

CWEMF IWFM v4.0 Workshop

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Emin Can Dogrul
California Department of Water Resources

Session 7: Automated Supply Adjustment



Automated Supply Adjustment

- Stream diversions and/or groundwater pumping can be adjusted to minimize the discrepancy between the water demand and supply
- Diversions and pumping can be adjusted to meet only urban demand, only agricultural demand or both
- Adjustment of individual diversions and pumping can be turned on or off during the simulation period
- If both diversions and pumping are requested to be adjusted, diversions are adjusted first
- Optimization techniques are not used in adjusting the water supply; i.e. no operation rules are considered (methods to link IWFM to models like CalSim are being developed to incorporate optimization techniques)
- IWFM tries to distribute the discrepancy between the demand and supply among adjusted diversions or pumping as equally as possible



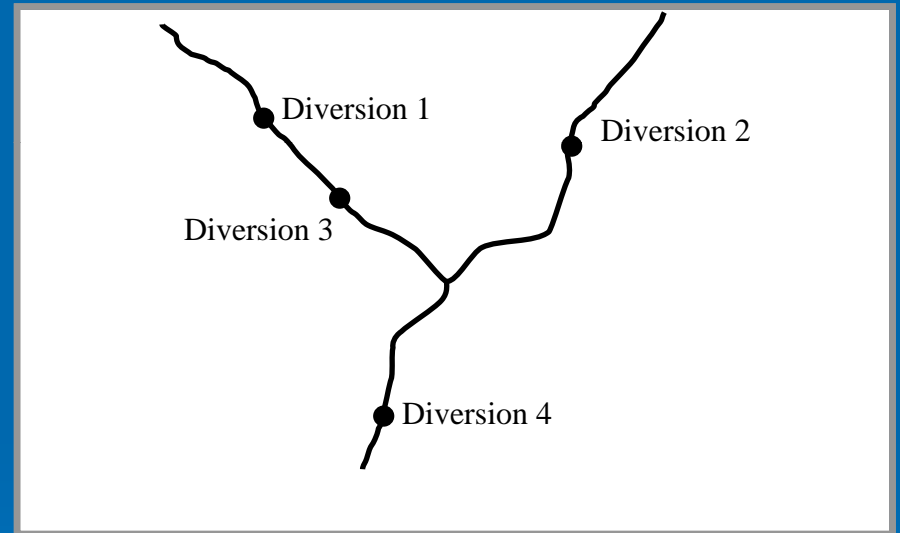
Automated Supply Adjustment

- IWFM adjusts “required” amount of diversions and pumping to meet the demand; there can still be shortages depending on the availability of water in the system
- Maximum diversion and pumping amounts can be imposed during supply adjustment to represent diversion canal and pump capacities
- Diversions and pumping that are exported outside the model area cannot be adjusted
- Adjustment of supply is performed until the ratio of actual supply to the demand is smaller than a user-defined tolerance value
- Spatial distribution of pumping as well as the irrigation fractions specified by the user for diversions and pumping may be altered during supply adjustment



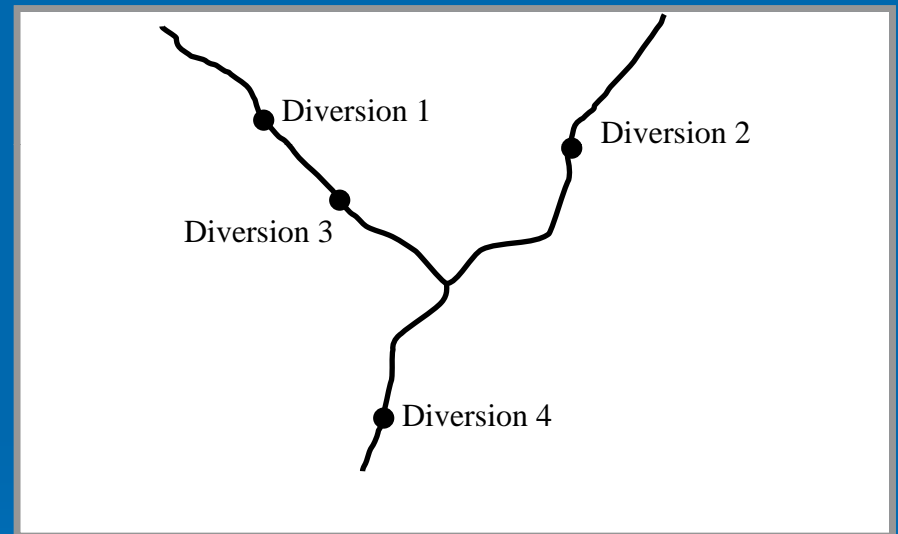
Adjustment of Stream Diversions

- Adjustment is performed based on the rank of stream diversions. Using figure on the right as an example:
 - **Rank 0:** Diversions 1 and 2 (zero upstream diversion points)
 - **Rank 1:** Diversion 3 (1 upstream diversion point)
 - **Rank 3:** Diversion 4 (3 upstream diversion points)
- **First adjustment step:** Adjust all diversions from all ranks
- **Second adjustment step:** Adjust all diversions except rank 0 diversions
- **Third adjustment step:** Adjust all diversions except rank 0 and rank 1 diversions



Adjustment of Stream Diversions

- Total number of adjustable diversions is computed based on the following criteria:
 - Diverted water is delivered to the target demand area
 - Diversion originates from a stream node that is not dry (not used if a supply surplus is being adjusted)
 - Diversion is specified for adjustment by the user
 - The rank of the diversion is greater than or equal to the adjustment step

