

# Water 2025: *Preventing Crises and Conflict in the West*



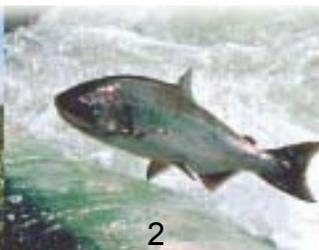
# Water 2025: Preventing Crises and Conflict in the West

**W**ater is the lifeblood of the American West and the foundation of its economy. More than a century ago, American pioneers began harnessing the water of the West, opening vast new lands for settlement and development. Today, the American West is the fastest growing region of the country. Water is its scarcest resource.

Water 2025 is intended to focus attention on the reality that explosive population growth in western urban areas, the emerging need for water for environmental and recreational uses, and the national importance of the domestic production of food and fiber from western farms and ranches are driving major conflicts between these competing uses of water.

**Today, in some areas of the West, existing water supplies are, or will be, inadequate to meet the water demands of people, cities, farms, and the environment even under normal water supply conditions.**

Water 2025 recognizes that state and local governments should have a leading role in meeting these challenges, and that the Department of the Interior should focus its attention and existing resources on areas where scarce federal dollars can provide the greatest benefits to the West and the rest of the Nation.



# Water 2025: Preventing Crises and Conflict in the West

**W**ater 2025 has two purposes. First, it provides a basis for a public discussion of the realities that face the West so that decisions can be made at the appropriate level in advance of water supply crises.

Second, Water 2025 sets forth a framework to identify the problems, solutions, and a plan of action to focus the conversation as the Department of the Interior works with states, tribes, local government, and the private sector to meet water supply challenges. This framework includes:

◆ **Six principles** to guide us as we address systemic water problems.

◆ **Five realities** that drive water crises.

◆ **Four key tools** to help us proactively manage our scarce water.

## The Six Principles

▪ Solutions to complex water supply issues must recognize and respect state and federal water rights, contracts, and interstate compacts or decrees of the United States Supreme Court that allocate the right to use water.

▪ Existing water supply infrastructure must be maintained and modernized so that it will continue to provide water and power.

▪ Enhanced water conservation, use efficiency, and resource monitoring will allow existing water supplies to be used more effectively.

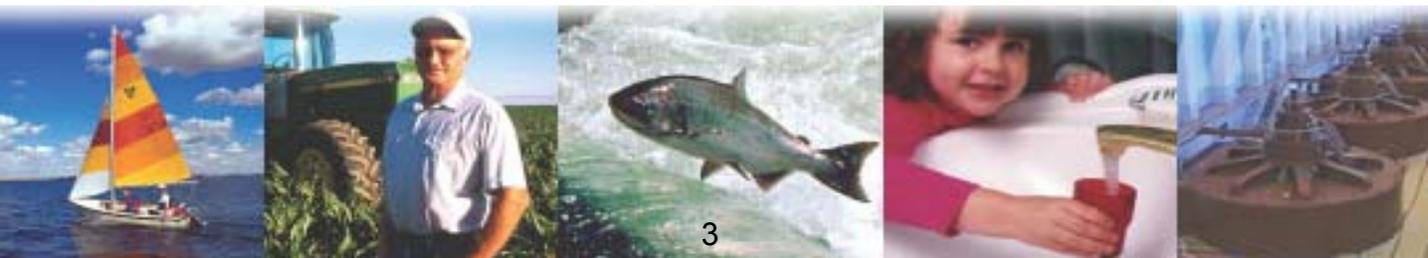
▪ Collaborative approaches and market based transfers will minimize conflicts between demands for water for people, for cities, for farms, and for the environment.

▪ Research to improve water treatment technology, such as desalination, can help increase water supplies in critical areas.

▪ Existing water supply infrastructure can provide additional benefits for existing and emerging needs for water by eliminating institutional barriers to storage and delivery of water to other uses while protecting existing uses and stakeholders.

Since 1866, federal water law and policy has deferred to states in the allocation and administration of water within their boundaries.

This policy will be honored and enhanced by Water 2025.



# Water 2025: Preventing Crises and Conflict in the West

**W**ater 2025 does not pretend to be a complete solution to the complex water needs of the West.

Principles of federalism and fiscal realities make it clear these decisions cannot and should not be driven from the federal level. Instead, they should be based on local and regional support.

Water 2025 is a commitment by the Department of the Interior to work with states, tribes, local governments and the public to address the realities of water supply challenges in the West.

Implementation and enforcement of the federal Endangered Species Act is far more effective if a water supply crisis is avoided through collaborative efforts than through lengthy litigation or managing water supply issues on an emergency basis.

**The Bureau of Reclamation's Fiscal Year 2004 budget requests \$11 million for the Western Water Initiative, the first step in laying the foundation for addressing current and future water needs.**

