



## Strategies for Responding to Western Water and Working Land Management Challenges

### Challenge # 1: Forecasting water supply in areas depending on snowmelt

Surface water supplies in the West rely in large part on precipitation that falls as rain or snow during the cool, wet seasons for use in warmer, drier times of the year. Forecasts of water supply provided by precipitation and meltwater from snowpack is critical to effective water management. Increasing demand for water makes accurate forecasting more important while climate change is making water forecasting more difficult. NRCS provides water supply forecasts and data used by other entities for their forecasts (USDA 2021).

Strategy	Need	How NRCS Will Help
1. Improve reliability of water supply forecasts	Under increased demand for water and with climate change impacts, supply from surface water sources to a myriad of users is increasingly unreliable. Forecasting expected streamflow is an important aid in planning water storage and release as well as irrigated agriculture planting decisions.	NRCS will improve the network of sites for monitoring snowpack and invest in innovative technology, methods, and models to inform water forecast products.

### Challenge # 2: Sustaining agricultural productivity in crop and pasture lands under dry climates

Farmers and ranchers in the West face a unique set of resource concerns as they produce food and fiber in the region. Irrigation is essential to crop production in much of the West, so efficient delivery of irrigation water to farms and efficient use of irrigation water on farms is critical to making the best use of limited water supplies. Managing soil moisture resources is vital to sustaining agricultural productivity for irrigated and non-irrigated crop production. The management of nutrients and soil health is unique for both irrigated and dryland production in the region. NRCS can provide voluntary assistance to individuals and communities as they strive to address conservation challenges while producing food and fiber under scarce water conditions.

Strategy	Need	How NRCS Will Help
1. Improve soil moisture and irrigation water management	Soil moisture may be supplied by precipitation or irrigation. Irrigation water mitigates the lack of soil moisture and high salt concentrations. Naturally available soil moisture needs to be managed in dryland agriculture, and both soil moisture and irrigation needs to be managed in irrigated agriculture to achieve economical production of common and high value crops in dry climates.	NRCS will help farmers in dry climates efficiently use soil moisture and irrigation water to sustain productivity and build resilience to agricultural drought in dryland or irrigated crop fields and pastures.
2. Improve water and nutrient management in crop fields and pastures	Water movement across the surface and down into the soil profile can transport sediment and nutrients within crop fields and pastures reducing plant productivity and health and degrading water quality. Healthy soils and an effective nutrient management program are needed to improve water infiltration and holding capacity, avoid nutrient loss below the root zone and from water runoff, and improve crop productivity and health. Water control practices further reduce the risk of excessive leaching, soil loss by water erosion, and nutrient transport by safely moving water runoff and sediment to trapping practices.	NRCS will help farmers in dry climates apply soil health management, nutrient management, and water control practices within crop fields and pastures to (1) sustain crop productivity; (2) avoid nutrient losses and control sediment and nutrient transport to areas where they can be trapped; and (3) protect groundwater and surface water quality.
3. Modernize water infrastructure	Water infrastructure such as canals, reservoirs, turnouts, and automation devices are needed to transport, store, and deliver surface water or manage groundwater. Only one-fifth of irrigation organizations use a formal drought plan to mitigate the risk of water supply disruptions.	NRCS will help irrigation districts, groundwater management organizations, and other water management entities modernize water storage and delivery infrastructure needed to (1) supply irrigation or livestock water to farms and ranches and (2) build drought resilience across a water project delivery area.
4. Improve community water supply by completing watershed projects	Local government agencies, tribal organizations, and other organizations need help during emergencies arising from a sudden watershed impairment caused by wildfire or other natural occurrences. Eligible organizations may sponsor small watershed projects that include agricultural water management, drought resilience, or emergency protection related to community water supply.	NRCS will help communities design, construct, rehabilitate, or modernize agricultural water storage and delivery infrastructure to build drought resilience or protect a watershed.
5. Increase reuse of wastewater for agriculture and conservation	Alternative sources of water such as treated wastewater are being considered to meet long-term needs. While reuse of wastewater can be a more reliable source of water supply than traditional water sources, it may also come with other challenges such as contamination by pharmaceuticals or other substances.	NRCS will help individuals, academic institutions, non-Government organizations, tribes, and local or state governments develop innovative water and land conservation tools, technologies, and approaches, including reusing treated wastewater for agricultural and conservation applications where feasible.



## Strategies for Responding to Western Water and Working Land Management Challenges—continued

### Challenge # 3: Protecting groundwater availability in landscapes relying on principal aquifers

Groundwater is an important source of water for agriculture, municipal and other uses, but the availability of this resource can be diminished by withdrawals exceeding recharge and by contamination. Increased demand for water, exacerbated by climate change, is putting additional strain on groundwater resources across the West. The decisions of water managers and the regulation of groundwater, as well as the absolute availability, may also reduce availability of water to agricultural producers. NRCS can assist producers in making more efficient use of groundwater and in supporting aquifer recharge in ways that do not risk reducing the quality of those resources.

