

THE FUTURE OF AGRICULTURAL WATER IN THE WEST

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ABSTRACT

Water is the key to the American West. Food security is as vital to our homeland security as our nation's other strategic interests, and the production of food and fiber on Western irrigated lands is critical to our nation's ability to feed itself. You cannot visit the West and not talk about water. No other commodity holds so much power or so much promise, and no other commodity has the often realized potential to cause so much conflict. As the West has grown, water issues have become increasingly polarized. Growing urbanization and increased public demand for available supplies to provide recreational and environmental benefits are placing heavy demands on Western water, the key ingredient in the production of agricultural products.

Everyone can agree that reallocating scarce water supplies from farms to cities and instream demands will alter the rural West's fabric. Although the debate is often divisive, these challenges can be addressed by thoughtful, motivated and reasonable parties. Inaction in this regard really is action. By not seeking creative ways to streamline the regulatory process associated with repairing existing facilities and creating new water infrastructure, the inevitable and foreseeable action that will follow is a deterioration of the status quo. Lack of active planning will allow water-short cities and new recreational and environmental demands to absorb farmers' water supplies. It will significantly diminish domestic food production at exactly the same time climate change may severely and adversely impact food production worldwide. We must plan for that now, and not wait until we are forced to make decisions during a crisis.

The Family Farm Alliance believes the West can find solutions to our conflict which assure that we can feed ourselves, export food to others, and continue to lead the world in agricultural production while finding ways to accommodate urban growth, recreational demands, and environmental requirements. Solutions will not come easily. They will require visionary leadership and a firm commitment to a balanced, workable policy.

We believe society will reject an approach which leads to shuttering farming communities to meet urban growth, recreational demands and environmental requirements. Our nation needs a stable domestic food supply, just as it needs a stable energy supply. Now is the time for a consistent and thoughtful federal water policy that looks to meet all of the needs of the West and the nation. The Family Farm Alliance believes the recommendations in this paper can form the basis for that policy.

Key Words: agriculture, climate change, conflict, irrigation, policy, water, Western United States

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INTRODUCTION

Over the past 20 years, we have moved toward a new paradigm when it comes to Western water policy. That paradigm assumes that the policies of the past, the policies that enabled the West to be settled and to flourish, have now outlived their usefulness and practicality. It is a belief that we no longer need to manage Western water resources in a manner that continues to encourage investment in agricultural production. And many times, it is also a paradigm that embeds a belief that the continued development and use of Western water resources for agriculture is inconsistent with the nation's goals to protect and steward the environment. The Family Farm Alliance strongly believes that with visionary leadership, we can find balanced solutions to today's issues. We believe it can be done without destroying the successes of the past.

FAMILY FARM ALLIANCE BACKGROUND

The Family Farm Alliance is a grassroots organization of family farmers, ranchers, irrigation districts and allied industries in 16 Western states. The Alliance is focused on one mission: To ensure the availability of reliable, affordable irrigation water supplies to Western farmers and ranchers. We are also committed to the fundamental proposition that Western irrigated agriculture must be preserved and protected for a host of economic, sociological, environmental and national security reasons – many of which are often overlooked in the context of other policy decisions.

THE WORLD FOOD RESERVOIR IS DWINDLING

For the first time in over 30 years, the world food reservoir is dwindling as consumption exceeds production. Over the past four to eight years, depending on the commodity, growing demand and sluggish productivity growth led to the change from a surplus to a shortage era and set the stage for commodity price increases. When weather and crop disease shocks hit commodity markets in 2006 and 2007, stocks of many agricultural commodities were already low, thus exacerbating the price impacts. The policy actions of some countries to isolate their domestic markets through export restraints made the situation even worse (Abott, Hurt et al, 2008).

Lost in all of this is the role of the American family farmer and rancher, where the domestic production of food and fiber ultimately begins. The very farmers and ranchers who can play a positive part in keeping food available and costs affordable are also part of Western communities who may most keenly feel the impacts of the faltering economy.

