

California Bay-Delta Program Independent Science Board **November 16–17, 2006 Meeting Summary**

Action Items

ISB

- Memo response to The Bay Institute letter re: ecorisk (Mount/Meyer)
- Memo to ERP Implementing agencies regarding ERP science (Patten/Meyer)
- Work with Science Program staff on SOSBDS. (Norgaard with help from Glaze and Goodwin)
- Provide written comments on performance measure Phase 1 report to Jeff (all ISB)
- Assign as liaisons for the four performance measure groups (two ISB members per group) (Mount).
- ISB members to provide additional names for candidates for DRMS review panel.

Science Program

- Send DRMS review panel names once board is completed
- Distribute EWA review panel report Jan 31, 2007
- Post all powerpoints/handouts from meeting on ISB web
- Update disclosure information for Goodwin and Glaze
- Develop communications strategy between SP and ISB before next meeting
- Send PDFs of documents to ISB members and post on web for next meeting
- Schedule next meetings (June 6, 2007 requested per DRMS) via email

Agenda items for February 21–23, 2007 Meeting

- Director’s report
- Science Program Update
- EWA Panel briefing
- Performance Measures - water quality subgroup
- ERP Science Needs – Patten/ERP agency proposal
- End of Stage 1 Report briefing
- State of Science Report – status/progress
- Briefing on DRERIP conceptual models

Meeting Materials

Handouts and copies of presentations are available on the ISB webpage at http://science.calwater.ca.gov/sci_tools/isb.shtml.

Meeting Summary, November 16, 2006

Attendance

ISB Members

Antonio Baptista
Bill Glaze
Peter Goodwin
Jack Keller
Daene McKinney
Judith Meyer

Jeff Mount
Richard Norgaard
Duncan Patten
Paul Smith
Bob Twiss

Absent: Michael Healey

Welcome/Introductions—Jeff Mount

Michael Healey is not present at this meeting, but will be present at the February 2007 ISB meeting.

The ISB meeting agenda was changed slightly; Joe Grindstaff will speak on Day 2 rather than Day 1.

Board Disclosures

Board member disclosures have been posted on the Science Program website at http://science.calwater.ca.gov/sci_tools/isb.shtml. Members were instructed to review them. Corrections and additions should be submitted to Rebecca Fris.

Goodwin, who was not present at the previous ISB meeting, introduced himself and provided his disclosure. He is a Professor of Civil Engineering at the University of Idaho and Director of the Center for Ecohydraulics Research. He was invited to give a lecture in Riverside at a CALFED watershed course in October, 2006.

Glaze has formed a consulting relationship with the consulting firm Water Quality and Treatment Solutions, based in the Los Angeles area. He will be working on projects regarding water quality on a global basis, on an advisory panel to assist corporations to develop sustainable water resources practices.

Update of Board Activities

Chairs have approved meeting minutes from the August 2006 ISB meeting. These notes are posted on the SP website.

The August 2006 meeting had three outcomes in the form of letters also on the SP website. Mount presented the conclusions of these letters to the Authority and to the Bay-Delta Public Advisory Committee. The letters and responses will be discussed further during this meeting.

1. Letter to ERP agencies regarding ERP science.
2. Letter to Department of Water Resources recommending that the SP help create a Delta Risk Management Strategy review panel.
3. Letter to all CALFED agencies expressing the ISB's concern about the lack of progress on performance measures.

A critical priority of the SP accomplished since the last ISB meeting was the appointment of a new Lead Scientist. Michael Healey has been approved by the Authority as Lead Scientist. Currently, the details for the University of California, Davis to hire this position are being worked out. Until the appointment is finalized, Healey will continue as a member of the ISB. Mount expressed hope that the appointment and hiring will be final by the February 2007 ISB meeting.

ISB Correspondence

It is the prerogative of the chairs to read and respond to letters directed to the ISB. Two of these letters raise important issues that the ISB should discuss today, to determine whether the ISB should offer input. Both letters are posted on the SP website.

Letter from Rod Meade, Executive Director, Delta Vision, Requesting ISB Recommendations for Science and Technical Experts

Request and Need

Rod Meade requested that the ISB provide recommendations of science and technical experts to the Delta Vision Committee, to assist the Delta Vision Committee, Blue Ribbon Task Force, and Stakeholder Coordination Group in their deliberations. He requested to receive the list in time for the November 27, 2006, kick-off meeting for the Delta Vision effort.

Mount noted that the pace for making policy decisions for the Bay-Delta (notably the Delta Vision process and DRMS) is outpacing development of sound science that should underlie those decisions. A method is needed to provide the scientific guidance that the Delta Vision effort needs—quickly to respond to their aggressive schedule, as transparently as possible, and minimizing any potential disagreement among different experts.

Mount initiated a discussion to discover whether the ISB felt that they could provide the list of experts before the November 27 Delta Vision meeting, and how the ISB should engage with science advice given to the Delta Vision effort.

Strawman Proposal

Mount began the discussion with a strawman proposal that the ISB recommend that the Delta Vision team engage a “stable” of science experts who would engage with the Delta Vision group through the Lead Scientist. These experts would be ready to respond to specific science questions according to their area of expertise within a short timeframe—about two weeks. The level of input would be “professional best judgment” rather than new research, and could either include or not include references to other works. A typical response would be written, a 5- to 10-page document that could be anything from narrative explanation to a simple collection of graphics. A “talk” would be another possible response, although a written record would be preferable. The ISB would track the process and the products of the process, but would not as a body provide answers to science questions.

Discussion

Because of the short turn-around needed (around two weeks) and the nature of the likely questions (complex issues often in areas where the state of knowledge is either uncertain or represented by divergent views among the experts), the quality of advice could be a concern. Each subject should be represented with a

stable of three or four experts (a pool to draw from for question), and each question should be answered by two experts—a lead expert and a second opinion. While this multiple-personnel approach could complicate decision-making, it would reveal differences of opinion. Mount noted that the budget appears to be adequate to allow this approach to reducing uncertainty; time is a bigger issue than budget.

Further, an additional systems liaison should be included in consultation to integrate the answers into a larger whole. Twiss noted that especially the Blue-Ribbon Task Force should be made aware of the broader system and the ecosystem complexity, including, e.g., landscape level issues and dynamic modeling, in addition to the specific topic areas.

Scientists might be reluctant to author a written document that would include the degree of uncertainty implicit in a short document written in a short timeframe on complex and uncertain topics. These documents should include statements about the assumptions that would clarify the degree of uncertainty. The documents could then collectively constitute a body of knowledge that would be a “living” work in a framework that would document key uncertainties.

Many questions could request a value judgment (i.e., “Would X action be good or bad?”), whereas scientists review in a valueless context. Mount noted that the Lead Scientist should screen the questions and pose them to the experts in valueless language.

