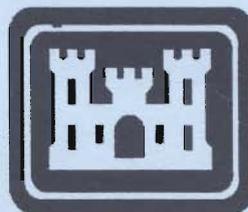


SUPPLEMENT TO STANDARD
OPERATION AND MAINTENANCE
MANUAL
SACRAMENTO RIVER
FLOOD CONTROL PROJECT
UNIT 118 - PART NO. 2
VEGETATION ON MITIGATION SITES

EAST LEVEE OF SACRAMENTO RIVER FROM
AMERICAN RIVER TO TOWER BRIDGE
AND
SOUTH LEVEE OF AMERICAN RIVER FROM
MAYHEWS DOWNSTREAM TO SACRAMENTO RIVER

APRIL 2000



SACRAMENTO DISTRICT
CORPS OF ENGINEERS
U.S. ARMY
SACRAMENTO, CALIFORNIA

Supplement to Standard Operation and Maintenance Manual
Sacramento River Flood Control Project

Unit 118 - Part 2
Vegetation on Mitigation Areas

East Levee of Sacramento River from American River to Tower Bridge and South Levee of
American River from Mayhews Downstream to Sacramento River

April 2000

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SUPPLEMENT TO STANDARD OPERATION AND
MAINTENANCE MANUAL
SACRAMENTO RIVER FLOOD CONTROL PROJECT

UNIT 118 - PART NO. 2
VEGETATION ON MITIGATION SITES

EAST LEVEE OF SACRAMENTO RIVER FROM
AMERICAN RIVER TO TOWER BRIDGE AND
SOUTH LEVEE OF AMERICAN RIVER FROM
MAYHEWS DOWNSTREAM TO SACRAMENTO RIVER

SECTION I

INTRODUCTION

1-01. Authority. Additional information pertaining to authority for this project, project works, and the protection to be provided by this project are provided in the Standard Operations and Maintenance Manual and the Supplement To Standard Operation and Maintenance Manual Unit No. 118 - Part 1.

1-02. Purpose of the Manual

a. General. This manual is Part 2 to the Supplement to Standard Operation and Maintenance Manual for the Sacramento River Flood Control Project for Vegetation on Mitigation Sites. This manual is intended to outline the maintenance and management requirements for *Vegetation on Mitigation Sites*; however, it is not intended to provide detail on how the Reclamation Board should implement maintenance and management requirements for Vegetation on Mitigation Sites. Because the Reclamation Board will assume all responsibilities for maintenance, management, and adherence to mitigation performance standards at the mitigation sites, the determination as to how the mitigation sites will be managed and maintained will be made by the Reclamation Board.

This supplement is intended to provide additional information and guidance for maintenance, management, and monitoring of the mitigation features. It does not address vegetation on the levee or maintenance of the levee outside of the designated mitigation planting areas. The Standard Operation and Maintenance Manual and Supplements thereof for the Sacramento River Flood Control Project will continue to provide primary guidance for all public safety issues and decisions.

b. Format and Content. The organization and format of this Supplement is written to be consistent with the Standard Operation and Maintenance Manual, and the Supplement to the

Standard Operation and Maintenance Manual, Unit No.118 - Part No. 1. This manual is intended to provide supplemental information that is not specifically addressed in these two documents. The intent of this manual is to provide supplemental information applicable to mitigation features not previously addressed.

This Supplement to the Standard Operations and Maintenance Manual, Sacramento River Flood Control Project, Unit No. 118-Part 2 pertains to Vegetation on Mitigation Sites, Sites 1, 2, 3, and 4 located on the (south) left bank of the Lower American River in Sacramento, California.

1-03. Location and Description

a. Location. The project sites covered under this manual are located on the Lower American River, a tributary of the Sacramento River (Exhibit A-1).

(1) Site 1 (river mile 2.10 LT) is located on the south bank in the vicinity of the 16th Street/Highway 160 bridges, extending about 2,600 feet (ft) along the south (left) riverbank. The site extends under an existing pedestrian bridge and the Union Pacific Railroad (UPRR) bridge that are located upstream of the Highway 160 bridge.

Bank protection and mitigation features at Site 1 were constructed in 1999. Mitigation features included hardpoints and embayments; instream woody material; an undulating, cobble-lined, low-berm surface; and planting on the low-berm face, low berm, lower slope and upper slope planting surfaces.

(2) Site 2 (river mile 3.75 LT) is located on the south bank, approximately 400 ft downstream of the Capital City Expressway (Business 80) bridge and extends approximately 650 ft to the Southern Pacific Railroad (SPRR) bridge.

Bank protection and mitigation features at Site 2 were constructed in 1999. Mitigation features included hardpoints and embayments; an undulating, low-berm surface covered by an erosion control blanket and mat system; and planting on the low-berm face, low berm, middle berm, and upper slope planting surfaces.

(3) Site 3 (river mile 4.40LT) is located on the south bank approximately 800 feet upstream of the Capital City Expressway (Business 80) bridge, in the vicinity of River Park, and extends upstream for approximately 3,500 feet.

Bank protection features at Site 3 were constructed in 1996 and 1997. Mitigation features at Site 3 were constructed in 1997 and 1999. Mitigation features constructed in 1997 include planting on the low-berm face. Mitigation features constructed in 1999 include hardpoints and embayments; an undulating, low-berm surface covered by an erosion control blanket and mat system; instream woody material; and planting on the low berm, upper slope and middle berm planting surfaces.

(3) Site 4 (river mile 6.80 LT) is located on the south bank along the edge of the California State University, Sacramento campus. The site is approximately 3,100 ft long and extends downstream from the City of Sacramento's water intake structure to a point approximately 1,200 ft upstream of the H Street bridge.

Bank protection and mitigation features at Site 4 were constructed in 1999. Mitigation features include, an undulating cobble-lined low-berm surface and planting on the low-berm face, low berm, and upper slope planting surfaces.

b. Description of Mitigation Planting Surfaces

(1) Sites 1, 2, 3, and 4

(a) General. The revegetation program at each site was designed to establish a self-sustaining, mixed-canopy forest and riparian scrub habitat on waterside levee berms without compromising bank protection features. The revegetation program at each site also includes creating shaded riverine aquatic (SRA) habitat. Vegetation has been planted on a number of revetment planting surfaces including a low-berm face, low berm, lower slope, upper slope, and middle berm.

(b) Low-berm Face. Low-berm face plantings will provide SRA overhead cover habitat value. The low-berm face surface was planted at Sites 1, 2, 3, and 4. The planting surface area is on a 2:1 slope that varies in width. The vegetation was planted in rows beneath an approximately 27-inch riprap layer. The planting rows begin approximately 3-4 inches above the summer water elevation and are spaced 1.3 feet in elevation with plants 2.0 feet on center within each row. Plants on the low-berm face will be frequently inundated during periods of high flow. Instream woody material was installed within the low-berm face at Site 1. Hardpoints and embayments were constructed at Sites 1, 2 and 3. It should be noted that planting of the low-berm face at sites 2, 3, and 4 involved installing pre-grown willow whips in layers and covering each layer of willow whips with a layer of riprap. This system of placing willow whips and riprap in layers during construction of the low-berm riprap allowed for planting of this surface. Therefore, it may not be feasible to replant this surface at sites 2, 3 and 4 and all such subsequent references to replacement plantings may not pertain to this surface. Because the riprap was smaller at Site 1, plants were installed after the riprap was placed. It may be feasible to replant this surface, if necessary.

(c) Low Berm. The low berm will provide a mixed-canopy riparian forest and provide SRA habitat, riparian mitigation, and erosion control. Woody riparian and herbaceous vegetation at sites 2 and 3 was directly planted through an erosion control blanket and a woven erosion control mat in native soil fill material that covers a layer of cobble revetment. At sites 1 and 4, woody riparian vegetation was installed on a cobble-lined, low-berm surface. The surface of the low berm undulates longitudinally in elevation providing a varied-depth surface, which will promote the establishment of a mixed riparian habitat. Woody plants were installed 6 feet on center at Sites 1, 2, and 4, and 4 feet on center at Site 3. Herbaceous plants were installed 1 foot on center on the low berm at Sites 2 and 3. Herbaceous vegetation on the low-berm surface is intended to provide long-term erosion protection once the erosion control blanket and mat system has broken down. The life expectancy on the blankets and mats is approximately 2-4 years, based on the manufacturer's

specifications. A soil trench extends beneath the berm and provides capillary water to plants during low flow periods.

(d) Lower Slope, Upper Slope, and Middle Berm. The lower slope (Sites 1, 2, and 4) upper slope (Sites 1, 2, 3, and 4) and middle berm (Sites 2 and 3) create a mixed-canopy riparian habitat. The revetment surface of the lower slope, upper slope and middle berm consists of embankment material, an 8-inch layer of bedding material, and a 12-inch layer of riprap. The lower and upper slope is a 2:1 slope and ranges in elevation at each mitigation site. Trees and shrubs were planted in the embankment material below the bedding and riprap layers. Lower slope elevations were planted with trees and shrubs that tolerate inundation and deposition and require more water. Plants were installed 8 feet on center at Sites 1, 2, and 4, and 6 feet on center at Site 3 along the lower slope, upper slope and middle berm.

(e) Elderberry Replacement Area. The goal of the onsite elderberry replacement areas is to provide elderberry seedling planting areas for impacts to VELB habitat that occurred at Sites 1, 2 and 3.

The bank protection projects were designed to avoid elderberry shrubs at Sites 1 and 2, however, due to site conditions at the time of construction unavoidable impacts to elderberry shrubs occurred at these sites. A total of 26 stems were impacted at Sites 1 and 2. A seedling compensation replacement ratio of 3:1 was calculated using the formula in the USFWS's VELB guidelines. Based on the quantity of stems affected by the project and the replacement ratio a total of 78 stems were required to compensate for project impacts at Sites 1 and 2.

A total of 25 stems were impacted at Site 3. A seedling compensation replacement ratio of 5:1 was calculated using the formula in the USFWS's VELB guidelines. However, because it was determined that the shrubs could not be transplanted the compensation ratio was doubled to 10:1, according to the USFWS's VELB guidelines. Based on the quantity of stems affected by the project and the replacement ratio a total of 250 stems were required to compensate for project impacts at Site 3.

A total of 328 elderberry seedlings are required to compensate for project impacts at Sites 1, 2, and 3. A total of 345 elderberry seedling were planted at Sites 1, 2, 3, and 4. In addition to elderberry plantings, other native tree and shrub species were planted in association with the elderberry seedlings to provide overstory vegetation. The elderberry replacement areas are located within the upper slope and middle berm planting areas at Sites 2 and 3, the upper slope planting areas at Sites 1 and 4.

(f) Offsite Elderberry Transplant Area. The goal of the offsite elderberry replacement area is to provide an elderberry shrub transplant area for impacts to VELB habitat that occurred at Sites 1 and 2. The bank protection projects were designed to avoid elderberry shrubs at Sites 1 and 2, however, due to site conditions at the time of construction unavoidable impacts to elderberry shrubs occurred at these sites. Because these impacts were not expected, a transplant area was not planned during the mitigation design phase. Therefore, the Corps of Engineers coordinated with the U.S. Fish and Wildlife Service to select an offsite replacement area. Affected shrubs were transplanted to the offsite replacement area which is located on the north side of the American River

at approximately river mile 3.30 RT. The offsite replacement area only serves as a transplant area, not as an elderberry replacement area. Elderberry seedling plantings at Sites 1, 2, 3, and 4 provide seedling compensation for elderberry shrubs impacted at sites 1 and 2.

An operations, maintenance, and monitoring manual for this offsite elderberry replacement area will be prepared by the Corps of Engineers (at a later date), in Coordination with the Reclamation Board, as part of a separate document that will also address elderberry operations, maintenance and monitoring requirements for non-project related VELB habitat impacts that will also be mitigated for at this location. The operations, maintenance and monitoring for this offsite elderberry replacement area is not included herein.

1-04. Construction Data and Contractors

a. General. The construction contract for the mitigation sites and the bank protection project on the Lower American River was accomplished under the contract listed below.

(1) Sites 1, 2, and 4

(a) Bank protection and mitigation features at river mile 2.20LT, 3.75 LT and 6.80 LT were constructed under Contract Number DACW05-98-C-0046 by J. E. McAmis, Inc. (work completed in 1999).

(2) Site 3

(a) Bank protection and mitigation features at river mile 4.40 LT were constructed under three separate contracts. The initial emergency bank protection features were constructed under Contract Number DACW05-96-C-0050 by J.E. McAmis, Inc. (work completed in 1996). Additional bank protection features to construct the mitigation planting surface and installation of low berm tree plantings were constructed under Contract Number DACW05-97-C-0046 by Nordic Industries, Inc. (work completed in 1997). Mitigation features were constructed under Contract Number DACW05-98-C-0011 by Adland (work completed in 1999).

