

Attachment A

Measure M2 Environmental Mitigation Program Restoration Funding Guidelines

February 2012

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- A FY 2009 – 12 Call for Restoration Projects

1 INTRODUCTION & BACKGROUND

1.1 INTRODUCTION

The Orange County Transportation Authority's (OCTA) Mitigation and Resource Protection Program (M2 Mitigation Program) provides for allocation of at least five percent of the total Renewed Measure M (M2) freeway budget for comprehensive environmental mitigation for the impacts from freeway improvements.

The Mitigation Program was approved by Orange County voters under the M2 half-cent sales tax for transportation improvements in 2006. In August 2007, the OCTA Board of Directors (Board) approved a five-year M2 Early Action Plan, covering the years 2007 to 2012, to advance the implementation of key M2 projects, including the freeway M2 Mitigation Program. The M2 Mitigation Program will be implemented under a master agreement between OCTA, Caltrans, and state and federal resources agencies.

This will offer higher-value environmental benefits such as habitat protection, connectivity and resource preservation in exchange for streamlined project approvals for the 13 M2 freeway projects. The Environmental Oversight Committee (EOC), subcommittee created by the OCTA Board of Directors (Board), is responsible for making recommendations to the Board on matters related to the M2 Mitigation Program, including the Master Agreement. Comprised of 12 members, the EOC has been meeting on a monthly basis since November 2007. In March 2009, the EOC and the Board approved the draft Master Agreement and draft Planning Agreement to establish the process, roles, responsibilities and commitments for the preparation of the Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP). The Master Agreement and Planning Agreement were approved by the Board in November 2009. The NCCP/HCP process examines habitat resources within broad geographic areas and identifies conservation and mitigation measures to protect habitat and species. This process is anticipated to take 30 months to complete. However, the Master Agreement includes an "advance credit" provision that could allow funds to be allocated prior to completion of the NCCP/HCP.

These restoration funding guidelines are intended to assist the restoration project sponsors/local entities (Project Sponsor) to better understand the specific technical needs of the OCTA funded restoration projects. These technical needs have been developed in cooperation with the United States Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), and the Army Corps of Engineers (ACOE). This document includes general guidance for the Project Sponsors receiving OCTA environmental mitigation funding. The Project Sponsors are expected to act as OCTA's agents in regards to the development and implementation of the selected restoration projects at the project level. OCTA is ultimately responsible for the success of the restoration projects and will be receiving mitigation "credit" from the applicable resource and regulatory agencies. In addition to these guidelines, the Project Sponsor is

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expected to enter into a contract with OCTA to further clarify the roles and responsibilities of each party for each specified restoration project. Some of these roles and responsibilities are included below.

1.2 ROLES AND RESPONSIBILITIES

This section describes the roles and responsibilities of the Project Sponsors and OCTA.

1.2.1 OCTA

OCTA will be responsible for providing funding to the Project Sponsor as well as approving the final restoration and implementation plan for the selected restoration projects. OCTA will also be responsible for leading the coordination for the approval of the restoration plan by the applicable resource and regulatory agencies. OCTA is ultimately responsible for the success of the restoration projects but will be relying on the Project Sponsor to act on its' behalf through the design, implementation, and monitoring of the project. The Project Sponsor will be responsible through the contract to perform the restoration activities in accordance to the Restoration Plan. OCTA will receive mitigation credit for the restoration project by the applicable resource/regulatory agencies.

1.2.2 Project Sponsor

The Project Sponsor will consist of those entities that are approved and receive OCTA environmental mitigation funding for the selected restoration projects. The Project Sponsor is expected to accept the specified funds from the OCTA M2 Mitigation Program and use those funds to finalize, implement and monitor the agreed upon restoration project. The Project Sponsor will be responsible for developing the restoration plans in compliance with the guidelines set forth in this document, obtaining all State and Federal permits as well as complying with all State and Federal laws required for restoration implementation, and for obtaining the qualified individuals/entities to provide as-needed support for restoration plan development and implementation. Qualified individuals and entities may consist of, but are not be limited to: Biologists, Cultural Resource Specialists, Hydrologists/Engineers, and Restoration Contractors.

1.3 RESTORATION PROJECT FUNDING

The M2 Mitigation Program will provide approximately \$5 million towards restoration projects for the second tranche of restoration funding. An additional \$137,500 will be added to the second tranche, as this was the remaining amount from the first tranche in 2009/10. The total amount for current restoration projects is \$5,137,500. Future tranches of funding have yet to be determined beyond the second tranche.

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The Project Sponsor shall disclose in the Restoration Plan any and all other funding sources which have been utilized for current maintenance and/or will be used for the restoration of the proposed project.

1.4 SUMMARY OF OVERALL PROJECT

In conjunction with Caltrans, CDFG, USFWS, and the ACOE all restoration proposals have been evaluated based on biological merits. There were 20 restoration proposal submittals during the second tranche of funding, including those within core habitat areas. Core habitat areas are defined as areas that support high or very high landscape integrity (intact habitat) and biodiversity (vegetation and sensitive species) in a configuration that promotes the long-term persistence of these biological values.

The evaluation of these restoration properties resulted in four hierarchical groups with the following characteristics:

Group 1	typically possess the highest potential to support similar vegetative communities lost to freeway projects, restore habitat for species that are considered sensitive, provide connectivity/contiguity opportunities, provide the highest potential to successfully replace lost functions and services of aquatic resources lost within the watershed of those at the impact site
Group 2	typically possess good potential to support similar vegetative communities lost to freeway projects, restore habitat for species that are considered sensitive, provide connectivity/contiguity opportunities, possess a good potential to successfully replace lost functions and services to aquatic resources within the watershed of those at the impact site
Group 3	generally possess lower potential to support similar vegetative communities lost to freeway projects, fewer sensitive species, fewer connectivity/contiguity opportunities, and possess lower potential to replace or restore aquatic functions and services lost as result of freeway projects.
Group 4	generally possess very low potential to support vegetative communities lost to freeway projects, very few species considered sensitive, very low connectivity/contiguity opportunities, and possess a very low potential to replace or restore aquatic functions and services lost as a result of the freeway projects

See Attachment—Preliminary Results Restoration Proposals: Biological Factors

Through preliminary discussions with CDFG and USFWS (Wildlife Agencies), and the ACOE restoration proposals within the first two groups (14 total proposals) possess the necessary biological value that would enable OCTA to obtain mitigation credits for the M2 freeway projects. A list of all of the proposed restoration projects from 2009 to 2012 are attached as Appendix A.

Six restoration projects were previously funded during the fiscal years 2010/11 and 2011/12. The six projects that received funding are included in the following table. These projects totaled \$5,462,500. The sixth project, Imperial/SR-91 Proposal (Pelanconi Park), dropped out during the Restoration Plan development process. Hence, the total amount funded was reduced by \$100,000, totaling \$5,362,500.

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Restoration Projects 2010/11	Project Sponsor	Funded
Big Bend	Laguna Canyon Foundation	\$87,500
2C Ranch/Trabuco Creek Restoration	City of San Juan Capistrano	\$1,500,000
Fairview Park	City of Costa Mesa	\$2,000,000
Bee Flat Canyon and Aqua Chinon	Irvine Ranch Conservancy	\$1,450,000
UCI Ecological Preserve	University of California, Irvine	\$325,000
Imperial/SR-91 Proposal (Pelanconi Park)	Anaheim	\$100,000
Total Amount		\$5,462,500

1.5 GOALS AND OBJECTIVES OF THE NCCP/HCP AND REGULATORY PERMITTING

The M2 Mitigation Program has the potential to minimize or reduce regulatory delays in the implementation of the 13 M2 freeway improvement projects. The specific type of mitigation will be determined by OCTA working in conjunction with various stakeholders. The various forms of mitigation may include acquisition and/or restoration of land for conservation.

OCTA is developing a NCCP/HCP Joint Programmatic Environmental Impact Report/Environmental Impact Statement (EIR/EIS), which is to include a Streambed Alteration Agreement (SAA) as well as programmatic level permitting from the ACOE and State Water Resources Control Board (SWRCB) for the 13 freeway improvement projects under M2.

The EIR/EIS/SAA will be prepared to ensure that the following planning goals are met:

- Conservation and management of covered species within the planning area;
- The preservation, restoration and enhancement of aquatic, riparian and terrestrial natural communities and ecosystems that support covered species within the planning area;
- A means to implement Covered Activities in a manner that complies with applicable state and federal fish and wildlife protection laws and other environmental laws, inclusive of the California and Federal Endangered Species Acts (CESA and ESA), the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA);
- A basis for permits necessary to lawfully take covered species;
- A comprehensive means to coordinate and standardize mitigation and compensation requirements for covered activities within the planning area;
- An accounting process that will document net environmental benefit from regional, programmatic mitigation in exchange for net benefit in the

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delivery of transportation improvements through streamlined and timely approvals and permitting;

- A less costly, more efficient project review process that results in greater conservation values than project-by-project, species-by-species review; and
- Clear expectations and regulatory assurances regarding covered activities occurring within the planning area.

