APPENDIX R

Valley Elderberry Longhorn Beetle Mitigation Plan

Valley Elderberry Longhorn Beetle Mitigation Plan

For

Rio Del Oro

Sacramento County, California

Superseded Date:
14 July 2009

Original Date:
18 January 2006

Prepared for:
Elliott Homes, Inc.
and
GenCorp Real Estate

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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1.0 BACKGROUND INFORMATION

The property Rio del Oro is located north of Douglas Road, south of White Rock Road, and east of Sunrise Boulevard in Sacramento County, CA (Figure 1. *Project Site and Vicinity*). The ±3,829 acre site corresponds to portions of Sections 5, 6, 7, 8, 9, 10, 31, and 32, Townships 8 and 9 North, and Range 7 East, Mount Diablo Base Meridian (MDBM) of the "Carmichael, California" and "Buffalo Creek, California" 7.5-minute topographic quadrangles (U.S. Department of the Interior, Geological Survey, photorevised 1993).

At the request of Elliott Homes, Inc. and GenCorp Real Estate, Gibson and Skordal conducted a Valley elderberry longhorn beetle (VELB) and elderberry shrub survey during the summer of 2000. The survey effort adhered to the current established conservation guidelines for the VELB (USFWS 1999). A total of 329 elderberry shrubs were identified in the Project Area, the majority of which are scattered throughout the dredge tailings on-site (Figure 2. *Elderberry Shrub Locations*). In order to determine if current overall elderberry counts were consistent with the surveys conducted in 2000, a sub-sample survey was conducted in 2007 (described in section 5.0) by ECORP Consulting. The elderberry shrubs observed within the Project Area range in size from small shrubs to large size trees. Forty-two (42) elderberry shrubs exhibit VELB evidence in the form of apparent exit holes, comprising approximately 13% of the total existing shrubs within the Project Area. Elderberry survey data are summarized in Attachment A.

The Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) became listed as a threatened species in 1980 (Federal Register 45: 52803-52807). As a result, impacts to potential VELB habitat require mitigation measures in general compliance with the requirements outlined in the U.S. Fish and Wildlife Service (USFWS) Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999).

1.1 Project Implementation

The proposed project will involve grading and filling activities to establish construction grade and installation of infrastructure for a master-planned community on the ±3,829 – acre parcel.

