From: BJ Miller
Sent: Thursday, February 19, 2004 4:26 PM
To: Guivetchi, Kamyar
Subject: the future

Kamyar,

Please forward this to the AC. It is my attempt to describe California's water future, including some example numbers. Some of what is in this document is included in the Ag Caucus comments.

John Mills suggests that variations on this general scenario might be described along with the significant effects of these variations. For example, you could have a high ag-urban-enviro efficiency without surface storage and see how much ag transfers are needed to make things balance. You could then examine the general effects of that scenario in a "what if" fashion.

I think this could be done for several variations by way of giving people examples of the future. It could be done not so much as a way of deciding what is right and what is wrong but, rather, what will happen under various courses of action.

This could be done in general terms now and in much more detail later.

My concern is that, without something like this, we are going to produce a happy talk document, one that leads the reader to believe that everything is going to be all right and there won't be any adverse effects. I don't think that is the case. There could be some significant adverse effects. Water costs could increase a lot. Environmental needs might not be met. Agricultural/rural areas could suffer or, if transfers were structured properly, they could prosper.

Somehow we have to describe those possibilities, to the extent that they are realistic, and I think we should be doing that from the get go, not just later.

Thanks.

BJ

Submitted by BJ Miller
on 2/19/04

DRAFT
CALIFORNIA'S WATER FUTURE
AN OVERVIEW
February 16, 2004

Too see California's water future we need only to look at its present and recent past. The key features are as follows:

More water is being dedicated to environmental uses.

Inter-basin import projects no longer reliably deliver water that seemed certain in the late 1980s. Environmental constraints are one reason for this. Competition from other water users is another.

In response, urban and agricultural water agencies and individual water users are carrying out a variety of water saving, water banking, water transfer, and water exchange projects, projects that were barely being considered only 15 years ago. Some urban agencies are actively pursuing desalting plants.

These agencies may have previously counted on ever-increasing imports, but they are now putting increasing reliance on local and regional projects. These projects may be more expensive than imported water would have been. For the future, they are more reliable than imported water would be.

Some of the increased cost has been offset by public funds. As long as federal and state funds are available, these offsets will continue.

The state's water future will assuredly consist of more of the same. More water will be allocated for unmet environmental needs. Urban and agricultural water agencies will implement more water saving, banking, and transfer projects. More water will be desalted. State and federal funds will help pay for local and regional projects, as long as those funds are available.

While these general patterns will continue, changes can be expected.

Local and regional projects will tend to cost more on a dollar per gallon basis. The cheaper projects will be built first, leaving more expensive ones for the future. At some point, local and regional projects can cost more than ratepayers are willing to pay. This is especially true for agricultural users, for whom the cost of water is a much greater share of their income than for urban users.

Federal and state funds can help offset these costs, but state and federal budget problems threaten the availability of such funds in the future.

Even with federal and state financial assistance, the price of water will increase. Without such assistance, the price increases will be larger. For urban water agencies, the higher

cost of water will drive them to the lower cost options, and usually, that will be increased purchases from willing agricultural sellers.

Those purchases will be larger in dry periods. Based on recent experience, there are likely to be willing buyers and sellers. However, such transfers must overcome several serious hurdles. The transferred water must not be another user's supply. The transferred water cannot cause significant damage to the environment or to the area from which the water is transferred. Finally, there must be a means to move the water from the seller to the buyer when it is needed.

Water to meet unfulfilled environmental needs is also likely to come from agriculture. As in the past, some of this water will simply be re-allocated from agriculture to the environment by regulation or litigation. However, there is a growing trend to accomplish such re-allocation by purchase from willing agricultural sellers.

For example, an Environmental Water Account has been established. The Account acquires water "assets" (actual water by purchase from agriculture, storage space in reservoirs and groundwater basins, conveyance capacity in canals, options to exchange water with urban and agricultural agencies, etc.). It pays for these assets with money from the state and federal government. There is now talk of water user funding as well.

Then, when water supplies to urban and agricultural users are shorted to protect the environment, the Environmental Water Account uses its assets to make up the shortage.

It is possible that this Account or some version of it will be used to fulfill some future environmental needs. To the extent that federal and state funds are used, it would amount to the public's buying water for the environment from water agencies, especially agricultural agencies. To the extent that water agencies contribute funds to the Environmental Water Account, it would amount to their buying insurance for more reliable water supplies. In either case, it is a way to purchase environmental water from agriculture.

Another change that might be expected is the construction of new surface storage. New reservoirs are being studied. Increasing the size of existing ones is also an option. However, adding reservoir storage has proven to be difficult. New reservoirs are expensive and their construction and use can cause environmental problems. On the other hand, some of the water produced by storage can be used for the environment. Some oppose new reservoir storage as a matter of principle, and some oppose it because of its relationship with population growth. On the other hand, as other options' cost go up, reservoirs will tend to compare more favorably.

Increases in conveyance (canal) capacity are another possibility. Such increases would make it possible to increase regular deliveries to urban and agricultural users. Perhaps just as important, the more water that can be conveyed, the more wet period water that can be stored and the more water that can be transferred from willing sellers to willing buyers.

Another change that could occur is to apply the principles of water use efficiency to environmental water use, just as these principles are being applied to urban and agricultural uses. Now, water is dedicated to environmental water use without necessarily applying the principles of efficiency. In some cases, this is unnecessary: if a stream has been dewatered, re-establishing flows requires little consideration of efficiency. But in other cases, a more comprehensive consideration of all options to achieve environmental goals, including water and non-water using actions, might lead to savings in water. These savings could be applied to other environmental needs, thus reducing the need for additional environmental water.

