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Date: Wed, 20 Aug 1997 10:34:30 -0400 (EDT)

To: rwoodard@goldeneye.water.ca.gov

Subject: Re: Comments on CALFED Volume III Ecosystem Restoration Plan Monitoring

Rick, Resend of CALFED Volume III Ecosystem Restoration Monitoring Plant to your office. Fred

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COMMENTS ON
CALFED ECOSYSTEM RESTORATION PROGRAM PLAN
VISION FOR ECOSYSTEM MONITORING

Via e-mail

August 16, 1997

Richard Woodard
CALFED Bay-Delta Program
Water Quality Technical Group
1416 Ninth Street; Suite 1155
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Dear Rick:

At the August 6, 1997 meeting of the CALFED Water Quality Program, you and Bellory Fong presented a discussion on the Comprehensive Monitoring, Assessment, and Research Program. It was indicated that there was interest in receiving comments on the Volume III: Ecosystem Restoration Program Plan, Vision for Ecosystem Monitoring, Review Review Draft: July 16, 1997 that was distributed at that meeting. Overall, there are some problems with descriptions of parameters and their use as well as some of the proposed monitoring program components. Please find presented below my comments on this program.

Page 101, second column states that the Sub-Program purpose is "To routinely monitor the basic water quality variables (listed below) that define the fundamental conditions of aquatic habitat in the Bay-Delta system." CALFED should be careful to not get into the trap of routinely monitoring selected

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parameters because this is traditionally done, but intelligently monitor focusing the resources available on addressing issues that are of potential importance to Delta ecosystems and water quality.

Discussions of "Sub-Program Element Descriptions (parameters)" for temperature should be expanded to include rate of temperature change. The rate of temperature change is as important, if not more important, in some situations than the absolute temperature. Under "Salinity" the word is "specific conductance," not conduction, and it should read: "Specific conductance is a more appropriate measure of salt content than salinity in freshwater systems."

Under "Chlorophyll concentration," there will be many who will not understand what "traditional box" means.

Under "pH" the statement: "A quantitative expression for acidity or alkalinity of the area sampled" is in error. pH is not a measure of acidity or alkalinity; they are different parameters related to buffer capacity. pH is a measure of the hydrogen ion activity in the water sample.

Page 102, under "Organic Carbon," states that "Organic Carbon - Provides information on sources and fluxes of the primary support of the estuarine food chain." This statement, as well as other statements made by various CALFED staff and others, shows a lack of understanding of the characteristics of organic carbon. A number of years ago I wrote an invited review on this issue in which I pointed out what was well-known then and is still well known today, that most of the organic carbon in aquatic systems is not suitable food; it is the residues after bacteria and other organisms have extracted the useful components from the organic carbon. Many waterbodies have from two to 10 mg/L organic carbon, much of which is dissolved and is inert. It does not serve as a food base for any organism; it is a residue, much as humus in soils is a residue left over from previous metabolic activity.

CALFED needs to begin to address the issue of what forms of organic carbon are in fact useable as food and refine the general statements about how organic carbon extracted from Delta Islands as part of farming activities is an important food source for aquatic life. Much of what is extracted from the peat soils is non-useable by bacteria and other forms of aquatic life as food.

Page 103, under "Key Focused Research Areas," mentions in item 2: "Development of a plan for storage, retrieval and analysis of water quality data." I have recently provided guidance on the approach that, based on my experience, should be considered for the Sacramento River Watershed Program data storage and retrieval system. Those in CALFED concerned with this may want to review the comments of the workgroup that is addressing these issues for the Sacramento River system.

Page 103, "Key Focus Research Areas," item 3: "Development of a computer

model or models to predict water quality conditions in unmonitored areas and evaluate restoration scenarios." That approach is dangerous and portrays a blind faith in the ability of computer modeling to provide useful information. Computer models of the type that are available today, relating physical, chemical and biological characteristics of waterbodies have limited predictive capability to assess the impact of altering load driving parameters on the response of an aquatic system. Modeling of the type that is typically done today involving physical, chemical and biological characteristics of waterbodies is largely a mathematical game that has little or no utility in predicting impacts of constituents and are not reliable for evaluating altered loads of constituents through CALFED restoration programs.

The way to make that type of assessment is through measurements - proper monitoring. It can not be made through modeling. Mathematical models are useful in organizing thoughts regarding understanding the system. They are not useful for predicting or evaluating a system, and they can certainly never predict the water quality characteristics of unmonitored areas. Such areas have to be monitored.

