Appendix D **Breakout guide used during stakeholder workshop.**

D-1 Developing influence diagrams and measurable attributes

Day 1, Tuesday, 1-3pm

Expected outcome:

1. **For each ecosystem type** (see **section 6c in Info Pack**), draft final ***influence diagram*** (see simplified example below) relating *categories of actions* (see **section 6d in Info Pack**) and *external drivers* (see Glossary in **section 8 of Info Pack**) to *intermediate drivers, constraints,* and *fundamental objectives* (see **section 6b in Info Pack**). Diagram should be in a format that the subregional team leader can present during plenary.
2. ***Measurable attribute*** (metric) **for each factor** (i.e., box) in each influence diagram.

Why is this important? These influence diagrams and measurable attributes will be incorporated into a *decision model* that will be used to identify *optimal allocations* of conservation funding within each of the four subregions of SF Bay. The decision model will be populated by participant input, and the results will be presented at the end of the workshop. During Thursday AM breakout, the group will make predictions about projected outcomes for each fundamental objective as a function of their drivers (i.e., intermediate and external).

Suggested approach:

Overview

- **Work individually or in pairs** to develop one influence diagram for each ecosystem type (see general example below) and for each *outcome horizon* (2015-2029 & 2030-2100), with a measurable attribute (metric) for each factor in the diagrams.
- You may use flip charts, colored sticky notes and/or masking tape to construct your influence diagrams, but please transfer these into a computerized version for presenting during plenary.
- To ensure completion of the elicitation exercise on Thursday AM, **include no more than 20 unique factors** for the entire subregion across ecosystems (factors = fundamental objectives, constraints, external drivers, and intermediate drivers; i.e. not counting the categories of actions).
- To maintain this level of simplicity, **include only those drivers with the greatest influence and that have the most uncertainty** in terms of their magnitudes and their effects on other factors.

Steps

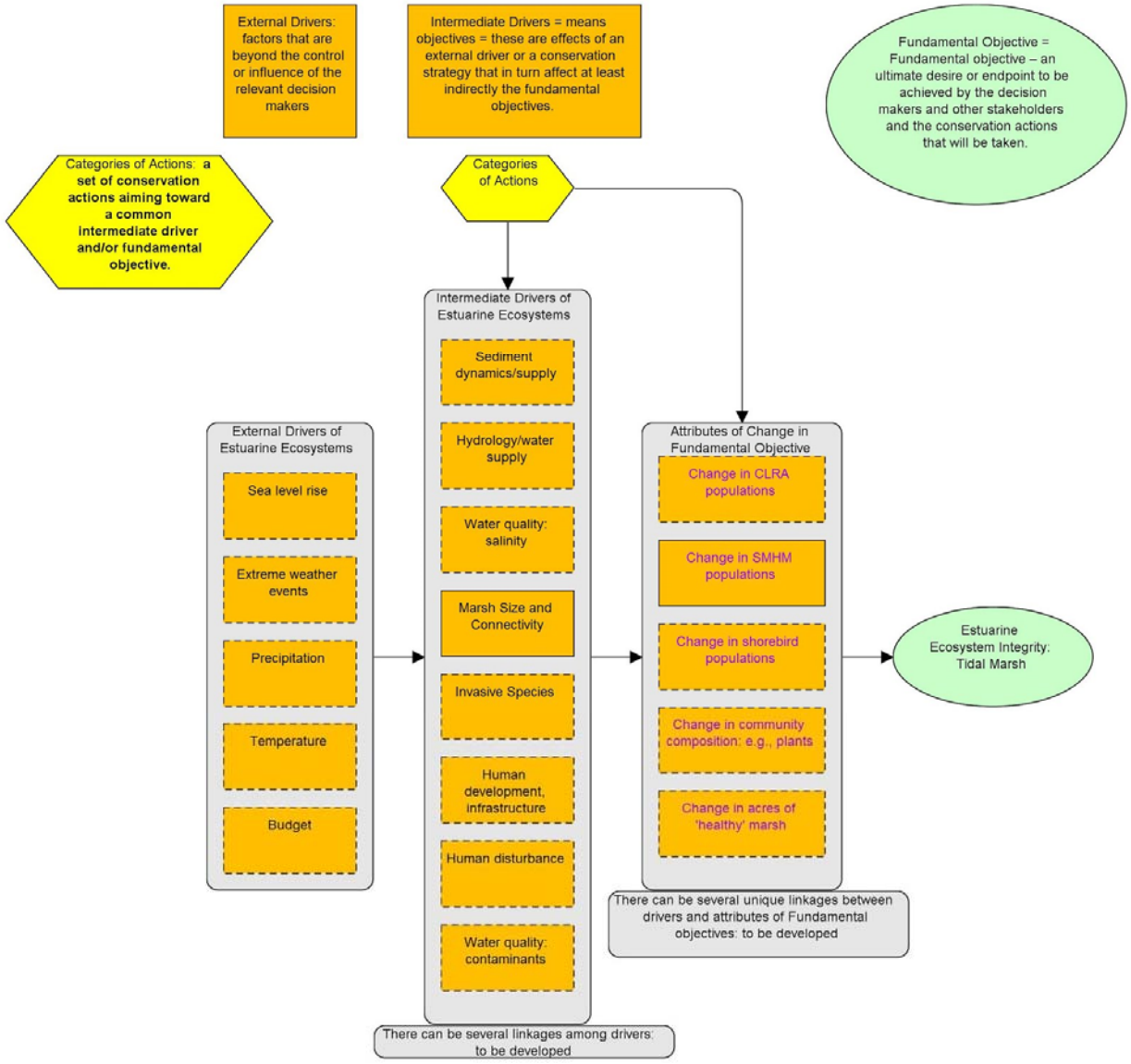
1. Each individual or pair picks one of the four ecosystem types such that all ecosystem types are covered by the breakout group as a whole.
2. For the chosen ecosystem type and for one of the outcome horizons (2015-2029 or 2030-2100), work from the prototype influence diagram to complete the following steps **in 30 minutes**:
    a. Choose up to **5 fundamental objectives and up to 3 constraints** (e.g., endangered species recovery) representing *biotic attributes* of the ecosystem. These selected fundamental objectives and constraints should be of greatest importance to the

