



San Bernardino Valley Water Conservation District

Helping Nature Store Our Water

ENVIRONMENTAL WORKSHOP AGENDA

Wednesday, November 20, 2024 – 12:00 p.m.

Anyone wishing to listen to or participate in the meeting can join via Teams:

Call in (661) 505-9833, 827179310#, Meeting ID: 242 605 602 688 Passcode: JK7nZY

To join the Teams Meeting on <https://teams.microsoft.com/l/meetup-join>

While the District makes every attempt to follow all guidance re COVID-19 safety protocols, the District cannot assure in-person attendees that they will not be exposed to COVID-19 or persons who have been so exposed, and attendees are advised to exercise caution in limiting their own incidences of exposure, particularly those who may be in groups at higher risk of infection, or serious symptoms of COVID-19 if infected.

Note: Copies of staff reports and other documents relating to the items on this agenda are on file at the District office and are available for public review during normal District business hours. New information relating to agenda topics listed, received, or generated by the District after the posting of this agenda, but before the meeting, will be made available upon request at the District office and in the Agenda Package on the District's website. It is the intention of the San Bernardino Valley Water Conservation District to comply with the Americans with Disabilities Act (ADA) in all respects. If you need special assistance with respect to the agenda or other written materials forwarded to the members of the Board for consideration at the public meeting, or if as an attendee or a participant at this meeting you will need special assistance, the District will attempt to accommodate you in every reasonable manner. Please contact Allison Zecher at (909) 793-2503 at least 48 hours prior to the meeting to inform her of your particular needs and to determine if accommodation is feasible. Please advise us at that time if you will need accommodations to attend or participate in meetings on a regular basis.

CALL TO ORDER

1. PUBLIC PARTICIPATION

Members of the public may address the Board of Directors on any item that is within the jurisdiction of the Board; however, no action may be taken on any item not appearing on the agenda unless the action is otherwise authorized by Subdivision (b) Section 54954.2 of the Government Code.

2. ADDITIONS/DELETIONS TO AGENDA

Section 54954.2 provides that a legislative body may take action on items of business not appearing on the posted agenda under the following conditions: (1) an emergency situation exists, as defined in Section 54956.5; (2) a need to take immediate action and the need for action came to the attention of the District subsequent to the agenda being posted; and (3) the item was posted for a prior meeting occurring not more than five calendar days prior to the date action is taken on the item, and at the prior meeting the item was continued to the meeting at which action is being taken.

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BOARD OF DIRECTORS

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Division 2:
Hillary Jenkins

Division 3:
Robert Stewart

Division 4:
John Longville

Division 5:
Melody McDonald

GENERAL MANAGER

Betsy Miller

3. **DISCUSSION ITEMS**

A. WASH PLAN 2024 ANNUAL REPORT (M#2073).....3

Presenter: Milan Mitrovich

Recommendations: Review, discuss in a workshop format, and file the Upper Santa Ana River Wash Habitat Conservation Plan Annual Report for 2024 and the Primer on Slender-horned Spineflower (*Dodecahema leptoceras*) Restoration in the Upper SAR Wash.

4. **ADJOURN MEETING**



San Bernardino Valley Water Conservation District

Helping Nature Store Our Water

Memorandum No. 2073

To: Board of Directors

From: Milan Mitrovich, Land Resources Manager

Date: November 20, 2024

Subject: Environmental Workshop

BACKGROUND

On November 1, staff submitted the Upper Santa Ana River Wash Habitat Conservation Plan (Wash Plan) Annual Report 2024 to the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife in compliance with the requirements of the Wash Plan. In addition, staff has prepared a Primer on Slender-horned Spineflower Restoration to support the planned meeting of the Spineflower Working Group as required by the Wash Plan. As we close the fourth year of Wash Plan implementation, staff seeks to provide details on the significant work accomplished to date, including monitoring and management of the San Bernardino kangaroo rat, slender-horned spineflower, and California gnatcatcher within the Wash Plan Preserve. We look forward to a discussion of these topics based on Board interest at the upcoming workshop.

While the attachments are provided to inform the discussion, please note that there is no need to review them in full in advance of the meeting as the details will be covered in the workshop and a Board action is not required per the Wash Plan. During the workshop, staff will provide an overview of and the results of work completed to date as well as be available to answer questions related to details of the specific projects and the ecology of the alluvial fan and its threatened and endangered species.

