Appendix 1

Long-Term Invasive Plant Management Plan for Fairview Park

Prepared for

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 LONG-TERM INVASIVE PLANT CONTROL PLAN

This Long-Term Invasive Plant Management Plan aims to provide the City of Costa Mesa with a strategic approach to controlling invasive plant species, ensuring the preservation of valuable biological resources within Fairview Park. Numerous nonnative species are present in Fairview Park, but this plan prioritizes the management of high-priority invasive species that pose substantial threats to native habitat functionality and biodiversity. Invasive plants were identified in the park during the 2023 biological surveys and assessments conducted for the development of the Fairview Park Master Plan Update.

Cultural artifacts of significance are present within the soil profile across various areas of the park. The invasive plant control methods outlined in this plan typically do not cause significant soil disturbance. However, in instances where substantial digging is necessary to remove a perennial high-priority invasive weed, the City should consult its records to determine the likelihood of encountering culturally significant materials in the affected area.

In cases where culturally significant materials are likely to be present, the City shall engage an appropriate cultural monitor during all ground-disturbing activities to ensure the protection of in-situ cultural resources. It is important to note that cutting or pulling roots of plants from the topsoil does not require the presence of a cultural monitor.

This approach ensures that our efforts to manage invasive plants are balanced with the preservation of culturally significant materials, promoting responsible stewardship of both natural and cultural resources within the park.

1.1 GOALS AND OBJECTIVES

The primary goal of this plan is to preserve the ecological balance within Fairview Park by focusing on invasive plant management.

Key objectives include:

1. Preventing excessive biomass production from invasive plants to protect native species and maintain biodiversity.
2. Controlling invasive plant populations before they produce viable seeds to ensure long-term control and reduce their negative impact on wildlife habitats and native plant recruitment.
3. Prioritizing management efforts for invasive species that pose the greatest threat to the park's biological resources, given limited resources available for annual control.

Specific goals for controlling high-priority invasive plants in sensitive habitat areas and fuel management zones (FMZ) include:

SENSITIVE HABITAT AREAS

1. In case of limited resources, first prioritize invasive weed control efforts in or near existing sensitive habitat areas.
2. Address smaller infestations of the most invasive weed species before controlling larger, more widespread, and ubiquitous weeds, especially if they risk spreading into high-quality habitats. In general, prioritize the removal of small populations of highly invasive species or species new to the area.
3. Implement management strategies to reduce disturbances (e.g., off-leash dogs, trash dumping, off-trail hiking) within the park.
4. Close unnecessary or unauthorized trails to minimize disturbance frequency and additional avenues for weed invasion into areas with sensitive native habitats.

FUEL MANAGEMENT ZONES

1. Apply weed abatement and fuel management techniques in areas that require wildfire risk reduction, ensuring they align with the protection of sensitive habitats and native-rich areas.
2. Utilize methods outlined in this plan to control target invasive species, taking care to prevent their spread within sensitive habitats and other natural areas of the park.
3. Employ weed abatement methods that do not disturb the soil, avoiding practices like tilling that maintain high disturbance regimes, promoting disturbance-adapted nonnative weeds, which act as dry, flashy fuel sources during summer and fall fire seasons.
4. Time weed abatement efforts to control fuel modification areas before weed seed set, managing fuel loads while simultaneously reducing nonnative weed seed contributions to the soil.

1.2 MANAGEMENT APPROACH

This plan is based on the framework presented in the invasive plant land management guide developed by the USFWS in collaboration with the California Invasive Plant Council (Cal-IPC) in the Land Manager's Guide to Developing and Invasive Plant Management Plan (USFWS, Cal-IPC, 2018). By focusing on high-priority invasive plants and implementing a strategic approach, the plan aims to maintain the park's ecological balance and promote the long-term control of invasive species. This plan consists of eight main steps:

1. Identify target invasive plants present in the park.
2. Prioritize the level of control based on invasive plant location and density to maximize protection of sensitive resources.
3. Follow biological resource protection measures to avoid impacts to sensitive and protected species.

4. Conduct annual invasive plant surveys to guide treatment timing and methods.
5. Time invasive plant control treatments to maximize control and avoid impacts to sensitive habitats and species.
6. Follow biosecurity procedures to prevent the spread of invasive plants.
7. Use the appropriate invasive plant control methods.
8. Conduct effectiveness monitoring and reporting to track invasive plant populations and guide recommendations for the following year.

1.2.1 Adaptive Management

Invasive plant control will be implemented using an adaptive management approach, which enables adjustments in response to observations, site conditions, best available treatment methods, efficacy of previous control measures, and annual weather variations. Adaptive management provides a flexible framework to address the complexities of invasive plant management and respond to feedback from regular monitoring.

Several fluctuating variables can impact the success of invasive plant control programs, including weather, fire events, intense rainfall, nonnative species distribution, and adjacent land management activities. Monitoring is a critical aspect of adaptive management and is necessary for tracking changes over time, assessing the effectiveness of control methods, and ensuring the protection of Fairview Park's sensitive biological resources.

Existing knowledge and experience, combined with new observations, will inform management adjustments while maintaining the plan's overall goals. Factors such as historic disturbance levels, invasive species density, soil complexity, and proximity to native habitats may require adapting strategies accordingly. The methods described in this plan will be used in various combinations, considering field conditions, weather, and monitoring results.

Adaptive management decisions will be based on experience from previous weed control treatments within the park or other relevant areas, new knowledge from reputable sources on alternative effective treatments, and new target invasive species discovered during early detection surveys. Additionally, any invasive plant control methods in this plan may be superseded by approved restoration plans for the park. For instance, opportunistic control species, such as five horn bassia (*Bassia hyssopifolia*), may be better controlled through a holistic weed management approach implemented as part of a restoration project.

The described invasive plant control methods can be amended as needed to accommodate improved methods or opportunities.

1.2.2 Access

The existing network of trails and fire roads can be used to access most of Fairview Park and shall be used for access to the invasive plant populations targeted for control. In

general, access within the invasive plant control areas for weed control shall be by foot. This is to protect sensitive resources to prevent harm to native plant and animal species, damaging impacts to the soil such as compaction, and to prevent the unintentional spread of invasive and nonnative weed seed that can be moved around by vehicles.

Some areas have difficult access due to steep terrain or dense vegetation. Park crews shall be used for invasive species control in these areas as well as during sensitive times of the year, such as the bird breeding season, to ensure that necessary biological protection measures are followed (Section 1.5). As opportunities arise for volunteer weeding events that may include control of the target invasive species recommended for control in this plan, areas for volunteer weeding efforts should be carefully selected to safeguard the safety of participants.

1.2.3 Volunteer Opportunities

Volunteer participation in mechanical control techniques that do not require heavy equipment, such as chainsaws or mowers, can be facilitated through organized events supervised by a trained "weed management leader." These leaders should be knowledgeable in identifying target weeds and common native species in the area, as well as experienced in effective mechanical treatment methods to demonstrate proper weeding techniques for volunteers.

To maximize the effectiveness of these events, selected sites should be easily accessible, located near existing trails or roads, and have manageable slopes. Focusing on a single target species per event can simplify identification, enabling volunteers to contribute more effectively to invasive plant control efforts.

1.3 HIGH-PRIORITY INVASIVE PLANTS

Due to limited resources, management efforts should focus on controlling invasive species that pose the greatest threat to the park's biological resources. Priority should be given to protecting sensitive habitat areas and high investment areas, such as restoration sites or locations where extensive efforts have already been made to control invasive species. Continued efforts in these areas will likely be necessary until invasive species are eradicated, and habitat restoration goals for the area are met.

Plant species list generated during surveys and assessments for the Fairview Park Master Plan Update were the basis for determining the high-priority invasive species targeted for control. The species are all Cal-IPC rated invasive plants species or locally invasive plants that are a threat to sensitive habitat areas in Fairview Park. Table 1-1 presents the high-priority invasive plants, Cal-IPC rating, and growth characteristics. Table 1-2 presents the general location where the high-priority invasive plants occur and the level of control targeted.

Table 1-1 High-Priority Invasive Plants for Long-Term Management

Scientific Name	Common Name	Cal-IPC Rating*	Bloom Period	Lifeform	Duration	Methods of Reproduction
Arundo donax	Giant reed	High	May to June	Grass	Perennial	Vegetative; roots, rhizomes, stems with nodes
Atriplex semibaccata	Australian saltbush	Moderate	April to Dec.	Subshrub	Perennial	Seed
Bassia hyssopifolia	Five horn bassia	Limited	June to July	Herbaceous	Annual	Seed
Brachypodium distachyon	Purple false brome	Moderate	April to July	Grass	Annual/Perennial	Seed
Brassica nigra	Black mustard	Moderate	April to July	Herbaceous	Annual	Seed
Bromus diandrus	Ripgut brome	Moderate	April to June	Grass	Annual	Seed
Carduus pycnocephalus	Italian thistle	Moderate	Feb. to July	Herbaceous	Annual	Seed
Carduus tenuiflorus	Slender flowered thistle	Limited	April to Aug.	Herbaceous	Annual	Seed
Cirsium vulgare	Bull thistle	Moderate	July to Sep.	Herbaceous	Perennial	Seed
Conium maculatum	Poison hemlock	Moderate	April to Se.	Herbaceous	Biennial	Seed
Cynara cardunculus	Artichoke thistle	Moderate	April to July	Herbaceous	Perennial	Seed
Echium candicans	Pride of Madeira	Limited	Feb. to Oct.	Shrub	Perennial	Seed
Foeniculum vulgare	Sweet fennel	Moderate	May to Sep.	Herbaceous	Perennial	Primarily seed; occasionally vegetatively from root and crown fragments
Glebionis coronaria	Crown daisy	Limited	March to July	Herbaceous	Annual	Seed
Hirschfeldia incana	Shortpod mustard	Moderate	Year Round	Herbaceous	Perennial	Seed
Oncosiphon pilulifer	Stinknet	High	March to July	Herbaceous	Annual	Seed
Pennisetum setaceum	Fountaingrass	Moderate	July to Aug.	Grass	Perennial	Seed
Raphanus sativus	Wild radish	Limited	Feb. to July	Herbaceous	Annual/Biennial	Seed
Ricinus communis	Castor bean	Limited	Year Round	Shrub	Perennial	Primarily seed; occasionally vegetatively from root and stem fragments
Rumex crispus	Curly dock	Limited	Year Round	Herbaceous	Perennial	Seed
Salsola australis	Russian thistle	Locally Invasive	March to Jan.	Herbaceous	Annual	Seed
Silybum marianum	Milk thistle	Limited	April to July	Herbaceous	Annual/Biennial	Seed
Sisymbrium irio	London rocket	Limited	Jan. to April	Herbaceous	Annual	Seed
Solanum rostratum	Buffalobur	Locally Invasive	May to Sep.	Herbaceous	Annual	Seed

** "Locally Invasive" is not a Cal-IPC rating, but Land IQ has identified these species as locally invasive with ecological impacts on sensitive biological resources in Fairview Park.*

Table 1-2 High-Priority Invasive Plant Eradication or Containment Priorities Parkwide or in Sensitive Habitat Areas: Vernal Pool Watershed (VPW) and Wetlands, Coastal Sage Scrub (CSS), and Riparian Habitat Areas (WRA).