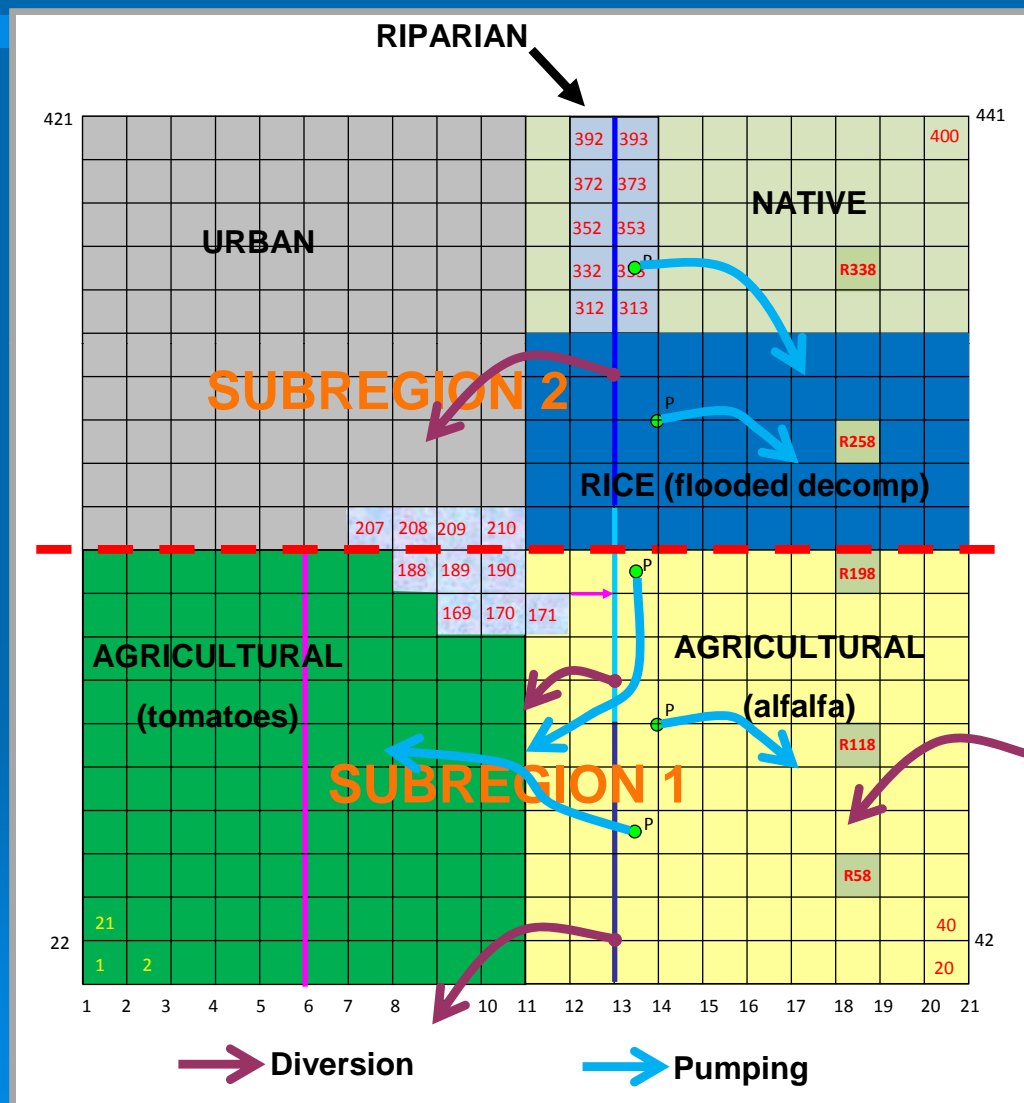


Adjustment of Pumping

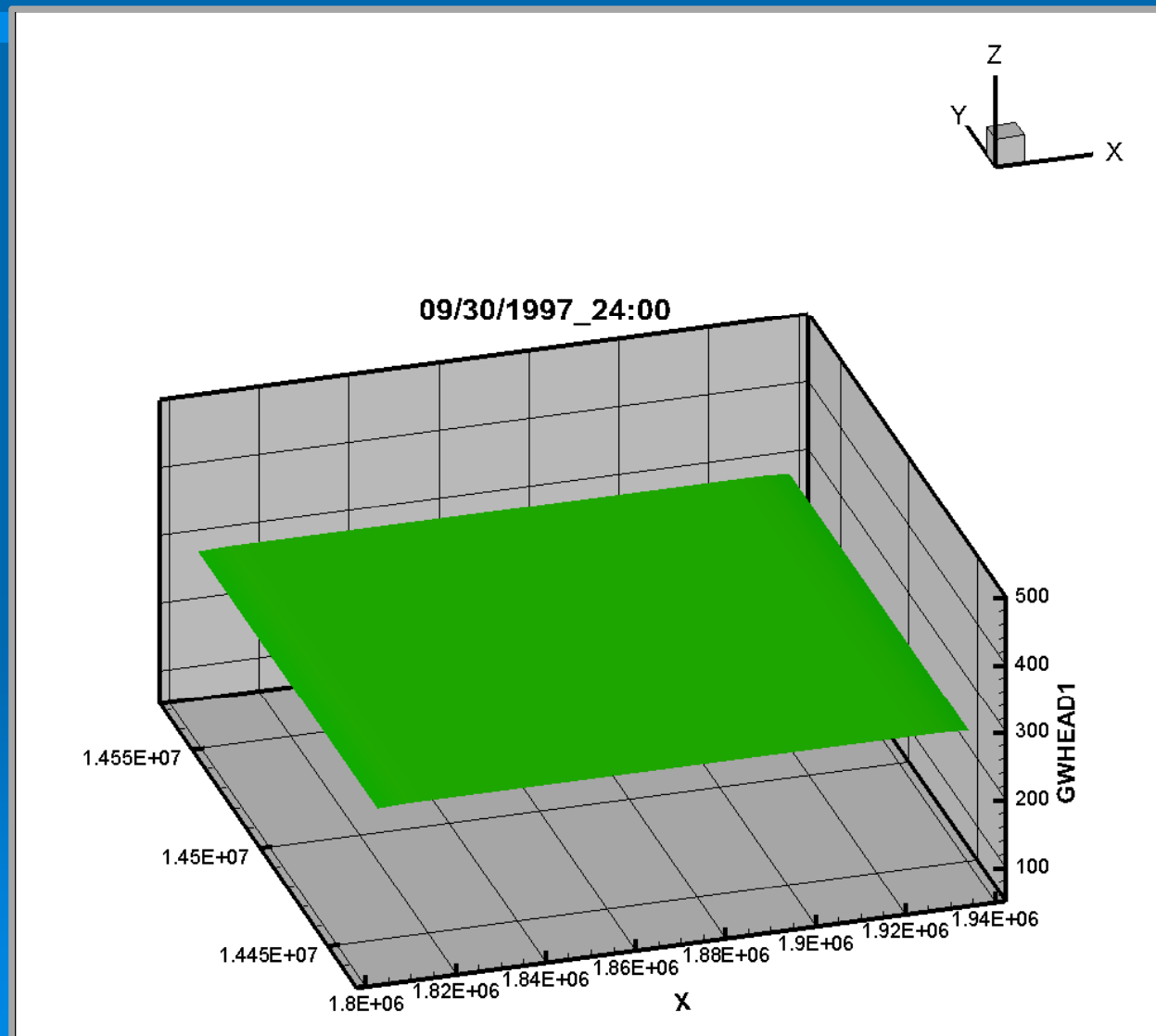
- Adjustment can be performed for well pumping as well as element pumping
- Similar to the adjustment of stream diversions except pumping wells and elements are not ranked like diversion points
- Adjustment of pumping is performed until the ratio of actual supply to demand is smaller than a user-defined tolerance value or until all adjusted pumping wells/elements go dry (applicable in adjusting for a supply shortage)



