DOCKETED	
Docket Number:	26-OPT-01
Project Title:	Vaca Dixon Power Center Project
TN #:	268172-2
Document Title:	Appendix Y Biological Resources Technical Study_VDPC_Part 2 of 3
Description:	Includes a Biological Resources Technical Study which analyzes the potential impacts of the Project and evaluates short and long term impacts of the Project to biological resources. Y.A Regulatory Framework; Y.B Species Compendia; Y.C Representative Site Photographs; Y.D Burrowing Owl Survey Report; Y.E Dry Season Large Branchiopod Protocol Sampling Results (2024); Y.F Wet Season Large Branchiopod Protocol Sampling Results; Y.G Large Branchiopod Habitat Assessment Report; Y.H Dry Season Large Branchiopod Protocol Sampling Results (2025); Y.I Crotch's Bumble Bee Survey Report; Y.J Aquatic Resources Delineation Report; Y.K Special-Status Species Evaluation Table; Y.L California Natural Diversity Database (CNDDB) Figure (scale1:6,000) (Confidential - submitted separately); Y.M United States Fish and Wildlife Service Meeting Minutes
Filer:	Grace Myers
Organization:	Rincon Consultants, Inc.
Submitter Role:	Applicant Consultant
Submission Date:	1/6/2026 3:49:38 PM
Docketed Date:	1/6/2026

Appendix Y, Part 2

Biological Resources Technical Study

APPENDIX A.
USFWS AUTHORIZATION LETTER

Gmail

Kathleen Colima Aguirre <kcolima@tansleyteam.com>

Survey Approval, RP-Vaca Dixon Site-2023-0824, VpB

1 message

SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov> Thu, Aug 24, 2023 at 3:39 PM
To: "kcolima@tansleyteam.com" <kcolima@tansleyteam.com>, Brent Helm <bhelm@tansleyteam.com>
Cc: "Cook, Megan T" <megan_cook@fws.gov>

Kat Colima,

By this email message, you are authorized to conduct wet and dry vernal pool branchiopod surveys, as specified in your Aug 17, 2023 email request, per the conditions of your recovery permit (795930-12). Surveys will be conducted at the Vaca Dixon Battery Energy Storage System Project site in Solano County, CA. Please remember to carry a copy of your permit while doing the work and to follow the terms and conditions therein. This authorization does not include access to the property which must be arranged with the landowner or manager. Please let us know if the activities are not performed as authorized, or if they are done by a different permittee under a separate authorization.

Please send survey reports with the reference # RP-Vaca Dixon Site-2023-0824 to FW8_SFWO_Permits@fws.gov and Sacramento Valley Division Supervisor, Megan Cook (megan_cook@fws.gov). Reports for vernal pool branchiopod surveys are due in 90 days. Reports for all other species are due in 45 days, unless otherwise specified in your permit. Reports should include, at minimum:

1. The reference number to help ensure that we correctly record the fulfillment of the reporting requirement under this authorization,
2. A copy of this authorization email,
3. The names of all persons involved in each activity and their recovery permit numbers, if applicable,
4. A U.S. Geological Survey topographic map (1:24,000 scale or larger scale) depicting the location of the project site, survey area, and location(s) of species in as precise a manner as possible.
5. All other information required in the 45/90 Day Survey Report section of your permit.

Thank you,

Lauren

10(a)(1)(A) Recovery Permitting | **Sacramento Fish and Wildlife Office**
Pacific Southwest Region | U.S. Fish and Wildlife Service

Helpful Links:
ePermits
Pacific Southwest Recovery Permitting

Minimum Qualifications | Survey Protocols | Vernal Pool Branchiopod Practical Exams

We have resumed in-office vernal pool branchiopod practical exams. Please send us an email to schedule your exam.

The Sacramento Fish and Wildlife Office is using this consolidated mailbox for all communications regarding 10(a)(1)(A) recovery permits in our jurisdiction. Please send survey notifications, reports, and permit inquiries to this email address: FW8_SFWO_Permits@fws.gov.

APPENDIX B.
REPRESENTATIVE PHOTOGRAPHS

Photograph of dried basin 3 taken facing north by Dr. Helm on August 30, 2023.

Photograph of dried basin 2 taken facing north by Dr. Helm on August 30, 2024.

Photograph of dried basin 2 taken facing northeast by Dr. Helm on August 30, 2024.

Appendix F

Wet Season Large Branchiopod Protocol Sampling Results

PROTOCOL-LEVEL
WET-SEASON SAMPLING
FOR
FEDERALLY-LISTED LARGE BRANCHIOPODS
AT THE
VACA DIXON BATTERY ENERGY STORAGE SYSTEM PROJECT,
SOLANO COUNTY, CALIFORNIA
(USFWS # RP-VACA DIXON SITE-2023-0824)

Prepared for:

Rincon Consultants, Inc.
Environmental Scientists | Planners | Engineers

RINCON CONSULTANTS, INC.
4825 J Street #200
Sacramento, CA 95819
Contact: **Elizabeth Atherton**
(831) 824-6871

Prepared by:

HELM BIOLOGICAL CONSULTING
A Tansley Team Division
4600 Karchner Rd, Sheridan, CA 95681

HELM BIOLOGICAL CONSULTING
4600 Karchner Road
Sheridan, CA 95681
Contact: **Dr. Brent Helm**
(530) 633-0220

June 2024

PROTOCOL-LEVEL WET-SEASON SAMPLING FOR FEDERALLY-LISTED LARGE BRANCHIOPODS AT THE VACA DIXON BATTERY ENERGY STORAGE SYSTEM PROJECT, SOLANO COUNTY, CALIFORNIA (USFWS # RP-VACA DIXON-2023-0824)

INTRODUCTION

Helm Biological Consulting (HBC), a division of Tansley Team, Inc., was contracted by Rincon Consultants, Inc. to conduct protocol-level wet-season sampling for large branchiopods (fairy shrimp, tadpole shrimp, and clam shrimp) that are listed as threatened or endangered under the federal Endangered Species Act (ESA) (e.g., vernal pool fairy shrimp [*Branchinecta lynchi*] and vernal pool tadpole shrimp [*Lepidurus packardi*]) at the Vaca-Dixon Battery Energy Storage System Project (hereafter "Project").

The Project consists of 4.6 acres and is located on the north side of Interstate 80, east of Leisure Town Road, and south of Midway Road, Solano County, California (Figure 1). Additionally, the Project is located within the southwest ¼ of the northeast ¼ of Section 1, Township 6 North, Range 1 West, and Mount Diablo Base and Meridian of the Allendale 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle map; approximate center coordinates in decimal degrees (North American Datum [NAD83]) are: 38.397721, -121.923819 (Figure 2).

The remainder of this report discusses the methods and results of the 2023/2024 wet-season sampling for the presence of federally-listed large branchiopods at the Project.

"I certify that the information in this survey report fully and accurately represents my work."

Brent P. Helm (TE-795930-12) Signature _____ Date 06-14-2024

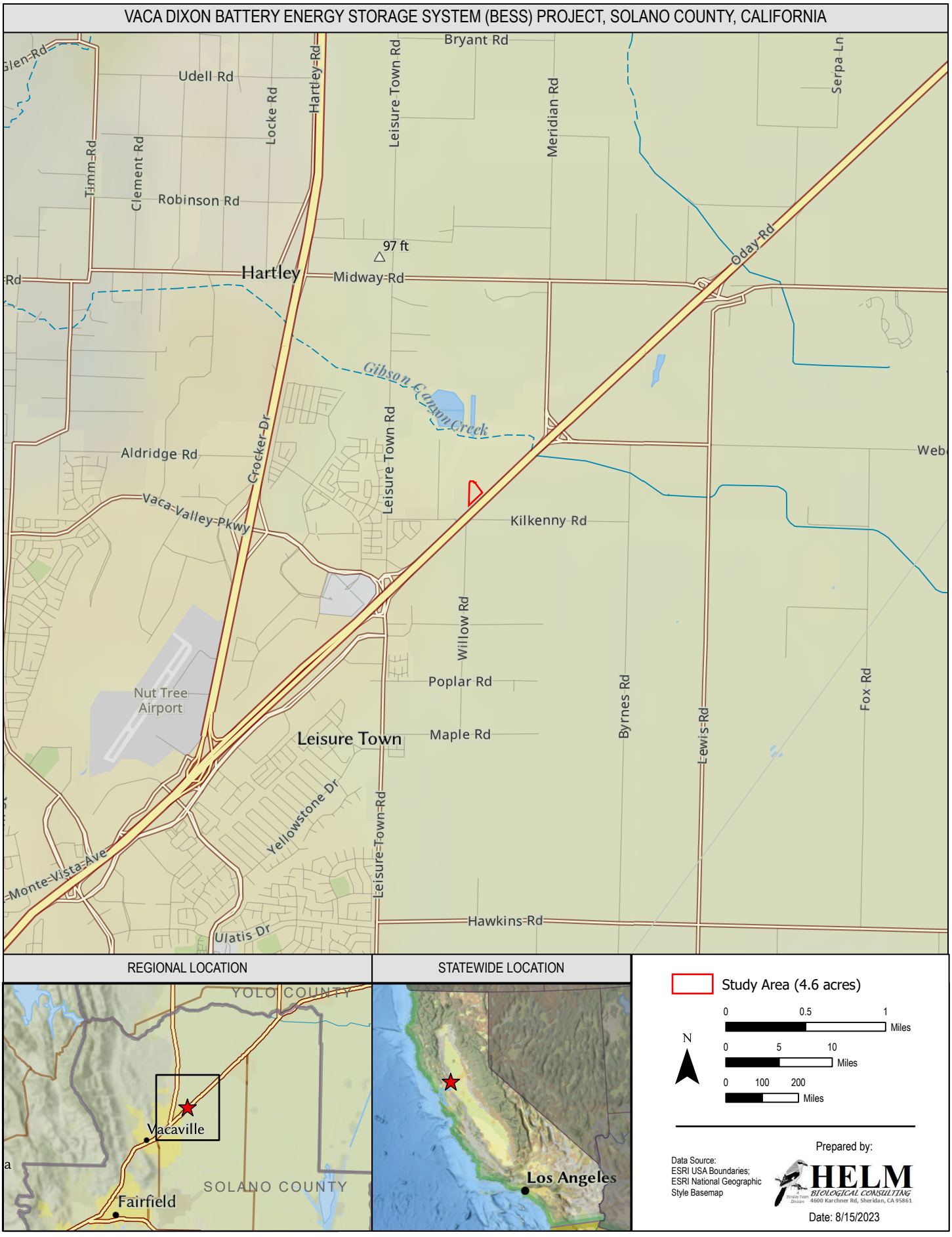

Figure 1. Project Vicinity

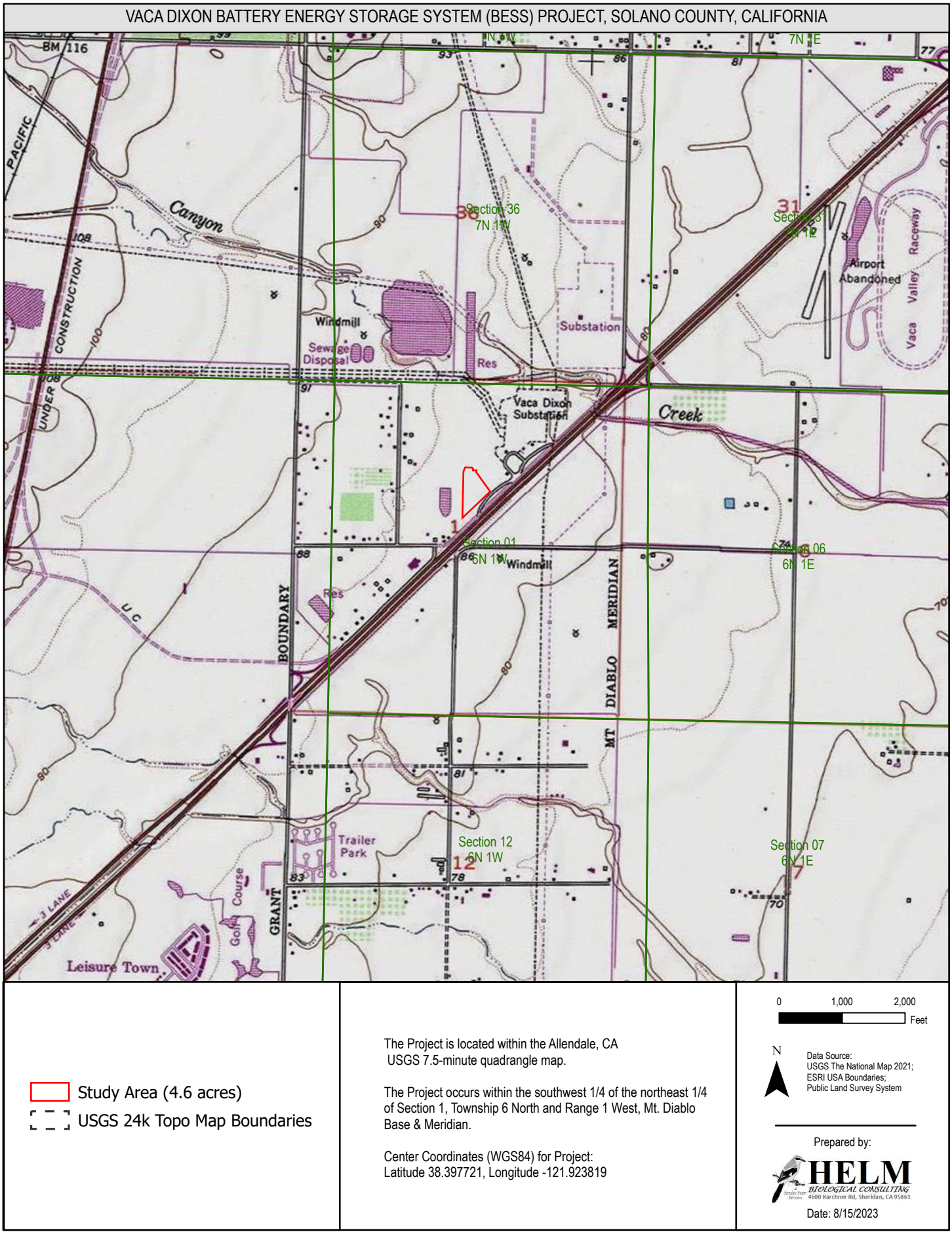

Figure 2. Project Location

METHODS

Dr. Brent Helm of HBC conducted seven rounds of protocol-level wet-season sampling during the 2023/2024 wet-season as follows:

- 1st round: December 12, 2023
- 2nd round: January 3, 2024
- 3rd round: January 12, 2024
- 4th round: January 26, 2024
- 5th round: February 9, 2024
- 6th round: February 23, 2024
- 7th round: March 8, 2024
- 8th round: March 22, 2024
- 9th round: April 5, 2024

Dr. Helm was assisted by Ms. Kathleen Colima on December 12, 2023 and Mr. Zach Einweck on January 26, 2024.