Higher energy and food prices disproportionately impact the poor, especially in rural areas. Fertilizer and fuel costs are already going through the roof, and livestock operations are also seeing higher costs for feed such as alfalfa and corn. Those increased costs likely will mean higher prices at the cash register of grocery stores. A survey by the Oil Price Information Service in 2008 (Krause, 2008) found that the fuel crisis is hitting people hardest – as a percentage of income - in rural areas of the South, New Mexico, Montana, Wyoming and the Dakotas. In Colorado, a recent study found that homeless families with children cited high energy bills as one main reason they became homeless (Energy Outreach Colorado, 2008).

The rural West faces challenges today that demand strong citizen engagement and aggressive, outspoken leadership by our elected officials. When Western food and fiber producers begin to disappear, the ripple effect will extend far beyond their communities. As a country, we have become complacent, and food production has been taken for granted too long. The United States for nearly four decades helped defeat world hunger through its massive production output of affordable food. Western family farmers and ranchers can continue this campaign, but they need to be told – through leadership and development of priority policy – that what they do matters to this country.

DISAPPEARING SMALL FAMILY FARMS

The number of farms is declining throughout the West. According to the U.S. Department of Agriculture (USDA), the total number of farms nationally is 2.08 million, a 0.6 percent drop from a year ago. Nationally 930.9 million acres are in farmland, a 1.5 million-acre drop from a year ago (USDA National Agricultural Statistic Service).

For example, at the start of 2008 in Oregon, California, Idaho and Washington, there were 170,800 farms, a decline of 2 percent compared to one year ago. California, Oregon and Washington each lost 1,000 farms since the last USDA annual report on farm numbers. There are 500 fewer farms in Idaho, according to the USDA report.

In the West, Oregon, California and Idaho each lost 100,000 acres compared to the previous year.

USDA attributes the decline in the number of farms and land in farms to a continuing consolidation in farming operations and diversion of agricultural land to nonagricultural uses.

Meanwhile, according to USDA's Economic Research Service statistics, Americans are spending, on average, 9.7 percent of their disposable income on food. To put this into perspective, consider what citizens living in other countries pay. For example, in Brazil, 22.7% of annual expenditures go for food. In other countries, people spend even more on food:

Country	Percent of Annual Income Spent on Food
Mexico	26.6%
Argentina	32.8%
Lithuania	40.4%
Indonesia	50.6%
Vietnam	64.7%
Tanzania	73.2%

At a time when average Americans are feeling the pinch in their pocket books, the foundation of our country's ability to provide safe and affordable food and fiber is at risk. Ironically, it is because Western irrigated agriculture has been so adaptive and successful at providing plentiful, safe and affordable food that it is now jeopardized – nobody believes there can be a problem. The last Americans to experience food shortages are members of the Greatest Generation and

their parents. For the most part, they have left us, taking with them the memories of empty supermarket shelves. When the issue has never been personalized, it's easy to be complacent.

AGRICULTURAL WATER HAS BECOME THE DEFAULT WATER SUPPLY FOR THE MODERN WEST

The West is the most rapidly growing part of the United States. Yet, water supplies there are essentially static. In some areas, urban demand for water -- and land -- is straining agriculture and rural communities to the breaking point. New environmental water demands imposed by regulatory agencies or courts also first look to agriculture, as evidenced by the water supply crisis faced this year by farmers in California's San Joaquin Valley. There, a decision by the U.S. Fish and Wildlife Service directed hundreds of thousands of acre-feet of water away from farmers with federal water contracts and towards the alleged needs of the tiny delta smelt, which is protected by the Endangered Species Act (ESA). The resulting severe water shortages caused by the combination of drought and federal restrictions on water supplies to the Westside of the San Joaquin Valley have forced more than 500,000 acres of farmland to be fallowed this year, according to county agricultural commissioners.