Finally, California's water picture could be significantly affected by natural events. Significant changes in climate are predicted over the next century. Effects of these changes will be felt within the planning horizon for this Water Plan Update.

These effects include a decrease in the snow pack. In California, the snow pack acts as a huge reservoir, holding water during the wet winter season for release in the spring. Less snow pack means more flooding and less water available for use.

Sea levels will rise, pushing more salty water into the Delta and also increasing the chances of Delta levee failure. Rising temperatures could adversely affect cold water fish and cause small increases in crop production.

Of course, a multi-year drought is always a possibility. A serious seven-year drought occurred from 1928 to 1934 and a six-year drought occurred from 1987 to 1992. A longer and more serious drought cannot be ruled out.

California is seismically active. Major earthquakes can be expected. Of particular concern is an earthquake in or near the Delta that causes multiple levee failures on several Delta islands. The likelihood of such an earthquake is more than 50 percent in the next 30 years. The resulting seawater intrusion could result in a several-month shutdown of exports from the Delta, putting serious, albeit temporary, strain on water users that rely on those exports.

We have described above, in general, qualitative terms, California's water future. Describing the future in more quantitative, specific terms is far more difficult. There are two reasons for this difficulty:

First, the data on which to base such a description have not been developed. These data could be developed, but this will require significant changes in the data collection and analysis efforts of state and local water agencies, and it will take money.

Second, prediction is difficult because all of the above actions are interrelated. Consider the options open to urban agencies. Their options include managing demand in a variety of ways, banking water in their own or other agencies' groundwater basins, importing water, banking water in existing or new reservoirs, exchanging water with other agencies,

and purchasing water from agriculture in a variety of ways. The more of any one of these options they carry out, the less of the otheroptions that will be required. Also, the more of one option they pursue, the more expensive (on a dollar per gallon basis) that option will tend to become. However, if federal and state financial assistance is available, the expense of that option can be reduced, at least to the local water agency.

So, there is no easy answer to the question of what California's water future will look like. The answer is, "It depends." It depends on the specifics in each region. It depends on the amount of federal and state financial assistance. It depends on how the costs of individual options change. It depends on how much additional environmental water in needed and how it is obtained. It depends on factors that we may not yet be fully aware of. Of course, it also depends on the hand dealt to California by Mother Nature. A ten-year drought or a 15-minute earthquake could cause significant and long-lasting effects.

The key question is, "Will we have enough water, at least through the year 2030?" The answer, unfortunately, is "It depends."

While we do not have the data to draw a complete, quantitative picture of California' water future, some numbers will serve to illustrate the possibilities. California's population numbers about 36 million now and is expected to increase by about 50 percent by 2030. Slightly more than half of those people live in southern California and about 70% of them live on the coast, including those in southern California.

Urban water use, to serve the 36 million people, is about 9 MAF/year now. Roughly one third of that is water imported from other parts of the state. If the increase in urban water use were proportional to the increase in population, urban use would increase by about 4.5 MAF/year by 2030. However, demand management actions by urban agencies will not allow that increase to occur. The precise increase is unknown, but it will not be as large as 4.5 MAF/year.

Unmet environmental needs are in the range of 1 MAF/year. Even though these needs are important, they are unlikely to approach the need for additional urban water.

In recent years, about 1 MAF/year is transferred in California. Roughly 50% of that is transferred from one agricultural user to another. About 25% is from agricultural to urban users and about 25% is from agricultural to environmental uses, primarily through the Environmental Water Account.

Agricultural use in California is about 34 MAF/year, of which about 6 MAF/year is reused as one farmer's runoff or percolation to groundwater becomes another farmer's supply.

Therefore, the statewide picture would appear to be as follows:

Without increases in efficiency (demand management), combined urban and environmental uses will increase by about 5.5 MAF/year. However, significant efforts

already planned by urban agencies and the possibility of increased efficiency of environmental use could significantly reduce that increase, possibly to the range of 2.5-3.5 MAF/year. These reductions may depend in part on the availability of federal and state financial assistance.

If additional storage (above or below ground) and conveyance are available, the 2.5 to 3.5 MAF/year can be further reduced, perhaps by as much as 0.5 MAF/year. Desalting would contribute further reductions.

This would leave 2.0 to 3.5 MAF/year of urban and environmental needs to be made up by transfers from agriculture, in addition to the 0.5 MAF/year already being transferred from agricultural users to urban users and the environment.

Therefore, total transfers from agriculture would range from 2.5 to 4.0 MAF/year by 2030, depending primarily on three factors, urban water use efficiency, environmental water use efficiency, and the amount of new storage and conveyance that is brought on line.

This amount of transferred water would be 9% to 14% of total, statewide, net agricultural use. Current state policy is to spread water purchases out so that no more than 20% of the use in any area was affected. Transfers will not be possible from some agricultural users for a variety of reasons, so spreading purchases out over all California agriculture will not be possible. Therefore, meeting the desired 20% criterion would appear to be difficult if transfers from agriculture amount to about 14% of total, statewide, net agricultural use.

Therefore, it would appear that if this criterion were met along with all urban and environmental needs, urban and environmental efficiency will have to be substantially increased and several storage and conveyance projects will have to come on line.

Of course, if we have a more serious drought than those in the last century or if we have a disruptive earthquake, serious shortages could occur. The seriousness of the shortages and their effect on California will depend on the circumstances at the time. If mechanisms (physical facilities and institutions) are available, water transfers from agriculture and stored water could offset the damage. If not, we could expect serious disruptions of California's economy. Regardless, the effects on California agriculture would be significant.