Scientific Name	Common Name	General Location in Fairview Park	ERADICATE			CONTAIN	
			VPW	WRA/CSS	Parkwide	VPW	Parkwide
Arundo donax	Giant reed	Drainages on the west bluff		X	X		
Atriplex semibaccata	Australian saltbush	Nonnative annual grasslands and trail edges	X				X
Bassia hyssopifolia	Five horn smotherweed	Vernal pool watershed, moist disturbed soils				X	
Brachypodium distachyon	Purple false brome	Vernal pool watershed, nonnative annual grasslands	X	X	X		
Brassica nigra	Black mustard	Common on slopes and on imported fill material	X				X
Bromus diandrus	Ripgut brome	Nonnative annual grassland, disturbed areas	X				
Carduus pycnocephalus	Italian thistle	Poison hemlock patches, riparian and wetland areas	X	X	X		
Carduus tenuiflorus	Slender flowered thistle	Poison hemlock patches, riparian and wetland areas	X	X	X		
Cirsium vulgare	Bull thistle	Riparian and wetland areas, disturbed areas	X	X	X		
Conium maculatum	Poison hemlock	North facing bluff slopes and west bluff drain		X	X		
Cynara cardunculus	Artichoke thistle	Nonnative annual grassland with clayey soils			X		
Echium candicans	Pride of Madeira	Landscaped areas			X		
Foeniculum vulgare	Sweet fennel	Throughout Park	X	X	X		
Glebionis coronaria	Crown daisy	Vernal pool watershed, fuel modification zones	X				X
Hirschfeldia incana	Shortpod mustard	Occurs on mesa	X				X
Oncosiphon pilulifer	Stinknet	Occurs on mesa and along trails	X				X
Pennisetum setaceum	Fountaingrass	Disturbed areas, Fairview Park Channel			X		
Raphanus sativus	Wild radish	Common in disturbed soils	X				X
Ricinus communis	Castor bean	Base of the earthen drain west bluff area			X		
Rumex crispus	Curly dock	Vernal pool watershed	X				X
Salsola australis	Tumbleweed	Vernal pool watershed	X				X
Silybum marianum	Milk thistle	Throughout Park			X		
Sisymbrium irio	London rocket	Common in disturbed soils	X				X
Solanum rostratum	Buffalobur	Vernal pool watershed	X				

ERADICATE = Complete removal of the invasive plant population and monitoring to ensure that is does not reestablish.
CONTAIN = Eradication is not practical, feasible, or necessary but the invasive plant population should be managed to contain its current population size until the habitat can be restored or otherwise enhanced, and to prevent the spread of the invasive plant to another sensitive habitat in Fairview Park.
Sensitive Habitat Areas = CSS Areas that have potential for nesting coastal California gnatcatcher nesting, and all riparian and wetland areas, including vernal pools.

1.3.1 Level of Control

The key to effective management is consistent and structured approaches for prioritizing monitoring, control, and eradication of invasive species. The approach for invasive species control presented in this plan is based on the knowledge that not all invasive species can be eradicated from the Park but may only be controllable in portions of the Park, such as sensitive habitats, or localized small populations, and larger more established populations may only feasibly be controlled to stop their spread.

The plan identifies three levels of control effort for target invasive species to ensure efficient management and protection of sensitive habitats and species. These levels include:

- **Parkwide Eradication**: High-priority invasive species with the most significant potential to harm sensitive habitats and species are targeted for complete eradication from the park. Feasibility assessments consider the extent of the species' spread, and the costs associated with control efforts.
- **Containment Control**: For well-established and ubiquitous invasive species, complete eradication may be challenging and cost prohibitive. Control efforts should focus on areas susceptible to species spread, such as access trails, roads, and locations subject to annual disturbances like fuel modification zones or grassy areas near Placentia Avenue.
- **Opportunistic Control**: Invasive species rated by Cal-IPC that are present within the park but may be costly to eradicate or contain fall under opportunistic control. Control measures for these species should be implemented when populations overlap with treatment areas for other high-priority species and resources permit.

1.4 PRIORITIZATION OF INVASIVE PLANT CONTROL AREAS

Control of high-priority invasive plants will be carried out in a phased approach, with the highest priority given to sensitive habitat areas (Priority 1 Control Areas). As time and resources permit, control efforts will expand to all other natural areas within the park, designated as Priority 2 Control Areas (Figure 1-1).

Figure 1-1 High-Priority Invasive Plant Control Priority Areas.

1.4.1 Priority 1 Control Areas

Priority 1 Control Areas encompass the following sensitive habitat areas:

1. Vernal pool watersheds, including vernal pools, which support rare plants and sensitive aquatic resources like the federally endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*) and Riverside fairy shrimp (*Streptocephalus woottoni*)
2. Suitable coastal sage scrub habitat for the federally threatened and state Species of Special Concern, coastal California gnatcatcher (*Polioptila californica californica)* (CAGN)
3. Suitable riparian habitat for the state and federally endangered, Least Bell's vireo (*Vireo bellii pusillus*) (LBV)

1.4.2 Priority 2 Control Areas

Priority 2 Control Areas include:

1. Fuel Modification Zones
2. Areas within the historic vernal pool watershed that are covered by improper fill material or disconnected hydrologically from the vernal pools by the improper fill material; these areas are identified for future habitat restoration, including removal of the fill material to restore the historic vernal pool watershed
3. All other natural areas within the park

Control efforts should initially target Priority 1 Control Areas, with the primary goal of eradicating specified target invasive plant species. Once treatment in Priority 1 areas is complete, remaining resources should be allocated to managing invasive species in Priority 2 Control Areas.

In cases where target invasive species populations are small or pose a significant threat to the park's natural areas and sensitive biological resources, parkwide eradication is the goal. If eradication is not feasible or necessary, such as when populations are widespread within the park and surrounding areas, containment and long-term control are the primary objectives.

FUEL MODIFICATION ZONES

Fuel Modification Zones (FMZ) are managed to minimize fire risk to buildings and provide firefighters with a defensible space during fire events. The 100-ft FMZ requirement set by OCFA is primarily maintained along the park's property line adjacent to habitable structures. Currently, these areas are dominated by nonnative annual grasses and forbs, with annual mowing during the summer season to manage fire risk while preserving nonnative plant dominance.

Several high-priority invasive plants are present within the FMZs, including black mustard (*Brassica nigra*), short pod mustard (*Hirschfeldia incana*), and crown daisy (*Glebionis coronaria*). These species should be controlled at the appropriate time of the

year, as outlined in Section 1.7, to ensure effective management. This may necessitate conducting control efforts at different times than fuel modification activities. If control is not feasible during the optimal treatment periods due to resource constraints, the seed and vegetative reproductive material of invasive species should be carefully bagged and removed from the FMZs to prevent their spread into adjacent natural areas of the park.

Annual surveys conducted by a qualified plant biologist during treatment, monitoring, or early detection efforts should include FMZs to identify any new invasive species requiring control or known invasive species that are encroaching on the FMZs.

Opportunities may arise to collaborate with OCFA on alternative fuel modification strategies that fulfill fuel reduction objectives, such as horizontal and vertical fuel breaks or trimming of dead standing vegetation. These strategies could incorporate desirable native species to replace current nonnative species, thereby enhancing wildlife habitat quality and reducing the spread of undesirable invasive species within the park.

1.5 BIOLOGICAL RESOURCE PROTECTION

The primary goal of the invasive plant control plan is to protect the natural resources within the park. This section outlines measures to minimize potential adverse impacts on:

1. Protected, sensitive, or locally rare plant and wildlife species
2. Nesting birds in or near treatment areas

When feasible, conduct invasive species control, including physical and chemical methods, outside the avian breeding season to limit impacts on sensitive species and biological resources in Fairview Park.

Although it is recommended to implement control measures outside the nesting season whenever possible, certain high-priority invasive plants may require control during the nesting season for effective management. The following resource protection measures should be implemented during the nesting season:

1. Schedule vegetation removal outside the nesting season (nesting seasons are as follows: February 15 to August 15 for songbirds; January 15 to August 15 for raptors; February 15 to August 31 for CAGN; and March 1 to September 15 for LBV) when possible.
2. If vegetation removal must occur during the nesting season, conduct thorough surveys for nesting birds in all suitable habitats prior to vegetation clearing activities. Surveys should be performed by a permitted and approved biologist. Raptor nesting surveys are only necessary in potential raptor nesting habitats, such as the park's existing riparian areas.

Successful implementation of the invasive plant management plan will enhance the quality and availability of nesting habitat for native and migratory birds. However, precautions must be taken to protect nesting birds throughout the process.

1.5.1 General Protective Measures

The following are general protective measures that shall be implemented during invasive weed control activities.

Weed Control Hours: Weed control activities will be limited to daylight hours.

Work Area and Staging: Equipment staging, such as for vehicle parking, equipment storage, or waste bin storage, will be restricted to the smallest area practicable in designated work areas, routes, temporary interior access, or the limits of existing roadways/pathways.

Environmentally Sensitive Areas and/or Exclusion: Where appropriate, fencing, flagging, or biological monitoring will be used to minimize or avoid disturbance to environmentally sensitive areas and listed species habitat which will include patches of coastal sage scrub, the vernal pool watershed, riparian, and other sensitive habitats.

Invasive Species: The spread or introduction of nonnative, invasive species will be avoided. Invasive plant material will be removed using approved protocols and disposed of at an appropriate upland disposal or compost area in a manner that will not promote their spread. The project will use weed free erosion control materials such as burlap rice straw wattles and certified weed-free mulch, if needed.

Equipment Maintenance and Materials Storage: Vehicle traffic will be confined to existing roads and trailways. All machinery must be in good working condition, showing no signs of fuel or oil leaks. Oil, grease, or other fluids will be washed off at off-site designated wash stations prior to entering the site. Inspection and evaluation for the potential for fluid leakage will be performed daily prior to use. All fuel and chemical storage, servicing, and refueling will be done in the designated staging area or other suitable location with secondary containment to prevent spills from traveling to surface water or drainages.

Herbicide Handling: All herbicide mixing shall occur in designated work staging areas and conducted in such a manner as all potential spills shall be captured in containment bins. Herbicide mixing shall not occur within 100 feet of an open body of water. Filling of spray backpacks shall be done in containment bin to collect any potential spills. Park crews shall have spill kits in their vehicles and all spills shall be cleaned up immediately and all contaminated material properly disposed of off-site.

Trash Removed Daily: All trash, especially food-related refuse that may attract potential predators or scavengers, will be properly contained in sealed containers or bags, removed from the work site, and disposed of daily.

1.5.2 Qualifications for Biologist

The following definitions describe a qualified biologist and an agency approved biologist for purposes of conducting surveys and biological monitoring:

Qualified Biologist: The minimum qualifications for the Qualified Biologist include a bachelor's degree in biological or environmental science, natural resources

management, or related discipline; field experience in the habitat types that occur at the project site; familiarity with the listed species (or closely related species) that may occur at the project site; and prior preconstruction survey, construction monitoring, or construction oversight experience.

Approved Biologist: For listed species, such as the coastal California gnatcatcher, least Bell's vireo, and Crotch's bumble bee, additional qualifications are required for biologists who would be responsible for species surveying. For this plan, the Approved Biologist will have the following qualifications:

- A federal section 10(a)(1)(A) recovery permit for coastal California gnatcatcher surveys
- At least five years' direct experience with least Bell's vireo to survey for this species
- Approved by CDFW to survey for Crotch's bumble bee on the project site

Because the qualifications for the Approved Biologist exceed those for the Qualified Biologist, any activity indicated as appropriate for the Qualified Biologist below may also be completed by an Approved Biologist. Where sensitive species may be directly or indirectly impacted by project implementation, the following species protection measures shall be implemented, as appropriate.

1.5.3 Environmental Training

Prior to involving new or existing personnel in restoration activities, all new restoration personnel will undergo environmental awareness training led by a Qualified Biologist. This training will cover the identification, habitat requirements, legal protections, avoidance and minimization measures, and applicable protection measures for special-status species and nesting birds that may be present in or near the project site. Personnel will be informed of the procedures to follow if a special-status species or nesting bird is encountered during project activities.

Training may be conducted in an online or virtual meeting format. For extended projects requiring multiple training events, a training video developed under the supervision of the Qualified Biologist may be used to educate new personnel, provided that a Qualified Biologist is available by phone to address questions about the training or any concerns that may arise during project activities.

1.5.4 Sensitive Species Protection

Surveys shall be conducted for the following threatened, rare, or endangered species that are known to or have the potential to occur at Fairview Park. The following are recommended survey guidelines. All existing resources to be protected will be identified by the required biologist and flagged prior to any project disturbance.

COASTAL CALIFORNIA GNATCATCHER

Habitat Avoidance: Invasive plant treatment impacts will be avoided or minimized in coastal sage scrub and other vegetation communities suitable for the coastal California

gnatcatcher (CAGN) during the breeding season. If surveys determine that the habitat is occupied or that impacts to these habitats cannot be avoided, any possible incidental "take" of CAGN individuals will be avoided or minimized through implementation of the measures listed below.

Work Window: To avoid or minimize impacts to nesting CAGN, all clearing of vegetation in CAGN suitable habitat will occur outside of the breeding season (September 1 through February 14). If the breeding season cannot be avoided, a United States Fish and Wildlife Service (USFWS) Approved Biologist will conduct pre-work nesting bird surveys prior to weed treatments. A minimum of 3 surveys are recommended to be conducted during the nesting season prior to the start of work activities with the third and final survey within 5 days of initiating the start of work. If no active CAGN nests are found, project activities may proceed.