## The Five Realities

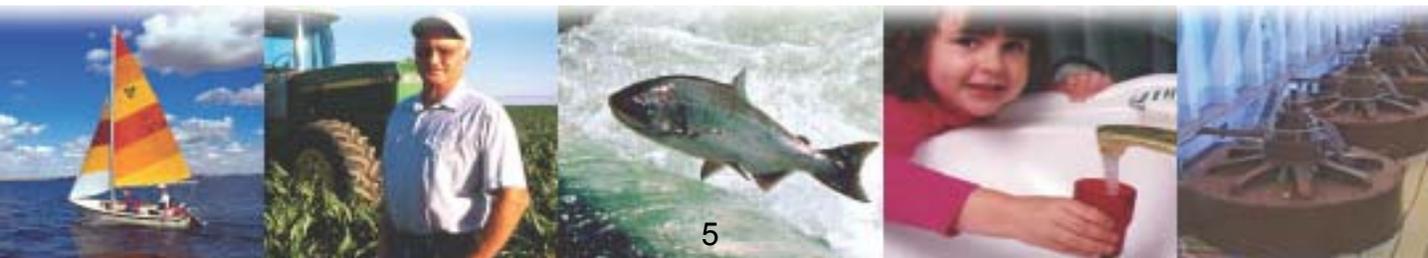
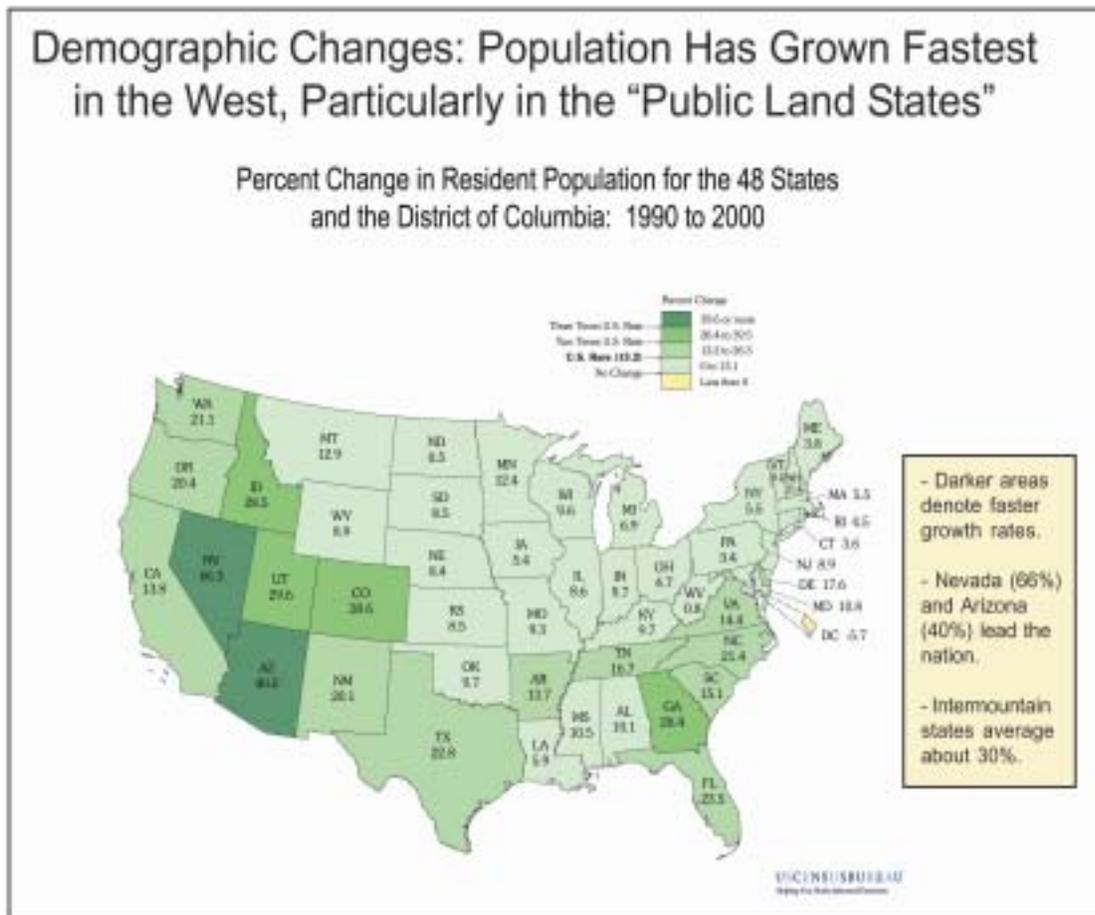
**F**ive interrelated realities of water management are creating crises in important areas in the West. These realities are:

- **Explosive population growth**
- **Water shortages exist**
- **Water shortages result in conflict**
- **Aging water facilities limit options**
- **Crisis management is not effective**



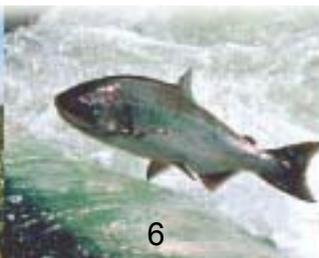
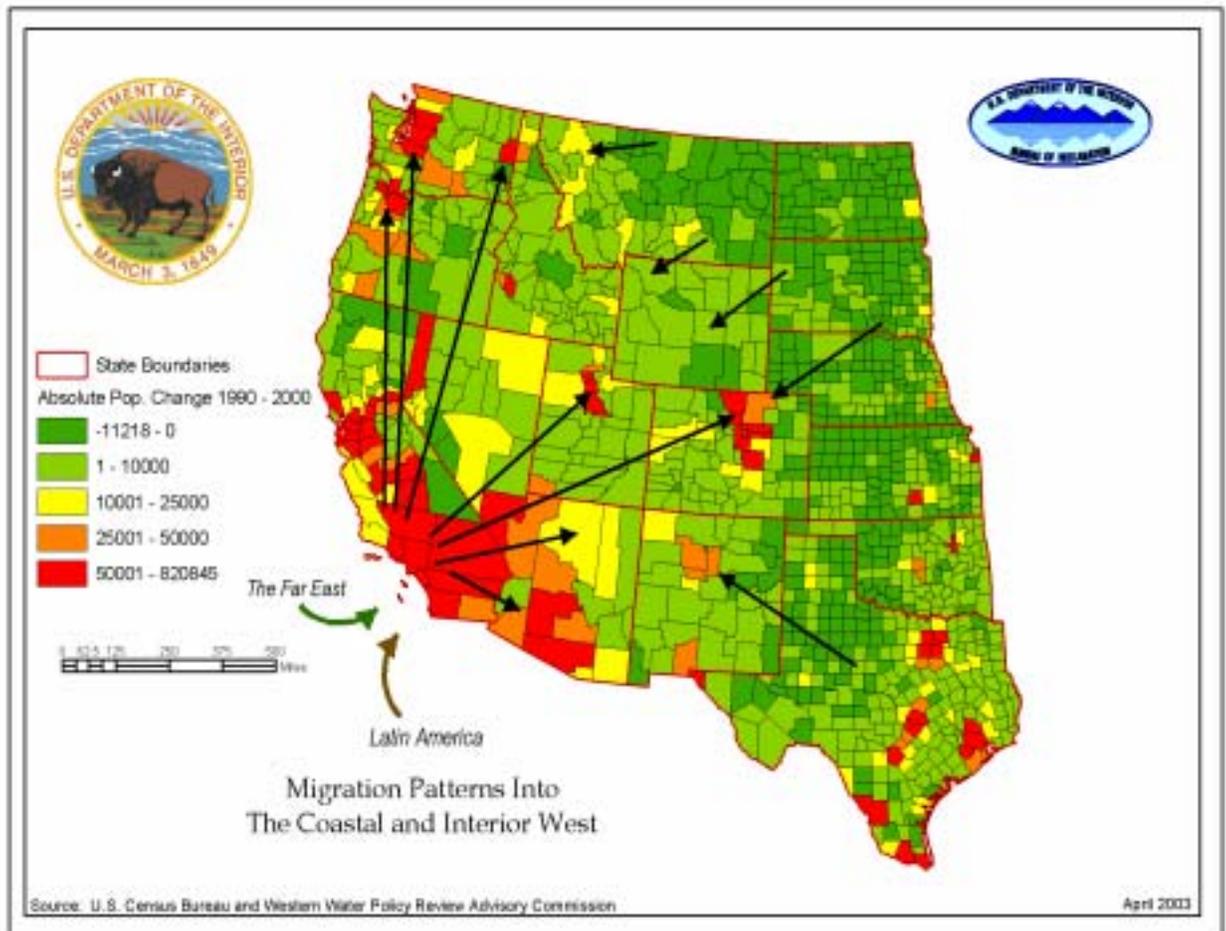
# Reality Number 1: Explosive Population Growth in Arid Areas

