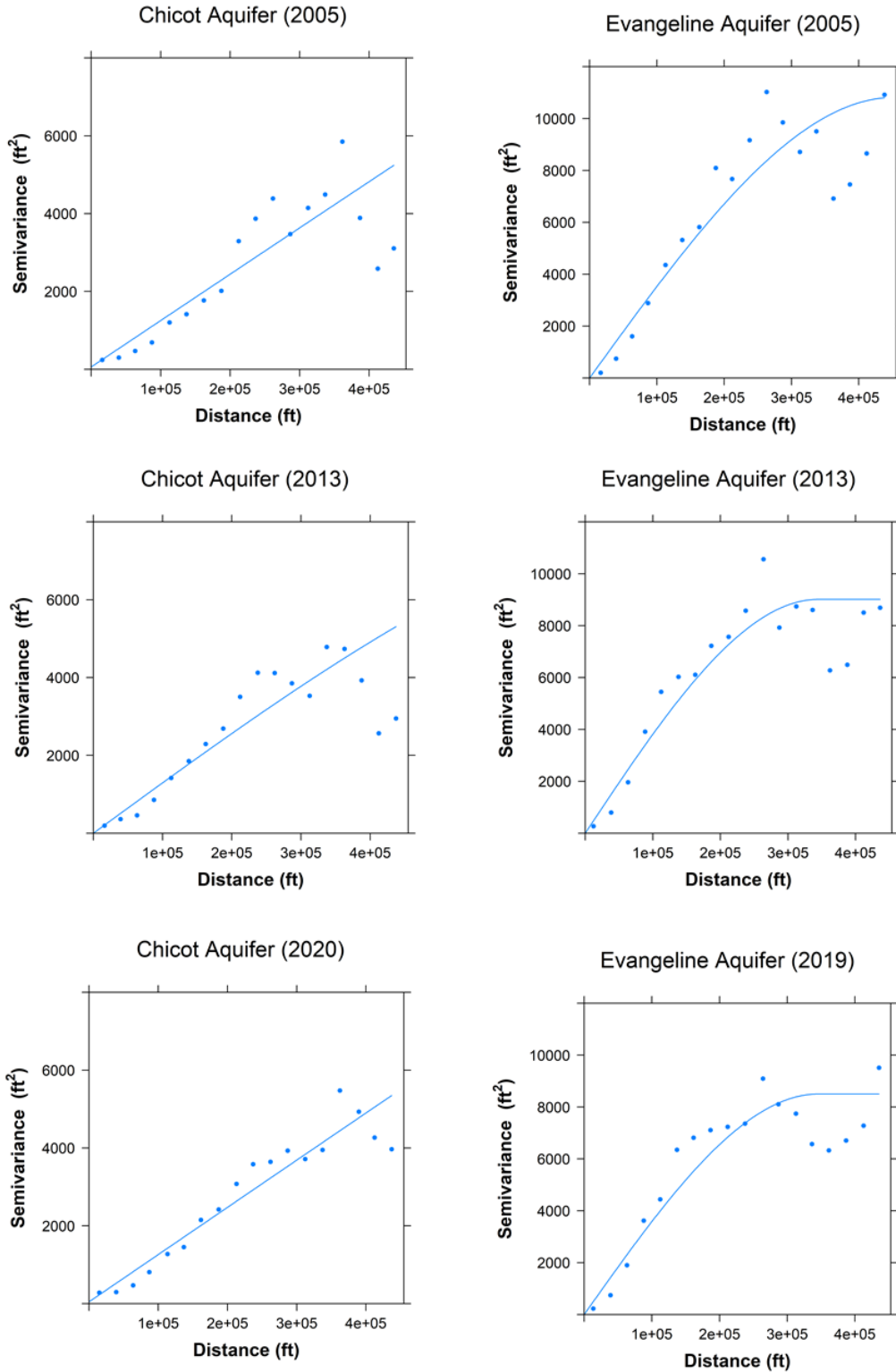


Figure D-3 Example experimental and theoretical semivariograms for the Kriged Measured WLS (KWL) method

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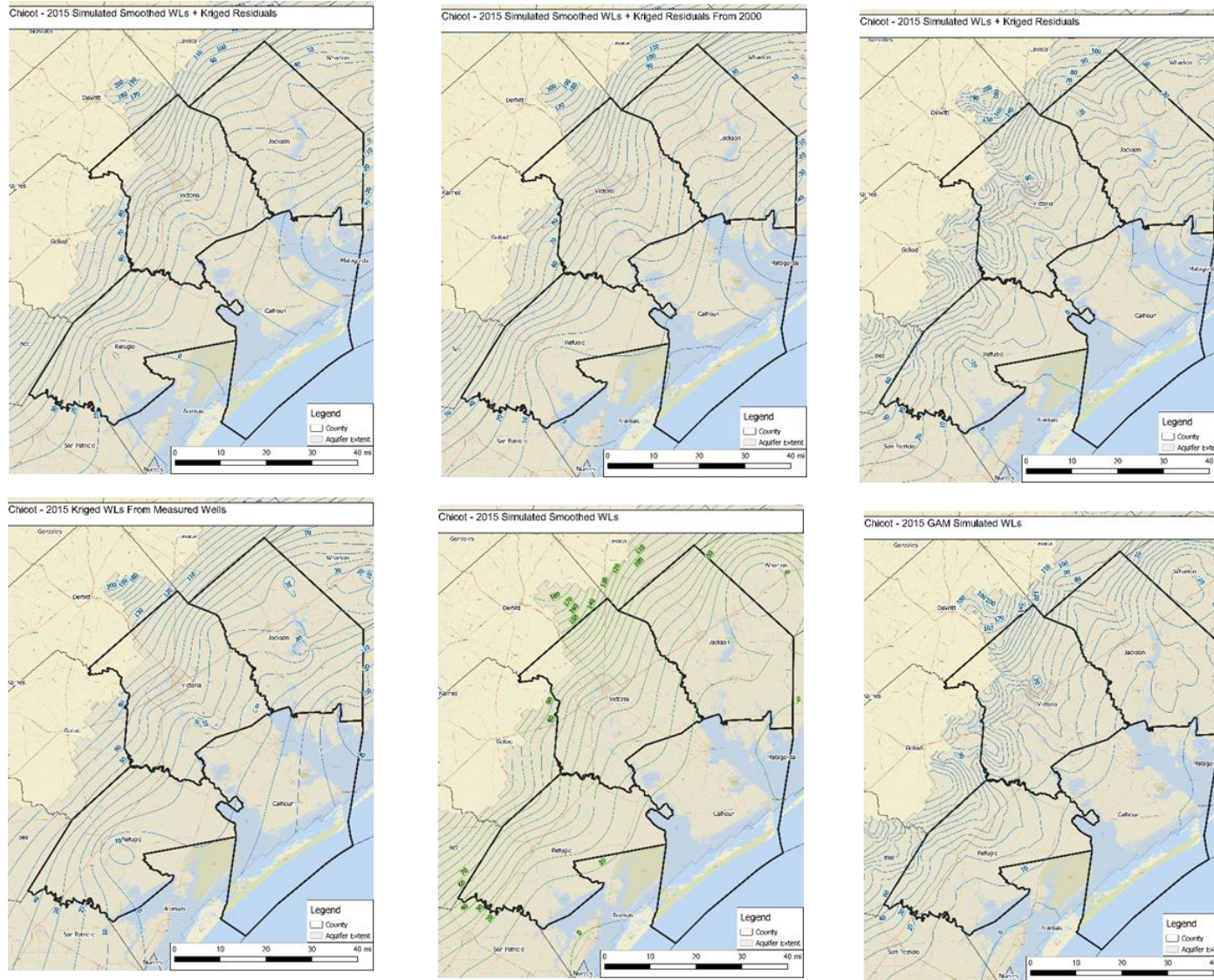


Figure D-4 Comparison of 2015 water level contours for Chicot Aquifer produced by the six methods described in Table 5-5. 1) SSWL+KR, 2) SSWO2000+KR, 3) SWLS+KR, 4) KWL, 5) GAM\_SSWL, and 6) GMA\_SWL

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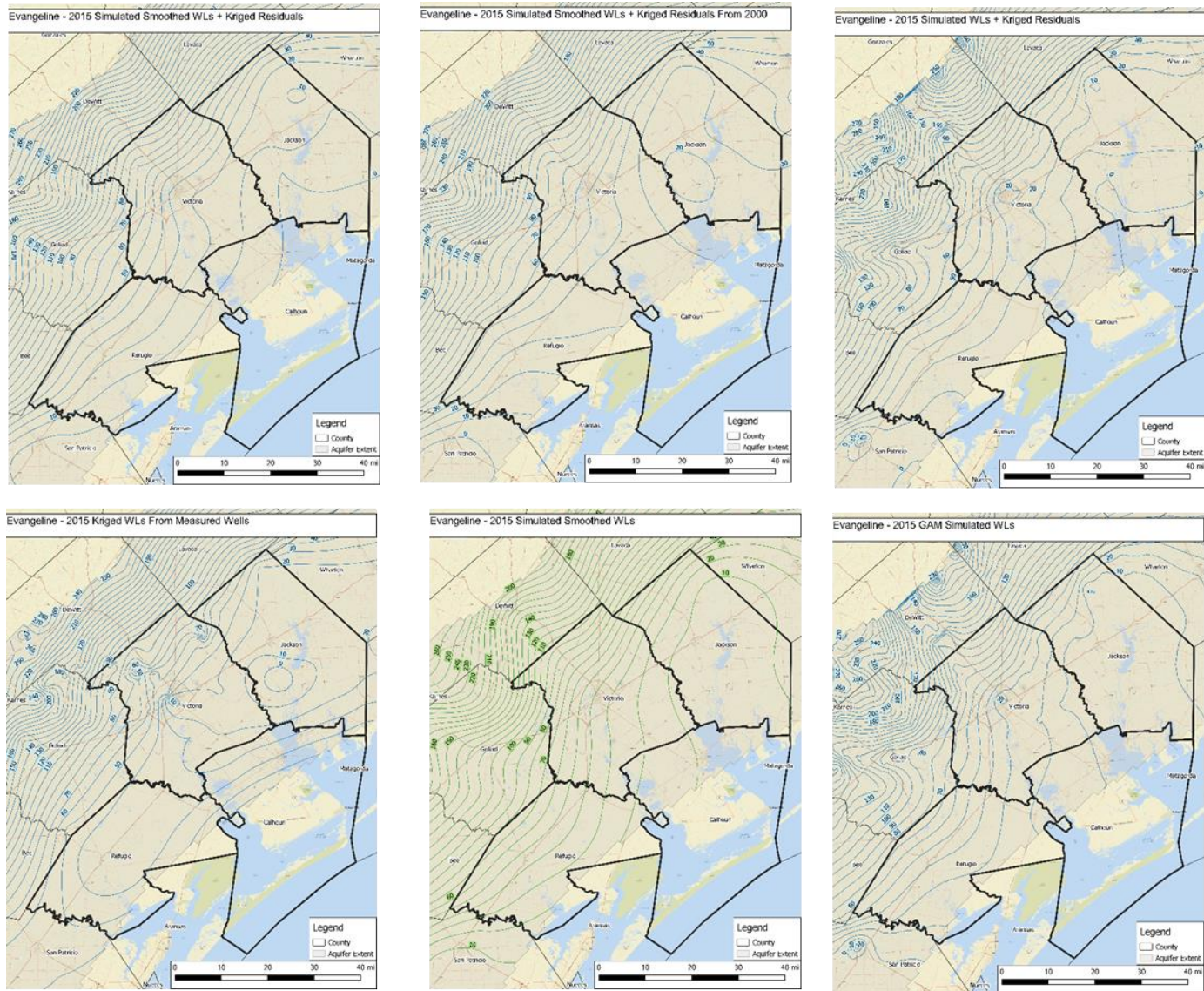


Figure D-5 Comparison of 2015 water level contours for Evangeline Aquifer produced by the six methods described in Table 5-5. 1) SSWL+KR, 2) SSWO2000+KR, 3) SWLS+KR, 4) KWL, 5) GAM\_SSWL, and 6) GMA\_SWL

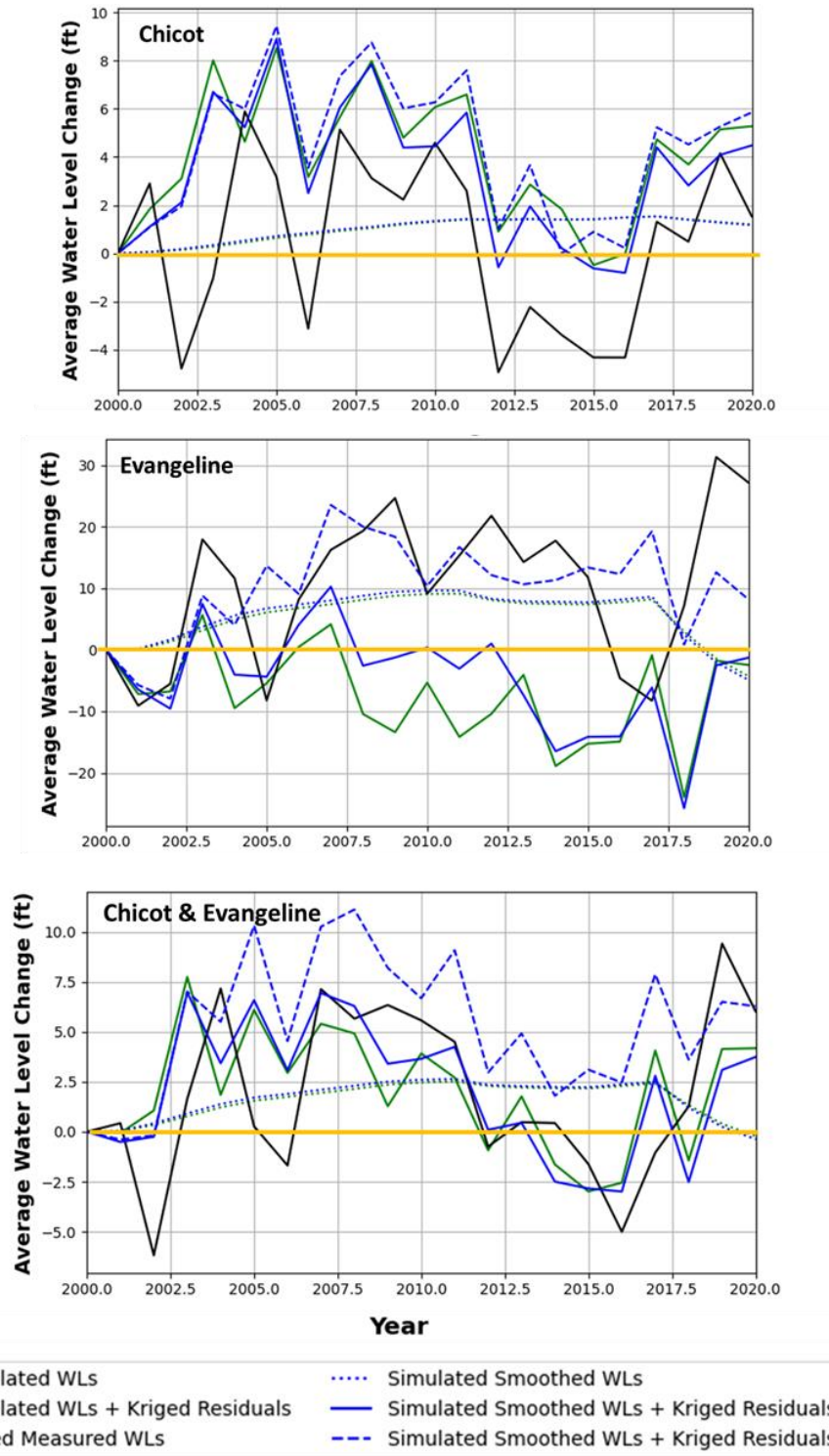


Figure D-6 Changes in the annual average water levels from five alternative methods and Simulated Smoothed WLS + Kriged residuals (SSWL+KR), which is considered to be Best Science Available for Calhoun County

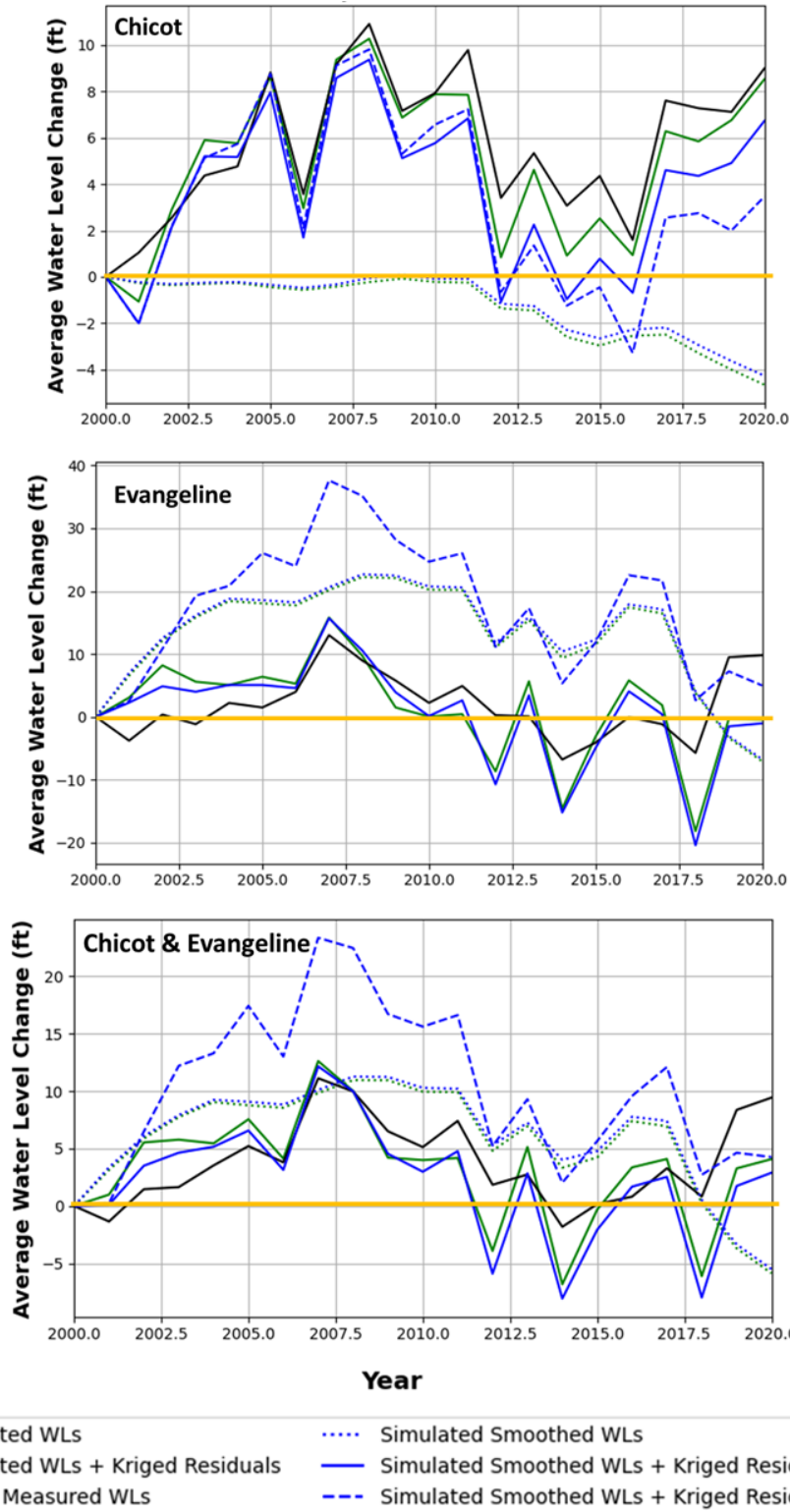


Figure D-7 Changes in the annual average water levels from five alternative methods and Simulated Smoothed WLS + Kriged residuals (SSWL+KR), which is considered to be Best Science Available for Jackson County

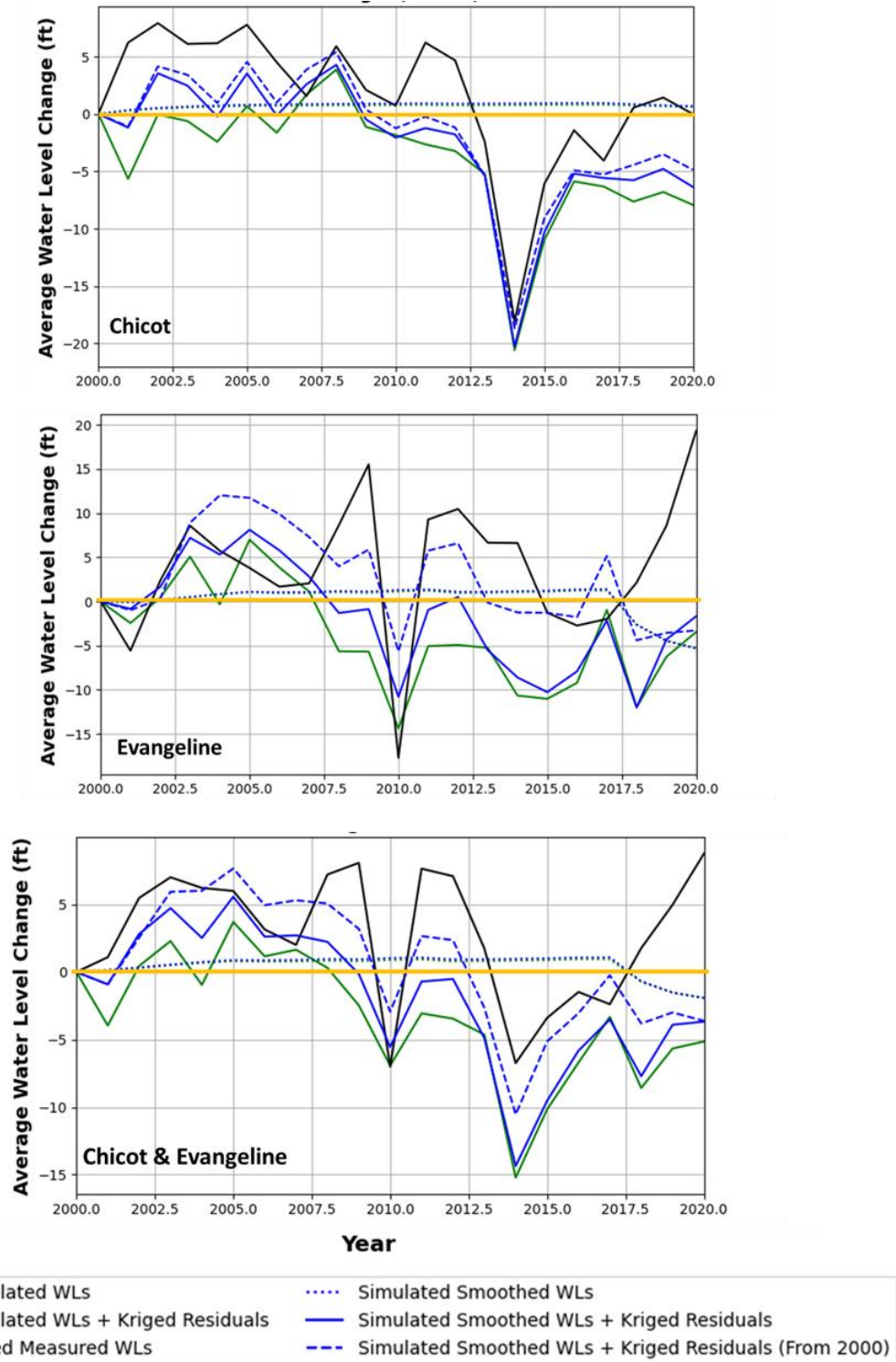


Figure D-8 Changes in the annual average water levels from five alternative methods and Simulated Smoothed WLs + Kriged residuals (SSWL+KR), which is considered to be Best Science Available for Refugio County



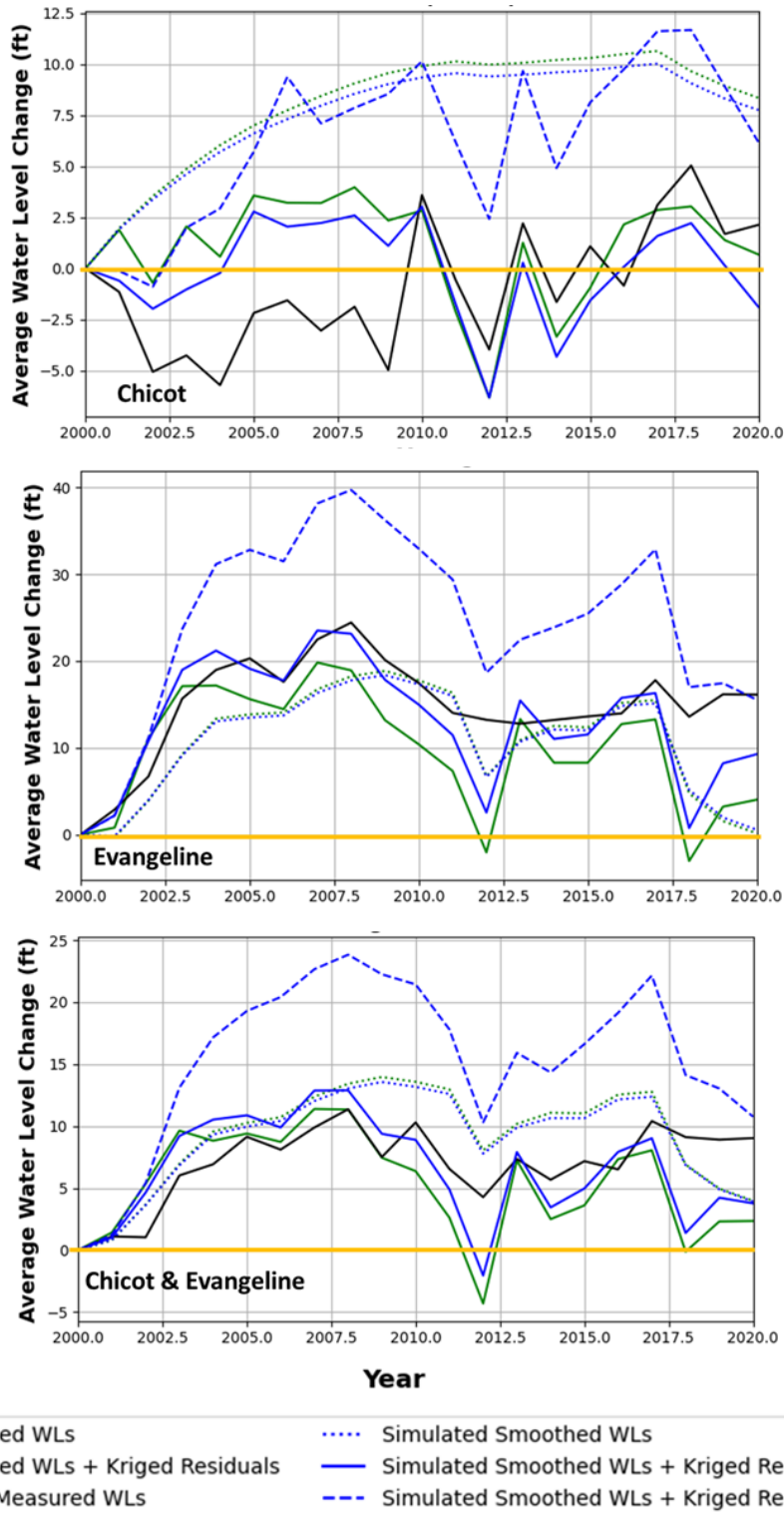


Figure D-9 Changes in the annual average water levels from five alternative methods and Simulated Smoothed WLS + Kriged residuals (SSWL+KR), which is considered to be Best Science Available for Victoria County

**APPENDIX E**  
**CHANGES IN WATER LEVEL ELEVATIONS IN THE CHICOT AQUIFER AND**  
**THE EVANGELINE AQUIFER ACROSS CALHOUN, JACKSON, REFUGIO,**  
**AND VICTORIA COUNTIES FROM 2000 TO 2020 IN 10-YEAR AND 5-YEAR**  
**INTERVALS**

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Changes in Water Level Elevations in the Chicot Aquifer and the Evangeline Aquifer across Calhoun, Jackson, Refugio, and Victoria Counties for the time periods in 10-year increments: 2000-2010 and 2010-2020, and 5-year increments: 2000-2005, 2005-2010, 2010-2015, and 2015 -2020

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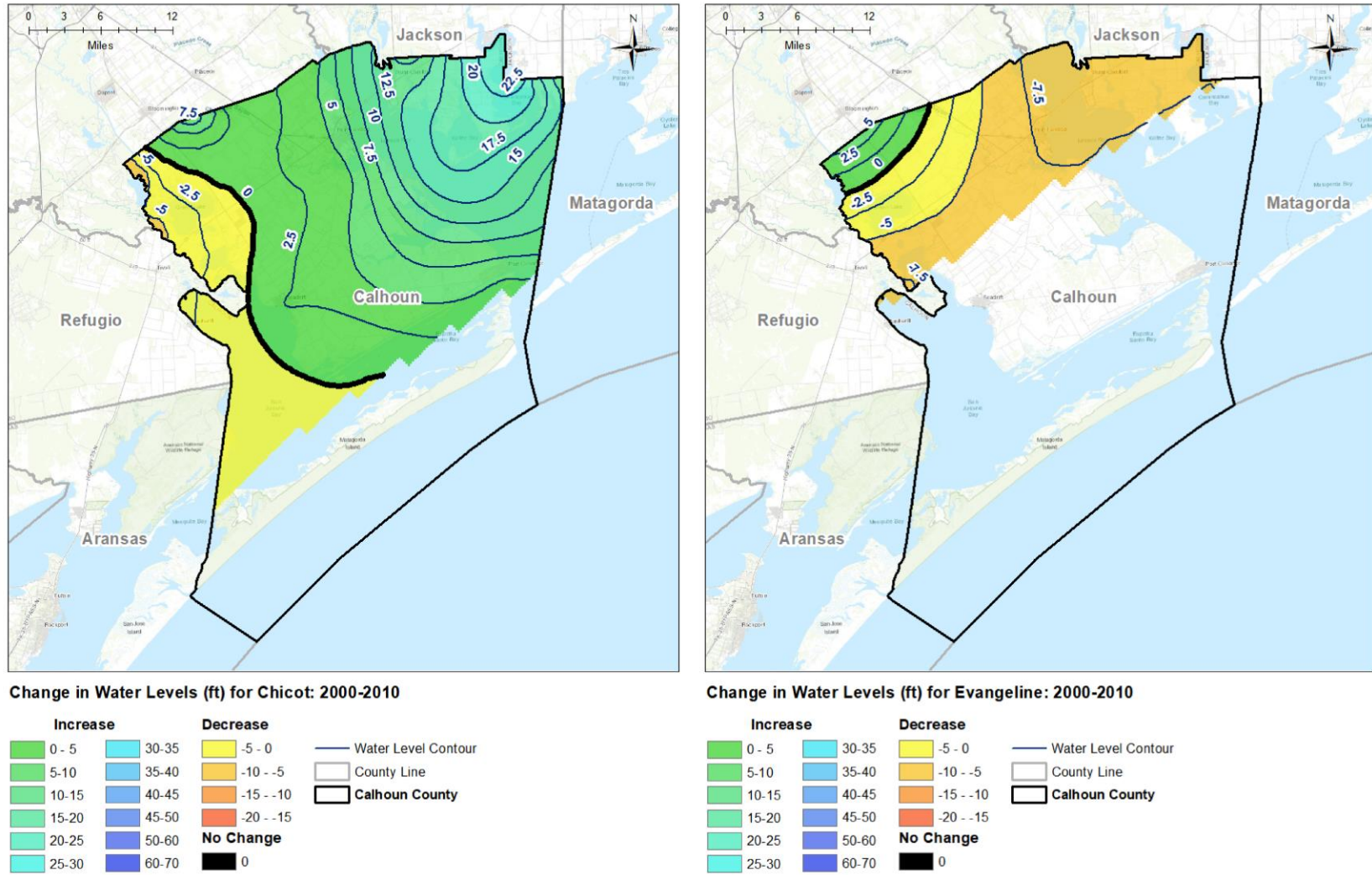


Figure E-1 Change in water level elevation in the Chicot and Evangeline aquifers across Calhoun County for 2000-2010

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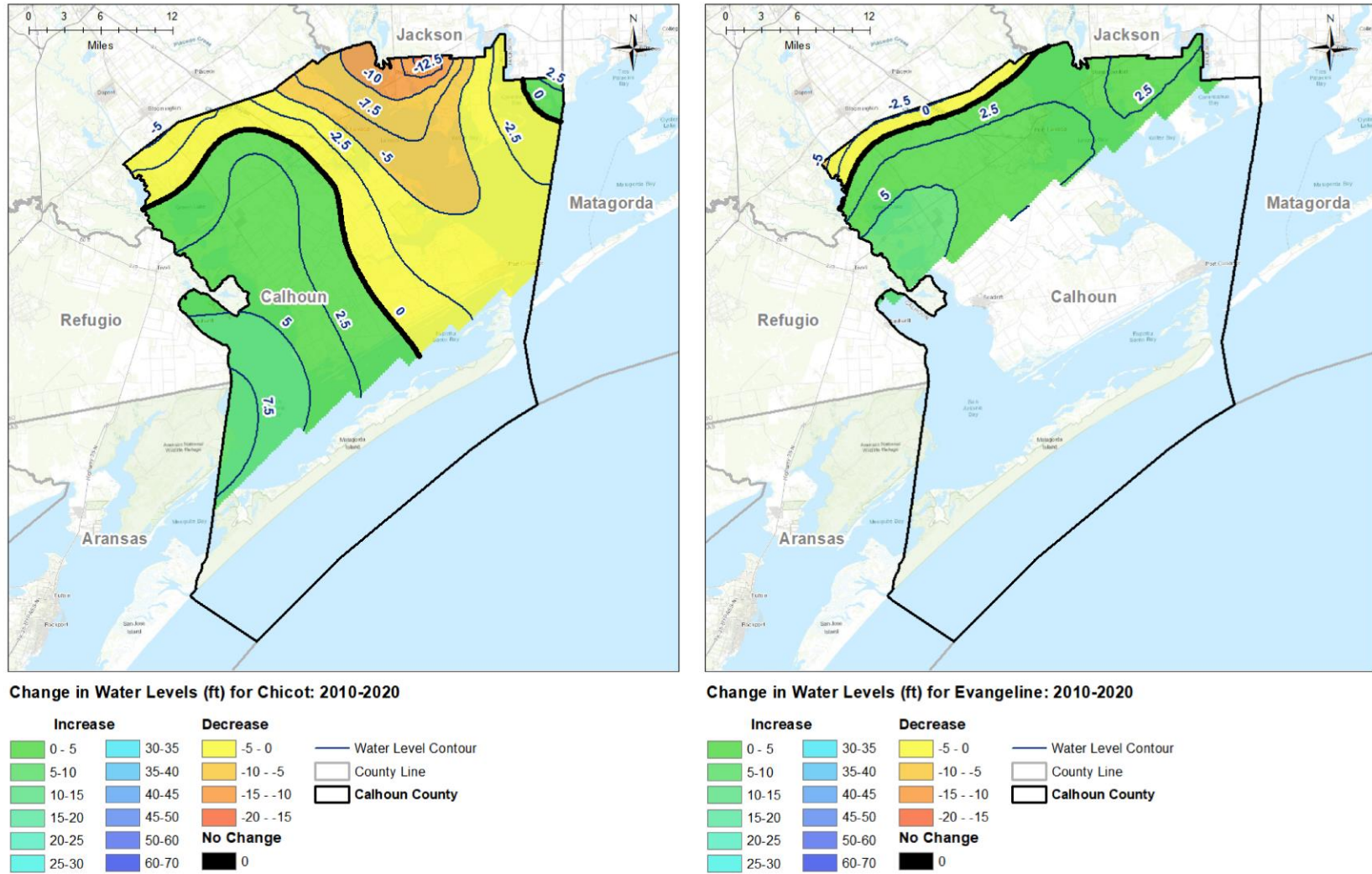


Figure E-2 Change in water level elevation in the Chicot and Evangeline aquifers across Calhoun County for 2010-2020

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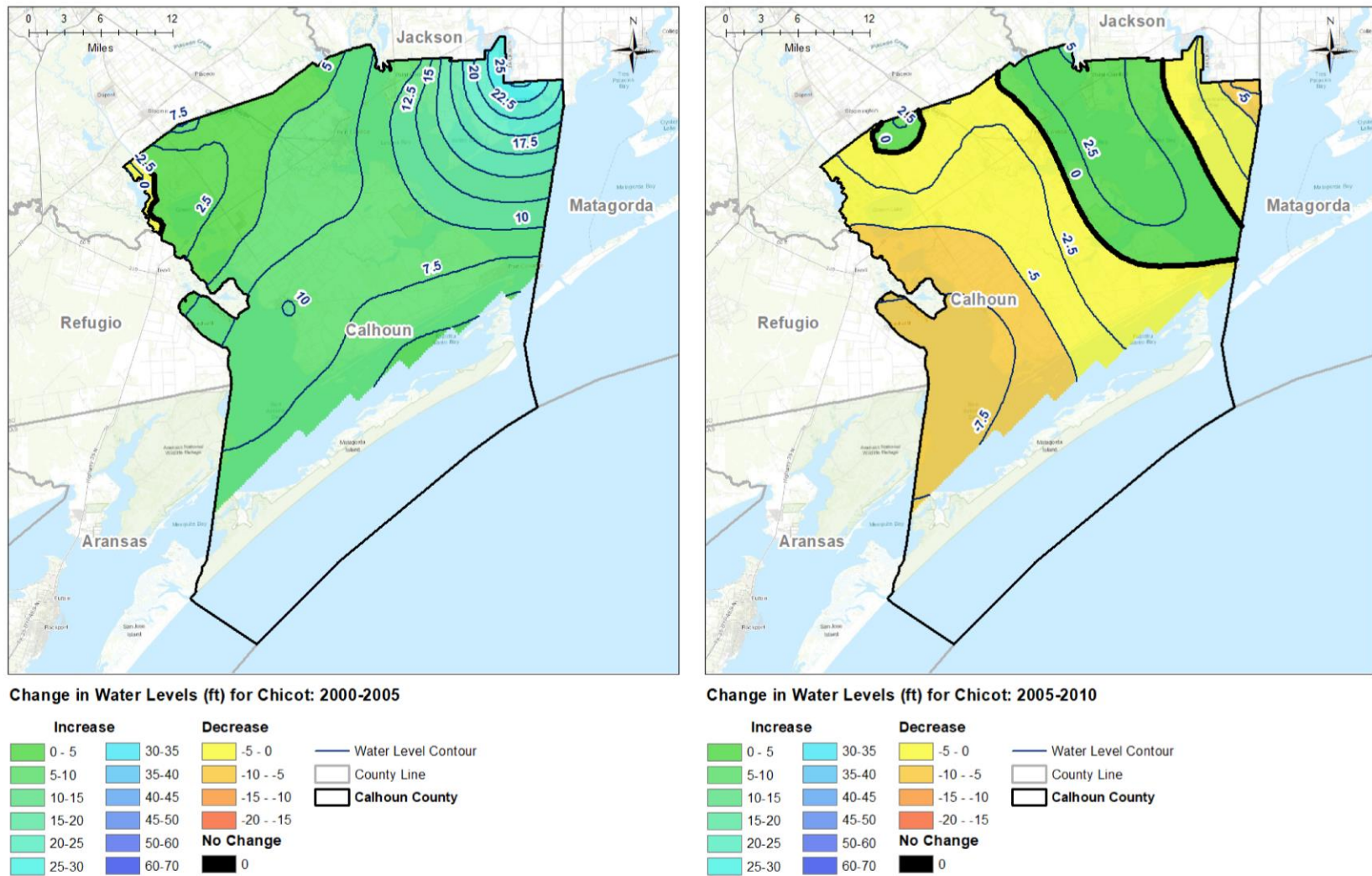


Figure E-3 Change in water level elevation in the Chicot Aquifer across Calhoun County for 2000-2005 and for 2005-2010

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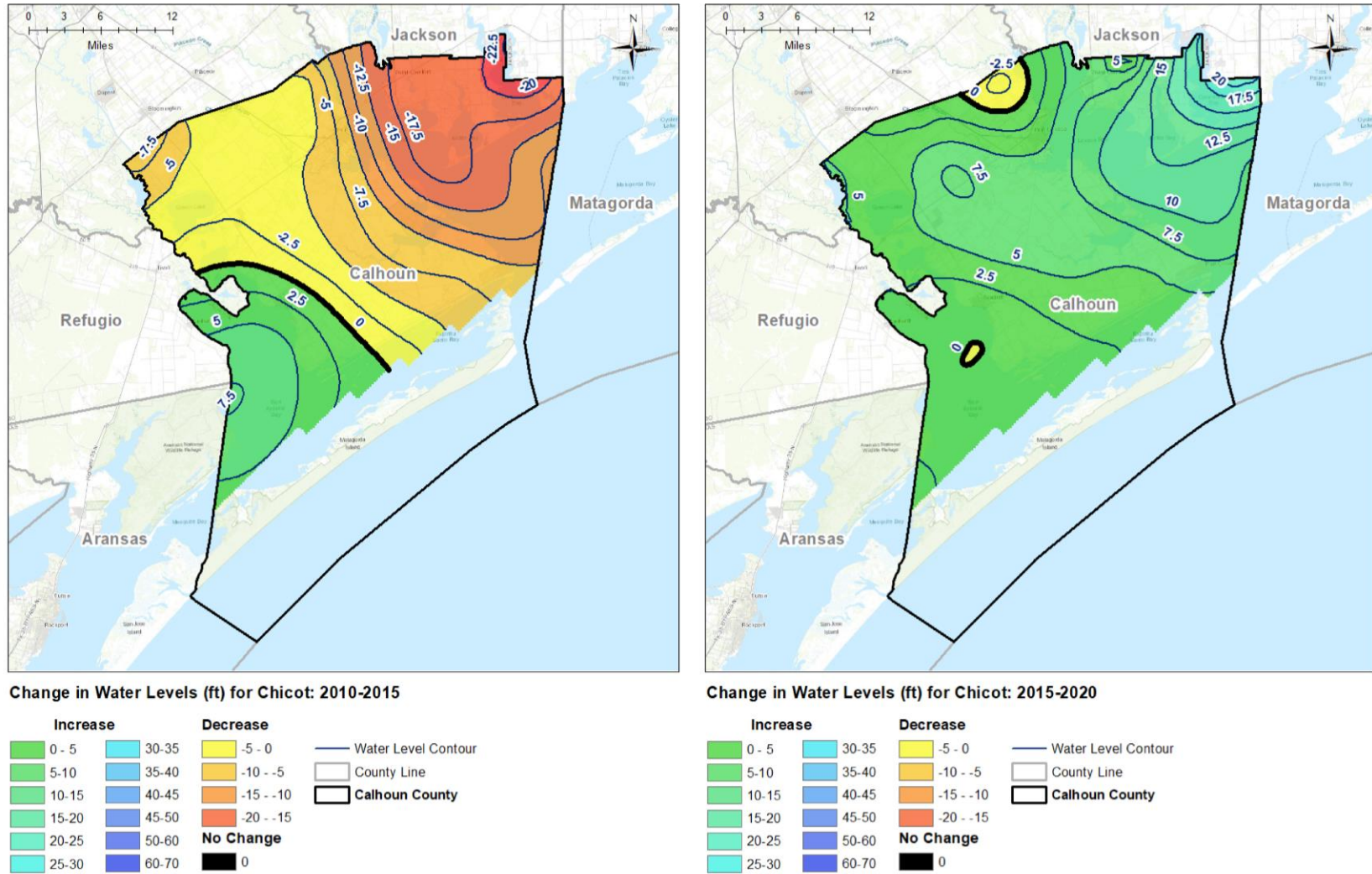


Figure E-4 Change in water level elevation in the Chicot Aquifer across Calhoun County for 2010-2015 and for 2015-2020

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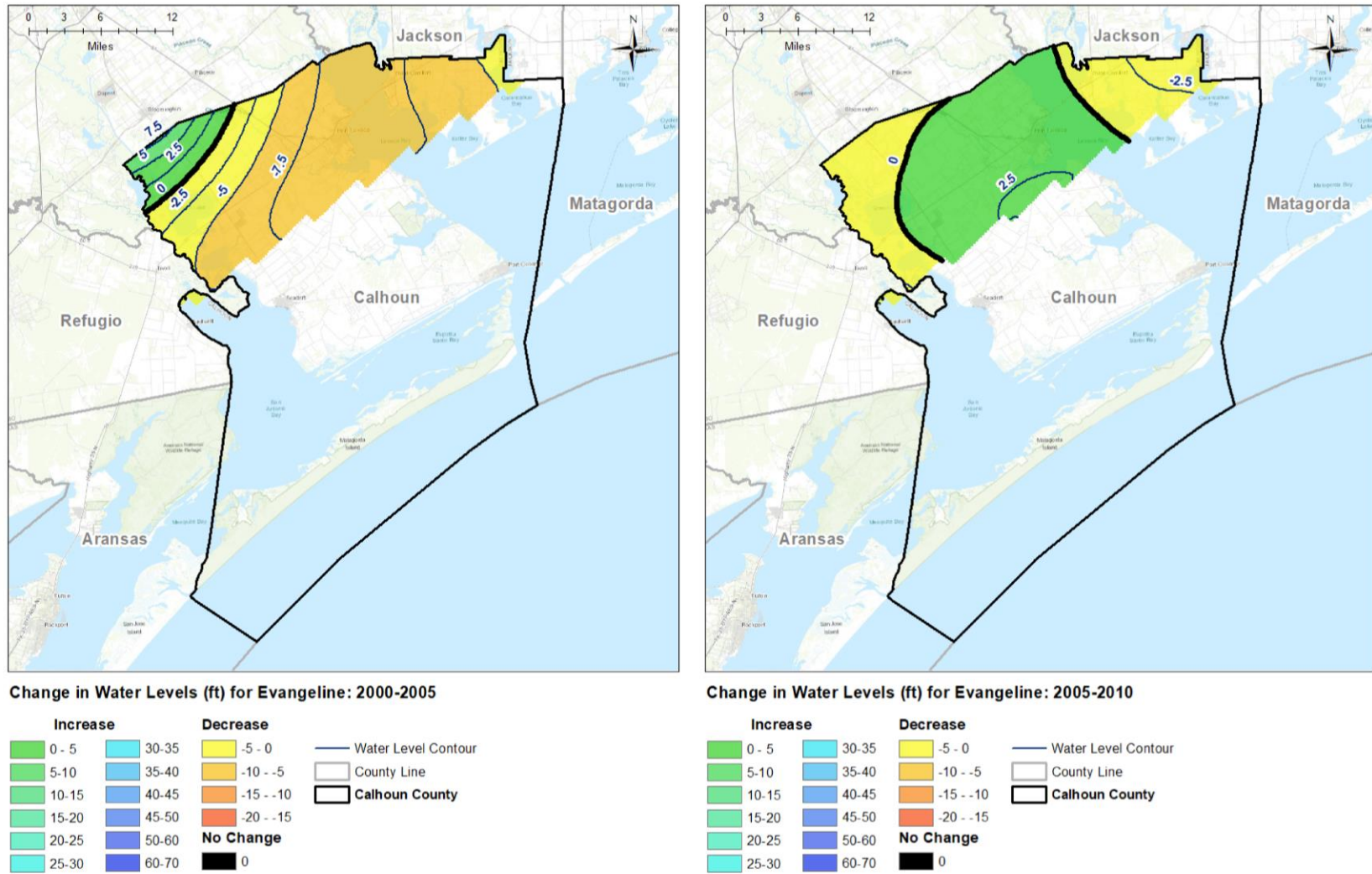