1-06. Assurances Provided by Federal and Local Sponsors

a. Federal Requirements. Federal responsibility will include the following:

(1) The government is responsible for project design, construction and prescribing operation and maintenance requirements.

(2) Prepare mitigation design, oversee project implementation, and provide construction period maintenance of plants to ensure plant survival prior to turnover to the Reclamation Board.

(3) Prepare mitigation report documenting, both in text and photographically, existing conditions of site and plants at time of turnover to the Reclamation Board.

(4) Ensure that environmental commitments, such as riparian mitigation measures and monitoring requirements, are successfully accomplished in accordance with National Environmental Policy Act (NEPA) environmental documentation or through other laws (e.g. Endangered Species Act) in joint responsibility with the Reclamation Board.

(5) Prepare as-constructed drawings showing location and layout of each mitigation site at time of turnover to the Reclamation Board.

(6) Prepare project Operation and Maintenance Manual Supplements as applicable to each mitigation project.

b. Non-Federal Requirements. Following completion and acceptance of construction by the Corps of Engineers, all responsibilities for operation, maintenance, repair, replacement and rehabilitation (OMRR&R), and all associated funding of the bank protection features as well as the mitigation features of the project will be transferred to the Reclamation Board. The Reclamation Board will be responsible for the establishment of the plantings following plant installation, monitoring the success of vegetation establishment and replacing plants should it be required to meet mitigation performance standards, and maintenance of other site features. After the mitigation monitoring period, the Reclamation Board will be responsible for ongoing routine operation and maintenance issues as well as repair, replacement, and rehabilitation of the mitigation and bank protection features.

Non-Federal responsibility will include the following:

(1) Establish, protect, and preserve using OMRR&R techniques, all onsite vegetation that has been turned over to the Reclamation Board, including vegetative growth as it “volunteers” throughout the life of the project, and existing vegetation that was present at the project site before mitigation features were constructed. Allow vegetation to grow to maturity with mitigation areas.

(2) Make regular inspections and submit annual reports that include text and photographic documentation of plant progress.

(3) Perform all maintenance requirements and comply with all mitigation monitoring requirements, meet all performance standards, and carry out any necessary remedial measures set forth in the California Environmental Quality Act (CEQA) and NEPA environmental documentation and as stated in this manual.

(4) Over the life of the project, replant and replace all vegetation that has died as a direct result of vandalism, public use (accidental damage), negligent maintenance practices, (e.g., herbicide overspray, fire damage directly resulting from the Reclamation Board’s activities), wildlife damage, normal maintenance activities, or other OMRR&R activities necessary for the project that result in damage to vegetation and requiring plant replacement. All damage resulting from “Acts

of God” will be revisited by all concerned agencies, and decisions relative to replanting will be made on a case by case basis.

(5) Take measures, such as security patrols, to prevent vandalism from occupancy or use by the homeless or other entities after project construction.

(6) Collect data and conduct any needed riparian habitat and SRA habitat evaluation procedure (HEP) analyses to assess the mitigation performance of the project.

(7) Appoint a mitigation evaluation team in consultation with the U.S. Fish and Wildlife Service and the California Department of Fish and Game to evaluate monitoring results for SRA cover and riparian vegetation and to recommend to the Reclamation Board, or its delegated maintaining agency, remedial measures for the vegetation elements of the project.

1-07. Letters of Acceptance from Reclamation Board. The Reclamation Board’s Letter of Acceptance addressing Vegetation on Mitigation Sites for each project site are included in Exhibit F.

SECTION IX - OPERATIONS AND MAINTENANCE OF VEGETATION ON MITIGATION SITES

9-01. Description

a. General

(1) Sites 1, 2, 3, and 4. The intent of this manual is to outline specific site operations and maintenance activities and vegetation monitoring requirements for revegetation features at the above-mentioned mitigation sites. The methods and techniques used to implement the operations and maintenance activities and the implementation schedule for these activities will be determined at the discretion of the Reclamation Board. The Reclamation Board will perform vegetation monitoring and reporting according to the methods and schedule required in the environmental documents for these project sites and as summarized herein.

The mitigation will be considered self-sustaining and successful in compensating for habitat impacts of the project if the site meets the performance standards at the end of 8 years (10 years for elderberries). Once mitigation plantings have become established, the revegetation areas should require only infrequent maintenance. It will be the responsibility of the Reclamation Board to address the following items in order to maintain acceptable site and plant conditions so that vegetative growth should not be impeded.

This section has been divided into four sub-sections. These sub-sections include: 1) 9-02 Plant Establishment Period (Short-term Operations and Maintenance); 2) 9-03 Post-Plant Establishment Period (Long-term Operations and Maintenance); 3) 9-04 Management and Operation of Mitigation Sites (Adaptive Management); and 4) 9-05 Vegetation Monitoring and Reporting.

The first sub-section (i.e., Plant Establishment Period [Short-Term Operations and Maintenance]) addresses specific site operation and maintenance activities for revegetation features at the mitigation sites. For the purposes of this manual, the operations and maintenance period has been divided into the two periods: the Plant Establishment Period (PEP) (years 0-3) and the post-Plant Establishment Period (post-PEP) (i.e., long-term operations and maintenance, years 4-50).

The second sub-section (i.e., 9-03 Post-Plant Establishment Period [Long-Term Operations and Maintenance]) addresses specific monitoring requirements for the mitigation areas. Vegetation performance monitoring will occur during years 1-8 (years 1-10 for elderberries) following completion of mitigation feature implementation at each site.

The third sub-section (i.e., 9-04 Management and Operation of the Mitigation Sites [Adaptive Management]) addresses the potential need for adaptive management strategies for the mitigation sites, should the vegetation fail to meet the performance standards or otherwise be in noncompliance with project requirements. This sub-section also recommends that the Reclamation Board and the mitigation evaluation team establish and implement an adaptive management strategy for the mitigation site(s) if they are not meeting the performance standards.

The fourth sub-section (i.e., Vegetation Monitoring and Reporting) addresses vegetation monitoring and reporting requirements for riparian and overhead SRA cover habitats.

9-02. Plant Establishment Period (Short-Term Operations and Maintenance)

a. General. The PEP will be at least 36 months in duration if no significant replanting is required. Throughout this period, operations and maintenance requirements are expected to be relatively intense compared to the requirements of the following post-PEP. During the PEP, the Reclamation Board will be responsible for maintaining the mitigation features listed below. At the end of the PEP, the mitigation sites will be considered successful if they are self-sustaining and provide adequate compensation as outlined in the performance standards (Exhibits I, L, and O) to offset habitat losses associated with the project. If the performance standards are not met, the Reclamation Board will consult with the mitigation evaluation team on possible remedial measures (refer to paragraph 1-06, b, [7]). The Reclamation Board will be responsible for determining maintenance methods and schedules needed to perform these maintenance requirements.

b. Responsibilities. Operations and maintenance requirements of revegetation features during the PEP will include but are not limited to the following: 1) site assessments of overall planting areas to determine plant condition, weed growth, and other revegetation-related site conditions; 2) installation, maintenance, operation, and removal of the irrigation system at each site; 3) hand watering of planted materials, as necessary, when irrigation system is not in place; 4) maintenance of all planted woody and herbaceous plant materials; including weed control in all of the revegetation areas; 5) replacement of plant material, and/or implementation of other remedial measures to meet performance standards in years 3 and 8 (year 10 for elderberries); 6) maintenance and repair of low-berm erosion control blankets and woven erosion control mats (including stakes) and replacement of herbaceous plugs lost because of damage and/or repair of the blankets and mats; 7) maintenance of signs; 8) preparation of project documentation, including record (i.e., as-maintained) drawings and submittals; 9) conducting semi-annual inspections; and 10) providing site surveillance and other measures to protect vegetation from vandalism following construction and during the establishment period.

(1) Site Assessments During Revegetation Plant Establishment

(a) Regular Inspections. The Reclamation Board will inspect mitigation areas. The inspections will be concurrent with maintenance activities during the PEP to ensure that plant materials are in a healthy and vigorous condition.

(b) Clean-up. The Reclamation Board will maintain the site in a natural-appearing condition throughout the PEP. Site cleanup will occur on a weekly basis. All garbage, construction debris, excess plants and dirt left over from replanting or site repair operations, other discarded materials, and extraneous equipment will be removed from the site in accordance with state and local regulations.

(c) Woody Debris and Felled Trees. Natural woody debris (i.e., logs, branches, or uprooted trees), whether from mitigation plantings or other sources, should not be

removed unless it poses a threat to public safety (including the safety of river users), or if it promotes local scour (i.e., movement or loss of stone or mats along bank protection features, including the upper slope and middle berm, and the low berm and low-berm face).

(d) Damage and Repair. Maintenance, repair, or replacement of all revegetation features will be the responsibility of the Reclamation Board throughout the duration of the PEP.

(2) Irrigation System and Watering

(a) Irrigation System. The Reclamation Board will be responsible for the installation, operation, maintenance, and removal of the irrigation system, and for the application of irrigation as described in the original construction documents. The Reclamation Board may elect, at their discretion, to install a different type of irrigation system than indicated in the construction documents. If a new system is designed and used, the system must be capable of providing an adequate quantity of irrigation to each planting site.

If the designed irrigation system is used, the Reclamation Board will install the entire system on the project site at the beginning of each irrigation season. At the end of each irrigation season, the Reclamation Board will remove the entire system from the project site. The Reclamation Board will be responsible for maintaining the irrigation system in a fully operational condition throughout the irrigation season defined herein. The Reclamation Board will hand water the plant materials when the irrigation system is not in place, as determined necessary by the Reclamation Board.

(b) Irrigation Season. The irrigation season will be April 1 through October 31 of each year of the PEP. The irrigation season may be adjusted at the Reclamation Board's discretion, based on site-specific conditions (e.g., high or low water surface elevations, prolonged or delayed rainy seasons).

(c) Irrigation Applications. The beginning and shutdown dates for the irrigation schedule are dependent on weather conditions. If most of the plant material appears to be stressed (e.g., water stress [over-watering], stunted growth, wilting, premature leaf loss, and yellowing of leaves [deciduous spp.]) and in danger of perishing or becoming severely damaged, the Reclamation Board will adjust the frequency and duration of watering. The Reclamation Board will be responsible for applying irrigation at the rates specified in the original construction documents, or at a similar rate if a different irrigation system design is used.

(3) Weed Control

(a) Requirements. Weed control will consist of hand-pulling, mechanical removal, or spot applications of herbicide to maintain a minimum 2-foot-diameter weed-free zone around each individual planting location. Weeds will include all woody and herbaceous plants occurring within a 1-foot radius around each plant. Weed control may also involve the removal or control of particularly invasive non-native species outside of the 2-foot diameter around each plant (Exhibits M and N). Weeds will also be controlled on all access roads and ramps.

(b) Herbicides. If herbicides are used, they will be non-selective, broad-spectrum, post-emergent, translocating herbicides approved for use in and around aquatic habitats by the U.S. Environmental Protection Agency. Herbicides, fertilizer, or other chemical-based materials will not be stored on the project site. Herbicides will be applied to avoid drift outside the designated revegetation planting areas and will protect existing plants to remain or to be transplanted from herbicide drift.

(c) Elderberry Plantings. At no time will herbicides be sprayed onto undesired vegetation within 100 feet of the elderberry plantings or existing and volunteer elderberry seedlings at Sites 1, 2, 3, and 4. Elderberry plantings at Sites 1, 2, 3, and 4 are in a designated elderberry shrub mitigation site, and they will provide valley elderberry longhorn beetle habitat. Weeds must be mechanically or manually removed in these areas. However, in order to control particularly invasive non-native weed species (e.g., *Arundo donax*), where herbicide application is the only viable means of weed eradication, herbicides may be applied by “painting” the cut stem or portions of the foliage. Minimal painting will occur to limit the quantity of applied herbicides. This method will be used as a means of preventing elderberry shrubs from being out-competed by weed species.

(4) Replacement Planting. Replacement planting of woody or herbaceous plant material is required if there is high plant mortality and the site is not achieving, or is not trending toward achieving, the performance standards outlined in Section 9-05. Plant mortality may be the result of numerous factors, including but not limited to, acts of nature, site suitability for the species planted, or insufficient maintenance activities. The quantity of replacement plants during a given maintenance year will (if necessary) be determined based on the monitoring results and an estimation by the Reclamation Board of the quantity of plants required to meet the performance standards.