**E**xplosive population growth is occurring in areas where water supplies are limited and the demand for water is increasing.



# Reality Number 1: Explosive Population Growth in Arid Areas

Urban growth in the West presents water management challenges that must be met if we are to avoid bitter conflicts that may have significant adverse social, economic, and environmental impacts.



# Reality Number 1: Explosive Population Growth in Arid Areas

**S**ome areas in the Western United States receive less than one-fifth of the annual precipitation that other areas of the country enjoy. Adding explosive urban growth to existing uses in these areas increases pressure on a limited resource – water.

Average Inches of Annual Precipitation  
in the United States 1961-1990



Source: USDA-NRCS: <http://www.nrcs.usda.gov/pubs/1000/>



## Reality Number 2: Existing Water Supplies are Inadequate

In some areas the water supply will not be adequate to meet all demands for water even in normal water years. Inevitable droughts merely magnify the impacts of water shortages.

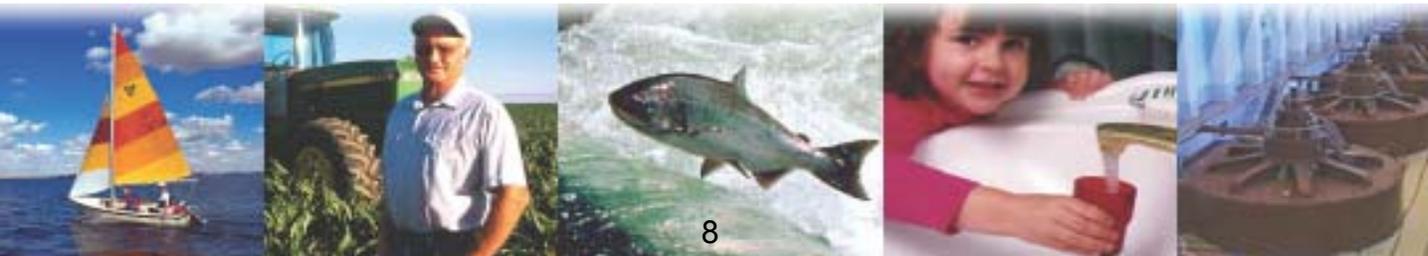
Severe droughts can have dramatic effects. During 2002:

- Rainfall in the Colorado River basin was the lowest in recorded history.
- Rio Grande flows in New Mexico were at 13 percent of normal; Elephant Butte Reservoir held only 19 percent of its capacity, the lowest water level since the dam was built in the early 1900s.
- Boise, Idaho, had one of its driest calendar years on record.
- Extended drought and a reduced water supply have placed a great strain on the communities in the Lower Rio Grande.

However, the potential for conflict over water supplies is no longer defined by drought events.

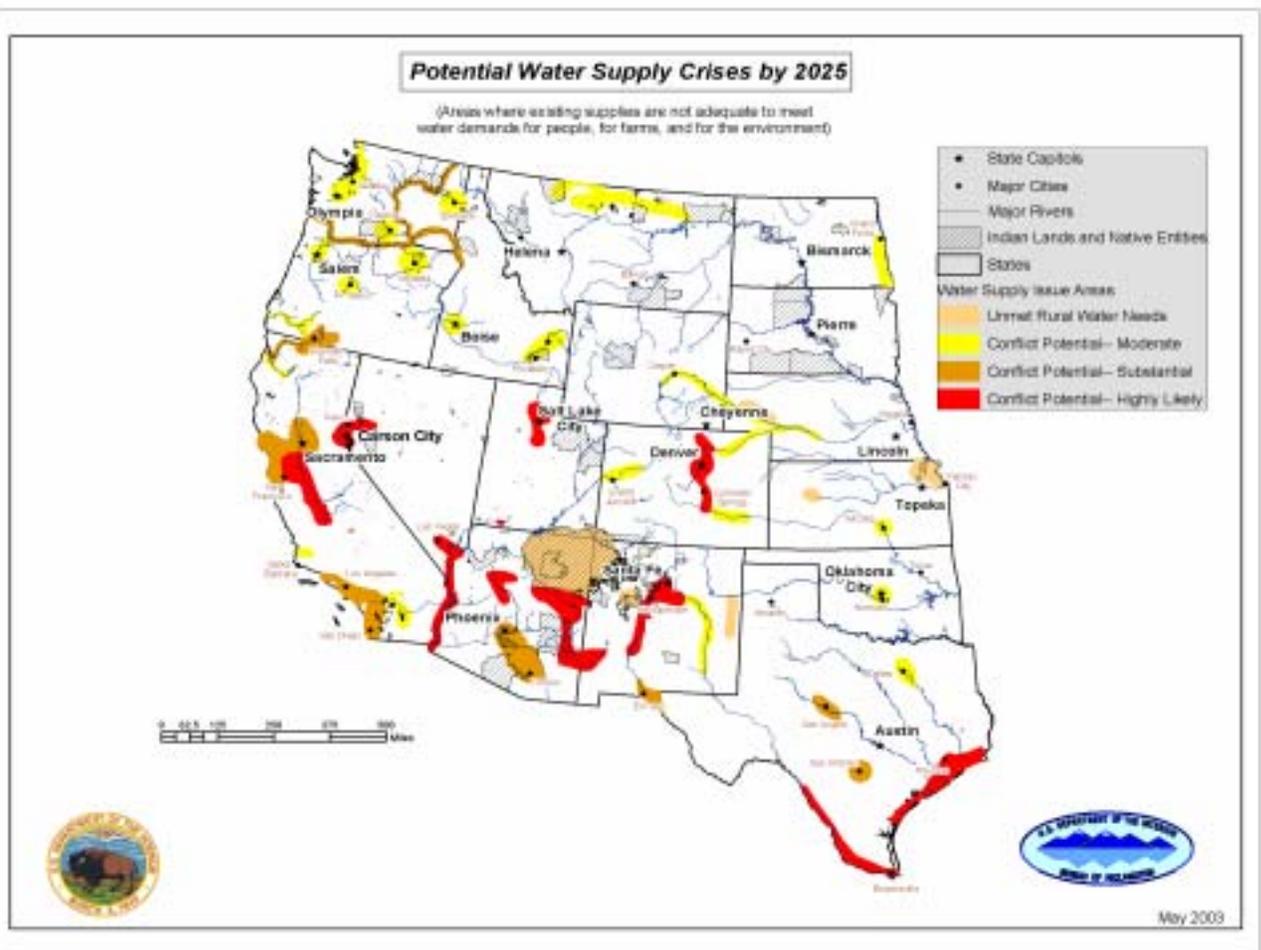
*Water supply and management issues are becoming increasingly important as the demand on existing supplies continues to grow. Increasing populations in many areas, combined with increasing demand for water for recreation, scenic value, and fish and wildlife habitat, have resulted in conflicts throughout the country, especially in the arid West.*

