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Subgroup: Increase Water Supply

Chapter 11 Recycled Municipal Water

This chapter addresses recycling of municipal wastewater from treatment plants. Recycling water from other sources is addressed in other chapters of the Water Plan Update 2009. Municipal wastewater is primarily from domestic sources, but includes wastewater from commercial, industrial, and institutional sources that discharge to a common collection system where it mixes with domestic wastewater before treatment. Many industries recycle and reuse their wastewater; such recycling is not addressed in this chapter.

"Recycled water" is water that, as a result of treatment of wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource.[1] "Recycled water" and "reclaimed water" have the same meaning.[2]

To protect water quality and public health, State regulations mandate that producers and users of recycled water meet waste discharge and water reclamation requirements from the Regional Water Quality Control Boards (RWQCB or Regional Water Boards), including the water recycling criteria adopted by the California Department of Public Health (DPH). These criteria specify approved uses of recycled water, numerical limitations and requirements, treatment methods, and performance standards.

The permitted uses of recycled water increase with advanced levels of treatment. For example, municipal wastewater that has been treated to secondary levels is generally suitable for uses that do not include contact with food or people. Agricultural irrigation of forage crops is an example of such use. Wastewater that has completed tertiary treatment can be used to irrigate school yards, parks and residential landscape, and may be suitable for industrial applications or use in office and institutional buildings for toilet flushing. Refer to the sidebar on West Basin Municipal Water District for examples of recycled water treatment processes. Additional discussion is presented in Chapter 16, Matching Water Quality to Water Use.

Recycled water has been recognized for many years as an important component of the state's water supply. According to State law, "It is hereby declared that the people of the state have a primary interest in the development of facilities to recycle water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the state" (California Water Code Section 13510).

In 1984, the State Water Resources Control Board (SWRCB or State Water Board) issued Water Quality Order No. 84-7 expressing the intent that, pursuant to California Water Code, Section 13142.5(e), in cases where discharges of wastewater to the ocean are proposed in "water-short" areas, the report of waste discharge should include an explanation as to why the effluent is not being recycled for further beneficial use.

In 2001, California adopted Assembly Bill 331 (Goldberg, Chapter 590, Statutes of 2001), which established a 40-member Recycled Water Task Force (Task Force). In 2003, the Task Force completed evaluation of water recycling in California, presenting findings and recommendations in a final report titled *Water Recycling 2030, Recommendations of California's Recycled Water Task Force*. The Task Force estimated the future potential and costs of water recycling and made a wide variety of findings, many of which are reflected in this chapter. The Task Force issued 26 recommendations to increase water recycling. Those recommendations (Box 11-1, California Recycled Water Task Force Recommendations

[1] California Water Code Section 13050
[2] California Water Code Section 26

Summary, 2003) are broad, and are not limited to legislative actions or statutory changes. Many recommendations are being implemented by State or local agencies within existing statutory authority.

Box 11-1 California Recycled Water Task Force Recommendations Summary (2003)

1. Funding for Water Recycling Projects. State funding for water reuse/recycling facilities and infrastructure should be increased beyond Proposition 50 and other current sources. The California Water Commission in collaboration with DWR and SWRCB should seek federal cost sharing legislation for water recycling.

2. Funding Coordination. A revised funding procedure should be developed to provide local agencies with assistance in potential State and federal funding opportunities and a Water Recycling Coordination Committee should be established to work with funding agencies.

3. Department of Water Resources Technical Assistance. Funding sources should be expanded to include sustainable State funding for DWR's technical assistance and research, including flexibility to work on local and regional planning, emerging issues, and new technology.

4. Research Funding. The State should expand funding sources to include sustainable State funding for research on recycled water issues.

5. Regional Planning Criterion. State funding agencies should make better use of existing regional planning studies to determine the funding priority of projects. This process would not exclude projects from funding where regional plans do not exist.

6. Funding Information Outreach. Funding agencies should publicize funding availability through workshops, conferences, and the Internet.

