

Efficient Water Management: Investing in California's Future.

*Highlights of the Efficient Water Management for
Regional Sustainability in the Sacramento Valley Report*



Essential. Efficient. Exceptional.

The Sacramento Valley is essential to the long-term health and viability of the state of California and its citizens.

The Sacramento Valley is an exceptional place to live, work and raise a family. Equally important, the Valley is an essential part of California’s economic well-being and long-term viability. Preserving the Sacramento Valley requires that we continue to use our water resources efficiently and wisely.

Water in the Sacramento Valley is the lifeline for:

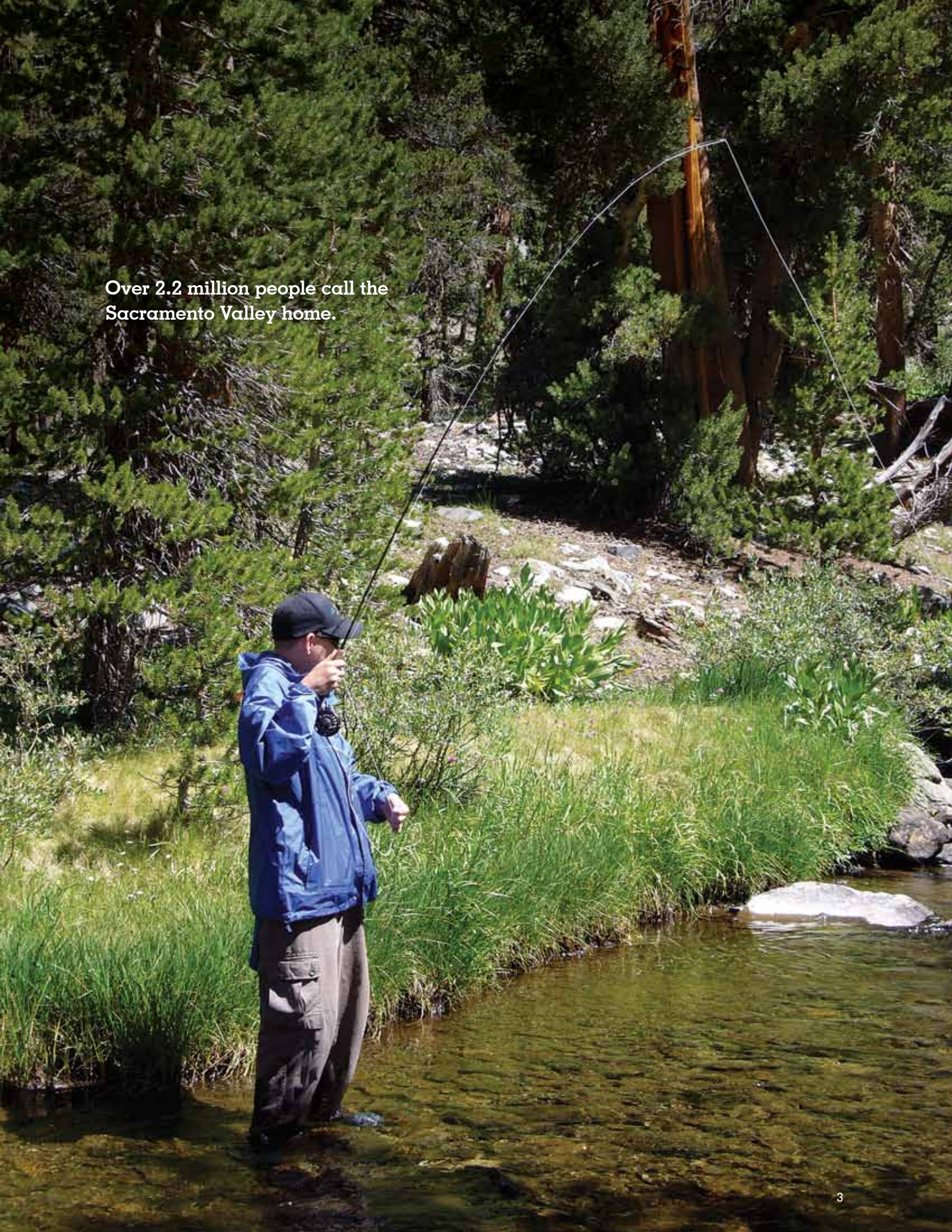
- Highly productive farming that supports the region’s economy and communities,
- Healthy ecosystems that support a host of critical plant and animal species,
- Recreational opportunities for people within and outside the Valley.

To ensure that the Valley’s water resources continue to be sustainably and efficiently managed, the Northern California Water Association (NCWA) commissioned a report on *Efficient Water Management for Regional Sustainability in the Sacramento Valley*.