The wet-season sampling was conducted under permit TE-795930-10.2 of Section 10(a)(1)(A) of the federal Endangered Species Act, 16 U.S.C. 1531 et seq., and its implementing regulations as authorized by the U.S. Fish and Wildlife Service (USFWS) (Appendix A). Methods generally followed USFWS's (2017) *Survey Guidelines for Listed Large Branchiopods* for wet-season sampling.

Wet sampling was conducted in all basins (habitats) at the Project that had potential to support federally-listed large branchiopods. An aquatic resources map (provided by Rincon Consultants, Exhibit A), aerial imagery of the Project obtained from Google Earth©, and other documents provided by the Client were utilized to target appropriate habitats for sampling. Habitats sampled that were not previously included on the aquatic resources map were delineated with the aid of a handheld Global Positioning System (GPS) unit with sub meter accuracy and numbered chronologically.

Potential habitat for federally-listed large branchiopods is defined as any seasonal inundated depression that on average ponds water at a sufficient depth and duration for a listed large branchiopod to complete its lifecycle (generally 2.0 inches or greater in depth for 14 or more consecutive days for fairy shrimp and 30 or more consecutive days for tadpole shrimp) (USFWS 2017). Generally these habitats occur within the California Floristic Province at elevations below 1,707 meters in the Coast Ranges (CNDDB #178) and below 914 meters for the rest of California and Oregon (CNDDB #244) and Oregon (USFWS 2017). Habitats that swiftly flow water (e.g., creeks, streams, and ephemeral drainages), semi-to-permanently inundated areas that support perennial population of predators (e.g., bullfrogs, fish, and crayfish), and habitats that receive water during the dry season (i.e., artificial water sources) were not generally considered suitable habitat for federally-listed large branchiopods (USFWS 2017).

EXHIBIT A.
PRELIMINARY WETLANDS FEATURES MAPPED BY RINCON CONSULTANTS, INC. 2023

According the USFWS (2017), the Project is within Survey Zone A (Southern Oregon, Sacramento Valley, San Francisco Bay Area, North Coast Ranges, Northern Sierra Valley Foothills, Cascade Range foothills, and South Coast Ranges). Therefore wet-season sampling was initiated 14 days after any of the habitats on site (determined to potential large branchiopod habitat) ponded a minimum of 3 centimeters (cm) of standing water.

After initial inundation, wet-season sampling was continued at a minimum of 14-day intervals until the habitats were dry or 90 continuous ponding days had occurred. In cases when the habitats dried and refilled the 90 days would start over. Specific sampling methods are described below.

Each habitat was viewed for active large branchiopods prior to entering the water. Any large branchiopods observed were quickly netted, viewed with the aid of a 30x hand lens to determine species, and released unharmed back into the environment from which they were obtained. If no large branchiopods were observed, then a semi-quantitative sample was taken to determine the relative abundance of large branchiopods as follows.

A dip net was lowered vertically into the deepest portion of the inundated habitat (usually the center) and rested on the bottom. The 80-µm mesh size dip net was then moved in the direction of the longest axis of the habitat for approximately one-meter. In instances where half of the habitat length is less than one meter in length, the dip net was repositioned in the deepest portion of the habitat and moved in the opposite direction for the remainder of the one-meter sample. Given the aperture of the dip net of 0.025 m^2 and distance the dip net was moved, roughly 0.025 m^3 or 25 liters of the water column was sampled horizontally each time. In those cases when the water column was shallower than the dip net aperture height, the volume of water per sweep was calculated by the horizontal distance the net is moved multiplied by the width of the dip net (25-cm) multiplied by the depth of water. After the completion of each sample sweep, the contents of the net were examined for large branchiopods. All large branchiopods captured in the dip net were identified to the lowest justifiable taxon in the field, and recorded on standardized data sheets. The relative numbers of individuals observed within each taxonomic group was recorded in one of five categories: rare (≤2 individuals), not common (3-10 individuals), common (11-50 individual), very common (51 -100 individuals), and abundant (>100 individuals). This method allows for the relative abundances and richness of large branchiopods to be compared between and among wetlands through time. Additionally, this method allows for concentration estimates of large branchiopods to be calculated as number of individuals per liter of water (= number of individuals/net aperture area x length of sweep).

If federally-listed large branchiopods were not detected during the semi-quantified sampling method, then the entire habitat was sampled as follows. Starting at one end of the habitat, the net was moved from one side of the habitat to the other in a zigzag fashion, until the opposite end of the habitat was reached. During this procedure, the net was often bounced along the habitat bottom (to encourage large branchiopods to move up into the water column from hiding places for easier

capture) and viewed often for evidence of large branchiopods. If still no federally listed large branchiopods were captured, then additional netting took place in specific locations within the habitat that may have not been sampled during prior efforts. Additional taxonomic groups of large branchiopods detected using this alternative method is noted as present by an "X" on the standardized field data sheet. After the taxonomic identification and enumeration were completed, the contents of the net were placed back into the habitat from which they were collected.

Data concerning air and water temperatures, present depths (maximum and average [ft]), present ponding surface area (percent inundation), and habitat conditions were collected during each field visit. The potential depths (maximum and average [ft]) and potential ponding surface area percentage were visually estimated. Additionally, presence and abundance data were recorded for all other aquatic species using the same methods as described above for large branchiopod sampling. Representative photographs were taken of the habitats sampled and species observed.

RESULTS

A total of seven wetlands were sampled using wet season techniques (Figure 3). Six of the basins were previously mapped by Rincon Consultants, Inc., and one additional basin was mapped by HBC (Basin 6) during the wet-season sampling.

The first site visit (December 12, 2023) was conducted after an 8-day back-to-back storm event that delivered 1.31 inches of rain (University of California, Davis Integrated Pest Management daily weather Station at Dixon [UCDIPM.edu] 2024). However, the basins onsite did not initiate ponding. Upon the second visit (January 3, 2024) basin 1 had started to inundate after four rain events that combined dropped an additional 2.74 inches of rain. Another 0.33 inches of rain occurred prior to the third visit (January 26, 2024), yet only Basins 1 and 2 had water. By the fourth visit (February 9, 2024) all of the basins on site were inundated after an additional 2.0 inches of rain had occurred. With the exception of Basin 1 that continuously was inundated for over 90 days, these basins were fairly short lived and were dry six weeks later (March 22, 2024).

Representative photographs of the basins sampled are located in Appendix B. No large branchiopod were observed during the surveys (Appendix C).

Figure 3. Basins Sampled

LITERATURE CITED

U.S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). 2017. Survey guidelines for the listed large branchiopods. 24 pp. Dated: 31 May 2015 (Revised November 13, 2017).

APPENDIX A.
USFWS AUTHORIZATION LETTER

Gmail

Kathleen Colima Aguirre <kcolima@tansleyteam.com>

Survey Approval, RP-Vaca Dixon Site-2023-0824, VpB

1 message

SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov> Thu, Aug 24, 2023 at 3:39 PM
To: "kcolima@tansleyteam.com" <kcolima@tansleyteam.com>, Brent Helm <bhelm@tansleyteam.com>
Cc: "Cook, Megan T" <megan_cook@fws.gov>

Kat Colima,

By this email message, you are authorized to conduct wet and dry vernal pool branchiopod surveys, as specified in your Aug 17, 2023 email request, per the conditions of your recovery permit (795930-12). Surveys will be conducted at the Vaca Dixon Battery Energy Storage System Project site in Solano County, CA. Please remember to carry a copy of your permit while doing the work and to follow the terms and conditions therein. This authorization does not include access to the property which must be arranged with the landowner or manager. Please let us know if the activities are not performed as authorized, or if they are done by a different permittee under a separate authorization.

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1. The reference number to help ensure that we correctly record the fulfillment of the reporting requirement under this authorization,
2. A copy of this authorization email,
3. The names of all persons involved in each activity and their recovery permit numbers, if applicable,
4. A U.S. Geological Survey topographic map (1:24,000 scale or larger scale) depicting the location of the project site, survey area, and location(s) of species in as precise a manner as possible.
5. All other information required in the 45/90 Day Survey Report section of your permit.

Thank you,

Lauren

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We have resumed in-office vernal pool branchiopod practical exams. Please send us an email to schedule your exam.

The Sacramento Fish and Wildlife Office is using this consolidated mailbox for all communications regarding 10(a)(1)(A) recovery permits in our jurisdiction. Please send survey notifications, reports, and permit inquiries to this email address: FW8_SFWO_Permits@fws.gov.

APPENDIX B.
REPRESENTATIVE PHOTOGRAPHS

Photograph of Basin 1 taken by Dr. Helm facing south on January 3, 2024.

Photograph of Basin 1 taken by Dr. Helm facing north on January 3, 2024.

Photograph of Basin 2 taken by Dr. Helm facing north on February 9, 2024.

Photograph of Basin 3 taken by Dr. Helm facing north on February 9, 2024.

Photograph of Basin 4 taken by Dr. Helm facing northeast on February 9, 2024.

Photograph of Basin 5 taken by Dr. Helm facing northeast on February 9, 2024.

Photograph of Basin 6 taken by Dr. Helm facing northeast on February 9, 2024.

Photograph of Basin 1A taken by Dr. Helm facing northwest on February 9, 2024.

APPENDIX C.
WET-SEASON SAMPLING FIELD FORMS

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm, Kathleen Colima** | **Weather Condition: slight breeze, 0% cloud cover**

Date: 12/12/2023 | **Time: 2:27 pm** | **Temperature: 64˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera														
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	S																																					Barely Saturated
1a																																						Dry
2																																						Dry
3																																						Dry
4																																						Dry
5																																						Dry

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm** | **Weather Condition: rained not long ago, 10% cloud cover**

Date: 1/3/2024 | **Time: 3:38 pm** | **Temperature: 55˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera													
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	55	6.5	3																												NC							
1a	S																																					
2	S																																					
3	S																																					
4	S																																					
5	S																																					

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm** | **Weather Condition: 80% cloud cover**

Date: 1/12/2024 | **Time: 10:05 am** | **Temperature: 52˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera													
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	55	6.5	4																																			
1a	S																																					
2	S																																					
3	S																																					
4	S																																					
5	S																																					

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm, Zachary Einweck** | **Weather Condition: 90% cloud cover**

Date: 1/26/2024 | **Time: 10:30 am** | **Temperature: 56˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera													
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	55	8	4					X		X	X																											
1a	S																																					
2	58	2	0.5																																			
3	S																																					
4	S																																					
5	S																																					

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm** | **Weather Condition: 10% cloud cover**

Date: 2/09/2024 | **Time: 10:46 am** | **Temperature: 56˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta												Mollusca			Turbellaria	Acari	Collembola	Other	Herps			
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera													
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other	Habitat Condition	Comments
1	45	11	5			50%		NC		C	C							R	X		X					X	X					X				X			
1a	49	3	1	3	1	100%		R		NC																													
2	50	4	1	6	2	70%				R																													
3	50	4	1	7	3	65%																																	
4	47	6	3	10	6	80%				NC																													
5	48	6	2	6	2	100%				NC																													
6	50	6	4	8	6	90%				R																													NEW

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm** | **Weather Condition: Slight breeze, Sunny**

Date: 2/23/2024 | **Time: 8:30 am** | **Temperature: 59˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera														
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	52	8	6					NC	X	C	C							X	X	X	X					X	X					X				X			
1a	50	2	0.5					R		X																													
2	51	3	1							X																													
3	50	4	1.5																																				
4	51	5	3							R																													
5	50	5	2							NC																													
6	50	6	4					NC	R	NC	X																												

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm** | **Weather Condition: Sunny, slight breeze, < 10 5 cloud cover**

Date: 3/8/2024 | **Time: 2:41 pm** | **Temperature: 59˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera													
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	70	9.5	6					NC	NC		C															R				R							
1a	S																									C											
2	73	0.5	0.5					VC																		C											
3	72	2	0.5					A																		C											
4	73	2	0.5					A																		NC											
5	73	1.5	0.5					A																		C											
6	73	6	4					NC																													

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm** | **Weather Condition: Sunny,**

Date: 3/22/2024 | **Time: 11:26 Am** | **Temperature: 71˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

		Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera													
Pool No.	Water Temp (°F)	Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	62	8	5					X	NC		C															X					X							
1a	S																																					
2	S																																					
3	S																																					
4	S																																					
5	S																																					
6	S																																					

Project: Vaca Dixon (BESS) | **Surveyor(s): Brent Helm** | **Weather Condition: Cool, 5% cloud cover, Slight breeze from south**

Date: 4/5/2024 | **Time: 9:15 Am** | **Temperature: 54˚F**

Abundance: R = Rare (≤2 individuals), NC = Not Common (3-10 individuals), C = Common (11-50 individuals), VC = Very Common (51-100 individuals), A = Abundant (>100 individuals)

Hydrology: D = dry, N/P = not ponding, M=moist, S = saturated to surface, I/P = intermittent ponding, X = Present but not observed in 1 meter sample

LB Redroductive Status: i = immature, m = mature, g = gravid (with eggs)