OCTA is also working with the ACOE and the SWRCB to obtain permits for these 13 freeway improvement projects. This process will most likely include the execution of a Section 404 (Clean Water Act) Master Individual Permit (MIP) from the ACOE as well as a Programmatic Section 401 (Clean Water Act) Permit from SWRCB. The funded restoration projects may become a part of an OCTA Mitigation Bank or an In Lieu Fee Program established for OCTA through coordination with the ACOE and an identified Interagency Review Team (IRT). The goal is that these restoration projects will adequately mitigate the impacts to jurisdictional waters potentially caused by the 13 freeway improvement projects.

2 RESTORATION PLAN OVERVIEW

The Project Sponsor(s) shall submit a Restoration Plan to OCTA for review and written approval at least 30 days prior to commencing restoration activities. OCTA will then coordinate with the resource and regulatory agencies to obtain acceptance of this plan. Plans shall be prepared by persons with expertise in restoration and monitoring of Southern California ecosystems. A qualified Restoration Contractor shall be responsible for site preparation, plant species installation, and long-term maintenance. Restoration plans shall include the following elements, as described in this section:

- Land ownership/land management
- Property Analysis Record
- Restoration strategy
- Goals and objectives
- Success criteria/Performance Standards
- Site assessment
- Planting plan
- Source materials
- Species protection
- Functions and services to any applicable aquatic resources
- Site preparation and installation
- Maintenance program
- Monitoring program
- Contingency measures
- Reporting and documentation

2.1 LAND OWNERSHIP AND LAND MANAGEMENT

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The Project Sponsor(s) shall provide a description of the land ownership status including the name and address of the land owner(s), the total acreage of the property, the proposed restoration acreage. Where the property is managed by a different entity than the land owner, the Project Sponsor(s) shall include the name, address, and organizational status (e.g., private company, non-profit organization) of the land management entity, including years of experience managing habitat lands and/or conducting habitat restoration.

The protection status of the land shall also be provided including any documentation indicating the Project Sponsor has permission to restore habitat with the appropriate conservation easement or deed restrictions (see Section 7.1). Any current deed restrictions or easements on the land should also be stated. If easements are recorded, those easements should be discussed as to how they are applicable to the restoration project activities (i.e. easement for flood control and known maintenance activities).

The history of the proposed restoration site should also be included. It should be clearly stated, if the land was obtained through federal or local funding that has stipulations for restoring specified resources. If this is the case, restoration activities must be over and above the requirements of the condition expected or anticipated by that previous funding. This discussion should also include if the site was previously used for mitigation or if there are mitigation sites adjacent to the proposed project area.

2.2 PROPERTY ANALYSIS RECORD

The Property Analysis Record (PAR), developed by The Center for Natural Lands Management (<http://cnlm.org/>), is a tool to allow land managers to identify long-term land management tasks and associated costs, including site monitoring, maintenance, and administrative fees. Assigning realistic costs allows establishment of an estimate of the level of effort required to successfully complete and maintain the restoration. Prior to project funding, the Project Sponsor(s) shall prepare a site-specific PAR, or PAR-like equivalent analysis, for review and approval by OCTA and the Wildlife Agencies.

2.3 RESTORATION STRATEGY

The Project Sponsor(s) shall provide a description of the restoration strategy or strategies to be used for the proposed project. Restoration strategies include habitat enhancement, restoration, or establishment (creation), and can be defined as follows:

- *Enhancement* refers to improving the functions and values of existing (but marginal or degraded habitat) to benefit species and/or landscape integrity or connectivity. Enhancement typically does not result in a net gain in habitat acres, but has a high potential for success.

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In relation to jurisdictional waters, enhancement is defined in the ACOE 2008 Mitigation Rule as the manipulation of the physical, chemical, or biological characteristics of an aquatic resource/habitat to heighten, intensify, or improve a specific resource function(s). Enhancement results in the gain of selected aquatic resource function(s), it does not result in a gain in aquatic resource area.

- *Restoration* focuses on re-establishing or rehabilitating former or degraded habitat so that it is capable of supporting native species and/or landscape functions that historically occurred within the site. Restoration may or may not result in a net gain in habitat acres.

In relation to jurisdictional waters, restoration is defined in the ACOE 2008 Mitigation Rule as the manipulation of the physical, chemical, or biological characteristics of the physical, chemical, or biological characteristic of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource/habitat. For the purpose of tracking net gains in aquatic resource areas, restoration is divided into two categories: re-establishment and rehabilitation;

- Rehabilitation means the manipulation of physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.
 - Re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and function.
- *Establishment/Creation* creates habitat where none currently exists, and often involves site manipulations such as grading. Creation may result in a net gain in functions and values by developing one or more types of habitat acres in areas where the habitat type did not exist before. Creation may have a lower potential for success than enhancement or restoration and also has the potential to impact existing habitats.

In relation to jurisdictional waters, establishment is defined in the ACOE 2008 Mitigation Rule as the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource/habitat that did not previously exist at an upland area. Establishment results in a gain of aquatic resource area and functions.

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Although all strategies will have similar goals of improving and increasing the structure, composition, and overall function of the system, they will vary in methods, cost, potential for success, and possibly, maintenance and monitoring requirements. In the following sections, these strategies are referred to collectively as 'restoration.'

2.4 GOALS AND OBJECTIVES

The Project Sponsor(s) shall identify specific goals and objectives for the proposed project. Establishing goals and objectives is an essential component of any restoration effort. Goals and objectives provide a framework against which to measure the overall success of the project and ensure that implementation and monitoring is sufficiently tailored to assess project progress. Goals and objectives should be clear, understandable, measurable, feasible, and sufficiently detailed to avoid interpretation regarding the intent of the project. Goals focus on overall project results, while objectives list the steps or tasks that will be used to attain the goal(s). An example of an appropriate project-specific restoration goal with objectives might be:

- Goal: Improve habitat quality for riparian birds by increasing native plant species diversity, density, and structure within XX feet (acres) of a streambed channel.
 - Objective 1: Remove XX acres of fill within the restoration area to improve hydrological flows (specify timeframe)
 - Objective 2: Remove XX acres of the non-native, invasive Pampas grass (*Cortaderia selloana*) within the restoration area (specify timeframe)
 - Objective 3: Plant XX acres of willows, cottonwoods, and sycamores within the restoration area at a density of XX trees per acre (specify timeframe)

In the case of restoration targeting jurisdictional waters, the objective should also describe the resource type(s) and amount(s) that will be provided, the method of compensation (restoration, preservation, establishment, or enhancement), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed (pursuant to the ACOE 2008 Mitigation Rule).

2.5 SUCCESS CRITERIA/PERFORMANCE STANDARDS

The Project Sponsor(s) shall identify appropriate success criteria prior to project implementation. Success criteria provide a standard by which to (1) measure the progress of the restoration effort and (2) allow for remedial actions or adaptive management if milestones are not achieved. Criteria should evaluate specific attributes of the target habitat or ecosystem that are tied to ecological functioning *and* linked to the project-specific goals and objectives. In addition, species responses to habitat improvements will also be evaluated, where appropriate.

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Performance standards should be listed in table format and clearly document the interim and final performance requirements of the mitigation site.

General and selected habitat-specific criteria are provided in Sections 2.5.1 and 2.5.2, below. However, OCTA recognizes that there may be instances where site conditions and/or operational or ecological parameters preclude attainment of these success criteria. Therefore, the Project Sponsor(s) may establish alternative site-specific success criteria based on historic and/or existing conditions at reference sites on or near the restoration site(s). In these cases, proposed alternative success criteria must be scientifically defensible and supported by scientific evidence, including but not limited to published reports or papers, quantitative field studies, or long-term monitoring data that is relevant to the proposed effort. Documentation to support alternative success criteria must be included in the Restoration Plan and will be subject to approval by OCTA.

2.5.1 General Success Criteria

Success criteria are often defined in terms of percent cover by native and non-native species and species diversity within restored habitat. For restoration projects that involve planting trees, the survival rate of individual trees is also a success criterion. Habitat-specific success criteria are included below. If survival and/or cover requirements have not been met, the Project Sponsor(s) shall be responsible for replacement plantings or additional weed control efforts to achieve these results. Replacement plantings shall be subject to the same survival, growth, and monitoring requirements as initial plantings, and the monitoring period shall begin *after* re-planting. Irrigation shall stop two years prior to achieving the success criteria.

2.5.2 Habitat-specific Success Criteria

Oak, Walnut and Sycamore Woodlands Orange County supports a variety of oak, walnut, and sycamore woodlands, and these habitats may be included in restoration projects. The monitoring period for oak and walnut restoration will be a minimum of 10 years, and the monitoring period for sycamore restoration will be a minimum of 5 years. For these and other tree-dominated woodlands, the following success criteria shall be used.

