

U.S. Fish and Wildlife Service

**DRAFT POST-DELISTING MONITORING PLAN
FOR THE VALLEY ELDERBERRY LONGHORN
BEETLE (*Desmocerus californicus dimorphus*)**



Prepared by:

**U.S. Fish and Wildlife Service
Sacramento Field Office
Sacramento, California**

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1.0 Introduction

Post-delisting monitoring (PDM) is a requirement of the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq.*). Section 4(g)(1) requires the Secretary of Interior to:

implement a system in cooperation with the States to monitor effectively, for not less than five years, the status of all species which have recovered to the point at which the measures provided pursuant to this Act are no longer necessary.

The purpose of this PDM Plan is to verify that the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) remains secure from the risk of extinction after it has been removed from the protections of the Act. The primary goal of the final PDM Plan is to monitor the species to ensure that any substantial decline in the species occurrences or any increases in threats are detected, and to take measures to halt either so that re-proposing it as a threatened or endangered species is not needed. This draft PDM Plan meets the minimum requirement set forth by the Act by effectively monitoring the beetle for not less than 10 years. While not specifically mentioned in section 4(g) of the Act, authorities to list species in accordance with the processes prescribed in sections 4(b)(5) and 4(b)(6) also may be used to reinstate plants or animals on the list, if warranted.

The U.S. Fish and Wildlife Service (Service) published a proposed rule on MONTH dd, 2012, to remove the valley elderberry longhorn beetle from the protections of the Act based on the recovery of the species. The proposed rule includes a brief description of the draft PDM Plan that would be initiated if the animal is delisted.

This draft PDM Plan provides information on the goals, duration, implementation, methods, and reporting schedule for monitoring the valley elderberry longhorn beetle. Upon publication of a final delisting rule, the Service will convene a Science Panel (see Section 4.7 below) to help develop a Detailed Monitoring Plan (which includes site-specific monitoring plans for each monitoring site). This Detailed Monitoring Plan will be developed based on site-specific parameters. In addition, there will be recognition of an adaptive management concept in the Detailed Monitoring Plan that outlines how we may potentially revise the monitoring protocols based on new information to ensure monitoring will be standardized throughout the species range. The draft PDM Plan provides direction for the following measures:

- (1) Identifying thresholds that trigger an extension of monitoring, adaptive management changes at protected sites, or a status review.
- (2) Continued monitoring of currently known occurrences, and conducting additional surveys (in addition to the 56 sites described in this PDM plan) to identify occurrences in new locations.
- (3) Refining the population and habitat baseline published at time of delisting against which subsequent increases or decreases in occurrences can be compared.
- (4) Determining overall and rangewide trends over 10 years of monitoring (with at least 3 of those years consisting of normal rainfall and air temperatures (see Section 4.6) for the range of the animal), specifically including trends regarding persistence of the beetle within watersheds and within protected areas such as conservation banks,

- select established mitigation sites, California Department of Fish and Game (CDFG) Wildlife Areas, the Sacramento National Wildlife Refuge (Sacramento NWR), and the San Joaquin River National Wildlife Refuge (San Joaquin River NWR).
- (5) Conducting studies to determine the continued amount (such as number of habitat acres or number of individual plants) and effectiveness of restoration efforts after delisting.
 - (6) Developing an adaptive management strategy.
 - (7) Creating a science panel to address issues that arise throughout the PDM process.

We expect to annually monitor the implementation of commitments by Federal, State, local, and nongovernmental entities to conserve the valley elderberry longhorn beetle and its habitat for not less than 10 years following delisting. Additionally, comprehensive evaluations of data will occur at least during years 2, 4, and 9 (although these proposed comprehensive evaluation years will be examined and possibly modified if necessary by the Science Panel at initial meetings to be held upon publication of a final delisting rule (see Section 7.0 below)). We are soliciting comments regarding this draft PDM Plan, as outlined in the **Public Comments** section of the proposed delisting rule.

2.0 Background and Summary of the Species at the Time of Delisting

The information on the biology, ecology, distribution, threats, and recovery efforts of the valley elderberry longhorn beetle in this draft PDM Plan is based on peer-reviewed studies and reports, including (but not limited to): Barr (1991), Burke (1921), Huxel (2000), Collinge *et al.* (2001), Talley (2005), Service (1984, 2006), Talley *et al.* (2007), and Holyoak and Koch-Munz (2008).

The valley elderberry longhorn beetle is found only in riparian and upland riparian vegetation in the Central Valley of California from southern Shasta County south to Kern County (see Appendix B; Service 2006, Talley *et al.* 2006, Barr 1991). When the species was listed in 1980 due to loss of beetle habitat and inadequate regulatory mechanisms, it was believed to be extremely limited in distribution and was known from 10 localities in Merced, Yolo, and Sacramento Counties (45 FR 52805; August 10, 1978). Subsequent to the time of listing, survey efforts have revealed that its range includes the majority of the Sacramento Valley and much of the San Joaquin Valley. It is probable that beetle habitat distribution was coarsely related to the extent of riparian forests of which the host plant, elderberry, is often a component; however, we note that elderberry does not occur in all areas where riparian vegetation exists. Thus, we are unable to provide an accurate assessment of potential lost historical range of valley elderberry longhorn beetle habitat; rather, estimates are based on historical losses of riparian vegetation (see Lost Historical Range section of the proposed delisting rule for further discussion). California's Central Valley riparian forests have experienced extensive vegetation loss during the last 150 years due to expansive agricultural and urban development (Katibah 1984, p. 23). For a complete discussion of current and potential threats, please see the **Summary of Factors Affecting the Species** section of the proposed delisting rule.

The valley elderberry longhorn beetle is a wood-boring animal that is dependent on, and found only in association with its hostplant, *Sambucus* spp. (i.e., *S. mexicana* (blue elderberry) or *S. racemosa* (red elderberry), hereafter collectively referred to as "elderberry") (Burke 1921; Barr

1991; Collinge *et al.* 2001; Service 2006). Elderberry is a common shrub component of riparian forests and adjacent uplands along river corridors of the Central Valley (Hickman 1993; Sawyer *et al.* 2009). The beetle utilizes elderberry shrubs with stems that are at least 1 inch (in) (2.54 centimeters (cm)) or greater in diameter at ground level (Barr 1991; Jones and Stokes 1989). The beetle occurs in small populations even in large areas containing elderberry, with only a low percentage of elderberry plants exhibiting adult exit holes (see exit hole discussion below) (Lang *et al.* 1989; Barr 1991; Collinge *et al.* 2001; Talley 2005, 2007; Gilbert 2009). These are the features visible on elderberry stems used to determine presence of the beetle in a given area (see below).

Female valley elderberry longhorn beetles lay from 8 to 20 eggs singly on the bark of living elderberry shrubs (Service 2006). The eggs hatch in a few days and the larvae bore into the wood where they feed on moist woody material until they complete their development. While feeding, each larva creates its own gallery of tunnels within the elderberry shrub (Burke 1921; Service 1999, 2006; Talley *et al.* 2006). After approximately 2 years when the larva reaches the final instar (growth period between a molting stage), it chews a pupal cell and an emergence hole (or exit hole; one per larvae) out of the shrub that it plugs with frass (droppings and wood shavings). The larva does not leave the plant through the exit hole at this point in time. Rather, it changes into a pupa within the chamber it has excavated. The pupal stage lasts about 1 month (Burke 1921) during which time the pupa transforms into an adult. After this transformation, the adult emerges from the exit hole in the shrub between mid-March and mid-June (Burke 1921; Lang *et al.* 1989; Barr 1991; Talley *et al.* 2007). The beetle does not kill the elderberry (Burke 1921). Adults live from a few days to a few weeks after emerging, during which time they feed on elderberry flowers and breed (Linsley 1961; Talley *et al.* 2007). The complete life cycle of the beetle lasts approximately 2 years (Burke 1921).

