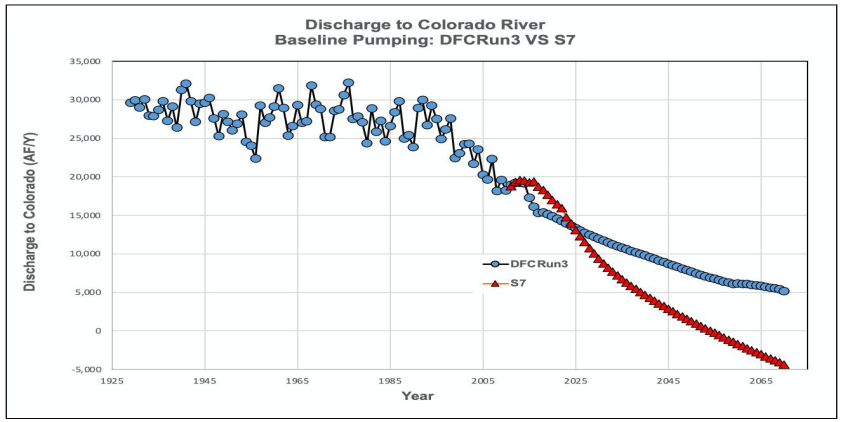
GMA-12 DFCs
Summary of Environmental Stewardship's Comments and Requests

