



Stormwater Strategies for Arid and Semi-Arid Watersheds

Water supply and flood control have traditionally dominated watershed planning in arid and semi-arid climates. Until recent years, stormwater quality has simply not been much of a priority for water resource managers in the west. This situation is changing rapidly, as fast-growing communities are responding to both emerging water quality problems and new federal regulations. In particular, larger cities in the west have gradually been dealing with stormwater quality to meet the requirements of the first phase of EPA's municipal stormwater National Pollutant Discharge Elimination System (NPDES) program. Soon, thousands more smaller communities will need to develop stormwater quality programs when the second phase of this national stormwater regulatory program is rolled out later this year.

At first glance, it seems ludicrous to consider managing the quality of stormwater in arid regions where storms are such a rare and generally welcome event—sort of like selling combs at a bald convention. The urban water resources of the southwest, however, are strongly influenced by stormwater runoff and by the watershed development that increases it. Indeed, the flow of many urban streams in the southwest is generated almost entirely by human activity: by urban storm

flow, irrigation return flow and wastewater effluent. Thus, the quality of both surface water and groundwater in urbanizing areas of arid and semi-arid regions of the southwest is strongly shaped by urbanization.

For purposes of this article, arid watersheds are defined as those that receive less than 15 inches of rain each year. Semi-arid watersheds get between 15 and 35 inches of rainfall, and have a distinct dry season where evaporation greatly exceeds rainfall. In contrast, humid watersheds are defined as those that get at least 35 inches of rain each year, and often much more. There are many arid and semi-arid watersheds, most of which are located in fast growing regions of the western United States (Figure 1). Low annual rainfall, extensive droughts, high intensity storms and high evaporation rates are characteristic of these watersheds, and present many challenges to the stormwater manager. [Note: in some arid and semi-arid watersheds, most precipitation falls as snow and evaporation rates are much lower. These watersheds are found in portions of Alaska and at higher elevations of the Rocky Mountains and Sierra Nevada. Guidance on stormwater strategies for these dry but cold watersheds can be found in Caraco and Claytor (1997)].

Figure 1: Distribution of Rainfall in the United States