Very few adult valley elderberry longhorn beetles have been observed during survey efforts for this species, (Barr 1991; Collinge *et al.* 2001; Talley *et al.* 2006). Consequently, the current or past presence of the beetle in a given area is usually established based on the presence of recent or old exit holes in elderberry shrubs (Jones & Stokes 1987; Barr 1991), which is a survey technique widely accepted for this species based on the best known science at this time. Trained biologists are generally able to distinguish recent exit holes (such as holes made within the current year) from holes made in previous years (Collinge *et al.* 2001). Trained biologists are also typically able to distinguish between exit holes made by the valley elderberry longhorn beetle and exit holes made by other species (Talley *et al.* 2007). However, untrained or inexperienced observers may mistake holes made by bees, other insects, woodpeckers, or holes in the shrub that are the result of stems and branches that have broken off as those made by the valley elderberry longhorn beetle.

Additionally, exit holes made by the valley elderberry longhorn beetle are not distinguishable from exit holes made by the non-listed California elderberry longhorn beetle (*Desmocerus californicus californicus*), except by inference based on where the observation occurred within the range of either beetle (River Partners 2007). The California elderberry longhorn beetle is found in the adjacent coast range (Halstead and Oldham 2000; Linsley and Chemsak 1972; Service 2006) and in the Sierra Nevada foothills as far as Mariposa County (Halstead and Oldham 2000, pp. 74–75). The zone of introgression, if it exists, between these two beetles is at an undetermined level in the foothills of the Sierra Nevada, the Coast Range, and probably the

Transverse Range (see proposed survey measure 4.1.b below under the *Monitoring Locations and Surveys* section).

Currently, there are 201 valley elderberry longhorn beetle occurrences (records of individuals or exit holes) from 26 locations identified in the California Natural Diversity Database (CNDDDB) and other sources (see Appendix A, Appendix B, and CDFG 2009). The CNDDDB is managed by CDFG and contains a computerized inventory of location information for California's rare plants, animals, and communities (CDFG 2009). An occurrence (a beetle observation that is reported in CNDDDB as an element occurrence) refers to an observation at a location where a species has been documented to occur, such as a sighting of a valley elderberry longhorn beetle, or an exit hole (recent or otherwise) that indicates possible presence of the species (for further explanation of beetle occurrence and location information, see the *Occurrence Information and Population Size and Distribution* section of the proposed delisting rule). A location refers to the river system, major river reach, or watershed vicinity in which several records in general proximity may occur. Occurrences are only considered by CNDDDB to be extirpated if they receive verifiable information that the area has been searched for many years without a sighting, or the habitat at the location has been destroyed (CDFG 2009).

The number of valley elderberry longhorn beetle occurrences does not necessarily indicate the number and size of separate populations (i.e., groups of beetles that have the potential to interbreed). The majority of the occurrences are distributed across the Central Valley, generally occurring singly and in small, relatively isolated clusters along river corridors. Clusters of beetle records occur along the northern portions of the Sacramento River (around Tehama, Glenn, and Butte Counties), along the lower American River (primarily in Sacramento County), and along the Kings River (in Fresno County). One hundred and twenty-five beetle occurrences have been recorded in the northern portion of the Central Valley (north of the line formed by the southern boundaries of Sacramento and Amador Counties), as compared with 76 in the southern portion of the Central Valley.

3.0 Purpose and Objectives

As stated above, the primary goal of the PDM Plan is to monitor valley elderberry longhorn beetle to ensure that any substantial decline in the species occurrences or any increases in threats are detected, and to take measures to halt either so that re-proposing it as a threatened or endangered species is not needed. This will be accomplished by monitoring the beetle over a specific period of time by measuring selected variables and recording changes at sites located both in protected areas (such as conservation banks, select established mitigation sites, CDFG Wildlife Areas, and NWRs known to have been inhabited by the species (see Appendices A–D)), and non-protected areas. The loss of a beetle occurrence or location could be an indication of a problem. Therefore, if a beetle location or an important area (such as a large block of beetle habitat) is destroyed, the potential causes will be investigated and action taken (such as adaptive management) as outlined in this draft PDM Plan. The PDM Plan would accomplish the objectives through cooperation with the appropriate Federal, State, and local agencies, private partners, and species experts (Cooperating Partners), thus fulfilling the goal to prevent the species from needing Federal protection once again, per the Act.

4.0 Methods

The status of the valley elderberry longhorn beetle will be analyzed by: (1) Monitoring valley elderberry longhorn beetle occupancy at the 26 known locations (Appendix C); (2) surveying for new beetle occurrences, including presence/absence of beetles at restoration sites and identifying subspecific identity of beetles found at foothill locations; (3) recording the number and condition of elderberry shrubs (i.e., beetle habitat); (4) collecting information on the effectiveness of riparian vegetation restoration and enhancement projects; (5) recording qualitative information on beetle habitat and associated riparian vegetation, including information on native and nonnative species (6) recording presence/absence of predatory Argentine ants and European earwigs, including recording relative abundance if present at specific beetle locations to ensure that these potential predators do not become a significant threat to the beetle in the future); and (7) tracking potential loss of beetle habitat and riparian vegetation. Tracking these parameters for the duration of this PDM Plan should help ensure the beetle does not decrease to the point of again meeting the definition of endangered or threatened under the Act by identifying declining trends in population or habitat.

There has been no comprehensive long-term or range-wide monitoring of the valley elderberry longhorn beetle. To date, surveys have been conducted for specific localities or drainages over varying (but limited) periods of time. We have developed and implemented specific guidelines for surveying this species (Service 1999). We believe it is important to the success of this draft PDM Plan to add to the existing data set by continuing to use the same methods (the Service's 1999 guidelines, as discussed further in Section 4.1 below) to survey for the beetle and measure the size of elderberry shrubs to ensure that data are comparable to data collected before the protections of the Act had been removed. Field work is expected to be conducted by qualified biologists with demonstrated experience with the valley elderberry longhorn beetle, elderberry shrubs, Argentine ants, European earwigs, and riparian vegetation in the Central Valley.

A Science Panel will be formed that will consist of Service and CDFG biologists, and recognized scientific experts on the beetle and riparian vegetation. The Science Panel will develop the Detailed Monitoring Plan that will include site-specific monitoring protocols that are standardized throughout the species range. Additionally, the Science Panel will assist in the annual review of data and recommend actions that could be implemented if the species begins to decline. Finally, special attention may be given to the San Joaquin Valley portion of the species range considering the lack of surveys and spotty distribution currently known from that portion of the beetle's range.

4.1 Monitoring Locations and Surveys

Within the 26 locations (Appendices A, B, and C) where the valley elderberry longhorn beetle currently occurs, we have selected 56 sites to monitor valley elderberry longhorn beetle and its habitat, and conduct surveys for new or updated records (occurrences) of the beetle. The 56 sites (Appendix D) include a selective representation of the 201 current known occurrences of the beetle across its range, as well as mitigation sites and conservation banks that have been approved for the species (there are currently 22 mitigation sites and 4 conservation banks for valley elderberry longhorn beetle, in some of which the beetle is currently known to occur). The

Science Panel may decide to modify or add additional survey sites beyond the 56 sites described herein and represented in Appendix D. The mitigation sites and conservation banks are included as an essential part of the draft PDM Plan because these areas have many years of monitoring data available that are valuable for long-term trends analyses, and they are permanently protected lands specifically for conservation of valley elderberry longhorn beetle and its habitat.