The panel of advisory experts should be very familiar with the Delta Risk Management Strategy (DRMS) technical memoranda, in order to avoid tension between DRMS and the Delta Vision experts.

The experts must be prepared to provide no answer rather than a poor answer. The ISB should warn the advisors not to give answers to questions that cannot reasonably be answered in two weeks. Mount suggested that a review of science input to the Delta Vision process be made a standing agenda item for ISB review at each meeting—to make sure that no “poor” answers are given.

The ISB’s role should encompass not only providing names of science and technical experts, but should also include providing advice on how to solicit and use their opinions. Mount noted that the SP would run the stable of advisors and the ISB would provide oversight of the process and output.

ISB members could be included as part of the stable of advisors. There appears to be no potential conflict of interest involved in the ISB reviewing the work of an ISB member serving as an advisor to the Delta Vision process; this is standard procedure for other science advisory boards.

Conclusions

Mount will relay input back to Meade.

- The stable of advisors should include subgroups of expertise with multiple members.

- Each question should be addressed by more than one person. This, together with the previous point, is part of a system of internal checks and balances.
- ISB members can serve as members of the stable of advisors.

A couple ISB members will be appointed to work with the SP to monitor the Delta Vision scientific advisor process and output.

Letters from Gary Bobker, Program Director, The Bay Institute Regarding Delta Ecosystem Risk Analysis

Background

Gary Bobker of The Bay Institute sent two letters, the first dated October 12, 2006, on “Ecosystem Risk Analysis for Delta Vision” sent to Ryan Brodrick, Director, California Department of Fish and Game, Joe Grindstaff, Director, CALFED Bay-Delta Program, and Rod Meade, Executive Director, Delta Vision, and the second dated November 10, 2006, on “Delta Ecosystem Risk Analysis and Strategy Development” sent to the first three individuals and to Jeffrey Mount, Chair ISB. The letters expressed concern that that current efforts to assess and quantify risks to the Delta ecosystem and identify strategic responses to those risks are not adequate to support development of a Delta Vision and Delta Strategic Plan, and requested that the ERP, with help from the ISB, should immediately initiate a Delta ecosystem risk analysis and strategy development effort. Bobker recommended that the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) effort was the best vehicle for initiating this effort.

Mount noted that the second memo implied two responses from the ISB: (1) whether to recommend that DRERIP should incorporate or be a system risk-analysis program and (2) what the ISB’s role should be with respect to this perceived need.

DRERIP is one of the largest current ecosystem-related planning efforts for the Delta. It has employed numerous experts to develop conceptual models for key species and ecosystem components in the Delta, to be used to evaluate proposed ERP actions. Denise Reed (DRERIP advisor) has said she has suggestions for responding to this need. Ultimately, DFG will decide how to allocate resources and whether DRERIP should be refocused.

Bobker’s Comments

Bobker is chair of CALFED’s Ecosystem Restoration Subcommittee. He noted two issues.

The effort to address long-term management issues in the Delta is incomplete. Specifically, understanding of long-term ecosystem risk and scenarios of ecosystem change is lacking (in particular with respect to issues whose risk is better understood, e.g., levees). If the ISB agrees that this is a knowledge gap, they could advise the Delta Vision Committee that it needs to receive more attention.

While the CALFED Record or Decision identified many good actions for the ERP, there was no clearly documented scientific rationale or framework that would help choose or prioritize. DRERIP is an important (although belated) response to this need. Additional tools are needed to help assess risk and provide better science for important decisions. He asked the ISB to assist in identifying tools—e.g., quantitative risk analysis, system modeling—that could be available within the next two years. Managers agree there is a knowledge gap and are generally receptive to new decision-making tools, but do not have the solution themselves. It is critical that the ISB provide whatever guidance it can.

Discussion

This issue is very important, so important that the ISB must be involved in some way. The ISB will draft a memo that will be broadly addressed to many people and organizations.

Any response must be focused on current and anticipated future conditions, rather than past conditions, and it must be “real-time,” i.e., integrated with the current processes—such as DRMS and the Delta Vision—that will result in substantial changes to Delta.

DRERIP has the most momentum of current efforts to develop decision-making tools, and so using its momentum is a natural first source. However, its current mandate is more restricted. A more robust input from ecosystem science is needed in future planning efforts; otherwise, ecosystems will suffer.

The ISB is not able to do the work, but could assign two members to work with SP staff to develop a framework to guide development of ecosystem risk assessment tools.

Perry Herrgesell, DFG, noted that they are interested in guidance and advice from ISB on how to address this.

Conclusions

Mount and Meyer will draft a memo endorsing the Bobker memos. It will include these messages:

1. There is a knowledge gap in ecosystem risk assessment. It is of high importance that this gap be filled.
2. The agencies should decide on how to approach this task, whether through the DRERIP process or some other mechanism.

Science Program Update—Ron Ott

Ron Ott, Science Program (SP), provided an overview of SP activities, including staffing changes and Science Program funding. Details can be found in the SP Update on the ISB webpage.

Discussion

ISB members requested that more information, more frequently available, be posted on the SP website. This would include new staff, science conference presentations, recent actions within the SP, and so forth. Notification should go out to ISB members when new significant updates or additions are made. Ott agreed and said that this would be implemented by the next ISB meeting. Mount suggested that a monthly update to ISB members would be useful.

Mount requested information about the plan for next year's Science Program priorities so that the ISB could comment. Ott agreed that advice from the ISB before they set funds would be useful. He noted that Johnnie Moore had recommended spending more money on synthesis and less on PSPs, and expanding the cadre of advisors.

The ISB also would like the opportunity to comment on the serious underfunding of science.

After the Lead Scientist has been hired and has presented his priorities to the ISB, they will develop a response.

Scientific Review of ERP Activities

Discussion of ERP Response Letter—Patten

ISB Letter to Agencies

The ISB sent a letter to the ERP implementing agencies after the last ISB meeting, asking (1) how the agencies are responding to the absence of an ERP Science Board (ERPSB)—in particular to the roles it had fulfilled that are not now being fulfilled in a consistent manner across agencies: (a) providing scientific advice, (b) incorporating science into the ERP working plan, (c) providing technical reviews, and (d) assuring scientific rigor and transparency, and (2) how these roles are being handled today.

Agency Written Response

The agencies suggest that the approaches below, together with public review, will ensure scientific rigor and transparency.

- a. The implementing agencies will depend on the new ISB for advice on how science needs will be met.
- b. The agencies responded that they continue to follow the same Proposal Solicitation Package (PSP) and directed action process as before. The scientific review of PSPs continues; the actions are posted on the CBDA website. The ERP is governed by the eight-year-old ERP Strategic Plan.
- c. Short-duration technical panels, such as the panel for Suisun Marsh, are being used. This includes ad hoc advisory groups for issues as they arise.