7. Community Value-Based Decision-Making Model for Project Planning. Local agencies should engage the public in an active dialogue and participation using a community value-based decision-making model in planning water recycling projects.

8. State-Sponsored Media Campaign. The State should develop a water issues information program, including water recycling, for radio, television, print, and other media.

9. Educational Curriculum. The State should develop comprehensive education curricula for public schools; and institutions of higher education should incorporate recycled water education into their curricula.

10. University Academic Program for Water Recycling. The State should encourage an integrated academic program on one or more campuses for water reuse research and education, such as through State research funding.

11. Statewide Science-Based Panel on Indirect Potable Reuse. As required by AB 331, the Task Force reviewed the 1996 report of the California Indirect Potable Reuse Committee and other related advisory panel reports and concluded that reconvening this committee would not be worthwhile at this time. However, it is recommended to convene a new statewide independent review panel on indirect potable reuse to summarize existing and on-going scientific research and address public health and safety as well as other concerns such as environmental justice, economic issues and public

awareness.

12. Leadership Support for Water Recycling. State government should take a leadership role in encouraging recycled water use and improve consistency of policy within branches of State government and local agencies should create well-defined recycled water ordinances and enforce them.

13. DHS Guidance on Cross-connection Control. DHS should prepare guidance that would clarify the intent and applicability of Title 22, Article 5 of the California Code of Regulations pertaining to dual plumbed systems and amend this article to be consistent with requirements included in a California version of Appendix J that the Task Force is recommending to be adopted.

14. Health and Safety Regulation. DHS should involve stakeholders in a review of various factors to identify any needs for enhancing existing local and State health regulation associated with the use of recycled water.

15. Stakeholder Review of Proposed Cross-Connection Control Regulations. Stakeholders are encouraged to review Department of Health Services draft changes to Title 17 of the Code of Regulations pertaining to cross-connections between potable and nonpotable water systems.

16. Cross-Connection Risk Assessment. DHS should support a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water.

17. Uniform Plumbing Code Appendix J. The State should revise Appendix J of the Uniform Plumbing Code, which addresses plumbing within buildings with both potable and recycled water systems, and adopt a California version that will be enforceable in the state.

18. Recycled Water Symbol Code Change. The Department of Housing and Community Development should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code.

19. Incidental Runoff. The State should investigate, within the current legal framework, alternative approaches to achieve more consistent and less burdensome regulatory mechanisms affecting incidental runoff of recycled water from use sites.

20. Source Control. Local agencies should maintain strong source control programs and increase public awareness of their importance in reducing pollution and ensuring a safe recycled water supply.

21. Water Softeners. The Legislature should amend the Health and Safety Code Sections 116775 through 116795 to reduce the restrictions on local ability to impose bans on or more stringent standards for residential water softeners. Within the current legal provisions on water softeners, local agencies should consider publicity campaigns to educate consumers regarding the impact of self-regenerative water softeners.

22. Uniform Interpretation of State Standards. The State should create uniform interpretation of State standards in State and local regulatory programs by taking specific steps recommended by the Task Force in its full report.

23. Permitting Procedures. Various measures should be conducted to improve the administration and compliance with local and State permits. State and local tax incentives should be provided to recycled water users to help offset the permitting and reporting costs associated with the use of

recycled water.

24. Uniform Analytical Method for Economic Analyses. A uniform and economically valid procedural framework should be developed to determine the economic benefits and costs of water recycling projects for use by local, State, and federal agencies.

25. Project Performance Analysis. Resources should be provided to funding agencies to perform comprehensive analysis of the performance of existing recycled water projects in terms of costs and benefits and recycled water deliveries.

26. Economic Analyses. Local agencies are encouraged to perform economic analyses in addition to financial analyses for water recycling projects and State and federal agencies should require economic and financial feasibility as two criteria in their funding programs.

In 2007, the Governor approved Assembly Bill 1481 requiring the Water Boards to prescribe general waste discharge requirements (General Permit) for landscape irrigation that uses recycled water for which the DPH has established uniform statewide recycling criteria. The General Permit is expected to be finalized and presented to the State Water Board for consideration in 2009.

