



California Sportfishing  
Protection Alliance

*"An Advocate for Fisheries, Habitat and Water Quality"*

July 30, 2009

Honorable David Hayes  
Deputy Secretary of the Interior  
Department of the Interior  
1849 C Street, N.W.  
Washington DC 20240

**Subject: Briefing on the Peripheral Canal, Bay Delta Conservation Plan, and Drainage Problem Lands in the Western San Joaquin Valley, California**

Dear Deputy Secretary Hayes:

The California Water Impact Network (C-WIN) and the California Sportfishing Protection Alliance (CSPA) welcome you back to California's water issues. We are encouraged that someone of your experience, knowledge, and integrity is back representing the federal government on California water issues. Through this letter, we wish to brief you on the three most important California water issues that affect interests of the US Department of Interior:

- ❖ Irrigation drainage issues, water allocation impacts, and potential economic models for the western San Joaquin Valley.
- ❖ A Peripheral Canal around the Sacramento-San Joaquin River Delta.
- ❖ The Bay Delta Conservation Plan process.

In sum, we believe that current efforts to develop "technological fixes" for salt and selenium-contaminated irrigated lands in the western San Joaquin Valley are vehicles for delay; these technologies are not likely to be cost-effective for agriculture without federal government subsidy. These lands should be retired permanently from irrigation; doing so would save taxpayer funds and contribute substantially to a more reliable water future for all other Central Valley water right holders and irrigators. Such increased reliability will in turn promote economic stability, and should be legislated to free up a large amount of water for environmental restoration in the Bay-Delta's Central Valley watershed. We also oppose a Peripheral Canal around the Delta. Finally, we regard the Bay Delta Conservation Plan process as another vehicle for delaying enforcement of laws and authorities that should instead be used as soon as possible to protect public trust resources in the Bay-Delta Estuary and end wasteful and unreasonable uses and methods of diversion of water.

Beyond simply conveying our opinions, we summarize *why* we believe Congress and the federal government should avoid entering the controversies over the Peripheral Canal and BDCP. On the other hand, the Department of the Interior could and should

take the lead to enforce retirement of western San Joaquin Valley lands from irrigation by seeking congressional authorization of an interdepartmental effort to reduce crop and water subsidies to the area and encourage green economic models for this area of California, such as solar photovoltaic array farms, and commit much of the water savings to fishery recovery and ecological restoration efforts, including those already benefiting from legislative authorization.

### **1. Retirement from Irrigation and New Economic Models for the Western San Joaquin Valley.**

As you are by now aware, irrigation drainage water from the western San Joaquin Valley—for federal purposes, the San Luis Unit of the Central Valley Project—contributes most of an average of 900,000 tons (1.8 billion pounds) of salt to the San Joaquin River each year, degrading water quality for riparian farmers throughout the lower San Joaquin and southern and central Delta. Due to the natural occurrence of salts and trace metals in the marine sediments of the Valley (such as selenium, boron, arsenic, and molybdenum) polluted drainage to the San Joaquin River led the State Water Resources Control Board to declare the river and several sloughs and tributaries impaired water bodies under the meaning of the federal Clean Water Act. Selenium is especially toxic even in low concentrations; it readily bioaccumulates from sediments through the feeding activities of predators consuming benthic organisms consumed, further concentrating in tissues of animals on up the food chain.

The environmental and public health effects of these toxic constituents became clear when Kesterson Reservoir—to which San Luis Unit irrigators had drained their tailwater—had to be closed in 1985 and subsequently remediated in the aftermath of extensive ecological problems, including discovery of deformed and dead birds by federal wildlife biologists.

In the late 1980s and early 1990s, San Luis Unit irrigators sued and settled in 2002 with the Bureau to require the agency to provide drainage service to their lands, as originally called for in Congress's authorization of the Unit in 1960. Under supervision of federal judge Oliver Wanger, the Bureau and the irrigators undertook an extensive re-evaluation of San Luis Unit drainage features between 2003 and a Record of Decision in March 2007. The Record of Decision called for implementation of an "in valley/water need land retirement" alternative that would retire nearly 200,000 acres of farmland from irrigation. Unfortunately, this alternative would prolong saline and selenium-laden drainage reaching the San Joaquin River at a minimum through at least 2019. A better alternative was not chosen at the time. The Bureau's two in-valley alternatives were studied in 2008 for feasibility and cost-effectiveness. That study found that **the environmentally preferred alternative of the Record of Decision was actually much more cost effective—and would have retired 100,000 more acres of drainage-problem lands and treat less drainage—than the alternative selected by the Bureau and supported by the irrigators.** The higher cost and poorer

environmental performance of the chosen alternative results from inclusion of source control methods that rely on reverse osmosis treatment of the irrigators' drainage water. The feasibility study conducted in 2008 found that this technology was far from proven to work. Yet both the Westlands Water District and the Grasslands Drainage Area irrigators are encouraged by the Bureau to move forward with these methods, in the perhaps naïve belief that the treatment technologies will soon improve in cost-effectiveness. The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board appear to support a time extension for the Grasslands Bypass Project for similar reasons.

We understand from Judge Wanger's order (issued July 22, 2009) that he granted the Bureau and the US Department of the Interior a 90-day extension for reporting on the federal government's progress in reaching a drainage solution for the San Luis Unit. Judge Wanger makes clear that "no further delay shall be permitted in this case" and that continued delay would result in the drainage case proceeding to its "enforcement of judgment stage." It would seem that if the Department of the Interior and the Bureau wants to avoid having the San Luis Unit's drainage service solution dictated to them by Judge Wanger, this matter is now a top priority. We hope you will seriously consider our analysis of the western San Joaquin Valley situation, particularly in light of extreme fiscal difficulties facing both California and the federal government.

These drainage problem lands should be retired from irrigation and other uses found for them. We recommend the environmentally preferred alternative in the March 2007 San Luis Drainage Feature Re-evaluation Record of Decision. It calls for retirement of approximately 300,000 acres of land from irrigation. Despite many proposals by the Bureau and the irrigators on how to resolve these drainage problems of the western San Joaquin Valley, C-WIN and CSPA believe that a large amount of scientific and economic analysis is ignored by the Bureau and the west side irrigators. Most of that large body of knowledge comes from Interior Department agencies such as US Geological Survey, the US Fish and Wildlife Service, and the Bureau of Reclamation itself.

Retirement of these and other Tulare Lake Basin and Kern County drainage problem lands from irrigation would free up substantial supplies within both the Central Valley Project and the State Water Project. In both cases, it is possible that reallocation of water supplies once provided to irrigators using these lands would require legislative authorization. We believe the Department of the Interior should be in the forefront of solving the San Luis Unit's drainage problems by retiring as many of these lands as possible as the most cost-effective and sustainable approach to land retirement and source control of salt and selenium discharge to the San Joaquin River.

Cumulatively, we believe that such solutions will free up enough water to make it unnecessary to build a Peripheral Canal or any new dams, while establishing these reallocated supplies at a fraction of the cost of these projects. By retiring as much as 1.3

million acres of land in the service areas of both the Central Valley Project and State Water Project, the Pacific Institute and other experts believe we can save as much as 3.9 million acre feet of water a year. By not irrigating the drainage problem lands, leaching of toxics and accumulation of salts would be stopped or dramatically slowed. This would help address problems from the bioaccumulation of selenium in river sediments and salinity problems in the San Joaquin River, and central and south Delta. Land retirement would cost very little by comparison to building expensive treatment facilities, a Peripheral Canal and new dams. These would cost taxpayers and ratepayers billions of dollars while benefiting only a small minority of farmers *and* probably ruining lands of several thousand farmers working productive Delta soils, and who have more senior water rights.

Under the previous administration, the Department of the Interior, the Bureau, and the irrigators would either have the federal government build expensive, massive, and unproven treatment facilities, or would transfer drainage responsibility to the irrigators—including the Westlands Water District—in return for transfer of federal facilities and a permanent 9d water contract. In the first case, the economics pencil out only with massive new federal subsidies, and in the second case would place some of California's most junior water contractors as senior water users ahead of many existing senior water users. The first case would be unfair to all US taxpayers, and the second option which would be patently unjust with respect to senior vested water right holders.

As you are aware, the maximum funding authorized by Congress for the San Luis Unit has been reached, and no matter which alternative is selected, it will require Congressional authorization for funding. For San Luis Unit to move forward, approval at the highest levels at Interior will be needed. We heartily encourage you and the Department of the Interior to take a fresh look at what really makes sense for California and the federal government in the western San Joaquin Valley.

As part of that fresh look, Congress needs and deserves to have the best and most scientifically-sound ideas brought to it when determining the San Luis Unit's future. An important forum for developing such ideas for the Department of the Interior on San Luis Unit drainage problems has come from US Geological Survey-led *Decision Analysis Framing Study for In-Valley Drainage Management Strategies for the Western San Joaquin Valley, California*. Tom Stokely of our staff has participated in this process because we believe that such an effort has an excellent chance at reaching an unbiased conclusion on how to resolve these drainage issues. Regardless of our position or any other entity's position on San Luis Unit drainage issues, we encourage you to continue with the Decision Analysis process managed by the US Geological Survey. Only through objective analysis will the federal government find the best possible solutions for the western San Joaquin Valley.