- d. The influence of past ERPSB activities continues, through old recommendations regarding adaptive management, performance measures, and so forth; and through the presence of previous ERPSB members on the ISB and other boards.

Results of Conference Call with Implementing Agency Representatives

Patten had a conference call Tuesday, November 14, with representatives from the ERP implementing agencies, discussing their responses. Strawman recommendations that arose from this discussion are the following.

1. Reestablish the ERPSB as a standing board, but focused more on short-term response and/or smaller, and/or with more frequent meetings.
2. Use the present ISB to review the most critical ERP activities. This would necessitate deciding which elements ISB is concerned with and which are better covered by short-term special-topic panels. It would also require assigning a liaison from the ISB.
3. Assign a subset of present ISB for science oversight for ERP.
4. Appoint an ad hoc independent science panel to review ERP activities annually or biannually.

Discussion

The annual budget of ERP was approximately \$150 million and is now less. Current funds will run out within two years or so. Beyond that, Prop 84 could provide funds, but they will not be specifically marked for ERP under CALFED. Some funds could come from the Bay-Delta Conservation Plan, but will be much less. Dave Harlow, USFWS, suggested that it would be wise to use smaller, less expensive scientific review panels until the financial future seems more certain.

It was noted that there is now no continuous body that provides independent oversight over a \$300 million 2-year effort. The discussion is whether one is needed, or whether ad hoc panels that exist for short periods would be sufficient. The ISB is concerned that review is agency-driven, on an ad hoc basis, with no independent overview. Funding for a reconstituted ERPSB or equivalent would have to come from the ERP program budget.

If there is a reconstituted ERPSB, it remains to be determined who would administer the board, where it would be housed, and so forth. These are topics to explore with the implementing agencies.

Perry Herrgesell noted that DFG did not make a conscious decision to move away from the ERPSB, but rather followed Moore's advice. DFG is eager to work with advisors and is eager to find a solution that will provide needed guidance.

Meyer noted that the EWA review approach has been successful. It is important that this approach remain one of the viable alternatives.

Outcome

Patten will draft a memo, outlining the four strawman recommendations above, and suggesting a discussion between the SP, ISB, and implementing agencies to develop a strategy to assure independent outside review (*independent* and *outside* are essential characteristics of the review).

Patten will consult with the agencies on this issue, develop a proposal, and present it at the February 2007 ISB meeting for ISB debate and approval. The proposal should also address overlaying issues, such as how to create other kinds of expert panels, how the boards interact with future management of the SP, and so forth; these topics are likely to be evolving issues.

Twiss noted that an ecosystem restoration science board should have a broad ecosystem focus, deal with ERP oversight responsibilities, and be relevant to timely projects such as the Biological Opinions being developed currently for the Bay-Delta Conservation Plan (BDCP).

Informational Update on POD Research—Sommer (DWR)

Jeffrey Mount introduced Dr. Ted Sommer, a senior scientist with DWR and a member of the Pelagic Organism Decline (POD) Management Team.

Sommer began with a summary of the POD, with a series of graphs that show a trend for overall decline of four major pelagic fishes in the Delta. During the early stages of POD, a multi-agency working group was formed to try and come up with a study program to suggest what was happening. This POD Management Team is comprised of state and federal members. The team would like to emphasize that they had to change a lot about the way research and monitoring was being done. While a lot of data was being collected, it was mostly uncoordinated. The team made an effort to bring a large group of knowledgeable people on board. Early in 2000, the team came up with a conceptual model.

Sommer's presentation continued with how far the team has come since then (2000). The team had been charged with giving a report and developing narrative models. They've moved beyond this and are working on a new model. The model components include fish stock, habitat, top-down effects (mortality or loss), and bottom-up effects (food supply). For each of these factors, there are three major questions: (1) What changed around the time of the decline? (2) How and why did they change? (3) Does that have any population links?

The short answers for these questions are that stock, habitat, food, and mortality all changed coincident with the POD; for each, reasonable mechanisms have been identified along with links to population-level effects. With regard to stock effects, the team has learned that they do have extremely low population levels and that this is likely to have a lag effect on production, and that environmental variables typically have a stronger effect on populations than stock size. Environmental stressors have particularly large effects at these levels.

Habitat effects include chemical and physical conditions such as temperature, turbidity, disease, toxic algae, and water quality. Channel geometry and in-shore areas probably have much less effect. To address this issue, researchers are doing bioassays looking at contaminant effects, disease, and toxic blue-green algal blooms. Modeled analyses of habitat availability based on salinity and turbidity indicate that there is evidence of a long-term decline in fall habitat quality, with a remarkable recent drop. These changes have population links. Looking at habitat quality in fall, when adult life stages are present, the main change appears to be salinity. The effects of salinity changes include increasing levels of bivalves in the fall. Recent results suggest that the clam *Corbula* declines only during extremely high flows. Researchers are also measuring habitat stressors. A suite of bioassays are being conducted about all of this. There is almost no effect on toxicity in test organisms. Delta smelt, when UCD pathologists look at tissues, have very low incidence of contaminant or disease stress. Striped bass don't look nearly as healthy. The team is not sure how to balance it.

Top-down effects include sources of mortality, like water diversions and predation. Water diversions include large state and federal projects, agricultural diversions, and power plants. There has been a lot of emphasis on these diversions to date. Research is gradually over the next year or so moving to other sources of mortality, like predation. A graph presented shows that during winter, when delta smelt are migrating upstream to spawn, a significant number show up at fish screens. This may not necessarily be a very good measure of water project effects, but it's the best available information. It was also observed that coincident with the increase in salvage, there was an increase in exports and tributary flow. The working hypothesis is that this may have led to the increase in entrainment and winter salvage. All pelagic species and just about every other fish looked at showed the same general trend. The hydrodynamics of the Delta are particularly complex. However, analyses by Pete Smith at USGS suggest that salvage is correlated with negative flows in Old and Middle Rivers. In the POD years, flows are especially negative. Moreover, the relationship between pelagic organism populations and flows is not a simple relationship. Research by Bill Bennett at UCD provides clues as to why these relationships are not simple. Not all smelt are created equal. His data research is still in progress and not published yet. He has estimates of when adult spawners are present and when fish were produced that survived later in the year. He looked at ear bones and back calculated when the fish were born. There were a significant number of spawners present earlier in the year, but the only ones that seemed to survive came later on. There is a disconnect between those that survived and the adult spawners. Larger/older females have higher fecundity, spawn early and often, produce larger offspring that have higher fitness, and are more subject to water project effects. This gives a clue as to why just looking at gross measures doesn't explain things. It may depend on whether fish are anywhere near the pumps in a given year. This may show up in interesting ways in populations. The "best and brightest" of the fish are being exported.

The final component of the POD model is bottom-up effects: food availability and food quality. The short story is that for phytoplankton, chlorophyll levels are low. With respect to zooplankton, fish food species, plankton levels are very low

relative to other estuaries. There have been long-term declines in both phytoplankton and zooplankton. Once the clam *Corbula* was introduced, chlorophyll levels have continued to stay low.