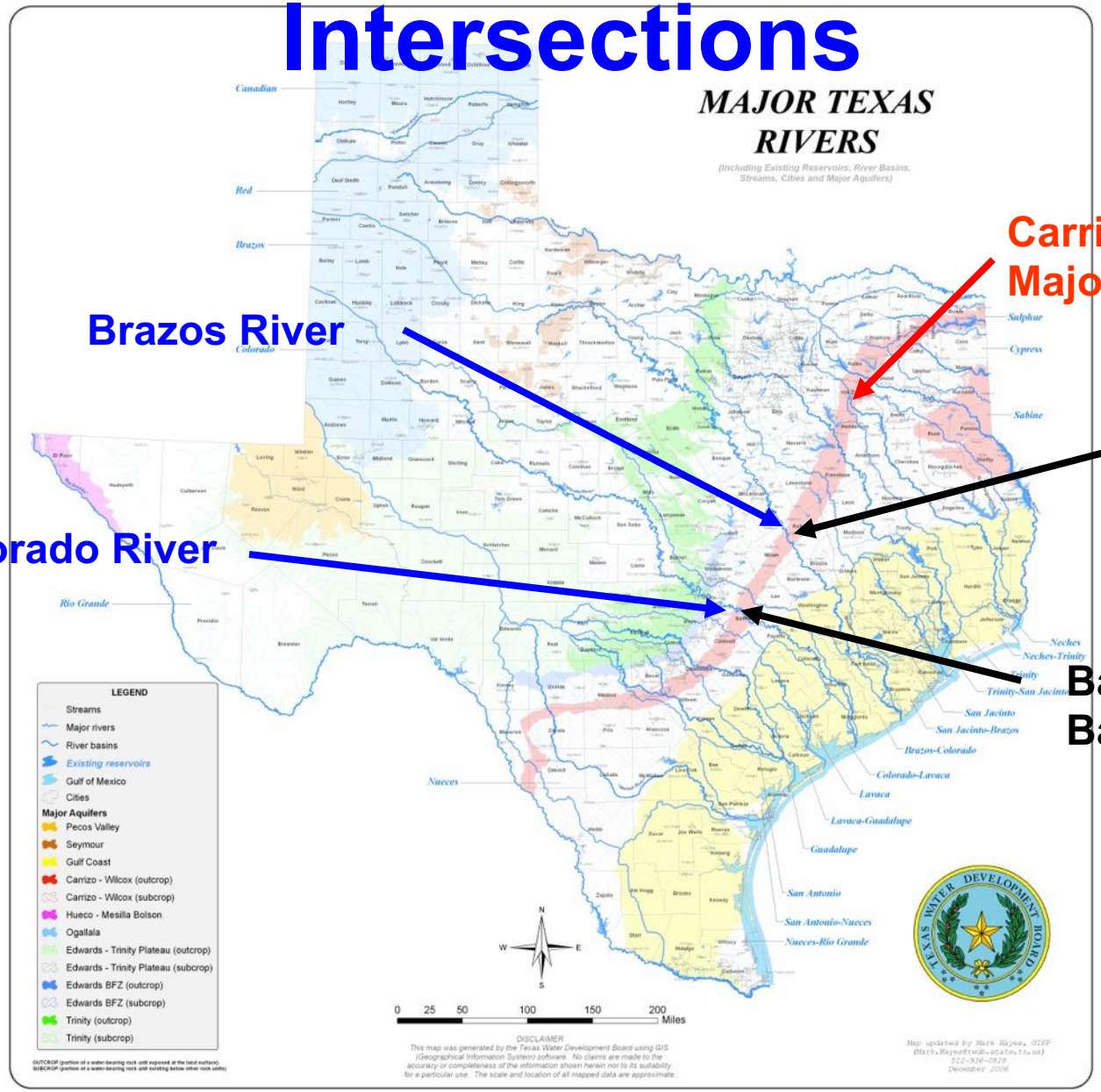


Presented to
GMA-12
January 15, 2021 Virtual Meeting

Environmental Stewardship
A Sustainable Ecosphere
TM

Environmental-Stewardship.org

Ground & Surface Water Intersections



Carrizo-Wilcox Major Aquifer

Brazos River

Milam/ Robertson Counties

Colorado River

Bastrop, TX Bastrop County

II. COMPARISON OF IMPACT OF PUMPING ON OUTFLOWS TO MAIN STEM COLORADO RIVER

- **Adopted 2017 DFCs (Old GAM):**

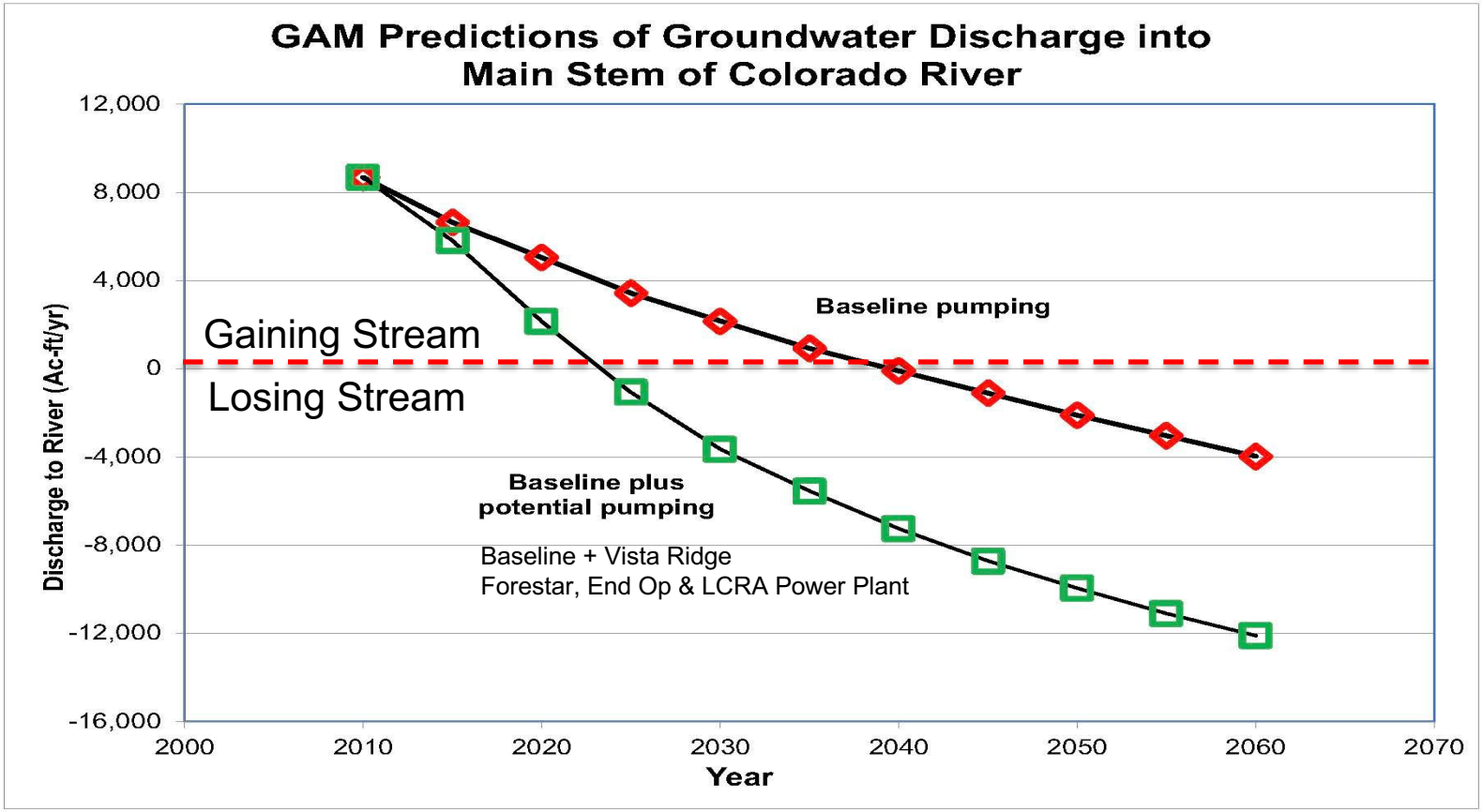


Figure 1. Predicted reduction of discharge of groundwater into the mainstream Colorado River due to combined pumping (Old GAM).