Page 104, top of the first column, "Sub-Program Purpose," states "To monitor levels of contaminants potentially harmful to aquatic life, system-wide, in water, sediments, and biota for documenting trends in contamination levels, bioaccumulation, and identifying potential biological effects and to identify time periods and locations where specific contamination reduction efforts should be focused." While that objective is appropriate, the program that is proposed will fall short of that objective since the monitoring that has been done, or is being done, is not utilizing information available on what is known about how chemical constituents impact aquatic life. It appears that the CALFED monitoring program, as it is formulated, will be another program that will generate massive amounts of data, at great expense, where in the end the data will be filed in a file cabinet (computer data storage based system) and will become more of what is known as "file cabinet fodder" since it does not provide a significant amount of useful information on the key issues that need to be addressed.

Under "Sub-Program Element Descriptions," item 1 mentions herbicides, pesticides and metals as the parameters to be monitored. In collaboration with existing programs, the monitoring of pesticides, herbicides and metals will not provide information on anything other than the concentrations present as a result of the fact that it is not possible to relate concentrations measured by various techniques commonly used in monitoring programs to water quality impacts. The first step in monitoring of the Delta should not involve throwing large amounts of money at monitoring various conventional pollutants, but should instead focus on finding real water quality use impairments in the Delta that need to be managed. For example, copper or, for that matter, many other constituents in the Delta is not a problem per se, unless it affects the numbers, types and characteristics of desirable forms of aquatic life. The monitoring, therefore, must be focused on finding real water quality use impairments determining the cause of the

use impairment and the constituents responsible. Based on this information, through forensic analysis, the monitoring program should determine the source of the constituents responsible for causing the use impairment. Rather than measuring chemicals and trying, unsuccessfully, to extrapolate to impacts, focus on impacts and then determine through relatively simple, straight-forward procedures that have been available for many years, the significance, cause and source of the constituents responsible.

I have been involved in water quality monitoring programs throughout my over 37 year professional career. I have helped design major monitoring programs for components of the Great Lakes and have been involved in many large, as well as small, scale studies, where monitoring was a key component. It became clear to me several years ago that the traditional approach, which is the approach that CALFED is proposing, has limited utility for monitoring and helping to identify and manage real water quality use impairments that are of concern to the people who voted for the restoration of the Delta. Because of the shortcomings in conventional monitoring, Dr. Anne Jones-Lee and I have developed what we call Evaluation Monitoring, which changes the focus from ambient water monitoring or source monitoring to problem identification and characterization monitoring. Extensive information on Evaluation Monitoring is available from my web site (<http://members.aol.com/gfredlee/gfl.htm>), which includes summary papers and an over 100-page guide devoted to implementing this approach on a group of waterbodies. These papers and reports are available as downloadable files, and I would be happy to answer any questions about them.

It is my recommendation that a significant part of CALFED's monitoring efforts be specifically focused on developing and implementing an Evaluation Monitoring program for the Delta. This will not be a routine monitoring program of the type described in the Ecosystem Restoration Program Plan, Vision for Ecosystem Monitoring draft, July 16, 1997. That proposed program will cost large amounts of money and fall far short of providing the information needed to restore the Delta.

Evaluation monitoring is not simply some toxicity measurements or bioaccumulation measurements or fish condition measurements which are added on as part of the routine monitoring. Such problem identification issues such as toxicity, bioaccumulation, and fish condition, become the focal point of the monitoring. Do not measure heavy metals and try to extrapolate to toxicity. Measure toxicity, find out what it is due to. If it is due to a heavy metal, what are the sources of the toxic components of heavy metals that caused the toxicity in the system of concern?

Page 104, second column, second paragraph states, "Toxicity monitoring has the potential to be logistically difficult and expensive." This is a typical statement made by those who are not familiar with toxicity monitoring.

Toxicity monitoring is far less expensive and easily implemented than properly conducted chemical monitoring. With respect to the SFEI

bioaccumulation monitoring, mention should be made here that the Sacramento River Watershed Program has also developed a bioaccumulation monitoring program that is being implemented this summer.

The statement is also made about using the State's Mussel Watch program in the Delta monitoring. Great caution must be exercised in using Mussel Watch data. It is not reliable for identification of problems unless people eat mussels or freshwater clams. Mussel Watch data is subject to many factors that are not related to the available concentrations of constituents in the waterbody. Further, it is not possible to relate Mussel Watch bioaccumulation data to concentrations of constituents in aquatic life of concern to people who use the organisms as food.

Page 104, item 4, "Fish Condition Monitoring" is an area that needs attention for problem identification, although it will almost certainly prove

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