

California's Water Problems Are Not New Now There is a Solution, Desalination

Starting as early as the gold rush during the mid-1800s and when President Ulysses S. Grant, in 1873, initiated the first investigation of California's water resources, the need to develop California's water resources was apparent.

Gov. Jerry Brown's multi-billion-dollar plan to build two massive tunnels under the Delta to move water from Northern California to Southern California is just the latest in a never ending quest for water. A \$24-billion plan to resolve California's decades-long fight over moving water from the north, where most of the state's rain and snow falls, to thirsty cities and farms in the south and the Central Valley.

Experts on all sides agree that the present system has degraded the environment of the Sacramento-San Joaquin Delta, requiring costly temporary measures to protect endangered species. It's vulnerable to earthquakes and saltwater contamination, and it won't reliably meet the state's future water needs.

Around 75% of California's water supply comes from north of Sacramento, with 80% of the water demand occurring in the southern two-thirds of the state. About 80-85% of all developed water in California is used by the agricultural industry.

There are six main systems of aqueducts and infrastructure that redistribute and transport water in California: the State Water Project, the Central Valley Project, several Colorado River delivery systems, the Los Angeles Aqueduct, the Tuolumne River/Hetch Hetchy system, and the Mokelumne Aqueduct.

The problem with all these projects including the proposed Jerry Brown two massive tunnels under the Delta is that we are working on distributing a finite amount of water. If there is no rain there is no water to distribute. Further, asking the population areas to conserve might be a feel good idea but when agriculture is using 80% of the water it will have only a minimum impact on the usage. It also does not make sense for the state to ask the people in the populated areas to pay for something where they are only getting 20% of the benefit.

The ultimate solution to the problem is to find an infinite source of water. Fortunately there is one, the ocean. The problem in the past has been the cost of converting salt water to fresh water and the environmental impact of the process. Today there is a solution to both these problems.

It takes energy and in this case natural gas to remove the salt from sea water. Therefore the cost of the natural gas will drive the cost of the water. Hydraulic fracturing, or fracking, offers a path to low cost. Fracking has been used safely in California since the 1950s making it possible for shale oil extraction to produce oil and natural gas in places where conventional recovery technologies are ineffective. Modern fracking started in 1990 when vast amounts of formerly inaccessible hydrocarbons were extracted from formerly inaccessible shale deposits. Last year California has issued

new regulations assuring that it will not impact the environment. As a result California now has the most stringent and farthest reaching regulations on hydraulic fracturing. Unfortunately there are environmentalists and democratic legislators calling for a moratorium until fracking is proved safe. This would be a disaster not only for a cheap source of energy but for the economy.

Desalination

Environmentalists historically have opposed desalination plants largely due to impact on ocean life as wildlife can be sucked in along with the ocean water brought in for treatment as well as the brine discharge back in the ocean.

In Redondo Beach California a demonstration plant has been running for two years. It uses the reverse osmosis technology. The project is being used to evaluate the impact of the desalination process on the environment.

A \$1 billion Carlsbad desalination plant in San Diego County will open in 2016. The plant will produce 50 million gallons of drinking water per day for about \$2,000 an acre-foot which is about double those of the most readily available alternatives.

The technology used in the Carlsbad plant and Redondo, known as reverse osmosis, was developed decades ago. It involves pushing the water through a series of microscopic sieves to filter the water. The energy-intensive process separates pure water from both salt molecules and impurities.

With newer technologies, such as wedge-wire intakes, having reduced the impact on wildlife and fracking the cost of energy, the only issue is the brine discharge. This can be mitigated by combining the waste water from Hyperion sanitation plants which is now discharged into the ocean.

The new environmental cry is carbon foot print as the reverse osmosis technology is energy intensive. By its self it is, but transporting the water from the north is not energy free as the water needs to be pumped from the rivers into the system and then over mountain ranges to get to the south. When trading off the impact on the environment due to pumping the water out of the northern rivers and the delta increase in the carbon foot print caused by the desalination process, desalination wins.

Desalination wins because it has the least impact on the environment overall and has the potential of providing a low cost of reliable water source independent of the weather.

But this is only possible if there is a low cost energy supply. For that to happen, the restrictions and moratoriums on fracking must be removed at both the State and Federal level.

The Obama administration must remove the moratorium on drilling on public lands and the Brown administration must resist the environmentalists call for a moratorium on fracking in the state.