Strategy	Need	How NRCS Will Help
1. Prolong aquifer life	Groundwater supplied by principal aquifer systems is a significant source of agricultural water in many places, and the only source in a few. In some places, long-term droughts and irrigation withdrawals are depleting aquifers. Where the aquifer is the only source of water, irrigated agriculture will cease when it is gone. In areas fortunate to have both groundwater and surface water, depleting the aquifer reduces the buffer against declining surface water supply.	NRCS will help farmers and ranchers prolong aquifer life by reducing groundwater withdrawals to rates that correspond with natural recharge or comply with local or state groundwater withdrawal regulations.
2. Complete managed aquifer recharge projects	In some places managed aquifer recharge is feasible due to geology, topography, and available surface water sources.	NRCS will help farmers, ranchers, groundwater management entities, and communities prolong aquifer life by assisting with design and installation of managed aquifer recharge projects where surface water runoff or delivered water is available.

### Challenge # 4: Protecting surface water availability in the driest parts of the West

Surface water is the primary source of irrigation water in the driest parts of the West and is similarly important for other water users. Climate change is affecting the absolute amount of surface water available as well as the timing of that availability. The decisions of water managers and regulation of surface water, as well as the absolute availability, may reduce availability of water to agricultural producers. Pollutants from agricultural runoff can reduce the quality of surface water making it less available for use by people and wildlife. NRCS can assist producers in reducing surface water withdrawals to rates that correspond with diminished supply or meet local or state requirements, reduce losses of nutrients and other potential contaminants to surface water, and restore streams and wetlands in watershed or groundwater recharge areas. NRCS can also assist water management entities to improve water distribution systems to reduce losses as well to use alternative water sources such as water reuse.

Strategy	Need	How NRCS Will Help
1. Reduce surface water withdrawals	When surface water volume is sufficiently depleted there is not enough water available for all users. In some cases, increased irrigation efficiencies can result in less water available for downstream users.	NRCS will help farmers and ranchers protect the availability of the surface water by reducing withdrawals to rates that correspond with diminished supply or that meet requirements of local or state regulations.
2. Install conservation systems that protect water quality	Extreme storm events in dryland agriculture can exceed the capacity of water control practices to safely convey water runoff, which could result in soil erosion and water quality impairments. Inefficient irrigation water applications can lead to excess nutrients in irrigation tailwater, nutrient loading to tributaries, water quality impairments, and in some cases, even algal blooms in lakes.	NRCS will help farmers and ranchers protect surface water availability by installing conservation systems that protect water quality by reducing losses of sediment, nutrients, and other materials at the edges of fields and pastures.
3. Restore and protect streams and wetlands	Streams, wetlands, riparian areas, and floodplains contribute significantly to surface water supply and groundwater recharge.	NRCS will help individuals, entities, and communities restore and protect floodplains, riparian areas, wetlands, and streams to increase available surface water supply, build hydrologic drought resilience, recharge aquifers, or protect water quality in small watersheds or other areas.





## Strategies for Responding to Western Water and Working Land Management Challenges—continued

### Challenge # 5: Managing and restoring rangelands and forestlands

Many watersheds in the West are predominantly made up of rangelands and forests. These landscapes are sensitive to climate impacts like fires, floods, and drought that may reduce their productivity for food and fiber production as well as their water cycling function. Degradation of rangelands and forests can lead to reduced quality and quantity of the water in watersheds. NRCS can assist landowners and managers to improve the condition and resilience of these ecosystems.

Strategy	Need	How NRCS Will Help
1. Manage and restore rangelands and forestlands	Rangelands and forestlands play a critical role in the regional balance of water supply and demand. These lands are sensitive to more intense and longer droughts, increasing frequency of extreme weather events, increased risk of erosion, lower water tables, wildfires, changes in land use and cover. Rangelands supply the greatest amount of forage for domestic livestock and grazed forests may be an important part of a multiple land use grazing system.	NRCS will help ranchers and forest owners improve the condition and resilience of rangelands and forestlands by making them less vulnerable during intense and longer droughts and extreme weather events. Vulnerabilities are reduced through improved grazing and forest management systems that sustain agricultural productivity of rangelands and forestlands and increase the supply of water available to communities.

### Challenge # 6: Disruptions from catastrophic events

Disasters such as droughts, fires, floods are increasing in frequency and intensity across the West and some cause catastrophic damage. These events can have immediate impacts on water delivery infrastructure and conservation structures as well as long term effects on water supply. NRCS helps individuals, entities, and communities in recovering from these disasters and can build resilience to climate stressors into recovery measures.

Strategy	Need	How NRCS Will Help
1. Increase resilience during disaster recovery	The increasing frequency and intensity of catastrophic events is resulting in major shifts in vegetation (ecological drought), land use changes, declining water supplies, and degraded water quality and habitat. Communities have limited resources to respond to natural disasters and most cannot cope with catastrophic events (e.g., megadroughts, devastating wildfires, extreme weather, epic flooding, massive landslides, etc.).	NRCS will help individuals, entities, and communities repair damage from natural disasters (including wildfire, ecological drought, and related emergencies). Where opportunities exist, NRCS will provide long-term support for adding resilience measures, such as conserving water resources, recovering from wildfires, and improving livestock access to water.

Note: Strategies are not applicable everywhere as not all areas experience the same water and working land management challenges. These are the primary challenges addressed by the strategy(ies). See framework text for secondary challenges also addressed.