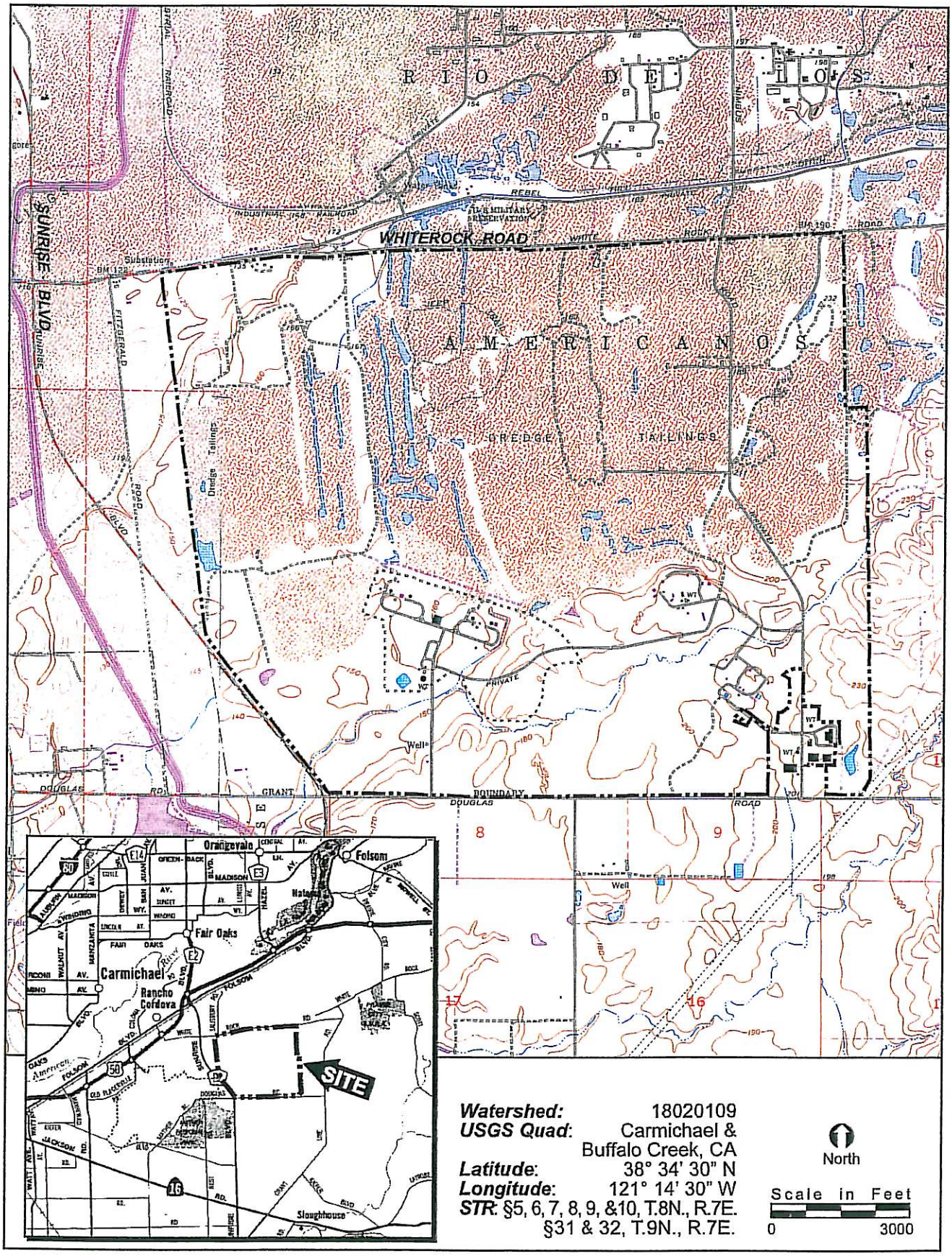

FIGURE 1. Project Site and Vicinity

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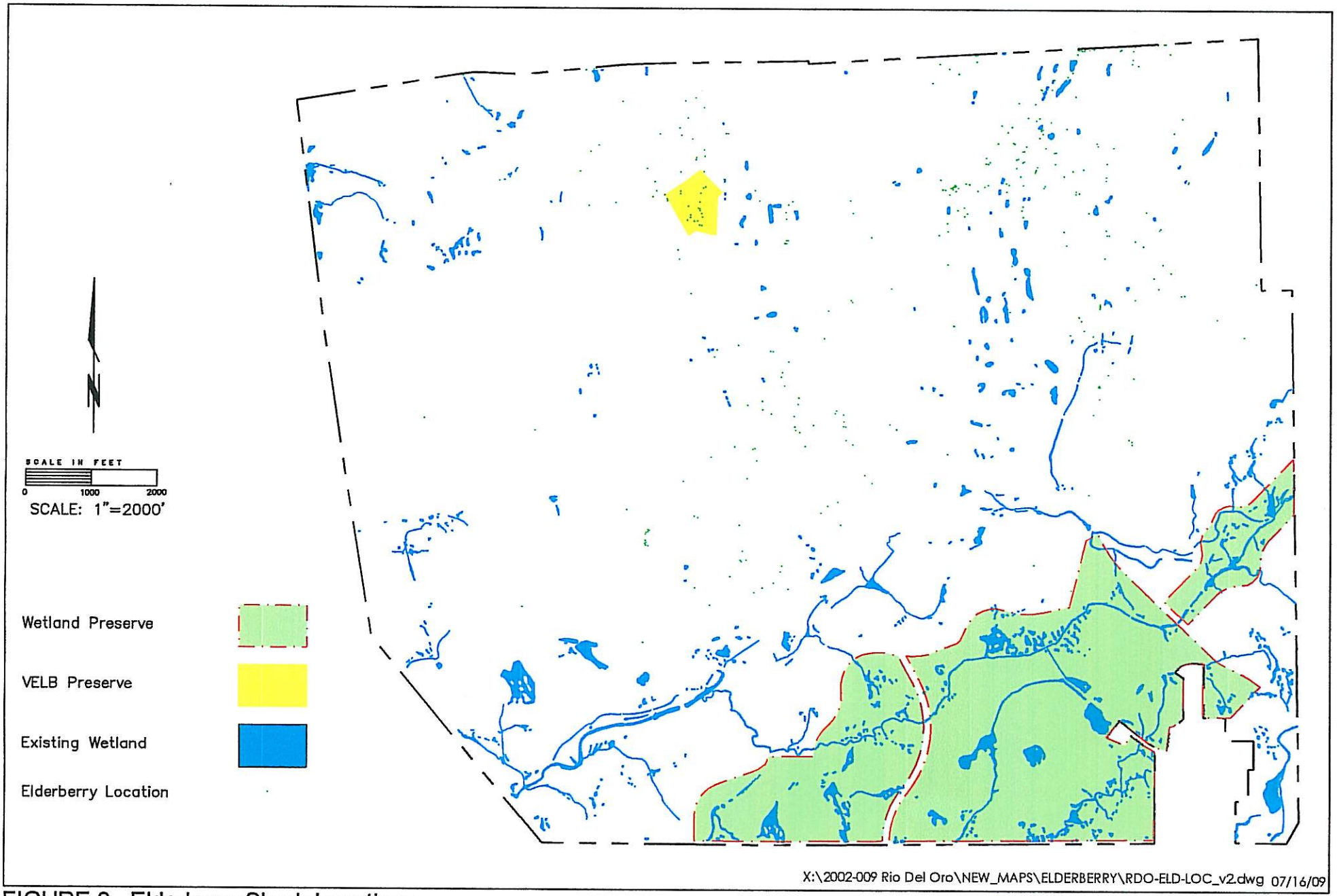

FIGURE 2. Elderberry Shrub Locations

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The proposed land use plan includes high, medium, and low-density residential, retail/commercial, office, park, schools, wetland preserve, and open space areas.

The current land use plan will directly impact 310 of the elderberry shrubs within the Project Area. On behalf of Elliott Homes Inc. and GenCorp Real Estate, ECORP Consulting, Inc. conducted an analysis of the required mitigation measures necessary to compensate for this total net loss. Mitigation calculations followed the compensation requirements outlined in the USFWS VELB Conservation Guidelines (USFWS 1999). These guidelines define mitigation measures based on the number of stems by diameter classes at ground level, the presence or absence of evidence/exit holes, and whether the elderberry shrubs occur in riparian habitats. Each of the 310 impacted shrubs are proposed for transplantation (if feasible). An additional 3,230 elderberry seedlings and 4,170 associated natives will be planted and protected within the 12-acre conservation area (Figure 3. *Elderberry Mitigation Area*). Nineteen (19) shrubs will be protected in the on-site elderberry habitat preserves and the remaining will be mitigated at an offsite VELB mitigation bank.

2.0 INTRODUCTION

This document provides information pertaining to the life history, habitat requirements, and threats posed to the elderberry habitat within the Project Area. This report summarizes VELB mitigation measures for the Project and describes how the proposed compensation measures comply with the USFWS Conservation Guidelines for the VELB (USFWS 1999). The ultimate goal of mitigation measures presented in this report is to avoid and minimize adverse effects on the VELB and the elderberry habitat. Mitigation will be accomplished through a combination of avoidance measures, compensatory mitigation (transplantation, additional plantings, and associated native plantings), and monitoring.

