

## ***From Water Quality, Quantity and Security Initiative Strategic Plan***

### **Surface Water Quality**

Population increases, urbanization, and climate change are placing unprecedented stresses on natural resources such as freshwater. This challenge is exacerbated in the state of California, with its predominantly arid and semi-arid lands. For example, growing populations, especially in coastal regions of the state, have increased degradation of surface water resources through contaminants from urban landscapes.

In addition, climate changes will further strain the availability of high-quality water resources in many areas of the state, requiring greater dependence on lower-quality recycled and/or reclaimed water for both food production and urban landscape irrigation.

Over the last two decades, government regulatory agencies, environmental nonprofit organizations, and public and private research institutions have invested considerable effort into improving the quality of California's surface waters. Even with this intense focus, the majority of California's streams, rivers, lakes, and estuaries continue to be impaired by excess nutrients (nitrate and/or phosphate), inorganic (e.g., selenium) or organic (e.g., pesticides) contaminants, and a variety of microbial pathogens (e.g., salmonella, giardia) and bacterial indicators (e.g., fecal coliforms). The potential impact of "emerging contaminants" such as pharmaceuticals and personal care products (PPCPs) is only beginning to be recognized.

### **Preferred areas of research and extension**

Topics common to agricultural and urban land uses:

- Characterization of constituents of concern in runoff (nutrients, pesticides, pathogens, sediments) including loading estimates for improved Total Maximum Daily Load (TMDL) allocations.
- Impact of current and alternative irrigation methods on movement of contaminants in surface runoff.
- Mitigation strategies to minimize movement of contaminants in surface runoff, including both structural and non-structural management practices.
- Management of recycled water runoff contaminants, including emerging contaminants, pathogens, salts, and nutrients into surface waters.
- Minimizing introduction of pesticides into surface runoff through the use of integrated pest management practices.

Topics specific to production agriculture:

- Early pollutant detection methods to improve production agriculture's ability to quickly respond to surface runoff contamination and possible food safety issues.
- Improved management practices for concentrated animal feeding operations (CAFOs) and their accumulated manure to minimize discharge of surface runoff containing nutrients, pathogens, and emerging contaminants such as antibiotics.
- Improved management practices for livestock to mitigate surface water contamination from non-point source fecal pollution.

Topics specific to urban environments:

- Assess and develop urban management practices that lessen water quality degradation of surface water resources.