Hypothetical Examples to Illustrate the Offset Concept[1]

Offset Example #1: *Equivalent Discharge Concentration*

Company X is seeking to discharge 10,000 gallons/day with an average TDS concentration of 1,200 mg/L to a groundwater basin with a TDS objective of 900 mg/L and a current average quality of 2,000 mg/L. Because there is no assimilative capacity available, the Central Valley Water Board intends to issue a WDR that restricts TDS concentrations in the discharge to no more than 900 mg/L. To meet this requirement, Company X would need to reduce the TDS in its discharge by 11.4 kg/day.

Company X proposes to construct and operate stormwater recharge basins in the area overlying the same groundwater basin. The new basins are expected to increase the total amount of precipitation that percolates to groundwater by 6 acre-foot/year (approximately 2 million gallons). The captured runoff has an estimated average TDS of 100 mg/L. The combined effect of the wastewater discharge and stormwater capture is 5.6 million gallons/year of recharge with a total volume-weighted average TDS concentration of 807 mg/L. The estimated offset ratio = 1.32:1 (Note: Long-term averaging required to implement this approach).

Offset Example #2: *Equivalent Mass Reduction*

Company X is seeking to discharge 10,000 gallons/day with an average TDS concentration of 1,200 mg/L to a groundwater basin with a TDS objective of 900 mg/L and a current average quality of 2,000 mg/L. Because there is no assimilative capacity available, the Central Valley Water Board intends to issue a WDR that restricts TDS concentrations in the discharge to no more than 900 mg/L. To meet this requirement, Company X would need to reduce the TDS in its discharge by 11.4 kg/day.

Company X proposes to construct and operate a desalter in the worst area of the same groundwater basin where the average TDS concentration is 4,000 mg/L. They will pump and treat 1,000 gallons/day for the benefit of a nearby community. The reverse osmosis treatment system will reduce the average TDS concentration in the product water to 200 mg/L (effectively removing 3,800 mg/L or about 14.4 kg/day). The estimated offset ratio = 1.25:1.

Offset Example #3: *Alternate Load Reduction - Eliminate Septic System*

A municipal discharger operates a wastewater treatment facility using a series of unlined ponds that overlie a groundwater basin with no assimilative capacity for nitrate-nitrogen. The average nitrate concentration in the discharge is 14 mg/L. As the city grows, the discharger plans to replace the present treatment with an activated sludge system that will reduce the average nitrate concentration to < 10 mg/L. However, this upgrade is not scheduled to begin until 2024. In lieu of accelerating the construction plans to meet the current WDRs, the discharger proposes to expand the existing collection system to provide sewer services in an adjacent, upgradient community and to install additional aeration at the ponds to reduce the average Total Inorganic Nitrogen (TIN) concentration from 14 mg/L down to 13 mg/L. Mass balance calculations show that intercepting and treating sewage currently going to septic systems in that community and upgrading aerators will reduce the combined TIN load by 2% more than building the activated sludge system early. Expanding the collection system is estimated to cost less than one-third what it will cost to build the new wastewater treatment plant and will expand

[1] These examples are <u>not</u> being proposed as archetypes. They are offered solely to stimulate discussion regarding potential application of the Offsets Policy and identify the key issues and concerns related to using offsets.

the utility's rate base by 10%. It will also result in the current pond system reaching capacity one year sooner than would occur under normal growth conditions. Therefore, the discharger also intends to begin the plant upgrade one year earlier than previously planned (i.e., 2023 instead of 2024). This project might also be implemented thru a traditional compliance schedule or TSO.