Much media attention is lavished on the plight of water-short farmers in the San Joaquin Valley. This coverage distorts a regional reality of record crop production and farm

employment growth in Valley agriculture, which ought by rights be *good news* despite dry weather. This multi-year dry spell has *not* been the disaster the public is led to believe about the Valley as a whole. Instead, according to California Employment Development Department statistics and county agricultural commissioner reports to the state, San Joaquin Valley agriculture is actually a strong economic sector in the Valley as a whole, and bucks the trend of the recession that has hit other sectors hard. We analyzed crop and farm employment data and found (Attachment 1):

- ❖ 2007 crop reports for the seven agricultural counties of the San Joaquin Valley reported substantial increases in crop production values in the first year of the present dry spell. They reported that **agricultural production in 2007 increased by \$3.77 billion over 2006 crop values.**
- ❖ In 2008, five counties (Fresno, Kern, Kings, Madera, and Tulare) reporting so far, gross crop value increased from 2007 to 2008 by about \$488 million, a 2.9 percent rise. **Fresno County—from where most of the western San Joaquin Valley complaints about water shortage emanate—reported its \$5.7 billion gross crop value was a new county record in the second year of supposed drought.**
- ❖ Merced, Fresno and Kern counties also reported record crop values in 2007, the first year of dry weather.
- ❖ **Growth of the Valley's labor force—more people looking for fewer jobs in all sectors—accounts for its significant rise in unemployment, not water shortage.** Over 43,500 more people entered the Valley's labor force by May 2009 over May 2008, while total employment decreased by 47,600 at the same time, according to data from the state of California.
- ❖ **However, Valley farm employment (in the seven counties) grew 1.6 percent between June 2008 and June 2009 to 206,000 farm jobs.** Madera, Kings, Tulare, and Kern counties led the way recording strong employment gains in the farm sector. But for an estimated loss of about 100 farm jobs, Fresno would also have been in the farm job growth column—despite the western Valley water shortage.
- ❖ **Other industry sectors in the Valley are hurt worse from the more generalized effects of the recession, but not agriculture.** The Valley is not in economic crisis from Delta export limitations that protect endangered fisheries at the expense of struggling farms; its real economic story more closely resembles the industry sectors hit by the recession in California and the nation as a whole. We encourage you, your staff, and agencies to look beyond the headlines and media releases from the western San Joaquin Valley to get the full picture—full of good news about Valley agricultural production and employment growth.
- ❖ **Western Valley irrigators with low priority water contracts have instead cultivated the ability to get abundant media attention for their lack of water.** They do not reveal to the public that they are last in line for water from the Central Valley Project. They are vexed by their low water rights priority, not by endangered fish in the Delta. Their rhetorical preferences should not be allowed to dictate water policy for the Bay Delta estuary and Central Valley watershed.

Given the huge economic and environmental costs to California and the federal government (and US taxpayers) of continuing irrigation in the San Luis Unit, **we believe it makes a great deal of sense economically and environmentally for the Department of the Interior to recommend that Congress de-authorize the San Luis Act and actively encourage and support with governmental resources other more sustainable forms of economic development for the area.** This could reduce crop subsidy expenditures for the US Department of Agriculture as well, since some lands would go out of production where farmers now obtain crop subsidies. Retirement of these lands from irrigation would not preclude their continuing in crop production through dry farming techniques, which were used in some Valley areas prior to congressional authorization of the San Luis Unit in 1960. The US Geological Survey also notes that some use of groundwater pumping in the area would also help to alleviate the drainage problems of the San Luis Unit lands.

As an alternative economic model for the region, C-WIN and CSPA further believe that the time is right for the federal and state governments (including the California Energy Commission, the California Public Utilities Commission, and the US Department of Energy), private utilities, and the solar power industry to study western San Joaquin Valley lands as sites of potential large-scale solar power arrays, particularly on retired lands. Sunlight is abundant in this area outside of winter months, and rainfall averages 7 inches annually. Landowners in the Westlands and other current water districts may benefit from long-term ground leases and other partnerships with solar power operators, especially with nearby markets for air conditioning in the summer and heating/frost protection in the winter. We believe it could make far more sense for the federal government to spend taxpayer funds researching, developing, and producing clean and sustainable energy in the Valley, rather than supporting unsustainable and polluting agriculture in this area of California. The South San Joaquin Irrigation District's solar array may also provide a model for such solar energy development.

California's water supply is grossly over-allocated, as we discuss below. The San Luis Unit irrigators operate under temporary contracts, so discontinuing Unit contracts would absolve the federal government of continuing responsibility for drainage service there. De-authorization of the San Luis Unit would also take pressure off Delta water rights, supplies, improve water quality, and would make solutions there easier to arrive at. The Westlands Water District is one of the most vocal and active supporters of constructing a Peripheral Canal at this time.

## **2. The Peripheral Canal**

C-WIN and CSPA firmly believe that California has enough water to meet all its needs. California does not have enough water to continue wasteful and unreasonable uses that harm public trust resources and compromise our state's agricultural, economic, and environmental future. **There is no real surplus water anywhere in northern**

**California to fill a Peripheral Canal, even if it is built.** In January 2008, the State Water Resources Control Board disclosed in its Strategic WorkPlan and to the Governor's Delta Vision Blue Ribbon Task Force in September (Attachment 2) that California's water right permit system down through the years has issued in excess of five to eight (8) times in water rights permits the average amount of water that annually flows in California's rivers and streams. The permits of both the federal Central Valley Project and the State Water Project account for much of this paper water, and are among the most junior and therefore lowest priority water right holders in California.

**We (and many others) fear the "surplus" water sought for a Peripheral Canal would be taken from Sacramento Valley groundwater resources and Delta river channels.** In the original planning for the first Peripheral Canal (which was soundly rejected by California voters in 1982), its water sources were to be exported from North Coast rivers and streams. In 1961, the California Department of Water Resources told the public that exported water from the Klamath, Mad-Van Duzen, Eel, and Trinity rivers would enter the new state water system (Attachment 3). The Smith River was later added to this list. Today, only water supplies from the Trinity are available (to the Central Valley Project). And the Eel, Smith, and others are now unavailable for export to the Central Valley because of their Wild and Scenic River status. (The Klamath, with its own recent fish kills and water supply controversies earlier this decade, is not practical as a source.) And yet the State Water Project still began operation by 1967 without these surpluses that would have reduced direct effects of export pumping on the Delta. **The Delta and Sacramento Valley are not new surplus sources because they have long-standing riparian (Delta) and overlying (Sacramento Valley) water rights attached to these sources.** Resort to drought water banks relying on pumped groundwater substitution for transfers in dry years attests to the high regard the California Department of Water Resources has for aquifers in the Sacramento Valley. But to count on these areas' water supplies permanently for the Peripheral Canal is to attack long-vested property rights of farmers in two of the most productive regions of the Central Valley, and to extend further north the swath of ecological and economic destruction spread by California's artificial water system. It is to set Californians against other Californians—which is a recipe for bad faith in water politics at a time when California already has severe fiscal problems, and public regard for state leaders is abysmal.

The issue of bad faith and trust in our politics is central to the decision on a Peripheral Canal. **A Peripheral Canal would eliminate the main physical reason to protect the Delta from salt intrusion through upstream releases of flows from rim reservoirs, which have occurred since the 1940s.** These reservoir releases hold back tidal flows emanating from the Golden Gate in San Francisco Bay. Delta exports would only be limited by "assurances" that fisheries would be protected. **Assurances and regulations the Delta should benefit from now are not followed, and are actively undermined.**

For example:

- The State Water Resources Control Board issued an emergency order (drafted and approved by just one board member) in 2008 waiving Delta salinity standards in interior Delta for six months because of supposedly low water supply conditions. The Bureau and the California Department of Water Resources later acknowledged to the State Water Board that western San Joaquin Valley irrigators and urban southern California water districts received 81 to 99 percent of their historic average (2000-2008) deliveries from the State Water Project and the federal Central Valley Project (see Attachment 4). It is also well documented from State Water Project data supplied to the State Water Board that delta exports were at their historic peak during this 9-year period (Attachment 5). ***Meanwhile, the Bureau and the Department were given carte blanche to violate south Delta water quality standards from July through December 2008.***
- Governor Schwarzenegger declared a drought emergency declaration in February 2009 to eliminate due diligence on environmental protections for the Sacramento Valley Giant Garter Snake and Delta endangered fisheries (smelt, salmon, and steelhead). **He also suspended the California Environmental Quality Act and the Delta's water quality control plans, actions that were unwarranted and, frankly, politically-motivated to facilitate transfers of water across the Delta to the low-priority western San Joaquin Valley irrigators, the intended beneficiaries of the Governor's actions.** The drought emergency declaration was maintained despite significant storms in February, March and May that make 2009 neither a drought nor critical year, but merely another "dry" water year. These late storms enable the Bureau to revise its supply allocations for the San Joaquin River Exchange Contractors and the Friant Water Authority districts to 100 percent allocations—hardly sufficient pretext to suspend environmental regulations statewide. The same is true for the eastside irrigation districts, such as those along the Merced, Tuolumne and Stanislaus rivers. Western San Joaquin Valley water contractors, by contrast, have lower priority for deliveries in the CVP and were awarded 10 or 15 percent of their normal allocations.
- Yet despite low CVP allocations to the western San Joaquin Valley contractors, Lester Snow, director of the California Department of Water Resources, informed Senator Dianne Feinstein in a letter on May 7<sup>th</sup> that irrigators in this region will still obtain significant supplies through various sources of water, including purchases from other sources (like the Drought Water Bank) and from pumped groundwater (Attachment 6).
- Delta water quality regulations contained in the Bay-Delta Water Quality Control Plan and implemented through the State Water Board's Water Rights Decision 1641 (D-1641) are routinely violated even during normal operations of the State



Water Project and Central Valley Project, both of which are held responsible for meeting interior and south Delta water quality standards. Routine violations include these recent instances:

- **March 2009:** Delta outflow requirements violated.
  - **June 2009:** San Joaquin River flow requirements violated.
  - **Since mid-December 2008,** South Delta salinity standards have been violated.
  - **Water transfers are occurring using “Joint Point of Diversion” (JPOD) despite D-1641 prohibiting its use when salinity standards in the south Delta are violated.** These are routine events in the wake of the adoption of D-1641 in 2000.
- A State Board 2006 Cease and Desist Order requiring the projects to comply with D-1641 salinity requirements in south Delta river channels is about to be weakened instead of enforced by the State Board due to dry conditions and low 2009 supply allocations to low priority water contractors in western San Joaquin Valley.

**Despite California’s laudable efforts to lead the United States on climate change response planning and energy conservation, this is a poor track record on which to establish good faith assurances that a Peripheral Canal would operate to protect Delta ecology and agriculture.** This pattern of official behavior is water management through manipulation of the public’s fears of water shortage. It embodies a failure to lead on water conservation. Political trust of water agency officials and political leaders on matters of Delta water supply protection is, to say the least, in considerable doubt among environmentalists and Delta farming interests.