Congressional Research Service report for Congress, "Water Resource Issues in the 107th Congress," by Betsy Cody and H. Steven Hughes, January 16, 2001

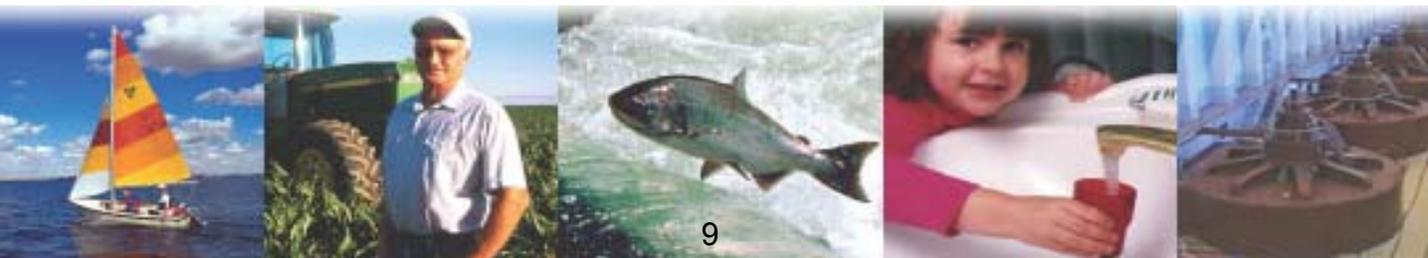


## Reality Number 2: Existing Water Supplies are Inadequate

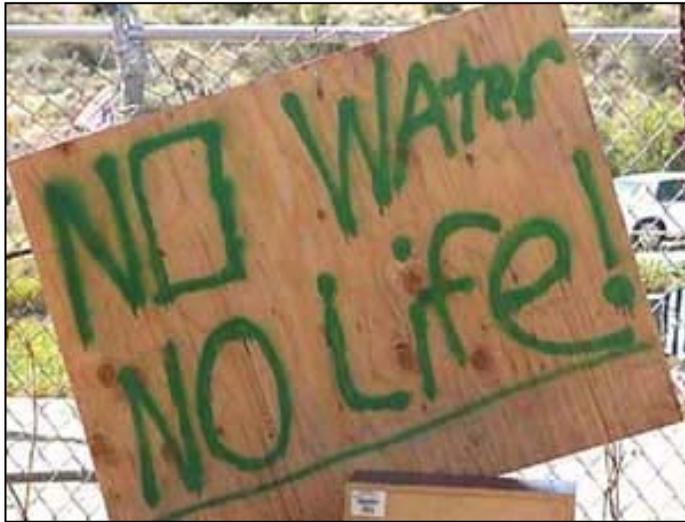
Improved water management requires knowledge of basin-specific problems. The Bureau of Reclamation prepared an analysis of potential water supply crises and conflicts by the year 2025. This analysis is based on a combination of technical and other factors, including population trends and potential endangered species needs for water. The Department of the Interior intends to seek extensive input from states, tribes, and the public on this analysis and expects that it will be revised and improved through this effort.



**As** a part of Water 2025, the Department of the Interior will use all available tools that have a demonstrated capacity to address potential water supply crises.



# Reality Number 3: Over-Allocated Water Supplies Can Cause Crisis and Conflict



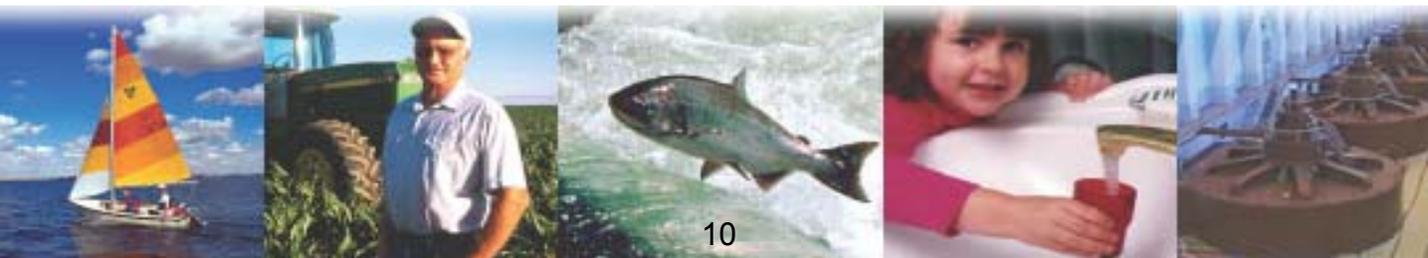
A sign from Klamath Basin crises

**R**ecent crises in the Klamath River and Middle Rio Grande basins -- where farmers, cities, Native Americans, fish and wildlife all were impacted by the water shortages -- vividly demonstrate the consequences of failing to address competing demands of people and

the environment for a finite water supply. The Nation cannot afford repeated water crises. The social, economic, and environmental consequences of water supply crises are too severe.



