

Case Study: Camp Far West Reservoir Spill as an indicator of water supply availability in the Bear River system for Centennial Reservoir

Is there water in the Bear River system for Centennial?

What are the consequences and downstream conflicts from Centennial Reservoir?

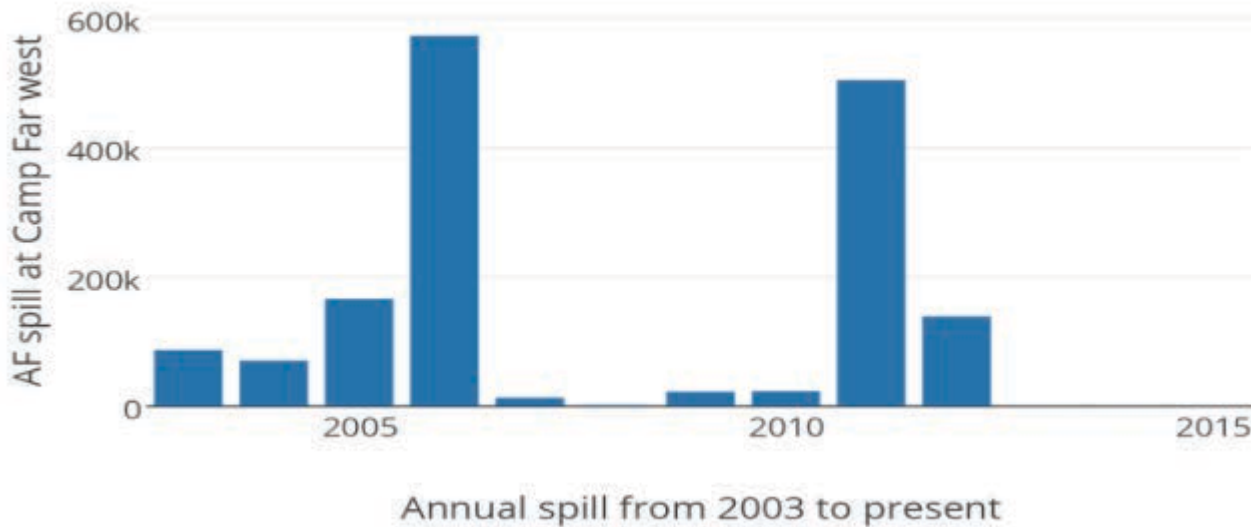
Is NID looking at filling Centennial Reservoir from its Yuba River water rights, or new Bear River rights?

A watershed assessment of how much water is available to fill the proposed Centennial Reservoir is needed. An initial assessment of the amount of water that spills annually from Camp Far West reveals troubling issues:

- Enough surplus water to fill Centennial reservoir has happened only twice since 2002.
- Water diverted to fill Centennial will come at the expense of water now captured at Camp Far West, directly impacting the existing water supplies downstream, creating conflict.
- Camp Far West was built to provide surface water to farmers, and to stabilize the groundwater basin in Western Placer and Sutter which was in a state of serious overdraft, dropping one to three feet per year. Upstream diversion will again drive the groundwater basin use to overdraft, which directly impacts Lincoln and Roseville urban water supplies, and farmers throughout the region.

Spills at Camp Far West¹

year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
AF spill	86,678	70,413	165,521	573,223	13,190	1,670	22,500	22,500	504,793	139,041	292	292	292



¹ Methodology. This case study is based on the actual spill at Camp Far West Dam. Annual graphs of the spills were downloaded from CDEC. The rate in cubic feet per second and duration were calculated into acre-feet subtotals for each spill event, and totaled for every water year (July 1 through June 30) from 2002 to the present. Two water years were lacking data, 2013 and 2015. The data from 2014 was used as surrogates for those two years, as all three years were severe drought years, and very minimal spills occurred at the dam in any of those three years. While these calculations could be refined to a higher level of accuracy, there is little point since the wet years are so wet, the dry years are so dry, and the middle years have a low margin of error. Refer to background data, which is published on the website.

As a graph shown above. Note that since 2007, only two years have sufficient water to fill Centennial Reservoir. Seven of the nine years from 2007 to 2015 Centennial Reservoir would not fill in the winter/spring. The years 2008 and 2013-15 show no water at all available in the Bear River system to fill Centennial.

Centennial would be drawn down every fall approximately 120 feet from the high water mark in order to capture and store winter runoff. Draw down of 120 feet yearly is extreme, creating a huge “bathtub ring” of stark red dirt/rock and stump “dead zone”. As a reference, Rollins draws down up to 25 feet in the Fall, and Combie draws down 10 feet in the Fall. Successive dry years with no surplus water would leave Centennial Reservoir drawn down year round, for several years in a row.