ATTACHMENTS

Wash Plan Annual Report 2024

Primer on Slender-horned Spineflower (*Dodecahema leptoceras*) Restoration in the Upper Santa Ana River Wash

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**San Bernardino Valley
Water Conservation District**
Helping Nature Store Our Water

Upper Santa Ana River Wash Habitat Conservation Plan

ANNUAL REPORT 2024

Draft Submitted: November 1, 2024

Prepared by:
San Bernardino Valley Water Conservation District
1630 West Redlands Blvd., Suite A
Redlands, California 92373



www.sbvwd.org

Acknowledgements

The Conservation District would like to thank the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife, Participating Entities, Bureau of Land Management, and other important partners for their respective contributions towards seeing the Wash Plan successfully implemented since its adoption in 2020.

This Year's Cover Photo

One of two principal locations for out-planting of slender-horned spineflower (SHSF) in the Wash Plan Preserve. The photo was taken in February 2024 and overlooks the out-planting blocks at the Cone Camp site located just southwest of the Borrow Pit off Greenspot Road.

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Acronyms and Abbreviations

AMMP	Adaptive Management and Monitoring Program
BO	Biological Opinion
BMPs	Best Management Practices
BLM	U.S. Bureau of Land Management
CAGN	California gnatcatcher
CalBG	California Botanic Garden
CESA	California Endangered Species Act
CEMEX	Construction Materials Pacific, LLC
CDFW	California Department of Fish and Wildlife
Conservation District or District	San Bernardino Valley Water Conservation District
COI	Certificate of Inclusion
County	County of San Bernardino
CRAM	California Rapid Assessment Method
East Valley	East Valley Water District
FESA	Federal Endangered Species Act
HCP	Habitat Conservation Plan
Highland	City of Highland
HMMP	Habitat Maintenance and Monitoring Plan
IA	Implementing Agreement
IERCD	Inland Empire Resource Conservation District
ITP	Incidental Take Permit
MCV	Manual of California Vegetation
MSHCP	Western Riverside Multiple Species Habitat Conservation Plan
NPS	National Park Service
O&M	operations and maintenance
PAO	Percent Area Occupied
PMC	Preserve Management Committee
RAFSS	Riversidean Alluvial Fan Sage Scrub
Redlands	City of Redlands
RUD	Redlands Municipal Utility District
Robertson's	Robertson's Ready-Mix Ltd.
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SARWQCD	Santa Ana Regional Water Quality Control Board
SBCFCD or Flood Control	San Bernardino County Flood Control District
SBVCT	San Bernardino Valley Conservation Trust
SBVMWD	San Bernardino Valley Municipal Water District
SBVWCD	San Bernardino Valley Water Conservation District
SBKR	San Bernardino kangaroo rat
SHA	California Endangered Species Safe Harbor Agreement
SHSF	Slender-horned Spineflower
Trust	San Bernardino Valley Conservation Trust
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Wash Plan or HCP	Upper Santa Ana River Wash Habitat Conservation Plan

Introduction

The primary goal of the Upper Santa Ana River Wash Habitat Conservation Plan (Wash Plan or HCP) is to balance ground-disturbing activities of water conservation, aggregate mining, recreational activities, and other public services in the Plan Area (Plan Area) with the conservation of natural communities and populations of special-status plant and animal species.

Purpose of the Annual Report

The Annual Report highlights the accomplishments of the Conservation District and Participating Entities in executing the agreed upon terms and conditions of the Wash Plan.

Document Organization

This document is organized as follows:

SECTION 1: GENERAL INFORMATION

- **Background Information** – This section serves to quickly orient the reader to the general purpose of the Wash Plan and the specific program goals and objectives. A general map of the Plan Area is included.
- **Overview – Wash Plan Annual Report** – *This section provides the reader with a quick overview of the Annual Report and provides links to the required sections of the report as described in the Wash Plan.*
- **Governance and Implementation Structure** – *This section identifies the recognized Participating Entities and discusses their specific roles and responsibilities and the formation of the Task Force. Also discussed in this section is the Preserve Management Committee and HCP Implementation Team.*

SECTION 2: PHASING OF THE WASH PLAN

Section 2 discusses the phasing of the HCP and related phasing of conservation and impacts from Covered Activities. The section addresses the responsibilities of the Conservation District and Flood Control to provide an annual accounting of the acreage, type, and location of vegetation communities and species habitat conserved and impacted by permitted land uses and other Covered Activities within their respective portions of the Plan Area.

