

**Scenarios, Criteria, Alternatives:
What are the WSAC's Technical Support Needs?**

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This note provides an introduction and some background information on scenarios, alternatives, criteria, ratings, and how they all fit together. One point of focus for this note is to provide context that will help you identify the kinds of information that will support your decision-making process, and identify the technical expertise needed to provide that information.

We believe it is important to continue identifying the key technical questions – and related technical expertise required – during Recon. This is because: (1) it takes time to nominate, gain WSAC approval, and bring additional expertise under the contract, (2) we need to be able to provide experts with some advance notice, so they can plan to schedule this assignment within their workload, and (3) some of the technical issues will require many months (or longer) to complete. Therefore, waiting until the Real Deal to start retaining expertise to address these analyses may cause roadblocks that can be avoided by planning ahead. Basically, we want to tee up the analytic work that everyone agrees needs to be completed, and begin the discussion of what technical support WSAC may want/need in the future.

This memo provides background materials for the discussion on Aug 27. Additional information and details will be provided at that time.

Scenarios

The use of a scenario-based approach has been identified as one of the few proven methods for facilitating informed decision making under large uncertainty. Using scenarios, you can plan for several differing visions of the future and identify what alternatives work for each vision. Scenario-based decision-making can be facilitated using a set of criteria, ratings and weights within an MCDS framework. This allows decision makers to identify the mix of alternatives, the timings of alternatives, etc. that -- based on criteria and ratings applied in a MCDS process -- helps identify the 'best' overall selection of alternatives for Santa Cruz.

Based on the template and rudimentary scenarios developed during the last WSAC meeting, we suggest that each Scenario discussion include the elements outlined in Figure 1. An example is also provided, as a separate document.

We believe that scenarios provide a useful construct for looking into a future that embodies considerable *uncertainty* along several relevant dimensions (e.g., climate change, fishery flow requirements, the future level and patterns of growth). One way to use scenarios in this fashion is to articulate plausible futures of interest or concern (the scenarios). The Committee can then evaluate

alternatives according to how well they perform across the various potential futures (e.g., to determine which alternatives are “robust” in that they perform suitably well across most or all identified future scenarios).

Figure 1: Elements of a Scenario (and Related Analyses)

- A) **Vision Statement:** A vision statement lays out a specific future that WSAC wants to support through their consideration of water supply alternatives.
- B) **Measure of Success (Criteria and Ratings):** How do we measure success for this vision; E.g., how do we define the criteria and which associated ratings metrics will we develop and use to define/evaluate success? Which criteria and ratings will be assessed using *quantitative* measures derived from objective technical analyses, and which may be more subjective and qualitative?
- C) **Alternatives:** Eventually we need to identify the set of alternatives that can be used to help meet this vision as reflected by the measure(s) of success, based on the ratings metrics. As part of evaluating how well each alternative meets the vision, WSAC will want to rate how the alternatives perform against their identified set of criteria. WSAC can then place weights on the different criteria to identify how well the different alternatives perform, overall.
- D) **Questions of Critical Concern about this Vision:** What do I need to understand about this vision in order to ensure that the decision I make supports this vision? In other words, what are the criteria WSAC will establish?. Amongst the likely criteria are those that may be characterized broadly as falling in the following categories:

Financial: What set of *Financial* criteria - to the City and ratepayers - are important to understand and include?

Social: What set of *Societal/Community* values and related criteria – Including a sense of community identity – are important to understand and include?

Environmental: What set of *Environmental* criteria are important to understand and include?

Technical: What set of technical feasibility and performance reliability criteria are important to assess and include?

Other: What additional criteria may be important to WSAC, beyond those criteria identified under the broad categories above?

- E) **Technical Research Needs:** Based on the questions of critical concern – the criteria outlined above, what are the research tasks needed to assess the financial, social, environmental and other criteria (and ratings) established for this Scenario? And do we execute these analyses?
- F) **Technical Support Needs:** Suggestions for kinds of Recon work, and associated individual experts or firms, WSAC may choose to provide answers to the questions of critical concern outlined above.

- Scenarios also provide a way to develop some explicit and shared *visions of the future* for Santa Cruz – visions towards which the Committee may wish to aim (or futures they want to avoid). Such scenarios are used in the same fashion as discussed above.
- Defining the *baseline* is a critical aspect of the process, as it represents a scenario reflecting the future if the City remains on its current path (i.e., the status quo in which the Water Dept. does not make any appreciable changes in its water supply portfolio, related infrastructure, operations, or demand management). The baseline is thus the scenario against which the other scenarios (and related Alts) are compared.

We will work with the Committee on the 27th to develop a few potential scenarios for the Committee’s consideration. The upcoming discussion is intended to assist the Committee in its deliberations for defining the scenarios that it finds most useful and relevant.

Key Questions, and Related Potential Criteria

As the Committee works to define scenarios, several key technical questions begin to emerge. For example, for a scenario that envisions providing generous fish flows that fully ensure vibrant and healthy coho and steelhead populations at all times, one key question that emerges is “what flows does that mean?” Associated questions may include: “Are we looking to go above and beyond DFG-5? If so, by how much? What does this imply for extractable yields for the City? How might the target instream flows (and associated yields) change under climate change?”

