Family Farm Alliance Western Water Management Case Studies

July, 2010

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Family Farm ALLIANCE SM

Protecting and enhancing
Western irrigated agriculture

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Family Farm Alliance Western Water Management Case Studies: An Overview

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 the nation's ability to feed itself and the world. The economies of many rural Western communities are tied to the health of agriculture, and policy makers in Washington, D.C. are now preparing to put into place legislative and administrative initiatives that can prepare us to meet the challenges of the future. Family farmers and ranchers have a proven track record of finding solutions to constantly emerging challenges. The ongoing, initial response of irrigators and water agencies to current water supply challenges can provide some insight into the possible measures that might be taken to cope with long-term water supply reductions resulting from climate change and competing uses. Farmers and ranchers – many of whom possess college degrees - are remarkably resourceful business people, who employ creative strategies to survive prolonged drought periods and steward the environment they work and live in. Throughout the West, creative measures have been taken to develop and efficiently manage water resources for irrigation. Some of these actions are undertaken consciously with this objective in mind; others have been implemented as part of the broad portfolio of actions that successful farmers have to take to stay profitable in today's fierce economic and regulatory climate. This report is offered as a tool to policy makers to provide real-world examples for consideration as new water and environmental laws, regulations and policies are developed.

Intent Behind the Water Management Case Study Report

This report compiles a number of case studies that highlight real-world examples of water conservation, water transfers and markets, aging infrastructure problems, watershed restoration, and ecosystem enhancement. The report describes unique complications facing local water users, the creative solutions that can be developed to meet those problems and recommendations that ensure continued, locally-driven success. The reader should come away from this with the clear message that water managers, ranchers and farmers are resourceful and creative individuals. They should be actively solicited by federal water policy makers to participate in resolving the water conflicts of the West.

Additional Policy Considerations: Appendix to this Report

U.S. Agriculture Secretary Vilsack earlier this year pledged that the government needs to try new approaches to keep young people in rural American communities[1]. The Secretary was correct: rural incomes are falling farther and farther behind our fellow Americans who reside in urban and suburban areas. And those expanding residential developments are eroding our agricultural base. According to the American Farmland Trust, every single minute of every day, America loses two acres of farmland. From 1992-1997, we converted to developed uses more than six million acres of agricultural land—an area the size of Maryland[2]. These demographic trends should also serve as a wake-up call to the nation and the world. A recent United Nations study cited by Secretary Vilsack finds that global food production must be increased by 70% in the next four decades to meet escalating world hunger demands[3]. American family farmers and ranchers for generations have grown food and fiber for the world, and we will have to muster even more innovation to meet this critical challenge. That innovation must be encouraged rather than stifled with new regulations and the uncertainty. Unfortunately, many existing and proposed federal policies on water issues make it difficult to survive, in an arena where agricultural values are at a disadvantage to ecological and environmental priorities. In the rural West, water is critically important to farmers and ranchers and the communities they have built over the past century. However, in recent decades, we have seen once-reliable water supplies for farmers steadily being diverted away to meet new needs. Rural farming and ranching communities are being threatened because of increased demand caused by continued population growth, diminishing snow pack, increasing water consumption to support domestic energy, and emerging environmental demands[4]. The appendix to this report contains a policy discussion that further articulates these arguments and suggests that our country 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. In our own country, that means finding ways to keep farmers and ranchers doing what they do best, and to further encourage young farmers to follow in their footsteps. Unfortunately, it now seems that water policies are being considered separately from those goals.

About the Family Farm Alliance

The Family Farm Alliance is a nonprofit organization composed of family farmers and those in related industries throughout the Western states dedicated to the preservation of irrigated agriculture. The organization was formed to ensure that its members are afforded an opportunity to air their views and concerns to the public, to legislators, and to regulators. The Alliance is a grassroots organization, and therefore works directly with individual farmers in order to preserve the tradition of farming which has developed in the Western states and which provides the country with a majority of its food and fiber. The principal objective of the Alliance is to help ensure the continued availability of adequate irrigation water supplies to Western farmers.

The Alliance's Problem-Solving Philosophy

The Alliance has a long tradition of developing practical solutions to the challenges facing Western agricultural irrigators. We convey these solutions to Congress, the executive branch, and other water policy makers through a variety of forums. In the past five years, Alliance representatives have testified 23 times before Congressional committees on water and environmental legislation and related issues. Through the years, we have also published several reports that have provided guidance to policy makers on issues important to irrigated agriculture. In 1998, the Alliance commissioned an economic study[5] by Dr. Darryl Olsen and Dr. Houshmand Ziari which estimated the impact of irrigated agriculture in the Western states to be $60 billion annually. In 2007, the Alliance was one of the first national agricultural associations to proactively address climate change implications for producers when it released "Water Supply in a Changing Climate – The Perspective of Family Farmers and Ranchers in the Irrigated West". In 2008, the organization published a water policy document[6] that was shared with political leaders gathered at the Democratic and Republican national conventions.

Other Alliance Case Study Compilations

One of the strengths of the Alliance is the working relationship the organization has with farmers and ranchers on the ground, and with water professionals who work with environmental and natural resources challenges on a daily basis. We have pulled from these relationships real-life case studies and compiled reports that provided the best characterization of "lessons learned" that can benefit policy makers. For example, in the late 1990's, the Family Farm Alliance developed a case study report that was designed to address concerns of local districts that contract with the Bureau of Reclamation regarding expenses and overhead that were assigned by Reclamation to work that was paid for by the water users. Also, in 2005, the Alliance developed a case study report[7] that was submitted to the National Academy of Sciences regarding the role of Reclamation in the 21st Century. That report was pointed to by Reclamation as a contributing factor in its decision to proceed with Managing for Excellence, a key initiative that was implemented over the following three years. This process provided an important opportunity for western water users to find further ways to improve transparency in Reclamation decision-making, provide improved accountability, and make the organization as efficient as possible. There were important lessons learned by studying these examples, and Congress and past administrations have applied those lessons to how Reclamation does business now and in the future.

Summary of Key Findings and Recommendations

The report that is in your hands provides the latest effort to put the lessons learned from experiences gained from real-life, on-the-ground work into the hands of elected officials and other important policy makers. The following summarizes key findings and related recommendations derived from the lessons learned in the case studies highlighted in this report.

Water Conservation - General

- Partnering with others and sharing project benefits can generate significant local and regional support for proposals.

Water Conservation - WaterSMART Grant Applications

- There is often a "disconnect" between required funding timelines and needed National Environmental Policy Act (NEPA)/National Historic Preservation Act reviews. These reviews might be conducted more expeditiously by relying on existing, similar state reviews, where applicable, or by employing a programmatic approach.
- Federal administrators sometimes have a lack of understanding about the limited construction "window" that is available when working on water delivery systems. Early "kickoff meetings" with project proponents and Reclamation personnel should be required.
- Grant applicants sometimes face a conflict between the desire to spread the grant program benefits and the efficacy of spending significant sums of money to secure smaller grants.

Holistic and Innovative Watershed and Irrigation System Management

- Local leadership yields the best results. Encouraging federal agencies to support local and state efforts is imperative.
- Transferring project title from the federal government to local agencies can provide new opportunities and flexibility to meet conservation, water management and flood control challenges.
- In the 110th Congress, H.R. 6992 proposed an effective mechanism to identify and analyze the potential for public benefits from the transfer out of federal ownership of eligible facilities. Such a bill – if re-introduced, approved by Congress and signed by 7 the President – would facilitate the transfer of those eligible facilities to promote more efficient management of water and water-related facilities at the local level.
- Settlement agreements with long-time adversaries can generate measures to provide water supply security and increased predictability for the irrigation community. Local water users can position themselves to properly develop a suite of actions to meet water demands, including conservation easements, forbearance agreements, conjunctive use programs, efficiency measures, land acquisitions, water acquisitions, groundwater development, groundwater substitution, other voluntary transactions, water storage, and any other applicable measures.
- Local water users and elected officials are advancing concepts and ideas to evaluate, test and implement improved water supply forecast methods and web-based tools for managing water and water-dependent resources. Success is dependent upon the active and full participation of the various agencies responsible for water supply forecasting and water management within Western watersheds. The intent is not to usurp the role and responsibility of these agencies, but to use local initiative to facilitate the development of improved water supply forecast methods and new water management tools of mutual benefit to those responsible for resource management.
- In the past, Western irrigation district managers controlled weed growth with costly and labor-intensive methods, such as scraping canal beds with heavy chains to uproot plants, scooping out vegetation with backhoes, or applying herbicides, such as acrolein. However, increased scrutiny from environmental activists and stringent regulations on chemical use in water ways has led some water managers to pursue more progressive and environmentally sound approaches to aquatic weed control, including the use of live fish.

Low-Head Hydropower Development

- Water providers in West who seek to implement multiple low head hydro-power generation sites throughout their service area must undergo costly and time-consuming licensing processes, which impede their ability to

contribute completely renewable, green energy. Under current regulations, anyone who wants to develop hydropower less than 5 megawatts (which would apply to virtually every single potential location within irrigation canals) can get an exemption from FERC licensing requirements. The costs and time associated with the environmental compliance issues (noticing, public meetings, etc) can make projects that only cost $20,000 in materials suddenly become infeasible.

- New solar and wind projects can move full-steam ahead without these restrictive licensing impediments. Common-sense dictates that the process for installing in-canal low-head hydro facilities should be the same.
- Family Farm Alliance and other national water and power organizations are working with Congress, the Department of Interior, and the Federal Energy Regulatory Commission (FERC) to establish a policy that allows a special exemption from Federal Power Act licensing for these types of projects. A preferable fix would be a new exemption category for low-head hydro in irrigation projects that does not require federal agency interaction. For more complicated projects that still fall under the existing FERC 5 megawatt exemption ceiling but exceed this new minimum threshold (whatever that may be), the process must be streamlined.
- The Bureau of Reclamation should be encouraged to aggressively work with its water customers to find ways to get more low-head projects built into the existing delivery system.

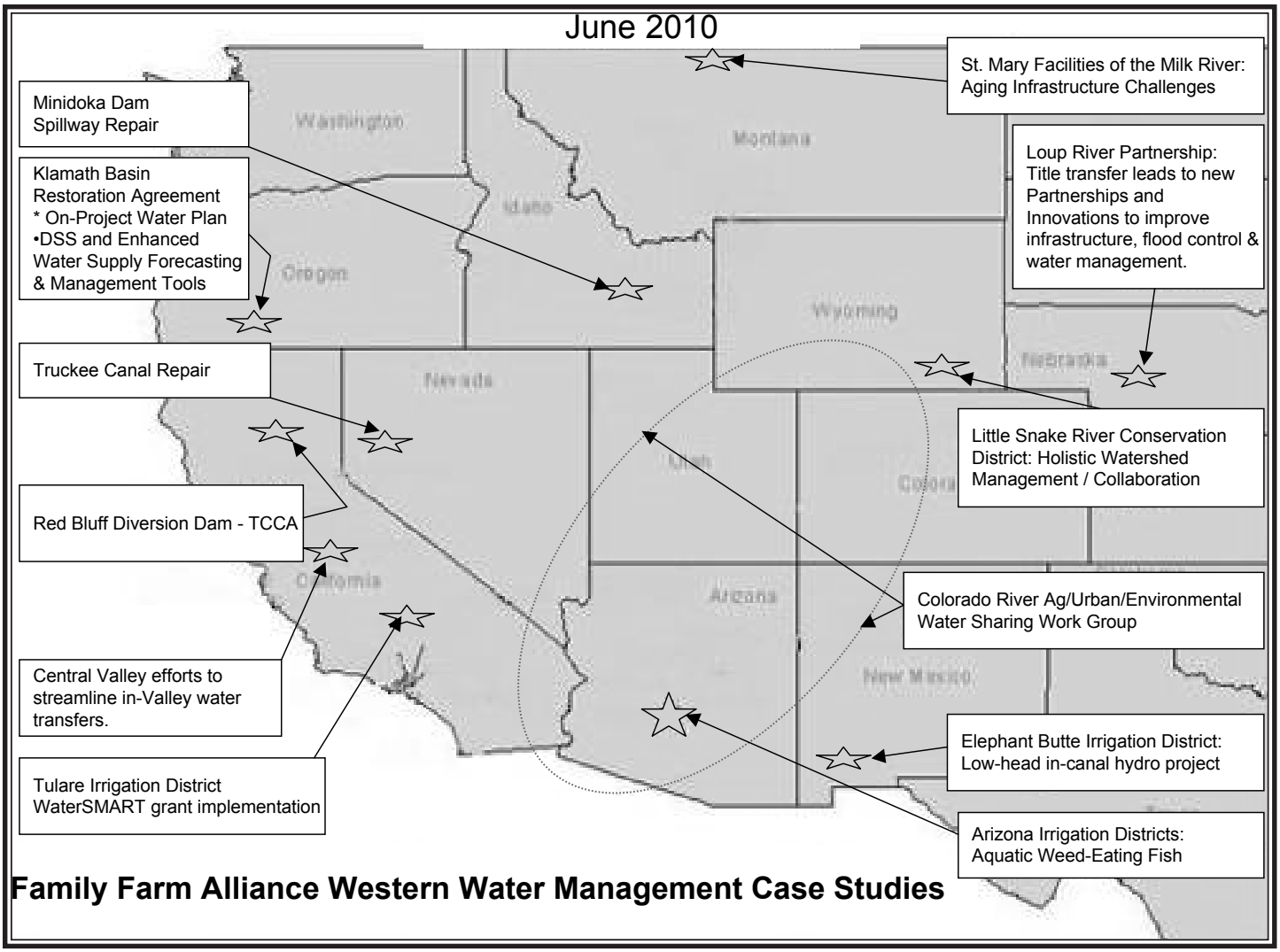
Aging Infrastructure

- Federal irrigation districts should take advantage of provisions in the Omnibus Public Lands Management Act of 2009 that authorizes the Secretary of Interior to advance funding for the costs of "extraordinary operation and maintenance work" that can be repaid by local authorities, with interest, over 50 years. The 50-year repayment option applies to both reserved works and those works whose management has been transferred to local entities by Reclamation.
- Under new authority provided in the Public Lands Management Act of 2009, the Bureau of Reclamation is performing onsite and aerial inspections of identified canals in urbanized areas throughout the western states. Local water users should monitor this effort and coordinate with Reclamation, since these inspections will benefit existing programs by providing a basis for determining long-term management requirements.
- Agency biological opinions that impact existing water users must be developed using the best available science and subjected to truly independent peer review processes. Clear recommendations with measurable outcomes and realistic timelines are essential components of these often controversial documents.
- Without adequate funding to start and continue critical aging infrastructure projects, the agricultural water supply can be put at tremendous risk. The cooperative effort of local entities, federal agencies like the Bureau of Reclamation, and the states to assure adequate funding for projects is of paramount importance.
- In less populated rural areas where the high cost of repairing aging infrastructure cannot be borne by local farmers and ranchers, project proponents may be required to look for other ways for the federal government to take into account other sectors that benefit from the projects, such as public flood control, recreation, fish and wildlife benefits and municipal and industrial uses.
- The creation of new local water authorities can provide a vehicle capable of entering into agreements with government entities to address the infrastructure repair challenges, sell bonds, and manage water in a different manner than currently is allowable.
- Development of environmentally safe low head hydropower can provide a local source of revenues to support infrastructure fixes.
- Given the shaky economy, there are fears that future inflation may greatly increase the planned costs for large-scale, multi-year infrastructure repair projects. Federal funding must be prioritized and secured quickly to match local funding.

Water Transfers

- For years, water agencies within California's Central Valley Project (CVP) routinely transferred water among themselves in compliance with state law. Since the passage of the Central Valley Project Improvement Act (CVPIA) in 1992, those transfers are now subject to months of review by the Bureau of Reclamation. CVP users believe that Reclamation is misinterpreting the CVPIA by applying the water transfers criteria intended only for the new transfers specifically authorized by the Act to historical transfers within regions of the CVP. The result is that some once-routine transfers are now not possible.
- California's Bay-Delta is in crisis. Numerous species, habitat and levees are all in serious decline. Twenty-five million people and 3 million acres of prime agriculture depend on water supply from the Delta. While there are many troubling causes for decline of Delta species, decline of Delta aquatic species has been historically blamed on the State Water Project and CVP pumps that support much of the State's population and agriculture. Until the primary causes of Delta decline are addressed, California's water supply security will continue to erode. Under these increasingly dire circumstances, water users cannot survive without exercising all available tools, including the tools to be provided by the Water Transfer Facilitation Act of 2009.
- Rapid population growth, urbanization and increased competition for water in the West have created significant pressures on certain agricultural sectors. Agriculture holds the most senior water rights in the West and is considered a likely source of water to meet growing municipal and environmental demands. A group of environmental, urban and agricultural representatives is working on an initiative aimed at finding balanced "water sharing" solutions for the Colorado River Basin. This could provide a template for success that could be applied to other Western watersheds. The key to this initiative is the diversity and credibility of the Work Group members.

