

## Chapter 7. Monitoring, Maintenance, and Land Management

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This chapter addresses post-construction monitoring of plants and wildlife, maintenance of the restoration plantings, and alternative land management practices. These recommendations are general guidelines and will be refined during Phase 2.

### MONITORING

The primary purpose of monitoring is to help the Parkway Trust and the Conservancy evaluate progress toward meeting project goals. Because this project is not mitigation, there are no legal requirements for meeting specific habitat objectives. However, monitoring vegetation will provide a measurement for evaluating the degree of success in vegetation establishment. This information may be qualitatively compared with information on wildlife sightings to evaluate the enhancement plan's overall benefits to wildlife and to help the Parkway Trust and the Conservancy improve restoration techniques for future projects. This process may be considered a type of "adaptive management". As the first phase of habitat improvements is implemented, monitoring can be initiated to provide information that will improve and refine later phases of habitat improvements.

The first several years of monitoring would document survivorship of planted material, the extent of natural colonization, and the degree of success for each species. Quantitative data on survivorship and recruitment could be collected through plant counts (e.g., documenting the number and survival rates of planted species and volunteer plants). Qualitative data on vegetation could be collected using visual inspection, data collected from photographic documentation (pictures should be taken from designated photographic documentation points to compare vegetation growth on a year-to-year basis), and direct observation of the habitat quality and health of installed plants. Also, several permanent and random transects could be set on the site to provide a more quantitative assessment of plant success.

The following vegetation characteristics should be observed:

- native grassland success as an estimate of percent cover;
- plant survival, vigor, and height by species;
- native woody riparian species that are observed colonizing the site and their relative abundance;
- weed problems and recommendations for removal of invasive exotics (e.g., yellow star-thistle, giant reed, tamarisk, Bermuda grass); and

- vegetation patterns (e.g., multilayering and clustering distribution).

Monitoring of plant establishment would be performed at least twice each year for the first 2 years and once each year thereafter. Monitoring during the first 2 years would be performed once during mid-March to mid-April following the winter rainy season and once during mid-September to mid-October following the summer dry season. In subsequent years, vegetation monitoring may either follow the same schedule or be performed annually during the fall.

Wildlife monitoring may not be necessary for the first several years until vegetation begins to establish. If wildlife structures are constructed, they would be monitored to document their success in providing roosting and nesting habitat. The nest boxes would be surveyed during late spring of each year to determine the number of young produced for each species. Annual reporting forms should be prepared and used to monitor the breeding success of each species. Surveys may be conducted by qualified volunteers (e.g., from the local Audubon chapter or California State University, Fresno) or by a qualified wildlife biologist.

Monitoring of physical factors affecting the growth and establishment of riparian vegetation is strongly encouraged. Physical factors that influence vegetation include sedimentation, erosion, disturbance, monthly high and low river stage, and groundwater depth. Sedimentation, erosion, and disturbance factors can be qualitatively identified, along with other wildlife and vegetative monitoring activities. River stage information should be available from the USBR from water release data at Friant Dam. Groundwater depth could be measured twice per year, once during the highest river stage and once during the lowest river stage (i.e., February and September). This information would be useful to further understand the relationship of groundwater elevations to riparian success. Groundwater could be measured by installing peizometers along a transect through the site perpendicular to the river. This type of monitoring is most appropriate for a research group from California State University, Fresno or the community college. The sponsoring organization could encourage researchers to use and publish the data by maintaining a long-term database of monitoring results. In addition, the monitoring results could be summarized in the local newspaper or the newsletters of sponsoring organizations.

## MAINTENANCE

The restoration contractor is typically responsible for maintaining the restoration area for 1 year or as defined in the construction documents. Maintenance expectations and requirements should be clearly defined in the construction documents. If the project is constructed by volunteers or others, it is recommended that the first year of maintenance be contracted or additional staff hired to manage the property.

## **Plant Maintenance**

Regular maintenance of planting areas will be required during the plant establishment period to control weeds and replace unsuccessful plantings, as needed. Annual grasses and weeds compete with seedlings for nutrients and water, and vegetation adjacent to seedlings provides cover for rodents that may damage seedlings. The contractor should use manual, mechanical, and/or chemical (i.e., herbicide for use near aquatic environments) methods to clear weeds from inside furrows and basins to reduce competition with restoration plantings and remove cover for rodents.

## **DK Area Channel Maintenance**

The DK area channel and new facilities constructed as part of the oxbows will need to be maintained. An agreement should be made between the FMFCD and the Conservancy regarding responsibility for maintenance of features beyond the original FMFCD easement. Each oxbow will have a designated clean-out area at the bottom of the concrete chute for annual sediment and debris removal. The new weir will need periodic inspection and maintenance, and the remaining grassy swale will require occasional mowing. Other areas within the oxbows may require occasional (e.g., every 3–5 years) sediment and vegetation removal.

## **Infrastructure Maintenance**

Irrigation systems, whether flood irrigation ditches, pumps, pipes, or drip irrigation tubes, will need periodic maintenance. Filters on the drip systems may need cleaning or replacement, and emitters should be maintained in proper working order.

Public access and use elements will also need periodic repair and replacement, depending on the materials used. The equestrian trails need annual disking, drinking fountains need to be maintained, and portable toilet facilities (if included) need to be maintained.

## **LAND MANAGEMENT PRACTICES**

The site is large enough to need an effective land management plan that addresses weed control and grass thatch production should. Areas can be mowed to control grass growth or grazed to control weeds and thatch. These two options are discussed below.

## **Mowing**

It may be beneficial to selectively mow annual grasses and weeds in restoration areas to a height of 1 foot once or twice a year as an additional method of controlling growth and reducing the risk of wildfire. Mowing should be done only between September 15 and March 15 to minimize disturbance to ground-nesting birds.

## **Grazing**

There is an opportunity to continue grazing as a management component during the early stages of the project or, as it is phased into construction, over several years. Grazing can limit the proliferation of invasive weedy species and keep thatch levels under control. The proposed valley oak/sycamore savannah and native grassland areas are best suited to grazing. These areas have a low planting density, and plants could be protected individually or in clusters to prevent damage from grazing animals.

Sheep or beef cattle could be used for grazing. Sheep can be penned with less substantial fencing than cattle, which can reduce the cost of relocating fences. A grazing plan should be developed as part of the detailed design in Phase 2 once the Advisory Committee, Conservancy, and Parkway Trust agree to pursue this path. The grazing plan would identify the stocking rates necessary to achieve the project objectives and, secondarily, would also identify the goals of the grazing permittee. As the site becomes established, grazing could be phased out.