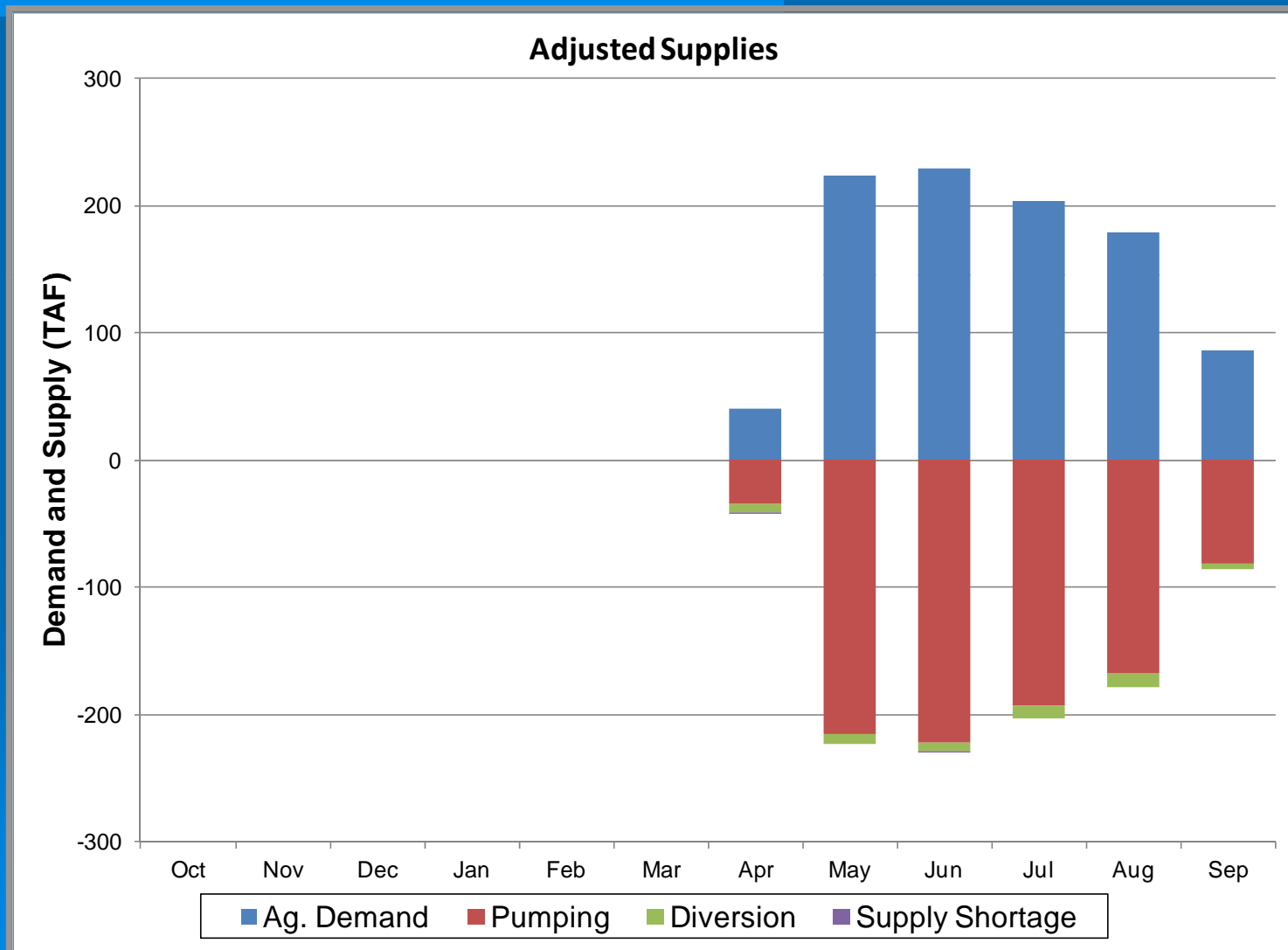
Example 7



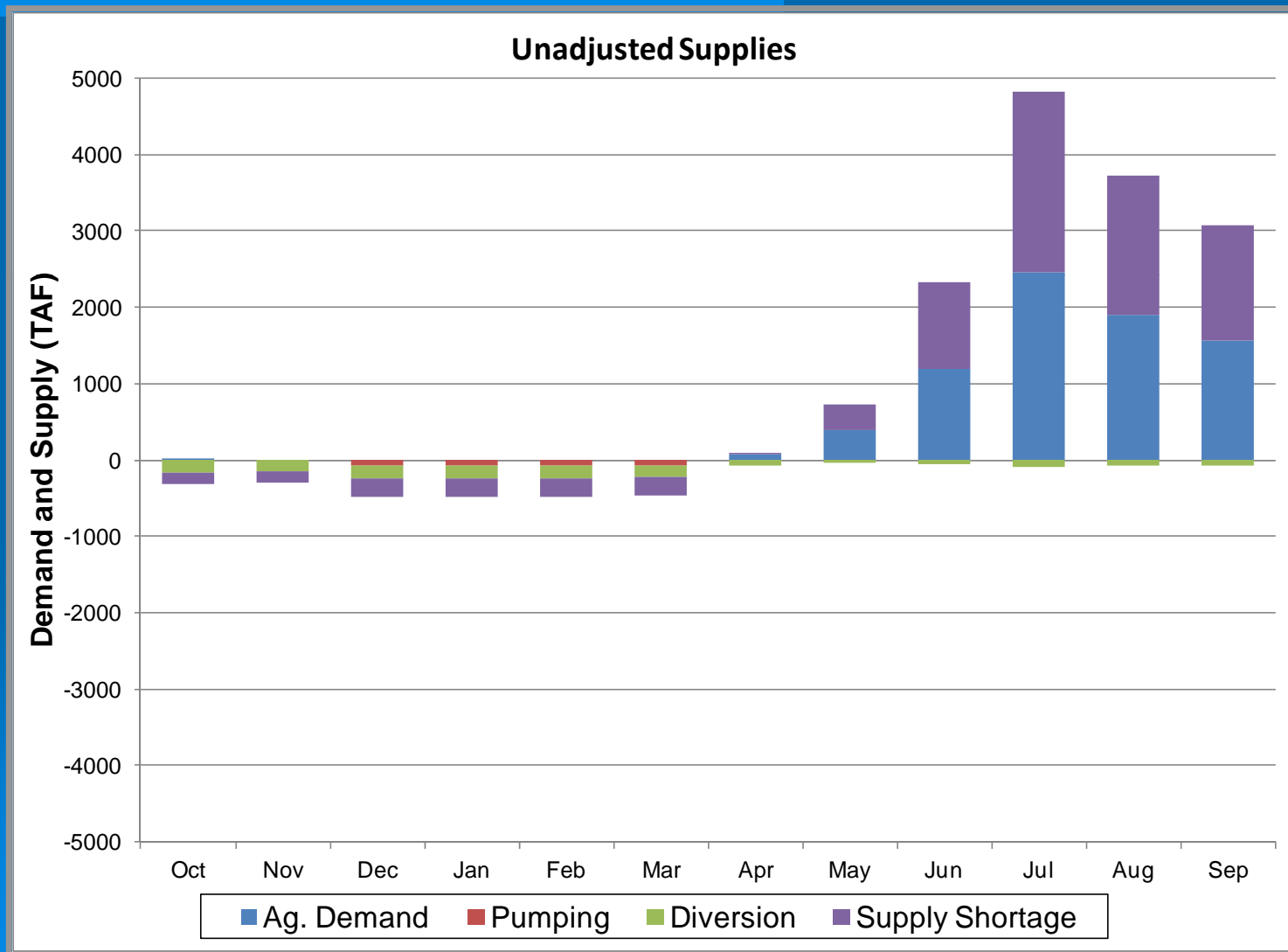