decision makers and stakeholders, with an effort to select those that are unique and non-duplicative. For example, including both California clapper rail and black rail may be duplicative. Fundamental objectives and constraints should be on the right-hand side of the influence diagram and have **no arrows coming out of them**. Attributes representing multiple (rather than individual) fundamental objectives and constraints may be used to help simplify the diagram (e.g., index of ecosystem integrity).

b. **Identify three of the intermediate drivers** having the greatest uncertainty and projected impacts on the suite of fundamental objectives and constraints. Intermediate drivers are affected by *external drivers* and/or other intermediate drivers.
c. **Connect each of the three intermediate drivers to fundamental objectives and constraints** that they affect using arrows.
d. **Identify three of the *external drivers*** having the greatest uncertainty and projected impacts on intermediate drivers and/or (directly) on fundamental objectives and constraints. External drivers are those beyond the control of management and have no arrows coming into them (e.g., sea level rise, extreme storm events, availability of conservation funding, policies enacted by upper government levels).
e. **Connect each of the three external drivers** to intermediate drivers, fundamental objectives, and/or constraints that they affect using arrows.
f. **Assign a measurable attribute to each factor** (i.e., external drivers, intermediate drivers, and fundamental objectives) in the influence diagram (can use same ones for both outcome horizons).

3. Discuss the influence diagram (from step #2) with the entire breakout group and revise if needed (**30 minutes**).
4. Repeat steps 2 & 3 for the other outcome horizon.

Prototype influence diagram to be customized for particular ecosystems within subregions:



D-2 Developing future scenarios and allocation options

Day 2, Wednesday, 9:20 - 11:30am

Expected outcomes:
These will be presented by the subregional team leaders during plenary.

1. **Alternative environmental scenarios**: two scenarios for each of the near-term *outcome horizon* (2015-2029) and two scenarios for the long-term outcome horizon (2030-2100). Scenarios will represent potential magnitudes of 1-2 focal environmental drivers, external or intermediate, that are of particular concern for management decisions because of their potential impacts on the fundamental objectives and the degree of uncertainty surrounding them. Scenarios must specify whether each focal environmental driver is above or below a

quantitative threshold , e.g. >X meters sea-level rise and >Y severe storms per year. Each threshold should represent the level at which resulting biophysical impacts would become severe enough to cause significant concern by stakeholders and decision makers focused on conservation of SF Bay in terms of the fundamental objectives.