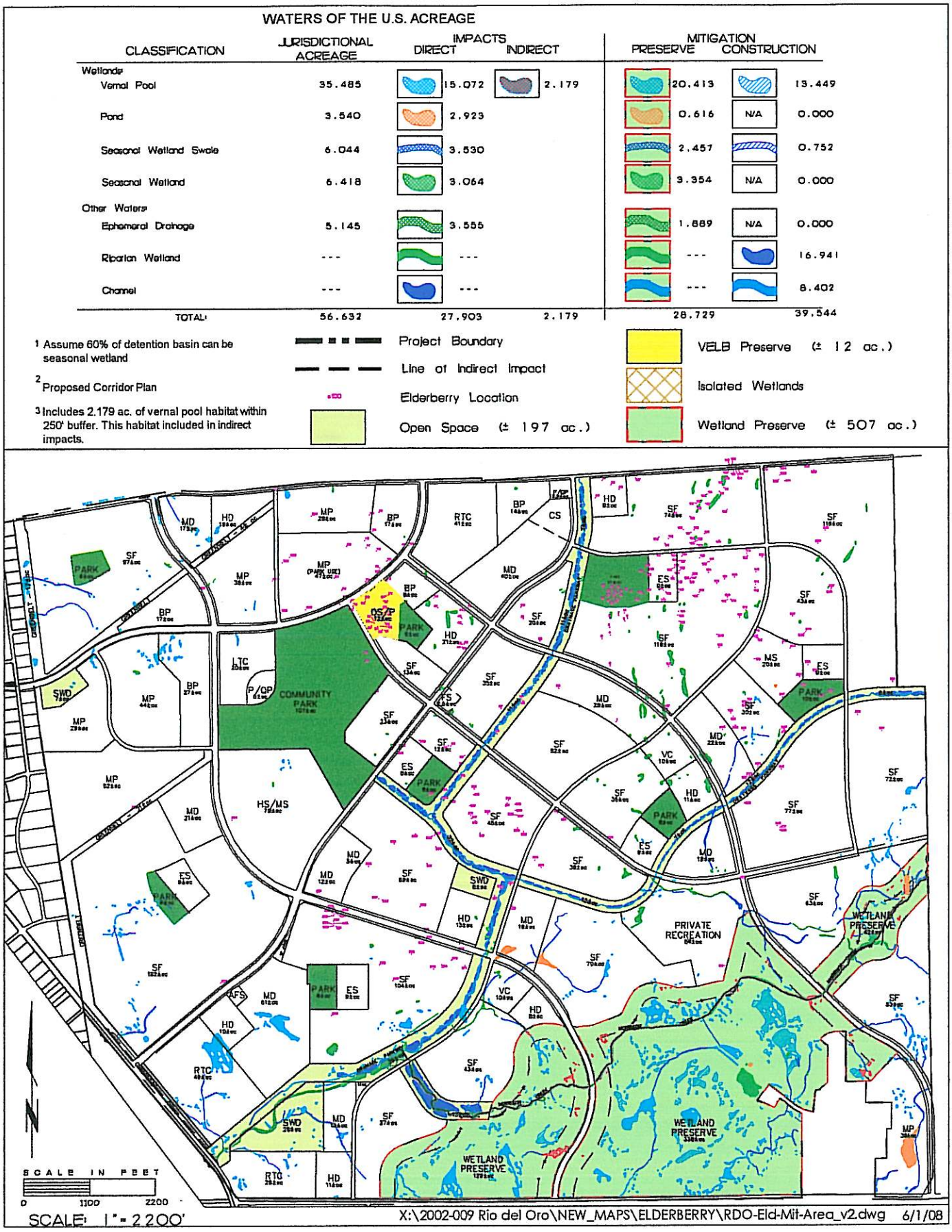

FIGURE 3. Elderberry Mitigation Area

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3.0 VELB LIFE HISTORY CYCLE AND OTHER ATTRIBUTES

3.1 Description and Taxonomy

The Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is a member of the Cerambycidae family and is known from California alone. Subspecies separation is based on distribution and male color pattern variation (Barr 1991). The 'dimorphus' of its name alludes to morphological differences between males and females. Females are typically larger than males, and can grow up to two inches. They have shorter segmented antenna, and have dark metallic green forewings with red margins. The male's antenna is at least as long as its body and the prominent segmented antenna is what the common name 'longhorn' refers to. Males have red forewings and dark green spots.

3.2 Ecological Relationships

The VELB can only be found in association with its exclusive host plant the elderberry, typically blue elderberry (*Sambucus mexicana*) and occasionally red elderberry (*Sambucus racemosa*). VELB range is limited and includes all of California's Central Valley from Shasta County in the north to Kern County in the south at elevations below 3,000 feet (Barr 1991). Elderberry shrubs generally occur in riparian communities surrounding the American, San Joaquin, Tule, Kings, Kaweah, and Sacramento rivers and along outlying tributaries of these watersheds (USFWS 1999). They also occur in upland savannah areas adjacent to some riparian habitats.

Early work on the VELB has demonstrated that isolated elderberry shrubs and lone-standing drainages are less likely to support beetle populations than dense elderberry shrubs within riparian communities that have some connectivity to other habitats (Collinge et al. 2001).