(a) Woody Plant Species. During the PEP, individual plant counts (summarized as percent survival values) will be performed for all container plants. If individual plant counts are infeasible based on site conditions (e.g., dense vegetative growth) a cover-based monitoring method will be used. The target performance goals for survival of originally installed and replacement woody plant material during years 1, 2, and 3 of the PEP are 70%, 60% and 50%, respectively. If the recommended performance goal for plant survival is not met, the Reclamation Board may elect to replant all or a portion of the planting sites needed to increase the percent survival to the desired level.

Replacement planting will be performed in the fall or winter of each maintenance year. Plants of the same species and planting size as were originally installed will be installed, unless it is determined that another species is better suited to a particular site condition. Replacement plants will be installed according to the original construction documents unless another viable alternative should be considered based on the cause of mortality or future site conditions. Dead plants will be completely removed before installation of replacement plants and will be removed from the site.

If replacement plants are required, all replacement plant propagation materials will be collected from local genetic stock from within the project site region as outlined in the

original construction documents. Adjustments to the original planting design will be recorded on the as-maintained drawing and in the annual reports.

(b) Herbaceous Species on the Low-berm Surface. Herbaceous species on the low-berm surface with sparse cover or bare areas greater than 25 square feet in size will be reseeded with the original seed mix and application rates, modified as necessary, or re-plugged with container stock of the herbaceous plants originally installed. If an area has sparse or bare areas, but has an overstory of woody plant growth (e.g., willows) reseeding/replanting will occur at the discretion of Reclamation Board. If significant loss of vegetation or damage to the site occurs, the Reclamation Board will discuss potential remedial measures with the mitigation evaluation team.

(5) Erosion Control Blanket and Woven Erosion Control Mat System. The integrity of the blanket and mat system (which are an integral feature of many of the mitigation features) will need to be maintained during the PEP. This maintenance will include regularly checking the integrity of the wooden stakes and checking to ensure that the edges of the blankets and mats are secure. The Reclamation Board will be responsible for repairing damage to the mat system caused by vandalism, fire, debris, or other causes during the PEP.

(6) Sign Maintenance. The Reclamation Board will maintain the revegetation and VELB signs throughout the PEP. Maintenance will include replacing lost, stolen, or damaged signs; and performing any corrective actions required to maintain desired sign conditions.

(7) Project Documentation. The Reclamation Board will be responsible for documenting project conditions and progress throughout the operations and maintenance period. Documentation will include monthly logs, as-maintained drawings, and annual monitoring reports, which are described in the following sections.

(a) Plant Establishment Form (Monthly Maintenance Log). Throughout the PEP, the Reclamation Board will be responsible for daily (monthly logs) record-keeping of the maintenance activities, including but not limited to irrigation, weed control (i.e., types of herbicides used, application rates, personnel performing work), and replacement planting. The Reclamation Board will compile all data recorded during the plant establishment activities on a form similar to the sample form in Exhibit H-1. The Reclamation Board will compile and present the forms for that year (one form for each month) in the annual reports.

(b) Record or "As-Maintained" Drawings. One set of as-constructed drawings will be prepared by the construction contractor for each site and submitted to the Corps of Engineers following project acceptance. The Corps of Engineers will provide a set of the as-constructed drawings to the Reclamation Board. The drawings will be maintained by the Reclamation Board during the PEP and will be kept current. Record drawings will include information such as the location and size of the planting organized according to species. The revised drawings will include summary tables showing all plants that have been replaced according to species and location. At the end of the PEP, final record drawings will be prepared showing the final status of the project.

(8) Site Inspections. Inspections of mitigation areas will be initiated by the Reclamation Board and made with interested agencies at the times specified below to compare progress with the intent of mitigation plans as stated in the environmental documentation and other project documents. The Reclamation Board will provide the Corps of Engineers and other interested agencies written notice 30 days prior to all inspections and will invite the Corps of Engineers and other interested agencies to participate in the inspection. Documentation will include inspection reports that will be recorded on forms similar to the example in Exhibit H-2. In addition to inspections held by the Reclamation Board, the Corps of Engineers may also enter, at reasonable times and in a reasonable manner, without notice or prior approval, upon the lands of the project to inspect and monitor the progress of the revegetation program.

(a) Spring Inspection. Inspections will occur during the period of leaf emergence or soon after the leaves emerge from the buds (e.g., April, depending on plant condition during a given year). This will allow for a simpler means of species identification and provide a good indicator of overall plant health.

(b) Fall Inspection. Inspections will occur just prior to the rainy season when plant stress is most prevalent (e.g., September or October, depending on weather conditions during a given year).

(c) Annual Reports. Refer to paragraph 9-05, "Vegetation Monitoring and Reporting".

9-03. Post-Plant Establishment Period (Long-Term Operations and Maintenance)

a. General. This section addresses specific site operations and maintenance activities during the post-PEP (i.e., long-term operations and maintenance period), which begins in year 4 and continues through year 50. The Reclamation Board will continue to be responsible for long-term operations and maintenance of revegetation mitigation features during the post-PEP. Operations and maintenance will occur on an infrequent but regular basis and should be relatively minor in scope. However, years 4-8 (years 4-10 for elderberries) are important for meeting the mitigation performance standard at year 8 (year 10 for elderberries). The intensity of maintenance, monitoring, and replanting during this period (i.e., years 4-10) will be greater than in years 11-50. If significant mortality occurs requiring replanting and intense maintenance, the intensity of maintenance during the post-PEP may resemble that of the PEP period until performance standards have been met.

b. Responsibilities

(1) General Plant Care. It is anticipated that during the first 3 years, a sufficient and healthy plant community will be established and that after this period, no plant replacement will be required. If, however, there are unvegetated areas (specifically on the low berm) that could affect meeting long-term performance standards, additional plantings may be installed or remedial measures may be implemented by the Reclamation Board in coordination with the mitigation evaluation team.

(2) Tree Preservation. Existing trees and other native vegetation will be preserved. Only those large trees that interfere with levee or revetment maintenance or threaten public safety or the integrity of the bank protection structure should be removed by the Reclamation Board. If a tree is removed, the goal will be to replace each tree on a one-to-one basis, as appropriate.

(3) Volunteer Growth. Volunteer seedlings of native species are expected to naturally colonize the project site. Volunteer seedlings will be preserved unless they are competing with installed plants, are establishing within access roads, or are threatening public safety or the integrity of the bank protection structure. Restricted planting areas, as identified in the construction documents, were planted with shrub species. No tree species were planted in the restricted planting areas. Volunteer seedlings of tree species will be removed from the restricted planting areas on an as-needed basis by the Reclamation Board.

(4) Weed Control. Weeds targeted for control on the revegetation site during the post-PEP will include invasive non-native species (e.g., giant reed: *Arundo donax*) that can dominate the site and reduce the desired vegetation to below the performance standards. The Reclamation Board will determine which weed species will be targeted for control.

(a) Elderberry Planting. No herbicides will be used within the revegetation area that are not approved for use near water and no herbicides will be sprayed on or within 100 feet of elderberry shrub canopies. Weed infestations will be controlled as early as possible to prevent establishment and to minimize weed control efforts and pesticide usage.

(5) Selective Clearing and Pruning. Downed trees and branches, dead limbs, and dead trees provide habitat for numerous wildlife species. Therefore, clearing and pruning will not occur unless such materials restrict site access from the ramps, prove to be detrimental to the integrity of the bank protection structure, present a risk to public safety, or overhang firebreaks. Restricted planting areas, as identified in the construction documents, were planted with shrub species. No tree species were planted in the restricted planting areas. Volunteer seedlings of tree species will be removed from the restricted planting areas on an as-needed basis by the Reclamation Board.

(6) Public Use. The public's impact on a site will continue to be potentially disruptive to the vegetation. The Reclamation Board will ensure that recreational activities do not impact the plants. If public use becomes destructive, the Reclamation Board shall take corrective measures to replace plants and to ensure their survival.

(7) Local Maintenance District Damage. Within the area of human impacts, standard maintenance practices may pose a threat to the mitigation vegetation. Each district should assess its present maintenance practices and determine if it can continue these practices or needs to adjust these methods to make them less detrimental to the vegetation. Some traditional practices might not be appropriate for some sites and different methods should be implemented. Local maintenance personnel are the people most involved with the sites on a day-to-day basis and, therefore, stand the greatest risk of inadvertently damaging them. Current levee maintenance practices, such as burning, can quickly destroy years of mitigation work, if they get out of control.

The most common methods used to control vegetative growth on the levee structure (not the berm) are as follows:

(a) Mowing. If controlled, mowing is by far the safest method used for avoiding potential damage and should be encouraged where feasible.

(b) Discing. Discing is another preferred method, but is not as widely used because of its limited application to levee maintenance. Discing is most effective in maintaining a fire-break along the toe of the levee structure.

(c) Spraying. Chemical spraying is commonly used. Care shall be taken to prevent spray drift onto adjoining areas in accord with all applicable state and federal laws.

(d) Burning. Burning is the least preferred method. The potential for damage with burning is great.

(8) Human Impacts. All damage to planted, volunteer, or existing vegetation as a result of human activities (i.e., Reclamation Board activities, other agencies or utilities, and the general public) is the responsibility of the Reclamation Board.

(9) Vegetation Removal to Meet OMRR&R. Vegetative areas that are partially or completely damaged as a result of carrying out OMRR&R requirements shall be replanted by the Reclamation Board.

(10) Woody Debris and Felled Trees. Woody debris washing down the river during high flows tends to settle out as water levels recede. As a result, it is possible for debris or snags to accumulate in or around the bank protection features at the project sites. While there are certain advantages provided by such materials (e.g., wildlife habitat and shelter), the presence of woody debris can pose a threat to public safety. The issue of public safety will be the overriding consideration for deciding when to remove debris and woody debris or felled trees will be removed at the Reclamation Board's discretion.

(11) Erosion Control Blankets and Woven Erosion Control Mats. Erosion control blankets and mats will be maintained to ensure that the performance and condition, as installed and approved by the Corps of engineers, is maintained, until such time that they naturally degrade (i.e., life expectancy 2 to 4 years based on manufactures specification) and no longer provide structural support (i.e., woody and herbaceous plant material cover the majority of the low-berm surface). The Reclamation Board will determine when repair of the blankets and mats is no longer required.

(12) Wildlife Damage. Wildlife use of the project site is expected and encouraged. However, some species such as beaver, deer, rabbits, and small rodents can present a serious problem to a mitigation site in the early stages of establishment. If the project site exceeds an acceptable mortality rate or plant vigor and growth is reduced to a point where the plantings are not meeting the performance goals and standards, then remedial actions may become necessary. The Reclamation Board will consult with the appropriate resource agencies to determine appropriate remedial actions.

(13) Natural Environmental Damage. The project site may be affected by natural events including wildfire, flooding, erosion, wind, drought, or disease. Natural processes are inevitable and could occur at any time during the course of reestablishing the vegetation. Natural events are a function of a dynamic ecosystem; however, the effects of such events could seriously affect the establishment of the revegetation area. If a natural event occurs during the post-PEP, the damaged areas will be monitored to ensure that the site indicates successful regeneration. Remedial action may be necessary if the site does not show signs of rebounding from natural events. Potential remedial actions that may be necessary are contained in section 9-04. All natural environmental damage (“Acts of God” damage) will be revisited by the mitigation evaluation team and decisions, relative to replanting, made on a case by case basis. Environmental damage caused by human impacts are considered events other than “Acts of God”.

(14) Vegetation Free Zone. The goal of the mitigation and bank protection project is to create a self-sustaining, mixed-canopy riparian forest and riparian scrub habitat. Therefore, vegetation-free zones will only include permanent site access ramps. Other areas within the project site will not be cleared of vegetation unless emergency repairs are necessary to repair the structural integrity of the levee or bank protection features.

(15) Public Health and Safety. The goal of the project is to provide flood control protection while also providing habitat replacement. Vegetation and other site features will be maintained in such a manner as to maximize the benefit to the environment while maintaining the integrity of the bank protection features and the levee. Vegetation removal will only occur if it provides an immediate threat to public safety (e.g., dead limbs overhanging an access road, woody debris and felled trees, or vegetation removed to allow for emergency levee repairs). Local maintenance entities will coordinate with the Reclamation Board and receive the Reclamation Board’s approval prior to undertaking any action.