These findings and recommendations will be used in several forums. Lessons learned from water conservation and management projects that work well (best management practices), especially those that have benefited from WaterSMART grants, will be passed on to the Bureau of Reclamation. Observations and recommendations from these types of projects can also be used to help influence how the SECURE Water Act will be implemented by Reclamation. We also believe that many of the successful projects described in this report are the types of activities that could be potentially funded under the climate change bills currently moving through Congress. These findings and recommended solutions will also be used in the Alliance's efforts to find creative ways for Congress and the administration to address critical infrastructure issues in the West.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Family Farm Alliance Western Water Management Case Studies

WESTERN WATER MANAGEMENT CASE STUDIES

Tulare Irrigation District

A case study highlighting more recent grant ("Challenge Grant", now termed "Water-SMART Grants") and funding opportunities with a focus on USBR programs.

Backdrop - Many Western water projects are reaching the end of the original economic and design life. Dollars for preventative maintenance and system rehabilitation are hard to come by, while at the same time, costs are increasing because less water is being sold, regulations are increasing, farmed acreage is reduced, and energy and labor are more expensive. Water supply reliability has been reduced in recent years, which means that ways to increase additional yield are needed to even get back close to meeting demand. Fortunately, new technology is available to improve operational control. And local water managers are realizing that new partnerships are needed in order to obtain reasonable costs for improvements, all the while ensuring that benefits are shared. In California, Integrated Regional Planning (IRP) efforts are gaining in prominence. The State of California has embedded the IRP approach in Propositions 50 and 84 and the water bond proposal that will be voted upon in November 2010. The IRP approach advocates for collaboration and achievement of multiple benefits. It encourages a blending/exchange of resources to maximize local benefits, and the outcome is usually controlled more by regional partnerships then any one individual agency.

Organization – Tulare Irrigation District (TID) covers 67,600 acres in California's San Joaquin Valley. TID is a Central Valley Project Friant contractor with major water rights on the Kaweah River and access to groundwater. Two growing communities - Visalia and Tulare – affect TID's operations. The district is water-short and located in an area of regional groundwater overdraft, exacerbated by conditions caused by San Joaquin River restoration efforts.

Key Actions – System Optimization Review (SOR) – TID in 2009 undertook a $655,000 planning study (with $300,000 USBR cost share) that will evaluate historic diversions, currently available supplies; existing delivery system capacity; past and projected demands; and groundwater pumping estimates (municipal and agricultural) and estimated safe yield. The SOR will assess potential groundwater recharge/banking projects and other projects/programs (pre-feasibility level), addressing specific issues raised in the SOR study. Based on this assessment, the SOR Study will prepare a Strategic Plan to address the pressing issues TID faces in the next several years. It will update the TID Groundwater Management Plan and re-assess current resources and capabilities. The Study will include a focused strategic planning effort to engage in regional collaboration, especially with nearby cities and other regional water managers. Projects and programs pre-feasibility analysis will also be performed. Plum Basin Phase 1 – This $1,060,000 project (including a 2009 Challenge Grant cost share of $300,000 and partnered with the City of Tulare) proposes the construction of groundwater recharge basins and control structures. SCADA Upgrade - Improvements to District canal operations with new SCADA equipment and construction of new automated control structures will cost $765,300, with 2005 Challenge Grant cost share of $300,000. Other TID grant successes –

- USBR Field Services Grant $50,000 in FY 2007 for SCADA improvements at the Tagus Basin, a District water recharge and regulation facility;
- USBR Field Services Grant $50,000 in FY 2008 for the design and installation of a ramp flume on Rockford Canal.
- NRCS AWEP funding in FY 2009 for conservation projects - $4,000,000 to be spent over 5 years with TID growers;
- ARRA Drought Relief Funding in FY 2009 of $925,000 for 2 well enhancements and 26 well rehabs for TID growers.

Lessons Learned

Tulare Irrigation District (TID) is fortunate to have aggressive staffers who are always looking for opportunities and are willing to invest time and money to successfully secure grants for projects that conserve water and promote conjunctive management of surface and groundwater. TID has benefited from partnering with others and sharing project benefits, which generates significant local and regional support for their project proposals. The keys to TID's grant success have been: 1)

Paying close attention to grant requirements; 2) Sufficient planning to demonstrate a thoughtful and consistent approach; and 3) Recognition that a "phased" approach can be used to incrementally fund larger projects. TID and other Alliance members have also identified some defects with Challenge Grant administration and have offered up recommendations to repair those flaws:

- There is often a "disconnect" between required funding timelines and needed National Environmental Protection Act/National Historic Preservation Act (NHPA) reviews. In California, local water users believe these reviews could be satisfied in a much more expeditious manner by relying on existing, similar state reviews. For aging water infrastructure, the historic review requirements should be modified, perhaps by developing a programmatic approach to the NHPA requirements for water facilities.
- Federal administrators sometimes have a lack of understanding about the limited construction "window" that is available when working on water delivery systems. Early "kickoff meetings" with project proponents and Reclamation personnel should be a required step in these projects.
- Grant applicants sometimes face a conflict between the desire to spread the grant program benefits and the efficacy of spending significant sums of money to secure smaller grants.

TID believes there is not enough Challenge Grant money to address the needs that are out there. They also lament the absence of any current program to address major rehabilitation needs, similar to the now-defunct "Small Reclamation Projects Rehabilitation and Betterment Program".

Source

Richard Moss, P.E.
Provost & Pritchard Engineering Group, Inc.
3500 W. Orchard Ct. Visalia, CA 93277-7705
Tel: (559) 636-1166
Fax: (559) 636-1177
E-mail: RMoss@ppeng.com

Little Snake River Conservation District

A case study highlighting integrated collaborative watershed management and the importance of locally-led management efforts.

Backdrop - In most Western states, much of the water used derives from snow-melt in mountainous areas. We are hearing more frequent reports from state and local governments and water users who question how the federal government is managing the watersheds. Forested lands cover about one-third of the nation's land area, and although they have roles in timber production, habitat, recreation and wilderness, their most important output may be water. Forests provide natural filtration and storage systems that process nearly two-thirds of the water supply in the U.S. Forest vegetation and soils, if healthy and intact, can benefit human water supplies by controlling water yield, peak flows, low flows, sediment levels, water chemistry and quality. One of the biggest threats to forests, and the water that derives from them, is the permanent conversion of forested land to residential, industrial and commercial uses.

Real management is needed in the real "reservoir" of the West – our federally-owned forest lands in upper watershed areas.

Location - The Little Snake River is a Colorado River Headwaters Basin arising on the continental divide with land in both Colorado and Wyoming. It is a major tributary to the Yampa and Green Rivers in the Upper Colorado Basin.

Geography and Hydrology - The area is relatively geographically isolated from any large metropolitan or urban communities (> 300 miles from Denver or Salt Lake City). Population in the basin is less than 1,000 people. There are three towns in the basin, Baggs, Dixon, and Savery with populations of 400, 82, and 26, respectively. There are 20,000 acres of irrigated lands adjacent to the main stem of the Little Snake River and its major tributaries. Land ownership in the basin is approximately 31% private, 8% state, and 61% federal (BLM & USFS).

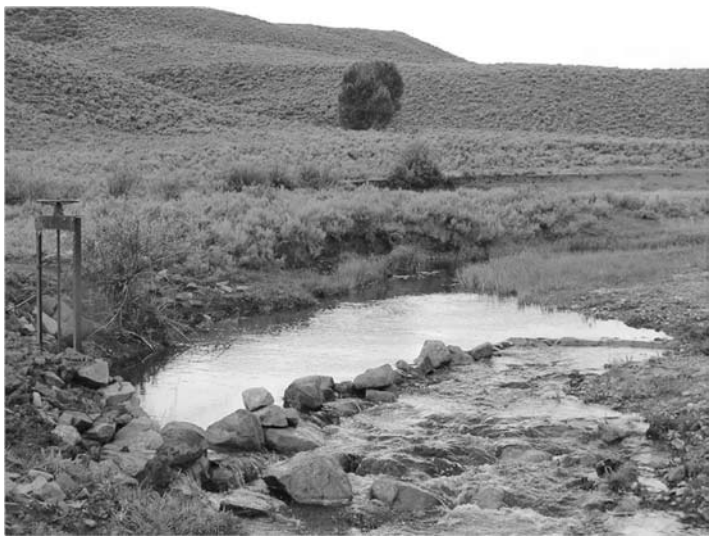
Elevations and precipitation in the basin range from 10,000 feet and 55 inches of annual precipitation to 6,000 feet and 8 inches of annual precipitation. Low elevation landscapes are dominated by desert shrub land communities and transition to mixed mountain shrub, aspen, and pine/spruce/fir plant communities at the highest elevation.

Average annual water yield out of the basin is approximately 449,000 acre-feet (AF) per year. Total consumptive water use in the basin is approximately 44,000 AF per year. The largest annual consumptive use is for municipal water project via a trans-basin diversion (21,000 AF) followed by agriculture (20,000 AF) and environmental and miscellaneous uses (3,000 AF).

The first water rights for irrigation where filed with the Territory of Wyoming in March of 1875.

Land Use and Habitat Characteristics - Predominant land uses are range land agriculture, recreation, and - more recently - fluid mineral development (oil & gas). Historically, the basin also supported some timber harvest and hard rock mining for copper, gold, and silver. Because of the basin's geographic isolation and low population, it has not incurred major deleterious impacts associated with human activity until the recently development of fluid minerals. Consequently, the area has a fairly intact ecosystem that supports the largest population of Colorado Cutthroat Trout, flannelmouth suckers, and round-tailed chubs. It also supports some of the largest populations of Columbian Sharp-tail and Greater Sage Grouse in the U.S. The basin is also home to 8,000 elk, 21,000 mule deer, 22,000 antelope, 130 species of birds, 15 species of fish, and numerous other species of mammals and amphibians.

In 1844 John C Fremont traversed the Little Snake River Valley and noted in his journals *"The country here*



Fish Habitat Improvement in the Little Snake River watershed.

appeared more variously stocked with game than any part of the Rocky mountains we had visited: and its abundance is owing to the excellent pasturage and its dangerous character as a war ground". The game (wildlife) that attracted the warring Native American tribes to the area was a by-product of the excellent pasturage that Fremont spoke of. It is also the reason the area attracted early ranchers. The first cattle entered the Little Snake Basin in 1871 when Noah Reader brought 2,000 head that where turned out at the mouth of Savery Creek. In 1873 George Baggs brought 2,000 head into the valley near the vicinity of the town bearing his name. Today the area supports around 25,000 head of cattle, 6,000 head of sheep, and 2,500 head of horse both domestic and wild.

Organization - The Little Snake River Conservation District (LSRCD) has a locally elected board of supervisors and is staffed by dedicated professionals.

Key Integrated Collaborative Watershed Management Actions

- Muddy Creek and Savery Creek Clean Water Act Section 319 Watershed Projects. The LSRCD has received and administered over $1 million dollars from EPA to implement best management practice for livestock grazing.
- Muddy Creek Wetlands. Established the largest wetland project in the State of Wyoming and received over $800,000 in grant funding for this project including $165,000 from Ducks Unlimited.
- Little Snake River Aspen Conservation Joint Venture. Locally lead effort with BLM & USFS, private land owners to restore and enhance 12,000 acres of Aspen forest.
- Little Snake River Watershed Fish Barrier Assessment. Collaborative effort with Trout Unlimited, LSRCD, and local landowners/irrigators.
- Little Snake Watershed Fish Barrier Removal and Aquatic Ecosystem Restoration Project. Joint project with numerous local, state, federal, and NGO partners. Current expenditure and obligation for this project is $2.5 million.
- Cooperative Conservation Planning Initiative (CCPI). This is a USDA-NRCS farm bill program. The LSRCD is the local sponsor on two different CCPI projects including the Fish Barrier Removal and Hazardous fuels - forest health projects in the Little Snake Basin.
- Battle Collaborative Stewardship Contract. The USFS and the LSRCD agreed to address hazardous fuels on 3,000 acres of the Medicine Bow National Forest due to bark beetle infestation.
- Little Snake River Conservation Planning initiative. This is a joint effort among the LSRCD, NRCS, The Nature Conservancy (TNC), and private land owners. It consists of inventorying and updating conversation plans for 42,000 acres of private lands for consideration under Conservation Easements.

Results

- In 2005 the local community, working with the State of Wyoming, constructed a 23,000 acre foot $30 million dollar water storage project to provide water for municipal, agricultural, fisheries and recreational use.
- As part of the overall watershed project, Clean Water Act Section 319 monies were utilized to implement grazing Best Management Practice to restore and enhance riparian and upland areas. Other funds and partners have assisted with the restoration and enhancement of more than 20 miles of river and stream channels for both cold and warm water fish species. Over 800 acres of wetland habitat has been constructed, improved, and enhanced.
- 3,500 acres of forest treatment has been completed to reduce hazardous fuels and improve wildlife habitat.
- Thousands of acres have been put under conservation easements in order to perpetuate agricultural use and protect critical wildlife habitat.
- Ten irrigation diversion structures have been modified to allow for fish passage and in 2011 all remaining irrigation diversion structures in the Little Snake basin are scheduled for modification for fish passage.

Recognition - Since 1991 numerous agencies, organization, and NGO's have recognized the Little Snake River community and the local governmental natural resource agency, the Little Snake River Conservation District (LSRCD), as leaders in natural resource conservation. Following are list of acknowledgments and achievements.

Landowners work with government wildlife agencies to improve habitat for sage grouse, protected by the Endangered Species Act. Photo courtesy of Little Snake River Conservation District.

- 1996 USDI-BLM Rangeland Stewardship Award.
- 1996-2000 National Demonstration Project "Seeking Common Ground –Livestock and Big Game on Western Range Lands".
- 1997 & 2002 EPA volume II & III Section 319 Success Stories.
- 2007 National Association of Conservation District South West Region Collaborative Conservation Award.
- 2009 Rocky Mountain Elk Foundation Imperial Habitat Partner.

Numerous articles featuring work conducted by the LSRCD, area land owners, and its partners have been featured in popular publications like *Farm Journal, Beef Today, Bugle Magazine, Wyoming Wildlife*, and *Range Magazine* as well as peer reviewed journal publication in the *Journal of Soil and Water Conservation* (2008) and the *Journal of Rangeland Ecology* (2009).

Lessons Learned

These efforts have all been locally-led. Conservation of natural resources in the Little Snake River Basin integrated with agrarian life style and perpetuation of this culture is the highest priority for the local community in the Little Snake Basin. In Wyoming, the local residents have passed a conservation property tax to carry on this work. Since 1990 this tax has generated approximately $8 million dollars in local revenues. These funds have leveraged over $40 million dollars in project money to implement conservation and development projects in the Little Snake River Basin. Today the Little Snake River Basin hosts a myriad of wildlife, and robust natural resources while sustaining compatible agricultural uses and natural resource based recreation business. This was accomplished through local leadership and commitment of the Little Snake River Conservation District working collaboratively with over 30 different partner organizations and agencies that have assisted in the conservation of the Little Snake Basin, in a collaborative locally-led process. Properly managing federal watersheds and encouraging federal agencies to work with the agricultural community to solve local water problems is imperative. Through thoughtful planning, the Administration can play a truly important role in helping find the solutions that have proved so elusive to date.

Sources:

Patrick O'Toole
Ladder Livestock
P. O. Box 26 Savery, WY 82332
Office: 307/383-2418
Fax: 307/383-2419
E-mail: h2otoole@gmail.com
Dr. Larry Hicks
Little Snake River Conservation District
P.O. Box 355
285 North Penland Street
Baggs, WY 82321
Office: 307-383-7860
Fax: 307/383-7861
E-mail: lsrcd@yahoo.com

Flood waters from the Truckee Canal breach inundate residences in Fernley, Nevada, January 2008. Photo courtesy of Newlands Water Protective Association.

Truckee Canal Repair

A case study focusing on efforts to repair a canal system designed over a century ago to meet rural agricultural needs. The January 2008 breach of the Truckee Canal flooded over 500 residences, serving as a warning to other urbanizing areas of the West of the importance of addressing aging water infrastructure.