Work Restrictions Near Active Nests: If an active CAGN nest is detected during the surveys, work will be suspended until the end of the nesting season (August 31), or until the young have fledged; alternatively, the following conditions will apply:

- A USFWS-Approved Biologist will establish a 100-foot disturbance buffer distance between noise-generating project activities and CAGN nest(s). Noise-buffer distances may be modified in coordination with the USFWS Field Office based on project-specific characteristics or the City may choose to submit their own analysis and buffer recommendations for USFWS's consideration.
- Once the buffer is established, a Qualified Biologist will monitor the nest during treatment activities for signs of adverse effects, including distress/disturbance. If adverse effects are detected, the Qualified Biologist will have the authority to stop all treatment activities in the vicinity of the nest and implement additional protection measures. If no work is to occur within or near the buffer, and no adverse impacts were detected during any previous monitoring activities, work can proceed outside the buffer without the need for a monitor being present.
- A Qualified Biologist will continue to monitor the nest and will determine when young have fledged (in coordination with a USFWS-Approved Biologist). Once the USFWS-Approved Biologist has confirmed that the young have left the nest, the protective buffer may be removed, and treatment activities within these areas may resume.

LEAST BELL'S VIREO

Habitat Avoidance: Invasive plant treatment impacts will be avoided or minimized in areas suitable for least Bell's vireo (LBV) habitat during the breeding season (March 15 through September 15). If surveys determine that the habitat is occupied or that impacts to these habitats cannot be avoided, any possible incidental "take" of LBV individuals will be avoided or minimized through implementation of the measures listed below.

Work Window: To avoid or minimize impacts to nesting LBV, all clearing of vegetation in occupied habitat or suitable habitat will occur outside the breeding season (September 16 through March 14). If the breeding season cannot be avoided, a USFWS-Approved Biologist will conduct pre-work nesting bird surveys prior to weed treatments. A minimum of 3 surveys are recommended to be conducted during the nesting season prior to the start of work activities with the third and final survey within 5 days of the start of work. If no active LBV nests are found, project activities may proceed.

Work Restrictions Near Active Nests: If an active LBV nest is detected during the survey, work will be suspended until the end of the nesting season (September 15), or until the young have fledged; alternatively, the following conditions will apply:

- A USFWS-Approved Biologist will establish a 100-foot disturbance buffer distance between noise-generating project activities and LBV nest(s). Noise-buffer distances may be modified in coordination with the USFWS Field Office based on project-specific characteristics or the City may choose to submit their own analysis and buffer recommendations for USFWS's consideration.
- Once the buffer is established, a Qualified Biologist will monitor the nest during treatment activities for signs of adverse effects, including distress/disturbance. If adverse effects are detected, the Qualified Biologist will have the authority to stop all treatment activities in the vicinity of the nest and implement additional protection measures. If no work is to occur within or near the buffer, and no adverse impacts were detected during any previous monitoring activities, work can proceed outside the buffer without the need for a monitor being present.
- A Qualified Biologist will continue to monitor the nest and will determine when young have fledged (in coordination with a USFWS-Approved Biologist). Once the USFWS-Approved Biologist has confirmed that the young have left the nest, the protective buffer may be removed, and treatment activities within these areas may resume.

Crotch's Bumble Bee

Habitat Avoidance: Impacts to burrows/nests occupied by Crotch's bumble bee (CRBB) (*Bombus crotchii*), candidate species for state endangered status, will be avoided. If CRBB are observed, the area shall be considered occupied, and work shall not occur until the end of the flight season.

Surveys shall be performed by a CDFW-Approved Biologist or entomologist familiar with CRBB behavior and life history. Surveys shall be conducted during the flying season (April through mid-October), when the species is most likely to be detected above ground and include a minimum of 3 surveys with a 3-week space between surveys. If no CRBB are found within the work area, project activities may proceed. If Crotch's bumble bee is found within the work area, the City may propose site-specific measures in coordination with CDFW to avoid take or obtain an Incidental Take Permit.

BURROWING OWL

now candidate species - modify

Avoidance: Burrowing owls (*Athene cunicularia*) (BUOW), state Species of Special Concern, are not known to nest at Fairview Park but are known to occupy the Park in the winter. The restoration activities shall avoid impacts to nesting BUOW and known overwintering locations. If a BUOW is observed on the project site, work shall be suspended, and the Qualified Biologist shall immediately contact CDFW to develop a plan for avoidance prior to initiating any ground disturbance on the project site.

BREEDING / NESTING BIRDS

Avoidance: To the extent feasible, weed control activities should be scheduled to avoid the bird nesting season (February 15 through August 31 for songbirds; January 15 to August 15 for raptors). If it is not possible to schedule weed control activities between September 1 and February 14, or January 14 in suitable raptor nesting areas, then pre-work surveys for nesting birds will be conducted by a Qualified Biologist to avoid impacts to nesting birds.

Pre-work breeding/nesting bird surveys will be conducted during the bird nesting season (February 15 through August 31 for songbirds; January 15 to August 15 for raptors) if vegetation removal or other activities are planned that could violate the California Fish and Game Code and/or the Migratory Bird Treaty Act (MBTA). A Qualified Biologist will conduct pre-work breeding/nesting bird surveys no more than 5 days prior to the initiation of any site-disturbance activities that may impact nesting birds. During this survey, the biologist will inspect all vegetation and other potential nesting habitats in the work area for nests. Active nesting is present if a bird is building a nest or sitting in a nest, if a nest has eggs or chicks in it, or if adults are observed carrying food to the nest. If no breeding/nesting birds are observed, work activities may begin. If breeding/nesting birds are observed, the measures described below shall be implemented.

Work Restrictions Near Active Nests: If an active nest is detected, work will be suspended until the young have fledged or until the end of the nesting season (August 31); alternatively, the following conditions will apply:

- A Qualified Biologist will establish a disturbance buffer distance between noise-generating project activities and the nest. Noise buffer distances (typically up to 300 feet for raptors and up to 100 feet for other species) will be determined by the Qualified Biologist based upon consideration of the bird species and the nature of the planned project activity.
- If a buffer is established, a Qualified Biologist will monitor the nest during weed control activities for signs of adverse effects, including distress/disturbance. If adverse effects are detected, the Qualified Biologist will have the authority to stop all weed control activities in the vicinity of the nest and implement additional protection or avoidance measures. If no work is to occur within or near the buffer, and no adverse impacts were detected during any previous

monitoring activities, work can proceed outside the buffer without the need for a monitor being present.

- A Qualified Biologist will continue to monitor the nest and will determine when the young have fledged. Once the Biologist has confirmed that the young have left the nest, the buffer and exclusion zone may be removed, and weed control activities within these areas may resume.

1.5.5 Protective Buffers

All buffers shall be clearly marked in the field sufficiently to prevent the crew from entering the buffers with the minimal amount of flagging to prevent drawing the attention of the nest to predators. The buffer locations shall be shown in the field to the crews that will be working in the area along with a map provided of all nest locations and associated buffers. The crew shall be informed of all restrictions to work activities within the buffer as well as any access information that may be required for avoidance of the buffer. For instance, access points shall be determined to prevent repeated travel near a buffer during the workday.

1.6 INVASIVE PLANT SURVEYS AND EDRR

A brief high-priority invasive plant control plan will be developed annually by a qualified biologist possessing the necessary expertise in native and nonnative plants of California. The minimum qualifications for the qualified biologist include:

1. A bachelor's degree in biological or environmental science, natural resources management, botany, or a related discipline.
2. Field experience in the park's habitat types.
3. Familiarity with sensitive or rare plant species that are present or may occur at the park.
4. Knowledge of invasive plant species found in the park.

The qualified biologist will survey the park at the appropriate time to identify and assess the location, density, and phenology of target invasive species. Survey data should encompass the following:

1. Invasive plant population coordinates.
2. Invasive plant species.
3. Population size.
4. Phenology or life stage of most of the invasive plant population.
5. General location description.

Based on the most up-to-date best practices, the qualified biologist will provide the park maintenance crews with recommended treatment methods for each target invasive species. The plan should include:

1. The phenological stage of the target invasive plants for treatment.
2. Recommended treatment methods.
3. Necessary follow-up treatments and their anticipated timing.
4. A map of the location, including information on population size.
5. The number and timing of treatments throughout the year.
6. Protective measures for sensitive species or habitats to be implemented before treatments.

By following these guidelines, the park's invasive weed management plan will be effectively developed and implemented, ensuring the preservation of the park's diverse ecosystems.

1.6.1 Invasive Plant Surveys

To determine appropriate timing and control methods, initial weed surveys for annual treatment should be conducted during winter, ensuring that weed treatment can take place before the start of the earliest bird nesting season, which begins on January 15 for raptor species. If additional weed control is required during the growing season, subsequent surveys by the qualified plant biologist will identify optimal timing and methods for follow-up treatments. Surveys should be timed to prevent significant seed set, ensuring that treatment can effectively control the population before viable seeds are produced.

Follow-up surveys may be needed at appropriate times depending on the weed treatment method used. For example, after stump cut treatments, populations should generally be checked about one month after treatment to address any emerging resprouts or seedlings that may have germinated around the treated mature plant.

For invasive species that can sustain their life cycle throughout the year and emerge under favorable conditions, species-specific surveys may be necessary to determine multiple follow-up treatments. An example of such a species is castor bean (*Ricinus communis*), which can flower and germinate year-round when adequate soil moisture is available, including during summer months.

1.6.2 Early Detection and Rapid Response

Alongside managing known high-priority invasive species populations, it is crucial to continually assess the park for newly introduced invasive species or populations in previously undetected areas. Implementing an Early Detection and Rapid Response (EDRR) management approach is the most cost-effective method for detecting invasive plants before they become a widespread problem.

EDRR efforts should focus on:

- Detecting new invasive plants requiring control
- Identifying new populations of known invasive species for inclusion in subsequent treatment events

Annual focused surveys, conducted by a qualified plant biologist, should be supplemented by documenting incidental findings during other park activities. Surveys should prioritize areas susceptible to new infestations, such as trails, landscaped areas, fuel modification zones, or potential vector corridors.

Preventing invasive species introduction is the primary and most cost-effective long-term defense. Prevention measures include restricting invasive plant installation in landscaped park areas. Promptly treating new infestations while eradication remains feasible is the next line of defense. If eradication is not possible due to cost or feasibility constraints, containment efforts may be necessary to protect sensitive park resources. Containment typically requires long-term or indefinite control.

By systematically surveying for new populations of known invasive plants and detecting new invasive species annually, the goal is to eradicate these species before they cause ecological harm or become uncontrollable (USFWS 2015). Early control is key, as the chances of successful eradication diminish, and control efforts increase once the species are established and mature.

SURVEYS FOR NEW INVASIVE SPECIES

Detection of new invasive species can be integrated with other invasive plant surveys conducted throughout the year. However, it is recommended to perform at least one targeted early detection survey during the optimal time for detecting most invasive species within the park. Spring is the most suitable season for this survey, as most plants are actively growing, allowing for treatment of newly detected invasive species during subsequent control events.

Prior to early detection surveys, gather and review background information to guide detection and control prioritization:

- Review invasive plant species occurrences in the surrounding area (e.g., within 50 miles). Information on invasive plant species in the area can be obtained from many web-based sources including CalWeedMapper, Calflora, Biodiversity Serving Our Nation (BISON), EDDMapS, and iNaturalist.
- Consult with local invasive plant experts and land managers to see if there are any additional species that should be considered for early detection.
- Lists of invasive plant species from other available sources including the U. S. Department of Agriculture, from the local Santa Ana River and Orange Weed Management Area (WMA), or other conservation management partnerships or collectives.

Surveys for detecting new invasive species populations should be conducted annually, using a systematic and repeatable approach. Focus on areas with a higher likelihood of invasion, such as trails, roads, access points, and areas subject to regular disturbance like fuel modification zones and annually mowed nonnative grasslands. Additionally, assess areas adjacent to residential properties for invasive plants potentially introduced from yards and escaped landscaping plants.

The City could collaborate with residents and property owners to educate the public on avoiding the use of invasive target plant species in their yards, minimizing the potential for degradation of native park habitats. By working together and implementing these strategies, the park's ecosystem can be better protected from the harmful effects of invasive species.

1.7 TIMING OF INVASIVE PLANT CONTROL TREATMENTS

Successful control and protection of native habitats rely on consistent and well-timed invasive plant treatments. Annual control efforts should be adjusted to each species' requirements, such as the number of treatments needed, and consider any constraints like avoiding herbicide use in sensitive areas (e.g., vernal pools and vernal pool watershed).