The primary source of State funding for water recycling is the Water Recycling Funding Program administered by the SWRCB, providing low-interest loans and grants to local agencies. The Water Boards' *Strategic Plan Update: 2008-2012* identifies priorities and direction for the State Water Board and its nine Regional Water Boards. Water recycling is a key objective in the *Strategic Plan Update*. The State Water Board is preparing a statewide Recycled Water Policy to provide consistency and uniform direction for water recycling. It is widely recognized that some facets of water recycling are controversial, and a public participation process must be completed before this policy can be finalized and presented to the State Water Board for consideration.

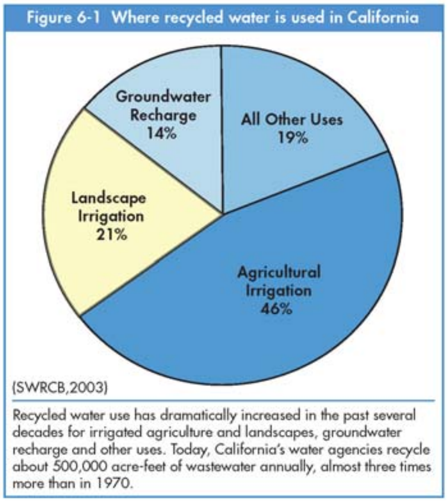
The California Environmental Protection Agency (Cal/EPA) oversees the Climate Action Team (CAT) which was created to formulate measures to mitigate the effects of climate change. Water recycling can contribute to the reduction of greenhouse gas (GHG) emissions by replacing energy intensive imported water with locally recycled water. To that end, the CAT formulated a water recycling measure to require the development and implementation of wastewater recycling plans. The Water Recycling CAT measure is identified in the AB32 Climate Change Scoping Plan prepared by the California Air Resources Board (CARB).

The Department of Water Resources administers the Integrated Regional Water Management Program (IRWMP). Water recycling is one of many resource management strategies that may be considered by IRWM regions in developing their water resource management portfolios. IRWM grant funding has enabled many communities in IRWM regions to implement water recycling projects.

Recycled Water Use in California

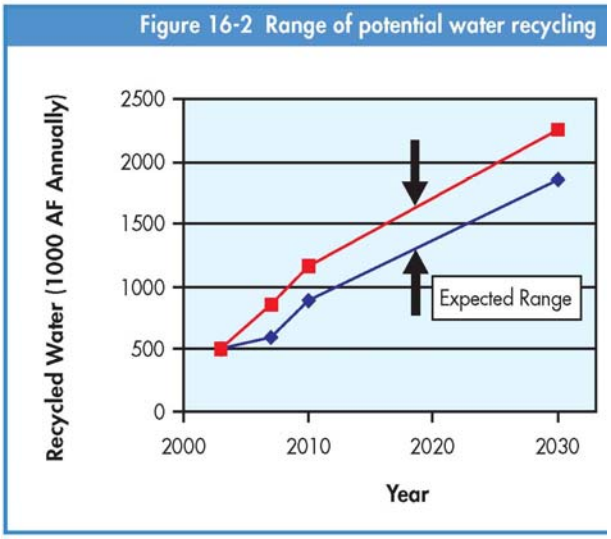
Californians have recycled water since the late 1800s and public health protections have been in effect since the early part of the 1900s. Yet water recycling remained an isolated practice for most of the 20th century. Ample supplies of water to satisfy demand, the availability of inexpensive energy to move water great distances, and the absence of adequate treatment technology delayed implementation of water recycling practices in most communities. California's requirements for water to support continued growth, coupled with finite water supplies, have generated a renewed interest in water recycling in recent decades. Currently, more than 500,000 acre-feet of treated municipal wastewater are reused in California annually, almost three times more than in 1970. Approximately two-thirds of all recycled municipal wastewater is used for irrigation, including 46 percent for agriculture and 21 percent for landscaping (Figure 11-1 Where Recycled Water is used in California). Beyond the base year of 2002, the Task Force estimated a potential of about 1.4 million to 1.7 million acre-feet of additional water supply could be realized annually through water recycling by the year 2030, as shown in Figure 11-2 Range of Potential Water Recycling (*Water Recycling 2030 Report*).