Restoration plantings shall attain a minimum of 80% survival the first year, 95% the second year, and 100% survival thereafter. By the end of the monitoring period, cover by non-native species will be less than 5%, and none of the non-native invasive species identified in Section 2.10.3 will be present within the restoration site. Because non-native annual grasses have become naturalized in upland environments in Southern California, the performance criteria for non-native annual grasses will be less than 10% cover at the end of the monitoring period.

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All tree plantings should achieve measurable annual growth in height and trunk girth and no loss of the primary growth leader. Loss of the primary growth leader shall require tree replacement if this occurs in years 1-3. Replacement plantings shall be subject to the same survival, growth, and monitoring requirements as initial plantings, and the monitoring period shall begin *after* re-planting (e.g., 5 years after replanting for sycamores, 10 years for oaks and walnuts).

The planting plan for woodlands (Section 2.6.1) should specify the targeted planting density. Surviving trees should be well-distributed spatially across the planting area and any area greater than 400 square feet lacking surviving trees with measurable growth in years 1-3 shall receive replacement plantings. The maintenance and monitoring period shall be extended an additional 5 years *after* replacement plantings for sycamores, and 10 years for oaks and walnuts.

If survival and/or cover requirements have not been met, the Project Sponsor(s) shall be responsible for replacement plantings to achieve these results. Replacement plants shall be monitored with the same survival and growth requirements for 5 years after replacement planting for sycamores and 10 years after replacement planting for oaks and walnuts. Irrigation shall be stopped two years prior to achieving the success criteria (minimum of 5 years prior to achieving the success criteria for oak and walnut restoration sites).

Willow Woodland and Riparian Scrub Restoration plantings shall attain a minimum of 75% native cover after 3 years and 90% cover after 5 years with less than 5% cover by non-native species and 0% cover by non-native invasives. The site shall have 90% of the species diversity of a nearby reference site.

Coastal Sage Scrub Restoration plantings shall attain 50% native shrub cover after 3 years, and 75% native shrub cover after 5 years, with less than 5% cover by non-native species (except annual grassland, which will have less than 10% cover), and 0% cover by non-native invasives. Non-native and non-native invasive species are defined in Section 2.10.3. The site shall have 90% of the species diversity of a nearby reference site.

Native Grasslands If the proposed restoration site will include native grasslands, success criteria should be proposed by the Project Sponsor in the Restoration Plan for concurrence by OCTA and the Wildlife Agencies.

Open Water and Emergent Wetland If the proposed restoration site will include open water and/or emergent wetlands, success criteria should be proposed by the Project Sponsor in the Restoration Plan for concurrence by OCTA, the Wildlife Agencies, and the regulatory agencies. Additionally, habitat function-based success criteria will be used based on project-specific requirements. This may include criteria based on the California Rapid Assessment Method (CRAM) method of evaluation or a similar method that evaluates and scores

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landscape/buffer, physical, hydrological, and biotic attributes within the restoration site.

2.5.3 Species Success Criteria

Assessing species responses to habitat restoration will focus on demonstrating upward trends in presence, abundance, nesting/breeding activity, and/or diversity of selected target species or groups of species (e.g., riparian birds). Target species selection shall focus on species that are indicators of habitat conditions, and may include covered species (as appropriate) and/or non-sensitive common species.

2.6 SITE ASSESSMENT

A site assessment shall be conducted by qualified individuals to (1) identify the basic opportunities and constraints for successful restoration and (2) establish existing or baseline conditions *prior* to initiation of restoration activities. The latter will allow for a comparison of pre- and post-restoration conditions and thus, a measure of the overall success of the restoration effort. The assessment of baseline conditions may assist in establishing realistic success criteria. It is anticipated that the term “qualified individuals” will consist of one or more of the following, depending on project-specific needs: biologist/ecologist; cultural resource specialist; and hydrologist.

In many cases, existing data will be available for use in completing all or a portion of this assessment. It is anticipated that the site assessment will utilize a combination of existing data and surveys, including (but not limited to) technical reports, plant and animal surveys, vegetation and species mapping, field sampling, aerial photography, photos of existing conditions, land use maps, USEPA 303(d) listings, and historic records. At a minimum, the site assessment shall document:

- Existing or historic land uses within and adjacent to the site (including easements)
- Potential for cultural resources issues
- Site access and proximity to water sources
- Fuel management issues
- Existing and historic habitat conditions on and adjacent to the restoration site(s)
- Sensitive species mapping (distribution) on or near the restoration site(s)
- Invasive species mapping (species specific, abundance, acreage, and distribution/map with polygons) on the restoration site(s)
- Soil suitability, as appropriate to the specific restoration effort
- Topography
- Jurisdictional delineation, as appropriate to the specific restoration effort
- Functional assessment (aquatic habitat), as appropriate to the specific restoration effort

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- Hydrology (including aquatic resource concerns such as flooding or poor water quality)
- Water balance study (creation of riparian or wetland habitat), as appropriate to the specific restoration effort
- Compatibility with adjacent land uses and watershed management plans. Reference sites for alternative success criteria, as applicable (this should also include a delineation of jurisdictional waters and a functional assessment)

2.7 PLANTING PLAN

For those projects that propose to introduce plant materials into restoration sites, the Project Sponsor(s) shall include a detailed planting plan in the Restoration Plan. At a minimum, the planting plan shall include:

- Location (with map) of the restoration site(s)
- Schematic depicting the restoration site(s), including identification of suitable planting locations based on soils, aspect, and other site features
- Detailed irrigation plan (if applicable)
- Plant palette (list of all species proposed to be used in the restoration area)
- Size and number of container plantings or cuttings (by species) and amount of seed (by species)
- Planting density (including on-center spacing for each tree and shrub species)
- Planting methodology
- Planting schedule
- Plant protection methods (e.g., invasive species control, herbivory control)
- Photos (with photo point locations/maps) of existing condition
- Videography (if possible) of existing condition

The following guidelines are provided for additional clarification on the planting plan.

2.7.1 Woodlands

Woodland habitats with multiple canopy layers shall include detailed plans for both the canopy (tree) layer and the associated understory layers (including early successional native species); all structural layers shall be monitored to ensure restoration of viable habitat, and all layers shall be subject to general or habitat-specific success criteria, as outlined sections 2.5.1 and 2.5.2.

2.7.2 Tree Relocation

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Tree relocation is not anticipated for most restoration projects; however, the following conditions must be met where tree relocation is deemed feasible and appropriate.

- Prior to relocation, the Project Sponsor(s) shall prepare a complete inventory of trees to be relocated, including species and diameter-at-breast-height (dbh); results of this inventory shall be included in the Restoration Plan.
- The Project Sponsor(s) shall only relocate trees that are in good health, less than 30 inches dbh, *and* that will otherwise be removed as a result of project activities. The trees shall be boxed and relocated to an appropriate location within the restoration site. If a tree is damaged or destroyed during boxing or relocation, it will not be suitable for use in the restoration area.
- Relocation of trees shall be conducted by a certified arborist experienced with transplanting oaks and other native trees.
- If tree relocation is tied to mitigation credit, any damaged or destroyed trees shall be replaced onsite and in-kind. For oak and walnut trees that are less than 5" dbh, replacement ratios shall be 3:1; for trees from 5-12" dbh, the replacement ratio shall be 5:1; and for trees that are 12" or greater dbh, the replacement ratio shall be 10:1. All sycamores shall be replaced in-kind at a 10:1 ratio. In the event that relocated trees need to be replaced, Project Sponsor(s) shall use acorns or walnuts, plants rooted in liners, or one gallon containers to increase the likelihood of survival.
- Relocated trees shall be monitored for survival annually by a biologist according to the schedule in Section 2.5.2. Any relocated tree that does not survive shall be replaced in-kind, at the ratios specified above. Any relocated trees that do not survive or appear unhealthy due to transplanting during the 10 year monitoring period shall be replaced. Replacement plantings shall be monitored with the same survival and growth requirements as initial plantings, for 10 years *after* re-planting.
- All replacement tree stock shall be obtained from a reputable and experienced native plant nursery, using locally adapted stock, and shall not be inoculated to prevent heart rot.

2.8 SOURCE MATERIALS

While source materials typically refer to materials used for restoration plantings, guidelines are also provided to ensure that plant materials used in areas adjacent to the restoration site(s) are compatible with the restoration program.

2.8.1 Restoration Plants

Appropriate selection of restoration plant materials (seed, cuttings, container stock) will have a direct bearing on the overall success of the restoration effort. Locally collected material will be better-adapted to site conditions and thus, have a greater potential for survival. Equally important is maximizing genetic diversity

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of restoration materials; genetically diverse populations are better able to adapt to changing conditions.

In many cases, procurement of source materials from the restoration site or general vicinity will provide adequate material if the source population(s) is large and collection methods include an adequate number of parental plants. In some cases (e.g., relatively common plants or plants with small, local populations), collection from a wider zone (e.g., South Coast ecoregion) may be appropriate. The Project Sponsor(s) shall include a list of all acceptable plant sources in the Restoration Plan; the Project Sponsor(s) shall confirm that all container stock, cuttings, and seed species are derived from specified sources prior to delivery to the restoration site during implementation. The plant source refers to the geographic area where the material was collected for container species propagation and development of seed mixes, which may be different from the nursery or facility where the restoration material is grown.