Backdrop - 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. Much of this federally-owned infrastructure is now 50-100 years old, approaching the end of its design life, and needs to be rebuilt and rehabilitated for the next century[1]. 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[2]. 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. 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. Aging public infrastructure across the Nation is a growing critical problem. 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.

Organization - The Lahontan Valley Environmental Alliance (LVEA) is a non-profit organization which was created in 1993 and is composed of representatives from Churchill County, City of Fallon, City of Fernley, Truckee-Carson Irrigation District and the Stillwater and Lahontan Conservation Districts. LVEA works to educate the public and coordinate efforts to protect the natural resources of the communities within the Newlands Project.

The Challenge - In January 2008, the Truckee Canal, an integral part of the Newlands Project, breached its banks in Fernley, Nevada, flooding 500 homes. This disaster resulted in a court order to reduce Truckee Canal flows to less than half the normal flow.[3] This in turn led to a shortage of water to Lahontan Reservoir, causing economic damage to farmers and impacting everyone within the Newlands Project. In order to protect the residents of Fernley from flooding and avoid the devastating economic and environmental effects of prolonged artificial drought, state-of-the-art permanent repairs must be promptly implemented in the Truckee Canal, a key component of the Newlands Project.

Project Description - The Truckee Canal carries water from the Truckee River to the Lahontan Reservoir, where it is joined with Carson River water. The amount of water in the Truckee Canal is monitored by the Federal Water Master and balanced with Carson River water to meet the water rights of all downstream users. The amount of water diverted from the Truckee River varies widely according to the snow pack at the headwaters of both rivers. Access to mountain snow pack run-off is crucial to Lahontan Reservoir, since Newlands Project valleys average only five inches of rain per year. Benefits of the Truckee Canal As in any desert community, all activities are predicated upon water. The water carried through the Truckee Canal directly and directly supported $330 million in 2007 local economic activity[4].

The establishment of the Newlands Project, including the Truckee Canal, encouraged and allowed for the growth and industry that developed within its service area. In addition to supporting agriculture and sustainable green power generation, this project supports the economies of the cities of Fernley and Fallon, Hazen, The Fallon Paiute-Shoshone Tribe, and the Fallon Naval Air Station. The environmental and recreation benefits provided by Lahontan Reservoir and Lahontan Wetlands also depend on the Newlands Project. Wells located in the vicinity of Fernley, Hazen and Swingle Bench rely upon recharge from the Truckee Canal to maintain groundwater quality and quantity. For a sustainable future, the current water rights owned within the Newlands Project need to be maintained and the delivery of water, as provided by law, insured. Repair of the Truckee Canal, therefore, is critical.

Recommended Solutions - The LVEA has developed a Canal White Paper Working Group to help inform local residents, elected officials and government agencies about the importance of repairing the Truckee Canal. In addition to seeking federal funding assistance, LVEA is encouraging the streamlined management of environmental studies to accelerate the repair of the Truckee Canal. State-ofthe-art repairs are sought to ensure safety to Fernley residents and adequate flow in the canal. Solutions will consider but not be limited to:

- Concrete lining in critical canal reaches;
- Appropriate rodent protection;
- Additional automated cross structures in the Fernley reach of the canal to isolate any future events;
- Electrical float monitors that would alert residents of flood events and immediately control flows;
- Additional flood control structures in the Fernley reach that would include soft plugs with electrically-controlled gates that would direct the water into safety channels in the case of a flood event;
- Precipitation gauges that could detect unforeseen weather events and would be capable of restricting the flow in the canal; and
- Injection of independent peer-review into the development and selection of solution options.

The Bureau of Reclamation has appropriated over $2 million to study the canal fix, which Reclamation believes

Flood waters after Truckee Canal breach, January 2008. Photo courtesy of Newlands Water Protective Association.

will take two years. In the meantime, many water right owners will not receive delivery because the canal has to be maintained at such low flows that sufficient head does not exist to deliver to them. Reclamation is also mandating the TCID remove all plant materials from the banks and easements along the Fernley reach of the Truckee Canal in an effort to reduce rodents and other animals. These efforts are being organized by the Newlands Water Protection Association, which is arranging for groups of volunteers to help do the work, in an effort to keep costs to a minimum.

Related Developments - The Omnibus Public Lands Management Act of 2009 (P.L. 111-11), signed into law in March 2009, includes new authorities to address aging canal systems in urbanized areas of the West. These authorities were proposed by Senator Harry Reid (NEVADA), who in early 2008 – in response to the Fernley canal breach - introduced a bill (S. 2842) designed to make aging federal-owned canals and levees safer across the West. The Family Alliance ended up taking the lead on developing proposed detailed recommendations to help Senator Reid achieve his desired outcome while minimizing potential burdens to our members. An important part of this 23 law, (Title IX, Subtitle G) authorizes the Secretary of Interior to advance funding for the costs of "extraordinary operation and maintenance work" that can be repaid by local authorities, with interest, over 50 years. The 50-year repayment option applies to both reserved works and those works whose management has been transferred

to local entities by Reclamation. This extended repayment authority is something the Alliance has advocated for and which has been welcomed by its members as a means of securing affordable financing for repairs to federal facilities.

In the bigger picture, using the authority provided in Title IX, Subtitle G of the Public Lands Management Act of 2009, the Bureau of Reclamation in March 2010 awarded a $2,545,952 contract under the American Recovery and Reinvestment Act of 2009 to perform onsite and aerial inspections of identified canals in urbanized areas, approximately 230 canal reaches which total more than 985 miles, throughout the western states. These inspections will provide important data to help ensure that canal reaches continue to provide authorized project benefits and are properly operated and maintained. These inspections will also benefit existing programs by providing a basis for determining any long-term management requirements.

Sources:

Jamie Mills
Newlands Water Protective Assoc.
Newlands222@msn.com
Office: 775/423-7774

Also, see "The Truckee Canal: Water for a Sustainable Future", produced by Truckee Canal White Paper Working Group under the auspices of Lahontan Valley Environmental Alliance, P.O. Box 390, 90 N. Main Street 101A, Fallon, NV 89407, (775)-423-0525 (office), http://ww.lvea.org

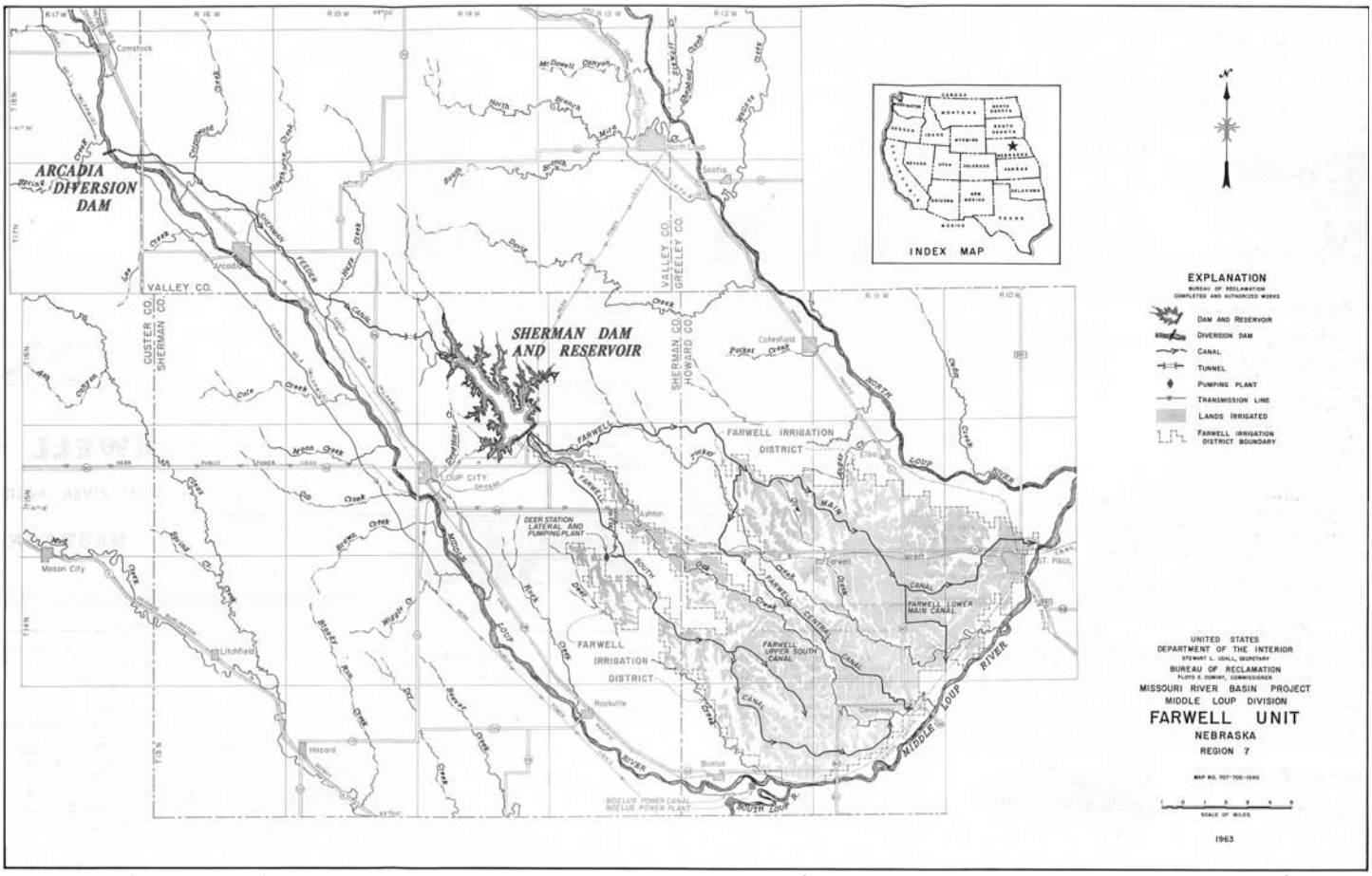
Loup River Irrigation Districts.

A case study that demonstrates how title transfer can open up new opportunities for irrigation districts to better manage irrigation and flood waters for multiple benefits.

Backdrop - Streamlined federal regulation and decision-making are the keys to sound Western water policy. Wherever possible, meaningful delegation of decision-making authority and responsibility should be transferred to the local level. Of course, regulation of water supplies and water projects is both necessary and beneficial. However, in the water arena, a "one size fits all approach" dictated from Washington is counterproductive and ineffective. Title transfers are a positive means of strengthening control of water resources at the local level. In addition, they help reduce federal costs and allow for a better allocation of federal resources. Over the past 12 years, the Family Farm Alliance has worked closely with Reclamation on both individual title transfers and on title transfer policy. Since 1996, more than two dozen Reclamation projects have been transferred or authorized to be transferred to local entities. Those local agencies are usually the irrigation or water district that has fulfilled its federal obligation to pay for construction of the project.

Organization - In November, 2002, the Loup Basin Reclamation District, Farwell Irrigation District and Sargent Irrigation District purchased all facilities from the Bureau of Reclamation and Department of Interior. The title to the facilities were put into the Loup Basin Reclamation District's name; Farwell and Sargent Irrigation Districts operate the facilities.

Project Description - The Sargent Unit of the Pick-Sloan Missouri Basin Program extends along the Middle Loup River Valley between the towns of Milburn and Comstock, Nebraska. Generally, the lands are within the Loess Hills region. Irrigation facilities consist of the Milburn Diversion Dam on the Middle Loup River, the 39.6-mile-long Sargent Canal, 44.2 miles of laterals, 19.4 miles of drains, and a small pump lifting installa-



Farwell Unit (pictured here) and Sargent Unit make up the Middle Loup Division of the Missouri River Basin Project. Map courtesy of U.S. Bureau of Reclamation.

tion. Approximately 14,000 acres of irrigated acres are served by Sargent. Other benefits include flood control, recreation, and fish and wildlife conservation and enhancement.

The Farwell Unit of the Pick-Sloan Missouri Basin Program lies between the North and Middle Loup Rivers in Nebraska. The unit furnishes a full supply of water to 53,414 acres of irrigable land. Flood control, recreation, and fish and wildlife benefits also are provided. Principal features are Sherman Dam and Reservoir, Arcadia Diversion Dam, Sherman Feeder Canal, and Farwell Canals, a system of laterals, and 38 pumping plants.

The Loup Basin Reclamation District operates and maintains the diversion dam works, laterals, drains, and other irrigation works of the Sargent Unit. The Loup Basin Reclamation District acts as the contracting agency for the Sargent Irrigation District and the Farwell Irrigation District (Farwell Unit) in matters concerning the diversion and canal works. The Sargent and Farwell Irrigation Districts are the contracting agencies for the lateral and drainage works of their respective units within the Middle Loup Division.

Benefits Associated with Title Transfer - By assuming control of their projects, Sargent and Farwell Irrigation Districts are in the driver's seat and have found new partners and opportunities to work for multi-benefit solutions to aging infrastructure, flood control and water management challenges.

Aging Infrastructure Cost-Sharing - Since the 2002 title transfer, irrigation district managers have found creative ways to secure financial assistance for aging water infrastructure. In the Sargent Project, local water managers brokered a deal with the Nebraska Game and Parks Department, which was interested in developing a fish way on the Middle Loup River at Milburn Diversion Dam. In exchange for working with the state on this proposal, Sargent Irrigation District asked for assistance to install three new gates on the diversion dam. After the new gates were installed, the district was able to fix two old gates, which puts the facility in sound shape for decades. Sargent Irrigation District received about $140,000 from the State of Nebraska through a grant program, $75,000 from a local Natural Resources District, and about $550,000 in federal funding administered by the Nebraska Game and Parks Department. The remainder of the project was paid for by the Sargent Irrigation District, which issued a 25-year bond in the amount of $600,000. The state financial assistance allowed this project to get off-center and provided a means to repair the facility and pay for it. Local water managers believe the title transfer, which removed past contractual obligations with the Bureau of Reclamation, provided the freedom for the district to work with other local, state and federal agencies to find creative solutions.

In the future, funding to address aging infrastructure will become more and more difficult to obtain. It will take very creative financing and doing things "outside the box" – like title transfers – to address aging infrastructure challenges. For the Sargent and Farwell districts, title transfer has proven thus far that others are willing to assist with addressing aging infrastructure issues as long, as they receive something in return.

Flood Control Assistance - The years 2007 and 2008 brought excessive rains and floods to the Loup Basin valley. The four counties served by the two irrigation districts were declared disaster areas at least once during this period by the governor of Nebraska. Because the Bureau of Reclamation was no longer tied to this project, FEMA was able to provide much-needed federal emergency funding assistance to fix flood-damaged facilities. The Sargent District was authorized to receive in excess of $500,000 and the Farwell District in excess of $1.2 million. Both Districts filed for extensions, which allowed the districts to use their own staff to take care of most of the work. District managers believe this assistance would have been impossible if they were still under contract with Reclamation.

Water Conservation Assistance - Farwell and Sargent Irrigation Districts have been approached by numerous entities on the local, state and national level who are interested in working with the Districts on partnership-based water conservation programs. District managers believe these important opportunities could only be considered by districts that no longer have Reclamation contracts.

Water Leasing - In the State of Nebraska, a law has been passed that allows leasing of water, which could potentially provide another future revenue stream for the Farwell and Sargent districts. Federal and state agencies, local entities and cities are currently discussing proposals with the districts on this matter. A decision will likely be

The Middle Loup River, photo courtesy of http://stevekking.wordpress.com.

made in the next few years that could prove to be very beneficial to the long-term viability of the districts.

Challenges - Other irrigation districts are interested in acquiring title to Reclamation facilities. Experience throughout the West demonstrates that when control of projects is assumed by local interests, the projects are run more cost effectively and with far fewer items of deferred maintenance. In addition, some local districts want to acquire title to their own water distribution works, to which the federal government holds title because federal funds – long since repaid - were used to help build them. Despite the benefits, local water agencies are discouraged from pursuing title transfers because the process is expensive and slow. Environmental impact analyses can be time-consuming, even for uncomplicated projects that will continue to be operated in the same manner as they always have been. Moreover, every title transfer requires an act of Congress to accomplish, regardless of whether the project covers 10 acres or 10,000 acres.

Solutions

The challenge associated with title transfers was identified as a major concern when the Family Farm Alliance engaged in the Managing for Excellence" (M4E) process with the Reclamation. Executing the action plan was a primary initiative for Reclamation in recent years. Alliance engagement in M4E and the related NRC study has been a priority with the Alliance since early 2005.

