

Outline of TDS and Nitrate Projection Methodology Report

July 22, 2008 Version

1. The Cooperative Agreement
 - (State the requirement for doing TDS and nitrate projections and why the RWQCB cares)

2. The Salt Planning Problem
 - Thresholds of Significance
 - TDS SMCL
 - Nitrate MCL
 - Past TDS and Nitrogen Projections
 - The 1969 WRE Report
 - The Basin Plan and Basin Planning Procedures
 - The Chino Basin Water Resources Planning Module
 - The Hydrologic and Salt Budget Components for the Santa Ana Watershed
 - The Impact of Source Water TDS Concentration on Recycled Water Management (point is that it is not enough to manage the TDS concentrations in gw below the MZ objectives: source water TDS concentrations affect recycled water TDS concentrations and the ability to reuse or discharge this water)

3. Proposed Methodology
 - Method Summary
 - Part 1 – Management Zone Salt Flux
 - Hydrologic and Salt Fluxes (need definition sketch for hydrologic and salt budgets with involved legend, table showing fluxes by MZ)
 - Recharge Fluxes
 - Storm Water Recharge in Channels, Retention Basins and Spreading Basins (need a table that lists previous estimates of storm water recharge in selected drainages and associated TDS and nitrogen concentration: sources of data)
 - Artificial Recharge of Imported Water in Channels, Retention Basins and Spreading Basins (need a table that lists previous estimates of imported water recharge for selected areas and associated TDS and nitrogen concentration: sources of data)
 - Artificial Recharge of Recycled Water in Channels, Retention Basins and Spreading Basins (need a table that lists previous estimates of recycled water recharge for selected areas and associated TDS and nitrogen concentration: sources of data)
 - Artificial Recharge of Wastewater through Onsite Wastewater Disposal Systems
 - Deep Percolation of Precipitation and Applied Water (need a table that lists previous estimates of deep percolation of precipitation and applied water for selected areas and associated TDS and nitrogen concentration: sources of data)

Subsurface Boundary Inflow (need a table that lists previous estimates of subsurface boundary inflows for selected areas and associated TDS and nitrogen concentration: sources of data)

Discharge Fluxes

Groundwater Pumping (need a table that lists previous estimates of groundwater pumping for selected areas: sources of data)

Rising Groundwater (need a table that lists previous estimates of rising groundwater for selected areas: sources of data)

Subsurface Boundary Outflow (need a table that lists previous estimates of subsurface boundary outflow for selected areas: sources of data)

Evapotranspiration (need a table that lists previous estimates of evapotranspiration for selected areas: sources of data)

Water and Salt Feedback Loops (describe recursive equation for TDS and nitrogen)

Routing Recharge Fluxes through the Vadose Zone

Use of Vadose Zone Models to Develop Aggregate Time Histories of Water and Salt Loading to Saturated Zone (use Chino Basin as demonstration and implications for planning: past is future)

Piston Displacement Analog (create a time series of saturated zone recharge fluxes that are appropriately lagged; will consist of past deep percolation and applied water fluxes with future artificial recharge of supplemental and storm waters)

Part 2 – Management Zone TDS and Nitrate Concentration Projections

The Initial Conditions in the Saturated and Vadose Zones (decision: use Basin Plan ambient or time specific value based on data for that time; initial vadose zone concentrations will be significant contributor to TDS and nitrate changes during the projection period)

Planning Period Definition (decision: choose a specific past time history or use an expected value time series)

Numerical Groundwater Model Approach (preferred when available and necessary when the future groundwater hydraulics do not resemble the past, e.g., the San Jacinto MZs)

Continuously-Stirred Reactor Model Approach (use needs to be defensible, most useful for small and simple basins)

Selection of Approach

Part 3 – Watershed-Scale TDS and Nitrate Concentration Projections

Watershed Decomposition and Routing Approach

The Wasteload Allocation Model (five-page summary including calibration summary and its nodal relationship to each management zone)

Hierarchical Approach with Attribution (start with the upstream MZs, recommend method and pass discharge fluxes downgradient to adjacent MZs and the WLAM; sequential; say who does what)

4. Implementation (This section may or may not be included)