This document – *Efficient Water Management: Investing in California’s Future* – presents an overview of the report’s findings. The entire report can be found at the NCWA website – www.norcalwater.org.

The unimpaired flow from the Sacramento River hydrologic region averages approximately 22 million acre-feet annually, nearly one-third of the state’s total annual runoff and the largest contributor of inflow to the Bay Delta.

Over 2.2 million people call the Sacramento Valley home.



Water resources directly benefit healthy ecosystems.



Limited Resources, Increasing Demand.

California policy requires that “Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.” (Water Code §85021.)

To meet this objective, the allocation and management of water resources – whether it’s from surface water, reused water, groundwater, or for refuge and habitat management – will require careful consideration if we are to ensure that water resources are managed to support our long-term future, economically, socially and environmentally.

Surface Water Management

Water collected on the ground or in a river, stream, lake or wetland is referred to as surface water. Naturally replenished by precipitation, surface water is depleted by evaporation or seepage into the ground.

The Sacramento River and its tributaries are the main surface water supply sources for much of California’s urban, agricultural and environmental areas, including areas north and south of the Bay Delta. The unimpaired flow from the Sacramento River Hydrologic Region measured at the city of Sacramento averages approximately 22 million acre-feet annually, representing nearly one-third of the state’s total annual runoff and the largest component of inflow to the Bay Delta.

While the opportunities to increase outflow from the Valley are modest, increased water use efficiency provides many opportunities to restore and enhance our environment.

The region’s water supply is delivered through a complex system of interconnected natural and constructed conveyance systems. Thousands of miles of well-maintained irrigation canals and drains interlace the Valley, providing surface water supplies to thousands of customers.

Over 90 irrigation water suppliers (which include local public agencies and private companies) own, operate and maintain these systems to deliver water and provide drainage services to wetland managers and growers who cultivate a wide variety of permanent and annual crops.

Water Reuse Management

The Sacramento Valley is considered to be a “flow-through” system, which is due to the Valley’s topography and geology and its current hydrologic state. The Sacramento River and its tributaries essentially act as drains while simultaneously serving as prime water sources.

Much like a funnel, all of the water not consumed by crops and other vegetation or for other purposes will eventually return to the river or will percolate to groundwater that recharges local aquifers. Additionally, outflow from one user or water district is often the supply source for the next user or district downstream.

Because of its flow-through nature, the only water “lost” from the Sacramento Valley is through consumption. Thus, the only means of producing more outflow from the Valley would be through reduction of consumptive uses.

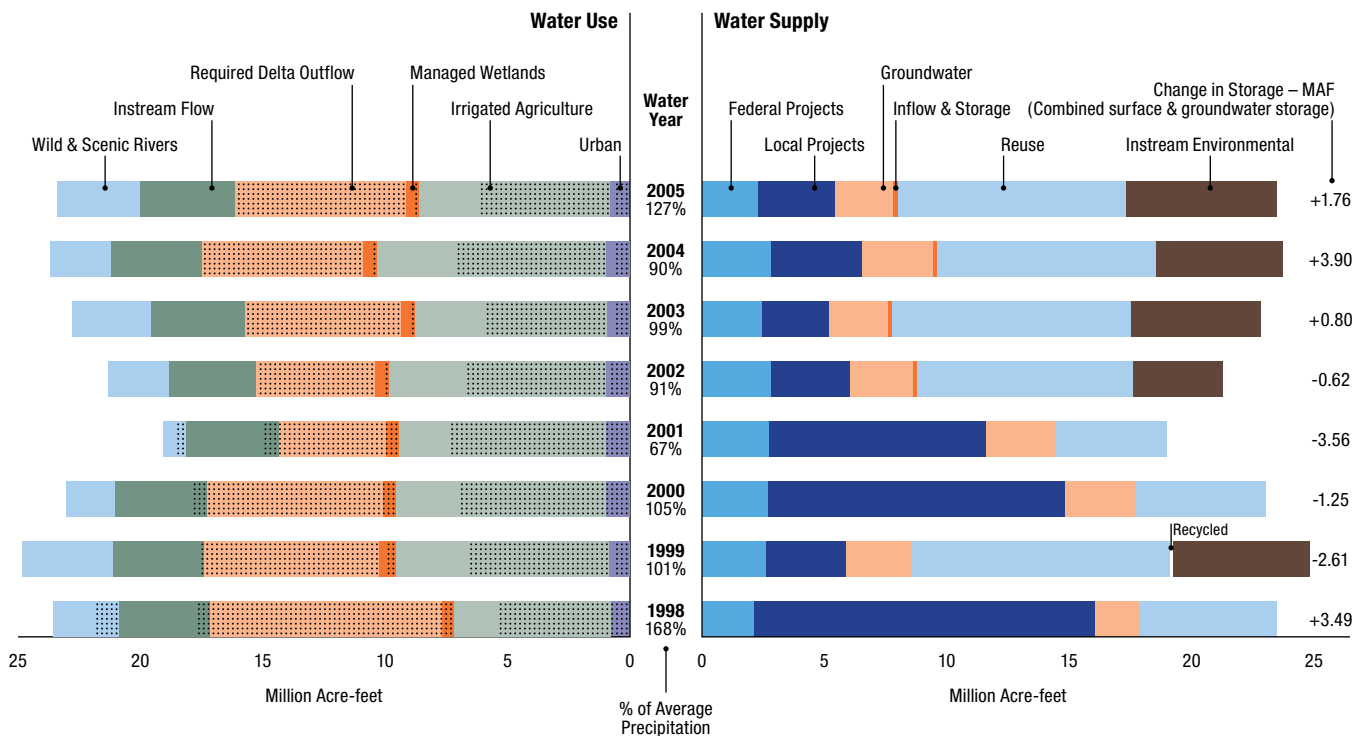
Effectively managing the system flow requires that water resource managers carefully and effectively integrate water management practices such as conservation, measurement, reuse, and surface and groundwater use together so the location, timing, rate, and quality of flow can be optimized to achieve specific benefits, while not causing unintended impacts.