Example 7: Results



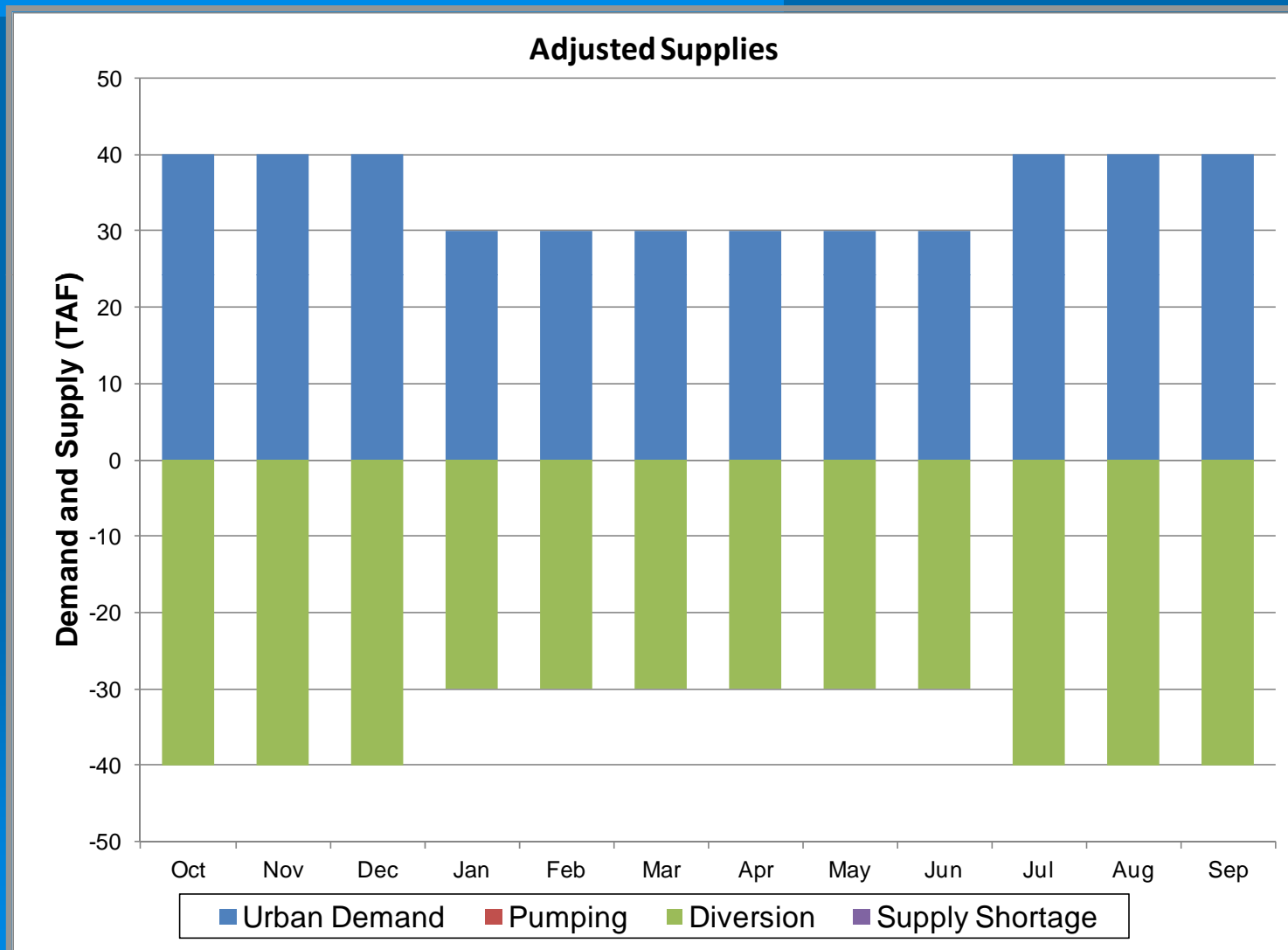
Example 7: Agricultural Demand versus Adjusted Supply



