Watershed Management

INTRODUCTION

Watershed management in this context is the identification and utilization of areas, both instream and offstream, to maximize ground water recharge. This type of resource management has not formally been recognized in previous water master plans. However, it has occurred naturally throughout the County as part of reservoir operations, wastewater disposal practices, and storm runoff retention and percolation.

Watershed management involves utilizing the areas where ground water recharge occurs, the sources of water for ground water basin recharge, and implementing practices which enhance ground water recharge. The ground water recharge areas, the sources of recharge water, and the existing practices of ground water recharge in San Luis Obispo County are described in this section, followed by a ranking of the recharge potential of the water management areas.

RECHARGE AREAS

Recharge areas for the County ground water basins have been identified on the basis of outcrop locations for permeable geologic formations. These geologic formations include stream alluvium and sand dune deposits. The alluvial deposits are in flood plains of creeks and rivers and the sand dune deposits are primarily on the Nipomo Mesa. These areas are identified in Table 1 and the attached map.

There are, throughout the County, relatively small, localized areas offstream where recharge may be significant. But these have yet to be formally investigated and are not, therefore, shown on the table or map. These areas of potential recharge include:

- the gravel zones within the Paso Robles Formation (such as the basal member outcropping near Atascadero and Santa Margarita);
- the Obispo Formation volcanics along the Nipomo Valley foothills, and;
- aquifers within the Pismo Formation in the San Luis Range and in the Arroyo Grande/Pismo Beach fringe area.

SOURCES OF WATER FOR GROUND WATER BASIN RECHARGE

Ground water basins receive recharge from various natural and artificial sources. The natural sources of recharge include deep percolation of precipitation, storm water runoff percolation, stream seepage, and underflow from bedrock along the basin edges. Artificial recharge occurs as a result of inefficiencies in water application as well as the disposal of excess water such as irrigation return flows, wastewater percolation, storm water retention, and reservoir releases. Other sources of potential recharge water are wastewater and storm water currently disposed of to the ocean. Management practices dealing with these sources of water could increase ground water basin yields.

Releases from Lopez, Nacimiento, Whale Rock, and Salinas Reservoirs have been required in part for ground water recharge. Modifications to these reservoirs, to where the releases are made, or to the schedules of releases could potentially increase the effectiveness of recharge. Additional reservoir storage capacity could be used for water

conservation purposes and ground water recharge.

Table 1 -- Ground Water Recharge Areas

Water Planning Area	Basin name	Ground Water Recharge Areas for Watershed Management
1	San Carpoforo	Stream channel from Highway 1 to approximately 2.5 miles upstream (1)
1	Arroyo de la Cruz	Stream channel from Highway 1 to approximately 6.6 miles upstream (1)
1	Pico	Stream channel from Highway 1 to approximately 1.9 miles upstream (1)
1	San Simeon	Stream channel from Highway 1 to approximately 4.5 miles upstream (1)
1	Santa Rosa	Stream channel from Windsor Blvd. to approximately 5.7 miles upstream (1)
1	Villa	Stream channel from Highway 1 to approximately 6 miles upstream (1)
2	Cayucos	Stream channel from Highway 1 to approximately 3.9 miles upstream (1)
2	Old	Stream channel from Highway 1 to Whale Rock Reservoir; 0.5 miles (1)
2	Toro	Stream channel from Highway 1 to approximately 2.5 miles upstream (1)
3	Morro	Stream channel from Highway 1 to approximately 5.3 miles upstream (1)
3	Chorro	Stream channel from Chorro Creek Rd. to approx. 8 miles upstream (1)
3	Los Osos	Portion of Paso Robles Formation south of Highland Drive not underlain by aquitards and Los Osos creek channel beginning near east end of Santa Ysabel to approximately 3 miles upstream (2)
4	San Luis Obispo	Stenner Subbasin - 4,000 feet of stream deposits along Stenner Creek near City filtration plant. (3) City Subbasin - 6,000 feet of stream deposits along San Luis Obispo Creek upstream of Highway 101 crossing. (3) Laguna Subbasin - 1,500 feet of stream deposits along lower Prefumo Creek. (3)
5	Pismo Creek-Edna Valley	Area of shallowest subcrop of Pismo Formation sand and shell beds beneath Paso Robles Formation and Alluvium; area roughly 5 miles long and 1,500 feet wide along Orcutt Road from Tiffany Ranch Road to Biddle Ranch Road. (4)
5	Arroyo Grande Creek Valley	Arroyo Grande Creek stream channel deposits downstream of Lopez Dam, upstream of Orcutt Road/Lopez Drive intersection. (5)
5	Los Berros Creek Valley and fractured volcanics	Stream channel deposits from Upper Los Berros Creek Road near stream gage to confluence with the Cienaga Valley of Arroyo Grande. Volcanics recharge limited to stream deposits upstream of Highway 101. (6)
5	Arroyo Grande Plain & Tri-Cities Mesa	Arroyo Grande Creek stream channel between Highway 101 and Highway 1. (7)
6	Nipomo Mesa	Roughly entire Nipomo Mesa southwest of Pomeroy Road, south of Tefft Street, and southwest of Highway 101.(8)
6	Santa Maria	Santa Maria River channel upstream of Bonita School Road. (9)
7	Cuyama	Cuyama River channel from above Ozena downstream to slightly below the bridge on State Highway 166 near the town of Cuyama. (10)
8	Carrizo Plain	Recharge occurs “to some extent around its edges”. (11)
9	Paso Robles	Along forebay stream channels, particularly where they enter the ground water basin area, e.g., Huer Huero Creek near Creston, San Juan Creek from Highway 58 to Shandon, Estrella Creek, Salinas River (with the exception of the reach from Graves Creek confluence to Highway 46 West). (12)