2.8.2 Invasive Plants

The use of invasive plants in or adjacent to restoration area(s) is prohibited. The Project Sponsor(s) shall not plant, seed, or otherwise introduce invasive plant species into the restoration area(s) or into adjacent landscaped areas. Invasive plant species include those on the California Native Plant Council's (Cal-IPC) California Invasive Plant Inventory (Cal-IPC 2006) and updates (e.g., Cal-IPC 2007). The Invasive Plant Inventory replaces the earlier Exotic Pest Plants of Greatest Ecological Concern in California (Cal-EPPC 1999).

2.8.3 Landscape Plants

The Project Sponsor(s) shall not use plants that require intensive irrigation, fertilizers, or pesticides in landscaped areas adjacent to restoration area(s). In addition, runoff from adjacent areas shall be routed away from restoration site(s) unless specifically intended to augment flows onsite. Any runoff allowed into the restoration area(s) shall be treated prior to entering the site to remove debris or pollutants. The Project Sponsor(s) shall submit a list of plants proposed for use in areas adjacent to the restoration site to OCTA for review and approval. This list shall be submitted with the Restoration Plan or at least 30 days prior to acquiring and/or use of any plant materials in adjacent areas.

2.9 SPECIES PROTECTION

A key objective of restoration projects is to improve habitat for the benefit of native species, including sensitive plants and animals. However, the process of restoration has the potential to directly or indirectly impact species during implementation. For this reason, the Restoration Plan shall incorporate sensitive species protection measures. Species protection measures include (1) focused surveys to identify sensitive species that may be impacted during project implementation, (2) permits and authorizations for take of listed species and

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Species Protection Plans for listed species, and (3) restoration activities restrictions to limit or minimize impacts to sensitive species.

2.9.1 Sensitive Species Surveys

Where the site assessment indicates the presence or potential for occurrence of sensitive species and these species may be directly or indirectly impacted by restoration activities, the Project Sponsor(s) or a qualified Biologist under direction of the Project Sponsor(s), shall conduct appropriately timed surveys prior to initiation of restoration activities. Where sensitive species are documented, the Project Sponsor(s) shall adhere to conditions in sections 2.9.2 and 2.9.3, as applicable.

Focused surveys may include (but are not limited to) surveys for threatened, rare, or endangered species, breeding/nesting birds, southwestern pond turtle, and bats. The Project Sponsor(s) shall use survey guidelines provided below or agency-approved survey protocols. Findings shall be included in the Restoration Plan (if timing allows) or documented in a letter report to OCTA prior to the onset of restoration activities.

Federally or state-listed species. The restoration site(s) (or suitable habitat within the restoration site[s]) shall be surveyed for listed species prior to the onset of restoration activities to ensure that no direct or indirect impacts will occur from project implementation. Surveys shall be conducted by a qualified biologist using agency-approved, species-specific survey protocols. If listed species are detected, the Project Sponsor(s) shall adhere to conditions in sections 2.9.2 and 2.9.3, as appropriate, including the preparation of a Species Protection Plan.

If restoration activities occur subsequent to site preparation (e.g., remedial grading in year 2 or 3), a qualified biologist shall re-survey for listed species using agency-approved, species-specific survey protocols. If listed species are detected, the Project Sponsor(s) shall adhere to conditions in sections 2.9.2 and 2.9.3, as appropriate, including the preparation of a Species Protection Plan.

Breeding/nesting birds. If vegetation removal or other activities that may result in the destruction of nests and death or injury of nestlings and fledglings will be conducted during the bird breeding season (January 15 to June 30 where nesting raptors are an issue, March 15th to September 15th in riparian habitat, and February 15th through August 31st in upland habitat), breeding bird surveys will be conducted. These surveys will consist of at least three surveys conducted the week prior to conducting activities, with the last survey occurring within 2 days prior to commencement of work activities. If no breeding/nesting birds are observed and concurrence has been received from OCTA, work activities may begin. If breeding/nesting birds are observed, the measures described in 2.9.3 will be implemented.

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Southwestern pond turtle. Suitable habitat within the restoration site(s) (i.e., drainages that contain standing water and adjacent uplands) shall be surveyed for southwestern pond turtle (*Actinemys marmorata*) prior to the onset of restoration activities to ensure that no direct or indirect impacts will occur from project implementation. Presence/absence surveys shall be conducted by a qualified turtle biologist. The biologist shall survey both aquatic habitat and potential breeding areas or existing nests in adjacent uplands.

Bats. If the restoration project includes any work at a bridge site, a qualified bat biologist shall survey the bridge structure for bats prior to the onset of restoration activities. The biologist shall conduct a minimum of 3 surveys, 7 days apart; unless a positive presence is determined, the surveys can be ended.

2.9.2 Permitting

If federally or state-listed species are documented on or adjacent to the restoration site(s) during the site assessment and/or focused surveys, the following conditions shall apply:

- The Project Sponsor(s) shall consult with the appropriate agencies, as prescribed in Federal and State Endangered Species Acts, and obtain any necessary federal and/or state permits/authorizations prior to the onset of any restoration activities. Any unauthorized take of listed species may result in prosecution.
- The Project Sponsor(s) shall be required to prepare a Species Protection Plan that contains specific measures to avoid, minimize, or mitigate impacts to listed species. The plan shall be submitted to OCTA with the Restoration Plan (if timing allows) or prior to initiation of any restoration activities, and will require OCTA review and approval prior to commencing work.

If federally and/or state-listed species are found on or near the restoration area *after* the project has been initiated, the following conditions shall apply:

- The Project Sponsor(s) shall cease work in the affected area and consult with the appropriate agencies, as prescribed in Federal or State Endangered Species Acts.
- If the work requires that the species be removed, disturbed, or otherwise impacted, the Project Sponsor(s) shall obtain the appropriate federal and/or state permits/authorizations prior to re-starting work in the affected area. In addition, the Project Sponsor(s) shall submit a Species Protection Plan to OCTA for review and approval.

The Project Sponsor(s) shall also be responsible for obtaining any other resource agency permits applicable to any work related to restoration activities. Such permits may include compliance with CDFG Section 1600, and/or ACOE and Regional Water Quality Control Board Sections 401 and 404.

2.9.3 Restoration Activities Restrictions

Where sensitive species may be directly or indirectly impacted by project implementation, the following species and general biological resource protection measures shall be implemented, as appropriate:

- If threatened or endangered bird species are present in or adjacent to the restoration area, no work shall occur during the breeding season (March 15th through September 15th in riparian habitat and February 15th to August 31st in upland habitat) to avoid direct or indirect (e.g., noise) impacts to listed species *except* as authorized by state and/or federal threatened/endangered species permits/authorizations which may be required prior to commencing restoration activities.
- If breeding activities and/or active bird nests of unlisted bird species are located and concurrence has been received from OCTA, the breeding habitat/nest site shall be fenced or otherwise marked a minimum of 50 feet (250 feet for raptors) in all directions, and this area shall not be disturbed until the nest becomes inactive, or the young have fledged, are no longer being fed by the parents, have left the area, or will no longer be impacted by the project.
- Where restoration activities may disturb nesting swallows on bridges, the Project Sponsor(s) shall avoid work March 15th through September 15th. If such a condition cannot be met, then prior to March 1st of each year, the Project Sponsor(s) shall remove all existing nests which would be impacted by the project. The Project Sponsor(s) shall continue to discourage new nest building in places where they would be disturbed using methods approved by OCTA. Nest removal and hazing must be repeated at least weekly until restoration activities begin or until a swallow exclusion device is installed. The exclusion device must provide a space of four to six inches for the passage of snakes at the bottom edge. Nests must be discouraged throughout the restoration implementation phase. At no time shall occupied nests be destroyed as a result of project implementation.
- If southwestern pond turtles are present in or adjacent to the restoration area, impacts to turtle habitat in wetlands or uplands from project implementation shall take place outside the breeding period (April-August).
- If bats are present in or adjacent to the restoration area, OCTA shall be notified and provisions for their protection/conservation will be discussed. If loss of significant bat roosting habitat occurs due to the implementation of the project, the Project Sponsor(s) shall institute protection measures including the installation of roosting structures below the deck at OCTA approved locations.
- If work is performed within any stream channel during the winter storm period, the Project Sponsor(s) shall monitor the five day weather forecast. Where the forecast indicates precipitation, the Project Sponsor(s) shall

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secure the site to prevent materials from entering the stream or washing downstream. The site shall be completely secured one day prior to precipitation, unless prior written approval has been provided by OCTA. During precipitation events, restoration activities are prohibited *except* for those activities necessary to secure the site. No work shall occur in areas containing flowing water until the flows have receded and the soil moisture content has stabilized.