Upon delisting, the Service, Science Panel (see Section 4.7 below), and Cooperating Partners will assemble and cooperatively evaluate the 56 sites identified in Appendix D, determine if site locations should be modified or additional sites added, and determine additional monitoring specifics (such as timing of surveys). In general, each of the sites selected will be 1 acre (ac) (0.4 hectare (ha)) in size and contain at least one elderberry shrub (or likely more as determined by the Science Panel) with a minimum of one stem that is 1 in (2.5 cm) or greater at ground level. All surveys and monitoring efforts will be consistent with the Service's July 9, 1999, survey protocol (i.e., Conservation Guidelines for the Valley Elderberry Longhorn Beetle (Service 1999)), or any subsequent version that is reviewed and approved by the Science Panel prior to initiating work on this PDM Plan.

- 4.1.a Surveys at 56 sites will be conducted each year, including attempts to locate new occurrences.
- 4.1.b Sampling for adult beetles will be conducted at those sites that occur in the foothills of the Sierra Nevada and the Coast Range (some of which are captured within the 56 sites identified in Appendix C and D), which is the California elderberry longhorn beetle/valley elderberry longhorn beetle zone of introgression for both species. Specimens will be examined to determine the subspecific identity of animals in those areas and aid the Service, Science Panel, and Cooperating Partners in determining if management for the valley elderberry longhorn beetle or its habitat is needed in those areas.
- 4.1.c Surveys for adults and exit holes will be conducted at riparian restoration and enhancement projects that may occur anywhere within the range of the beetle (such as at any of the 56 sites or another area within the Sacramento and San Joaquin Valleys). Data will be collected to ascertain the effectiveness of these efforts for the beetle. See also Section 4.4 below.
- 4.1.d The presence/absence of beetles at conservation easements and mitigation sites (which are a subset of the 56 sites identified in Appendix C and D) will be determined to help inform the status of the species.

4.2 Time of Monitoring

Monitoring will occur between approximately July 1 and August 31 each year (after the annual flight season) to ensure current year exit holes can be detected.

4.3 Variables to be Monitored

Several ecological variables will be monitored at each of the sites.

- 4.3.a Stems with exit holes: The number of exit holes and, number of elderberry stems with exit holes will be counted, and size of elderberry stems (greater than 1 in (2.5 cm) in diameter, which are the size of stems the beetle found to use) with exit holes will be measured. Stems with current-year exit holes will be distinguished from stems with older exit holes, and the precise location of exit holes will be recorded. These variables will be monitored to provide an indication of beetle occupancy and where suitable habitat is available for the beetle.
- 4.3.b Number and condition of elderberry shrubs: The number of elderberry shrubs and, where it can be determined, the condition of elderberry shrubs will be documented to determine the overall quality of the host plant for the beetle.
- 4.3.c Native and nonnative plants: Qualitative information will be recorded on the diversity and relative abundance of native and nonnative plants in the context of the size of the vegetation community where the elderberry shrubs are found. This information will help assess habitat quality for the beetle.
- 4.3.d Management Efforts: Monitoring of management efforts will occur to maximize benefits of overall expenditures for management activities and help the Service, Science Panel, and Cooperating Partners reprioritize management efforts (consistent with the PDM Plan) if needed.
- 4.3.e Nonnative predators: Presence or absence of Argentine ants and European earwigs will be determined through the use of appropriate sampling methods (as determined by the Service, Science Panel, and Cooperating Partners) to determine presence and potential site-specific impacts of these predators, particularly considering the potential for this threat to become substantial (see Factor C discussion in the proposed delisting rule).
- 4.3.f Other Threats: In addition to specific monitoring for nonnative predators (see 4.3.e above), other potential threats information will be recorded, such as implementation or changes in agriculture or other land uses adjacent to the monitoring sites, signs of levee maintenance, changes or impacts from construction or use of roads and trails, fire and fire control, vegetation clearing or control, herbicide use, or other sources of disturbance or change to the habitat. The Service, Science Panel, and Cooperating Partners will collectively decide at initial meetings (following completion of the final PDM Plan) which of these variables will be most appropriate to monitor at each of the 56 sites. Information from these variables will provide qualitative information on the overall level of impacts one or more potential threats may have on the beetle or its habitat at the monitoring sites.

4.4 Riparian Restoration and Enhancement

Information on riparian vegetation restoration and enhancement that occurs at any of the 56 sites implemented after the delisting of the valley elderberry longhorn beetle, such as acreage, location, and other specifics, will be collected and analyzed on an annual basis to supplement other habitat quality information collected as described in this PDM Plan (see Section 4.3 above). Specific information to be collected will be determined by the Service, Science Panel, and Cooperating Partners at the initial meetings that follow completion of a final PDM Plan. Data collected will assist the Service, Science Panel, and Cooperating Partners to track the quantity and quality of habitat available to the beetle throughout its range. At minimum, information will be collected on the abundance of elderberry shrubs, the number of stems with exit holes, the presence of nonnative predators, and qualitative information on native and nonnative plants.

4.5 Loss or Damage to Riparian Vegetation within the Range of the Valley Elderberry Longhorn Beetle

Upon delisting, Federal agencies will not be required to consult with the Service under section 7 of the Act when actions they carry out, fund or permit may affect the valley elderberry longhorn beetle or its habitat, the latter of which is a component of riparian vegetation within the Central Valley. Additionally, private landowners will not be applying for authorization for incidental take through section 10 of the Act for this species. Therefore, the Service will attempt to track riparian vegetation in the Central Valley that is lost or damaged through analysis of documents completed under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), as well as through coordination with Cooperating Partners and the public. The Service, Science Panel, and Cooperating Partners will collectively decide at initial meetings (following completion of the final PDM Plan) what information would be most valuable to track and use to assist in the annual review of data, and aid in developing recommendations that could be implemented if the species begins to decline.

4.6 Monitoring Duration

We expect to annually monitor the implementation of commitments by Federal, State, local, and nongovernmental entities to conserve the valley elderberry longhorn beetle and its habitat for not less than 10 years following delisting, with at least 3 of those years (not necessarily consecutive) consisting of normal rainfall and air temperatures for the range of the animal. The specifics related to measuring rainfall, air temperature, and other weather pattern information will be defined by the Science Panel at initial meetings upon publication of a final delisting rule. As discussed in the “Background” section of this draft PDM Plan, adult valley elderberry longhorn beetles are difficult to observe, the species has a cryptic life history, and they exist in widely scattered, low-density populations. Also, the beetle may undergo changes in population size from year to year in response to the host plant and other environmental conditions. Thus, a minimum 10-year monitoring period is necessary to meet the objectives of this draft PDM Plan, including a determination as to whether any observed changes are the result of natural variation or are cause for concern (as determined by the Science Panel as part of completing the Detailed Monitoring Plan). As stated previously, the duration of monitoring may be extended if there is

indication of a decline in the valley elderberry beetle, a substantial new threat is observed, an increase in an existing threat is detected, or additional survey years are needed to ensure data are collected that include 3 years of normal rainfall and air temperatures. The Service, Science Panel, and Cooperating Partners will determine (at initial meetings following completion of the PDM Plan) the necessary thresholds for deciding that low numbers of beetles recorded in a given year may be an indication of a declining population trend versus natural variation in population size.