II. COMPARISON OF IMPACT OF PUMPING ON OUTFLOWS TO MAIN STEM COLORADO RIVER

- **Adopted 2017 DFCs (New 2018 GAM):**

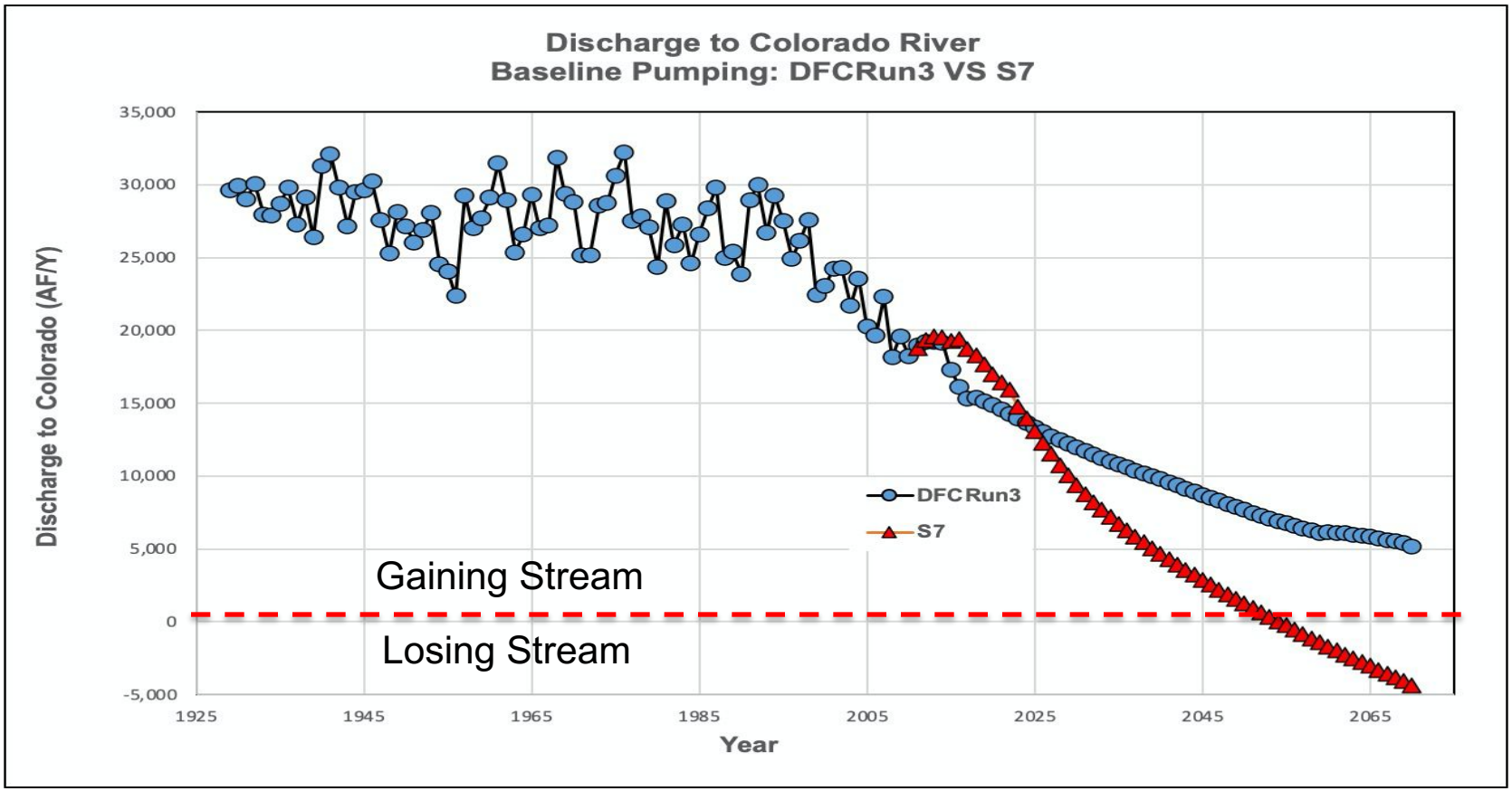


Figure 2. Predicted reduction of discharge of groundwater into the mainstream Colorado River due to DFC Run 3 and Scenario S-7 (New GAM).