Habitat Condition:

UD = undisturbed, D = disturbed - tt = tire tracks, t = trash, p =plowing

UG = ungrazed, G = grazed - C = cattle, H = horse, S = sheep, l = light grazing, m = moderate grazing, h = heavy grazing

Pool No.	Water Temp (°F)	Present Depth (inches)		Potential Depth (Inches)		Surface Area (ft^2)		Crustacea										Insecta											Mollusca			Turbellaria	Acari	Collembola	Other	Herps		Habitat Condition	Comments
									Copepods			Large Branchiopods (LB)						Coleoptera			Hemiptera			Odanota		Diptera													
		Max	Ave.	Max	Ave.	Present	Pot. Max	Ostracods	Calanoida	Cyclopoda	Cladocera	*LIOC*	*BRLY*	*BRLI*	*LEPA*	*LYBR*	*CYCA*	Dytiscidae	Hydrophilidae	Haliplidae	Notonectidae	Corixidae	Ephemeroptera	Zygoptera	Anisoptera	Culicidae	Chironomidae	Trichoptera	Lymnaeidae	Physidae	Planorbidae	Micro-turbularian	Hydracarini		Other Invertebrate	Pseudacris	Other		
1	60	6.5	3.5					NC			NC															C											
1a	S																																				
2	S																																				
3	S																																				
4	S																																				
5	S																																				
6	S																																				

Appendix G

Large Branchiopod Habitat Assessment Report

HABITAT SUITABILITY ASSESSMENT
FOR
FEDERALLY-LISTED LARGE BRANCHIOPODS
AT THE
VACA DIXON BATTERY ENERGY STORAGE SYSTEM PROJECT
ALTERNATIVE SITE,
SOLANO COUNTY, CALIFORNIA

Prepared for:

Rincon Consultants, Inc.
Environmental Scientists | Planners | Engineers

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July 2025

HABITAT SUITABILITY ASSESSMENT FOR FEDERALLY-LISTED LARGE BRANCHIOPODS AT THE VACA DIXON BATTERY ENERGY STORAGE SYSTEM PROJECT ALTERNATIVE SITE, SOLANO COUNTY, CALIFORNIA

INTRODUCTION

Helm Biological Consulting (HBC), a division of Tansley Team, Inc., was contracted by Rincon Consultants, Inc. to assess the habitats occurring at the Vaca-Dixon Battery Energy Storage System (BESS) Project Alternative Site (hereafter "Site") for its suitability to support large branchiopods (fairy shrimp, clam shrimp, and tadpole shrimp) that are listed as threatened or endangered under the federal Endangered Species Act (e.g., the threatened vernal pool fairy shrimp [*Branchinecta lynchi*] and the endangered vernal pool tadpole shrimp [*Lepidurus packardi*]) (hereafter referred to as "federally-listed large branchiopods").

The Site consists of roughly 10 acres is located on the south side of Interstate 80, just south of the Vaca Dixon Substation, Solano County, California (Figure 1). Additionally, the Site is located within the southwest ¼ of the northeast ¼ of Section 1, Township 6 North, Range 1 West, and Mount Diablo Base and Meridian of the Allendale 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle map; approximate center coordinates in decimal degrees (North American Datum [NAD83]) are: 38.396143, -121.921524 (Figure 2).

The remainder of this report discusses the methods and results of the habitat suitability assessment to determine the potential for federally-listed branchiopods to occur at the Site.

"I certify that the information in this survey report and attached exhibits fully and accurately represents my work."

Brent P. Helm Signature _____ Date 07-19-2025

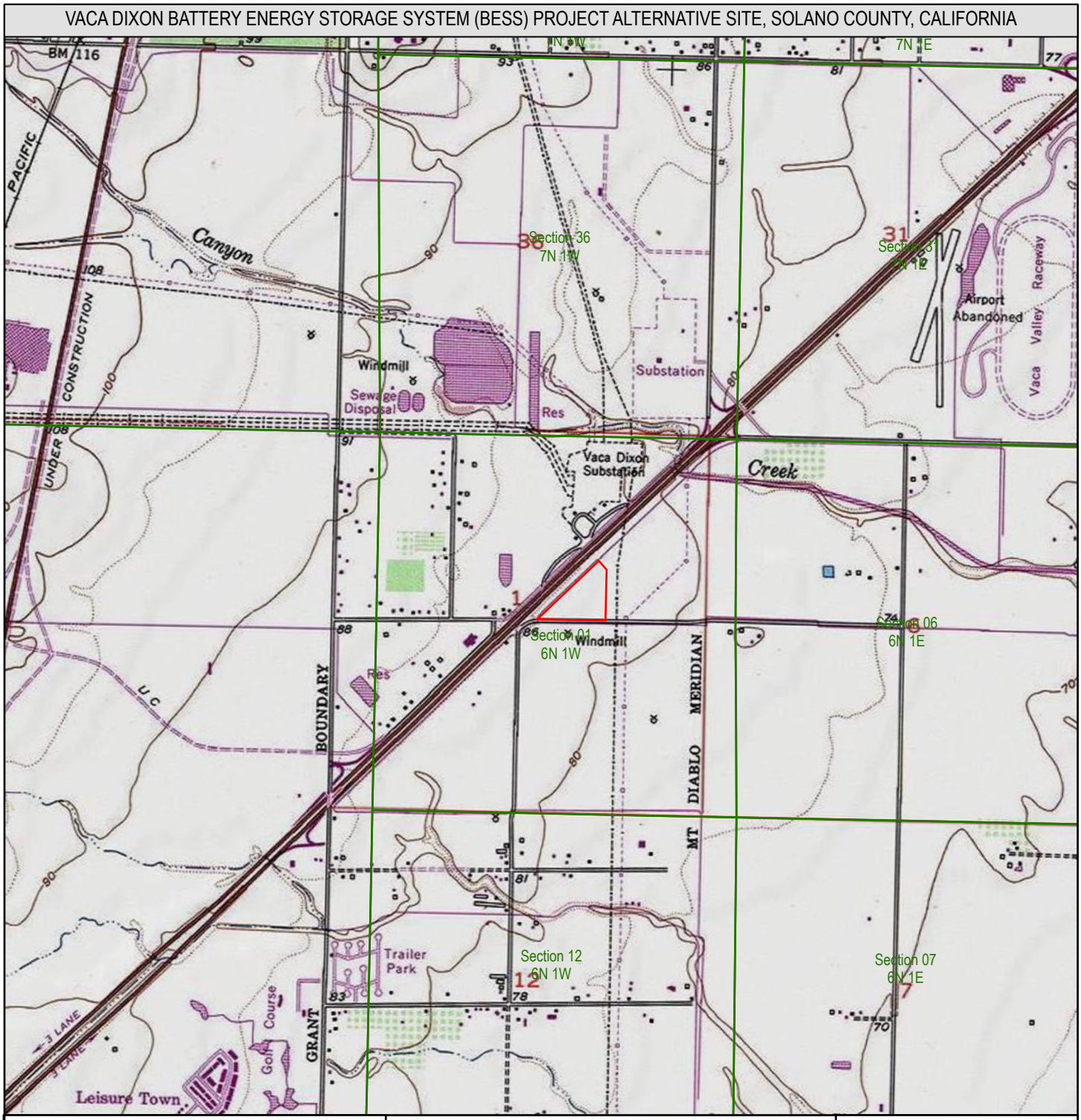

Figure 1. Project Location

METHODS

Dr. Brent Helm of HBC conducted a site visit on July 12, 2025 to determine the existing habitat conditions occurring within the Site. Pedestrian surveys were used to investigate the Site using closely spaced (50 feet in width) transects. All habitats (e.g., micro-depressions) encountered occurring within the Site that had the potential to support large branchiopods were evaluated.

Potential habitat for federally-listed large branchiopods is defined as any seasonally inundated depression that on average ponds water at a sufficient depth and duration for a listed large branchiopod to complete its lifecycle (generally 2.0 inches or greater in depth for 14 or more consecutive days for fairy shrimp and 30 or more consecutive days for tadpole shrimp) (U.S. Fish and Wildlife Service [USFWS] 2017). Generally these habitats occur within the California Floristic Province at elevations below 1,707 meters in the Coast Ranges (CNDDB 178) and below 914 meters for the rest of California and Oregon (CNDDB 244) and Oregon (USFWS 2017). Habitats that swiftly flow water (e.g., creeks, streams, and ephemeral drainages), semi-to-permanently inundated areas that support perennial population of predators (e.g., bullfrogs, fish, and crayfish), and habitats that receive water during the dry season (i.e., artificial water sources) were generally not considered suitable habitat for federally listed large branchiopods (USFWS 2017).

Habitat characteristics of large branchiopods were based on the life history of California species, especially Central Valley endemics (Eriksen and Belk 1999; Helm 1998, 1999; Helm and Vollmar 2002, Helm and Noyes 2016). The presence of water marks, algae mats, driftlines, hydrophytic vegetation ("water-loving plants"), slope, contributing watershed, maximum potential ponding depth, and aquatic arthropods (i.e., crustaceans and insects) exoskeletons were helpful indicators for evidence of ponding depth and duration used to determine potential habitat.

All habitats that could potentially inundate with water to a depth of 2 or more inches for 14 consecutive days were mapped with a Trimble Geo 7X GPS handheld unit.

RESULTS

According to California Department of Fish and Wildlife's (CDFW 2025) RareFind 5 which tracks California Natural Diversity Database (CNDDB) occurrences, the closest known federally-listed large branchiopod occurrences to the Site are vernal pool fairy shrimp and the vernal pool tadpole shrimp (Figure 3). The California fairy shrimp (*Linderiella occidentalis*) also occurs within two miles of the site but has no federal or state listing status. However, based on the habitat types occurring onsite (road rut pools), discussed below, potential for the California fairy shrimp and vernal pool tadpole shrimp is highly unlikely. Similarly, the potential for the vernal pool fairy shrimp is low. However, the non-special status versatile fairy shrimp (*Branchinecta lindalhli*) would have the greatest potential of the large branchiopods for occurrence.

A total of five depressions consisting of vehicular ruts along the south and southwest edges of the Site have potential to support large branchiopods (Figure 2). Although there are small shallow depressions within the plum (*Prunus* spp.) orchard, they would not be considered large branchiopod habitat since they are inundated with irrigation water. Similarly, the small drainage located along the southwest corner of the Site is also not considered large branchiopod habitat since it fills with irrigation water during the dry season. Representative photos of the habitats onsite are located in Appendix A.

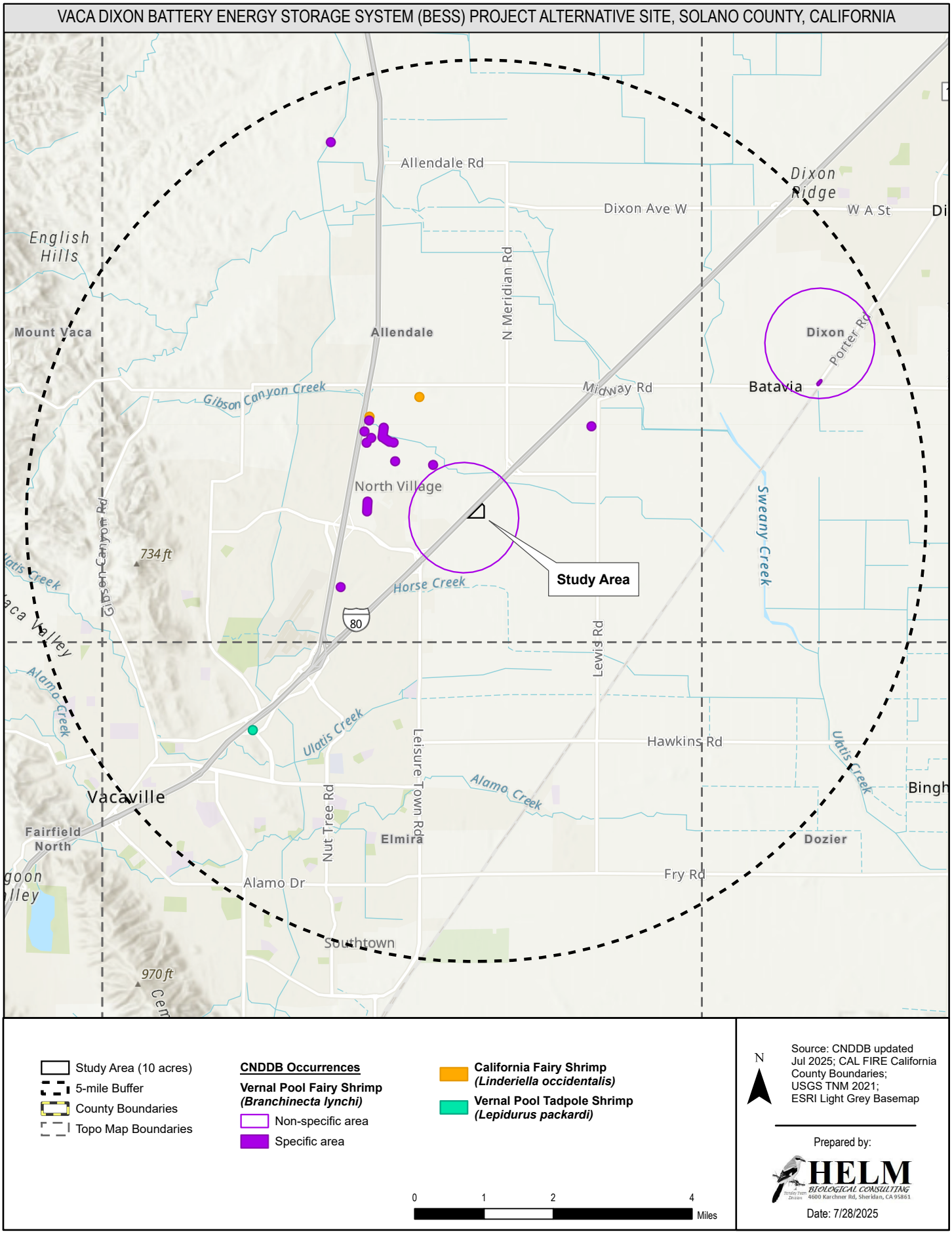

Figure 2. CNDDB Map

DISCUSSION

Although the habitat for large branchiopods onsite is of poor quality, HBC suggests conducting dry-season sampling to determine if federally-listed large branchiopod species are present.

