

Answers to Questions for Mr. O'Toole
Water & Power Subcommittee Hearing- June 6, 2007

Questions from Senator Cantwell:

1) You mention the need for expanding the water supply in the West through new storage projects that will make water available to farms and cities.

- *What type of storage projects has the Alliance and its members been contemplating?*

The Board of Directors of the Family Farm Alliance in 2005 launched an aggressive and forward looking project that pulled together a master data base of potential water supply enhancement projects from throughout the West. Our goal was to gather together ideas from around the West and put them into one master data base.

The types of projects contained in the resulting Western Water Supply Enhancement Study database are not monstrous dams like China's Three Gorges project. Instead, they are supply enhancement projects that range from canal lining and piping, to reconstruction of existing dams, to integrated resource plans. There are also some very feasible new surface storage projects. The benefits from these projects include providing certainty for rural family farms and ranches, additional flows and habitat for fish, and cleaner water.

Along with basic information included on a CD-ROM, the database that was generated from the compilation of the survey has a Global Information System (GIS) element and includes pictures, maps and a description of up to 500 words for each project or proposal. New GIS format technology is embedded that permits viewers to see a map of 17 Western states and then "drill down" to see map details of a project area. If you would like, we can make copies of the CD-ROM available to your committee. We welcome all constructive comments.

The Initiative shows that, in most areas of the West, water resources are available and waiting to be developed. However, the policies of the federal government make development of that water nearly impossible. Water wars are being fought throughout the West simply because we have not had the vision to develop new, environmentally sound, sources of water.

- *Can you give some examples?*

There are over 100 projects included in our data base. Some specific projects include:

- **Water for Irrigation, Streams, and Economy Project (WISE)**, a collaborative effort in Oregon to improve the health of the Little Butte Creek and Bear Creek systems and increase the effectiveness and efficiency of local irrigation districts. The WISE Project utilizes a combination of strategies including: piping and lining canals, increasing the storage capacity of selected reservoirs, and installing a pumping system that will provide

access to water that has been allocated for agricultural purposes. Collectively, more water will be available for management for irrigation and environmental instream purposes.

- ☛ **Sites Reservoir** has been identified by the Department of Water Resources and the CALFED Program as one of the most cost-effective and environmentally beneficial new facilities under consideration in California. The Sites project would enhance water supply reliability for environmental, urban and agricultural uses throughout the state. It would provide water supplies in average and dry years for urban, agricultural and environmental purposes, increase San Francisco Bay-Sacramento / San Joaquin Delta outflows during critical times, improve flood control, enhance groundwater recharge, bolster fish flows, and improve flexibility for existing projects, such as Shasta Reservoir. Sites reservoir can greatly increase reliability of water supplies by reducing water diversions on the Sacramento River during critical fish migration periods.
- ☛ **Strawberry Valley Rehabilitation and Betterment Projects** (Utah) are proposed to decrease the water seepage and losses in the Strawberry Valley Project, as well as provide gravity pressure for the continued migration toward sprinkler irrigation systems, which would then provide additional water savings. These projects could save approximately 15,000 to 20,000 acre-feet of water per year in an agricultural area that is rapidly urbanizing.
- ☛ **Farmington Groundwater Recharge Program.** This \$33.5 million effort is lead by Stockton East Water District (California) in partnership with the U.S. Army Corps of Engineers to contribute to restoration of local aquifers and to repel saline water intrusion. The Program seeks to rotate water with other land-uses via short- and long-term agreements with landowners, and develop permanent recharge facilities. The recharge facilities also provide seasonal habitat for migratory waterfowl. This will provide an additional water supply yield to the region of approximately 17,000 acre-feet annually.
- *Obviously, there will be environmental concerns associated with any new surface water storage projects. Moreover, increasing temperatures means more reservoir evaporation, resulting in some loss of the water supply that storage might otherwise make available. In your opinion, is it possible to address those issues and move forward with storage projects that will ultimately have broad support from a number of different stakeholders?*

Environmental Impacts

Individual surface storage proposals must be evaluated and the associated benefits and risks must be viewed in a net, comprehensive manner. While some environmental groups focus on perceived negative impacts associated with new facility construction (e.g. loss of habitat, disruption of “natural” stream flow patterns, and potential evaporative losses), these perceived impacts must also be compared to the wide range of multi-purpose benefits that storage projects

can provide. Properly designed and constructed surface storage projects provide additional water management flexibility to better meet downstream urban, industrial and agricultural water needs, improve flood control, generate clean hydropower, provide recreation opportunities, and – yes, create additional flows that can benefit downstream fish and wildlife species.

Evaporation

Potential increasing temperatures and associated increased evaporation must also be evaluated for new storage projects on a case-by-case basis. Evaporation is a function of several variables, including temperature, wind and the surface area of the reservoir. Sometimes, new reservoirs might actually result in lower evaporative losses than is the current case.