Through the M4E process, Reclamation developed a legislative concept for a programmatic approach intended to simplify transfer of "non-complicated" facilities. The idea was to create a set of criteria to identify "non-complicated" projects whose transfer to local ownership would not impact the environment or taxpayers. Facilities meeting the criteria could be transferred out of federal ownership by the Secretary of the Interior under a new standing authority granted by Congress. The Reclamation approach envisioned the use of existing procedures under the National Environmental Policy Act (NEPA) to streamline environmental reviews for proposed title transfers meeting the programmatic criteria.

Title transfers for larger, more complicated projects that did not meet the criteria would still require individual acts of Congress. In essence, Reclamation's approach would allow Congress to delegate to the Secretary of Interior the authority to transfer the ownership of single-purpose, non-complicated projects. This would greatly reduce the hurdles and expense that can impede transfers beneficial to local and federal government.

In the 110th Congress, Rep. McMorris-Rodgers introduced H.R. 6992, which captured well the philosophy embedded in Reclamation's M4E approach to facilitate title transfers. H.R. 6992 established an effective mechanism to identify and analyze the potential for public benefits from the transfer out of federal ownership of eligible facilities. The Family Farm Alliance testified in support of this bill before the U.S. House of Representatives Water & Power Subcommittee in 2008. Unfortunately, there was not enough time left in the 110th Congress for H.R. 6992 to move. Such a bill – if reintroduced, approved by Congress and signed by the President – would facilitate the transfer of those eligible facilities to promote more efficient management of water and water-related facilities at the local level.

Source:

Tom Knutson
Loup Basin Reclamation District
P.O. Box 137
Farwell, NE 68838
Office: 308/336-3341
E-mail: tknutson@micrord.com

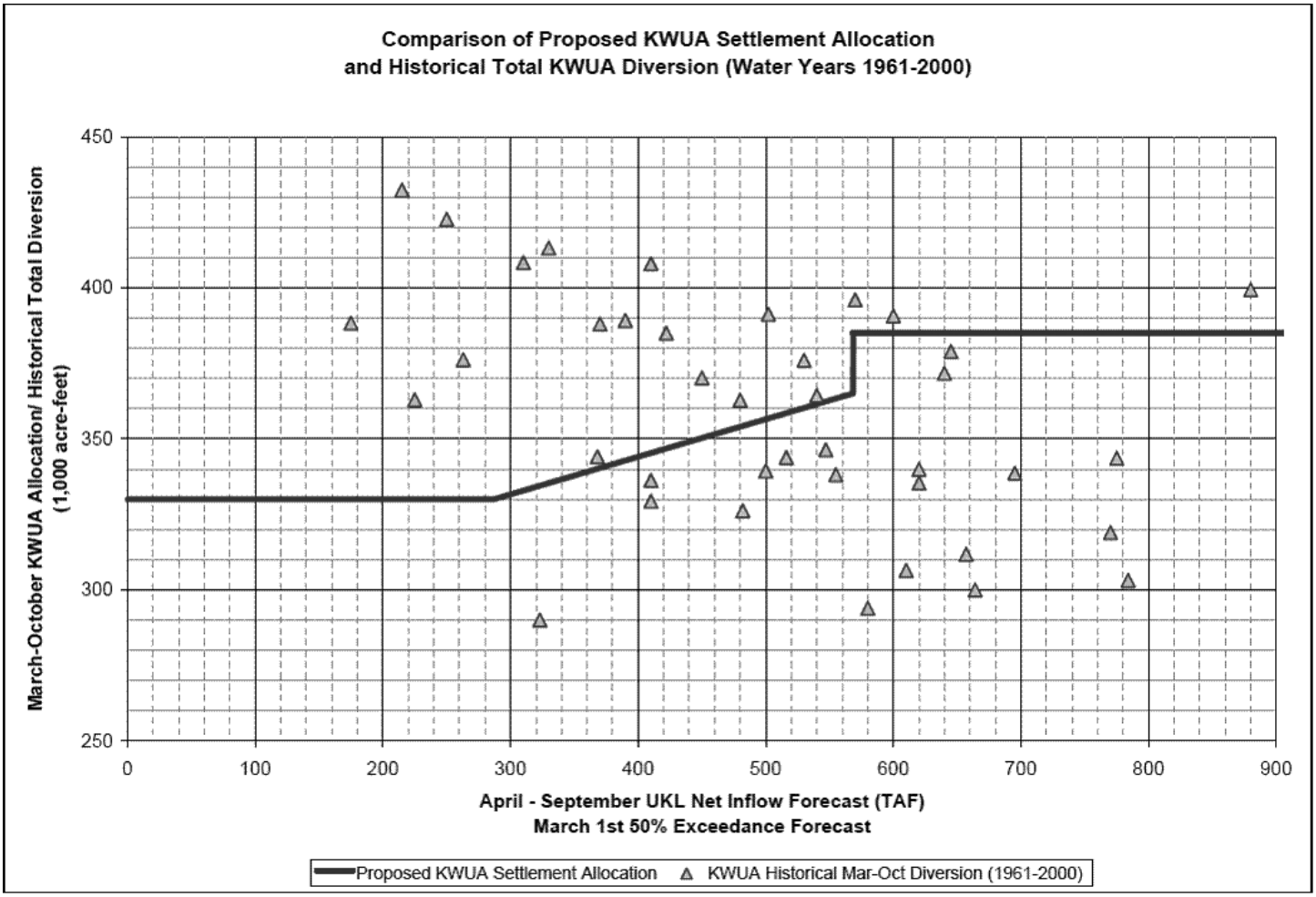
Klamath Basin Restoration Agreement "On Project" Water Plan.

This case study summarizes a locally-driven water management plan proposed by the Klamath Water Users Association (KWUA) to provide water supply security and increased predictability for the irrigation community.

Backdrop - Increasingly, federal water project operations are governed by a variety of biological opinions, court-mandated directives, and governmental obligations that have essentially gutted their original designed intent: to store water for use in dry months by farmers and ranchers. This has been the case for the Klamath Irrigation Project since the early 1990's.

The Organization - KWUA is a non-profit organization that represents the irrigation districts served by the 100-year old federal Klamath Irrigation Project. Over 1,400 family farms are included in those districts.

Challenge - In essence, the Klamath Project is now operated to first take care of downstream salmon, suckers in the lake, and federal tribal trust obligations. Then, Project irrigators get what's left over (if any). The two National Wildlife refuges that are located within the boundaries of the Project get what's left over after that. Most people probably have no idea how much uncertainty surrounds this type of arrangement. There is simply no way for a Project irrigator to assume that he will have a reliable water supply from year to year or even during the growing season, particularly near the end of each month, when minimum levels in Upper Klamath Lake must be met to avoid potential Endangered Species Act litigation. These circumstances become truly dire if downstream tribes – citing federal tribal trust obligations – call for additional "emergency" water to be released into the river to try to help diseased fish or stranded minnows.



The water delivered to Klamath Project irrigators under the KBRA will be less in some years, compared to the past. Importantly, irrigators will obtain a locked-in quantity prior to the irrigation season and be provided with tools, such as land idling, ground-water substitution and conservation, to make up the difference during dryer years. Chart courtesy of Klamath Water Users Association.

Solution - The Klamath Basin Restoration Agreement (KBRA) was signed by multiple parties, including the Secretary of Interior and governors of California and Oregon in February 2010. The agreement contains a number of measures to provide water supply security and increased predictability for the irrigation community, including an "On-Project Plan". Plan proponents estimate that, in approximately 50% of the years, enough surface water would be available to irrigate 100% of the Project.

Parties supporting the KBRA have tentatively agreed to a permanent limitation on the amount of water that would be diverted from Upper Klamath Lake and the Klamath River for the Klamath Reclamation Project. The newly formed Klamath Water and Power Agency (KWAPA), which is comprised of Project districts, would have the responsibility to develop, implement, and administer the On-Project Plan. The plan would align irrigation demand with the available supply for the Project from the Klamath River system consistent with the diversion limits which would come into effect in the future. KWAPA will evaluate the following measures to meet the purpose of the plan: conservation easements, forbearance agreements, conjunctive use programs, efficiency measures, land acquisitions, water acquisitions, groundwater development, groundwater substitution, other voluntary transactions, water storage, and any other applicable measures.

Key Principles for Water Users - Details of the plan remain to be worked out pending approval of Project Districts, KWUA and KWAPA. However, plan development will be built around some key principles:

- Avoid permanent "downsizing" of the Klamath Project (this is important for local economies and agricultural infrastructure). Land should not be idled and groundwater should not be necessary in above average and wet years –the goal is to maximize production, wherever possible.
- Market driven approach – irrigators would either irrigate, or choose not to irrigate and be compensated.
- True conjunctive use must be part of the solution
- Lock-in the diversion limit/allocation as early as possible in the water year (March 1) to allow for proper planning and management
- Management of the program developed and administered by the irrigation community, not the federal government or others. The KBRA parties have agreed to the diversion limit and will let water users decide how best to handle a shortage.
- Provide necessary resources and other tools to effectively manage the program.
- Provide for a settlement with Tribes both from an adjudication perspective as well as to permanently address all federal tribal trust responsibility for water in the Basin.

Funding - KWUA did not want to depend indefinitely upon Congressional appropriations to make the program work. As such, the settlement seeks full funding within the first 10 years. KWAPA will likely enter into very long-term or permanent agreements with landowners who would be asked to idle land in certain hydrologic year types. Landowners would be compensated, likely one time (up front), to participate. Based on a competitive system, landowners could elect to enter all or part of their land into the program. KWAPA would 30 have to ensure that enough acres (increasing amounts the drier the forecast) would be enrolled in the program. Once the March 1 forecast was made, program participants would be notified whether or not they would have water available that year for land enrolled. This would allow for sufficient planning time with respect to crop selection, etc.

Sources:

Klamath Water Users Association
735 Commercial St., Suite 3000
P.O. Box 1402
Klamath Falls, OR 97601
Phone: (541) 883-6100
Fax: (541) 883-8893

Klamath Water and Power Agency
735 Commercial St., Suite 4000
P.O. Box 1282
Klamath Falls, OR 97601
Phone: (541) 850-2503
Fax: (541) 883-8893

Decision Support System, Water and Resource Management and Enhanced Water Supply Forecasting Tools (OREGON)

Local water users and elected officials are advancing concepts and ideas to evaluate, test and implement web-based tools for managing water and water-dependent resources, sharing information about watershed restoration activities and water conservation measures, and to improve water supply forecast methods and information, within the Klamath Basin, Oregon.

An important and critical anticipated outcome of this effort is improved information in a public forum for a better understanding of water and resource management decisions, leading to reduced social conflict. Additional anticipated outcomes are a shared restoration project database that shows progress is being made to improve resource conditions in the Klamath Basin, a better understanding of the complexity of the Klamath Basin, water information and management tools, and tools that integrate seasonal water supply forecast information and real-time streamflow data to improve the public understanding of forecast accuracy for use in decision-making. These web-based tools and applications are being implemented within the Klamath Basin Decision Support System.

Background / Challenges - The Klamath Basin in southern Oregon has many complex water and resource management issues, and recent conflicts in the watershed have generated national media and political interest. Dozens of state agencies from California and Oregon, as well as numerous federal agencies, water users, tribes and a long list of non-governmental organizations all have websites containing various data sets applicable to the Klamath Basin. To date, there has not been a "one-stop shop" that allows simple access to the massive data available on-line on matters related to the Klamath Basin. One result of these non-integrated data sources is that the public, local leaders, decision-makers, the irrigation community, resource managers, local, state, federal and Tribal Governments and others often lack understandable technical information.

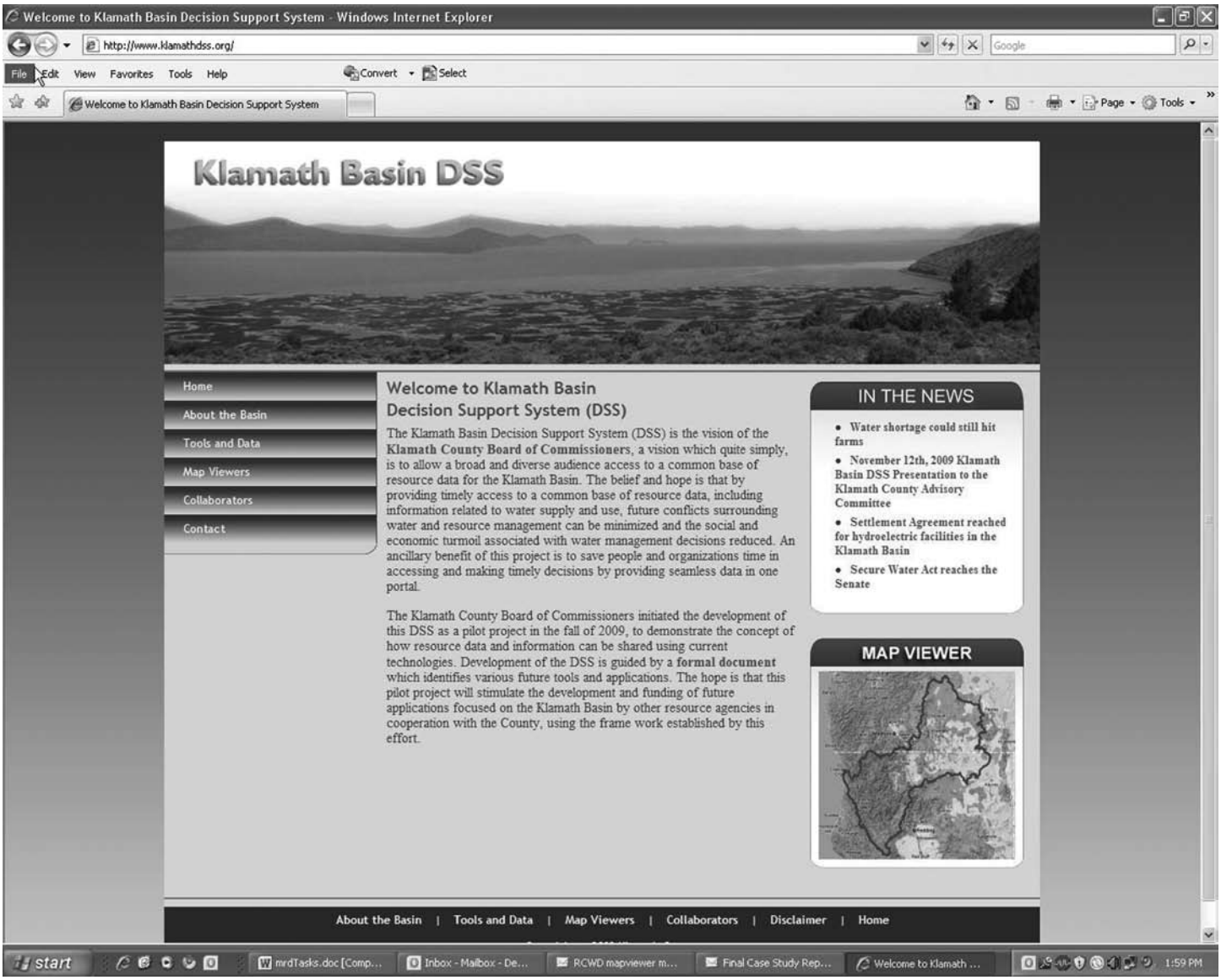
Solution - The Klamath County Board of Commissioners recently funded the initial development and deployment of the Klamath Basin Decision Support System (DSS) (see www.klamathdss.org). The purpose of the Klamath Basin DSS is to provide public access to commonly requested geospatial data (i.e., data related to location) developed and maintained by the County and commonly requested by the public. These County data can be integrated with other state and federal data into a single location. An additional purpose for the DSS is to serve as an initial platform for information, data and resources specific to managing water and water dependent resources within the Klamath Basin. The County closely coordinated with the myriad of other water and environmental agencies and organizations on this endeavor.

The initial DSS provides the following:

1. Illustrates the DSS concept of providing common and consistent data and information to the public;
2. Serves as the foundation for a more advanced DSS capable of providing common and consistent data to facilitate decision-making and understanding the relationship between the management of water in the Klamath basin and the social, natural resources, and economic implications; and
3. Makes available common (local) data specific to the County.

Development of the DSS is occurring in phases. The initial phase (completed) focused on developing an interactive DSS application for geospatial data within Klamath County and select information within the Klamath Basin. Subsequent phases are focused on the development advanced applications related to hydrologic forecasting and satisfying water needs.

Currently Available DSS Tools and Applications - The Klamath Basin DSS includes specific applications and tools related to accessing water and water resource dependent related information. These tools include interactive mapping applications coined the "Watershed Viewer" and the "Restoration Viewer." The Watershed Viewer is focused on sharing information about water, water features, hydrology, land use, and parcel ownership information within the Klamath Basin. The Watershed Viewer integrates this information by using web services intended to allow the sharing of information across the internet, without the information being physically located on a single computer. New products are being developed and deployed to the Watershed Viewer, including gridded snow depth and moisture content information as well as real-time precipitation and streamflow data.