Comparison of DFC Run 3 and Scenario S-7

- Average Pumping Amount:
  - **DFCRun3 = 50,900 acre-feet per year average pumping all aquifers**
  - **Scenario S-7 = 116,000 acre-feet per year average pumping all aquifers**
- The New 2018 GAM (DFCRun3- Current Adopted DFCs) predicts:
  - **Pumping *will reduce discharge* to the main stem of the Colorado River by about 14,000 ac-ft per year from 2010 to 2070.**
  - **Pumping *will not reverse its historical relationship* to the aquifers in the current planning period.**
- The New 2018 GAM (S-7)predicts that:
  - **Pumping *will reduce discharge* to the main stem of the Colorado River by about 24,000 ac-ft per year from 2010 to 2070.**
  - **Pumping *will reverse its historical relationship* to the aquifers by about 2050.**

Comparison of DFC Run 3 and Scenario S-7

- **By comparison:**
  - **The new GAM predicts that Scenario S-7 will reduce outflows by about 10,000 ac-ft per year more than DFC Run 3.**
  - **The new GAM predicts that Scenario S-7 will cause a reversal in the surface water-groundwater relationship to occur about 2050 whereas DFC Run 3 does not predict a reversal within the planning period.**
  - **Scenario S-7 (New GAM) is comparable to Baseline + potential pumping in the Old GAM.**
    - **Both predict the same magnitude of reduced outflow from the aquifer to the Colorado River; about 22,000 to 24,000 acre-feet per year.**

II. COMPARISON OF IMPACT OF PUMPING ON OUTFLOWS TO MAIN STEM COLORADO RIVER

In summary:

- **Groundwater pumping impacts outflow of groundwater to surface waters.**

- **The greater the quantity of groundwater pumped, the greater the decrease in outflows to the river.**

- **The quantity of pumping in the 2017 adopted DFCs is predicted to cause a significant decrease in outflows to the river; *an impact that may be unreasonable*.**

- **GAM Run S-7 is predicted to decrease outflow by an even greater magnitude; and impact that is *even more likely to be unreasonable*.**

III. COMPARISON OF IMPACT OF PUMPING ON OUTFLOWS TO COLORADO RIVER TRIBUTARIES

Introduction:

- **Environmental flow standards have not been adopted for tributaries in this river segment**
- **The tributaries cannot be protected from the impacts of groundwater pumping by increased releases of surface water from the Highland Lakes.**
- **We need a method to protect the tributaries.**
- **The best method for monitoring and protecting the tributaries is likely to develop DFCs for the Colorado Alluvium Aquifer.**
- **Hydrological separation of stream gage records will help inform the need for instream flow and surface water-groundwater monitoring.**

III. COMPARISON OF IMPACT OF PUMPING ON OUTFLOWS TO COLORADO RIVER TRIBUTARIES

New 2018 GAM combined discharge to the four tributaries (Big Sandy, Wilbarger, Piney and Cypress Creeks).

