4. Water Disposition

The Stipulation directs that there be an annual accounting of the disposition of water supplies in the SMVMA. The primary uses of water in the SMVMA are for agricultural irrigation and for domestic and related municipal uses, as detailed in Chapter 3, where most of the water is consumptively used. The balance of water supplies primarily flow, or are disposed, back to the groundwater basin via deep percolation of applied irrigation that exceeds agricultural crop water requirements, via deep percolation of landscape or other non-agricultural irrigation, and via purposeful infiltration of treated municipal waste water. Other disposition of water in the SMVMA includes purposeful consumptive use (evapotranspiration) via spray irrigation for disposal of some treated municipal waste water, minor agricultural drainage in localized areas of low surface elevation and high shallow groundwater levels and, potentially, purposeful export of water to another management area. This chapter quantitatively addresses the two largest of the preceding components of water disposition, deep percolation of applied irrigation and discharge of treated municipal waste water. It also includes estimated return flows from landscape irrigation. No data are available with regard to agricultural drainage, so there is no quantitative discussion of that component of disposition herein. Finally, the Stipulation includes provisions for export of water from the SMVMA to the adjacent NMMA; extensive planning has been completed on that potential transfer, and its implications on the SMVMA are conceptually discussed below.

4.1 Agricultural Return Flows

The largest component of overall return flows in the SMVMA originates as applied water for agricultural irrigation. Except for local areas near the Santa Maria River toward the western end of the SMVMA where subsurface drainage removes shallow groundwater beneath irrigated lands, applied irrigation in excess of crop water requirements is considered to deep percolate beyond crop rooting depths and result in return flows to groundwater. The estimation of agricultural water requirements and associated groundwater pumping, as described in Section 3.1, is based on crop areas, respective crop water requirements, and estimated performance of various irrigation systems (distribution uniformity). For the range of crops and irrigation systems in the SMVMA, most crops are considered to consumptively use about 80 to 85 percent of the water applied to them, resulting in an estimated 15 to 20 percent of applied water exceeding crop consumption and deep percolating as return flow to the underlying aquifer system (the one exception to the preceding ranges is wine grapes, where 95% of applied water is estimated to be consumptively used, resulting in return flow of only 5% of applied water).

For the full range of crop categories in the SMVMA, return flow rates are estimated to range from about 0.10 af/ac for Grain, to about 0.50 af/ac for the predominant Rotational Vegetables in the Valley, to a maximum of about 0.87 af/ac for Pasture. The respective estimated agricultural return flow rates are detailed in Table 4.1-1. When combined with their respective individual crop acreages, it is estimated that just over 20,000 af of applied agricultural irrigation deep percolated to groundwater as return flows in the SMVMA in 2008.

4.2 Treated Municipal Waste Water Discharge

There are three municipal wastewater treatment plants in the SMVMA: the City of Santa Maria Plant located west of the City; the Laguna Sanitation District Plant west of the Santa Maria Airport; and the City of Guadalupe Plant west of the City (see Figure 1.3-1a). At the City of Santa Maria WWTP, effluent volumes are metered and recorded, and all treated water is discharged to percolation ponds near Green Canyon adjacent to Plant facilities. At the Laguna Sanitation District WWTP, influent volumes are metered and recorded, and the large majority of treated water (96%) is discharged to permanent spray fields north and west of the Plant facilities. The remainder, which is brine derived from reverse osmosis treatment of part of the total waste water flow, is discharged to a deep injection well (a converted oil well, completed below the base of fresh groundwater). At the City of Guadalupe WWTP, influent volumes are recorded and all treated water is discharged to permanent spray fields north of the Plant facilities, across the Santa Maria River (with storage pond north of facility).

Influent and effluent data are currently available for 2008 only (data for previous years to be incorporated in future annual reporting), and the monthly and annual totals are shown by facility and method of disposal in Table 4.2-1. At the two plants where influent volumes are metered (Laguna Sanitation District and City of Guadalupe), the effluent volumes are estimated to be 90 percent of the influent, with the remainder assumed to be lost (consumed) during treatment. At the other plant (City of Santa Maria), where effluent is metered, the influent volumes are estimated by using the same assumed loss (10%) during treatment.

In 2008, an estimated 12,100 af of treated municipal waste water were discharged in the SMVMA. Nearly 80 percent (9,500 af) of that total was discharged to the percolation ponds of the City of Santa Maria WWTP. About 2,000 af of treated water were discharged to spray irrigation of permanent pasture of the Laguna Sanitation District WWTP (and 90 af of brine were discharged by deep well injection). Slightly less than 600 af of treated water were discharged to spray irrigation by the City of Guadalupe.

The Stipulation has provisions for each of the municipal water purveyors in the SMVMA to have rights to recover return flows that derive from their respective importations of water from the SWP. Those rights are to specific fractions of SWP water use in the preceding year; they are limited in time to recovery in the following year, and thus do not carry over or otherwise accumulate in the basin. The respective fractions for the three municipal purveyors are 65 percent for Santa Maria and 45 percent each for Southern California Water Company (now GSWC) and for Guadalupe. The Stipulation is silent as to the basis for the respective fractions; logically, however, they would have some basis in the fate of imported SWP water, i.e. what fraction ends up being “disposed” as a “return flow” to the groundwater basin.