2. **Possible subregional funding scenarios** (ranges of dollar amounts) representing total amount of money available to implement conservation actions (i.e., BEHGU recommendations belonging to the categories of actions for CADS). Develop two funding scenarios for near-term (2015-2029) & two for the longer-term (2030-2050) management horizon.
3. **Alternative subregional allocations** of conservation funding -- allocations should correspond with the best and worst cases under the combination of external-driver scenarios and funding scenarios (#1 and #2 above). An allocation is the percent of funding that would be spent on a particular action category within an ecosystem in each subregion to achieve fundamental objectives. Develop two allocations for near-term (2015-2029) and two for longer-term management horizon (2030-2050).

Why is this important? The decision analysis on Thursday AM will evaluate which of the alternative subregional allocations is optimal for the near-term management horizon (2015-2029), taking into account uncertainties about available funding, environmental drivers, and decisions during the longer-term management horizon (2030-2050).

Suggested approach:

1. Alternative external-driver scenarios -- in each outcome horizon, develop a best and worse-case scenario for a set of environmental drivers (e.g., related to climate change).
2. Possible subregional funding scenarios -- in each management horizon, develop a best and worse-case scenario for funding.
3. Alternative subregional allocations: See attachment "Portfolio and allocation template" and mock example below for the Sierra Nevada. Work individually or in pairs Begin by filling in an "X" for every combination of action category and ecosystem type where dollars could conceivably be allocated for a given external-driver scenario. Then, for a given funding and external-driver scenario, fill in the percentage of dollars that would be spent for each category of actions and/or ecosystem type. If necessary, then allocate those percentages among action categories of among ecosystems for a given ecosystem or action category, respectively.

Mock example alternative allocation for northern subregion of Sierra Nevada:

Subregion: _____*North Sierra*_____

Scenario name: _____*Pessimistic*_____

Outcome horizon (circle one): 2015-2029 OR 2030-2100

Environmental drivers and thresholds: _*< 10 cm avg annual precipitation*_____

Funding level (range of dollars): ____*$10-20 million annually*_____

Action Category	Low Elevation	Mid Elevation	High Elevation
Protect acreage	*2*	*4*	*12*
Manage individual wildlife species	*7*	*2*	*19*
Manage vegetation for multiple species	*5*	*14*	*4*
Manage human disturbance	*13*	*4*	*14*

D-3 Identifying quantitative thresholds and relationships

Day 2, Wednesday, 1:30 - 3:20pm
Expected outcomes:

1. **Quantitative thresholds** for the fundamental objectives and drivers for which thresholds remain to be developed following the Wednesday AM breakout. For each fundamental objective in the influence diagrams, a quantitative threshold should be identified to represent the level at which an outcome would become of significant concern for stakeholders and decision-makers focused on conservation in SF Bay. For each intermediate or external driver, the quantitative threshold should represent the level at which resulting biophysical impacts would become severe enough to cause significant concern by stakeholders and decision makers focused on conservation of SF Bay in terms of the fundamental objectives.
2. **Qualitative relationships** (positive, negative, or unclear) between attributes representing fundamental objectives, drivers, and alternative allocations (see results generated from breakout sessions on Tuesday). Set of qualitative predictions should be in a format that the subregional team leader can present during plenary.