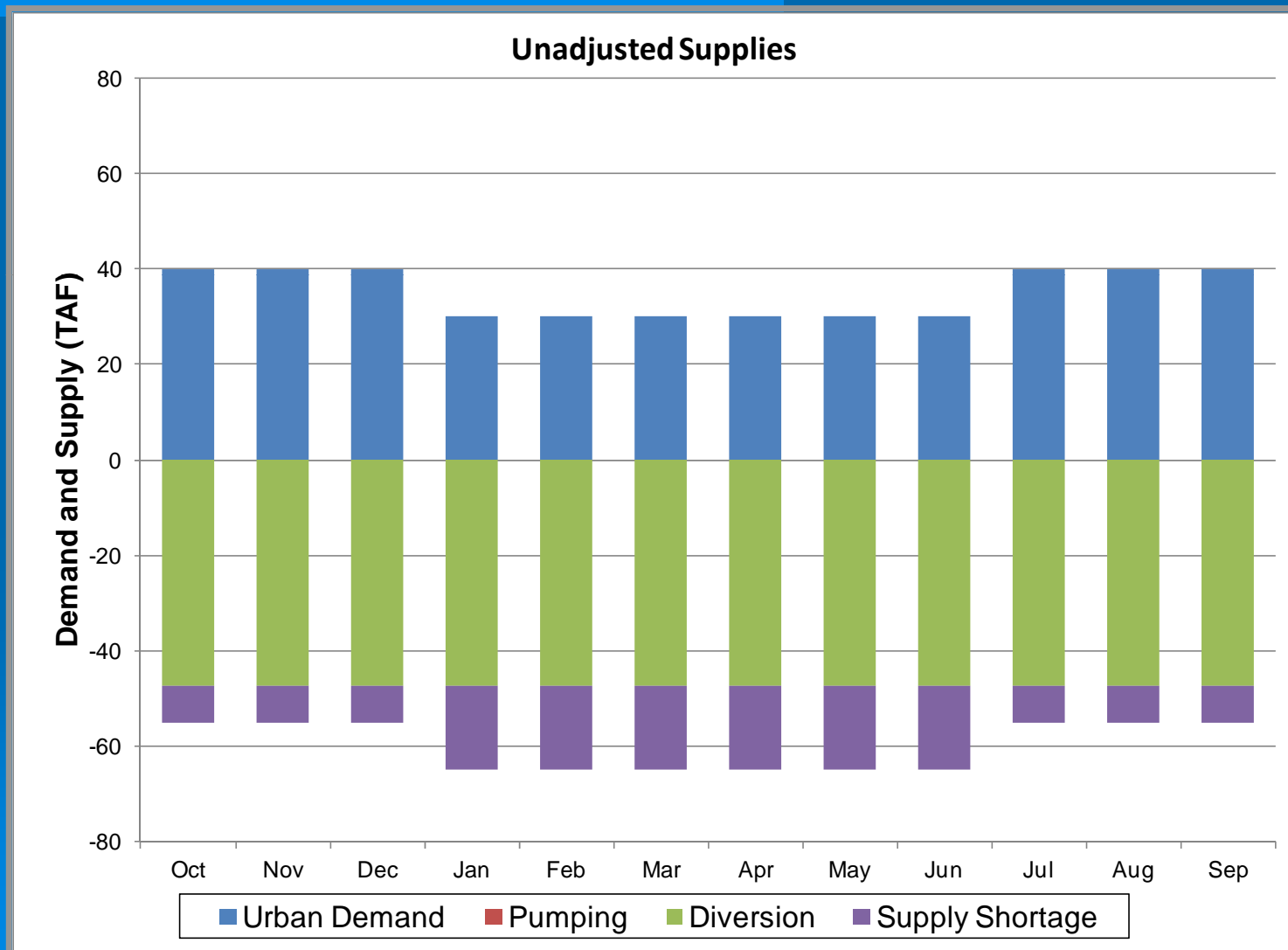
Example 7: Agricultural Demand versus Unadjusted Supply