Sommer also noted that the abundance of calanoid copepod (prey species) is high upstream but low downstream where clam *Corbula* is abundant. In other words, the prey population is being subsidized from upstream, but is being grazed downstream by clams. Other species don't have upstream subsidy, so there are very low levels downstream. Also, prey occurrence helps predict adult recruitment. Wim Kimmerer demonstrated that prey matters for some species: for longfin smelt, X2 relationships, and outflow relationships. In general, increases in outflow lead to increased fish production. After the clam *Corbula* was introduced, there was a big step-change, resulting in considerably less fish production, given the amount of flow. Smelt may be having to change their diet habits. The range of zooplankton species that smelt are eating has changed. Their diets recently were way more diverse than expected and this may be out of necessity.

Overall, there appears to be a pretty good case for each of the four major areas being an important factor in the decline. The next step is synthesis: taking in of all the data and putting it into life-cycle models where the effects can be balanced in all of the boxes. They are moving into getting some more firepower to help with this. The National Center for Ecological Analysis and Synthesis (NCEAS) program at UCSB has an excellent reputation for top-notch science and multi-disciplinary studies. The POD team is working with these people to integrate different types of data and create special teams to address these factors. The team needs help in studying contaminants and disease. The integrated research effort with the NCEAS is a new effort, and it is hoped there will be a contract soon to help bring them on board. To date, \$3.7 million has been spent on 60 study components with several milestones. Perry Herrgesell, DFG, noted that it was important to mention that the \$3.7 million is on top of the annual program budget of about \$14 million.

Discussion

Mount asked what the fundamental difference was between POD years and drought years. Sommer responded that the POD years were moderate/wet years. Moreover, the biological responses of the system are more indicative of drought than historically. Hydrodynamically, water management is creating conditions characteristic of drought during the fall of moderate to wet years.

Mount asked then why population decline was not seen during drought and what were the populations like during the last drought? Sommer responded that there had been severely declined populations during the last drought, and that was when many of these species were listed. Mount asked what the dates of the POD decline are and whether all of this is taking place at a different period of time than where pumping patterns were changed. Sommer responded that many of the changes in operations occurred as a result of the 1994 Bay-Delta Accord. Meyer asked whether the drought years were considered as part of the analysis.

Sommer responded that the drought years were in the middle of data collection, and that it was right in the middle of the drought when the clam was introduced.

With regard to the prey studies, Smith asked whether diet has been expressed in terms of selection, comparing what food is available versus what food is eaten. Sommer responded that communities keep changing as a result of continued introduction of new species. Previous research suggests that new species results in some selection. There's one prey species that smelt have a hard time catching to eat, it moves too quickly for the smelt. Research on the diet of pelagic organisms has only been proceeding for the past year and a half, too short a time for much of the results to show up in the scientific literature. Patten noted that if they didn't know what some of the changes were going on today, it would be obvious to look back at past data, or even for the Delta Smelt—the POD is not in the drought period, it's in the early to mid 80s. It should be asked what was going on in each of those periods to cause population fluctuations before looking at the present situation. Pull out the stressors then compare and see if new stressors compound them today. Sommer responded that in a lot of the data analysis shown, they were looking at the entire data set and trying to pick out the signals. For some things though, like pathology, toxicology, and disease, they only have data from recent years.

Smith was concerned with the use of fish abundance as the key response variable. It seems obvious that is what the POD team is interested in, but that variable is a composite of two to three other variables: what fraction of the Delta the fish covers and how many per unit presence are there, in other words, fish density. Fish abundance is incidence times density. Has the team looked at those separately? Sommer responded that Brian Manly has looked at presence and absence.

Smith responded that correspondence with Brian Manly didn't look at presence and absence separately. Incidence has gone down. Only the precision of the abundance estimate had gone down. The team will find for delta smelt that the fish density is not demonstrably less per unit habitat than it has been all along. What has changed is the size of the habitat. Abundance needs to be broken into its component parts. Sommer responded that this approach might not work for a species like longfin smelt—there is no evidence that habitat for longfin has shrunk.

Perry Hergessell noted that when flow came back in past declines, populations responded positively. Today populations are not responding to getting flows back.

Patten noted that of the four fish on the charts, threadfin shad follows a separate pattern from the other three. Sommer responded that all species occupy different habitats, but all showed this drop simultaneously. Patten noted that this happens all over the place. "Somehow create a habitat that's optimal for all species." It can't be done. Species fluctuate individually from year to year.

Mount asked to be convinced that these four graphs are related; he sees no similar pattern in them. Sommer responded that the POD team does not claim

that the patterns are parallel for each of the species, but that one of the consistencies is the recent low abundance. Mount responded that 100% of striped bass sampled this year were shown that they're not going to survive. Sommer responded that threadfin shad are freshwater and are way upstream, that they have a subsidy to the population from upstream. Longfin smelt are much more marine. In other words, habitat is has an important role in part of the life-cycle, but it is not everything.

Meyer asked whether Bennett's work with delta smelt showed similar patterns other species. Sommer responded that the work Bill Bennett is doing is unique, cutting edge, and expensive, and that he has not yet repeated it with other species yet.

Baptista asked for a sense of what the error bars mean. Sommer responded that they are to see if there has even been a decline, that there has been lots of variability. It shows that there's been a decline relative to previous years.

Smith noted the problem with mixing fish density with incidence is that they have different error structures. With incidence it is a binomial distribution, but with density it is multiplicative. By putting the two together, the result is a drop. The reason a baseline comparison to fish abundance should not be tried is because it is mixed between incidence and density. Mount asked how Smith would describe it. Smith responded that the two terms should be treated separately with their own error bars.

Keller asked what implications this complicated and somewhat uncertain issue has for water reliability, and in particular for instructions for the operators turning the valves on and off, so to speak, in terms of where, what, and when. There is a reliability issue to meet demands for ecological and water quality purposes. The biggest unknown is dealing with this issue right here: how and when are there hard numbers to turn valves to. Sommer responded that he totally agrees—on the other hand there are major political pressures. There are already proposals based on the preliminary unpublished results.

Baptista asked Sommer to clarify how the fall fish habitat analyses were done. Sommer responded that in the paper they submitted the analyses were done based on mean salinity. For this particular exercise, they showed X2 (the location of the isohaline) for familiarity of the local scientists. They developed the graph using generalized additive modeling techniques. There were thousands of data points for fish and water quality data. They developed a model predicating occurrence of those fish, then developed a deposit index for those years and developed trends. There are a number of similar studies using this technique to define the habitat for this species. They just happen to be extremely lucky to have decades of data.