9-04. Management and Operation of the Mitigation Sites (Adaptive Management)

a. General. The operations and maintenance manual assumes that the mitigation features will function as part of a self-sustaining, established site (i.e., it is capable of natural regeneration and should not require additional irrigation after the PEP). Remedial measures for each habitat were discussed above. However, in the event of a structural failure, or if the riparian vegetation fails to meet long-term performance standards or is otherwise in noncompliance with project requirements; the mitigation evaluation team will be responsible for reviewing monitoring reports, evaluating results, and recommending remedial measures to be implemented by the Reclamation Board that would provide information for the repair, replacement, or rehabilitation of vegetation and structural features.

Because the factors that might require remediation cannot be identified specifically in this document, some potential factors will be briefly summarized herein. If it should become necessary, more specific information pertaining to the cause of the problem and the proposed adaptive management technique will be prepared by the mitigation evaluation team.

b. Determination of the Need for Adaptive Management. Noncompliance with long-term performance standards for all revegetation or problems regarding bank or other site features will be determined from the monitoring results and visual observations made during the annual and semi-annual inspections. The Reclamation Board will report this information to the mitigation evaluation team. Based upon review of that report, the current understanding about system dynamics, current site conditions, and the project's performance standards, the mitigation evaluation team will determine what actions, if any, may be required.

c. Selection of Critical Areas. The project site may be affected by a number of natural events or human impacts. Remedial action may be necessary throughout the revegetation areas or in specific areas. The selection of specific or critical areas will be based on the following considerations, or other factors not listed below that may effect project performance: 1) After remediation, is the area capable of achieving self-sufficiency in a minimal period of time? 2) If original mortality was a result of inappropriate species composition within a microhabitat condition, would modifying the plant palette result in greater plant survival rates? 3) If original mortality was a result of berm or bank failure, would modifying the structures result in greater survival rates? 4) Should other sites within or outside of the river bank be considered for a remedial revegetation site?

d. Potential Reasons for Implementing Adaptive Management Actions. There are a number of possible circumstances that may require the adaptive management actions. Such circumstances may include the following: 1) berm or bank failure resulting from high flow events or other causes; 2) excessive wildlife damage; 3) competition with invasive, non-native weed species; 4) human impacts, including vandalism, arson, or inadvertent impacts; and 5) natural events, such as floods or wildfire.

9-05. Vegetation Monitoring and Reporting

a. General. The goal of this project is to create a self-sustaining, mixed-canopy riparian forest and riparian scrub habitat. The mitigation will be considered self-sustaining if the site achieves, or is trending toward achieving, the performance standards at the end of the 8-year monitoring program (10-year for elderberries) and is determined successful in providing adequate compensation to offset the habitual losses from project construction. The performance standards for riparian, overhead SRA cover, and VELB habitat are provided in Exhibits I, L, and O respectively. Vegetation monitoring will occur annually in June of each monitoring year during the 8-year monitoring program for riparian and overhead SRA cover and during the 10-year monitoring program for elderberries.

Following mitigation project construction, the Corps of Engineers will transfer the responsibilities for monitoring and reporting for the biological resources monitoring programs to the Reclamation Board. Monitoring will be supervised and conducted by a qualified biologist, botanist or habitat restoration specialist. The Reclamation Board will also be responsible for attaining the performance standards for each of the monitoring programs.

A mitigation evaluation team will be appointed by the Reclamation Board, in consultation with the USFWS and DFG, to advise the Reclamation Board on whether remedial

measures are required and what types of remedial measures are recommended for the vegetation element of the project. The mitigation evaluation team will evaluate the results of the annual monitoring reports, which are to be prepared by the Reclamation Board, to determine if the project sites are achieving, or progressing towards achieving the performance standards for each habitat type. The year 8 monitoring report will be evaluated by the mitigation evaluation team to determine if riparian and SRA cover vegetation at the project sites has met the performance standards and whether standards are likely to be met 50 years in the future. The results of subsequent monitoring, if any, will also be provided to the mitigation evaluation team.

This section describes the mitigation monitoring and reporting responsibilities for each mitigation habitat.

(1) Riparian Habitat

(a) Performance Standards and Goals. Performance standards for riparian habitat are minimum vegetation reestablishment objectives that must be achieved in monitoring years 3 and 8 to meet project objectives. Failure to achieve performance standards may necessitate implementation of remedial measures to mitigate project impacts. In addition to performance standards during the PEP, performance goals have been established for monitoring years 1, 2, and 4-7 to identify the need for management changes in order to improve the success of reestablishment of riparian vegetation and ensure compliance with performance standards in monitoring years 3 and 8. If implementation of remedial measures is required at or toward the end of the monitoring period, monitoring would be performed for a least 5 years after measures are implemented.

The performance standards and goals for riparian habitat are summarized in Exhibit I.

(b) Monitoring Schedule. Riparian habitats will be monitored annually in June for an 8-year period that will begin the year following installation of the mitigation features. The monitoring period is expected to begin in June 2000 and end in year 2007.

(c) Monitoring Methods. Individual plant counts will be used in monitoring years 1-3. In addition to individual plant counts, data will also be collected along permanent transects to be established perpendicular to the river bank. The transects will be sequentially numbered and established at 150-foot intervals starting from the upstream end of the project site and will extend the width of the project site (Exhibit J-1). The beginning and end of each transect will be permanently marked to allow replication of surveys in subsequent monitoring years. The biological monitors will measure the height and canopy width by species of trees and shrubs with foliage that intersects the transect line (Exhibit J-2). Percent tree and shrub canopy cover will be determined by measurement of the length of the transect intersected by overhanging tree and shrub cover.

Surveys will be conducted each monitoring year to measure the following: 1) the diversity of woody plant species; 2) percent plant mortality; 3) landscape position (i.e., berm slope, low berm, or levee berm) of each plant by species; 4) tree canopy height by species; 5) tree canopy

width by species; 6) percent tree canopy cover; 7) mean shrub height by species; 8) mean shrub canopy width by species; and 9) percent shrub canopy cover.

(d) Photographic Documentation. A sufficient number of sampling points will be established by the Reclamation Board at each of the project sites so that a visual record of habitat development can be provided. The sampling points will be established during the first year monitoring surveys and the locations will be identified in the first year monitoring report. Photographs taken from each of these locations will be included in subsequent monitoring reports.

(e) HEP Analysis. Data collected during monitoring will be used to determine compliance with performance standards. These data could also be used to conduct a HEP analysis to assess mitigation success. If results of HEP analyses indicate that revegetation success is less than predicted in the project analysis, mitigation may be required.

If performance standards are not met, implementation of remedial measures may not be required if the HEP analysis shows that the project will still provide adequate compensation. If the HEP analysis shows a deficit, the Reclamation Board will be required to implement remedial actions. If a HEP analysis is not conducted, remedial actions will be carried out.

If, however, revegetated areas perform better than predicted, riparian habitat mitigation credits may be banked as mitigation for potential impacts on riparian habitats associated with the implementation of other bank protection projects on the Lower American River in future years.

(f) Monitoring Reports. Monitoring reports will be submitted to the Corps of Engineers, the Reclamation Board, the USFWS, and the DFG by December 31 of each monitoring year. Monitoring is expected to begin in year 2000 and end in year 2007. Monitoring reports will include the following: 1) the number and density of plantings by species and landscape position for the project site (first-year monitoring report only); 2) maps showing the survey transect locations; 3) a summary of monitoring data for the project site by transect; 4) a summary of extrapolated monitoring data for the project site; 5) a qualitative description of the growth and vigor of vegetation; 6) a qualitative description of the low-berm substrate and depositional features; 7) a qualitative description of the establishment of volunteer vegetation; 8) a description of how plantings are performing relative to performance standards and goals; 9) a description of environmental factors that may be adversely affecting planting success; and 10) a description of proposed and implemented remedial measures.

(g) Remedial Measures. If riparian vegetation reestablished on the project site fails to meet performance standards, mitigation may be required. Specific remedial measures and the level of effort required will be determined based on the magnitude and causes of failure. Potential remedial measures that may be implemented to achieve performance standards include the following: 1) planting additional riparian plants at the project site; 2) extending the irrigation period; and 3) planting additional riparian plants at offsite locations.

If implementation of remedial measures is required, monitoring will be performed for a 5-year period after measures are implemented.

include: 1) berm surface elevations and area; 2) widths, configuration, spacing, and number of hardpoints and embayments; and 3) locations, width, and surface area of installed instream wood.

(b) Performance Standards. Performance standards for as-constructed instream cover specifications were established using instream SRA cover widths and areas of hardpoints and instream woody cover values assumed in the revised HEP analysis performed by the USFWS. The performance standards for as-constructed specifications are presented in Exhibit K.

(c) Monitoring Reports. Data collected for instream SRA cover monitoring and the as-constructed drawings will be included in the first-year monitoring report. Subsequent monitoring and reporting of instream SRA cover features will not be required.

(d) Remedial Measures. If instream SRA cover features at the project site are not constructed to the specified performance standards, mitigation may be required. Because reconstruction of most instream SRA cover features would be infeasible, potential on-site remedial measures would be limited to off-site mitigation.

(3) Overhead Shaded Riverine Aquatic Cover

(a) General. Overhead SRA cover will develop over time as riparian vegetation planted near the shoreline grows and eventually overhangs the river channel. Overhead SRA cover is determined by two measures of vegetation structure: mean canopy width (which determines the horizontal extent of overhanging vegetation) and percent shoreline canopy cover. Because several years may be required for overhanging vegetation to develop, overhead SRA cover will be measured indirectly.

(b) Performance Standards and Goals. Performance standards and goals for mean canopy width of woody vegetation and percent canopy cover have been established using estimated mean growth rates for riparian trees and shrubs (Exhibit L). Performance standards represent the minimum mean canopy width and percent canopy cover required to ensure that vegetation growth is sufficient to provide the percentage of overhead SRA cover predicted to develop in years following the 8-year monitoring period.

These performance standards require achievement of minimum desired structural characteristics of overhead SRA cover before compensation for project impacts on SRA cover would be considered successful. Performance standards have been established for monitoring years 3 and 8 for SRA overhead cover. In addition to performance standards during the PEP, performance goals have been established for monitoring years 1, 2, and 4-7 to identify the need for management changes to improve the success of reestablishment of riparian vegetation and to ensure compliance with performance standards in monitoring years 3 and 8. If implementation of remedial measures is required, monitoring would be performed for at least 5 years after measures are implemented.

These performance standards provide an indirect measure to evaluate overhead SRA cover. The performance standards, as shown in Exhibit L, assume that if the performance standard for percent canopy cover and percent shoreline cover are met than the values assumed in

compliance with performance standards in monitoring years 3 and 8. If implementation of remedial measures is required, monitoring would be performed for at least 5 years after measures are implemented.

These performance standards provide an indirect measure to evaluate overhead SRA cover. The performance standards, as shown in Exhibit L, assume that if the performance standard for percent canopy cover and percent shoreline cover are met than the values assumed in the USFWS HEP analysis would be achieved. The values for mean width of vegetation overhanging the shoreline and the percent of shaded shoreline are provided in Exhibit L, as a means for the Reclamation Board and the mitigation evaluation team to compare actual site conditions with those assumed in the HEP analysis for a given target year.

(c) Monitoring Schedule. Overhead SRA habitats will be monitored annually in June for an 8-year period that will begin the year following installation of the mitigation features. The monitoring period for overhead SRA habitat is expected to begin in year 2000 and end in year 2007.

(d) Monitoring Methods. Overhead SRA cover will develop over time as riparian vegetation planted near the shoreline grows and eventually overhangs the river channel. Overhead SRA cover is determined by two measures of vegetation structure: mean canopy width (which determines the horizontal extent of overhanging vegetation) and percent shoreline canopy cover.

Because several years may be required for overhanging vegetation to develop, overhead SRA cover will be measured indirectly. The canopy width of shrubs on the berm face and cottonwoods on the berm surface up to 20 feet from the low flow water edge will be measured along transects established for monitoring riparian vegetation plantings during years 1 through 8 to ensure that canopy cover is developing at the rate necessary to provide the desired amount of overhead SRA cover in future years. Percent shoreline canopy cover will be determined from photographs of the shoreline taken from the river channel each monitoring year.

(e) HEP Analysis. Data collected during monitoring will be used to determine compliance with performance standards. These data could also be used to conduct a HEP analysis to assess mitigation success. If results of HEP analyses indicate that revegetation success is less than predicted in the project analysis, mitigation may be required.

If performance standards are not met, implementation of remedial measures may not be required if the HEP analysis shows that the project will still provide adequate compensation. If the HEP analysis shows a deficit, the Reclamation Board will be required to implement remedial actions. If a HEP analysis is not conducted, remedial actions will be carried out.

If, however, revegetated areas perform better than predicted, riparian habitat mitigation credits may be banked as mitigation for potential impacts on riparian habitats associated with implementation of other bank protection projects on the Lower American River in future years.