Since it is reasonable to assume that such a Peripheral Canal would be operated without sufficient respect for Delta farmers and ecosystems, we may all expect the Canal (or other designs, such as “dual conveyance”) would remove fresh water supplies from Delta ecosystems, reduce the diversity of aquatic habitats for failing species, and literally dewater the water rights of profitable Delta farms and associated businesses.

**A Peripheral Canal would shift the point at which Sacramento River water is exported to a point north of the Delta.** This would shift the impacts of export diversions directly to the Sacramento River (and away from the San Joaquin), the last river in the Valley supporting substantial, but vulnerable salmon and steelhead populations. We believe this poses grave risks for salmonid fisheries that are already on the ropes, as well documented by both the US Fish and Wildlife Service’s Anadromous Fisheries Restoration Program (Attachment 7) and the National Marine Fisheries Service’s recent biological opinion on present operations of the State Water Project and Central Valley Project.

**A Peripheral Canal would eliminate “critical habitat” for fish species in Suisun Bay and the Sacramento River who move around seasonally.** This is particularly true for pelagic fish like the Delta smelt, the longfin smelt, and striped bass. A Peripheral Canal would make the Delta more saline, shrinking their habitats, forcing them into Suisun Bay or more marginal brackish wetlands and sloughs that would make them more vulnerable to predation, starve them of food and nutrients, and push them closer to extinction.

**A Peripheral Canal would increase the residence time of river flows reaching the Delta not otherwise diverted into the canal.** Without greater regulation of upstream land uses, slower and lower water flows would increase pollutant concentrations, water temperatures, and dissolved oxygen problems in the Delta—all of which further compromise fish habitat, including the migration corridors of anadromous salmonid fisheries and other beneficial uses of water. Lower freshwater flows to the Delta would increase algal blooms, and would increase exposure of fish larvae and smolts to predators and entrainment in reverse river channel flows heading to the export pumps.

**A Peripheral Canal would increase salt water intrusion into soils and water diversions, thereby reducing yields on hundreds of thousands of acres of productive farmland in the Delta,** harming the region’s agricultural economy: business and farm failures could result from lack of credit, farm and agricultural service employees would lose their jobs, and sales and property tax revenues to five counties in the Delta would decrease, worsening an already difficult fiscal and economic situation in California.

You need not take just our word on these impacts of a Peripheral Canal. On July 21, 2009, the Contra Costa Water District made available its analysis of a large Peripheral Canal (one with a capacity of up to 15,000 cubic feet per second [cfs]). Based on models supporting the Bay Delta Conservation Plan process (discussed below), the District finds through its analysis that **a Peripheral Canal would:**

- ❖ **Deliver less water when the water is needed, *not more than is currently exported from the Delta.*** A canal would enclose water from the Sacramento River only, whereas now the export pumps derive water from both the Sacramento and San Joaquin rivers. Sacramento River flows are needed to prevent the river from drying up in the north Delta, and the river carries less than 15,000 cfs only about 46 percent of the time. Minimum instream flows in the river are needed and must be deducted from whatever would be diverted into a Peripheral Canal.
- ❖ **Go empty three times as often as it would operate full.** A peripheral canal would operate at full capacity only 4 percent of the time, but would be empty 12 percent of the time.

- ❖ **Still draw 50 to 75 percent of the water exported from the south Delta, with less fresh water in it than occurs now.**
- ❖ **Worsen stagnant polluted conditions in the Delta** caused by low river inflows.
- ❖ **Fail to solve the key conflict of providing water supply while protecting fish populations.** A Peripheral Canal would be an expensive investment to make without discernible environmental and economic benefits to California.

In 2008, the Public Policy Institute of California scholars (most of whom are from the University of California at Davis), found that dual conveyance canals in the Delta “is not likely to be better for fish than a peripheral canal operated on its own.” For Delta smelt, the Public Policy Institute authors reported a 10 to 40 percent chance of survival for the smelt under either Peripheral Canal or dual conveyance regimes. For endangered salmon species, the authors indicated only a 20 to 50 percent chance of viability with a Peripheral Canal or dual conveyance system in place. The best thing for fish, they concluded, was to end Delta exports. Their research further suggested that California agriculture and southern California cities, with their great size and diversity, would survive and eventually recover. We agree.

### **3. The Bay Delta Conservation Plan**

The Bay Delta Conservation Plan (BDCP) is the most ubiquitous and far-reaching Habitat Conservation Plan (HCP) ever envisioned together with a massive hydraulic scheme like a Peripheral Canal or dual conveyance. No significantly scaled HCP has ever been completed within the proposed timeframe, and the hydraulic schemes complicate the task. An HCP should focus on needed habitat improvement sufficient to enhance listed species so they may be eventually removed from endangered species lists. Because of this purpose (stated in both state and federal law) C-WIN and CSPA do not believe the Bay Delta Conservation Plan should include guaranteed water deliver and/or changes in Delta infrastructure as solutions in the Plan. Maintaining some level of water exports within the framework of an HCP prejudices the ability of the fish species to recover, when an appropriate HCP must rely on adaptive management strategies to both recover endangered species while continuing exports.

C-WIN and CSPA see the Bay Delta Conservation Plan as a vehicle for delay for environmental and economic protection of the Delta, and is likely not to result in improvements for the fisheries it is seemingly to protect. It accomplishes this window-dressing function by devising operational criteria by which the State Water Project and Central Valley Project export pumps in the Delta may pump while “taking” (killing) individuals of endangered species with the authoritative blessing of a habitat conservation plan allowed under the Endangered Species Act. **Such a habitat conservation plan would allow a *status quo ante* to continue wherein the**

**California Department of Water Resources and the US Bureau of Reclamation could operate the Delta export pumps with allowed takes of endangered species—just as they do now, but with their killing of fish “legalized” through the habitat conservation plan.** We don’t see how this makes possible meaningful ecosystem restoration or endangered species recovery in the Delta. We believe the US Department of the Interior should seriously consider withdrawing from this process, and **instead direct the Bureau of Reclamation and the Fish and Wildlife Service to prepare a joint implementation plan for the Anadromous Fisheries Restoration Program, with generous—and long overdue—funding to see it through.**

Proponents of BDCP have yet to answer basic questions that must be addressed in the plan’s environmental review:

- ❖ How much water does the estuary need to maintain ecosystem integrity?
- ❖ How much surplus water is available for export?
- ❖ What economic and environmental consequences follow from various reduced or no export scenarios?
- ❖ Can a diversion point for junior water rights be legally changed when it will harm senior water right holders and users?

The matter of trust does not go away with BDCP. The process is supposed to arrive at assurances on how the export pumps and other Delta water facilities are to be operated to ensure the endangered fish species there will recover so they can be de-listed someday. “Assurances” about how Delta conveyance schemes will be operated are not likely to be reassuring given the recent and historical track record of water quality standard violations by the Department of Water Resources and the Bureau. And our faith (and that of others concerned with the Delta) in assurances is further undermined through actions of the Governor to suspend the water quality control plan that sets forth the very water quality standards that are violated. Moreover, “assurances” that water supplies would be unaffected are strictly incompatible with a truly adaptive management approach to recovering Delta fisheries and ecosystems.

There is still no settled project description for BDCP on which adequate environmental documentation can be performed. Sizing, location, capacity, operational protocols, mitigation measures, assurances and safeguards, and the plan’s financing are all unfinished. The treatment of the effects of upstream reservoirs on Delta inflows and fisheries is ignored. An acceptable range of alternatives has still not been settled either, and that range must include no export and reduced export scenarios for evaluation.

**The Delta cannot afford to wait for the outcome of BDCP.** The population crashes reported by the US Fish and Wildlife Service this past April (Attachment 7) for salmon and steelhead in the Central Valley and Delta smelt indicate these fisheries are in imminent peril. The problems have been known since the 1950s and study after study performed only to see the Delta ecosystem worsen and crash because well-known corrective actions have been avoided and delayed. It is not more study that is needed;

only the courage to take corrective actions.

Please feel free to contact Carolee Krieger or Bill Jennings about these important issues.

Sincerely,



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#### Attachments

Cc: President Barack Obama  
Hon. Ken Salazar, Secretary of Interior  
Senator Dianne Feinstein  
Senator Jeff Bingamon  
Hon. Nancy Pelosi, Speaker of the House  
Anne Castle, Assistant Interior Secretary for Water and Science  
Hon. George Miller, Congressional District 7, California  
Hon. Mike Thompson, Congressional District 1, California  
Lisa P. Jackson, Administrator, Environmental Protection Agency  
Donald Glaser, Regional Manager, US Bureau of Reclamation, Mid-Pacific  
Region  
Thomas Strickland, Assistant Interior Secretary for Fish and Wildlife  
Marcia McNutt, U.S. Geological Survey  
Hon. Nick Rahall, House Committee on Natural Resources  
Hon. Jerry McNerney, Congressional District 11, California  
Hon. Grace Napolitano, Congressional District 38, California  
Lester Snow, Director, California Department of Water Resources  
Honorable Members, California State Water Resources Control Board  
Hon. Jared Huffman, California State Assembly, District 6  
Hon. Lois Wolk, California State Senator, District 5  
Hon. Fran Pavley, California State Senator, District 23  
Hon. Nancy Skinner, California State Assembly District 14  
Hon. Joe Simitian, California State Senator, District 11

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Hon. Loni Hancock, California State Senate, District 9  
Hon. Lois Capps, Congressional District 23  
John Herrick, General Manager and Chief Counsel, South Delta Water Agency  
Dante Nomellini, General Manager and Chief Counsel, Central Delta Water  
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Lynn Barris, Water Policy Analyst, Butte Environmental Council  
Barbara Barrigan-Parrilla, Executive Director, Restore the Delta  
Thomas Birmingham, General Manager, Westlands Water District