Klamath Basin DDS Watershed Viewer. Image courtesy Houston Engineering, Inc.

The Restoration Viewer allows visual access using a map interface to information about watershed restoration projects being implemented by local landowners, nongovernmental organizations, and local, state and federal agencies. The restoration includes the Forest Service's Watershed Information Tracking (WIT) database, normally only accessible internal to the Forest Service. Information about the type of restoration project, the project participants, the year constructed and the project cost are accessible.

The most recent soon to be deployed tool is the Water Supply Forecast Tracking Tool (WSFTT). The WSFTT allows the comparison of forecast water supplies to measured water supplies at forecast locations within the Klamath Basin. Forecast information can be compared to actual measured flows to provide a sense of forecast accuracy. Forecast information is also is also combined with historic streamflow information to provide an 33 estimate of future monthly runoff volume. The WSFTT also allows access through an interactive map to real-time streamflow and lake level information.

The Future Vision - Most recently, Houston Engineering, Inc., a consultant working on the project for Klamath County, has developed a concept to improve the water supply forecast methods being used in the Klamath Basin. These tools may be accessed through the prototype web site www.klamathdss.org. The vision is

the ability to access real-time forecast information about streamflow, soil moisture content, snowpack moisture, evapotranspiration, and precipitation from a single source. This information can then be directly related to the Biological Opinions of the National Marine Fisheries Service and the U.S. Fish and Wildlife Service for the coho salmon and the shortnose and lost river suckers that influence water management decisions within the Klamath Basin.

Local water users and elected officials are advancing concepts and ideas to evaluate, test and implement improved water supply forecast methods and web-based tools for managing water and water-dependent resources within the Klamath Basin. The anticipated outcomes from implementing this concept are improved accuracy for the seasonal water supply forecasts issued by the Natural Resources Conservation Service, National Water and Climate Center (NRCS - NWCC), improved understanding about the necessary accuracy of the forecasts, and water management tools that use the forecasts, implemented within the Klamath Basin DSS. Expectations are that the products and tools available through the DSS can be used by Stakeholders, including the Klamath Water and Power Authority, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Bureau of Reclamation, Native American Tribes, and others, for water and water-dependent resource management decisions. These decisions include matters related to the likelihood of achieving biological opinions, the probable effectiveness of water conservation measures, and the availability of water for irrigation and support of the Klamath Basin National Wildlife Refuge.

Ensuring Success - Success is dependent upon the active and full participation of the various agencies responsible for water supply forecasting and water management within the Klamath Basin. The intent is not to usurp the role and responsibility of these agencies, but to use local initiative to facilitate the development of improved water supply forecast methods and new water management tools of mutual benefit to those responsible for resource management in the Klamath Basin.

In order for the concept to be successfully implemented, it must include those state and 34 federal agencies currently responsible for issuing forecasts and managing resources in the basin. The implementation approach must be a collaborative process including local, state, federal and tribal governments with an interest in and responsibility for, water supply forecasting and the management of water within the Klamath Basin.

The approach recognizes and maintains the institutional responsibility of NRCS-NWCC and the CNRFC for water supply forecasting and river forecasting, respectively. The approach also recognizes the reliance of the U.S. Bureau of Reclamation (Reclamation) upon the forecasts for making operational decisions related to the Klamath Irrigation Project.

Sources:

Mark Deutschman, Ph.D, P.E., Vice President
Houston Engineering, Inc.
6901 East Fish Lake Road, Suite 140
Maple Grove, MN 55369
Phone: 763.493.4522
Fax: 763.493.5572
E-mail: mdeutschman@houstoneng.com
Website: www.houstonengineeringinc.com

Lani Hickey Natural Resource Manager
Klamath County Public Works
305 Main Street
Klamath Falls, Oregon 97601
Phone: 541-883-4696
E-mail: lhickey@co.klamath.or.us

Red Bluff Diversion Dam Fish Passage Improvement Project

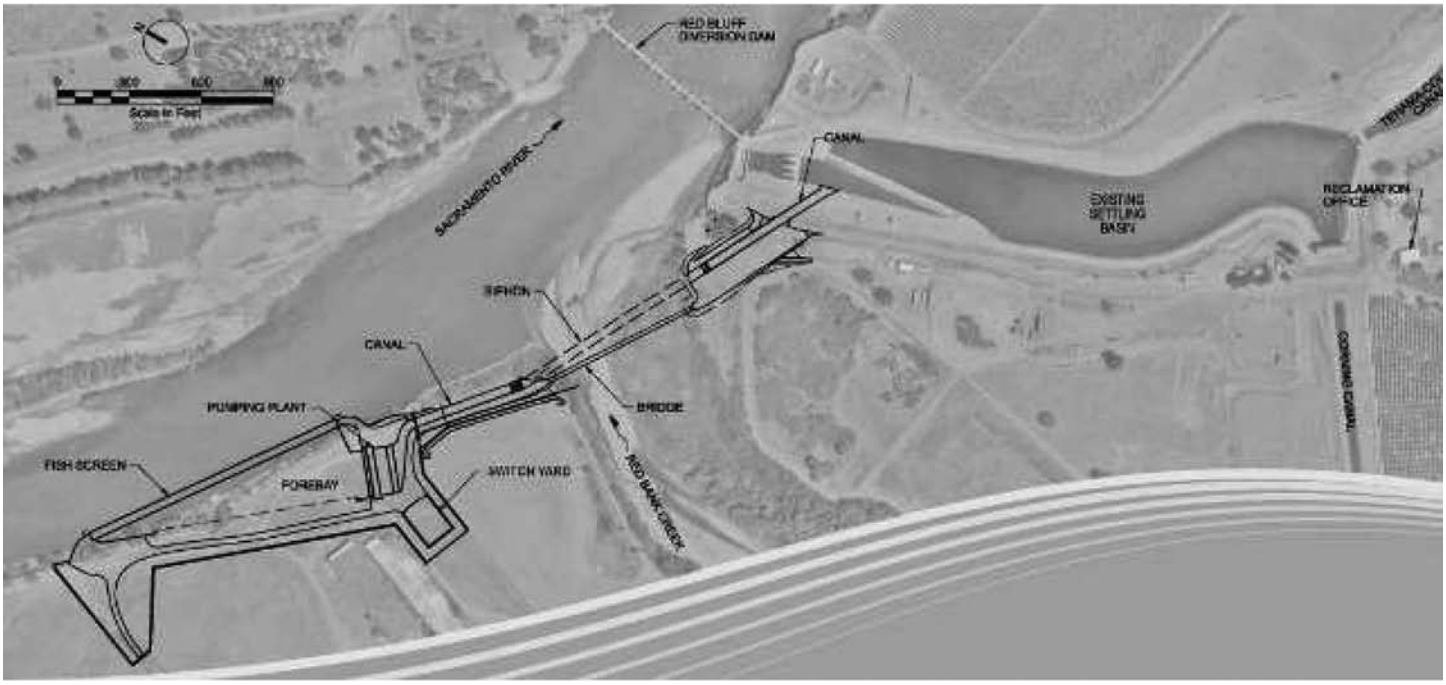
This case study describes the Red Bluff Diversion Dam (RBDD) Fish Passage Improvement Project (the Project), which is a priority for the Tehama-Colusa Canal Authority to protect the ability to deliver irrigation water to the California farmers served thereby. The Project consists of the construction of a positive barrier fish screen and a pumping plant, resulting in the achievement of the dual goals of the Project: Fixing the fish passage issues associated with the operation of the RBDD; while simultaneously providing a long term solution for water conveyance reliability to the TCCA service area. The completion of the Project will reduce or eliminate reliance on the RBDD, thereby avoiding the Endangered Species Act and regulatory issues associated with its operation.

Backdrop - Red Bluff Diversion Dam (RBDD) is a serious impediment to upstream and downstream fish migration because a significant portion of the Sacramento River spawning habitat for endangered salmon and steelhead occurs upstream of the dam. As a result, the "gates-in" period at RBDD has been significantly reduced and it currently operates on a two and a half month "gates-in" period. Current "temporary" operations allow gravity diversion during a portion of the irrigation season and provide unimpeded fish passage ("gates out") during the remainder of the year. The main species of concern are winter- and spring-run Chinook salmon, Central Valley steelhead, and green sturgeon.

The schedule for completion of the Fish Passage Improvement Project is mandated by the National Marine Fisheries Service's 2009 Biological Opinion for operation of the Central Valley Project. The "Reasonable and Prudent Alternative" for operation of the RBDD requires the gates to be raised year-round after 2011.

The Organization - TCCA is a Joint Powers Authority comprised of 17 irrigation districts in Tehama, Glenn, Colusa, and Yolo Counties. TCCA operates and maintains the 140-mile Tehama-Colusa and Corning Canal agricultural water supply systems. TCCA provides irrigation to 150,000 acres of agricultural land, over half of which is permanent crops, such as almonds, olives, and grapes. Crops grown in the service area produce over $250 million in crops and contribute over $1 billion to the regional economy annually.

The Problem - When the RBDD gates are raised, the TCCA continues to deliver irrigation water through a series of short-term fixes: the Temporary Pumping Plant, Research Pumping Plant, seasonal pumps at the canal headworks, and by forcing water backward into the Tehama- Colusa Canal at Stony Creek from Black Butte Reservoir. Existing diversion capacity is not enough to meet year-round agricultural demand. Mandated changes to gate operations may occur faster than the project



Schematic of the Red Bluff Diversion Dam Fish Passage Improvement Project, courtesy U.S. Bureau of Reclamation.

can be implemented. If the gates are raised year-round before the project is operational, then 150,000 acres of valuable, productive cropland would be significantly impacted.

The Solution - The Fish Passage Improvement Project is the culmination of over 40 years of efforts by various entities to find a balanced solution that improves fish passage and the reliability of irrigation water deliveries. Highlights include:

- *Selection of a Project:* The selected project includes construction of a pumping plant near the existing canal headworks with an initial installed capacity of 2,000 cfs and a footprint that will allow expansion to 2,500 cfs.
- *Completion of Environmental Review:* TCCA certified the Environmental Impact Report under CEQA on June 4, 2008, and Reclamation signed the Record of Decision under NEPA on July 16, 2008.
- *Design:* Design of the pumping plant, fish screen, bridge, siphon, utility relocations, cofferdams, and pumps is 100 percent complete.
- *Construction:* Under an accelerated schedule, construction is anticipated to be completed and operational by spring of 2012.

Although the project received over $109 million from the American Recovery and Reinvestment Act (ARRA), with an estimated price tag over $220M, project funding remains the top priority to meet the court-mandated schedule. If the schedule is not met, then the ability to meet the irrigation demand for 150,000 acres of agriculture in the Tehama-Colusa Canal Authority (TCCA) service area will be severely compromised. The TCCA and the US Bureau of Reclamation are working cooperatively to meet the aggressive schedule.

Remaining Challenges - *Central Valley Project Operations Criteria and Plan (CVP-OCAP) Biological Opinion.* The 2009 CVP-OCAP BO restricts gate operations from June 15 to August 31 annually. The BO also requires that the new pumping facility be operational by 2012; at that time the RBDD gates will no longer be operational. There are significant concerns about reaching the necessary milestones (i.e., completing approval processes, obtaining funding) to achieve the mandated schedule.

Proposed Designation of Critical Habitat for the Green Sturgeon. The NMFS recently proposed designating areas of the Sacramento River as critical habitat for the green sturgeon. Regulations surrounding this designation will likely impact operations at the Red Bluff Diversion Dam.

Project Funding. Without adequate funding to continue the project on the mandated schedule, the agricultural water supply for the TCCA irrigation districts is at tremendous risk. The cooperative effort of TCCA, Reclamation, and the State to assure adequate funding for the project is of paramount importance.

Sources:

Jeff Sutton/TCCA
P.O. Box 1025
Willows, CA 95988
530.934.2125
jsutton@tccanal.com

Jason Larrabee/JLV, LLC
P.O. Box 188440
Sacramento, CA 95818
530.570.1620
jason@jasonlarrabee.com

Mike Urkov/NewFields
304 S Street, Suite 101
Sacramento, CA 95811
916.329.3116
murkov@newfields.com

St. Mary Facilities of the Milk River.

This case study examines the U.S. Bureau of Reclamation's (Reclamation) St. Mary Facilities of the Milk River Project, which are in urgent need of rehabilitation.

Backdrop - 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. Like many other parts of the West, this single-purpose project puts the financial burden of repairs on the irrigators it serves, who simply do not have the resources to solely pay for such an expensive repair. The solutions developed at St. Mary may very well provide a successful template that can be used in other parts of the West.

The Project - The St. Mary Facilities, located on the Blackfeet Reservation in Glacier County, consists of a storage dam (Sherburne Dam), diversion dam, headgate, 29 miles of canal, two sets of steel siphons, and five concrete drop structures. Starting on the east side of Glacier National Park, the St. Mary River flows north into Canada. In 1891, the U.S. Department of Agriculture proposed a trans-basin diversion of water from the St. Mary River into the North Fork of the Milk River. In 1905 the Secretary of the Interior authorized construction of the St. Mary Diversion Dam and Canal.

Construction began in 1906. Construction of Sherburne Dam – which releases water to Swiftcurrent Creek and Lower St. Mary Lake via the Swiftcurrent Dike – was completed in 1919. The St. Mary Diversion Dam is located immediately downstream from Lower St. Mary Lake. It serves as the diversion point for the St. Mary Canal, which, further downstream, crosses the St. Mary River and Hall's Coulee through two huge, parallel riveted steel-plate siphons. A series of concrete drops at the lower end of the 29-mile canal discharges the flows into the North Fork of the Milk River, over 200 feet below. The water then flows for 216 miles through Alberta, Canada, before returning to Montana, where it is stored in Fresno Reservoir 14 miles east of Havre.

Significance - Failure of the St. Mary Facilities would be catastrophic to the economy of north central Montana. Settlers moved to the Milk River valley on the promise of a stable supply of water for irrigation, which hinged on federal government's intent to divert water from the St. Mary River to provide supplemental water to Reclamation's Milk River Project. In dry years the imported water may make up to 90% of the Milk River flows past Havre. The system provides water to irrigate over 110,000 acres on approximately 660 farms 39 within the Project. Together, these farms produce about 8% of all cattle/calves, irrigated hay and irrigated alfalfa in Montana.

The stable supply of irrigation water provided by the system supports the backbone of the region's agricultural economy. The Milk River also provides municipal water to approximately 14,000 people in the communities of Havre, Chinook, and Harlem and two rural water systems. This water further benefits fisheries, recreation, tourism, water quality and wildlife.

Challenges - This system, which brings water from the St. Mary River Basin to the Milk River Basin, has been in operation for over 94 years with only minor repairs and improvements since its original construction. Most of the structures have exceeded their design life and are in need of major repairs or replacement. System capacity

Deteriorating St. Mary Facilities of the Milk River Project, photos courtesy of Larry Mires, St. Mary Rehabilitation Working Group.

has diminished. The steel siphons are threatened by slope stability and leaks, and landslides and crumbling structures have reduced water supply reliability. The economy of the Hi-Line region of northern Montana has been built around the stable water supply provided by the St. Mary Facilities. Without the needed rehabilitation the aging system may soon suffer catastrophic failure. Loss of the St. Mary Facilities would have a disastrous economic impact on the Milk River Basin and the state of Montana.

The design capacity of the system has dropped by about 20%. The steel siphons are plagued with slope stability problems and leaks, and the concrete in the drop structures is severely deteriorating. Landslides along the canal and condition of the structures make the canal unreliable as a water source. Failure of one of the drop structures in 2002 resulted in the canal being turned off for approximately two months during the irrigation season. It would cost $153 million to bring the system up to modern standards.

Local water users are pursuing possible solutions that could help finance this project. Unfortunately, to date - because of agency policy or OMB reluctance – they have not been able to secure a revolving loan, extended re-payment provisions, or any other government financed option. Further, no bank or other financial institution has been willing so far to provide a funding option that is workable with the current contract holder's ability to pay.

In addition to the financial challenges, rehabilitating the St. Mary Facilities will involve complex political and legal considerations, including assessing impacts to threatened bull trout and addressing two Federal Indian Reserved Water Right Compacts. Canadian and U.S. differences on apportioning flows of the St. Mary and Milk Rivers must also be worked out.