Figure 11-1 Where recycled water is used in California



Source: California Water Plan Update 2005

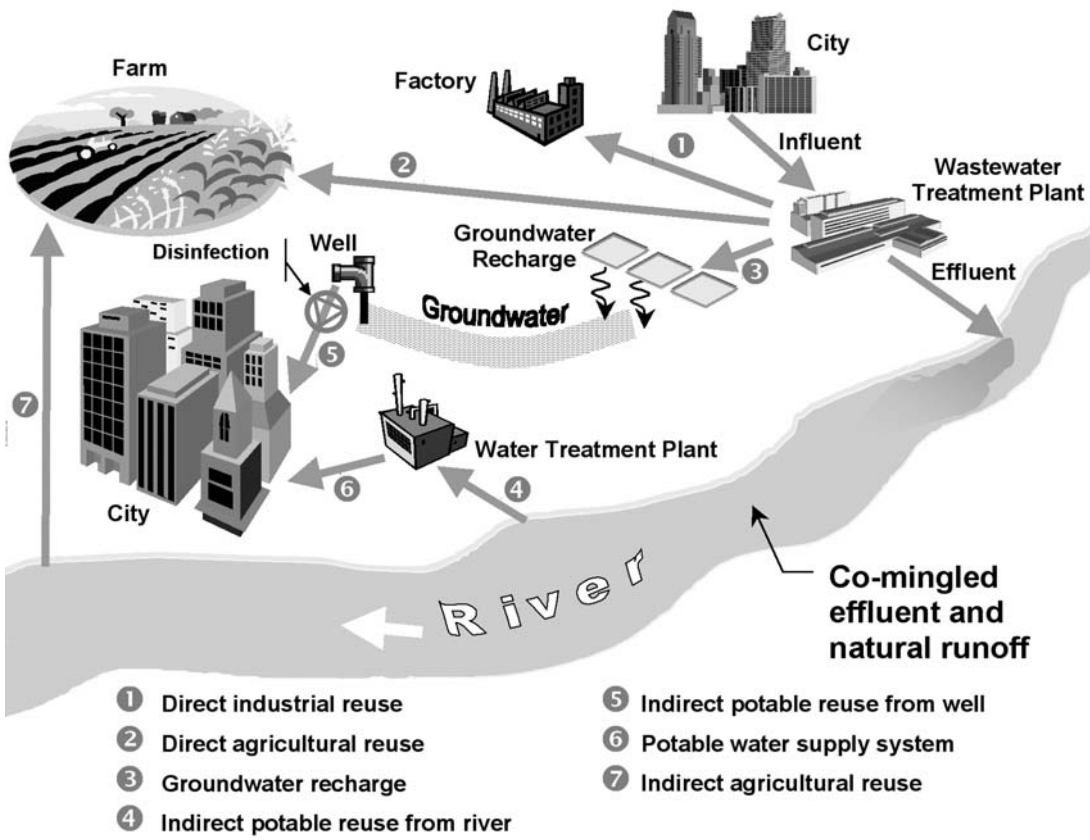
Figure 11-2 Range of potential water recycling



Source: Water Recycling 2030 Report

Many communities rely on rivers and streams as their primary water supply. Water is withdrawn from the stream, used by the community, and most is discharged back to the stream as wastewater. Wastewater mixes with the ambient water and becomes part of the flow that is reused by downstream communities. This manner of unintentional reuse is termed "indirect reuse". It is estimated that between 86 and 100 percent of wastewater discharged in some Central Valley hydrologic basins is indirectly reused. Indirect reuse is illustrated in Figure 11-3 (Direct and indirect recycled water use).