In addition, the spill from Camp Far West overstates the potential flows available for filling Centennial. Below Combie Reservoir are four creek systems that flow into Camp Far West and are downstream of Centennial dam site. These systems are Magnolia Creek, Brushy Creek, Wolf Creek, and Little Wolf creek, as well as some smaller drainages just upstream from Camp Far West Reservoir. The spill at Camp Far West LESS the flow from these drainages would be a more accurate measure of the flows available to fill Centennial. When these lower creek flows are subtracted from the spill data, the potential for filling Centennial Reservoir is reduced substantially. Thus, the graph and the data show an overstated potential for filling Centennial. However, even this overstated potential makes the fundamental point for the investigation and dialogue: there is not enough surplus water in the Bear River watershed system to fill Centennial.

Stated another way, if Centennial is filled first, in more than half the water years, there will be NO spill from Centennial, therefore Camp Far West will have only the water from the small creek systems (noted above). The consequences of minimum storage in CFW are addressed below.

SWRCB analysis from 1960’s. Additional support for the above perspective that there is not enough water available in the Bear River system is found in the analysis of the 1960’s when both the expanded Camp Far West and Rollins Reservoir were being proposed. Data on the volume of water available in the Bear River system was summarized in the California State Water Resources Control Board (SWRCB) Decision D1197, 10/29/64, page 2: *“An operation study for the enlarged CFW reservoir which takes into consideration the effect of the proposed Rollins Reservoir to be constructed upstream by NID shows that the reservoir would have spilled in 18 of the 35 years of study.”* That means that if both Rollins and Camp Far West were built, Camp Far West would spill in just over half the years of the 35 year study. The data presented from our analysis above has the same result; essentially the picture of the 35 year from 1925 to 1960 and the past fifteen years is the same. Half the time, Camp Far West does not spill.

Now consider construction of Centennial Reservoir (115,000 AF) upstream of Camp Far West (100,000 AF). The two time periods show that because Centennial is larger than CFW and upstream of CFW, it can be concluded that while Centennial would fill in most years, it would spill in less than half the years studied. And that would mean that there would be *NO WATER* to fill CFW coming over the spillway at Centennial in more than half the water years. If Camp Far West is devoid of water in more than half the water years, there will be serious consequences for farmers in the South Sutter District including Placer County farmers, who would lose their source of low cost surface irrigation water. The American River Groundwater Sub-basin will begin to be depleted again by overdraft pumping, just like before Camp Far West was built. A significant volume of water will be removed from the Delta system, which will harm the ecosystem, and result in reduced allowances for downstream diverters. Further, reduced diversions from the Delta will trigger the SWRCB implementation of

Term 91, which mandates that diverters above the Delta also cut back so that water shortages are shared statewide (which includes Placer County Water Agency diversions).

Conflict with Camp Far West. NID has claimed, however, that because their water right was first filed in 1926, NID can divert water freely upstream of Camp Far West and South Sutter Irrigation District. This is an issue of potential dispute. But the bigger picture is that system-wide, the only water that is not already being diverted for human use is the spill at Camp Far West. NID diversions upstream will be made at the expense of beneficial uses downstream to South Sutter Water District and Camp Far West Irrigation District, plus the current environmental water for the health of the Delta. A comprehensive, system-wide perspective is necessary to develop a solution set that does not create conflicts, and collaboratively solves our regional challenge of sustainable water resource use.

Instream flows below Camp Far West. There is also the question of whether spills at Camp Far West are truly surplus to the system? or do they perform benefits downstream, like benefitting fisheries, or recreation, or flushing flows for water quality? or are the Camp Far West spills part of important Delta system spring flushing flows? These questions need to be addressed thoroughly. NID has clearly stated its intent to use Proposition 1 State funding to assist in the construction of Centennial Dam. What is the interest of the State in this circumstance? Is it in the State's interest to support the diversion of the last water flowing in the Spring from the Bear River into the Bay Delta system? Proposition 1 states that investments would have to have clearly demonstrated benefits for the Delta system? How would Centennial Dam benefit the Delta? Proposition 1 also states that the local share of a project must be 50% or more. Is it in the local interest to invest big money in a system whose purpose is to benefit downstream uses like the Delta? These questions require serious analysis from a system-wide perspective, and this system includes Bay Delta impacts and flows.

Impacts to North American River Groundwater Sub-basin². Historically, Camp Far West Reservoir was built by South Sutter Water District in 1963, funded by the California State Water Project. The sub-basin had previous to the dam been subject to overdraft due to farm irrigation. The dam provided inexpensive surface water to farmers for irrigation, and the overdraft condition was subsequently stabilized. If water is diverted upstream of Camp Far West and surface water for irrigation is reduced, it is very likely that farmers will return to pumping groundwater for irrigation. Most farmers still have their wells and pumps, and use their groundwater only when the inexpensive surface water from CFW is unavailable. Farmers will pump groundwater, and the overdraft of the American River Groundwater Sub-basin will return to its pre-CFW condition before the 1960's, when the groundwater table was receding by 1 ½ to 3 feet per year.