Refuge Water Management

In addition to being a highly productive farming region, the Sacramento Valley lies near the southern end of the Pacific Flyway migratory route and is one of the most prominent wintering sites for migratory waterfowl.

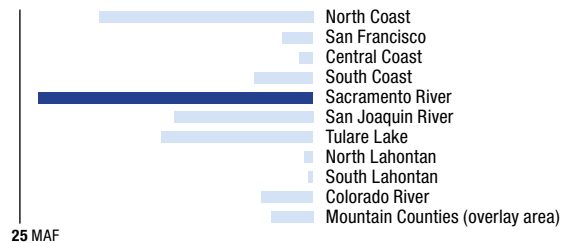
The Valley’s seasonal marshes and winter-flooded rice fields attract nearly half of the waterfowl using the Pacific Flyway and hundreds of thousands of shorebirds, herons, egrets and ibises, among other species.

Sacramento River Hydrologic Region Water Balance Summary, 1998-2005



Stippling in bars indicates **depleted (irrecoverable) water use** (water consumed through evapotranspiration, flowing to salt sinks like saline aquifers, or otherwise not available as a source of supply)

Comparison of 2005 total water use



From the California Department of Water Resources, California Water Plan Bulletin 160-2009 (page SR-16). (This table was not generated as part of the report.)

Make Every Drop Count – Protecting Our Most Valuable Resource.

After in-stream uses, farming and refuge water are the major uses of water in the Sacramento Valley (see table p. 6). Each year, about 5.5 million acre feet (maf) are diverted from Sacramento Valley rivers and tributaries for irrigation within the Valley, with an additional 2.5 maf pumped from Valley aquifers. To ensure efficiency and a viable farming community, water must be delivered to promote three goals:

- **Sufficiency** – To meet irrigation water requirements.
- **Efficiency** – To match the requirements of on-farm irrigation systems.
- **Affordability** – To maximize the potential for financially sustainable farms.

Agricultural Water Management

At the Farm and Refuge Level

Although most farmers in the Sacramento Valley rely on surface water, the surface supply in some areas may be supplemented with groundwater pumped from privately owned wells.

Irrigation districts or water companies deliver most of the surface water to fields and farms within the Sacramento Valley. In some areas, landowners are completely reliant upon groundwater.

Water directly benefits the Sacramento Valley's highly productive agriculture enterprises, which support the region's economy and communities; the healthy ecosystems that support a host of critical plant and animal species; and recreational opportunities used by people within and outside the Valley.

At the District Level

As water flows through the system, across boundaries, many districts operate recirculation systems that collect some or all of the drainwater from fields as well as operational spills from the district's supply canals and laterals. In these systems, the drainwater, which may include runoff from surface water deliveries and groundwater pumping, is lifted into the district's supply canals and is an integral part of the water supply available to fields and farms within the district.

Since the early 1990s, districts have been implementing programs within the Valley to protect anadromous fish species, including salmon and steelhead. As a result, today, most surface diversion facilities are equipped with state-of-the-art fish screens that assure water deliveries and protect salmon and other fish species.

Sacramento Valley water resource managers have one overarching goal: sustainability. The Valley's water resources need to be managed to ensure that existing economic, social and environmental systems endure indefinitely.

At the Basin Level

Water users cooperate to manage water discharge and reuse across jurisdictional lines. In most basins (and sub-basins) within the Valley, water reuse from one district to the next is "automatic," meaning that the system design allows for reuse to occur with no overt management or control asserted over the water.