Figure 11-3 Direct and indirect recycled water use



In some instances, indirect reuse could pose a constraint to recycling. Municipal recycled water is typically diverted from the wastewater discharge, reducing the volume of wastewater that would otherwise be returned to the stream and available for downstream indirect reuse. As communities increase their level of recycling, the volume of water that is returned to streams will be reduced. Streams fulfill many essential environmental functions including sustenance of aquatic and riparian habitats, wetlands, and wildlife. The potential consequences of reducing stream flows could be significant in some locations. Because discharges to the ocean or brackish water bodies support few, if any, downstream beneficial uses, the Recycled Water Task Force identified such discharges as excellent sources of wastewater for future recycling efforts. Historically, discharges to saline or brackish water bodies have been considered "lost water" as the process to reclaim freshwater from saltwater is both energy intensive (contributing to GHG emissions) and expensive. In 2003, the Task Force estimated that 0.9 million to 1.4 million acre-feet of water could be obtained by 2020 through recycling municipal wastewater that is otherwise discharged into the ocean saline bays, or other brackish water bodies. It should be noted that, as the demand for potable water increases and supplies diminish, desalination could become a viable water source in some situations. Desalination is discussed in Chapter 9 of the Water Plan.

Conservation, efficiency, and water reuse become increasingly important during drought periods when water supplies could be diminished. Many public and private entities are implementing programs to assess their water footprint and the effectiveness of measures to obtain the greatest benefit from existing water supplies. Some consider water recycling to be a conservation or efficiency measure because it reuses existing water, essentially obtaining more use from the same volume. Others categorized water recycling as a source of increased supply, noting that the use of recycled water to replace potable water increases the availability of potable water supplies. Regardless of the perspective, for the purposes of this section, water recycling is recognized as an instrumental part of California's strategy to increase the availability and sustainability of water to meet future needs.

Potential Benefits of Water Recycling

Water recycling has the potential to provide a variety of benefits including reduced costs, increased reliability of supply, and increased availability of potable water. All of these benefits are derived from the primary benefit of using recycled water to increase local water supplies.

Water recycling plays a role in California's climate change mitigation efforts. Combustion of fossil fuels at power plants is a major source of GHG emissions. A significant amount of the energy produced by those power plants is used by the water sector. Water recycling can provide a comparatively low energy source of local water using less energy than importation of water from other regions or desalination of ocean or brackish water. This benefit is greatest where recycled water is available for applications that do not demand the advanced levels of treatment, such as agricultural irrigation of nonfood crops. The provision of recycled water for urban applications requires an advanced level of treatment that requires a greater amount of energy, reducing the potential GHG savings.

Global warming and climate change are predicted to impact the state's water supply, most notably altering the seasonal availability of water. Less snow accumulation in the mountains will reduce snowmelt that traditionally provides water supply during the spring and summer. Municipal water recycling is one of several water resource management tools that may be utilized by IRWM regions to help develop sustainable local water resources and meet water management goals and objectives. Recycled water cannot be directly used for potable applications, but recycled water can increase the availability of local potable water. Potable water is often used for applications, like irrigation, which do not require potable quality. Using recycled water for such applications provides potable water for more appropriate uses. Additional discussion of the appropriate use of water based on quality is presented in Chapter 16, Matching Water Quality to Use.

Potential Costs of Recycled Water

The Recycled Water Task Force estimated that 1.4 million to 1.7 million acre-feet of water could be recycled in California by the year 2020, of which 0.9 million to 1.4 million acre-feet (62 to 82 percent) would be recycled from discharges that would otherwise be lost to the ocean, saline bays, or brackish bodies of water. The potential capital cost to implement that level of wastewater recycling is estimated to be about $9 billion to $11 billion.[3] Given the variability of local conditions and their effect on treatment and distribution costs, the estimated range of capital and operational costs of water recycling range from $300 to $1,300 per acre-foot of recycled water, but in some instances costs above of this range are plausible. The actual cost will depend on the quality of the wastewater, the level of treatment required, and the availability of infrastructure (purple pipe) to distribute recycled water to potential users. Uses that require higher water quality and/or have greater public health concerns will incur higher costs.