This groundwater sub-basin is also used by Roseville and Lincoln for urban supply, particularly in peak use times, and in emergency situations. Roseville has studied and experimented with using their treated surface water supply to directly inject into the groundwater basin for recharge. There is a direct and clear relationship between the beneficial use of Camp Far West for surface water irrigation and the stabilization of the American River Groundwater Sub-basin. The Centennial Dam proposal will need to study this relationship in detail, as

² American River Groundwater Sub-basin (Sub-basin). A component of the Sacramento Valley Groundwater Basin, the Sub-basin is roughly bounded by the American River to the south, the Sierra Nevada foothills to the east, the Bear River to the north, and the Sacramento River to the west. The WPCGMP area includes the SubBasin's eastern edge, Sacramento County to the south, the western edge of PCWA's service area, and Bear River to the north. The latest version of PCWA's Western Placer County Groundwater Management Plan is referenced here: http://www.pcwa.net/files/docs/enviro/WPCGMP_Groundwater_Management_Plan_07.pdf

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there will be direct impacts to the upstream diversion which will reduce the runoff available for Camp Far West storage.

Bear River water or Yuba River water? This assessment shows that there is sufficient water in the Bear River system to fill Centennial Reservoir only every few years, unless water is “taken” from Camp Far West. If NID does not plan on “taking” water from SSWD, where will the water come from? NID has stated that “Centennial Dam will make it easier to move water from the upper system through the lower system.” It is essential to understand exactly what this means. It seems to imply using Centennial Dam to store water right water from the Yuba River, even though the Centennial Dam water right permit application was for storage of Bear River water. Will Centennial Dam be used as a surrogate for a dam on the South Fork Yuba? NID needs to be completely transparent on how it intends to operate this proposed facility. Conveying Yuba River water for storage on the Bear River will have a complex set of conflicts and consequences.

What would Camp Far West Reservoir look like? The mind’s eye usually pictures a reservoir full to the brim. What the historic data is showing is that Camp Far West would be receiving no water from Centennial Reservoir in more than half water years. So CFW would be drawn down by the end of the year, and more than half the years would look like it did in October of 2015:

Camp Far West, October 2015



Centennial Reservoir would spill water in less than half the water years, leaving no water to fill downstream reservoirs.. Camp Far West will look like this year round.

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What will Centennial Reservoir look like? NID has stated that the purpose of Centennial is to capture the 120,000 AF of water that is currently stored in snowpack. NID claims that because of global warming due to climate change, this 120,000 AF will fall as rain rather than be stored in snowpack. Thus Centennial will be built to capture these peak rain flows. This means that the reservoir will be drawn down its full amount of active storage of 114,000 AF to an elevation of 1730', which is 120 feet lower than its high water elevation of 1850'. What does a reservoir that is drawn down 120 feet look like? The two pictures below offer perspective, the first from the South Fork Feather River to the north, and the second from the Stanislaus River to the south. What a drawn down Centennial Reservoir on the Bear River will look like something in between the two.



South Fork Feather River to our north drawn down over 150 feet.



Stanislaus River to our south drawn down over 100 feet.

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What will Centennial Reservoir look like? It would be somewhere in between.

Regional solutions and collaboration. This case study demonstrates that the proposed Centennial Dam will create conflicts with downstream beneficial uses, and questions whether it will also create upstream conflict by diverting Yuba River water for dam storage on the Bear River. This is a complex situation. Clearly, broad stakeholder participation is needed to analyze the problem thoroughly and develop appropriate solution sets.

Some of the potential solutions to the water supply problem include:

- Increasing supply by optimizing existing facilities rather than building a new dam. Several opportunities to raise existing dams have already been studied: Rollins dam, Fordyce dam, and Silver Lake dam.
- Meadow restoration are options that need to be assessed. e.g. Bear Valley, Lake Norden
- Forest management for water yield and fire safety need to be assessed.
- Lining canals or replacing with pipe. NID estimates 30% water loss from leaking canals.
- Urban water conservation (NID urban use is 250 gpd, high by state standards, has no cons. program)
- Raw water (ditch water) conservation should be assessed and implemented.
- Using the extra capacity of the North American River Groundwater Sub-basin for additional storage has not been thoroughly studied.
- Collaboration on existing facilities, like Camp Far West, should be investigated. It is possible to raise this dam and spillway. The increased capacity could be dedicated to conjunctive use with the groundwater basin, banking the water in the American River Sub-basin. This underground reservoir is not subject to evaporation, and can be stored for years for emergencies.
- Recharge of the groundwater basin through the Merhten Formation should be evaluated. This formation runs north-south at approx. 500-1000 elevation and provides most of the recharge for the sub-basin. NID canal systems can supply water directly to this recharge zone.
- Collaboration on raising Camp Far West for conjunctive use and recharge of the American River Groundwater Sub-basin should be explored.
- Clearly, the most available additional water could come from NID's current supply of "agricultural" water. NID has made little effort to maximize efficiencies in either delivery (canal leakage which currently equals NID's total treated water delivery volume), or in demand side conservation. Most of this water is being used for landscape irrigation on rural estates, not agriculture. The table below shows NID water use:

