January 29, 2016
To: Delta Stewardship Council
From: Delta Independent Science Board
Re: Review of ongoing process for refining and updating performance measures in the Delta Plan

Summary

The Delta Stewardship Council staff has has begun to refine and update performance measures for assessing outputs and outcomes of the Delta Plan. The staff asked us to comment on its approach to this task. We applaud the staff's diligence in building on appropriate precedents and incorporating external guidance. We recommend clarifying the criteria for selecting metrics, and adding criteria for stability and consistency over space and time. It is likely that improving performance metrics for such a complex and multifaceted plan, with its diverse and sometimes conflicting objectives, will be difficult and controversial. The proposed process may advance Delta science by generating interest in the details of performance measures and performance metrics to be produced.

Background

The Delta Reform Act of 2009 directs the Delta Stewardship Council (Council) to include performance measures in the Delta Plan. Accordingly, the Delta Plan of 2013 "contains performance measures developed to monitor performance of Delta Plan policies and recommendations." The Plan anticipates that these performance measures "will be periodically reviewed by independent expert panels and will be sent to the Delta Independent Science Board (us) for further review and comment" (2013 Delta Plan, p. 45).

We were recently asked for review and comment concerning changes to some of the Delta Plan's performance measures. The request was made at our December 10, 2015 meeting by Cindy Messer, then the Council's Deputy Executive Officer for the Planning Division. Ms. Messer outlined a process to refine and update the Plan's performance measures. We agreed to review this ongoing process—but not the performance measures themselves—and to provide comments by the middle of February 2016.

Ms. Messer specifically asked us to review the process for refining and updating two of the three kinds of performance measures in the 2013 Delta Plan. The Plan contains 160 performance measures in all: 118 "administrative," 21 "output," and another 21 "outcome." Output measures track results of administrative actions, and the outcome measures are to gauge broader impacts. Ms. Messer requested that we review only the proposed approach for updating and refining the output and outcome measures only—42 measures in all. As written guidance for the review, Council staff provided us its "Report to the Delta Independent Science Board: Process for refinement and update of Delta Plan performance measures."

It is our understanding that Council staff seeks our review and comment in three areas:

1. Whether appropriate methods have been proposed for updating and refining the performance measures;
2. Whether the proposed process is headed in directions consistent with current scientific knowledge and available monitoring activities and capabilities; and
3. What general recommendations we might offer to assist in making the output and outcome measures more informative and measurable.

Support for the process

Overall, the process is likely to provide useful performance measures and metrics that will improve on those currently in the 2013 Delta Plan.

The process is thorough. The Delta Plan already contains a large and diverse set of performance measures to track progress toward the Plan's goals. We are confident that if the expected refinements and updating receive the in-depth and thorough analysis promised, the resulting performance measures should serve their intended purpose.

The process builds on thoughtful precedents. It is based in large part on prior, well-documented efforts involving use of similar performance indicators, including the planning, development and reporting methods. The process adapts these precedents by aligning performance measures with the particular needs and circumstances of the Delta Plan.

The process emphasizes learning. It began with ten pilot performance measures selected for a proof-of-concept analysis. The revisions were vetted by regional regulatory agencies for consistency with their missions and goals. The vetting process included consultation with additional experts, both internal and external to government agencies holding stakes in the Delta. Additional expertise was sought through internal consultation with the Delta Science Program.

Finally, the proposed process lays foundations for sustaining the Delta Plan. As anticipated by the Plan's writers, updating and refinement will be needed for performance measures that serve a plan this comprehensive, for managing resources so contested and changing. Iterative improvements in performance measures are sure to be needed to support policy and management under the Delta Plan.

Suggested improvements to the process

Our main concerns are less with the proposed process than with its implementation, as discussed below under "Next steps." Our suggestions and comments on the proposed process itself are mostly minor:

- *Explain more fully the criteria for selecting and assessing the metrics.* Many of the criteria listed in Figure 3 are not self-explanatory. Some are quantitative (spatial scaling) but without discussion of what is acceptable. How would the various criteria be used? What do "process" and "staff notes" signify as "criteria"? The criteria in Figure 3 seem to be key to the overall process, so more information about them would be helpful.
- *Aim for metrics that are stable and consistent.* The text suggests in several places that the performance measures should be adaptively changed as circumstances change. But the report should explain that a performance *measure* (item being measured) differs from a performance *metric* (the quantitative measure). To detect responses to management or trends in system conditions (i.e., outcomes), it is essential that the metrics be stable and consistent through time and space; otherwise it is difficult to determine whether an observed change is due to a real change in the system or a change in the metrics. .
- *Clarify the "Assess" step (page 6, step 2).* Provide examples of what aspects of this step can be quantified.
- *Say more about the reviews from subject experts.* How were the 65 subject experts selected and how many responded? Outsiders' confidence in the process could be increased by overviews and examples of how the input mentioned on pages 11-12 was used.
- *Clarify the status of the metrics.* Which metrics have been selected already? Are they the ones in the tables at http://deltacouncil.ca.gov/event-detail/12801? The staff report cited

above says that work has progressed through step 3.3. More could be said about how the metrics will be further refined.

Next steps

No less important than the proposed process are the measures and metrics that will result from it. Several thoughts about those next steps:

- The outcome measures not only are the most relevant to the goals and objectives of the Delta Plan, but may also be the most difficult to assess. The goal of habitat restoration, for instance, is to create suitable conditions for the persistence and flourishing of target species or ecological processes (a measure of outcome). A restoration plan sets out what is to be done, which is then assessed by measures of administrative performance. Implementation of the plan may result in some number of acres restored (a measure of output). But all of this is for naught if the desired outcomes do not follow, and these outcomes can be far more difficult to measure, particularly if a causal connection to the plan action is muddied by other external factors, such as new invasive species or a drought.
- An outcome may be a nonlinear function of what is measured by the output. For example, restoring acres of habitat may produce no ecological response until some threshold value is reached or passed—that is, when the restored area is large enough for the processes to occur.
- The report's Figure 3 appropriately notes the need to consider temporal and spatial scales. But scale-dependence is a thorny issue. It is determined by a complex intersection of the scales on which the system and its dynamics are operating (which differs for different components of the system) and the scales of management, decision-making, and policy (which also differ for different objectives).
- Statistical analyses will be essential in many of the performance measures. Careful statistical design is needed to tell whether a change in a variable is a response to management actions or to other changed environmental conditions (which likely willbecome a more prevalent problem with climate change) or endogenous developments (such as internal population dynamics), and to assess the power of inference, which tells one whether a numerical change in a metric really indicates a significant change in the variable of interest.
- The expected revision and updating of performance measures will require complementary efforts in policy and management arenas. The Delta Stewardship Council itself is likely to wrestle with insights that these measures provide.

Conclusion

In relying on performance metrics, the Council is undertaking an innovative effort that is both scientifically and institutionally difficult, but which is also essential to success of the Delta Plan and adaptive management. The process is a good one overall, but the proof of this pudding will be in the eating.