9	Pozo	Along stream channel [11]

Sources:

(1) Hall and others, 1979, Geologic Map of San Luis Obispo - San Simeon, U.S.G.S. Miscellaneous Investigations Series, Map I-1097.

(2) California Department of Water Resources District Report, July 1989, Geohydrology and Management of Los Osos Valley Ground Water Basin, San Luis Obispo County.

(3) Boyle Engineering Corporation, January 1991, City of San Luis Obispo - Ground Water Basin Evaluation.

(4) Hall, Clarence A., 1973, Geology of the Arroyo Grande Quadrangle.

(5) Ryder, R.W., December 1, 1921, Investigation in Connection with Water Supply for City of San Luis Obispo, Application 348 & 1990 State of California Department of Public Works, Division of Water Rights.

(6) Cleath & Associates, July 1995, Water Supply Management for the Proposed Bartleson Development Plan.

(7) Hoover & Associates, June 24, 1985, Stream Infiltration Study Arroyo Grande Creek, Zone 3 Conjunctive Use Study, San Luis Obispo County, California, prepared for San Luis Obispo County Flood Control District.

(8) The Morro Group, July 1990, South County Area Plan, Draft EIR

(9) Worts Jr., G. F. , 1951, Geology and Ground-Water Resources of the Santa Maria Valley Area, California, U. S. Geological Survey Water-Supply Paper 1000

(10) Upson, J. E. and G. F. Worts, Jr., 1951, Ground Water in the Cuyama Valley, California, U. S. Geological Survey Water-Supply Paper 1110-B

(11) California Department of Water Resources, May 1958, San Luis Obispo County Investigation, State Water Resources Board Bulletin 18.

(12) California Department of Water Resources, March 1979, Ground Water in the Paso Robles Basin, District Report.

Wastewater percolation to ground water basins is practiced through individual on-site disposal of wastewater. On a larger scale, public wastewater treatment and disposal systems are located in the communities of Paso Robles, Templeton, Atascadero, San Luis Obispo, and Nipomo, and also support ground water recharge either through percolation basins or through direct stream releases. As populations increase in these communities, more wastewater is likely to be generated which could be used for ground water recharge. Each water planning area has different issues, which need to be addressed regarding wastewater disposal, and the consideration of ground water recharge management should be an important part of the solution to these issues.

Additional potential sources of ground water for recharge include wastewater that is now being disposed of to the ocean or evaporated, as well as storm runoff that currently flows to the ocean. San Simeon, Cambria, Cayucos/Morro Bay, Avila Beach, Pismo Beach and South San Luis Obispo County Sanitation District all have ocean outfalls to dispose of wastewater. The wastewater disposal systems near Lake Nacimiento are designed to evaporate treated effluent. The reuse of this wastewater for ground water recharge typically will require additional treatment or the installation of new facilities, which are designed for ground water recharge. Storm runoff retention and percolation is an increasingly applied practice to enhance ground water basin yields where new projects are being designed. These conservation practices are under consideration by many agencies and communities within the County.