Conversion of agricultural land and water to other uses is happening in every state, but farmers and ranchers point to some striking examples (Family Farm Alliance, 2007):

- A report released in 2006 by Environment Colorado found that, from 1987-2002; Colorado lost an average of 460 acres per day of agricultural land. The report predicts 3.1 million more acres will be lost to development by 2022.
- Arizona's massive Salt River Project (SRP) in a few years will cease to provide water to agriculture in order to meet new urban growth demands.
- In Las Vegas, Nevada, over 70,000 new residents are moving in every year, and urban water officials are looking to rural areas to satisfy its growing thirst.
- A restoration agreement developed for the Platte River could potentially dry up hundreds of thousands of acres of farmland in Nebraska and Wyoming, in order to reallocate water to meet the needs of imperiled fish and wildlife (Family Farm Alliance, July 2006).
- The California Department of Conservation indicates that more than 1 million acres of farmland in the state was converted to new residential and commercial uses between 1988 and 1998. In 2005, California's population officially topped 37 million, a growth rate of 1.4 percent, representing 500,000 new residents in the last fiscal year. With the state's population growing rapidly and developers responding with new housing subdivisions and commercial centers, farmers and ranchers are getting pinched, particularly in the Central Valley. In some of California's most productive farm counties, these pressures have eroded the agricultural land base and impacted dwindling water supplies (State of California, 2007).

Admittedly, many of the transactions involving agricultural land and water conversions include "willing" buyers and sellers. How many of those sellers, though, were truly "willing"? Farmers

and ranchers are exposed to overlapping and inconsistent mandates from different regulatory agencies that are piled on year after year. Pressure is building on farmers to give up the lifestyle and preserve the remaining equity in their property for their families, or move farming operations to other countries where labor is plentiful, environmental concerns relaxed and economic development is welcomed (Cline, 2008).

Farmers, ranchers and rural communities cannot provide the water supplies need for the Western population boom without ruining their own communities and businesses.

Farmland is disappearing at a time when the U.S. needs a stable domestic food supply (just as it needs a stable energy supply). A reliable, safe and sustainable domestic food supply is just as important as a strong military to the protection of our national interests. The post 9/11 world of terrorist threats makes the stability of domestic food supply even more pressing. And, amazingly, it appears that this critical issue – which becomes even more serious when viewed in the context of projected climate-change impacts to water supplies - is being overlooked by our national leaders.

For farmers to survive; for food to be produced in America; a stable water supply must be available. In many areas of the West, water resources are available and waiting to be developed (Family Farm Alliance, 2005; U.S. Bureau of Reclamation, 2005). However, the policies of the federal government make development of that water nearly impossible. Water conflicts are erupting throughout the West simply because we have not had the vision to develop new, environmentally sound, sources of water.

We cannot continue to downplay or ignore the negative implications of reallocating more agricultural water supplies to meet new urban and environmental water demands. At what point will too much agricultural land be taken out of production? Do we want to rely on imported food for safety and security? The Europeans, who have starved within memory, understand the importance of preserving their food production capability. They recognize it for the national security issue that it is. If our elected leaders want to do something truly meaningful, they too, should look at the bigger picture.

OUR CRUMBLING WATER INFRASTRUCTURE

The Bureau of Reclamation (Reclamation) built and manages the largest part of the critical water supply infrastructure that is the foundation of the economic vitality of the 17 Western States. Most of this federally-owned infrastructure is over 50 years old, approaching the end of its design life, and needs to be rebuilt and rehabilitated for future generations². The Congressional Research Service has calculated the original development cost of this infrastructure to be over \$20 billion, and Reclamation estimates the current replacement value of its water supply and delivery infrastructure at well over \$100 billion (Johnson, 2008).

Our water supply infrastructure is not only in disrepair, but it is also outdated. Dams and canals that are more than half a century old were conceived of and designed using projections from the early 1900s. As visionary as the water infrastructure planners were a century ago, they could not

² Reclamation has determined that 73% of its dams are greater than 50 years old.

have foreseen the explosion of population and resource utilization in the West of the past several decades. Even if repaired, our water supply infrastructure is based on demonstrably inaccurate assumptions. Would Americans tolerate a highway system designed in 1920 that had never been expanded? While the answer is obvious, we are in effect relying on a 1920 water supply system in much of the West.