3.3 Life Cycle

Adult beetles are present on elderberry shrubs from March through June. Adult males are short lived and survive for only a few days. Females persist for up to a month. They feed exclusively on the leaves and flowers of the host plant. During this time period mating occurs and females

lay their eggs on the stems, leaves, and in bark crevices of elderberry shrubs. Hundreds of oblong, reddish brown eggs are laid which are about 2.5 to 3.0mm long and ridged. The eggs typically hatch within 24 to 48 hours and small larvae emerge. The larvae burrow themselves into the plant stems immediately. VELB larvae remain inside the elderberry stems for 1 to 2 years feeding on its pith. Their feeding activities create a distinctive gallery (feeding chamber) that is a hollow tunnel filled with frass and shredded wood (Barr 1991). Larvae mature and eventually pupate into adults. Adult beetles then chew an exit hole and emerge out of the shrub completing the life cycle. Although few researchers have seen adult beetles, their exit holes are often visible. Exit holes are circular or oval and are typically 5 to 15 mm. in diameter. Most exit holes are located in the basal portions of elderberry stems, generally not above heights of 4 feet.

3.4 Habitat Requirements

Elderberry shrubs are a common component of the Central Valley's lush riparian forests. This distinctive plant community surrounds the region's rivers, streams, and numerous watershed tributaries. The VELB appears to occur more frequently in thick riparian stands with high elderberry densities as opposed to sparse and highly fragmented riparian habitats.

3.5 Threats

Habitat loss and fragmentation are the most significant threats to the VELB. It is estimated that over 90% of the riparian habitat in California has been removed over the last century. Agricultural activities and conversion, suburban and urban development, aggregate mining sites, channelization, infrastructures such as damns and levees, and flood control practices continue to replace the riparian forests throughout the state. In addition to habitat loss and fragmentation, exotic and invasive species pose a threat to the beetle. In particular the Argentine ant (*Linepithema humile*), an introduced species in riparian habitats, is a major threat to the distribution and survival of the VELB. Pesticide and herbicide use, insecticidal drift from fields and orchards, pollution and inappropriate chemical disposal, over grazing, and general mismanagement are several other factors contributing to the VELB demise.

4.0 MITIGATION MEASURES

The following VELB habitat mitigation plan has been prepared for the Rio del Oro site to mitigate known and potential direct and indirect impacts to elderberry shrubs within the proposed development areas of the project. A summary of proposed compensation (i.e., plantings or mitigation unit purchase) for direct and indirect impacts is included in Table 1.

Table 1 – Proposed Elderberry Impacts and Mitigation

Location	Exit Holes	Number of Stems (by Diameter) at Ground Level			Elderberry Plantings	Associated Native
	Present	1" to 3"	> 3" & < 5"	≥ 5"	Required	Plantings Required
Non-Riparian	No	27	3	5	48	48
Riparian	No	596	130	165	2242	2242
Non-Riparian	Yes	1	0	2	14	28
Riparian	Yes	99	23	49	926	1852
				Subtotal:	3230	4170

Total Plantings: 7400
Number of Transplants: 310
Total Credits Needed: 740
Total Credits Accomplished Onsite: 290.4
Offsite Credits Needed: 449.6

Based on the 3,230 elderberry plantings, plus the 4,170 associated native plantings, there is a total of 7,400 plantings that are required for mitigation, which is the equivalent of 740 credits. There are 10 plantings, 5 elderberry seedlings and 5 associated Natives, per credit. In order to convert the credits into acreages, 740 is multiplied by 1,800 square feet, which equals 1,332,000 square feet or 30.578 acres. Onsite, there is a total of 12 acres designated for mitigation, which will accommodate 290.4 onsite credits. This leaves a balance of 449.6 credits, or 18.578 acres of habitat that will be purchased at an offsite mitigation bank.

ECORP Consulting has contacted various VELB mitigation banks to inquire about available VELB credits. To date, three mitigation banks, or combination of banks, have been identified that could provide the balance of VELB credits needed for the Rio del Oro project. The USFWS has also indicated that service-area restrictions are no longer a factor, which should allow for more banks to offer mitigation for the Rio del Oro project.

4.1 Regulatory Context

Impacts to VELB habitat are subject to compliance with the federal Endangered Species Act (ESA). According to general compensation guidelines for impacts to VELB, as stipulated by the Guidelines (USFWS 1999), VELB habitat avoidance should be a priority. Complete avoidance can be assumed when a 100-foot buffer would be established and maintained around all elderberry plants containing stems measuring one inch or greater in diameter at ground level. Encroachments into the 100-foot buffer require USFWS approval and may require mitigation for indirect impacts. If avoidance is not feasible, the Guidelines recommend transplantation of all existing elderberries that cannot be avoided by the project to a conservation area, and the establishment of new elderberry plants and associated native vegetation within the conservation area. This requires an incidental take permit issued by the USFWS. Replacement ratios for impacts (i.e., transplanted or destroyed) to elderberry stems one inch or greater in diameter at ground level, range from 1:1 to 8:1 (new plantings to affected stems). These ratios are based on stem size class, presence or absence of exit holes (evidence of VELB use), and location (riparian or non-riparian). For example, a replacement ratio of 1:1 is specified for elderberry shrubs located within non-riparian communities, with no evidence of VELB use and stems between one and three inches at ground level. A 4:1 replacement ratio is specified for shrubs where VELB evidence is apparent, stems are between one and three inches in diameter, and the shrub is riparian in habitat. An 8:1 replacement ratio is specified for elderberry shrubs where VELB evidence is apparent, stems are greater than five inches in diameter, and the shrub is located in a riparian community.

The Guidelines also describe recommended methods and timing for transplantation and planting activities, as well as habitat protection measures. The Guidelines indicate that recent studies have shown that VELB are more abundant in dense native plant communities, with mature overstory and mixed understory. Consequently, establishment of various native plants, at a given ratio to elderberries, is recommended. Compensation VELB habitat is typically monitored over a 10-year period.

The following mitigation measures have been prepared specifically for the Rio del Oro Project Area to address direct and indirect impacts to the 310 elderberry shrubs within the Project Area.