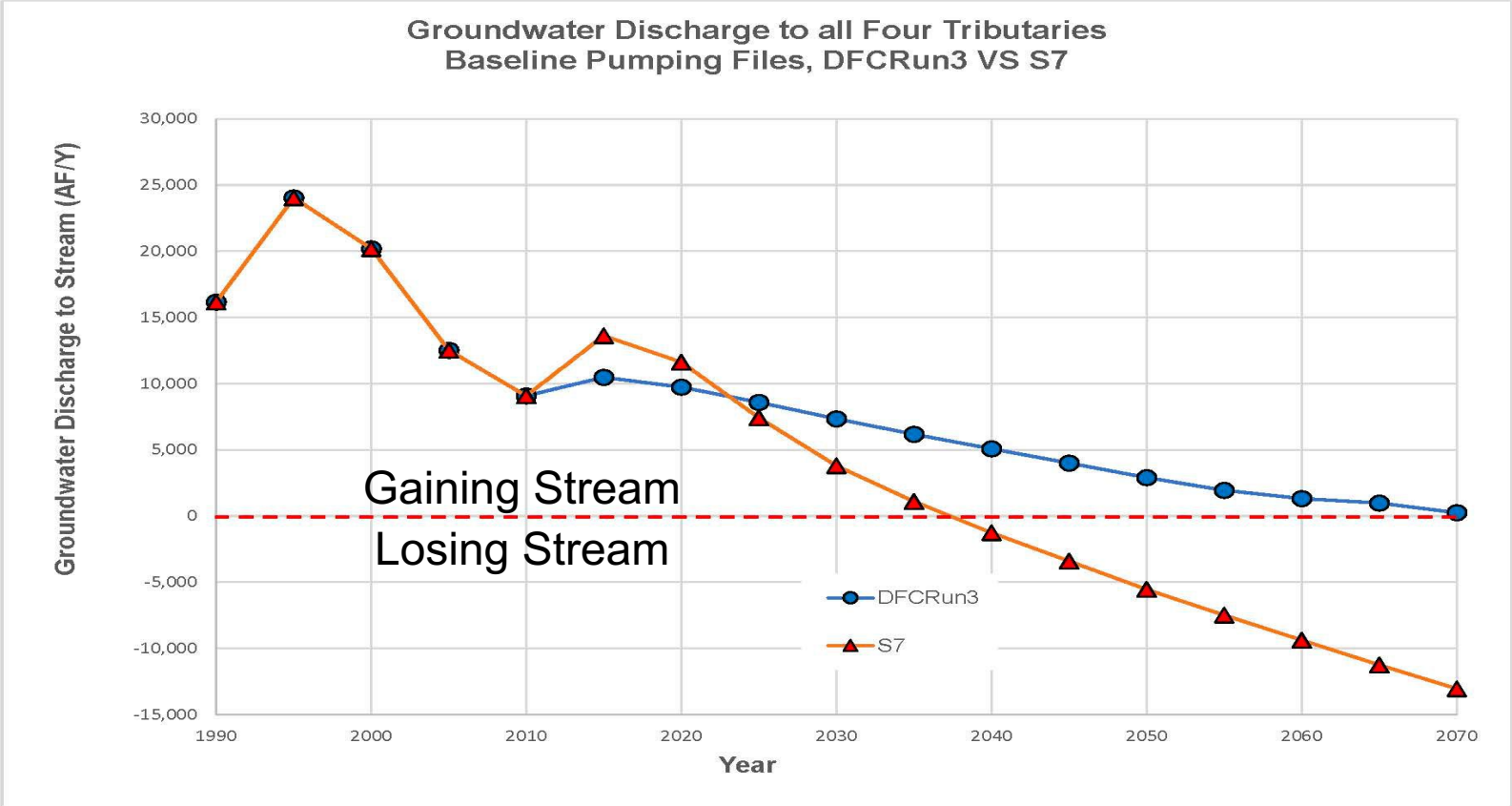


Figure 3: Groundwater Discharge to four tributaries of the Colorado River located primarily in Bastrop County, TX (New GAM).

Combined flow of four tributaries in Bastrop Co.

- **Combined discharge to the four tributaries:**
  - **Historic outflows were significantly higher than during development**
  - **Outflows declined during the early development period**
  - **Outflows are predicted to continue to decline as pumping increases in the current development period**
  - **Gain/Loss relationship will reverse during the planning period for currently adopted DFCs**
  - **S-7 pumping will accelerate the reversal by about three decades**