Offset Example #4: Planning & Design Work for Large Regional Projects

A coalition of agricultural dischargers, operating under a common set of categorical WDRs, are discharging salts to the underlying groundwater basin where the average TDS concentration is 1,100 mg/L and no assimilative capacity exists. The agricultural operators are using the best available water supply (TDS = 175 mg/L) to irrigate their fields; but, with a 15% leaching fraction, the recharge quality averages approximately 1,050 mg/L. This is slightly better than the receiving water quality but slightly worse than the "Upper" end of the acceptable TDS range specified for the Secondary Maximum Contaminant Levels.[2] However, TDS concentrations in the drinking water wells throughout the area are generally less than 700 mg/L. In lieu of increasing the leaching fraction, the dischargers are proposing to fund the first phase of the proposed long-term salt mitigation strategy identified in SSALTs, i.e., construction of a regulated brine line. This effort would focus primarily on preliminary engineering analysis (e.g., siting priorities), initial CEQA review, and regulatory permitting. The dischargers also propose to support the outreach efforts needed to secure the federal and state grant funding needed to pay for the capital construction anticipated in some subsequent phase of the program. This "offset" might also be approved as a condition for authorizing an exception to WDRs.

Offset Example #5: Alternate Water Supply

An industrial discharger disposes of its wastewater by a land application system that irrigates silage crops grown in a 500 acre parcel. This parcel overlies a groundwater basin where the average nitrate concentration is 30 mg/L (no assimilative capacity). There is an economically-disadvantaged community immediately adjacent to and upgradient from the discharger's property. The community draws its drinking water from the same basin and the groundwater is contaminated by both nitrate and naturally-occurring arsenic. In lieu of reducing nitrate in the discharge, the discharger proposes to construct and operate a well-head treatment system that will reduce nitrate and arsenic levels in the upgradient community's drinking water so that it easily complies with state and federal drinking water standards.

Offset Example #6: Nitrate Mitigation Bank

A Non-Governmental Organization (NGO) seeks and receives significant grant funding from the HP Foundation to develop an independent, non-profit corporation with a charter to construct and operate small drinking water supply systems for economically-disadvantaged communities. However, the initial grant funding is sufficient to address only a small fraction of the total problem. The HP Foundation encourages the non-profit corporation to leverage the available resources by establishing a Nitrate Mitigation Bank. The NGO does so and the Central Valley Water Board formally recognizes the mitigation bank as an acceptable offset program (subject to continuing verification of nitrate credits by state authorities and independent auditors).

a. A coalition of dairy operators, governed by a common set of categorical WDRs, is discharging nitrate to groundwater at a number of widely separated locations. Some of these dairies are proximate to

[2] California Water Code 22 §64449, Table 64449-B.

economically-disadvantaged communities with wells impaired by excess nitrate and some are not. Rather than attempting to discern the relative priority and develop appropriate offset projects for each dairy facility, the dischargers propose to make regular payments to the Nitrate Mitigation Bank.

b. A separate crop coalition, governed by its own common set of categorical WDRs, is also dispersed over a wide area with varying proximity to economically-disadvantaged communities with nitrate-impaired wells. The coalition proposes to establish and collect an annual fertilizer use fee from its own members and to remit the proceeds to the Nitrate Mitigation Bank as an Alternate Compliance Program. The dischargers request that the Central Valley Water Board deem remission of said fees as an acceptable offset under their WDR.

In both cases, the mitigation bank would be responsible for assessing needs and coordinating with the community water systems to select a cost-effective solution. Contributions from the dischargers would be used to meet "matching requirements," operation and maintenance costs, or other expenses not normally covered by state and federal grants.

Offset Example #7: Alternate Load Reduction - Fallow Cropland

A small municipality relies on a pond system to treat its wastewater. Recharge water from the ponds presently has an average nitrate concentration of 15 mg/L. Small, low cost operational improvements are expected to reduce their nitrate concentration to about 13 mg/L. Meeting a WDR of 10 mg/L would require the city to construct and operate a modern activated sludge process that would cost several tens of millions of dollars. To offset the remaining nitrate the city proposes to purchase, annex, and retire 1,000 acres of active farmland on its border. The land will be re-zoned for multi-use purposes and will have ordinances and/or covenants severely restricting the use of nitrogen-based fertilizers in this area. Mass balance analysis confirms that the load reduction which results by fallowing the farmland is functionally-equivalent to that which would be achieved by building a new wastewater treatment plant. However, the offset approach would cost 30% less and, eventually, the acquisition expense would be recovered when the land was re-sold for development. The ordinances and covenants would remain in place in perpetuity. Some sort of formal load allocation process may be needed to implement this type of offset project.