The treatments shall be primarily focused outside of any sensitive times for sensitive species, such as when there is standing water in the vernal pools, the breeding season for bird species that are sensitive or protected under the MBTA, or during the flight season of Crotch’s bumble bee. If work outside these sensitive periods cannot be avoided, the appropriate protective measures, including biological surveying and monitoring needs to be conducted during the breeding season to detect breeding activity. If breeding activity is observed, appropriate protective buffers shall be placed around sensitive areas, such as an active bird nest, and no work shall occur in these areas until the nests are no longer active. Monitoring by a biologist with appropriate requirements, approvals, and permits may be necessary. Protective measures are described in more detail in Section 1.5.

Multiple control events using the most effective control strategies for the target invasive species shall be anticipated during a control year for effective control. Table 1-3 shows the control timing and strategies for the target invasive species.

The following provides timing for the different habitat areas of the Park along with important management notes for control activities.

Table 1-3 Timing and Method of Treatment for High-Priority Invasive Plants Parkwide or in Sensitive Habitat Areas: Vernal Pool Watershed (VPW) and Wetlands, Coastal Sage Scrub (CSS), and Riparian Habitat Areas (WRA).

Scientific Name	Common Name	Physical/Mechanical Treatment Method (P)	Chemical Treatment Method (C)	Control Event 1 (Jan. to Feb. 15)			Control Event 2 (Spring to Early Summer)			Control Event 3 (Summer to Fall)		
				VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide
Arundo donax	Giant reed	Cut and dig out plant removing all plant material	Foliar herbicide application – glyphosate	---	P/C	P/C	---	P/C	P/C	---	P/C	P/C
Atriplex semibaccata	Australian saltbush	Hand-pull removing all rooting material	Foliar herbicide application - glyphosate	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Bassia hyssopifolia	Five horn bassia	Hand-pull removing all rooting material	N/A	P	---	---	P	---	---	P	---	---
Brachypodium distachyon	Purple false brome	Hand-pull small patches; or mow before viable seed production but after soil moisture depleted	Foliar herbicide application - fluazifop	P	P/C	P/C	P	P/C	P/C	P	P	P
Brassica nigra	Black mustard	Hand-pull removing all rooting material; or mow after flowering but before viable seed production cutting close to the ground to prevent resprouting (this may require removal of thick plant thatch in sensitive habitat areas); remove viable seeds from mature plants	Foliar herbicide application - glyphosate	P	P/C	P/C	P	P/C	P/C	P	P	P
Bromus diandrus	Ripgut brome	Hand-pull small patches; or mow before viable seed production close to the ground removing bolting stems (this may require removal of thick plant thatch in sensitive habitat areas)	Foliar herbicide application - fluazifop	P	---	---	P	---	---	P	---	---
Carduus pycnocephalus	Italian thistle	Hand-pull removing all rooting material; remove viable seeds from mature plants	Foliar herbicide application – glyphosate or clopyralid	P	P/C	P/C	P	P/C	P/C	P	P	P
Carduus tenuiflorus	Slender flowered thistle	Hand-pull removing all rooting material; remove viable seeds from mature plants	Foliar herbicide application – glyphosate or clopyralid	P	P/C	P/C	P	P/C	P/C	P	P	P

Scientific Name	Common Name	Physical/Mechanical Treatment Method (P)	Chemical Treatment Method (C)	Control Event 1 (Jan. to Feb. 15)			Control Event 2 (Spring to Early Summer)			Control Event 3 (Summer to Fall)		
				VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide
Cirsium vulgare	Bull thistle	Hand-pull removing as much of the tap root as possible; remove viable seeds from mature plants	Foliar herbicide application - clopyralid	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Conium maculatum	Poison hemlock	Hand-pull removing all rooting material; remove viable seeds from mature plants	Foliar herbicide application - glyphosate	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Cynara cardunculus	Artichoke thistle	Hand-pull removing as much of the tap root as possible; remove viable seeds from mature plants	Foliar herbicide application - clopyralid	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Echium candicans	Pride of Madeira	Cut and dig out plant removing all plant material	Foliar herbicide application; or Stump cut herbicide application (requires follow-up treatment of resprouts)	---	P/C	P/C	---	P/C	P/C	---	P/C	P/C
Foeniculum vulgare	Sweet fennel	Cut and dig out plant removing at least 3 to 6” of the root crown; remove viable seeds from mature plants	Foliar herbicide application – triclopyr in winter; glyphosate all other times most effective before flowering	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Glebionis coronaria	Crown daisy	Hand-pull removing all rooting material including any viable seed	Foliar herbicide application - glyphosate	P	P/C	P/C	P	P/C	P/C	P	P	P
Hirschfeldia incana	Shortpod mustard	Hand-pull removing all rooting material; or mow after flowering but before viable seed production cutting close to the ground to prevent resprouting; remove viable seeds from mature plants	Foliar herbicide application - glyphosate	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Oncosiphon pilulifer	Stinknet	Hand-pull removing all rooting material; remove viable seeds from mature plants	Foliar herbicide application – glyphosate most effective in the bolting stage	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C

Scientific Name	Common Name	Physical/Mechanical Treatment Method (P)	Chemical Treatment Method (C)	Control Event 1 (Jan. to Feb. 15)			Control Event 2 (Spring to Early Summer)			Control Event 3 (Summer to Fall)		
				VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide
Pennisetum setaceum	Fountaingrass	Hand-pull seedlings; Cut and dig out mature plants removing all plant material; remove viable seeds from mature plants	Foliar herbicide application – fluazifop; or glyphosate best control when applied during flowering stage	P	P	P	P	P/C	P/C	P	P/C	P/C
Raphanus sativus	Wild radish	Hand-pull removing all rooting material; mow after flowering but before viable seed production cutting close to the ground to prevent resprouting	Foliar herbicide application - glyphosate	P	P/C	P/C	P	P/C	P/C	P	P	P
Ricinus communis	Castor bean	Hand-pull seedlings; cut and dig out mature plants removing all plant material; remove viable seeds from mature plants	Foliar herbicide application or Stump cut herbicide application (requires follow-up treatments to foliar spray any resprouts)	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Rumex crispus	Curly dock	Hand-pull removing as much as the tap root (minimum of 2 inches) as possible to prevent resprouting	Foliar herbicide application – glyphosate or clopyralid	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Salsola australis	Russian thistle	Hand-pull removing as much of the root as possible before seed set	Foliar herbicide application – glyphosate before seed set; triclopyr most effective on young plants	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Silybum marianum	Milk thistle	Hand-pull removing as much of the root as possible; remove viable seeds from mature plants	Foliar herbicide application – clopyralid from seedling to bud stage	P	P/C	P/C	P	P/C	P/C	P	P/C	P/C
Sisymbrium irio	London rocket	Hand-pull removing all rooting material; or mow after flowering but before viable seed production cutting close to the	Foliar herbicide application - glyphosate	P	P/C	P/C	P	P/C	P/C	P	P	P

Scientific Name	Common Name	Physical/Mechanical Treatment Method (P)	Chemical Treatment Method (C)	Control Event 1 (Jan. to Feb. 15)			Control Event 2 (Spring to Early Summer)			Control Event 3 (Summer to Fall)		
				VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide	VPW	WRA/CSS	Parkwide
		ground to prevent resprouting; remove viable seeds from mature plants										
Solanum rostratum	Buffalobur	Hand-pull removing as much of the root as possible	Foliar herbicide application - glyphosate	P	---	---	P	---	---	P	---	---

Notes:

1. *Sensitive Habitat Areas = CSS Areas that have potential for nesting coastal California gnatcatcher nesting, and all riparian and wetland areas, including vernal pools.*
2. *P = Physical or mechanical control method appropriate for the life stage of the invasive plant. C = Chemical control method. "---" = Species does not currently or is not expected to occur in an area, or species is not a target for control in this portion of the Park, and no control method is provided.*
3. *The number of weed control events per year will be dependent on weed growth throughout the season, annual weather conditions, incidence of standing water and saturated soil conditions in the vernal pool areas, and ability to do nesting bird surveys during the bird nesting season.*
4. *Treatments during the nesting seasons will require pre-work biological surveys and monitoring around active nests: CAGN nesting season 2/15 to 8/31; LBV 3/15 to 9/15; Raptors 1/15 to 8/15; CRBB 4/1 to Oct 15; MBTA Protected Birds 2/15 to 8/31.*
5. *The City shall provide a cultural monitor to protect culturally significant materials if significant digging is required in areas with protected cultural resources. Cutting or pulling out the roots of the plant from the topsoil does not require a cultural monitor.*
6. *All treatments shall occur before viable seed production when possible; if control cannot occur before viable seed production all seed material shall be cut, bagged, removed, and properly disposed of off-site.*
7. *No weed control treatments shall occur in the vernal pool watershed when there is standing water or while the soil is saturated—until the surface is dry enough to walk on without disturbing the soil surface.*
8. *No herbicide treatment of any kind shall be conducted in the vernal pool watershed—except for the improper fill material soil that was placed on the mesa.*
9. *No mowing with mechanical equipment shall occur in the vernal pool watershed*
10. *Only aquatic approved herbicides shall be used within 100 feet of water.*
11. *A state licensed Pest Control Advisor (PCA) shall be consulted to provide written herbicide recommendations for species specific herbicide control methods for the Park.*

1.7.1 Vernal Pool Watershed

No weed control shall be implemented in areas with standing water or saturated soils that occurs during the rainy season October through April. No herbicides shall be used within the vernal pool watershed at any time of the year. The use of mechanical equipment including mowers shall not be used in the vernal pool watershed to prevent negative impacts to the soil, such as ruts, and the potential crushing of fairy shrimp cysts (i.e., eggs).

- **Control Event 1** timed to be in the winter prior to standing water in the pools and prior to nesting bird season. Only physical methods allowed, such as hand weeding or line trimming. No mowing with equipment or herbicides is allowed.
- **Control Event 2** timed to be during the late spring early summer when there is no longer standing water in the vernal pools or saturated soil conditions. The timing should coincide with the most effective treatment time with the target invasives species. Pre-work surveys are required prior to implementing this control event. Only physical methods allowed. No mowing with equipment or herbicides is allowed.
- **Control Event 3** timed in the fall after the bird nesting season has ended. Actively growing or senesced perennial species shall be hand-pulled and removed. Senesced annuals need not be pulled unless the standing biomass would degrade bird habitat or impact the function of vernal pool, only remaining intact and viable seed material need be cut and removed from the site. Care shall be taken so as not to shatter seed pods so as not to contribute weed seed to the seed bank.

1.7.2 Sensitive Habitat Areas (Potential CAGN and LBV Habitat)

- **Control Event 1** timed to be in the winter prior to bird nesting season February 15 in coastal sage scrub areas that are potential habitat for CAGN and prior to raptor nesting season January 15 in riparian areas that are potential LBV habitat as there is suitable habitat for raptor nests in the riparian habitat within the Park. Methods can be either physical or chemical.
- **Control Event 2** timed to be in mid-spring. The timing should coincide with the most effective treatment time with the target invasives species. Pre-work surveys are required prior to implementing this control event. Control can be either physical or chemical methods.
- **Control Event 3** timed to be after the nesting season has ended August 31 in CAGN potential habitat and September 15 in LBV potential habitat areas. Actively growing or senesced perennial species shall be hand-pulled and removed. Senesced annuals need not be pulled unless the standing biomass would degrade bird habitat only remaining intact and viable seed material need be cut and removed from the site. Care shall be taken so as not to shatter seed pods so as not to contribute weed seed to the seed bank.

1.7.3 All Other Natural Areas

- **Control Event 1** timed to be in the winter prior to bird nesting season February 15. If suitable raptor nesting habitat is present, the control should be timed prior to January 15. Methods can be either physical or chemical.
- **Control Event 2** timed in spring to be at the optimum time for most target invasive species to be treated. Requires a pre-project survey by a qualified bird biologist within one week of work.
- **Control Event 3** timed to be in the summer at the optimum time for most target invasive species to be treated. Requires a pre-project survey by a qualified bird biologist within one week of work if it occurs prior to August 31.

1.8 BIOSECURITY PROCEDURES TO PREVENT THE SPREAD OF INVASIVE PLANTS

Implementing biosecurity procedures is essential to prevent the unintentional spread of target invasive plant species during control activities and to mitigate the introduction of new invasive species to the park. Biosecurity measures include cleaning clothing and equipment, ensuring that equipment used on-site is free of any invasive plant species reproductive material, and verifying materials used in the park, such as erosion control devices, are weed seed-free.