A dry Middle Rio Grande riverbed



## Reality Number 4: Aging Water Facilities Limit Management Options

**M**ost of the federal infrastructure that manages the finite usable water supply in the West is approaching 50-60 years of age, and some facilities are almost a century old.



Aging irrigation water control structure

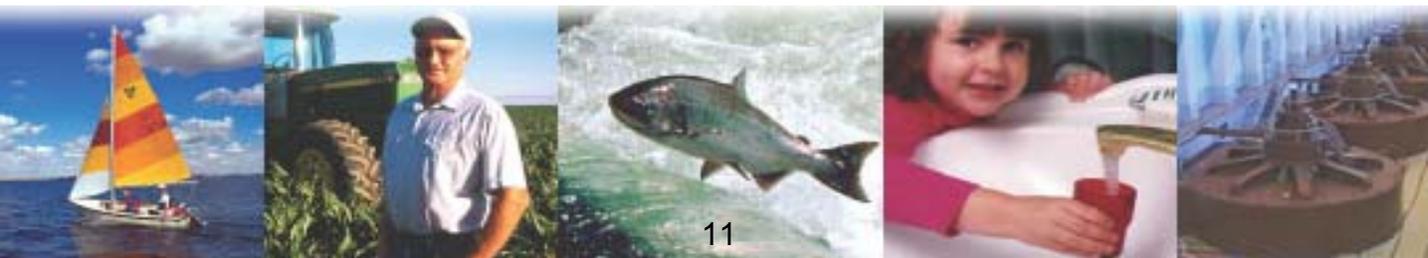
Beginning in the early 1900s, the federal government built many of the water storage and delivery facilities in the arid West to develop water supplies for a growing and expanding United States.

These systems - the visions of past water use pioneers - created vast areas of irrigated agriculture,

harnessed the power of falling water to produce energy, and allowed cities to flourish.

Many water supply facilities today in the West continue to use 19th century technology to attempt to meet 21st century problems.

In some instances, canals can lose up to 50 percent of their irrigation water through seepage.



## Reality Number 5: Crisis Management is Not Effective



**C**risis management is not an effective solution for addressing long-term, systemic water supply problems.

Congress, states, tribes, and interested citizens have over the years sought to define and refine water policy in the West. Many studies and other processes have assessed these issues at a conceptual level. Collectively, these studies would fill entire rooms. However, in reality, the options for addressing water supply crises are fairly well known and understood. In the long run, shortages in water quantity can be met only by increasing efficiency of existing uses, transfers of water between uses, reducing or eliminating existing water uses, the development of alternative sources of water such as desalination, or by storing additional water in wet years for use in dry years.

Public and policy-level attention to water supply issues in drought conditions tends to disappear as soon as rain (or snow) relieves the drought. But drought is only a magnifier of the larger problems associated with rapid population growth and environmental demands for water in areas where water supplies are already over-allocated.

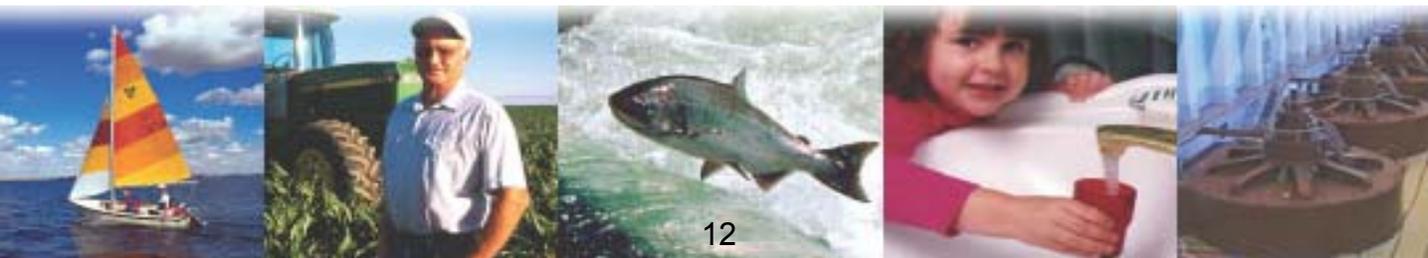
Water 2025 is intended to focus sustained attention on measures that can be put in place before extended drought or other pressures push communities toward divisiveness and conflict.

Simply put, the West has developed to the point that the social, economic and environmental consequences of water supply crises are no longer a local or regional issue. These crises now affect economies and resources of national importance.

Conflict can be minimized or avoided when potential water supply crises are addressed in advance by local and regional communities.

Mere plans or endless processes are not a substitute for decision making, and can have the unintended and adverse effect of delaying action until a potential crisis becomes a reality.

In some areas of the West, communities are already implementing water banks, voluntary transfers between existing users, and water conservation measures to address potential water supply crises in advance.