Figure E-5 Change in water level elevation in the Evangeline Aquifer across Calhoun County for 2000-2005 and for 2005-2010



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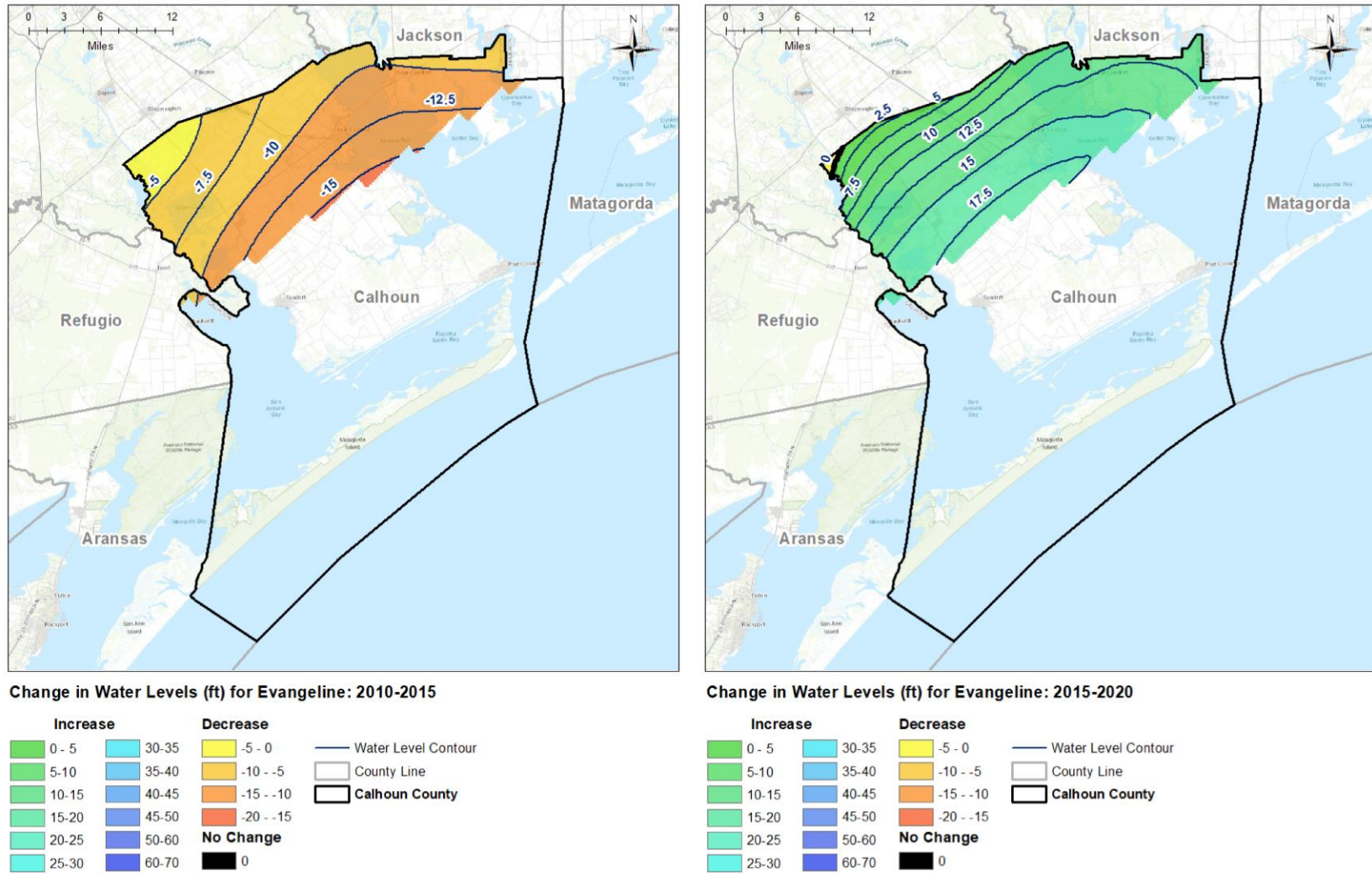


Figure E-6 Change in water level elevation in the Evangeline Aquifer across Calhoun County for 2010-2015 and for 2015-2020

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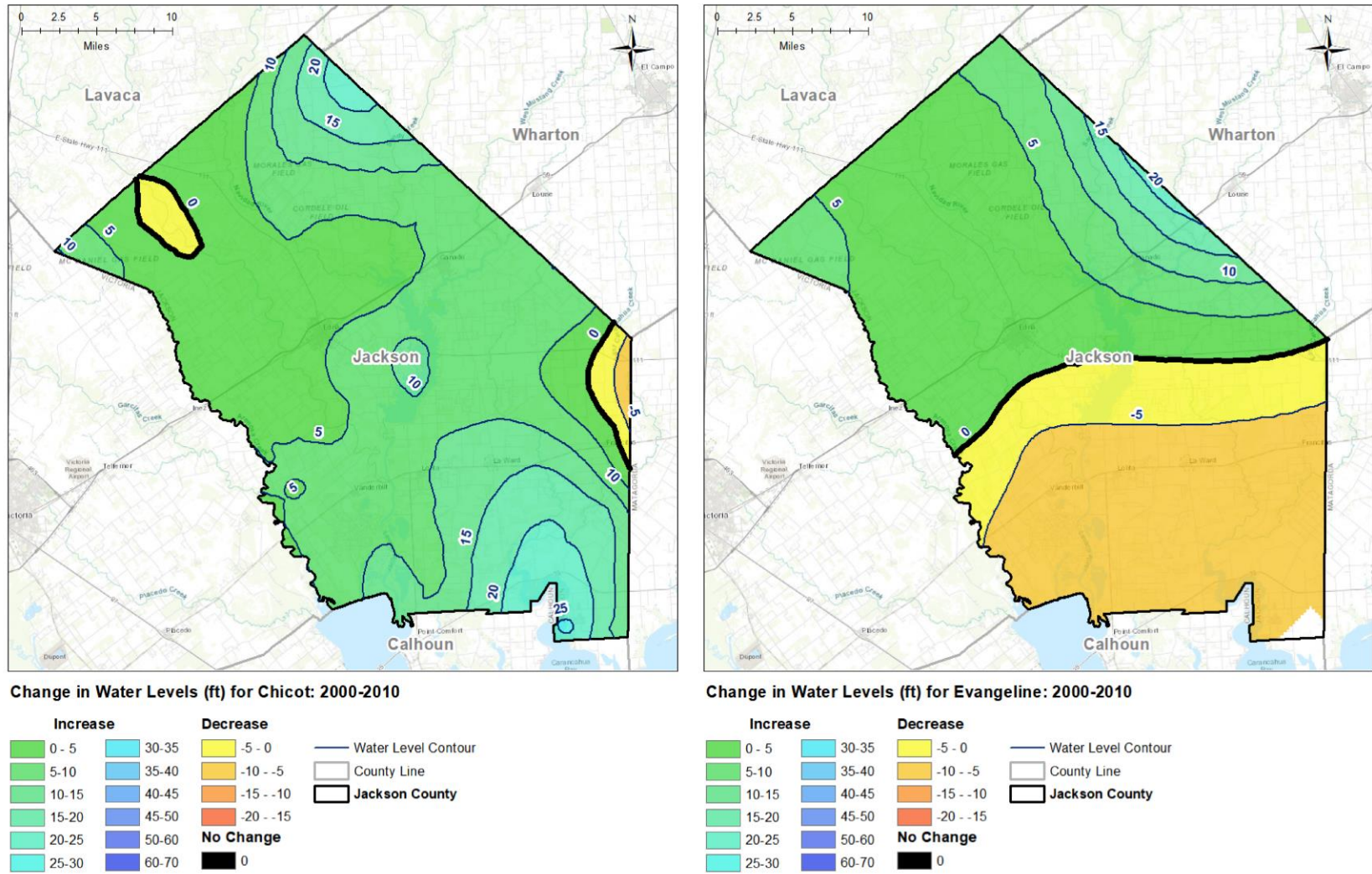


Figure E-7 Change in water level elevation in the Chicot and Evangeline aquifers across Jackson County for 2000-2010

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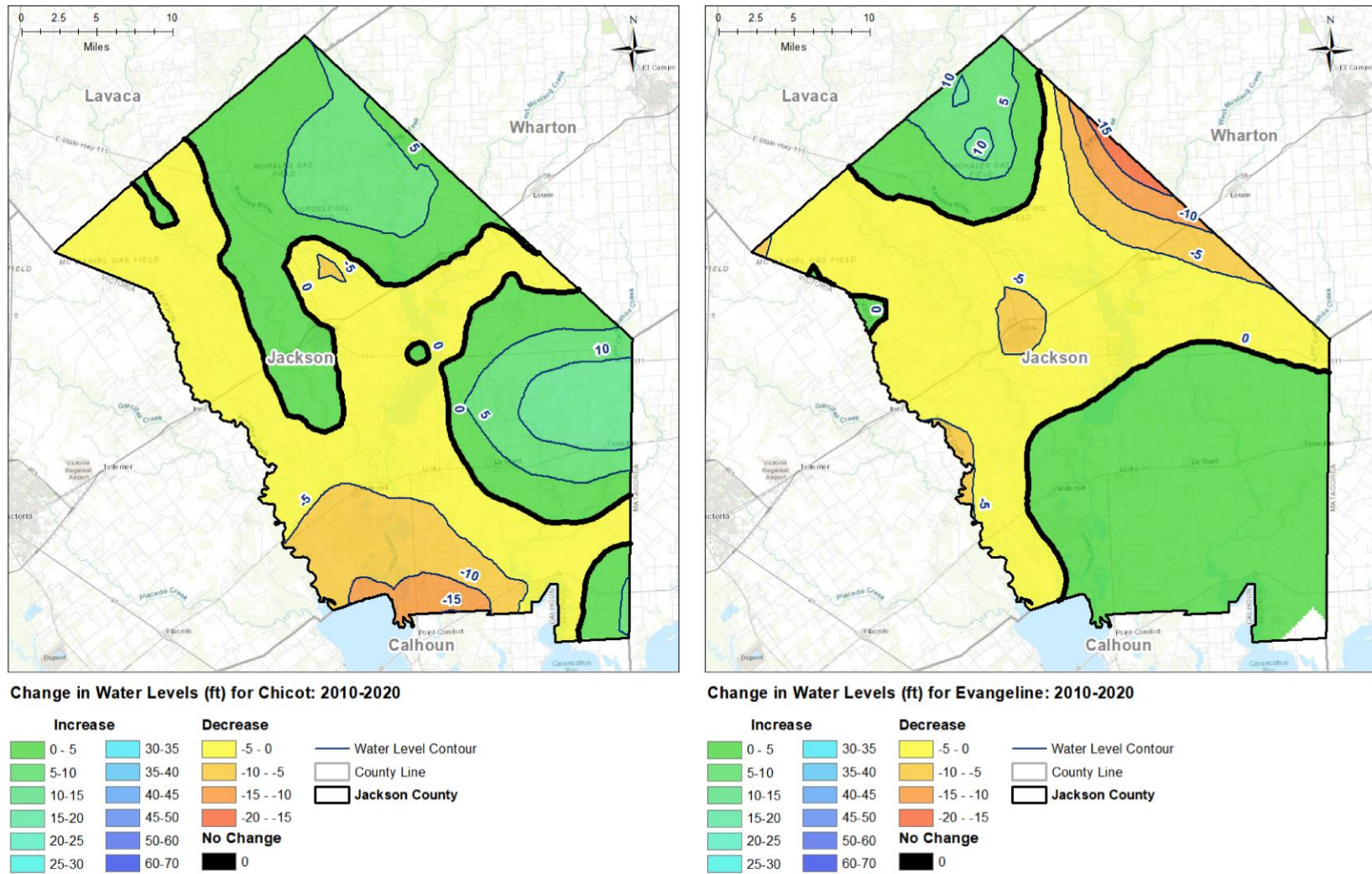


Figure E-8 Change in water level elevation in the Chicot and Evangeline aquifers across Jackson County for 2010-2020

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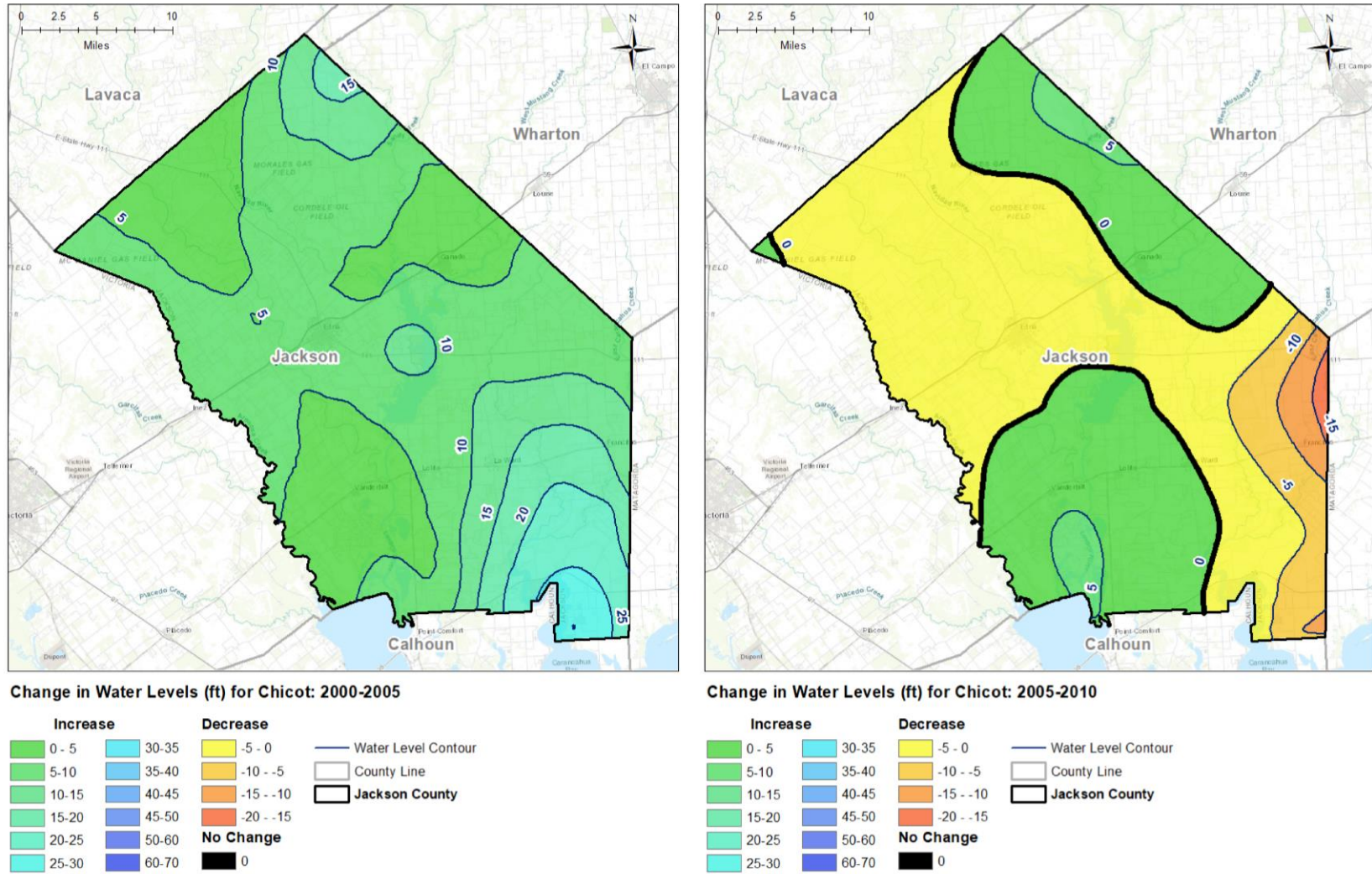


Figure E-9 Change in water level elevation in the Chicot Aquifer across Jackson County for 2000-2005 and for 2005-2010

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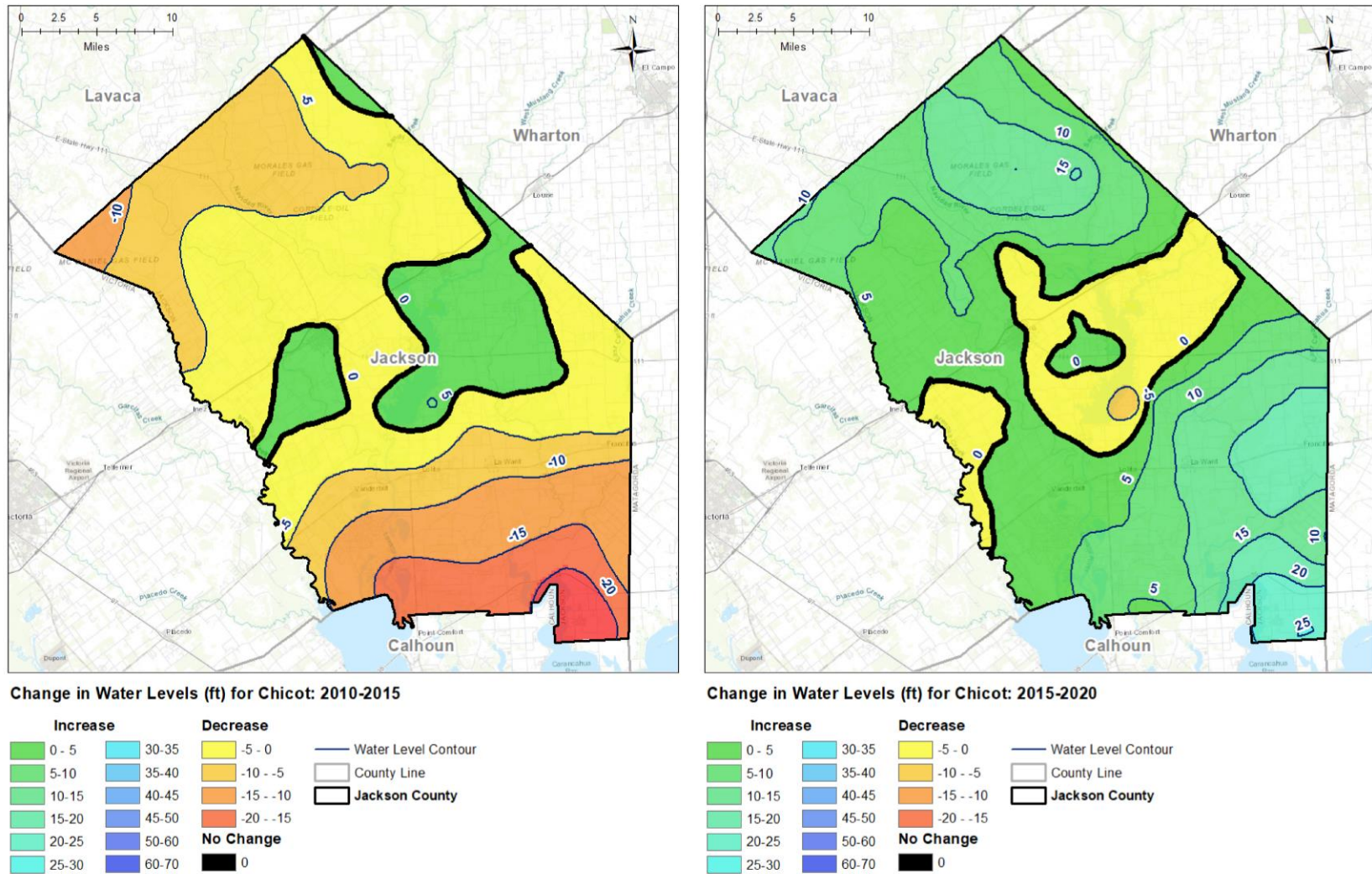


Figure E-10 Change in water level elevation in the Chicot Aquifer across Jackson County for 2010-2015 and for 2015-2020

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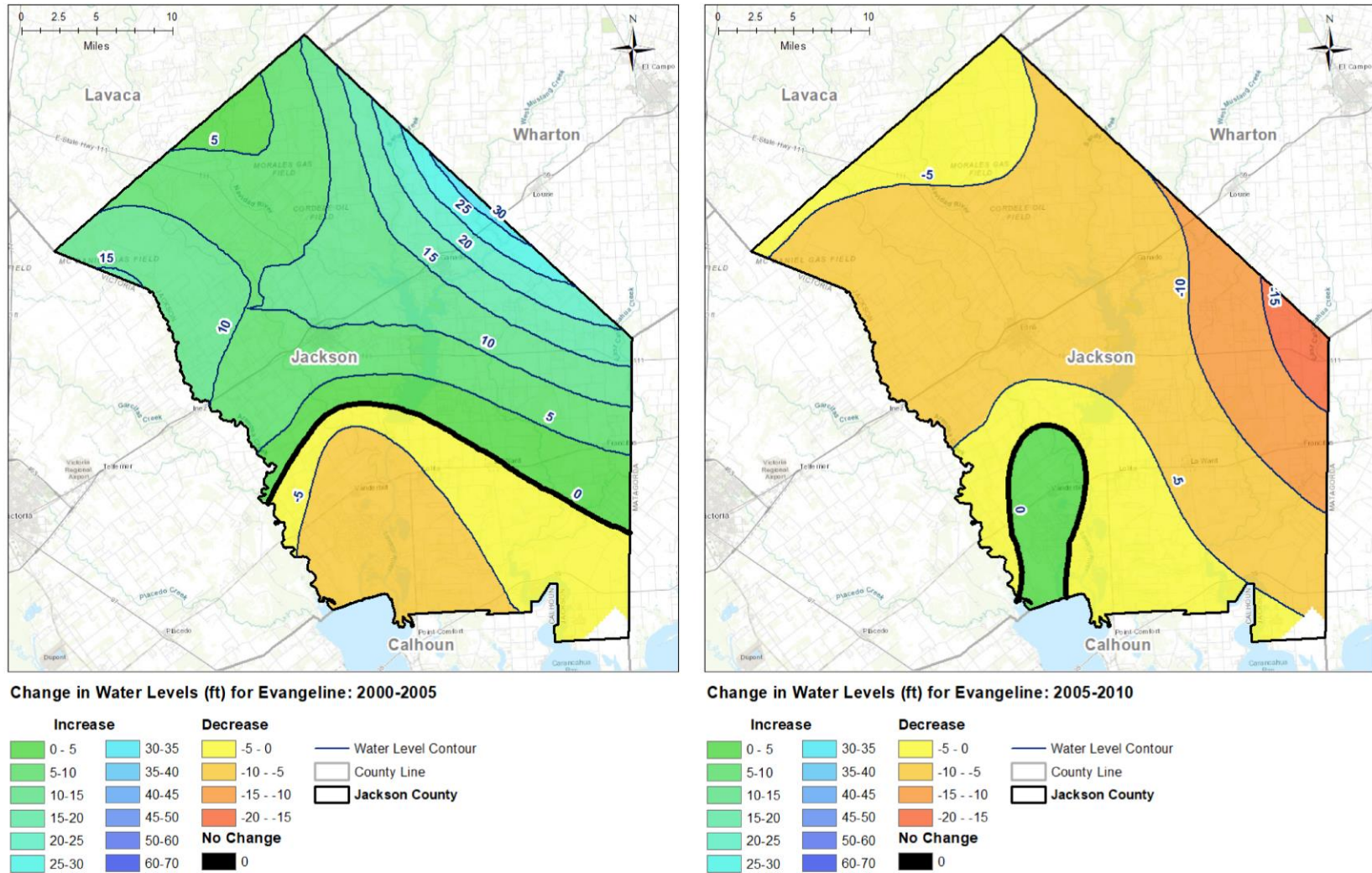


Figure E-11 Change in water level elevation in the Evangeline Aquifer across Jackson County for 2000-2005 and for 2005-2010

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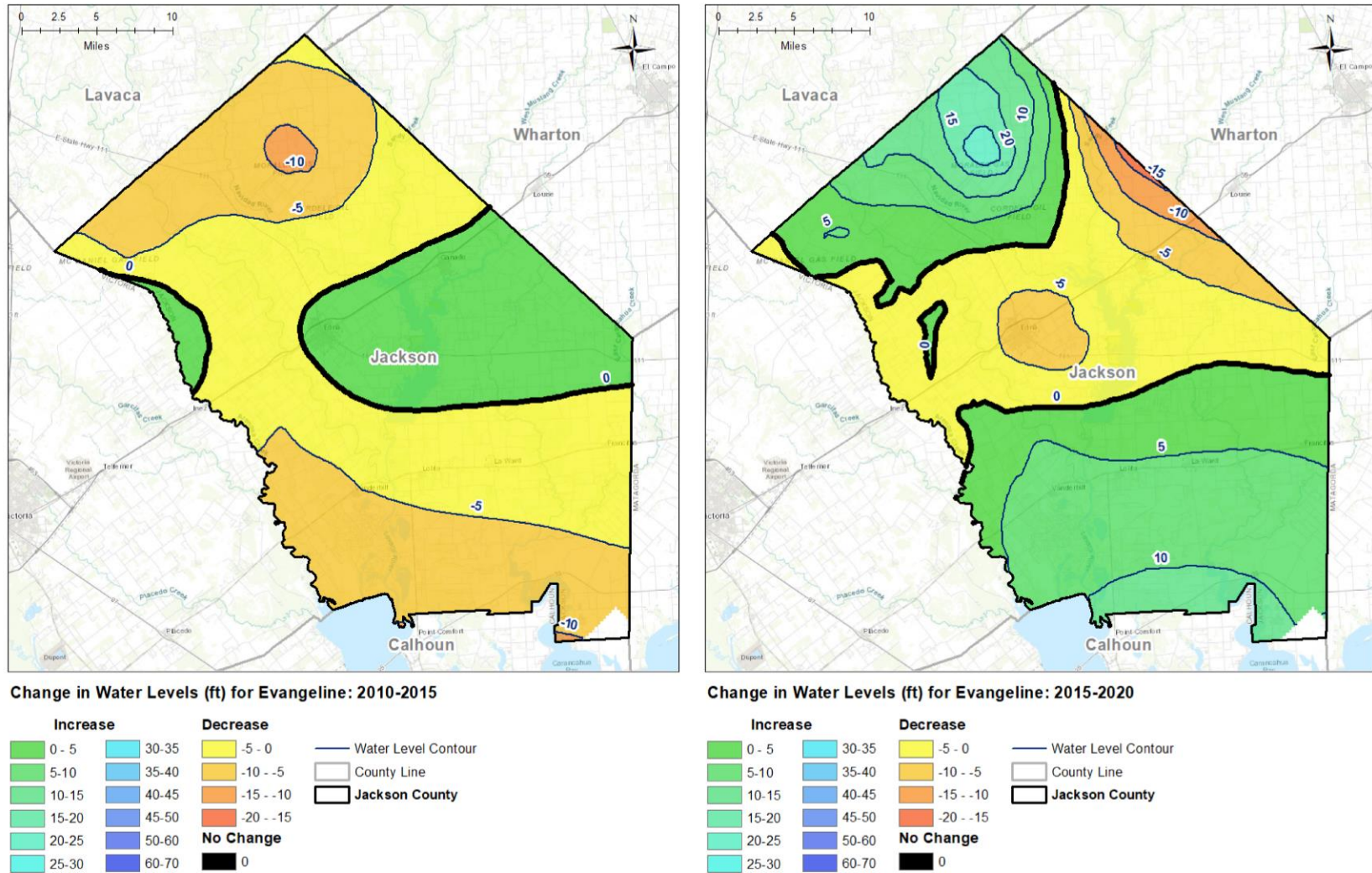


Figure E-12 Change in water level elevation in the Evangeline Aquifer across Jackson County for 2010-2015 and for 2015-2020

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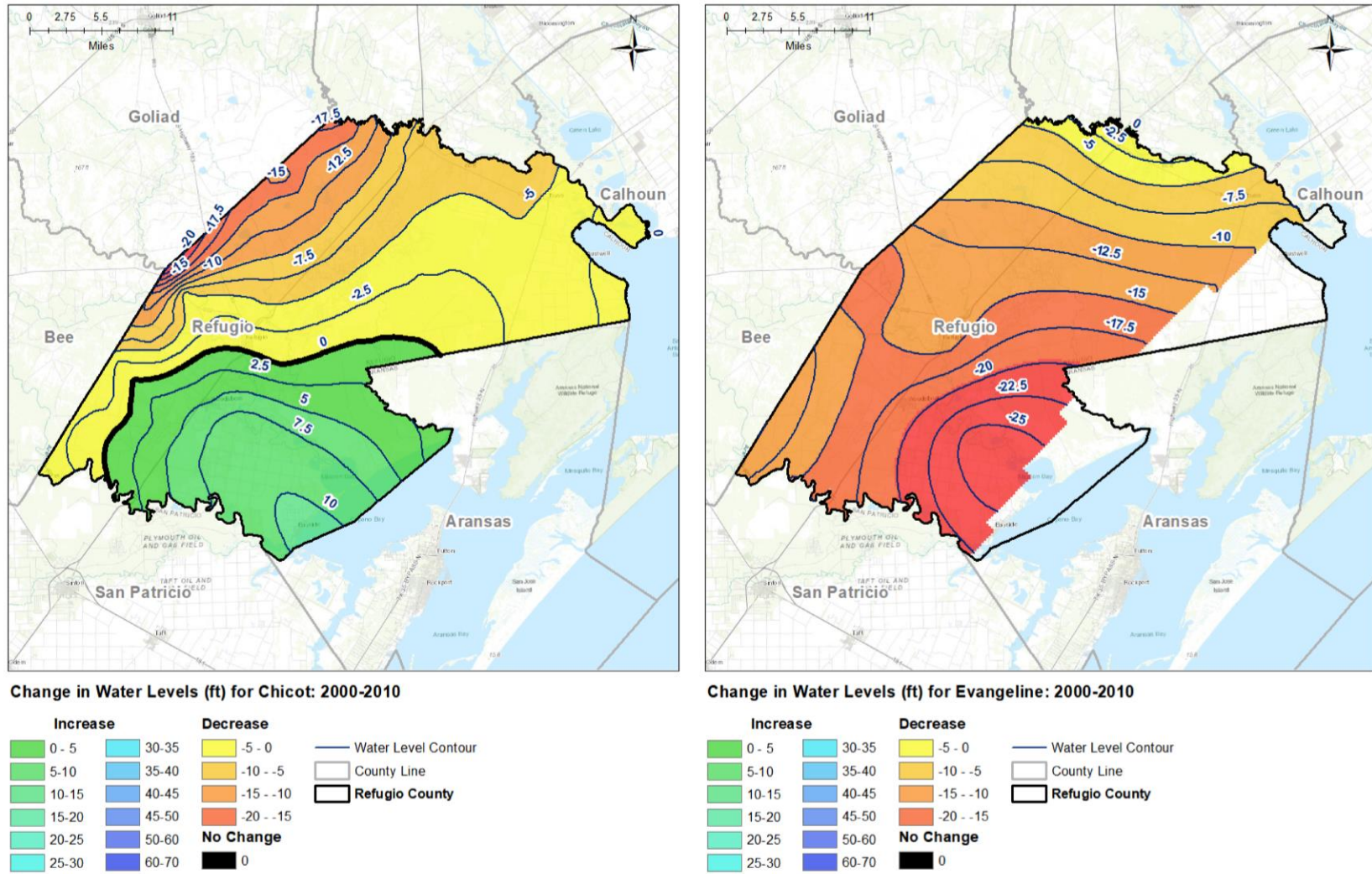


Figure E-13 Change in water level elevation in the Chicot and Evangeline aquifers across Refugio County for 2000-2010



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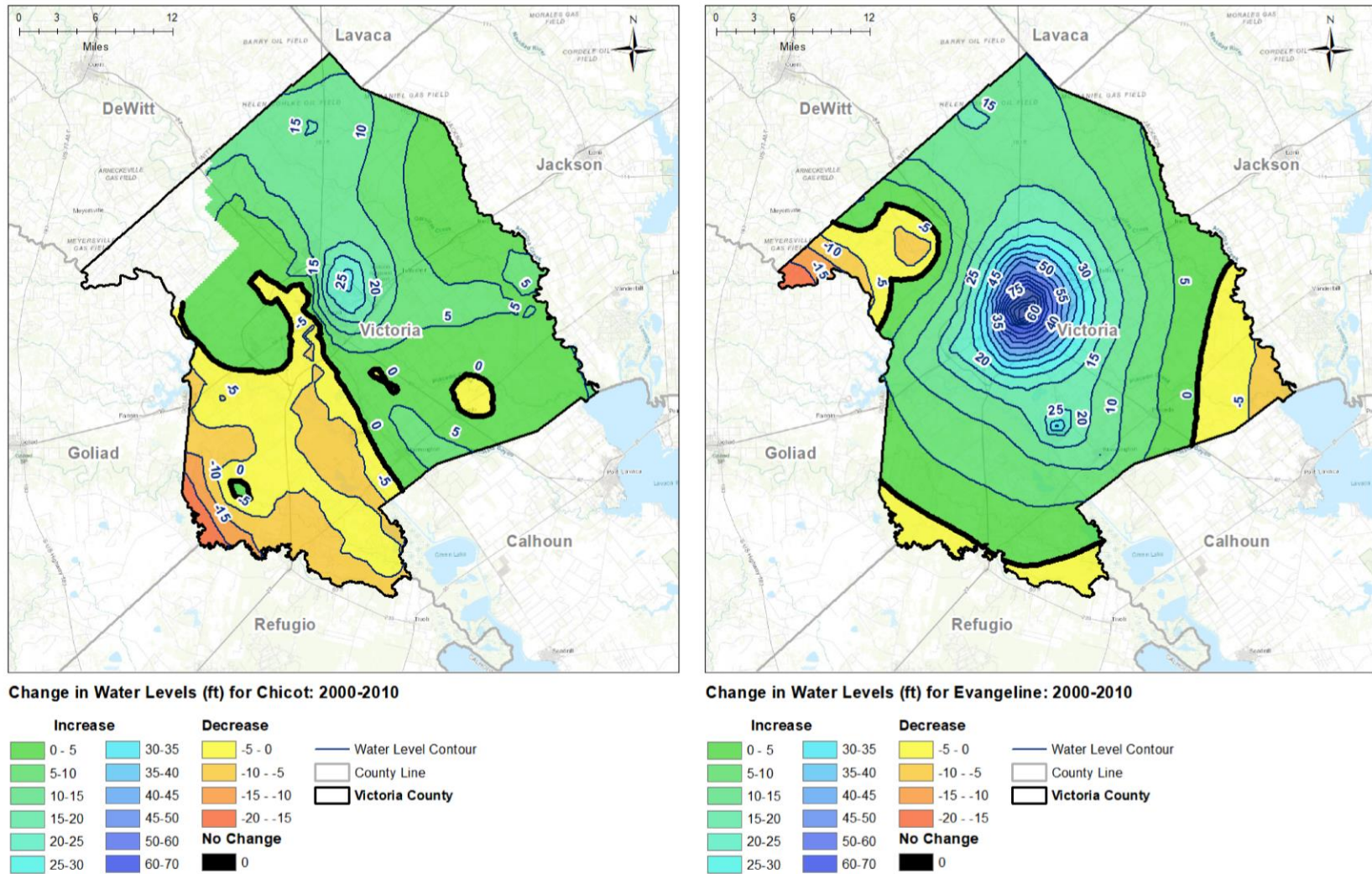


Figure E-14 Change in water level elevation in the Chicot and Evangeline aquifers across Refugio County for 2010-2020

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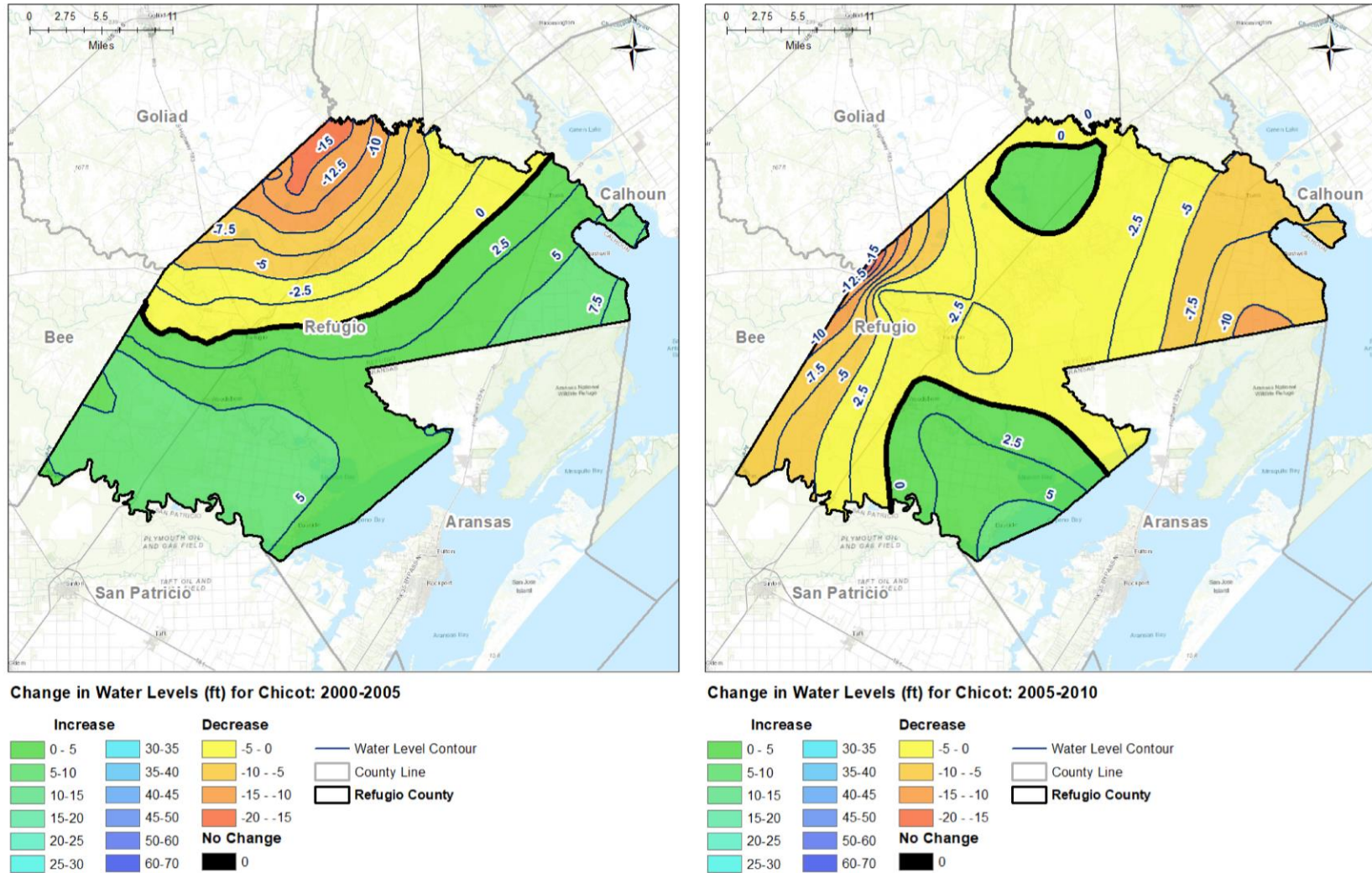


Figure E-15 Change in water level elevation in the Chicot Aquifer across Refugio County for 2000-2005 and for 2005-2010

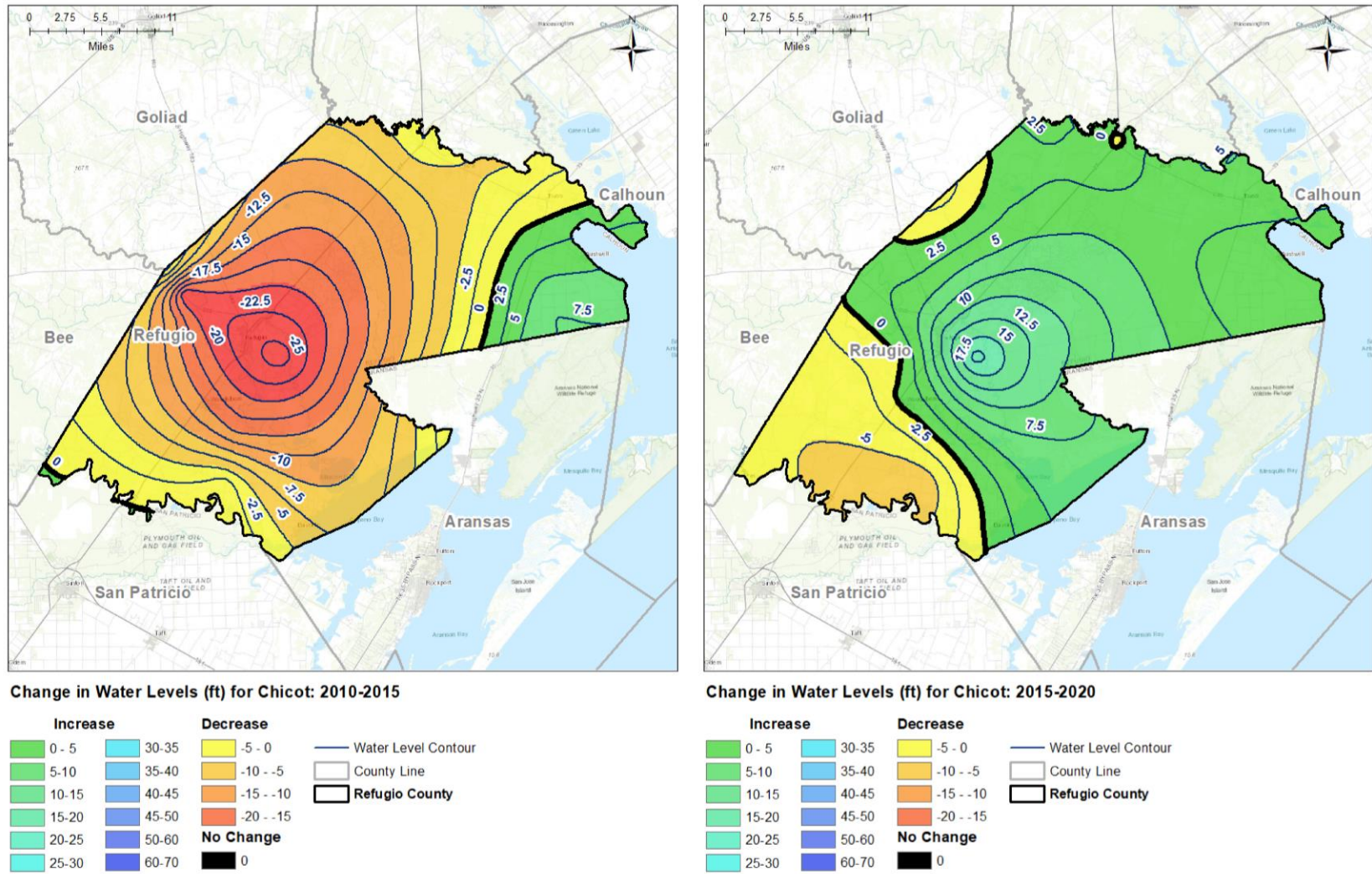


Figure E-16 Change in water level elevation in the Chicot Aquifer across Refugio County for 2010-2015 and for 2015-2020

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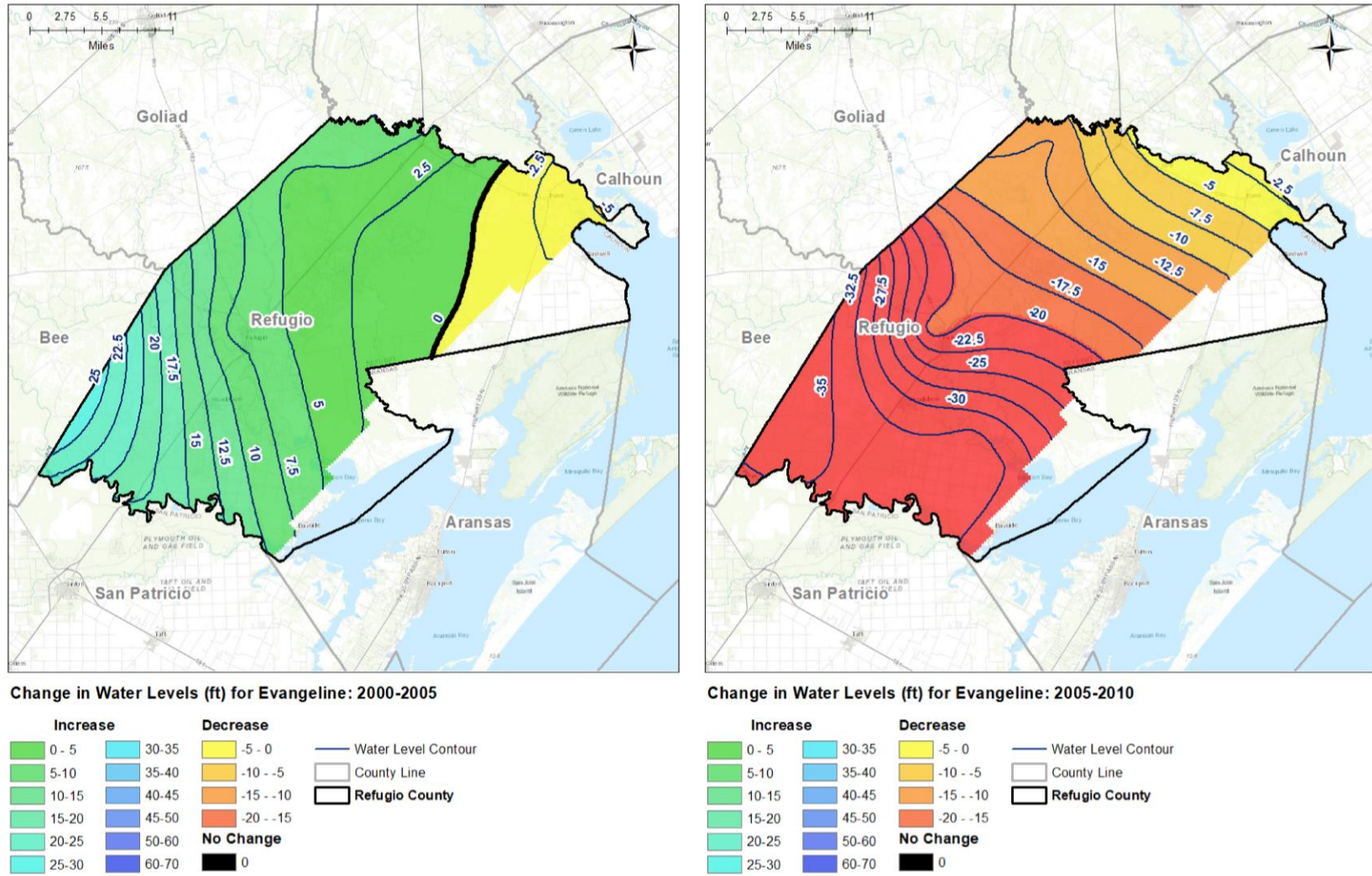


Figure E-17 Change in water level elevation in the Evangeline Aquifer across Refugio County for 2000-2005 and for 2005-2010

Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

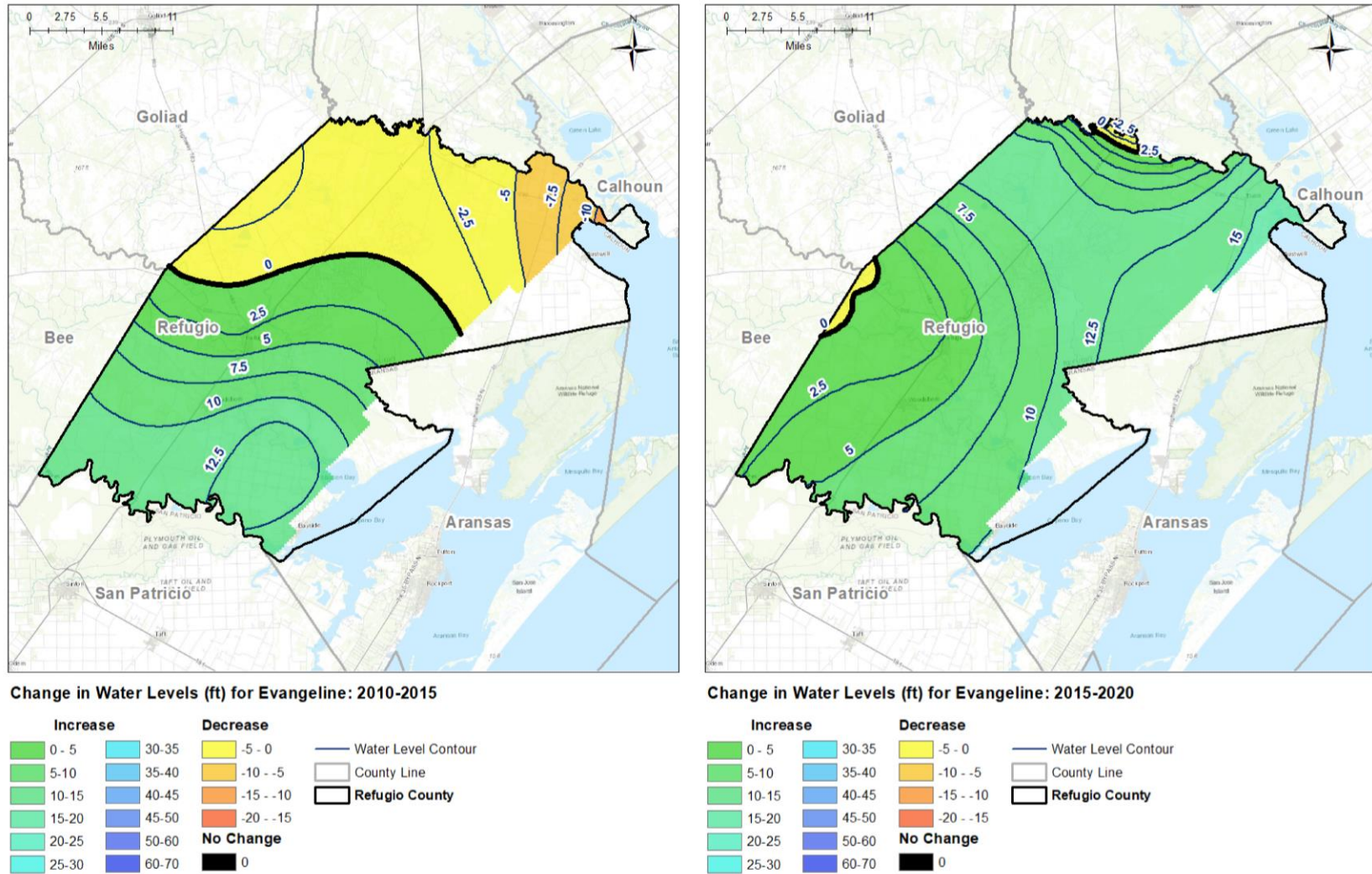


Figure E-18 Change in water level elevation in the Evangeline Aquifer across Refugio County for 2010-2015 and for 2015-2020

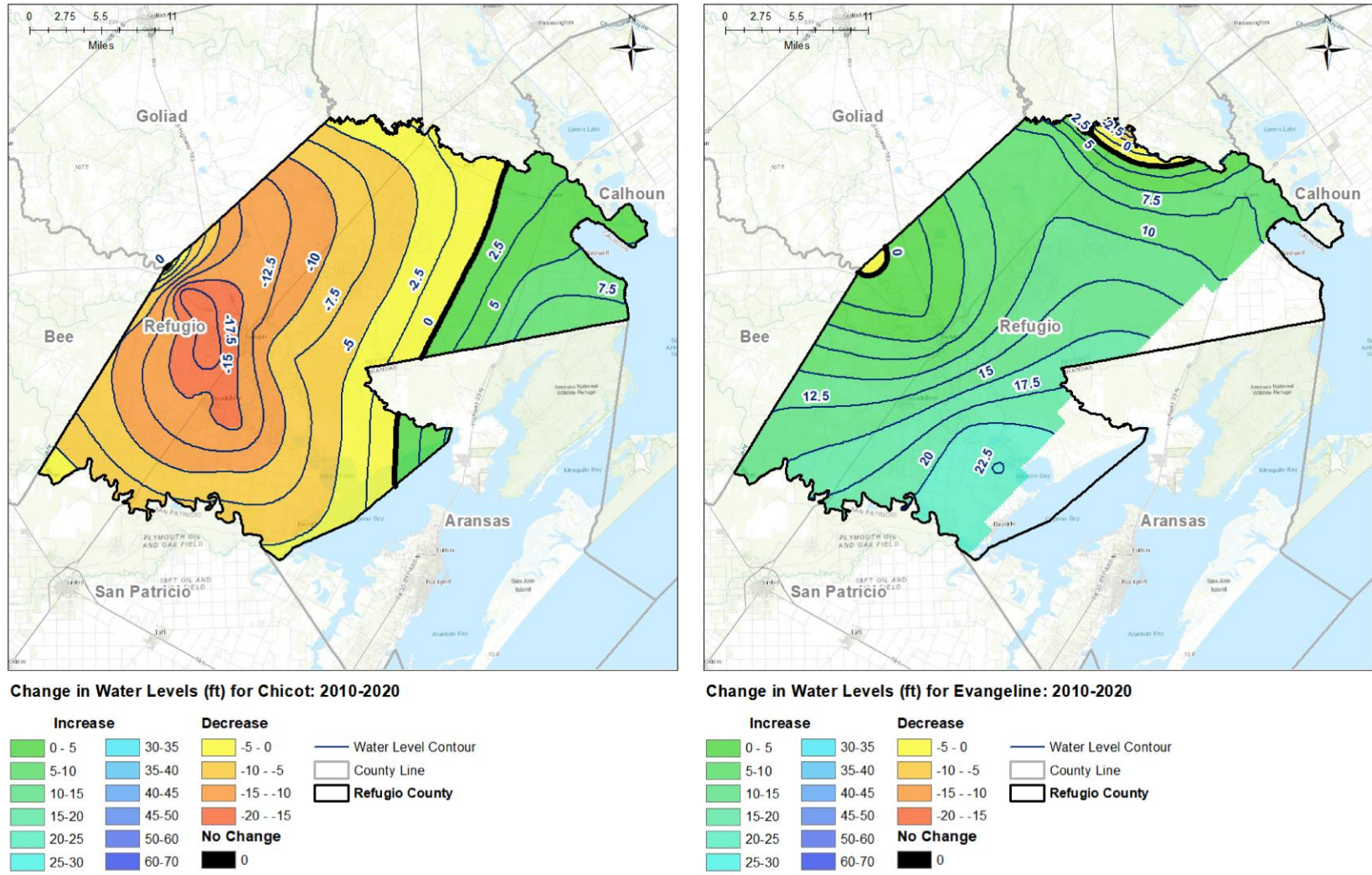


Figure E-19 Change in water level elevation in the Chicot and Evangeline aquifers across Victoria County for 2000-2010

Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

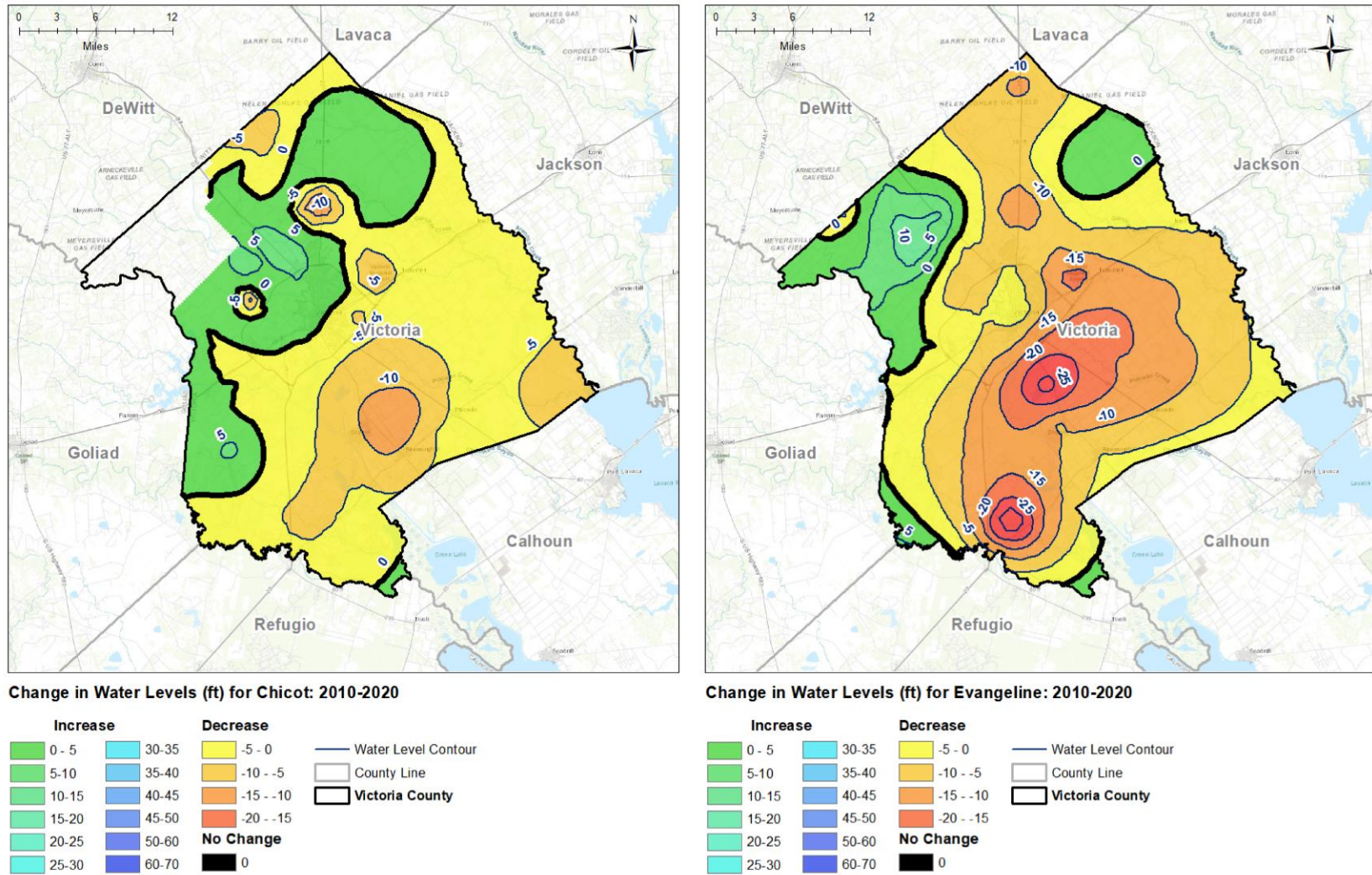


Figure E-20 Change in water level elevation in the Chicot and Evangeline aquifers across Victoria County for 2010-2020

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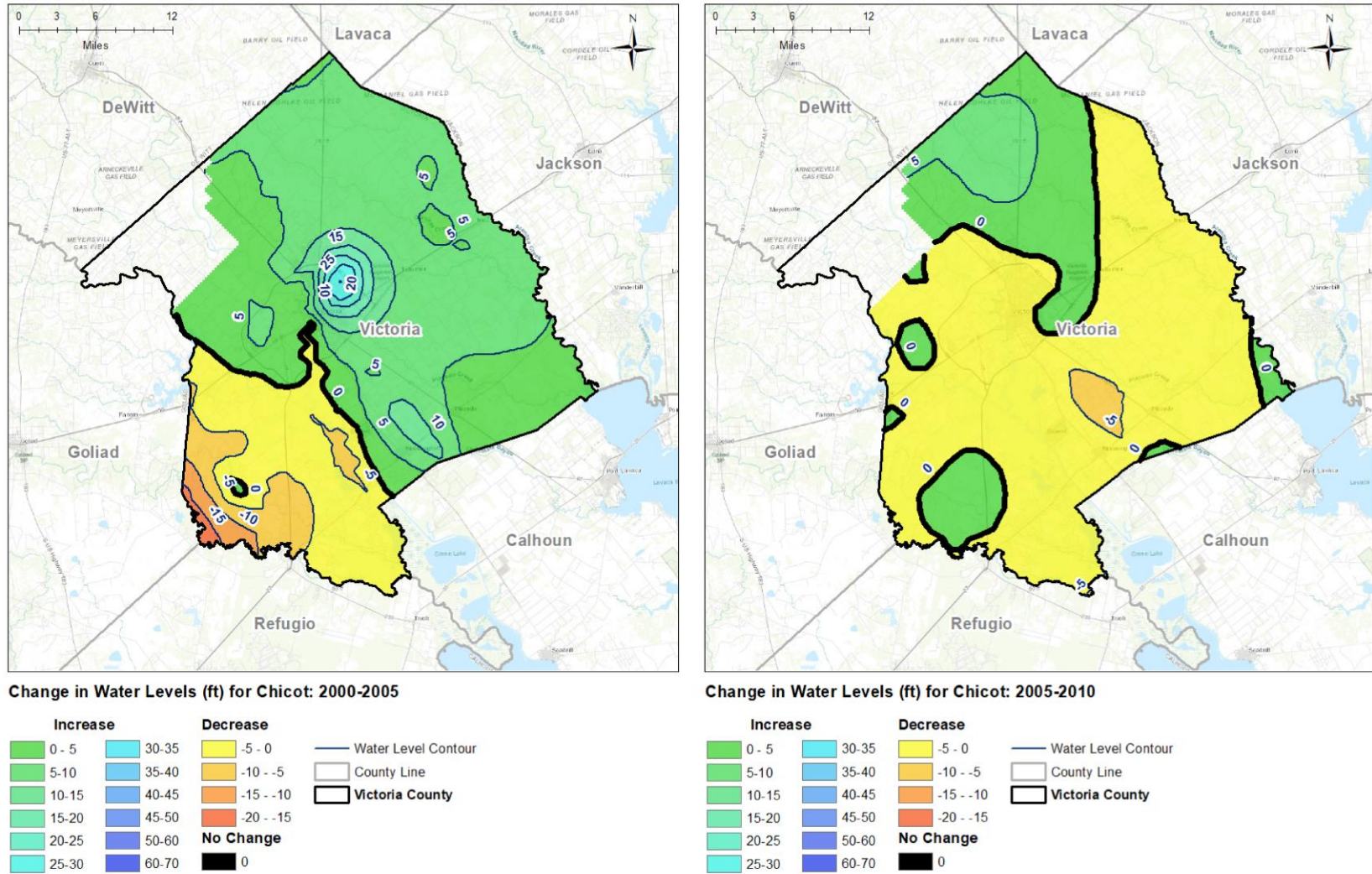


Figure E-21 Change in water level elevation in the Chicot Aquifer across Victoria County for 2000-2005 and for 2005-2010



Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

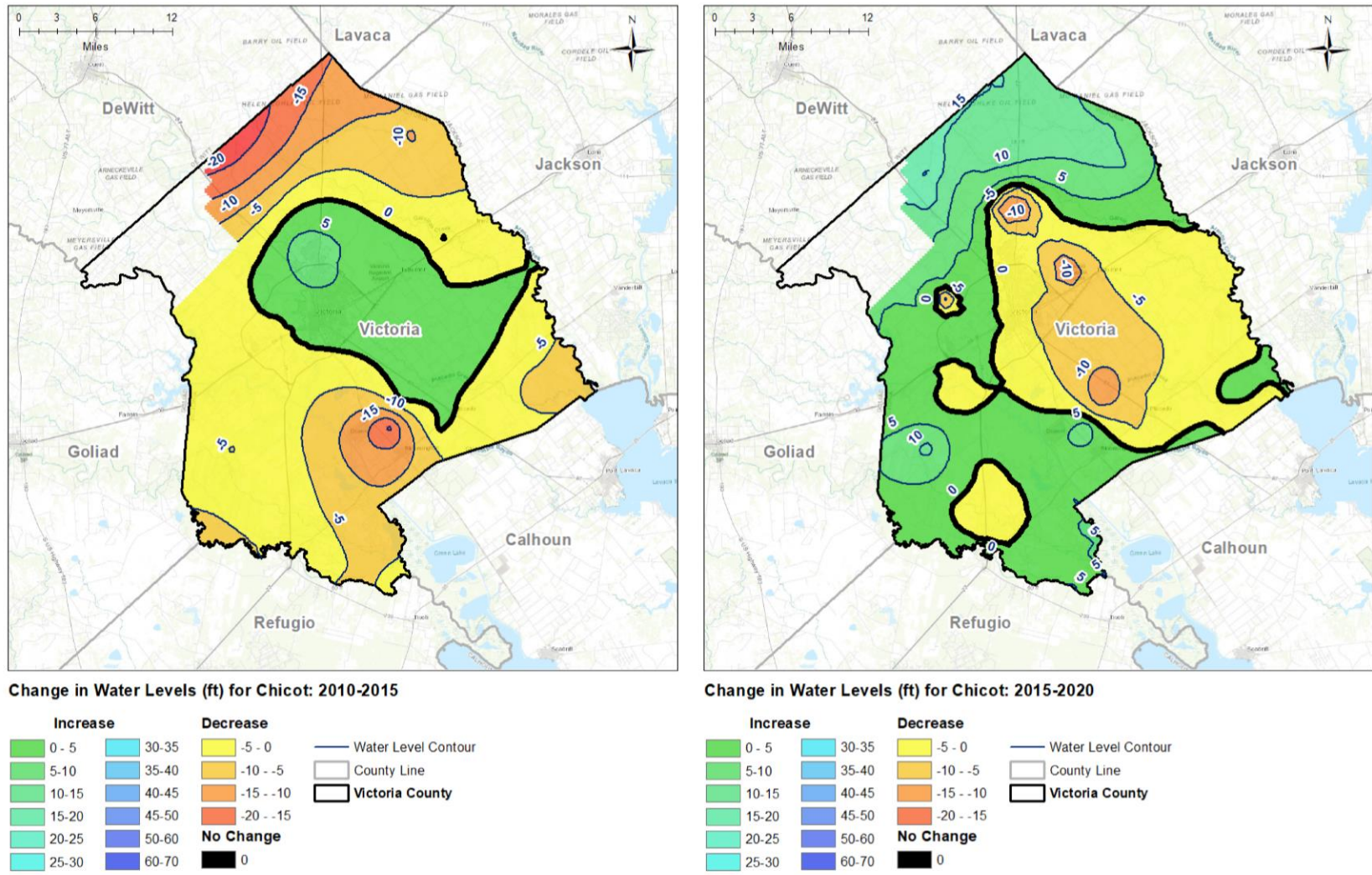


Figure E-22 Change in water level elevation in the Chicot Aquifer across Victoria County for 2010-2015 and for 2015-2020

Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

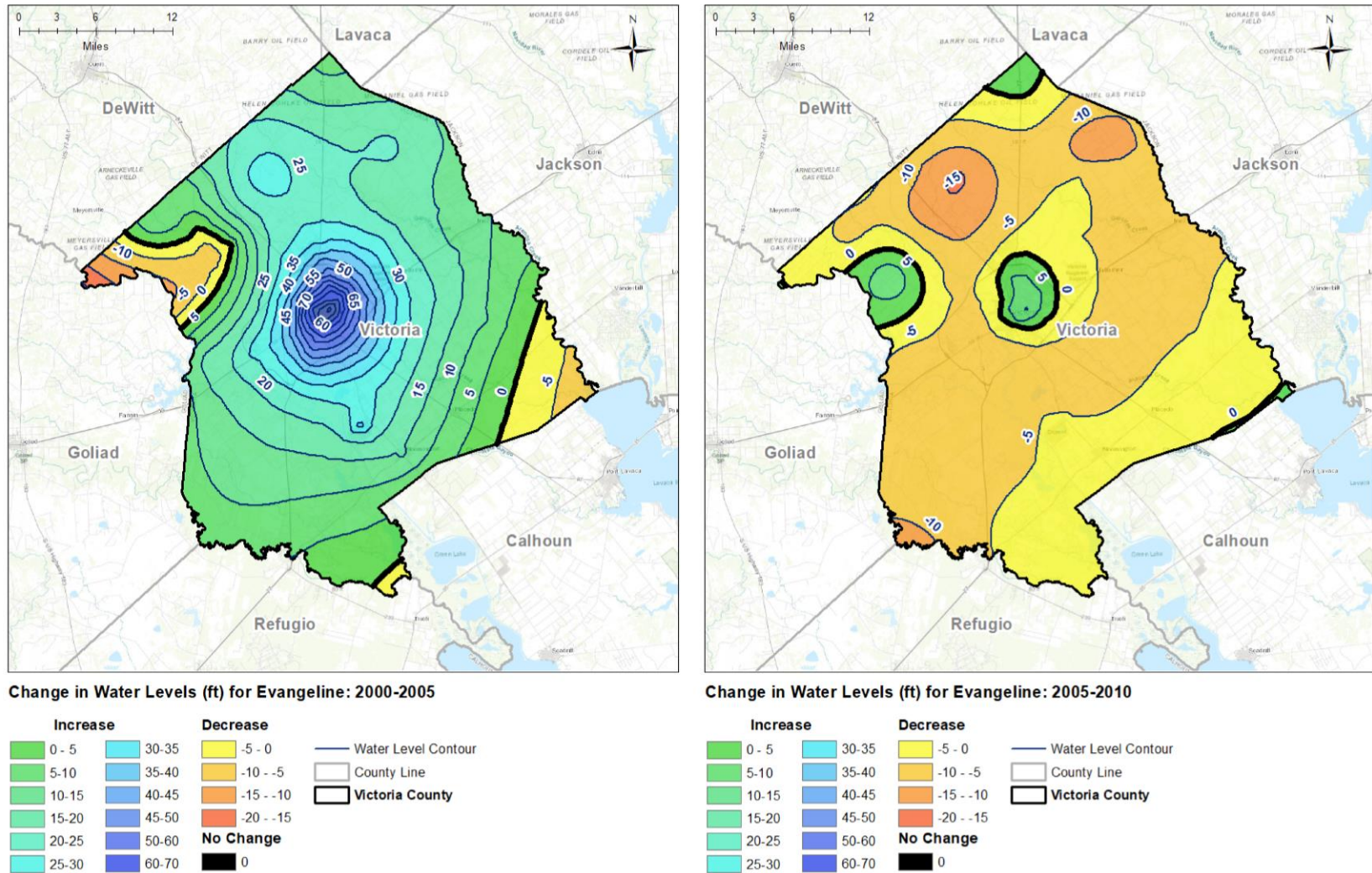


Figure E-23 Change in water level elevation in the Evangeline Aquifer across Victoria County for 2000-2005 and for 2005-2010

Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

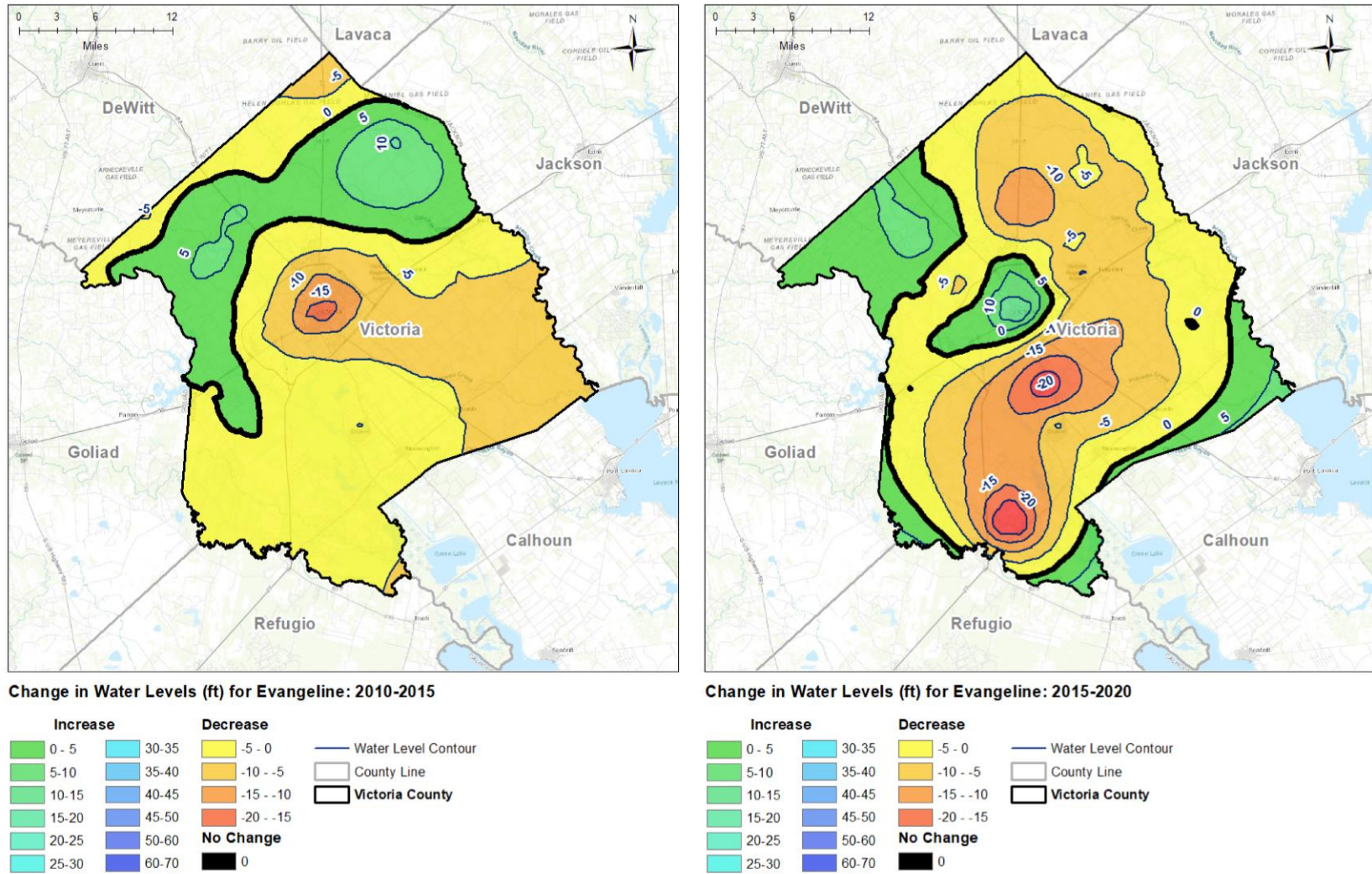
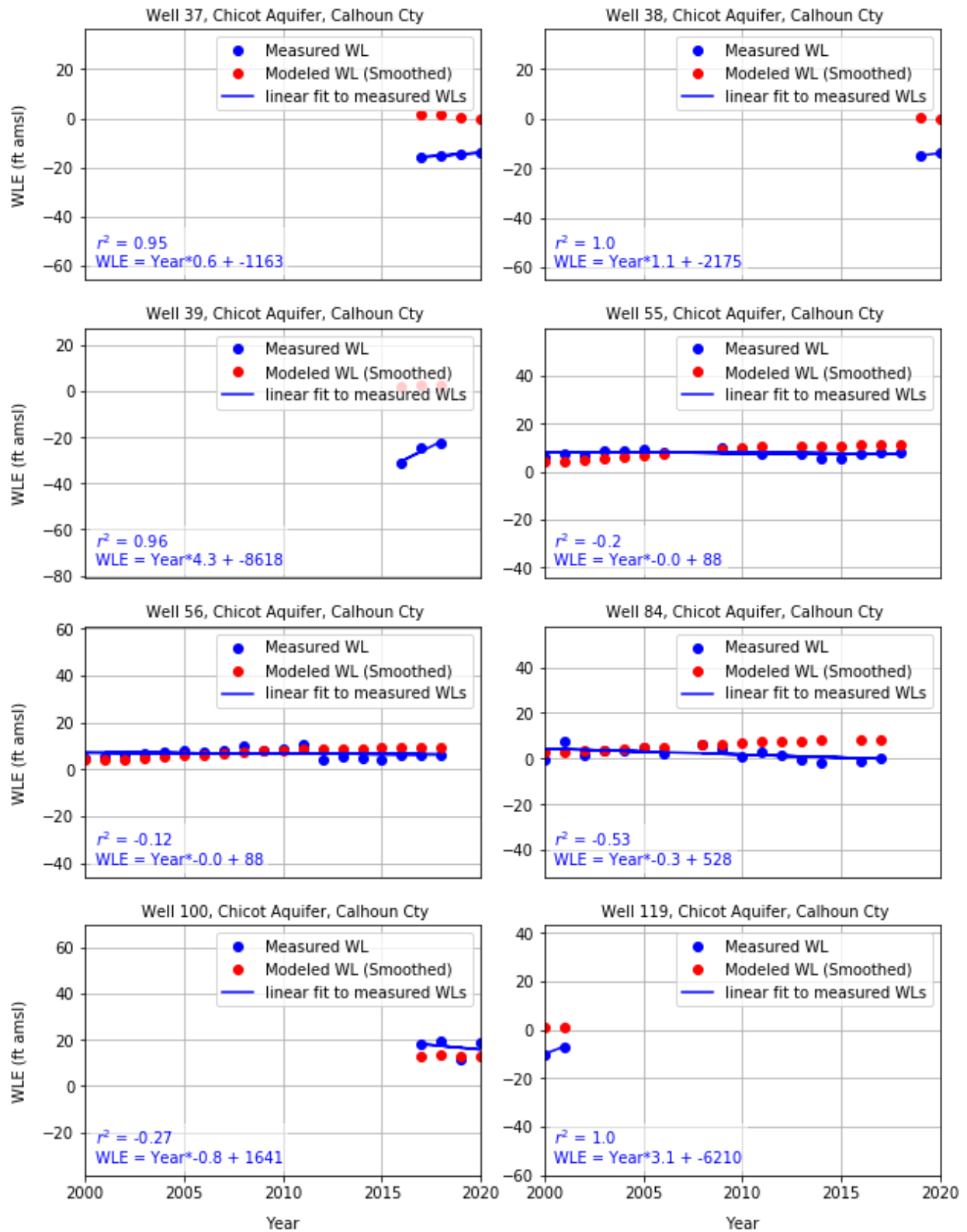
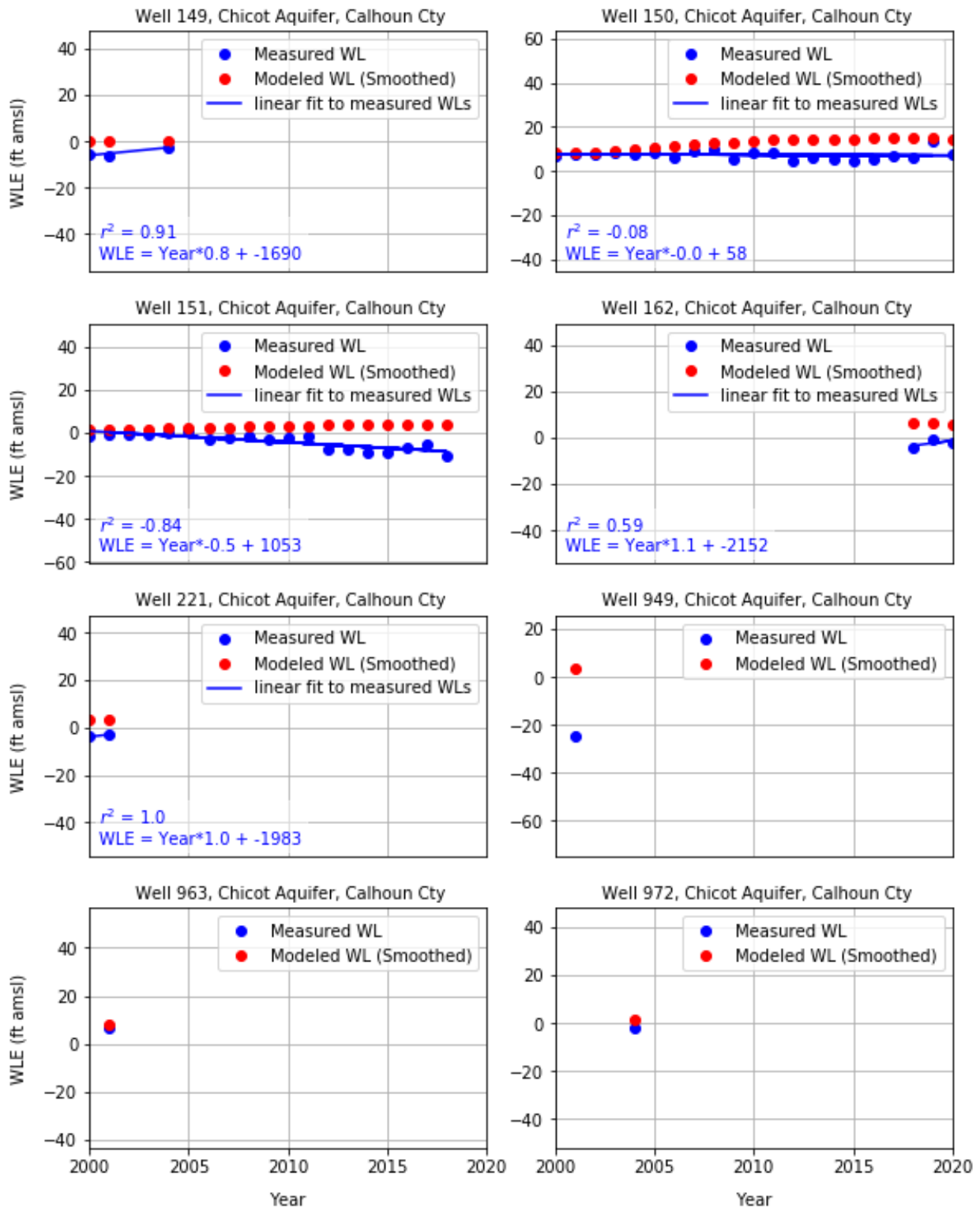


Figure E-24 Change in water level elevation in the Evangeline Aquifer across Victoria County for 2010-2015 and for 2015-2020

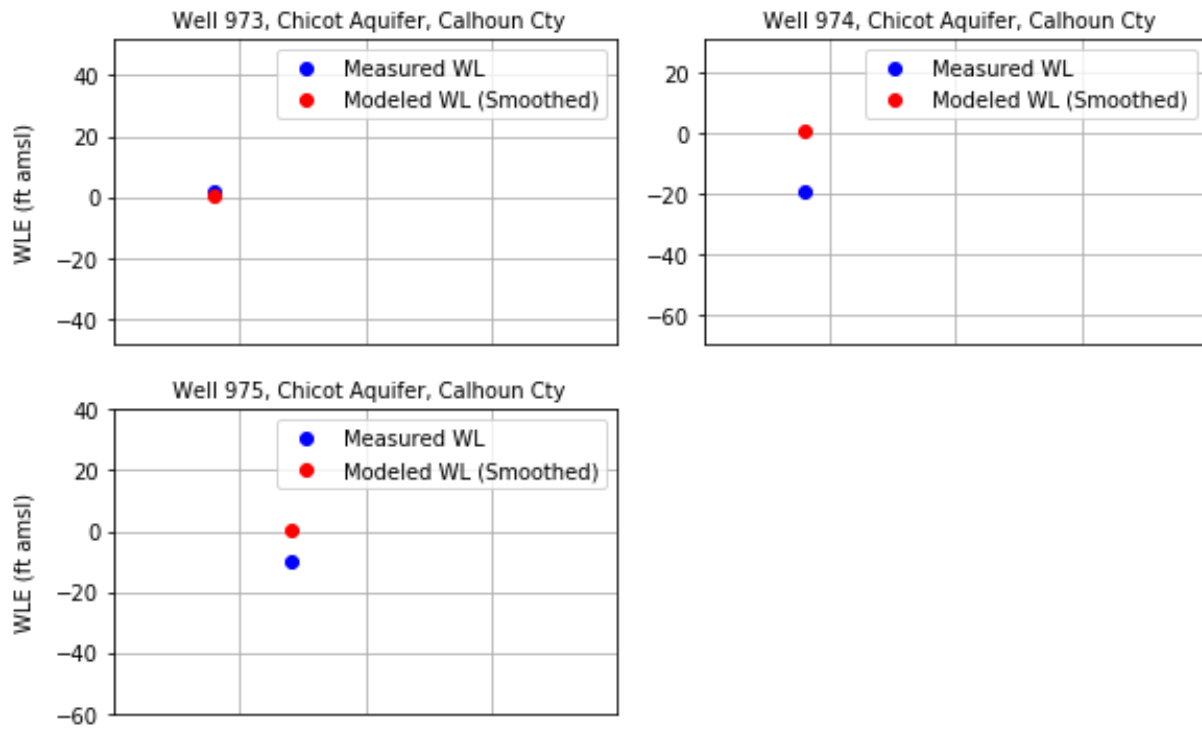
**APPENDIX F**  
**WELL HYDROGRAPHS FOR THE CHICOT AQUIFER IN CALHOUN,  
JACKSON, REFUGIO, AND VICTORIA COUNTIES**

Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

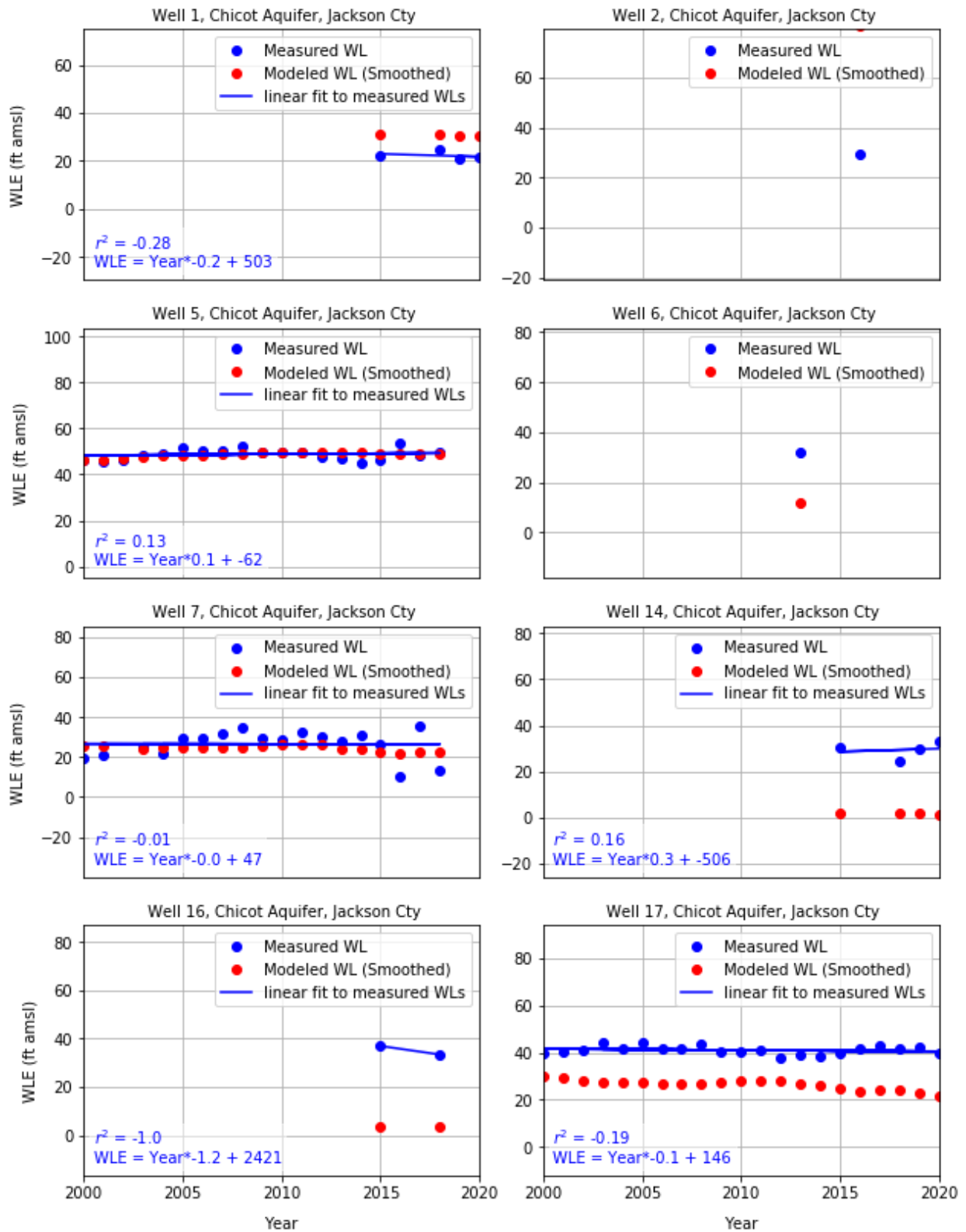




Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels

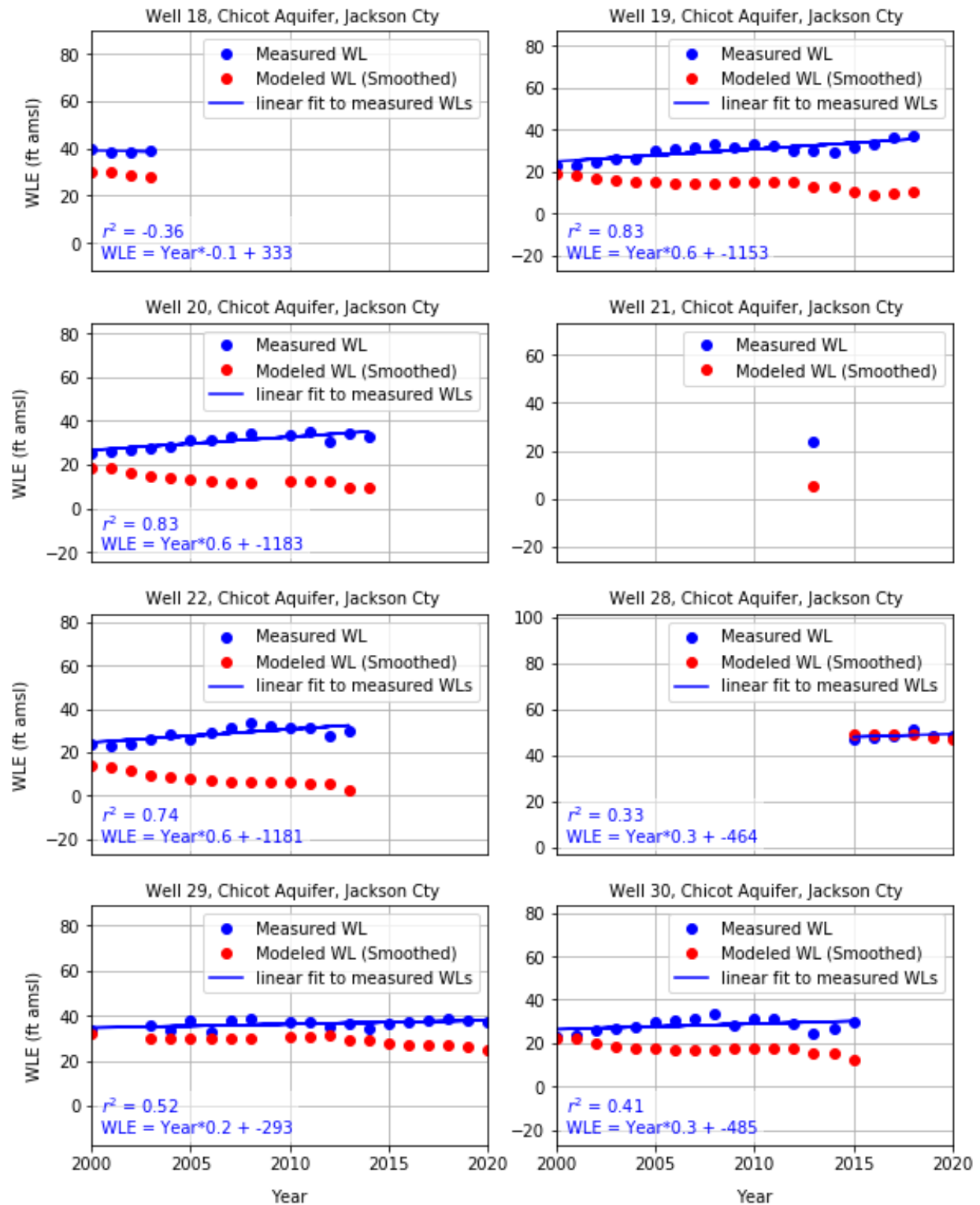


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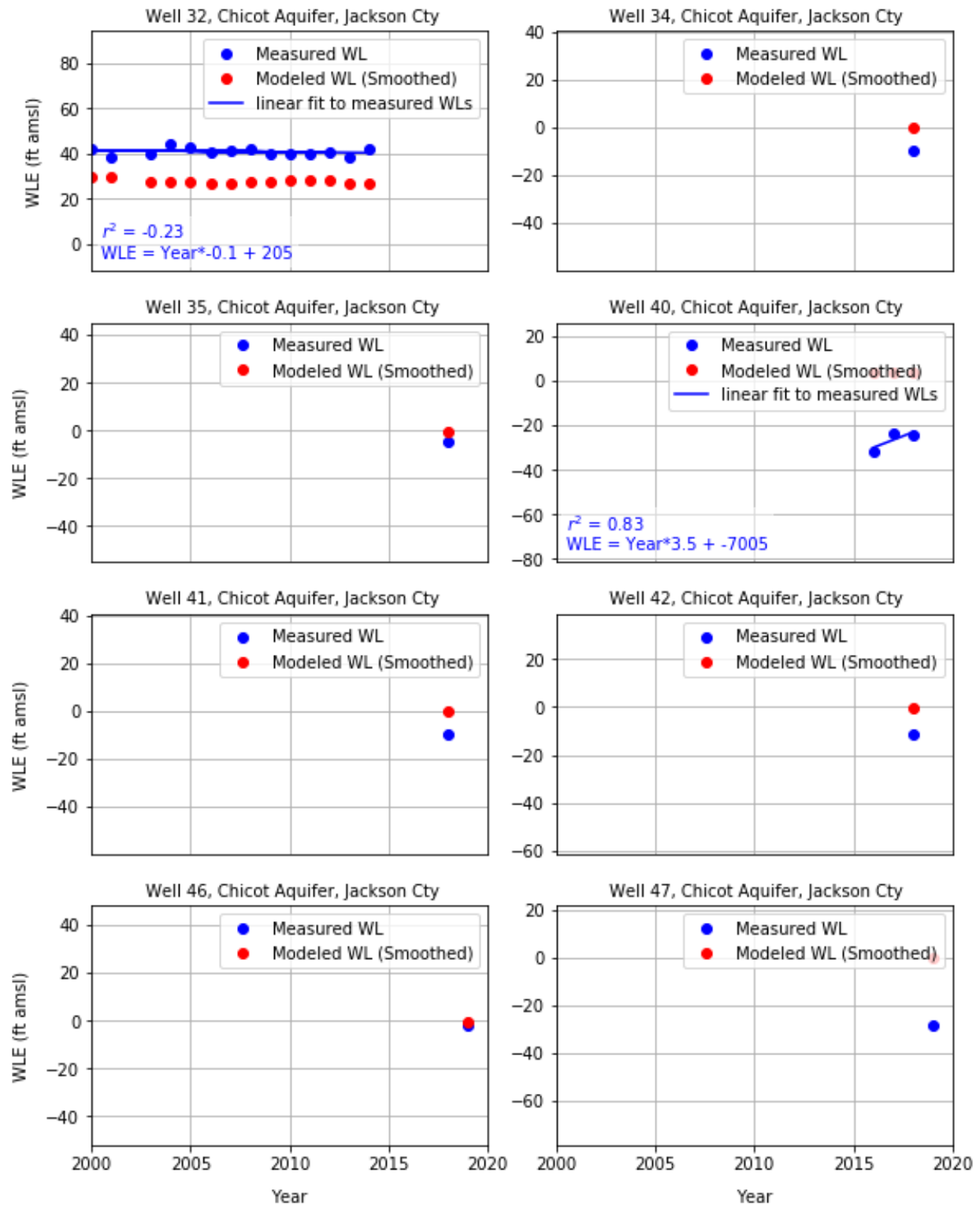