(f) Monitoring Reports. Monitoring reports will be submitted to the Corps of Engineers, the Reclamation Board, SAFCA, the USFWS, and the DFG by December 31 of each monitoring year. Monitoring is expected to begin in year 2000 and continue through year 2007.

Monitoring reports will include the following: 1) maps showing survey transect locations; 2) a summary of monitoring data for the project site by transect; 3) a summary of extrapolated monitoring data for the project site; 4) photographs of shoreline vegetation along the length of the project site and estimates of percent shoreline cover; 5) a qualitative description of the growth and vigor of vegetation growing adjacent to the river channel; 6) a qualitative description of the low-berm and near-shore substrate and depositional features; 7) a qualitative description of the establishment of volunteer vegetation on berms and berm slopes; 8) a description of how plantings adjacent to the river channel are performing relative to performance standards and goals; 9) a description of environmental factors that may be adversely affecting the success of SRA cover establishment; and 10) a description of proposed and implemented remedial measures.

(g) Remedial Measures. If shoreline riparian vegetation reestablished on the project site fails to meet the performance standards, remedial actions and/or additional mitigation may be required. Specific remedial measures and the level of effort required will be determined on a site by site basis, based on the magnitude and causes of failure.

It should be noted that initial planting of the low-berm face involved installing pre-grown willow whips in layers and covering each layer of willow whips with a layer of riprap. This planting method was determined to be the most feasible planting method, based on the depth of riprap on the low-berm face and the difficulty associated with moving riprap and excavating a planting hole once the riprap was placed. Therefore, it may not be feasible to replant this surface, should the sites not meet the performance standards. The Reclamation Board will consult with the mitigation evaluation team to determine what remedial measure should be taken if the sites do not meet the performance standard for overhead SRA cover.

Potential remedial measures that may be implemented to achieve performance standards include the following: a) planting additional riparian plants along the river channel edges at the project site along the interface (hinge-point) of the low-berm face and the low berm; b) extending the irrigation period; and c) planting additional riparian plants along channel banks at offsite locations to increase SRA cover values at those locations if onsite mitigation and/or remedial measures are not successful. If implementation of remedial measures is required, monitoring will be performed for up to 5 years after measures are implemented.

(4) Valley Elderberry Longhorn Beetle Habitat

(a) Performance Standards. Performance standards for VELB habitat are based on recommended guidelines developed by USFWS for mitigating impacts on VELB (U.S. Fish and Wildlife Service 1994). The USFWS guidelines suggest a performance standard of 80 percent survival of the minimum number of shrubs necessary to be planted for mitigation 10 years after planting. Performance goals have also been established for monitoring years 1 through 7 (Exhibit O). The purpose of performance goals is to identify the need for management changes to improve the success of elderberry shrub establishment and to ensure compliance with the performance standard in order to preclude the need for remedial measures to be taken in monitoring year 10, which is expected to be in year 2009.

Performance standards for associated riparian vegetation are the same as those established for riparian vegetation. Failure to achieve performance standards for riparian vegetation may necessitate implementation of remedial measures to mitigate project impacts.

(b) Monitoring Schedule

(1) Post-construction Surveys. The Corps will perform post-construction surveys for valley VELB following completion of grading and fill placement operations.

(2) Elderberry Mitigation Plantings. Monitoring of mitigation elderberry plantings will be conducted annually by the Reclamation Board between February 14-April 30, and in June, for a 10-year period following the completion of project construction. The monitoring period for VELB habitat is expected to begin in year 2000 and end in year 2009

(c) Monitoring Methods

(1) Post-construction Surveys. Following construction, the Corps will survey the project site to determine the number of individual shrubs, the numbers of stems less than and more than 1 inch in diameter, and the number of stems with emergence holes and adult VELBs avoided during construction. The number of elderberry shrubs and stems more than 1 inch in diameter recorded during postconstruction surveys will be subtracted from the number of shrubs and stems present on the site before construction to determine final project impacts.

(2) Elderberry Mitigation Plantings. Mitigation planting sites will be searched twice annually (i.e., Feb 14-April 30, and June) for adult VELB and VELB exit holes and once annually (i.e., June) to assess the success of elderberry shrub plantings. The June surveys will be conducted concurrent with monitoring surveys of riparian habitat and overhead SRA cover.

All individual elderberry mitigation plantings will be surveyed annually to determine the number of live and dead elderberry shrubs. Monitoring surveys for riparian associates will be conducted along permanent transects established for monitoring riparian vegetation, as described above. Data collected along the transects will be extrapolated to determine mitigation success for the entirety of each mitigation site.

The following information will be recorded for each elderberry planting:

1) the presence of adult VELB and VELB exit holes, 2) the number and location of VELB exit holes (if present), 3) the number of live and dead elderberry shrubs, 4) the quality of associated woody vegetation, 5) elderberry shrub height and canopy width, 6) elderberry shrub condition (qualitatively assessed), and 7) a description of observed threats or potential threats to VELBs or elderberry shrubs.

(d) Monitoring Reports. As recommended in the USFWS guidelines for VELB mitigation, monitoring reports will be submitted to USFWS, DFG, and the California Academy of Sciences by December 31 of each monitoring year. Monitoring is expected to begin in year 2000 and end in year 2009. Monitoring reports will include the following: 1) a summary of observations of VELBs and VELB exit holes; 2) an estimate of VELB population size; 3) maps showing the locations of transects, VELB observations, and elderberry shrubs with exit holes; 4)

a summary description of survival, condition, and sizes of elderberry shrubs; 5) a description of the condition of associated vegetation; 6) a description of environmental factors that are adversely affecting or could adversely affect mitigation success; 7) a description of recommended management actions to eliminate or reduce actual or potential effects of adverse environmental conditions; and 8) a description of proposed and implemented remedial measures.

(e) Remedial Measures. If performance standards for elderberry shrub plantings are not met, the causes for mitigation failure will be identified during monitoring, the problems will be corrected, and replacement plantings will be installed as necessary each year until the performance standards are met. The Reclamation Board is responsible for plant replacement. Although plant replacement may occur at the Reclamation Board discretion, the Reclamation Board will be responsible for achieving the performance standards. If performance goals are not achieved, management actions may be implemented to increase the likelihood that performance standards will be achieved.

If portions of the embankment slope and middle berm require maintenance in the future because of flood damage to the revetment or slope instability, and planted elderberry shrubs require removal, the Reclamation Board may be required to consult with USFWS to determine if losses require mitigation under provisions of the federal Endangered Species Act.

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OPERATIONS MAINTENANCE AND MANAGEMENT-RELATED DOCUMENTS

(Citations 1 through 12 are available on the U.S. Army Corps of Engineers website: <http://www.usace.army.mil>)

1. Code of Federal Regulations, Title 33, Section 208.10, 9 August 1944
2. ER 1130-2-335, 5 December 1968, Levee Maintenance Standards and Procedures
3. ER 1130-2-400, 15 November 1985, Project Operation - Management of Natural Resources and Outdoor Recreation at Civil Works Water Resources Projects, USACE
4. ER 1130-2-438, 26 October 1987, Project Construction and Operation - Historic Preservation Program, USACE
5. ER 1105-2-100, 28 December 1990 - Section 7-39, Operation and Maintenance of Mitigation Features, Non-Federal Responsibility
6. EM 1110-2-301, 31 February 1999 - Landscape Planting and Vegetation Management at Floodwalls, Levees, and Embankment Dams
7. EP 1165-2-1, 15 February 1989 - Chapter 11 - Operations, Maintenance, and Project Management.
8. EP 1165-2-501, 18 December 1988, Water Resources Policies and Authorities - Environmental Policies, Objectives, and Guidelines for the Civil Works Program of the Corps of Engineers, USACE

9. TR E-85-7, Aug. 1985, Final Report, Environmental Features for Streamside Levee Projects, pp. 26-31, Tree Preservation, WES, USACE
10. TR E-84-11, Nov. 1984, Final Report, Environmental Features for Streambank Protection Projects, WES, USACE
11. TR HL-90-19, November 1990, Final Report, pp. 20-38, A Study of Vegetation on Revetments, Sacramento River Bank Protection Project, Phase I, Literature Review and Pilot Study, WES, USACE, PART II: LITERATURE REVIEW
12. TR E-79-2, August 1979 (Reprinted August 1991), Final Report, Flood Tolerance in Plants: A State-of-the-Art Review, WES, USACE
13. Sacramento River Bank Protection Project, Phase II Report, Study of Vegetation Allowances on Rock Revetment, Sept. 1992, Section 3 - Geomorphic and Environmental Aspects of the SRBPP Area, pp.19-22, and Section 4 - Issues and Concerns, pp.26-30
14. Effects of large woody debris removal on physical characteristics of a sand-bed river, Aquatic Conservation: Marine and Freshwater Ecosystems, Vol. 2, pp.145-163 (1992)
15. Interim Guide for Vegetation on Flood Control Levees, Under Reclamation Board Authority, adopted September 16, 1988
16. Arboriculture, Care of Trees, Shrubs, And Vines in the Landscape, Richard W. Harris, 1983, p. 46, Size of Root Systems
17. Riparian Planting Design Manual for the Sacramento River, Chico Landing to Collinsville, USACE, Sacramento District, May 1986
18. Office Report, Revegetation Project Summary, Sacramento River Bank Protection Project, 41A, November 1, 1992.

EXHIBIT A

FLOOD CONTROL REGULATIONS
(CONTAINED IN STANDARD MANUAL)

EXHIBIT A-1

PROJECT LOCATION MAP

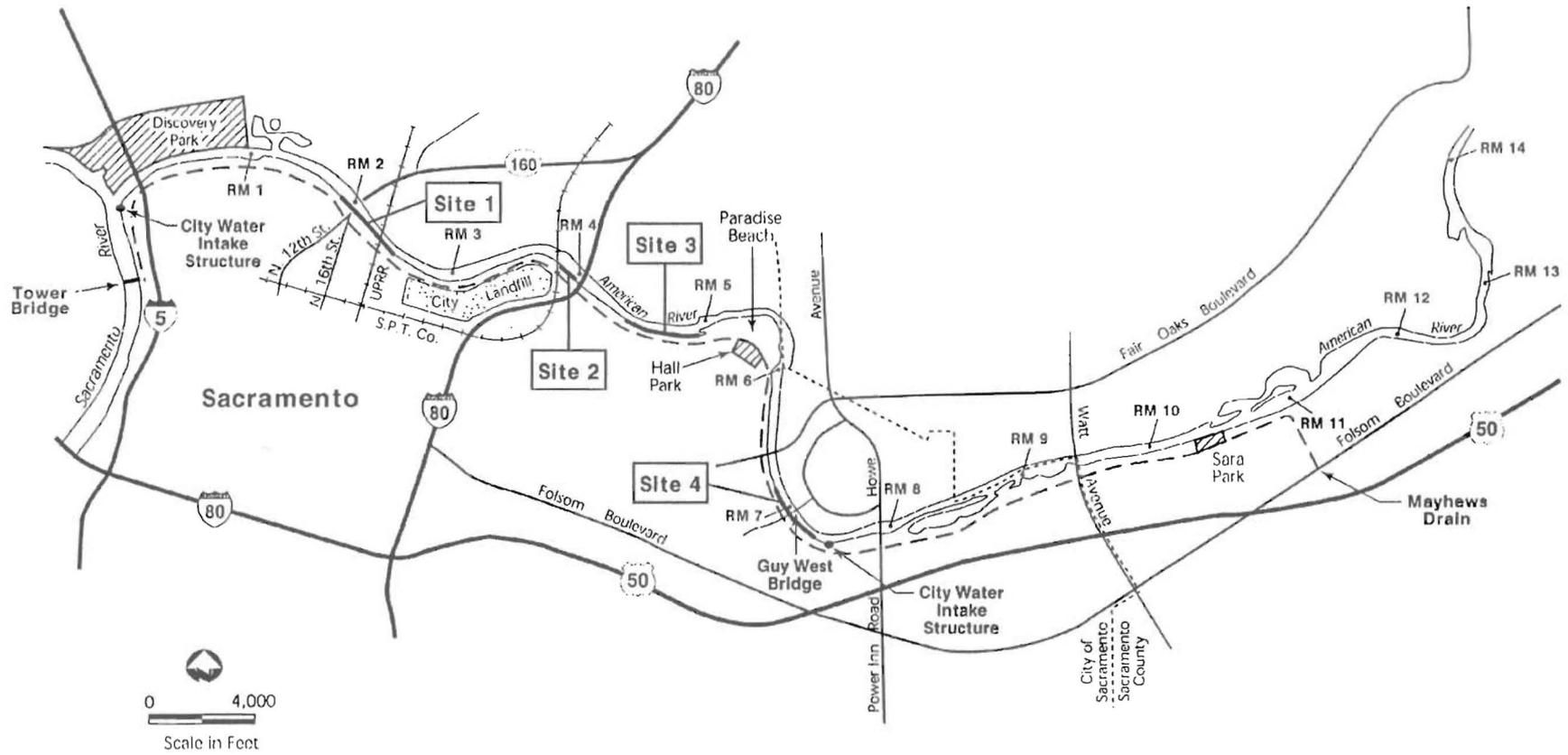


EXHIBIT B

“AS CONSTRUCTED”
DRAWINGS

EXHIBIT B

Original mitigation and bank protection feature construction documents, include:

1. Sacramento River Bank Protection Project, California, Bank Protection - Contract LAR1B of Separable Element 42, Lower American River at River Miles 2.1 LT, 3.75 LT, and 6.8 LT
Specification No. 9957
Drawing File No. 50-04-6052.
2. Sacramento River Bank Protection Project, Lower American River, Contract LAR1A1, River Mile 4,4L, Sacramento County, California
Specification No. 9773
Drawing File No. 50-04-6007;
3. Sacramento River Bank Protection Project, Lower American River, Contract LAR1A2, Sacramento County, California
Specification No. 9807
Drawing File No. 1-04-464; and
4. Sacramento River Bank Protection Project, Sacramento River and Tributaries, CA, Bank Protection Contract LAR 1A3 of Separable Element 42, Lower American River, RM 4.4OLT
Specification No. 9846
Drawing File No. 50-04-6022

Notes:

1. Exhibit B consists of "As Built" unattached drawing sets to this document for the above-referenced project. These drawings include cross-sections, structures, miscellaneous features, plant lists, and planting locations. Drawings are available in the office of the District Engineer.

Exhibit B
unattached

EXHIBIT C

PLATES OF SUGGESTED FLOOD
FIGHTING METHODS
(CONTAINED IN STANDARD MANUAL)

EXHIBIT D

CHECK LIST NO. 1 - LEVEE INSPECTION REPORT
(CONTAINED IN SUPPLEMENT TO O&M)

EXHIBIT E

CHECK LIST - LEVEES, CHANNELS AND STRUCTURES
(CONTAINED IN SUPPLEMENT TO O&M)

EXHIBIT F

LETTER OF TRANSFER/ACCEPTANCE
(UNATTACHED)

EXHIBIT G

SUGGESTED SEMI-ANNUAL REPORT FORM
(CONTAINED IN SUPPLEMENT TO O&M)

EXHIBIT H

MONTHLY MAINTENANCE LOG FORM AND INSPECTION REPORT FORM

EXHIBIT H-1

MONTHLY MAINTENANCE LOG FORM

Exhibit H-1. Sample Format for Monthly Log Form

Plant Establishment Form to Record Irrigation, Weed Control, and Plant Mortality
for Low Berm, Upper Slope, and Middle Berm Planting Areas

Name of Inspector _____ Name of Company _____

Mitigation Site^a _____

Planting Surface^b _____

MO NTH	DAY	IRRIGATION						WEED CONTROL						PLANTING		COMMENTS		
		Watering Day					Total Hrs/Wk.	Operator	Chemical			Manual		Site Conditions	Mortality			
		S	M	T	W	T			F	S	Type	Rates	Operator		Type		Operator	Qty.
	1																	
	2																	
	3																	
	4																	
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^a Lower American River project sites 1, 2, 3, 4, or 5.

^b Designate planting surface as being low-berm face, low berm, lower or upper slope, or middle berm.

Additional Comments:

EXHIBIT H-2

INSPECTION REPORT FORM

EXHIBIT H-2

CHECK LIST NO. 1

VEGETATION ON MITIGATION SITE
INSPECTION REPORT FORM

Location of Area Inspected: Part No. _____, Unit No.s: _____ Date: _____
(including river mile(s)) _____
Inspected by: _____

Report below the condition of the site and those items requiring maintenance work. Opposite each item listed, indicate the appropriate response, yes or no, in the area provided. Provide an attachment, if necessary, describing the negative significant conditions and any proposed/implemented maintenance work for each item. Note any changes, positive or negative, from the previous inspections.

Reference O&M Unit No. _____

Item No.	Description	Response	Yes	No*
1:	Mitigation area erosion free	.....	_____	_____
2:	Vegetation is free of fire damage	.....	_____	_____
3:	Vegetation is free of flood damage	.....	_____	_____
4:	Vegetation is free of wind damage	.....	_____	_____
5:	Vegetation is free of herbicide damage	.....	_____	_____
6:	Vegetation is free of wildlife damage	.....	_____	_____
7:	Vegetation & equipment is free of vandalism	.....	_____	_____
8:	Site is free of trash	.....	_____	_____
9:	Fire-break plowed and clear of growth	.....	_____	_____
10:	Access roads clear	.....	_____	_____
11:	Access gate barriers & locks in good working order	.....	_____	_____
12:	Beaver barrier cages or fencing in good condition	.....	_____	_____
13:	New volunteer growth (trees, shrubs) observed	.....	_____	_____
14:	Perimeter fencing in good working condition	.....	_____	_____
15:	Other items: _____	.....	_____	_____

COMMENTS: _____

*Requires explanation

EXHIBIT I

PERFORMANCE STANDARDS AND GOALS
FOR RIPARIAN HABITATS

Exhibit I-1. Performance Standards and Recommended Performance Goals
for Riparian Habitat at Sites 1, 2, and 4

Performance Criterion	Performance Standards by Monitoring Year ^a		Recommended Performance Goals by Monitoring Year ^a					
	Year 3	Year 8	Year 1	Year 2	Year 4	Year 5	Year 6	Year 7
Mean tree height (meters)	1.4	3.8	0.5	1.0	1.9	2.4	2.9	3.3
Percent tree canopy cover	5.3	14.1	1.8	3.5	7.1	8.8	10.6	12.4
Mean shrub height (meters)	0.6	1.5	0.2	0.4	0.76	1.0	1.1	1.3
Percent shrub cover	8.6	N/A ^b	2.8	5.7	11.4	14.3	17.1	20.0

Notes:

^a Performance standards and recommended goals are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results.

^b N/A: There is no performance standard for percent shrub cover in year 8.

Source: Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project (U.S. Army Corps of Engineers and State of California Reclamation Board 1998).

Exhibit I-2. Performance Standards and Recommended Performance Goals
for Riparian Habitat for Site 3 (River Park)

Performance Criterion	Performance Standards by Monitoring Year ^a		Recommended Performance Goals by Monitoring Year				
	Year 3	Year 8	Year 1	Year 2	Year 4	Year 6	Year 7
Mean tree height (feet)	5.0	16.7	1.7	3.3	6.7	10.0	13.3
Percent tree canopy cover	6	20	2	4	8	12	16
Mean shrub height (feet)	1.2	4.0	0.4	0.8	1.4	2.4	3.2
Percent shrub cover	11	38	3	8	15	23	30

Notes:

^a Performance standards and recommended goals are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results.

^b N/A: There is no performance standard for percent shrub cover in year 8.

Source:

Adopted final environmental assessment and initial study of streambank protection at River Park - Lower American River. Jones & Stokes Associates. 1996.

