1. **Study area/scale:** The Framework suggests "Initial Studies" use a clearly defined study area. While no specific scale is given for the Initial Studies, it is indicated the area include natural hydrological boundaries such as watersheds or groundwater basins. It is stated that a key objective of the initial study is to develop water budgets and salt and nitrate mass balances that are complete and include an **"accounting of all components in sufficient detail to identify potential management strategies".** It is further stated that the Initial Studies develop salt/nitrate loads and mass balances where all "salt/nitrate sources, sinks, and concentrators are identified with appropriate quantitative, location, and associated land use data." And, it is suggested that Final Studies *may* include determining "current and legacy salt/nitrate sources that are causing or have caused beneficial use impairment and establish the salt/nitrate load contribution of each source."

   Based on the indicated objectives for Initial Studies, the **study area for any Final Study would necessarily need to be the same as for the Initial Study** for time and resource expediency. More importantly, **in order to develop an accounting method with sufficient detail to identify potential management strategies, spatial and temporal objectives need to be specified and met in the Initial Study**. A sufficient level of detail would then enable further analysis as part of a "Final Study" to determine whether current/legacy loading have contributed to specific beneficial use impairment due to specific salt/nitrate source loading.

   There are two types of studies compared in Table 1 in the Framework document. The Turlock study has a "gross" working scale, i.e., the entire subbasin is treated as the unit of analysis. The Pilot Study represents three area study areas (Modesto, Tule River and Yolo) each of which is comprised of many catchments, or subunits of analysis, defined based on the characteristics of both the watershed (physical features for major and minor surface water courses and use of the WARMF accounting tool to track all air, surface (soil and surface water), and near subsurface processes (surface water/groundwater interface and interface with deeper groundwater) and groundwater flow models in each of the three areas. The number of catchments in each area is: Modesto (55), Tule River (51), and Yolo (41). Accordingly, use of the WARMF accounting tool for organizing data and simulating processes allows initial and future **analyses with appropriate quantitative source/sink location and land and water use information to enable linkage of these processes to potential or actual impairment and to identify source/sink location-specific management strategies**. **Such analyses are not meaningful when the unit of analysis is too large**, i.e., basin/subbasins and no differentiation within those areas of the processes and source loading, and meaningful management strategies cannot be developed.

2. **Constituents of analysis:** The Framework places **equal significance on an accounting of salt and nitrate loads and mass balance determinations**. The Pilot Study approach addresses this objective for Initial Studies whereas the Turlock Study approach does not, or at least not in its current form. Additionally, the data collected and input into the WARMF accounting tool include many more constituents than simply TDS and nitrate. Rather, WARMF includes the suite of general minerals composing TDS, and also nutrients, biological constituents and other parameters which can play important roles in the analysis of source- and location-specific processes when tracking potential pollutants through a watershed from source areas.

3. **Temporal: Temporal considerations play a significant role when considering water to salinity/nutrient relationships and mass loading** (e.g., during different water year types, or seasonal water/wastewater flow variability, etc.). **Temporal considerations are, therefore, also important for the development of meaningful management strategies**. The Pilot Study data include daily or hourly meteorological parameters. These parameters were also based on stations located nearest to each of the catchments. The Pilot Study approach also included a 10- year

simulation period that incorporated average, dry, and wet water years. The Pilot Study also provided a comparative analysis between wet and dry water year types to test the sensitivity of the results to the water year type. The Turlock Study did not address temporal variability.

4. **Projected salinity/nitrate concentration trends: Two important factors are necessary** to make this analysis meaningful, including the **data representing the portion of the surface water or groundwater system to which the projection is being compared** and the **unit of analysis used to make the projection.** The Pilot Study described the sources of data and whether the data (e.g. groundwater data) allowed for differentiation of groundwater quality in different parts of the aquifer system. The Turlock Study did not describe efforts to differentiate the groundwater quality data obtained from different wells in the Subbasin. The Pilot Study used an approach for the Yolo study area for projecting concentration trends that was based on a shallow or upper portion of the aquifer system. While both studies employed a "mixing model", the Yolo study employed one linked to data output from the WARMF model and also the CVHM MODFLOW model which varied temporally based on 10-year hydrologic data record for each catchment analyzed. The Turlock Study employed a mixing model that used the entire volume of groundwater contained in storage in the subbasin and assumed "instantaneous and uniform" mixing of all the groundwater in storage (23 MAF) with the salt mass load estimated for the entire subbasin. The Turlock Study approach is not meaningful as such mixing is highly unrealistic. Therefore, this approach is not a useful tool to project concentrations in the upper part of the aquifer system; it also does not allow differentiation by area of the affect of different land and water uses (i.e., potential management strategies) on groundwater quality. Therefore, it is not suitable for an Initial Study. The Yolo study area approach provides for a reasonable approach to an **analysis of the assimilative capacity of an area by catchment or collection of catchments**. The Turlock study approach is not suitable for analysis of assimilative capacity as it would overestimate the mass-dilution capacity by using the full volume of groundwater in storage.

5. **Priority areas of analysis:** The Framework does not suggest simpler and more expedient approaches to identifying priority regions for Salt and Nutrient Management Planning. **Existing groundwater quality data have been mapped for the entire Central Valley that show concentration changes with time and also by area with the more sensitive land use/geologic settings being associated with elevated constituent concentrations for TDS and nitrate**. These basic data are available to help guide and expedite the implementation of more detailed studies of the type that the Framework categorizes as Follow-Up Studies. The **greater spatial and temporal differentiation is required for meaningful salt and nitrate management planning** on the Central Valley scale that leads to timely completion of studies that inform the Basin Plan amendments.