## Attachment 1

Employment Measure	Stanislaus County		Merced County		Madera County		Fresno County		Kings County		Tulare County		Kern County		Valley Totals	
	June-08	June-09	June-08	June-09	June-08	June-09	June-08	June-09	June-08	June-09	June-08	June-09	June-08	June-09	June-08	June-09
Civilian Labor Force	237,300	243,200	104,100	107,000	65,900	69,200	437,400	452,300	59,400	64,600	205,600	215,400	364,700	381,200	1,474,400	1,532,900
Civilian Employment	211,800	202,900	91,700	88,200	60,100	59,600	395,200	383,300	53,400	52,200	186,500	183,700	330,700	325,300	1,329,400	1,295,200
Civilian Unemployment	25,500	40,300	12,400	18,800	5,800	9,600	42,100	69,000	6,000	9,400	19,100	31,700	33,900	55,900	144,800	234,700
Unemployment Rate	10.7%	16.6%	11.9%	17.6%	8.8%	13.9%	9.6%	15.3%	10.1%	14.6%	9.3%	14.7%	9.3%	14.7%	9.8%	15.3%
Total All Industries	175,100	167,600	71,000	68,300	46,400	46,400	362,800	351,500	45,200	44,200	159,900	158,100	293,500	289,100	1,153,900	1,125,200
Total Farm	<b>17,100</b>	<b>16,900</b>	<b>12,100</b>	<b>11,900</b>	<b>11,300</b>	<b>11,700</b>	<b>56,600</b>	<b>56,500</b>	<b>7,800</b>	<b>8,000</b>	<b>45,600</b>	<b>47,600</b>	<b>52,300</b>	<b>53,400</b>	<b>202,800</b>	<b>206,000</b>
Total Nonfarm	158,000	150,700	58,900	56,400	35,100	34,700	306,200	295,000	37,400	36,200	114,300	110,500	241,200	235,700	951,100	919,200
Percent Change in Farm Employment		-1.2%		-1.7%		3.5%		-0.2%		2.6%		4.4%		2.1%		1.6%
Farm Employment as % of All Industries	9.8%	10.1%	17.0%	17.4%	24.4%	25.2%	15.6%	16.1%	17.3%	18.1%	28.5%	30.1%	17.8%	18.5%	17.6%	18.3%

Employment and Unemployment, 2008 and 2009, San Joaquin Valley	Stanislaus County		Merced County		Madera County		Fresno County		Kings County		Tulare County		Kern County		Valley Totals	
	May-08	May-09	May-08	May-09	May-08	May-09	May-08	May-09	May-08	May-09	May-08	May-09	May-08	May-09	May-08	May-09
Civilian Labor Force	232,900	240,400	102,100	105,800	66,100	68,600	435,300	439,100	59,600	61,100	207,400	216,800	364,400	379,500	1,467,800	1,511,300
Civilian Employment	208,400	201,200	90,200	87,500	63,300	59,200	394,200	371,500	54,000	52,300	189,000	185,800	331,600	325,600	1,330,700	1,283,100
Civilian Unemployment	24,400	39,200	11,900	18,300	5,700	9,400	41,100	67,700	5,600	8,800	18,400	31,000	32,800	53,900	139,900	228,300
Unemployment Rate	10.5%	16.3%	11.7%	17.3%	8.6%	13.7%	9.4%	15.4%	9.4%	14.4%	8.9%	14.3%	9.0%	14.2%	9.5%	15.1%
Total All Industries	171,500	165,200	69,400	65,800	46,500	45,800	360,500	348,600	45,700	44,200	161,800	159,700	394,000	288,400	1,249,400	1,117,700
Total Farm	14,400	14,300	11,400	11,100	11,300	11,300	52,900	53,000	8,300	8,000	47,000	49,100	53,700	53,200	199,000	200,000
Total Nonfarm	157,100	150,900	58,000	56,300	35,200	34,500	307,600	295,600	37,400	36,200	114,800	110,600	240,300	235,200	950,400	919,300
Farm Employment as % of All Industries	8.4%	8.7%	16.4%	16.9%	24.3%	24.7%	14.7%	15.2%	18.2%	18.1%	29.0%	30.7%	13.6%	18.4%	15.9%	17.9%
Did farm employment improve over last year?		No		No		No		Yes		No		Yes		No		Yes
Change in Labor Force		7,500		3,700		2,500		3,800		1,500		9,400		15,100		43,500
Change in Employment		-7,200		-2,700		-4,100		-22,700		-1,700		-3,200		-6,000		-47,600
Change in Unemployment		14,800		6,400		3,700		26,600		3,200		12,600		21,100		88,400

Source: California Employment Development Department, Labor Market Information, July 2009.

County	2008 Total Crop Value	2007 Total Crop Value	Percent Change
Fresno	\$5,662,358,028	\$5,347,398,000	5.9%
Kern	\$4,033,312,000	\$4,092,166,180	-1.4%
Kings	\$1,760,168,000	\$1,761,852,000	-0.1%
Madera	\$1,310,875,000	\$1,220,230,000	7.4%
Tulare	\$5,018,022,800	\$4,874,960,000	2.9%
<b>Total</b>	<b>\$17,784,735,828</b>	<b>\$17,296,606,180</b>	<b>2.8%</b>

Sources: Agricultural Commissioner Crop Reports for each county, 2007 and 2008.

## **WATER RIGHTS WITHIN THE BAY/DELTA WATERSHED STATE WATER RESOURCES CONTROL BOARD**

The water right permit system administered by the State Water Resources Control Board (State Water Board) applies to surface water bodies and to a narrow classification of groundwater, "subterranean streams flowing in known and definite channels." (Wat. Code, § 1200.) Aquifers that are not part of a subterranean stream are classified as "percolating groundwater." There are two basic categories of surface water rights: post-1914 appropriative; and pre-1914 appropriative and riparian. The State Water Board has very limited information on water use for either of these classes of water rights, and the little information it does have has not been synthesized and is not maintained electronically. The State Water Board has no information on groundwater use in the Delta watershed.

### **Post-1914 Appropriative Water Rights**

The State Water Board has permitting and licensing authority over surface water diversions associated with post-1914 appropriative water rights within the legal Delta and within the Delta watershed. December 19, 1914 is the effective date of the Water Commission Act that established the modern procedures to regulate surface water appropriation. Surface water appropriations established prior to this date are not bound by these procedures. The State Water Board maintains paper and electronic files for post-1914 permitted and licensed water rights, pending water right applications, and also state filings, which are state filed water right applications reserved for future use by individuals and entities in the areas where water originates. The information in its files includes the holder of the water right, point of water diversion, limitations on the rate, amount, and season of diversion, the place and purpose of use of the water, and any other terms or conditions placed on the water right. These limitations on rate, amount, and season of use are used to determine the "face value" of the water right, defined as the total annual amount of diversion authorized for direct diversion or storage by a permit or license. The term is primarily used in the calculation of water right fees and does not take into account water availability, bypass requirements, or other conditions that may have a practical effect of limiting diversions. Further, the State Water Board has continuing authority to change existing water rights, following formal notice and opportunity for hearing, in order to protect the public trust and water quality and to prevent the waste, unreasonable use, and unreasonable method of use or diversion of water.

Water right permit and license holders are required to file progress reports with the State Water Board, and to report their water diversion and use amounts (Cal. Code of Regs, tit. 23, § 847). These reports are to be completed annually for water right permit holders and triennially for water right license holders. Approximately 68 percent of permit and license holders submit completed water use reports to the State Water Board. The Water Code does not contain specific enforcement provisions that would allow the State Water Board to enforce against the lack of reporting. Use information reported to the State Water Board is stored in paper files and there has been no verification of the quality of this information except as part of limited enforcement



actions. Summary information is therefore not available to compare face value of water rights to actual use. Some water users who hold multiple rights report the same use information for all of their rights. For instance, a right holder may use 2500 acre-feet per year of water under three different water rights. If that user reports a use of 2500 acre-feet for each of the three rights, a cursory review might lead the reviewer to conclude that 7500 acre-feet of water is being used, although this is not the case.

### **Pre-1914 Appropriative and Riparian Water Rights**

The State Water Board does not have permitting and licensing authority over Pre-1914 appropriative or riparian water rights. The State Water Board does however collect Statements of Water Diversion and Use (Statements) from water diverters claiming riparian and pre-1914 water rights. (Wat. Code, § 5100 et seq.) The State Water Board has approximately 5,500 Statements of Water Diversion and Use on file for pre-1914 and riparian rights in waters tributary to the Delta. These Statements, however, do not provide complete information about riparian and pre-1914 water diversions in California. Of particular significance in the Delta, certain diverters are statutorily exempt from filing Statements; Water Code section 5101 exempts diversions that are reported by the Department of Water Resources (Department) in its hydrologic data bulletins or that are included in the consumptive use data for the Delta lowlands published by the Department in its bulletins. (*Id.*, § 5101, subds. (e)-(f).) The State Water Board estimates that there are approximately 1,600 unreported Pre-1914 and riparian diversions in the Delta. Additionally, even if a water diverter is statutorily required to file a Statement, there is no penalty for failure to file a report. (*Id.*, § 5108.)

### **Groundwater**

Percolating groundwater is not subject to the State Water Board's permitting system and, in most of the state, is not regulated by any other public agency. When considering a proposed appropriation of groundwater, or determining whether an unpermitted diversion in close proximity to a stream is an unauthorized diversion, the State Water Board must evaluate the legal classification of the groundwater from which the water is being appropriated to determine whether it is a subterranean stream, which is under the jurisdiction of the State Water Board, or percolating groundwater, which is not. (See *North Gualala Water Co. v. State Water Resources Control Board* (2006) 139 Cal.App.4th 1577 [43 Cal.Rptr.3d 821] [upholding State Water Board's use of four-part test in determining legal classification of groundwater].) To the extent groundwater is classified as a subterranean stream, it is managed as surface water. (See also Wat. Code, § 2500 [statutory adjudication procedures, under which all rights in a stream system are determined, apply to surface waters and subterranean streams, not percolating groundwater].) The State Water Board has no legal authority to require users of percolating groundwater to report their uses of water, other than in four southern California counties. The State Water Board does not therefore maintain information on extraction of percolating groundwater within the Delta watershed.

