

## WATER REUSE - WATER QUALITY AND WATER RIGHTS CONSIDERATIONS

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### ABSTRACT

*In the western United States most of the available surface and groundwater has been appropriated. Additional supplies of fresh water for new or increased municipal demands may not be available. Because new water sources may be prohibitively expensive or unavailable, alternative water sources such as treated wastewater should be considered.*

*Large volumes of treated wastewater are available for reuse after discharge from municipally-owned sewage treatment plants. Treated wastewater can provide water supplies for a wide range of municipal, industrial, agricultural, and recreational purposes. The sale of wastewater can produce additional revenue, as well as jobs in the industries using the effluent. Wastewater can also be used for artificial aquifer recharge through stream beds or slow percolation through sand filters.*

## INTRODUCTION

The efficient use of water and the reuse of large volumes of treated municipal wastewater can provide water supplies for a wide range of municipal, industrial, agricultural, and recreational purposes. In the past, most treated effluent was simply disposed of by discharging it to the nearest stream bed where it created perennial streams in ephemeral channels or mixed with natural stream flows. If it is reused, effluent from sewage treatment plants can generate revenue for the municipality which treats the water and also conserve the diminishing water resources of the western United States.

Land application of secondary-treated sewage effluent is the most common method of wastewater reuse. Land application can affect groundwater quality if concentrations of contaminants such as nitrates or heavy metals in the effluent exceed the nitrogen uptake of the irrigated crop or the sorptive capacity of the underlying soils. If the effluent quality is such that the irrigated crop completely removes contained contaminants from the wastewater, a percentage of the water recharges the aquifer with clean water.

## WATER RIGHTS AND WATER QUALITY

The law governing usage and ownership of water in the western United States is the law of prior appropriation. The right to take the water is owned by he who makes the first appropriation. In some states there is no preference among the different kinds of water users, except on the basis of the antiquity of their water right. A farmer who first irrigated his land in 1900 established his date of first appropriation at that time. The farmer who began irrigating in 1900 has priority over a city whose water right was established in 1930. If drought or other factors cause a water shortage, the farmer who started irrigating in 1900 has the right to use available water before the city with the later appropriation date. In order to acquire the farmer's water right, the city must pay the farmer an agreed-upon purchase price.

In this system, one must distinguish between the water and the water right. The physical water is owned by the State government, and the administrative entity responsible for administering waters of the State grants to the user the legal/administrative right to appropriate the water for beneficial use. A water right is generally held to be part of the land on which the right is put to beneficial use. Beneficial use of water includes but is not limited to municipal, domestic, industrial, agricultural, and recreational uses (New Mexico State Engineer, 1966).

The owner of the water right may appropriate the volumes of water allowed by the right, at the times, and in the manner allowed by the right. The water is owned by the State until the water is in the possession of the owner of the right, at which time the water right becomes the personal property of the owner. For example, once the water flowing in an irrigation ditch is stored in an irrigator's pond, that water becomes the irrigator's personal property, and the irrigator can put the water to beneficial use for irrigation or stock watering, or he can sell or lease the water to another entity. Neither the livestock, nor the irrigator, nor the residents of a city can drink a water right, but only the water taken pursuant to a water right. Although the water right is associated with a specific tract of land, the right can be bought, sold, or traded, provided that the individual, corporation, or municipality which acquires the right has land on which to put the water to beneficial use.

Cities in the western U.S. generally take water pursuant to their water rights and deliver it to the domestic, industrial, and other users who return large percentages of it to municipally owned sewage treatment plants. Over the years, the general practice was to dispose of the treated effluent by discharging it to the nearest watercourse. In some areas the effluent water is blended with natural stream flow. In other areas, the effluent makes perennial streams out of ephemeral streams. To be eligible for discharge to a stream, the treated effluent must meet water quality standards for nitrates, chlorine, phosphorus, fecal coliform, and other regulated constituents.

## LEGAL, ECONOMIC, AND CONTRACT CONSIDERATIONS

Water quality regulations governing discharges to water courses are site-specific, depending on the type of stream system receiving the discharge. For high mountain streams or fishable/swimmable rivers, effluent limitation standards are very stringent. For discharges to perennial streams that are not fishable or swimmable, or to areas with no downstream users, effluent limitations are less stringent.

Regardless of the location of the discharge, cities must expend large amounts of money, labor and expertise to treat and dispose of wastewater. Some of that expenditure can be recovered through the sale of effluent water for irrigation, and for industrial and related uses. Other benefits to the municipality can arise from enhancement of local industry with resulting local employment, made possible by the availability of reused water for industrial purposes.

The cost of acquiring water rights can be very high. In Santa Fe, New Mexico, since 1967, the price of an acre-foot of water right has risen from about

\$85.00 to \$12,000.00. Transportation, purification and administration costs of municipal potable water supply systems have risen astronomically.

Effluent from sewage treatment systems is valuable. Although psychologically unsuited for human consumption, it is otherwise usable even for that purpose. Higher payments and creative leases for effluent water will become more common as arid regions of the world deplete readily available water supplies.

Effluent water from sewage systems presents unique economic and legal problems. Under New Mexico law, while the water remains in the possession of a City, it is personal property which can be sold, given away, or put to use for other purposes. Discharging effluent water to the nearest stream does not utilize its value.

If a City adopts a program to use the effluent previously discharged, it will remove that water from the local stream system, which may adversely affect downstream users. New Mexico partially solved this problem by adopting a statute recognizing that rights over released water might be created, but that the rights of the first owner are superior. While downstream users may have the right to take water from the stream, including the effluent, they have no right to demand that the city continue to discharge the effluent.

Cities in arid regions should make broad use of treated effluent water for purposes not requiring potable water. Two examples of uses of effluent water are industrial cooling and irrigation of recreation facilities. These uses of effluent water can offset a taking of potable water, greatly increasing the available supply for all requirements. Injection or seepage from surface flows into groundwater can recharge the local water supply. This method is currently in use in El Paso, Texas.

Where effluent is generated by a municipality, legal requirements for competitive bidding for the purchase of water may be in force. In practice, however, those lands closest to the point of discharge are most likely to use the effluent water because of proximity. A binding and reliable contract for the ongoing purchase of effluent water is essential to ensure that the purchasers' water requirements will be met for a predictable time in the future.

While a binding, reliable and long-term contract for the ongoing purchase of effluent water is essential for an enterprise which proposes to put it to use, municipal officials may properly be concerned that the city has a higher and better use for the water, as soon as its potable water supply reaches its limits. City officials must balance their present surpluses of fresh and effluent water, the costs of buying, leasing or using other fresh water, the benefits of