[3] Water Recycling 2030, Recycled Water Task Force (2003)

The cost to install new distribution systems is a major obstacle to the expansion of water recycling. Because recycled water is not classified as potable, regulatory constraints prohibit conveying recycled water and potable water in the same pipelines. Recycled water must be conveyed in a separate purple pipe distribution system that is posted and readily distinguished from traditional water lines. The cost to install new purple pipe distribution mains from treatment plants to users can be prohibitively expensive. As a consequence, extension of recycled water service to areas near treatment plants is more cost-effective than extending infrastructure and service to more distant users. Ironically, many of the users that could use large volumes of recycled water, such as agricultural users, are often the most distant from urban wastewater treatment plants. Some water agencies have constructed satellite water recycling facilities to provide recycled water at locations near large users. Establishment of local ordinances requiring uniform upgrades to dual water distribution systems (purple pipe) could bolster the acceptance and implementation of recycled water projects.

The potential for cross-connection is one of the challenges of separate pipeline systems for potable and nonpotable water. As the name implies, cross-connection refers to the accidental connecting of potable and nonpotable systems, essentially contaminating potable water systems. The potential for such errors will likely increase as a greater number of offices, commercial centers, and residences incorporate dual plumbing to provide nonpotable water for irrigation, toilet flushing, and other permitted uses.

Incorporation of dual plumbing in existing buildings and new construction can be hindered by the absence of an adopted dual plumbing building code in California. In their 2003 report, the Recycled Water Task Force recommended adoption of building code for dual plumbing to accommodate recycled water. A proposed code was developed from the national model code of the International Association of Plumbing and Mechanical Officials (IAPMO) with revisions to comply with California Title 22 requirements. The Water Recycling Act of 2006 assigned implementation of the dual plumbing code to DWR but did not convey the authority to adopt the code.

Major Issues Facing More Recycled Water Use

Data Availability

The last comprehensive inventory of water recycling facilities was completed in 2001 to support the efforts of the Recycled Water Task Force. Without a systematic inventory and reporting system, it is impossible to quantify water recycling efforts, characterize success and/or failures, or make informed decisions as to future endeavors and funding priorities.

Affordability

The cost to provide recycled water can exceed the current price of freshwater, but may be less than other water sources such as importing water from other regions or desalination. Because a significant portion of the cost to implement water recycling is associated with the installation of core infrastructure such as treatment equipment and distribution mains, recycled water can be prohibitively expensive at the local level, and more cost effective at the regional or state scale.

Much of the water provided by federally funded projects is provided at discounted prices. Artificially low rates discourage adoption of water recycling and similar conservation programs. Consequently, there is growing recognition that pricing should more closely reflect the true costs to provide water and thus encourage more efficient use of existing water supplies.

As the number of water recycling projects increases, resulting advancements in recycling technology should reduce costs providing greater incentive for additional water recycling projects. The cost to install infrastructure for recycled water continues to represent a significant obstacle to the provision of recycled water to existing communities. Within the urban setting, retrofitting existing development to incorporate new pipelines can be prohibitive. However, the cost to install “purple pipe” is greatly reduced when included in new projects during original construction.

The shortage of local funding to plan recycled water projects can slow the construction of new projects. Public funding and incentive measures should be provided to advance water recycling projects that provide local, regional, and statewide benefits. The primary source of state funding has been the Water Recycling Funding Program administered by the State Water Resources Control Board, providing low-interest loans and grants to local agencies. The Department of Water Resources administers the Integrated Regional Water Management Grant Program. Water recycling is a resource management strategy that must be considered by an IRWMP, and may be utilized as an active component of the plans to help the region meet water management goals and objectives. In addition, water recycling projects associated with IRWMPs in which it has been identified as a key strategy may qualify for IRWM grant funding.