- **HCP Phasing and Stay-ahead Process** – *Through this section the reader is provided with information, captured at a high-level, tracking impacts and conservation within each phase of the HCP to ensure conservation actions stay ahead of Covered Activity implementation.*
- **Conservation Phasing** – *This section describes instances where appropriate assurances of long-term conservation have been provided by the respective public agency within the appropriate phase of plan implementation (and before any impacts on Covered Species are allowed by Covered Activities), either through conservation easements or other agreement acceptable to the Wildlife Agencies.*
- **“Jump Start” Funding** – *This section documents the activities implemented by the Wash Plan Task Force tied to providing 250 acres of early conservation, including 200 acres that will become actively managed within the first seven years (Phase 1).*

SECTION 3: COVERED ACTIVITIES

Section 3 details the progress of all activities in the Plan Area carried out by the Permittee and Participating Entities covered by the authorizations for incidental take. Covered activities include projects and the operations and maintenance (O&M). Projects are well-defined actions that occur once in a discrete location (e.g., aggregate mining, construction of new facilities, infrastructure development, capital improvement projects). O&M activities are actions that occur repeatedly in one area or over a wide area (e.g., bank stabilization, storm-damage repair, maintenance of roads and facilities).

- **Certificate of Inclusion** – *This section addresses the need to document (and archive) cases where the incidental take authorization granted to the Permittee has been extended to a member of the Task Force for the purpose of carrying out a Covered Activity. The Permittee’s decision to*

issue a Certificate of Inclusion to a Participating Entity shall be captured together with required documentation from the USFWS noting the project is a Covered Activity and has complied with the requirements of the HCP.

- **Status and Progress of Activities** – *Both types of Covered Activities, those associated with new or expanded facilities planned in the Plan Area, and those activities related to the O&M of existing facilities or associated with new facilities constructed as a Covered Activity are listed and their progress noted in this section.*

SECTION 4: LAND STEWARDSHIP

Section 4 discusses the principal threats and stressors impacting, or with the potential to impact, the Wash Plan Preserve and the general stewardship activities designed to address individual and collective threats.

- **General Stewardship Monitoring** – *This section provides information tied to the general stewardship monitoring activities implemented during the reporting period supporting management of the Wash Plan Preserve. Such activities allow for identification of general management issues and documentation of whether management actions are being carried out as planned.*
- **Preserve Management** – *This section identifies the Best Management Practices (BMPs) implemented during the reporting period consistent with Section 5.5 of the Wash Plan. Management actions that fall into this category may include stewardship activities such as trash and debris removal, runoff control, fencing and signage installation and repair, routine (minor) weed control, illegal access and encroachment violations, seasonal restrictions and trail closures, trail maintenance, vandalism repair, erosion control, fuel modification, public outreach and education, and enforcement of Preserve regulations.*

SECTION 5: CONSERVATION PROJECTS

This section reports on the progress of monitoring, management, and restoration projects undertaken by the Conservation District and Participating Entities in support of biological goals and objectives identified in the HCP.

- **Monitoring Projects** – *This section presents monitoring activities employed during the reporting period designed to help the Preserve Manager acquire the appropriate data to ensure goals and objectives of the Wash Plan and the Preserve are met, determine if Preserve management strategies are having the desired effect, and evaluate if underlying biological assumptions are supported by field-collected data.*
- **Management Projects** – *Management activities described and addressed in this section support the conservation and protection of Covered Species. Management actions are those actions taken to improve and maintain the suitability of the habitat for a Covered Species by restoring or enhancing the habitat, or by reducing, removing, or preventing threats that may degrade the habitat (e.g., invasive plant infestations or trespass).*
- **Restoration Projects** – *This section highlights activities specific to the long-term management and monitoring of restoration and enhancement projects expected to be many years in duration.*