Mount noted that this highlights this morning's discussion. With short time frames, decisions have to be made, and there is tremendous political pressure. The question is how to manage this discussion in a way to come up with and convey these important observations. None of the board members are comfortable with the pace of these studies as scientists. What is the oversight? How should they

be conducted? Does this relate to the ISB in any way? Sommer responded that Ron Ott might be better to explain the links. The SP runs independent panels for each of the reports they come up with. Mount responded that each report is reviewed by one of these panels. Sommer responded that the gold standard is peer-reviewed journals, but that nothing's been published yet.

Smith asked about observations on the web in the form they've been presented to the independent science panel. Ron Ott noted that in the last POD review, the independent panel wrote it's findings and that both were posted on the web. Current synthesis and future plans have been reviewed. The next review is the late 2007 synthesis. When comments are posted on the web, that's when the panel weighs in to look at both of those.

Meyer noted that the ISB needs to be told when those reviews are on the web so they can look at them and that would be the board's oversight. Patten noted that knowing the information is there is important. Ron Ott noted that this was an area in which they would improve communication.

Glaze asked whether there was any plan for ISB involvement in the overview of that work. Mount noted that was a good question. The relationship between the ISB and the IEP is also not very clear, which is really behind most of this POD work anyway. IEP technically sits separately from CALFED. The board can visit that issue sometime in the future. POD work is politically extremely important. Imagine that during the Delta Vision Process they come to us and ask whether they should "cut back on the pumps in February." There's no way the ISB could respond in five pages in two weeks. Patten noted that is not the kind of question they should ask. They should ask what the effects of cutting back would be. Mount concluded by noting that hopefully the ISB would be involved in some sort of overview of that work.

Delta Risk Management Strategy (DRMS) Review Panel—Lougee

Background

In the previous ISB meeting, the ISB was requested to comment on the review process for DRMS. The ISB response is on the SP website.

Schedule

The schedule for DRMS review was presented in the handout *Independent Review of Delta Risk Management Strategy Products*, posted on the SP website.

DRMS will present its products in two releases. Phase 1 will address risk analysis and trend assessment. Phase 2 will discuss what can be done to mitigate or minimize the risks.

The first DRMS products, the technical memoranda, will be available in January to Independent Review Panel (IRP) members. They will have a month in which to become familiar with the content (although will not review these documents). In mid-February, a two-day, private informational meeting will take place. In mid-April, Phase 1 products are scheduled for release. The IRP will review these products in early May at a two-day meeting, part of which will be public. Two weeks later, on May 23, the IRP will submit written review comments on the technical merit of Phase 1 products. Then the ISB will have one week in which to respond and will present its conclusions at the following ISB meeting on June 6.

Phase 2 review will follow a similar review strategy. The IRP will release its report on Phase 2 products on October 10.

Membership on the IRP is not yet established. The SP envisions about eight members to cover the 13 technical memoranda topics.

ISB Discussion

Because of the short time-line, any recommendations from the ISB will have minimal effect on Phase 1 products. However, ISB comments on Phase 1 products could be reflected in Phase 2 products, and certainly will affect the Delta Vision effort.

Glaze noted that the National Research Council often places a liaison on study groups to report back to the board on progress. This liaison is not involved in evaluation. It could be useful for the ISB to have a liaison to the IRP. This liaison should come from the SP or the ISB, to maintain agency independence, and should be a senior person who has contacts to experts who can provide needed information in a timely manner to answer IRP questions.

The budget for the IRP is approximately \$250,000.

Outcome

Mount, Twiss, and Norgaard will constitute rotating ISB liaisons to the DRMS IRP. In this capacity, they will attend meetings to listen and to answer questions. Mount will serve for the first quarter.

Members should come to the June ISB meeting with written comments on the IRP review of the Phase I report and agency response to the IRP review. One or two ISB members will draft the ISB memo responding to IRP review and response, and will submit to the co-chairs for approval.

ISB members should submit additional nominees' names to Mount to complete the IRP.

Environmental Water Account—Machula

Background

The ISB will review the Environmental Water Account (EWA) review as well as agency and Science Program responses to the review. This presentation is preparation for that review and is on the SP website.

EWA was established in 2000 as part of the CALFED Record of Decision (ROD). Its purpose is to provide increased water supply reliability while assuring sufficient water to meet fishery protection goals. The SP facilitated an annual scientific review, until 2004 when the review panel recommended that full review be done biennially. The four reviews to date have focused mostly on incremental progress, but in 2004, the review panel assessed all four years of program implementation. This review reported real progress in water supply reliability and reduced political conflicts.

2006 Review

The agencies must address whether the EWA is meeting its objective of species protection and recovery. The charge to the panel for the 2006 review is to determine to what extent the program is meeting its objective. Current membership on the review panel focuses more on biology and less on social science than did previous membership.

EWA is moving from public funding to private funding. It was originally a four-year program, which has been extended through 2007. Its funding is uncertain beyond Year 7, and thus it is unclear how long the program will last and whether it will be a future tool for fish recovery.

ISB Discussion

The EWA review panel will consider EWA performance in context of the other "environmental water" programs: b(2), b(3), and VAMP (and to a lesser extent the EWP).

The ISB will pay particular attention to some issues in their review of the EWA review panel's report (due out end of January 2007) and subsequent agency response.

- What are the agency responses to the report?

- Is the EWA review a comprehensive technical review? This question may arise because south-of-Delta water contractors have expressed concern that this is not a comprehensive review.

Paul Smith is on the EWA review panel and can serve as liaison to the ISB.

State of Science for the Bay-Delta System Report— Culberson

Background

Discussion of the *State of Science for the Bay-Delta System* report is a standing item on the ISB agenda. The ISB will continue to be involved in overseeing its development.

The ISB provided direction to the SP at the last meeting. Today's discussion is to receive additional input on the current approach. In particular, Culberson asked for feedback on (1) how the current document framework addresses the issue of integration, (2) whether the use of water management as an organizing principle is effective, and (3) how the document should address the question of how to provide input to large management system questions.

Proposed Document Organization

The draft document will include an Executive Summary (“30,000-foot view” for high-level decision-makers including members of Legislature), technical appendices (“3,000-foot view” intended primarily for technical experts), and the body of the document (“300-foot view;” the chapters). The report should be usable by lawmakers.

This document will focus on the “system” aspect of the Bay-Delta system. This will bring attention to how the current state of knowledge fits into the literature, identify gaps in knowledge, and help clarify which connections need to be made.

Discussion

This report will be the first of what is hoped will become a series of reports on the state of the system, updated every two or three to five years. It is essential that the report be relevant to management and not just a summary of the state of science for a scientific audience.

The report should affirm that the Bay-Delta is a complex physical and biological system, which responds over time to external forces and internal forces of the

system and to socioeconomic forces. The report's framework should link to the papers from the CALFED Science Conference. *Specifically, the report should approach the Bay-Delta system from a systems perspective, and not from the more traditional water management perspective.*

The report should present not only the current state of science and what is needed, it should also consider where science is heading and what its likely value will be to the Bay-Delta system.

