

Appendix G Post-workshop elicitation guide

This guide was provided to subregional teams to give them further guidance in providing their probabilities (see section 3.5.3) and utility values (see section 3.6)

G-1 Overview

Expected outcome

Each subregional team member independently fills in their quantitative inputs to their subregional decision model using the spreadsheet template provided by their SDM coach.

Why is this important?

- Quantitative inputs are the **final essential ingredients** to identifying optimal subregional allocations for the near-term management horizon (2015-2029) using a decision analytic approach, taking into account uncertainties about available funding, environmental drivers, and outcomes in terms of the fundamental objectives.
- Collecting and compiling elicited inputs from team members will allow the SDM coaches to **identify an optimal subregional allocation of resources** to maximize SF Bay conservation at the subregional level for this near-term horizon.
- **Draft results** from this near-term horizon decision analysis along with summary statistics for the elicited inputs will be presented to each subregional team for **discussion and input**.
- Following these subregional team discussions, the **subregional decision model will be modified if necessary** and incorporated into a more comprehensive subregional decision model taking into account **decisions during the longer-term management horizon (2030-2050)**, and trade-offs between medium-term (2030) and long-term (2100) fundamental objectives.

Overview of contents within elicitation spreadsheet template

One tab for each element requiring quantitative input for the decision model. Factors can be one of two general types, and the factors were based on influence diagrams developed by subregional teams:

1. *Utility*: values representing all possible outcomes in terms of the fundamental objectives.
2. *Probabilistic (aka stochastic)*: probabilities representing predicted outcomes of alternative allocations, external drivers, and/or intermediate drivers.

G-2 Utilities

Utility values represent how much a stakeholder values a particular outcome in terms of the fundamental objectives. In this case, we're asking them to place a numerical value on how much they value each ecosystem type with regards to its projected change biotic integrity during 2015-2029 on a scale of 0 to 100.

Example: How would you score on a scale of 0-100 a scenario where biotic integrity for subtidal/intertidal flats was ____, tidal marsh was ____, managed ponds was ____, and upland transition zone was ____ . A value of 0 represents the worst-case scenario and great dissatisfaction where biotic integrity is decreasing for all ecosystems; a value of 100 represents the best-case scenario and great satisfaction. A way to think about the scores using a grading analogy is that 100 would be an A+, 90 would be like an A-, 85 a B, 75 a C, etc.

G-3 Probabilities

For each of the probabilistic (aka ‘stochastic’) factors in the decision model, we need to enter one or more probabilities on a scale from 0-100. Even though a probability is on the same scale as a utility value, a probability has a very different meaning. Whereas a utility represents a stakeholder’s happiness or satisfaction with a potential outcome, a probability represents the likelihood that a future event will occur. Each probabilistic factor has two states (e.g., “Not Decreasing” and “Decreasing”). We need to estimate the probability of the factor being in one of these two states in the future (for the other state, we can simply subtract from 100). In each of the sheets in the workbook, the experts are asked to provide a probability for the state corresponding to the “good” outcome (the column for the “bad” outcome is calculated and therefore updates automatically and requires no direct input from the team members). Please see a list of [supporting information](#) that will help in general when assigning utilities to the two types of probabilistic factors: 1) external drivers, and 2) intermediate drivers and fundamental objectives.

External Drivers:

You will see that some tabs in the spreadsheet ask for just a single probability. In the case of external drivers, there are actually two probabilities representing the likelihood of being in each of the two possible states (e.g., “Rosy” and “Not So Great”; see example [here](#)). For the external drivers (budget, extreme events, etc.), we determined the criteria for the “Rosy” and “Not So Great” [scenarios](#). The question to elicit one of the two probabilities for an external driver would be something like:

Extreme events: What is the likelihood or probability (0-100) that extreme events will be Rosy 2015-2029?

Outcomes:

You will notice that some tabs have multiple rows of probabilities to fill in. Whereas external drivers have no influencing factors, stochastic factors representing outcomes (i.e., intermediate drivers and fundamental objectives; for example an attribute of biotic integrity like change in acreage of high-quality tidal marsh) are predicted by one or more driving factors (alternative allocation, external driver, and/or intermediate driver). Please see two examples to illustrate this: [marsh vegetation acreage](#) and [subtidal biotic integrity](#). In each case, there are driving factors that each can take two states, representing good vs. bad states. The question for each outcome requires that the team members consider the states of each of the driving factors when filling in their probabilities

The allocation (decision), budget (i.e., resource availability; external driver), extreme events (external driver) are drivers for many outcomes. When filling in probabilities, team members should refer to the external-driver [scenarios](#), allocation options, and influence diagram for the particular subregion and ecosystem. The latter two documents can be found within the respective subregional subfolder on [google drive](#). Referring to these documents will help you to assign probabilities.

Example, [Marsh vegetation acreage](#) for North Bay (Row 7): What is the likelihood or probability (0-100) that marsh vegetation acreage will at least remain at the current levels if the [Rosy] budget allocation strategy is chosen for the 2015-2029 time frame, the budget actually is [Bad],

precipitation is [Rosy], and extreme events are [Bad] over the 2015-2029 timeframe? Square brackets here indicate that one of the two possible states is given as an example. For intermediate drivers and fundamental objectives, the questions will iterate through each combination of the states of the driving factors, corresponding to each row in the spreadsheet tab.

A challenging aspect of assigning probabilities to many of the outcomes is that team members must distinguish between budget allocation strategy (the decision, which took into account contrasting possible futures with respect to resource availability and environmental processes) and the uncertainties about what the budget and environmental drivers will actually be. It might be helpful to first think about the scenario for a given factor in row 2 (in the [example](#)), in which the choice of the allocation alternative and the actual external drivers match. Next, consider the scenario in row 10, in which the decision made is to allocate for a “bad bad” external-driver scenario, but the actual drivers turned out to be “rosy”. How would this mismatch between the chosen allocation and actual external drivers affect the outcome if at all?

The biotic integrity of each ecosystem will be elicited in a similar fashion, and illustrated here by an [example](#) for subtidal/intertidal flats in North Bay (row 7):

Subtidal/intertidal flat biotic integrity: What is the likelihood or probability (0-100) that the biotic integrity of the subtidal and intertidal marsh ecosystem complex will not decrease if shorebird abundance is [Rosy], shellfish acreage is [Bad], eelgrass acreage is [Rosy], diving duck forage availability is [Rosy], and the abundance of native fishes is [Bad].

The change-in-biotic-integrity factors are capturing the tiered structure of the fundamental objectives. Even though the integrity of each ecosystem attribute is of fundamental importance, we are simplifying the decision model by relating each of these attributes to a higher-order fundamental objective of change in biotic integrity for the entire ecosystem that integrates the various ecosystem attributes. Continuing the example above, if you believed that biotic integrity of subtidal/intertidal flat was poorly represented by diving duck foraging ability, then the likelihood of increasing biotic integrity for this scenario (Row 7) would be similar or equal to another scenario where the only difference is that diving duck forage availability is Bad (Row 9).