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CALFED Bay-Delta Program
650 Capitol Mall, 5th Floor
Sacramento, CA 95814
Phone: (916) 445-5511
Fax: (916) 445-7297
www.science.calwater.ca.gov

DRAFT (3/5/08)

March 10, 2008

To: IEP Directors

From: Jeff Mount, Chair
CALFED Independent Science Board

Moving the Interagency Ecological Program into the Future

Monitoring done by the Interagency Ecological Program (IEP) has provided the observational foundation for the current scientific understanding of ecological conditions in the Bay-Delta ecosystem. Recognizing the crucial role played by monitoring in assessing ecosystem status and trends and in evaluating consequences of management actions, CALFED's Independent Science Board (ISB) conferred with IEP scientists and examined previous program reviews. We offer the following general observations and suggestions to the IEP Directors and Coordinators, IEP Lead Scientist, IEP Program Managers, and CALFED Lead Scientist as they continue to develop the program to adapt to new challenges, opportunities and priorities.

- The IEP monitoring program should be an anticipatory, goal-oriented, hypothesis-driven, ecologically-based comprehensive monitoring and evaluation program that documents ecological status and trends, facilitates evaluation of policy alternatives, and promotes understanding of the entire Bay-Delta system. Its activities and priorities should be based on information needs as its highest priority, with mandated, compliance monitoring as a second priority.

- As has been emphasized in every review by IEP's Science Advisory Group, resources must be provided to make data analysis, interpretation, synthesis, and peer-reviewed publication an integral part of the program's culture. Data collection is not sufficient. The knowledge generated from analysis is an essential input to adaptive management. Without this, review of goals, conceptual models, and management actions cannot proceed. Requiring analysis and publication as part of participation in the program, and identifying and supporting individuals and groups to do it should be a top priority for the IEP Lead Scientist.

- The IEP program appears to be insular and needs to extend its interaction and collaboration with research and monitoring programs within the Bay-Delta, its tributaries, other parts of the State, and nationally. In addition to sharing information and coordinating monitoring activities, these interactions will strengthen the monitoring program. The current collaboration with the National Center for Ecological Analysis and

Synthesis (NCEAS) is an example of the advantages of such engagement with the broader scientific community. The program is likely to benefit greatly from collaboration with groups involved in developing new observational and analytical technologies as part of national oceanic and ecological observatory networks. There have been major developments in distributed data management systems by several federal agencies and the National Science Foundation in the past five years. These systems leave the responsibility of managing the data with individual agencies, but facilitate the synthesis, display and retrieval of data. It is recommended that IEP conduct an evaluation of the various systems and determine what might work best in the CALFED setting. Specifically, the systems of the USGS, NOAA and the NSF Environmental Observatories should be considered.

- The ISB recognizes the value of the long-term monitoring that has been conducted. It has been a real achievement to keep this program running through changing policies, budgets and management priorities. The managers in the contributing agencies are to be commended for this foresight; however, there are now major new policy directions for the Bay-Delta and contributing watersheds. The IEP monitoring program would benefit from a strategic analysis of its current sampling sites and procedures in light of growing scientific understanding of Bay-Delta ecosystems, projected activities with potential impacts on those ecosystems, and innovations in technology and approaches to data analysis and management. This analysis also requires coordination with the activities of other monitoring groups. It could be accomplished using appropriate workshops or groups of experts. Modifications of the design of IEP monitoring program should be based on exploratory studies to ensure that appropriate parameters (e.g., indicators) are monitored to address relevant questions. This requires a transparent effort that recognizes that research and monitoring are integrated activities along a science-information gradient. Strategic selection of communities or ecosystem processes to monitor is critical to all monitoring efforts as it is not possible to monitor all species and processes. Strategic analysis will require acceptance of possible changes or evolution in the program: what, where, when and how selected parameters (e.g., ecosystem state variables and functions including hydrodynamic characteristics and background water quality measures that include key organic and inorganic substances, as well as biological species) are monitored, and perhaps major redesign of some of the monitoring programs.

- Continuing periodic review (as has been done by the Science Advisory Group) should be an essential feature of the program. Regular reviews of IEP should include not only what is monitored and monitoring protocols, but also a review of commitment of resources to achieve the program, how

decisions are reached to allocate those resources, and the response of IEP to previous reviews. Inadequate commitment to a comprehensive monitoring program that goes beyond data collection is likely to result in inappropriate resource management decisions. As part of ISB discussions, we heard a suggestion for a small group of individuals (perhaps one each from DWR, USBR, outside, and the IEP Lead Scientist) empowered to make program decisions, and another small group (IEP Lead Scientist, IEP agency managers, senior scientists, and stakeholders/customers) empowered to make strategic decisions on science planning. This idea holds promise and is worthy of consideration by the program.

- IEP should consider expansion of its monitoring, analysis, and research functions to better support management of the entire Bay-Delta *system.* Design of monitoring protocols and interpretation of resulting data should include cross-analyses among findings to assure a comprehensive understanding of (a) the functioning and response of the many Bay-Delta ecosystems; (b) drivers for those functions and responses that lie outside of the Delta itself, such as the streams and catchments that feed them; and (c) the response of Delta and water resources to management actions. IEP activities should be tightly integrated with the other organizations that have a monitoring function in the Delta as well as in its tributaries and watersheds. Only through such integrated studies will decision-makers have the information necessary to guide the reconfiguration of the Delta and to provide wise management for it in the future. In other words, the future IEP should become a crucial – perhaps the primary – organization of its type serving the Bay-Delta management teams, and it should be organically integrated with other similar organizations in the public and private agencies that provide monitoring, analysis and related research on the Bay-Delta system.

Current planning efforts, including Delta Vision and the Bay-Delta Conservation Plan, are just beginning to evaluate how science will be used to support management of the Bay-Delta system. It is the view of the Independent Science Board that IEP and its related programs must be explicitly factored into the thinking of both efforts. It is, in our view, unwise to leave the details of integration of science and science institutions to some future date. With oversight and direction from its Science Advisory Group, the IEP should be an active participant as proposals related to the future of the Delta move forward. The IEP has a grand reputation and a tradition of cooperation between its participating agencies. We anticipate that IEP will continue this tradition while evolving to meet the Bay-Delta's future demands for data collection, analysis, synthesis and publication.

cc: Joe Grindstaff, Director, CALFED
IEP Coordinators
IEP Management Level Advisory Group