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JUL 0 1 1998

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Non-Profit Law and Consulting in Conservation of Natural Resources and the Global Environment

July 1, 1998

Mr. Lester Snow, Executive Director
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, CA 95814

RE: Comments on Draft Programmatic EIS/EIR for the CALFED Bay-Delta Program

Dear Mr. Snow:

The Natural Heritage Institute welcomes this opportunity to submit these comments on the CALFED Draft Environmental Impact Report (DEIR) within the formal comment period. In this submission, we confine our review to aspects of the DEIR which we believe require specific improvement as CALFED completes its environmental review obligations under NEPA and CEQA. More detailed analyses, information and affirmative recommendations for reorienting the CALFED process will be forthcoming in the near future. That additional submission is being prepared in response to the injunction of the CALFED policy agencies at the "roll-out" of the DEIR to provide positive suggestions on how to improve the CALFED program, not just critiques of the current documents. NHI's positive recommendations will take the form of a revised and expanded iteration of the "Environmentally Optimal Alternative" which was originally submitted during the scoping phase. Please treat the Environmentally Optimal Alternative when it is received as an elaboration of these comments and as part of the public comment record.

Planning Methodology: Setting Attainable Goals and Translating them to Specific Actions on the Ground.

CALFED has laid out a reasonable hierarchy of planning steps that includes goals, objectives, targets, and actions. However, the DEIR does not consistently employ a clear planning methodology throughout the core programs. Often the core programs do not have stated goals or objectives. For example, in place of objectives, the water quality program lists 24 "actions." These are not objectives but rather a strategy for achieving the objective of using water more efficiently. When programs do have goals and objectives, they are often not explicit, attainable, or measurable. For example, one objective for urban water use efficiency is to "Include the strengths and benefits of the CUWCC and the urban MOU." This objective is vague and unmeasurable. Finally, the goals and objectives listed in the Goal and Objectives Report often differ from the objective described in the core program reports. This inconsistency throughout the document on such a basic element as goals and objective renders the DEIR unworkable.

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Before going any further, we recommend that CALFED adopt and consistently employ a clear planning methodology throughout all of the CALFED programs. Each program must describe a clear path between goals and specific actions as well as a program for measuring whether implementation of the specific actions actually achieves the desired goals. We suggest the following approach:

Goals: Broad statements that reflect normative social choices. CALFED staff or consultants can not write the goals. The goals will necessarily reflect the values of the public stakeholders and must thus be written by the stakeholders in collaboration with CALFED staff. All goals must be attainable and explicit. To the extent possible, goals should be framed without predisposing strategies or actions for achieving those goals. For instance, it may be necessary to restore ecological processes to restore endangered fish species, but the goal is restoring endangered fish species not restoring processes. Therefore the goal statement should read "restore endangered fish species" rather than "restore ecological processes." Goals should not change over the life of the program.

Objectives: Objectives are quantifiable elaborations of the goal statements. Several objectives may be necessary to achieve one goal. Setting objectives requires participation of both stakeholders and scientists because objectives are a gray area between normative goals and scientifically determined numerical targets necessary to achieve those goals. Objectives should not change over the life of the program except as necessary to achieve the program goals.

Targets: Targets are quantified, numerical elaborations of objectives. Targets should be adjusted as the program evolves to reflect the information learned through the adaptive management process.

Strategies: An "opportunities and constraints" analysis should be performed to identify the most promising strategies for achieving the targets. As opportunities and constraints change over time, new strategies can be identified for achieving targets.

Actions: Actions are specific suggestions for modification of the landscape or institutions to achieve targets.

Performance metrics: Performance metrics and targets look very similar but are very different. Targets are something to aim for, and performance metrics are something to measure the success of the program against. Targets reflect strategies and will be informed by the adaptive management process. It is critical that CALFED carefully select performance metrics that are not tied to a particular strategy or target. For example, it is conceivable that we could meet our goals of restoring endangered fish species without achieving our target of restoring 10% of historical tidal marsh. If our goals are met, there is no need to spend more money toward the target. On the other hand, we may hit our targets but not achieve our goals. In this case the target needs to be expanded

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or the strategy reconsidered. In conclusion, targets reflect how we think we should get to our goals, and performance metrics reflect whether we have achieved our goals.