Water Quality

Public acceptance of recycled water depends on confidence in the safety of the water. The following four water quality characteristics have been identified as being of particular concern: (1) microbiological quality, (2) salinity, (3) heavy metals, and (4) organic and inorganic substances such as pharmaceuticals and personal care products, household chemicals and detergents, fertilizers, pesticides, fungicides, and animal growth hormones. Applying appropriate levels of treatment for specific uses assures the safe use of recycled water. With respect to nonpotable applications, such as irrigation or commercial uses, microbiological pathogens are the primary concern. Heavy metals, nitrogen compounds, and organic and inorganic chemicals can pose problems when groundwater is used for nonpotable or potable applications. Salinity has more impact on plant growth and commercial and industrial processes than on public health.

Conventional wastewater treatment plants are not designed to remove all organic wastes (i.e. "emerging contaminants"). The fate of untreated organic waste constituents is variable and in some cases unknown. Some are removed and destroyed through physical and biological processes at treatment facilities. Others may concentrate in the residual solids. Some pass through the treatment processes unchanged and are discharged. For these reasons, further analysis and study of “emerging contaminants” is necessary. Substantial uncertainty currently exists regarding the analytical methods and protocols used to study “emerging contaminants”.

Concentrations of heavy metals have been a concern and are closely monitored in recycled water. However, modern wastewater treatment processes are able to routinely remove more than 90 percent of heavy metals from wastewater before discharge. As technology continues to advance, concerns about the presence of heavy metals are expected to diminish.

The salinity of recycled water can limit its usefulness in salt sensitive applications such as landscaping, golf courses, and agriculture. Salt is not removed by traditional wastewater treatment processes and as a result occurs in most recycled water. Reverse osmosis or similar advanced filtration is required to remove salts. Reverse osmosis is an energy-intensive and expensive process that is not used in conventional water recycling. Without advanced treatment, the simplest way to produce recycled water with low salt concentrations is to obtain wastewater from sources that are low in salts. Wastewater that is high in salts is more difficult and expensive to recycle. The use of water softeners increases salts (by mass), as does water conservation which reduces the dilution (by concentration). Because each cycle of recycling concentrates additional salt, there are a limited number of times that water can be recycled unless advanced treatment, such as reverse osmosis, is used to remove the salts.

The introduction of recycled water with elevated salt levels into groundwater potentially limits the future uses of that water. Reverse osmosis and advanced treatment techniques are required to remove excessive salts to protect groundwater sources. Disposal of salts is recognized as a challenge in some areas. The idea to construct a brine line to convey salts to the ocean is a controversial proposal that some associate with water recycling in some locations. Discussion of salinity issues is presented in Chapter 18, Salt and Salinity Management.

Water quality criteria for recycled water, established by the California Department of Public Health (DPH), define water quality and treatment requirements to protect public health for most expected uses of recycled water. These requirements are incorporated into the waste discharge or water reclamation requirements that are issued by the Regional Water Boards to producers and users of recycled water. Extensive monitoring assures compliance with the requirements.

Public Acceptance

Public acceptance of recycled water remains a major obstacle to implementation of water recycling projects. One of the reasons that public acceptance has been slow to develop is attributed to the perceived conflict between assurances that recycled water is safe and the necessity of regulations to protect the public from misuse. Although recycled water is increasingly used in agriculture, industrial applications, and to a lesser extent urban landscape irrigation, the primary public association with recycled water projects is often limited to seeing purple pipe and posted warnings against human consumption and contact. Regulation of the use of recycled water protects public health, but without public outreach and education programs, the precautionary measures, such as separate pipes and posted warnings, contribute to the characterization of recycled water as less than safe. Additional public education is warranted to increase public understanding and acceptance.

The demand for fresh water to serve the growing California population coupled with uncertain availability of future supplies has increased interest in water recycling. Use of recycled water for nonpotable applications is generally tolerated by the public, but the proposed use of recycled water to increase potable supplies is much more controversial. Public resistance as a result of the “yuck factor” has proven a formidable obstacle to furthering the use of recycled water.