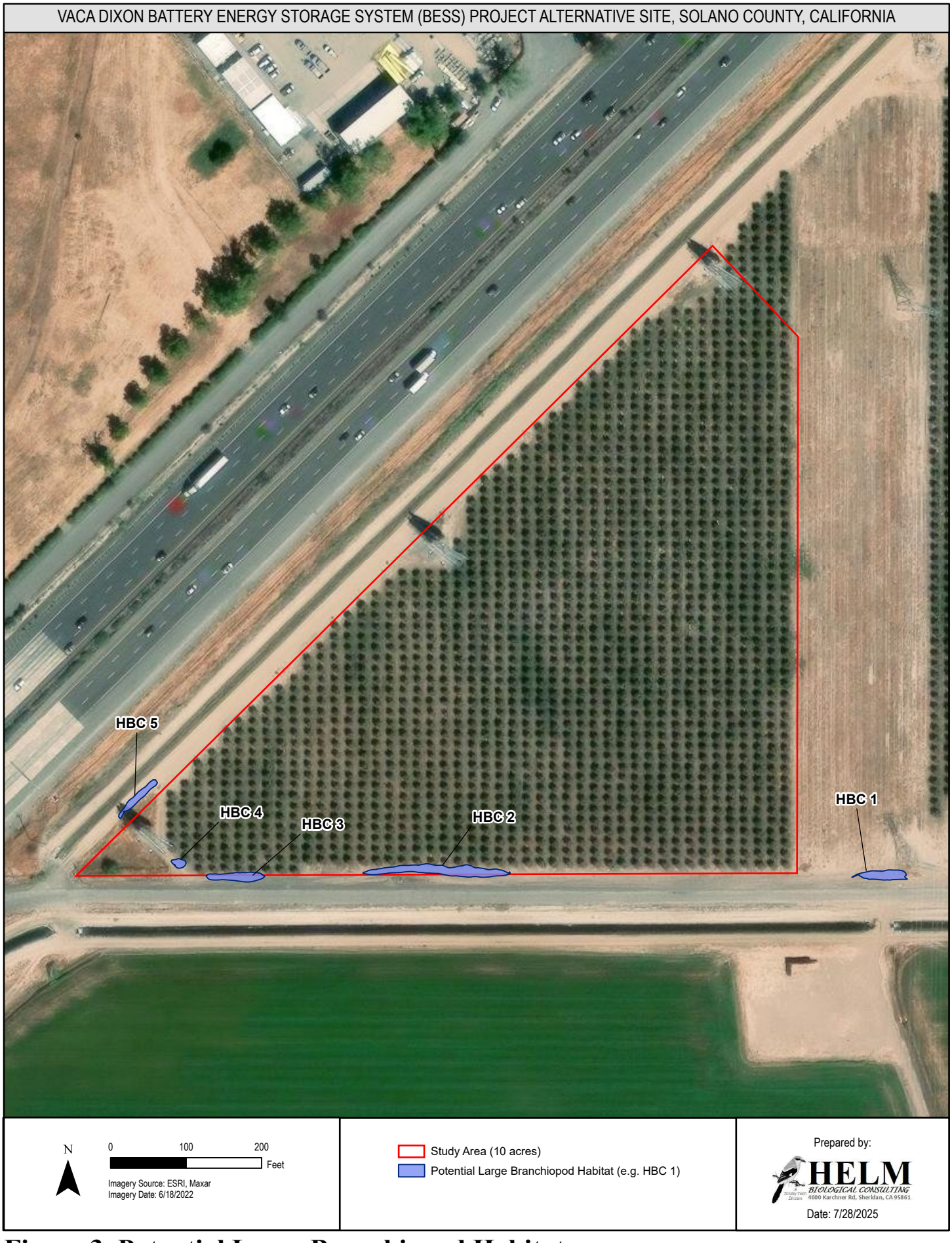

Figure 3. Potential Large Branchiopod Habitat

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APPENDIX A.
REPRESENTATIVE PHOTOGRAPHS

HBC 1. Photograph taken facing east.

HBC 2. Photograph taken facing west.

HBC 3. Photograph taken facing west.

HBC 4. Photograph taken facing northwest.

Photograph of drainage ditch located in southwest corner of the Site which is not large branchiopod habitat because it receives artificial irrigation water (from the orchard) during the dry season. Photograph taken facing west.

Photograph of agricultural ditch paralleling the northern boundary of the Site which is not large branchiopod habitat because it receives artificial irrigation water during the dry season. Photograph taken facing southwest.

HBC 5. Photograph taken facing northeast.

Photograph of shallow depressions within the orchard that are filled with irrigation water during the dry season. Photograph taken facing southeast.

Photograph of shallow depressions within the orchard that are filled with irrigation water during the dry season. Photograph taken facing southwest.

Appendix H

Dry Season Large Branchiopod Protocol Sampling Results (2025)

PROTOCOL-LEVEL DRY-SEASON SAMPLING FOR FEDERALLY-LISTED LARGE BRANCHIOPODS AT THE VACA DIXON BATTERY ENERGY STORAGE SYSTEM PROJECT ALTERNATIVE SITE, SOLANO COUNTY, CALIFORNIA

Prepared for:

Rincon Consultants, Inc.
Environmental Scientists | Planners | Engineers

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October 2025

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PROTOCOL-LEVEL DRY-SEASON SAMPLING FOR FEDERALLY-LISTED LARGE BRANCHIOPODS AT THE VACA DIXON BATTERY ENERGY STORAGE SYSTEM PROJECT ALTERNATIVE SITE, SOLANO COUNTY, CALIFORNIA

INTRODUCTION

Helm Biological Consulting (HBC), a division of Tansley Team, Inc., was contracted by Ricon Consultants, Inc. to conduct protocol-level dry-season sampling for large branchiopods (fairy shrimp, tadpole shrimp) that are listed as threatened or endangered under the federal Endangered Species Act (e.g., vernal pool fairy shrimp [*Branchinecta lynchi*] and vernal pool tadpole shrimp [*Lepidurus packardi*]) at the Vaca-Dixon Battery Energy Storage System (BESS) Project Alternative Site (hereafter "Site").

The Site consists of roughly 10 acres is located on the south side of Interstate 80, just south of the Vaca Dixon Substation, Solano County, California (Figure 1). Additionally, the Site is located within the southwest ¼ of the northeast ¼ of Section 1, Township 6 North, Range 1 West, and Mount Diablo Base and Meridian of the Allendale 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle map; approximate center coordinates in decimal degrees (North American Datum [NAD83]) are: 38.396143, -121.921524 (Figure 2).

The remainder of this report discusses the methods and results of the dry-season sampling for the presence of federally-listed large branchiopods at the Site.

"I certify that the information in this survey report and attached exhibits fully and accurately represents my work."

Brent P. Helm Signature _____ Date 10-11-2025
(TE-795930-12)

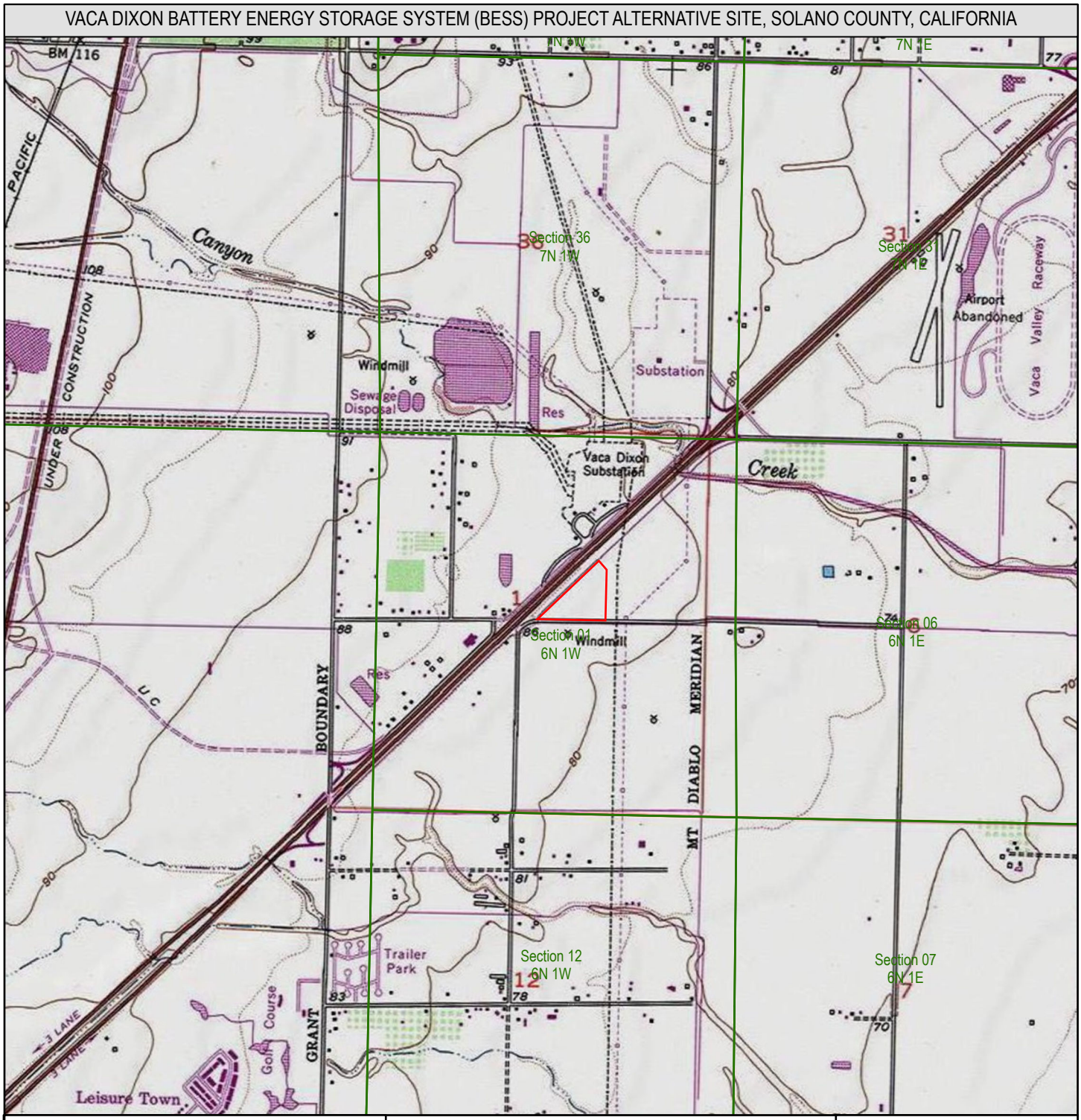

Figure 1. Project Location

METHODS

Dr. Brent Helm of HBC conducted dry-season sampling on September 25, 2025 as authorized by the U.S. Fish and Wildlife Service (USFWS) (Appendix A) under recovery permit TE-795930-10.2 of Section 10(a)(1)(A) of the federal Endangered Species Act, 16 U.S.C. 1531 et seq., and its implementing regulations (Appendix A). Dry-season sampling methods followed USFWS's (2017) *Survey Guidelines for the Listed Large Branchiopods* (hereafter "Survey Guidelines") for dry-season sampling as described below.

Dry sampling was conducted in all basins (habitats) at the Project with the potential to support federally-listed large branchiopods. According to the Survey Guidelines, potential federally listed large branchiopod habitat is defined as "any seasonally inundated depression that on average ponds water at a sufficient depth and duration for a listed large branchiopod to complete its lifecycle." Based on the Projects location (Sacramento Valley), sufficient habitat depth would be 2.0 inches or greater and sufficient habitat duration would be 14 or more consecutive days of inundation for the vernal pool fairy shrimp and 30 or more consecutive days of inundation for the vernal pool tadpole shrimp. Habitats that swiftly flow water (e.g., creeks, streams, and ephemeral drainages) or habitats that are semi-to-permanently inundated and support perennial population of predators (e.g. bullfrogs, fish, and crayfish), generally do not provide suitable habitat for listed large branchiopods.

Habitat characteristics of the vernal pool fairy shrimp and vernal pool tadpole shrimp are based on their life history (Eriksen and Belk 1999; Helm 1998, 1999; Helm and Vollmar 2002, Helm and Noyes 2016). The presence of water marks, algae mats, driftlines, hydrophytic vegetation ("water-loving plants"), slope, contributing watershed, and aquatic arthropods (i.e., crustaceans and insects) exoskeletons were helpful indicators for evidence of potential ponding depth and duration.

Soil samples were collected mainly from the lowest topographic areas within each sampled basin. Soil samples were placed in liter size plastic sealable bags and marked with the project name, basin or sub-basin number, and date. Representative photographs were taken of the basins sampled (Appendix B). The soil was then transported to HBC for processing and analysis as described below.

In HBC's laboratory, a brine solution was prepared by mixing table salt (NaCl) with lukewarm tap water in a large container. The collected soil material was placed in the brine solution. The soil material was then gently worked by hand to breakdown any persistent soil structure. The organic material rising to the top of the brine solution was skimmed off and placed in a 600-micron diameter pore-size sieve stacked atop a 75-micron diameter pore-size sieve. The soil

material was processed through the top sieve by flushing it with lukewarm tap water while gently rubbing it with a soft-bristle brush. The soil retained from the 75-micron diameter pore size sieve was then removed and thinly (≈1.0 mm) spread into plastic petri dishes.

The contents of each petri dish were examined under a 10 to 252-power zoom binocular microscope. A minimum of 0.5-hour was spent searching the contents of each petri dish for large branchiopod cysts (embryonic eggs). Dr. Helm's large branchiopod cyst reference collection and scanning electron micrographs of cysts (Belk 1989, Brendock *et al*. 2008, Gilchrist 1978, Hill and Shepard 1998, Mura 1991, and Rabet 2010) were used to identify and compare any cysts observed within the soil samples. Evidence of other macroscopic aquatic invertebrates encountered was also noted on the laboratory data sheet.