These mitigation measures adhere to and satisfy the recommendations of the USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USWFS 1999). Mitigation will be accomplished through a combination of avoidance, transplantation into designated preserves, compensatory mitigation (additional elderberry plantings and associated native plantings), and monitoring efforts.

4.2 Avoidance/Protection

A designated elderberry habitat preserve totaling 12-acres has been established within the Project Area (see Figure 3). The preserve is located in the northwest corner of the site and has 19 existing elderberry shrubs that will be avoided and permanently protected (Figure 4. *Detail of Preserve/Mitigation Area*). These shrubs will also be avoided during the project activities and permanently protected. As recommended in the USFWS guidelines (USFWS 1999), this area will be fenced off during construction and a 100-foot buffer zone will be established with brightly colored pin-flags. Contractors working in the vicinity of the preserve will be briefed on the need to avoid damaging the elderberry shrubs and forewarned regarding the consequences for not complying with these instructions. The members of the various work crews will also be informed about the status of the beetle and the need to protect its elderberry host. Signs indicating the necessary information, as outlined in the USFWS guidelines (USFWS 1999), will be erected every 50 feet along the edges of the avoidance/preservation area.

Following construction activities, the elderberry preserve will be fenced and monitored as stipulated in the Mitigation Plan for Rio del Oro and the project's long-term Operations and Management Plan. During future monitoring efforts, particular attention will be given to ensure that the avoided elderberry bushes survive and thrive (i.e., maintenance of fencing and signs, weed control, trash removal, etc.). The preserve area will be permanently fenced and will be protected by deed restrictions and conservation easements. The property will be managed as wildlife habitat in perpetuity. Such management will be funded by an endowment established by the applicant (Elliott Homes, Inc. and GenCorp Real Estate) and carried out by the City of Rancho Cordova or a third-party conservation entity.

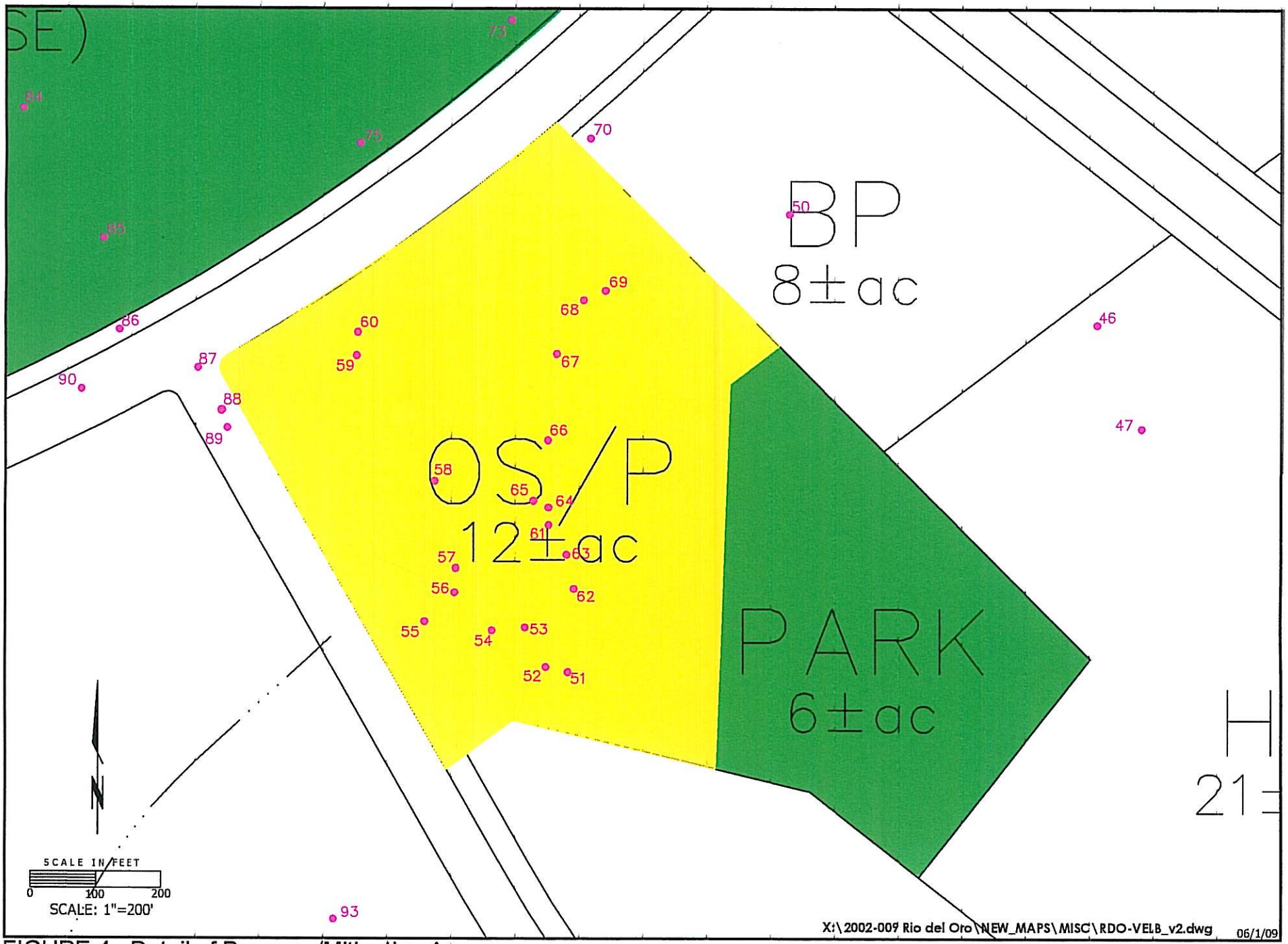

FIGURE 4. Detail of Preserve/Mitigation Area

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4.3 Mitigation Phasing

Grading is expected to begin immediately after all requirements for commencement of construction have been fulfilled (Figure 5. *Phased Elderberry Shrub Impact Analysis*). There will be eight building phases, starting with phase one, located in the northwestern portion and mid-northern portions of the project (Table 2 – Elderberry Shrub Impact per Phase). The onsite 12-acre preserve will be established concurrent to Phase One build out. Prior to grading per phase, surveys will be conducted on all areas to be disturbed to identify transplant and mitigation for all impacts.