To answer these questions, specialized technical expertise is required related to fisheries, stream flow hydrology, and so forth. This defines specific needs that may require adding technical firms or individuals to the consultant team (more on this aspect, below).

In addition, the Committee needs to consider how it may evaluate Alts in the context of fish flows. Providing desired fish flows may well become one likely criterion. Determining how such a criterion will be worded, and establishing rating scales for the criterion (i.e., developing the metric with which an Alternative’s performance will be rated relative to this criterion), are important aspects to consider. Does the criterion include a specified ideal target for fish flow? Will performance relative to this criterion be rated based on specific quantitative measures, or subjective qualitative scoring?

As we help flesh out possible scenarios, one might apply a Triple Bottom Line (TBL) organizational framework as one mechanism to help identify and categorize likely key questions and potential associated criteria – although other factors may also be included. For example:

- For the *financial* bottom line, one key issue for the Committee is likely to be, “How much does it cost to attain the targets associated with a scenario? How will this impact customer water bills, compared to the baseline?” These questions point to cost and affordability as potential criteria and, therefore, indicate a need for analyses relying on engineering and economic expertise to estimate costs and affordability impacts.

- For the *societal* bottom line, key focal points may include the impact on the City’s economic vitality, including opportunities for meaningful local employment for residents across the economic spectrum. Regional economic impacts may also be a factor that the Committee wishes to examine. These issues point to developing analyses relying on regional economic modeling, and so forth. Other possible societal criteria may include “aligns with community identity” as suggested by Carie and Nicholas based on their interview work with the Committee members; and ratings for such a potential criterion might be largely qualitative and developed through a deliberative process (rather than a quantitative technical analysis).
- For the *environmental* bottom line, key focal points are likely to include fish flows and related fishery health issues (as described above), energy use and associated carbon footprint/GHG emissions, and other factors. Assessing some of these factors will require various types of expertise. For example, a technical expert may be needed to assess the energy requirements (and carbon footprint) associated with the various Alts (or combinations of Alts).
- Other criteria may emerge that do not fit neatly within the TBL construct, and these can be identified and included. For example, technical feasibility and reliability are important considerations when evaluating how well an Alt may perform.

A Quick Look at Expertise Needs Related to Alts

While the Committee has yet to dive deeply into the Alts discussion, we can already identify several topics that we expect to emerge and for which additional technical expertise will likely be required. For example, *groundwater-related hydrogeological questions* are likely to emerge related to a range of issues:

- Potential risks of seawater intrusion into wells in near-coastal areas
- The impact of City well operations on City wells, and on Soquel Creek’s wells (and vice versa)
- The feasibility of using local aquifers for storage (i.e., the leakage issue)
- The viability of neighboring water districts to provide the City with groundwater in seasonal exchanges

This indicates that hydrogeological expertise will be needed related to the complex groundwater formations in the region. This is specialized expertise and the associated studies and modeling probably require considerable time to develop and apply.

Likewise, the discussions to date have pointed to other types of anticipated technical needs, including *engineering* (e.g., for examining the feasibility, cost and performance of various Alts, including possible modification of extraction points and related infrastructure that may improve San Lorenzo River yields), *fishery expertise*, *water rights knowledge*, and so forth.

We also expect there will be interest in exploring various potential *water recycling* alternatives, which in turn draws on engineering, public health/regulatory knowledge, and other skills.

To avoid delays later, we would like to help move the process along for expanding the technical team. As we move forward, we will aim to better define specific technical needs, and provide some options and recommendations for who might best fill those needs. We also will try to articulate technical needs relative to:

1. What is useful/necessary for Recon
2. What is likely to be needed/useful for the Real Deal, but requires a relatively long timeline and would thus benefit from initiating the technical analysis during Recon
3. What is likely to be needed once we start the Real Deal, such that having expertise in place will enable expeditious tasking once the Real Deal begins.

Criteria for Selecting and Approving Additions to the Technical Team

To help us focus our suggestions for specific experts or firms, it will help if the Committee can consider and articulate how it wishes to evaluate potential additions to the technical team. While a core factor is the technical qualifications of the potential additions, there are also some additional considerations and tradeoffs that may emerge. For example, does the Committee have any strong preference between:

- Santa Cruz experience, versus a fresh perspective
- Individual experts, versus firms that provide more breadth and depth
- Real field experience versus some more conceptual/academic knowledge

There does not need to be a hard rule one way or the other, but if there is a strong preference across the Committee members for some attributes, then it will be useful to have them articulated.

Conclusions

This document is intended to help draw useful linkages between scenario analysis (as a constructive way to contemplate long-range decisions when there are several sources of considerable uncertainty), and the identification of key technical questions. These technical questions are related to defining the criteria and ratings that may be useful within an MCDS approach to evaluating alternatives. To best support the Committee in its deliberations, our objective is to help articulate the key questions – and associated technical analyses that may help answer or clarify these questions – to facilitate the Committee’s ability to objectively evaluate alternatives. This in turn provides a foundation for working with the Committee to define what additional types of technical expertise to consider adding to the process, so that we can help provide relevant and objective information to support the deliberations.