Preventing the spread of invasive species is the first line of defense and a cost-effective approach to controlling their impact. Consistent measures to ensure that seeds and reproductive material of invasive plant species are not spread to new areas will help avoid costly future efforts and potential ecological damage. By safeguarding sensitive habitats from infestation, their ecological functions can be preserved, promoting the overall health and resilience of the park's ecosystem.

1.8.1 Biosecurity Measures During Control Activities

Effective weed management not only involves the physical removal and chemical treatment of invasive species but also requires careful attention to minimizing seed dispersal, resprouting, and other unintended consequences of control measures. By taking steps to prevent the future propagation of weeds, the effectiveness of current practices can be enhanced while reducing the severity of subsequent infestations.

Although it is advisable to control weeds before seeds mature, this may not always be feasible, such as when a weed can seed year-round, and monitoring each life stage is challenging. In these situations, it is crucial to be aware of the presence of seeds during control sessions. Even if the plant itself is removed, seeds left behind at the site or on clothing, equipment, vehicles, or waste containers can undermine management efforts and spread the infestation to new areas.

To reduce seed spread, follow these practices:

1. Remove seeds found on plants before cutting, hand-pulling, or herbicide application, placing the material in appropriate disposal containers.

2. Collect seeds from the ground and place them in containers.
3. After each treatment, remove seeds from clothing and equipment, placing them in disposal containers before leaving the area.
4. Thoroughly inspect and clean clothing, equipment, bags, etc., using a brush or other tool, paying close attention to laces, socks, cuffs, pockets, etc.
5. Remove dirt from shoe treads to eliminate embedded seed material.

Vehicles should only be driven on approved pathways to limit contact with potential invasive weed species seed material. Despite minimal contact, vehicles should be inspected and cleaned of all weed seeds before leaving the site, focusing on tire treads, bumpers, radiators, and undercarriages. If waste disposal containers are brought on-site from other locations, inspect, and remove any weed seeds before using them in the park.

Crews shall be trained by the qualified plant biologist on the Best Management Practices (BMP) for cleaning equipment and clothing to prevent the spread of invasive species. As an alternative, already developed sources for training crews is available online such as from Cal-IPC video that can be found here Training Video: Best Management Practices for Preventing the Spread of Invasive Plants – California Invasive Plant Council (cal-ipc.org).

By implementing these measures, the spread of invasive species can be mitigated, promoting a more effective and sustainable approach to weed management.

BIOSECURITY MEASURES FOR PROJECT MATERIALS USED IN THE PARK

To minimize the introduction of invasive species, all materials used within the park should be certified weed-free. This includes, but is not limited to, mulch materials, erosion control products (e.g., straw wattles, hay bales), container plants, soil, and aggregate (topsoil, sand, gravel, fill), and landscape materials such as plants, seeds, sod, mulch, and soil amendments. Prior to use, all materials shall be inspected, and confirmation of their weed seed-free status shall be obtained from the vendor.

In landscape areas, it is recommended to not plant any invasive plants including trees to prevent the infestation of these invasive plants into natural areas of the park, particularly in the sensitive habitat areas. Resources to check when making landscaping plant palettes includes Don't Plant a Pest! – California Invasive Plant Council (cal-ipc.org) and The Cal-IPC Inventory – California Invasive Plant Council which is a list of invasive plants in California that either are rated as an invasive plant or are on the watch or alert list.

1.9 HIGH-PRIORITY INVASIVE PLANT CONTROL METHODS

These guidelines for physical and chemical control methods are based on Land IQ's experience in Southern California, with a focus on treating the target invasive species recommended for control in this plan. Control methods have been cross-referenced

using "Invasive Plants of California's Wildlands" (Bossard et al., 2000) and "Weed Control in Natural Areas in the Western United States" (DiTomaso et al., 2013).

Nonnative plants identified as highly invasive in Fairview Park are designated as "High-Priority Invasive Plants" and targeted for focused control efforts. Repeated treatments over multiple years will likely be necessary for effective control of these invasive plants. A minimum of five years may be needed to eradicate some species, while others may require long-term management with containment as the primary goal when eradication is not feasible.

Recommended control methods consider site conditions, population density of invasive plants, biological constraints (e.g., avian breeding season, rare vegetation presence), regional management experience, and published weed control methods. Ideally, weeds should be controlled before seed production to limit soil seed bank accumulation. Care should be taken to avoid damaging native plants during weed control activities.

Methods for control include physical and chemical approaches. Before initiating herbicide treatment, a written herbicide application recommendation from a California Licensed Pest Control Advisor should be obtained, confirming appropriate dosage, timing, and application method. All herbicides used for the project require approval from the City before use.

Effective invasive plant species control involves managing the existing weed seed bank and implementing timely control measures to prevent additional seed or propagule input from target invasive species. Successful control may take several years, depending on population size and annual treatment frequency. Invasive species reproducing from seed should be controlled before seed set to deplete the existing weed seed bank and minimize new seed entry. Species that reproduce vegetatively should be controlled at the optimal time during their growing season.

Table 1-1 presents key phenological information for the target invasive species along with their reproductive strategies to help guide timing for scheduling survey events by the qualified plant biologist and control events.

The density and vigor of invasive plant species in any given season or year is highly dependent on annual weather patterns, including the timing and amount of rainfall, as well as diurnal temperature variations. This necessitates an adaptive weed management approach that allows flexibility in the timing and intensity of treatment events each year. Adaptive management is also crucial due to the difficulty and impracticality of quantifying the nonnative seed bank of target invasive species in the park. Instead, weed management efforts can only be estimated based on prior biological monitoring and experience with similar treatment efforts.

Invasive weed management is vital for the successful establishment and maintenance of native habitats within the park. Special care must be taken when weeding around native plants and within high-quality native habitats, requiring additional labor and expertise. Working around native species often necessitates increased use of manual methods

(e.g., hand-cutting or pulling) and reduces opportunities for time-saving mechanized equipment like mowers and line trimmers.

The number of years required for invasive species eradication through annual weed treatment events will depend on site-specific factors such as weed density, type of weed species, annual weather patterns, and variables like landscape position and soil type.

Weed management methods will be selected based on the type and density of target invasive species present, the density of native species, accessibility, and location within the park. Several control methods can be employed to manage invasive species at Fairview Park:

1. **Mechanical Methods:** Manual hand-pulling or cutting; taproot extraction with tools, such as weed extractors or shovels; mowing or line trimming
2. **Chemical Methods:** Targeted low-pressure foliar herbicide application; stump-cut and herbicide application

Each weed control method has advantages and disadvantages, with considerations including implementation timing, equipment and trained staff availability, biological resource protection, and site access limitations for equipment. Nonnative seedlings and flowering plants should be controlled before producing viable weed seeds to minimize contributions to the weed seed bank. If weeding is delayed until after seed development, seed material should be cut, bagged, and disposed of off-site.

Soil disruption should be minimized to reduce the germination of new weed individuals, injury to native species, and disturbance to biological soil crusts. Care should be taken not to disturb deep soil layers that could bring up buried weed seeds that would not otherwise germinate without disturbance.

Careful weeding by trained crews is necessary to avoid damage to native species in areas with significant native cover or sensitive species. Adaptive management, including regular monitoring to guide the scheduling and selection of weed control methods, is key to success. General guidelines for control methods are presented in Table 1-3.

1.9.1 Physical Control Methods

Physical control methods recommended include hand-pulling, cutting, or removal with digging equipment. These methods are best used for isolated individuals or small patches for the most efficient control. Digging with a shovel, pick or mattock can be labor intensive especially for larger mature individuals. Hand-pulling is best suited for seedlings or smaller plants that can be easily pulled. In many instances removal of all or most of the invasive species is necessary for effective control to limit resprouting from the roots or root crown. Using hand garden tools such as picks, cultivators, weeders, specialized hoes, mattocks, and trowels, can help to loosen the soil around the roots. After loosening the soil, pull vertically from the ground to remove as much of the root system as possible, especially weed species with a long tap root.

MOWING/LINE TRIMMING

Mowing with mechanical equipment, such as a rotary mower, flail mower, or mulcher attached to a tractor or skid steer, or hand-operated motorized cutting tools such as line trimmers are generally an efficient method to use in areas with a high density of target invasive grasses and herbaceous species in areas with little to no native vegetation present. Mowing is appropriate in larger areas that are flat to moderately sloped. Careful mowing should be implemented to limit injury to native species when cutting. The use of mechanical equipment including mowers shall not be used in the vernal pool watershed to prevent negative impacts to the soil, such as ruts, and the potential crushing of fairy shrimp cysts (i.e., eggs). In areas with a steeper slope or with a higher density of natives, walk behind, hand-operated mowers or line trimmers should be used.

Line trimming can be accomplished with a gas-powered, hand-operated line trimmer fitted with a string, brush blade, or similar instrument in areas inaccessible to larger equipment. Like line trimming, a gas-powered, hand-operated, shafted hedge trimmer with an articulating blade can be used to trim target invasive weeds above the soil surface from a standing position. Shafted hedge trimmers can be effective for cutting denser patches of broadleaf weeds after they have flowered, such as mustard species (*Brassica*, *Sisymbrium*, and *Hirschfeldia*). Line and hedge trimmers are most effective in areas that are inaccessible to larger equipment, or when working around dense, existing native vegetation that excludes the use of larger equipment.

Fire prevention measures must be taken to avoid accidental fires from sparks during machinery operation or line trimming with blades. These measures may include always having a water truck on site near the mowing activity, shovels carried on the mower and water truck, and water fire extinguishers. The weed material should be cut as close to the ground as possible to limit re-sprouting of herbaceous species and ensure removal of bolting crowns of grasses. Care should be taken to not damage biological soil crusts where present.

HAND/MECHANICAL PULLING OR CUTTING

Hand-pulling or cutting of target invasive weeds is one of the least disruptive methods but is an inefficient method of weed control in dense stands. Hand-pulling or cutting should be reserved for controlling isolated individuals, controlling small infestations in areas that are inaccessible to equipment, or where high densities of native or sensitive species are present. Hand-pulling is a very useful manual technique to use on young plants and small patches of weeds.

Hand-cutting can be used to remove the flowering stalks of target invasive weeds prior to seed development with tools such as sickles or vinyl knives. If cut material contains viable seed, then it should be properly disposed of off-site.

When hand-pulling target invasive weeds, the plants should be grasped near the base pulling in the direction the plant is growing to be able to better extract most of the roots

out of the ground. Short tugs work better than one long pull to prevent breaking the plant before the main roots are removed.

Isolated individuals of select invasive species can be pulled by hand or with a tool such as the Weed Wrench™. Using hand garden tools such as picks, cultivators, weeders, specialized hoes, mattocks, and trowels, can help to loosen the soil around the roots. After loosening the soil, pull vertically from the ground to remove as much of the root system as possible, especially weed species with a long tap root. When using a weed wrench, the clamp should be placed on the lowest point on the trunk of the plant as much as possible. The base of the weed wrench should be on the ground, but if it is not touching, rocks or branches can be placed underneath to improve leverage. Using your weight the weed wrench should be pulled toward you and not pushed away or injury could occur.

CUT-AND-DIG

Larger mature invasive species can be controlled by cutting the upper foliage of the plant and digging out the root system. Plant foliage can be cut with a handsaw, loppers, axe, or similar tools and removed to allow for better access to the roots. The root material can be dug out and removed with a shovel, mattock, Pulaski, or similar tool. As much of the root material should be removed as possible for effective control since many of the target invasive weed species can readily resprout from remaining roots. Removed root material should be properly disposed of to prevent resprouting. For example, the removed roots and rhizomes of giant reed (*Arundo donax*) or even cut stems with nodes can resprout if they are touching wet soil.

RAKING AND REMOVAL OF WEEDED BIOMASS

Plant biomass of weeded invasive species shall be removed from the vernal pool watershed and other sensitive habitat areas since plant thatch degrades the quality of bird habitat and the functioning of the vernal pool habitats. Thick pant thatch also inhibits germination and recruitment of desirable native species and would hinder the natural.

Raking of the cut material can be done with handheld rakes and collected on burlap bags to be removed from the Park.

1.9.2 Chemical Control Methods

Herbicide treatment is specified mainly for dense areas of the target invasive species with low densities of native species and are invasive species that are perennial or that may re-sprout from taproots and rhizomes. Limited use of selected herbicides is specified when no other effective alternative is feasible for effective control. Most herbicides are not selective for weeds only; in other words, herbicides must be applied with the least harmful effect to non-target native species.

For effective control of target invasive species populations, they must be controlled before they produce viable seed. Most herbicides are not selective for weeds only (i.e., these herbicides must be applied with the least harmful effect to non-target native

species). In general, only post-emergent herbicides, which kill plants after they have germinated and are actively growing, are recommended.