EXHIBIT J

EXAMPLE OF SAMPLING METHODS

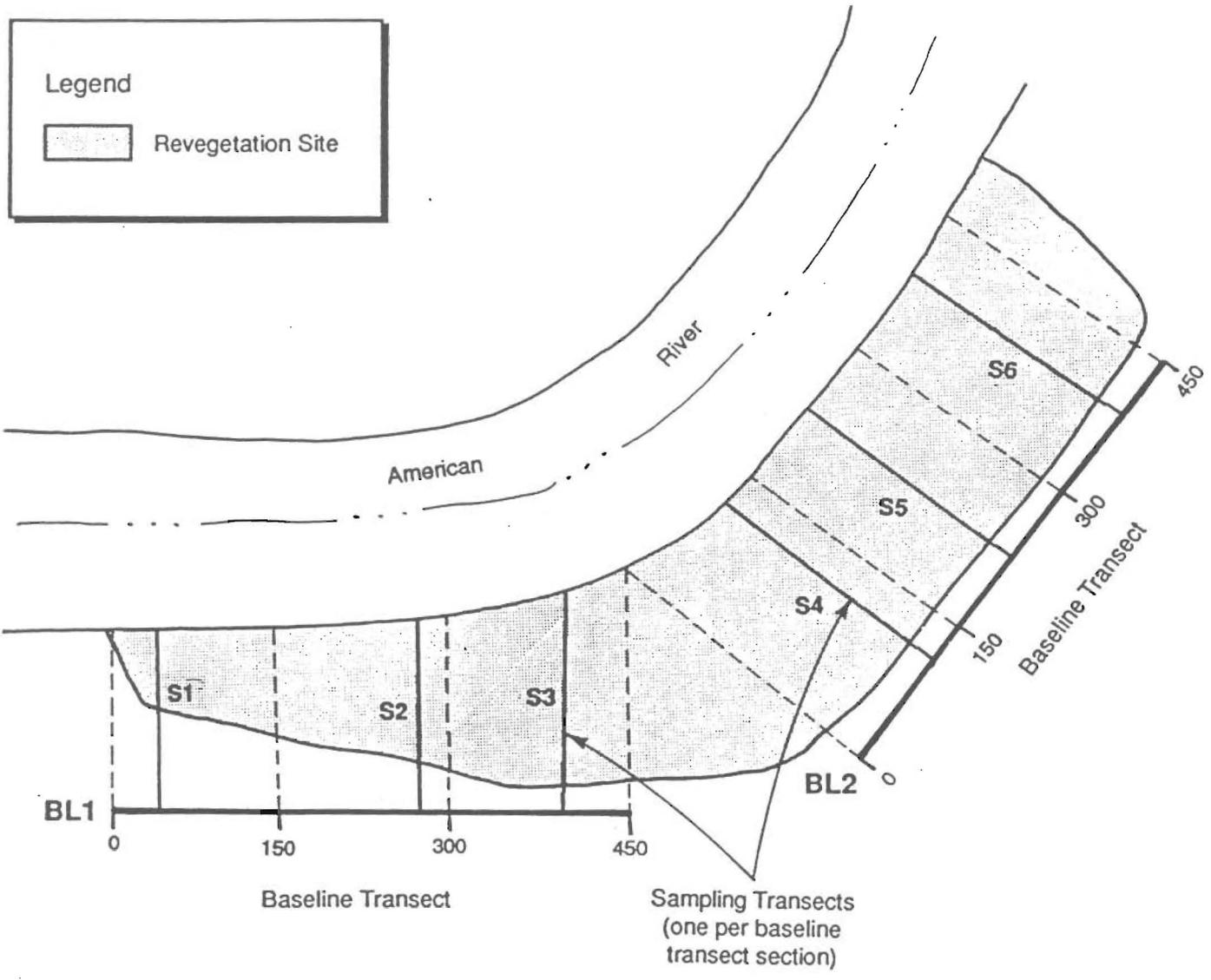


EXHIBIT J-2

EXAMPLES OF ROUNDING OUT PLANT CANOPIES FOR
LINE-TRANSECT MEASUREMENTS

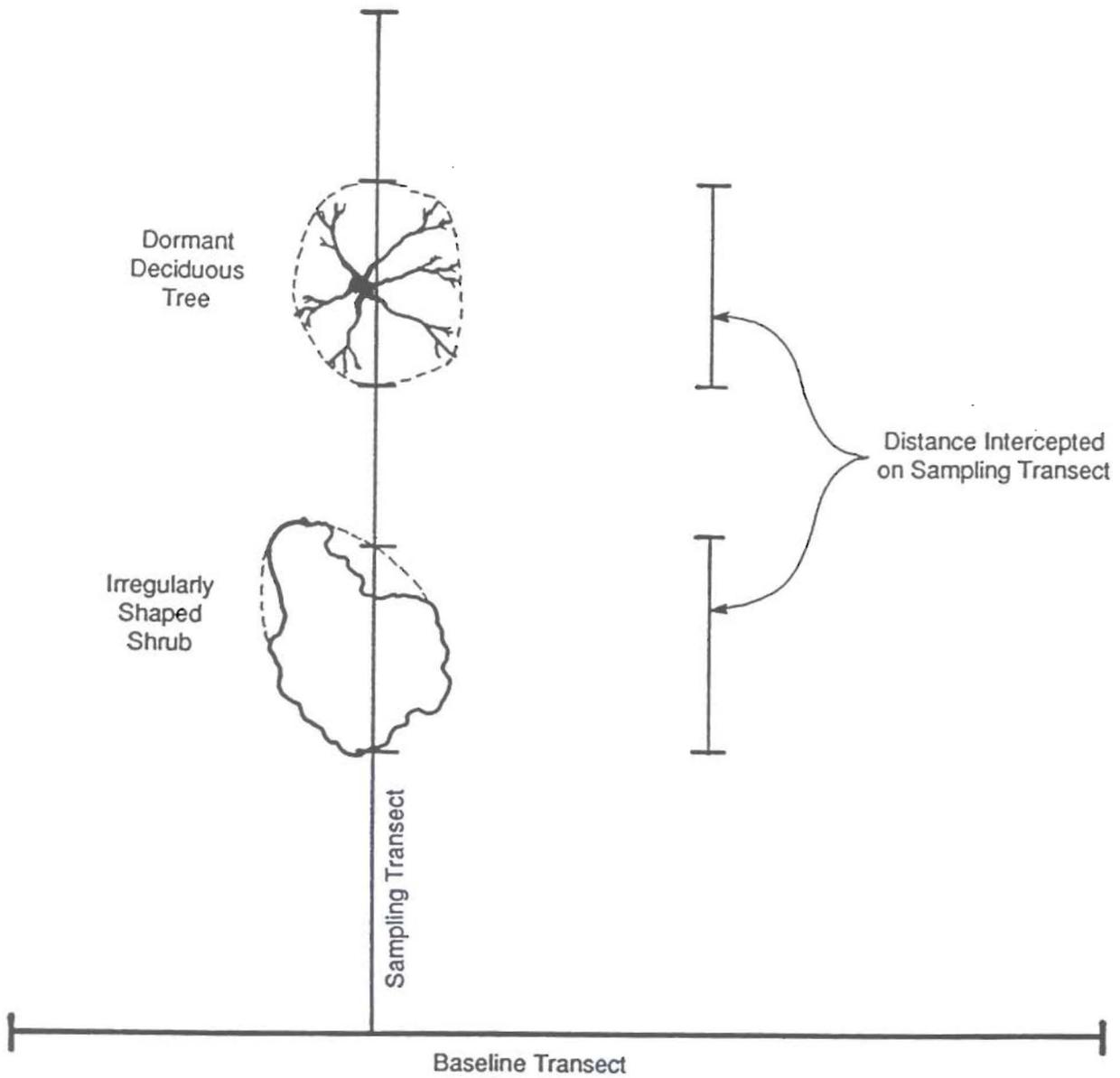


EXHIBIT K

PERFORMANCE STANDARDS FOR
INSTREAM SHADED RIVERINE AQUATIC HABITAT

Exhibit K-1. As-Built Instream SRA Cover Performance Standards for Sites 1,2, and 4

Performance Criterion	Site 1	Site 2	Site 4
Minimum mean SRA cover width (meters)	1.9	2.1	1.7
Minimum percentage of instream woody material ^a	3.5	0	0

Notes: Performance standards are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results.

SRA = Shaded riverine aquatic.

^a Placement of instream woody material is not included as part of the project alternatives for Sites 2 and 4.

Source: Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project (U.S. Army Corps of Engineers and State of California Reclamation Board 1998).

Exhibit K-2. As-Built Instream SRA Cover Performance Standards for Site 3

Performance Criterion	Site 3
Minimum mean SRA cover width (feet)	6.2
Minimum percentage of instream woody material	17.5

Notes: Performance standards are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results.

SRA = Shaded riverine aquatic

Source: Adopted final environmental assessment and initial study of streambank protection at River Park - Lower American River. Jones & Stokes Associates. 1996.

EXHIBIT L

PERFORMANCE STANDARDS AND GOALS FOR OVERHEAD
SHADED RIVER AQUATIC HABITAT

Exhibit L-1. Overhead SRA Performance Standards and
Recommended Performance Goals for Site 1

Performance Criterion	Performance Standards by Monitoring Year		Recommended Performance Goals by Monitoring Year					
	Year 3	Year 8	Year 1	Year 2	Year 4	Year 5	Year 6	Year 7
	Percent shoreline cover	26	57	9	17	35	43	52	54
Mean canopy ^a width (meters) of shrubs on the berm face	1.22	1.83	0.30	0.91	1.52	1.83	1.83	1.83
Mean canopy ^a width (meters) of cottonwoods on the berm surface	1.83	4.88	0.61	1.22	1.83	3.05	3.66	4.27

Notes: Performance standards and recommended performance goals are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results. Performance standards and goals represent the weighted average of predicted future conditions for the upstream, middle, and downstream sections of the site.

The information shown in this table was modified from the original source table [i.e., Final Environmental Impact Report and Supplemental Environmental Impact Statement (EIR/SEIS) (March 1998)] to account for numeric errors in the table. The performance criterion for mean canopy width of shrubs and cottonwoods indicates the value to be in meters, however, the values in the Final EIR/SEIS were not converted to metric values. The mathematical conversion has been made in the table above.

SRA = Shaded riverine aquatic.

^a Applies only to portions of the site planted with shrubs and/or cottonwoods.

Source: Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project (U.S. Army Corps of Engineers and State of California Reclamation Board 1998).

Exhibit L-2. Overhead SRA Performance Standards and
Recommended Performance Goals for Site 2

Performance Criterion	Performance Standards by Monitoring Year		Recommended Performance Goals by Monitoring Year					
	Year 3	Year 8	Year 1	Year 2	Year 4	Year 5	Year 6	Year 7
	Percent shoreline cover	32	66	10	21	42	53	63	64
Mean canopy width ^a (meters) of shrubs on the berm face	1.22	1.83	0.30	0.51	1.52	1.83	1.83	1.83
Mean canopy width ^a (meters) of cottonwoods on the berm surface	1.83	4.88	0.61	1.22	1.83	3.05	3.66	4.27

Note: Performance standards and recommended performance goals are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results. Performance standards and goals represent the weighted average of predicted future conditions for portions of the site receiving different restoration treatments.

The information shown in this table was modified from the original source table [i.e., Final Environmental Impact Report and Supplemental Environmental Impact Statement (EIR/SEIS) (March 1998)] to account for numeric errors in the table. The performance criterion for mean canopy width of shrubs and cottonwoods indicates the value to be in meters, however, the values in the Final EIR/SEIS were not converted to metric values. The mathematical conversion has been made in the table above.

^a Applies only to portions of the site planted with shrubs and/or cottonwoods.

Source: Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project (U.S. Army Corps of Engineers and State of California Reclamation Board 1998).

Exhibit L-3. Overhead SRA Performance Standards and Goals for River Park Site (Site 3)

Performance Criteria	Performance Standards by Monitoring Year		Performance Goals by Monitoring Year					
	Year 3	Year 8	Year 1	Year 2	Year 4	Year 5	Year 6	Year 7
Percent Shoreline Cover	65	90	25	50	80	90	90	90
Mean Canopy Width (feet) of Shrubs on the Berm Face	4	6	1	3	5	6	6	6
Mean Canopy Width (feet) of Cottonwoods on the Berm Surface	1.83	4.88	.61	1.22	1.83	3.05	3.66	4.27

Notes: Performance standards and recommended performance goals are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results. Performance standards and goals represent the weighted average of predicted future conditions for the upstream, middle, and downstream sections of the site.

The information shown in this table was modified from the original source table [i.e., Final Environmental Impact Report and Supplemental Environmental Impact Statement (EIR/SEIS) (March 1998)] to account for numeric errors in the table. The performance criterion for mean canopy width of shrubs and cottonwoods indicates the value to be in meters, however, the values in the Final EIR/SEIS were not converted to metric values. The mathematical conversion has been made in the table above.

SRA = Shaded riverine aquatic.

^a Applies only to portions of the site planted with shrubs and/or cottonwoods.

Source: Jones & Stokes. 1996. Adopted final environmental assessment and initial study of streambank protection at River Park - Lower American River.

Exhibit L-4. Overhead SRA Performance Standards and
Recommended Performance Goals for Site 4

Performance Criterion	Performance Standards by Monitoring Year		Recommended Performance Goals by Monitoring Year					
	Year 3	Year 8	Year 1	Year 2	Year 4	Year 5	Year 6	Year 7
Percent shoreline cover	38	78	13	24	51	64	77	77
Mean canopy ^a width (meters) of shrubs on the berm face	1.22	1.83	0.30	0.91	1.52	1.83	1.83	1.83
Mean canopy ^a width (meters) of cottonwoods on the berm surface	1.83	4.88	0.61	1.22	1.83	3.05	3.66	4.27

Notes: Performance standards and recommended performance goals are derived from predicted project alternative conditions for future years presented in U.S. Fish and Wildlife Service's preliminary draft HEP analysis results. Performance standards and goals represent the weighted average of predicted future conditions for portions of the site receiving different restoration treatments.

The information shown in this table was modified from the original source table [i.e., Final Environmental Impact Report and Supplemental Environmental Impact Statement (EIR/SEIS) (March 1998)] to account for numeric errors in the table. The performance criterion for mean canopy width of shrubs and cottonwoods indicates the value to be in meters, however, the values in the Final EIR/SEIS were not converted to metric values. The mathematical conversion has been made in the table above.

SRA = Shaded riverine aquatic

^a Applies only to portions of the site planted with shrubs and/or cottonwoods

Source: Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project (U.S. Army Corp of Engineers and State of California Reclamation Board 1998).

Exhibit L-5. Overhead SRA Cover Values Assumed in the HEP Analyses for Sites 1, 2, 3 and 4

Site Number	Planting Surface	Percent Shaded Shoreline, by Target Year			Mean Width (in feet) of Vegetation Overhanging the Shoreline, by Target Year		
		TY 1	TY 7	TY 12	TY 1	TY 7	TY 12
1 - Upstream reach ^a	Rock fill slope	0	40	60	0.00	0.40	1.20
1 - Middle reach ^a	Cobble-covered berm	0	80	80	0.00	1.60	1.60
	Transition zones	0	30	50	0.00	0.30	1.00
1 - Downstream reach ^a	Cobble-covered low berm	0	80	80	0.00	1.60	1.60
	Restricted planting surfaces by bridges	0	30	50	0.00	0.30	1.00
2 ^a	Fabric-covered low berm	0	80	80	0.00	1.60	1.60
	Transition zones	0	30	50	0.00	0.00	1.00
3 ^b	Fabric covered low berm	0	90	90	0.00	2.00	2.00
	Transition zones	0	90	90	0.00	2.00	2.00
4 ^a	Cobble-covered low berm	0	80	80	0.00	1.60	1.60
	Transition Zones	0	30	50	0.00	0.00	1.00

Source:

^a Draft HEP Report for the Sacramento River Bank Protection Project, Lower American River Contract Sites 1, 2, and 4 (U.S. Fish and Wildlife Service 1997).

^b Adopted final environmental assessment and initial study of streambank protection at River Park - Lower American River. Jones & Stokes Associates. 1996.

EXHIBIT M

SELECTED LIST OF WOODY PLANTS,
WITH MAINTENANCE CONSIDERATIONS

EXHIBIT M

SELECTED LIST OF WOODY PLANTS, WITH MAINTENANCE CONSIDERATIONS

The following categorizes plant types exhibiting similar growth characteristics that will be encountered. Exotic plants are listed only because of their presence along the river. Their inclusion in this list does not imply they are desirable. Ensure these plants do not encroach into the levee structure, rock revetment, or firebreaks, unless permitted in mitigation plans or as noted herein. Only native species have been planted and are desirable as mitigation vegetation.

