STRATECON INC.

Rodney T. Smith, Ph.D. President

Reasonable Ratio of M&I to AG Groundwater Extraction Charges

United Water Conservation District
Santa Paula, CA
May 22, 2018

Statement of Question

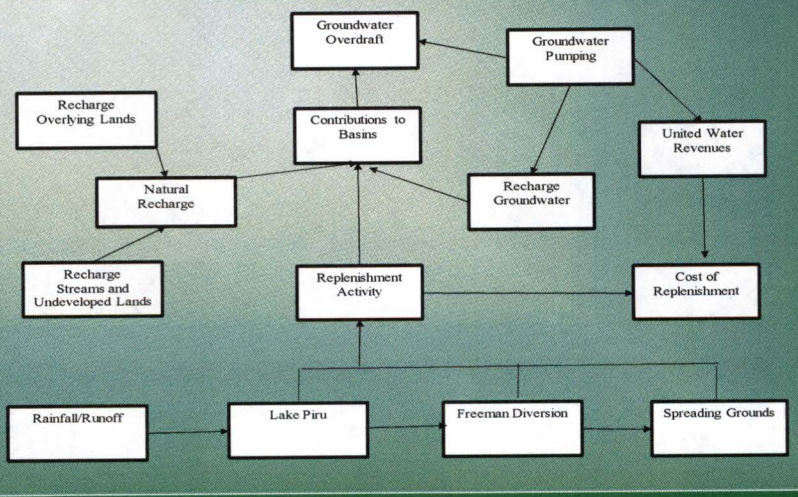
- Develop a quantitative method to determine a reasonable ratio of groundwater extraction charges Municipal & Industrial ("non-agricultural") water to agricultural ("AG") water
  - Focus on the differential hydrological impact of M&I and AG groundwater usage and land use on the eight inter-connected basins within United
  - How differential hydrological impact creates a need for replenishment projects and activities from United
  - How the rate structure should reflect these differences

2

Economic Principles of Rate Structure

3

United Water's Objectives and Sources of Revenues and Costs



4

Principle 1: Components of Fee for Water User Class

- Fee = Variable Cost Component + Fixed Cost Component
- Variable Cost Component: replenishment costs that vary with the volume of replenishment projects and activities (estimated @ 10% of total replenishment costs)
- Fixed Cost Component: replenishment costs that do not vary with the volume of replenishment projects and activities (estimated @ 90% of total replenishment costs)

5

Principle 2: Variable Cost Component Based on Impact of Pumping on Overdraft

- Impact of pumping on overdraft: pumping less groundwater reuse

AG Variable Cost Component: 75.9% of variable cost

M&I Variable Cost Component: 85.2% of variable cost

6

Principle 3: Fixed Cost Component based on apportionment rules

- Rule 1: apportion fixed cost according to relative demands water user class places on United for replenishment projects and activities
  - Share based on groundwater pumping adjusted for reuse
- Rule 2: credit water user class based on amount of differential recharge on overlying lands relative to districtwide average
  - Differential recharge per acre: AG (0.07 AF/acre); M&I (-0.14 AF/acre) adjusted by portion of recharge that benefits the inter-connected basins
  - Annual cost of replenishment projects and activities

7

Consistent With Cost-of-Service, Rate-Making Principles

- United Water undertakes projects to mitigate the effects of groundwater overdraft
- For a parcel, demand for United Water's services reflect water use and land use
- Stratecon's method
  - United Water's variable cost: comparable to commodity charge
  - United Water's fixed cost: comparable to demand charge

8

United Water's Cost of Replenishment Projects and Activities

9

United Water Projects to Address Groundwater Overdraft

- Ferro/Rose (retirement of groundwater allocation)
  - annual cost of replenishment activity: $1,131 per acre-foot (firm replenishment)
- Ferro/Rose (recharge project)
  - annual capital cost of replenishment activity: $820/acre-foot (non-firm replenishment)
- Desalination of brackish groundwater project (annual cost)
  - For 10,000 acre-foot annual design capacity: $1,217 per acre-foot to $1,399 per acre-foot
  - For 20,000 acre-foot annual design capacity: $1,093 per acre-foot to $1,238 per-acre foot
- Reasonable estimate for United Water's Annual Cost of Replenishment is $1,100 per acre-foot

10

Other Water Initiatives in Ventura County

- City of Ventura "Water Rights Dedication and Water Resources Net Zero Fee Ordinance"
  - Estimated fee for 2018: $28,204
  - Annual cost of $1,722 per acre foot
- Fox Canyon Groundwater Management Agency surcharge to bring pumping to safe yield
  - $1,815/AF for excess pumping of more than 100 acre feet per year
- Casitas Connection to State Water Project (annual cost per expected yield)
  - Capital Cost: $1,450/AF
  - Replacement Cost: $237/AF
  - SWP charges: $1,453/AF
  - Total: $3,140/AF

11

Reasonable Ratio for Groundwater Extraction Charges

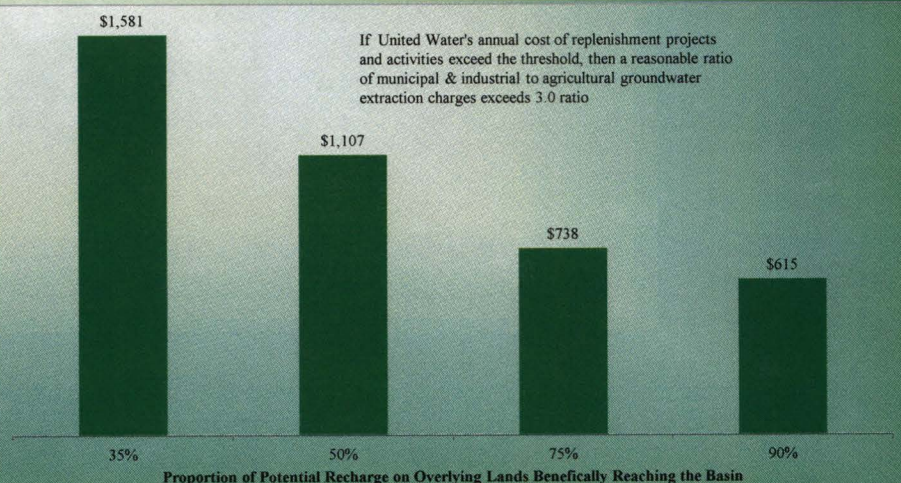
12

Assumptions

- Groundwater Revenue including in-lieu: $15,807,931
- Groundwater pumping and in-lieu: agricultural (221,730 acre-feet) and municipal & industrial (49,860 acre feet)
- Hydrologic Conditions
  - Reuse of groundwater: agricultural (24.1%) and municipal & industrial (14.8%)
  - Overlying recharge for lands: agricultural (0.56 acre-feet per acre) and municipal & industrial (0.35 acre-feet per acre)
- Acreage: Agricultural (80,078 acres) and Municipal & Industrial (40,918 acres)

13

Threshold Annual Cost of Replenishment Projects and Activities by Proportion of Potential Recharge on Overlying Lands Beneficially Reaching the Basin ($/AF)



14

Conclusion

- A ratio of at least 3.0 for M&I to AG groundwater extraction charges reasonably reflects the quantitative differences between the hydrologic impacts of the different water user classes

15