- Silt; foreign material; herbicides/pesticides; and/or liquids such as oil, gasoline, or other petroleum products will not be introduced to any soil on the restoration site, the drip line (the outside edge of foliage overhang) of any adjacent native plant species, or within existing stream channels.
- Construction equipment, vehicles, and materials will not be placed on planted/seeded restoration species, existing native vegetation, or within sensitive resource areas (stream or wash) and appropriate Best Management Practices (BMPs) should be implemented. All existing resources which are to be protected will be identified by the Project Sponsor(s) on an as-needed basis.
- Equipment should be stored outside of any stream or wash and appropriate BMPs should be implemented.
- If water diversion is needed, a water diversion plan should be prepared and submitted to the resource agencies for approval.

2.10 SITE PREPARATION AND INSTALLATION

The Project Sponsor will be responsible for the implementation of the restoration project. This will consist of site preparation and native plant materials installation performed under direction of the Project Sponsor(s) and the Biologist. The Biologist conducting maintenance inspections shall be knowledgeable of the physical requirements of native vegetation and experienced in the installation and maintenance of native habitats.

2.10.1 Grading

Where grading is necessary to achieve an appropriate planting surface for restoration, the Project Sponsor(s) shall prepare a pre-grading plan which will include final contours, hydrological testing and anticipated flow regime (as appropriate), and schedule for implementation. The pre-grading plan shall be included in the Restoration Plan.

Grading activities shall be subject to the following conditions:

- Grading of restoration sites(s) shall be completed no later than December 31st. If activities are within a stream or creek, grading activities should avoid the wet season (generally between October 1st and April 30th). To the extent feasible, grading should be conducted when soil moisture is relatively low.

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- Heavy machinery used in grading may result in soil compaction. Therefore, grading activities shall avoid the dripline of oaks and other areas where compaction may damage existing native tree species and limit restoration success. If necessary, protective fencing shall be placed around the oak dripline to prevent compaction of the root zone from equipment.
- Following completion of heavy grading, discing (or similar) shall be performed to create loose, uncompacted soil surfaces that are suitable for plant establishment. Soil treatment activities shall avoid the dripline of oaks and other areas to avoid damaging the root systems of oak trees. If necessary, protective fencing shall be placed around the oak dripline to prevent damage of the root zone from equipment.
- For areas that are to be graded temporarily for construction access roads or equipment and are within jurisdictional waters, those areas will need to be restored to pre-construction elevations and revegetated with native non-invasive species. Any temporary fills shall be removed immediately upon completion of its use and relocated or disposed of outside of waters of the US. A grading plan is required showing the locations where grading is to occur and the amount of material to be dredged or filled.

2.10.2 Soil Testing

For restoration strategies that focus on restoring or creating habitat, soil testing may be required prior to and during installation to determine soil suitability and prescribe appropriate soil amendments (if necessary) to ensure adequate growing conditions. Soil testing may occur during the site assessment, site preparation, or restoration monitoring phases, and shall include an assessment of soil texture, nutrients, pH, and compaction, among other factors.

2.10.3 Pre-planting Weed Control

Weed control at restoration sites must be addressed at least 3 months before planting activities are initiated. Sites with a significant weed population may require one or more seasons of weed control before native plantings can be installed. While many methods of weed control are available, weed control strategies shall be site-specific and consider target weed species (including extent and abundance of infestation), existing native vegetation, presence of sensitive species, proximity to water sources, and in some cases, importance of maintaining an intact soil profile.

Methods for controlling many perennial invasive weeds (e.g., Pampas grass, tamarisk, eucalyptus) are relatively standard and include removal and/or herbicide treatment. Refer to Cal-IPC (<http://www.cal-ipc.org/ip/management/index.php>) for sources on specific treatment methods. In all cases, treated plant material shall be removed from the site and disposed of at an appropriate offsite facility.

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Effective herbaceous weed eradication requires initial stimulation of weed growth. This allows a larger crop of weeds to be eradicated and reduces the weed seed bank in the soil. This 'weed farming' method of removal is recommended for restoration sites where target herbaceous weeds are established *and* where irrigation is feasible. Weed farming includes a cycle of irrigation, weed germination, and weed removal that may be repeated up to 12 times or more as a means of reducing the weed seed bank. Mechanical clearing, mowing, and non-residual herbicides (e.g., Rodeo and/or Roundup) may be used to remove weed and exotic species, either in combination with weed farming or as an alternative where weed farming is not feasible. Only herbicide approved for use in aquatic areas by the U.S. Environmental Protection Agency (USEPA) shall be used in riparian areas adjacent to surface flows. Herbicides shall be judiciously and carefully applied in a manner that avoids spillage, and shall not be applied native plant species or spilled into any surface waters. The weed farming process is described below:

- The site will be cleared of weeds by mechanical mowing. Cut vegetation (including stems and flowering heads) will be removed from the site and disposed of at an appropriate offsite facility.
- In the absence of natural rainfall, the restoration area will be irrigated two times per week for a two week period using a temporary irrigation system. Soils shall be saturated to a depth of at least 3 inches during each irrigation cycle.
- Germinated weeds will be mowed and/or treated with an appropriate post-emergent herbicide at the end of the first two week irrigation cycle. Dead vegetation will be removed from the site and disposed of at an appropriate offsite location.
- The cycle of irrigation and weed removal, as described above, will be repeated at least 3 times, including the initial cycle. The cycle will be repeated during different seasons to ensure the removal of both annuals and perennials. The Project Sponsor(s) shall determine if further treatment is required to reduce the weed seed bank.

At the time of planting, the Project Sponsor(s) shall assess whether any undesirable vegetation has become established in the restoration area(s) and whether additional eradication is necessary. Wherever feasible, pre-planting weed control will use mechanical methods such as removal by hand or string trimmers. If effective weed control cannot be attained through mechanical means, appropriate systemic non-residual herbicides may be applied by a licensed applicator under the supervision of the Project Sponsor(s). In some cases, herbicide application may be preferable to mechanical control, particularly where the latter results in excessive impacts to the soil profile. Weed species to be removed may include, but are not limited to the following species listed in Table 1:

**Table 1
Non-native Species**

Common Name	Scientific Name
Tamarisk	<i>Tamarix ramosissima</i>
Eucalyptus	<i>Eucalyptus</i> spp.
Castor Bean	<i>Ricinus communis</i>
Pepper trees	<i>Schinus</i> spp.
Mustards	<i>Brassica</i> spp.
Tree tobacco	<i>Nicotiana glauca</i>
Fennel	<i>Foeniculum vulgare</i>
Arundo	<i>Arundo donax</i>
Ailanthus	<i>Ailanthus altissima</i>
Perennial pepper weed	<i>Lepidium latifolium</i>
Russian thistle	<i>Salsola tragus</i>
Mexican fan palm	<i>Washingtonia robusta</i>
Italian thistle	<i>Carduus pycnocephalus</i>
Milk thistle	<i>Silybum marianum</i>
Non-native weedy thistles	<i>Cirsium</i> spp.
<i>Non-native annual grasses:</i>	
Wild Oats	<i>Avena fatua</i>
Slender wild oats	<i>Avena barbata</i>
Foxtail chess	<i>Bromus madritensis</i> ssp. <i>rubens</i>
Ripgut brome	<i>Bromus diandrus</i>
Soft chess	<i>Bromus hordeaceus</i>
Mediterranean barley	<i>Hordeum murinum</i>
Italian ryegrass	<i>Lolium multiflorum</i>
Annual beard grass	<i>Polypogon monspeliensis</i>
<i>Non-native perennial grasses:</i>	
Pampas grass	<i>Cortaderia selloana</i>
Bermuda grass	<i>Cynodon dactylon</i>
Fountain grass	<i>Pennisetum setaceum</i>
Smilo grass	<i>Piptatherum miliaceum</i>

It should be noted that some non-native species (e.g., annual grasses) are naturalized in southern California and reducing their levels to <5% cover may not be practicable in all situations.

Invasive species consisting of, but not limited to, Arundo (*Arundo donax*), tree tobacco (*Nicotiana glauca*), pepper tree (*Schinus* sp.), Ailanthus (*Ailanthus altissima*), tamarisk (*Tamarix* sp.), perennial pepperweed (*Lepidium latifolium*),

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Russian thistle (*Salsola tragus*), Mexican fan palm (*Washingtonia robusta*), and castor bean (*Ricinus communis*) shall comprise 0% of the cover at the end of the 5-year monitoring period.

2.10.4 Irrigation

Many (but not all) restoration projects will require a supplemental source of irrigation for following plant installation. The irrigation system utilized will depend on site conditions (including access and sources of water) and target plant species. Potential irrigation systems include (but are not limited to) overhead, drip or bubbler systems, or water trucks. The Project Sponsor(s) shall include a detailed irrigation plan in the Restoration Plan. The irrigation plan shall identify the irrigation system and materials, water source, and irrigation schedule.