Solutions - It will take a well-coordinated and cooperative basin-wide effort to secure rehabilitation of the St. Mary Facilities, and ensure the economic viability of the Milk River Basin. The forum where this is already occurring is the St. Mary Rehabilitation Working Group, which includes representatives from government, tribes, irrigators and local communities. In addition to developing a comprehensive working plan to fix St. Mary, this group is also working the political end, looking for ways to get the federal government to take into account the other sectors that benefit from the diversion, such as public flood control, recreation, wildlife and municipalities.

U.S. Senator Conrad Burns (MONTANA) secured a total of $7 million for the St. Mary Rehabilitation and Milk River Project for fiscal year 2007. The Energy and Water Appropriations bill included $5 million for environmental and feasibility studies and development of an emergency response plan in the event of catastrophic failure. The Interior bill included $2 million for irrigation investigations at the Blackfeet and Fort Belknap Reservations.

Senator Burns also introduced legislation in 2006, co-sponsored by Senator Baucus (MONTANA), which authorized major repairs for the water system along the Hi-Line (see insert). Unfortunately, this legislation failed to receive Reclamation support during a field hearing conducted by Sen. Pete Domenici in September of that year. A series of other attempted congressional actions failed to receive any Reclamation or OMB support until FY2010, when $3.5 million in federal support was provided to support NEPA required on the diversion dam and headgate replacements. In an effort to protect ESA-listed bull trout and practice good stewardship of the environment, SMRWG is currently working on securing funding and language for Reclamation to replace the diversion dam and headgates.

In 2007 Senator Max Baucus secured $153 million in authorization in the Water Resources Development Act (WRDA), with a reasonable 75% federal and 25% non-federal cost share. However, there was no matching Congressional appropriation, and this has now subsequently been classified as a "new project start" for the Corps of Engineers.

In 2009, the Montana State Legislature passed legislation that would allow for the creation of a new form of local government - a Regional Resource Authority –that would be capable of entering into agreements with government entities to address the issues of a rehabilitated canal system, sell bonds, and manage water in a different manner then currently is allowable. The SMRWG is currently in the process of developing the petition to seek a Milk River authority, which represents a challenge, since it requires passage by 51 % of registered voters in the four county areas that it would encompass.

The State of Montana passed the Blackfeet Water Compact in 2007 and the state is in the process of submitting that to Congress. There will be no rehabilitation allowed of the system until the Blackfeet Compact is approved and passed by the Congress and the tribe.

So far, replacement of existing deteriorating structures is being tackled sporadically, as Reclamation law requires that O&M must be paid in the fiscal year of expenditure by the contract holders. Unfortunately, this is causing serious hardship on most of the irrigators, and some have resorted to deferring maintenance on their own systems to keep the assessments reasonable for the greater collective benefit of all district members.

The Milk River irrigators are also working on a local level with their Canadian neighbors.

Finally, low head hydropower has a great deal of possibilities – but this region is isolated and at a disadvantage on its northern border. The project currently does not have an authorized energy development component, a situation the locals are attempting to fix.

Source:

Larry Mires, Executive Director,
St. Mary Rehabilitation Work Group
(406) 263-8402
Montana Department of Natural Resources and Conservation
http://dnrc.mt.gov/st_mary/pdfs/stmarybackground.pdf

Catastrophic blow-out of one of the siphons along the St. Mary river, resulting in closure of the system for two months, photo courtesy of Larry Mires, St. Mary Rehabilitation Working Group.

Minidoka Dam Spillway Repair

This case study describes the Minidoka Project, identified in 1902 as one of the most promising irrigation developments in the entire West. The rehabilitation of the Minidoka Dam spillway is typical of the numerous water infrastructure projects that are aging and require repair throughout the Western United States.

Background - The Minidoka Project has its roots in a decision by the Secretary of the Interior to withdraw 130,000 acres of land from homestead filings on the north and south side of the Snake River to be set aside for the project. Crews began surveying on the Minidoka Dam site in March of 1903. After 100 years of continued use, the concrete dam spillway is reaching the end of its functional and economic lifespan.

Project Description - Minidoka Project lands extend discontinuously from the town of Ashton, in eastern Idaho along the Snake River, about 300 miles downstream to the town of Bliss in south-central Idaho. The Minidoka and Palisades Projects that serve this area collectively furnish irrigation water from reservoirs that have a combined active storage capacity of more than 4 million acre-feet.

The project works consist of Minidoka Dam and Power Plant and Lake Walcott, Jackson Lake Dam and Jackson Lake, American Falls Dam and Reservoir, Island Park Dam and Reservoir, Grassy Lake Dam and Grassy Lake, Palisades Dam, two diversion dams, canals, laterals, drains, and some 177 water supply wells.

Organizations - Various components of the Project are operated by the Minidoka Irrigation District, Burley Irrigation District, American Falls Reservoir District No. 2, Fremont-Madison Irrigation District, and the A&B Irrigation District. All storage and power facilities are operated by the U.S. Bureau of Reclamation.

Minidoka Significance - The Project provides water for livestock, sugar beets, cereal grains, beans, seeds, potatoes, and other vegetables. In generally, livestock brings in roughly one-half of total Project revenues, while potatoes and beets normally contribute one-third, and cereals and beans one-fifth to one-sixth. The Project also creates significant amounts of hydroelectricity as a byproduct. Another byproduct of the Project is the 500,000 acre-feet of water lost annually from the reservoirs and canal systems into the Snake River Aquifer. These "losses" have helped make the aquifer a source of domestic drinking water and irrigation supplies.

Minidoka Dam, photo courtesy of U.S. Bureau of Reclamation.

Challenges - The Minidoka Dam and Spillway was built between 1905 and 1907, and the spillway pillars were built in the fall of 1909. The integrity of the concrete mix used at that time was inconsistent. During the winter of 1926-27, the full reservoir behind the dam froze over. The ice pressure on the spillway broke, and the spillway crest actually moved about six inches in three locations. In the late summer of 1927, holes were drilled in the 2,200 foot spillway, and rebar was driven into the concrete to hold the structure in place. Since that time, the reservoir has not been allowed to fill during winter months.

The gated spillway structure has been evaluated by the Bureau of Reclamation, which has recommended that it be replaced, since the entire structure is at risk of failure. The dam directly provides water for over 4,000 family landowners on about 120,000 acres of irrigated land. The facility also regulates other users that impact 500,000 acres and 15,000 farm units.

Should the dam fail during growing season, irrigation supplies would be interrupted, potentially leading to crop damage and economic losses in the hundreds of millions of dollars. A failure during spring and winter months would likely cause considerable flood damage and possible loss of life downstream. Because the consequences of even partial spillway failure during an irrigation season would be unacceptable, spillway rehabilitation efforts are now under way.

Solutions - An appraisal-level study of possible alternatives has been completed. Alternatives under consideration include:

- Encapsulating the old spillway.
- Constructing a new spillway weir downstream.
- Installing new radial gate sections.
- Installing inflatable rubber dams.

Initially, it appears that the rubber dam alternative and the construction of a new spillway section downstream will provide the most cost-effective solution. The total cost for the spillway rehabilitation is estimated at $55 million.

Reclamation started work on compliance with National Environmental Policy Act (NEPA) in fiscal year 2007. Design and permitting efforts are underway and a three year construction period is anticipated. The expected project timeframe will gave the local districts nearly a decade to collect funds from district patrons to meet their financial obligations for the spillway rehabilitation. In February 2010, the two districts passed bond elections to finance the 42% local share of the total construction cost which are now about $ 55 Million. However, on that very same day, the Bureau of Reclamation cut the funding from its 2011 budget, so the project is now on hold until federal government share can be secured.

The irrigation districts are working with the Office of Management and Budget to include funding in the 2012 budget and urging Reclamation to make it a high priority in that budget and all future budgets until it is completed. The districts' biggest concern is that inflation may increase the cost if construction does not start quickly and begin moving forward.

Sources:

Randy Bingham
Burley Irrigation District
246 East 100
South Burley, ID 83318
Phone: (208) 678-2511
E-mail: bid@atcnet.net

Norm Semanko
Idaho Water Users Association
205 North 10th St. #530
Boise, ID 83702
Office: 208/ 344-6690
Fax: 208/ 344-2744
E-mail: norm@iwua.org

Snake River in southern Idaho.

Water Transfers in California's Central Valley

Water users in California's Central Valley face increasing difficulty every year trying to transfer adequate supplies of supplemental water, which puts at risks tens of thousands of acres of high value permanent crops. This case study looks at how legislation can help facilitate water transfers between agricultural water users.

Backdrop - In the Central Valley, irrigation districts and water agencies have for decades exchanged and transferred water to each other as a means of getting surplus water to water short areas. These water transfers are regulated by California water law and by federal and state environmental laws, including the Endangered Species Act (ESA) and the National Environmental Quality Act (NEPA). Transfers of water in federal Central Valley Project (CVP) are subject to an additional level of regulation under the Central Valley Project Improvement Act 1992 (CVPIA).

One of the major purposes of the CVPIA was to "assist California urban areas, agricultural water users, and others in meeting their future water needs." The law affected water transfers in three major ways. First, it allowed, for the first time, CVP water to be sold by individual water users to entities outside the CVP service area. The authors of the legislation intended this provision to "open up" CVP supplies to major urban areas, such as Los Angeles, and generate revenue for CVP environmental restoration through transfer fees. Second, it allowed certain water-rights holders in the San Joaquin and Sacramento Valleys to transfer water made available to them by the CVP under settlement contracts with the federal government. And third, the CVPIA made these newly-authorized transfers subject to review and approval by the Interior Department, through the Bureau of Reclamation, according to a set of criteria written into the Act.

Challenges - The CVPIA has not achieved its goal of facilitating water transfers to help Californians meet their water needs. The envisioned transfers of water out of the CVP service area to urban water agencies have not occurred for several reasons, including environmental restrictions on pumps in the San Francisco Bay – Sacramento / San Joaquin River Delta (Bay-Delta). Transfers among agencies within the CVP service area have been slowed and even discouraged by Reclamation's application of CVPIA.

Before the Act, water agencies within the CVP routinely transferred water among themselves, often on short notice, in compliance with state law. Now, those transfers are subject to months of review by the Bureau. Moreover, CVP users believe that Reclamation is misinterpreting the CVPIA by applying the water transfers criteria intended only for the new transfers specifically authorized by the Act to historical 46 transfers within regions of the CVP. The result is that some once-routine transfers are now not possible.

Solutions - The Water Transfer Facilitation Act of 2009 (S. 1759) was introduced by Senators Barbara Boxer and Dianne Feinstein (CALIFORNIA) and is intended to facilitate water transfers among agencies within the CVP south of Delta service area by removing some of the bureaucratic impediments that discourage transfers or make them unnecessarily slow. This legislation would:

- Ensure that agencies transfer only water that they actually have and could otherwise use so that transferring agencies do not impact the supplies of other water users. These "consumptive-use" and "historic-use" safeguards make sense for transfers that would move water through the Delta from the Sacramento Valley to the San Joaquin Valley or to a region entirely outside of the CVP service area. But they don't make sense for transfers among agencies within the same region that are sharing the same limited regional water supply.
- Deem that the CVPIA "consumptive-use" and "historic-use" criteria are met by transfers among CVP water agencies ("contractors") in specific Divisions of the Project south of the delta.
- Ease this impediment and allow for improved management of surface and groundwater supplies. Transfers among the Friant CVP contractors on the East side of the Valley and neighboring non-CVP districts have historically been used to make the best use of groundwater storage opportunities. Reclamation's application of the CVPIA consumptive-use and historic-use criteria to these water-management transfers has made them more difficult, and in some cases impossible.
- Facilitate transfers within the entire CVP by directing the Interior Department to use existing authority to develop a programmatic environmental review of

CVP water transfers.

Many districts in the San Joaquin Valley will live or die by the success or failure of water transfers. In 2009, with only 10 percent CVP allocation, failure to transfer adequate supplies of supplemental water would have resulted in the loss of tens of thousands of acres of high value permanent crops. In 2009, a combination of prior regulation, three years of below normal precipitation and new Endangered Species Act regulations have resulted in a meager 10 percent allocation of CVP contract supplies to districts lying south of the Bay-Delta. Over 500 square miles of productive land were fallowed, threatening farms, families, cities and counties with unprecedented economic hardship.

Worse still, the U.S. Bureau of Reclamation has advised that in 2010 those water uses will receive only 30 percent water supply allocation under average hydrology and only 25 to 40 per cent allocation in the wettest of years. Prior to Biologic Opinions (B.O.s) rendered in the past two years, south of Delta CVP allocations averaged 65 percent. Current hydrologic modeling forecasts a decline of average annual allocations to 35 percent as a consequence of the recent smelt and salmon B.O.

The Bay-Delta is in crisis. Numerous species, habitat and levees are all in serious decline. Twenty-five million people and 3 million acres of prime agriculture depend on water supply from the Delta. There are many troubling causes for decline of Delta species including:

- Collapse of the food web
- Toxic runoff
- Invasive species
- Thousands of unscreened water pumps throughout the Delta
- Changes in ocean conditions

Despite all these other critical impacts, decline of Delta aquatic species has been historically blamed on the State Water Project and CVP pumps that support much of the State's population and agriculture. Until the primary causes of Delta decline are addressed, California's water supply security will continue to erode.

Under these increasingly dire circumstances, water users cannot survive without exercising all available tools, including the tools to be provided by S 1759, the Water Transfer Facilitation Act of 2009.

Source:

Martin McIntyre, General Manager, San Luis Water District has been personally responsible for oversight of numerous transfers and negotiating the withering gauntlet of agreements, administrative approvals, and regulatory processes required for a one time single year transfer. E-mail: martin.m3653@sbcglobal.net

Installing irrigation pipe in California's Central Valley. Photo courtesy of Provost & Pritchard Engineering Group.

Innovative Strategies for Sharing Water in the Colorado River Basin

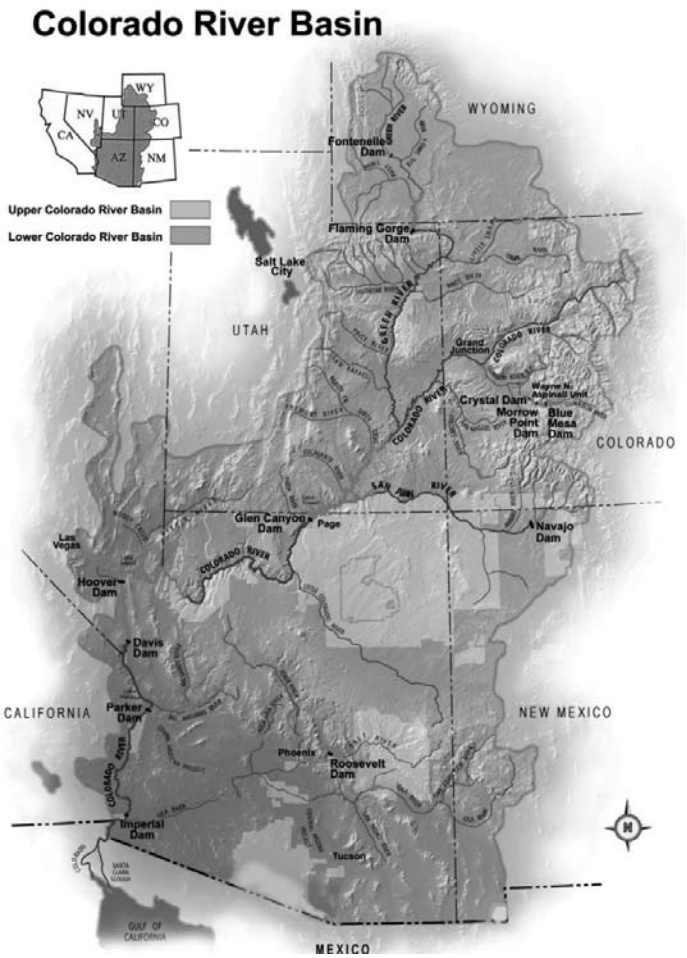
This case study summarizes efforts by the Agricultural/ Urban/Environmental Water Sharing Work Group to seek the most effective and innovative ways water can be shared for mutual benefit, without damaging agriculture or rural communities. This collaborative effort between diverse stakeholders intends to pinpoint obstacles to sharing, and to develop strategies to alleviate obstacles.

Background - Rapid population growth, urbanization and increased competition for water in the West have created significant pressures on certain agricultural sectors. Agriculture holds the most senior water rights in the West and is considered a likely source of water to meet growing municipal and environmental demands. Challenges We are facing a water crisis in the West. In the future, we know we will need:

- Water for more people moving to our cities from outside the region;
- Water to make up for anticipated climate change;
- Water for energy independence—including renewable energy;
- Water to protect and enhance our natural environment;
- Water to sustain recreational/tourism economy; and
- Water for agriculture.