### **Water Use versus Water Rights**

The mean annual unimpaired or full natural flow in the Delta Watershed between 1921 and 2003 was 29 million acre-feet per annum (AFA), with a maximum of 73 million AFA

in 1983.<sup>1</sup> Unimpaired flow is flow that would be expected in the Delta watershed in the absence of storage and other human developments. In contrast, the total face value of the approximately 6,300 active water right permits and licenses within the Delta managed by the State Water Board, including the already assigned portion of state filings, is approximately 245 million AFA. There are 100 rights with a face value of 500,000 AFA, or more that account for 84% of the total face value of the water rights within the Delta watershed. The Central Valley Project and State Water Project hold 75 permits and licenses within the Delta watershed that account for 53% of the total face value of the water rights within the watershed. The total face value of the unassigned portion of state filings for consumptive use (excluding state filings for the beneficial use of power) within the Delta watershed is approximately 60 million AFA. This does not mean that this 60 million AFA is hydrologically available for appropriation. Prior to assignment of a state filing, the State Water Board will require that an applicant provide evidence that water is available to support the assignment. Clearly, actual use must be only a small fraction of the face value of these water rights, particularly since face value does not include pre-1914 and riparian water rights. There are three primary reasons why the face value of water rights is greater than actual diversions:

1. When approving a water right application, the State Water Board has to find that water is available for appropriation for the project being proposed. In making that determination, the State Water Board looks at both the demand characteristics associated with the proposed use and the likelihood that supply will be adequate to supply that demand. The State Water Board is required to maximize the beneficial use of water. Historically, the State Water Board has approved permits for agricultural projects if water is available in 50 percent of years, under the condition that water cannot be diverted in years in which there is insufficient supply to satisfy prior vested rights.
2. Water rights are issued based on the maximum rate of diversion (for direct diversion projects) and the maximum annual diversion to storage (for reservoirs and other impoundments). For large storage projects, the maximum annual diversion to storage generally only occurs in the year in which the project initially fills. Most modern water rights include a bypass condition which can limit diversion amounts below the "face value" amount in many years. Some water rights include a condition that limits the amount of water that can be diverted in combination with other water rights. This information is difficult to capture in a database format.
3. Some projects are covered by multiple rights for the same molecules of water. The State Water Board's regulations require that separate water rights be obtained for non-consumptive and consumptive uses of water. Large multi-use reservoirs will have at least two permits as a result, one that allows non-consumptive uses like recreation at and below the reservoir and one that allows consumptive uses such as municipal and irrigation uses. Similarly, the same molecule of water may be diverted several times by several different water right holders as it works its way down a river. If the water is not consumptively used,

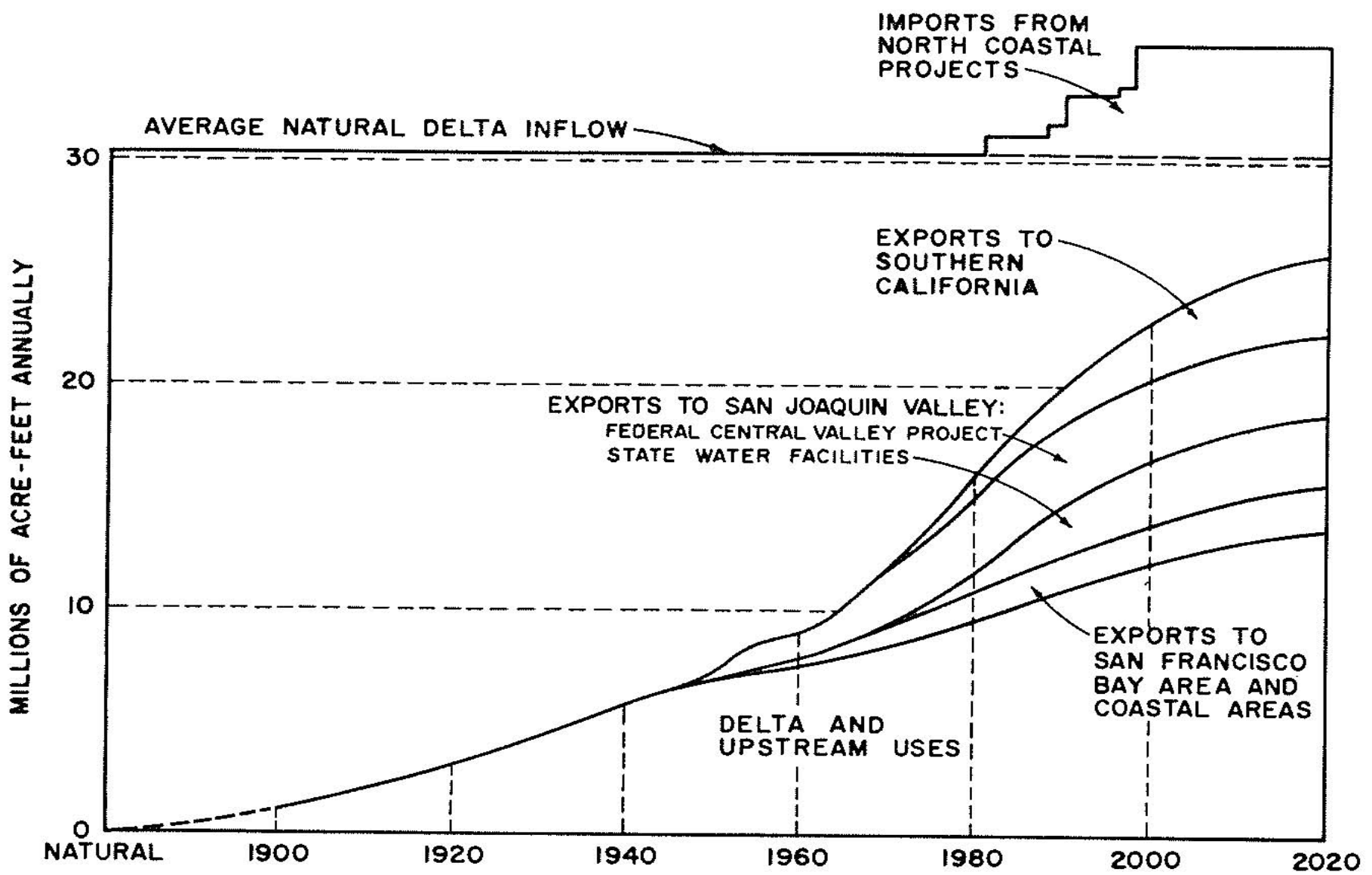
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<sup>1</sup> DWR, Bay Delta Office, California Central Valley Unimpaired Flow Data, Fourth Edition Draft, May 2007

9/26/08

or lost to deep groundwater recharge, it likely returns to a river and is rediverted downstream.

Actual use under existing water rights is clearly a better metric to compare with unimpaired flows than is face value but the State Water Board has limited information on actual use. Comprehensive review and synthesis of the State Water Board's paper files would however provide only a crude estimate of actual historic and current use because of gaps in reporting and unreliability of the data already collected. Finally, there is a linkage between water availability in many surface waters and groundwater pumping but the State Water Board has no information on percolating groundwater pumping in the Delta watershed.



### USE OF DELTA WATER SUPPLIES

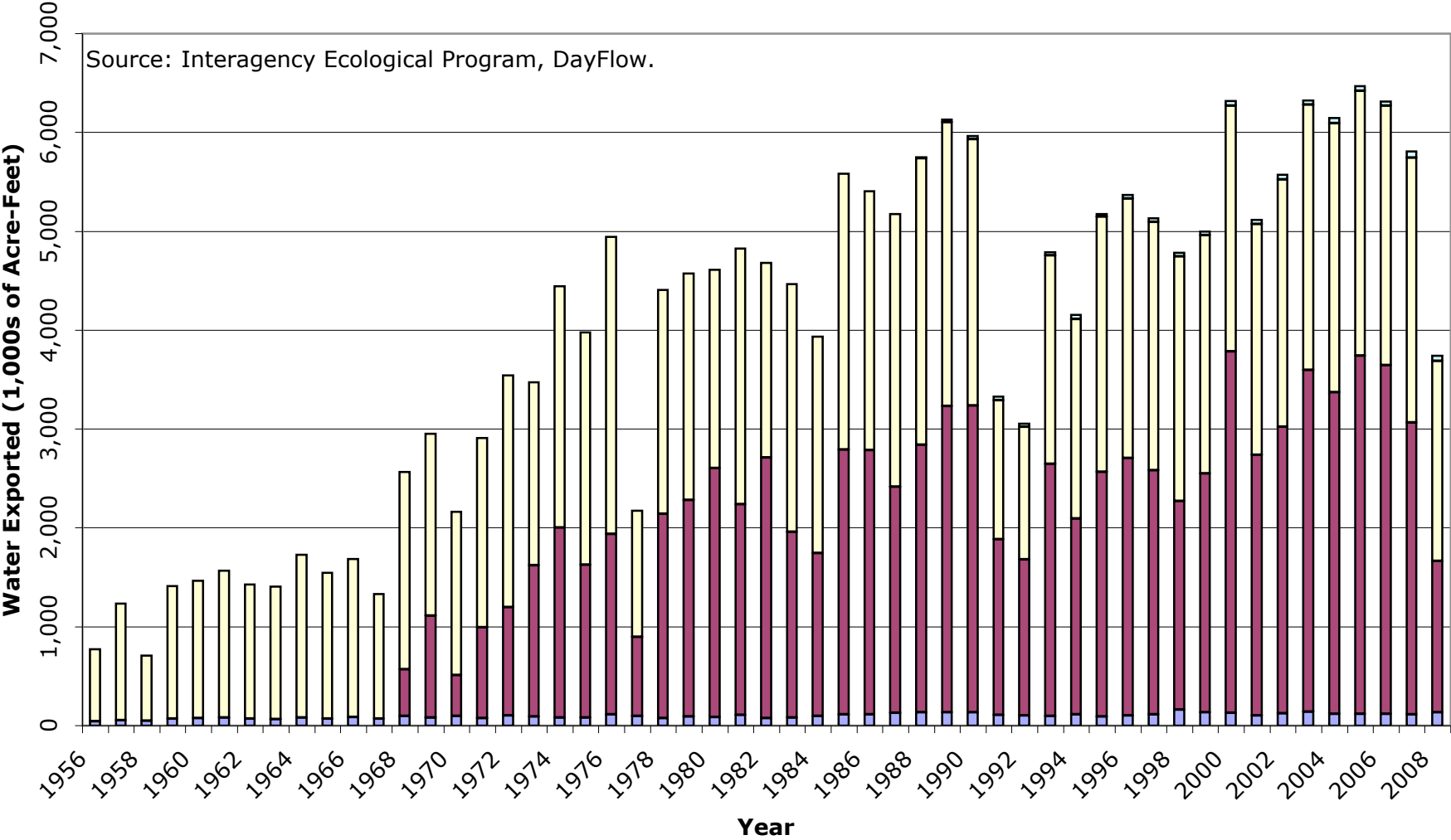
Source: California Department of Water Resources, Bulletin 76, Delta Water Facilities, December 1960 p. 13.