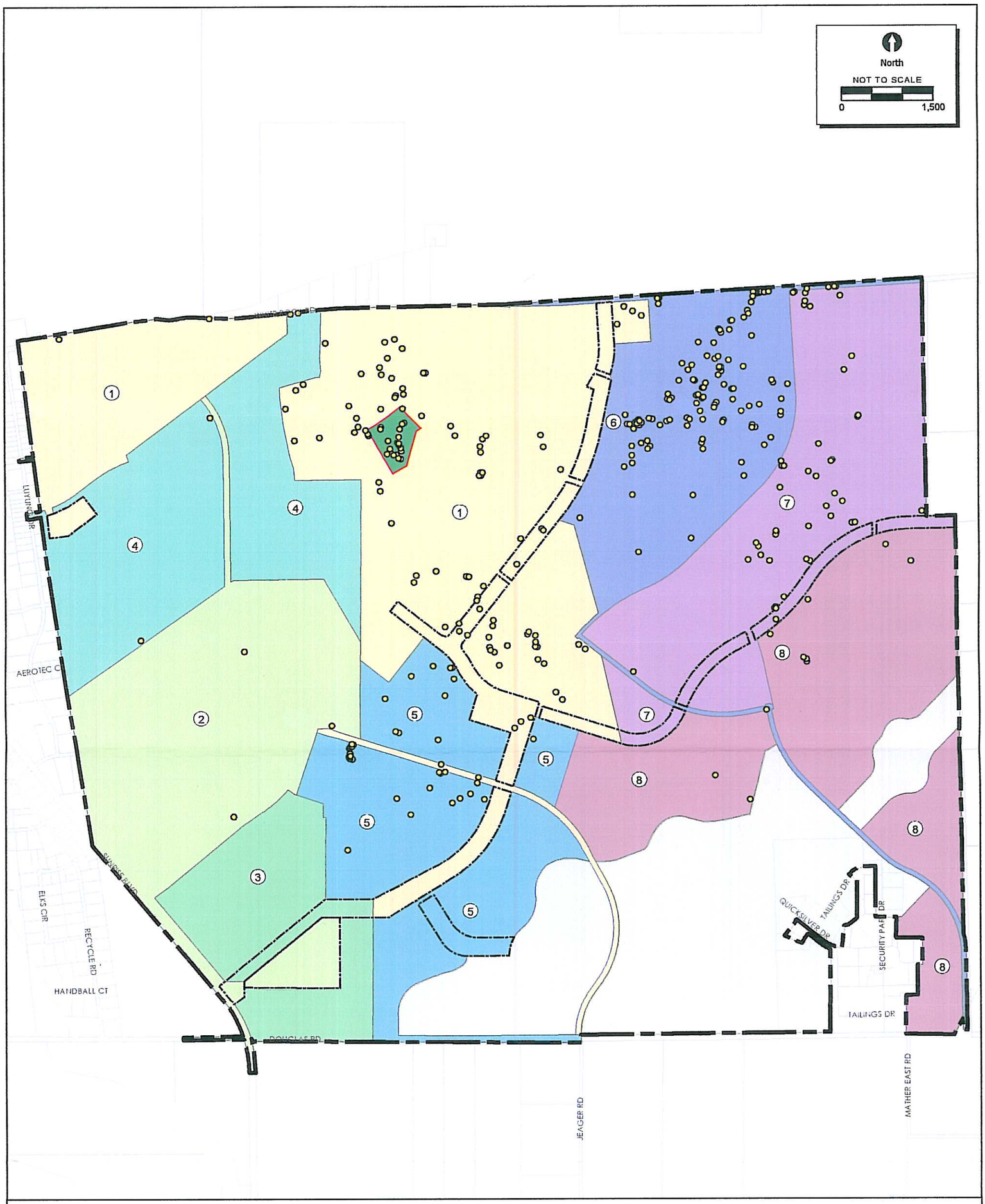
Table 2 – Elderberry Shrub Impact per Phase*

Phase	Impacted	Preserved	Total
1	92	19	111
2	3	0	3
3	0	0	0
4	4	0	4
5	33	0	33
6	123	0	123
7	46	0	46
8	9	0	9
Total	**310**	**19**	**329**

*Based on current data. Actual counts will be determined through surveys conducted for each phase.

4.4 Transplantation

As part of project mitigation plan implementation, the 310 elderberry shrubs that will be impacted by the project activities will be transplanted into the designated elderberry preserve area and/or off-site locations. Transplantation activities will be conducted according to the recommendations supplied by the USFWS guidelines. Elderberry shrubs will be transplanted to the conservations area on the Rio del Oro site. Transplantation will occur at the appropriate time of year and a qualified biological monitor will observe all transplantation acts. The actual elderberry shrub transplanting will be conducted according to the "Transplanting Procedure" which is also outlined in the USFWS guidelines (USFWS 1999).