New GAM Predictions for Wilbarger Creek

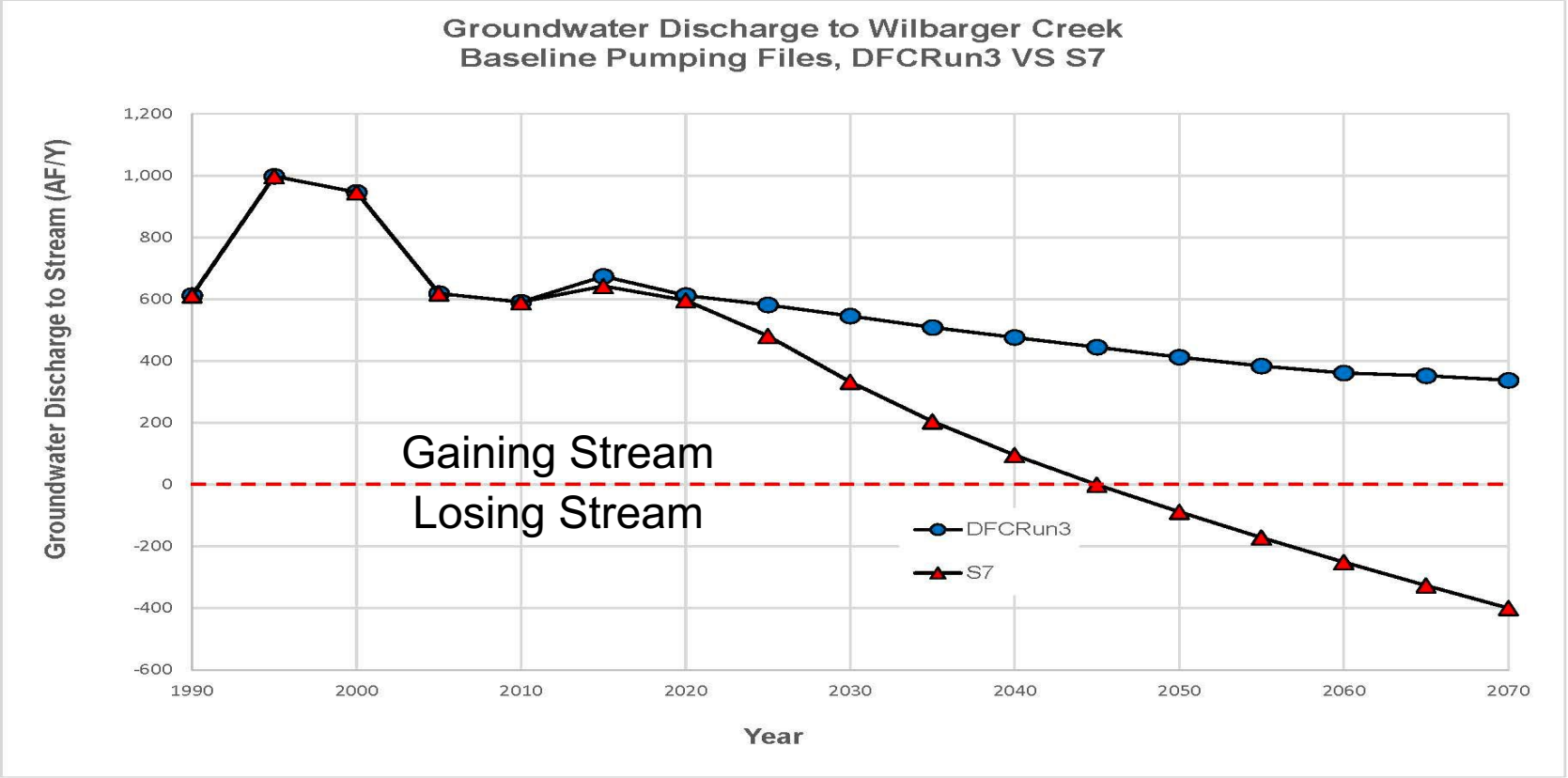


Figure 4. Wilbarger Creek: Overall, S-7 pumping caused a greater decline in outflows from the aquifers than DFC Run 3. Likewise, S-7 pumping is predicted to cause a reversal in the surface water-groundwater relationship whereas DFC Run 3 does not predict a reversal. Wilbarger Creek flows across the outcrops of the Hooper, and the Simsboro.

New GAM Predictions for Big Sandy Creek:

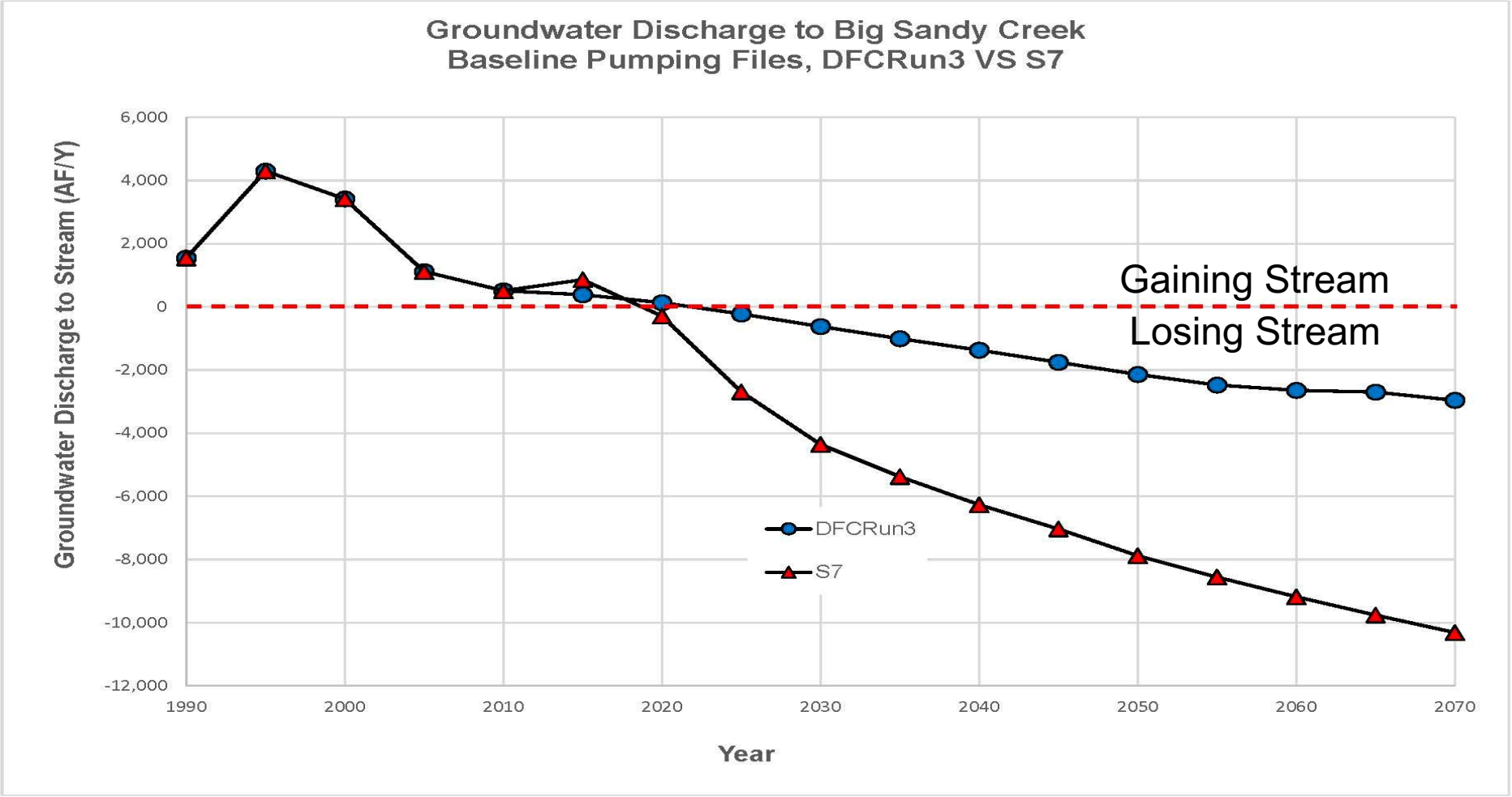


Figure 4. Big Sandy Creek: Overall, S-7 pumping caused a greater decline in outflows from the aquifers than DFC Run 3. Both DFC Run 3 and S-7 pumping predict a reversal in the surface water-groundwater relationship has already occurred. Big Sandy Creek flows across the outcrops of the Hooper, Simsboro, and Calvert Bluff.

New GAM Predictions for Walnut/Cedar Creek:

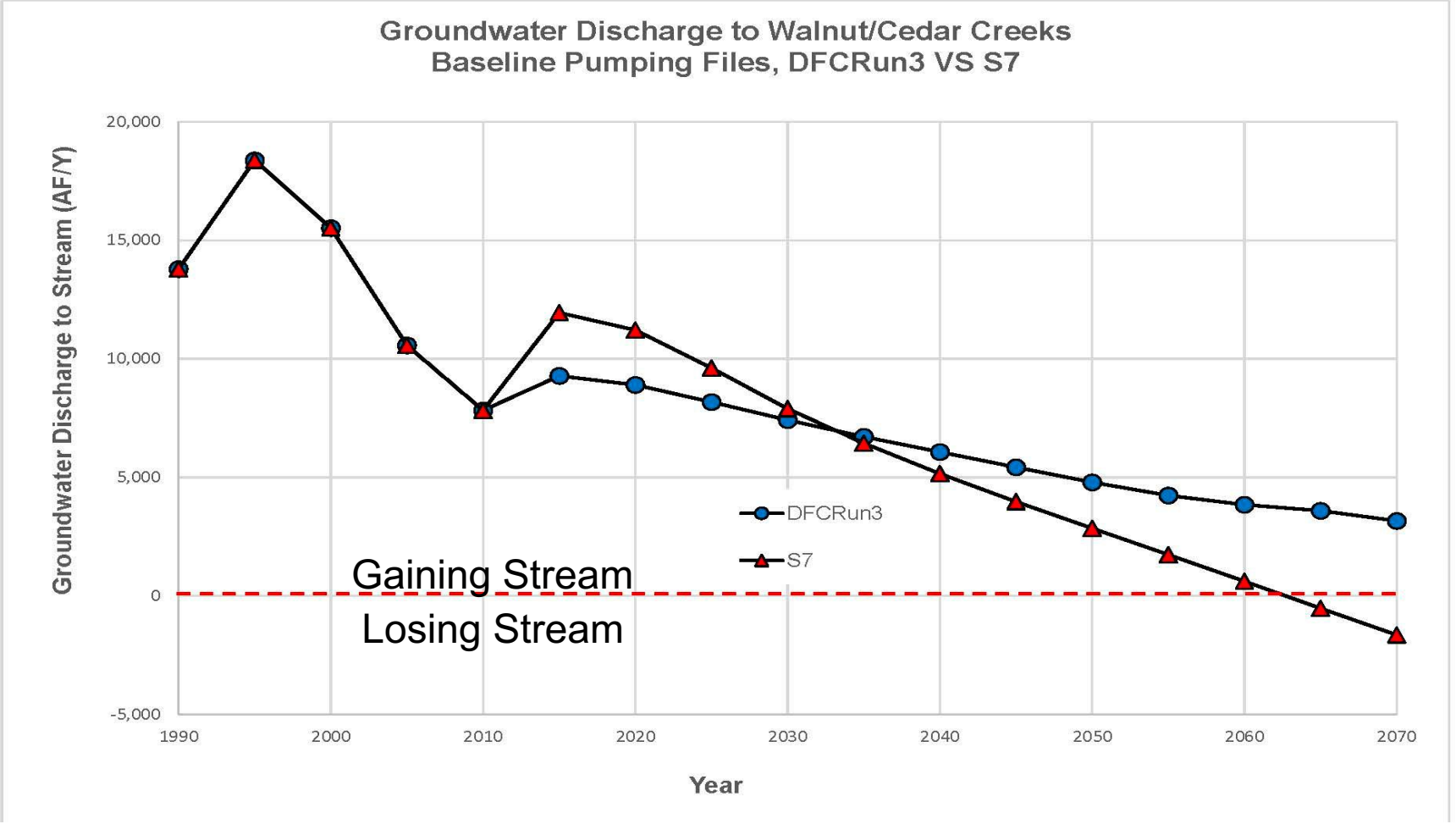


Figure 4. Walnut/Cedar Creek: Overall, S-7 pumping caused a greater decline in outflows from the aquifers. Likewise, S-7 pumping is predicted to cause a reversal in the surface water-groundwater relationship whereas DFC Run 3 does not predict a reversal. Walnut/Cedar flows across the outcrops of the Hooper, Simsboro, Calvert Bluff, and Carrizo.