Consider, for example, Oregon's Long Lake basin, located just west of Upper Klamath Lake, the principal reservoir for the Klamath Irrigation Project. A recent editorial board article in the Klamath Falls *Herald & News* explains how putting in earthen dams in the mostly dry Long Lake could create a reservoir with about the same storage capacity as Upper Klamath, but with only about 10 percent of the surface area. It would be about 160 feet deep, compared to an average depth of just 8 feet for Upper Klamath Lake. Upper Klamath's annual water loss to evaporation is 290,000 acre-feet. The projected annual loss from a Long Lake Reservoir would be 8,000 acre-feet. That's a huge difference – and a huge benefit. So is the fact that the water from such a reservoir would be much colder than water from Upper Klamath.

Stakeholder Support for New Projects

Some people and organization oppose dams as a matter of dogma. They have no flexibility when it comes to surface storage. But experience teaches us that solving complex problems requires a great deal of flexibility. It also requires the collective efforts of reasonable, well intentioned people who may come at the problem from entirely difference perspectives. Surface storage isn't the solution in all cases, but dismissing it out of hand serves no good purpose.

Creative, successful solutions can be found by motivated, unthreatened parties. The holders of water rights approach the Western water supply problem with much at risk, and with much to offer in the form of practical experience managing the resource on a daily basis. Incentives that create reasons to succeed will do more good for the environment in a shorter period of time than actions that rely on threats of government intervention.

- ***Given the cutbacks in water supply funding over the last several years, do you envision that water users will be able to pay for a majority of any new water supply infrastructure?***

Those who benefit from new water supply infrastructure should help pay for that infrastructure. For the most part, new water supplies are not being proposed to meet the expanding needs of agriculture. On the contrary, we are seeing a move in the opposite direction, where agricultural

lands are going out of production and being lost to expanding urban development. Water that was originally established for agriculture and the communities it supports is now being reallocated to meet new growing urban and environmental water demands. The growing numbers of urban water users in the West and the public interest served through improved environmental water supplies should naturally be part of equitable financing schemes.

The President and Congress will prioritize whatever federal funds are available to meet existing and future needs. As for the rest of the capital, it must come either from state and local governments or from the private sector. If the federal government cannot fund the required investments, it should take meaningful steps to provide incentives for non-federal entities to fill the void, and remove barriers to the new ways of doing business that will be required.

In this time of tight budgets and huge overseas spending, the federal government must adopt a policy of supporting new projects to enhance water supplies while encouraging state and local interests to take the lead in the implementation of those projects.

2) Your testimony identifies as a priority, the need for research that would validate projected climate-driven changes in streamflow; and which would then be coupled with a plan addressing the new storage and conservation targets essential to compensate for the changed hydrology. You also suggest the need for a comprehensive assessment of changes in agricultural land and water use over the last decade.

- *In your opinion, should the Federal government lead such a research effort? If so, who should take the lead? Is any one agency equipped to carry out such a large task?*

No. Rather, this type of study lends itself well to a private-public partnership that would add non-governmental farming organizations, state agencies and academic institutions to a team of federal agencies like the Natural Resources Conservation Service, Bureau of Reclamation, and U.S. Geological Survey. For example, the Family Farm Alliance has partnered with Colorado State University and recently developed a proposal to the U.S. Department of Agriculture for a project that would assess public attitudes and perceptions regarding agricultural water use in the West. A similar type of proposal – one that involves producers, state and federal agencies, and academia - could be developed to create a partnership of the above agencies and other entities to collaboratively lead a climate change / hydrology research effort. We would be happy to further coordinate and detail such a proposal.

Questions from Senator Salazar:

1) Are the existing reservoir storage capacities capable of handling the early snowpack melts?

There are several reports that suggest existing reservoirs will not be capable of safely accepting the earlier, more intense snowmelt. As noted in our written testimony, a report released last year by the State of California predicts that climate change will result in a drastic drop in the state's drinking and farm water supplies, as well as more frequent winter flooding. The report suggests that warmer temperatures will raise the snow level in California mountains, producing a smaller snowpack and more winter runoff. This means more floodwaters to manage in winter, followed by less snowmelt to store behind dams for cities, agriculture, and fish. Water resources experts in other parts of the West also realize that new surface water storage projects may be necessary to capture more snowmelt or more water from other sources.

Some Western water managers believe there will likely be a "rush" to re-operate existing multi-purpose projects to restore some of the lost flood protection resulting from the changed hydrology associated with climate change. These projects were designed to provide a certain level of flood protection benefits that will be reduced because of more "rain flood"- type of events. There will be a call to reduce carryover storage and to operate the reservoirs with more flood control space and less conservation space. If this is done, it will even further reduce the availability and reliability of agricultural water supplies.

