From Water Quality, Quantity and Security Initiative Strategic Plan

Groundwater Quantity

California has allocated water for in-stream flow, irrigated agriculture, urban use, managed wetlands, wild and scenic rivers, and required Delta outflow. A combination of surface water, groundwater, re-used water, and recycled water provided the supply to meet these demands.

On average, 30 percent of the state's annual irrigation and urban water supply is from groundwater. During droughts, groundwater may provide as much as 60 percent or more of this supply. About 85 percent of Californians, more than 30 million people, rely on groundwater for some of their drinking water supply. Many California communities in agricultural areas and practically all rural residences rely entirely on groundwater for drinking water. Agriculture's dependency on groundwater for irrigation depends on both location and annual precipitation. Statewide, it is estimated that, on average, about 2 million more acre-feet of groundwater is extracted annually than is replenished.

Groundwater is California's hidden resource, a water supply with localized hydrologic and geologic features that are not fully or easily understood. Similarly, the extent and nature of groundwater use is complex and localized. The California Department of Water Resources has defined 431 groundwater basins statewide and further divided these into 515 distinct groundwater systems underlying about 40 percent of the state's surface area. California policy and institutional structure recognize the localized nature of this vital groundwater resource and promote local or regional efforts to monitor, comprehend, and manage it.

Preferred areas of research and extension

Topics common to agricultural and urban land uses:

- Improve understanding of basin-scale water balances, particularly groundwater percolation, empirical measurements of water use, and return flows
  - Assess potential changes in management of groundwater and surface water systems
  - Project the effect of future growth and land use changes on groundwater resources
- Assess climate change's impact on groundwater basins
  - Account for changes in groundwater demand and recharge
  - Assess need for changes in groundwater management and surface water management under climate change scenarios
  - Evaluate merits of potential management responses to climate change scenarios
- Improve understanding of surface water and groundwater interactions in relation to the environment
  - Develop groundwater management assessment and implementation tools for improved management of groundwater-dependent ecosystems
- Improve understanding of impact of saltwater intrusion

- Develop new groundwater banking alternatives, particularly in agricultural regions
- Education/outreach on conjunctive management of groundwater and surface water

Topics specific to production agriculture:

- Evaluate impact of change in irrigation methods
  - Assess unintended impacts of conversion to pressurized irrigation systems
  - Assess opportunities to modernize water district infrastructure and aid groundwater management
  - Evaluate how changes in irrigation methods have influenced demand for groundwater and surface water as well as groundwater imbalances
- Evaluate role of irrigation efficiency in managing groundwater
  - Assess unintended impacts of conversion to pressurized irrigation systems on groundwater and surface demand and water balances

Topics specific to urban environments:

- Evaluate impacts of changing urban landscapes on groundwater supply and demand
- Assess potential impacts of urban water re-use and watershed management on groundwater supply and demand