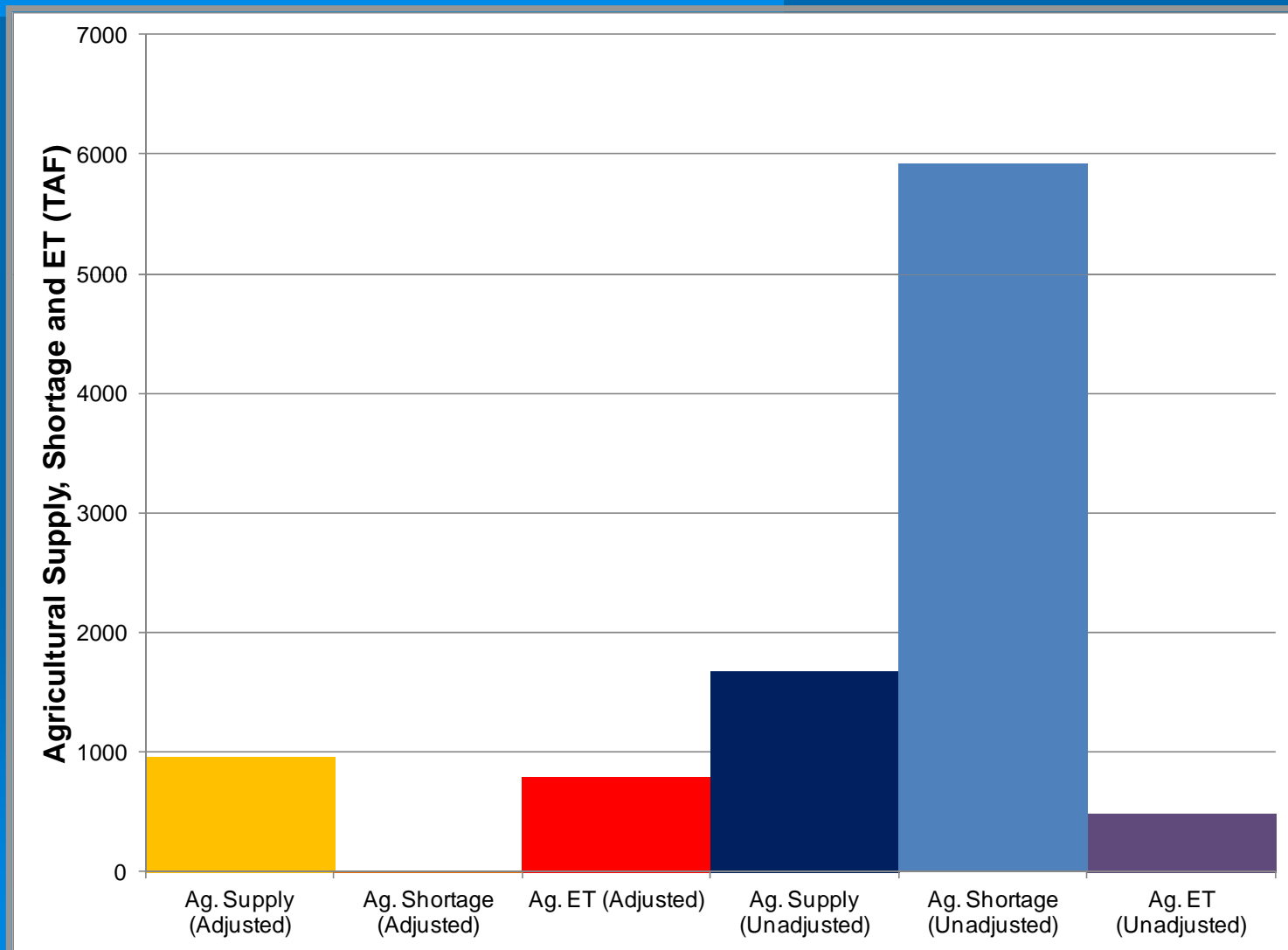
Example 7: Urban Demand versus Adjusted Supply