Attachment 4

<b>Comparison of 2000-2008 Historic Average CVP and SWP Deliveries with Historic Dry Years 2001, 2002, 2007, and 2008</b>							
	<b>2001</b>	<b>2002</b>	<b>2007</b>	<b>2008</b>	<b>2000-2008 Average</b>	<b>Average of Selected Dry Years</b>	<b>Dry Year Average as Percent of 2000-2008 Historic Avg</b>
<b>Annual SWP Allocation</b>	<b>39%</b>	<b>70%</b>	<b>60%</b>	<b>35%</b>	<b>71%</b>	<b>51%</b>	72%
<b>Annual Total SWP Deliveries</b>	<b>2,173,262</b>	<b>2,911,327</b>	<b>3,215,731</b>	<b>2,191,237</b>	<b>3,112,796</b>	<b>2,622,889</b>	84%
Annual Total San Joaquin Valley Deliveries	787,077	983,392	1,124,652	832,606	1,156,190	931,932	81%
Annual Total Southern California Area Total Deliveries	1,188,690	1,707,251	1,861,248	1,155,305	1,712,673	1,478,124	86%
CVP San Luis Canal Annual Total Deliveries	1,016,975	1,077,906	1,099,267	691,358	1,091,984	971,377	89%
Westlands WD	862,721	915,175	928,571	565,959	930,681	840,621	90%
Pacheco WD	9,461	6,267	10,557	3,055	7,388	7,346	99%
Panoche WD	56,924	60,215	53,209	34,685	55,093	52,025	94%
San Luis WD	78,577	85,724	93,304	76,215	87,205	84,205	97%
CVP Delta Mendota Canal	120,459	140,939	134,212	97,947	133,251	125,362	94%
CVP Exchange Contractors	767,115	766,857	747,473	730,222	730,222	748,378	102%
CVP Mendota Pool	58,855	64,159	66,066	51,638	65,406	61,225	94%
CVP Cross Valley Canal	12,651	95,925	64,150	43,882	32,711	49,864	152%
CVP San Felipe Division	170,759	158,749	154,213	136,611	135,885	151,243	111%
CVP Friant Division	886,333	958,309	610,827	869,150	1,113,752	887,674	80%
<b>Total CVP Contractor Annual Deliveries</b>	<b>3,033,147</b>	<b>3,262,844</b>	<b>2,876,208</b>	<b>2,620,808</b>	<b>3,303,211</b>	<b>2,995,122</b>	91%
<b>Total Annual Deliveries, CVP and SWP contractors</b>	<b>5,206,409</b>	<b>6,174,171</b>	<b>6,091,939</b>	<b>4,812,045</b>	<b>6,416,007</b>	<b>5,618,011</b>	88%

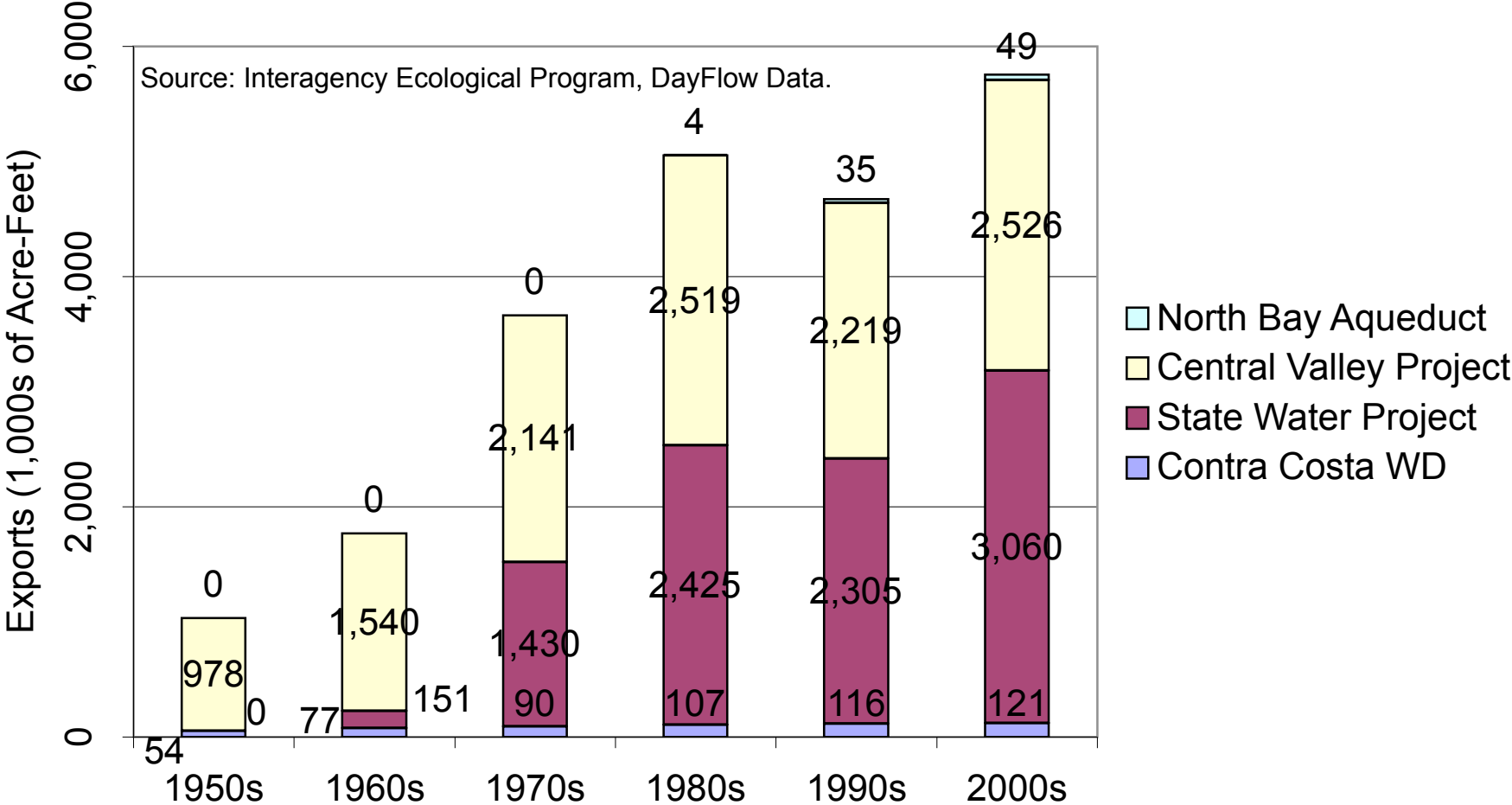
Source: DWR and USBR, Joint Petition to Consolidate Places of Use, March 20, 2009. Note that the 2000-2008 Historic average is an average of the percent allocations for the SWP only. The average allocations were simple calculations from Table 1 of the Petition.

### Delta Water Exports, 1956-2008



■ Contra Costa WD ■ State Water Project ■ Central Valley Project ■ North Bay Aqueduct

# Average Delta Exports by Decade 1950s through 2000s



**Attachment 6**

**San Joaquin Valley 2009 Water Supplies  
As of 5-13-09**

*Working Draft*

	<b>San Luis Delta Mendota*</b>	<b>Westland's Water District</b>	<b>Friant Water Users Authority</b>	<b>Kern County Water Agency</b>	<b>Modesto Irrigation District</b>	<b>San Joaquin River Exchange Contractors</b>	<b>SJV Refuges</b>
<b>Carryover Water</b>	96	236	50	120	0	0	0
<b>Surface Water</b>	125 (CVP only)	125	870 (Friant Supplies Only)	568	170	840	250 Level 2
<b>Groundwater</b>	147	200	0	1,200	30	0	unknown
<b>Additional 2009 Groundwater</b>	0	260+ (last year 460TAF total, expect to exceed last year in 2009)	0	1,000	0	0	0
<b>Transfers/ Exchanges</b>	80	172	0	10	unknown	0	30 Level 4
<b>Total</b>	448	993 (86%)	920 (74%)	2,898 (85%)	200 (89%)	840 (100%)	280 (75%)
<b>Average Annual Use</b>	unknown	1,154	1,250	3,400	255 (175 ag, 80 urban from website)	840	371
<b>Following</b>							
<b>Maximum Irrigated Acres</b>	315,000	569,000	920,000	995,000	58,650	240,000	136,000 (total SJV refuge acres)
<b>Normal Following</b> (assumes 10% unless otherwise specified)	39,000	78,000	92,000	100,000	5,900	24,000	NA
<b>2009 Following</b>	65,000 (21%)	225,000 (40%)	0 (Reduced double cropping)	220,000 (22%)	unknown	unknown	NA

\* Ag Service Contractors only, excluding Westland's Water District

**The information contained in this table was obtained from multiple sources and is subject to change.  
This information should be used only as an estimate.**