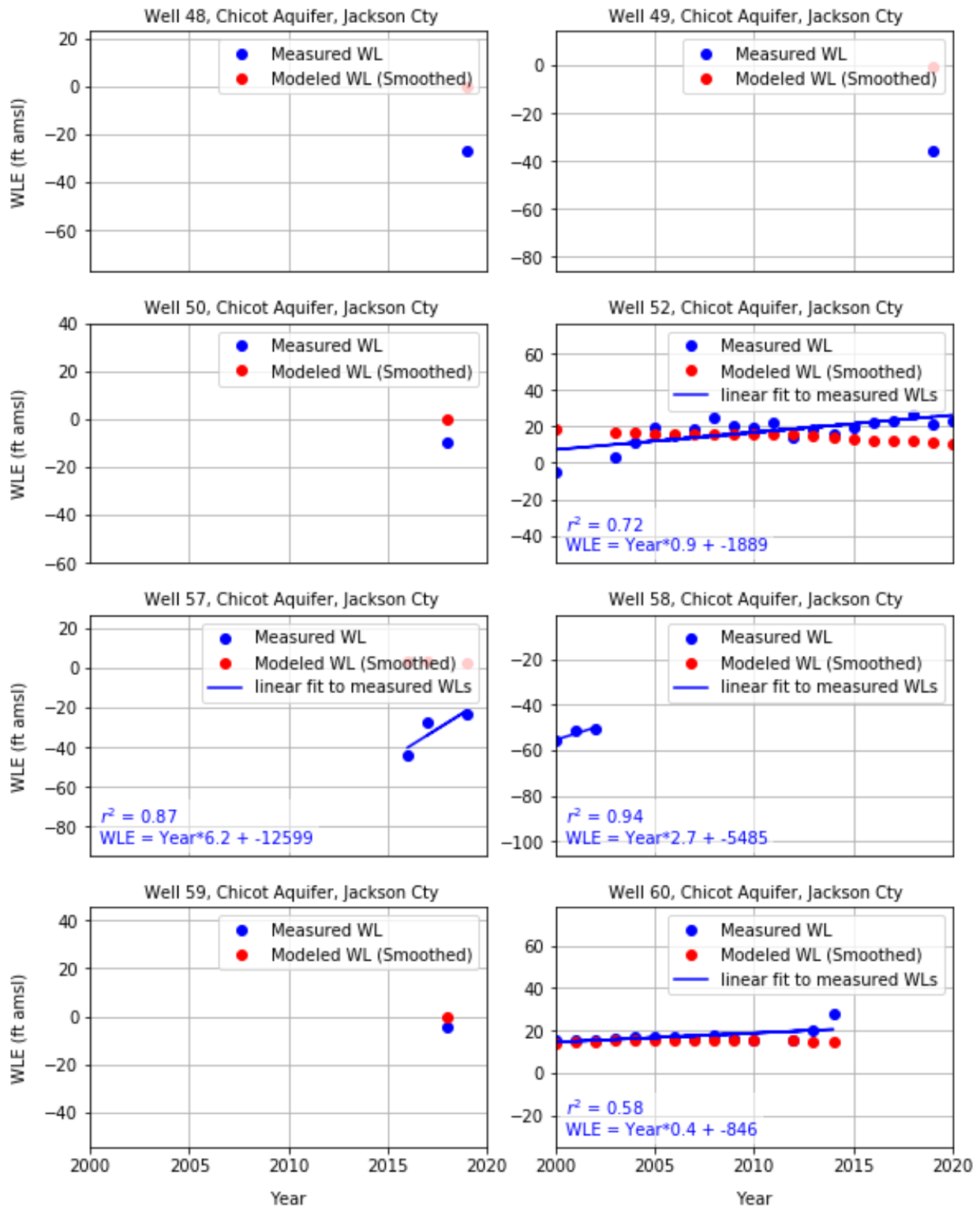
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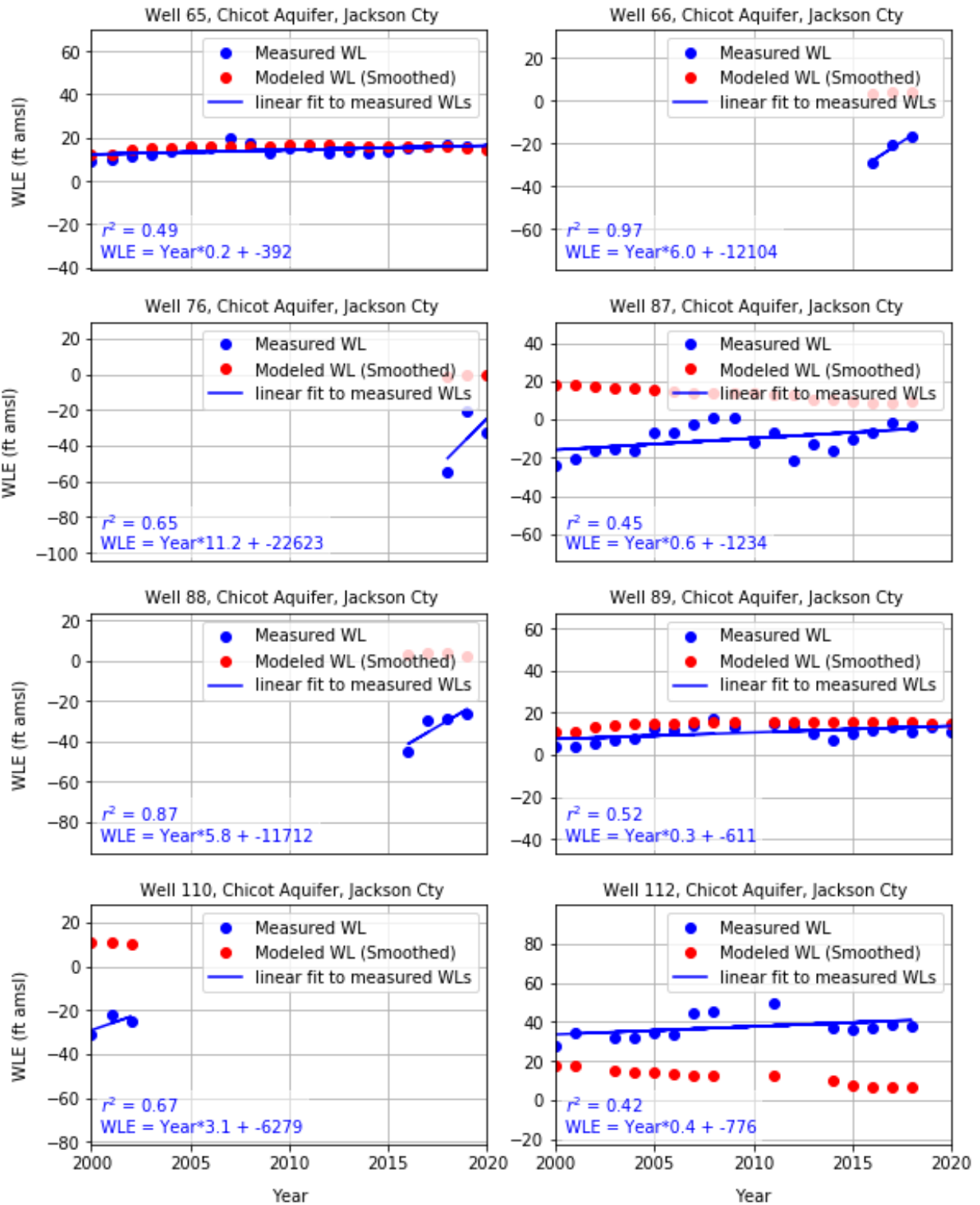


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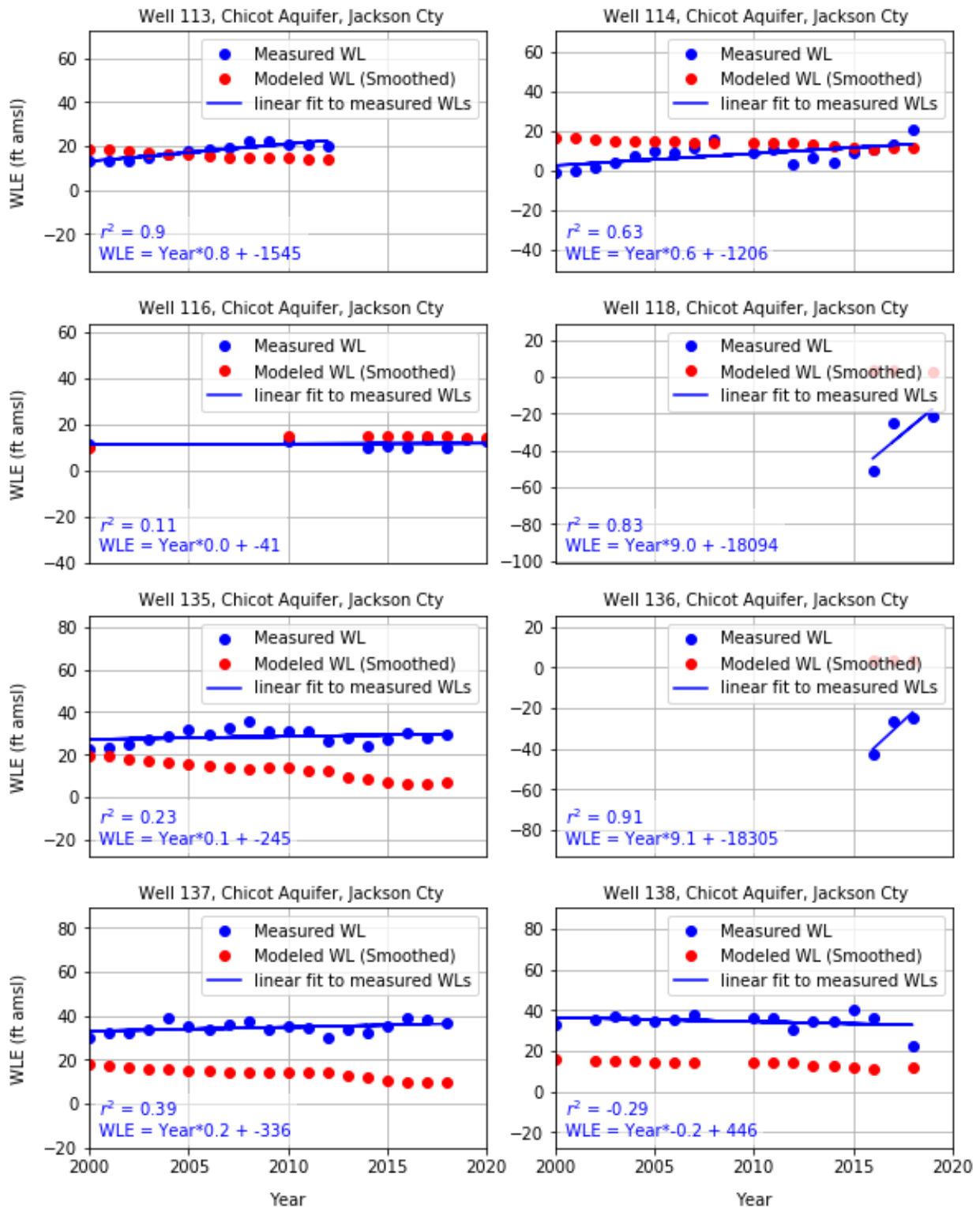


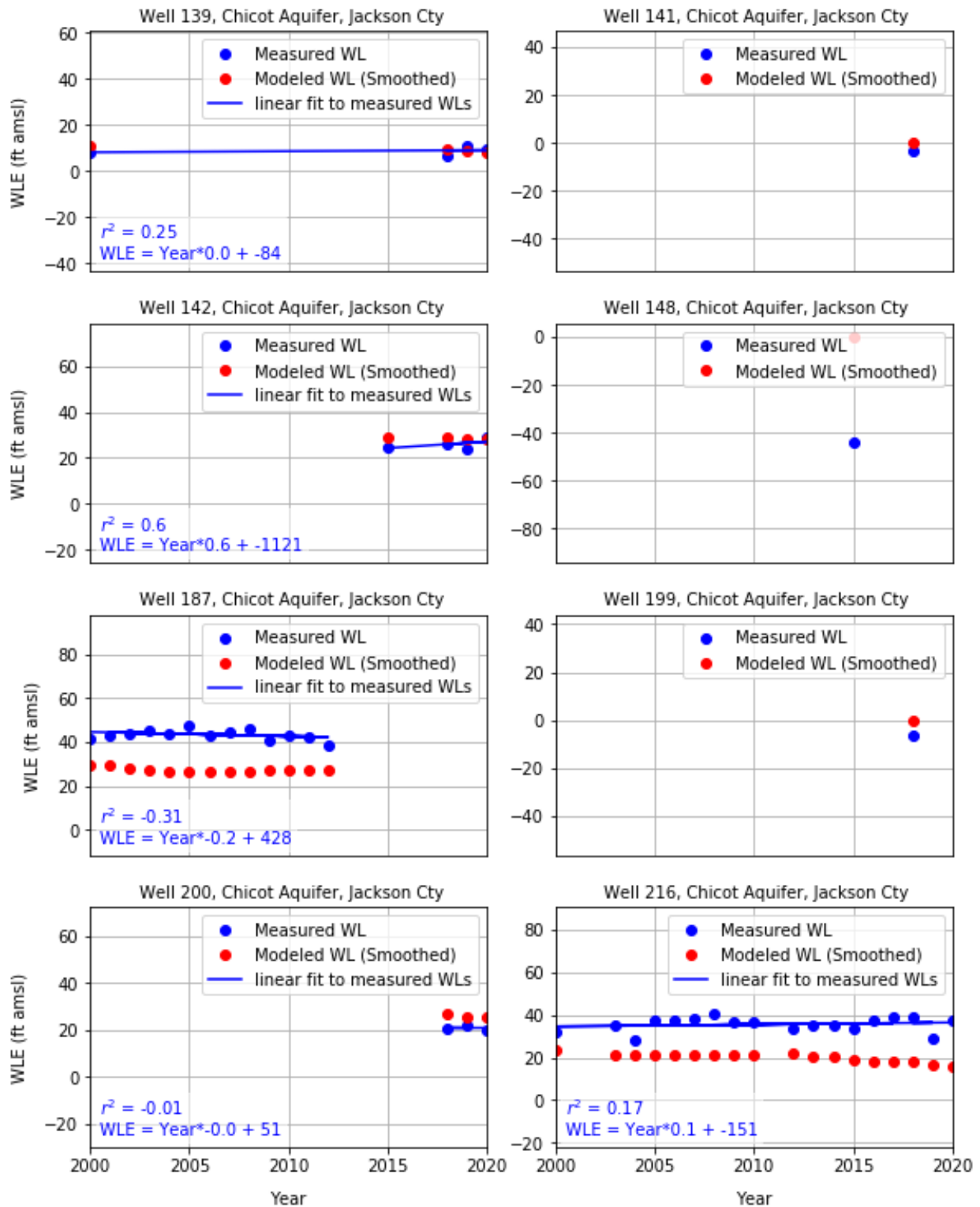
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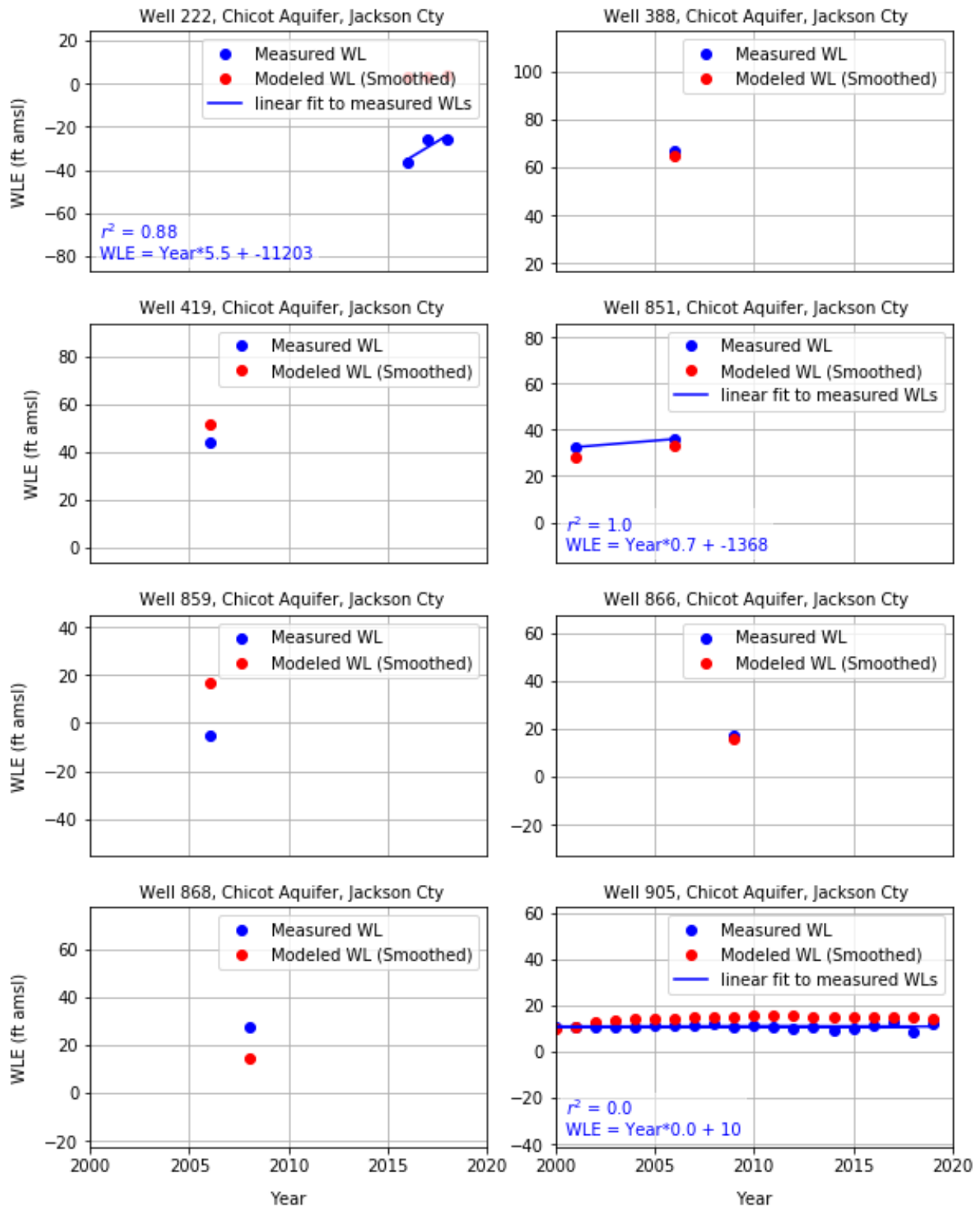


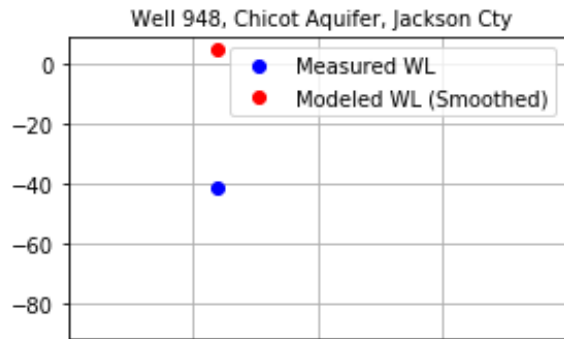
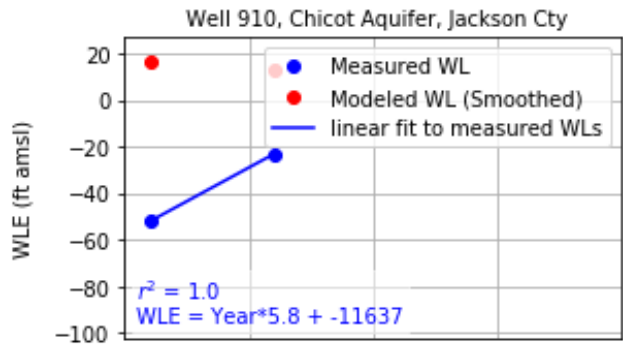
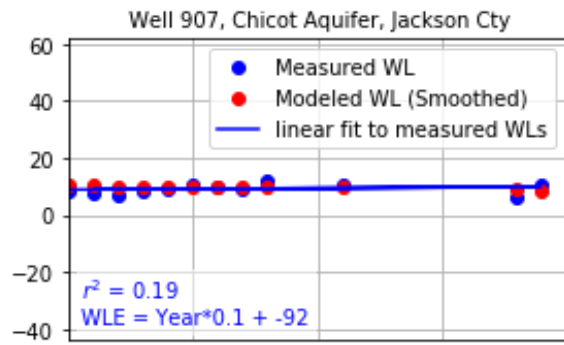
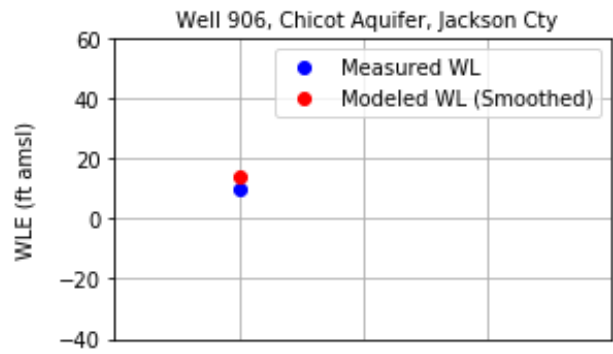


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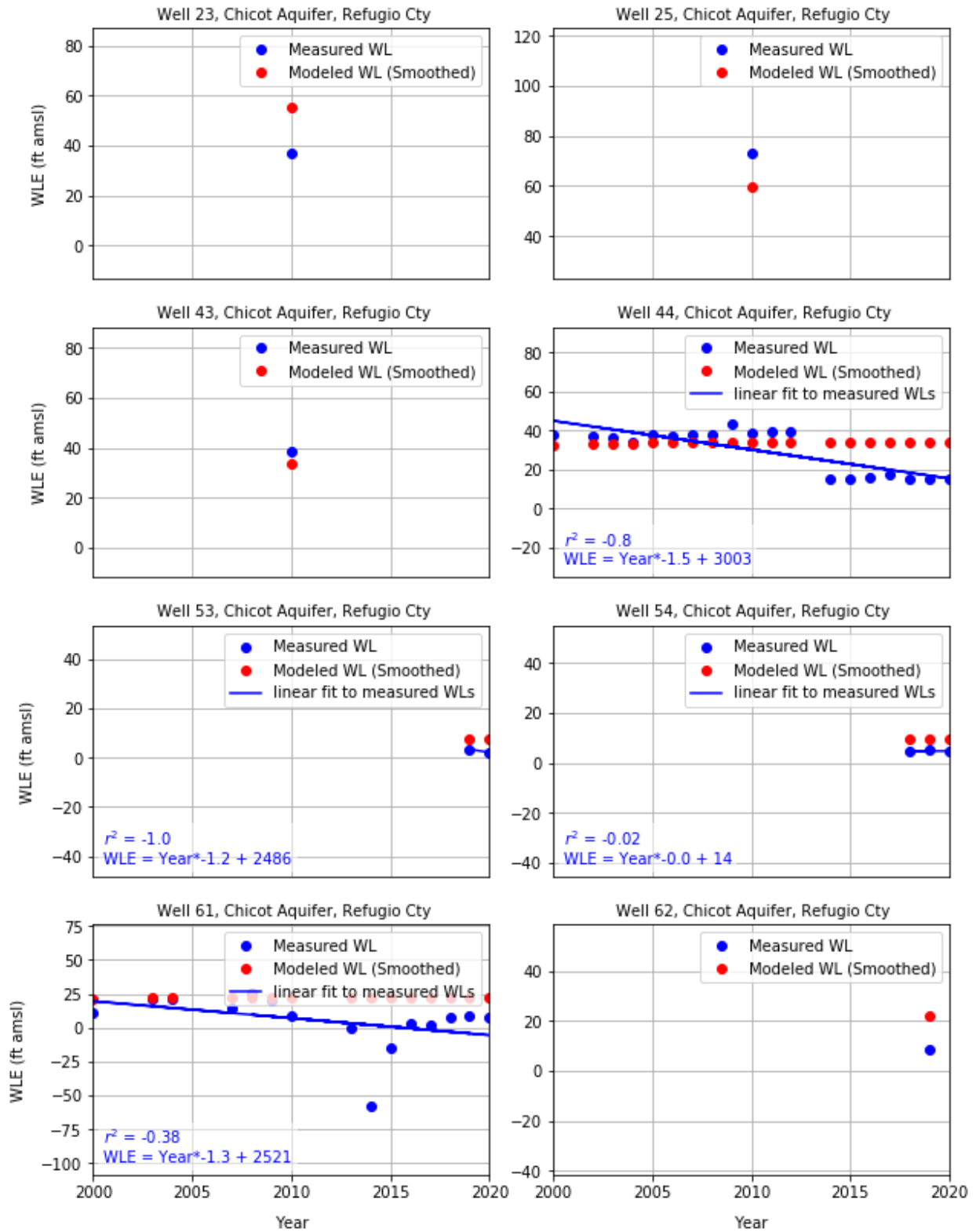


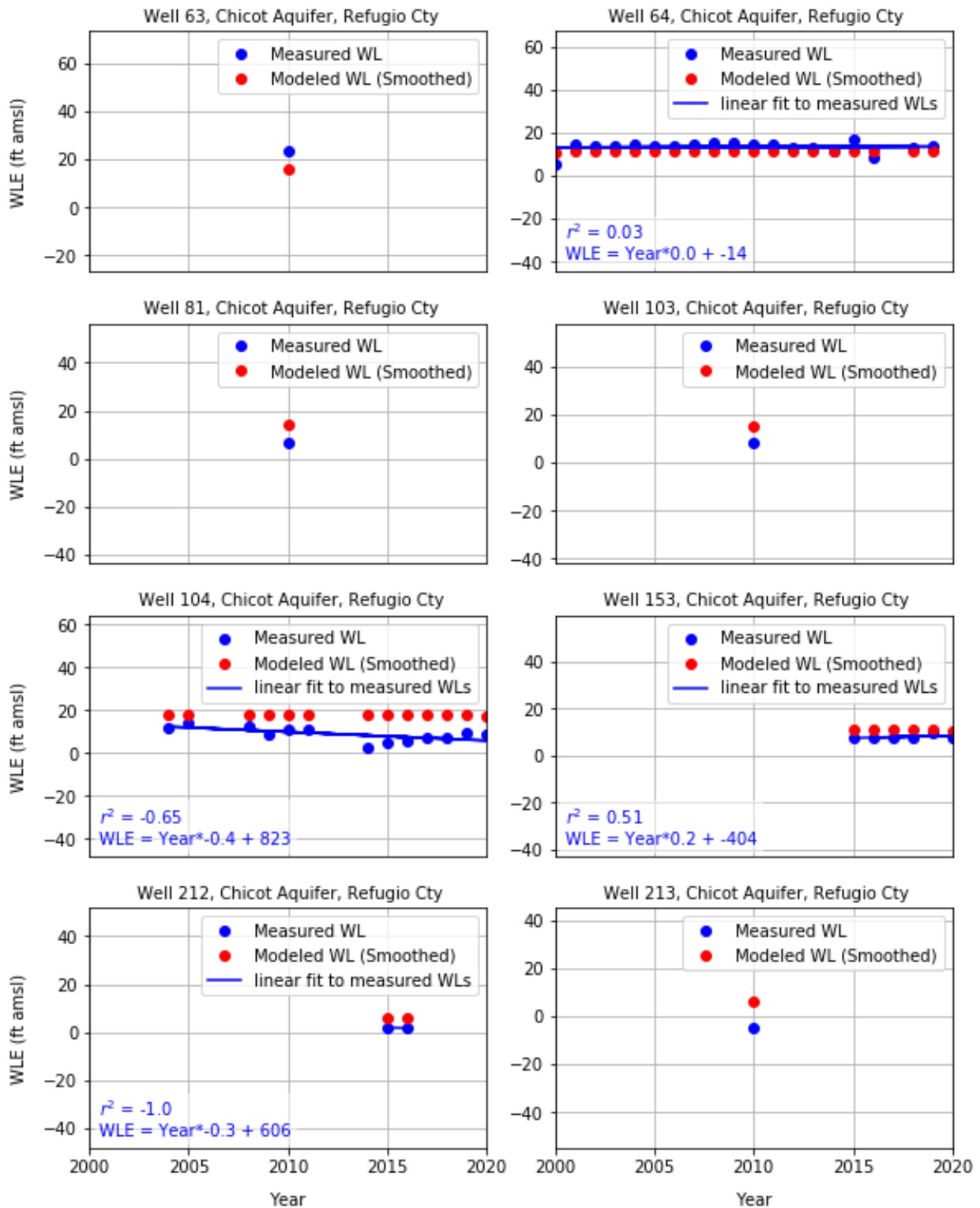


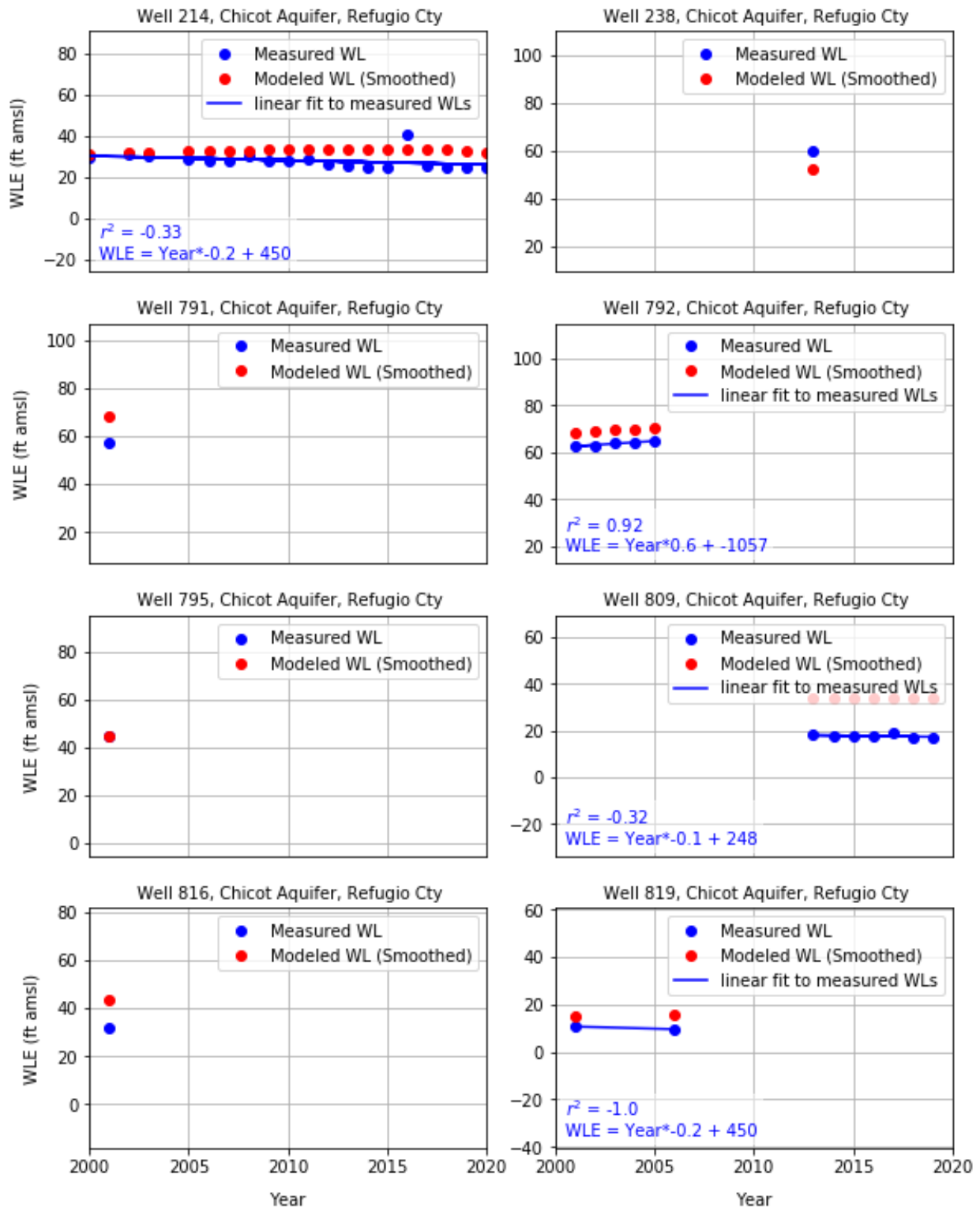




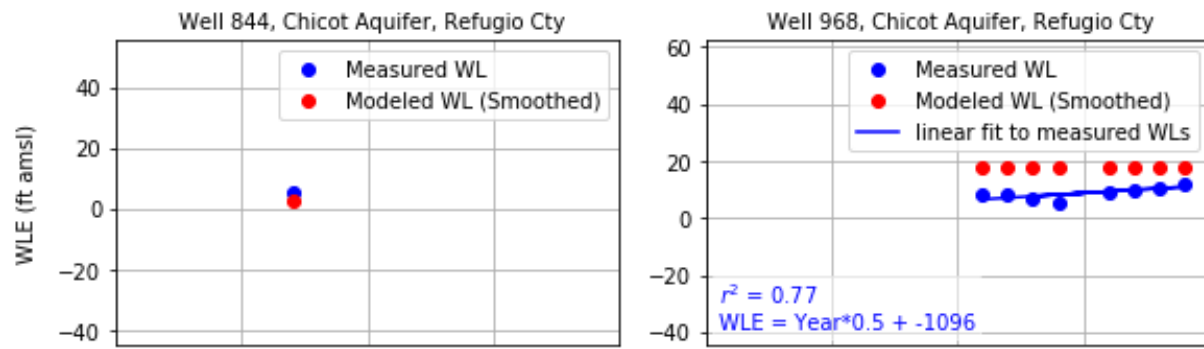




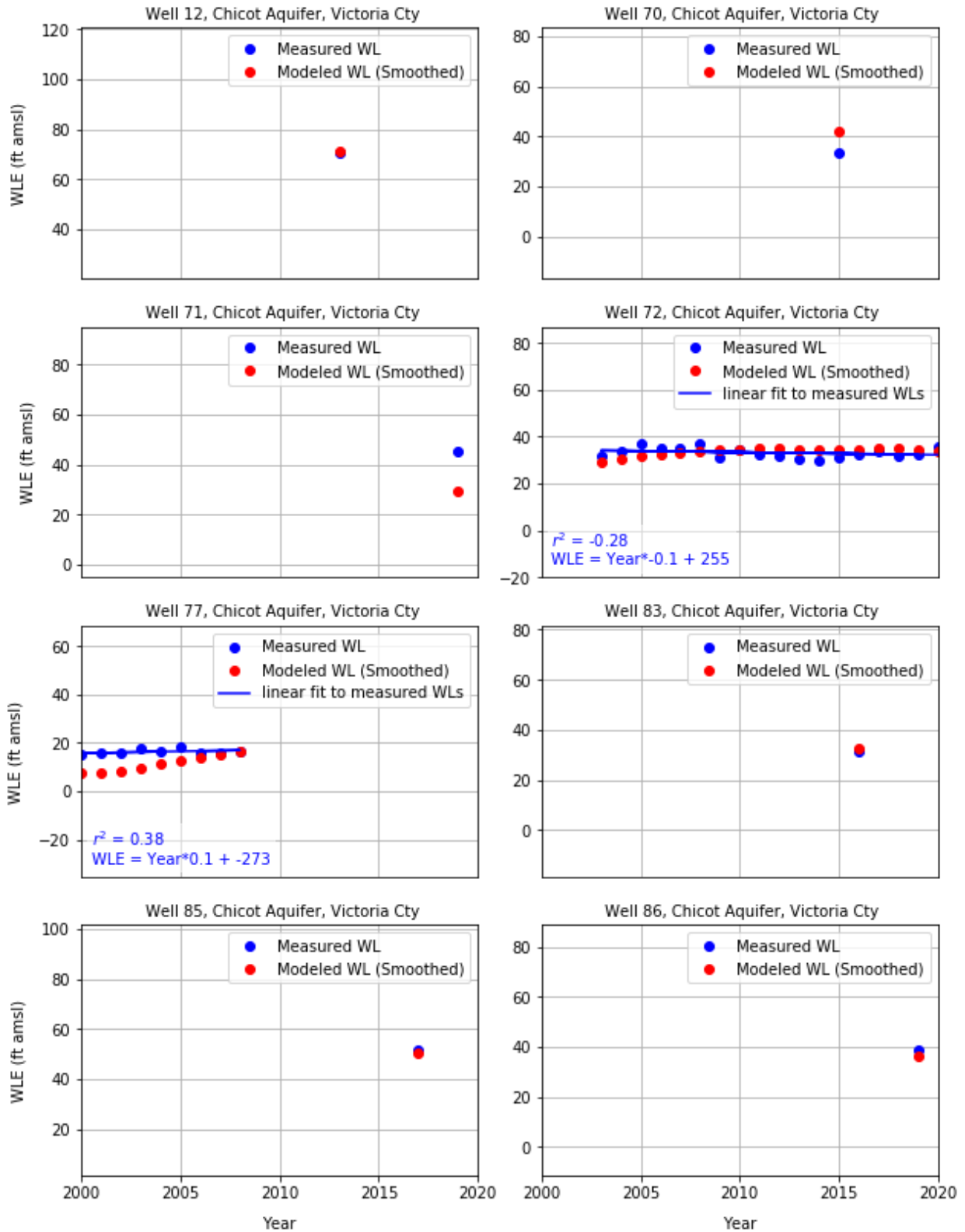




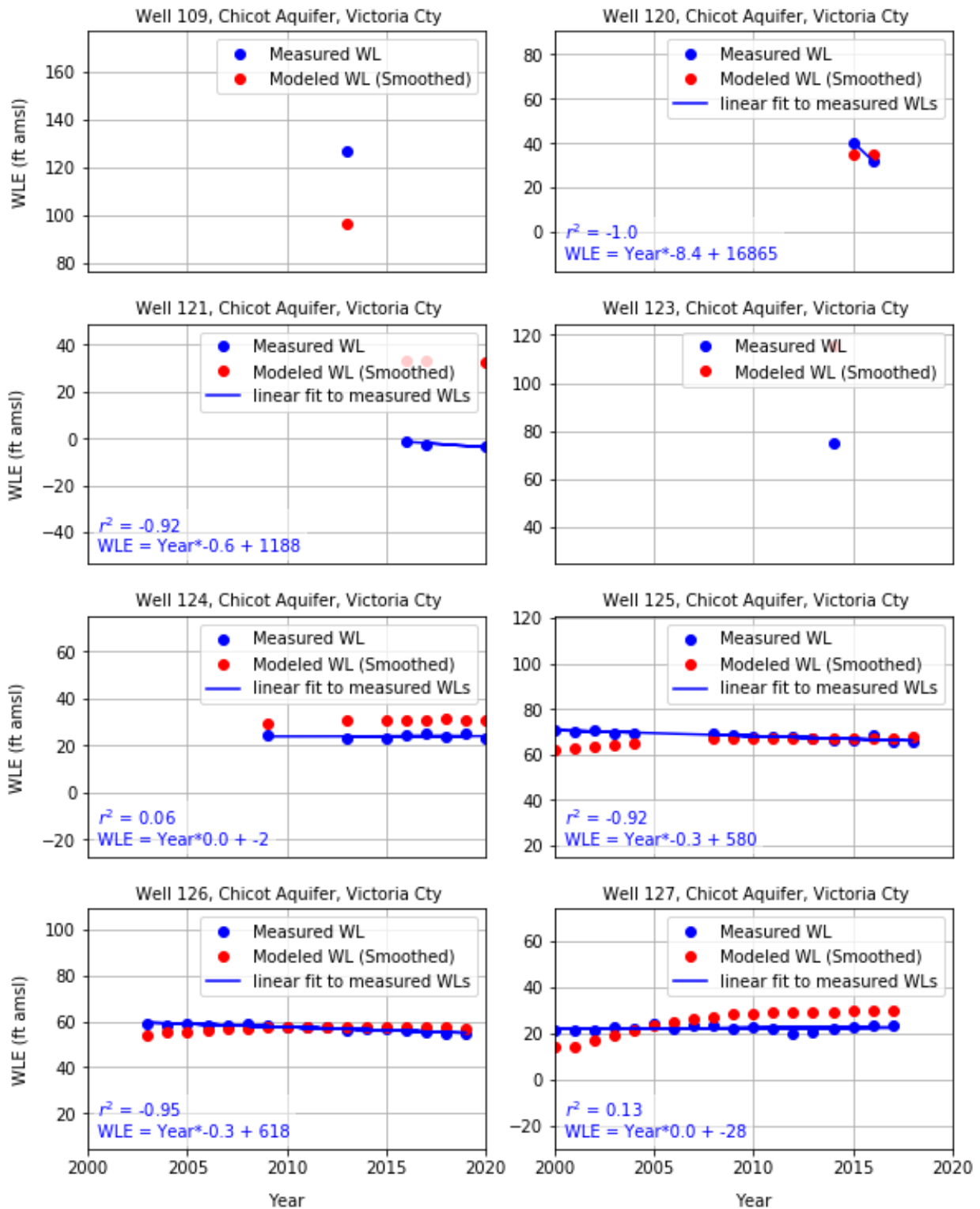
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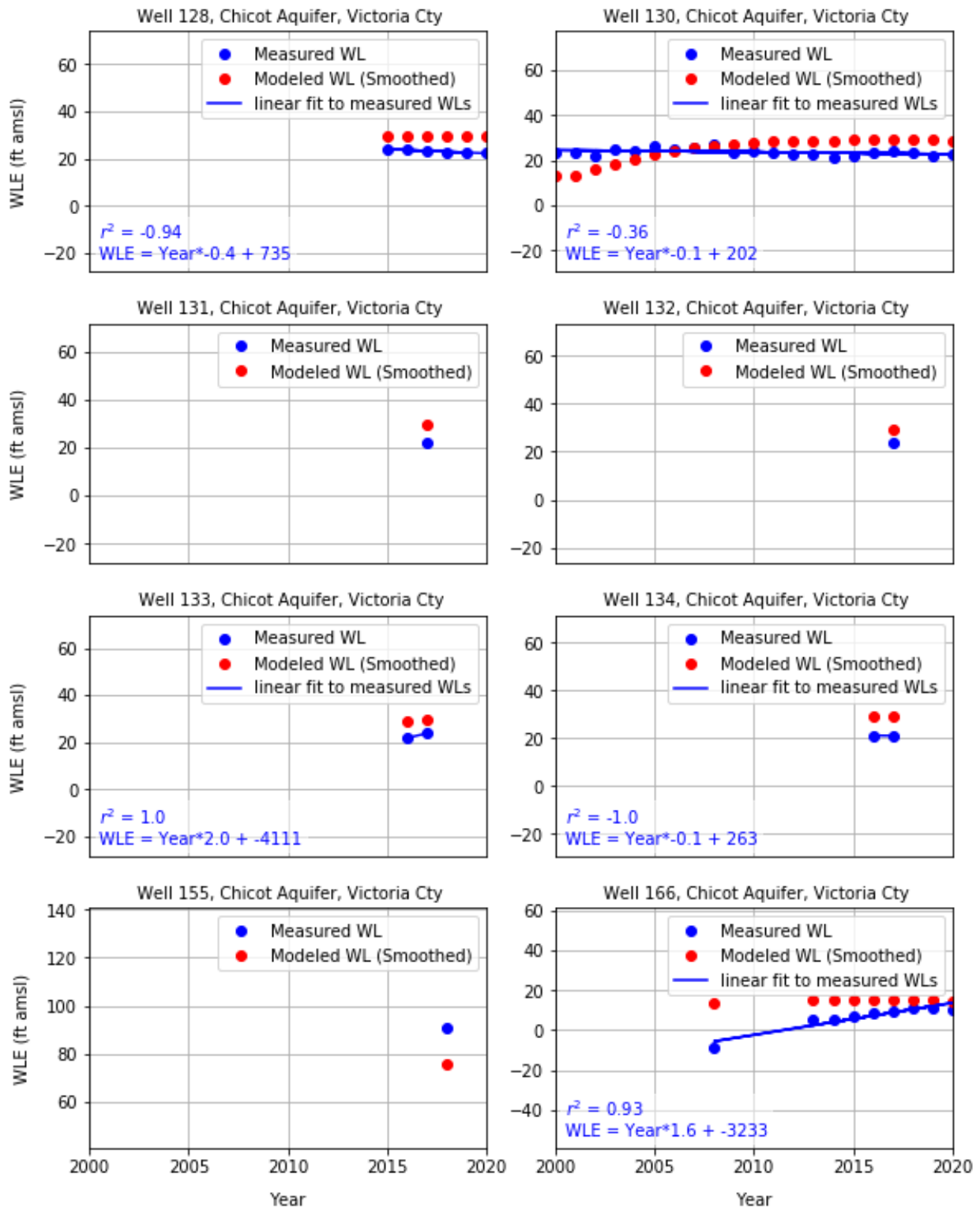


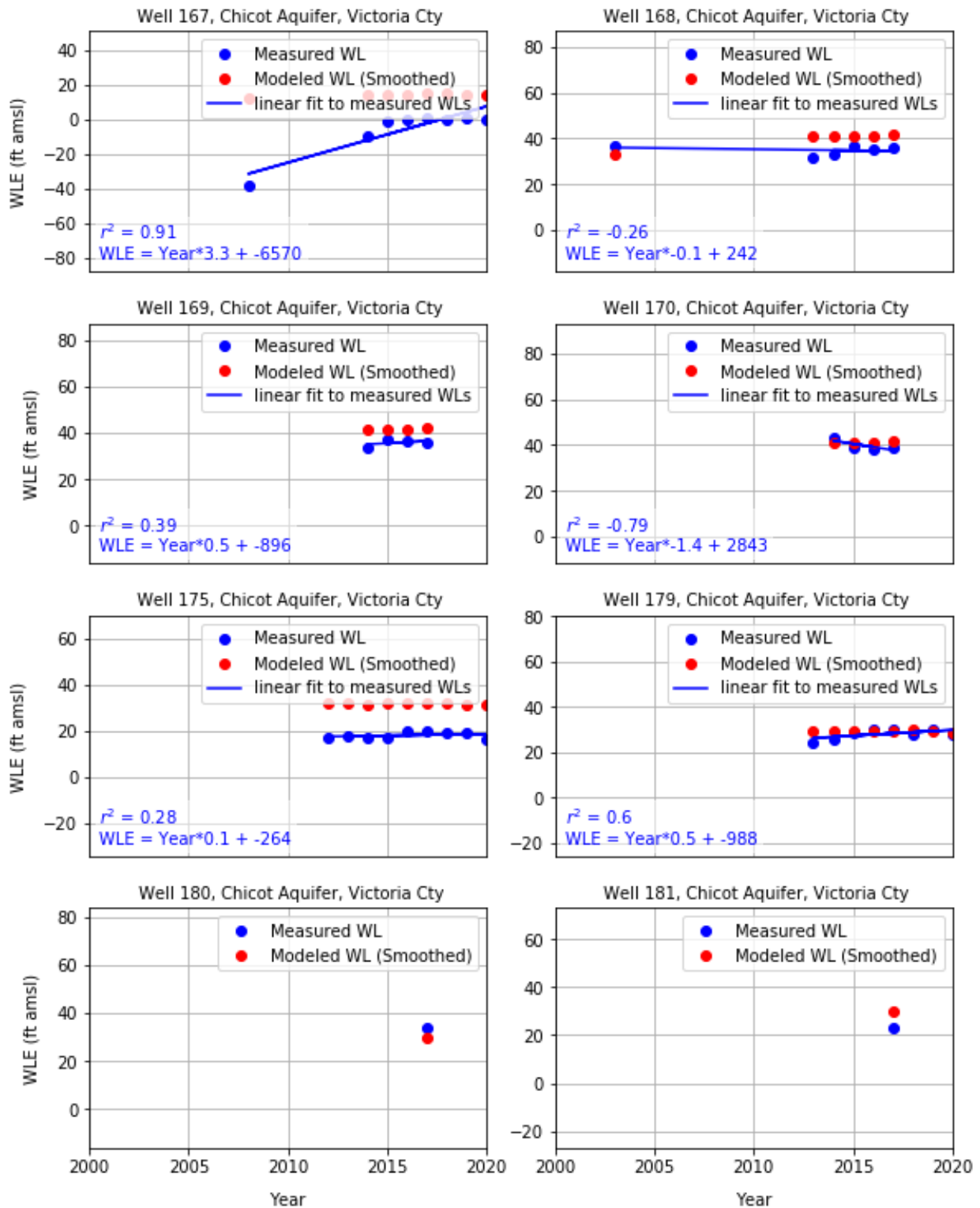
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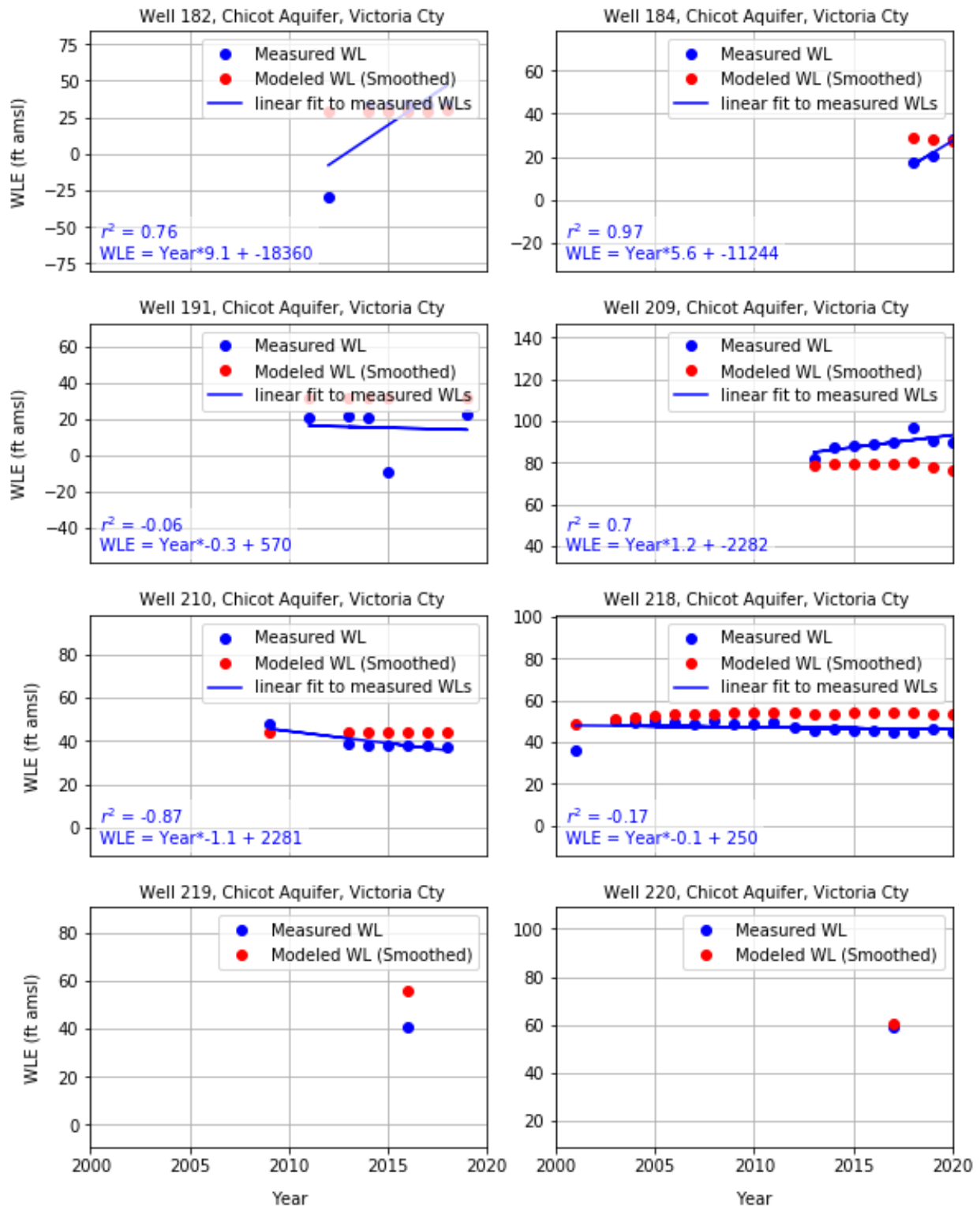
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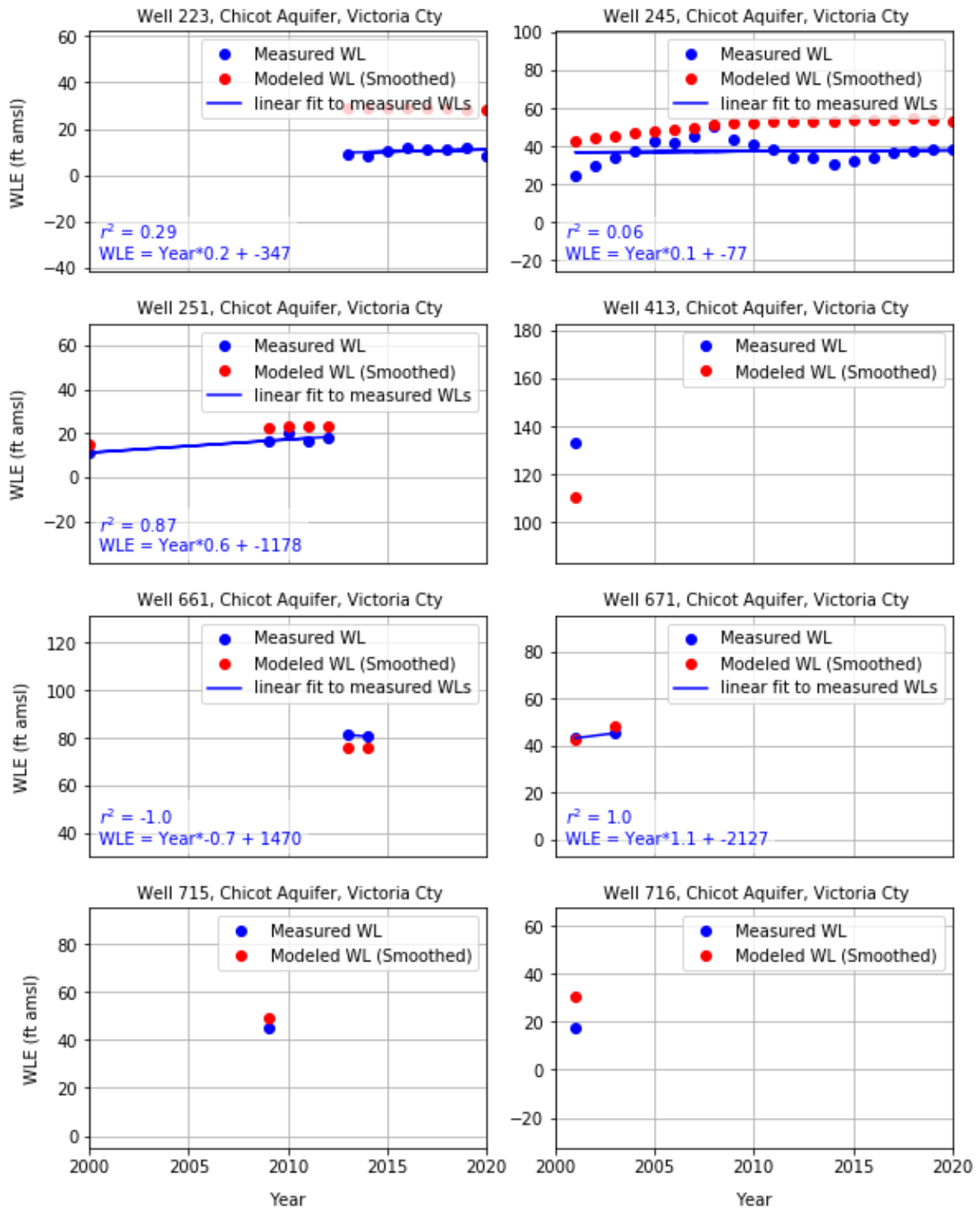


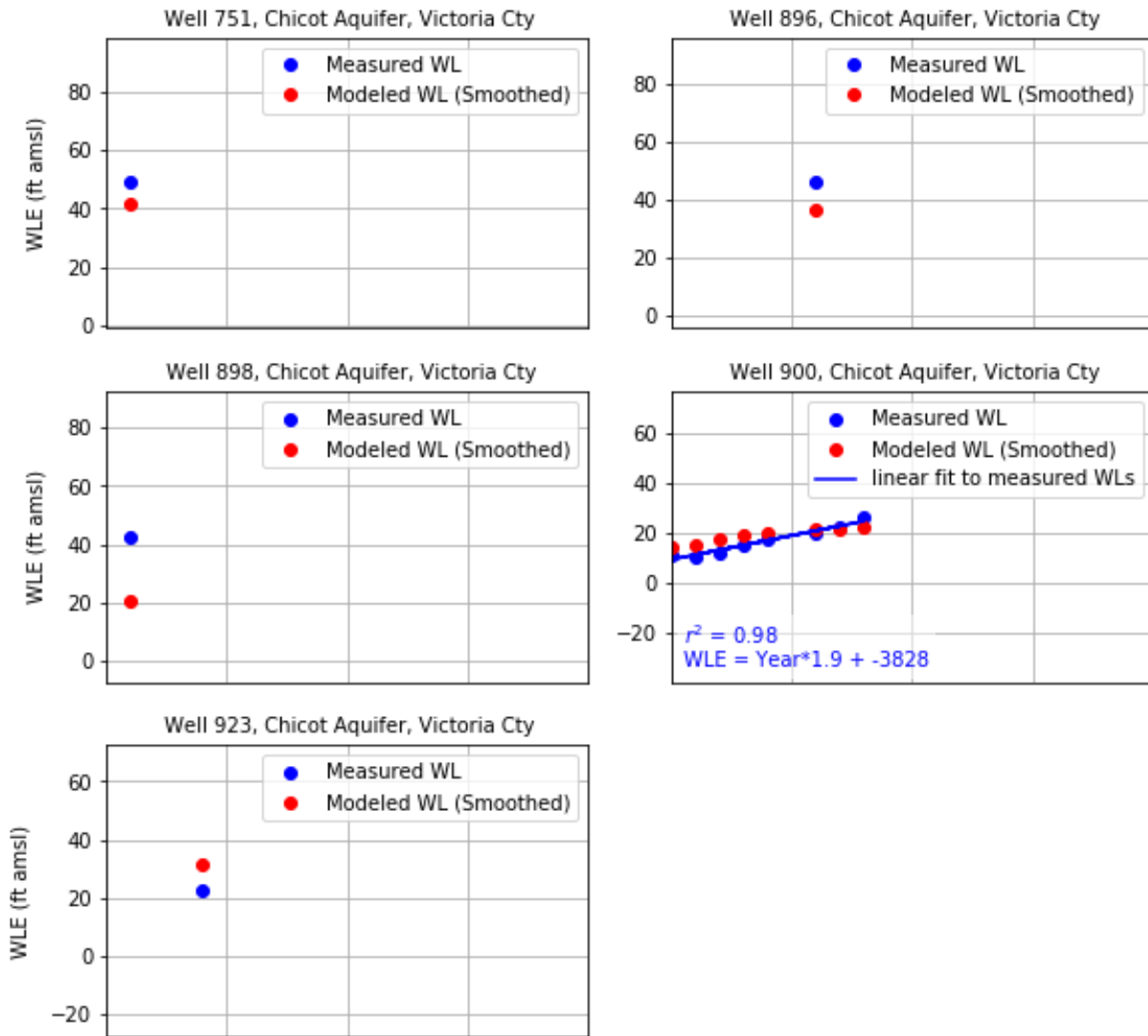






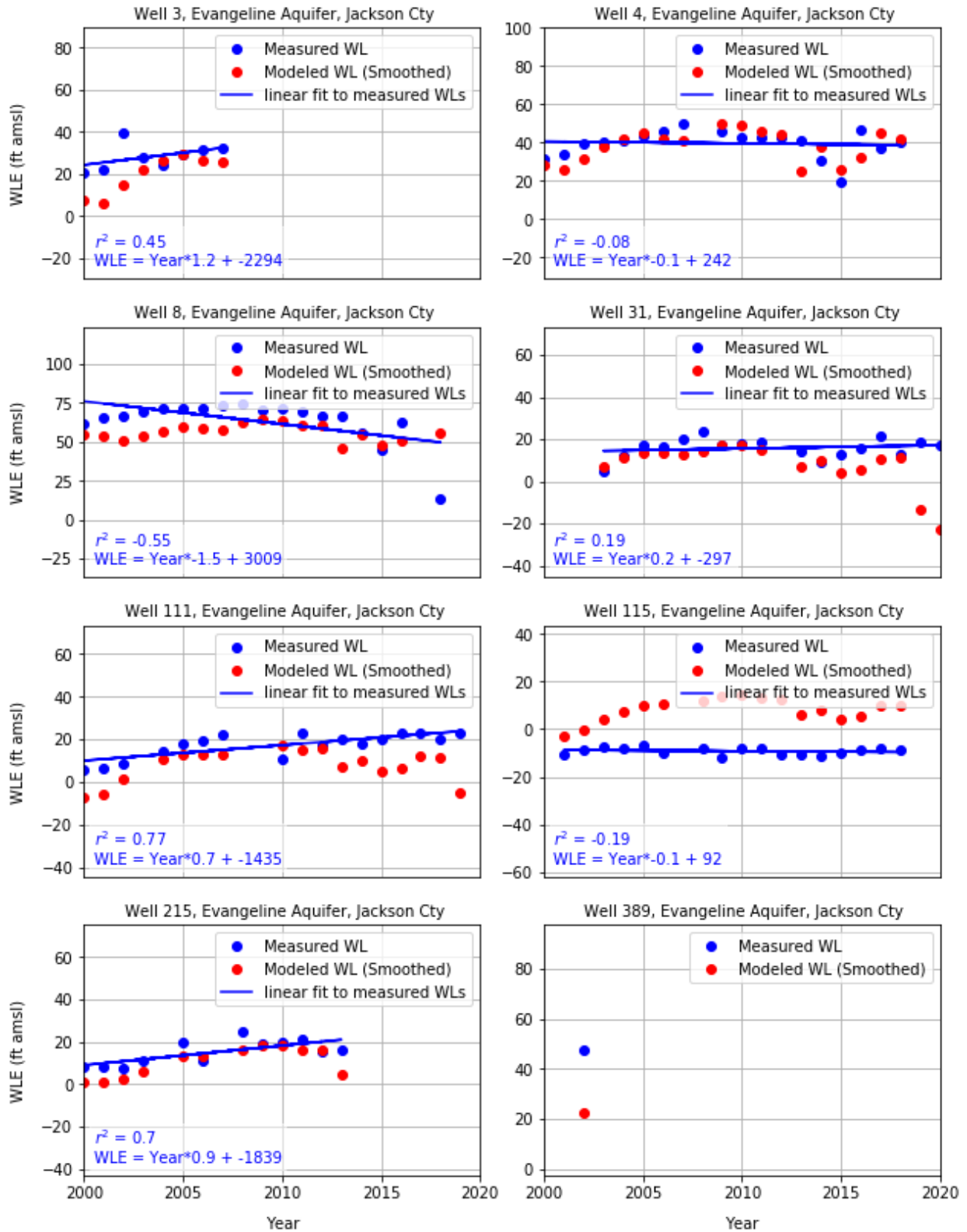




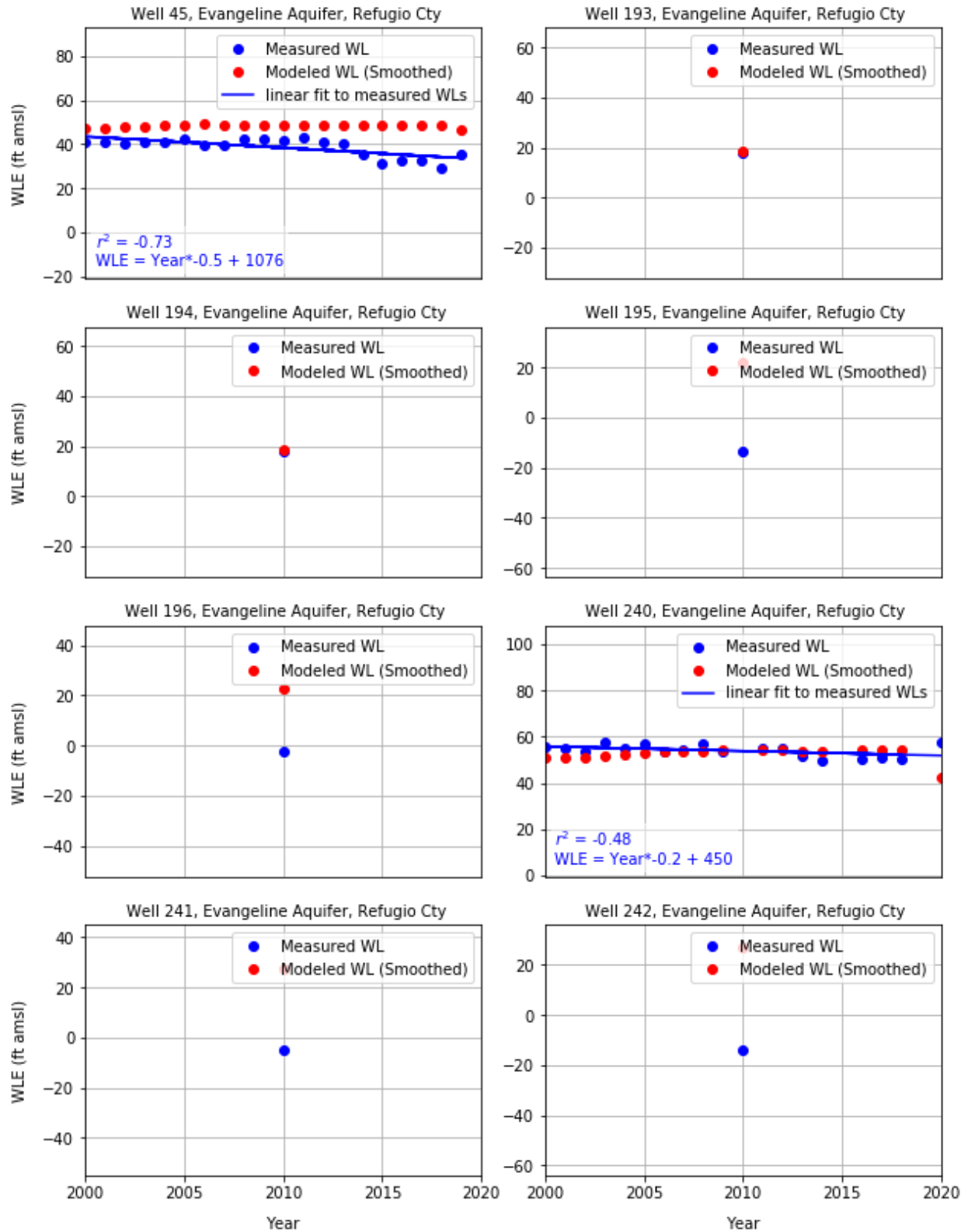


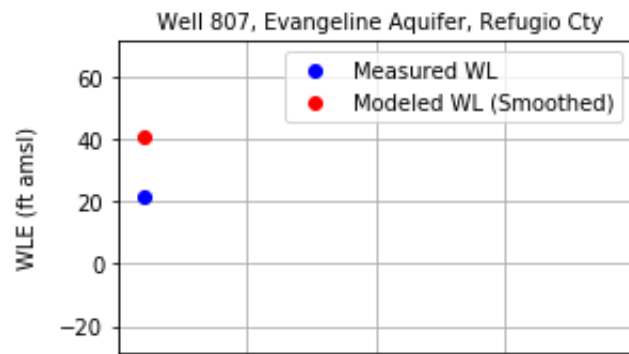
**APPENDIX G**  
**WELL HYDROGRAPHS FOR THE EVANGELINE AQUIFER IN CALHOUN,  
JACKSON, REFUGIO, AND VICTORIA COUNTIES**

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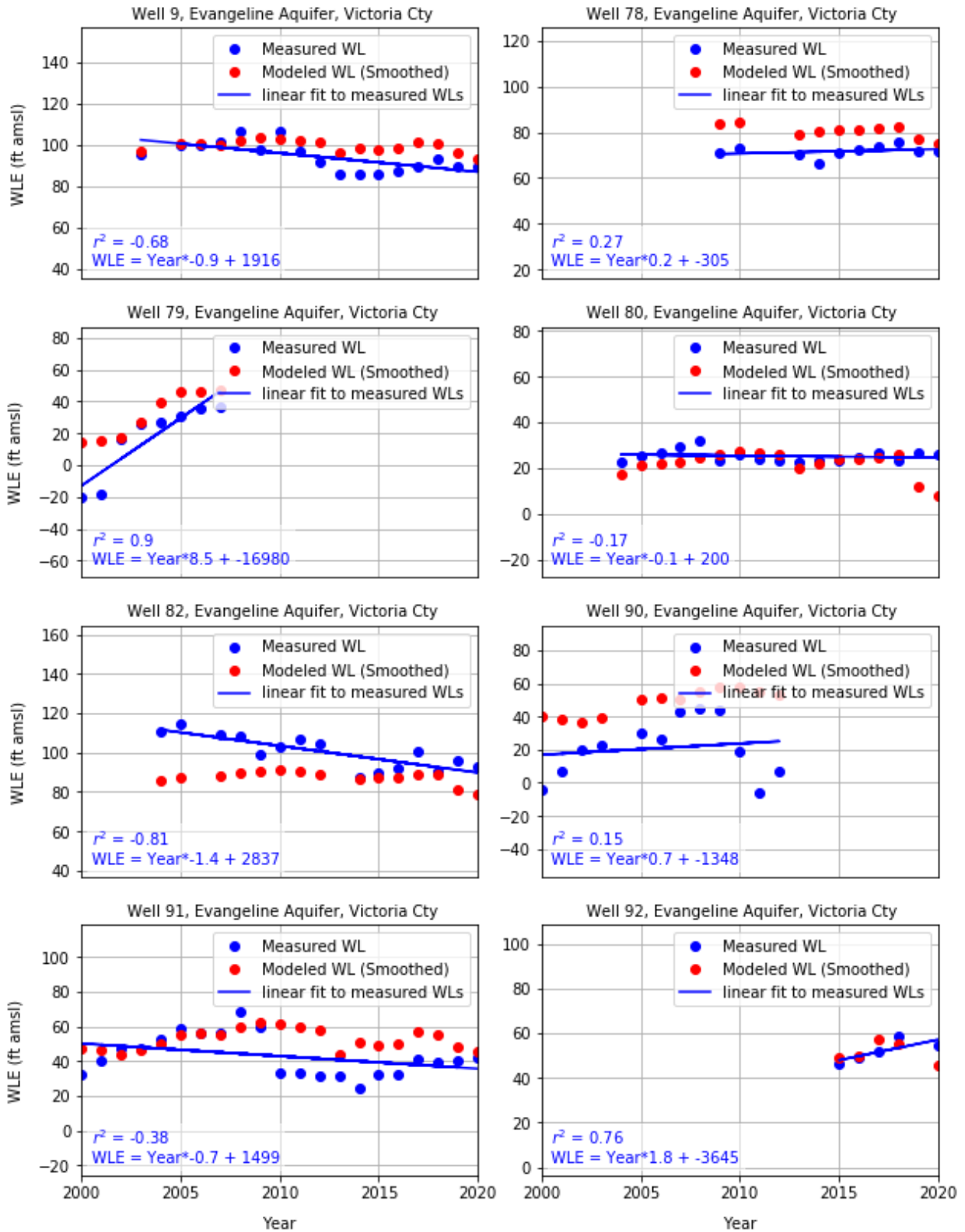


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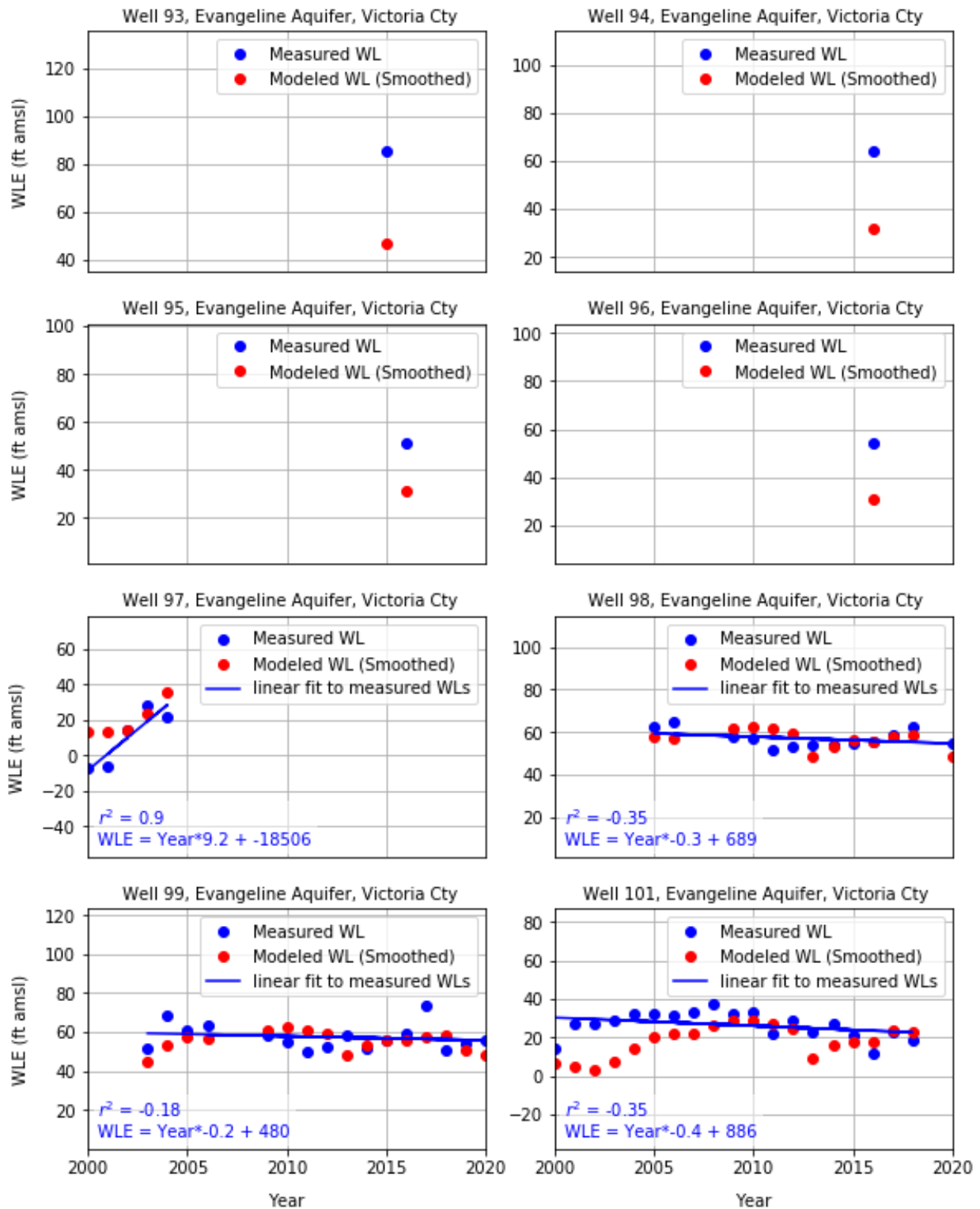




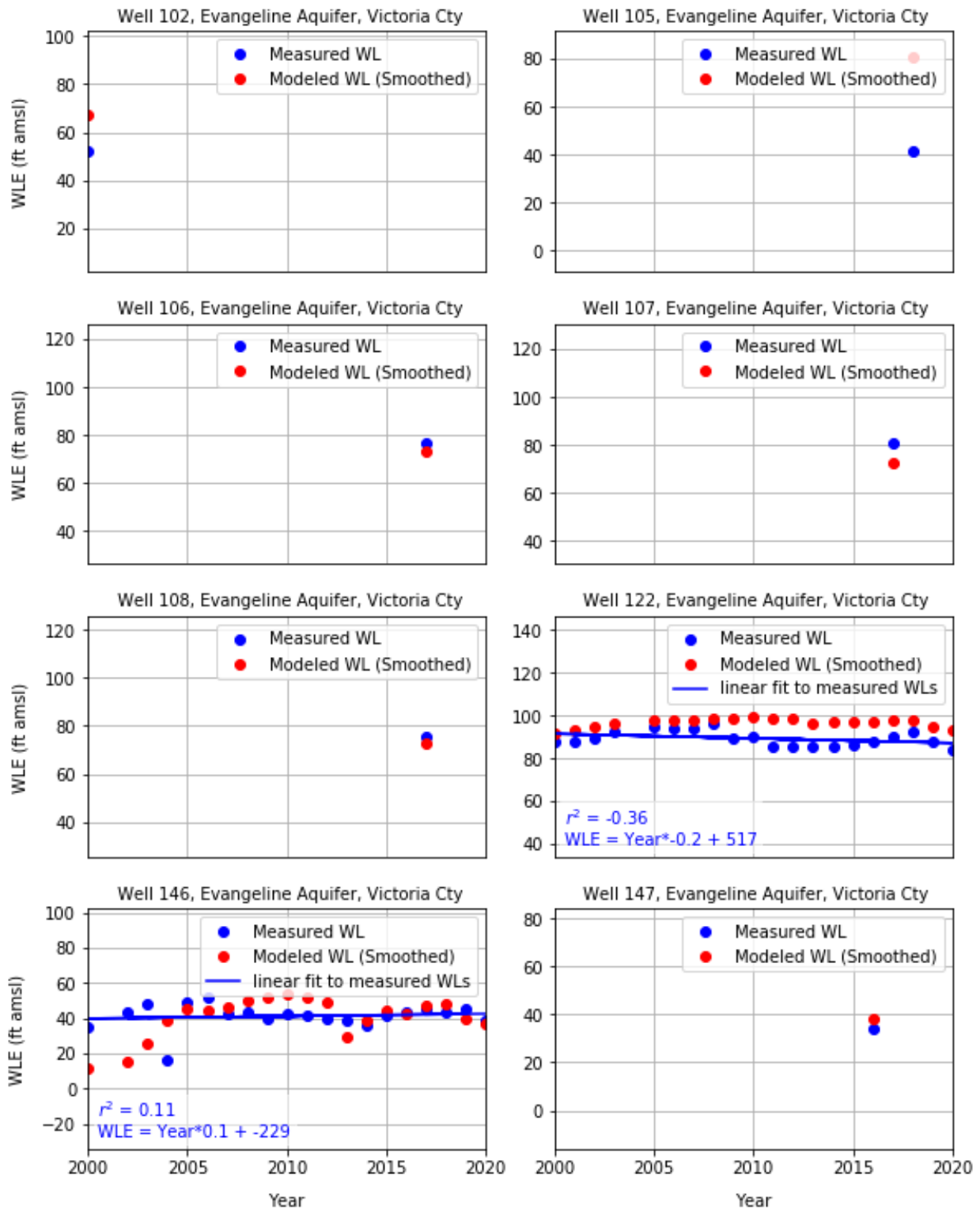
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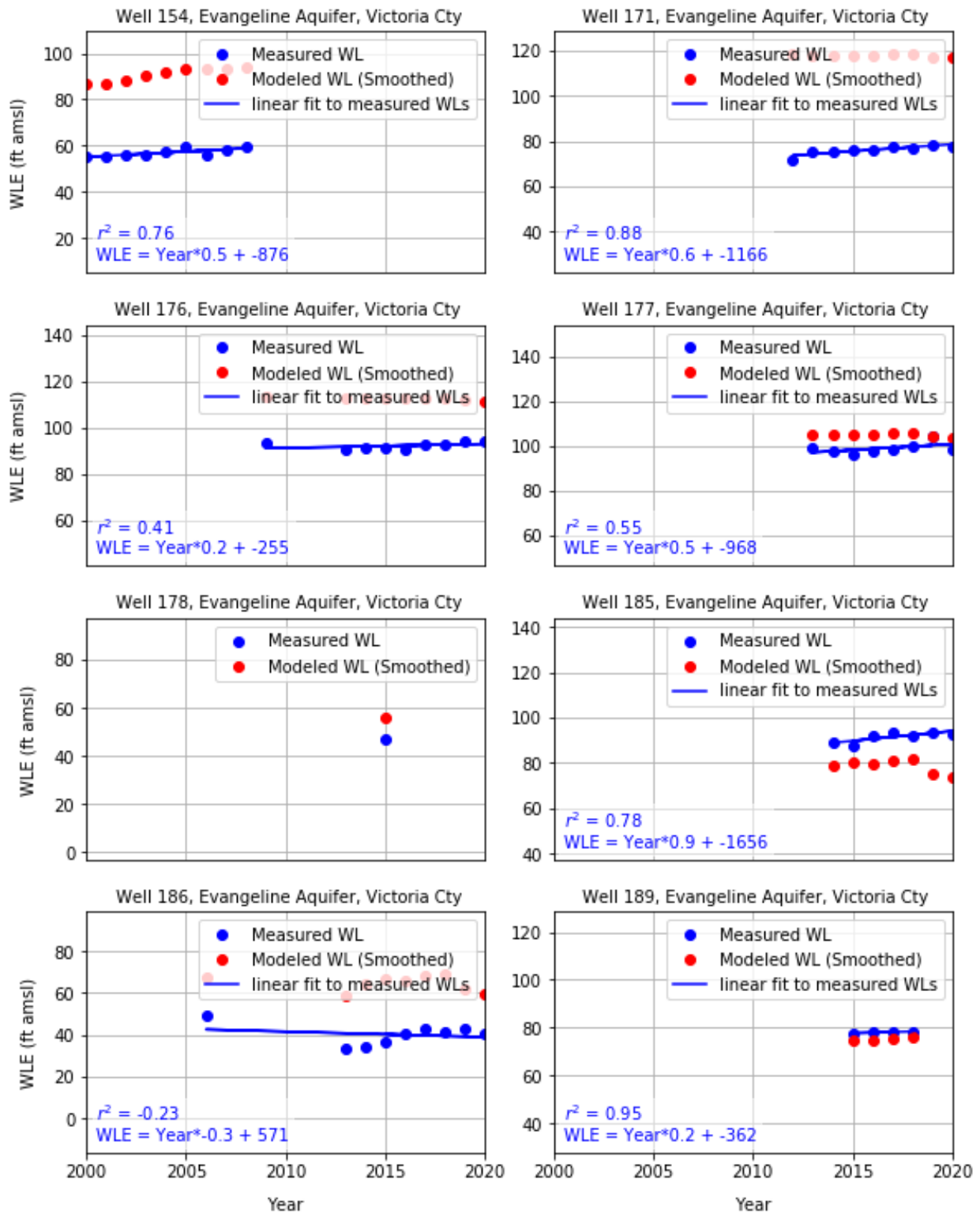




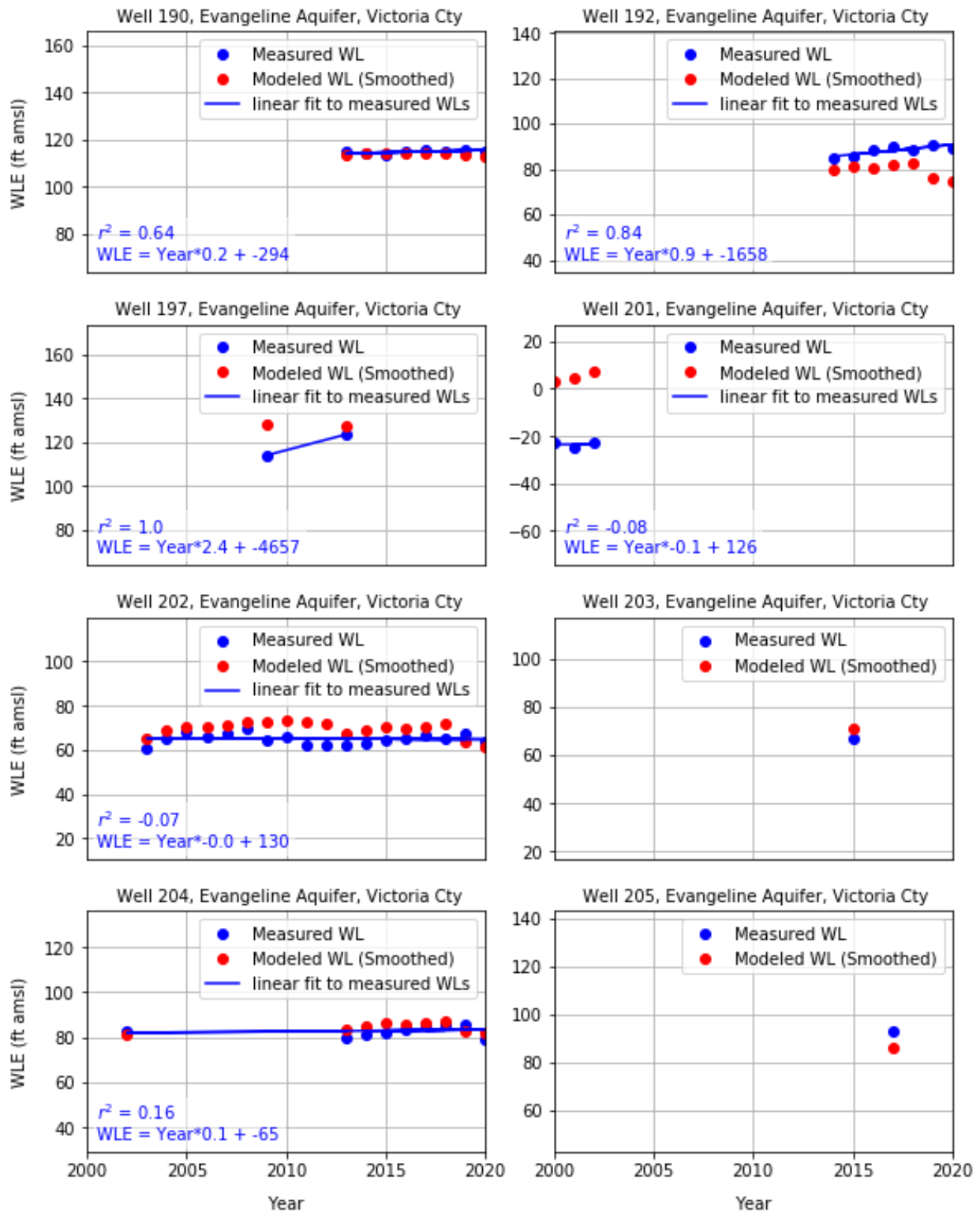
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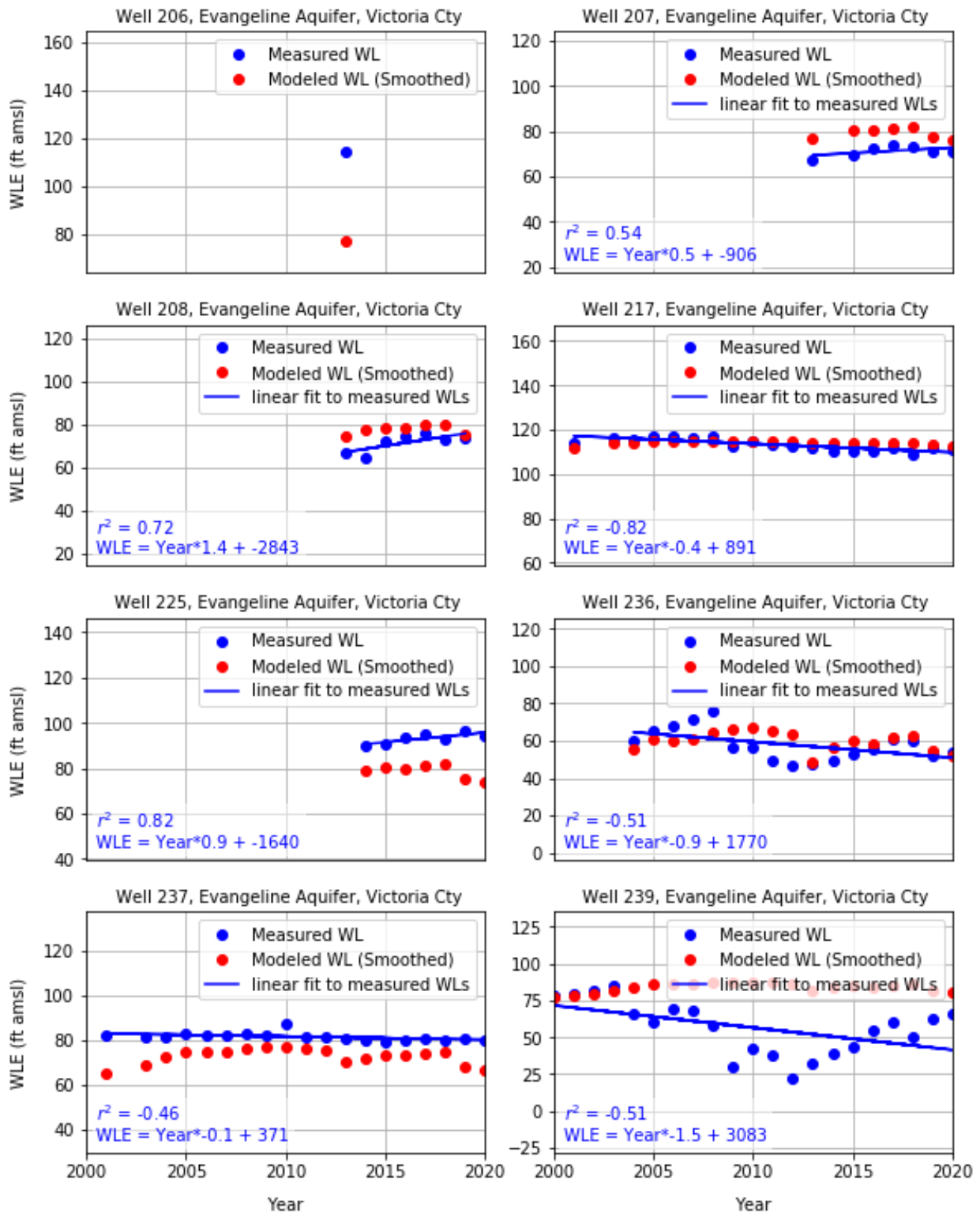


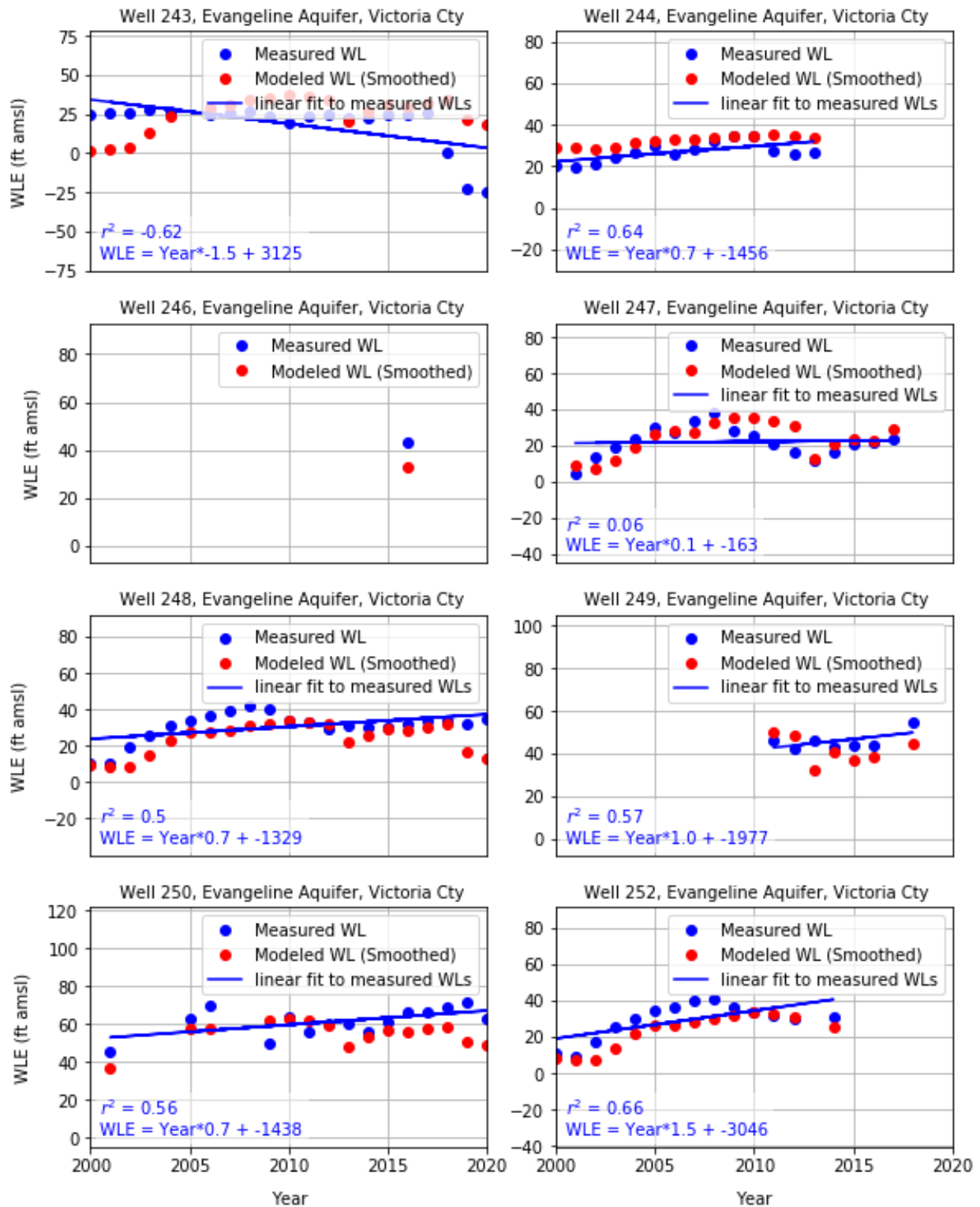
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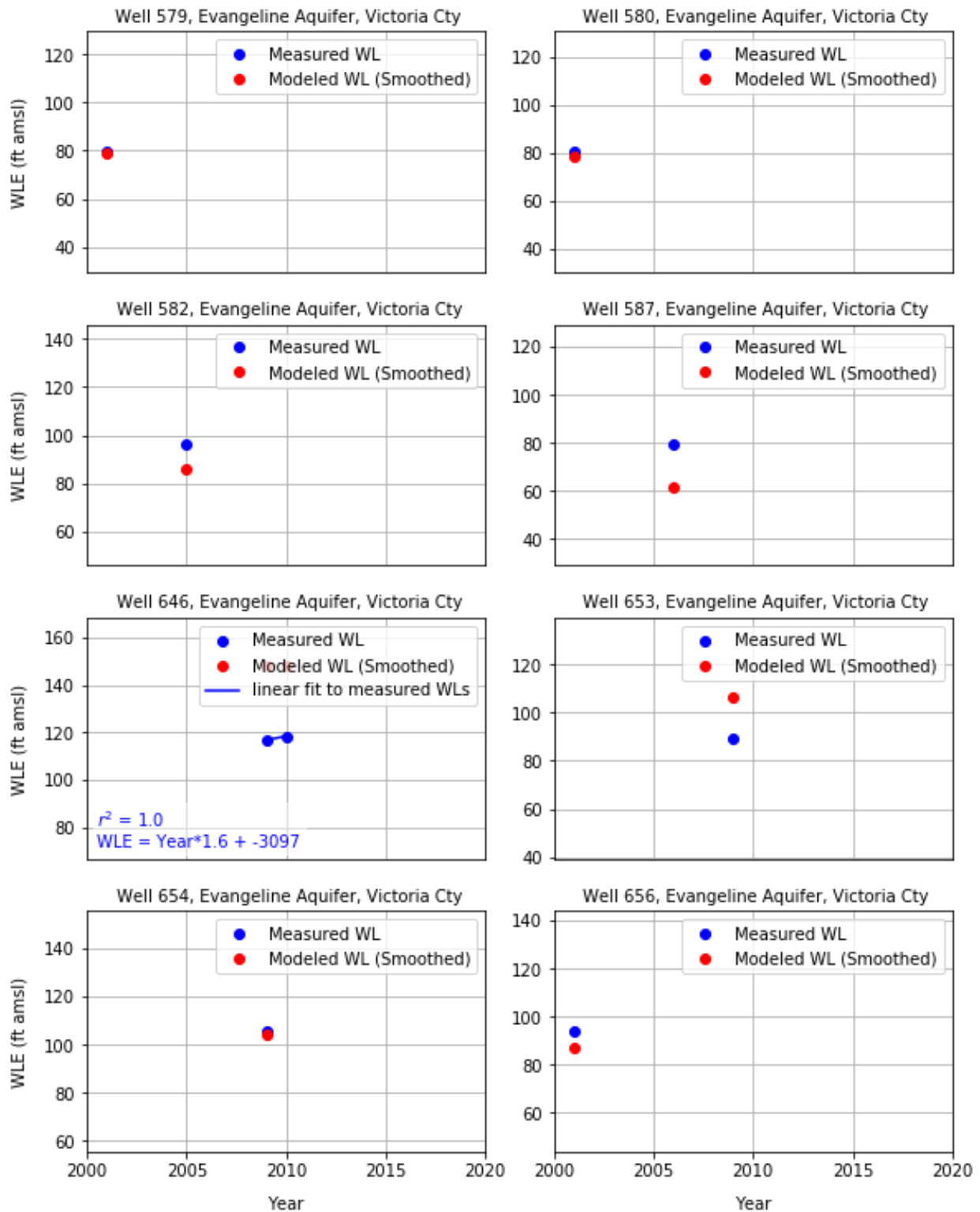
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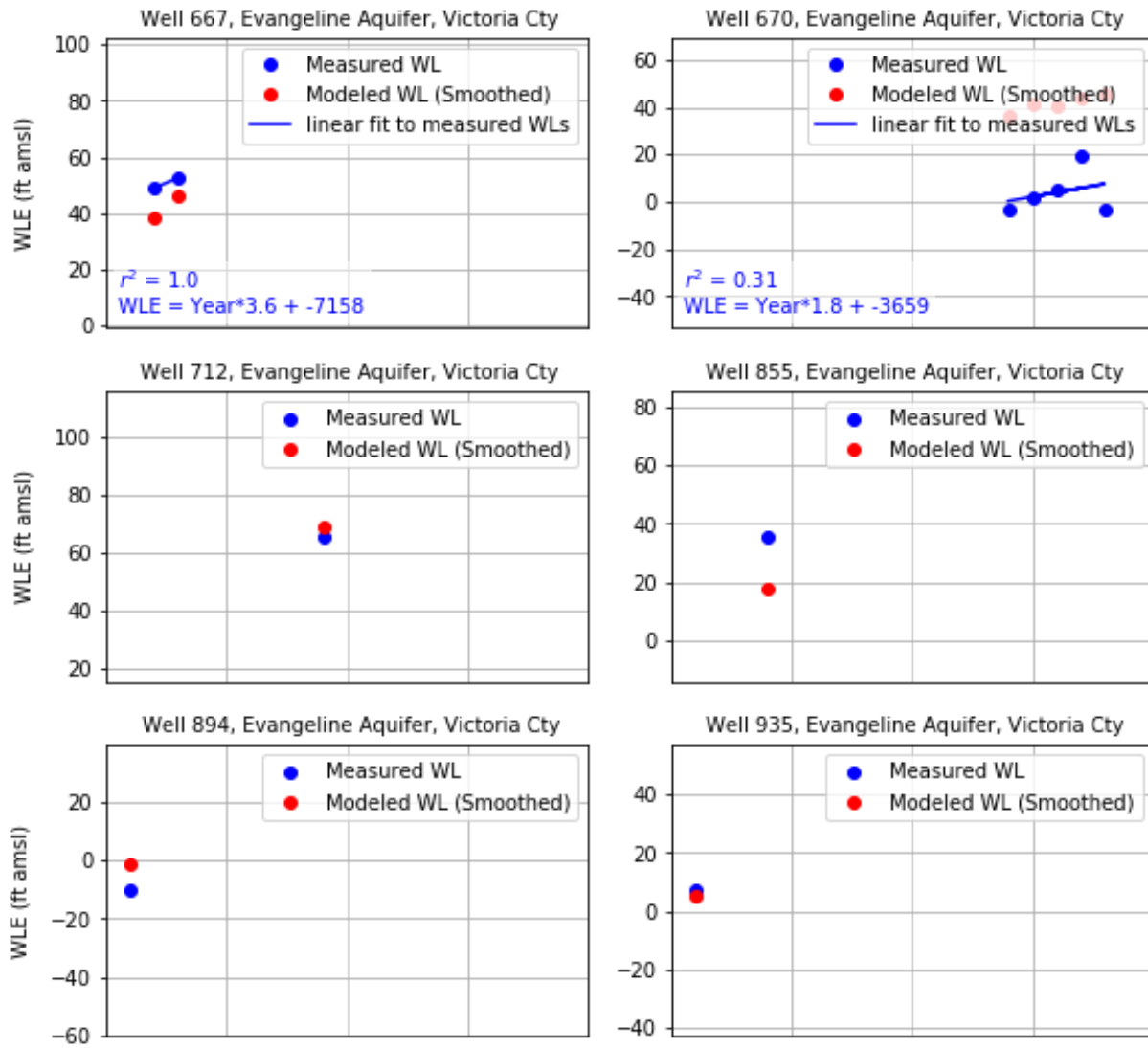




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Draft: Application of Geostatistical Techniques to Quantify Changes in Water Levels





# Texana Groundwater Conservation District

411 N. Wells, Room 118, Edna, Texas 77957

P.O. Box 1098, Edna, Texas 77957

Phone (361) 781-0624 | Fax (361) 781-0453 | www.texanagcd.org

The meeting of the Texana Groundwater Conservation District Board of Directors convened on May 20, 2021, at 8:30 AM at the 411 N. Wells, Edna, Texas.

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Kenneth Koop	Present
Precinct 2:	Michael Skalicky	Present
Precinct 3:	Robert Martin	Absent
Precinct 4:	Robert Gendke Jr.	Present
At Large:	Jim Revel	Absent
At Large:	Johnny Dugger	Present
At Large:	Fredrick Woodland	Present
General Manager:	Tim Andruss	Present
Legal Counsel:	Jim Allison of Allison, Bass & Magee, LLP	Absent

1. Call the meeting to order and welcome guests.

Discussion: Mr. Skalicky called the meeting to order at 8:30 AM.

Board Action: None.

2. Receive public comments.

Discussion: None.

Board Action: None.

3. Consideration of and possible action on matters related to groundwater management including the efforts and activities of the District regarding permitting as well as complaints, investigations, and enforcement cases associated with permitting.

### 3.1 - Report regarding Groundwater Management

Discussion: Mr. Andruss explained that as of March 2, 2021, the District had one administratively complete permitting case related to drilling and operating a well awaiting processing, two administratively complete permitting cases related to well registrations awaiting processing.

Board Action: None.

### 3.2 - Groundwater Production from Ekstrom Aquaculture Well Field

Discussion: Mr. Andruss explained that on May 14, 2021, Ekstrom Aquaculture submitted the performance report for April 2021. Based on the achievement of the performance standards established with waiver WV-20191219-01 during the preceding reporting period, production

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curtailment is not required. However, the performance standards of waiver WV-210191219-01 for the fresh zone were not satisfied for April 2021. The average conductivity measurement for April 2021 (which did not include any measurements in April until April 7th) was 2,806  $\mu\text{S}/\text{cm}$ . The maximum allowable conductivity average under waiver WV-20191219-01 is 2,087  $\mu\text{S}/\text{cm}$ .

The District is investigating potential issues with the instruments and conductivity measurements associated with the East-Lower Fresh Monitoring Well (FMW-3) at the Ekstrom Fish Farm.

The District is evaluating potential amendments to address issues identified and experienced during the initial year of implementation of the waiver and amendment suggested by Ekstrom.

Board Action: None.

### 3.3 - Wells for Palmetto Dam Investigation by LNRA

Discussion: Mr. Andruss explained that on May 13, 2021, Mr. Brzozowski, General Manager of Lavaca-Navidad River Authority, inquired about permitting requirements for wells that may be needed to investigate water seepage downstream of the Palmetto Dam. Initially, the management recommendation was to be a recommendation that the Board waive the permitting requirements for the wells for the project based the initial impression that the wells were needed to address an emergency situation related to dam integrity. However, upon further consideration and apparent lack of an emergency, the District notified LNRA that drilling and production permits would likely be required for proposed wells of the project on May 18, 2021. Representatives of LNRA were invited to participate in the meeting and the discussion of this matter.

Mr. Brzozowski clarified that "under this initial engineering study we plan to place a single (one) test well and multiple static observation wells and/or piezometers to measure and monitor changes in water surface elevations across a portion of the maximum dam section" and requested that the District give timely consideration to the permitting request as the study is a pressing issue.

Board Action: None.

4. Consideration of and possible action on matters related to groundwater protection including complaints, investigations, violations and enforcement cases.

#### 4.1 - Enforcement Case - ENC-20200505-01 - Edwin Juranek

Discussion: Mr. Andruss explained that on April 15, 2021, the District notified Mr. Juranek of the violations and offer to settle the new violations.

On April 27, 2021, the District received acknowledgement and acceptance of the District's settlement offer of April 15, 2021. The acknowledgement included a groundwater production report for the subject well and a revised well log.

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On April 28, 2021, the District (Mr. Andruss and Mr. Faltysek) visited Mr. Juranek's property to discuss the settlement agreement and inspect the subject well. Mr. Juranek confirmed 1) he drilled the well; 2) he modified his well log but did not re-work the well in any way; and 3) he was not currently operating the well. He explained that he would likely need to operate the well in 2 weeks to water existing crops. The District inspected the subject well, collected a water level measurement from the existing house well (a potential candidate for a monitoring well), and measured the depth of an existing, capped 2" well (another candidate for a monitoring well). Mr. Andruss offered to send an email message regarding deficiencies identified with Mr. Juranek's production permit request and a draft waiver request for his consideration.

On May 11, 2021, the District reviewed the production permit request AOW-20200709-06 and determined the application remains administratively incomplete. The deficiencies and supplemental information required to complete the application were identified. A draft waiver request was prepared to assist Mr. Juranek in submitting an administratively complete waiver request if he is unable to address certain application deficiencies for which he can show good cause for the Board to waive the related permitting requirements. On May 12, 2021, the District sent message regarding the required supplemental information for the application to Mr. Juranek via email at [bjuranek@ykc.com](mailto:bjuranek@ykc.com).

The settlement offer of April 15, 2021, required that Mr. Juranek "cease groundwater production immediately from the subject well until you demonstrate: 1. the subject well was re-worked/re-construct in a manner that satisfies the annular seal requirements of Rule 7.2.3.a; or ..." plug the well. Mr. Juranek submitted a revised well log that changed the section 10 of the form regarding the Annular Seal Data. Mr. Juranek changed the depth of the seal from 20 feet below the surface to 50 feet below the surface:

Rule 7.2.3 reads as follows: Non-grandfathered wells and replacement wells must be completed such that annular space is filled from ground level to a depth of ten (10) feet as specified under Texas Administrative Code, Chapter 76, Water Well Drillers and Pump Installers Rules, the annular space seal crosses a confining layer having a thickness in excess of five (5) feet, and in accordance with the following specifications and in compliance with the local county or incorporated city ordinances: a. The annular space between the borehole wall and the casing of a well shall be filled with an authorized annular space sealant such that: i. The annular space is sealed from ground level to the top of the water producing strata; or ii. The annular space is sealed from ground level to a depth of fifty (50) feet below the land surface; or iii. The annular space is sealed from ground level to a depth of ten (10) feet below the land surface and the placement of at least two commercially manufactured, formation packers that exceed the diameter of well boring by at least 2 inches in the annular space and placement of a commercially manufactured, formation packers that exceed the diameter of well boring by at least 2 inches in the annular space in each confining stratigraphic layers above the production zone of the well.

Since the well was not "reworked/reconstructed" or plugged as required by the settlement offer, the Board should determine if the revised well log is sufficient to address the identified violation regarding well completion.

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Board Action: None.

5. Consideration of and possible action on matters related to groundwater monitoring.

## 5.1 - Drought Monitoring

Discussion: Mr. Andruss explained that the United States Drought Monitor, an information source produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration, indicates that no portions of Jackson County were experiencing moderate drought conditions as of May 11, 2021.

Board Action: None.

6. Consideration of and possible action on matters related to groundwater conservation.

Discussion: None.

Board Action: None.

7. Consideration of and possible action on matters related to groundwater resource planning including Groundwater Management Area 15 Joint Planning and regional water planning.

Discussion: Mr. Andruss explained that the District will participate in the next Region P Regional Water Planning Group Meeting when scheduled.

The District participated in the Management Area 15 Meeting convened on April 8, 2021. The representatives of GMA 15 proposed for adoption a GMA-Wide DFC and County-Specific DFCs. The proposed DFCs and supporting information were mailed to member districts beginning the public comment period (at least 90 days) on the proposed DFCs. The District will conduct a public hearing regarding the proposed DFCs. The hearing is planned for July 15, 2021.

Board Action: None.

8. Consideration of and possible action on matters related to groundwater policy including the Management Plan of the District and the Rules of the District.

## 8.1 - Management Plan Adoption

Discussion: Mr. Andruss on May 10, 2021, Mr. Allen of TWDB notified the District that the revised draft management plan passed the pre-review conducted by TWDB and the District could proceed with the public hearing and adoption of the Management Plan of the District. The hearing for and consideration of revised management plan will be scheduled for July 15, 2021.

Board Action: None.

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9. Consideration of and possible action on matters related to groundwater research.

Discussion: None.

Board Action: None.

10. Consideration of and possible action on matters related to performance management including management goals and objectives of the District.

Discussion: None.

Board Action: None.

11. Consideration of and possible action on matters related to meeting management including minutes of previous meetings.

## 11.1 - Report regarding Meeting Management

Discussion: Mr. Andruss explained that the next meeting of the Board of Directors is scheduled for July 15, at 8:30 AM in the Jackson County Services Building, 411 N. Wells, Edna, Texas 77957.

Board Action: None.

## 11.2 - Minutes of Previous Meeting

Discussion: Mr. Andruss explained that the minutes for the meeting held on April 15, 2021, were sent the board members prior to the meeting.

Board Action: Mr. Gendke moved to accept and approved the meeting minutes for April 15, 2021, as drafted. Mr. Koop seconded the motion. The motion passed unanimously.

12. Consideration of and possible action on matters related to financial management including the annual budget of the district, financial reports of the district, bills and invoices of the district.

## 12.1 - Report on Financial Management

Discussion: Mr. Andruss explained that the financial reports for April 2021 have been compiled, reviewed, and sent to the board members prior to the meeting. All expenditures are related to business of the District and properly authorized.

Board Action: Mr. Skalicky moved to accept and approve the financial records for April 2021, as presented. Mr. Koop seconded the motion. The motion passed unanimously.

13. Consideration of and possible action on matters related to office administration and management including personnel, staffing, employment agreements, consultant agreements, interlocal

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cooperation agreements, and support services provided to and from other groundwater conservation districts.

## 13.1 - Report regarding Administration and Management

Discussion: Mr. Andruss explained that for a second year, local government entity employees who have access to a local government computer system or database and elected officials must take a DIR-certified cybersecurity course by June 14, 2021, as required by Texas Government Code Section 2054.5191. TMLIRP makes available a video that includes a self-administered test. This option is available to anyone who can access the website. See <http://bit.ly/TMLIRPCyber> for the video.

Once the training is completed by staff and directors, Tammy Amaimo, Administrative Assistant will submit the Cybersecurity Training Certification for Local Governments form at [www.dir.texas.gov](http://www.dir.texas.gov) to the DIR by June 15, 2021, to verify the District's compliance after training has been completed. The board members present, Mr. Koop, Mr. Skalicky, Mr. Woodland, Mr. Duggar, and Mr. Gendke reported that they had completed the Cybersecurity Training.

Board Action: None.

## 14. Consideration of and possible action on matters related to legal counsel report.

Discussion: None.


Board Action: None.

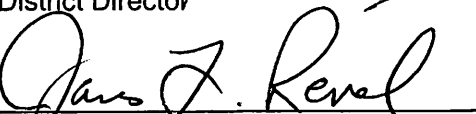
## 15. Adjourn.

Board Action: Mr. Dugger moved to adjourn the meeting at 10:25 AM, after concluding all business of the District. Mr. Skalicky seconded the motion. The motion passed unanimously.

The above and foregoing minutes were read and approved on this the 15<sup>th</sup> day of July, 2021.

ATTEST:

  
District Director

  
District Director

# Texana Groundwater Conservation District

411 N. Wells, Room 118, Edna, Texas 77957

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The meeting of the Texana Groundwater Conservation District Board of Directors convened at 411 N. Wells, Edna, Texas 77957 on Thursday, October 15, 2020 at 8:30 AM.

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Mr. Kenneth Koop, Treasurer	Absent
Precinct 2:	Mr. Michael Skalicky, President	Absent
Precinct 3:	Mr. Robert Martin, Director	Present
Precinct 4:	Mr. Fredrick Woodland, Director	Present
At Large:	Mr. Jim Revel, Secretary	Present
At Large:	Mr. Johnny Dugger, Vice President	Present
At Large:	Mr. Robert Gendke, Jr., Director	Present
General Manager:	Mr. Tim Andruss	Present
Legal Counsel:	Mr. Jim Allison of Allison, Bass & Magee, LLP	Present

1. Call the meeting to order and welcome guests.

Management Discussion: Mr. Dugger called the meeting to order at 8:30 AM.

Board Action: No action taken.

2. Receive public comments.

Management Discussion: None.

Board Action: No action taken.

3. Consideration of and possible action on matters related to groundwater management including the efforts and activities of the District regarding permitting as well as complaints, investigations, and enforcement cases associated with permitting.

### 3.1 - Ekstrom Aquaculture - Performance Report for CY2020M09

Management Discussion: Mr. Andruss explained that on October 13, 2020, Mr. Ekstrom submitted the monitoring report as required by waiver WV-20191219-01 via email. The report contains all the required elements. The report contains 1) the groundwater production data collected by Ekstrom, 2) the water level monitoring data and conductivity data collected by the District, and 3) an evaluation of the production and monitoring data relative to the performance standards established within waiver WV-20191219-01.

Ekstrom reported 127.25 acre-feet of production from the well field in September 2020 with a cumulative production of 1,020 acre-feet in Year 2020.

Based on the evaluation of the performance criteria relative to the measurements collected during most recently closed reporting period, the performance criteria established in waiver WV-20101219-01 were NOT achieved. In particular, the water level requirement

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established for the East - Lower Fresh (FMW-3) DAMW was exceeded the maximum water level change permitted during the reporting period. The maximum water level change permitted during the reporting period for the East - Lower Fresh (FMW-3) DAMW is 10 feet. The average water level change for the East - Lower Fresh (FMW-3) DAMW was 11.16 feet. This represents the first instance of failure to satisfy performance criteria since August 2020.

The waiver requires, under Section 5.11 - Fresh Zone Performance Responses, that "[i]n the event that any performance criteria are not satisfied during two consecutive reporting periods, groundwater production from wells of the subject well field zone during the next reporting period shall be curtailed to 75 percent of the PGW of the most recent reporting period."

Board Action: No action taken.

## **3.2 - PRC-20200922-01 - Ekstrom Aquaculture**

Management Discussion: Mr. Andruss explained that Mr. James P. Ekstrom for Ekstrom Aquaculture, LLC seeks an amendment to drilling permit DP-20200521-01 related to the replacement of well GW-00452/IW-3, under permitting request case PRC-20200922-01, to extend the permit expiration date from November 17, 2020, to November 17, 2021 "due to operations disruptions caused by the Covid-19 pandemic."

On September 24, 2020, the District completed the public notice requirements for this case.

As of October 14, 2020, the District had not received any protests regarding the permitting request.

Item 8 of Rule 4.2 of the Rules of the District states that drilling permits shall be valid for 180 days (approximately 6 months).

Currently, the drilling permit DP-2020051-01 expires on November 11, 2020.

Board Action: Mr. Dugger moved to 1) proceed with the case as an uncontested matter and 2) amend drilling permit DP-20200521-01 by extending the expiration date of April 15, 2021. Mr. Martin seconded the motion. Motion passed unanimously.

## **3.3 - Ekstrom Aquaculture - Permitting Policies related to Plugged Wells, Replacement Wells**

Management Discussion: Mr. Andruss explained that on September 17, 2020, the Board requested a briefing on replacing well GW-00452/IW-3 after the expiration of the existing drilling permit for a replacement well for well GW-00452/IW-3.

Board Action:



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8:49 AM – Mr. Revel moved to go into closed session for legal consultation regarding replacing well GW-00452/IW-3 after the expiration of the existing drilling permit for a replacement well for well GW-00452/IW-3. Mr. Dugger seconded the motion. Motion passed unanimously.

9:00 AM – Mr. Dugger moved to open session. Mr. Woodland seconded the motion. Motion passed unanimously.

Board Action: Mr. Dugger moved to authorize the release of the letter from Mr. Allison regarding IW-3 (GW-00452) Additional Legal Issues. Mr. Martin seconded the motion. Motion passed unanimously.

4. Consideration of and possible action on matters related to groundwater protection including complaints, investigations, violations and enforcement cases.

Management Discussion: None.

Board Action: No action taken.

5. Consideration of and possible action on matters related to groundwater monitoring.

## **5.1 - Continuous Aquifer Monitoring Equipment**

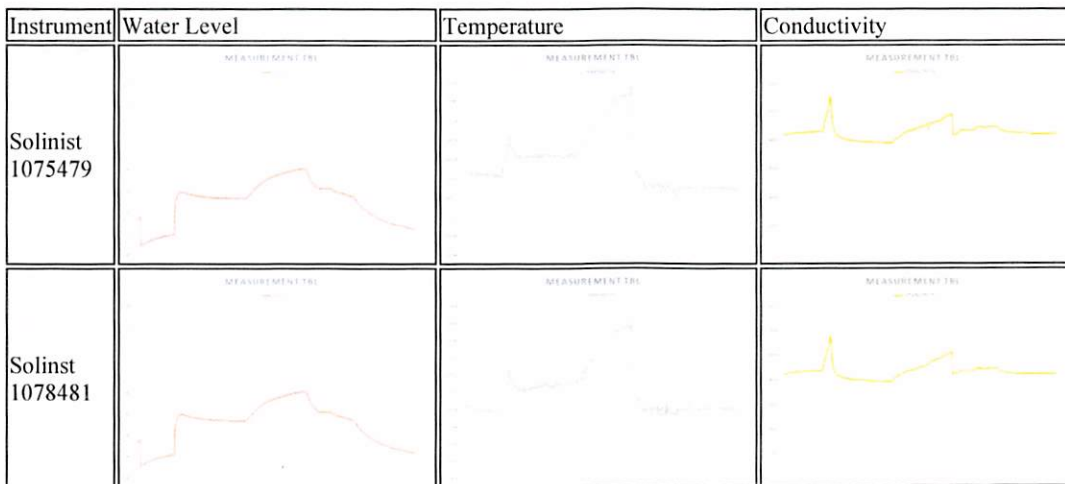
Management Discussion: Mr. Andruss explained that as authorized by the Board, the District rented In-Situ equipment for one month for the purposes of evaluating certain instruments for use at the Ekstrom Site. The rented units were deployed in the Upper Brackish and Lower Brackish monitoring wells at the Center Aquifer Monitoring Site at the Ekstrom Fish Farm between August 17 and September 9, 2020.

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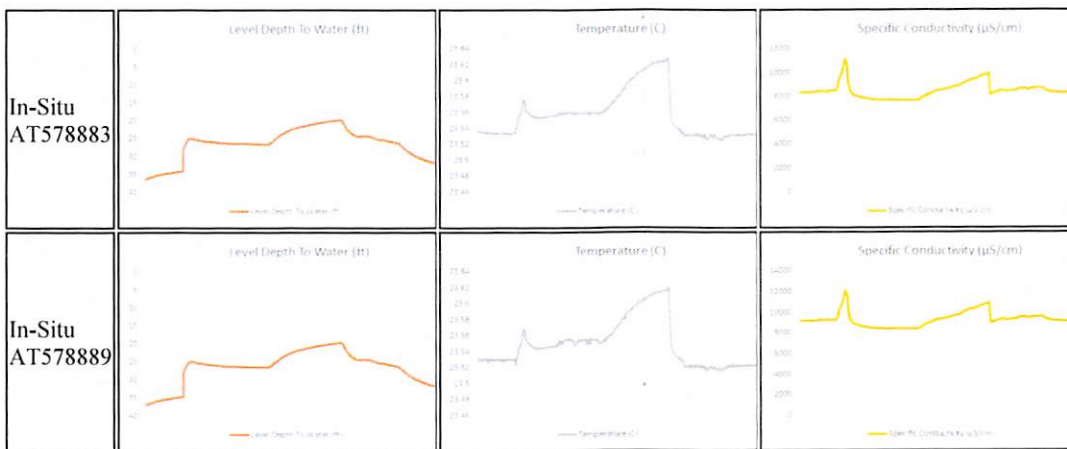
### Data Collected at the Center Aquifer Monitoring Site from the Upper Brackish Dedicated Aquifer Monitoring Well (Center - UB DAMW)

Instrument	Avg Water Level (ft)	Avg Temperature (°C)	Avg Conductivity (µS/cm)
Solinist 1075479	27.57	22.76	8572.71
Solinst 1078481	27.40	23.50	8741.54
In-Situ AT578883	27.05	23.55	8486.01
In-Situ AT578889	27.04	23.54	9292.33



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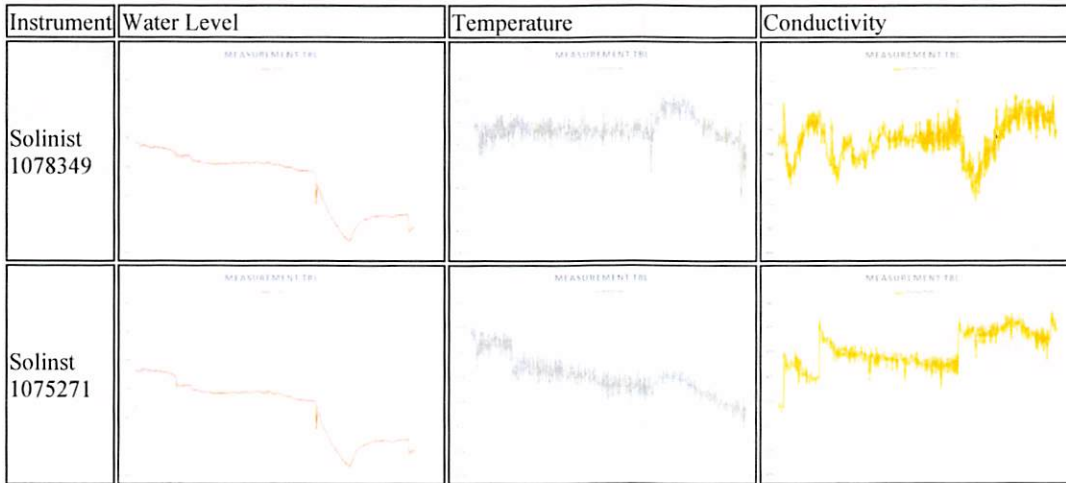


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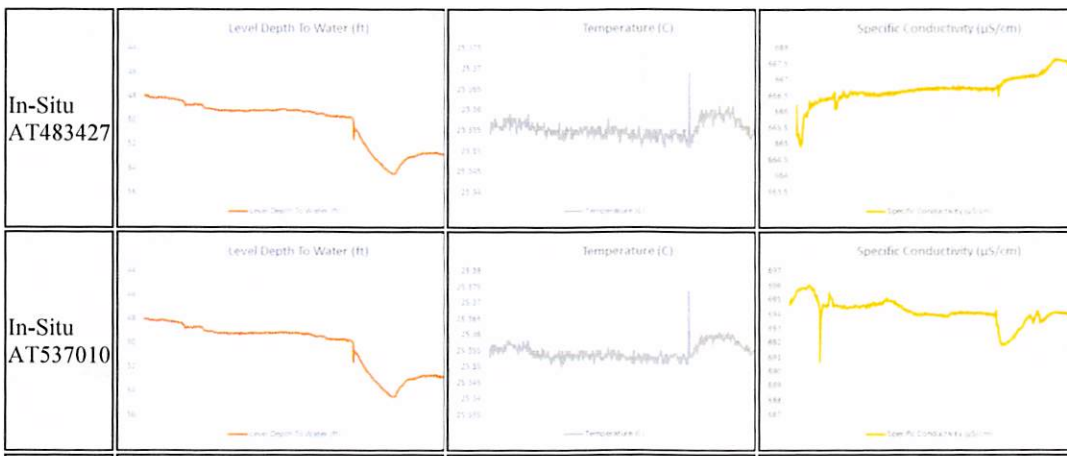
**Data Collected at the Center Aquifer Monitoring Site from the Lower Fresh Dedicated Aquifer Monitoring Well (Center - LF DAMW)**

Instrument	Avg Water Level (ft)	Avg Temperature (°C)	Avg Conductivity (µS/cm)
Solinist 1078349	48.98	25.22	707.20
Solinist 1075271	49.29	25.29	678.09
In-Situ AT483427	50.39	25.35	666.79
In-Situ AT537010	50.40	25.35	694.15



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The District was able to configure and deploy the In-Situ instruments with relative ease. The District was able to retrieve the monitoring data and complete the post processing tasks with relative ease. The In-Situ instruments had no operational failures during the limited test period. The resulting data appears to be comparable to the data produced from the Solinst instruments during the test period with greater differences in graph shapes observed in the conductivity data collected from the lower fresh monitoring well.

Based on the data presented above, the District has concluded that the performance of the In-Situ instruments was satisfactory and could be used as monitoring equipment at the Ekstrom Aquaculture Fish Farm. However, given the recent operational stability experienced with the Solinst instruments, a transition to In-Situ instruments is not recommended at present.

Board Action: No action taken.

## 6. Consideration of and possible action on matters related to groundwater conservation.

Management Discussion: None.

Board Action: No action taken.

## 7. Consideration of and possible action on matters related to groundwater resource planning including Groundwater Management Area 15 Joint Planning and regional water planning.

### 7.1 - Report regarding Groundwater Resource Planning

Management Discussion: Mr. Andruss explained that the District participated in TWDB's stakeholder meeting regarding a new groundwater availability model (GAM) for central and southern Gulf Coast Aquifer. The District requested additional time to provide comments on the conceptual plan. TWDB has indicated that it would accept comments beyond the original comment deadline of October 16, 2020.

The District, in cooperation with VCGCD, has requested proposals from Dr. Young and Dr. Uddameri for a project to review and comment the conceptual plan. The costs of the proposals submitted by Dr. Young and Dr. Uddameri exceed the estimate costs. Additional funding will be required to proceed with the review.

Board Action: Mr. Revel moved to increase the funding level of the cooperative effort to have the conceptual plan reviewed by \$500 to \$2,500. Mr. Dugger seconded the motion. Motion passed unanimously.

### 7.2 - TWDB Exempt-Use Estimates

Management Discussion: Mr. Andruss explained that TWDB has completed an analysis of existing data to estimate the volume of groundwater used for "rural domestic, livestock, mining, and rig supply exempt uses." The associated report specifies "[t]hese estimates

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are based on a comprehensive survey of groundwater wells in the TWDB Groundwater Database (GWDB), the TWDB Water Use Survey, the 2017 State Water Plan (SWP), the newest projected demand estimates for the upcoming 2021 SWP,, and population data from the Texas Demographic Center." The report includes a note that "these estimates may not represent actual use from exempt wells." TWDB has estimated exempt use of groundwater in Jackson County at 1,581 acre-feet. This estimate used in the joint planning process likely significantly underestimates the volume of water produced from water wells within Jackson County that are categorized as exempt-use wells by the District.

Board Action: No action taken.

8. Consideration of and possible action on matters related to groundwater policy including the Management Plan of the District and the Rules of the District.

## 8.1 - Legislative Support Services

Management Discussion: Mr. Andruss explained that on September 25, 2020, Greg Ellis submitted responses to the Formal Request for Information issued by the House Natural Resource Committee on behalf of VCGCD, CCGCD, RGCD, and TGCD. The responses addressed the topics of Achieving DFCs and Marketing of Groundwater.

Board Action: No action taken.

9. Consideration of and possible action on matters related to groundwater research.

Management Discussion: None.

Board Action: No action taken.

10. Consideration of and possible action on matters related to performance management including management goals and objectives of the District.

Management Discussion: None.

Board Action: No action taken.

11. Consideration of and possible action on matters related to meeting management including minutes of previous meetings.

Management Discussion: Mr. Andruss explained that the recommended meeting schedule for future meetings during Fiscal Year 2021 is as follows:

January 21, 2021 at 8:30 AM

- Officer Elections

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- By-Laws and Administrative Policy Review
- Annual Report
- Audit Report
- DFC Proposals

April 15, 2021 at 8:30 AM

- Draft Rule Revisions
- Replacement Wells

July 15, 2021 at 8:30 AM

- Expense Budget Recommendation

August 19, 2021 at 8:30 AM

- Revenue Budget and Tax Rate Recommendation

September 16, 2021 at 8:30 AM

- Budget

Board Action: Mr. Dugger moved to approve the amended meeting schedule for FY2021. Mr. Martin seconded the motion. Motion passed unanimously.

## **11.2 - Minutes of Previous Meeting**

Management Discussion: Mr. Andruss explained that the minutes for the meeting held on September 17, 2020, were sent the board members prior to the meeting.

Board Action: Mr. Revel moved to accept and approve the meeting minutes for September 17, 2020, as drafted. Mr. Dugger seconded the motion. Motion passed unanimously.

12. Consideration of and possible action on matters related to financial management including the annual budget of the district, financial reports of the district, bills and invoices of the district.

## **12.1 - Financial Reports and Records**

Management Discussion: Mr. Andruss explained that the financial reports for September 2020 have been compiled, reviewed, and sent to the board members prior to the meeting. All accounts reconcile with internal records. All funds of the District are properly secured by FDIC Insurance and pledged collateral. All internal controls have been reviewed and adhered to. All expenditures are related to business of the District and properly authorized.



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**Board Action:** Mr. Gendke moved to accept and approve the financial records for September 2020. Mr. Dugger seconded the motion. Motion passed unanimously.

**Management Discussion:** Mr. Andruss presented a list of recommended amendments to the FY2020 Budget intended to resolve all exceedances of actual credits and debits as compared to the original budget.

**Board Action:** Mr. Martin moved to amend the FY2020 Budget as recommended. Mr. Dugger seconded the motion. Motion passed unanimously.

## 12.2 - Unpaid Accounts Payable

**Management Discussion:** Mr. Andruss explained that the District has outstanding accounts payable invoices that are not considered regular and routine for which the District has received the goods and services billed for under the invoices.

**Board Action:** Mr. Revel move to authorize the general manager to pay the following items: TGCD - Adm - FM - Accounts Payable - ACCTP-20201005-03 - \$190.30 - Invoice No. 3453520920 - Victoria Advocate - OPEN/CLOSED; TGCD - Adm - FM - Accounts Payable - ACCTP-20201006-01 - \$537.20 - Invoice No. 8777 - TML - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20201013-01 - \$20.40 - Invoice No. 94189 - Jackson County Herald Tribune - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20201014-01 - \$150.00 - Invoice No. ILA-20201013-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20201014-02 - \$6,626.44 - Invoice No. ILA-202009-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20201014-03 - \$6,725.62 - Invoice No. ILA-202010-T - VCGCD - OPEN. Mr. Dugger seconded the motion. Motion passed unanimously.

13. Consideration of and possible action on matters related to office administration and management including personnel, staffing, employment agreements, consultant agreements, interlocal cooperation agreements, and support services provided to and from other groundwater conservation districts.

## 13.1 - Projects and Schedule

**Management Discussion:** Mr. Andruss explained that the listing below outlines the projects to be completed by the District, in addition to routine activities such as permit application processing and casing placement inspections, during the fiscal year grouped by operational programs:

Program 2000 - Groundwater Conservation

- Water Conservation Article

Program 3000 - Groundwater Management

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- Groundwater Production Reporting for CY2020
- Production Permit Renewals and New Permits for CY2020

## **Program 4000 - Groundwater Monitoring**

- Aquifer Condition Assessment using Geostatistics
- Synoptic Water Level Monitoring for FY2021
- Synoptic Water Quality Monitoring for FY2021
- Ekstrom Monitoring for CY2021

## **Program 5000 - Groundwater Policy**

- Rule Revisions
- Legislative Session Monitoring

## **Program 6000 - Groundwater Protection**

- Water Well Inspections for FY2021

## **Program 7000 - Groundwater Research**

## **Program 8000 - Groundwater Resource Planning**

- DFC (3rd Cycle) Adoption
- TWDB Groundwater Availability Model Evaluation

## **Program 1000 - Administration**

- Performance Audit for FY2020
- Financial Audit for FY2020
- Cyber Security Training for FY2021
- Open Government Training for FY2021

Board Action: No action taken.

## **13.2 - Cyber Security Training**

Management Discussion: Mr. Andruss explained that all employees have watched the TMLIRP Cyber Security Training YouTube Video (link: [https://www.youtube.com/watch?v=pCRbR2ka\\_0o](https://www.youtube.com/watch?v=pCRbR2ka_0o)) and submitted their self-administered Cyber Security Test for archiving in the records of VCGCD. The training requires

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approximately 20 minutes to complete. Directors that submit their results to the District will have those results archived in the District's records to document his completion of the training.

Board Action: No action taken.

## 13.3 - Electronic Record Backup

Management Discussion: Mr. Andruss explained that the District budgeted \$1,950 (PRG 1000- Function 1900- Category 433) for the implementation of a system to back up the electronic records of the District. The backup system relies on subscriptions to a system integration service (Zapier) and a cloud-base file sharing service (Dropbox) at a cost of \$840 per year.

Board Action: Mr. Martin moved to authorize the General Manager to implement the record back up system. Mr. Dugger seconded the motion. Motion passed unanimously.

## 13.4 - Website Re-Work

Management Discussion: Mr. Andruss explained that the District has re-designed its website. The new website is structured based on the primary programs of the District and closely aligns with the record keeping system, meeting management processes, and financial management processes.

In addition to the home page, the website has one or more pages dedicated to each program of the District: Groundwater Conservation, Groundwater Management, Groundwater Monitoring, Groundwater Policy, Groundwater Protection, Groundwater Research, Groundwater Resource Planning, and Administration. This structure enables the efficient maintenance and expansion of information provided to the public.

Notable changes to the website include:

1. contact names and numbers for each program;
2. a page with a google map for the Jackson County;
3. a page dedicated to Aquifer Monitoring at Ekstrom Fish Farm;
4. expanded information related to the Administrative Program;
5. information regarding the relationship between the District and VCGCD.

Finally, in an effort to simplify the use of the District's website and provide a consistent interface for uses, the websites of VCGCD, CCGCD, and RGCD would re-designed in a similar fashion and structure.

Board Action: No action taken.

## 14. Consideration of and possible action on matters related to legal counsel report.

Management Discussion: None.

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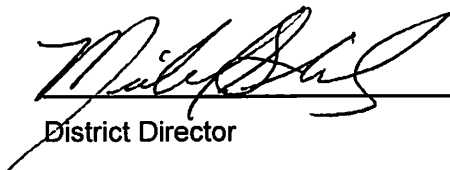
Board Action: No action taken.


15. Adjourn.

Board Action: Mr. Dugger moved to adjourn the meeting at 9:56 AM. Mr. Gendke seconded the motion. Motion passed unanimously.

The above and foregoing minutes were read and approved on this the 30 day of November, 2020.

ATTEST:

  
District Director

  
District Director

# Texana Groundwater Conservation District

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The meeting of the Texana Groundwater Conservation District Board of Directors convened at 411 N. Wells, Edna, Texas 77957 on Monday, January 4, 2021 at 8:30 AM.

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Kenneth Koop	Present
Precinct 2:	Michael Skalicky	Present
Precinct 3:	Robert Martin	Present
Precinct 4:	Robert Gendke Jr.	Present
At Large:	Jim Revel	Absent
At Large:	Johnny Dugger	Present
At Large:	Fredrick Woodland	Present
General Manager:	Tim Andruss	Present
Legal Counsel:	Jim Allison of Allison, Bass & Magee, LLP	Present

## AGENDA

1. Call the meeting to order and welcome guests.

Management Discussion: Mr. Skalicky called the meeting to order at approximately 8:30 AM.

Board Action: None.

2. Receive public comments.

Management Discussion: None.

Public Comments: None.

Board Action: None.

3. Consideration and possible action on matters related to a request for forbearance regarding groundwater production curtailment from water wells of the Ekstrom Aquaculture Well Field in accordance with waiver WV-20191219-01.

Management Discussion:

Mr. Andruss informed the Board that Ekstrom had submitted the pumping and monitoring report for December 2020, the performance criteria of the waiver had been satisfied, and the curtailment of groundwater production in the fresh zone wells would be revised from 0 AF to 7.5 AF for January 2021 (i.e., a 25% reduction of the most recent production from the fresh zone: 10 AF of production that had inadvertently been pumped in November 2020).

Mr. Andruss explained that waiver WV-20191219-01 establishes the water level performance criteria for monitoring wells for the fresh zone at the Ekstrom Fish Farm. Average drawdowns in excess of 10 feet relative to the initial water level conditions established for the fresh zone

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monitoring wells represent an exceedance. Curtailment of production from the fresh zone water wells is required when exceedances have occurred for two or more consecutive reporting periods, i.e., months. The average drawdown observed for September, October, and November 2020 at the East Lower Fresh Monitoring Well (FMW-3) have exceeded 10 feet. The reference water level for the East Lower Fresh Monitoring Well (FMW-3) is 48.3 feet.

Below is a summary of groundwater production and average drawdown values for fresh zone monitoring wells.

Report Period	Well Field Production	Brackish Water Production	Fresh Water Production	Production from IW-1	Production from IW-2	Production from IW-3	Avg. Drawdown at FMW-1	Avg. Drawdown at FMW-2	Avg. Drawdown at FMW-3
August 2020	149.9 AF	141.6 AF	8.4 AF	6.7 AF	1.7 AF	0.0 AF	45.3 '	47.9 '	53.4 '
September 2020	127.3 AF	102.0 AF	25.3 AF	14.3 AF	11.0 AF	-	48.8 '	52.2 '	59.5 '
October 2020	210.2 AF	210.2 AF	0.0 AF	0.0 AF	0.0 AF	-	49.0 '	52.1 '	59.4 '
November 2020	185.0 AF	175.0 AF	10.0 AF	0.0 AF	10.0 AF	-	49.9 '	53.8 '	61.9 '

Waiver WV-20191219-01 includes the following provision: *"The General Manager may waive or reduce the performance responses described in this section if the Permitted Entity makes a scientifically-credible showing that the exceedance was caused by conditions outside the Permitted Entity's reasonable control, including force majeure."*

On December 10, 2020, Ekstrom Aquaculture submitted a report developed by Mr. Lee Wilson to support their request for the District for forbearance of curtailment of groundwater production from wells of the fresh groundwater zone and requested the scheduling of a special meeting of the Board of Directors to consider the forbearance request. The report includes appendices of Mr. Wilson's resume and a summary of expert testimony provided by Mr. Wilson.

On December 10, 2020, the District forwarded the report developed by Mr. Lee Wilson to Dr. Uddameri and requested a proposal for the review of the report. Dr. Uddameri has been asked to *"review the report and determine if the conclusions expressed in the report are scientifically credible and supportive of any forbearance on the District's part."* Subsequently, Dr. Uddameri confirmed his intention to complete his review by the end of the year.

Dr. Uddameri presented his review of the report developed by Mr. Lee Wilson and concluded that report did not represent a scientifically-credible showing that the exceedances were caused by conditions outside of Ekstrom's reasonable control.

Board Action: None.

4. Adjourn.

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Board Action: Mr. Dugger moved to adjourn the meeting at 10:51 AM. Mr. Gendke seconded the motion. Motion passed unanimously.

The above and foregoing minutes were read and approved on this the 15th day of April, 2021.

ATTEST:



District Director



District Director

# Texana Groundwater Conservation District

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The meeting of the Texana Groundwater Conservation District Board of Directors convened on January 21, 2021 at 8:30 AM at 411 N. Wells, Edna, Texas.

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Kenneth Koop	Absent
Precinct 2:	Michael Skalicky	Present
Precinct 3:	Robert Martin	Present
Precinct 4:	Fredrick Woodland	Present
At Large:	Jim Revel	Present
At Large:	Johnny Dugger	Absent
At Large:	Robert Gendke, Jr.	Present
General Manager:	Tim Andruss	Present
Legal Counsel:	Jim Allison of Allison, Bass & Magee, LLP	Present

## **Agenda Item 1: Call the meeting to order and welcome guests.**

Discussion: Mr. Revel called the meeting to order at approximately 8:49 AM.

Board Action: None.

## **Agenda Item 2: Receive public comments.**

Discussion: None.

Board Action: None.

## **Agenda Item 3: Consideration and possible action on matters related to a request for forbearance regarding groundwater production curtailment from water wells of the Ekstrom Aquaculture Well Field in accordance with waiver WV-20191219-01.**

### 3.1 - Ekstrom Forbearance Request

Discussion: Mr. Andruss explained that on January 8, 2021, Mr. Ekstrom provided a response to Dr. Uddameri's review of the technical report developed by Dr. Wilson. The response was forwarded to Dr. Uddameri for review. In the same message, Mr. Ekstrom requested reconsideration of the forbearance request, and a new request for forbearance based on animal welfare and the consideration of the "ethical question of imposing preventable suffering and death to our animals, and instead allow us to pump the necessary volume to respond appropriately to any crisis that occurs during the current curtailment period(s)."

On January 11, 2021, the District responded to Mr. Ekstrom's message requesting clarification of "the specific provision under Chapter 36 of the Texas Water Code, the Rules of the District, or related permits and waivers you believe support the new requests and provide additional details about each request including the volume of production you are requesting to be authorized, the period of time for which you are requesting the adjustment, the circumstances under which the



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adjusted production would be used, and the purpose of use of the produced groundwater (e.g., emergency fish pond maintenance, pumping drawdown test)."

On January 20, 2021, Mr. Ekstrom notified the District that his technical consultant and legal counsel intended to make a presentation to the Board via virtual meeting applications or telephone.

On January 20, 2021, Dr. Uddameri notified the District, via a phone call, that he had reviewed Dr. Wilson's response to his review and the response did not present any new evidence that altered his previous conclusions.

Mr. Jacobs and Dr. Wilson participated in the meeting via telephonic connections.

At 11:24 AM, Mr. Martin moved to go into closed session for legal consultation. Mr. Woodland seconded the motion. Motion passed unanimously.

At 11:58 AM, Mr. Revel moved to open session. Mr. Skalicky seconded the motion. Motion passed unanimously.

Board Action: Mr. Revel moved to instruct the General Manager to withhold any enforcement action against Ekstrom Aquaculture for production from IW-1, IW-2, and IW-3 within permitted volumes until March 31, 2021 and continue to accumulate information on the effect of groundwater production, both within and without the Ekstrom permitted wells, and report to the board on or before March 31, 2021. Mr. Skalicky seconded the motion. Motion passed unanimously.

**Agenda Item 4: Consideration of and possible action on matters related to groundwater management including the efforts and activities of the District regarding permitting as well as complaints, investigations, and enforcement cases associated with permitting.**

## 4.1 - Report regarding Groundwater Management

Discussion: Mr. Andruss explained that the District has initiated 45 permitting request cases (PRCs) since October 1, 2020.

As of January 20, 2021, the following permitting matters remain unresolved with the District:

A. Administratively Incomplete Permitting Applications requiring coordination with Applicant:  
TGCD - GMa - PR - Drilling Permit Requests - ADW-20200720-04 - Otto C. Stanford - Administratively Incomplete  
TGCD - GMa - PR - Drilling Permit Requests - ADW-20200730-03 - Kemp Properties, LP - Administratively Incomplete  
TGCD - GMa - PR - Production Permit Requests - AOW-20200519-01 - Carl Swenson - Administratively Incomplete  
TGCD - GMa - PR - Production Permit Requests - AOW-20200709-06 - Edwin Juranek - Administratively Incomplete

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TGCD - GMa - PR - Production Permit Requests - AOW-20200730-04 - Kemp Properties, LP - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AOW-20200923-03 - Charley W. Koop - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AOW-20200923-04 - High Cotton Land Complany, LLC - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AOW-20200928-01 - B'Mann Farms, LLC - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AVW-20190128-01 - Mark Kallus - Status: Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARW-20190128-03 - Mark Kallus - Status: Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARW-20200709-02 - Edwin Juranek - WELLLOGID - Administratively Incomplete

B. Permitting Applications considered Dormant:

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-01 - Formosa Plastics (Aggregate Production Application) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-02 - Formosa Plastics (Well 3) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-03 - Formosa Plastics (Well 7) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-04 - Formosa Plastics (Well 8) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-05 - Formosa Plastics (Well 10) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-06 - Formosa Plastics (Well 11) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-07 - Formosa Plastics (Well 12) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-08 - Formosa Plastics (Well 13) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-09 - Formosa Plastics (Well 14) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-10 - Formosa Plastics (Well 16) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AONW-20120123-11 - Formosa Plastics (Well 17) - Administratively Incomplete

TGCD - GMa - PR - Production Permit Requests - AOW-20190128-02 - Mark Kallus - Status: Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-01 - Formosa Plastics (Well 3) - Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-02 - Formosa Plastics (Well 7) - Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-03 - Formosa Plastics (Well 8) - Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-04 - Formosa Plastics (Well 10) - Administratively Incomplete

# Texana Groundwater Conservation District

411 N. Wells, Room 118, Edna, Texas 77957

P.O. Box 1098, Edna, Texas 77957

Phone (361) 781-0624 | Fax (361) 781-0453 | [www.texanagcd.org](http://www.texanagcd.org)

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-05 - Formosa Plastics (Well 11)

- Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-06 - Formosa Plastics (Well 12)

- Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-07 - Formosa Plastics (Well 13)

- Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-08 - Formosa Plastics (Well 14)

- Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-09 - Formosa Plastics (Well 16)

- Administratively Incomplete

TGCD - GMa - PR - Registration Requests - ARGNW-20120123-10 - Formosa Plastics (Well 17)

- Administratively Incomplete

TGCD - GMa - PR - Transport Permit Requests - ATW-20120123-01 - Formosa Plastics - Administratively Incomplete

C. Permitting Cases being reviewed for consistency with the Rules of the District:

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200717-01 - ARW-20200709-02/AOW-20200709-06 - Edwin Juranek - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200717-02 - ARPP-20200716-02 - Vanderbilt Farmers Co-op, Inc - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200928-02 - AOW-20200923-03 - Charley W. Koop - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200928-03 - AOW-20200923-04 - High Cotton Land Complany, LLC - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200928-04 - AOW-20200928-01 - B'Mann Farms, LLC - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201103-02 - ADW-20201028-01/AOW-20201028-02 - Ms Henke Family Limited Partnership - Pending

TGCD - GMa - PR - Amend Permit or Certificate Requests - AAPC-20200127-13 - Laddie Lee Krenek - VPW-20150520-01/GW-00382 - Administratively Incomplete

TGCD - GMa - PR - Dormant Well Designation Requests - ADWD-20200303-02 - Lee Hafernack - Administratively Complete

D. Permitting Cases awaiting public comment or consideration by the Board of Directors:

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200928-01 - AOW-20200923-01 - Dugger Family Limited Partnership - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201029-01 - AOW-20201012-01 - Russell K. Ring - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201103-01 - ARW-20201020-02/AVW-20201020-03 - HMC Land Trust - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201202-02 - AOW-20201202-01 - M.S. Henke Family Limited Partnership - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201207-01 - AOW-20201008-01/02/03/04/05 - Robert McCurdy, II - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201228-01 - AOW-20201228-01 - Wraxall Holdings, LP - Pending

E. Permitting Cases awaiting final completion and close-out:

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200928-01 - AOW-20200923-01 - Dugger Family Limited Partnership - Pending

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TGCD - GMa - Pe - Permitting Request Cases - PRC-20201029-01 - AOW-20201012-01 - Russell K. Ring - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201103-01 - ARW-20201020-02/AVW-20201020-03 - HMC Land Trust - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201202-02 - AOW-20201202-01 - M.S. Henke Family Limited Partnership - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201207-01 - AOW-20201008-01/02/03/04/05 - Robert McCurdy, II - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201228-01 - AOW-20201228-01 - Wraxall Holdings, LP - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20201230-01 - ADW-20201214-01 - LNRA - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20170213-01 - Hearing Date: - Roen LLC - Closed

TGCD - GMa - Pe - Permitting Request Cases - PRC-20170801-01 - Hearing Date: - Gideon Baptist Church - Closed

TGCD - GMa - Pe - Permitting Request Cases - PRC-20180514-03 - ADW-20180514-01/AOW-20180514-02 - Russell Johnson - Complete

TGCD - GMa - Pe - Permitting Request Cases - PRC-20181009-06 - ADW-20181009-01/AOW-20181009-03 - Larry Ellis - Status: Approved

TGCD - GMa - Pe - Permitting Request Cases - PRC-20181009-07 - ADW-20181009-02/AOW-20181009-04 - Larry Ellis - Status: Approved

TGCD - GMa - Pe - Permitting Request Cases - PRC-20190304-03 Part C - AWW, ADWs, AOWF - Ekstrom Aquaculture, LLC - Status: Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20191101-01 - ADW-20191001-01 /AOW-20191007-01 - Brock Family Partnership - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20191106-02 - ADW-20191106-02/AOW-20191106-03 - Morales Baptist Church - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200108-01 - ADW-20200108-01/AOW-20200108-02 - LNRA - Pending

TGCD - GMa - Pe - Permitting Request Cases - PRC-20200504-01 - ADW-20200427-01/AOW-20200427-02 - Almetta S. Clark - Pending

F. Permits awaiting final execution

TGCD - GMa - Pe - Production Permits - OPW-20160414-01 - Ernest F. Roth - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - OPW-20160525-02 - Dorothy Jacobs Koop Life Estate by Charley W. Koop - Active

TGCD - GMa - Pe - Production Permits - OPW-20170306-02 - ROEN, LLC - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - OPW-20170825-02 - Gideon Baptist Church - Draft

TGCD - GMa - Pe - Production Permits - OPW-20180618-01 - Russell Johnson - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - OPW-20190124-01 - L and S Land - Pending

TGCD - GMa - Pe - Production Permits - OPW-20190124-02 - Land S Land - Pending

TGCD - GMa - Pe - Production Permits - OPW-20190315-01 - Mirage Industrial Group, LLC - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - OPW-20191119-01 - Morales Baptist Church - Draft

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TGCD - GMa - Pe - Production Permits - OPW-20191121-01 - Brock Family Partnership, LTD - Draft

TGCD - GMa - Pe - Production Permits - OPW-20200220-01 - Lavaca Navidad River Authority - Draft

TGCD - GMa - Pe - Production Permits - OPW-20200225-02 - Double B Energy, LLC - Draft

TGCD - GMa - Pe - Production Permits - OPW-20200520-01 - Almetta S. Clark - Draft

TGCD - GMa - Pe - Production Permits - OPW-20200817-02 - Shaun J. Garza - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - PPA-20200107-01 - Carlon Budd - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - PPA-20200107-02 - Kemp Properties, LP - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - PPA-20200113-01 - Todish Farms - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - VPW-20150917-02 - Elizabeth C. Rogers - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - VPW-20150917-05 - Mauritz Rogers - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - VPW-20150917-07 - Elizabeth C. Rogers - Approved/Unexecuted

TGCD - GMa - Pe - Production Permits - VPW-20181025-01 - Formosa Plastics Corporation, Texas - Draft

TGCD - GMa - Pe - Production Permits - VPW-20181025-03 - Formosa Plastics Corporation, Texas - Draft

TGCD - GMa - Pe - Production Permits - VPW-20190808-01 - Dorothy M. Morton - Approved/Unexecuted

G. The District has the following investigations open related to Groundwater Management:

TGCD - GMa - CIE - Investigations - INV-20141015-01 - Failure to Obtain Permit - Non-Exempt Uses from Non-Grandfathered Well - Active

TGCD - GMa - CIE - Investigations - INV-20150410-01 - Failure to Obtain Permit - Non-Exempt Uses from Non-Grandfathered Well - Active

TGCD - GMa - CIE - Investigations - INV-20160525-02 - Failure to Obtain Permit - Non-Exempt Uses from Non-Grandfathered Well - Active

TGCD - GMa - CIE - Investigations - INV-20180302-01 - Failure to Obtain Permit - Well Drilling - Active

TGCD - GMa - CIE - Investigations - INV-20190926-01 - Failure to Obtain Permit - Well Drilling - Active

TGCD - GMa - CIE - Investigations - INV-20200522.1355 - Failure to Obtain Permit - Non-Exempt Uses from a Non-Grandfathered Well - Active

TGCD - GMa - CIE - Investigations - INV-20200911.0917 - Failure to Obtain Permit - Well Drilling - Active

TGCD - GMa - CIE - Investigations - INV-20160225.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active

TGCD - GMa - CIE - Investigations - INV-20160225.0900 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active

TGCD - GMa - CIE - Investigations - INV-20160330.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active

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TGCD - GMa - CIE - Investigations - INV-20160405.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160411.0100 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160411.1200 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160425.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160503.1000 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160516.0200 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160613.1000 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160718.1100 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160811.0100 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160811.0400 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160822.0900 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20161013.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20170418.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20170526.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20180713.0900 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20180926.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20181218.0900 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20181218.1000 - Failure to Register a Non-Grandfathered or Replacement Water Well - Active  
TGCD - GMa - CIE - Investigations - INV-20160711-01 - Failure to Satisfy Permit Condition or Rule - Drilling of Water Well without Proper License - Active  
TGCD - GMa - CIE - Investigations - INV-20160712-01 - Failure to Satisfy Permit Condition or Rule - Drilling of Water Well without Proper License - Active  
TGCD - GMa - CIE - Investigations - INV-20170118-01 - Failure to Satisfy Permit Condition or Rule - Well Located Outside of Authorized Drilling Area - Active  
TGCD - GMa - CIE - Investigations - INV-20170208-01 - Failure to Satisfy Permit Condition or Rule - Well Located Outside of Authorized Drilling Area - Active  
TGCD - GMa - CIE - Investigations - INV-20170214-02 - Failure to Satisfy Permit Condition or Rule - Well Located Outside of Authorized Drilling Area - Active

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TGCD - GMa - CIE - Investigations - INV-20161228-01 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20161228-02 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20170525-01 - Failure to Submit an Accurate Well Log  
- Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20170526-01a - Failure to Submit an Accurate Well Log  
- Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20171121-01 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-02 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-03 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-04 - Failure to Submit an Accurate Well Log  
- Well Location and Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-05 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-06 - Failure to Submit an Accurate Well Log  
- Well Location and Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-07 - Failure to Submit an Accurate Well Log  
- Well Location and Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-08 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-09 - Failure to Submit an Accurate Well Log  
- Well Location - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-10 - Failure to Submit an Accurate Well Log  
- Well location - Active  
TGCD - GMa - CIE - Investigations - INV-20171122-11a - Failure to Submit an Accurate Well Log  
- Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20180125-01 - Failure to Submit an Accurate Well Log  
- Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20180125-02 - Failure to Submit an Accurate Well Log  
- Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20180427-01 - Failure to Submit an Accurate Well Log  
- Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20180601-01 - Failure to Submit an Accurate Well Log  
- Annular Seal Data - Active  
TGCD - GMa - CIE - Investigations - INV-20180718-02 - Failure to Submit an Accurate Well Log  
- Annular Seal Data and Screen Data - Active  
TGCD - GMa - CIE - Investigations - INV-20180719-01 - Failure to Submit an Accurate Well Log  
- Annular Seal Data and Screen Data - Active  
TGCD - GMa - CIE - Investigations - INV-20180808-01 - Failure to Submit an Accurate Well Log  
- Annular Seal Data and Screen Data - Active  
TGCD - GMa - CIE - Investigations - INV-20181005-01 - Failure to Submit an Accurate Well Log  
- Annular Seal Data and Screen Data - Active

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TGCD - GMa - CIE - Investigations - INV-20181017-01 - Failure to Submit an Accurate Well Log - Annular Seal Data - Active

TGCD - GMa - CIE - Investigations - INV-20181017-02 - Failure to Submit an Accurate Well Log - Annular Seal Data and Screen Data - Active

TGCD - GMa - CIE - Investigations - INV-20181017-03 - Failure to Submit an Accurate Well Log - Annular Seal Data and Screen Data - Active

TGCD - GMa - CIE - Investigations - INV-20181218-01 - Failure to Submit an Accurate Well Log - Well Location - Active

TGCD - GMa - CIE - Investigations - INV-20190522-01 - Failure to Submit an Accurate Well Log - Well Location - Active

On January 20, 2021, the District closed the following investigations without a finding that related violation(s) persist:

TGCD - GMa - CIE - Investigations - INV-20160212.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20160405.0900 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20160411.1000 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20160513.0100 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20160520.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20160613.1100 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20160630.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20161228.0900 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20161228.1000 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20161228.1200 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20170201.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20170626.0800 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

TGCD - GMa - CIE - Investigations - INV-20180112.1257 - Failure to Submit an Accurate Well Log - Annular Seal Data - Closed

TGCD - GMa - CIE - Investigations - INV-20190923.0900 - Failure to Register a Non-Grandfathered or Replacement Water Well - Closed

Board Action: None.

#### 4.4.a - Permitting Request Case - PRC-20200928-01 – DFLP

Discussion: Mr. Andruss explained that Mr. Johnny Dugger for Dugger Family Limited Partnership seeks, under permitting request case PRC-20200928-01, a production permit authorizing production of groundwater for construction and agriculture uses at rates not to exceed



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90 gallons per minute or 145 acre-feet per year from well GW-00082. The subject well is located on a 1592-acre tract of land near the intersection of FM 1593 and Highway 35 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permit is properly conditioned, the operation of the existing well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On January 5, 2021, the public notice related to the consideration of the permit case was completed.

As of January 20, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Martin moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; 2) issue a production permit to Dugger Family Limited Partnership under application AOW-20200928-01 with the following conditions in accordance with the Rules of the District: Authorized Purpose of Use: construction and agriculture uses; Authorized Maximum Rate of Production per Minute: 90 gallons per minute; Authorized Maximum Rate of Production per Year: 145 acre-feet per year; and Expiration Date: July 31, 2025. Mr. Gendke seconded the motion. The motion passed unanimously.

#### 4.4.b - Permitting Request Case - PRC-20201029-01 - R. Ring

Discussion: Mr. Andruss explained that Mr. Russell K. Ring seeks, under permitting request case PRC-20201029-01, a production permit authorizing production of groundwater for domestic, livestock, fire protection, and pasture irrigation uses at rates not to exceed 150 gallons per minute or 190 acre-feet per year from well NW-00273. The subject well is located on a 384-acre tract of land near the intersection of County Road 284 and County Road 401 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permit is properly conditioned, the operation of the existing well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On January 5, 2021, the public notice related to the consideration of the permit case was completed.

As of January 20, 2021, the District had not received notice of intent to contest the permitting request.

Management Recommendation: Mr. Martin moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; 2) issue a production permit to Mr. Ring under application AOW-20201012-01 with the following conditions in accordance with the Rules of the

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District: Authorized Purpose of Use: domestic, livestock, fire protection, and pasture irrigation uses; Authorized Maximum Rate of Production per Minute: 150 gallons per minute; Authorized Maximum Rate of Production per Year: 190 acre-feet per year; and Expiration Date: July 31, 2025. Mr. Woodland seconded the motion. The motion passed unanimously.

#### 4.4.c - Permitting Request Case - PRC-20201207-01 - R McCurdy

Discussion: Mr. Andruss explained that Mr. Robert McCurdy seeks, under permitting request case PRC-20201207-01, five production permits authorizing production of groundwater for irrigation and wildlife uses at rates not to exceed 100 gallons per minute or 49.8 acre-feet per year per well from wells NW-00150, NW-00151, NW-00152, NW-00153, and NW-00154. The subject wells are located on a 498.51-acre tract of land near the intersection of County Road 127 and FM 822 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permits are properly conditioned, the operation of the existing wells would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On January 5, 2021, the public notice related to the consideration of the permit case was completed.

As of January 20, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Martin moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; 2) issue five production permit to Mr. McCurdy under application AOW-20201008-01 with the following conditions in accordance with the Rules of the District: Authorized Purpose of Use: irrigation and wildlife uses; Authorized Maximum Rate of Production per Minute: 100 gallons per minute; Authorized Maximum Rate of Production per Year: 49.8 acre-feet per year; and Expiration Date: July 31, 2025. Mr. Gendke seconded the motion. The motion passed.

#### 4.4.d - Permitting Request Case - PRC-20201103-01 – HMC

Discussion: Mr. Andruss explained that Ms. Carol Drushel Arter for HMC Land Trust seeks, under permitting request case PRC-20201103-01, a historic use production permit authorizing production of groundwater for golf course irrigation at rates not to exceed 50 gallons per minute or 8.61 acre-feet per year from grandfathered well GW-00558. The subject well is be located on an 85-acre tract of land near the intersection of County Road 301 and County Road 3011 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permit is properly conditioned, the

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operation of the existing well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

The application identifies year 1953 as the validation year and provides a estimation of the volume produced based on operating the well at 50 GPM for 4 hours for 4.5 days per week for 52 weeks a year, totaling 2,808,000 gallons per year or 8.167 acre-feet per year. The application is supported by an affidavit from Carol Drushel Arter.

On January 5, 2021, the public notice related to the consideration of the permit case was completed.

As of January 20, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Gendke moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; and 2) authorize the general manager to issue a historic use permit to HMC Land Trust under application AVW-20201020-03 for well GW-00558 authorizing the production of 8.61 acre-feet of groundwater per year for irrigation uses. Mr. Martin seconded the motion. The motion passed unanimously.

#### 4.4.e - Permitting Request Case - PRC-20201202-01 - M.S. Henke Family Limited Partnership

Discussion: Mr. Andruss explained that Mr. Ross Russell for M.S. Henke Family Limited Partnership seeks, under permitting request case PRC-20201202-01, a production permit authorizing the production of groundwater for agriculture, livestock, and wildlife conservation and management purposes at rates not to exceed 350 gallons per minute or 100 acre-feet per year. The well drilled under permit DP-20201118-012 is located on a 1100-acre tract of land near the intersection of County Road 476 and FM 3280 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permit is properly conditioned, the operation of the existing well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On January 5, 2021, the public notice related to the consideration of the permit case was completed.

As of January 20, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Gendke moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; 2) issue a production permit to M.S. Henke Family Limited Partnership under application AOW-20201202-01 with the following conditions in accordance with the Rules of the District: Authorized Purpose of Use: agriculture, livestock, and wildlife conservation and management uses;  
Authorized Maximum Rate of Production per Minute: 350 gallons per minute;

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Authorized Maximum Rate of Production per Year: 100 acre-feet per year; and  
Expiration Date: July 31, 2025. Mr. Woodland seconded the motion. The motion passed unanimously.

#### 4.4.f - Permitting Request Case - PRC-20201228-01 - Wraxall Holdings, LP

Discussion: Mr. Andruss explained that Mr. James H. Long, Manager of Draycott Management LLC, General Partner of Wraxall Holdings, LP seeks, under permitting request case PRC-20201228-01, a production permit authorizing the production of groundwater for irrigation and agriculture uses at rates not to exceed 499 gallons per minute or 1,200 acre-feet per year. The production well will be located on a 2,450.72-acre tract of land near the intersection of CR 127 and FM 822 in Jackson County, Texas.

Mr. Long intends to rework an oil and gas well to plug the casing back to a depth of 900 feet below the surface which above the base of usable quality water as determined by the RRC (1,750 feet below the surface).

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permit is properly conditioned, the operation of the proposed well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On January 5, 2021, the public notice related to the consideration of the permit case was completed.

As of January 20, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Martin moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; 2) issue a production permit to Wraxall Holdings, LP under application AOW-20201228-01 with the following conditions in accordance with the Rules of the District: Authorized Purpose of Use: irrigation and agriculture uses; Authorized Maximum Rate of Production per Minute: 499 gallons per minute; Authorized Maximum Rate of Production per Year: 1,200 acre-feet per year; and

Expiration Date: July 31, 2025, contingent upon plugging to 900' and notice of plugging to District. Mr. Woodland seconded the motion. The motion passed unanimously.

#### 4.5 - Enforcement Case - ENC-20200505-01 - Edwin Juranek

Discussion: Mr. Andruss explained that on January 20, 2021, the District reviewed its records regarding enforcement case EC-20200505-01. A CMRRR receipt for a request for supplemental information dated October 21, 2020 could not be located. The request will be resent via CMRRR.

Board Action: None.

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## **Agenda Item 5: Consideration of and possible action on matters related to groundwater protection including complaints, investigations, violations and enforcement cases.**

Discussion: None.

Board Action: None.

## **Agenda Item 6: Consideration of and possible action on matters related to Groundwater Monitoring.**

### 6.1 - Report regarding Groundwater Level Analysis

Discussion: Mr. Andruss explained that on October 2, 2020, the District provided notice to Dr. Young of Intera to proceed with the geostatistics project as described in the proposal with a geographic scope of Victoria, Jackson, Calhoun, and Refugio Counties.

On January 18, 2021, Dr. Young provided a presentation of the certain results to be included in the final report related to the computed changes to water levels since year 2000. Slide 3 of the presentation illustrates the best estimate of water level change within Jackson County between Year 2000 and Year 2020. The slide illustrates positive change (recovery/rebound) of approximately 5 feet in water levels in the Chicot Aquifer, a negative change (drawdown/decline) of approximately 2.5 feet in the Evangeline Aquifer, and a positive change (recovery/rebound) of the Chicot and Evangeline Aquifers (combined) of approximately 2 feet which represents a reasonable assessment of water level change of the Gulf Coast Aquifer System within Jackson County.

The desired future conditions of Gulf Coast Aquifer System within GMA 15 is: drawdown shall not exceed 13 feet at December 2069.

The desired future conditions of Gulf Coast Aquifer System within Jackson County is: drawdown shall not exceed 15 feet at December 2069.

This information provided by Intera supports a conclusion that the District is fully complying with the desired future conditions of Gulf Coast Aquifer in Jackson County.

This information will be incorporated in the annual report for the District for fiscal year 2020 under Goal 7: Addressing the desired future conditions adopted by the district under Section 36.108; Objective G7O2: Analyze water level monitoring information to evaluate water level trends and determine the degree to which the DISTRICT is complying with the desired future conditions of Gulf Coast Aquifer in Refugio County.

Board Action: None.

### 6.2 - Drought Monitoring

Discussion: Mr. Andruss explained that the U.S. Drought Monitor, produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United

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States Department of Agriculture, and the National Oceanic and Atmospheric Administration, indicates that no portion of Jackson County was experiencing dry or drought conditions as of January 12, 2021.

Board Action: None.

## **Agenda Item 7: Consideration of and possible action on matters related to Groundwater Conservation.**

Discussion: Mr. Andruss explained that the District has identified an objective within its management plan to "[p]romote conservation, rainwater harvesting or brush control within Jackson County." This objective has been achieved in previous years by developing news releases promoting conservation and participating in the annual South Texas Farm and Ranch Show. Due to complications created by the COVID 19 Pandemic and other operational issues, these approaches to achieving the the objective are either no longer available or advisable. Therefore, the District will develop and maintain a webpage focusing on promoting water conservation, rainwater harvesting or brush control as a means of achieving the stated objective the District.

Board Action: None.

## **Agenda Item 8: Consideration of and possible action on matters related to groundwater resource planning including Groundwater Management Area 15 Joint Planning, DFC Proposals, and regional water planning.**

Discussion: Mr. Andruss explained that on December 29, 2020, the District requested that Dr. Uddameri develop and submit a letter with his presentation related to his review of the TWDB conceptual model for GMA 15 and 16 to TWDB.

The District participated in the Management Area 15 Meeting on January 14, 2021, at the Goliad County GCD Office. The committee is concluding the technical tasks associated with the 3rd DFC Development Cycle. Prior to the next meeting of the GMA 15 Committee, the District will consider options for proposing a DFC for GMA 15 based on the relevant technical information.

The District will participate in the Management Area 15 Meeting on April 8, 2021.

Board Action: None.

## **Agenda Item 9: Consideration of and possible action on matters related to Groundwater Policy including the Management Plan of the District and the Rules of the District.**

### 9.1 - Report regarding Groundwater Policy

Discussion: Mr. Andruss explained that on January 12, 2021, Mr. Ellis provided the District with lists of bills filed for the 87th Legislature related to Chapter 36 of the Water Code, Local Government, Open Government, and Groundwater. The 87th Legislative Session began on January 12, 2021 and is scheduled to reconvene on January 26, 2021.

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Board Action: None.

## 9.2 - Management Plan Adoption

Discussion: Mr. Andruss explained that on November 4, 2020, Mr. Allen with TWDB transmitted technical information regarding historical water use and the state water plan for use in the development of a revised management plan.

On November 18, 2020, Ms. Shearhart of TWDB transmitted GAM Run 20-006 to the District for use in the development of a revised management plan.

The current Management Plan of the District will expire on June 13, 2021. TWDB suggests that a revised plan should be adopted by March 15, 2021 and submitted to the Executive Administrator of TWDB by April 14, 2021.

The District will prepare a draft management plan revision and schedule it for hearing and consideration at the meeting of the Board scheduled for March 18, 2021.

Board Action: None.

## **Agenda Item 10: Consideration of and possible action on matters related to Groundwater Research.**

Discussion: None.

Board Action: None.

## **Agenda Item 11: Consideration of and possible action on matters related to performance management including management goals and objectives of the District.**

Discussion: None.

Board Action: None.

## **Agenda Item 12: Consideration of and possible action on matters related to meeting management including minutes of previous meeting.**

### 12.1 - Report regarding Meeting Management

Discussion: Mr. Andruss explained that the next meeting of the Board of Directors is scheduled for March 18, 2021, at 8:30 AM.

Board Action: None.

### 12.2 - Minutes of Previous Meeting

Discussion: Mr. Andruss explained that the minutes for the meeting held on January 4, 2021, were sent the board members prior to the meeting.

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Board Action: None.

## **Agenda Item 13: Consideration of and possible action on matters related to financial management including the annual budget of the district, financial reports of the district, bills and invoices of the district.**

### 13.1 - Report on Financial Management

Discussion: Mr. Andruss explained that the financial records for December 2020 have been compiled, reviewed, and sent to the board members prior to the meeting. All accounts reconcile with internal records. All expenditures are related to business of the District and properly authorized.

Board Action: Mr. Skalicky moved to accept and approve the financial records for December 2020. Mr. Woodland seconded the motion. The motion passed unanimously.

### 13.2 - Financial Audit for FY2020

Discussion: Mr. Andruss explained that Mr. Cox of Goldman, Hunt and Notz informed the District that his firm had completed the financial audit for the fiscal year ending September 30, 2020 and Mr. Cox presented the audit report at the meeting, noting a "clear" opinion.

Board Action: Mr. Revel moved to accept the financial audit for FY20200930. Mr. Woodland seconded the motion. The motion passed unanimously.

### 13.3 - Unpaid Accounts Payable

Discussion: Mr. Andruss explained that the District has outstanding accounts payable invoices that are not considered regular and routine for which the District has received the goods and services billed for under the invoices.

Board Action: Mr. Skalicky moved to authorize the general manager to pay the following items: TGCD - Adm - FM - Accounts Payable - ACCTP-20210119-01 - \$4,834.30 - Invoice No. 5037 - Allison, Bass and Magee, L.L.P - OPEN. Mr. Gendke seconded the motion. The motion passed unanimously.

### 13.4 - Prosperity Bank Accounts

Discussion: Mr. Andruss explained that in order for Ms. Amaimo, Administrative Coordinator, to obtain information and reports regarding any financial accounts, including certificates of deposit, from Prosperity Bank the board would need to authorize the bank to allow her access to do so.

Board Action: Mr. Revel moved to authorize Ms. Amaimo, Administrative Coordinator, to obtain information and reports regarding any financial accounts, including certificates of deposit, from Prosperity Bank. Mr. Skalicky seconded the motion. The motion passed unanimously.



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**Agenda Item 14: Consideration of and possible action on matters related to office administration and management including personnel, staffing, employment agreements, consultant agreements, interlocal cooperation agreements, support services provided to and from other groundwater conservation districts, administrative policies, by-laws of the District, and election of officers.**

## 14.1 - Report regarding Administration and Management

Discussion: Mr. Andruss explained that on January 19, 2021, the RGCD Board of Directors passed a resolution authorizing the payment of Fees of Office at a rate of \$250.00 per day and motion authorizing reimbursement of expenses associated with traveling to board meeting between October 1, 2019 and September 30, 2021. The RGCD Board is considering changes to the operation of their office in response to a recent employee resignation and the potential to reduce expenses.

Board Action: None.

## 14.2 - Review of Administrative Policies

Discussion: Mr. Andruss explained that on February 2020, the Board re-adopted all existing administrative policies and explicitly re-adopted the Investment Policy and By-Laws of the District. Based on a review of the records of the District, and additional policy as been located related to injection wells. While the District deliberately cancelled this policy in the past, record of a specific board action to cancel the policy cannot be identified.

Board Action: Mr. Revel moved to adopt the Investment Policy and the By-Laws of the District and ratify the cancellation the policy related to injection wells.

## 14.3 - Election of Officers of the Board

Discussion: Mr. Andruss explained that the By-Laws of the District require the election of four officers, President, Vice-President, Secretary, and Treasurer, each January. Currently, Mr. Skalicky serves as President is vacant; Mr. Dugger serves as the Office of Vice-President; Mr. Revel serves as Secretary; Mr. Koop serves as Treasurer.

Board Action: Mr. Martin moved to re-elect Mr. Skalicky serves as President is vacant; Mr. Dugger serves as the Office of Vice-President; Mr. Revel serves as Secretary; Mr. Koop serves as Treasurer. Mr. Woodland seconded the motion. The motion passed unanimously.

**Agenda Item 15: Consideration of and possible action on matters related to legal counsel report.**

Discussion: None.

Board Action: None.

**Agenda Item 16: Adjourn.**

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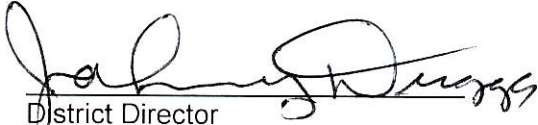
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Board Action: Mr. Gendke moved to adjourn the meeting at 12:44 PM, after concluding all business of the District. Mr. Skalicky seconded the motion. The motion passed unanimously.

The above and foregoing minutes were read and approved on this the 15th day of April, 2021.

ATTEST:

  
District Director

  
District Director

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The meeting of the Texana Groundwater Conservation District Board of Directors convened on April 15, 2021 at 8:30 AM at 411 N. Wells St., Edna, Texas 77957

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Kenneth Koop	Present
Precinct 2:	Michael Skalicky	Present
Precinct 3:	Robert Martin	Present
Precinct 4:	Fred Woodland	Present
At Large:	Jim Revel	Present
At Large:	Johnny Dugger	Present
At Large:	Robert Gendke, Jr.	Present
General Manager:	Tim Andruss	Present
Legal Counsel:	Jim Allison of Allison, Bass & Magee, LLP	Absent

1. Call the meeting to order and welcome guests.

Discussion: Mr. Skalicky called the meeting to order at approximately 8:30 AM.

Board Action: None.

2. Receive public comments.

Discussion: None.

Board Action: None.

3. Consideration of and possible action on matters related to groundwater production from water wells of the Ekstrom Aquaculture Well Field in accordance with waiver WV-20191219-01.

### 3.1 - Groundwater Production from Ekstrom Aquaculture Well Field

Discussion: Mr. Andruss explained that on January 21, 2021, the Board granted forbearance to Ekstrom Aquaculture by instructing the General Manager to withhold any enforcement action against Ekstrom Aquaculture for production from IW-1, IW-2, and IW-3 within permitted volumes until March 31, 2021.

On March 10, 2021, Ekstrom Aquaculture submitted the performance report for February 2021. Based on the information contained within the report and continued achievement of the performance standards established with waiver WV-20191219-01, production curtailment was no longer required.

The forbearance request submitted by Ekstrom Aquaculture requested forbearance through April 2021.

Board Action: None.

4. Consideration of and possible action on matters related to groundwater management including

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the efforts and activities of the District regarding permitting as well as complaints, investigations, and enforcement cases associated with permitting.

## 4.1 - Report regarding Groundwater Management

Discussion: Mr. Andruss explained that as of March 2, 2021, the District had eight NIPCRs and twenty-five well logs awaiting processing.

Board Action: None.

## 4.2 - Groundwater Production

Discussion: Mr. Andruss explained that as of April 2021, the District has recorded groundwater production of 17,109.611 acre-feet during calendar year 2020. The historic average of reported production from wells that did not supply a production value for CY2020 is 8,090.829 AF. At present, the best estimate for groundwater production in CY2020 is 25,200.44 AF.

There appear to be numerous instances in which groundwater production was not reported to the District as required by Rule 2.6: REPORTING REQUIREMENT OF NON-EXEMPT USE WELLS and, at least one instance, in which annual groundwater production was reported through an alternate procedure (e.g., Ekstrom Aquaculture monthly reports).

Board Action: Mr. Skalicky moved to 1) authorize the General Manager to open enforcement cases for each instance in which required groundwater production was not reported, 2) find that each instance of failure to report groundwater production is a violation unless the well owner can demonstrate that groundwater production for the subject well for calendar year 2020 was submitted on or before January 31, 2021, and 3) send an initial Notice of Violation (1st NOV) with an offer to settle the violation without penalty or fee if, by July 1, 2021, a) groundwater production for the subject well for calendar year 2020 is reported and b) the well owner of the subject well acknowledges the violation. Mr. Duggar seconded the motion. The motion passed unanimously.

### 4.4.1 - Permitting Request Case - PRC-20210322-01 - E. Roth

Discussion: Mr. Andruss explained that Mr. Ernest F. Roth seeks, under permitting request case PRC-20210322-01, a production permit authorizing production of groundwater for domestic, irrigation, and agriculture uses at rates not to exceed 80 gallons per minute or 2 acre-feet per year from well NW-00421. The subject well is located on a 4-acre tract of land near the intersection of FM 822 and CR 130 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permits are properly conditioned, the operation of well NW-00421 would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On April 5, 2021, the public notice related to the consideration of the permit case was completed.

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As of April 12, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Skalicky moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; 2) issue a production permit to Mr. Roth under application AOW-20210318-01 with the following conditions in accordance with the Rules of the District: Authorized Purpose of Use: domestic, irrigation, and agriculture uses; Authorized Maximum Rate of Production per Minute: 80 gallons per minute; Authorized Maximum Rate of Production per Year: 2 acre-feet per year; Expiration Date: July 31, 2025. Mr. Duggar seconded the motion. The motion passed with 6 aye and 1 nay vote. Mr. Revel voted nay.

5. Consideration of and possible action on matters related to groundwater protection including complaints, investigations, violations and enforcement cases.

## 5.1 - Enforcement Case - ENC-20200505-01 - Edwin Juranek

Discussion: Mr. Andruss explained that on April 12, 2021, the District reviewed the well log and related applications (ARW indicates capacity of 900 GPM) submitted by Mr. Juranek for the subject well of the enforcement case. Based on a review of the well log (e.g., annular seal information) and the information provided in the related applications (e.g., 900 GPM capacity), several potential violations of the Rules of the District have been identified. In particular, the following provisions of the Rules of the District appear to have been violated in addition to the rules related to obtaining drilling permits and production permits:

- Rule 4.2.4 (notice of intent to place casing),
- Rule 4.3.18 (monthly water level measurements from two or monitoring wells),
- Rule 4.3.19 (monthly water quality measurements from two or more monitoring wells),
- Rule 7.2.3.a (annular seal requirements).

Board Action: Mr. Gendke moved to:

1. extend the following settlement to Mr. Juranek:
  1. cease groundwater production immediately from the well until he demonstrates that:
    1. the subject well was re-worked/re-construct in a manner that satisfies the annular seal requirements of Rule 7.2.3.a; or
    2. the subject well was plugged and replaced in accordance with the Rules of the District including proper sealing of the annular space; and
  3. either:
    1. demonstrate the actual production rate of the subject well is less than 720,000 GPD (500 GPM) and complete with the permitting process established by the Rules of the District for wells that do not exceed a production capacity of 720,000 GPD; or
    2. install of two monitoring wells; provide the monthly water level and water quality measurements in accordance with Rule 4.3.18 and Rule 4.3.19; and complete with the permitting process established by the Rules of the District for wells that exceed a production capacity of 720,000 GPD; and

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2. authorize legal counsel to proceed with the process to bring suit against Mr. Juranek if he fails to accept the settlement offer by May 3, 2021.

Mr. Woodland seconded the motion. The motion passed unanimously.

6. Consideration of and possible action on matters related to groundwater protection including complaints, investigations, violations, and enforcement cases.

## 6.1 - Report regarding Groundwater Level Analysis

Discussion: Mr. Andruss explained that Dr. Young of Intera submitted a draft report for the project proposed by Intera titled *Proposal to Use Geostatistical Techniques to Assess Water Levels and to Evaluate Water Level Changes in Victoria County* which was modified to incorporate Jackson County at the request of the Board. After completing the technical work of the project, the District held a workshop (posted as a public meeting of the participating GCDs) during which Dr. Young presented details on the methodology used to develop the water level data and analysis.

The report includes the following passages of particular importance to the District:

On page ES-3, "Notable changes from 2000 to 2020 are: ...

Jackson County

- Chicot Aquifer: Water levels rose across about 90% of the county. Increases of about 25 ft occurred in northeast and of about 20 ft occurred in south. In the remaining areas, water levels dropped less than 5 ft.
- Evangeline Aquifer: Water levels increased across about 50% of the county with the largest increase of about 12 ft occurring in the northern region. Water levels dropped across the remaining county with the greatest decline of 10 ft occurring in the southern region."

Board Action: Mr. Skalicky moved to 1) accept the report developed by Dr. Young of Intera titled *Application of Geostatistical Techniques to Quantify Changes in Water Levels* and 2) authorize the General Manager to pay the associated invoices in an amount of \$17,500. Mr. Duggar seconded the motion. The motion passed unanimously.

## 6.2 - Drought Monitoring

Discussion: Mr. Andruss explained that the United States Drought Monitor, an information source produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration, indicates that all portions of Jackson County were experiencing moderate drought conditions as of April 6, 2021.

Board Action: None.

7. Consideration of and possible action on matters related to groundwater monitoring.

## 7.1 - Report regarding Groundwater Conservation

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Discussion: Mr. Andruss explained that in order to address conservation as required by the Management Plan of the District and TWC §36.1071(a)(7) and 31 TAC 356.52(a)(1)(G), the District has revised its website to include information and links to websites related to the District's conservation efforts. The website will continue to be updated, revised, and maintained to ensure the District is addressing conservation goals and objectives.

Board Action: None.

## 8. Consideration of and possible action on matters related to groundwater conservation.

### 8.1 - Report regarding Groundwater Resource Planning

Discussion: Mr. Andruss explained that the District will participate in the next Region P Regional Water Planning Group Meeting when scheduled.

The District participated in the Management Area 15 Meeting convened on April 8, 2021. The representatives of GMA 15 proposed for adoption a GMA-Wide DFC and County-Specific DFCs. The proposed DFCs and supporting information will be mailed to member districts soon to begin the public comment period (at least 90 days) on the proposed DFCs. The District will be required to conduct a public hearing, likely to be scheduled for July 2021, regarding the proposed DFCs during the comment period.

Board Action: None.

## 9. Consideration of and possible action on matters related to groundwater resource planning including Groundwater Management Area 15 Joint Planning, proposals for desired future conditions, and regional water planning.

### 9.1 - Management Plan Adoption

Discussion: Mr. Andruss explained that on January 21, 2021, the Board considered the technical data provided by TWDB to support the District's efforts to draft a revised management plan. The District drafted a revised management plan that incorporates the technical data as appendices and modifies other portions of the management plan. In addition to formatting changes, several objectives and performance standards have been revised, beginning on page 16 of the draft plan, to better reflect the how the District operates, and the activities completes to achieve the goals established with in the plan.

Board Action: Mr. Duggar moved to authorize the General Manager to submit the draft plan to TWDB for pre-review and make the necessary public notices for the District to conduct a hearing on the draft management plan on July 15, 2021. Mr. Revel seconded the motion. The motion passed unanimously.

## 10. Consideration of and possible action on matters related to groundwater policy including the Management Plan of the District and the Rules of the District.

Discussion: None.

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Board Action: None.

## 11. Consideration of and possible action on matters related to groundwater research.

### 11.1 - Report regarding Performance Management of the District

Discussion: Mr. Andruss explained that based on the review of the activities and projects of the Texana Groundwater Conservation District Management Plan between October 1, 2019 and September 30, 2020, the District has determined that all the goals and associated objectives, based on an assessment of the performance standards, have been fully achieved the fiscal year ending September 30, 2020.

Board Action: Mr. Revel moved to accept and approve the Annual Report for FY2020, as presented.

## 12. Consideration of and possible action on matters related to performance management including management goals and objectives of the District.

### 12.1 - Report regarding Meeting Management

Discussion: Mr. Andruss explained that the next meeting of the Board of Directors is scheduled for May 20, 2021, at 8:30 AM in the Jackson County Services Building , 411 N. Wells, Edna, Texas 77957.

Board Action: None.

### 12.2 - Minutes of Previous Meeting

Discussion: Mr. Andruss explained that the minutes for the meeting held on January 4, 2021, and January 21, 2021, were sent the board members prior to the meeting.

Board Action: Mr. Skalicky moved to accept and approved the meeting minutes for January 4, 2021, and January 21, 2021, as drafted. Mr. Duggar seconded the motion. The motion passed unanimously.

## 13. Consideration of and possible action on matters related to meeting management including minutes of previous meetings.

### 13.1 - Report on Financial Management

Discussion: Mr. Andruss explained that the financial reports for March 2021 have been compiled, reviewed, and sent to the board members prior to the meeting. All expenditures are related to business of the District and properly authorized.

Board Action: Mr. Skalicky moved to accept and approve the financial records for March 2021, as presented. Mr. Duggar seconded the motion. The motion passed unanimously.



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14. Consideration of and possible action on matters related to financial management including the annual budget of the district, financial reports of the district, bills and invoices of the district.

Discussion: Mr. Andruss explained that for a second year, local government entity employees who have access to a local government computer system or database and elected officials must take a DIR-certified cybersecurity course by June 14, 2021, as required by Texas Government Code Section 2054.5191. TMLIRP makes available a video that includes a self-administered test. This option is available to anyone who can access the website. See <http://bit.ly/TMLIRPCyber> for the video.

Once the training is completed by staff and directors, Tammy Amaimo, Administrative Assistant will submit the Cybersecurity Training Certification for Local Governments form at [www.dir.texas.gov](http://www.dir.texas.gov) to the DIR by June 15, 2021, to verify the District's compliance after training has been completed.

Board Action: None.

15. Consideration of and possible action on matters related to office administration and management including personnel, staffing, employment agreements, consultant agreements, interlocal cooperation agreements, and support services provided to and from other groundwater conservation districts.

Discussion: None.

Board Action: None.

16. Consideration of and possible action on matters related to legal counsel report.

Discussion: None.

Board Action: None.

# Texana Groundwater Conservation District

411 N. Wells, Room 118, Edna, Texas 77957

P.O. Box 1098, Edna, Texas 77957

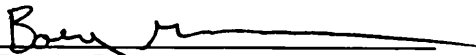
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## 17. Adjourn.

Board Action: Mr. Dugger moved to adjourn the meeting at 11:20 AM, after concluding all business of the District. Mr. Revel seconded the motion. The motion passed unanimously.

The above and foregoing minutes were read and approved on this the 20<sup>th</sup> day of may, 2021.

ATTEST:

  
District Director

  
District Director

# Texana Groundwater Conservation District

411 N. Wells, Room 118, Edna, Texas 77957

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The meeting of the Texana Groundwater Conservation District Board of Directors convened on July 15, 2021, at 8:30 AM at the 411 N. Wells, Edna, Texas.

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Kenneth Koop	Present
Precinct 2:	Michael Skalicky	Present
Precinct 3:	Robert Martin	Absent
Precinct 4:	Fredrick Woodland	Present
At Large:	Jim Revel	Present
At Large:	Johnny Dugger	Present
At Large:	Robert Gendke	Present
General Manager:	Tim Andruss	Present
Legal Counsel:	Jim Allison of Allison, Bass & Magee, LLP	Present

## Agenda Items:

1. Call the meeting to order and welcome guests.

Mr. Skalicky called the meeting to order at 8:30 AM.

2. Receive public comments.

Meeting Discussion: None.

Board Action: None.

3. Consideration and possible action regarding matters related to the litigation filed by Edna Masonic Lodge against the taxing entities of Jackson County.