# Meeting the Challenge

1



3



2

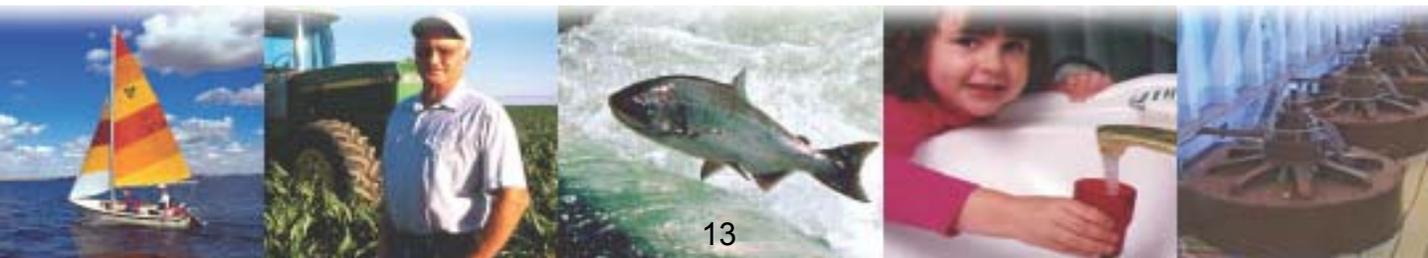


4

## Four Key Tools to Prevent Water Crises

Water conflicts can have serious social, economic, and environmental impacts. Through Water 2025, the Department of the Interior identifies four key tools to help prevent future conflict and crises over water in the West.

1. **Conservation, Efficiency, and Markets**
2. **Collaboration**
3. **Improved Technology**
4. **Remove Institutional Barriers and Increase Interagency Coordination**



# Conservation, Efficiency, and Markets: *Improve Water Management and Use Market-Based Approaches To Head off Conflicts*

**1** In many cases, implementation of new water conservation and efficiency improvements through cooperative partnerships will result in an increased ability to meet otherwise conflicting demands for water.

Most irrigation delivery systems were built in the early 1900s and remain virtually unchanged today. These irrigation delivery systems can be modernized and retrofitted with new water management technologies. Water districts can install cost-effective water management technologies, using low-cost solar-powered components that allow remote water measurement and operation of deliveries through irrigation delivery systems. The initial investment in these systems, though significantly less than in the past, can still be burdensome to many water delivery organizations.

◆ The Department of the Interior will work with partners to retrofit and modernize existing facilities to



Modernized Canal Structure

accomplish improved water management through the use of new technologies.

For example, with Reclamation's assistance, irrigation districts have installed automated control and remote water measurement structures.

✓ In Idaho's Payette Valley, nine irrigation districts and canal companies within the Payette River Water District have automated 29 control structures, installed more than 30 remote water monitoring and measurement devices, and modified a large dam on the river. These improvements provided just enough additional operational water storage to vastly improve the efficiency of river operations.



# Conservation, Efficiency, and Markets: *Improve Water Management and Use Market-Based Approaches To Head off Conflicts*

✓SCADA (Supervisory Control And Data Acquisition) systems allow river managers to remotely monitor and operate key river and canal facilities on a real-time basis. Individual stations can be set to monitor river levels or flow rates continuously. In addition, Reclamation and water district managers can respond to daily water management needs and emergencies in a timely fashion by controlling pump and canal facilities remotely. The cost of this high-tech equipment was once thought to be out of reach for most irrigation delivery entities, but today has become more affordable. However, less than 20 percent of irrigation water delivery systems currently use this technology.

◆Reclamation's research has shown that for every \$1 spent on canal modernization (such as rehabilitating canal gates), an expected return of \$3 to \$5 in conserved water can be achieved.

✓For every \$1 spent on maintaining an existing canal lining, a return of up to \$10 in conserved water can be achieved.

✓Canal-lining technologies can minimize seepage losses at a reasonable cost.

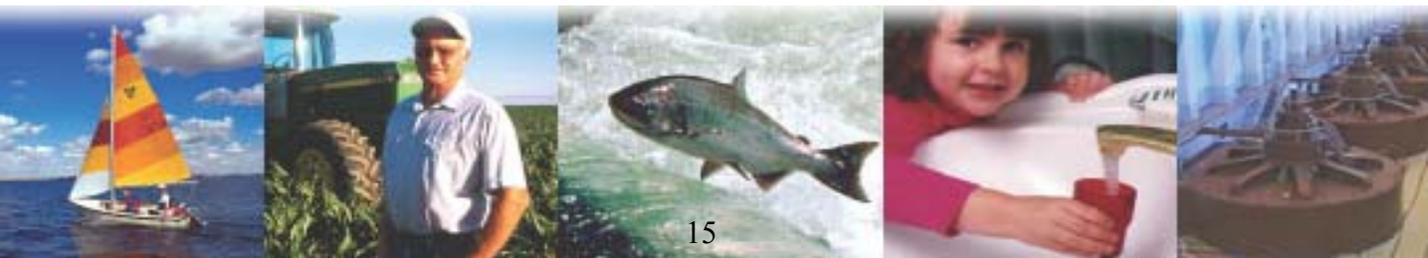
✓More than 30 test sections have been constructed in several irrigation districts throughout the Pacific Northwest. Canals in central Oregon have reduced seepage losses by up to 50 percent.



Installing canal lining technologies

◆Most irrigation water delivery canals in the West are currently unlined. Water savings and corresponding increases in available water supplies from installation of canal lining technologies could be significant as a whole.

✓Reclamation is providing funding and technical assistance to state and local agencies and water districts in the Klamath basin area to conserve existing water through the lining of canals.



# Conservation, Efficiency, and Markets:

## *Improve Water Management and Use Market-Based Approaches To Head off Conflicts*

◆ Accounting for irrigation water deliveries plays a vital role in an effective water management system. Improvements in design and construction of new measuring devices allow water to be accurately measured. These devices could become the foundation for improved water management in the West.



Solar-powered headgate

✓ The Ochoco Irrigation District in central Oregon lost approximately 40 cubic feet per second (cfs), or 25.8 million gallons per day, at the end of their irrigation system. The District, in partnership with Reclamation, dramatically cut its daily losses by 75% after installing advanced water measurement equipment. In the last two irrigation seasons, these improvements have allowed the district to

provide irrigation water for a longer period of time, even though both the 2001 and 2002 water seasons have been drought years in central Oregon.

◆ Water banks and markets are essential to avoiding crises in critical areas of the West. The use of water banks and markets is sometimes a source of concern to agricultural areas and the communities that support them. However, the Department of the Interior strongly supports the use of these mechanisms to allow water to be shifted between competing water uses because they are based on a recognition of the validity of existing rights. Water banks also avoid or reduce the conflict, crisis, and heartache that results when water uses are changed through regulatory or other means. More importantly, water banks can provide a mechanism for preserving irrigated agriculture and meeting other water supply needs.