Schedule

Timeline for development of the document is as follows:

- Draft report: in six months.
- Independent technical review: August 2007.
- Draft for ISB approval: November 2007.

This is an ambitious schedule. The ISB recommended that the first release of this document contain the “most important” aspects, and that future editions be expanded to include more information. Note that the technical appendices will be compiled from existing documents, not written specifically for this report.

Environmental Setting and Management Questions

The ISB recommended that the document include a section specifically to discuss the setting separate from the management questions. The setting should discuss the physical, biological, and social forces acting on the system. McKinney stressed that the ecosystem forces and the hydro-geological forces be given equal weight. Culberson noted that the uncertainty surrounding ecosystem knowledge is greater.

New Understandings and Paradigm Shift

This report should emphasize throughout, perhaps chapter by chapter, what the new understandings are, especially of how the system operates. It should include some speculation for what implications this new knowledge will have for the following year. This is an opportunity for the SP to highlight how much new science has been done and the extent of the advances, and to acknowledge that continued success in the future is very likely.

An example of new understanding is the fact that the Bay-Delta system is tidally driven, implying that previous understanding that focused on maintaining sufficient river flow were incomplete. Other new information includes the role that water velocity, volume of water, and lifecycle stages play in species survival and ecosystem health.

Writing Process

The SP intends to establish one editorial voice for the document as soon as possible. Authorship of the report will be a combination of SP staff and consultants. One suggestion was for staff to draft the document, and a technical writer or editor to “clean it up.”

It was suggested that an editorial board might be useful. This suggestion might be revisited at the February 2007 ISB meeting.

ISB Participation

The ISB will at least critique the report.

Keller suggested that the ISB should be strongly involved framing the first five pages of the document, setting the tone for the entire document. He suggested that this introduction should note that within the Delta are subsystems, frame how they look, describe the natural forces that are physical drivers, then human forces, and then management forces.

Goodwin suggested that the summary could appear in a glossy color brochure with graphics; these can be very powerful.

Outcome

ISB proposed the following changes in terminology and approach.

- Physical forcing => system setting.
- Management => system management. How the system is currently managed. This includes general plans.
- Delta ecosystems => system response.
- Decision-making => system decision-making.
- Observations => system observations.

Norgaard will provide input to the SP on the document.

Public Comment

There were no public comments.

Introduction of Elizabeth Soderstrom

Elizabeth Soderstrom will be taking over Donna Podger's responsibilities coordinating development of performance measures. She is familiar as a support facilitator from the first incarnation of the ISB.

November 17, 2006

Attendance

ISB Members

Antonio Baptista
Bill Glaze
Peter Goodwin
Jack Keller
Daene McKinney
Judith Meyer

Jeff Mount
Richard Norgaard
Duncan Patten
Paul Smith
Bob Twiss

Absent: Michael Healey

Director's Update—Joe Grindstaff

Joe Grindstaff introduced Sue Garrett-Dukes who is working on Program Performance and Tracking for the CALFED Program. She has tremendous relevant experience and was most recently in charge of strategic planning and developing performance measures for CalPers. Grindstaff noted that a significant amount of time and energy will be internally focused on Program Performance and Tracking.

Joe also provided update on the Delta Vision Process. The governor has signed an Executive Order and the Delta Vision Process has started. A final Delta Vision Report is scheduled for December of next year, with a draft available in summer. After that report is made, the committee is scheduled to make a recommendation on a strategic plan by October of 2008.

Another ongoing activity is the Bay-Delta Conservation Plan (BDCP). The Planning Agreement for the BDCP for aquatic species in the Delta has been signed. The goal is to have 75% of the BDCP complete at the end of 2007.

At the end of Stage 1 meaning the end of 2007, the Delta Vision, BDCP, and other efforts such as DRMS must tie together to present a coherent and cohesive view of the Program and its future.

With the recent passage of Proposition 84 and 1E, a lot of money is available to fund levees—whereas recently levees were underfunded—but there is as yet no comprehensive plan for spending the money.

ISB Discussion

Patten asked how CALFED will assure the public that decisions are being made based on the best available science rather than on an “urgency to spend money,”

especially the large amounts of money now available for levees. Grindstaff acknowledged the concern, and said that CALFED is committed to developing a plan that is comprehensive in nature that will guide how the levee money is spent. Some of the expenditures will be governed by the State Legislature, and much of the \$4 billion is likely to be spent upstream from the Delta on the Sacramento and San Joaquin Rivers.

Glaze asked whether Grindstaff believes that the level of funding for science is close to the amount needed, or whether it is “completely out of the ballpark.” Grindstaff noted that some efforts should be funded by the SP, whereas in other cases they want to encourage the agencies to fund science. An example of successful funding for science is the “carbon farm.” This 15-acre demonstration farm has shown that carbon can be sequestered through growing tules. This might be an effective way to reduce flood risk—by raising elevations in the Delta a few inches a year. This could be economically effective as well, if it is possible to sell credits to help fund purchase of land in the Delta. Otherwise, funding for the Interagency Ecological Program (IEP) should be increased. Beyond such programs, it is important for him to have the information to make a case that funding for science should be increased.

Mount expressed concern that much of the investment in science is made in high-visibility, high-return projects, and that too little is being spent on scientific *infrastructure*. The amount being spent on science is very small, considering that 23 million people drink water that comes from the Delta and California has the seventh largest economy in the world. He encourages that science infrastructure be improved (IEP, etc.), and states that the ISB would help support this. Grindstaff agreed that science is important and noted that one step they are taking is to recommend that the CALFED Lead Scientist also be lead scientist for IEP. He also said that while money is a big issue, he is optimistic that CALFED can secure the needed funding for science—but first there needs to be a system that shows how beneficial science is. The CALFED Science Conference helps with visibility.

Baptista’s following comment is predicated on the assumption that CALFED will continue long-term in the region and that science is integral to the success of CALFED. A large portion of the \$11 million science budget is allocated to plan management and communication, but little to projects with long-lasting impact. This suggests that CALFED lacks a system that could be used as an anchor or framework for most activities. With \$2 million investment yearly, a framework could be built. The advantage to this is that for instance, with each RFP, the RFP could reference previous projects’ tools. Baptist also encourages Grindstaff and Ott to continue sharing details of the CALFED budget with the ISB.

Goodwin noted that Baptista’s recommended approach is consistent with current research in environmental observatories on a national level.