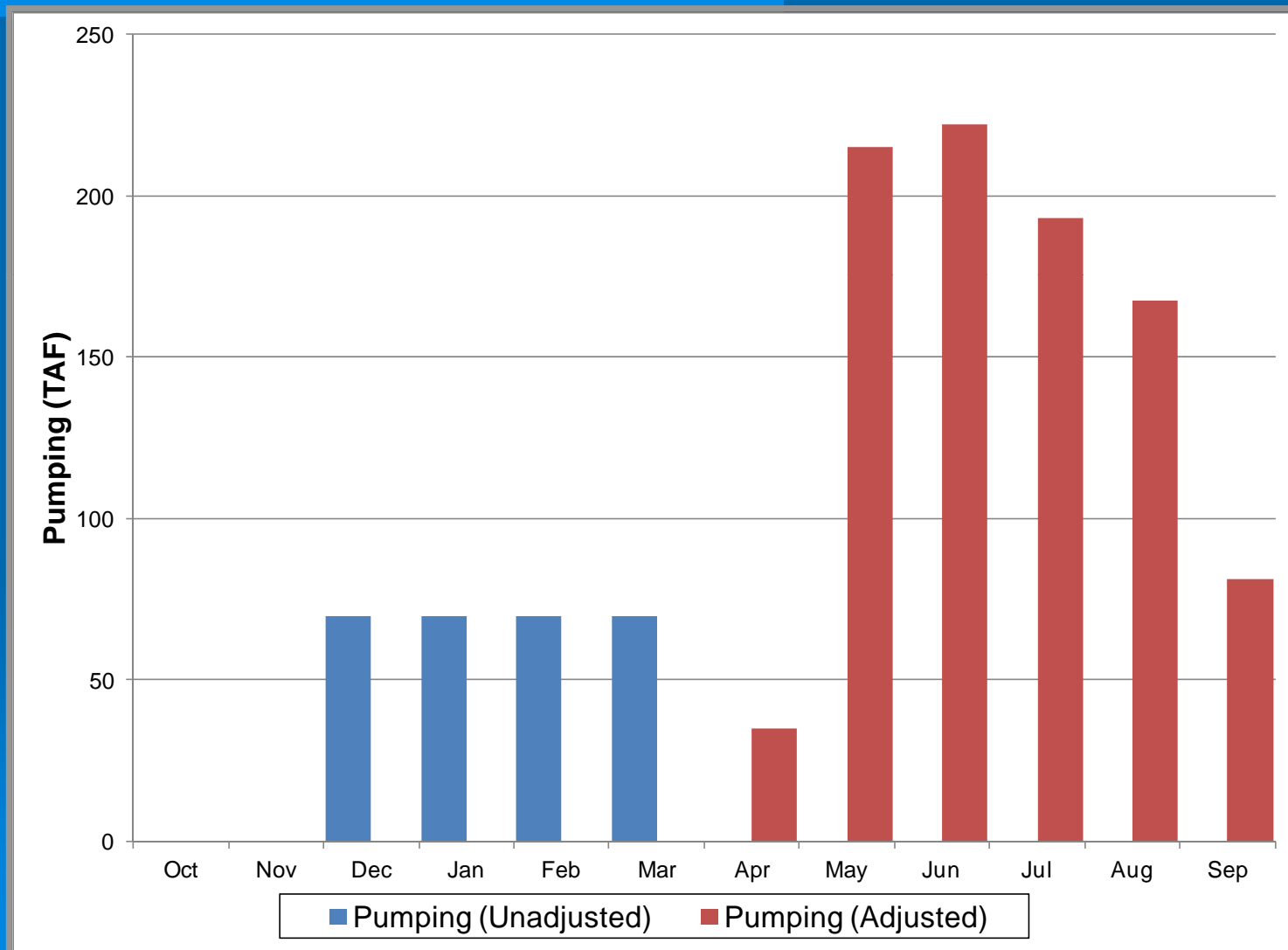
Example 7: Urban Demand versus Unadjusted Supply



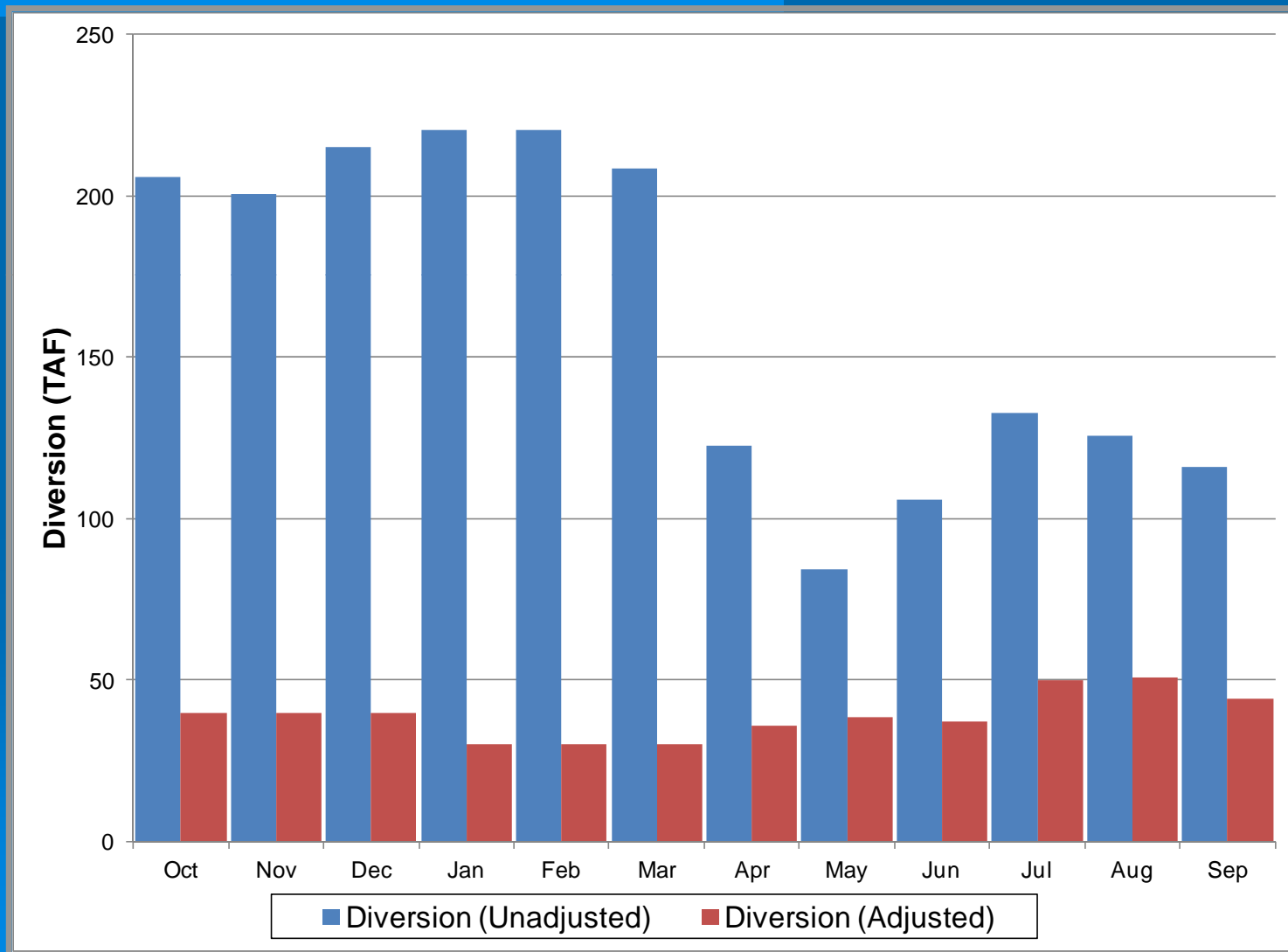
Example 7: Agricultural Adjusted and Unadjusted Supplies