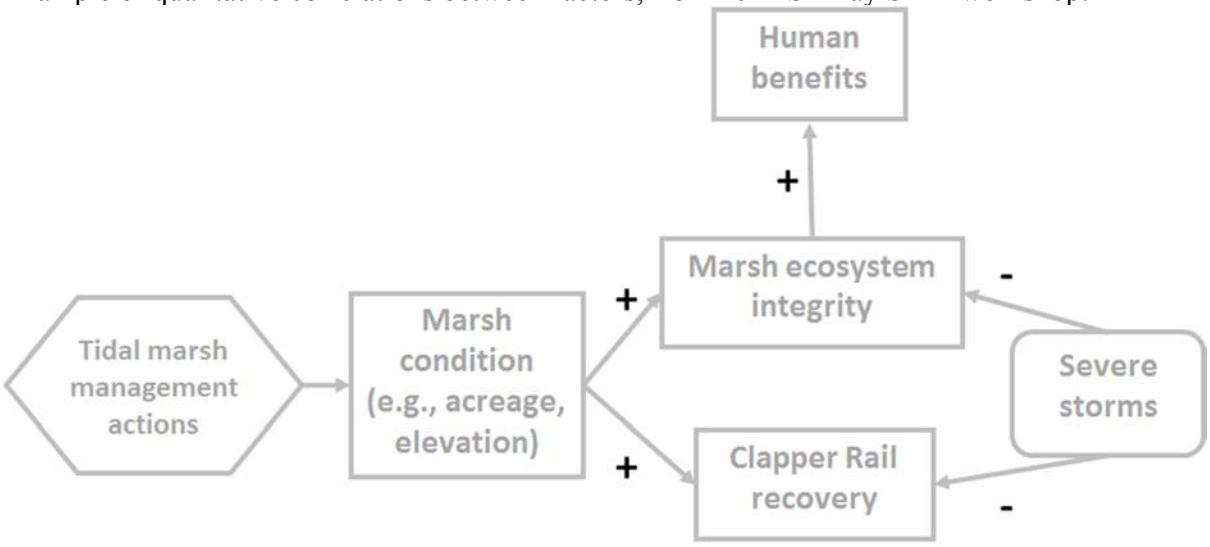
Why is this important? Knowledge about the quantitative thresholds and qualitative relationships between factors in the influence diagram will help ensure logical consistency when populating the decision model with quantitative predictions from participants on Thursday, helping to ensure robust management recommendations that can inform on-ground decisions.

Suggested approach:

1. Quantitative thresholds -- for each fundamental objective and their drivers in the influence diagram, specify a quantitative threshold meeting expectations given above.
2. Qualitative correlations--for each arrow in the ecosystem-specific influence diagrams generated during the Tuesday breakout session, assign a qualitative correlation of positive (+), negative (-), or unclear (?). See example below from 2011 SF Bay SDM workshop.

Examples in other contexts: 1) positive -- we expect a positive correlation between the frequency of intense droughts and the frequency of wildfire in the Sierra Nevada; 2) negative -- we expect a negative correlation between the degree of forest fragmentation and nest survival of ground-nesting forest songbirds; 3) uncertain -- we are unclear, or there is no consensus in the group, about whether carbon storage would increase or decrease with the amount of spring rainfall.

Example of qualitative correlations between factors, from 2011 SF Bay SDM workshop:



D-4 Quantifying predictions and tradeoffs

Day 3, Thursday, 9:15 - 10:45pm
Expected outcomes:

1. **Quantitative predictions** for relationships between attributes representing fundamental objectives, drivers, and alternative strategies (see influence diagram generated from breakout session on Tuesday and set of qualitative predictions from Wednesday PM). Set of quantitative predictions should be in a format that the subregional team leader can present during plenary.
2. **Quantified utility values** for all possible outcomes in terms of the fundamental objectives.

Why is this important? Quantified predictions and utilities 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, decisions during the longer-term management horizon (2030-2050), and trade-offs between medium-term (2030) and long-term (2100) fundamental objectives.

Suggested approach:
Each individual participant enters their predicted probabilities and utilities in the template provided using Excel or Google Sheets. These are then assembled anonymously by the subregional SDM coach and summarized across participants (averages, ranges) for presentation to the subregional

team. Participants may change their numbers during the presentation, and the numbers will be reassembled for the SF Bay-wide decision analysis.

1. **Quantitative predictions --** Hypothetical examples for the Sierra Nevada: 1) if intense droughts occur more than 5 times over the next decade, there is a __% chance that there will be more than 3 wildfires in the Sierra Nevada over the next decade; 2) in forests with a core area of less than 100 hectares, there is a __% chance that the density of ground-nesting forest songbirds will decline over the next decade. In plenary, practice by filling in the blanks and these entries will be discussed as a group.
2. **Quantified utility values --** Hypothetical example for the Sierra Nevada: if there are more than 3 wildfires in the Sierra Nevada over the next decade but ground-nesting forest songbird density has increased over the next decade, the executive director with the Sierra Nevada Conservation Cooperative (fictitious NGO) would assign a utility value of __ out of 100 to this outcome. Here, the best-case (at most 3 wildfires, stable or increasing bird density) would receive automatically a value of 100 and the worst-case (more than 3 wildfires, decreasing bird density) would automatically receive a value of 0. In plenary, practice by filling in the blank and these entries will be discussed as a group.