Initial interpretation of the municipal water supplies and waste water processes in the SMVMA in 2008 suggests that the 65 percent “return flow” fraction for Santa Maria is approximately representative of the relative amount of overall Santa Maria water supply that primarily ends up as metered effluent that is discharged to spreading basins for infiltration to the groundwater basin. While the 9,520 af of metered effluent in Table 4.2.1 is mostly reflective of water that originates as Santa Maria water supply, it is slightly inflated by the net interception of some

waste water, by the Santa Maria sewer system, from Orcutt (originally from GSWC water supply). On the other hand, effluent from the Santa Maria WWTP does not account for "return flows" that derive from landscape irrigation with municipal water supply. Deduction of the former and addition of the latter suggest that, depending on how much actually infiltrates from the spreading basins, the net "return flow" to groundwater from the Santa Maria municipal water supply system could be as high as about 70 percent of its total water supply. Since the Santa Maria water supply is a commingled combination of groundwater and SWP water, the "return flow" fraction attributable to SWP water would be the same as that for the commingled supply.

Initial interpretation of the GSWC/Laguna Sanitation District and Guadalupe water supplies and waste water processes in 2008 suggests that the 45 percent return flow fractions in the Stipulation are not representative of relative amounts of those respective water supplies that end up as groundwater recharge which, in turn, would be recoverable by pumping from the basin. In the case of Guadalupe, metered influent to the treatment plant represents nearly 64 percent of its water supply, and estimated effluent is about 57 percent of its water supply. While both fractions exceed the 45 percent return flow fraction in the Stipulation, the disposal method (spray irrigation) is not conducive to groundwater recharge but is, conversely, conducive to consumption of the effluent by evapotranspiration. Ignoring the fact that the Guadalupe spray field is located over an area where the deeper part of the aquifer system is confined, constraining the effectiveness of recharge via application at the ground surface, a reasonable estimate of any deep percolation beneath the Guadalupe spray field would be in the range of about 10 to 15 percent of its water supply, far less than the stipulated 45 percent.

Finally, while the overall sewer and waste water treatment system at the Laguna Sanitation District is more difficult to analyze, the combination of treated volumes and disposal method suggests that far less than the stipulated 45 percent of water supply ends up as groundwater recharge. The metered influent to the Laguna plant represents only about 25 percent of the GSWC water supply to its Orcutt, Lake Marie and Tanglewood systems; estimated effluent represents only about 21 percent of those water supplies. With credit for the net sewer fraction that is intercepted to the Santa Maria plant, those fractions increase to about 30 and 25 percent, respectively. Beyond those low fractions, the spray irrigation disposal method is, as with Guadalupe, not conducive to groundwater recharge. A reasonable estimate of deep percolation to groundwater recharge beneath the Laguna spray field would be about 20 percent of the estimated effluent, equivalent to only about 5 percent of the GSWC water supplies. Addition of recharge from waters intercepted to the Santa Maria plant would increase the estimate of return flows to about 8 percent of the GSWC water supplies. Further addition of estimated recharge that derives from landscape irrigation in the GSWC service area would increase the total return flow fraction to about 18 percent. All the preceding fractions are far less than the stipulated 45 percent. While further analysis is probably warranted, the treated volumes and disposal methods for waters supplied do not appear to support the credit for return flows of SWP water designated for GSWC in the Stipulation.

4.3 Exported Water

No water was exported from the SMVMA in 2008. However, planning continued in 2008 for future export of water from the SMVMA to the NMMA, specifically from the City of Santa Maria to the Nipomo Community Services District (Nipomo CSD). The Stipulation includes provisions specific to the NMMA for implementation of a Memorandum of Understanding (MOU) between the City and Nipomo CSD that provides for the sale of up to 3,000 af of "supplemental water" per year by Santa Maria to Nipomo; that sale would be equivalent to an export from one management area (the SMVMA) to another (the NMMA). While the potential export remains in planning, its potential raises at least three technical concerns in the SMVMA:

- First, while there has apparently been extensive analysis of the need for supplemental water in the NMMA, prior to and through a recently certified EIR on the project, the Nipomo CSD "Waterline Intertie", there has been no analysis to identify the existence of any surplus water in the SMVMA. There has similarly been no analysis of any impacts to water supplies in the SMVMA that might derive from an export as described in the MOU.

- Second, the MOU includes provisions that the water delivered by Santa Maria shall be of the same quality that the City delivers to its customers; the project EIR notes that the water will be a mix of City groundwater and SWP water. In the year prior to the signing of the MOU, the City delivered an average blend of 87 percent SWP water and 13 percent local groundwater to its customers. In 2008, those respective fractions were 53 percent and 47 percent. Using both sets of fractions for illustration purposes only, the delivery of "supplemental" water to the NMMA could represent about 1,600 to 2,600 afy of SWP water and about 400 to 1,400 afy of groundwater pumped from the SMVMA. There has been no analysis of the source(s), pumping locations, or potential impacts of such groundwater pumping for export from the SMVMA.

- Finally, and perhaps of greatest concern, there is an apparent conflict with regard to importation and use of SWP water between the Stipulation and the MOU. In the Stipulation provisions specific to the SMVMA, the City of Santa Maria is to import and use within the SMVMA at least 10,000 afy of SWP water. The only exception to that amount of importation and use is in years when SWP availability to Santa Maria is less than 10,000 af; in those years, Santa Maria is to import and use all its available SWP supply in the SMVMA. However, if Santa Maria were to export water in accordance with the MOU in years when its SWP supply was less than 10,000 af (i.e. in years when overall SWP reliability is less than about 60%), Santa Maria would be out of compliance with the Stipulation in all those years, leading to more groundwater pumping for municipal supply in the SMVMA than envisioned by the Stipulation.

Analysis and resolution of the preceding technical issues remains to be undertaken and reported in future annual reports on the SMVMA.