

DELTA INDEPENDENT SCIENCE BOARD

DRAFT REVIEW OF ADAPTIVE MANAGEMENT IN THE DELTA

The Delta Reform Act of 2009 charges the Delta Independent Science Board (DISB) with providing "oversight of the scientific research, monitoring, and assessment programs that support adaptive management of the Delta through periodic reviews of each of those programs" such that "all Delta scientific research, monitoring, and assessment programs are reviewed at least once every four years" (§85280 (a)(3)). Rather than reviewing individual programs one-by-one, we are conducting reviews based on broad thematic areas. This questionnaire is the first stage of our review of how adaptive management is being thought about, planned, and implemented in the Delta and how science can best support those efforts.

We intend that our review go beyond oversight to be constructive and helpful. To probe more deeply into the responses to this questionnaire, we will follow up with in-person interviews with some respondents. After preparing a report on our findings, we will engage in further discussions to help selected programs advance their adaptive management planning and actions and adjust the focus of future reviews.

Designing and implementing adaptive management isn't easy, and is done less frequently than it is talked about. By thinking about the following questions and then providing brief responses, you'll help us suggest when and whether adaptive management should be used, how it can be improved, and how science can best aid this process. The questionnaire is in four parts.

Please provide links to or copies of documents that you think would help us better understand how you are thinking about, planning, and/or implementing adaptive management.

[ADD DEADLINE]

I. A QUICK SURVEY

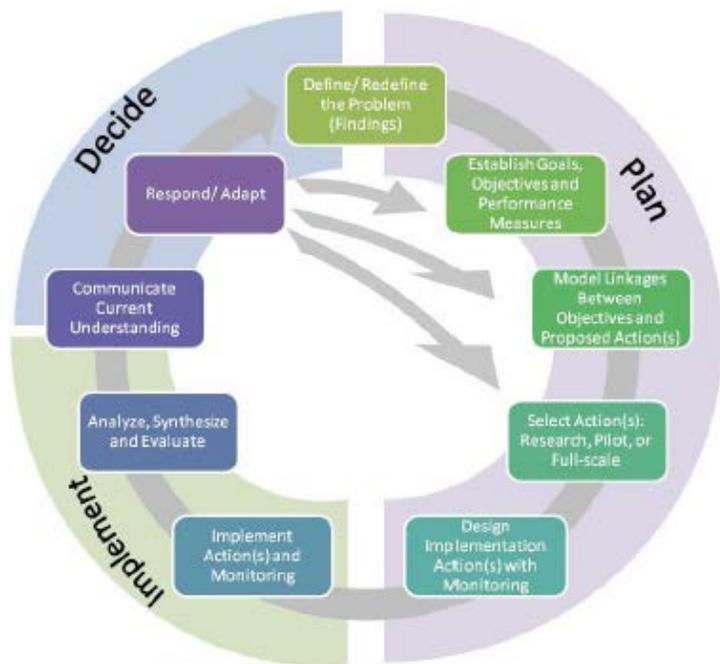
We'd like to develop a quantitative understanding of how adaptive management is used in Delta programs (after all, we're scientists). Please answer the following survey questions using the options provided (you'll have the opportunity to say more in the sections that follow).

II. SCIENCE PLAN(S)

Please provide a copy of your agency or program's science plan or plans.

III. ADAPTIVE MANAGEMENT PROCESS

In the Delta Plan and the Delta Science Plan, adaptive management is visualized as a nine-step process. The



following figure illustrates how these steps are linked in sequence, and provides a useful framework for describing how you are thinking about, planning, or implementing adaptive management. **If you have an adaptive management plan or plans, please provide it.**

The following sections relate to each step of this adaptive management process. **Please briefly describe how or whether each step is being planned or conducted in your program(s), along with any comments you'd like to share with us.**

Step 1: Define the problem. Adaptive management depends on a clear understanding of the problem to be addressed through some combination of science, management, and policy.

Step 2: Establish goals, objectives, and performance measures. Goals and objectives provide specific guides or targets for adaptive management, and performance measures indicate whether actions are working well. How are performance measures identified and employed? What are some common performance measures for your projects?

Step 3: Model linkages between objectives and proposed action(s). Developing models helps define the structure and relationships of the system being managed. Models may be conceptual, analytical, simulation (of varying complexities), and involve probabilistic risks or scenarios. How are you using models, of which type(s)? How do you decide what kind of modeling is needed or justified, or how detailed it should be?

Step 4: Select actions: Research, pilot, or full-scale: Depending on the situation, the state of existing knowledge of the system, the uncertainties and risks of undertaking a planned action, its costs, and other factors, additional research (literature, modeling, field observations or experiments) may be needed before implementation, or it may be useful to conduct a pilot study. What is done in your program, and how are decisions made about what to do? What steps are taken to assemble and make accessible a knowledge base for the project or problem? How is targeted research incorporated into adaptive management?

Step 5: Design implementation action(s) with monitoring: Are details of adaptive management and monitoring in place *before* a project is started?

Step 6: Implement action(s) and monitoring. Monitoring generates lots of data. How are data managed? Are data bases linked with other data bases outside the project?

Step 7: Analyze, synthesize, and evaluate. When is analysis done after or during implementation? What kinds of project evaluation are common?

Step 8: Communicate current understanding. Communication of analysis results and synthesis of scientific data usually requires translation into readily understandable messages for managers and decision-makers. When is this done, how, and by whom?

Step 9: Respond/Adapt: How are decisions made about whether to change goals and objectives, revise or conduct more modeling, or conduct additional research or take different actions to achieve the objectives?

IV. SOME SPECIFIC QUESTIONS

Here are a few additional questions that we'd like you to think about and tell us what you think, especially the last question.

1. How should one decide when adaptive management is needed or appropriate and when it is not? What criteria should be used to make this decision?
2. How have linkages among projects or actions and their effects been considered in your planning (or how should they be considered)?
3. What mechanisms exist for bringing scientists, managers, and stakeholders together throughout the adaptive management process?
4. What is the role of independent peer review, and in what phases of the process is it best applied?
5. How are your adaptive management science efforts funded (or how should they be funded)? What staff support is needed, with what sorts of expertise?
6. What legal, regulatory, or administrative barriers to doing effective adaptive management have (or will) you encountered?
7. Given the uncertainties that prompt adaptive management, there is a real likelihood of being wrong or mistaken. How do you deal with that possibility?
8. How are you incorporating anticipated future conditions (e.g., climate change, sea-level rise, land-use change) in adaptive management?
9. Do you have suggestions for making adaptive management work more effectively?
10. What question(s) should we have asked but didn't (your answer would be helpful)?