Water Supply Conveyance, and Storage

Water Supply

The water supply analysis of the DEIR fails to evaluate the water supply reliability benefits of an integrated agricultural water conservation, water transfer and conjunctive management program. Indeed, CALFED does not seem to realize that these three components cannot be separated functionally or analytically. Analyses that NHI has previously provided to the program staff demonstrates that such an integrated strategy would provide superior water supply reliability benefits at far less cost and in an environmentally acceptable fashion, compared to the construction of expensive new water supply projects. We would be pleased to submit that analysis again and as often as necessary to reorient CALFED's narrow, conventional and suboptimal approach on this important issue.

To summarize, supply reliability is a function of improving water availability during times of scarcity. That means increasing the ability to store water from years of relative abundance for use in years of relative scarcity. Groundwater basins are a low-impact way to store water. The legal issues are not difficult to overcome and the political resistance is removed if the program is voluntary. With appropriate incentives, voluntary provision of groundwater storage services is not hard to procure, CALFED's assumptions to the contrary notwithstanding. Deep percolation of irrigation water does recharge groundwater and allow it to be carried over. However, deep percolation during dry years undermines the objective of expanding beneficial uses. Marrying an agricultural efficiency program that operates in all years with a purposeful groundwater storage program that stores conserved surface water in wetter years and extracts it to supplement surface water supplies in drier years could meet the CALFED supply reliability goals admirably. Water transfers are a necessary part of that approach because they provide the market incentives to induce the efficiency improvements, on the one hand, and provide the mechanism for moving water from surface sources to groundwater storage and from the latter to points of end use. In short, all three components--efficiency improvement, groundwater storage and market transfers are—mutually dependent and indispensable elements of a water supply reliability based on conjunctive water management. A CALFED program that neglects to develop and compare this alternative to the conventional surface storage option is dead on arrival. Yet, this DEIR is devoid of analysis or even recognition of this alternative, notwithstanding its presentation to CALFED staff in documents and in briefings on several occasions.

Surface and Groundwater Storage

CALFED's plan overemphasizes the need for surface water storage and underestimates the potential of groundwater storage opportunities. CALFED estimates a groundwater storage potential of 750,000 acre feet. CALFED's own analysis shows that the groundwater storage potential at just

three sites (Butte Basin, Madera Ranch, and Yolo County) exceeds their target by 250,000 acre feet. An NHI study on maximal groundwater banking estimated that it was possible to increase the average yield of the Central Valley water supply system by nearly 900,000 acre feet. A CH2MHill study which focussed on the direct capture of storm water for groundwater storage came up with an estimate of approximately 1 MAF per year. The actual storage and dry year yield from a maximal groundwater banking program would be considerably greater.

Analysis of Fishery Benefits of Alternatives

The DEIR fails to provide a thorough, replicable analysis of fishery benefits and impacts of the various alternatives. We understand that the fish diversions team is currently working on such an analysis. We look forward to this analysis, but believe that its absence in the DEIR is a fatal flaw. NHI will support the alternative that is best for the fish and the environment, but only after CALFED has performed a credible analysis.

Institutional Considerations

The DEIR fails to provide any description or analysis of the type of institution necessary to implement the CALFED program. NHI has previously submitted recommendations on design and function in its Environmentally Optimal Alternative, and urges CALFED to consider them.

Water Use Efficiency

The CALFED Water Use Efficiency Program is fundamentally flawed because 1) it does not adequately address the fundamental role of the economics of water use in efficiency, and 2) it confuses means with goals. The primary agricultural water use efficiency objective, to "build on the progress and achievements of the AB 3616 MOU," is an example of both of these flaws. Like many stated core program objectives, it is actually a strategy rather than an objective and illustrates the risk of presupposing particular strategies within a goal statement. The correct objective, however, should entail actual improvements in efficiency, not just building "on the progress and achievements" of MOU's.

Moreover, we note that the agricultural MOU is very fragile because it does not enjoy much environmental support. NHI is a party to the MOU and currently co-chairs its Agricultural Water Management Council. However, our support is expressly conditional upon CALFED going beyond the MOU framework and developing a more demanding and effective water use efficiency component. As we stated, the MOU should be considered the floor, not the ceiling, for the CALFED program. Specifically, CALFED needs to go beyond the EWMP- based approach and create market incentives for efficiency improvements in agriculture through by facilitating and removing the barriers to water transfers. Evidence out of NHI's "Challenge Grant" agricultural water conservation collaborative with water districts, USBR and the University of California confirms that financial incentives are the key to increasing the investment farmers make to water conservation techniques and technologies. By contrast, the water transfer program described in

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section 7 of the technical appendix is nothing more than a plan to develop a plan. We are pleased that CALFED has recently chosen to develop a core transfers program, but we are disappointed that so little progress has been made on this key element.