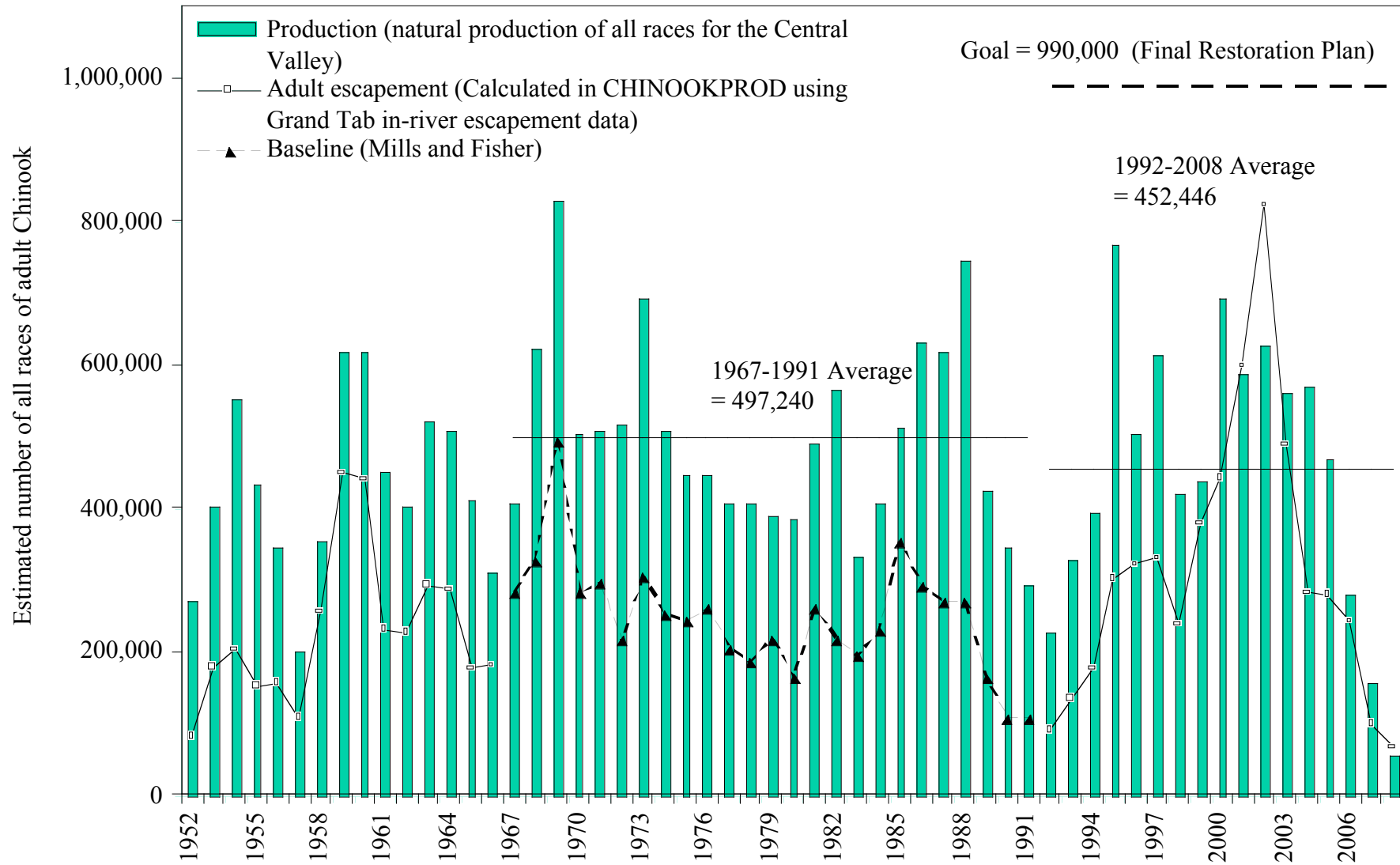


Figure 1. Estimated yearly natural production and in-river escapement of all races of adult Chinook Salmon in the Central Valley rivers and streams. 1952 - 1966 and 1992 - 2008 numbers are calculated in CHINOOKPROD using CDFG Grand Tab in-river escapement data (February 18, 2009). Baseline numbers (1967 - 1991) are from Mills and Fisher (CDFG, 1994).

Source: US Fish and Wildlife Service, accessed from <http://www.fws.gov/stockton/afrp/index.asp>.

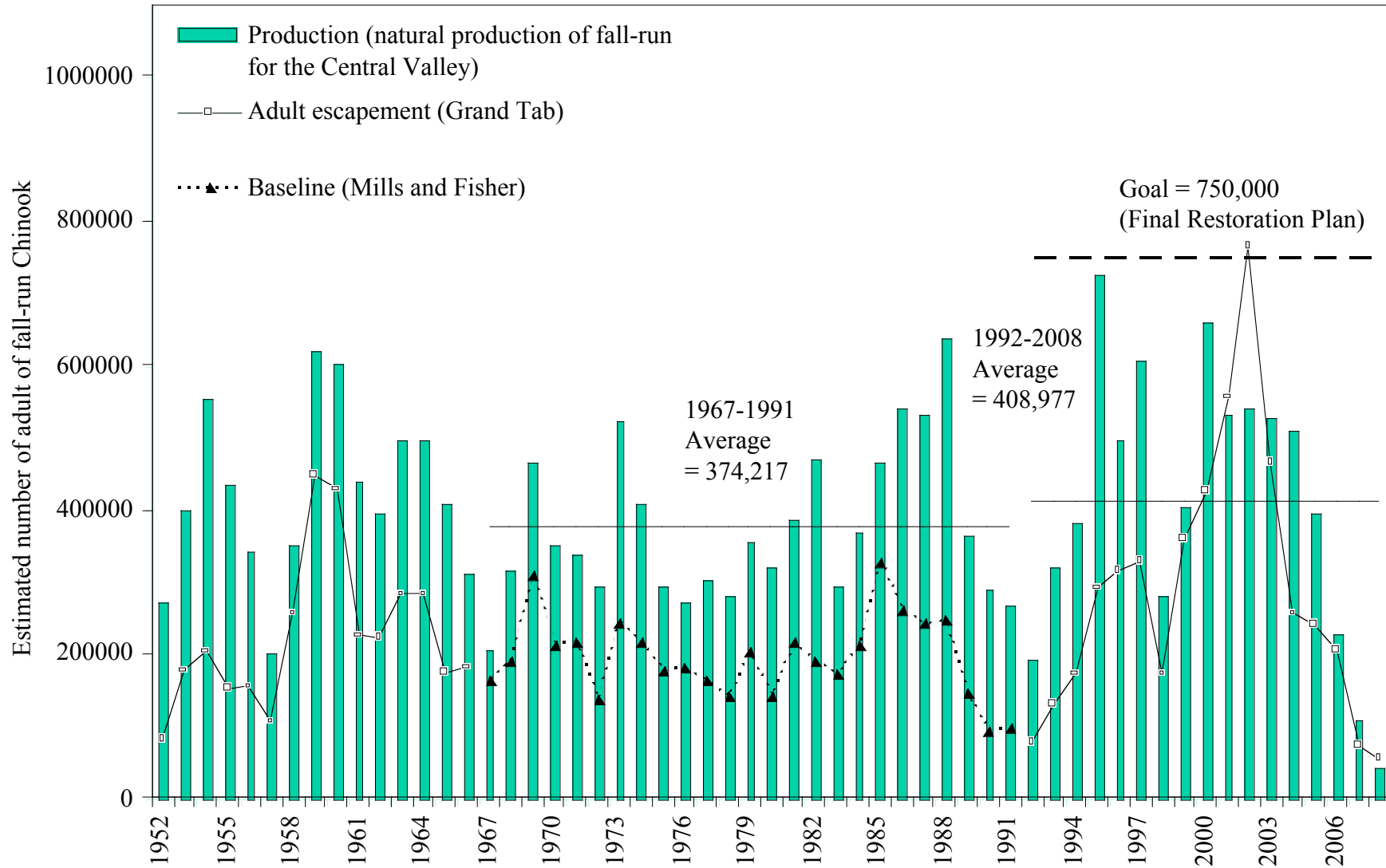


Figure 2. Estimated yearly natural production and in-river escapement of adult fall-run Chinook salmon in the Central Valley rivers and streams. 1952 - 1966 and 1992 - 2008 numbers are from CDFG Grand Tab (February 18, 2009). Baseline numbers (1967 - 1991) are from Mills and Fisher (CDFG, 1994).