4.7 Science Panel and Adaptive Management

The Service will form a Science Panel upon completion of the final PDM Plan to finalize the specific monitoring sites (i.e., the 56 specific sites discussed herein and represented in Appendix D, and potentially additional sites if deemed necessary by the Science Panel) for monitoring within the range of the valley elderberry longhorn beetle. Additionally, the Science Panel will develop standardized site-specific monitoring protocols (based on the PDM Plan and the Service's 1999 Conservation Guidelines), review the annual site-specific monitoring data and information, provide recommendations for adaptive management, and address other scientific questions as they arise. A complete list of the roles and responsibilities of the Science Panel is found in Section 9.0 below. The Science Panel will consist of recognized valley elderberry longhorn beetle experts and riparian vegetation experts familiar with riparian vegetation conditions in the Central Valley.

According to Service policy (65 FR 35242), adaptive management is defined as a formal, structured approach to dealing with uncertainty in natural resources management, using the experience of management and the results of research as an ongoing feedback loop for continuous improvement. Adaptive approaches to management recognize that the answers to all management questions are not known and that the information necessary to formulate answers is often unavailable. Adaptive management also includes, by definition, a commitment to change management practices when determined appropriate within the guidelines of the post-delisting monitoring plan.

The PDM Plan includes a monitoring/feedback mechanism. The Service will work with the Science Panel and Cooperating Partners to review the results of monitoring (as outlined in Sections 4.1–4.5 above), devise appropriate conservation measures if the valley elderberry longhorn beetle declines, and pursue implementation of those conservation measures as resources and priorities allow.

4.8 Evaluation of Information

Valley elderberry longhorn beetle data and other information collected will be entered into the spatial database at the Service's Sacramento Fish and Wildlife Office. Data and information collected on the presence or absence of the species, habitat, and threats will be analyzed each year by the Service, Science Panel, and Cooperating Partners based on the most appropriate methodology (such as those methods described in Southwood 1966, Collinge *et al.* 2001, Talley 2005, and Holyoak and Koch-Munz 2008). Data will be reviewed for downward trends in

occupancy (occurrences or locations) and threats within or across the monitoring sites, as these types of changes may be cause to evaluate the need to relist the species.

5.0 Restoration or Enhancement of Sites

Based on the Service's evaluation of the data and information from monitoring and surveys, an assessment will be made by the Service for new and continuing habitat restoration or enhancement opportunities. For example, monitoring data could assist biologists in determining conditions where beetles and elderberry shrubs may be more abundant, which in turn could assist biologists in choosing higher-quality restoration sites. The Service will work with the Science Panel and Cooperating Partners to identify the best suitable locations for new and continuing habitat restoration or enhancement, and the optimal means to conserve these areas.

6.0 Factors Indicating Potential Need for Action by the Service and Cooperating Partners

Although often included in PDM Plans for other species, we do not believe it is feasible to specify in advance a complete list of the explicit quantitative triggers for the valley elderberry longhorn beetle that would require specific actions by the Service (such as extension of the PDM period, initiation of a formal status review, or publication of a relisting proposal). However, some possible triggers or scenarios are discussed in the following paragraphs. For example, if a decline in the number of exit holes in a single year is observed, this does not necessarily equate to the beetle's imminent extirpation across its range; rather, the decline may be the result of population variation in response to short-term environmental factors. Additionally, identifying range-wide triggers is further complicated by the cryptic nature of this beetle. Therefore, any responsive action will be undertaken by the Service based on recommendations developed by the Service, Science Panel, and Cooperating Partners and described in the Detailed Monitoring Plan.

In the event of a significant change, adverse incident, or rangewide decline of valley elderberry longhorn beetle or its habitat, the Service may take one or more of the following responsive actions, as appropriate:

- (1) Convene the Science Panel and Cooperating Partners to discuss the causes and severity of any observed change, incident, or decline of the species, and develop appropriate responses for possible implementation. This coordination could result in a determination that adaptive management considerations should be implemented. Examples of adaptive management actions include (but are not limited to) additional monitoring sites; additional research; modified monitoring methods; intensification of existing monitoring and research; or modification of management activities, restoration techniques, or enhancement measures. Any of these or other actions could be implemented to determine the cause of changes in monitored variables.
- (2) Add new objectives and actions to the PDM Plan (as an amendment) following coordination with Cooperating Partners.
- (3) Extend the PDM Plan monitoring period.

- (4) Conduct a rangewide status review of the beetle, including a five-factor analysis of the threats to the species, to determine whether it warrants relisting under the Act.
- (5) Emergency list the beetle as threatened or endangered.

The Science Panel and Cooperating Partners may determine that events (beyond those conditions expected and planned for as described in Sections 4.3–4.5 above) may warrant further study or action. Examples of potential events and responses include (but are not limited to):

- (1) A severe winter storm could impact the Central Valley and result in flooding of valley elderberry longhorn beetle habitat, or a wildfire could occur at a locality containing a monitoring site for the species.

Possible Service Response: Additional surveys might be conducted to assess the locations and degree of loss of valley elderberry longhorn beetle habitat, with subsequent management or restoration conducted accordingly.

- (2) Invasive pests (such as the fire ant (*Solenopsis invicta*), Asian tiger mosquito (*Aedes albopictus*), or Japanese beetle (*Popilia japonica*)) are targeted by the California Department of Food and Agriculture (CDFA) for their potential environmental harm. These invasives could be detected at a monitoring location or in the vicinity of suitable valley elderberry beetle habitat, and might require immediate eradication or control measures.

Possible Service Response: The Service and Cooperating Partners might work with CDFA, local Agricultural Commissioner's Office, or Mosquito Abatement District to ensure potential adverse effects to the valley elderberry longhorn beetle are avoided or minimized during control activities.

Finally, the following potential changes also will be discussed, evaluated, and expanded upon by the Science Panel (for development of more specific triggers to be incorporated into the Detailed Monitoring Plan):

- (1) Unanticipated decline of valley elderberry longhorn beetles (i.e., no new exit holes or individuals are observed) over a specific period of time, or decline in beetles at two or more monitoring sites or one of the 26 locations in a given year.
- (2) Unanticipated decline in the elderberry shrubs becomes apparent at one or more monitoring sites in a given year.
- (3) The detection of Argentine ants or European earwigs at one or more monitoring sites in a given year.

7.0 Meetings and Reports

Annual meetings will be held by the Service, Science Panel, and Cooperating Partners to share and discuss monitoring results, evaluate any observed change(s) in monitored variables, determine information needs, consider additional research, and develop recommended conservation actions. As part of each meeting, the Service will consider changes to the PDM Plan.

As part of the methodology for the PDM Plan, meetings between the Service, Science Panel, and Cooperating Partners held at the end of years 2, 4, and 9 (at a minimum)¹ will be more comprehensive, with additional comprehensive meetings scheduled if determined necessary by the Service (such as if the monitoring period extends beyond 10 years, as discussed previously). The goal of these more comprehensive meetings (in addition to those discussion items identified above) will be to discuss any substantial decline in the species occurrences, or any increases in threats that might be detected over the 2-, 4-, or 9-year monitoring period and to identify measures to reverse the declines or ameliorate the threats so that re-proposing the beetle as a threatened or endangered species is not needed.

In addition to the annual and more comprehensive (i.e., years 2, 4, and 9) meetings, the Service will attend appropriate scientific conferences and workshops that pertain to valley elderberry longhorn beetle ecology or insect conservation (such as annual meetings of the Entomological Society of America and the Xerces Society). Participation at such meetings will provide opportunities for the Service to present PDM results, gather additional information on other longhorn beetle species and their habitats that may apply to the valley elderberry longhorn beetle, and encourage or maintain interest in valley elderberry longhorn beetle monitoring within the scientific community.