Mount asked Grindstaff what message he is offering when he speaks about the end of Stage 1 decisions. Grindstaff responded with his personal point of view (not CALFED’s view). He believes that if we maintain current practices in the Delta, we cannot expect to be successful. That is, we cannot continue to export

as much water from the Delta, continue to pump through the Delta, continue to do restoration, and expect that the ecosystem will continue to thrive. At least part of the ecosystem must be returned to a more native state—i.e., fluctuating salinity—in order for it to support native species. This implies choices. With continuation of the status quo, consequences are likely to be unfavorable both for the ecosystem and for exports (because the law will drive how pumping is done). Or we could reduce exports appreciably. With a reduction of about 2 million acre-feet, there could be a large improvement in ecosystem conditions, but with a large economic consequence for the state—100,000 jobs and \$2 billion in economic activity. Grindstaff is telling people that these decisions need to be made in the next two years. He believes that if these decisions are not made in that time, the next thirty years will be spent in court, and everyone will lose.

Meyer noted that in this situation, better economic science (profound, deep economic analysis) is needed. Grindstaff noted that the Public Policy Institute of California (PPIC) is developing an issues paper on economic issues in the Delta, scheduled to be released February 2007.

Norgaard noted that the economic cost that Grindstaff had mentioned would happen if exports were reduced suddenly. However, with a gradual change, costs would be less. Do CALFED and PPIC take this into account? Grindstaff responded that this shows the importance of the Delta Vision, to enable California to envision its goal and achieve it in a systematic way.

Twiss suggested that the ISB should develop an outline of the system-wide science framework or observation system that Baptista suggested above. Its target would be the Delta Strategic Plan and the comprehensive plan. Healey's arrival as Lead Scientist will be an advantageous point to begin this process.

Indicators and Performance Measures—Hastings

Overview

Lauren Hastings provided background on the status of performance measures. Hastings described how a new unit of CALFED called the Program Performance and Tracking Program was created based on a recommendation by the 10-Year Action Plan, which called for better performance-based management, fiscal tracking, and program and project tracking. Sue Garrett-Dukes is the new Deputy Director of this Program. The Program will create a comprehensive database for CALFED programs and projects. Currently, several program elements have their own databases but they are not integrated.

The SP will be involved with both Level 2 (drivers/management actions) and Level 3 (system response or outcome) indicators, while the Program Performance and Tracking Program will be involved with all types of relevant performance measures.

Hastings noted that the SP uses the term *indicator* to describe how the system is doing—the status of the system. *Performance measures* are used to track how the program is performing, compared against a target or an anticipated trend.

In the future, the SP will convene a technical review panel to provide feedback on the draft performance measures. Because the technical review panel has yet to be convened, the SP is requesting interim feedback from the ISB. Today's meeting is an opportunity for the ISB to give feedback on the subgroups' identified driver and outcome indicators. In addition, she requested that the ISB consider the following questions: What information does the ISB need in order to fulfill its charge? How does the ISB recommend that the technical review panel be handled to support ISB efforts?

ISB Discussion

Keller noted that an outcome in one conceptual model might be a driver in another.

McKinney suggested that it would be advantageous to allow more active input by stakeholders into the development of performance measures which might improve buy-in. Hastings noted that the BDPAC subcommittees have been considered as a place for this kind of input. Garrett-Dukes stated that a new BDPAC Performance Management and Tracking Subcommittee has been formed.

McKinney expressed concern that the implementing agencies seemed to be in the position of developing performance measures to evaluate their own performance. Hastings noted that there is oversight by several groups, including ISB and the technical review panel.

Mount requested ISB members to submit specific comments to him that were beyond the scope of today's discussion; he will forward them to SP staff.

Glaze suggested that there be two ISB liaisons for each performance measures subgroup to provide input and track progress. Mount and Meyer will make these assignments.

Subgroups

ERP (Bart Prose)

The ERP Report is from CDFG, USFWS, and NMFS and outlines the performance measures development process; it is still largely in the planning phase. The agencies are developing an organizational structure for cooperating among programs (ERP, CMARP, IEP, CALFED's Water Quality Program).

The intent is to use conceptual models from DRERIP. Tier 1 models are almost ready for review. Tier 2 models will be started in December.

Background on ERP Performance Measures

Since its inception, ERP has acknowledged the need to establish ecosystem indicators and performance measures, and much work has been conducted in these areas during the last several years. During Stage 1, ERP has used “milestones” to track program progress. These milestones were identified in the CALFED programmatic biological opinions and Natural Community Conservation Plan (NCCP) determination. These milestones have been Level 1 and Level 2 performance measures, e.g., money spent, percentage of projects funded, acres affected, etc. Only approximately a third of these milestones were quantifiable, and their main purpose was tracking performance with respect to environmental compliance. These milestones were reviewed in 2004 and used as part of the annual milestone assessment in 2005-2006.

Near-Term Evaluations

There are several ongoing tasks and activities related to defining ERP performance measures which are defined in the Draft Phase I report. They include:

- End of Stage 1 milestones assessment
- Review of current Conservation Agreement and CALFED regulatory documents
- Assessment of current ecological conditions of the Bay-Delta watershed
- Development of a Bay-Delta Conservation Plan (BDCP)
- Development of conceptual models for DRERIP, CMARP and IEP.
- Development of Stage 2 ERP conservation needs – the previous items will help in this development.

Next Steps

The next steps associated with the development of ERP Performance Measures include:

- Continue coordination with SP and ISB—give updates and solicit advice and information from ISB and SP.
- Continue development of conceptual models.
- Continue to review existing indicators and use those that are still viable and up-to-date.
- Coordinate with CMARP, IEP, CALFED Water Quality Program.
- Review existing monitoring projects.
- Develop coordinating monitoring and indicators strategy (2007 ERP Program Plan)

- Develop performance measures concurrently with these other activities, including participating in the Performance Measures Subcommittee, and drafting the Phase 1 Report.

ISB Discussion

Meyer expressed disappointment with the report, noting that because the report does not contain details, it was impossible to give useful feedback. Meyer also asked why USGS was not involved with this effort. She noted that it is important to know how monitoring data will be used to assess status and trends; otherwise, the monitoring program may be inadequate. Prose responded that the ERP group will collaborate with CMARP which is in the process of reviewing existing performance measures and developing an inventory of existing and needed performance measures.

Patten noted that the group should have used previous ERPSB efforts with respect to performance measures. Patten suggested that the group review meeting minutes from the ERPSB. Prose responded that they plan to do so; the conceptual models being developed by DRERIP will help them vet existing performance measures.

Water Supply and Reliability (Steve Roberts, Steve Cimperman, DWR)

Goal for Water Supply Reliability

The goal for water supply reliability is to “reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system.”

Key Issues and Principles

Measuring M&I and agriculture needs is fairly well understood, but the ERP component is harder to quantify.

What is the relative importance of end-user supply reliability with a focus on the Delta?

Performance measures must be vetted with upper management. Funds from Prop 84 might be available to develop these performance measures.

Issues that the performance measures will address include water quality and fish restoration, project needs for water delivery, and EWA. These would be implemented by water plans developed in each region.

