Salt and Nitrate Sources Pilot Study
Work Plan Outline

A. Work Plan Objectives and Scope
    1. Study area descriptions
    2. Study tools descriptions
    3. Study methodologies (area specific)
        a. Basic approach (tools to be used)
        b. Data assessment (needs, gaps, sources)
        c. Data collection and review
        d. Mass balance analysis
        e. Trend analysis
        f. Sensitivity analyses
            1) Hydrologic conditions (wet, dry, normal)
            2) Land use
            3) Other factors?
    4. Study output
    5. Schedule
B. Study area descriptions
    1. Yolo Sub-Basin
        a. Surface watershed
            1) Boundaries
            2) Surface water features and supply sources
            3) Land use elements
        b. Groundwater basin
            1) Stratigraphy
            2) Groundwater supply
    2. Modesto Area
        a. Surface watershed
            1) Boundaries
            2) Surface water features and supply sources
            3) Land use elements
        b. Groundwater basin

1) Stratigraphy
2) Groundwater supply

3. Tule River Basin
    a. Surface watershed
        1) Boundaries
        2) Surface water features and supply sources
        3) Land use elements
    b. Groundwater basin
        1) Stratigraphy
        2) Groundwater supply

C. Study Tools descriptions
    1. WARMF model
        a. General description
        b. Assumptions / limits
        c. Inputs
            1) Meteorological
            2) Soils
            3) Topography
            4) Land use
            5) Surface water flows
            6) Surface water quality
            7) Irrigation rates
            8) Groundwater flows
            9) Groundwater quality
        d. Outputs
    2. MODFLOW/USGS (Modesto) groundwater model
        a. General description
        b. Assumptions / limits
        c. Inputs
        d. Outputs
    3. Tule River Basin (Harter) groundwater model
        a. General description
        b. Assumptions / limits

c. Inputs
d. Outputs

4. Other tools

D. Study methodologies

1. Yolo Sub-basin
   a. Basic approach (tools to be used)
   b. Data assessment (needs, gaps, sources)
      1) Land Use
      2) Irrigation Rates
      3) Fertilization Rates
      4) Point Source Flow and Quality
      5) Surface Water Flow and Quality
      6) Groundwater Pumping and Recharge
      7) Groundwater Quality
   c. Data collection and review
      1) Land Use
      2) Irrigation Rates
      3) Fertilization Rates
      4) Point Source Flow and Quality
      5) Surface Water Flow and Quality
      6) Groundwater Pumping and Recharge
      7) Groundwater Quality
   d. Mass balance analysis
      1) Temporal scale (WARMF + Groundwater model integration)
      2) Spatial extent (WARMF + Groundwater model integration)
      3) Salts vs. nitrates
      4) Other constituents
   e. Trend analysis
      1) Historical
         a) Salts
         b) Nitrates
      2) Future
         a) Salts

b) Nitrates

f. Sensitivity analyses

1) Hydrologic conditions (wet, dry, normal)

a) Salts

b) Nitrates

2) Land use (1980 vs. Current DWR/NLCD)

a) Salts

b) Nitrates

3) Other factors?

2. Modesto Area

a. Basic approach (tools to be used)

b. Data assessment (needs, gaps, sources)

1) Land Use

2) Irrigation Rates

3) Fertilization Rates

4) Point Source Flow and Quality

5) Surface Water Flow and Quality

6) Groundwater Pumping and Recharge

7) Groundwater Quality

c. Data collection and review

1) Land Use

2) Irrigation Rates

3) Fertilization Rates

4) Point Source Flow and Quality

5) Surface Water Flow and Quality

6) Groundwater Pumping and Recharge

7) Groundwater Quality

d. Mass balance analysis

1) Temporal scale (WARMF + Groundwater model integration)

2) Spatial extent (WARMF + Groundwater model integration)

3) Salts vs. nitrates

4) Other constituents

e. Trend analysis

1) Historical
    a) Salts
    b) Nitrates
2) Future
    a) Salts
    b) Nitrates

f. Sensitivity analyses
1) Hydrologic conditions (wet, dry, normal)
    a) Salts
    b) Nitrates
2) Land use (1980 vs. Current DWR/NLCD)
    a) Salts
    b) Nitrates
3) Other factors?

3. Tule River Basin
a. Basic approach (tools to be used)
b. Data assessment (needs, gaps, sources)
1) Land Use
2) Irrigation Rates
3) Fertilization Rates
4) Point Source Flow and Quality
5) Surface Water Flow and Quality
6) Groundwater Pumping and Recharge
7) Groundwater Quality
c. Data collection and review
1) Land Use
2) Irrigation Rates
3) Fertilization Rates
4) Point Source Flow and Quality
5) Surface Water Flow and Quality
6) Groundwater Pumping and Recharge
7) Groundwater Quality
d. Mass balance analysis

1) Temporal scale (WARMF + Groundwater model integration)
2) Spatial extent (WARMF + Groundwater model integration)
3) Salts vs. nitrates
4) Other constituents

e. Trend analysis
   1) Historical
      a) Salts
      b) Nitrates
   2) Future
      a) Salts
      b) Nitrates

f. Sensitivity analyses
   1) Hydrologic conditions (wet, dry, normal)
      a) Salts
      b) Nitrates
   2) Land use (1980 vs. Current DWR/NLCD)
      a) Salts
      b) Nitrates
   3) Other factors?

E. Study Output
   1. Tables
   2. Graphs/Charts
   3. Maps
   4. Other?

F. Schedule