A PRELIMINARY PLAN FOR A RECOMMENDED SOLUTION TO THE GRASSLAND AREA DISCHARGES OF DRAINAGE WATER AND SALT TO THE SAN JOAQUIN RIVER[1]

DRAFT SUMMARY

Frequently San Joaquin River water does not meet water quality objectives established to protect beneficial uses. Studies indicate that a substantial portion of the salt and other constituents degrading the river come from the west side valley soils with shallow saline water tables where subsurface drains have been installed to control water tables in the irrigated land. Specifically, the drainage problem area is the area that drains both subsurface drainage water and surface water (tailwater) into the San Joaquin River from the area of the "draining entities". This summary outlines the problem and summarizes a preliminary plan for a solution.

There has been a substantial increase in the salinity of the San Joaquin River water specifically during the past several years and generally since the Delta Mendota Canal went into operation, about 1951. The two main reasons for this salinity increase are: 1) there has been an increase in the salinity of drainage water reaching the river because of recent changes in the drainage water flow patterns through the Grasslands Area and 2) there has been an escalation in reuse of the rather good quality tailwater particularly during the 1986-1992 drought. Good quality tailwater was heretofore mixed with saline subsurface drainage water prior to its flowing through the Grassland Area and into the river.

Data collected on the westside of the valley show that the salinity of drainage effluent coming from drained fields decreases substantially during the first 2 to 3 years the fields are drained. After that, the salinity output from the drained fields is rather stable as long as irrigation and drainage practices remain about the same. It should be noted that if all of the tailwater generated by the draining entity districts is ever completely recycled, the salinity and the concentration of other constituents in the water draining into the San Joaquin River from these districts will increase.

Another significant reason for past increases in salt load is the increase in the amount of land drained with subsurface drainage systems. The area within the draining entity districts served by subsurface drainage systems increased from about 18,700 acres in 1965 to about 58,500 acres in 1991.

A number of "potential solutions" to the San Joaquin Valley West Side drainage problem have been studied over the years. Most recently the coordinated State and Federal San Joaquin Valley Drainage Program issued a December 1991 Report entitled "A Strategy for Implementation of the Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley". This report specified eight major components of a "solution" to manage (but not "solve") the saline drainage water problem. Even if the "drainage problem" cannot be solved in total, action must be taken to reduce or eliminate the impact of the production of saline drainage water on the quality of water in the San Joaquin River. A program must be implemented that is physically achievable and will not cause adverse salt build up in the drained soils.

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RECOMMENDED SOLUTION

There are basically only two practical ways in which saline subsurface drainage water can be managed once it is produced. One is with surface storage facilities, i.e. open ponds. The other is by removing the drainage water from the area where it is produced, i.e. draining it to the ocean. The first is environmentally unacceptable because it is not known how long salt laden water containing constituents, such as selenium, would have to be stored in open ponds, particularly during drought situations. Additionally, this solution imposes a burden on the agricultural sector since it requires dedication of otherwise productive land to on-farm retention ponds. The second, a drain to the ocean, while the most scientifically feasible solution, continues to be politically rejected. It is believed that a process to remove selenium from drainage water may soon be available for application. The technology is already developed. When this approach becomes both technically and economically feasible, the situation regarding evaporation ponds and the use of the drainage water for fish and wildlife habitat may change significantly. However, until then something must be done to protect the San Joaquin River.

Under current circumstances the most reasonable method of controlling the production of the subsurface drainage water and its subsequent flow to the San Joaquin River is to retain the water in the ground where the subsurface drainage systems are located. Such a program will require the redesign and reconstruction of the drainage facilities and retention of saline water in the ground until it can be safely moved to the river. At an appropriate release time, it could then be diluted with high flows and moved down the river to the Bay and Ocean with lesser impact on downstream water users and little or no impact on the environment.

This scheme has the potential to meet the alternative "Controlled and limited discharge of drainage water from the San Joaquin Basin portion of the study area to the San Joaquin River, while meeting water quality objectives". It is physically possible, but will require that most of the subsurface drainage systems within the draining entities be either reconstructed or replaced with systems that will prevent saline groundwater from rising into the crop root zone or surfacing for extended periods of time. It is estimated that this could cost up to $1,000 per drained acre or as much as $60,000,000 if the approach is adopted for the entire area. Although initially costly, this solution could be considered as permanent.

This solution would not, however, assure total salt balance for the irrigated land on the west side of the Valley unless sufficient dilution flows are assured during critical and dry water years. Coordination of west side drainage flows with the release of water from the east side tributaries would be a necessary part of the ultimate water quality management plan.

Analysis of the plan is currently under way and results of such analysis will be available in the near future. However, it is contemplated that it will be recommended that the SWRCB, the EPA, the USBR, and/or the DWR, experimentally fund the reconstruction of several existing on-farm subsurface drainage systems. The reconstruction would take place in fields where the drainage effluent cannot be shut off and where, if the drains are now shut off, ponding would occur. The reconstructed systems would only be allowed to operate when the flow in the San Joaquin River permits the safe discharge and transport of saline water to the Ocean.

The goal is to maintain the viability of agriculture and improve the quality of water in the San Joaquin River. Under proper operating criteria this plan may even allow the completion of the San Luis Drain to Vernalis. This would permit the utilization of the full dilution capacity of the entire San Joaquin Basin. It is conceivable that with careful control of irrigation water applications, some recycling of marginally saline drainage water and strict discharge limits, that additional land in the most severe drainage problem areas of the Federal San Luis Unit could also be drained through the San Luis Drain without causing water quality impacts.