Crop Water Management

Rice Water Management

Rice is a dominant crop grown in the Sacramento Valley, planted on about 525,000 acres and spanning a distance of some 120 miles – roughly Red Bluff to Sacramento. From a water management perspective, rice is different from other crops because it is grown under flooded conditions, which offers both crop production and environmental benefits.

Flooding helps to control certain competitive weeds and enhances the availability of nutrients. Additionally, ponded water acts as a thermal buffer, gaining heat during the day and releasing it at night to protect against cool nighttime temperatures that can reduce rice yield at certain growth stages.

The Environmental Benefits of Rice Cultivation

Over the past 30 years, the environmental benefits of rice cultivation have become better understood and documented, especially as they relate to habitat value for wintering waterfowl.

Of the 525,000 acres planted to rice each year in the Sacramento Valley, about 350,000 acres are re-flooded following harvest, with most fields maintained in a ponded state throughout the winter by precipitation and supplemental water application.

Six national and 50 state refuges/
wildlife areas are the cornerstone for
more than 75,000 acres of wetlands
and associated uplands.

This is a double benefit. For the farmer, flooding helps in the decomposition of the rice straw, which otherwise would require burning or baling and removal. The flooding also creates favorable conditions for waterfowl. Eliminating burning of the rice straw also reduces harmful emissions to the atmosphere.

- Ricelands provide about 60 percent of all the food that wintering waterfowl consume in the Sacramento Valley each year.
- Every three acres of ricelands is equivalent to about two acres of wetlands. That's a good return on investment.
- Additionally, rice tailwater from the winter flood-up supplies 57 percent of water supplied to the area's 75,000 acres of wetlands.
- Ricelands support nearly 230 wildlife species, including 187 birds, 27 mammals and 15 reptile species. Of these, 30 are considered special-status species that rely upon ricelands for central habitat.



Other Crops

Trees and row crops are planted to more than a million acres in the Sacramento Valley. Over the past few decades, farmers have made considerable progress in converting cropland and crops to water-efficient drip irrigation and micro-sprinklers for tree and row crops. Using micro-sprinklers to apply water to orchards is often more efficient and uses less water than other application methods. In fact, this method of application is proven to increase yields, enhance quality and achieve higher productivity with less water than conventional irrigation systems.

Water use efficiency in the Sacramento Valley must be defined within a framework that recognizes existing and possible future uses of water, and understands the physical characteristics of the hydrologic system, the interrelationships among water uses, and water management goals and objectives.

Row crops have benefited from advances in subsurface drip irrigation technology that allow liquid fertilizer to be mixed with irrigation water, providing water and nutrients directly to the plant roots.

Benefits of drip irrigation include:

- Increased fertilizer efficiency
- Better water quality protection
- Efficient water application
- Reduced need for field leveling
- Safe use of recycled water
- Optimal root zone moisture maintenance
- Minimal soil erosion
- Fewer weeds





**Each year in the Sacramento Valley
about 525,000 acres are planted to rice.**

Working Together – A Balanced Approach.

Sacramento Valley water resource managers are constantly striving for continuous improvement in managing resources. To do so effectively requires that they take into consideration three interrelated functions or components that work together to contribute to the well-being of the natural environment and the social well-being of those who live within and beyond the Valley's borders.

These components are:

- 1. Ecological** – Environmental protection and stewardship
- 2. Economic** – Financial considerations
- 3. Social** – Society/community and individual human well-being

In general, a sustainable approach balances and maximizes benefits within the framework of these three components.

Depending on the area or issues at hand, focusing on only one of the three components is often at the expense of one or both of the others. Trade-offs or unintended consequences are typically the result.

Whenever improvements to efficiency are made, water resource managers are fully aware of the trade-offs and potential consequences of their management decisions. However, if we are to ensure that the Valley's water supplies are kept in balance for generations to come, it is critical that Valley water managers work together with local and state governments to develop working policies and conventions that embody regional sustainability and self-sufficiency principles.

Our rivers, streams, lakes, and reservoirs enhance the natural ecosystem by providing shelter for wildlife, as well as providing recreational and economic opportunities, and a sense of well-being for the Sacramento Valley. These natural resources are a big part of what makes this such a unique and exceptional place to live. Sustaining these resources is essential to ensuring our long-term viability and a bright future for the Valley.

The Sacramento Valley provides a critical life source for most of California. Twenty-five million people – two-thirds of California’s population – depend on the Sacramento River for their water, so we need to make every drop count.



For more information on the Northern California Water Association and the *Efficient Water Management for Regional Sustainability in the Sacramento Valley Report*, please visit our website at www.norcalwater.org.