2.10.5 Planting

All plantings (including seeding and hydroseeding) shall occur between October 1st and April 30th to take advantage of winter rains. If supplemental irrigation will be provided for container stock, planting (but not seeding) may occur into early spring. The Restoration Contractor shall install locally-specific plant materials as described in Section 2.8.1. Container stock shall be installed no later than April 30th, cuttings shall be installed no later than February 1st, and seed shall be planted no later than December 31st. The plant palette, as well as planting density and methodology, shall follow specifications set forth in the detailed Planting Plan (Section 2.6).

3 RESTORATION MAINTENANCE PROGRAM

Maintenance of the restoration site(s) shall be performed by the Project Sponsor(s) or a qualified Restoration Contractor ('Maintenance Contractor') under direction of the Project Sponsor(s). The individual conducting maintenance inspections shall be a professional (e.g., biologist, landscape architect, horticulturist) knowledgeable of the physical requirements of native vegetation and experienced in the installation and maintenance of native habitats.

3.1 SCHEDULE AND DURATION

Restoration site(s) shall be maintained on a regular basis throughout the maintenance period. The frequency of maintenance activities will depend on a variety of factors, including (but not limited to) restoration site size, type of plantings, use of irrigation, weed control requirements, and herbivore issues. Typically, maintenance will occur more frequently in the year following plant installation and will taper off as plantings become established and success criteria are met. The maintenance period shall begin upon completion of plant installation.

During the maintenance period, sufficient personnel and equipment shall be allocated to perform maintenance of all planted areas. Maintenance of the restoration site(s) shall occur for 5 years (10 years for oak and walnut restoration

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sites) following plant installation (sections 2.5.1 and 2.5.2). Maintenance visits shall be conducted a minimum of once monthly during the first year after installation and quarterly thereafter. The need for additional maintenance visits shall be determined by OCTA the Wildlife Agencies, and the regulatory agencies depending on site conditions.

3.2 MAINTENANCE ACTIVITIES

The Project Sponsor(s) or Maintenance Contractor shall be responsible for implementing maintenance activities in Sections 3.2.1-3.2.9, as appropriate, according to the schedule and duration in Section 3.1.

3.2.1 Erosion Control

Drainage and sedimentation control devices shall be routinely cleaned, maintained, and repaired, as necessary. The Project Sponsor(s) or Maintenance Contractor shall install additional erosion control devices where necessary, as indicated by OCTA. Once sufficient vegetative cover has developed to prevent erosion, the erosion control devices shall be removed at the direction of OCTA.

3.2.2 Weed Control

Weeds shall be controlled in the restoration area(s) for a minimum of 5 years (10 years for oak and walnut restoration sites). Weeds shall be removed mechanically, to the degree feasible. Where mechanical removal is ineffective or detrimental to the soil profile, herbicides shall be applied utilizing appropriate methodologies and application rates, as determined by the Project Sponsor(s) and/or Maintenance Contractor, and as described in Section 2.10.3.

Follow-up foliar application of herbicide shall be applied to any resprouting stems of invasive species in the restoration area(s) approximately 5 to 7 weeks after the initial treatment. At a minimum, quarterly inspections and reapplication of herbicide, if necessary, shall be conducted for a period of 5 years (10 years for oak and walnut restoration sites) to ensure weed control.

Weed control activities shall occur prior to seed set to prevent weed seed from contributing to the soil seed bank. Care should be taken to avoid native plantings during weed control activities. Spraying shall not be done under windy conditions to avoid herbicide drift.

3.2.3 Plant Protection

In restoration areas where plant loss or damage from herbivores (e.g., rabbits, gophers, ground squirrels, deer) is high, individual plants may need protective barriers. The need for plant protection shall be assessed on a site-specific basis. Plant protection may include (but is not limited to) wire cages lining planting holes for root protection (e.g., oaks, walnuts); shields or protective sleeves around

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trunks (trees) or entire plants (e.g., herbaceous perennials, shrubs) for sapling or shoot protection; or fencing of all or a portion of the restoration site(s) to exclude herbivores completely. Above-ground plant protectors shall be removed once plants are sufficiently large to withstand herbivore damage. After removal, plant protection devices shall be disposed of at an appropriate offsite facility.

Insects, plant disease, herbivores, and other pests will be closely monitored during the maintenance period. Diseased or infected plants will be immediately disposed of off site at an appropriate landfill to prevent infection of on-site resources. Where possible, biological controls will be used instead of pesticides or herbicides. Pesticide use will comply with local codes and regulations. The use of rodenticides that contain the active ingredients brodifacoum, bromadiolone, or difethialone is prohibited. If caging and fencing, as described above, is not sufficient to control rodent herbivory, live traps will be used as necessary to control problem rodent species.

3.2.4 Trash and Debris Removal

Although trash and debris will be removed from the restoration area during initial site preparation, it is anticipated that ongoing trash and debris removal will be required (e.g., following rain events or weed control activities). The Project Sponsor(s) or Maintenance Contractor shall be responsible for removing trash and debris during the maintenance period. Garbage, debris, and noxious weed biomass shall be removed from the restoration site(s) and disposed of at an appropriate offsite facility. Dead or downed wood of native species shall not be removed except as required for safety or flood control purposes.

3.2.5 Irrigation

The Project Sponsor(s) or Maintenance/Restoration Contractor shall be responsible for ensuring proper irrigation of plantings and maintaining all components of the temporary irrigation system at the restoration site(s). The irrigation system shall be maintained and repaired as necessary during the period of use. When irrigation is discontinued, all irrigation equipment shall be removed from the site and disposed of at an appropriate offsite facility.

For restoration projects that use supplemental irrigation, irrigation shall be discontinued 2-5 years before the end of the maintenance period. Projects with a 5-year maintenance program may utilize irrigation for a maximum of 3 years after planting, while projects with a 10-year program may utilize irrigation for up to 5 years following planting. For 5-year projects, it is anticipated that in the first year following installation, plants will be irrigated at a frequency sufficient to keep soil within the root zone moist during the active growing season. In year 2, irrigation is anticipated to lessen, with frequency based on specific plant requirements. In year 3, it is anticipated that little to no irrigation shall be required. This schedule shall be tailored, as appropriate for 10-year projects. In all cases, the timing and

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frequency of irrigation shall be adjusted, as necessary, based on climatic conditions.

3.2.6 Vandalism

The Project Sponsor(s) or Maintenance/Restoration Contractor should note any instance of vandalism and report occurrences to OCTA within 24 hours. Recommendations for the replacement of damaged plants and their protection shall be developed by the Project Sponsor(s) and submitted to OCTA for review and approval. Remedial measures will be undertaken in a timely manner by the Project Sponsor. A description of all remedial actions will be included in the annual reports.

3.2.7 Replacement Plantings

Any portion of the restoration area that is bare or exhibits cover significantly below the success criteria due to low seed germination or establishment shall be reseeded. Prior to reseeding, soil compaction and soil chemical analyses may be required to identify site-specific characteristics that may inhibit plant establishment and thus, require specialized site preparation methods or seed mixes.

Dead container plants shall be recorded by the Maintenance /Restoration Contractor and replaced on an annual basis to ensure that project success criteria are met. Prior to replanting, the Project Sponsor(s) shall assess the cause of mortality to determine whether the same or alternative (native) species shall be re-installed. All reseeding and replanting shall be conducted from October through December of each year, unless irrigation is provided.

3.2.8 Fire Suppression

Wildfires are an integral component of the Mediterranean ecosystem of southern California and will likely affect some restoration sites. Although native vegetation is generally fire-dependent, recovery from fire depends on a variety of factors, including the age and health of pre-fire native vegetation, presence of an established native species soil seed bank, and fire intensity and frequency. Preventing overly frequent fires (particularly for young or establishing vegetation) will assist in achieving a diverse age structure of vegetation, while promoting natural fire cycles will prevent habitat from becoming too mature and dense. This, in turn, will reduce the fuel load and the chances of large, uncontrollable fire events.

Although prevention of fire is not possible, the damaging effects can be minimized by maintaining the overall health of the restoration plantings *and* reducing invasive species to the degree feasible. Many invasive species, such as grasses, are highly flammable and capable of spreading fire quickly across the landscape. Further, they often exhibit higher post-fire establishment rates

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than native species, thereby perpetuating the cycle of increased fire frequency and intensity at the expense of native plant establishment.

In addition to appropriate site maintenance, the Project Sponsor(s) shall develop a Fire Management Plan that addresses wildland fire suppression and pre-fire vegetation management for the restoration site(s). If the restoration site(s) is part of a larger property for which a Fire Management Plan already exists, it shall be subject to guidelines in the existing plan. The Fire Management Plan shall identify the following elements:

- Fire management objectives and general guidelines
- Fire management units (if appropriate, depending on size of site)
- Restricted uses onsite to help prevent catastrophic wildfires
- Prevention and suppression tactics, including fuelbreaks and targeted fuel management
- Sensitive resource areas to be avoided
- Staging areas for trucks and equipment
- Road repair and maintenance requirements for specified fire access roads

In developing the Fire Management Plan, the Project Sponsor(s) shall coordinate with the appropriate fire agencies (e.g., CalFire, Orange County Fire Authority).