SECTION 6: ADMINISTRATIVE UPDATES

- **Data Entry and Storage** – *This section highlights details concerning the geospatial database maintained by the Conservation District in support of implementation of the Wash Plan. Lists of available digital copies of monitoring data, including metadata, spatial data, and photo-documentation of project progression will be included.*
- **Administrative Corrections** – *This section makes notice of any needed administrative corrections to the Wash Plan in the period of reporting.*
- **Amendments to the HCP** – *This section makes notice of any amendments made to the HCP, providing a list of all amendments throughout the life of the Wash Plan.*

APPENDICES

- **Appendix A: Wash Plan Programmatic Permits** – *The included appendix identifies and reports on the status and provide updates on the progress tied to meeting the obligations associated with the regulatory permits required of Covered Activities approved under the Wash Plan. Such permits are to include the Regional Water Quality Control Board (RWQCB) Programmatic 401 Certification; USACE 404 Programmatic Individual Agreement; CDFW 2081 ITP; CDFW Streambed Alteration Agreement (SAA) Construction Agreement; and CDFW – SAA Maintenance Agreement for Conservation District Activities.*
- **Appendix B: Project Records Management** – *The appendix provides description of the type of information found in the Project Management Table and Project Narrative Template accompanying the individual write-ups of monitoring and management projects highlighted in the Wash Plan Annual Report.*

Distribution and Updates

This document will be posted on <https://www.sbvxcd.org/santa-ana-Wash-plan>. If revisions are required, the update will be noted in a revision log included in the new version and the updated document posted on <https://www.sbvxcd.org/santa-ana-Wash-plan>.