Annual reports are targeted for completion by the Service on January 31 of each year based on data collected and analyzed at the 56 monitoring sites. The reports prepared at the end of years 5 and 10 will be more comprehensive, including a threats analysis² and a more detailed rangewide discussion. All reports will include, but will not be limited to, the following information:

- (1) A summary of annual survey results for the beetle.

¹ Comprehensive evaluations of data will occur at minimum during years 2, 4, and 9, representing early, middle, and later detailed evaluations during the monitoring period. An evaluation at year 9 (versus 10) was specifically proposed to provide time for the Science Panel to plan for additional years of monitoring (if determined necessary). The Science Panel will evaluate the proposed timeframe for these comprehensive evaluations at initial meetings to be held upon publication of a final delisting rule and possibly modify these time frames if necessary.

² Threats to the valley elderberry longhorn beetle will be evaluated with respect to the five factors considered when a species is proposed for addition to the Federal List of Threatened and Endangered Plants (i.e., Factor A—the present or threatened destruction, modification, or curtailment of habitat or range; Factor B—overutilization for commercial, recreational, scientific, or educational purposes; Factor C—disease or predation; Factor D—inadequacy of existing regulatory mechanisms; and Factor E—other natural or manmade factors affecting its continued existence.

- (2) A summary of information about the beetle and its habitat at each of the 56 sites, as well as the conservation banks and mitigation sites that are monitored.
- (3) A summary of other data that can be used to assess the beetle and determine if any substantial decline in the species occurrences or any increases in threats are detected.
- (4) Conservation recommendations for actions that should be implemented for the beetle at each of the 26 locations.

The report prepared by the Service at year 10 will also include a determination of whether monitoring should continue beyond the 10-year period. If there is not substantial information indicating that the valley elderberry longhorn beetle meets the definition of endangered or threatened under the Act at the end of the 10-year monitoring period (or following additional years that could be added to accommodate 3 consecutive years of normal rainfall and temperatures), then the PDM can be discontinued at that time. Alternatively, if there is substantial information indicating that the beetle meets the definition of endangered or threatened under the Act, monitoring would continue and be modified as appropriate. The Service may request reviews of draft reports by the Science Panel and Cooperating Partners, as appropriate. Upon completion of the comprehensive rangewide report at the end of year 10, a Notice of Availability will be published in the **Federal Register**. The final report will be posted at <http://www.fws.gov/sacramento>.

8.0 Funding

The Service currently is developing cost estimates for implementation of the PDM Plan and will include these in the final PDM Plan.

9.0 Implementation

Implementation of the valley elderberry longhorn beetle PDM Plan will be a cooperative effort, and the Service will coordinate with a Science Panel and Cooperating Partners (such as other Federal, State, and local agencies, private partners, species experts, and others as appropriate) to implement an effective monitoring program for the species. The Cooperating Partners may include (but not be limited to): U.S. Army Corps of Engineers, Bureau of Reclamation, California Department of Water Resources, and appropriate local agencies.

The Sacramento Fish and Wildlife Office will lead the initiation of activities described in the PDM Plan. Additionally, the Sacramento Fish and Wildlife Office will be responsible (with the cooperation and assistance of other Service offices and refuges, appropriate Federal and State agencies, species experts, and other Cooperating Partners) for ensuring that the monitoring requirements outlined in this PDM Plan are accomplished, including the completion of all reports described herein.

The roles of the Sacramento Fish and Wildlife Office are to:

- (1) Develop a Notice of Availability (for publication in the **Federal Register**) for the draft PDM Plan, distributing the Notice and draft PDM Plan to other Service representatives (such as Sacramento and San Joaquin River NWRs), other appropriate

- Federal and State agencies, species experts, peer reviewers, and the public for comment.
- (2) Incorporate comments and recommendations from peer reviewers and commenters into the final PDM Plan, as appropriate.
 - (3) Complete a final PDM Plan.
 - (4) Publish a Notice of Availability (for publication in the **Federal Register**) for the final PDM Plan, distributing the Notice and final PDM Plan to other Service representatives (such as Sacramento and San Joaquin River NWRs), other appropriate Federal and State agencies, and species experts.
 - (5) Establish and maintain coordination with Cooperating Partners who will assist in implementation of the final PDM Plan.
 - (7) Create a Science Panel composed of recognized experts on the valley elderberry longhorn beetle, its habitat, and riparian vegetation in the Central Valley. Maintain coordination with these individuals to assist in developing detailed monitoring plans based on site-specific parameters, adaptive management strategies, and other monitoring or evaluation criteria as outlined in this PDM Plan.
 - (8) Work with the Science Panel, Cooperating Partners, and appropriate landowners or land managers to implement monitoring and collection of survey data.
 - (9) Work with the Science Panel and Cooperating Partners to analyze monitoring and survey data.
 - (10) Coordinate and hold annual meetings with the Science Panel and Cooperating Partners to discuss and analyze monitoring and survey results, information needs, and consider updates to the final PDM Plan (as needed).
 - (11) Prepare draft and final annual reports using the monitoring and survey data.
 - (12) Prepare more comprehensive draft and final reports at the end of years 5 and 10 on the monitoring and survey results. Develop a Notice of Availability of the final PDM Report for publication in the **Federal Register** following completion of the PDM and final analysis.

In cooperation with the Service, the roles³ of the Science Panel and Cooperating Partners are to:

- (1) Assist the Service with developing a scientifically sound monitoring approach for the site-specific monitoring plans.
 - a. Evaluate the proposed 56 monitoring sites represented in Appendix D, and if necessary modify the specific geographic locations and number of sites. Inquire with landowners to request permissions to access properties.
 - b. Develop detailed monitoring plans that use standardized monitoring protocols. Each monitoring plan would be based on site-specific parameters, as proposed in the draft PDM Plan. Evaluate various monitoring parameters, such as (but not limited to) determining the minimum number of elderberry shrubs to be present at a site; and defining specifics related to measuring rainfall, air temperature, and other weather pattern information.
 - c. Evaluate the monitoring methods for determining presence/absence of potential nonnative predators.

³ Roles identified for the Science Panel and Cooperating Partners that will be conducted prior to surveying or monitoring activities are initiated include 1–7.

- d. Determine which information should be collected on riparian vegetation restoration and enhancement, as well as lost or damaged riparian vegetation, in the Central Valley that will assist the Service to track quantity and quality of habitat available to the beetle throughout its range.
 - e. Determine which variables related to threats to the species or its habitat will be most appropriate to monitor at each of the monitoring sites. Identify appropriate sampling or surveys methods to record information, including presence of potential nonnative predators, implementation or changes in agriculture or other land uses adjacent to the monitoring sites, signs of levee maintenance, changes or impacts from construction or use of roads and trails, fire and fire control, vegetation clearing or control, herbicide use, or other sources of disturbance or change to the habitat.
- (2) Develop a comprehensive list of quantitative triggers to consider when analyzing information, including identifying the necessary thresholds for deciding if low numbers of beetles recorded in a given year could be natural variation in population size or an indication of a declining population.
- a. Develop an adaptive management strategy.
- (3) Monitor the implementation of conservation actions for valley elderberry longhorn beetle.
- a. Participate in annual meetings and assist with conducting annual reviews of data.
 - b. Evaluate the timeframe for comprehensive evaluations, which this document currently proposes to take place in years 2, 4, and 9. This will aid in determining possible underlying cause(s) of potential declines or changes in beetle presence or its habitat. Participate in meetings related to comprehensive evaluations.
 - c. Assist in the collection and analysis of valley elderberry longhorn beetle monitoring and survey data throughout the life of the PDM Plan.
 - d. Gather information for their respective areas (such as the geographic area that each agency or partner is responsible for) or through their governing authorities that may aid in monitoring beetle occurrences, locations, habitat, and threats.
- (4) Recommend actions that could be implemented if the species begins to decline and assist in re-prioritizing management efforts if needed.
- (5) If valley elderberry longhorn beetles are found to occur in the foothills of the Sierra Nevada and Coast Range, determine if management for this species is needed in these areas.
- (6) Provide guidance on potential revisions (if needed) for the Service's July 9, 1999, survey protocol (i.e., Conservation Guidelines for the Valley Elderberry Longhorn Beetle (Service 1999)).