### 3.1 - Edna Masonic Lodge Litigation

Meeting Discussion: Mr. Andruss explained that on June 23, 2021, the District learned, via email, that a suit had been filed against the Jackson County Central Appraisal District and certain taxing entities of Jackson County including the District.

The information received by the District regarding the case was forwarded to Mr. Allison for his review.

As of July 12, 2021, the District had received correspondence from Jackson County Commissioners' Court and the Edna ISD through which these entities authorized the legal counsel of the appraisal district to seek dismissal of the case on their behalf.

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Board Action: Mr. Dugger moved to request that the appraisal district to file a response on behalf of the District and seek dismissal of the case. Mr. Koop seconded the motion. The motion passed unanimously.

4. Consideration of and possible action on matters related to groundwater management including the efforts and activities of the District regarding permitting as well as complaints, investigations, and enforcement cases associated with permitting.

## 4.1 - Report regarding Groundwater Management

Meeting Discussion: Mr. Andruss explained that as of July 12, 2021, the District had four permitting cases related to non-exempt use wells, and 16 well logs awaiting processing by the District.

Board Action: None.

## 4.2 - Groundwater Production from Ekstrom Aquaculture Well Field

Meeting Discussion: Mr. Andruss explained that on July 12, 2021, Ekstrom Aquaculture submitted the performance report for June 2021.

Ekstrom has reported groundwater production totaling 427.016 acre-feet between January 2021 and June 2021 with 2.830 acre-feet being produced during June 2021. While conductivity levels had shown a modest decrease in the lower fresh monitoring well as the East Monitoring Site, the levels remain above the established performance condition

Based on the failure to achieve the performance standards established with waiver WV-20191219-01 during the preceding reporting period for April 2021, May 2021, and June 2021, production curtailment is required from wells producing from the Fresh Zone. The average conductivity measurement for June 2021 was 2,725  $\mu\text{S}/\text{cm}$ . The maximum allowable conductivity average under waiver WV-20191219-01 is 2,087  $\mu\text{S}/\text{cm}$ .

Board Action: None.

## 4.3 - Groundwater Production

Meeting Discussion: Mr. Andruss explained that per the Board's authorization on April 15, 2021, the District has initiated 36 enforcement cases related to potential failures to report groundwater production for CY2020. The District must extend the time period to respond to settlement offer from July 1, 2021, to August 15, 2021, due to the delay in developing the enforcement case and transmittal of notices of violation letters to well owners.

Board Action: Mr. Skalicky moved to revise the previously approved settlement offers as follows: "offer to settle the alleged violation without penalty or fee if, by September 1, 2021, a) groundwater production for the subject well for calendar year 2020 is reported and b) the well owner of the

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subject well acknowledges the violation." Mr. Revel seconded the motion. The motion passed unanimously.

## 4.4 - Production Permit Renewals

Meeting Discussion: Mr. Andruss explained that the District has received Applications to Renew a Production Permit. In order for the District to approve the request to renew a production permit, the Rules of the District require the permit holder to a) be current in paying any fee required by the district; b) not be subject to a pending enforcement action for a substantive violation of a district permit, order, or rule that has not been settled by agreement with the district or a final adjudication; or c) be current in paying any civil penalty or otherwise comply with any order resulting from a final adjudication of a violation of a district permit, order, or rule.

Board Action: Mr. Revel moved to authorize the general manager to issue production permit renewals for the permits associated with the following renewal requests: Permitting Request Cases - PRC-20210422-02 - ARPP-20210422-01 - Kinder Morgan Tejas Pipeline, LLC; Permitting Request Cases - PRC-20210527-02 - ARPP-20210525-01 - Tennessee Gas Pipeline Company, LLC. Mr. Dugger seconded the motion. The motion passed unanimously.

### 4.5.1 - Permitting Request Case - PRC-20210621-01 - Black Sheep Ag. LLC

Meeting Discussion: Mr. Andruss explained that Mr. Houston Hennigh for Black Sheep Ag, LLC seeks, under permitting request case PRC-20210621-01, a drilling permit and production permit authorizing construction of a well and the production of groundwater for crop irrigation uses at rates not to exceed 475 gallons per minute or 37.5 acre-feet per year. The proposed well will be located on a 75-acre tract of land near the intersection of County Road 256 and County Road 257 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permits are properly conditioned, the drilling and operation of the proposed well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On July 2, 2021, the public notice related to the consideration of the permit case was completed.

As of July 13, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Revel moved to cancel the permit hearing and proceed with the permitting case as an uncontested matter. Mr. Skalicky seconded the motion. The motion passed unanimously.

Board Action: Mr. Skalicky moved to approve the drilling permit to Black Sheep Ag, LLC under application ADW-20210618-01 with the requirement that the proposed well be offset from the nearest property line by 50 feet and 475 feet from wells owned by other landowners. Mr. Revel seconded the motion. The motion passed unanimously.

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Board Action: Mr. Revel moved to issue a production permit to Black Sheep Ag, LLC under application AOW-20210618-02 with the following conditions in accordance with the Rules of the District: Authorized Purpose of Use: crop irrigation uses; Authorized Maximum Rate of Production per Minute: 475 gallons per minute; Authorized Maximum Rate of Production per Year: 37.5 acre-feet per year; and Expiration Date: July 31, 2026. Mr. Skalicky seconded the motion. The motion passed unanimously.

## 4.5.2 - Permitting Request Case - PRC-20210518-01 - Punta de Vista, LLC

Meeting Discussion: Mr. Andruss explained that Mr. John Murray for Punta de Vista, LLC seeks, under permitting request case PRC-20210518-01, a production permit authorizing production of groundwater for irrigation and wildlife management uses at rates not to exceed 499 gallons per minute or 364 acre-feet per year from well GW-00565. The subject well is located on a 728.32-acre tract of land near the intersection of County Road 110 and County Road 111 in Jackson County, Texas.

The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information to evaluate the request relative to the Rules of the District. Provided the resulting permits are properly conditioned, the drilling and operation of the proposed well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On July 2, 2021, the public notice related to the consideration of the permit case was completed.

As of July 13, 2021, the District had not received notice of intent to contest the permitting request.

Board Action: Mr. Skalicky moved to 1) cancel the permit hearing and proceed with the permitting case as an uncontested matter; 2) issue a production permit to Punta de Vista, LLC under application AOW-20210512-02 with the following conditions in accordance with the Rules of the District: Authorized Purpose of Use: irrigation and wildlife management uses; Authorized Maximum Rate of Production per Minute: 499 gallons per minute; Authorized Maximum Rate of Production per Year: 364 acre-feet per year; and Expiration Date: July 31, 2026. Mr. Woodland seconded the motion. The motion passed unanimously.

## 5. Consideration of and possible action on matters related to groundwater protection including complaints, investigations, violations, and enforcement cases.

Meeting Discussion: None.

Board Action: None.

## 6. Consideration of and possible action on matters related to groundwater monitoring.

Meeting Discussion: Mr. Andruss explained that the United States Drought Monitor, an information source produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and

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the National Oceanic and Atmospheric Administration, indicates that no portions of Jackson County were experiencing moderate drought conditions as of July 8, 2021.

Board Action: None.

7. Consideration of and possible action on matters related to groundwater conservation.

Meeting Discussion: None.

Board Action: None.

8. Consideration of and possible action on matters related to groundwater resource planning including Groundwater Management Area 15 Joint Planning, regional water planning, and the Desired Future Conditions Proposed for Adoption by Groundwater Management Area 15.

8.1 - Report regarding Groundwater Resource Planning

Meeting Discussion: Mr. Andruss explained that the District participated in the Region P Regional Water Planning Group Meeting held virtually on June 14, 2021.

The District will participate in the Management Area 15 Meeting scheduled for October 14, 2021.

Board Action: None.

8.2 - Public Hearing regarding DFCs Proposed for Adoption by GMA 15

Meeting Discussion: Mr. Andruss explained that on May 4, 2021, the desired future conditions proposed for Groundwater Management Area 15 were mailed to the member districts initiating the public comment period (period of not less than 90 days) for the desired future conditions proposed for adoption by the representatives of GMA 15.

The representatives of Groundwater Management Area 15 proposed the following Desired Future Conditions for Adoption on April 8, 2021:

1. The Desired Future Condition for the counties in the groundwater management area (gma-specific DFC) shall not exceed an average drawdown of 13 feet for the Gulf Coast Aquifer System at December 2080; and
2. The Desired Future Conditions for each county within the groundwater management area (county-specific DFCs) shall not exceed the values specified in Table A at December 2080:

Table A. Desired Future Conditions for Counties of GMA 15 expressed as an Average Drawdown between January 2000 and December 2080.

- Aransas County: 0 feet of drawdown of the Gulf Coast Aquifer System.
- Bee County: 7 feet of drawdown of the Gulf Coast Aquifer System.
- Calhoun County: 5 feet of drawdown of the Gulf Coast Aquifer System.

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- Colorado County: 17 feet of drawdown of the Chicot and Evangeline Aquifers; and 25 feet of drawdown of the Jasper Aquifer.
- DeWitt County: 17 feet of drawdown of the Gulf Coast Aquifer System.
- Fayette County: 44 feet of drawdown of the Gulf Coast Aquifer System.
- Goliad County: 4 feet of recovery of the Chicot Aquifer; 2 feet of recovery of the Evangeline Aquifer; 7 feet of drawdown of the Burkeville Aquifer; and 14 feet of drawdown of the Jasper Aquifer.
- Jackson County: 15 feet of drawdown of the Gulf Coast Aquifer System.
- Karnes County: 22 feet of drawdown of the Gulf Coast Aquifer System.
- Lavaca County: 18 feet of drawdown of the Gulf Coast Aquifer System.
- Matagorda County: 11 feet of drawdown of the Chicot and Evangeline Aquifers.
- Refugio County: 5 feet of drawdown of the Gulf Coast Aquifer System.
- Victoria County: 5 feet of drawdown of the Gulf Coast Aquifer System.
- Wharton County: 15 feet of drawdown of the Chicot and Evangeline Aquifers.

During this period, the District has made available in its office a copy of the proposed desired future conditions and supporting materials, such as the documentation of factors considered under Subsection (d) and groundwater availability model run results.

On July 11, 2021, the District completed the posting requirements established for the public hearing on the proposed desired future conditions.

While the District has been informed that public comments may be submitted to the District or other GCDs with GMA 15, as of July 13, 2021, the District had not received any public comments on the DFCs proposed for adoption by GMA 15.

Mr. Skalicky opened the public hearing.

Public Comments: Mr. Andruss informed the Board that the District had received written comments from organization called Neighbors Against Destroying Aquifers regarding the DFC proposed for adoption and would be incorporated into the summary report of the public comment period.

Mr. Skalicky moved to close the public hearing at 10:00 AM, after receiving all public comments regarding the DFC's proposed for adoption by GMA 15 and moved to terminate the public comment period on September 1, 2021, and authorize the General Manager to compile and submit for consideration at the next joint planning meeting a summary of relevant comments received, any suggested revisions to the proposed desired future conditions, and the basis for the revisions. Mr. Dugger seconded the motion. The motion passed unanimously.

9. Consideration of and possible action on matters related to groundwater policy including the proposed Management Plan of the District with revisions and the Rules of the District.

9.1 - Report regarding Groundwater Policy



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**Meeting Discussion:** Mr. Andruss explained that the regular session of the 87th Legislature concluded without the passage of any legislation that would have a negative and direct impact on the ability of the District to manage groundwater resources with Jackson County. Mr. Allison provided additional comments regarding legislative changes that may impact the District.

**Board Action:** None.

## 9.2 - Public Hearing regarding Proposed Management Plan of the District

**Meeting Discussion:** Mr. Andruss explained that the District proposes for adoption a revised management plan that (1) identifies the performance standards and management objectives under which the district will operate to achieve the management goals ; (2) specifies the actions, procedures, performance, and avoidance that are or may be necessary to effect the plan; (3) includes estimates of (A) modeled available groundwater in the district based on the desired future condition established under Section 36.108; (B) the amount of groundwater being used within the district on an annual basis; (C) the annual amount of recharge from precipitation, if any, to the groundwater resources within the district; (D) for each aquifer, the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers; (E) the annual volume of flow into and out of the district within each aquifer and between aquifers in the district, if a groundwater availability model is available; (F) the projected surface water supply in the district according to the most recently adopted state water plan; and (G) the projected total demand for water in the district according to the most recently adopted state water plan; and (4) considers the water supply needs and water management strategies included in the adopted state water plan.

On May 21, 2021, the TWDB notified the District that the draft management plan passed the pre-adoption review process. On June 16, 2021, the District complete the requirements for public notice. On July 8, 2021, the District sent notice to the Lavaca-Navidad River Authority and Jackson County Commissioners' Court of the hearing on the management plan.

On July 14, 2021, the District received comments from Patrick Brzozowski of the Lavaca-Navidad River Authority. Mr. Brzozowski commented: "Upon review of the District's Groundwater Management Plan, I would propose that the District consider undertaking the effort to establish goal(s) and objective(s) for the management of the brackish groundwater supplies in the District. The desalination of brackish water, from groundwater and/or brackish surface water sources, is a water management strategy identified and adopted by the Region P Regional Water Planning Group and this strategy was included in the most recently adopted 2021 State Water Plan. Because the timeline to develop a new water supply can be extensive, no matter the source, I propose the District consider taking the necessary steps to establish the framework under which this water resource might be developed, managed and/or governed."

Mr. Skalicy opened the public hearing on the proposed management plan of the District.

Mr. Brzozowski provided oral comments.

**Board Action:** Mr. Dugger moved to 1) close the public hearing after receiving all public comments regarding the proposed management plan of the District, and 2) approve and adopt the proposed

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management plan of the District by Resolution 2021-07-15-A. Mr. Woodland seconded the motion. The motion passed unanimously with 6 ayes and 0 nays.

10. Consideration of and possible action on matters related to groundwater research.

Meeting Discussion: None.

Board Action: None.

11. Consideration of and possible action on matters related to performance management including management goals and objectives of the District.

Meeting Discussion: None.

Board Action: None.

12. Consideration of and possible action on matters related to meeting management including minutes of previous meetings.

12.1 - Report regarding Meeting Management

Meeting Discussion: Mr. Andruss explained that the next meeting of the Board of Directors is scheduled for August 19, 2021, at 8:30 AM in the Jackson County Services Building, 411 N. Wells, Edna, Texas 77957.

Board Action: None.

12.2 - Minutes of Previous Meeting

Meeting Discussion: Mr. Andruss explained that the minutes for the meeting held on May 20, 2021, were sent the board members prior to the meeting.

Board Action: Mr. Dugger moved to accept and approved the meeting minutes for May 20, 2021, as drafted. Mr. Gendke seconded the motion. The motion passed unanimously.

13. Consideration of and possible action on matters related to financial management including the annual budget of the district, financial reports of the district, bills and invoices of the district.

13.1 - Report on Financial Management

Meeting Discussion: Mr. Andruss explained that the financial reports for June 2021 have been compiled, reviewed, and sent to the board members prior to the meeting. All accounts reconcile with internal records. All expenditures are related to business of the District and properly authorized.

Board Action: Mr. Skalicky moved to accept and approve the financial records for June 2021. Mr. Dugger seconded the motion. The motion passed unanimously.

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## 13.2 - Unpaid Accounts Payable

Meeting Discussion: Mr. Andruss explained that the District has outstanding accounts payable invoices that are not considered regular and routine for which the District has received the goods and services billed for under the invoices.

Board Action: Mr. Revel moved to authorize the general manager to pay the following items: TGCD - Adm - FM - Accounts Payable - ACCTP-20210712-01 - \$270.88 - Invoice No. 2903 - Prosperity Bank - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210618-02 - \$1,685.15 - Invoice No. 354352 - Victoria Advocate - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210617-01 - \$1,890.55 - Invoice No. 6140 - Allison, Bass and Magee, L.L.P. - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-13- \$6,603.82 - Invoice No. ILA-202106-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-12 - \$6,694.88 - Invoice No. ILA-202105-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-11 - \$6,720.98- Invoice No. ILA-202104-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-10- \$6,876.42 - Invoice No. ILA-202103-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-09 - \$6,763.32 - Invoice No. ILA-202102-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-08 - \$6,597.44 - Invoice No. ILA-202101-T - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-07- \$6,629.92 - Invoice No. ILA-202012-T- VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-06 - \$150.00 - Invoice No. ILA-202106-T-LS - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-05 - \$450.00 - Invoice No. ILA-202105-T-LS - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-04 - \$450.00 - Invoice No. ILA-202104-T-LS - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-03 - \$450.00 - Invoice No. ILA-202103-T-LS - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-02 - \$450.00 - Invoice No. ILA-202102-T-LS - VCGCD - OPEN; TGCD - Adm - FM - Accounts Payable - ACCTP-20210714-01 - \$17,500.00 - Invoice No. ILA-20210104-T - VCGCD - OPEN. Mr. Dugger seconded the motion. The motion passed unanimously.

14. Consideration of and possible action on matters related to office administration and management including personnel, staffing, employment agreements, consultant agreements, interlocal cooperation agreements, and support services provided to and from other groundwater conservation districts.

### 14.1 - Report regarding Administration and Management

Meeting Discussion: Mr. Andruss explained that the agreement between the District and VCGCD (INTERLOCAL AGREEMENT FOR SERVICES RELATED TO GENERAL MANAGEMENT AND ADMINISTRATIVE ACTIVITIES) states "[t]his agreement will automatically renew for an additional one (1) year period on October 1 of each year unless either party provides 90-day written notice of their Intent to not renew the agreement." The agreement presently costs the District \$6,500 per month (i.e., \$78,000 per year) unless a qualifying event occurs resulting in a credit by VCGCD to the District.

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The VCGCD Board of Directors will be asked to consider significant changes to staffing which support the District via the interlocal agreement. The changes include the addition of an enforcement specialist position (VCGCD Office), the reclassification of an administrative assistant position to an office assistant position (VCGCD Office), wage increases for existing staff, and revision to the fee credit provisions. If approved, VCGCD will likely propose a revised agreement to for services to be provided during FY2022.

Mr. Andruss explained that the District had received an interlocal cooperation agreement from the Jackson County Tax-Assessor Collector titled the 2021-2022 Property Tax Assessment/Collection Agreement.

Board Action: Mr. Skalicky moved to accept and approve 2021-2022 Property Tax Assessment/Collection Agreement. Mr. Gendke seconded the motion. The motion passed unanimously.

15. Consideration of and possible action on matters related to legal counsel report.

Meeting Discussion: None.

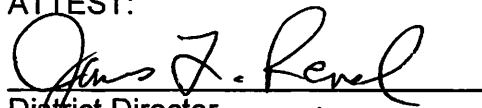
Board Action: None.

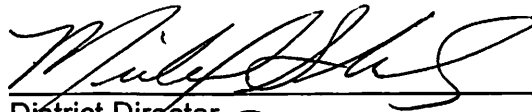
16. Adjourn.

Mr. Skalicky moved to adjourn the meeting. Mr. Gendke seconded the motion. The motion passed unanimously.

The above and foregoing minutes were read and approved on this the 19<sup>TH</sup> day of AUGUST, 2021.

ATTEST:

  
District Director  
Sec'y

  
District Director  
PRES.

# Texana Groundwater Conservation District

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The meeting of the Texana Groundwater Conservation District Board of Directors convened on August 19, 2021, at 8:30 AM at the 411 N. Wells, Edna, Texas.

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Kenneth Koop	Present
Precinct 2:	Michael Skalicky	Present
Precinct 3:	Robert Martin	Present
Precinct 4:	Robert Gendke Jr.	Present
At Large:	Jim Revel	Present
At Large:	Johnny Dugger	Absent
At Large:	Fredrick Woodland	Present
General Manager:	Tim Andruss	Present
Legal Counsel:	Jim Allison of Allison, Bass & Magee, LLP	Present

## Agenda

1. Call the meeting to order and welcome guests.

Mr. Skalicky called the meeting to order at 8:34 AM.

2. Receive public comments.

Public Comments: None.

3. Consideration of and possible action on matters related to Groundwater Management including the efforts and activities of the District regarding permitting as well as complaints, investigations, and enforcement cases associated with permitting.

### 3.1 - Ekstrom Aquaculture Forbearance Request

Discussion: Mr. Andruss explained that following a meeting with Mr. Ekstrom to discuss issues with the existing permits and waivers associated with the Ekstrom Aquaculture Fish Farm, Mr. Ekstrom submitted a request for forbearance on August 12, 2021.

On August 17, 2021, the District requested additional information from Mr. Ekstrom regarding the request for forbearance.

Board Action: Mr. Revel moved to grant the request for forbearance from Ekstrom Aquaculture by authorizing the production groundwater from the water wells completed in the fresh zone until November 30, 2021, for the following purposes and volumes: 10 acre-feet hatchery operations; 20 acre-feet for water quality maintenance purposes; and 80 acre-feet for pump test purposes contingent upon approval of a pumping test plan by the District. Mr. Gendke seconded the motion. The motion passed unanimously.

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Board Action: Mr. Revel moved to authorize the General Manager to obtain support of a technical consultant to assist with reviewing the pumping plan proposed by Ekstrom. Mr. Skalicky seconded the motion. The motion passed unanimously.

## 3.2 - Groundwater Production from Ekstrom Aquaculture Well Field

Discussion: Mr. Andruss explained that on August 5, 2021, Ekstrom Aquaculture submitted the performance report for July 2021.

Ekstrom has reported groundwater production totaling 468.992 acre-feet between January 2021 and July 2021 with 41.976 acre-feet being produced during July 2021 and 0.0 acre-feet being produced from the fresh zone wells during July 2021. While conductivity levels have shown a modest decrease in the lower fresh monitoring well at the East Monitoring Site during June and July 2021, the levels remain above the established performance condition

Based on the failure to achieve the performance standards established with waiver WV-20191219-01 during the preceding reporting period for April 2021, May 2021, June 2021, and July 2021, production curtailment is required from wells producing from the Fresh Zone. The average conductivity measurement for June 2021 was 2,725  $\mu\text{S}/\text{cm}$  and for July 2021 was 2,642  $\mu\text{S}/\text{cm}$ . The maximum allowable conductivity average under waiver WV-20191219-01 is 2,087  $\mu\text{S}/\text{cm}$ .

Board Action: None.

## 3.3 - Production Permit Renewals

Discussion: Mr. Andruss explained that the District has received an Application to Renew a Production Permit. In order for the District to approve the request to renew a production permit, the Rules of the District require the permit holder to a) be current in paying any fee required by the district; b) not be subject to a pending enforcement action for a substantive violation of a district permit, order, or rule that has not been settled by agreement with the district or a final adjudication; or c) be current in paying any civil penalty or otherwise comply with any order resulting from a final adjudication of a violation of a district permit, order, or rule.

The following applications are administratively complete and satisfy the requirements related to production permit renewal established by the Rules of the District: TGCD - GMa - Pe - Permitting Request Cases - PRC-20200717-02 - ARPP-20200716-02 - Vanderbilt Farmers Co-op, Inc – Pending.

Board Action: Mr. Skalicky move to authorize the general manager to issue production permit renewals for the permits associated with the following renewal requests: TGCD - GMa - Pe - Permitting Request Cases - PRC-20200717-02 - ARPP-20200716-02 - Vanderbilt Farmers Co-op, Inc - Pending. Mr. Woodland seconded the motion. The motion passed unanimously.

4. Consideration of and possible action on matters related to Groundwater Protection including complaints, investigations, violations, and enforcement cases related to groundwater contamination and waste.

# **Texana Groundwater Conservation District**

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Discussion: None.

Board Action: None.

5. Consideration of and possible action on matters related to Groundwater Monitoring.

Discussion: None.

Board Action: None.

6. Consideration of and possible action on matters related to Groundwater Conservation.

Discussion: None.

Board Action: None.

7. Consideration of and possible action on matters related to Groundwater Resource Planning including Groundwater Management Area 15 Joint Planning and regional water planning.

Discussion: None.

Board Action: None.

8. Consideration of and possible action on matters related to Groundwater Policy including the Management Plan of the District and the Rules of the District.

Discussion: None.

Board Action: None.

9. Consideration of and possible action on matters related to Groundwater Research.

Discussion: None.

Board Action: None.

10. Consideration of and possible action on matters related to Performance Management including management goals and objectives of the District.

Discussion: None.

Board Action: None.

11. Consideration of and possible action on matters related to Meeting Management including minutes of previous meetings.

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## **11.1 - Report regarding Meeting Management**

**Discussion:** Mr. Andruss explained that the next meeting of the Board of Directors is scheduled for September 16th, at 8:30 AM in the Jackson County Services Building, 411 N. Wells, Edna, Texas 77957.

**Board Action:** None.

## **11.2 - Minutes of Previous Meeting**

**Discussion:** Mr. Andruss explained that the minutes for the meeting held on July 15, 2021, were sent the board members prior to the meeting.

**Board Action:** Mr. Skalicky moved to accept and approved the meeting minutes for July 15, 2021, as drafted. Mr. Revel seconded the motion. The motion passed unanimously.

## **12. Consideration of and possible action on matters related to Financial Management including the annual budget, budget recommendation FY2022 of the district, Tax Rate for tax year 2021, bank accounts, investments, financial reports of the district, bills, and invoices of the district.**

### **12.1 - Report on Financial Management**

**Discussion:** Mr. Andruss explained that the financial reports for July 2021 have been compiled, reviewed, and sent to the board members prior to the meeting. All accounts reconcile with internal records. All expenditures are related to business of the District and properly authorized.

**Board Action:** Mr. Skalicky moved to accept and approve the financial records for July 2021. Mr. Woodland seconded the motion. The motion passed unanimously.

### **12.2 - Unpaid Accounts Payable**

**Discussion:** Mr. Andruss explained that the District has outstanding accounts payable invoices that are not considered regular and routine for which the District has received the goods and services billed for under the invoices.

**Board Action:** Mr. Gendke moved to authorize the general manager to pay the following items: 1) ACCTP-20210729-03 - \$100.00 - Invoice No. 1390781 - Pace Analytical - OPEN; 2) ACCTP-20210729-02 - \$40.00 - Invoice No. 1390763 - Pace Analytical - OPEN; 3) ACCTP-20210729-01 - \$280.00 - Invoice No. 1390315 - Pace Analytical - OPEN; and 4) ACCTP-20210818-01 - \$6,836.40 - Invoice No. 202107-T - VCGCD. Mr. Skalicky seconded the motion. The motion passed unanimously.

### **12.3 - Budget Recommendation for FY2022**

**Discussion:** Mr. Andruss explained that a recommended budget for fiscal year 2022 for the District has been developed that, if adopted, would fund the operations of the District in a



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manner that should provide for 1) the accomplishment of the management plan goals and objectives and 2) the completion of certain projects and tasks associated with the administration of the district, groundwater conservation, groundwater management and permitting, groundwater monitoring, groundwater policy development, groundwater protection, groundwater research, and groundwater resource planning, and 3) avoid a budget deficit in Fiscal Year 2021-2022.

The recommended budget anticipates the continued cooperation with and support of the staff of the Victoria County Groundwater Conservation to be achieved through the approval of a revised interlocal cooperation agreement. The significant revisions provide for 1) an increase to the monthly fees for service from \$6,500.00 to \$6850.00 and 2) a decrease to the credit provided for office closure. The revised agreement includes the following changes:

7. The COOPERATING DISTRICT shall pay VCGCD a monthly fee of ~~\$6,500.00~~ \$6,825.00 for services provided under this agreement. The amount of the monthly fee will be subjected to an annual review by the parties.

8. The VCGCD shall credit the COOPERATING DISTRICT ~~\$1,000.00~~ \$500.00 for each calendar week during for those weeks in which the office of the COOPERATING DISTRICT is closed for more than ~~twelve~~ twenty-eight(4228) hours during of normal business hours excluding weeks with office closures ~~associate~~ associated with observing federal, state, and county holidays.

The recommended budget includes and is based on the following:

- estimation of total fund balance of \$587,612 at the end of Fiscal Year 2020-2021;
- anticipation of expenditures of \$215,380 during Fiscal Year 2021-2022;
- allocation of \$215,380 of the total fund balance to the Operating Fund effective October 1, 2021;
- allocation of the remainder of the total fund balance to the Reserve Fund effective October 1, 2021;
- commitment of the monies of the Reserve Fund in equal portions to groundwater conservation, groundwater management, groundwater monitoring, groundwater protection, groundwater research, groundwater resource planning, and legal contingencies with the adoption of this budget;
- anticipation of revenue from sources other than tax-related sources to be \$2,500;
- adoption of a Tax Year 2021 tax rate of \$0.008100/\$100 of taxable value;
- anticipation of revenue from tax-related sources to be \$248,933; and
- anticipation of an increase of the reserve fund by \$36,053 at the conclusion of the fiscal year.

Based on District's budget information as of May 31, 2021, the District anticipates the following unencumbered fund balances at the End of the Fiscal Year:

- Operating Fund Balance: \$ 68,902
- Reserve Fund Balance: \$518,710

Based on calculations completed by the Jackson County Tax Assessor-Collector, the following tax rates exist for the District for Tax Year 2021:

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- No-New-Revenue Tax Rate: \$0.008100/\$100
- Voter-Approved Tax Rate: \$0.008700/\$100

The District adopted a tax rate of \$0.009100/\$100 for Tax Year 2020.

The recommended tax rate for Tax Year 2021 (No-New-Revenue Tax Rate; \$0.008100/\$100), if adopted, would decrease the tax rate, and produce an additional \$1,120 of tax revenue.

Board Action: Mr. Revel moved to 1) designate the budget for FY2022 recommended by the General Manager as revised as the Proposed Budget of the District for FY2022; 2) propose a tax rate of \$0.008700/\$100 of taxable value for Tax Year 2021; and 3. authorize the General Manager to complete all public notice requirements to facilitate the required public hearings and action by the Board to adopt the budget for FY2022, the tax rate for Tax Year 2021, and the acceptance of the certified tax roll for Tax Year 2021 on September 16, 2021. Mr. Skalicky seconded the motion. The motion passed with 5 ayes and 1 nay:

Mr. Koop – Aye  
Mr. Skalicky – Aye  
Mr. Martin – Aye  
Mr. Gendke – Nay  
Mr. Revel – Aye  
Mr. Woodland – Aye

13. Consideration of and possible action on matters related to office administration and management including staffing, consultant agreements, interlocal cooperation agreements, and support services provided to and from other groundwater conservation districts.

## 13.1 - Report regarding Administration and Management

Discussion: Mr. Andruss explained that on August 17, 2021, the District was informed that the Jackson Central Appraisal District was seeking the dismissal of the Edna Masonic Lodge's suit brought against the appraisal district, the groundwater district, and other taxing entities

Board Action: None.

## 13.2 - Interlocal Cooperation Agreement with VCGCD for FY2022

Discussion: Mr. Andruss explained that on July 16, 2021, the VCGCD Board expressed interest in continuing the cooperative arrangement with RGCD, TGCD, and CCGCD, as well as adjusting the staffing schedule to reduce administrative staffing and increase technical staffing to support increase efforts related to compliance and enforcement of the rules of the district. The revised interlocal cooperation agreement used to develop the recommended budget for FY2022 was accepted and approved by the RGCD Board on August 16, 2021, and will be presented to the VCGCD Board on August 20, and the CCGCD Board on August 23 with a recommendation that the agreement be accepted and approved contingent upon the ultimate acceptance and approval by the other cooperating districts.

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Board Action: Mr. Revel moved to accept and approve the revised interlocal cooperation agreement and authorize the execution of the revised agreement by the President of the Board upon acceptance and approval by the boards of the VCGCD and the CCGCD. Mr. Martin seconded the motion. The motion passed unanimously.

14. Consideration of and possible action on matters related to the vacancy in the office of director of the Texana Groundwater Conservation District.

Discussion: Mr. Martin informed the Board that he was resigning as a director of the district.

Board Action: None.

15. Consideration of and possible action on matters related to legal counsel report.

Discussion: None.

Board Action: None.

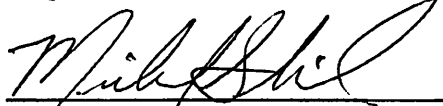
16. Adjourn.

Mr. Revel moved to adjourn the meeting at Mr. Martin seconded the motion. The motion passed unanimously.

The above and foregoing minutes were read and approved on this the 27<sup>th</sup> day of SEPT, 2021.

ATTEST:

  
District Director

  
District Director

# Texana Groundwater Conservation District

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The meeting of the Texana Groundwater Conservation District Board of Directors convened on September 23, 2021, at 8:30 AM at the 411 N. Wells, Edna, Texas.

The following representatives of Texana Groundwater Conservation District attended the meeting:

Precinct 1:	Kenneth Koop	Present
Precinct 2:	Michael Skalicky	Present
Precinct 3:	Robert Martin	Absent
Precinct 4:	Robert Gendke Jr.	Absent
At Large:	Jim Revel	Present
At Large:	Johnny Dugger	Present
At Large:	Fredrick Woodland	Absent
General Manager:	Tim Andruss	Present
Legal Counsel:	Jim Allison of Allison, Bass & Magee, LLP	Absent

1. Call the meeting to order and welcome guests.

Mr. Skalicky called the meeting to order at 8:30 AM.

2. Receive public comments.

No Public Comments.

3. Consideration of and possible action on matters related to groundwater management including the efforts and activities of the District regarding permitting as well as complaints, investigations, and enforcement cases associated with permitting.

### 3.1 - Report regarding Groundwater Management

Management Discussion: Mr. Andruss explained that the District has initiated 92 permitting request cases (PRCs) since October 1, 2020. As of September 13, 2021, the following permitting requests and applications are pending with the District:

Board Action: None.

#### 3.5.1 - Permitting Request Case - PRC-20210823-02 – LNRA

Management Discussion: Mr. Andruss explained that Mr. Doug Anders for Lavaca-Navidad River Authority seeks, under permitting request case PRC-20210823-02, a drilling permit and production permit authorizing construction of a well and the production of groundwater for pump test uses at rates not to exceed 250 gallons per minute or 5 acre-feet per year. The proposed well will be located on a 17,012-acre tract of land near the intersection of FM 3131 and FM 1822 in Jackson County, Texas.

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The applications and supplemental information associated with this permitting request case are considered administratively complete and contain sufficient information evaluate the request relative to the Rules of the District. Provided the resulting permits are properly conditioned, the drilling and operation of the proposed well would satisfy the requirements as established within the Rules of the District without a waiver or variance.

On September 2, 2021, the public notice related to the consideration of the permit case was completed.

As of September 13, 2021, the District had not received notice of intent to contest the permitting request.

Upon cancellation of the meeting of the Board scheduled for September 16, 2021, the District posted a permit issuance notice for PRC-20210823-02.

Board Action: None.

4. Consideration of and possible action on matters related to groundwater protection including complaints, investigations, violations, and enforcement cases.

Management Discussion: None.

Board Action: None.

5. Consideration of and possible action on matters related to groundwater monitoring.

## 5.1 - Intera Proposals re Groundwater Monitoring

Management Discussion: Mr. Andruss explained that in response to the recommendations made by Dr. Young in the Water Level Assessment Report, the District requested a proposal from Intera to improve and expand the District's effort to monitor groundwater levels. Dr. Young provided a proposal for:

1. Assignment of aquifers to water wells recorded in the District's database;
2. Development of protocols for flagging measured water levels that appear to be unrepresentative of actual aquifer conditions;
3. Establishment of criteria for assessing the adequacy of the monitoring well coverage in the Chicot and Evangeline aquifers to assess water level changes over time within Calhoun, Jackson, Refugio, and Victoria Counties;
4. Identification and evaluation of the potential benefits to groundwater monitoring to be obtained by quantifying the predictive uncertainty of the Kriged interpolation values and the average annual water levels within the report;
5. Development of an approach for identifying the most beneficial locations for adding monitoring wells (purpose-built, new monitoring wells) to the groundwater monitoring network and determination of the benefits resulting from the incorporation of the identified locations in the use of geostatistics to evaluate aquifer conditions; and

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## 6. Design and construction specifications for dedicated aquifer monitoring wells.

The Technical Support for Monitoring project cost is \$55,000 and has a spatial scope of Victoria, Calhoun, Refugio, and Jackson Counties (\$13,750 per GCD).

The Board of VCGCD accepted the proposal and authorize the General Manager to initiate the project upon approval to equally share costs for the project by the boards of CCGCD, RGCD, and TGCD.

The District has also requested a proposal from Intera for updating the Water Level Assessment Report with CY2021 water level. The cost of the Update Water Level Analysis project is \$10,000 (\$2,500 per GCD).

Board Action: Mr. Dugger moved to 1) accept the proposals, 2) authorize the General Manager to initiate the projects upon approval to equally share costs for the project by the boards of VCGCD, RGCD, and CCGCD. Mr. Skalicky seconded the motion. The motion passed unanimously.

### 5.2 - Drought Monitoring

Management Discussion: Mr. Andruss explained that the U.S. Drought Monitor, produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration, indicates that no portions of Jackson County were experiencing dry or drought conditions as of September 7, 2021.

Board Action: None.

## 6. Consideration of and possible action on matters related to groundwater conservation.

Management Discussion: None.

Board Action: None.

## 7. Consideration of and possible action on matters related to groundwater resource planning including Groundwater Management Area 15 Joint Planning and regional water planning.

### 7.1 - Report regarding Groundwater Resource Planning

Management Discussion: Mr. Andruss explained that the District will participate in the next Region P Regional Water Planning Group Meeting anticipated to be held at the LNRA offices in Jackson County.

The District will participate in the Management Area 15 Meeting on October 14, 2021, at 9:30 AM at Jackson County Services Building in Edna.

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Board Action: None.

## 7.2 - Summary of Public Comment Period re Proposed DFC

**Management Discussion:** Mr. Andruss explained that on July 15, 2021, the District conducted a public hearing regarding the desired future condition proposed for adoption on April 8, 2021, for GMA 15. The proposed DFC specifies the following relevant to Texana GCD:

1. The Desired Future Condition for the counties in the groundwater management area (gma-specific DFC) shall not exceed an average drawdown of 13 feet for the Gulf Coast Aquifer System in December 2080; and
2. Jackson County: 15 feet of drawdown of the Gulf Coast Aquifer System.

During the public comment period, the District received written comments from the organization Neighbors Against Destroying Aquifers (NADA) dated July 15, 2021. NADA asserts within the written comments that the District, as well as GMA 15, would violate 36.108(d)(8) of the Texas Water Code relating to the consideration of "the feasibility of achieving the desired future condition." NADA recommends that the District suggest a revision to the proposed DFC to 1) limit the acceptable level of drawdown in the Gulf Coast Aquifer from 15 feet to 0 feet at 2080, and 2) set a water quality-specific conditions limiting increases of total dissolved solids, on average, to not more than 50 mg/L per year (i.e., 2,000 mg/L over a 40-year period).

The representatives of GMA 15 considered each of the factors identified in 36.108(d) of the Texas Water Code before approving the desired future condition proposed for adoption on April 8, 2021.

At the conclusion of the technical work to evaluate the 36.108(d) factors and the process to draft the desired future condition proposed for adoption, the technical consultant affirmed that the draft of the desired future condition proposed for adoption was feasible.

Board Action: None.

8. Consideration of and possible action on matters related to groundwater policy including the Management Plan of the District and the Rules of the District.

**Management Discussion:** None.

Board Action: None.

9. Consideration of and possible action on matters related to groundwater research.

**Management Discussion:** None.

Board Action: None.

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10. Consideration of and possible action on matters related to performance management including management goals and objectives of the District.

Management Discussion: None.

Board Action: None.

11. Consideration of and possible action on matters related to meeting management including minutes of previous meetings.

## 11.1 - Report regarding Meeting Management

Management Discussion: Mr. Andruss explained that the next meeting of the Board of Directors is scheduled for October 28, 2021, at 8:30 AM in the Jackson County Services Building, 411 N. Wells, Edna, Texas 77957.

Board Action: None.

## 11.2 - Minutes of Previous Meeting

Management Discussion: Mr. Andruss explained that the minutes for the meeting held on August 19, 2021, were sent the board members prior to the meeting.

Board Action: Mr. Revel moved to accept and approved the meeting minutes for August 19, 2021, as drafted. Mr. Koop seconded the motion. The motion passed unanimously.

12. Consideration of and possible action on matters related to financial management including the annual budget of the district, the adoption of the annual budget for Fiscal Year 2022, the hearing on the proposed tax rate for Tax Year 2021, approval of the appraisal roll for Tax Year 2021, financial reports of the district, bills and invoices of the district.

## 12.1 - Proposed Budget for FY2022

Management Discussion: Mr. Andruss explained that the proposed budget was published on the home page of the website of the District on September 9, 2021. The District has received no comments on the proposed budget as of September 13, 2021.

Board Action: Mr. Revel moved to approve and adopt the proposed budget for FY2022 by order. Mr. Dugger seconded the motion. The motion passed unanimously.

## 12.2 - Tax Rate for FY2021



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**Management Discussion:** Mr. Andruss explained that the District completed the public notice requirements related the required public hearing regarding the proposed tax rate for tax year 2021. The District has received ten comments on the proposed tax rate for tax year 2021 as of September 14, 2021.

The Board proposed a tax rate of \$0.008700/\$100 value for Tax Year 2021. If the Board adopts the proposed rate, the tax rate would be lower than the current rate of \$0.009100/\$100 value but would exceed the No-New-Revenue Rate by 7.41%. The taxes on a \$100,000 home would be increased by -\$0.40. However, due to the increase to the Total Taxable Value, the proposed tax rate is anticipated to generate an addition \$19,560 as compared to the tax levy for Tax Year 2020.

**Board Action:** Mr. Revel moved to approve and adopt the proposed tax rate of \$0.008700/\$100 value as the tax rate for tax year 2021 and adopt the Order Adopting Tax Rate for Tax Year 2021. Mr. Koop seconded the motion. The motion passed unanimously.

## 12.3 - Appraisal Roll for FY2021

**Management Discussion:** None.

**Board Action:** Mr. Skalicky moved to accept and approve the appraisal roll for Tax Year 2021 adopt the Order Approving the 2021 Appraisal Roll. Mr. Koop seconded the motion. The motion passed unanimously.

## 12.4 - Report on Financial Management

**Management Discussion:** Mr. Andruss explained that the financial reports for August 2021 have been compiled, reviewed, and sent to the board members prior to the meeting. All accounts reconcile with internal records. All expenditures are related to business of the District and properly authorized.

**Board Action:** Mr. Skalicky moved to accept and approve the financial records for August 2021. Mr. Koop seconded the motion. The motion passed unanimously.

## 12.5 - Unpaid Accounts Payable

**Management Discussion:** Mr. Andruss explained that the District has outstanding accounts payable invoices that are not considered regular and routine for which the District has received the goods and services billed for under the invoices.

**Board Action:** Mr. Dugger moved to authorize the general manager to pay the following items: TGCD - Adm - FM - Accounts Payable - ACCTP-20210920-01 - \$6,500.00 - Invoice No. ILA-202108-T - VCGCD - OPEN Mr. Skalicky seconded the motion. The motion passed unanimously.

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13. Consideration of and possible action on matters related to office administration and management including personnel, staffing, employment agreements, consultant agreements, interlocal cooperation agreements, and support services provided to and from other groundwater conservation districts.

## 13.1 - Report regarding Administration and Management

Management Discussion: Mr. Andruss explained that the VCGCD has extended an offer of employment to Ms. Caitlynn Davenport for the position of Administrative Coordinator with her first day of employment schedule for October 5, 2021. Ms. Davenport will share time between the offices of VCGCD, RGCD, and CCGCD and support TGCD remotely.

The office computer used by Ms. Whitley was purchased in 2016 and is insufficient for the current operations of the office.

Board Action: Mr. Dugger moved to authorize the purchase of a new office computer as well as the surplus and disposal of the existing computer. Mr. Koop seconded the motion. The motion passed unanimously.

14. Consideration of and possible action on matters related to legal counsel report.

Management Discussion: None.

Board Action: None.

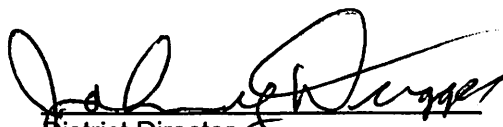
15. Adjourn.

Mr. Skalicky moved to adjourn the meeting at 9:35 AM, after concluding all business of the District.

*Mr. Dugger seconded the motion. The motion passed.*

The above and foregoing minutes were read and approved on this the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

ATTEST:

  
District Director

  
District Director

# Texana Groundwater Conservation District

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## INVESTMENT REPORT Fiscal Year 2020 – 2021 As of September 30, 2021

### Detailed Description of Investment Position - PFIA 2256.023(b)(1)

The investment position of the Texana Groundwater Conservation District (District) during the reporting period was restricted to: 1) cash deposited into an interest-bearing, demand deposit account for the purposes of holding monies of the Operating Fund, and 2) cash deposited into an interest-bearing, money-market account for the purposes of holding monies of the Operating Fund and Reserve Fund.

During the reporting period, the District deposited cash in an interest-bearing, demand deposit account at Prosperity Bank (Account Number: 217837512) for the purpose of holding monies of the Operating Fund, receiving interest deposits of the account, receiving deposits of district fees, and paying of bills and invoices of the District.

During the reporting period, the District deposited cash in an interest-bearing, money market account at Prosperity Bank (Number: 219189448) for the purpose of holding monies of the Operating Fund and the Reserve Fund, receiving interest deposits of the account, and receiving ad valorem tax revenue deposits.

The accounts are secured by FDIC insurance and pledged collateral in accordance with state law and the Investment Policy of the District.

### Summary of Pooled Fund Groups – PFIA 2256.023(b)(4)(A-D)

The District did not invest any portion of its funds in any pooled fund groups during the reporting period.

Beginning Market Value of Investments in Pooled Fund Groups:	\$0.00
Additions and Changes to the Market Value of Investments in Pooled Fund Groups:	\$0.00
Ending Market Value of Investments in Pooled Fund Groups:	\$0.00
Fully Accrued Interest of Investments in Pooled Fund Groups:	\$0.00

### Book and Market Values by Asset Type and Fund Type Statement – PFIA 2256.023(b)(5)

Asset Type	Institution	Fund Types	Book Value	Market Value
Interest-Bearing Demand Deposit Bank Account*	Prosperity Bank	Operating	\$100,467.70	\$100,467.70
Interest-Bearing Money Market Bank Account*	Prosperity Bank	Operating and Reserve	\$522,192.16	\$522,192.16
Total:			\$622,659.86	\$622,659.86

\* Based on monthly statements provided by banking institutions.

**Summary of Insurance and Collateral by Institution**

Institution	FDIC Insurance	Market Value of Pledged Securities as Collateral	Total Insurance and Pledged Securities
Prosperity Bank	\$250,000.00	\$656,495.04	\$906,495.04

\* Based on statements provided by banking institutions.

**Asset Maturity Date Statement – PFIA 2256.0023(b)(6)**

Asset	Maturity Date
Operating Funds in Interest-Bearing Demand Deposit Account	N/A
Reserve Funds in Interest-Bearing Money Market Account	N/A

**Investments for Funds Statement – PFIA 2256.0023(b)(7)**

Investment	Fund
Cash Deposits in Interest-Bearing Demand Deposit Account	Operating
Cash Deposits in Interest-Bearing Money Market Account	Reserve

**Statement of Compliance – PFIA 2256.0023(b)(8)**

The portfolio of the District is believed to be in compliance with the District's Investment Strategy expressed in the District's Investment Policy and the Public Funds Investment Act.

**Statement regarding Report Preparation – PFIA 2256.0023(b)(2-3)**

By my signature, I represent that 1) this report was written under my direct supervision; 2) I have thoroughly reviewed all the information contained within and used to develop this report; and 3) I believe this report to be true and correct to the best of my knowledge.



\_\_\_\_\_  
Timothy A. Andruss, TGCD Investment Officer

1/18/21  
Date