WATERSHED MANAGEMENT PRACTICES

The previous sections have identified both the locations where recharge to the basins is known to occur and recharge water sources. Additional ground water recharge practices will need to occur intentionally as a matter of policy and practice. Policy statements will provide the basis on which future practices can be founded. Both small scale as well as larger efforts should be recognized and encouraged.

Practices that should be encouraged include both facilities design and facilities operation. Siting and design criteria are critical to enhancing existing recharge. Operations can improve the efficiencies of existing and future recharge activities in the ground water basins.

In urban areas and urban fringe areas, storm water retention and specific siting of retention basins to enhance ground water recharge should be encouraged where storm runoff is an issue. Alternatives to hardscaping of potential recharge areas should be considered where additional developments are proposed. Design options should be provided to contractors who are building improvements in known recharge areas, in order that water can captured or retained for recharge rather than forced to run off onto non-permeable areas.

Wastewater disposal sites should be selected to allow deep percolation without surfacing of ground waters, such as has been the goal of the proposed wastewater percolation pond siting efforts in Los Osos. Conservation of wastewater disposed of to the ocean and reuse for ground water recharge or to offset ground water production should be considered when up-grades to wastewater facilities and augmentation of water supplies are sought.

Where reservoir operations can be modified to enhance ground water recharge, procedures and facilities should be developed. This could be the case where seismic retrofits are being required or where dams are being raised for additional storage. Conjunctive use of reservoirs, imported

water and ground water can result in increased ground water basin yields. This can be critical in areas such as Cambria where water supply sources are restricted to ground water.

Imported water is being delivered via the Coastal Aqueduct in part for ground water recharge. As the water is being used for domestic purposes, the wastewater generated remains, from a mineral content point of view, suitable for reuse and therefore should be allowed to be reclaimed through ground water recharge. The Chorro Valley water purveyors have a considerable potential for enhancing ground water yields through use of the significant quantity of imported water.

WATERSHED MANAGEMENT POLICY AND PLANS

In light of the fact that watershed management has been enacted on a local basis and not formally encouraged by the County, the areas where specific watershed management practices should be actively encouraged should be better delineated and the policies and practices clearly stated. The watershed management policies should be established at the County level while watershed management plans and implementation procedures could be developed within each water management planning area.

GROUND WATER RECHARGE AREA RANKINGS

Recharge areas have been ranked in terms of recharge effectiveness, proximity to areas of need, and availability of recharge water (Table 2). The criteria for recharge effectiveness are existing storage capacity and the duration of feasible recharge periods. Note that some of the coastal basins where the ground water resource is generally undeveloped have a limited effectiveness ranking due to the short duration of feasible recharge periods (i.e. the basins are close to full). In other cases, the storage capacity of the basin is limited. Proximity to areas of need is based on distance, roughly scaled for the size of the basin. Recharge water availability considers the availability of water within the watershed, comprised primarily of storm runoff and wastewater. In Water Planning Area 1, for example, the availability of recharge water includes wastewater which is disposed of to the ocean and to the uncontrolled discharge of storm waters to the ocean.

Table 2 -- Ground Water Recharge Area Rankings

Water Planning Area	Basin name	Effectiveness Rank: 1 - limited 2 - short term 3 - long term	Proximity Rank: 1 - distant 2 - general area 3 - near	Recharge water availability: 1 - little available 2 - potentially available 3 - existing water available
1	San Carpoforo	1	1	2
1	Arroyo de la Cruz	1	2	2
1	Pico	2	3	3
1	San Simeon	2	3	3
1	Santa Rosa	2	3	3
1	Villa	1	1	2
2	Cayucos	2	2	2
2	Old	1	3	2
2	Toro	1	2	2
3	Morro	2	3	3
3	Chorro	1	3	3
3	Los Osos	3	3	2
4	San Luis Obispo	2	3	3
5	Pismo Creek-Edna Valley	3	3	2
5	Arroyo Grande Creek Valley	1	2	3
5	Los Berros Creek Valley and fractured volcanics	2/3	2	2
5	Arroyo Grande Plain & Tri-Cities Mesa	3	3	2
6	Nipomo Mesa	3	3	1
6	Santa Maria	3	3	3
7	Cuyama	3	2	2
8	Carrizo Plain	2	1	1
9	Paso Robles	3	3	2
9	Pozo	1	1	1