10.0 Anti-Deficiency Act Disclaimer

Post-delisting monitoring is a cooperative effort between the Service and other Cooperating Partners (i.e., State, tribal, and foreign governments; other Federal agencies; and nongovernmental partners). Funding for monitoring activities (as outlined in this draft PDM

Plan) presents a challenge for all partners committed to ensuring the continued viability of the valley elderberry longhorn beetle following removal of Endangered Species Act protections. To the extent feasible, the Service intends to provide funding for PDM efforts through the annual appropriations process. Nonetheless, nothing in this draft PDM Plan should be construed as a commitment or requirement that any Federal agency obligate or pay funds in contravention of the Anti-Deficiency Act (31 U.S.C. 1341), or any other law or regulation.

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APPENDIX A. Locations and occurrence records of the valley elderberry longhorn beetle in the north Central and south Central Valley of California (information also presented as Table 1 in the 2012 proposed delisting rule)¹.

Locations (North to South)²	Number of Occurrence Records³	Years of Occurrences⁴
1.a. Sacramento River (SR), Redding-Red Bluff	10	87, 89, 91, 03A, 08A
1.b. SR, Red Bluff-Chico	13(3)	85, 86, 87, 91, (00A), 01A, (03), (10)
1.c. SR, Chico-Colusa	18(1)	86, 87, 88, (03), 06
1.d. SR, Colusa-American River confluence	7	85A
1.e. SR, American River confluence south	2(1)	05A, 06A, (08)
2. Thomes Creek	1	91, absent 97
3. Stony Creek	1	91, absent 97
4. Big Chico Creek	2(1)	91, 97, (10)
5. Feather River	6(1)	85, 91, (07), 10A
6. Butte Creek	4	93, absent 91, 95, absent 97
7. Yuba River	7	98
8. Bear River	4(2)	91, 98, 03, (04A, 10A)
9. Lower American River	11(4)	84A, 85A, 90A, 95A, 96, 00, 08A, (02, 03, 04,10)
10. Upper American River vicinity (Miner and Secret Ravine, Coon, Anderson and Linda Creeks) (foothill location >1,000 ft elevation)	8	84, 91, 02, 10
11. Putah Creek	4(2)	82A, 91A, 95, 00A, (04, 10)
12. Cache Creek	7	91, 01A, 07A
13. Ulatis-Green Valley Creeks	6	91, 02, 04, (08)
14. Cosumnes-Laguna-Dry Creeks	7(3)	64A, 84, 87, 91, (02, 03, 04)
15. Mokelumne-Bear Rivers	6	84, 91A, 06
16. Stanislaus River	4(1)	84A, 85, 89, 91, (10)
17. Upper Stanislaus hills (vicinity above and between New Melones and Don Pedro Reservoirs, including Sullivan Creek) (foothill location >1,000 ft elevation)	6	99, 00, 02A, 07A
18. Calaveras River-Stockton Diverting Canal	5	84A, 91, 00
19. Tuolumne River	4	84, 91, 99
20. Merced River	3(1)	85, 86, 90A, absent 91, (10)
21. Kings River	18	89A, 90A, 91, 94, 98A, absent 10

Locations (North to South)²	Number of Occurrence Records³	Years of Occurrences⁴
22. Kaweah River	5	37, 86A, 91, 94
23. Tule River-Deer Creek	5(1)	91A, 93, (10)
24. Kern River (excluding Caliente Creek)	1(2)	91, (08, 10)
25. Caliente Creek (foothill location >1,000 ft elevation)	3	91
26. San Joaquin River	3(1)	84, 89, 92, 04

1 - Non-CNDDDB source information includes survey from review of a section 7 consultation, literature sources such as Holyoak and Graves 2010, River Partners 2007, Collinge *et al.* 2001, and Talley 2005, and other verified sources (such as information from scientific experts or Service biologists who have evaluated data for accuracy) compiled in a GIS database by the Service's Sacramento Fish and Wildlife Office.

2 - The locations presented in this table are based on available data that provide detailed information about valley elderberry longhorn beetle presence. Additional locations were not included in this table due to a lack of sufficient information that provides certainty on valley elderberry longhorn beetle presence (areas with extremely limited habitat, locations that are exclusively at higher elevation that abut with the range of the California elderberry longhorn beetle, a record of a single shrub, etc.).

3 - Occurrence records are a combination of CNDDDB source data and non-CNDDDB source data, the latter of which is presented as a value between parentheses. For example, the Big Chico Creek location has a total of three occurrence records, including two from CNDDDB source data and one from non-CNDDDB source data.

4 - Data provided in this column show: (1) Years when surveys were conducted and beetles were found (e.g., "99" indicates that beetle evidence was observed in the year 1999, or "90A" indicates adult beetles were observed in 1990), and (2) years when surveys were conducted and beetles or evidence of beetles were not found (e.g., "absent 91" indicates that a survey was conducted in 1991 but no beetles or evidence of beetles were observed). Additionally, there could be existing known locations, or new locations (in addition to the 26 locations listed in this table) where valley elderberry longhorn beetles occur today, but it is uncertain because we know of no recent surveys that have been conducted.

APPENDIX B. Valley elderberry longhorn beetle locations, threats, protections, and study needs in the North Central and South Central Valley of California. Acronyms are defined below¹ (information also presented as Table 1 in the 2012 proposed delisting rule).

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
1.a. Sacramento River (SR), Redding-Red Bluff	Factor A: limited habitat loss from urban development in city and associated bank protection (non-project); additional habitat remains on some tributaries but not others. Factor C: Argentine ants. (Holyoak and Graves 2010) Factor E: human use (recreation, cutting).	One small restoration (Turtle Bay, 120 acres).	Continued and expanded habitat or species surveys to include more tributaries.
1.b. SR, Red Bluff-Chico	Factor A: relatively low past loss/current threat; localized extensive loss in vicinity of small city; some agricultural encroachment; some bank protection; resulting in narrow riparian corridor band on mainstem and tributaries. Factor C: Argentine ants (Holyoak and Graves 2010).	Significant conservation easements, some with restoration to lessen effects of adjacent agriculture.	Consistent habitat and species monitoring.
1.c. SR, Chico-Colusa	Factor A: least habitat loss or threat in mainstem, tributary channelization but not to completion; some bank protection/flood control noted, but no levees.	Significant conservation easements, some with restoration, to lessen effects of adjacent agriculture.	Consistent habitat and species monitoring.