✓ A critical component of the “CalFed” process in the Central Valley of California is the innovative Environmental Water Account. This account provides a mechanism for state and federal governments to purchase water from willing sellers in order to meet important ecological restoration goals in the San Francisco Bay Delta region.



## Conservation, Efficiency, and Markets: *Improve Water Management and Use Market-Based Approaches To Head off Conflicts*

✓A form of “water bank” has been in operation in Northern Colorado for over 50 years. Water delivered from the federal Colorado-Big Thompson Project (C-BT) can be rented on an annual basis between agricultural water users and municipalities within the Project. Once the buyer and seller have reached agreement on the price, water is transferred when the seller simply sends a postcard to the water district that manages the water from the C-BT Project. Permanent transfers of water within the District can occur between willing buyers and sellers in a process that takes months, not years, to complete with transaction costs of a few thousand dollars. Over the years, municipalities have acquired additional Project water to meet the needs of their growing populations during droughts. However, a substantial amount of the municipally-held water supplies are rented back to farmers in normal years. This combination of permanent transfers and annual rentals has allowed the region to meet the needs of a growing population **and** protect a very important agricultural economy.

✓A dynamic similar to the one in Northern Colorado is currently developing in California, where farmers have the option to sell water on a short term basis to urban areas within California that have short term needs. This flexibility allows farmers an additional option in years when the market for agricultural products will not produce an acceptable rate of return, and preserves their ability to stay in production in the long term.

✓Three Idaho water banks enable water users to transfer their surplus storage entitlements to other uses. These water banks helped provide in-stream flows for ESA-listed species of salmon. While controversial, it prevented conflict between traditional water users and the federal government in the implementation of the ESA.

✓In 2000, the State of Colorado authorized a five-year water banking program for the Arkansas River Basin to help farmers receive revenues for temporarily leasing their water to others, with the water rights remaining in agriculture.



# Conservation, Efficiency, and Markets: *Improve Water Management and Use Market-Based Approaches To Head off Conflicts*

◆ Interagency efforts to coordinate both existing and new water conservation programs would improve the return on federal dollars already being spent “on the ground,” allowing for marked improvements in water management.

✓The USGS will enhance groundwater monitoring and stream flow-measurement systems in critical areas of the West. This will improve drought evaluations, predictions, and long-term resource planning. States, tribes, and localities would maintain their important role in setting priorities for these enhancements.

✓Improvements in the coordination of collection and management of snow pack and runoff data in critical watersheds will allow water managers to predict and plan for water shortages earlier than current systems.

✓Reclamation and USGS are partnering on the Watershed River System Management Program to create models that will help farm agencies, drought planners, and others better understand the unique aspects of the basin when they make critical decisions.



Reclamation and the USDA Natural Resource Conservation Service will continue to construct and manage SnoTel sites across the West that measure and record real-time snow pack data used to develop runoff forecasts for entire watersheds. Such partnerships would be expanded to include watersheds that are suffering shortages of both water and adequate data used to predict and forecast water supply.



# Collaboration: *Cooperative Approaches To Resolving Conflict*

# 2

**S**ignificant water supply crises must be addressed

in advance of the crisis. Collaborative processes that are based on recognition of the rights and interests of the stakeholders allow the problem solving that maximizes the opportunity for innovation and creativity.

💧 One of the most important aspects of intelligent water management in the West is to have a system that allocates available water supplies in a rational manner when there is not enough to meet all demands for water.



Congress has decided that, except in limited circumstances, states should have the authority to allocate water within their boundaries. Congress has also required that federal needs for water must respect prior rights to water created under state law, and that both federal and nonfederal needs for water

must be integrated into a single priority system in states that follow the doctrine of “prior appropriation.”

The integration of claims to water typically occurs in court proceedings. These proceedings or “adjudications” can be complex and take decades to complete. The problem is that until these



# Collaboration:

## *Cooperative Approaches To Resolving Conflict*

proceedings are completed, water managers do not know how to allocate water in times of scarcity. The resulting uncertainty over “who owns what” causes chaos and conflict. The Department of the Interior is committed to working with states, tribes, and interested stakeholders to find ways to accelerate these proceedings in order to protect existing federal and non-federal rights.

◆ A common element of many of the potential crises identified in Water 2025 is the need to provide for water supply for people, cities, and farms in a manner that also attains the goals of the federal Endangered Species Act. Success in meeting this challenge almost always requires a collaborative effort between stakeholders, as is demonstrated by the success of the Upper Colorado River – San Juan Endangered Fish Recovery Programs. These Recovery Programs provide for the recovery of endangered species and the continued use and development of water for people, for cities, and for farms. A similar effort is underway in the Central Valley of California, where the “CalFed” process

has brought diverse stakeholders together in an effort to protect and restore important ecological resources *and* protect the people and economy of California.

These large scale efforts to meet the needs of people and the environment are based on several realities. First, the twin goals of recovery of endangered species and meeting the water needs of people who live in these areas cannot be attained when the issues and resources are locked into a cycle of short term litigation and decision-making. Long term Biological Opinions issued under the Endangered Species Act are essential to the long term planning and predictability that both people and endangered species need. Second, public support for the state, private, and federal commitments that is required to meet these twin goals is essential. Stakeholders typically will not commit public or private resources to water supply development and endangered species recovery efforts without an assurance that the benefits of their investment of resources will not be swept away by short term decision making.



# Collaboration:

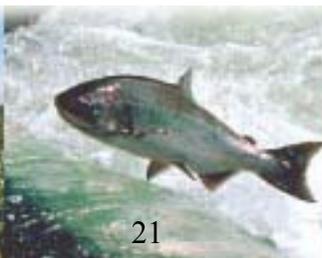
## *Cooperative Approaches To Resolving Conflict*



The 4-C's in action: Conservation through Cooperation, Communication, and Consultation

◆ Collaboration between stakeholders can also result in a resolution of longstanding conflicts. Interior will partner with state and local governments, tribes, water users and conservation groups to improve river systems.

✓ For more than 2 decades, the East Bay Municipal Utility District and several localities struggled over the management of the Sacramento River, thus disrupting the efficient use of water. Through facilitation sponsored by the Bureau of Reclamation, a sustainable and locally developed agreement was reached.