Herbicides shall not be used in the vernal pool watershed at any time of year, except for area on the mesa with improper fill material. Herbicides use in all other natural areas during the breeding season can be used if a pre-work survey by a qualified biologist is conducted prior to treatment. Herbicides may be used in the fuel modification zones outside the breeding season and during the breeding season if prework surveys for nesting birds is conducted.

Only herbicides registered for use in California and in wildlands should be used judiciously for the control of target invasive species. Herbicides that are registered for use in California natural areas are recommended to be used at rates specified on the herbicide labels for the target invasive species. The recommended herbicides registered for use in California that are proposed in these guidelines are glyphosate, a non-specific broad-spectrum herbicide registered for use on almost all weed species, fluazifop-p-butyl for the control of weedy grasses, clopyralid for the treatment of thistles in the rosette stage, and triclopyr for the treatment of woody invasive plant species.

A state licensed Pest Control Advisor (PCA) shall be consulted to provide written herbicide recommendations for species specific control methods for the Park. The herbicide applicator must have a pest control business license that requires at least one individual employed by the business be in possession of a qualified applicator's license. All licenses must be issued by the State of California and be currently registered in the county of work. If a qualified applicator is not present during the herbicide treatment, all applicators must have undergone documented herbicide training.

Personnel must wear all Personal Protective Equipment (PPE) required by law and follow all herbicide label directions and precautions. PPE includes but is not limited to chemical-resistant nitrile gloves, eye protection, chemical protective suits, e.g., Tyvek®, and protective footwear. All re-entry times specified on an herbicide label must be observed and posted. Herbicide preparation must be conducted only in approved staging areas more than 100 feet from a stream course or any body of water. Only herbicides and surfactants approved for aquatic use should be used within 100 feet of a stream course or any body of water.

A colorant or marking dye is recommended to ensure even coverage of herbicide. The material should be a non-toxic material such as Blazon®, Turf Mark®, or equivalent. The dye should be mixed with the herbicide at no more than half the rate specified on the label as it can reduce product performance of the active ingredient of the select herbicide, especially at lower herbicide application rates.

Herbicide treatment should be conducted only when weather conditions are conducive to effective uptake of the herbicide by target species when plants are at the specified growth stage. Optimal weather includes sunny and dry conditions with ambient temperatures of at least 65 degrees Fahrenheit. Wind conditions should be five miles per hour or less for herbicide applications that can be subject to drift, e.g., foliar spray

methods, to minimize herbicide drift for worker protection and to prevent damage to desirable vegetation. Treated plants shall not be disturbed until the applied herbicide has had time to take effect per the manufacturer's instruction.

FOLIAR SPRAY TREATMENT

Foliar spray treatment involves applying a select herbicide at a specified concentration directly to the exposed foliage of the plant to thoroughly wet all leaves. For the foliar spray treatment to be effective, the exposed foliage needs a thorough coating of herbicide, and the plant should be actively growing. The green or photosynthesizing parts of the plant should be sprayed for uptake of the herbicide by the plant. Typically, the foliar spray treatment is best used on smaller plants to ensure adequate cover of the herbicide.

The disadvantage of the foliar spray treatment is the damage that may be caused to desirable species in the localized area where spraying occurs, especially if a non-selective herbicide like glyphosate is being used. Additionally, the foliar application method is generally ineffective on invasive plants with thick waxy cuticles.

Foliar spray shall be by low pressure hand operated sprayers only and broadcast herbicide shall not be done anywhere in the Park. For backpack or hand-held application of herbicide, a low-pressure regulated sprayer with a coarse droplet size and single-nozzle wand shall be used. For this type of application use either spray-to-wet applications, or low volume directed spray.

Prior to use of hand-held herbicide applicators, the equipment should be checked to make sure it is fully functional and does not have any leaks. After filling the closure cap should be securely screwed on and not-cross threaded to prevent any spills or leakage. For backpack sprayers, the rubber gasket and nipple in the sprayer lid should be regularly lubricated for proper functioning. The applicator should not bend over or lean too far forward to prevent any spills onto their person or on to desirable vegetation. Prior to use, the pump of the backpack sprayer should be primed with 10 to 20 pumps. When traveling between spraying points, the applicator shall keep their hand off the lever to avoid any inadvertent spraying of herbicide.

To decrease the chances of spraying nontarget plants, preparation before spraying may be needed in areas where weeds are mixed in with native plants. The target invasive plant for control should be separated from natives and if the plant is tall, the plant should be carefully bent downward, away from natives, and the herbicide solution applied. After spraying, the plant should be released slowly and carefully to avoid any herbicide drips or runoff. The herbicide applicator should be sure to observe what is behind and around the target invasive species for control and be mindful of wind speed and direction. Nozzle adjustments may be necessary to get the mist pattern for best coverage of the target invasive plant. Larger plants should be sprayed from multiple angles to ensure adequate coverage of the plant with herbicide for effective control.

For application to small weeds (e.g., seedling stage) amongst dense native plants, if herbicide application is deemed necessary, the herbicide can be applied by backpack

sprayer with a low-pressure regulated wand with the nozzle directed to the weed foliage, thereby avoiding overspray. However, nozzle-to-plant application is time intensive and requires highly trained applicators that can differentiate between native and nonnative plants at the seedling stage; and therefore, it is typically not the most cost-effective weed management method. However, this treatment method may be needed since it is recommended to conduct herbicide treatment outside of the bird nesting season (January 15 to September 15) in sensitive habitat areas.

STUMP CUT AND HERBICIDE TREATMENT

Treatment of larger and well-established individuals, including high priority invasive species that may re-sprout from taproots or rhizomes, is best accomplished by using the stump cut and herbicide application method. Advantages of the stump-cut treatment compared with foliar application for larger individuals, includes the following:

- Lower quantity of herbicides required to treat the invasive species; and
- Localized application of the herbicides reduces the likelihood of herbicide contact with non-target native species, during application.

Typically, the stump cut and herbicide treatment is used in late summer and early fall when plants are translocating energy reserves to the rootstock and when seed dispersal is not enhanced by weeding activities optimal timing though is dependent on the weed species being treated.

The stump cut treatment method process involves cutting the stump of an invasive species flat at about 8 to 10 inches in height, then immediately (within 2 minutes or less) treating the exposed cambium of the cut stump with a select herbicide at a specified concentration. The stump cut treatment should be implemented in the following steps:

Step 1. Plants will be cleanly cut, horizontally, close to the ground (using a saw, rotary brush cutter or similar tool).

- If the weed species has already set seed, seed material shall be immediately collected, bagged, and removed from the project area prior to cutting
- The cut vegetation will be removed from the project area the same day it is cut and properly disposed of off-site or in a designated buffer area.

Step 2. The stumps or stems will be re-cut, cleared of sawdust and immediately painted with the specified herbicide within two minutes of cutting, before the cut surface begins to congeal, to ensure penetration of the herbicide. The herbicide should be applied to the cambium in 60 seconds or less after cutting.

- Apply the herbicide on the cut stump (the percent solution will be dependent on the weed species treated and herbicide used). Apply carefully to avoid any drips or damage to surrounding native species.

Plants generally should be checked about one month after initial stum cut treatment to determine the success of the herbicide treatment. Any re-growth from the treated

stumps should be treated with the foliar herbicide application method in the same growing season or as re-growth appears in the next growing season. Any new seedlings and small saplings observed during follow-up treatments can be hand-pulled, ensuring that the root system is removed. The pulled material should be removed from the project area or chipped and stockpiled for composting, as some species can regenerate when moisture is available.

If it is not possible for the herbicide applicator to work alongside the crew who is cutting the plants for treatment, then the herbicide treatment Step 2 may be applied within one week of the initial cutting. However, the cut stump must be re-cut to expose fresh cambium for effective herbicide treatment. If the stump cannot be re-cut, then herbicide application is not recommended as it will no longer be effective since the surface would be congealed and the herbicide would not be taken up by the plant.

RECOMMENDED HERBICIDES FOR USE IN FAIRVIEW PARK

The following sections provide information and application rates for specific herbicides recommended for use in the restoration areas.

Categories of herbicides include pre-emergent and post-emergent. Pre-emergent herbicides work on newly germinated weed species. They prevent them from developing and do not harm established plants. Post-emergent herbicides work on established and actively growing weed species. Only post-emergent herbicides are recommended for use. Pre-emergent herbicides should not be used for habitat restoration since they may also affect newly germinated native species.

Only herbicides registered for use in wildlands should be used judiciously within the Conservation Easement. Herbicides that are registered for use in California for natural areas are recommended for weed species at specific rates noted on the labels. Pre-emergent chemicals are not recommended for use at any time during. The following herbicides are recommended herbicides to implement this plan:

- Fluazifop-P-butyl (e.g., Fusilade®; EPA Toxicity Class III, low toxicity) will be specified for foliar applications, at application rates recommended on the label, for grasses.
- Glyphosate (e.g., Round-up®; EPA Toxicity Class III, low toxicity) will be specified for foliar and stump cut applications, at application rates recommended on the label, for most target invasive species.
- Clopyralid (e.g., Transline®; EPA Toxicity Class III, low toxicity), will be specified for foliar spray applications, at application rates recommended on the label, for thistle control.
- Triclopyr (e.g., Garlon 4 ultra®; EPA Toxicity Class III, low toxicity) will be specified for foliar spray applications and stump-cut application, at rates recommended on the label, for woody species, sweet fennel, and other target invasive herbaceous species.

Post-emergent herbicides are either selective (kills specific types of weeds such as grasses or broadleaves) or non-selective (works on all plants). Grass-selective herbicides include Fusilade® DX and Envoy®. Broadleaf-selective herbicides include Clopyralid. Non-selective herbicides include glyphosate and triclopyr.

Post-emergent herbicides can be broadcast sprayed in areas with a low density of native species or applied with backpack sprayers in areas with a higher density of native species. Selective herbicides can be broadcast sprayed to control the desired weed type with little to no impact on natives of a different plant type. Non-selective herbicides can be more efficient in areas with a mix of grass and broadleaf weed species since they can treat all the weed species present at the site. However, non-selective herbicides can cause the most harm to desirable native species and should only be broadcast sprayed in areas with a low density of natives.

Caution should be taken to prevent overspray and herbicide drift onto the foliage of native species as they can damage or kill the plant(s). Prior to selection and use, the label of each herbicide should be read to determine if the active ingredient can translocate through the soil and cause potential damage to the root system of native species. For example, imazapyr translocates through the soil and its use should be limited to the stump cut treatment method to reduce the amount of herbicide introduced into the soil and prevent herbicide drift.

Fluazifop (Fluazifop-p-butyl Fusilade® DX)

The active ingredient in Fusilade® DX is fluazifop-p-butyl. Fusilade® DX is a selective post-emergent herbicide used for the control of annual and perennial weed grasses. The herbicide is systemic i.e., it is absorbed and moves from the foliage to the roots, rhizomes, stolons, shoots, and meristematic regions of the grasses.

Application Rate

Fusilade® DX application rates for annual and perennial grasses are 16-24 ounces (oz) per acre (4 to 6 oz of active ingredient [a.i.] per acre). For control of seedlings the rate is 8 oz per acre (2 oz a.i. per acre). Add the following spray additives to the herbicide mixture for optimum effectiveness:

- Crop oil concentrate containing 15-20% approved emulsifier at 0.5-1% volume/volume (v/v) (0.5-1 gallon [gal]/100 gal)
- Nonionic surfactant containing at least 75% surface-active agent at 0.25-0.5% v/v (1-2 quarts/100 gal)
- A non-toxic colorant or marking dye to insure even coverage of herbicide. The dye should be mixed with the herbicide at no more than half the rate specified on the label of the dye as it can reduce product performance, especially at lower herbicide application rates.

Weedy grass species should be treated at the appropriate growth stage for optimum effectiveness. Grasses that have tillered (sprouted a shoot from its base), formed seed heads, or exceeded the growth stages listed on the label should not be treated. Target

weed grasses should not be under stress (e.g., from moisture, temperature, low soil fertility) for optimum control.

If the treatment area has a mix of weedy grasses, Fusilade application should be implemented when the first grass reaches the specified growth stage for treatment using the highest application rate for the grasses in the mixed population. The optimum growth stage for treatment of annual grasses is when grasses are 2–8 inches tall, but prior to tillering and/or seed head formation. It is important to note that in drought years when available water is limited, nonnative grasses can flower early when plants are less than 8 inches tall. Monitoring of flower production is critical to determine the optimum time for weed control. Thoroughly coat the foliage with herbicide during foliar application, but not to the point of runoff of the herbicide.