RESULTS

A total of five depressions consisting of vehicular ruts along the south and southwest edges of the Site have potential to support large branchiopods (Figure 2). Although there are small shallow depressions within the plum (*Prunus* spp.) orchard, they were not be considered large branchiopod habitat since they are inundated with irrigation water. Similarly, the small drainage located along the southwest corner of the Site is also not considered large branchiopod habitat since it fills with irrigation water during the dry season. No evidence of large branchiopods (cysts or carapaces of *Lepidurus* sp.) was observed in the basins or the collected soils (Table 1). Representative photographs of the basins sampled are provided in Appendix B.

Table 1. Results of Soil Examinations

Basin No.	Insect Exo-Skeletons	Micro-Turbellaria Cysts	Cladocera Ephippia	Ostracods Live/Cysts/ Carapaces	Copepods Live/Cysts	Hydracarina Live	Nematoda	Collembola
HBC-1	X	X	X	X	X			X
HBC-2	X						X	X
HBC-3	X		X	X	X			
HBC-4	X				X		X	
HBC-5	X					X	X	X

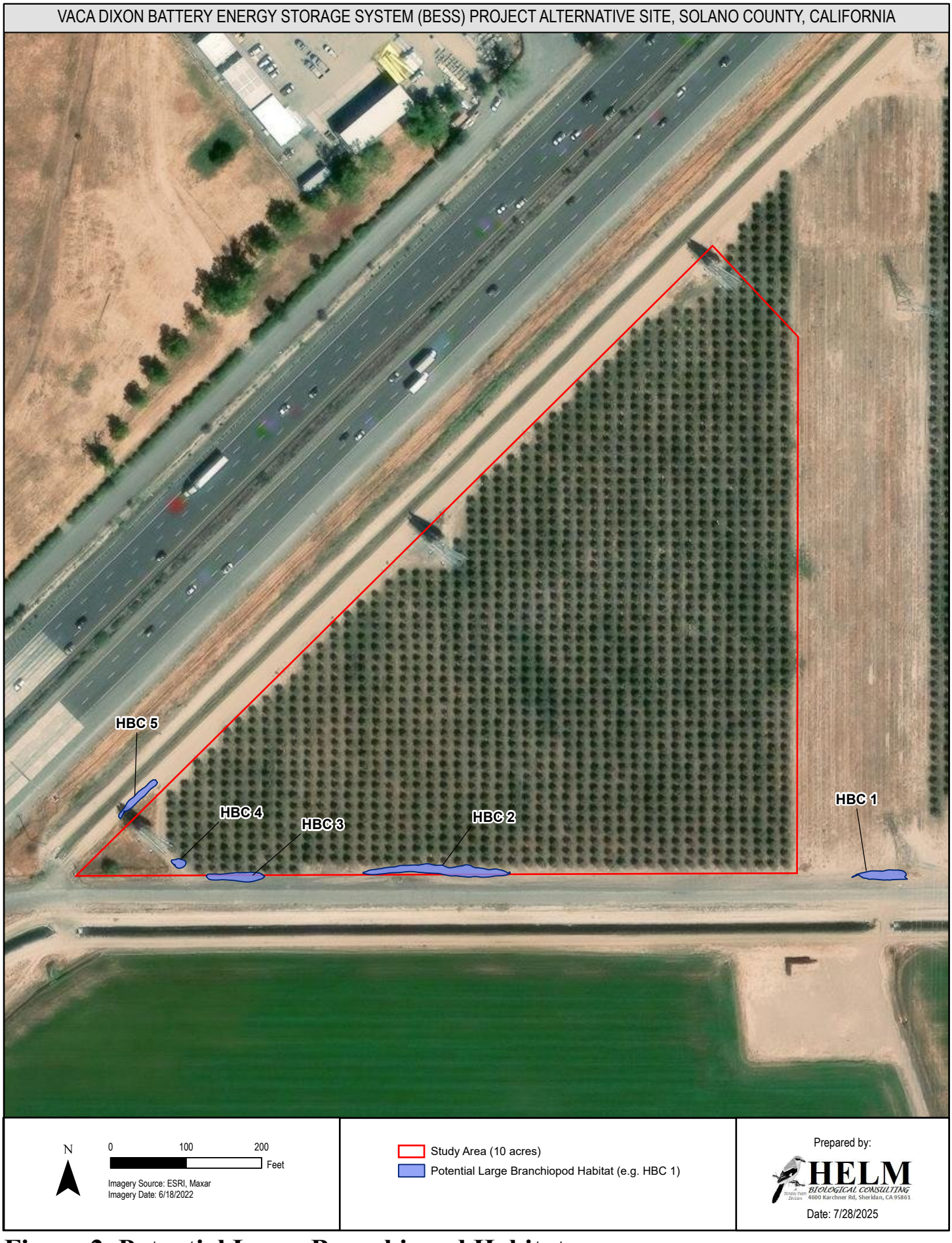

Figure 2. Potential Large Branchiopod Habitat

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Rabet, N. 2010. Revision of the egg morphology of *Eulimnadia* (Crustacea, Branchiopoda, Spinicaudata). Zoosystema 32 (3): 373-391.

U.S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). 2017. Survey guidelines for the listed large branchiopods. 24 pp. Dated: 31 May 2015 (Revised November 13, 2017).

APPENDIX A.
USFWS AUTHORIZATION

Gmail Brent Helm <bhelm@tansleyteam.com>

Re: [EXTERNAL] Large Brachiopod Sampling under Permit TE-795930-12

1 message

SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov> Mon, Sep 22, 2025 at 10:11 AM
To: Brent Helm <bhelm@tansleyteam.com>
Cc: "Cook, Megan T" <megan_cook@fws.gov>

Hi Brent,
We simplified our reply by adding an automatic response to this inbox. You may proceed with survey activities after 15 days of the notice's submission; the start date was September 10, and it does not appear that a denial reply was received by then by Megan Cook.
Best,
Stephen Curry, Recovery Permit Coordinator
10(a)(1)(A) Recovery Permitting | **Sacramento Fish and Wildlife Office**
Pacific Southwest Region | U.S. Fish and Wildlife Service

Helpful Links: ePermits | Pacific Southwest Recovery Permitting | Minimum Qualifications | Survey Protocols | Vernal Pool Branchiopod Practical Exams

From: Brent Helm <bhelm@tansleyteam.com>
Sent: Thursday, September 11, 2025 9:06 AM
To: SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov>
Cc: Cook, Megan T <megan_cook@fws.gov>
Subject: Re: [EXTERNAL] Large Brachiopod Sampling under Permit TE-795930-12

Megan,

Does this mean I can proceed with sampling?

Brent
Tansley Team, Inc.
DBA Helm Biological Consulting
4600 Karchner Rd
Sheridan, CA 95681
Phone: (916) 952-0308
Email: bhelm@tansleyteam.com

On Tue, Aug 26, 2025 at 11:38 AM SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov> wrote:

> Thank you for your notification to perform surveys following the U.S. Fish and Wildlife Service Survey Protocols (whether online or in your permit). Please include the relevant Geographic Division Supervisor (Cc'ed to this email) in future correspondences related to this notification.

10(a)(1)(A) Recovery Permitting | **Sacramento Fish and Wildlife Office**
Pacific Southwest Region | U.S. Fish and Wildlife Service

Helpful Links: ePermits | Pacific Southwest Recovery Permitting | Minimum Qualifications | Survey Protocols | Vernal Pool Branchiopod Practical Exams

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From: Brent Helm <bhelm@tansleyteam.com>
Sent: Tuesday, August 26, 2025 7:24 AM
To: SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov>
Cc: FWS-FW8 CFWO Permits <fw8_cfwo_permits@fws.gov>
Subject: Re: [EXTERNAL] Large Brachiopod Sampling under Permit TE-795930-12

Sorry about that, here it is.

Brent
Tansley Team, Inc.
DBA Helm Biological Consulting
4600 Karchner Rd
Sheridan, CA 95681
Phone: (916) 952-0308
Email: bhelm@tansleyteam.com

On Mon, Aug 25, 2025 at 3:46 PM SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov> wrote:

> Hello Brent,
>
> I didn't receive an attachment to this email. Can you please resend it to me?
>
> Thank you,
> Lauren

10(a)(1)(A) Recovery Permitting | **Sacramento Fish and Wildlife Office**
Pacific Southwest Region | U.S. Fish and Wildlife Service

Helpful Links: ePermits | Pacific Southwest Recovery Permitting | Minimum Qualifications | Survey Protocols | Vernal Pool Branchiopod Practical Exams

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From: FWS-FW8 CFWO Permits <fw8_cfwo_permits@fws.gov>
Sent: Monday, August 25, 2025 7:05 AM
To: Brent Helm <bhelm@tansleyteam.com>
Cc: SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov>
Subject: Re: [EXTERNAL] Large Brachiopod Sampling under Permit TE-795930-12

Good morning Brent,

The location proposed for sampling is outside of the Carlsbad jurisdiction, so I have copied the Sacramento office to make them aware of your request.

Thank you,
Jess Sattler

U.S. Fish and Wildlife Service
Carlsbad Field Office Recovery Permit Program
Contact:
fw8_cfwo_permits@fws.gov

Useful links:
Pacific Southwest Region Recovery Permits web page
ePermits and Recovery Permit application page
Technical problems with an ePermits account? Contact Support

Permittees:
Please include your permit number in all correspondence and reporting, thank you.

From: Brent Helm <bhelm@tansleyteam.com>
Sent: Saturday, August 23, 2025 4:20 PM
To: FWS-FW8 CFWO Permits <fw8_cfwo_permits@fws.gov>
Subject: [EXTERNAL] Large Brachiopod Sampling under Permit TE-795930-12

To Whom It May Concern,

Attached is a request to conduct dry-season sampling for the Vaca Dixon Battery Energy Storage System Project Alternative Site. Thank you for your time and consideration regarding this matter.

Brent
Tansley Team, Inc.
DBA Helm Biological Consulting
4600 Karchner Rd
Sheridan, CA 95681
Phone: (916) 952-0308
Email: bhelm@tansleyteam.com

APPENDIX B.
REPRESENTATIVE PHOTOGRAPHS

HBC 1. Photograph taken facing east.

HBC 2. Photograph taken facing west.

HBC 3. Photograph taken facing west.

HBC 4. Photograph taken facing northwest.

Photograph of drainage ditch located in southwest corner of the Site which is not large branchiopod habitat because it receives artificial irrigation water (from the orchard) during the dry season. Photograph taken facing west.

Photograph of agricultural ditch paralleling the northern boundary of the Site which is not large branchiopod habitat because it receives artificial irrigation water during the dry season. Photograph taken facing southwest.

HBC 5. Photograph taken facing northeast.

Photograph of shallow depressions within the orchard that are filled with irrigation water during the dry season. Photograph taken facing southeast.

Photograph of shallow depressions within the orchard that are filled with irrigation water during the dry season. Photograph taken facing southwest.

Appendix I

Crotch's Bumble Bee Survey Report

Rincon Consultants, Inc.
601 University Avenue, Suite 221
Sacramento, California 95825
916-706-1374

September 16, 2025
Project No: 25-17851

Robert Ray
Patch Services LLC
333 Sunset Avenue, Suite 210
Suisun City, California 94585
Via email: rray@patchservices.com

Subject: Crotch's Bumble Bee Protocol Survey Results for the Vaca Dixon Power Center Battery Energy Storage System Project in Solano County, California

Dear Mr. Ray:

Rincon consultants, Inc. (Rincon) has prepared this Crotch's bumble bee (*Bombus crotchii*; CBB) survey report to document the methods and results of CBB surveys conducted for the Vaca Dixon Power Center Project (Project). Specifically, surveys were conducted within the Project Area where the battery energy storage system (BESS) is proposed (BESS Project Area), south of Interstate 80 (I-80), within a 10-acre parcel (Accessor's Parcel Number 0133-060-060) located in the City of Vacaville, California. Please refer to Attachment 1, **Error! Reference source not found.**.

Project Location and Project Area

The Project is located within the City of Vacaville in Solano, in the northeastern portion of the City south of I-80, north of Kilkenny Road. The Project occurs within the *Allendale, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle and is associated with Township 6N 1W, Range 1W, Section 01, Mt. Diablo Meridian. The CBB surveys were completed within suitable habitat within the defined Project Area, which includes the 10-acre property where BESS facilities are proposed south of I-80, and does not include portions of the proposed project to the north of I-80 due to restricted site access (Attachment 1, Figure 2).

The Project Area is relatively flat, with elevations between approximately 79 to 84 feet above mean sea level. The Project Area consists primarily of an existing orchard, a row crop of plum trees that is regularly maintained (e.g., mowing, disking, herbicides) and bound by agricultural dirt roads. Interstate 80 occurs within the northern extent of the Project Area, and to the east is a Pacific Gas and Electric (PG&E) transmission line corridor, characterized as barren/ruderal habitat mostly devoid of vegetation with presence of non-native grasses that are routinely mowed and/or disked. Rotational agricultural lands occur within the southern portion of the Project Area that are routinely disked and rotated seasonally. The Project Area also consists of ditches/canals associated with agricultural activities. Please refer to Attachment 1: Figure 2 for an illustration of the vegetation and other land cover documented within the Project area.

Survey Methodology

The CBB surveys described in this report were conducted in accordance with the *CDFW Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species* (CDFW Survey Considerations), issued June 6, 2023 (CDFW 2023). Surveys were completed in compliance with a Memorandum of Understanding (MOU) issued to Principal Investigator Stella Moore (SCP S-242390003-24239-001) and Principal Investigator Elizabeth Shoemaker (SCP S- 242420002-24249-001) in February 2025, authorizing incidental take of the California Endangered Species Act

Candidate CBB during survey activities. The required notifications to conduct the MOU capture surveys were submitted to CDFW via email on June 30, 2025.