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
1.d. SR, Colusa-American River confluence	Factor A: intensive agricultural conversion, resulting in complete riparian vegetation loss between Colusa and Knight's Landing, then sparse/limited to Sacramento, due to past and recent flood control, including confinement by levees.	None known.	Assess enhancement opportunity. Limited potential absent levee reconstruction/setback. Easements for near term land-side elderberries may help connect populations.
1.e. SR, American River confluence south	Factor A: significant past and ongoing habitat loss due to flood control, bank protection, and upgrades; recent habitat loss associated with urban development and emergency levee repair; extensive flood control (confinement by levees, bank protection, devegetation); sparse/limited/intermittent riparian vegetation remaining.	Minimal trial areas of vegetation on levees, small fraction (estimated at less than 1% of bank length.); not of vegetation type to benefit beetle (i.e., not elderberry).	Assess enhancement opportunity, especially regarding the limited vegetation potential due to enforcement of Corps ETL; potential for more levee vegetation allowance via relaxed maintenance.
2. Thomes Creek	Factor A: modest rangeland/agricultural use; current vegetation appears limited from unknown cause; possibly naturally-limited elderberry to the west by soil/alluvium type, lack of water.	None known.	Updated habitat and species surveys to evaluate potential species protections.
3. Stony Creek	Factor A: More agriculture compared to other watersheds in immediate vicinity, but not adjacent to riparian, plus more persistent water, results in more riparian vegetation than Thomes but still limited/sparse; elderberry verified only near reservoir, more suspected habitat near DWR-mapped riparian area near Orland.	Some conservation easements. Elderberry plantings near mouth. Status elsewhere unknown.	Updated habitat and species surveys to evaluate potential species protections.

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
4. Big Chico Creek	Factor A: significant past loss from urban development in Chico; agriculture downstream; agriculture present in lower creek resulting in narrow but continuous corridor there; elsewhere riparian remains in moderate-to-wider band (e.g., Bidwell Park); abundant known elderberry.	Some parkland, especially in Chico. Mitigation bank nearby (Bidwell Ranch) at least partially offsets continuing urban impacts.	Updated habitat and species surveys. Evaluate threats and protection needs downstream of Chico.
5. Feather River	Factor A: past losses due to levees/bank protection; ongoing threats due to fix-in-place west levee proposal; future threats reduced by protection/ recovery actions resulting in locally wider riparian band in portions, but narrow riparian elsewhere. Factor C: Argentine ants. Factor E: human use (recreation, trails, fire, camping, cutting).	Significant conservation easements, some with restoration to lessen effects of adjacent agriculture.	Regular surveys. Evaluate alternatives to in-place west levee improvements (ring/J ³) to avoid growth inducement and urban encroachment.
6. Butte Creek	Factor A: losses/devegetation downstream of Chico; some remnant habitat may remain in Butte Sink area; best riparian vegetation is in lower canyon (upstream area), but this is currently unoccupied/unsurveyed.	Central Valley Joint Venture easement in portion of canyon (a few elderberry plantings above it). Otherwise unknown.	Updated habitat and species surveys; evaluate threats and protection needs downstream of Chico, especially in formerly occupied sink area.
7. Yuba River	Factor A: flood control; aggregate/gold mining; agriculture; elderberry present but unsurveyed, suspected to be minor component of overall riparian.	None known. Nearly all private.	Habitat and species surveys. Local threats and benefit evaluation. Protection and restoration opportunity ID as appropriate.

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
8. Bear River	Factor A: past losses due to levees/bank protection; associated agricultural development.	Setback levee project with elderberry plantings at mouth; wildlands bank nearby.	Habitat and species surveys. Identify maintenance within levees, and evaluate protective measures such as relaxed maintenance.
9. Lower American River	Factor A: some flood control. Factor C: Argentine ants. Factor E: human use (recreation, trails, fire, camping, cutting).	Extensive riparian plantings, monitoring; setback levees; management plan (implementation uncertain).	Continued monitoring. Determine funding mechanism of management plan implementation.
10. Upper American River vicinity (Miner and Secret Ravine, Anderson and Linda Creeks)	Factor A: Urban development. Factor E: human use (trails).	None known. Status of undeveloped portions unknown.	Habitat and species surveys. Evaluate protections and development threats.
11. Putah Creek	Factor A: narrowed corridor in major private land nearby agriculture (general threat). Factor C: Argentine ants. Factor E: human use (recreational, similar to lower American River, above).	Partly within park lands. Unknown in portions within private land. Management Plans exist; assurances to implement unknown.	Continued monitoring. Identify and evaluate protections in private areas.

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
12. Cache Creek	Factor A: Extensive past riparian vegetation loss due to adjacent agriculture, flood control, aggregate mining, resulting in limited habitat in the lower 2/3rds of creek.	None known.	Habitat and species surveys. Restoration and enhancement potential investigation.
13. Ulatis-Green Valley Creeks	Factor A: agriculture, flood control, channelization, suburban development; threat of habitat loss may be limited due to adjacent rugged terrain; some tributaries unchannelized.	None known.	Habitat and species surveys. Identify current protections or needs in private areas.
14. Cosumnes-Laguna-Dry Creeks	Factor A: urban development at Rancho Murieta-Wilton-Galt; agriculture/urban threat partly offset by preservation on part of Cosumnes only, not Laguna-Dry or Cosumnes outside preserve; riparian corridors currently narrow, some devegetated and not yet restored. Preserve lands include some waterfowl management, but elderberry there is undetermined.	5,500 acres lower watershed preserve; 780 acres upper watershed Laguna Creek Mitigation Bank; existing beetle habitat (elderberry) unquantified. Protection in private land and developed corridors unknown.	Habitat and species surveys. Evaluation of threats and protection needs outside preserve in private areas. Habitat potential within preserved area.

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
15. Mokelumne-Bear Rivers	Factor A: limited urban development (Lockeford-Lodi, concentrated subdivision); moderate agriculture; riparian vegetation remaining somewhat wider and more intact/mature on most of the Mokelumne (but not at Lockeford); Bear riparian looked better than most tributaries on aerials, but Barr (1991) found no elderberry in riparian vegetation.	Approximately 197 acres restoration. SHA - one enrollee for 300 acres with 12 elderberry shrubs, of 3,500 acres allowed in SHA.	Habitat and species surveys. Updated evaluation of threats and protection needs.
16. Lower Stanislaus River	Factor A: agriculture and urban losses. Moderate-to-thin riparian vegetation remains but varies with location. Tributaries channelized and devegetated. Factor C: Argentine ants.	Two elderberry planting sites (Mohler, McHenry). Partial failure at Mohler. Some parks may have other protections but not much is known.	Comprehensive habitat and species surveys. Identify further restoration and protection measures as appropriate.
17. Upper Stanislaus hills (vicinity above and between New Melones and Don Pedro Reservoirs, including Sullivan Creek)	Factor A: urban development/ranchette, especially around Sullivan Creek; some significant habitat loss, but similar unsurveyed landscape appears to remain unperturbed scattered in hills.	None known.	More thorough habitat and species surveys to verify extent outside of development. Species ID (adult sighting not yet verified) especially since at elevation, may be unlisted California elderberry longhorn beetle species.

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
18. Calaveras River-Stockton Diverting Canal	Factor A: agriculture, flood control (diversion channel, levee, maintenance activities); some adjacent urban use; but habitat still present to a variable extent (good to thin); corridor narrowed, significant portion sparse.	None known, but likely completely unprotected, mostly private.	Habitat and species surveys throughout. Threat evaluation and protection in private areas as warranted.
19. Tuolumne River	Factor A: extensive aggregate mining, urban development, and agriculture depending on location. Mostly narrow habitat remaining, with some areas of better quality.	Several floodway restorations include conservation easements; one (mining reach - 7/11 segment) has 87 acres, 160 elderberry plants; other reaches unknown.	Habitat and species surveys. Identify restoration and protection opportunities specific to beetle.
20. Merced River	Factor A: extensive aggregate mining, intensive agriculture, caused losses; narrow mainstem riparian; split channels channelized and devegetated. Factor C: Argentine ants.	None for beetle. Channel restoration on less than 5% of length; protections unknown.	Habitat and species surveys. Identify restoration and protection opportunities.
21. Kings River	Factor A: extensive agriculture; resulting in narrow riparian corridor downstream and near dam; wider in split channel area; sparse but unimpacted upstream. Species may be extirpated (negative 2010 survey); unknown reasons.	None known.	Habitat and species surveys. Assess potential causes of loss of species occupancy. Identify remedial measures specific to cause(s).