ELDERBERRY SHRUB IMPACTS BY PHASE

PHASE	IMPACTED	PRESERVED	TOTAL
Phase 1	92	19	111
Phase 2	3	0	3
Phase 4	4	0	4
Phase 5	33	0	33
Phase 6	123	0	123
Phase 7	46	0	46
Phase 8	9	0	9
TOTAL	310	19	329

Phase 1 · Phase 2 · Phase 3 · Phase 4 · Phase 5 · Phase 6 · Phase 7 · Phase 8 · Elderberry Location · Future Drainage Corridors · VELB Preserve

Location: J:\GIS_Maps\2002-009_Rio_Del_Oro\Phased_Impacts\PhasedImpacts_v3(2009-06-01)\Phased_Impacts_VELB.mxd

FIGURE 5. Phased Elderberry Shrub Impact Analysis

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4.5 Additional Plantings

According to the USFWS guidelines, each elderberry stem with a diameter measuring 1.0 inch or greater that is adversely affected must be replaced. This includes all impacted elderberry shrubs, even if they are proposed transplants (USFWS 1999). According to ECORP Consulting, Inc.'s mitigation calculations, a total of 3,230 additional elderberry plantings are required to mitigate the impacts to existing shrubs that will ensue from the project activities (see Table 1). The calculated additional plantings will be placed into the designated elderberry habitat preserve.

4.6 Associated Native Plantings

According to USFWS, the VELB seems to prefer densely populated native plant communities, in which multiple elderberry shrubs are scattered throughout an established overstory layer and a diverse native understory layer. As such a total of 4,170 associated native plantings will be established in addition to elderberry plants. The types of species used will be determined by a restoration specialist. A list of common plants used in VELB restoration projects is included as Attachment B

4.7 Monitoring and Maintenance

Monitoring of the VELB mitigation preserve area will occur over a ten year period, concurrent with monitoring of the greater Rio del Oro Vernal Pool Preserve.

One of the primary goals of this plan is to protect existing and transplanted elderberry shrubs from potential threats to their survival, as a means of safeguarding VELB habitat. Potential threats include excessive competition from invasive non-native vegetation, hydrological changes, herbicide/fertilizer residues, and human disturbances.

Invasive non-native annual plants can also impact VELB populations. Many invasive non-native annuals were introduced into the Sacramento Valley in the 1700's by Spanish missionaries

(Barry, 1996). These invasive annuals have since flourished, competing with native grassland and riparian vegetation.

Changes in hydrology can also have a significant impact on VELB habitat. As modifications to the landscape can directly influence the hydrology of riparian and drainage areas, measures need to be implemented to ensure that the hydrology of VELB habitat preserve is not compromised.

In addition, human disturbances such as litter and motorized vehicle disturbance can negatively effect VELB populations. Trash and landscape clippings are often disposed of in preserves and can smother vegetation and introduce exotic non-native plant species into the preserve. Other human disturbance threats include motorized vehicles and foot traffic through designated VELB habitat preserve areas.

The VELB mitigation plantings will be monitored on a yearly basis during the appropriate period (mid-February through June) concurrent with other planned monitoring activities. Adaptive management decisions should be made based upon monitoring results. Elderberry shrubs and the associated native plantings within preserve areas will be surveyed to determine overall health and to assess approximate VELB population size.

4.7.1 Methods

Per USFWS guidelines, the population of valley elderberry longhorn beetles, the general condition of the conversation area, and the condition of the elderberry and associated native plantings in the conservation area will be monitored over a period of ten (10) consecutive years. If conservation planting is done in stages (i.e., not all planting is implemented in the same time period), each stage of conservation planting will have a different start date for the required monitoring time.

4.7.2 Surveys

Each year a minimum of two site visits between February 14 and June 30 will be made by a qualified biologist. Surveys will include:

1. A population census of the adult beetles, including the number of beetles observed, their condition, behavior, and their precise locations. Visual counts will be used; mark-recapture or other methods involving handling or harassment will not be used.
2. A census of beetle exit holes in elderberry stems, noting their precise locations and estimated ages.
3. An evaluation of plants and associated native plants within the preserve areas, including the number of plants, their size and condition.
4. An evaluation of the adequacy of the fencing, signs, and weed control efforts in the avoidance and conservation area.
5. A general assessment of the habitat, including any real or potential threats to the beetle and its host plants, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, excessive weed growth, etc.

4.7.3 Reports

A written report, presenting a analyzing the data from the project monitoring will be prepared by a qualified biologist for ten (10) consecutive years. Copies of the report will be submitted by December 31 of the same year to the Service (Chief of Endangered Species, Sacramento fish and Wildlife Office), and the Department of Fish and Game (Supervisor, Environmental Services, Department of Fish and Gem, 1416 Ninth Street, Sacramento, California 95814; and Staff Zoologist, California Natural Diversity Data Base, Department of Fish and Game, 1220 S Street, Sacramento, California 95814). The report will explicitly address the status and progress of the transplanted and planted elderberry and associated native plants and trees, as well as any failings of the conservation plan and the steps taken to correct them. Any observations of beetles or fresh exit holes will be noted. Copies of original field notes, raw data, and photographs of the conservation area will be included with the report. A vicinity map of the site

and maps showing where the individual adult beetles and exit holes were observed must be included. For the elderberry and associated native plants the survival rate, condition, and size of the plants will be analyzed. Real and likely future threats will be addressed along with suggested remedies and preventative measures (e.g. limiting public access, more frequent removal of invasive non-native vegetation, etc.).

A copy of each monitoring report, along with the original field notes, photographs, correspondence, and all other pertinent material, will be deposited at the California Academy of Sciences (Librarian, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118) by December 31 of the year that monitoring is done and the report is prepared. The Service's Sacramento Fish and Wildlife Office will be provided with a copy of the receipt form the Academy library acknowledging receipt of the material, or the library catalog number assigned to it.

4.7.4 Access

Biologists and law enforcement personnel from the California Department of Fish and Game and the Service will be given complete access to the project site to monitor transplanting activities. Personnel from both these agencies will be given complete access to the project and the conservation area to monitor the beetle and its habitat in perpetuity.