## Improved Technology: *New Sources of Water*

# 3

**W**astewater, salty and other impaired water can be purified to increase their utility. Water 2025's

goal is to significantly aid technological advances and identify new supplies. Interior can facilitate research to reduce the high costs that slow adoption of new water purification technologies.

✓ A part of the effort to identify new potential sources of water would be to task the U.S. Geological Survey (USGS) with the comprehensive study of untapped but impaired supplies, with a focus on those places with a high probability of water demands exceeding supplies by 2025.

Various private entities, academic institutions, and state and federal agencies are engaged in research that could be better coordinated and focused. Recent reports to Congress on potential projects, along with a water desalination research roadmap now under review by the National Research Council, should guide research.

Reducing desalination costs, for instance, could enable the cost-effective treatment of brackish groundwater in traditionally water-short areas. In some rural communities and Indian reservations, this salty groundwater is unusable for human consumption, limiting growth and prosperity. Although one alternative is to pipe fresh water from rivers and reservoirs miles away to these water short areas, desalination could offer less expensive and drought-proof alternative while providing reliable and high quality water supplies to these communities.



Remote water data collection technology



## Improved Technology: *New Sources of Water*



Reverse osmosis water treatment plant

◆ Interior will seek to facilitate the implementation of desalination and advanced water treatment through improved interagency coordination of research and focused investments to areas most needing planning support.

✓ Past collaboration and dissemination of information has led to great technological advances. The Bureau of Reclamation, in cooperation with other federal agencies, can facilitate technology development and transfer, evaluate product capabilities, and assess research gaps and new technologies.



# Institutional Barriers and Interagency Cooperation:

## *Remove Institutional Barriers to Improve Water Management*

# 4

In some areas of the West, federal facilities have excess capacity during certain times of the year that could be

used to satisfy unmet demands elsewhere. This excess capacity is, however, sometimes not available due to policy or legal constraints. In some cases, this additional capacity can be made available with appropriate changes in Interior policy. In other cases, legislative action could be considered. The use of this excess

capacity could minimize or avoid the need to build new infrastructure to address additional water needs.

✓ In Colorado, an effort has been made to provide excess storage space in Reclamation's facilities to non-project irrigation districts and other water users for storage of their water during the continued drought.

✓ In California, Reclamation is working with the state to facilitate operations and take advantage of under-utilized pumping capacities at the southern end of the Sacramento-San Joaquin Delta. By sharing pumping capabilities, additional opportunities will be provided to both the state and federal projects to move more water where it is needed while reducing impacts to fish and protecting local irrigators.



Salmon migrating through fish ladder

Optimize the use of existing water supply infrastructure



# Institutional Barriers and Interagency Cooperation: *Coordinate Among Federal Agencies*

◆ Interior will cooperate with other federal agencies to more effectively focus federal dollars on critical water short areas, coordinating to enhance water management preparedness.

✓Through active support of the National Drought Monitoring Network, Interior will help accelerate the development of an important tool to drought preparedness.

✓The Departments of the Interior and Agriculture will create Drought Action Teams to focus scarce resources quickly where and when they are needed.

✓The USGS will team with other agencies to create a monthly Water Resources Assessment that will be available online so that decision makers can better understand the water supply component of drought conditions.

Interior interacts with many different stakeholders, including farmers, ranchers, cities, tribes, conservation groups and others. As part of the effort to establish the National Drought Monitoring Network, Interior believes that one-stop shopping for Western water users on a single government website will aid in problem solving, particularly in critical areas. Such a site can provide information on snow pack, runoff, river operations, forecasting, and drought prediction. This effort will be consistent with the President's Management Agenda initiative furthering e-government.

Drought Action Teams will enable each department to respond quickly to emerging water supply shortages, and to coordinate the implementation of existing programs to maximize the benefits of available resources. Upon the concurrence of both secretaries that an extreme water shortage event is likely to exist in a particular area, a Drought Action Team will be created for that area. Each team will include department-level policy staff in addition to appropriate staff from bureaus or agencies within each department. It is anticipated that these teams will exist only for the limited time required to ensure that DOI and USDA resources are being applied in a coordinated and streamlined manner.



# Water 2025 Will:



- ◆ Facilitate a cooperative, forward-looking focus on water short areas of the West;



- ◆ Help to stretch or increase water supplies to satisfy the demands of growing populations, protect environmental needs, and strengthen regional, tribal and local economies;



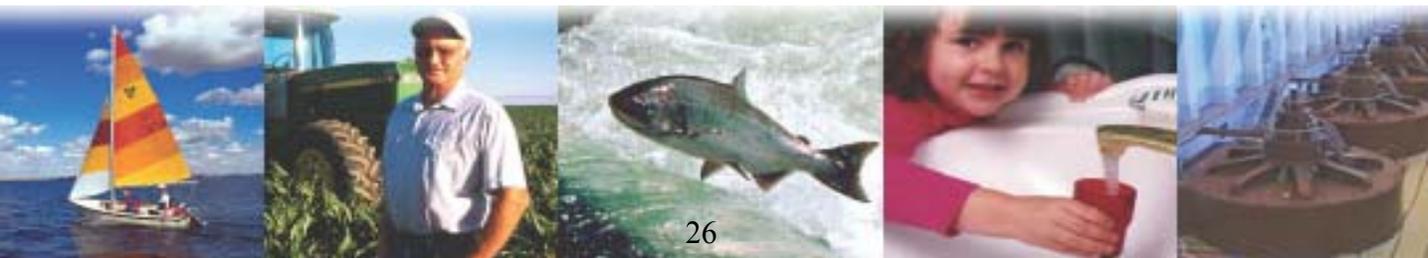
- ◆ Provide added environmental benefits to many watersheds, rivers, and streams;



- ◆ Minimize water crises in critical watersheds by improving the environment and addressing the effects of future droughts on important local and tribal economies; and



- ◆ Provide a balanced, practical approach to water management for the next century.





America's **strength** has always depended on the great wealth of her natural resources and the ingenuity of her people. **Water 2025** will enable our nation to continue to **prosper** and **grow** well into the 21<sup>st</sup> century and leave the legacy of a **healthy** environment, **community** strength, and **economic** self-reliance for **generations** to come.