A CALFED agricultural efficiency program that simply relies on what will happen anyway -- the agricultural efficiency MOU -- would be superfluous and would compel NHI to consider withdrawal from the MOU. The MOU is simply not good enough to deal with the fundamental reality that the state does not have enough water for unmet needs in the environmental, urban **and agricultural** sectors, if low-value agricultural uses continue to lock up its such a large fraction of total supplies.

EWMPs have limited efficacy simply because, under current water prices at the margin, California agriculture is about as efficient as is cost-justified. If, however, the value of water on farm can be increased (without necessarily increasing its average cost to farmers), much larger efficiency improvements become possible. And, these efficiency improvements help the farmers themselves (and their districts) cope with water supply deficiencies in drier years. This type of water conservation program is beneficial to all interests and consequently has been embraced by the water districts and their members who are participating with NHI, UC Berkeley and USBR in the Challenge Grant collaboration. Four annual reports documenting the progress in understanding incentive-driven water conservation in California are now available and will be provided to the CALFED staff. Conclusions pertinent to the design of a CALFED agricultural efficiency component are summarized below:

Defining Conservation

Water conservation is typically defined as reducing water applied to produce a given crop output. We adopt an alternative formulation, namely maximizing the value produced with a given amount of water. Of course, these definitions are not inconsistent, but are rather inverses of each other. Our Challenge Grant work has demonstrated that the latter definition has more resonance within agriculture, while producing an identical result.

In the discussion here, we only treat on-farm efficiency. In so doing, we ignore the important issue of regional- versus on-farm efficiency.

Financial Incentives

Farmers have been demonstrated to respond to incentives in the output market and other input markets. Not surprisingly, our Challenge Grant research has demonstrated that farmers also respond vigorously to changes in water price.

Financial incentives are likely to outperform best management practice regulations that dictate on-farm water use. One early finding of our Challenge Grant research was that irrigation system investments are conditioned by a number of individual and environmental conditions beyond the

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control of regulators. For this reason, investments are most often tailored to specific circumstances about which regulators may not have complete information. Thus, EWMPs may well have a one size fits all character that is inimical to the goal of conservation.

Volumetric Water Pricing

In the spring of 1995, Arvin-Edison Water Storage District (AEWSD) altered its rate structure from contracted water allotments to use-based allocation. Historically each grower had been contracted a given allotment of water per acre. If growers needed more they would either pump ground water or purchase additional water from the AEWSD, if it was available. With the change in the rate structure growers are no longer limited to a specific quantity of water and the variable portion of the charge has been increased to discourage excessive water use. One of the specific goals of this policy change was to target some water uses that the AEWSD thought were wasteful, especially pre-irrigation and other year end irrigation activities.

The problem was that when growers had water left over at the end of the year under the water contract rate structure they would typically use it on low value cover crops, such as hay, or use it for pre-irrigation. This typically was not an efficient use of water, but the grower perceived the water as already being paid for since it was specified in the contract. These changes have removed the perception that the water is already paid for and increased year-end flexibility.

To date, the data look promising; for example, there was a 1,200-acre reduction in hay and a 900-acre reduction in small grains, both of which tend to be low-value cover crops. There was also an 800-acre increase in potatoes, a 400-acre increase in onions and a 500-acre increase in miscellaneous truck crops, all of which are considered medium- to high-value crops. The end result of the change in the rate structure is a slight increase in water use per acre (which is achieved with a reduction in the total number of acres farmed and a reduction in potentially uneconomic practices such as pre-irrigation and double-cropping), and a dramatic increase in the value per acre-foot of water applied.

Water Trading

Water trading among growers serves many of the same functions as increasing the price paid to the district. Water trading can increase the marginal price of water; significantly, it also avoids the revenue neutrality requirements that hamstring most district-implemented conservation measures such as tiered pricing and buybacks. There are three basic conclusions of the Challenge Grant work on trading within Westlands Water District: i) there is extensive participation in the internal market, ii) the water market helps growers cope with surface supply fluctuations and iii) water trading has especially important benefits to small landowners. Detailed analysis of the data and its design implications is provided in the Challenge Grant's Annual Reports.