3.2.9 Flood Control

Flooding is a natural occurrence along stream channels. However, severe flooding that uproots establishing vegetation within restoration site(s) and causes excessive erosion may hinder achievement of restoration-specific success criteria. The Project Sponsor(s) shall implement erosion control measures (Section 3.2.1) in advance of flooding events to minimize damage.

4 RESTORATION MONITORING PROGRAM

The purpose of restoration monitoring is to evaluate progress towards achieving success criteria and ultimately, project goals and objectives, through repeated observations or measurements. Where monitoring indicates that the project is under-performing, maintenance or management activities can be modified or adapted in a timely fashion to correct the deficiency (i.e., adaptive management).

4.1 FREQUENCY AND DURATION

Restoration monitoring shall begin prior to project implementation with the establishment of baseline conditions during the site assessment. Thereafter, monitoring to assess project success shall commence subsequent to installation of plant materials or initiation of specific maintenance activities (e.g., invasive weed control). At a minimum, restoration monitoring will be conducted yearly

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during the life of the restoration project (e.g., 5- or 10-year maintenance and monitoring period plus any extensions due to replacement plantings).

4.2 ADAPTIVE MANAGEMENT PLAN

Adaptive management is a structured approach to resource management that includes (1) establishing objectives, (2) monitoring to determine whether objectives have been met, and (3) using monitoring results to update and/or alter management activities to achieve objectives. The Project Sponsor(s) shall develop an Adaptive Management Plan for restoration monitoring which will:

- Document the ranges of natural variation within the targeted restoration habitats (i.e., baseline conditions)
- Collect and continuously update information that will inform adaptive management (e.g., qualitative and quantitative data collection)
- Measure the success of specific restoration activities (e.g., vegetative growth, non-native species removal)
- Measure species response to restoration activities (e.g., distribution and abundance of target species)

Sections 4.2.1 – 4.2.4 identify potential monitoring methods, with the understanding that these may be refined or altered based on expert input and monitoring results. In general, monitoring for restoration success should focus on assessing both habitat condition and species responses to restored habitat. The monitoring activities will be performed either annually or during each maintenance site visit, as noted in each sub-section. The adaptive management utilization will need prior approval from resource and regulatory agencies.

4.2.1 Photo-monitoring

The Project Sponsor(s) or designated biologist(s) under direction of the Project Sponsor(s) shall establish photo-monitoring stations (points, plots), as appropriate, within the restoration site(s). Photo stations allow a photographic record to be developed over time, and are a valuable tool for monitoring change, as well as re-locating transect or plot locations. For monitoring change, the ability to replicate conditions (e.g., location, direction, camera lens and angle) between years is particularly important; therefore, photo stations and photographs need to be well-marked and documented, as follows:

- Photo stations shall be marked in the field with metal stakes or posts, and triangulated or otherwise referenced to permanent landmarks (e.g., large boulders, roads, structures) so that the photo station can be reestablished if the marker is lost or destroyed.
- Photo station locations shall be recorded using a GPS device; in addition, the location shall be marked on a map and included with the annual and final reports.

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- A photo log form shall be used for all photo documentation. The log shall include (but is not limited to) the following information:
 - Photographer name
 - Date of photo documentation
 - Photo station location (including GPS point)
 - Camera type and lens
 - Film type
 - Compass direction for each photograph
 - Height and angle of camera for each photograph
- Both the photo log for each photo station and all photographs taken at the station shall be included in the annual and final reports. Photographs shall be labeled and cross-referenced to the photo log.

As an option, video-monitoring to demonstrate the restoration progress and to make comparisons between before and after conditions is also recommended. Photographs of site progress (or video-monitoring) will be obtained at permanent photo stations at least once a year throughout the 5- or 10-year monitoring period. Photographs of maintenance activities and general site conditions will also be obtained as required throughout the 5- or 10-year period.

4.2.2 Habitat Monitoring

This section provides general guidelines on monitoring methodologies for those habitats expected to be the focus of most restoration efforts. Additional habitats not included here (e.g., coastal wetlands) may require alternative methodologies. In those cases, the Project Sponsor(s) shall develop habitat-specific monitoring methods for review and approval by OCTA.

Habitat monitoring methods outlined below are largely quantitative in nature, and shall be supplemented by plant survival data collected by the Maintenance/Restoration Contractor (Section 3.2.7). When developing or refining methodologies for habitat monitoring, the Project Sponsor(s) shall:

- Define the type and number of sampling units (e.g., transects, plots, points)
- Describe the sampling unit size and shape
- Determine the placement of sampling units and whether they will be temporary or permanent
- Provide sample data collection forms

Oak, Walnut, and Sycamore Woodlands. The Project Sponsor(s) or designated biologist(s) shall establish permanent vegetation transects within the restoration site(s), and collect quantitative data on species composition and structure (e.g., cover, height, development of multiple vertical layers) along each transect. Monitoring should quantify recruitment of trees and shrub species within 2 x 2-m plots along each transect, and measure heights and girths for the dominant tree

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and shrub species along each transect. In addition, the biologist(s) should qualitatively assess trees for evidence of damage or disease.

Riparian Habitat. The Project Sponsor(s) or designated biologist(s) shall establish permanent vegetation transects perpendicular to the riparian corridor, and collect quantitative data on species composition and structure (e.g., cover, height, development of multiple vertical layers) along each transect. Monitoring should measure foliage volume at 1-m height intervals within 2 x 2-m plots, identify species contributing to the foliage volume, quantify recruitment of woody riparian tree and shrub species within 2 x 2-m plots along each transect, and measure heights and girths for the dominant riparian tree and shrub species along each transect.

Depending on project-specific requirements, the Project Sponsor shall perform CRAM (or a similar method of evaluation) to assess the levels of habitat functions and services provided by the restoration site.

Coastal Sage Scrub. The Project Sponsor(s) or biologist(s) shall establish transects within scrub habitat, and collect quantitative data (e.g., species richness, cover) along each transect and in quadrats. Number and size of transects/plots may vary depending on the site; however, a relatively efficient and effective sampling design has been demonstrated using a combination of 10 50-m point-intercept transects with 1 m x 1-m quadrats placed on alternate sides of the transect at 5 m intervals. Cover data is collected at 1 m intervals along the transect line; species richness data is collected within the quadrats and should be correlated with climatic conditions, particularly for annual species (Deutschman and Strahm 2009).

Grasslands. The Project Sponsor(s) or biologist(s) shall collect quantitative data on vegetation species distribution, abundance, composition, and structure (e.g., cover, height, amount of thatch), using randomly allocated transects and/or randomly placed 1-m² quadrats. Monitoring shall record percent vegetative cover (categorized by native versus non-native species cover), species abundance, and amount of thatch for each quadrat. Quadrat size may need to be adjusted based on the size of the restoration area and/or results of initial monitoring studies.

4.2.3 Native Species Monitoring

While habitat monitoring provides an indication of the structure and composition of restored habitat, species monitoring can determine the functionality of the habitat for wildlife species. Species monitoring shall focus on sensitive and/or non-sensitive species, as appropriate. Although some sensitive species (e.g., California gnatcatcher, least Bell's vireo) can act as indicators of habitat condition, these species are not always present, even if suitable habitat is available. Therefore, monitoring increases or changes in species diversity

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(including common species), particularly where these changes can be correlated to habitat improvement or successional stages, may be a more useful measure of restoration success.

Based on restoration goals and objectives, the Project Sponsor(s), in coordination with OCTA and the wildlife agencies, shall identify suitable target species or species groups for monitoring (e.g., California gnatcatcher, arroyo toad, riparian birds, coastal sage scrub birds). The Project Sponsor(s) or designated biologist(s) shall monitor target species annually to assess their distribution, relative abundance, and/or breeding activity. Surveys shall be conducted according to standard survey protocols, where available.

Surveys for riparian birds shall be conducted along systematic survey routes, monitoring all portions of the riparian habitat. Monitoring shall identify species using the habitat and their relative abundance, and quantify the number of nesting pairs of any sensitive riparian bird species (e.g., least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, Cooper's hawk) using the habitat for nesting. Surveys shall be conducted at varying times of day between visits. The stream reach shall be monitored three times during January through mid-March, with at least a 7-day interval between site visits. Surveys shall begin within 1 hour after sunrise and end by noon, and should not be conducted under extreme conditions (i.e., during heavy rain or when the temperature is $>95^{\circ}\text{F}$ or $<40^{\circ}\text{F}$ or with winds >10 mph). Taped vocalizations shall be used, as needed. Territories (singing males) and nest locations shall be mapped, and the nest fate recorded (i.e., determine number of eggs laid, nest parasitism rates, eggs or nests lost to nest predators, and number of chicks fledged).

Surveys for upland birds (exclusive of those conducted using protocol surveys) shall be conducted by point counts 4 times per year (according to season), with each site visited 2 times per season. Point count monitoring shall record species and relative abundance within a given area, and counts shall begin at dawn.