4.7.5 Success Criteria

A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants will be maintained throughout the monitoring period. Within one year of discovery that survival has dropped below 60 percent, the applicant must replace failed plantings to bring survival above this level. The Service will make any determination as to the applicant's replacement responsibilities arising from circumstances beyond its control, such as plants damaged or killed as a result of severe flooding or vandalism.

5.0 VELB Subsampling Survey Methods and Results

5.1 Methods

A grid composed of 1-hectare (2.5 acres) blocks (hereafter referred to as blocks) was overlaid onto the Gibson and Skordal (2000) elderberry survey map. Each block was assigned a unique identifier and the number of elderberry plants identified by Gibson and Skordal within that block was recorded. A three-part selection process was used to select blocks for inclusion in the survey. First, those blocks that corresponded to the proposed elderberry preserves were selected. Next, blocks that contained one or more previously identified elderberry plants were selected randomly, using a random number generator, until the target subsample number of elderberry plants [~110 (~30% of total number of elderberry plants previously identified on-site)] was reached. Additional Additional blocks were randomly selected within which no elderberry plants were previously identified in order to ensure that no new elderberries plants became established since the 2000 survey.

Each of the selected blocks was thoroughly searched for the presence of live elderberry plants. To the extent possible, each elderberry plant was labeled in accordance with the original Gibson and Skordal identification numbers. "New" elderberry plants (i.e., those not identified by Gibson and Skordal) were assigned unique identifiers in a sequential manner starting at 500.

The following information was recorded for each elderberry plant:

- plant number,
- geographic coordinates,
- number and diameter of live stems at ground level,
- maximum stem diameter (in),
- maximum plant height (ft),
- number of recent, old, and or questionable exit holes,
- condition of plant, and
- vegetation association (riparian or non-riparian).

Geographic coordinates were recorded for each elderberry plant using a Trimble™ GPS unit (GeoXT) capable of sub-meter accuracy. Stem diameters (inches) were recorded at ground level in accordance with the diameter size classes described in the Guidelines (USFWS 1999) (i.e., <1, ≥1-≤3, >3-<5, and ≥5). Maximum plant height (feet) will be recorded as one of five size classes (<3, ≥3-<6, ≥6-<12, ≥12-<20, ≥20).

In 2007, ECORP searched all elderberry plants for evidence of exit holes that could be reasonably attributed to recent or past presence of VELB (Attachment C – *Valley Elderberry Longhorn Beetle SubSurvey Methods DRAFT*). Exit holes were classified as recent, old, or questionable. Exit holes characterized as recent typically have crisp margins, minimal evidence of healing, pith color ranging from light to dark, and, in some instances, wood shavings that are indicative of recent emergence. Exit holes characterized as old typically have faded margins, evidence of healing, dark pith, and, in some instances, exhibit elongation of the hole. Questionable holes are those holes that cannot be positively attributed to VELB; these may include holes located in dead stems, severely decayed holes, holes that do not appear to be the right size, etc. For the purpose of this survey, questionable holes were considered to represent a positive indication of past presence of VELB.

The condition of each plant was qualitatively assessed as dead, poor, or good. Shrubs characterized as dead lacked new growth, had a decayed structure, and did not appear to have any live stems. Plants characterized as poor had limited new growth and a significant portion (>50 percent) of the stems appeared to be dead. Plants characterized as good had ample new growth and the majority of the plant appeared to be alive and healthy.

5.2 Results

One hundred blocks were surveyed, and 154 live elderberry plants were identified within them. Of these, 45 were determined to represent "new" shrubs. A total of 125 of the original plants surveyed by Gibson and Skordal were contained within the survey blocks. Of these, 93 (74%) were alive and in good conditions, 16 (13%) were alive and in poor condition, and the remaining 16 (13%) were dead.

Exit holes of any type were observed in nine (6%) of the 154 live elderberry plants that were searched. No recent exit holes were observed during the survey. Old and questionable exit holes were present in four (3%) and five (3%) of the elderberry plants, respectively. Gibson and Skordal identified exit holes (approximate age and number of holes were not provided in the report) on 17 (14%) of the 125 elderberry plants contained within current survey blocks. Exit holes (of any age) were only identified on one of these 17 elderberry plants during the current survey. Of the elderberry plants on which exit holes were observed during the current survey, seven were on elderberry plants surveyed by Gibson and Skordal that lacked exit holes at the time of the original survey. Within the original survey, Gibson and Skordal identified a total of 329 elderberry plants within the entire site, of which 41 (12%) contained exit holes.

Additional data analysis was conducted by E. Fleishman at the request of ECORP. Her analyses showed that there was no significant difference in the number of shrubs on the site between 2000 and 2007. Also, the number of stems in 2007 was not significantly different from the number of stems in 2000. Finally, stem diameter across the site was found to be significantly greater than in 2007 versus 2000, and mean diameter of stems on each shrub (for the 92 shrubs that could be directly compared between years) was also significantly greater in 2007 versus 2000.

6.0 CONCLUSION

A VELB survey of the Rio del Oro Project Area during the summer of 2000. Surveys identified 329 elderberry shrubs within the Project Area. Approximately 13% of the identified elderberries had VELB evidence in the form of beetle exit holes. Development of the Rio del Oro project will result in direct impacts to 310 elderberry shrubs. Measures proposed to mitigate direct and indirect impacts to VELB habitat within the Project Area include avoidance of 19 remaining elderberry shrubs within the designated preserve area (e.g. fencing and monitoring during construction activity) and the transplantation of impacted populations. In addition to the previously mentioned VELB mitigation measures an additional 3,230 elderberry seedlings and 4,170 associated natives will be planted and protected within conservation areas totaling 12-acres. An additional 449.6 VELB credits will be purchased at a USFWS approved mitigation

bank. The VELB habitat preserve will be monitored over a ten year period concurrent with monitoring of the greater vernal pool preserve.

7.0 REFERENCES

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