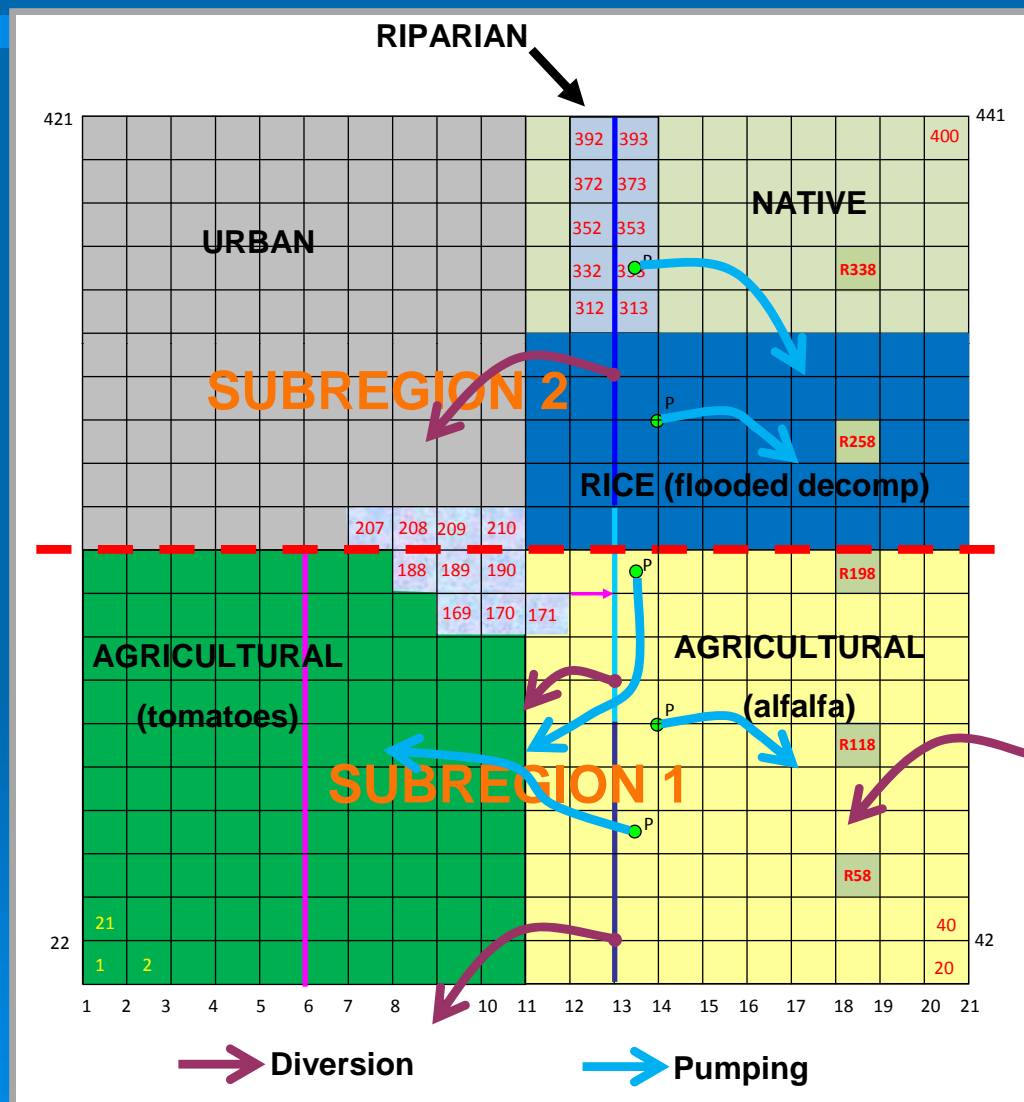
Example 7: Comparison of Pumping



Example 7: Comparison of Diversions



Example 7



Example 7: Comparison of Stream Reach 1 Loss to GW