In the American West, Federal water supply systems are essential components of communities, farms, and the environment. These facilities are part and parcel of the nation's food-production system and their operation helps ensure our ability to provide reliable and secure food for our own citizens and the rest of the world. The Bureau of Reclamation estimates that \$3 billion will be needed from project users in the near-term to provide for essential repairs and rehabilitation of Reclamation facilities (Johnson, 2008).

Aging public infrastructure across the Nation is a growing critical problem. For example, throughout Reclamation's history, canals have been constructed in the West to deliver project benefits. When these canals were constructed, they were located generally in rural areas, where the major impact of canal failure was the loss of project benefits. However, with increased urbanization occurring on lands below many canals, loss of life or significant property/economic damage can now result from failure.

Water projects constructed in rural areas, with limited ability to pay for massive rehabilitation, also pose a problem. For example, Reclamation's St. Mary Facilities of the Milk River Project (MONTANA) are in urgent need of rehabilitation. Most of the structures have exceeded their design life and are in need of major repairs or replacement. The St. Mary dilemma is seen by many as the "poster child" example of an aging water project that must be modernized soon, with potentially catastrophic implications if the problems are not addressed.

Similarly, much of the 55-year old Mancos Project in the southwest corner of Colorado was constructed by local interests prior to 1900. The Mancos Project has retained most of its structural integrity and functionality. However – as noted in an alarming number of other aging water facilities in the West – significant potentially catastrophic problems have been identified that threaten the future working life of this important project.

Like many other parts of the West, these single-purpose projects put the financial burden of repairs on the irrigators they serve, who simply do not have the resources to solely pay for such an expensive repair. The solutions developed at St. Mary and Mancos may very well provide successful templates that can be used in other parts of the West.

THE DESTRUCTIVE TACTICS OF THE ENVIRONMENTAL LITIGATION INDUSTRY

Recent research into litigation associated with federal environmental laws is beginning to uncover some unsettling facts: the federal government appears to be spending about as much money funding environmental lawyers as it does to directly protect endangered species. The Cheyenne, Wyoming-based Budd-Falen Law Offices set out in late 2009 to determine the

amount of litigation filed by environmental organizations and the amount of attorneys' fees these groups have received from the federal government for these cases.

The results are shocking, and they only include federal district court cases (Budd-Falen, 2009).

Between 2000 and 2009, eight environmental groups - Western Watersheds Project, Forest Guardians (now known as WildEarth Guardians), Center for Biological Diversity, the Wilderness Society, the Idaho Conservation League, the Oregon Natural Desert Association, the Southern Utah Wilderness Association, and the National Wildlife Federation - filed at least 1596 federal court cases against the federal government. Every one of the groups is a tax exempt, non-profit organization that receives attorney fees from the federal government.....for suing the federal government. These same environmental groups are receiving billions of tax dollars in attorney fees for settling or "winning" cases against the federal government.

Accurate statistics have not been kept by the Justice Department or the federal agencies, so there is no complete accounting for the total amount of tax dollars paid. However, the Budd-Falen firm was able to uncover some discerning facts.

Based on the limited information that was available, Budd-Falen found that over \$4.7 billion in total payments were paid in taxpayer dollars from 2003 through July 2007 for attorney fees and costs in cases against the federal government. Determining the total amount of funds awarded to litigants prevailing in litigation proved to be a more difficult task for Budd-Falen. However, just for the six Regions that span the West, they determined that the U.S. Forest Service paid over \$1.6 billion in awards to prevailing litigants in 2003-2005. Out of the 44 total cases in which USFS paid prevailing fees during this time, 35 payments went to environmental group plaintiffs.