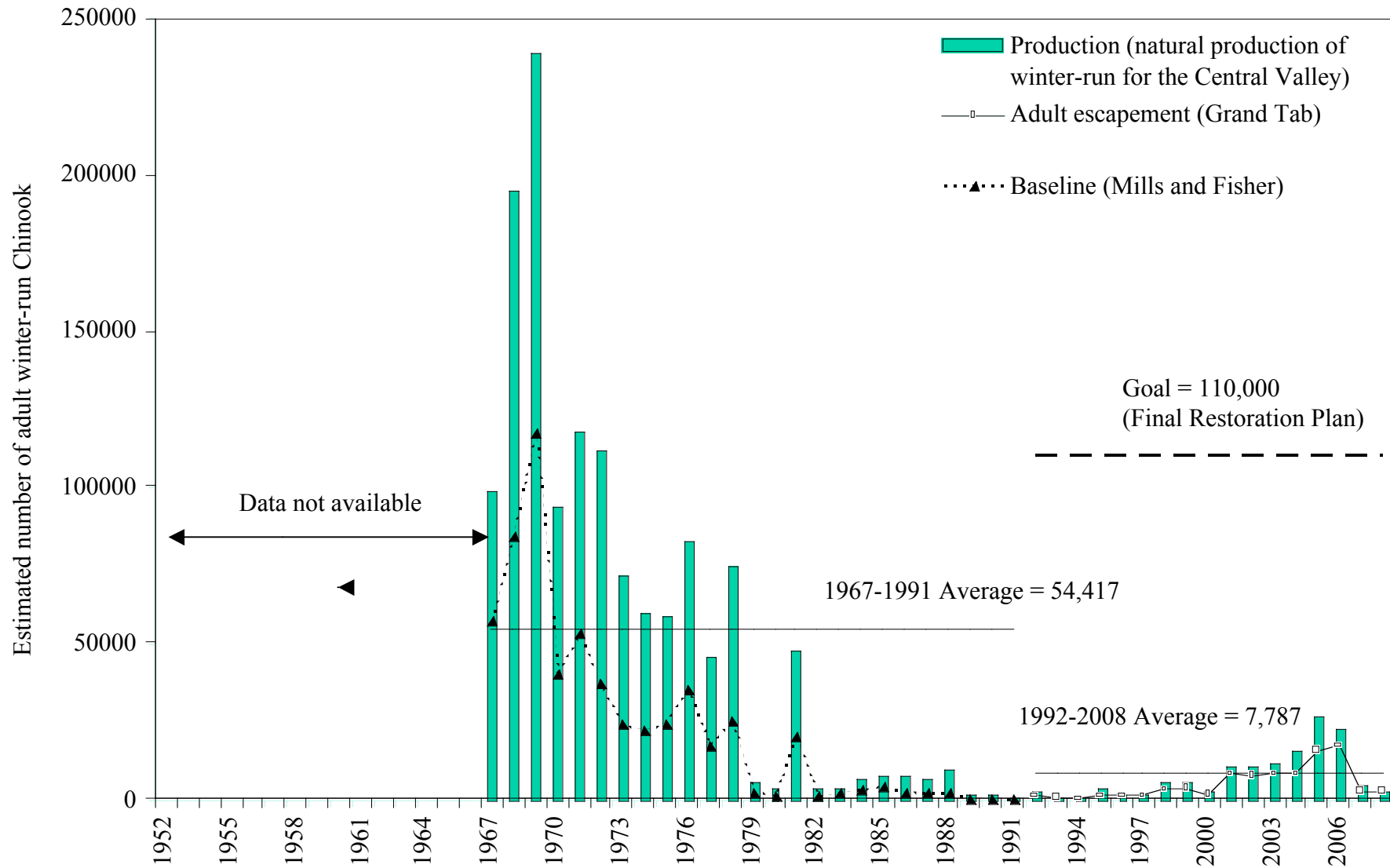


Figure 3. Estimated yearly adult natural production, and in river adult escapements of winter-run Chinook salmon in the Central Valley rivers and streams. 1992 - 2008 numbers are from CDFG Grand Tab (February 18, 2009). Baseline numbers (1967-1991) are from Mills and Fisher (CDFG, 1994).

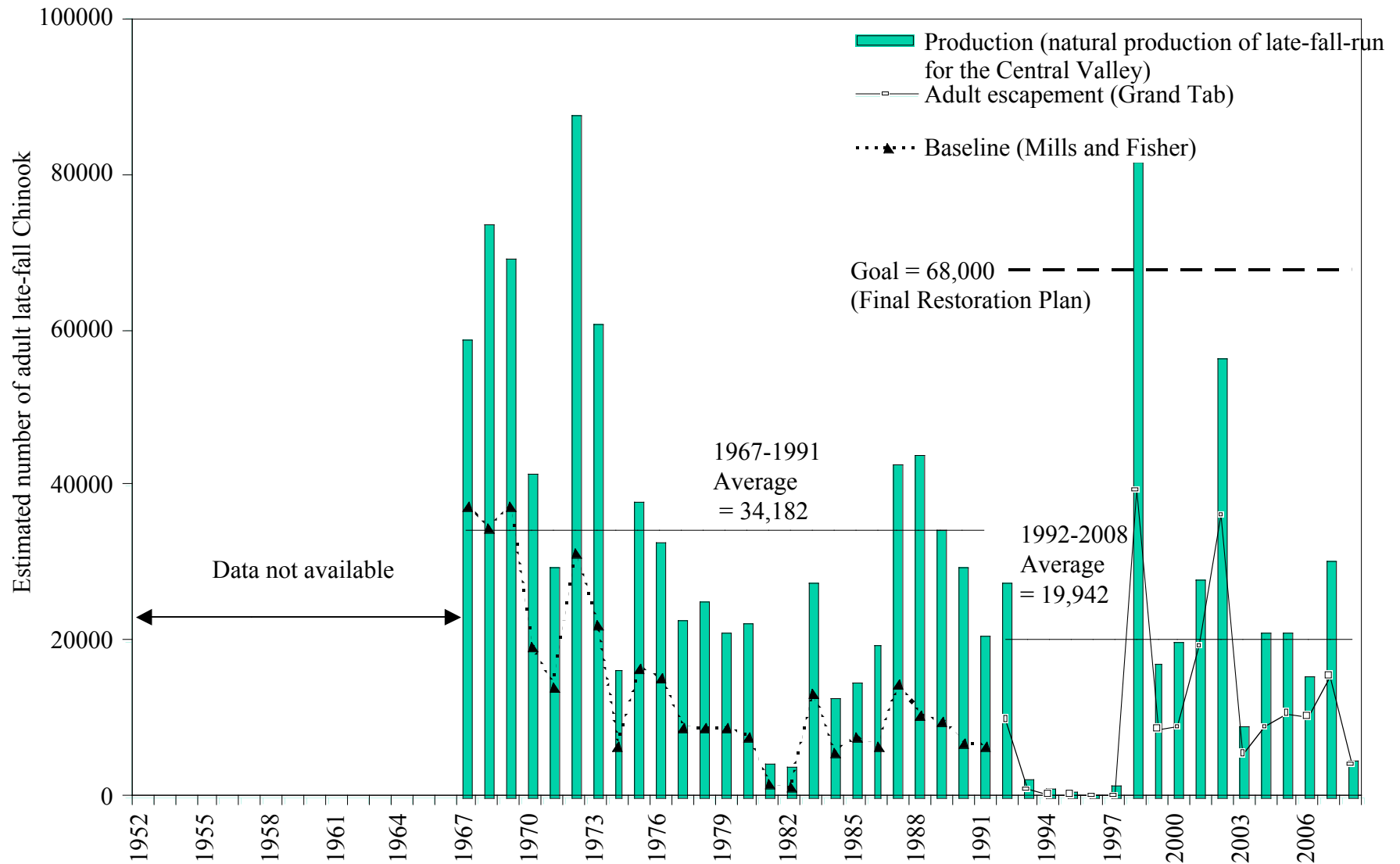


Figure 4. Estimated yearly adult natural production, and in-river adult escapements of late-fall-run Chinook salmon in the Central Valley rivers and streams. 1992 – 2008 numbers are from CDFG Grand Tab (February 18, 2009). Baseline numbers (1967 - 1991) are from Mills and Fisher (CDFG, 1994).

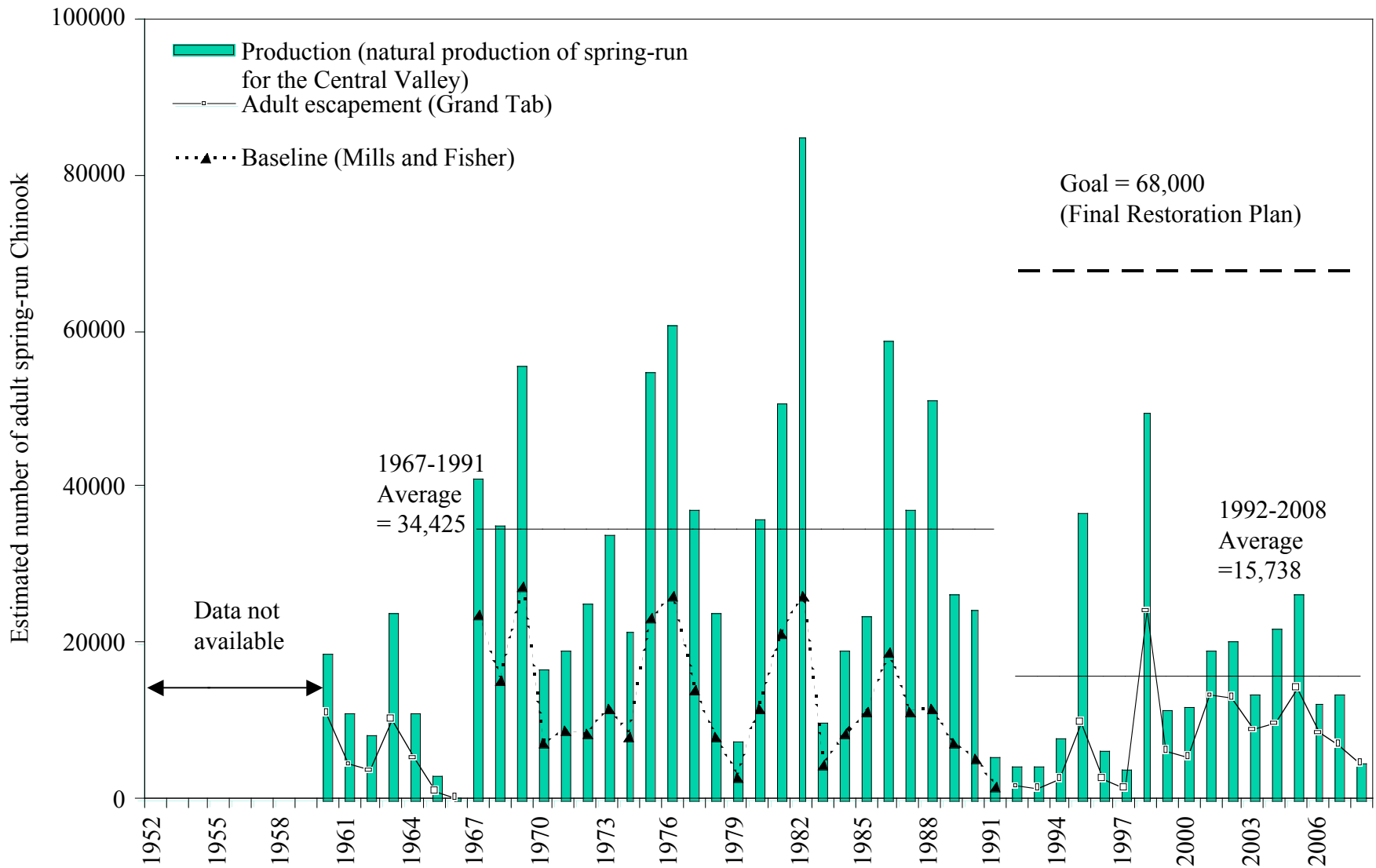


Figure 5. Estimated yearly adult natural production, and in-river adult escapements of spring-run Chinook salmon in the Central Valley rivers and streams. 1960 - 1966 and 1992 - 2008 numbers are from CDFG Grand Tab (February 18, 2009). Baseline numbers (1967 - 1991) are from Mills and Fisher (CDFG, 1994).