Food Security - the need to feed more people and people eating higher on the food chain—has worldwide implications. Water obviously provides environmental benefits, including return flow for habitat. And that water generates social benefits, including increased viability of rural communities. Agriculture is particularly vulnerable because about 75% of the water in the west runs through agriculture. This water is an easy target, because farmers are facing unstable commodity prices. The aging farmer population is marked by those with heirs who have little economic incentive to farm, which means that agricultural water is a highly valuable asset for funding retirement and college educations.

Solutions - There are limits to how much water is or will be available and there are new and increasing demands on the limited amount available. Creative strategies will be required to best share the water in a way to:



- maximize positive benefits for and minimize detrimental effects on the environment; 49
- preserve and enhance economic stability; and
- preserve and enhance what we value about living in the West. Water can be innovatively shared, but roadblocks to innovative sharing must be identified and solutions found to remove them. A work group of diverse interests throughout the Colorado River watershed—agricultural, environmental, and urban—will:
- Determine the magnitude of water transfers from agriculture in the Colorado River Basin;
- Research past Colorado River Basin transfers that provide insights because of both the innovative sharing and the players who were behind the innovation;
- Identify those who are currently experimenting (either on the ground or theoretically) with innovative agricultural/urban/environmental water sharing schemes;

- Stage a two day "roll up your sleeves" workshop in August, 2010, for 20 participants to share information and formulate ideas for action.
- Prepare a "show and tell" toolbox of discovered innovative water sharing opportunities and obstacles to be reported in both written and documentary form; and
- Convey findings (in the form of a written report and a video) to the Western Governors Association, Bureau of Reclamation, and to other key Colorado River Basin water interests to inform and spur significant innovative action in this arena.

Though the initiative is aimed at finding solutions for the Colorado River Basin, the work group is investigating transfers throughout the West in an attempt to uncover best ideas for the Basin.

Participants - The key to this initiative is the diversity and credibility of Work Group members:

- Colorado Water Institute
- Colorado Water Conservation Board
- Environmental Defense Fund
- Family Farm Alliance
- Metropolitan Water District of Southern California
- The Nature Conservancy
- Western Governors' Association
- Western Urban Water Coalition
- Western Federal Assistance Support Team

The initiative will uncover best practices for maximizing water for the benefit of agriculture, urban uses, and the environment through innovative management/ sharing strategies. Rather than concentrate solely on transfers, which connote that you take from X and give to Y, it instead will seek to uncover how innovative management/sharing strategies, including environmentally sound groundwater and surface water storage, reuse, and others, can be used in conjunction with transfers to better meet sharing objectives.

Applications - This initiative will result in practical and significant guidance for:

- The Western Governors Association to use in adopting best practices for their states to employ in meeting goals they have set for themselves relative to transfers of water from agriculture;
- The Bureau of Reclamation to use as a piece of their Colorado River Basin Water Supply and Demand Study (which is part of the Department of the Interior's Water Conservation Initiative and a key element in Reclamation's implementation of the SECURE Water Act.) The Basin Study Program is intended to "better define options for future water management of Western river basins." Because the Colorado River Basin study is not just looking at supply and demand but what could work to manage basin water for best overall effect, this initiative can provide a key piece of the puzzle.

The working group hopes to distribute final products in late 2010.

Source:

MaryLou Smith
Colorado Water Institute
Colorado State University
E102 Engineering Building
1033 Campus Delivery
Fort Collins, Colorado 80523-1033
Phone: (970) 491-6308
E-mail: cwi@colostate.edu

Elephant Butte Irrigation District (EBID)

This case study discusses how EBID has taken an innovative and aggressive approach to tackle clean water and energy challenges and take advantage of the unique characteristics of the local watershed and irrigation project. The unique hydraulics of the EBID irrigation water distribution system offer optimal, environmentally-safe hydropower-generating potential.

Backdrop - On the water management end, EBID is developing enhanced measures to capture stormwater using drains and canal structures. The district is also contemplating building five offstream reservoirs to capture stormwater, slow down runoff, reuse water, and return water back into the river at the appropriate time. Installation of mobile water treatment plants allows stormwater to be treated for use in drip irrigation and other uses. That water can later be used to recharge aquifers. In-line storage provided by EBID's drains is now turning traditional drainages into habitat, places of recreation, and a source of water re-use. EBID has further implemented streamflow gage improvements by expanding the extent of the existing telemetry network and weather stations to upstream ranches, which improves the ability of district managers to predict flooding and alert local communities.

The district is also getting creative in the energy realm. Optimal hydropower-generating opportunities can be achieved by simply harnessing and utilizing the energy contained within the steady flow of irrigation water throughout the system. This potential was previously considered when the system was engineered and developed in the 1910s and 1920s by the U.S. Bureau of Reclamation. Now, for the first time, EBID is taking action in designing and constructing an innovative method for renewable energy that can help address the nation's energy challenges.

Project Description - The Rio Grande Project ("Project") was authorized as a federal Reclamation project under the Reclamation Acts of June 17, 1902 and February 25, 1905. EBID manages and maintains a gravity-flow irrigation surface water distribution system comprised of almost 600 miles of canals, laterals, drains, and wasteways located in Southern New Mexico and West Texas. Ninety-five percent of EBID surface water is derived from Southern Colorado and Northern New Mexico snowmelt and rainfall runoffs and is stored in

Elephant Butte Reservoir. Photo courtesy of U.S. Bureau of Reclamation.

the Elephant Butte and Caballo reservoirs located north of EBID boundaries. Based on demand of the agricultural crops grown in the area, water is released at the reservoirs and diverted from the Rio Grande into EBID canals for delivery to the irrigators. EBID drains allow for return flow to the river for reuse downstream.

The Lower Rio Grande system. Map courtesy of Elephant Butte Irrigation System.

Low-head hydropower turbine for EBID under construction. Photo courtesy of EBID.

Significance of Project - EBID delivers surface water to 90,640 acres of farmland for irrigation below Caballo Reservoir through the 110 mile river reach of the Rio Grande, often referred to as the "Ribbon of Life" that runs through this historic, agricultural and culture-rich valley in Southern New Mexico. A typical irrigation season will last about 240 growing days. Unlike many other areas of the West, which primarily rely upon stored snowmelt originating from upstream forested highlands as a source of summertime irrigation supplies, EBID also receives significant water supplies from monsoon floods.

Low-Head Hydropower Development - Hydropower is the largest renewable resource in the U.S., currently providing about eight percent of the nation's electricity. New technologies are creating ways to generate electricity in all kinds of waterways. EBID is taking the lead by fabricating low-cost, efficient turbines to support low-head energy production, utilizing generic brand generators and products that can be purchased "off the shelf." The New Mexico Energy, Minerals and Natural Resources Department (NM EMNRD) has partnered with the EBID in funding a hydropower pilot project to construct a small turbine drywell modular unit. EBID is collaborating with El Paso Electric Power Company to output energy onto the regional power grid and receive "green" energy credits for the hydropower produced. Revenues to EBID for providing power to the grid will go into the District's general fund, thereby reducing the assessments paid by constituents. The savings can then be reinvested by the farmers for irrigation improvements such as sprinkler or drip systems, which can be offset by the energy produced. The hydropower production will indirectly encourage irrigation modernization and water resource conservation within EBID.

EBID is providing engineering design, construction, and development and has identified potential sites for as many as 100 small hydropower units that could be built along control structures in the District's canals. A total of 5 low-head hydropower units will be installed at the pilot project site to fulfill the commitments with the NM EMNRD. EBID has already begun the process of locating other potential hydropower sites. The pilot project is sited on the Westside Canal, south of Las Cruces, where an existing drop structure was redesigned to house two (2) turbines which would each generate 10 kW of energy. The canal carries 500 cubic feet per second (cfs), and has a drop in water surface elevation of about four feet. The hydropower modular unit is offset from the canal and the canal water flow is diverted into the turbine dry well structure. The two turbines will generate electricity from the irrigation water that flows by gravity through the Westside Canal system.

The hydropower production will in no way interfere with irrigation operations. Instead of dropping the water to dissipate energy from the old canal structure, the new energy source of water will be diverted and will be converted to electricity in the fabricated modular turbine dry well unit that is offset from the canal. This hydropower generation site requires no water consumption since all water used during power generation is returned back to the Westside Canal for delivery to downstream irrigators.

Benefits - In-canal, low-head hydroelectric projects like the one developed by EBID have tremendous benefits and virtually no negative impacts. Historic structures can be retained while the system is updated with modern technologies. Increased revenues will result in lower irrigation costs to farmers. And, importantly, irrigation water delivery services can continue while utilizing water flow for clean, emissions-free "green" energy production. From renewable portfolio standards to comprehensive energy and climate strategies, hydropower offers a proven resource for clean, renewable power production.

Regulatory Challenges - Water providers like EBID who seek to implement multiple low head hydro-power

generation sites throughout their service area must undergo costly and time-consuming licensing processes, which impede their ability to contribute completely renewable, green energy. Under current regulations, anyone who wants to develop hydropower less than 5 megawatts (which would apply to virtually every single potential location within irrigation canals) can get an exemption from FERC licensing requirements. However, the process required to get that exemption can cost $100,000 and 18-36 months just to satisfy National Environmental Policy Act (NEPA) compliance requirements. The costs and time associated with the environmental compliance issues (noticing, public meetings, etc) can make projects that only cost $20,000 in materials suddenly become infeasible.

Meanwhile, new solar and wind projects can move full-steam ahead without these ridiculous licensing impediments. Common-sense dictates that the process for installing in-canal low-head hydro facilities (there may be 50,000 opportunities in the country) should be the same.

Solutions - EBID and groups like the Family Farm Alliance and National Water Resources Association are working with Congress, the Department of Interior, and the Federal Energy Regulatory Commission (FERC) to establish a policy that allows a special exemption from Federal Power Act licensing for these types of projects. The Alliance this year will be working hard to make it easier for Western irrigators like EBID to develop new low-head hydropower.

A preferable fix would be a new exemption category for low-head hydro in irrigation projects that does not require federal agency interaction. For more complicated projects that still fall under the existing FERC 5 megawatt exemption ceiling but exceed this new minimum threshold (whatever that may be), the process must be streamlined. The Bureau of Reclamation should also be encouraged to aggressively work with its water customers to find ways to get more low-head projects built into the existing delivery system.

Source:

Gary Esslinger
Elephant-Butte Irrigation District
P.O. Drawer 1509
Las Cruces, NM 88004
Office: 505/526-6671
Fax: 505/523-9666
E-mail: gesslinger@ebid-nm.org

PK Gills (ARIZONA)

The owner of an Arizona water management company is using her 30-year track record to help irrigation districts in the Southwest naturally and economically control water quality challenges, including those posed by aquatic weeds.

Background - Aquatic weed control is a serious business for Western water managers. If irrigation delivery systems become choked with aquatic growth, they are subject to catastrophic failure caused by water backing up and overflowing or breaching canals. Breaches can damage large expanses of property and pose a risk to public safety.

In the past, Western irrigation district managers controlled weed growth with costly and labor-intensive methods, such as scraping canal beds with heavy chains to uproot plants, scooping out vegetation with backhoes, or applying herbicides, such as acrolein. However, increased scrutiny from environmental activists and stringent regulations on chemical use in water ways has led some water managers to pursue more progressive and environmentally sound approaches to aquatic weed control.

Pat Ann Church, owner of PK Gills in Tempe, has assisted irrigation districts, and managers of lakes, ponds and wetlands to control water quality using natural methods, which can save money compared to using chemical treatment programs. Her main tools are live fish.

Challenges - In the past two decades, as the environment became a more critical public issue and chemical applicators were less likely to obtain liability insurance, Church began to focus on using fish, organic dye and aeration as more natural methods of keeping aquatic systems healthy. In the early days, chemical treatments were the preferred method of dealing with algae, aquatic weeds, and insect infestations. She was dismayed when lakes, repetitively treated with algaecides and herbicides, developed chemically-resistant algae. She believed the situation was similar to medical professionals over-prescribing antibiotics, or the difficulty of eradicating boll weevils with DDT.

Solutions - Ms. Church established a number of protocols relying on the natural food chain present in biological systems. Working with top limnologists and fisheries biologists, ADI contracted to manage thousands of acres of water throughout Arizona and the southwestern United States. While ADI was acquired by Aquagenix in 1998, her time at ADI gave Pat Church the opportunity to gather data through twenty four years of conducting routine observations. After ADI was sold in 1998, Ms. Church's passion for promoting fish led her to establish Fresh Catch Fish and PK Gills in 1999. These new companies build on her 56 experience and provide services to those seeking stocking recommendations, natural water quality management programs, or establishment of healthy sport fisheries in lakes. These services have proven to be effective in irrigation canals, too.

Roosevelt Irrigation District (RID) has been serving west Phoenix since the 1920's via 50 miles of main canals and 185 miles of laterals. The district supplies a mix of reclaimed water and groundwater to agricultural and other users, and for many years, used the aquatic herbicide acrolein to control aquatic weeds. Safety and mechanical concerns associated with the "wand and pressure" system used to apply the herbicide, as well as high chemical costs, convinced initially skeptical district managers to make the leap to fish in 1992. Chemical treatments were completely disbanded and RID stocked a mixture of live fish worth $70,000, considerably less than the $600,000 previously spent on the acrolein program. To the surprise of RID managers, after the fish were added, the water quality met or exceeded their expectations. While a few pockets of sago pondweed did remain after the first year of the fish program, the pondweed challenge was dealt with by adjusting stocking densities. RID have been using fish ever since, which has freed up budget spending for priorities like upgraded facilities and new trucks.

Each year, RID conducts a "dryup" of its canal and lateral systems to perform necessary repairs and maintenance. Most of the fish are lost during that time. Still, Pat Church maintains that replacing the fish annually makes better economic sense then managing aquatic weeds with chemicals 12% of their prior chemical expenditure. Church also established a fish program for Roosevelt Water Conservation District (RWCD), which conducts its annual maintenance by lowering the water level, as opposed to the full dryup utilized by RID. This method retains the existing fish population, reducing the need for annual stocking.

Church has also provided fish to the two largest water projects in Arizona – the Salt River Project (SRP) and the Central Arizona Project. As Arizona's largest water supplier, SRP delivers approximately 326 billion gallons of water to metropolitan Phoenix each year through its 131-mile canal system. Aquatic weeds pose a constant challenge. SRP launched an innovative experiment in the mid 1980s that involved the use of white amur fish to clear the canals of weeds. According to SRP, the white amur, a type of carp native to China, was selected for its ability to control filamentous algae and weeds at a wider range of temperatures than most other fish.

Once in the canals, the fish become accustomed to significant temperature variations and abrupt water chemistry alterations resulting from source water changes and storm water runoff. A seven pound white amur can eat nearly three-quarters of its weight in weeds every day. The White Amur Fish Program saves SRP hundreds of thousands of dollars in annual operating costs and promotes innovative and environmentally friendly water management practices, according to the Salt River Project website dedicated to this unique program.

Source:

Pat Church
PK Gills
Phone: 480-456-0744
E-mail: pchurch@contact.net.nz

Salt River Project White Amur Fish Program
Groundwater Department
Phone: (602) 236-5304 or (602)236-2416

Weed and algae choked canal in Arizona. Photo courtesy of PK Gills

APPENDIX:
Teetering on the Edge of the Dark Ages

The Obama Administration recently announced plans to launch a campaign focusing on a rural "renaissance". U.S. Department of Agriculture (USDA) Secretary Tom Vilsack has pledged that the government needs to try new approaches to reverse trends that show rural America is aging[12]. The Secretary correctly noted that rural incomes are falling farther and farther behind those Americans who reside in urban and suburban areas. A renaissance is needed, because farmland is disappearing and we are in danger of losing a generation of farmers. We will need every family farmer we can muster to confront the world hunger challenges that face us in the next 40 years. Ignoring this critically important problem could plunge us into a Dark Age of food security.