Funds awarded to the "prevailing" litigants are taken from the "losing" federal agencies' budget. There is no oversight in spending this money, which could otherwise be funding on- the-ground programs to protect public lands, national forests, ranchers, fish and wildlife and other land uses.

Nonprofit, tax exempt groups are making billions of dollars, while ranchers and other citizens are being forced to expend millions of their own money to intervene or participate in these lawsuits to protect their way of life when they have no chance of the same attorney fee recovery if they prevail. And the economies which farmers and ranchers support also take a hit, as evidenced this year in California's Central Valley, where litigation filed to "protect" fish in the Bay-Delta is a primary reason for the \$1 billion-plus economic blow dealt to farm communities.

BIASED ESA IMPLEMENTATION BY FEDERAL AGENCIES

A growing concern to Western irrigators is the employment of the federal Endangered Species Act (ESA) as a means of protecting single species by focusing on one narrow stressor to fish: irrigation diversions. For the second time in a decade, Congress has been forced to call in high-level, independent scientific review of federal restrictions on water deliveries affecting thousands of Western farmers and ranchers. In 2009, those restrictions – based in large part on the ESA - were a primary cause for the economic devastation in the San Joaquin Valley and the water cutbacks and rationing afflicting hundreds of communities throughout California. A similar

decision was made by federal agencies in the Klamath Basin in 2002, and that decision was criticized later in a review conducted by the National Academy of Sciences (NAS).

The California and Klamath stories are one in the same. NAS stepped in after Klamath Irrigation Project supplies from Upper Klamath Lake were cut off by federal biologists in 2001. NAS' objective review concluded that there was insufficient evidence to support the biologists' actions, which had led to the near-collapse of the local agricultural community. In Klamath, the federal regulators looked at only one of the stressors contributing to the fisheries' decline and they focused on only one solution – cutting off water supplies. Likewise, in California today, the same federal agencies have refused to assess the impacts of the many stressors affecting the health of the Delta. And for fifteen years, they have been cutting off water deliveries, even though those fifteen years have conclusively demonstrated that the restrictions have done nothing to prevent the fisheries' decline.

As in California, the effects of the Klamath restrictions were immediate and far-reaching– not just losses to the economy but also the wildlife benefits that were lost with the water. And yet, the federal regulators failed to perform any environmental impact analysis before they ordered cutbacks in California and Klamath.

CITIZENS SUPPORT WATER FOR FARMERS

Despite the incredible pressure applied by some environmental activists and their allies in urban media outlets, our elected officials are on solid ground when they stand up for farmers and their water. A 2009 survey released by Colorado State University (CSU) is remarkable for the strong support average citizens from the American West give agriculture, especially in times of drought. Respondents were keenly aware of the potential for long-term water scarcity and how that could impact farmers and ranchers. For example, among Western respondents to the CSU poll, the most popular strategies for meeting long-term needs were to build reservoirs and reuse water, whether it is on private lawns or public landscapes. The least popular alternative was to buy water from farmers.

The survey demonstrated broad support in the Western United States for keeping water in agriculture. The survey also demonstrated that the “average Joe” recognizes water scarcity issues in the West, but on the whole, is not well educated on the details of water management.

STRONG LEADERSHIP IS NEEDED TO PROTECT FAMILY FARMS & RANCHES

Legislative gridlock and lack of political will are partly to blame for the West's inability to cope with water conflicts. For example, in California, the inability of leadership in the State Legislature has – until this year - prevented water supply enhancement initiatives from moving forward. This is unfortunate, since new supply and conveyance facilities can actually improve management flexibility that benefits fish, farmers and urban dwellers.

Doing nothing until now has pitted these interests against each other, with farmers taking the brunt of the damage, as evidenced by the disastrous consequences felt by San Joaquin Valley farmers this year. Severe water shortages caused by the combination of federal fisheries

restrictions, inadequate water infrastructure, and drought on water supplies to the Westside of the San Joaquin Valley have forced hundreds of thousands of farmland to be fallowed this year. Estimates from experts at the University of California demonstrate that the combined effects of these restrictions on the water supply have cost Central Valley agriculture nearly \$1 billion in lost income and more than 20,000 lost jobs in this year alone (Howitt, 2009).

As food and fuel prices soar, more and more Americans are beginning to realize that the fundamental foundations for their well-being are beginning to erode. Amazingly absent in the growing public dialogue about these matters is a demonstration of leadership and courage by our elected officials to confront the root causes of the epidemic of problems hitting us at once. Our political leaders need to step up fast and address the “big picture” crisis. Western farmers and ranchers can play a part in a solution to that crisis – if we can keep them on the farm.

POLICY RECOMMENDATIONS

Western water supplies are already inadequate to the demands of agriculture, urban growth and environmental enhancement. Global climate change, we’re told, will further reduce those supplies (Bittleman, 2007; Family Farm Alliance, 2007).

So how will we meet the ever-increasing demand for water in the West in an era when there will be an ever-decreasing supply? Improved conservation, water reuse and efficiency by urban and agricultural water users are certainly parts of the solution, but only a part. Resolving these issues without destroying what we worked so hard to achieve is the challenge that we all face. To be successful, we must face them together. No resolution will be found unless we find a way to balance all competing needs.

We believe that within the policies outlined in this paper lay the foundation upon which to build for the future. It will be a foundation that allows for resolution of significant conflicts in a way that supports continued growth of irrigated agriculture.

1. The United States must adopt an overriding national goal of remaining self-sufficient in food production. Food security is homeland security. Policy decisions on a wide range of issues should then be evaluated to be sure they are consistent with that goal.
2. States and local governments must consider the impacts of continued growth that relies on water transfers from agriculture and rural areas and to identify feasible alternatives to those transfers.
3. When water laws and environmental laws conflict, balanced solutions that respect the socioeconomic realities of the West must be found.
4. The goals of the Endangered Species Act are laudable. However, this 30-year old law could stand some targeted reforms, including common-sense changes to make it work better, encourage incentive-driven recovery efforts, and discourage litigation.

5. State laws and institutions must be given deference in issues relating to water resource allocation, use, control and transfer. The best decisions on water issues happen at the state and local level.
6. Aging water infrastructure must be addressed promptly and with priority commitments, as failure do to so will create a failed legacy for the next generation.
7. New water supplies must be developed to provide for recreational and environmental needs, allow for population growth and protect the economic vitality of the West.
8. Western water research needs must be prioritized and coordinated.
9. Real management is needed in the real “reservoir” of the West – our federally-owned forest lands in upper watershed areas.

A detailed treatment of these recommendations can be found on www.familyfarmalliance.org, where you can download a printable, PDF version of a policy white paper, titled “*Western Water Policy: The Challenges and Opportunities of our Times Our Legacy for the Next Generation*”.

CONCLUSION

Western water policy over the past 100 years stands out as one of the modern era’s great successes. Over 180 federal water projects serve 17 Western states. These provide water to more than 31 million people, and deliver irrigation water to 140,000 farmers and 10 million acres of farmland. These lands produce 60% of the nation’s vegetables and 25% of its fruits and nuts. Millions of acres of arid Western desert have been transformed into the world’s most efficient and productive agricultural system.

Irrigated agriculture is an incredible investment³. It continues to be a leading Western economic driver. Now is not the time to retreat. Sound policies are needed that encourage continued investment in irrigated farming rather than risking diminished domestic food production because cities are taking farm water. Relying on agriculture to be a “shock absorber” to soften or eliminate the impending water shortage is not planning. Rather, it is a choice to effectively put our heads in the sand and hope for the best. It will worsen the overall impact of climate change on our nation’s economy and security.

Western irrigated agriculture is a strategic and irreplaceable national resource. It must be protected by the federal government in the 21st Century. Now is the time for leadership at all levels – local, state, and federal – to face the challenges and create opportunities that will define the future of the West. Recognizing the value of irrigated agriculture is vital. Understanding the current and future role of irrigated agriculture in the West through aggressive action to repair

³ A 1998 study by Dr. Darryl Olsen and Dr. Houshmand Ziari, estimates the impact of irrigated agriculture in the Western states to be \$60 billion annually (direct and indirect income). The annual return to the economy from the \$11 billion investment in the federal system has been estimated at \$12 billion annually. In other words, the economy of the United States receives a greater than 100% return each year on this investment.

aging infrastructure and create new water supply enhancement projects is imperative. Properly managing federal watersheds and encouraging federal agencies to work with the agricultural community to solve local water challenges are equally crucial. Through thoughtful planning, our political leaders can play a truly important role in helping find the solutions that have proved so elusive to date.

LITERATURE CITED

- Abbott, Hurt, Tyner. 2008. "What's Driving Food Prices?" For Farm Foundation. July 2008.
- Bittleman, Sarah (Director, Washington, D.C., Office of Oregon Governor Theodore Kulongoski). 2007. Testimony Submitted on Behalf of The Western Governors' Association to U.S. House Committee on Science and Technology. May 3, 2007.
- Budd-Falen, Karen. September 15, 2009. Memo to Interested Parties, Re: Environmental Gravy Train. Budd-Falen Law Offices, L.L.C.
- Cline, Harry. 2008. *Death by a thousand cuts — when is enough?* Western Farm Press, Jul 29.
- Energy Outreach Colorado, 2008. "Colorado's New Energy Economy: The Path Forward. Making Where We Live More Sustainable". Skip Arnold, Executive Director, October 14.
- Family Farm Alliance, 2005. "Western Water Supply Enhancement Study".
- Family Farm Alliance, 2006. "A View from Ground Zero: Assessing the Real State of Western Irrigated Agriculture and Recommended Research Topics that Will Help Family Farmers and Ranchers" Presented to The National Agricultural Research, Extension, Education, and Economics Advisory Board Water Subcommittee, October 25, 2006.
- Family Farm Alliance, July 2006. "Agriculture Takes The Hit For Platte River Species Recovery", *Family Farm Water Review*, Family Farm Alliance, July 2006.
- Family Farm Alliance, 2007. "Water Supply in a Changing Climate – The Perspective of Family Farmers and Ranchers in the Irrigated West", Family Farm Alliance, August 2007.
- Family Farm Alliance, 2008. "Western Water Policy: The Challenges and Opportunities of our Times Our Legacy for the Next Generation". Family Farm Alliance, November 2008.
- Howitt, R. E., D. MacEwan, and J. Medellin-Azuara 2009. "Measuring the Employment Impact of Water Reductions". Department of Agricultural and Resource Economics and Center for Watershed Sciences, University of California, Davis, California.
- Johnson, Robert W. 2008. Commissioner, Bureau of Reclamation, U.S. Department of the Interior, Statement Before the Energy and Natural Resources Committee, Subcommittee on Water and Power, U.S. Senate on Reclamation's Aging Infrastructure. April 18, 2008
- Krause, C. 2008. "Rural U.S. Takes Worst Hit as Gas Tops \$ Average". *New York Times*. June 9.
- Olsen, D and Ziari, H. 1998. "Western Irrigation Economic Benefits Review: Irrigated Agriculture's Role for the 21st Century", Family Farm Alliance. September 1998.
- Pritchett, J. Bright, A. Shortleeve, A. Thorvaldsen, J. Bauder, T. Waskom, R. 2009. "Public Perceptions, Preferences, and Values for Water in the West". *A Survey of Western and Colorado Residents*, Colorado Water Institute, Colorado State University.
- State of California, 2007. Department of Finance, "Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity", Sacramento, California.
- U.S. Bureau of Reclamation. 2005. "Inventory of Reclamation Surface Water Storage Studies with Hydropower Components". *Report to Congress Implementing Provisions of Section 1840 of the Energy Policy Act of 2005* (Public Law 109-58). October 2005.
- USDA National Agricultural Statistic Service: <http://www.nass.usda.gov>