Key Water Supply Subcommittee Comments

The proposal as developed thus far has been presented to the BDPAC Water Supply Subcommittee. Their comments follow:

- There is a need to differentiate between directed and coordinated CALFED actions.

- The relationship between performance goals 1 and 2 needs to be clarified.
- The language in the document needs to be changed so that it is “neutral.”

Next Steps

- Re-present proposal to Water Supply Subcommittee in early December.
- Revise the proposal and submit to the Authority.
- Update the Phase I Report Appendix after getting buy-off.
- In 2007, use funds from Prop 50 and Prop 84 to further the performance measure process.
- Coordinate with California Water Plan Update process and regional water planning.

ISB Discussion

McKinney said that the Board was not given any information in the presentation or in the written report that it could consider for approval. Thus far, the work shows only additional questions. Progress made with water quality, conceptual models, and Delta salinity is not reflected in the body or the appendix of the document.

Levees (Bill Burkhard)

The ROD has specified that a certain number of levees had to conform to PL8499. This group felt that this was an inadequate measure of performance of levee stability. Half of the levees have failed by overtopping, but half of the levees failed from beaver activity. Overtopping has been addressed, but beaver influence has not.

It is possible to determine the costs of raising a levee's elevation through the inch-mile, a two-dimensional unit. An inch-mile costs about \$100,000. At the end of this winter, a LiDAR survey of the Delta will have been completed, yielding an accurate measure +/- 3 inch-miles. It is possible then to relate levee elevation to risk of failure (the kilo-inch-mile or “kim”) and map this value for different assets.

This work will be tied in closely to DRMS.

ISB Discussion

Twiss noted that the kim concept is helpful. He will pass written comments to the presenter through the ISB chair. He suggests that they include not just PL84-99 (historic 100-year) but also future estimates of the 100-year from CASCADE. He also suggested that they consider different classes of levee such as the Twichell Island setback and the double-armored style of levee. These would have different behaviors and priorities in case of flooding. It appears that this framework will be useful in the future to translate plan ideas into levee cost estimates.

Mount noted that while the kim measurement on the landscape scale is a useful tool. However, from a local perspective, kim could be limited. Two islands could have equal kim but have different configurations, such that one of them is more prone to failure. He also noted that PL8499 is out of date, and that the presentation did not discuss seepage, which interacts with beaver activity to undermine levee stability, nor foundational problems due to sagging. Mount stated that it is important that performance measures meet not just PL8499 standards, but the CALFED objectives of achieving water quality and water supply reliability. Not all islands in the Delta system have equal value for these objectives.

Twiss noted that perhaps the ISB should express concern that the PL8499, which is out of date, is being widely used as a metric. Twiss also noted that none of these measures address seismic issues.

Water Quality (Carolyn Yale, USEPA, Lisa Holm, CALFED)

The water quality performance measures work has been done in an interagency group representing DHS, SWRCB, RWQCB, USEPA, and ERP agencies, and reflects the need to integrate across program objectives.

Water Quality Indicators

Phase 1 indicators relate principally to (1) ecosystem and human health and (2) drinking water. The criteria used to select proposed outcome indicators include:

- Significance for priority beneficial uses
- Importance to the Delta, recognizing the CALFED is refocusing on the Delta
- Relation to CALFED program investment and other agency priorities, including plans and projects, research and monitoring, available information

Toxicity

DRERIP is developing more complex conceptual models regarding contaminants and their impact on POD. Next steps involve funding research on biomarkers.

Mercury

The Central Valley Regional Water Quality Control Board has released new standards. Next steps include:

- Refine conceptual models (DRERIP).
- Start process in Spring 2007 for reviewing and compiling and assessing the work from various funded projects.
- Refine mercury strategy.
- Develop monitoring plans through CMARP.
- Hire a mercury coordinator.

Drinking Water Quality

Performance measures for drinking water quality tier off other efforts which have been ongoing for five years.

Drinking Water Quality conceptual models are very large, and complex and begin with a global conceptual model with more specific conceptual models linked to it. This conceptual model has two aspects: keeping source water clean, and treating water. The nutrient model is available online and the pathogen model will be available this year. Basic work with organic carbon is ongoing. Fingerprinting will help determine where the water at the intakes originates.

Drinking Water Next Steps

- Work with priority watersheds.

Key Message

Water quality indicator development has made progress because projects which were funded were relevant to this analysis.

Collaboration is essential. To have indicators that work, everyone has to work together.

Water quality and ecosystem agencies lack resources to make progress on indicators. Individuals who feel it is an important effort find a way to fit it in, but management has not always strongly supported this performance measures work.

The group proposed the following questions to the ISB: What do you think of when you think of indicators? Also, how will panel review work? What kind of lead time will you need?

ISB Discussion

Mount noted that this effort is far ahead of the other efforts. ISB invited the presenters to attend the next ISB meeting to make a more detailed presentation.

Public Comment

Tina Swanson, Senior Scientist, The Bay Institute. There has been little progress in indicators and performance measures for the Bay-Delta system since TBI's efforts a few years ago. Development of indicators is essential, especially now because of the future-oriented work (Delta Vision, DRMS, etc.) that is going on. These future-oriented programs should be informed by science. Decisions are being made without sound scientific basis because of the lack of indicators. It is likely that serious mistakes could be made.

One of the ISB's roles is to express a vote of non-confidence in the work provided by the agencies to inform these processes, and to provide advice to agencies and CALFED to keep them from making mistakes.

The ISB is also concerned about this, and wrote a letter to the agencies expressing a similar point of view. Mount asked Swanson to submit her concerns in a written document and submit them to the ISB.

Appendix A

Acronyms and Abbreviations

Authority	California Bay-Delta Authority; the governance structure overseeing implementation of the CALFED Bay-Delta Program
BDCP	Bay-Delta Conservation Plan
BDPAC	Bay-Delta Public Advisory Committee
CALFED	CALFED Bay-Delta Program
CMARP	Comprehensive Monitoring Assessment and Research Program
DRERIP	Delta Regional Ecosystem Restoration Plan
DRMS	Delta Risk Management Strategy
ERP	Ecosystem Restoration Program
ERPSB	Ecosystem Restoration Program Science Board
EWA	Environmental Water Account
EWP	Environmental Water Program
IEP	Interagency Ecological Program
IRP	independent review panel (used here to refer to the DRMS IRP)
ISB	Independent Science Board
NCCP	Natural Communities Conservation Plan
NCEAS	National Center for Ecological Analysis and Synthesis
NRC	National Research Council
PSP	Proposal Solicitation Package
POD	pelagic organism decline
PPIC	Public Policy Institute of California
ROD	Record of Decision; refers to the CALFED programmatic Record of Decision from August 28, 2000
SP	Science Program
TBI	The Bay Institute
VAMP	Vernalis Adaptive Management Plan