4.2.4 Invasive Species Monitoring

Invasive Plant Species. Invasive plant species shall be monitored by the Project Sponsor(s) or Maintenance Contractor as part of the Maintenance Program (Section 3.2.2) and by the Project Sponsor(s) or designated biologist during habitat monitoring (Section 4.2.2). Where invasive plant species are determined to pose a threat to restoration success, remedial actions will be implemented, as discussed in Sections 3.2.2, and documented in the appropriate reports.

Invasive Animal Species. The Project Sponsor(s) or biologist(s) shall survey annually for bullfrogs, cowbirds, and other invasive animal species that have the potential to significantly and negatively affect native wildlife. Surveys shall be conducted by walking through suitable habitat and mapping their distribution and relative abundance. Where invasive animals are determined to pose a threat to

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native species, recommendations for management will be included in the appropriate reports.

5 CONTINGENCY MEASURES

If at any time, the restoration project appears to be under-performing according to the established success criteria, the Project Sponsor(s) shall conduct remedial actions in a timely fashion to ensure that goals and objectives of the project are met. In addition, the Project Sponsor(s) may consult with the agencies regarding adaptive management that may result in alterations to the Restoration Plan. Potential remedial actions have been addressed throughout this document and include (but are not limited to):

- Replacement plantings
- Remedial reseeding
- Soil testing
- Invasive control
- Supplemental irrigation

In the event of a major fire or flood or other disturbance that substantially damages the restoration project, post-disturbance site conditions will be assessed as soon as the area is safe to access (e.g., the threat has passed). This site assessment shall be conducted by the Project Sponsor(s) and results shall be documented in a letter report to OCTA with accompanying photographs. At a minimum, invasive species abatement practices will likely be initiated or increased to encourage natural recovery processes. If evidence of natural recovery, as defined by native species regeneration (e.g., seedlings, stump sprouting), is not observed within three months or one growing season of the disturbance, or if the recovery is deemed inadequate to meet the stated goals and objectives of the project, the Project Sponsor(s) shall prepare an analysis detailing the cause of the failure and shall enter into consultation with the agencies to determine an appropriate course of action, including (but not limited to) remedial actions, adaptive management, and/or modified project goals and objectives.

Where fire or flood damages the restoration site(s), the Project Sponsor(s) shall work with OCTA and the Wildlife Agencies to develop an adaptive management strategy that allows the restoration effort to move forward. This strategy may include (but is not limited to) post-disturbance monitoring, re-planting, and modified success criteria.

6 REPORTING AND DOCUMENTATION

Reporting is an important tool to assess project success and determine the need for remedial actions or adaptive management. Documentation provides a permanent record of the restoration project, and informs long-term site management and/or other restoration or research efforts.

6.1 REPORTS

The Project Sponsor(s) shall be responsible for submitting reports to OCTA for review and approval according to the schedules below. In addition, the Project Sponsor(s) shall be responsible for any other reporting requirements necessitated by federal or state permits or authorizations.

6.1.1 Maintenance Reports

The Project Sponsor(s), with input from appropriate contractors, shall be responsible for preparing maintenance reports during the entire maintenance period. Maintenance reports shall be prepared and submitted to OCTA and the Wildlife Agencies following each maintenance visit. As set forth in Section 3.1, maintenance visits shall be conducted a minimum of once monthly during the first year after installation and quarterly thereafter. Maintenance reports shall be letter reports (unless specific issues dictate a longer report) and shall include:

- Person or person(s) conducting the maintenance
- Date(s) of maintenance visits
- General site conditions
- Description of maintenance activities (e.g., irrigation maintenance, weed control, trash removal) and actions taken
- Issues or problems requiring follow-up attention
- Recommendations

Maintenance activities shall be summarized in the annual status report (Section 6.1.2) and final report (Section 6.1.3). In addition, those reports shall review the Maintenance Program budget, project schedule, and restoration site viability. Any proposed changes and/or recommendations shall be subject to review and approval by OCTA.

6.1.2 Annual Status Reports

The Project Sponsor(s) shall provide OCTA and the Wildlife Agencies with an Annual Status Report (ASR) no later than January 31 of every year after project initiation and continuing until OCTA accepts the Final Report. The ASR shall present an overview of the restoration effort, focusing on year-to-date activities, and shall specifically address maintenance activities, monitoring methodologies and results, success criteria (as measured by plant survival, percent cover, or other parameters), remedial actions (including but not limited to replanting or reseeding), and recommendations for the following year. The ASR shall include the following:

- a list of names, titles, and companies of all persons who prepared the content of the annual report and participated in monitoring activities for that year

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- a description of the existing conditions of the site
- the results of focused wildlife surveys
- an analysis of all qualitative and quantitative vegetation monitoring data
- the method used to assess these parameters
- the number by species of plants replaced
- copies of all photo documentation
- maps identifying monitoring areas, transects, and planting zones
- GPS points of all sampling locations and photo documentation points
- discussion and recommendations
- copies of all permits, and any special conditions or letters modifying the original permit conditions
- a description of the status of the restoration site and restoration activities, including actual or projected completion dates, if known
- a table showing the implementation status of each restoration task
- an assessment of the effectiveness (e.g., success criteria) of each completed or partially completed restoration task

6.1.3 Final Report

Upon completion of the maintenance and monitoring programs, the Project Sponsor(s) shall prepare a Final Report that summarizes methods, results, remedial actions, and adaptive management from all monitoring years (see elements in Section 4.2, above); appendices shall include all pertinent data and photo documentation. The Final Report shall serve as the complete record of the restoration project. The Final Report shall also include recommendations for long-term management of the restoration site(s).

The resource and regulatory agencies will determine if the mitigation site is successful. If the restoration project includes restoration with identified jurisdictional waters, the Project Sponsor (through coordination of OCTA) will need to obtain written concurrence from the ACOE District Engineer that the restoration project has met its objectives and no additional monitoring reports are required. A final site inspection may be necessary to determine mitigation success.

6.1.4 Data Documentation

The Project Sponsor(s) shall be responsible for maintaining and submitting project documentation to OCTA with all reports. Data to be submitted shall include maps (including GIS-generated maps where possible), quantitative monitoring data (including forms and field notes), photo documentation (photographs and accompanying photo logs) and video documentation (if applicable). This documentation should be completed to the standards required by the ACOE if the mitigation project includes restoration of aquatic habitat. Data shall be provided in an electronic format, to the degree feasible.

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The Project Sponsor(s) shall maintain a record of maintenance and monitoring activities to assist in evaluating changes in resource status, and responses to remedial or adaptive management actions. Restoration status should be reviewed annually to inform the next year's restoration maintenance and management activities.

7 LONG-TERM RESTORATION SITE PROTECTION

While the restored habitat will be presumed to be self-sufficient once maintenance and monitoring obligations are met, some level of post-restoration site protection and monitoring may be required to ensure long-term habitat viability. In the Final Report, the Project Sponsor(s) shall document site-specific conservation mechanisms and long-term land management tasks and costs.

7.1 SITE CONSERVATION MECHANISMS/LONG-TERM PROTECTION INSTRUMENT

The Project Sponsor(s) shall provide information on site-specific strategies for long-term land protection of restoration site(s). Strategies should include conservation easements or Deed restrictions.

Prior to sign off, the Project Sponsor will place a conservation easement, or other Wildlife Agencies-approved conservation mechanism, in favor of the Wildlife Agencies (or an approved third party), over the project site specifying that the area will be retained in perpetuity as open space for the sole purpose of native habitat conservation. The conservation easement or mechanism language should be approved by the Wildlife Agencies and OCTA prior to its execution. The conservation easement or mechanism shall disclose the obligations of future owners/tenants of the property.

For restoration projects within jurisdictional waters, long term protection of the aquatic habitat, riparian areas, buffers, and upland that comprise the overall compensatory restoration (mitigation) project is required. Long-term protection may be provided through real estate instruments such as a conservation easement. All real estate instruments shall be approved by the ACOE's Office of Counsel, through coordination with OCTA. The owner of the property must have the conservation easement/deed restriction placed prior to or concurrent to work within jurisdictional waters.

References

- California Exotic Pest Plant Council (Cal-EPPC). 1999. The Cal-EPPC list of exotic pest plants of greatest ecological concern in California. California Exotic Pest Plant Council: San Juan Capistrano, CA.
- California Invasive Plant Council (Cal-IPC). 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, CA. Available: www.cal-ipc.org.
- California Invasive Plant Council (Cal-IPC). 2007. New weeds added to Cal-IPC inventory. Cal-IPC News. Spring.
- Deutschman, D. and S. Strahm. 2009. Improving statistical sampling and vegetation monitoring for the NROC reserves in central Orange County: Year 2. 2008 Final Report. Prepared for The Nature Reserve of Orange County (NROC). Addendum #1 to research agreement #07-03. January.
- U.S. Army Corps of Engineers and Environmental Protection Agency. 2008. *40 CFR Part 230 Compensatory Mitigation for Loss of Aquatic Resources; Final Rule*. Available: <http://www.epa.gov/owow/wetlands/pdf/wetlands_mitigation_final_rule_4_10_08.pdf>