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Ecosystem Restoration

We appreciate the fact that CALFED staff have responded to our previous comments to the ERPP and made a number of changes in various sections of the ERPP. Still, the ERPP is largely unchanged from its fall 1997 version and thus continues to suffer from many of the same deficiencies we pointed out in our earlier comments.[1] Most fundamentally, the ERPP continues to ignore the fundamental problem of subsidence in the Delta. Please see the levee section of these comments and our previous comments to the ERPP for more detail on this point. We understand that CALFED is currently working with a number of experts on the development of a strategic plan for restoration. We commend CALFED on this effort and look forward to reviewing the strategic plan in the future.

Since the last draft, CALFED has added a sediment supply objective to the Delta restoration program - "maintain a sustainable supply of natural sediments to the Delta. Unfortunately, this "vision for a natural sediment supply" is more like a recipe for clogging the Delta channels and filling San Francisco Bay. Maintaining, a sediment supply is only one component of restoring and managing a balanced sediment budget. The Delta islands were formed by the annual deposition of sediment on Delta marshes over the last 6,000 years and as such acted as sinks for sediment transported into the Delta. Today these islands are now disconnected from the sediment budget. CALFED needs to identify a program for restoring sediment deposition processes, either artificially or naturally, on subsided Delta Islands if they want to restore large areas of tidal marsh.

A Plan for Restoring the San Joaquin River

The ERPP continues to ignore opportunities for restoring the upper San Joaquin River. The San Joaquin River below Friant dam once supported runs of chinook salmon but today 95% of the San Joaquin River is diverted at Friant Dam rendering large stretches of the river dry and thus impassable to migrating salmon. In dry and average hydrologic years, no water from the upper San Joaquin reaches the Delta. The dewatering of the San Joaquin in the 1940's extirpated spring and fall runs of chinook salmon, steelhead, and other native fish from the San Joaquin river upstream of the Merced. It also caused the loss or degradation of thousands of acres of riparian forest and wetlands between Friant Dam and the Merced River. The remnants comprise the San Luis National Wildlife Refuge complex and the Grasslands Ecological Reserve.

Studies have estimated that a minimum average annual release of approximately 200,000 acre feet from Friant Dam would be sufficient for restoring and maintaining a salmon run in the upper San Joaquin River between Gravelly Ford and Friant Dam (Fry 1957, Cain 1997). A 1987 draft study conducted by Boyle engineering for the Bureau of Reclamation concluded that it was possible to

[1] See NHI's November 1997 comments to the ERPP.

restore fall run salmon with as little as 77,000 acre feet per year.[2] In addition, to restoring Salmon, NHI believes that these measures would also improve water quality in the lower San Joaquin and south Delta, improve delta inflow, and recharge overdrafted groundwater basins, thus improving water supply availability on the west side of the San Joaquin.

Water for restoring the upper San Joaquin could be obtained by reducing water diversions to the Friant service area. To do this, it may be necessary to import substitute irrigation water. This would need to be done without increasing the pumping demands at the south delta CVP/SWP facilities. In the next iteration of its "Environmentally Optimal Alternative", NHI will describe options for rewatering the San Joaquin River and restoring its salmon fishery without depriving the Friant Service area of irrigation water .

Bay-Delta System Vulnerability

The purpose and name of this core program is still not clarified. The core program report is titled "Long-Term Levee Protection Plan," but references throughout the DEIR to this program refer to it as the "Bay-Delta System Vulnerability" program. These two titles imply very different program emphases. The stated program objectives in the core program report differ from the program objectives described in the "Program Goals and Objectives Report." NHI believes that the purpose of the program should be broadly described as reducing the vulnerability of the Bay Delta system and should strive toward the objective listed in the Program Goals and Objectives Report rather that the objectives listed in the Long Term Levee Protection Plan.

The best way to reduce the long-term vulnerability of the Delta system is to restore the elevations of subsided Delta Islands. Progress toward all CALFED objectives will be on fragile ground until CALFED adequately addresses the underlying problem of land subsidence on Delta islands. Although the levee program includes a subsidence control element, it is limited to subsidence that directly weakens Delta levees. As long as the western Delta Islands are many feet below sea level, CALFED will be plagued by the dilemma of either spending millions of dollars a year on environmentally harmful levee maintenance or accepting the risk of catastrophic levee failure that would severely undermine all progress toward CALFED goals.

