Appendix F **Descriptions of intermediate drivers for North Bay**

This appendix is a companion for section 5.1.5.1.

Intermediate drivers influence indicators of biotic integrity and are themselves influenced by external drivers and/or actions. Team members recognized there are many intermediate drivers that could be included, but to ensure a concise decision model they limited the influence diagrams to the drivers having the greatest uncertainty and greatest potential impacts on the fundamental objectives. Additionally, although these intermediate drivers were included in the influence diagrams, they were not explicitly included in the final decision model. Rather, the team was asked to consider these drivers while providing their expert opinion of how the action categories and external drivers would influence the fundamental attributes.

We identified intermediate drivers in the Upland Transition Zone for each time frame:

Near term (2015-2029):

1. *Detrimental levees and armoring/human development*- this included any sort of human infrastructure that might affect the fundamental attributes. This driver was influenced by extreme events, though the group thought that this could either be a positive or a negative influence, depending on what type of infrastructure is affected and what the desired outcome for that piece of infrastructure is.
2. *Invasive species*- this refers to invasive vegetation, which would be expected to increase in acreage with extreme events, changes in precipitation patterns, and increasing temperature.

Long term (2030-2100):

1. *Detrimental levees and armoring/human development*- this included any sort of human infrastructure that might affect the measurable attributes. This driver was influenced by extreme events and sea level rise (positive), though the group thought that extreme events could either be a positive or a negative influence, depending on what type of infrastructure is affected and what the desired outcome for that piece of infrastructure is.
2. *Sediment supply*- this includes sediment that would be deposited by riverine discharge. It is negatively affected by sea level rise and precipitation, and is affected by extreme weather, though the direction of this effect is uncertain. It positively influences all attributes, and is influenced by managing sediment (including sediment augmentation by dredge material reuse). The supply of sediment in the future will likely be very low.
3. *Adjacent land use for upland transgression*- this represents the type of land that might be available for upland transgression that it is now used for a variety of activities (agriculture, vineyards, etc.). It's negatively influenced by SLR, and positively influenced by protecting acreage and managing sediment.

For the Diked Wetlands/Managed Ponds ecosystem, the same 3 intermediate drivers were important in both time frames, with the only difference being that SLR will negatively influence each of these drivers in the long term time frame. Additionally, the group acknowledged that many of these structures will not be maintained throughout the long term time frame. They decided to measure the biotic integrity of these as "per structure" so that they can focus on those

ponds, etc., that are going to be maintained. Therefore, all intermediate drivers focus on those structures that will be maintained in the future:

1. *Pond maintenance water levels*- this is the managers' ability to maintain the pond at desired water levels, which is negatively influenced by extreme events, and could be positively or negatively influenced by changes in precipitation.
2. *Water quality (salinity)*- this represents the managers' ability to maintain desired salinity levels. Changes in precipitation could either negatively or positively influence this driver, and managing salinity levels would have a positive influence.
3. *Levee physical integrity*- this represents the ability of managers to maintain the levees required for the integrity of pond maintenance intact. This would be negatively influenced by extreme events and precipitation, and managing sediment would positively influence the integrity.

In the Tidal Marsh ecosystem, the group identified 3 intermediate drivers for both time frames, with the only difference being that SLR will negatively influence each of these drivers in the long term time frame:

1. *Freshwater inflow/hydrology/sediment dynamics*- this driver is represented by the maintenance of the marsh plain, and would be negatively affected by extreme events and SLR. This driver would be positively influenced by managing sediment and would have uncertain effects on marsh birds, native fish, and native plants.
2. *Marsh size/connectivity/complexity*- the group suggested that the importance of this driver relies on all three of these attributes of the marsh, but it is measured by acres of marsh. It would be negatively influenced by extreme events, and positively influenced by protecting acreage
3. *Invasives*- this is the same as for the upland transition zone.

In the Estuarine Subtidal and Intertidal Mudflats, the group identified 3 intermediate drivers for both time frames, with the only difference being that SLR will negatively influence each of these drivers in the long term time frame:

1. *Sediment dynamics/supply*- this represents the availability of sediment for this ecosystem, and it would be negatively influenced by extreme events, which would remove sediment, and changes in precipitation, which would reduce sediment supply. Sediment augmentation through re-use, placement, or mudflat protection with living shorelines ("manage sediment") would have a positive effect on this driver.
2. *Hydrology/water supply*- this represents the potential salinity increase in this ecosystem, as influenced by extreme events and precipitation. There is no action currently influencing this driver, though it would have an effect on all attributes, and it is affected by both extreme events and temperature/precipitation.
3. *Invasives*- this is the same as in the other ecosystems, and it would influence shorebird abundance, eelgrass beds, and diving duck populations.