Surveys were conducted by biologists Elizabeth Shoemaker (lead surveyor), Stella Moore (lead surveyor), Issac Kreger (field assistant), and Lisa Achter (field assistant), who were responsible for overseeing all aspects of the survey effort, including implementation of the survey methods, recording survey data and taking photographs.

Each CBB survey consisted of foraging bumble bee capture MOU surveys, surveys of potential nesting substrates and potential active CBB nests, and surveys to assess and document the presence of CBB overwintering habitat within the Project Area, further discussed below. Survey timing, weather conditions, bumble bee observations, floral resource assessments, nesting habitat assessments, and active nest observations (if any were observed) were recorded on a data sheet for data accuracy and consistency.

Foraging Bumble Bee Surveys

During the foraging bumble bee capture MOU surveys, floral species in bloom were noted and the percentage of floral resources available were assessed within the Project Area. Floral species visited by each bumble bee captured or observed were also recorded during the foraging bumble bee capture MOU surveys. The biologists walked the Project Area using meandering transect surveys. The transect and surveyor spacing varied depending on the quality of the foraging habitat in any given area, with transects closer together in areas with a higher density of blooming floral resources and farther apart in areas with sparse or blooming floral resources. Every bumble bee, if captured or observed during the surveys, was identified to species and caste.

Capture of bumble bees was conducted following the CA Bumble Bee Atlas non-lethal protocol (Xerces 2024). For all bumble bees captured during the surveys, photographs were taken of each bumble bee for further identification analysis and whenever possible included photographs of the following bumble bee morphology: (1) top overview of bee, (2) side view of bee depicting mandible length and hair phenology of thorax and abdomen, (3) face and vertex, (4) tip of abdomen, (5) close-up view of hind tibia, and (6) underneath of bee. Representative photos of each species captured are proved in Attachment 3. For bumble bees that were observed but unable to be captured, species identifications were made whenever possible and were based on bumble bee color morphology.

Nesting Surveys

Nesting surveys were conducted to assess the presence of suitable nesting resources including rodent holes/tunnels, or cavities within rock piles, brush piles, bunch grasses, leaf piles, pine needle duff, and vegetation mulch, and such potential nesting substrates were documented with representative photographs. Potential nesting sites were investigated for active CBB colonies by looking for concentrated bumble bee activity, and if a site was suspected to be occupied, it was observed to identify signs of bumble bees entering or exiting the entrance. If an active CBB colony were to be observed, the location, vegetation cover type, slope, aspect, and distance to colony foraging location would be documented and photographed. Active CBB colonies would be photographed at a distance to avoid any potential disturbance or encroachment.

Overwintering Habitat Surveys

Overwintering habitat surveys were conducted to assess and document the presence of CBB overwintering habitat including loose bare soil, leaf litter, pine needle duff, vegetation mulch, and bunch grasses. If observed, active bumble bee hibernacula would be documented and photographed.

Survey Results

The survey effort consisted of two biologists present during each survey day and included a minimum of one person-hour of searching per three acres of suitable habitat. The total suitable CBB habitat within the Project Area consisted of approximately 10 acres; therefore, a total of 3.3 person hours per survey was completed (Table 1). Active survey time does not include the time taken to process captured bees. Surveys were conducted between 2 to 3 weeks apart during the Colony Active Period for CBB (April through August).

Table 1 CBB Survey Dates, Surveyors, and Person-Hours of Searching

Survey	Dates	Surveyors	24-hour Time (start/ end)	Searching Time (hours) Per Person	Person-Hours of Searching
1	7/15/2025	Elizabeth Shoemaker, Issac Kreger	0830/1015	1.7	3.3
2	7/30/2025	Stella Moore, Issac Kreger	0835/1015	1.7	3.3
3	8/14/2025	Elizabeth Shoemaker, Lisa Achter	0940/1120	1.7	3.3

Surveys were conducted when weather conditions were suitable for bumble bee activity, on warm, sunny days with low wind (Table 2). Surveys began no earlier than one hour after sunrise and were completed at least two hours before sunset. Surveys were conducted when air temperatures ranged from 60 degrees Fahrenheit (°F) to 95°F, and when winds were less than 8 miles per hour (mph). Surveys were not conducted during wet conditions (e.g., foggy, raining, or drizzling) or when cloud cover was 100 percent.

Table 2 CBB Survey Weather Conditions

Survey	Date	24-hour Time (start/end)	Begin Air Temp (°F)	End Air Temp (°F)	Begin Wind Speed (MPH)	End Wind Speed (MPH)	Cloud Cover (%) - Begin	Cloud Cover (%) - End
1	7/15/25	0830/1015	69	76	1	4	0	0
2	7/30/25	0835/1015	66	73	1	6	10	10
3	8/14/25	0940/1120	70	85	1	1	0	0

Foraging Bumble Bee Surveys

Bumble Bees Captured or Observed

No bumble bees were captured or observed during the survey effort.

Floral Resources Available

A total of 13 floral species were in bloom during the surveys (Table 3). Approximately one percent of the Project Area had floral resources available during the surveys. Most flowering resources were observed around the perimeter of the Project Area. During the surveys, the orchard plants were not flowering and there was evidence of pesticide use/weeding in between the rows of trees, reducing the available habitat to support CBB. Representative photographs of vegetation communities with blooming floral resources observed within the Project Area are provided in Attachment 3 (Photographs 1-8 and 11-12).

Table 3 Floral Species in Bloom During CBB Surveys

Scientific Name[1]	Common Name	Bumble Bee Species Observed Visiting
Centaurea solstitialis	yellow star thistle	-
Cichorium intybus	chicory	-
Convulvulus arvensis	field bindweed	-
Cyperaceae spp.	sedge	-
Erodium cicutarium	common stork's-bill	-
Heliotropium europaeum	European heliotrope	-
Hirschfeldia incana	shortpod mustard	-
Murdannia nudiflora	doveweed	-
Lactuca serriola	prickly lettuce	-
Sonchus oleraceus	common sowthistle	-
Tribulus terrestris	goathead	-
Trifolium fragiferum	strawberry clover	-
Vicia villosa	hairy vetch	-

Nesting Surveys

Potential CBB nesting substrates identified in the Project Area included small mammal burrows and tunnels, specifically along the margins of the Project Area outside the active orchard. Potential nesting substrates were documented with representative photographs (Attachment 3, Photographs 9-10). No potentially active CBB nesting sites were observed during the surveys.

Overwintering Habitat Surveys

Potential CBB overwintering habitat documented within the Project Area included bare ground and rodent burrows (Attachment 3, Photographs 9-10), specifically along the margins of the Project Area outside the boundaries of the active orchard. The active orchard is routinely weeded to remove vegetation, mulch, and leaf litter, and does not provide suitable overwintering habitat for CBB. No bumble bee hibernacula were observed; however, the surveys occurred during the CBB Colony Active Period and hibernacula may not be active during the survey effort.

Conclusions

Suitable CBB nesting, foraging, and overwintering habitats are present in the Project Area; however, limited by available floral resources that could be used by CBB and active weeding and use of pesticides/herbicides as part of the active orchard occurring on-site. During the survey effort, no CBB were detected, which suggests absence within the Project Area. The CBB survey results are valid until August 14, 2026 (one year after the date of the surveys).

Rincon is committed to providing exceptional surveying and reporting services for this project. Please contact us if you have any questions or need any additional information.

Sincerely,
Rincon Consultants, Inc.

Elizabeth Shoemaker
Biologist/Lead CBB Surveyor

Thea Benson
Senior Biologist/Project Manager

Attachments

Attachment 1	Figures
Attachment 2	Resumes
Attachment 3	Site Photographs

References

California Department of Fish and Wildlife (CDFW). 2023. Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213150&inline

_____. 2025a. Memorandum of Understanding (MOU) for CESA Candidate Crotch's bumble bee (*Bombus crotchii*), western bumble bee (*Bombus occidentalis*). MOU SCP S-242420002-24239-001 issued to Principal Investigator, Elizabeth Shoemaker, on February 24, 2025.

_____. 2025b. Memorandum of Understanding (MOU) for CESA Candidate Crotch's bumble bee (*Bombus crotchii*), western bumble bee (*Bombus occidentalis*). MOU SCP S-242390003-24239-001 issued to Principal Investigator, Stella Moore, on February 19, 2025.

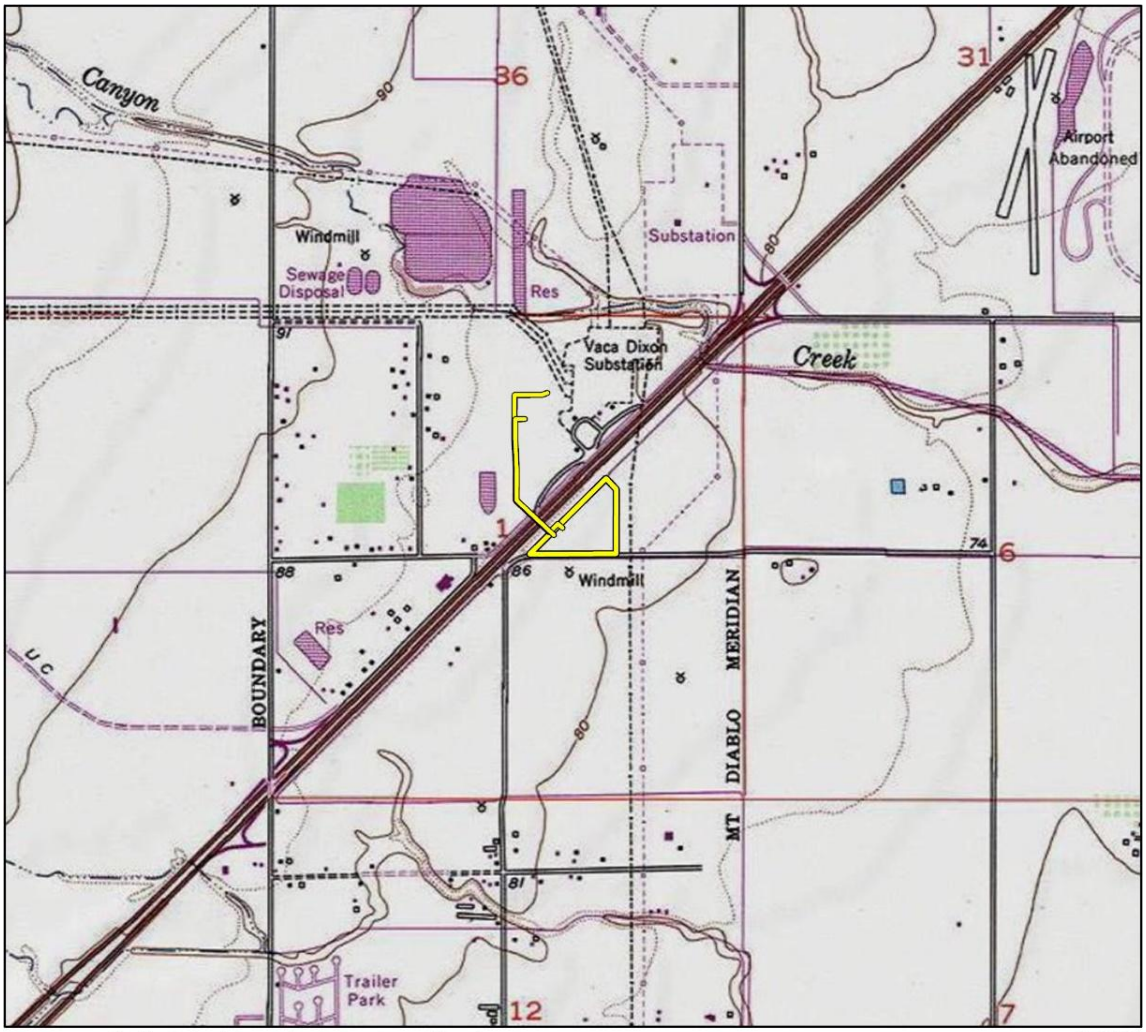
Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. *A Manual of California Vegetation*, Second Edition. California Native Plant Society, Sacramento, California.