No more than 72 fluid ounces of Fusilade per acre a year should be applied to a treatment area. It should not be applied if rainfall is expected within 1 hour of application. Fusilade should not be applied directly to water, where surface water is present, or where runoff into water bodies could occur. To reduce herbicide runoff, avoid applications of herbicide within 48 hours of rainfall. Restrict entry into treated areas as specified on the label.

Visual observations of control can be seen within one week of treatment; however, it is dependent on the grass species and environmental conditions. Growth of treated grasses typically stops soon after application. Signs of herbicide control include loss of vigor, yellowing, reddening, and eventual death.

Glyphosate

Glyphosate (e.g., Roundup Pro® Concentrate or Roundup Pro® Max) is a broad-spectrum post-emergence herbicide for the control of annual, perennial, and woody weed species. The herbicide is systemic and moves from the treated foliage to the root system.

Foliar application should be implemented when the target species are at the appropriate growth stage for optimum effectiveness. Target annual and perennial species should be actively growing. Application to annual species should be prior to seed head formation of grasses and before bud formation in broadleaf weeds. Perennial weeds should be treated after they reach the reproductive stage of growth, seed head formation in grasses and bud formation for broadleaf species. If treatment is necessary prior to perennials reaching the reproductive stage, the higher label application rate should be used.

Application Rate

Most annual and perennial weed species can be effectively treated with a 2% solution of glyphosate when applied during the appropriate growth stage. Follow label directions of the glyphosate product used to mix a 2% solution. Add colorant or marking dyes to the spray solution to aid the applicator in achieving good coverage of target species. The dye should be mixed with the herbicide at no more than half the rate specified on the

label as the amount of dye can reduce product performance, especially at lower herbicide application rates.

Most glyphosate products contain a surfactant, and no additional surfactant is needed or recommended to add to the mix except for glyphosate products registered for aquatic use. Aquatic glyphosate formulations do not contain a surfactant in the herbicide product. If using an aquatic formulation and a surfactant is added to the mix, follow the directions on the herbicide label. However, it should be noted that in some cases, specific project permits and conditions may not allow use of a surfactant for aquatic applications.

Except where specified on the label, no more than 8 pounds (lbs) of glyphosate acid per acre per year should be applied to a treatment area in California. The total glyphosate acid amount is additive for all glyphosate products used in a given area, so it is important to keep a record of the amount of all glyphosate acid used in a given area per year. Glyphosate products have different acid concentrations and acid equivalents are provided on all product labels.

Herbicide application should not occur if heavy rainfall is expected soon after application. Herbicide should not be applied directly to water or to areas where surface water is present. Restrict entry into treated areas as specified on the label.

Visual observations of control on annual weeds can be seen within 2 to 4 days and 7 days or more for perennial weeds. Signs of herbicide control include wilting and yellowing of foliage advancing to complete browning of above-ground growth and deterioration of root material.

Clopyralid

Clopyralid is a post-emergence selective broadleaf herbicide. It is particularly effective for the control of thistle and clover species and is considered safe to use with established native grass species. However, immature native grasses prior to tillering and development of a secondary root system may be negatively affected by clopyralid. Clopyralid is the active ingredient in the herbicide Transline®.

Application Rate

Clopyralid should be applied at ¼ to ⅔ pint per acre, depending on the weed species being treated and associated growth stage. Add the following spray additives to the herbicide mixture for optimum effectiveness:

- A non-ionic surfactant at a rate of 1 to 2 gal/100 gal of herbicide mixture.
- A non-toxic colorant or marking dye to insure even coverage of herbicide. The dye should be mixed with the herbicide at no more than half the rate specified on the label of the dye as it can reduce product performance, especially at lower herbicide application rates.

In general, the herbicide is most effective when weeds are small and actively growing. The lower rate should be used only during highly favorable growing conditions and

when plants are 3 to 6 inches tall. The higher rates should be used if the plants are stressed or in areas with high weed density. The foliage should be thoroughly coated for effective control.

Application during extreme growing conditions such as drought, freezing conditions, or wet foliage at the time of application may reduce the effectiveness of the herbicide. Herbicide is rainfast within 2 hours of application. Avoid injury to non-target plants by avoiding spray drift. Non-target plants can be affected by direct spray on plant foliage or indirectly by root uptake through the soil. The maximum application rate per year in California during the growing season is ⅔ pint per acre.

Clopyralid should not be applied directly to water, where surface water is present or where runoff into water bodies could occur. Clopyralid should not be used in areas where movement through the soil could contaminate ground water, such as loamy sand, sandy soils or in areas with a shallow water table.

Sprayed material should not be used for composting or mulch as clopyralid may remain for long periods in dead plant tissue and negatively affect future growth and development of non-target species in treated areas.

Triclopyr

Triclopyr (e.g., Garlon 3A, Renovate® 3) is a systemic herbicide used for the control of broadleaf species and grasses. Triclopyr can be used at any time during the growing season and is most effective when used to treat actively growing plants.

Application Rate

For the control of broadleaf species triclopyr should be applied at 1 to 4.5 lbs acid equivalent (a.e.) per acre in a total volume of 20 to 100 gallons of water. The herbicide mixture can be applied at any time of the growing season. Add the following spray additives to the herbicide mixture for optimum effectiveness:

- A non-ionic surfactant at the rate specified on the label of the surfactant. Use the higher recommended concentrations of surfactant when applying lower spray volumes per acre.
- A non-toxic colorant or marking dye to insure even coverage of herbicide. The dye should be mixed with the herbicide at no more than half the rate specified on the label of the dye as it can reduce product performance, especially at lower herbicide application rates.

The maximum application rate of triclopyr is 9 lbs a.e. per acre per year.

Herbicides Approved for Aquatic Use

Only herbicides and surfactants approved for aquatic use should be used in riparian habitats for treatment of weed species. It is important to note that permits may not allow the use of a surfactant in riparian habitats. The purpose of a surfactant is to provide more uniform coverage and penetration of the herbicide into the plant. Approved aquatic herbicides include Round-up® Custom (active ingredient glyphosate)

and Renovate® 3 (active ingredient triclopyr). Non-ionic surfactants approved for aquatic use include Liberate® and Rainier®.

1.10 TARGET INVASIVE SPECIES CONTROL METHODS

The following are specific control methods for the target invasive species presented in this plan. As stated previously, no herbicides or mechanical mowing shall be done in the vernal pool watersheds and only physical control methods presented below shall be implemented for the target invasive species in the vernal pool watershed.

1.10.1 Artichoke Thistle

The type of herbicide used for artichoke thistle (*Cynara cardunculus*) control is dependent on its growth stage. In the seedling to rosette stage in winter to early spring, clopyralid (e.g., Transline®) should be applied at 1.5 to 4 oz a.e. per acre. Foliage should be thoroughly coated for effective control. The higher rates should be used if the plants are stressed or in areas with high weed density. Physical control methods include hand pulling seedlings and cutting plants in the rosette stage. When using physical methods, as much of the root system should be removed as possible to limit resprouting (DiTomaso et al. 2013). It should be noted that while physical control methods can effectively control artichoke thistle, it may take longer than chemical control methods with more treatments per year and more years of control.

For mature, bolting artichoke thistle plants, a foliar application of 2% glyphosate should be used. Glyphosate treatments should be done after bolting when the plants are actively translocating fluids to the root system. If sprayed before bolting, the above-ground material may die back, but many of the plants will resprout from the roots later in the season (Bossard et al. 2000).

Physical methods include cutting the mature plant and removing as much of the upper taproot as possible to prevent resprouting. Plants can be cut with a mower, line trimmer or hoe. The most effective cutting method is the use of a hoe to cut down below the soil to remove part of the upper tap root system. Mowers and brush cutters can be used to deplete mature plants of their resources. Repeat mowing will be necessary during the growing season prior to seed set over multiple seasons for effective control.

1.10.2 Australian Saltbush

Australian saltbush (*Atriplex semibaccata*) is a perennial subshrub that can be controlled by hand-pulling, removing as much of the root material as possible. While plants are easy to hand-pull, they are brittle, and care should be taken not to break the mainstem when pulling to ensure as much of the root material is removed as possible. Chemical methods of control include foliar application of glyphosate that can be used from postemergence to mature plants that are rapidly growing. If seeds are present before treatment, seeds should be carefully cut and removed from the plant and properly disposed of off-site.

1.10.3 Crown Daisy

Crown daisy (*Glebionis coronaria*) is an annual herb that reproduces from seed that can be controlled by hand-pulling removing as much of the root material as possible. Line trimming is most effective after the plant has flowered or produced fruits, cutting the plants as close to the base as possible. Follow-up treatments will likely be required if line trimming is the method used. Foliar application of glyphosate is most effective when the plant is mature but prior to seed set. If seed set has already occurred, line trimming should be the method used. If seeds are present before treatment, seeds should be carefully cut and removed from the plant and properly disposed of off-site.

1.10.4 Castor Bean

Castor bean (*Ricinus communis*) can be either a summer annual, perennial, shrub, or even a small tree up to 10 feet tall. The seeds are highly poisonous as well as to a lesser degree the foliage. Protective gloves should be worn during hand-pulling activities since all plant parts are toxic to humans. Hands should be thoroughly washed after working with castor bean.

Seedlings and smaller castor bean individuals should be hand-pulled, removing as much of the root system as possible to prevent resprouting. Medium sized individuals can be pulled with hand-held tools such as a weed wrench. Hand-pulling can be best accomplished in soils that are wet and even larger individuals can be hand-pulled in wet sandy soils. Hand-pulling is more difficult when soil conditions are dry and should not be the method used if most of the root system cannot be removed. If plants are broken during hand-pulling, they will readily resprout with multiple shoots from the root crown.

Mature plants should be treated with a foliar herbicide application of a 2% solution of glyphosate. Foliar herbicide application can occur at any life stage of the castor bean from seedlings to large mature plants. Control is optimum between seedling to bloom stage and is most effective at flower bud and flowering stage. Herbicide control should be done before seed production has started.

For larger individuals, the stump cut method as described above can be used. The cut stumps should be treated with a 25% solution of glyphosate applied to the cut stump. The stump cut treatment can be done on mature plants at any time of the year. Smaller plants can be cut with loppers while hand saws or chain saws may be required for larger plants.

If seed production has occurred prior to any treatment, seeds should be cut from the plant, bagged, and removed from the site to prevent the seeds from entering the weed seed bank.

1.10.5 Fountaingrass

Fountaingrass (*Pennisetum setaceum*) is a perennial grass that reproduces by seed. Small populations can be effectively controlled by digging up the plant removing as much of the root system as possible. Roots of mature plants can be dug out of the ground with a pick, shovel, or mattock. Flowers shall be cut and removed prior to

digging out the plant and the material bagged and removed from the site. Mowing is not an effective control method for fountaingrass.

Herbicide control methods included foliar application. Plants can be treated with fluazifop from postemergence to rapidly growing plants. Foliar application of glyphosate with a 1 to 2% solution is effective from postemergence to rapidly growing plants from mid-summer to fall. The most effective treatment timing for foliar application of glyphosate is during the flowering stage in the summer.

1.10.6 Giant Reed

Giant reed (*Arundo donax*) is a perennial grass that is bamboo-like with hollow cane-like stems that can grow upwards to 25 feet tall. Giant reed does not produce by seed but can readily reproduce from roots, rhizomes, and stem material.

Foliar herbicide spray should consist of spraying giant reed with an 8% solution of Roundup Custom™ (a glyphosate herbicide approved for aquatic use), and the surfactant Liberate® (approved for aquatic use) directly to exposed green foliage. The green foliage should be thoroughly wetted with herbicide with a minimum of 75% of the plant treated. Since the root and rhizomes of giant reed are so substantial sufficient herbicide needs to be translocated to the roots for effective control. Tall stalks shall be carefully bent downward, and herbicide solution applied, being careful to avoid spraying any adjacent native species. Similarly, giant reed in that is in or near standing water should be carefully bent so that the foliage is over land and not water for spraying.

Treatment shall occur when giant reed is actively growing starting early spring and is most effective at the end of summer or beginning of the fall season when it is actively translocating resources to its root system. Herbicide control is least effective during the winter months when temperatures are colder and giant reed is primarily dormant. Control of mature well-established stands of giant reed can take between 3 and 7 years to control where hydrologic conditions favor the regrowth of giant reed.