Without an aggressive, long-term and successful subsidence reversal program, none of the central and western Delta islands and no beneficial use of them is sustainable. That includes agricultural uses, habitat restoration, salinity repulsion and water supply conveyance. According to appendix D, large areas of the Delta are subsiding by more than 1.5 inches per year and Delta islands are extremely vulnerable to failure in an earthquake. According to a report by DWR, there is a 50% chance that the levees in the western half of the delta will sustain significant damage in an

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[2] Boyle Engineering. 1986. Central Valley Fish and Wildlife Management Study: Evaluation of the potential of a comprehensive Restoration Program for the San Joaquin River Salmon Fishery, California. Draft Report to the Bureau of Reclamation.

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earthquake within 30 years.[3] The consequences of permanent and unplanned levee failures would be severe. If multiple islands were lost simultaneously to earthquake, it is unclear whether the islands could be repaired before wave action caused major damage to the interiors of the levees. In this scenario, hundreds of thousands of acres of delta land might be permanently abandoned. Land levels have subsided to such a depth that many islands, if flooded without prior modification, would be incapable of supporting a productive aquatic ecosystem. There would in fact be few offsetting environmental benefits for many decades. Furthermore, loss of the islands would lead to salt intrusion, which could degrade drinking water quality and aquatic habitat.

The levee program proposal to spend billions of dollars strengthening levees may not be enough to prevent catastrophic levee failure during a large earthquake, because CALFED has not yet quantified the risk or intensity of probable seismic events. We understand that CALFED consultants are currently completing this analysis.

Another way to view the issue is whether an equivalent expenditure in subsidence reversal, instead of levee maintenance, would not buy a more secure and productive future. That is likely to be only way to eliminate the long-term vulnerability of the levee system. To be sure, restoring the land surface elevations on subsided Delta Islands, particularly in the Western Delta, is a daunting task that will take many decades to achieve. Yet, recent studies confirm the viability of programs designed to restore island elevations.

Currently, the most promising method of halting and reversing subsidence on a large scale is to cultivate tules and other wetland vegetation. Recent field experiments determined that tule cultivation could accrete up to 2-3 inches of organic material a year. Combined with a program to spread fine layers of sediments on top of these tules to stabilize these organic soil accretions, it may be possible to accelerate or at least sustain this rate of tule growth over the long term. Within 50 years, this would amount to an average accretion rate of over 10 feet – enough to raise the vast majority of subsided lands to elevations that could support either shallow water habitat, sub-tidal marsh, tidal marsh, or sustainable agriculture.

Restoring subsided Delta Islands to sea level *would not* adversely affect Delta agriculture. To the contrary, minimizing reliance on inherently unstable levees would benefit agriculture. And, most of the heavily subsided western delta islands that are most critical to water supply and water quality are currently either in public ownership, slated for use as in-delta reservoirs and habitat, or not in cultivation. Thus, a major subsidence reversal program could be implemented without displacing existing Delta agriculture or private landowners. If CALFED can demonstrate the viability of restoring elevations on public lands, they may be able to entice private landowners on other subsided lands to implement similar programs. Over the long term, a subsidence reversal program

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[3] This estimate represents a middle range between the large uncertainties associated with whether peat soils amplify or attenuate seismic shocks. DWR, "Review of Seismic Stability Issues for Sacramento-San Joaquin Delta Levees", July 1993.

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could create future agricultural opportunities that would not exist if the current unsustainable practices were continued.

It will be expensive to restore subsided land surfaces, but CALFED has not done the analysis to determine how the cost would compare to levee maintenance in perpetuity, with a residual high risk of catastrophic failure with the attendant economic and ecological costs.

We acknowledge that an interim a levee improvement and maintenance program will be needed to minimize the risk of levee failure while the landforms are rebuilt. Such a program should prioritize expenditures on actions that will achieve multiple CALFED program objectives. For example, expenditures necessary to simultaneously protect water supply reliability, water quality, an ecosystem values should be given priority over expenditures necessary to prevent flooding of agricultural land. For example, maintenance of levees on western Delta islands should receive priority over maintenance of southern, eastern, and northern Delta islands because of their importance to water supply and water quality. Unfortunately, CALFED's $1 billion base levee protection plan does not prioritize expenditures but rather allocates levee maintenance funds evenly throughout the Delta.

Sincerely,

Gregory A. Thomas, President

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