Xerces Society for Invertebrate Conservation. 2024. California Bumble Bee Atlas Non-lethal Protocol: Point Surveys (Volunteer Handbook). Available at: https://www.cabumblebeeatlas.org/point-surveys.html

Attachment 1

Figures

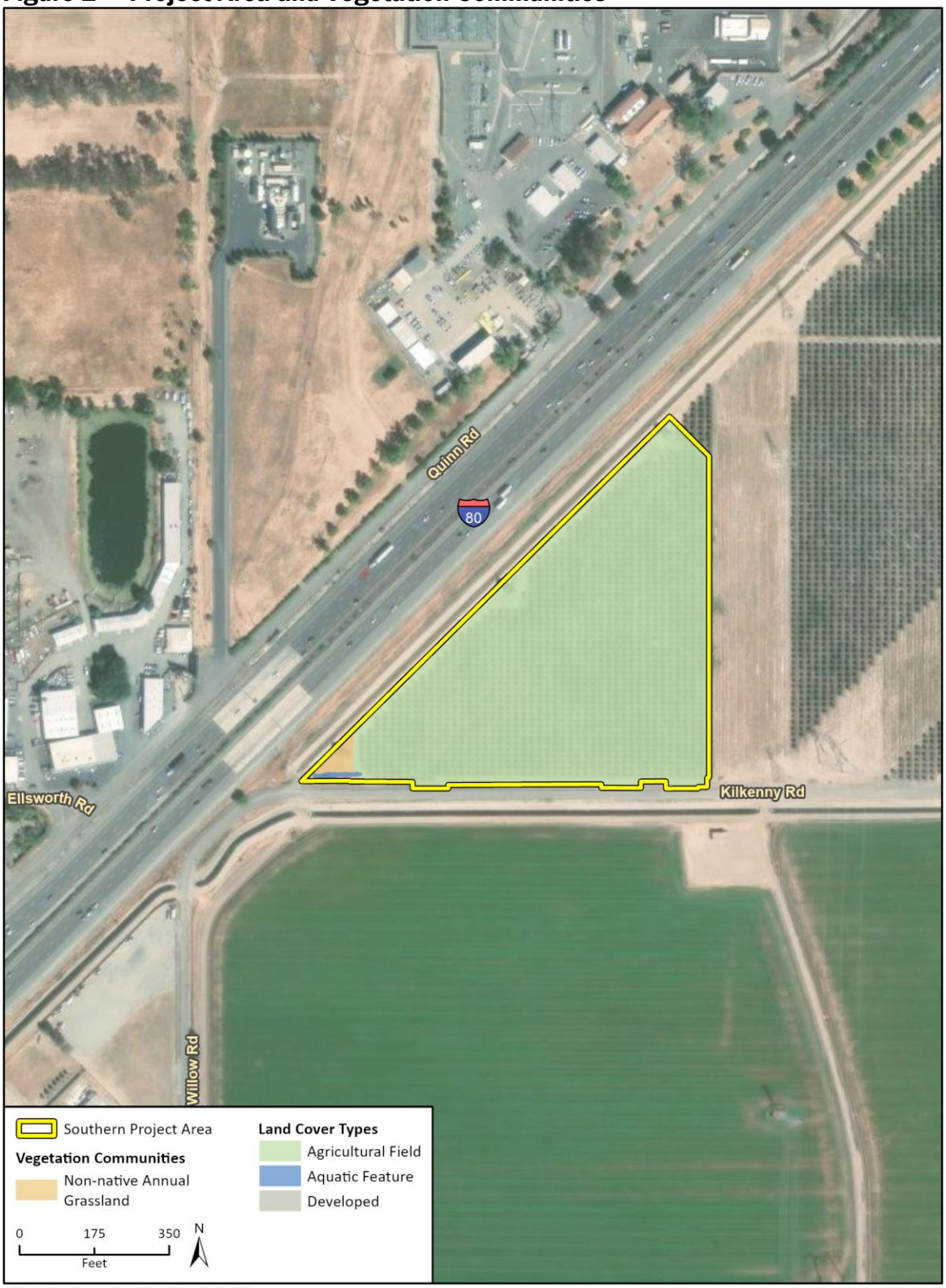
Figure 1 Project Location



Basemap provided by National Geographic Society, Esri and their licensors © 2025. Allendale Quadrangle. T06N R01W S01. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.

24-16186 CR
CRFig 1 Proj Locn Map - Site B

Figure 2 Project Area and Vegetation Communities



Imagery provided by Esri and its licensors © 2025.

25_17851 Bio
Fig X Vegetation Communities and Land Cover - Project Area

Attachment 2

Resumes

Stella Moore

Biologist

Ms. Moore works as a Biologist with Rincon's biological resources group. She holds an MOU to conduct protocol capture bumble bee surveys for CESA Candidate bumble bees. Ms. Moore has experience conducting Crotch's bumble bee (*Bombus crotchii*) protocol surveys, monarch butterfly surveys and counts, special status species surveys, reconnaissance surveys, construction monitoring, and reporting for environmental compliance. Ms. Moore has conducted approximately 45 bumble bee survey hours and captured or incidentally observed and identified a total of 238 individual bumble bees of 5 species during protocol-level photo-only bumble bee surveys and the CA Bumble Bee Atlas Project. Ms. Moore has captured or incidentally observed 44 *B. crotchii* (3 workers, 41 males) and 3 *B. caliginosus* (1 queen, 2 workers).

EDUCATION

BS, Molecular Environmental Biology, Minor in Science and Math Education, University of California, Berkeley

YEARS OF EXPERIENCE

3

EXPERIENCE

Rincon Consultants, Inc. (2023 to present)

Beissinger Lab at UC Berkeley (2022 to 2023)

Sespe Consulting, Inc. (2022)

CERTIFICATIONS AND PERMITS

CDFW Memorandum of Understanding (MOU) for CESA Candidate Bumble Bees
Authorization to capture and handle Crotch's bumble bee (*B. crotchii*) and western bumble bee (*B. occidentalis*). Executive Signatory and Principal Investigator.
Issued February 24, 2025.

SELECT PROJECT EXPERIENCE

2024 Bumble Bee Workshop – Wildlife Society/Xerces Society
Conducted point surveys and incidental observations for bumble bees during the training workshop under the Atlas Project CDFW Scientific Collecting Permit (SCP) and Memorandum of Understanding (MOU). Conducted 9 survey and incidental observation hours and captured or incidentally observed and photographed 110 individual bumble bees of 2 species, including *B. crotchii*, and *B. vosnesenskii*. Observed 9 *B. crotchii* males. July 2024.

San Simeon Training – Xerces California Bumble Bee Atlas Project
Conducted point surveys and incidental observations for bumble bees during the training under the Atlas Project CDFW SCP and MOU. Conducted 3 survey and incidental observation hours and captured or incidentally observed and photographed 50 individual bumble bees of 4 species, including *B. crotchii*, *B. melanopygus, B. caliginosus,* and *B. vosnesenskii*. Observed 2 *B. crotchii* workers, and 3 *B. caliginosus* (1 queen, 2 workers). July 2024.

Protocol Crotch's Surveys – Palmdale Ditch Project
Conducted photo-only Crotch's presence/absence surveys in accordance with the CDFW survey considerations for CESA Candidate bumble bees, and in accordance with the project survey plan approved by CDFW. Conducted 27 hours of protocol-level Crotch's bumble bee surveys and incidentally observed a total of 12 individual bumble bees. Observed 8 *B. crotchii* males, 3 *B. vosnesenskii* workers, and 1 *B. fervidus* worker. May through June 2024.

Bumble Bee Surveys – Xerces California Bumble Bee Atlas Project
Conducted point surveys and incidental observations for bumble bees under the Atlas Project CDFW SCP and MOU. Prepared data sheets and habitat assessments. Conducted 6 survey hours and captured or incidentally observed and photographed 66 individual bumble bees of 2 species, including *B. crotchii* and *B.* vosnesenskii. Captured 25 *B. crotchii* (24 males and 1 worker). April through July 2024.

BOMBUS SPECIES FIELD IDENTIFICATION EXPERIENCE

- Crotch's bumble bee (*B. crotchii*)
- Black-tailed bumble bee (*B. melanopygus*)
- Vosnesensky bumble bee (*B. vosnesenskii*)
- Obscure bumble bee (*B. caliginosus*)

SELECT TRAINING/COURSES

- The Bumble Bee Field Course. McLaughlin Reserve, Lake County, California. Xerces Society. July 19-21, 2024.
- California Bumble Bee Atlas In-Person Field Training on protocol bumble bee methods including capture, handling, vial transfer, cooling, photography, and identification. Xerces Society. San Simeon. June 23, 2024.
- In-person bumble bee MOU survey methodology training by Lead Surveyor, Amber Nichols. June 12, 2024.
- Training on bumble bee identification and photo-only survey methods with Lead Surveyor, Amber Nichols. May 2, 2024.
- California Bumble Bee Atlas Training Workshop (2024), Xerces Society, March 2024
- California Bumble Bee Atlas Training Workshop (2023), Xerces Society, March 2024
- Western Bumble Bee Identification for Bumble Bee Atlas Volunteers (2023), Xerces Society, March 2024

ADDITIONAL EXPERIENCE

Goleta City of Public Works – Ellwood MBHMP, Goleta
Conducted western monarch butterfly surveys with a team of Rincon Biologists in the Ellwood Mesa Open Space & Sperling Preserve during the overwintering season. Collectively, the team counted over 15,000 monarchs within the preserve.

Biologist, San Luis Obispo County – Camp SLO Emergency Sediment Debris Removal
Assisted with aquatic species relocation surveys in a tributary of Chorro Creek. Used dipnets, seine nets and aquarium nets to relocate aquatic species outside of the project area. Observed and handled 112 steelhead trout and 5 California red-legged frogs.

Biologist, Ventura County – Lower Santa Paula Creek Emergency Storm Protection, Santa Paula
Assisted with capturing and relocating fish during two fish diversions in Santa Paula Creek. She also performed monitoring with a Rincon Watershed Scientist during the installation of two different culverts. The species identified during the diversions included arroyo chub, Santa Ana sucker, three-spined stickleback, and fathead minnow.

Biologist, Kimley Horn – Bolthouse Wilsona, Los Angeles County
Ms. Moore assisted with many aspects of this project, starting with conducting a desktop review of online databases and literature. She assisted with a reconnaissance survey and a due diligence report. Then she coordinated a Swainson's Hawk Foraging Habitat Assessment with the Rincon team using GIS tools to map the suitable versus unsuitable foraging habitat within the project site and a 5-mile radius. She also helped perform a Burrowing Owl Habitat Assessment Survey and a Jurisdictional Delineation on-site. Lastly, she was the lead author for the Biological Resources Assessment.

Biologist, Blythe Mesa Solar, LLC. – Athos III Solar O&M, Blythe
Ms. Moore helped prepare a Worker Environmental Awareness Presentation for the Athos III Solar project. She also assisted in developing an Environmental Compliance Reporting and Notifications checklist that tracks the tasks for the Operations and Management phase of the project and the compliance verification form required for each task. She also assisted in the development and finalization of all of the regulatory plans for this project.

Southern California Gas Company – SCG, RGP-63, SL 41, 53, Desert Hot Springs
Ms. Moore drafted the Notice of Completion for the Regional General Permit (RGP) 63 for repair and protection activities in emergency situations. She also wrote the Project Completion Report for the project discussing the scope of the emergency pipeline repairs and all the permits involved.

EDUCATION

BA, Wildlife Management & Conservation, Humboldt State University

YEARS OF EXPERIENCE

17

EXPERIENCE

Rincon Consultants, Inc.
(2024 to present)

Kleinfelder
(2020 to 2024)

Garcia & Associates
(2019 to 2020)

UC NRS
(2021)

Dudek
(2013 to 2019)

US Geological Survey
(2007 - 2010)

US Forest Service
(2002 - 2007)

Lisa Achter

Senior Biologist

Ms. Achter works as a Senior Biologist with Rincon's biological resources group. She has experience conducting protocol-level bumble bee surveys, as well as extensive experience conducting habitat assessments, special status species surveys, protocol-level biological surveys, and preparing biological survey reports. Ms. Achter has conducted approximately 4 bumble bee survey hours and identified a total of 2 individual bumble bees of 1 species during protocol-level capture MOU surveys and incidental observations with the CA Bumble Bee Atlas Project.

SELECT ENTOMOLOGY PROJECT EXPERIENCE

Bumble Bee Surveys – Xerces California Bumble Bee Atlas Project
Conducted point surveys and incidental observations for bumble bees under the Atlas Project CDFW Scientific Collecting Permit and Memorandum of Understanding. Prepared data sheets and habitat assessments. Conducted 4 survey hours and captured or incidentally observed and photographed 2 individual bumble bees of 1 species, including *B.* vosnesenskii. June through July 2024.

SELECT TRAINING/COURSES

- In-person bumble bee MOU survey methodology training by Lead Surveyor, Amber Nichols. July 25, 2024.
- California Bumble Bee Atlas Training Workshop, Xerces Society, March 2024
- California Bumble Bee Atlas Training Workshop, Xerces Society, March 2022

BOMBUS SPECIES FIELD IDENTIFICATION EXPERIENCE

- Vosnesensky bumble bee (*B. vosnesenskii*)

ADDITIONAL EXPERIENCE

Biologist, Solano Community College District – Vacaville Center Campus Site Expansion, Vacaville, California
Conducted protocol-level burrowing owl nesting surveys.

Biologist, Grizzly Forebay Access Project, Plumas County, California
Conducted protocol-level California spotted owl surveys. Prepared survey reports.

Biologist, Altamont Landfill Resource Recovery Facility – Fill Area 2 Expansion Project, Livermore, California
Conducted preconstruction surveys for California red-legged frog, California tiger salamander, American badger, San Joaquin kit fox, and burrowing owl.

Biologist, Alameda Whipsnake and California Tiger Salamander Habitat Assessment, California
Conducted a habitat assessment for Alameda whipsnake and California tiger salamander.

Biologist, Giant Gartersnake Life History Studies, Dixon, California
Served as the lead biologist to perform radio telemetry studies for giant gartersnake movement tracking. Conducted capture and pit-tagging activities for giant gartersnake population assessments. Collected morphological and habitat data. Identified plant species within multiple study sites.

Biologist, San Francisco Gartersnake Life History Studies San Mateo County, California
Conducted trapping surveys for San Francisco gartersnake population assessments. Collected morphological and habitat data.

Biologist, Singh Property Conservation Easement, La Grange, California
Conducted a habitat assessment for California tiger salamander. Sampled breeding pools for presence of California tiger salamander larvae.

Biologist, Potrero Hills Landfill Expansion Project, Fairfield, California
Conducted trap checks, egg mass surveys, and larval sampling for California tiger salamanders. Conducted California tiger salamander measurements.

Biologist, Jenny Lind Wastewater Treatment Plant Pretreatment Upgrades Project, Valley Springs, California
Conducted a habitat assessment for California red-legged frog, Sierra Nevada yellow-legged frog, and western pond turtle. Conducted a preconstruction survey for nesting birds.

Biologist, Sacramento Regional Transit Blue Line Project, Sacramento County, California
Conducted preconstruction biological surveys for western pond turtle, giant gartersnake, and Swainson's hawk. Conducted burrowing owl nest monitoring, and passive burrowing owl relocation.

Biologist, City of Woodland – Recycled Water Project, Woodland, California
Conducted preconstruction nesting bird surveys.

Biologist, Blattner Energy – Alta Wind Project Phase 7/9, Tehachapi, California
Conducted preconstruction surveys for desert tortoise and nesting birds.

Biologist, Truckee Donner Recreation and Park District – Truckee Aquatics Center, Truckee, California
Conducted a habitat assessment and preconstruction survey for roosting bats and nesting birds.

Biologist, City of Auburn – Wastewater Treatment Plant Upgrade Project, Auburn, California
Conducted preconstruction nesting bird surveys.