For large, dense giant reed stands with a lot of standing biomass, it may be necessary to cut the canes prior to herbicide treatments. When cutting is done, all cut cane material should be removed from the Park or mulched in place. Mulched in place canes should be thoroughly shredded to prevent potential resprouting from stem nodes. The initial cutting should be in the late fall/early winter. Follow-up herbicide treatment of giant reed resprouts as described above during the growing season will be necessary. It is recommended the resprouts are a minimum of three feet tall for there to be sufficient foliage to treat.

Giant reed can be removed by cutting the canes and digging up the roots, culms, and rhizomes. As much of the roots and rhizomes need to be removed as possible to prevent resprouting. Hand-removal is most efficient and effective for smaller infestations or in areas previously treated with herbicides and only a few viable giant reed canes remain. All plant material should be collected and properly disposed of off-site.

1.10.7 Milk Thistle and Italian Thistle

Milk thistle (*Silybum marianum*) is an annual or biennial species and typically emerges during the fall after first rains. Italian thistle (*Carduus pycnocephalus*) and slender flowered thistle (*Carduus tenuiflorus*) are annual species and seedlings emerge after the first rains.

Physical control methods include hand pulling seedlings, cutting with hand tools, or mowing. When using hand tools such as grubbing hoes, plants should be cut a minimum of 2 to 4 inches below the ground to prevent resprouting. Mowing is most effective when done after the plants have bolted and are about to flower, as plants will regrow if plants are cut before fully bolted. Plants should be cut or mowed prior to seed production.

The type of herbicide used for control is dependent on their growth stages. In the seedling to bud stage, clopyralid (e.g., Transline®) should be applied at 1.5 to 6 oz a.e. per acre for control of milk thistle and 1.5 to 8 oz a.e. per acre for Italian thistle and slender flowered thistle (DiTomaso et al. 2013). However, it should be noted that the maximum application rate for clopyralid in California is ⅔ pint per acre per annual growing season. Foliage should be thoroughly coated for effective control. The higher rates should be used if the plants are stressed or in areas with high weed density. A foliar application of 2% glyphosate for milk thistle and glyphosate at a rate of 1.5 to 3 lbs a.e. per acre for Italian thistle and slender flowered thistle can be used at any time during the growth stage for effective control.

1.10.8 Pride of Madeira

Pride of Madeira (*Echium candicans*) can be controlled by hand-pulling seedlings and younger plants. Larger mature plants can be controlled by cutting the upper foliage of the plant and digging out the root system. Plant foliage can be cut with a handsaw, loppers, axe, or similar tools and removed to allow for better access to the roots. The root material can be dug out and removed with a shovel, mattock, Pulaski, or similar tool. As much of the root material should be removed as possible for effective control since Pride of Madeira can readily resprout from remaining roots.

Foliar herbicide application of a 1 to 2% solution of glyphosate is most effective from late spring to summer and should be timed before seed production. Stump cut treatments can also be effective using glyphosate. If seed production has occurred prior to any treatment, seeds should be cut from the plant, bagged, and removed from the site to prevent the seeds from entering the weed seed bank.

1.10.9 Purple False Brome

Purple false brome (*Brachypodium distachyon*) is a fast growing annual or perennial grass with a short life cycle that allows for multiple life cycles during a growing season (Bakker et al. 2009). First emergence is typically during the fall after the first rains however, emergence can occur any time following a rain event. Purple false brome produces a dense thatch that inhibits germination of many native species and the first step for control is to eliminate the dense thatch in a restoration area. Initial mowing and

dethatching will allow for natural recruitment of natives; however, other nonnative herbaceous species can invade after clearing.

Treatment methods for the control of purple false brome include mowing, mechanized or line trimming and foliar herbicide application. When mowing, the plants should be cut as close to the ground as possible. Effective herbicide treatments include fluazifop at 4 to 6 oz a.i./acre from post-emergence to prior to the boot stage or 0.56 to 1.1 lb a.i. per acre of glyphosate from post-emergence application to rapidly growing, non-stressed plants (DiTomaso et al. 2013). Given the fast-growing nature of purple false brome and its ability to have multiple life cycles in a growing season, multiple treatments during a growing season are optimal for increased control. Treatments must be implemented prior to seed set to limit seed banking. Typical timing for treatments is to implement the first control event in winter after emergence with follow-up treatment(s) in spring for later germinating populations and resprouts.

Growth and flower production are dependent on annual rainfall and subsequent soil moisture availability. Monitoring growth and development is important particularly during drought years to plan treatment accordingly for effective control. For example, the flowering height of purple false brome in treatment areas was observed at only a height of 1 to 2 inches in response to the 2015 drought conditions. As a result, physical control methods, such as mowing required more time than usual to ensure that the tractor, or skid steer, mounted mower stayed close enough to the ground to cut the flowering parts of the grass. The low flowering height required the use of a flail mower, instead of a rotary mower, mounted to a hydraulically driven skid steer so the grass could be mowed at the soil surface. The additional time and equipment for the physical control of purple false brome control in dry years increases the cost of control. An alternative option for treating low stature plants is broadcast herbicide application of fluazifop or glyphosate.

1.10.10 Mustard Species

Control methods for mustard species such as black mustard (*Brassica nigra*), shortpod mustard (*Hirschfeldia incana*), and London rocket (*Sisymbrium irio*) consist of mowing, hand pulling, and foliar herbicide application. Mowing or hand cutting treatments are most effective for actively growing plants that have flowered but prior to setting seed to limit contributions back to the weed seed bank. Cutting is most effective for the annual mustard species black mustard and London rocket compared to the perennial shortpod mustard; however, follow-up treatments will likely be necessary for all the mustard species since resprouting can occur. Foliar herbicide application of a 2% solution of glyphosate is most effective when plants are younger prior to flowering, particularly for black mustard. When hand pulling, as much of the taproot as possible should be removed (DiTomaso et al. 2013).

Treatment times depend on annual weather, but typical treatment times are in the winter after emergence from rainfall and a follow-up treatment(s) in spring before seed set. Shortpod mustard can germinate and grow at any time of the year conditions are

right and follow-up treatments may be needed in the summer. Several years of control are necessary to eliminate mustard species.

1.10.11 Nonnative Grass Control

Ripgut brome (*Bromus diandrus*) is a nonnative annual grass that typically emerges after the first rains. Growth and development are dependent upon rainfall events, with flower production earlier in the season during drought years along with a decrease in biomass and height of the plants. Nonnative annual grasses are typically the first nonnative species to germinate after rains. Control methods include, hand pulling, cutting, mowing, and herbicide application. Timing for control of nonnative grasses is typically in winter with follow-up treatments in spring for later-germinating individuals.

Smaller infestations can be controlled with hand pulling before seed development. Mowing can reduce seed production when timed right after flowering but before seeds mature. Plants cut earlier than this stage will grow back. When mowing, the material should be cut to about 2 inches to remove the bolting stems (DiTomaso et al. 2013). If mowing is the only option for control, mowing should be repeated every 3 weeks, as needed.

Ripgut brome can be controlled with a 0.375 to 1.1 lbs a.e. per acre of glyphosate at postemergence in early spring to rapidly growing plants that are not stressed. Fluazifop at a rate of 4 to 6 oz a.i. per acre for mature plants and 2 oz a.i. per acre for seedlings can also be used with the most effective treatment time before the boot stage.

1.10.12 Poison Hemlock

Poison hemlock (*Conium maculatum*) is a biennial species that reproduces by seed. For small infestations, hand-pulling is the recommended method for control. When hand-pulling, the entire taproot should be removed to prevent resprouting. Care should be taken when handling poison hemlock as all plant parts are toxic to humans. Gloves should be worn during control activities and hands should be thoroughly washed after working with poison hemlock. This includes handling of dried material since it takes several years for the toxins present to dissipate. Foliar application of a 1 to 1.5% glyphosate solution is most effective from postemergence to rapidly growing plants prior to bolting. Higher rates of glyphosate can be used for control of plants from bud to full bloom stage. If seed production has occurred prior to any treatment, seeds should be cut from the plant, bagged, and removed from the site to prevent the seeds from entering the weed seed bank.

1.10.13 Stinknet

Stinknet (*Oncosiphon pilulifer*) is an annual species that reproduces from seed that can be controlled by physical methods or chemical methods. Hand-pulling removing all the root material is the best method and is recommended for smaller infestations. Larger populations can be controlled with line trimming once plants reach the bud stage. If viable seed has already formed, line trimming is not recommended since the seed can be easily dispersed, unless the seed material can be removed before cutting. Follow-up control will be needed if cutting is the method used. Care should be taken when

handling stinknet as it can cause contact dermatitis for some individuals. Protective gear includes long sleeve shirts, pants, and gloves to prevent skin contact. Chemical control methods include foliar application of glyphosate. Timing of chemical control methods is critical, and plants should be treated in the rosette stage up to bolting stage but before flowering. Once the plants have flowered, chemical control efficacy diminishes (McDonald, 2023).

1.10.14 Sweet Fennel

Sweet fennel (*Foeniculum vulgare*) is a perennial species that typically emerges in mid-winter to early spring. Control methods include slashing, hand pulling, and herbicide application. Slashing is best used just before the flowering stage of fennel plants, but repeated slashing of new growth is likely required to kill the plant. Hand pulling is best for seedlings and younger, smaller plants as the root system needs to be removed for effective control. When cutting or digging out plants a minimum of 3 to 6 inches of the taproot should be removed for effective control. Physical methods for control of sweet fennel are very labor intensive. It is important to note that digging up plants causes soil disturbance that can lead to increased germination of exposed seeds therefore, digging should be limited to less dense populations (DiTomaso et al. 2013).

Foliar herbicide application of a 2 to 5% solution of glyphosate is most effective from post-emergence to prior to flowering stage. Control with glyphosate is less effective after fennel has bolted (DiTomaso et al. 2013). A 0.5 to 1% solution of triclopyr is most effective during the wet season from late February to early March (DiTomaso. et al. 2013) but can be used from post emergence but prior to flowering. The stump cut method can be used for larger mature plants using a 100% solution of glyphosate.

Timing for treatments is dependent on weather with the first treatment typically in late winter with follow-up treatments in spring. Populations should be checked after using any treatment method to check for resprouts and new seedlings.

1.10.15 Target Annual Invasive Control in the Vernal Pool Watershed

Specific target invasive species to be controlled in the vernal pool watershed include five horn bassia (*Bassia hyssopifolia*), curly dock (*Rumex crispus*), Russian thistle (*Salsola australis*), and buffalobur (*Solanum rostratum*). Control shall be by hand-pulling or line-trimming methods. When hand-pulling, as much of the root material shall be removed as possible. For curly dock, a perennial species, as much of the tap root, at least to a depth of 2 inches, shall be removed to prevent resprouting. Mowing should be done before seed production. Multiple mowing events should be planned to treat subsequent resprouts, including for annual species.

1.11 Effectiveness Monitoring and Reporting

In addition to annual invasive plant surveys by a qualified biologist (see Section 1.6) to determine the appropriate method and timing of control events, and sensitive species surveys (see Section 1.5) before work in sensitive habitat areas during the bird breeding

season, control effectiveness monitoring should also be performed. Effectiveness monitoring involves an annual survey of invasive plant control effectiveness, conducted at least one month after the last annual invasive plant treatment. This survey assesses treated invasive plant populations' estimated size and new locations to guide recommendations for the following year.

The Qualified Biologist should confirm treatments are executed during the year and record key information for a running treatment log, including treatment location, species treated, treatment timing, and treatment method. Treatment areas' spatial locations can be tracked using the 2023 vegetation cover map, recording the polygon in which treatment occurred based on the vegetation map geodatabase. Alternatively, GPS locations can be collected at control locations and entered into a geodatabase for archiving treatment locations.

Recording control treatments is essential for invasive plant management, demonstrating treatment effectiveness and facilitating adaptive management when necessary. More detailed information allows for better management practice adjustments as needed. If resources and time for monitoring and reporting are limited, a minimum amount of basic information should be collected to inform decision-making.

All eradicated populations should be monitored for at least three years to ensure no new recruits emerge from the weed seed bank. Continued surveying is necessary for target invasive species that have been eradicated but are present in the surrounding area and have a high probability of reinvading the park, focusing on areas with the highest potential for recurrence.

Comparing year-to-year monitoring results can yield analytical insights, such as:

- Increase or decrease in target invasive cover within mapped populations and parkwide.
- New occurrences or spread of currently targeted invasive species.
- Eradication of a target invasive weed species.

These quantitative results can document the weed management program's success, help secure future funding sources, and guide adaptive management recommendations to improve future invasive weed management efforts.

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