8.4 Performance Monitoring and Assessment

Over the year previous to submitting our implementation proposal, we conducted a planning project (Chappell et al. 2018) to examine potential outcomes of enhancing infrastructure for improved wetland management. Working with RMA Associates, we developed a model and selection tool that calculated drainage rates, a key factor in managing salinity and habitats, to allow us to examine benefits for different scenarios of changing infrastructure. It allowed us to objectively select the managed wetland change that would provide the greatest benefit to the marsh ecosystem. We estimated the wetland areas affected by our proposed infrastructure projects would be >4,800 acres or more than 10% of the managed wetlands.

We have included a set of metrics to help us examine if we have achieved success in accomplishing our objectives (see Performance Metric Table). Our team has a long background in performance monitoring wetlands (see https://tidalmarshmonitoring.net), but this project raises particular challenges. We needed to assess changes in infrastructure that benefit ecological conditions over a few decades but within a short-term (3-year) project budget. Most of our wetland project extend several years to a few decades, because most ecological responses have a time lag.

Thus, we choose metrics that were measurable and could provide indications of changing trends during the short period allowed under the grant. Under Objective 1, our ability to obtain cooperation with landowners who needed to cost share the work was used as a means to determine if the project was successful in involving regional stakeholders. We moved from our pilot project where we requested landowner access to measure their infrastructure elevations that didn’t require funding to specific involvement of selected landowners to improve their infrastructure and habitats that required funding 10% of the work. Obtaining the formal cooperation of the landowners would be a strong indication of success in developing regional landowner cooperation.

Under Objective 2, an endpoint showing success would be completing the proposed infrastructure projects. This was a relatively straightforward metric that would clearly show that the project had achieved initial results. Also, a related metric was completion of the specific infrastructure improvements, as many of the projects have several parts such as installing a pipe, installing a gate, and cleaning out water conveyance ditches.

For assessment of Objective 3, we will use the model that was developed to measure changes in hydrologic function. We propose to update the model with new information from the developed projects so that the results address changing trends. For example, we will be able to assess days to drain and circulation rates by gathering new empirical data before and after installation of the new infrastructure. However, applying the model would allow us to address volumetric change which is a key goal. Working with other specialists in our team, we will address change in the biota. We will attempt to predict the likely zooplankton benefits that should be derived based on the increase in volume and improved habitat conditions. We will look at the change in the vegetation community to see if the early response indicates preferred plants are responding favorably. Finally, we will examine bird populations to see if there are increasing trends for the species that are favored by many landowners.

In addition, although it is not a specific metric, we will be able to include sea-level rise projections within the model to examine the resilience of the new infrastructure. Gravity drainage requires that
surface elevations of the managed wetlands are high enough to facilitate drainage, and with rapid sea-level rise predicted for the latter part of the century, they will no longer be effective. The modeling tool we have developed should be able to run scenarios that show when drains are no longer effective in different areas and ownerships in the marsh. This in turn will help landowners prepare for adaptive management of their wetlands, especially if pumping becomes the only solution to continue managing the water that determines the habitats.