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
22. Kaweah River	Factor A: development variable (limited above Isabella; extensive agriculture and significant urban below Isabella); resulting in sparse/narrow/intermittent riparian corridor downstream in split channels; partially channelized/largely devegetated.	Some sites protected as mitigation for impacts of Corps dam works; other protections unknown.	Habitat and species surveys. Identify restoration and protection opportunities.
23. Tule River-Deer Creek	Factor A: encroachment by agriculture/urban development; trails/human use in corridor; flood control activities; resulting in narrow sparse riparian vegetation. Factor C: Argentine ants.	None known.	Evaluate human usage and identify management needs. Habitat and species surveys. Identify enhancement and restoration opportunities.
24. Kern River (excluding Caliente Creek)	Factor A: urban/suburban development; roads and trails; vegetation clearing and diversion downstream. Factor E: Human Use (trails).	None known.	Habitat and species surveys. Assess and identify restoration and protection opportunities that could enhance habitat.
25. Caliente Creek	Factor A: nearby roadway; some trails in a portion of riparian vegetation; sparse residential and ranching use; completely channelized and devegetated in Central Valley; portion in foothills has intermittent riparian vegetation, infrequent elderberry on creek, and on nearby upland and entering tributary.	None known.	Conduct more thorough habitat and species surveys to verify extent of elderberry, exit holes in mainstem, and tributaries. Adult ID especially since at elevation may be unlisted California elderberry longhorn beetle species.

Locations²	Site-Specific Threats (see below for pervasive threats under Factors C, D, and E that apply to all sites³)	Protections and Recovery Actions	Study Needs (to address uncertainties in species data, protections, threats, and hence prospectus for persistence)
26. San Joaquin River	Factor A: intensive agriculture; some urban development (Fresno); flood control throughout; portion nearest to Friant has riparian corridor, but much of this system is completely devegetated.	Parkway from Millerton to Fresno; some protections but not necessarily for the beetle. Limited Central Valley Joint Venture riparian easements, mostly not elderberry. Some elderberry plantings on NWRs.	Conduct further habitat and species surveys. Assess restoration opportunities for elderberry, including the addition of elderberry to ongoing or proposed restorations.

1 - Table acronyms: ID - taxonomic identification of the subspecies, whether valley elderberry longhorn beetle of California elderberry longhorn beetle; ETL – Corps Engineering Technical Letter; DWR – Department of Water Resources; SHA – Safe Harbor Agreement; NWR – National Wildlife Refuge; J and ring - structural levee alternatives that may be located away from a floodway or riparian zone (potentially providing local flood protection to higher value urban areas and avoiding the impacts and need for vegetative maintenance associated with improving the levee in its current location (also known as “in place” levee improvements).

2 - The locations presented in this table are based on available data that provide detailed information about valley elderberry longhorn beetle presence. Additional locations were not included in this table due to a lack of sufficient information that provides certainty on valley elderberry longhorn beetle presence (areas with extremely limited habitat, locations that are exclusively at higher elevation that abut with the range of the California elderberry longhorn beetle, a record of a single shrub, etc.).

3 - Pervasive threats (all sites): Factor C - The specific threat of Argentine ant denotes those sites with documented presence; there has been inadequate or no sampling at other sites to make a determination, however, based on the widespread infestation of Argentine ant in nursery stock and lack of control, we believe this threat applies to all sites until shown otherwise; Factor D - The inadequacies of regulatory mechanisms, as described in the proposed delisting rule, applies to a variable extent to all sites; Factor E - The specific

threats noted are instances of human use noted in literature or aerial imagery, however, human use likely applies to portions of other sites. Additionally, as described in the proposed delisting rule, Factor E includes other factors such as habitat fragmentation, small population size, and climate change that apply to all sites, and pesticide effects that applies to all sites with the possible exception of some foothill areas.

APPENDIX C. Valley elderberry longhorn beetle locations and associated mitigation sites or conservation banks where post-delisting monitoring sites will be established (The Science Panel may decide to modify or add additional survey sites beyond the 56 sites, as described in Section 4.1 of the draft PDM Plan).

Locations⁴	Established Mitigation Sites and Conservation Banks⁵
(1a) Sacramento River (SR), Redding-Red Bluff	(51)○ River Ranch, (52)○ Stillwater Plains
(1b) SR, Red Bluff-Chico	(27) ΔCottonwood Creek
(1c) SR, Chico-Colusa	(23)ΔToomes Creek
(1d) SR, Colusa-American River confluence	(42) ΔArden Parallel Force Main,(43)Δ Sacramento Urban Levee Project,(44) ΔTeichert-Haller Habitat Peninsula, (48) ΔLighthouse Marina
(1e) SR, American River confluence south	(45) ΔBrannan Island,(49)○ French Camp
(2) Thomes Creek	
(3) Stony Creek	
(4) Big Chico Creek	
(5) Feather River	
(6) Butte Creek	
(7) Yuba River	
(8) Bear River	
(9) Lower American River	(27) ΔM&T Ranch, (30) ΔSacramento River Flood Control, (31) ΔBickford Ranch, (32) ΔHighlands at Cavitt Ranch, (33) ΔSterling Point Estates, (34) ΔGranite Bay Golf Club, (35) ΔAmerican River Canyon North, (36) ΔBroadstone Mall, (37) Δ The Parkway, (38) Lake Natoma Shores, (39)Δ Prairie Oaks, (40) ΔAlder Creek Auto Mall, (41) ΔTributary Point, (42) ΔBurlington and Santa Fe Railroad , (50)○ Laguna Creek
(10) Upper American River vicinity (Miner and Secret Ravine, Coon, Anderson and Linda Creeks (foothill location >1,000 ft elevation)	
(11) Putah Creek	
(12) Cache Creek	
(13) Ulatis-Green Valley Creeks	
(14) Cosumnes-Laguna-Dry Creeks	
(15) Mokelumne-Bear Rivers	

⁴ The numbers in parentheses correspond to the numbers on the map in Appendix D.

⁵ ○ = conservation bank. Δ = established mitigation site

Locations ⁴	Established Mitigation Sites and Conservation Banks ⁵
(16) Stanislaus River	
(17) Upper Stanislaus hills (vicinity above and between New Melones and Don Pedro Reservoirs, including Sullivan Creek) (foothill location >1,000 ft elevation)	
(18) Calaveras River-Stockton Diverting Canal	
(19) Tuolumne River	(46) ΔGreenhorn Creek
(20) Merced River	
(21) Kings River	
(22) Kaweah River	
(23) Tule River-Deer Creek	
(24) Kern River (excluding Caliente Creek)	
(25) Caliente Creek (foothill location >1,000 ft elevation)	
(26) San Joaquin River	

APPENDIX D. Map of 56 valley elderberry longhorn beetle monitoring sites for Science Panel consideration (The Science Panel may decide to modify or add additional survey sites beyond the 56 sites, as described in Section 4.1 of the draft PDM Plan).