Further, many water users are located upstream of existing reservoirs. These users must then rely on direct or natural that is primarily fueled by snowmelt. In the Rocky Mountain West, snowmelt traditionally occurs during the onset of the irrigation season. Since conveyance systems are never 100% efficient, water is diverted, conveyed and spread on the land in excess of the net irrigation demand. This surplus returns to the stream and recharges groundwater aquifers, which augments water supplies for all users located downstream from the original diversion. If more runoff were to occur during warm cycles in winter before the onset of the irrigation season, this would impact the utility associated with these return flows.

One priority research item should be a comprehensive validation of West-wide changes in climate change-driven streamflow. This should be followed by quantification of the amount of additional reservoir storage, conservation targets, etc required to re-regulate this change in hydrology. To optimize beneficial use, storage should be spaced through the drainage and located at high and low elevations to regulate and subsequently re-regulate the water supply to maximize beneficial use.

2) What are the best options you believe are available to adapt to global warming impacts on water supplies in the West?

In our written testimony, we elaborated on general actions that should be prioritized to allow us to mitigate climate impacts to Western water supplies:

- a) Implement a Balanced Suite of Conservation and Supply Enhancement Actions;
- b) Streamline the Regulatory Process to Facilitate Development of New Infrastructure; and
- c) Prioritize Research Needs

Also, many of the West's Reclamation projects are nearing a century in age and are badly in need of repair. Rehabilitation measures should focus on maximizing the conservation effort through increased delivery efficiencies, construction of re-regulation reservoirs to prevent operational waste, and construction of new dams and reservoirs in watersheds with inadequate storage capacity to increase beneficial use and provide operational flexibility. Conjunctive management of surface and groundwater supplies should be encouraged. Installation of additional stream gauges, water meters, groundwater monitoring wells and better estimates of consumptive use are of paramount importance for the equitable management of available water supplies.

3) Have conservation efforts been effective in reducing water demand or have increases in population in the West negated the savings from conservation?

Yes – conservation efforts have been effective, but it strains credibility to believe that conservation alone will supply enough water for the tens of millions of new residents expected to arrive in Western cities during the coming decades. Also, conservation does not work in many cases, especially where the desire is to increase in-stream flow. Water that is conserved tends to be used by the next junior downstream appropriator and the flow remains the same.

In our written testimony, we provided several examples from throughout the West, where creative measures have been taken to develop and efficiently manage water resources for irrigation. These examples represent just a handful of the creative water management programs that Western irrigators are working on. Efforts to conserve water in urban areas have also been impressive, particularly in the Southwest.

In Las Vegas, description of a specific experience may provide the best response to Senator Salazar's question. The Southern Nevada Water Authority (Authority) has imposed dramatic conservation measures in the urban areas around Las Vegas. Consider the following:

- ☞ As of March 2006, a program developed to pay customers \$1 per square foot to remove lawns had already spent \$56 million.
- ☞ New restrictions were imposed on landscaping.
- ☞ Use of recycled water was stepped up dramatically.

- ☞ Casino-hotels along the Las Vegas Strip have made significant investments in water features, capturing and treating grey water and using recycled water.
- ☞ A stiff four-tier rate structure was imposed, as were high connection charges.

With conservation measures in place, southern Nevada reduced water use by 65,000 acre-feet in two years. However, despite these aggressive conservation actions, the Authority is moving with equal determination to develop new water supplies in other parts of the region, since probabilities of shortages on the Colorado River are likely going to increase over time. As noted in our written testimony, the Authority is already planning to take groundwater out of aquifers under the Utah-Nevada state line and pipe it to Las Vegas.

So, this particular example – which describes some of the most innovative and aggressive conservation measures undertaken in the West – suggests that even the highest level of conservation is insufficient to keep up with new demands caused by new residents moving to Las Vegas.

4) Do you believe that climate change impacts on water supplies will have to be considered when making commitments about future water deliveries?

Yes – with attached qualifications. Proper planning of any water resources project includes thorough hydrologic assessments and modeling of potential future scenarios. These scenarios can include a range of variables, including population projections, financial predictions, and weather/ climate scenarios. However, caution should be employed when making commitments about future water deliveries, especially where climate change is concerned. Policy makers must understand the incredible uncertainty and high range of variability inherent in climate change predictive models before considering using these models as a basis for commitments.

It often appears that agency modelers will expend seemingly endless amounts of funding based on their hope to create predictive tools, even though we are decades or more away from models that will have enough reliability to commit money or other resources. Climate scientists love their models, but when asked if they have enough confidence in them to make irreversible commitments of resources, the message becomes a more subdued "no, but we hope to get there".