New GAM Predictions for Piney Creek/Lake Bastrop

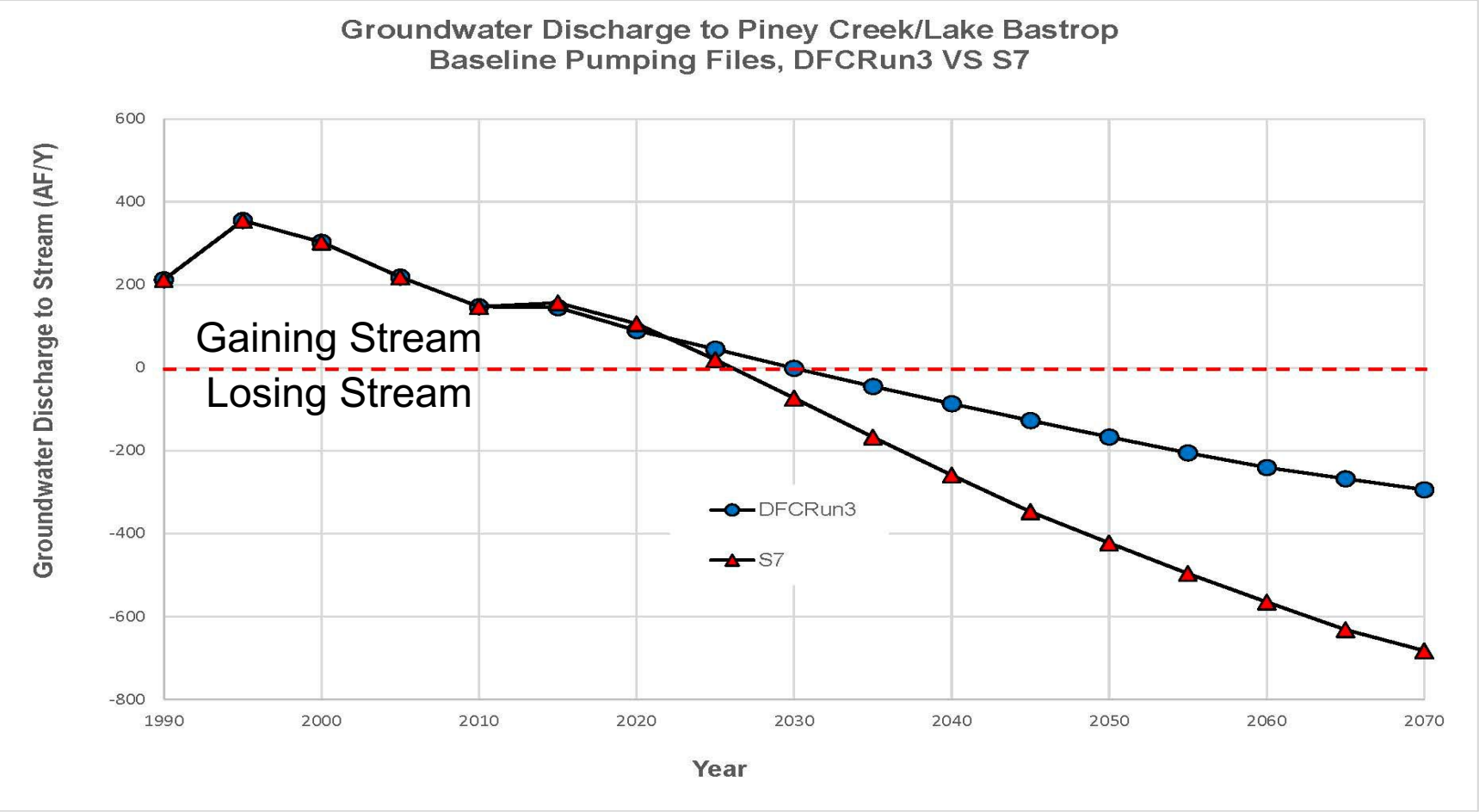


Figure 4. Piney Creek/Lake Bastrop: Overall, S-7 pumping caused a greater decline in outflows from the aquifers. Both S-7 pumping and DFC Run 3 are predicted to cause a reversal in the surface water-groundwater relationship. Piney Creek/Lake Bastrop flows across the outcrops of the Calvert Bluff and Carrizo.

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