Biologist, Placer County Coldstream Fish Relocation, Placer County, California
Conducted electrofishing for rainbow trout, brown trout, and Paiute sculpin. Conducted fish measurements and species identifications.

Biologist, Lower Blackwood Creek Habitat Restoration Project, South Lake Tahoe, California
Conducted preconstruction nesting bird surveys for yellow warbler and northern goshawk.

Biologist, Placer County Conservation Plan – Rare Species Assessment, Placer County, California
Conducted a habitat assessment for giant gartersnake and special status birds.

Biologist, Placer County Conservation Plan – Rare Species Assessment, Placer County, California
Conducted a habitat assessment for giant gartersnake and special status birds.

Biologist, Large Technological Development Project, Lima, Ohio
Conducted focused surveys for bald eagle and prepared a survey results memo.

Biologist, California Boulevard Roundabouts Project, Napa County
Conducted a biological constraints analysis and preconstruction nesting bird survey.

Biologist, Travis Air Force Base – Taxiway November and Ramp 400 Repair Project, Solano County, California
Served as the lead biologist and project manager. Ensured compliance with environmental documents and permits to avoid impacts to California tiger salamander, special-status plants and wetlands. Prepared and presented environmental awareness training to workers.

Isaac Kreger

Biologist

Mr. Kreger works as a Biologist with Rincon's biological resources group. He is participating in the 2024 CA Bumble Bee Atlas Project and has experience conducting protocol bumble bee surveys. He also has experience conducting habitat assessments, special status species wildlife and botanical surveys, as well as preparing biological reports. Mr. Kreger has conducted approximately 4 bumble bee survey hours and identified a total of 30 individual bumble bees of 2 species during protocol-level capture MOU surveys and incidental observations with the CA Bumble Bee Atlas Project.

EDUCATION

MPh, Forest and Ecosystem Science, University of Melbourne

BA, Environmental Studies, University of California, Santa Cruz

YEARS OF EXPERIENCE

8

EXPERIENCE

Rincon Consultants, Inc.
(2024 to present)

AECOM
(2022 to 2024)

Marin Municipal Water District
(2021 to 2022)

UC NRS
(2021)

University of Melbourne
(2019 to 2021)

Golden Gate National Parks Conservancy
(2017- 2018)

The Nature Conservancy
(2017)

SELECT PROJECT EXPERIENCE

Bumble Bee Surveys – Xerces California Bumble Bee Atlas Project
Conducted point surveys and incidental observations for bumble bees under the Atlas Project CDFW Scientific Collecting Permit and Memorandum of Understanding. Prepared data sheets and habitat assessments. Conducted 4 survey and incidental observation hours and captured or incidentally observed and photographed 30 individual bumble bees of 2 species, including *B. vosnesenskii* and *B. rufocinctus*. July 2024.

Tamalpais Bee Lab – One Tam, Golden Gate National Parks Conservancy
As a One Tam intern, Mr. Kreger assisted with leading community science events where volunteers mounted pollinator specimens. Distinguished and sorted specimens (bees, wasps, flies, and moths). Mr. Kreger also assisted with data collection, processing of pan traps and netting of bumblebees. This project is a collaboration with SFSU's, Dr. LeBuhn, to catalog taxonomic diversity in pollinators, particularly bees. 2017-2018.

SELECT TRAINING/COURSES

- California Bumble Bee Atlas Training Workshop, Xerces Society, March 2024

BOMBUS SPECIES FIELD IDENTIFICATION EXPERIENCE

- Yellow-faced bumble bee (*B. vonesenskii*)
- Red-belted bumble bee (*B. rufocinctus*)

ADDITIONAL EXPERIENCE

Biologist, Vernal Pool Branchiopod Survey, San Joaquin County, California
Conducted vernal pool branchiopod dip-netting surveys to assist the permitted vernal pool branchiopod biologist in special status species presence/absence surveys. Identified vernal pool fairy shrimp, vernal pool tadpole shrimp, and conservancy fairy shrimp.

Biologist, East Bay Municipal Utility District – Lafayette Reservoir Biological Resource Evaluation, Lafayette
Delineated sensitive natural communities to alliance level according to Manual of California Vegetation. Mapped priority invasive species for early detection rapid response. Prepared botanical reporting sections to document vegetation communities and land cover types.

Biologist, Longroad Energy Vegetation Management Plan, Merced County, California
Developed Vegetation Management Plan restoration planting palette and implementation methods to prevent invasive weed growth, to promote the establishment of native and desirable non-native vegetation, and to create and improve foraging habitat for special status wildlife species.

Biologist, Palmdale Ditch Relocation Project, Palmdale, California
Conducted protocol-level rare plant surveys to determine presence/absence of special status plants. Mapped vegetation communities and rare plant observations.

Biologist, Commercial Development Rare Plant Survey, Oakland, California
Conducted protocol-level rare plant surveys to determine presence/absence of special status plants. Led client site visit to discuss rare plant avoidance measures.

Biologist, Mid-Peninsula Open Space, Santa Clara County, California
Conducted protocol-level rare plant surveys to determine presence/absence of special status plants. Mapped vegetation for invasive species early detection rapid response. Prepared botanical survey report.

Biologist, East Bay Regional Parks District (EBRPD) – Pleasanton Ridge Tyler Ranch Trail Mitigation Project, Alameda County
Under a previous employer, Isaac provided restoration expertise for this project by documenting the effectiveness of EBRPDs compensatory mitigation along streams and swales in the upper Sinbad Creek watershed. Conducted field surveys to establish baseline conditions of restoration sites and report post-enhancement success criteria. Key aspects of this work included sampling vegetation cover of native, invasive and wetland plant species and erosion and hydrological features. prepared the post-construction and annual monitoring reports.

Biologist, Filoli Prescribed Fire Project, Santa Clara County
Worked directly with SFPUC to manage medusahead and goat grass within sensitive habitat for San Francisco gartersnake at Filoli historic grasslands. Developed sampling protocol and study design to measure effects of invasive grass treatments. The challenge of this project involved coordinating and conducting sampling within a small window of time to allow for grass identification and an opportune time for mowing and burning. Key aspects of this project included tracking phenology, mapping, and cover sampling of invasive grasses and pre-treatment surveys for nesting birds, rare plants, and butterfly host plants. Isaac delivered survey reports and data to the client.

Biologist, Santa Clara County – Sanborn Park Tree Inventory, Saratoga
Provided botanical expertise for a tree inventory within Sanborn County Park. Key aspects included documenting location and arrangement of trees and their demographic characteristics, tagging trees, and identifying ornamental and native tree species. Isaac identified Sudden Oak Death symptoms.

Biologist, California American Water – Monterey Pipeline Aquifer Storage and Recovery, Seaside
Conducted protocol level rare plant surveys and sensitive natural community mapping to association level according to Manual of California Vegetation. Visited reference populations to confirm identification and phenology of rare plants with potential to occur.

Biologist, East Bay Regional Parks District (EBRPD) – Fuels Reduction, Alameda County
Provided botanical expertise for EBRPD's fuels reduction project. Conducted pre- and post-assessment surveys and bio-monitoring support for fuel reduction activities. Key aspects of this project included mapping vegetation communities and assessing habitat for California red-legged frog and Alameda whipsnake. Surveys include the identification of sensitive plant species, including pallid manzanita (*Arctostaphylos pallida*), western leatherwood (*Dirca occidentalis*) and Oakland star tulip (*Calochortus umbellatus*).

Biologist, San Francisco Public Utilities Commission (SFPUC) – Bioregional Habitat Restoration, Alameda, and San Mateo Counties
Provided restoration expertise in support of SFPUC's Bioregional Habitat Restoration sites in multiple locations in support of annual mitigation performance goals. Key aspects included assessing mitigation requirements by performing a variety of vegetation monitoring projects, non-native invasive species management, sub-contractor oversight, cattle infrastructure management, and annual reporting.

Watershed Vegetation Aide, Marin Municipal Water District – Various Projects, Marin County
Conducted vegetation management and habitat restoration for Marin Municipal Water District's 22,000 acres watershed. Assisted in the design of 1000+ plant installation plan to enhance riparian corridors, supervised contractors and volunteers in invasive species removal, sourced and acquired restoration materials and mitigated the spread of Phytophthora and invasive seed. Monitored and collected seed for rare plants, Mt. Tamalpais lessingia (*L. micradenia var. micradenia*) and Tiburon buckwheat (*Eriogonum luteolum var. caninum)*, surveyed oak plantings for survivorship and collected and planted propagules for failed oak plantings, and created an annotated bibliography of resources related to the effects of prescribed fire on rare plant species.

Elizabeth Shoemaker

Biologist II

Elizabeth has helped support many different projects with biological monitoring, pre-construction surveys, nesting bird and special-status wildlife and plant surveys, and reporting. Elizabeth has helped prepare biological reports that include daily and monthly monitoring reports, a nesting bird management monitoring and reporting plan, and biological resources assessments. In addition, Elizabeth has experience conducting protocol-level Crotch's bumble bee surveys and identifying bumble bee species/casts and has experience performing bird nest and bat surveys. Ms. Shoemaker participated in the 2024 CA Bumble Bee Atlas Project.

EDUCATION

BS, Environmental Management and Protection, Minor in Political Science, California Polytechnic State University, San Luis Obispo

CERTIFICATIONS/ REGISTRATIONS

n/a

PERMITS

CDFW Bumble Bee MOU/SCP No. S-242420002-24249-001

YEARS OF EXPERIENCE

1

EXPERIENCE

Rincon Consultants, Inc. (2023 to present)

SELECT PROJECT EXPERIENCE

Crotch's Bumble Bee Surveys, Palmdale Water District – Palmdale Ditch Conversion Project, Palmdale

Ms. Shoemaker conducted Crotch's Bumble bee photo surveys along 7 miles of the Palmdale ditch. These surveys consisted of walking transects throughout the project area, recording floral resources, and bumble bee identification. She surveyed for and identified both Crotch's Bumble bee (*Bombus crotchii)* and Yellow-faced Bumble bees (*Bombus vosnenskii*). She observed 2 male and 6 worker *B. Crotchii.*

Crotch's Bumble Bee Surveys, Renewable Properties – RPCA 230th Street Solar Project, Lancaster

Ms. Shoemaker conducted Crotch's Bumble bee capture surveys across the approximately 33 acre project area. These surveys consisted of walking transects throughout the project area, recording floral resources, and bumble bee identification. She surveyed for Crotch's Bumble bee (*Bombus crotchii)* and captured/identified *B. Crotchii.* Three *B. Crotchii* workers were captured/observed within the project area.

Crotch's Bumble Bee Surveys, Tracy BESS LLC– Tracy Long Duration Energy Storage Project, San Joaquin County

Ms. Shoemaker conducted Crotch's Bumble bee capture surveys across the approximately 39.5 acre project area. These surveys consisted of walking transects throughout the project area, recording floral resources, and bumble bee identification. She captured and identified one male black-tailed bumble bee (*Bombus melanopygus*).

Crotch's Bumble Bee Surveys, City of San Luis Obispo – PCE Plume Characterization Project, San Luis Obispo

Ms. Shoemaker conducted Crotch's Bumble bee capture surveys across the approximately 15 acre project area. These surveys consisted of walking transects throughout the project area, recording floral resources, and bumble bee identification. She surveyed for Crotch's Bumble bee (*Bombus crotchii)* and captured/identified Yellow-faced Bumble bees (*Bombus vosnenskii*), California Bumble bee (*Bombus fervidus*), and Black-tailed Bumble bees (*Bombus melanopygus*). No *B. Crotchii* were captured or observed.

Bumble Bee Surveys – Xerces California Bumble Bee Atlas Project

Ms. Shoemaker conducted field point surveys and incidental observations for bumble bees under the Atlas Project CDFW Scientific Collecting Permit and Memorandum of Understanding. She conducted 2 survey hours incidentally observed various bumble bee species in April 2024.

Bumble Bee Surveys, City of Santa Barbara– Parma Park Restoration Ares, Santa Barbara

Ms. Shoemaker surveyed for bumble bees and nesting birds before weed whipping activities at a restoration site in Santa Barbara. No bumblebees were observed.

SELECT TRAINING/COURSES

- California Bumble Bee Atlas Training Workshop, Xerces Society, March 2024
- Male Bumblebee Identification along the Pacific Coast of North America, Xerces Society, April 2024
- Western Bumble Bee Identification for Bumble Bee Atlas Volunteers, Xerces Society, April 2024
- 2024 Bumble Bee Workshop, Xerces Society and the Western Section of the Wildlife Society, July 2024

ADDITIONAL PROJECT EXPERIENCE

Biologist, City of Goleta – Goleta City of Public Works Ellwood MBHMP, Goleta
Ms. Shoemaker helped survey the Ellwood area for the Monarch Butterfly Habitat Management Program (MBHMP). These surveys consisted of collecting data on the environmental conditions, tree/cluster location, and the number of butterflies observed in the Ellwood survey areas. In addition, Ms. Shoemaker drafted the annual monarch survey report for the 2023-24 overwintering season. This report summarized the data collected on the Ellwood monarch butterflies in the 2023-24 overwintering season and reflected on trends in monarch counts in past seasons.

Biological Monitor, Santa Barbara Flood Control – Santa Barbara County Beach Operations, Goleta
Ms. Shoemaker monitored beach operations for Goleta Beach. These beach operations consisted of Santa Barbara County bringing sediment loads from the Goleta Slough and depositing it on Goleta Beach for beach enhancement and flood control. Monitoring activities included taking VOC readings from sediment loads deposited on the beach, visually inspecting sediment loads for beach compatible material, compiling a list of species observed each day, and drafting an end of day summary of beach activities.

Biologist, Santa Barbara Public Works – East Beach Restoration Project, Santa Barbara
Ms. Shoemaker helped monitor the restoration efforts for the East Beach Restoration Project. These efforts included flagging in the restoration areas, seed sorting, and plant identification. Additionally, Ms. Shoemaker assisted with drafting a monthly monitoring report that outlined restoration efforts conducted in the month of March.