As a result of climate change, using recycled water to recharge groundwater supplies is a subject of increasing interest. Groundwater basins and aquifers have the potential to store significant amount of water from a variety of sources, potentially including stormwater and treated wastewater for later recovery. The use of wastewater to recharge groundwater basins addresses two fundamental challenges of climate change adaptation: 1) Wastewater discharges represent a potential source of additional water that is currently underutilized or not utilized, and 2) Groundwater recharge provides a practical storage solution. It is recognized that some obstacles remain to be addressed, including drinking water standards as administered by the DPH, and the public resistance to the addition of wastewater to potable supplies. The DPH is currently developing comprehensive regulations to address groundwater recharge projects for indirect potable reuse. Currently, wastewater that is used for groundwater recharge is subject to advanced treatment including microfiltration, reverse osmosis, and disinfection before being discharged for infiltration or injected. Public concern about mixing recycled water with groundwater appears to be partly alleviated by the knowledge that infiltration, percolation, and underground residence time expose the water to natural cleansing processes. Nonetheless, outreach and education programs will be increasingly important as supplies of local groundwater and imported water decrease and reliance on recycled water increases.

Potential Impacts

Communities that discharge wastewater to rivers, streams, or percolate to groundwater, contribute to the ambient water that is available for use by downstream users. The implementation of water recycling in upstream communities would reduce the volume of such discharges, potentially reducing the volume of ambient water available for downstream reuse and/or fulfillment of environmental needs. In some circumstances, downstream users may have rights to the use of discharged wastewater, potentially preventing upstream communities from implementing recycling.

Whether for storage or planned indirect use, the discharge of recycled water to wells, infiltration sites, or other locations underlain by permeable soil and geologic materials has the potential to introduce contaminants, including salts, into potable groundwater sources and aquifers. Modern microfiltration, reverse osmosis, and disinfection practices produce exceedingly high quality recycled water, but lingering concerns about pathogens, emerging contaminants, or other potentially unknown contaminants warrant continued research to advance the science and technology in this area. New technology called submerged membrane bioreactors is being used to purify wastewater for potable reuse in Europe. The two-step process involves adding bacteria to wastewater, and then sucking the remaining sludge through a membrane to filter the water. Europe expects to build more than 70 membrane bioreactor facilities per year over the course of the next three to five years. Presently, California does not approve direct potable reuse projects, maintaining that treated wastewater intended for ultimate consumption as drinking water follows the draft Groundwater Recharge Regulations with specific treatment goals, performance standards, and soil aquifer treatment.

Recommendations to Increase Recycled Water Use

1. The Recycled Water Task Force presented 26 recommendations to increase water recycling in their report, *Water Recycling 2030, Recommendations of California's Recycled Water Task Force*. The recommendations are presented in Box 11-1 of this section. State and local agencies and stakeholders should implement as appropriate the Recycled Water Task Force recommendations. These recommendations constitute the culmination of intensive study and consultation by a statewide panel of experts drawing on the experience of many agencies. Such recommendations can be used as a toolbox for communities to improve their planning of recycled water projects.

2. Although it is increasingly evident that water recycling projects have been, and continue to be, implemented throughout the state, a comprehensive inventory of recycling facilities and programs does not exist. The State Water Resources Control Board should establish a centralized data repository of recycling facilities and programs that contains basic information such as the type of treatment, volume of water recycled, uses of recycled water, and costs of operation. A systematic reporting process should be established to ensure maintenance and integrity of the data for future reference. Without such a system it is impossible to quantify water recycling efforts, characterize successes and failures, or make informed decisions as to future endeavors and funding priorities.

3. State agencies including the State Water Board, Regional Water Boards, DPH, and DWR should develop a uniform interpretation of State standards for inclusion in regulatory programs and IRWMPs, and clarify regulations pertaining to water recycling including permitting procedures and health regulations. Uniform building code requirements should be considered that include cross-connection control and dual plumbed systems.

4. The Department of Water Resources should be provided the authority to adopt and implement a dual plumbing building code for California.

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