Disappearing Small Family Farms

The number of farms is declining throughout America, including the West:

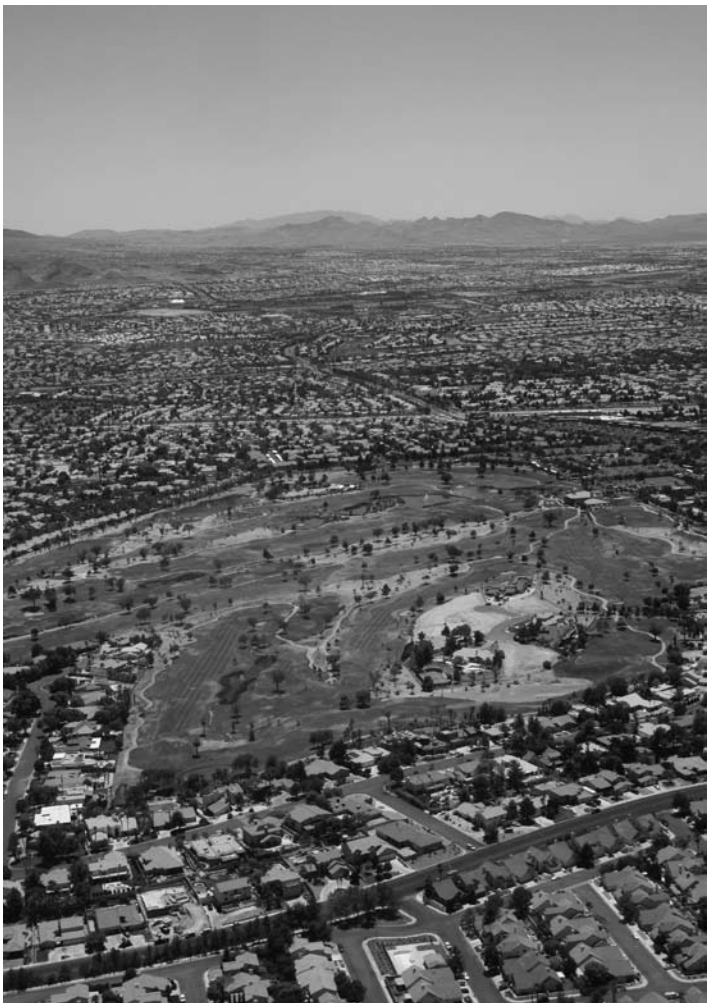
- According to the U.S. Department of Agriculture[13], nationally in 2007, 930.9 million acres were dedicated to raising crops and livestock, down 1.5- million acres from the previous year.
- The total number of farms in 2006 dropped by 0.6 percent to 2.08 million.
- USDA records indicate that 442 million acres of U.S. soil grew crops in 2002, down 28 percent from 1978 and the lowest figure since World War II.
- The American Farmland Trust (AFT) estimates that 86 percent of the country's fruits and vegetables and 63 percent of its dairy products are produced in areas affected by urban sprawl.

American Farmland Trust is committed to protecting the nation's farm and ranch land, keeping it healthy and improving the economic viability of agriculture. AFT strongly advocates that we have a responsibility to protect this most valuable resource for future generations. Consider these other AFT findings[14]:

- **Every single minute of every day, America loses two acres of farmland.** From 1992-1997, we converted to developed uses more than six million acres of agricultural land—an area the size of Maryland.
- **We lost farm and ranch land 51 percent faster in the 1990s than in the 1980s.** The rate of loss for 1992-1997, 1.2 million acres per year, was 51 percent higher than from 1982-1992.
- **We're losing our best land—most fertile and productive—the fastest.** The rate of conversion of prime land was 30 percent faster, proportionally, than the rate for non-prime rural land from 1992-1997. This results in marginal land, which requires more resources like water, being put into production.
- **Wasteful land use is the problem, not growth itself.** From 1982-1997, U.S. population grew by 17 percent, while urbanized land grew by 47 percent. Over the past 20 years, the acreage per person for new housing almost doubled; since 1994, 10+ acre housing lots have accounted for 55 percent of the land developed.

USDA attributes the decline in the number of farms and land in farms to a continuing consolidation in farming operations and conversion of agricultural land to nonagricultural uses. America's farmland is rapidly turning over to other uses, primarily residential development. And once productive farmland is converted to residential or commercial use, it is practically impossible to bring it back.

One of the most troubling aspects of the on-going farm crisis is the decline in the number of young farmers entering the field. More than half of today's farmers are between the ages of 45 and 64, and only six percent of our farmers are younger than 35[15]. Fewer than one



million Americans list farming as their primary occupation and among those, 40 percent are age 55 or older. Both statistically and anecdotally, for the first time in many generations we see sons and daughters of farmers opting to leave the family farm because of uncertainty about agriculture as a career.

Meanwhile, Western irrigators continue to make more food and fiber with less water and land. For example, the California Farm Bureau Federation reports that, between 1980 and 2000, water use and irrigated acreage in California decreased, yet crop production still rose 35 percent[16].

Irrigated Agriculture is an Important Cog in our Nation's Economic Engine

Western water policy, over the past one hundred years, is one of the great success stories of the modern era. Millions of acres of arid Western desert have been transformed into the most efficient and productive agricultural system in the world.

The Bureau of Reclamation (Reclamation) is the largest supplier and manager of water in the 17 western states west of the Mississippi, excluding Alaska and Hawaii. It maintains 480 dams and 348 reservoirs with the capacity to store 245 million acre-feet of water. These facilities deliver water to one in every five western farmers to irrigate about ten million acres of land, and provide water to over 31 million people for municipal and industrial (M&I) uses as well as other non-agricultural uses. Reclamation is also the Nation's second largest producer of hydroelectric power, generating 44 billion kilowatt hours of energy each year from 58 power plants. In addition, Reclamation's facilities provide substantial flood control and benefits to recreation and fish and wildlife habitats. All of this has been done for a total federal investment of $11 billion (U.S. Bureau of Reclamation).

Secretary of the Interior Ken Salazar in early 2010 released a first-of-its-kind report, *Economic Impact of the Department of the Interior's Programs and Activities*, is the first-ever analysis of the job creation and economic growth benefits associated with a wide range of departmental activities, including those related to Reclamation's irrigation and hydroelectric projects in the West. The report estimates that Reclamation's total estimated economic impact is $39.5 billion, impacting an estimated 261,200 jobs. Reclamation's irrigation activities generated an estimated 193,000 jobs and an economic impact of $25.3 billion, dwarfing the combined economic impacts ($14.2 billion, 68,200 jobs) associated with the bureau's hydropower, municipal and industrial water, and recreation functions[17].

A 1998 study[18] by Dr. Darryl Olsen and Dr. Houshmand Ziari, estimated that Reclamation's projects return $12 billion annually to the economy. In other words, the economy of the United States receives a greater than 100% return each year on its initial $11 billion annual investment.

Western Farmers and Ranchers Are Needed to Feed a Hungry World

We are facing a very real food crisis in the world today. The Food and Agriculture Organization of the United Nations (FAO) in June 2009 reported that over 1 billion people world-wide go hungry every day. FAO estimates that 62 percent of undernourished people live in either Africa or South Asia, most of who are small farmers or

rural landless laborers living in the countryside. And the problem will only get worse. The world's population is growing by 79 million people each year, the equivalent of two Californias. The FAO estimates that the world will need to produce 70 percent more food by 2050 to keep pace with population growth and increased demand for calories[19].

G-8 agricultural ministers at a summit last year committed to increase international assistance for agricultural development to $20 billion over the next three years. This year's budget, and President Obama's budget request for next year, put the United States on track to provide at least $3.5 billion of that total. These actions will surely give the world's hungry a reason for hope by tackling food security with a renewed commitment to agricultural development in other countries[20]. However, similar focus should be placed closer to home, where only two percent of the nation's population produces food for our country and the world[21]. Our own farmers and ranchers are subjected to increased regulations and related uncertainty that is making it harder to survive in a harsh economy. Putting just a part of that group out of work will impart huge limitations on our future ability to feed our country and the world.

A "Rural Renaissance" in America Is Needed.... With Caveats

The Obama Administration recently announced plans to launch a campaign focusing on a rural "renaissance". U.S. Department of Agriculture (USDA) Secretary Tom Vilsack has pledged that the government needs to try new approaches to reverse trends that show rural America is aging. The Secretary correctly noted that rural incomes are falling farther and farther behind those Americans who reside in urban and suburban areas.

These demographics are alarming to family farmers and ranchers throughout the 17 Western States, and they should serve as a wake-up call to the nation and the world. To reverse this decline, Secretary Vilsack is proposing to build USDA's new "Regional Innovation Initiative" on five pillars: 1) improved and expanded rural broadband; 2) biofuels and biobased products; 3) linking local production with local consumption of farm products; 4) ecosystem markets to pay farmers for storing carbon; and 5) forest restoration and private land conservation. At the same time, the Obama Administration and recent efforts in Congress have focused on tackling food security with a renewed commitment to funding agricultural development and helping farmers in other countries.

The Obama Administration's attention to the plight of rural America by looking for new ways for farmers to improve their cash flow is an encouraging first step. Supporting an expanded agricultural base in foreign countries is also admirable. However, American farmers and ranchers have a proven track record of producing safe, affordable and bountiful food and fiber. Why not look at those things that can be done to encourage them to do what they are very good at doing, and finding ways to bring along a new generation farmers that continue what their forefathers did? This objective can be reached, and the Regional Innovation Initiative can be a vehicle to get there, but the ride will be a lot smoother only if certain other realities are imbedded in its implementation, as described below.

On-Farm Energy Opportunities - USDA has launched

its first-ever national survey of on-farm energy production, as the agency looks for new opportunities to promote farm-based renewable energy projects[22]. The new survey of the 20,000 American farms using methane digesters, solar panels and wind turbines is part of a larger effort from the Obama administration to promote rural energy production, a key component of the Regional Innovation Initiative. As described in this report, there are tens of thousands of opportunities in the West to install low-head hydroelectric power facilities in existing irrigation canals. Because there are virtually no environmental impacts associated with these easy-to-build renewable projects, they should also be promoted and be accorded the same streamlined- permitting as new solar and wind projects.

Water Impacts Associated with Biofuels and Alternative Energy - The potential water impacts associated with use of alternative fuels and power generation must be studied. For example, some of the most widely used and economical solar-energy technologies require significant amounts of water, as much as or more than the coal, natural-gas or nuclear power plants the solar projects are meant to replace.[23] Throughout the West, we are also seeing proposals to build plants to make ethanol, another "answer" that may (or may not) lower greenhouse gas emissions. An April 2007 *Sacramento Bee* editorial provides a reality check on how much water it would take to grow all the corn required to meet California's goal of producing a billion gallons of ethanol a year. According to the Bee's calculations, that's about 2.5 trillion gallons of water for 1 billion gallons of ethanol, which is more than all the water from the Sacramento-San Joaquin Delta that now goes to Southern California and valley farms. Because there is only so much water for agriculture in California and other Western states, this means that some other existing crops will not be grown, thus furthering our dependence on imported food sources[24].

"Local Production for Local Consumption": Limitations and Opportunities - Consumer interest in locally grown foods has been catalyzed by farmers' markets and community-supported agriculture. Unfortunately, the movement to grow local, organic food is not going to save the world. Robert Paarlberg, a political scientist writing in Foreign Policy, argues that solving the world hunger crisis is going to require more of the very food production methods that trendy restaurant owners and food columnists criticize: modern seeds, cheap fertilizer, and the ability to sell food to faraway consumers. That will require "learning to appreciate the modern, science-intensive, and highly capitalized agricultural system we've developed in the West".

"Without it," Paarlberg says, "our food would be more expensive and less safe. In other words, a lot like the hunger-plagued rest of the world"[25].

With that said, the growing interest in local foods offers an important opportunity to educate the public and policy makers on the national importance of providing multiple production zones[26] in the West, capable of providing diverse, flexible and redundant locations to produce food supplies.

Importance of Food Production Redundancy - One of the dangers of our current food system is that it tends to concentrate production of many crops into small geographic areas. While economically advantageous for processors, the practice leaves significant portions of the nation's food crops vulnerable to pathogens, plant diseases, bioterrorism and vagaries of weather[27]. In recent years, Americans experienced this first hand when an *E. coli* outbreak in California' Salinas Valley – which grows nearly 80% of the country's lettuce and more than half its spinach – led to the virtual disappearance of bagged spinach from American grocery shelves. When heavy rains hit central Illinois in late 2009, the bulk of the nation's crop of canning pumpkins was ruined, making a once-plentiful product instantly scarce. And a major citrus shortage was likely averted when recent drought (in Florida) and frost (in California) disasters that sent citrus prices through the roof did not occur concurrently.

A stable and diversified domestic agricultural base would do much to improve our food security. However, the redundancy this would provide implies that our country has surplus agricultural operations underway to meet that need. As outlined earlier in this report, that is clearly not the case.

Compensating Farmers and Ranchers for Ecosystem Services - Farmers are stewards of our natural resources and are an important part of our rural and national economies. The rural communities they have built also have characteristics and values that are a unique part of our national culture. Society is benefitting from keeping that land open and green. We can find ways to keep them in business and invigorate their communities by exploring means to compensate farmers for the environmental benefits that accrue by keeping their land in farming[24]. While some look to carbon-trading arrangements where businesses offset carbon outputs by paying farmers to take steps to sequester carbon in their soils, this concept could be expanded by recognizing the role of farmland to provide "ecosystem services". Secretary Vilsack's new initiative proposes encouraging ways to assist rural communities through forest restoration and private conservation. Case Study 2 provides an existing example of a locally-led conservation effort in Wyoming that could be used as a template for future such projects in other parts of the West.

The Need for A National Goal of Remaining Self-Sufficient in Food Production

American family farmers and ranchers for generations have grown food and fiber for the world, and we will have to muster even more innovation to meet this critical challenge. That innovation must be encouraged rather than stifled with new regulations and uncertainty.

Unfortunately, many existing and proposed federal policies on water issues make it difficult to survive, in an arena where agricultural values are at a disadvantage to ecological and environmental priorities. In the rural West, water is critically important to farmers and ranchers and the communities they have built over the past century. However, in recent decades, we have seen once-reliable water supplies for farmers steadily being diverted away to meet new needs. Rural farming and ranching communities are being threatened because of increased demand caused by continued population growth, diminishing snow pack, increasing water consumption to support domestic energy, and emerging environmental demands.

The federal government needs to 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. In our own country, that means finding ways to keep farmers and ranchers doing what they do best, and to further encourage young farmers to follow in their footsteps.

The Disconnect Between Water Policy and Rural Policy

Right now, it seems that water policies are being considered separately from foreign and domestic agricultural goals. In the past year, federal agencies have steadily re-written numerous environmental policies that - if not checked – could carry the risk of real potential harm for Western agricultural producers. The list of new rulemaking and other potentially burdensome regulations continues to grow, and includes:

- Economic and Environmental Principles & Guidelines for Water and Related Resources Studies. The White House Council on Environmental Quality (CEQ) has drafted new standards for federal water projects that for the first time put environmental goals on the same plane as economic development concerns. These proposed changes may have a significant impact on new water project planning and federal

funding in the future.

- More stringent EPA pesticide restrictions, which increases costs, liabilities, and risk of crop damage to Western producers;
- EPA reconsideration of the "Water Transfers Rule", which could potentially subject water transfers throughout the nation to pollution permitting requirements. This would have major ramifications in states like California and Colorado, where huge amounts of water are transferred every year.
- USFWS consideration of wide-ranging revisions to the ESA that could lead to greater legal exposure to water users with ties to federal projects.
- USFWS revisions to designations and habitat associated with ESA-protected species, including Western bull trout, the California red-legged frog, Greater Sage Grouse, and Pacific smelt which could lead to even more restrictions on western lands and water users, including family farmers and ranchers. .
- CEQ intent to "modernize and reinvigorate" the National Environmental Policy Act (NEPA). Western irrigators and others in the regulated community fear that the net result of these changes will be more expense, delay and bureaucracy in pursuing federal actions.

Many of the above administrative changes are drawing praise from environmental organizations that have been advocating them for some time. The Family Farm Alliance hopes that the Administration will give equal consideration to the concerns of agricultural organizations.

We pledge to work with the Administration, Congress, and other interested parties to build a consensus for improving the regulatory processes associated with improving water systems. At a minimum, federal policies on these and various other water-related issues (Clean Water Act, aging water infrastructure, climate change, land-use, to name a few) should be informed and guided by the goals of preserving our domestic agricultural production capacity and the vitality of rural western communities.

Conclusions

Europeans aggressively protect their farms and food production capability because they still remember the hungry years during and after World War II when they relied on other nations, America in particular, to feed them. The time has come – indeed, it's long overdue – for the United States to similarly adopt an overriding national goal of remaining self-sufficient in food production.

It's hard to imagine a simpler or more important step to safeguard the American public.

The Alliance has a long track record of providing grassroots-driven, practical solutions to the difficult resources challenges faced by Western farmers and ranchers. This case study report will provide yet another tool that will be used to work with policy makers towards this end.

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