- (A) **Grasses and Forbs:** These herbaceous plants should be encouraged. They provide a root network immediately at the soil surface. These plants are permissible everywhere except on firebreaks. They provide some protection against surface erosion. Characterized by the following species:
1. *Artemisia douglasiana*/ Mugwort
 2. *Equisetum hyemale*/ Horsetail (exotic)
 3. *Cynodon dactylon*/ Bermuda Grass (exotic)
- (B) **Vines:** These vines are low growing and form a dense thicket 2-4 feet high. Vines have good erosion control properties and provide good low-cover habitats. Vines have not been planted on water-side berm sites, yet, may volunteer during the life of the project. Characterized by the following:
1. *Rosa californica*/ California Wild Rose
 2. *Rubus vitifolius*/ California Blackberry
 3. *Vitis californica*/ Wild Grape
- (C) **Small Shrubs:** These plants are low growing and generally under six feet in height. Allow these plants to mature on site. Characterized by the following species:
1. *Rhamnus californica*/ California Coffeeberry
 2. *Salvia mellifera*/ Black Sage
 3. *Baccharis pilularis* subsp. *consanguinea*/ Coyote Brush
- (D) **Large Shrubs:** These plants are generally characterized as having a multi-stem upright growth habit. They can appear "brushy" when young, but will develop into an "open" growth appearance over time. Most are deciduous and are "transparent" during winter inspections. Plants are generally under 15-20 feet high. Plants may also provide good slope stabilization. Characterized by the following species:
1. *Salix hindsiana*/ Sandbar Willow
 2. *Salix lasiolepis*/ Arroyo Willow
 3. *Cephalanthus occidentalis*/ Button Brush
 4. *Cornus occidentalis*/ Red Osier Dogwood
 5. *Baccharis viminea*/ Mule Fat
 6. *Heteromeles arbutifolia*/ Toyon

(E) Small-Medium Trees: These plants are characterized as having either a singular or multiple stem. Generally the Elderberry, Buckeye and Fig are as wide as they are tall. Branches may droop to ground at "dripline" of tree. Mature growth may obtain 25-30 feet in height. The Willows may be in shrubby form when in dense thickets or single stemmed trees where space allows. Mature growth is generally 30-40 feet in height. Trunk diameter is small even with age, generally less than 18 inches. Characterized by the following species:

1. *Sambucus mexicanus*/ Blue Elderberry
2. *Aesculus californica*/ California Buckeye
3. *Ficus carica*/ Edible Fig (exotic)
4. *Salix gooddingii*/ Black Willow
5. *Salix lasiandra*/ Yellow Willow
6. *Salix laevigata*/ Red Willow

(F) Medium Trees: These trees are characterized as having a single leader with an upright growth habit. Height of tree may eventually be 30-60 feet. Trunk diameters may achieve 3 feet with age, but generally are 18-24 inches. Characterized by the following species:

1. *Alnus rhombifolia*/ White Alder
2. *Acer negundo* spp. *californicum*/ Box Elder
3. *Robinia psuedoacacia*/ Black Locust (exotic)

(G) Large Trees: These trees are characterized as having a single leader with an upright growth habit. With age (and growing space) trees may eventually achieve heights of 60+ feet. Trunk may achieve large diameters with age, 4-6', but generally need space and time to achieve this. Generally classified as having deep roots, with the exception of the *Populus*. Good soil stabilizer of large areas. Characterized by the following species:

1. *Juglans hindsii*/ California Black Walnut
2. *Populus fremontii*/ Fremont Cottonwood
3. *Quercus lobata*/ Valley Oak
4. *Platanus racemosa*/ California Sycamore
5. *Fraxinus latifolia*/ Oregon Ash

Source: Jones & Stokes. 1996. Adopted final environmental assessment and initial study of streambank protection at River Park - Lower American River.

EXHIBIT N

SELECTED LIST OF WEED SPECIES,
WITH MAINTENANCE CONSIDERATIONS

EXHIBIT N

**SELECTED LIST OF WEED SPECIES, WITH
MAINTENANCE CONSIDERATIONS**

**STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF PLANT INDUSTRY**

**PEST RATINGS OF NOXIOUS WEED SPECIES
AND NOXIOUS WEED SEED**

PURPOSE

To advise commissioners as to the Department's policy regarding any pest action.

DEFINITIONS

- "A" An organism of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action.
- "B" An organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner.
or
An organism of known economic importance subject to state endorsed holding action and eradication only when found in a nursery.
- "C" An organism subject to no state enforced action outside of nurseries except to retard spread. At the discretion of the commissioner.

GUIDANCE

The district will be allowed to control noxious weeds classified as "A" and identified by the Department of Food and Agriculture as "(an) organism of known economic importance to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action."

The district will be allowed to control noxious weeds classified as "B" and identified by the Department of Food and Agriculture as (an) organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion to the individual county agricultural commissioner.

Before the district eradicates any plant belonging to either class "A" or "B", the plant to be eradicated must be identified as a noxious weed in either class "A" or class "B" by a qualified biologist or a representative of the county agricultural commissioner's office. The district shall notify the Department of Water Resources, Flood Control Project Branch before taking action.

"A" SPECIES

Eradication, containment, rejection or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state.

<u>Acaena anserinifolia</u>	bidly bidly
<u>Acaena novae-zelandiae</u> (- <u>A anserinifolia</u> in part as used previously and of British and Australian authors.)	bidly bidly
<u>Acaena pallida</u> (- <u>A anserinifolia</u> in part as used previously.)	bidly bidly
<u>Achnatherum brachychaetum</u> (- <u>Stipa brachychaeta</u>)	punagrass
<u>Albaga maurorum</u> (- <u>A pseudalhagi</u>)	camelthorn
<u>Alternanthera philoxeroides</u>	alligatorwood
<u>Arctotheca calendula</u>	capeweed, as seed or fertile plants
<u>Carduus acanthoides</u>	plumeless thistle
<u>Carduus nutans</u>	musk thistle
<u>Carthamus leucocaulos</u>	whitestem, distaff thistle
<u>Centaurea diffusa</u>	diffuse knapweed

"A" - Pests Continued

<u>Centaurea iberica</u>	Iberian starthistle
<u>Centaurea maculosa</u>	spotted knapweed
<u>Centaurea squarrosa</u>	squarrosa knapweed
<u>Chondrilla juncea</u>	skeletonweed
<u>Cirsium ochrocentrum</u>	yellowspine thistle
<u>Cirsium undulatum</u>	wavyleaf thistle
<u>Crupina vulgaris</u>	bearded creeper
<u>Cucumia melo</u> var. <u>dudain</u>	dudain melon
<u>Cuscuta reflexa</u>	giant dodder
<u>Euphorbia esula</u>	leafy spurge
<u>Euphorbia serrata</u>	serrate spurge
<u>Halimodendron halodendron</u>	Russian salttree
<u>Halogeton glomeratus</u>	halogeton
<u>Helianthus ciliaris</u>	blueweed
<u>Heteropogon contortus</u>	tanglehead
<u>Hydrilla verticillata</u>	hydrilla
<u>Linaria gonistifolia</u> spp. <u>dalmatica</u> (- <u>L. dalmatica</u>)	Dalmatian, toadflax
<u>Onopordum</u> spp.	onopordum thistles
<u>Orobanche ludoviciana</u> var. <u>cooperi</u> (- <u>O cooperi</u> (Gray) Heller, as used in Munz', A Flora of Southern California.)	Cooper's broomrape
(- <u>O multiflora</u> Nutt., as used in Correll and Johnston's Manual of the Vascular Plants of Texas.)	desert broomrape
<u>Orobanche ramosa</u>	branched, broomrape

"A" - Pests Continued

<u>Peganum harmala</u>	harmel
<u>Physalis virginiana</u> var. <u>sonorae</u> (- <u>p subglabrata</u> as used previously.)	smooth groundcherry
<u>Prosopis strombulifera</u>	creeping mesquite
<u>Salsola vermiculata</u>	wormleaf salsola
<u>Salvia virgata</u> (- <u>S pratensis</u> as used previously.)	meadow sage
<u>Scolymus hispanicus</u>	golden thistle
<u>Solanum cardiophyllum</u> nightshade	heartleaf
<u>Solanum dimidiatum</u>	Torrey's nightshade
<u>Sonchus arvensis</u>	perennial sowthistle
<u>Sphaerophysa salsula</u>	Austrian peaweed
<u>Striga lutea</u> (- <u>S asiatica</u>)	witchweed
<u>Tagetes minuta</u>	wild marigold
<u>Zygophyllum fabago</u>	Syrian beancaper

"B" SPECIES

Eradication, containment, control or other holding action at the discretion of the commissioner.

<u>Acacia paradoxa</u> (- <u>A armata</u>)	kangaroothorn
<u>Acronitlon repens</u> (- <u>Centaurea repens</u>)	Russian knapweed
<u>Aegilops cylindrica</u>	jointed goatgrass
<u>Aegilops ovata</u> (- <u>A geniculata</u> and <u>A neglecta</u> in part)	ovate goatgrass
<u>Aegilops triuncialis</u>	barb goatgrass

"B" - Pests Continued

<u>Aeschynomene rudis</u>	rough jointvetch
<u>Agropyron repens</u>	(see <u>Elytrigia repens</u>)
<u>Allium paniculatum</u>	panicked onion
<u>Allium vineals</u>	wild garlic
<u>Ambrosia trifida</u>	giant ragweed
<u>Araujia sericofera</u>	bladderflower
<u>Cardaria chalepensis</u>	lens-podded hoarycress
<u>Cardaria drabs</u>	heart-poddedhoarycress
<u>Cardaria pubescens</u>	globe-podded hoarycress
<u>Carthamus baeticus</u>	smooth distaff thistle
<u>Carthamus lanatus</u>	woolly distaff thistle
<u>Centaurea calcitrapa</u>	Purple starthistle
<u>Centaurea repens</u>	(See <u>Acroptilon repens</u>)
<u>Centaurea sulphurea</u>	Sicilian thistle
<u>Chorispora tenella</u>	purple mustard
<u>Cirsium arvense</u>	Canada thistle
<u>Coronopus squamatus</u>	swinecress
<u>Cucumis myriocarpus</u>	paddy melon
<u>Cynara cardunculus</u>	artichoke thistle
<u>Cyperus esculentus</u>	yellow nutsedge
<u>Cyperus rotundus</u>	purple nutsedge
<u>Elytrigia repens</u> (- <u>Agropyron repens</u>)	guackgrass

"B" - Pests Continued

<u>Euphorbia oblongata</u>	oblong spurge
<u>Gaura coccinea</u>	scarlet gaura
<u>Gaura drummondii</u> (- <u>G odorata</u>)	scented gaura
<u>Gaura sinuata</u>	wayleaf gaura
<u>Gypsophila paniculata</u>	baby's breath
<u>Imperata brevifolia</u>	satintail
<u>Isatis tinctoria</u>	dyer's woad
<u>Lepidium latifolium</u>	perennial peppergrass
<u>Lythrum salicaria</u>	purple looserife
<u>Muhlenbergia schreberi</u>	nimblewill
<u>Nothoscordum inodorum</u>	false garlic
<u>Nymphaea mexicana</u>	banana waterlily
<u>Oryza rufipogon</u>	red rice
<u>Panicum antidotale</u>	blue panicgrass
<u>Physalis viscosa</u>	grape groundcherry
<u>Polygonum cuspidatum</u>	Japanese knotweed
<u>Polygonum polystachyum</u>	Himalayan knotweed
<u>Polygonum sachalinonae</u>	giant knotweed
<u>Rorippa austriaca</u>	Austrian fieldcress
<u>Salvia aethiopsis</u>	Mediterranean sage
<u>Senecio Jacobaea</u>	tansy ragwort
<u>Senecio squalidus</u>	Oxford ragwort

"B" - Pests Continued

<u>Setaria faberi</u>	giant foxtail
<u>Solanum carolinense</u>	Carolina horsenettle, knotweed
<u>Solanum elaeagnifolium</u>	white horsenettle
<u>Solanum lanceolatum</u>	lanceleaf nightshade
<u>Solanum marginatum</u>	white-margined nightshade
<u>Symphytum asperum</u>	rough comfrey
<u>Ulex europaeus</u>	gorse
<u>Viscum album</u>	European mistletoe

"C" SPECIES

State endorsed holding action and eradication only when found in a nursery: action to retard spread outside of nurseries at the discretion of the commissioner: reject only when found in a cropseed for planting or at the discretion of the commissioner.

<u>Carduus pycnocephalus</u>	Italian thistle
<u>Carduus tenuiflorus</u>	Italian thistle
<u>Cenchrus echinatus</u>	Southern sandbur
<u>Cenchrus incertus</u>	coast sandbur
<u>Cenchrus longispinus</u> (- <u>C pauciflorus</u> as used previously)	mat sandbur
<u>Centaurea solstitialis</u>	yellow starthistle

EXHIBIT O

PERFORMANCE STANDARDS AND GOALS
FOR ELDERBERRY PLANTINGS

Exhibit O-1. Performance Standards and Goals for Elderberry Plantings
at Sites 1, 2, 3, and 4

Monitoring Year	Performance Goal (percent survival) ^a	Performance Standard (percent survival) ^a
1	90	NA
2	87	NA
3-7	85	NA
8	NA	84

Notes:

^a Percent survival of the number of plants necessary to mitigate impacts on VELB.

Note: NA = not applicable.

Source: Adopted final environmental assessment and initial study of streambank protection at River Park - Lower American River. Jones & Stokes Associates. 1996.