1 GENERAL INFORMATION

- Background
- About the Annual Report
- Governance and Implementation Structure

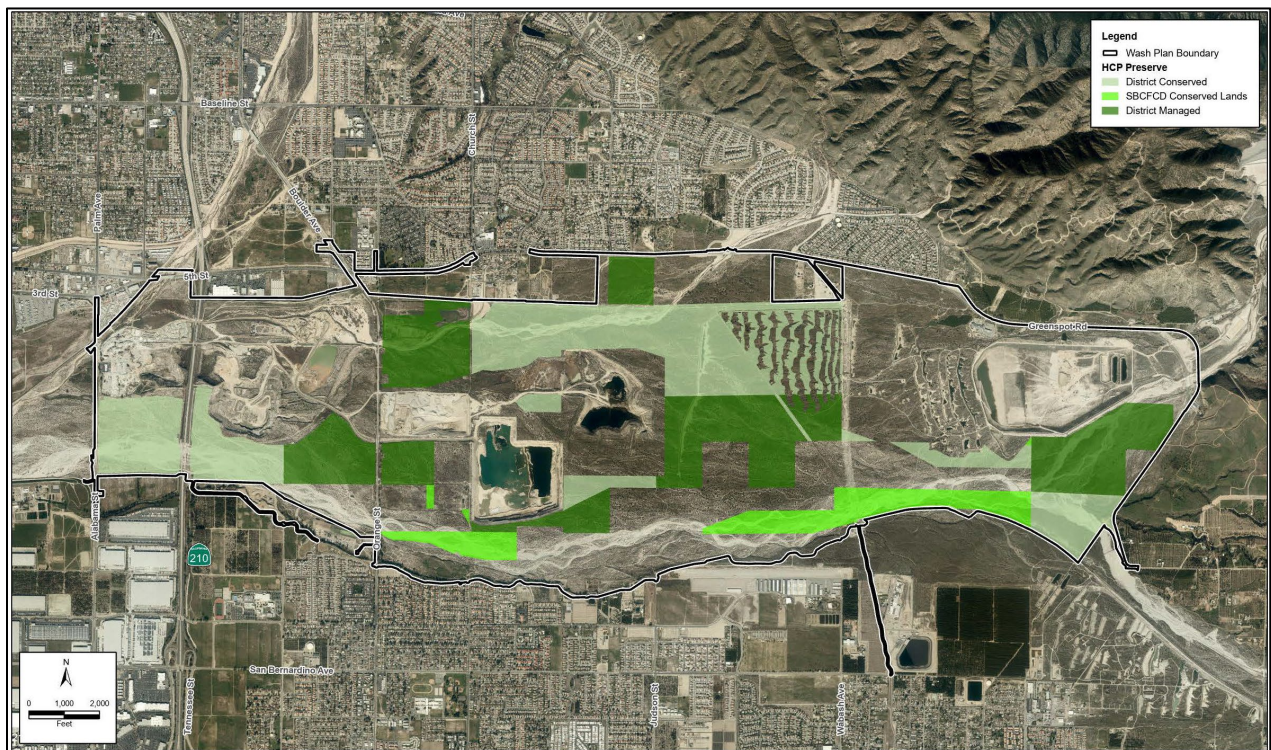
Background

Approval of the Upper Santa Ana River Wash Habitat Conservation Plan by the U.S. Fish and Wildlife Service (USFWS) was accompanied by an Incidental Take Permit (ITP) issued to the San Bernardino Valley Water Conservation District (Conservation District or District) on July 13, 2020.

Consistent with the ITP, the USFWS authorized incidental take under Section 10 of the Federal Endangered Species Act (FESA) for the California gnatcatcher (CAGN; *Polioptila californica californica*) and San Bernardino kangaroo rat (SBKR) (*Dipodomys merriami parvus*), and coverage for the Cactus wren (*Campylorhynchus brunneicapillus*). Through the ITP, the Conservation District also receives coverage of the Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*, woolly-star) and slender-horned spineflower (SHSF; *Dodecahema leptoceras*, spineflower). The San Bernardino kangaroo rat, woolly-star, and spineflower are also state-listed species and the District is seeking state authorization (Section 2081 permit under the California Endangered Species Act [CESA]) for incidental take of these species from the California Department of Fish and Wildlife (CDFW).

The Wash Plan includes avoidance, minimization, and mitigation measures for each of the Covered Species and through successful implementation provides for the conservation of the Covered Species and their habitat within the Plan Area as mitigation for the effects of Covered Activities.

Figure 1. Wash Plan Boundary and 1,659-acre HCP Preserve



About the Annual Report

This Annual Report, required by the Wash Plan (see Section 6.2.2 of the HCP), provides annual updates to the Wildlife Agencies, Participating Entities, and other stakeholders, including the public, regarding what monitoring and management actions occurred during the prior fiscal year (which, for the District, runs from July 1 through June 30) in support of implementation of the HCP, highlighting where and when activities occurred and conveying results, when available.

The Annual Report also functions as a reporting mechanism to ensure the Conservation District and Participating Entities are in compliance with requirements detailed in the Wash Plan. In addition to identifying the management activities undertaken in the last year, the report will document and analyze monitoring results, linking the results to specific goals and objectives identified in the HCP.

Consistent with the HCP, the Annual Report is to be prepared and submitted to USFWS and CDFW before November 1 of each year to demonstrate annual compliance with the terms and conditions of the HCP, ITPs (noting San Bernardino County Flood Control District sought and was provided an independent ITP), Implementing Agreements and to determine if the goals and objectives of the HCP are being met. At a minimum, the Annual Report is to include the following:

- A report on HCP Phasing and status of the stay-ahead provision including an accounting of the total impact and mitigation acreage and report on land and funding offsets implemented for Covered Activities (see [HCP Phasing and Stay-ahead Process](#))
- Status and progress of approved Covered Activities, including a tally of the habitat impacts from Covered Activities occurring in the prior year, and a list of the Covered Activities completed and amount of associated ground disturbance (see [Covered Activities](#))
- Certificate of Inclusion Avoidance and Minimization Measures Compliance (see [Certificate of Inclusion](#))
- O&M activities implemented in the prior year (see [Operations and Maintenance \(O&M\)](#))
- General stewardship monitoring and preserve management activities (see [Land Stewardship](#))
- Results of adaptive monitoring and management activities tied to supporting the conservation and protection of Covered Species (see [Conservation Projects](#))
- Habitat restoration and enhancement activities implemented in support of the biological goals and objectives of the HCP (see [Restoration Projects](#))
- Progress made in meeting biological goals and objectives of the HCP (see [Progress Made in Meeting Biological Goals and Objectives](#))
- An accounting of expenditures and available funds for HCP implementation (see [Total Expenditures Tied to Project Implementation](#))
- An annual work plan for the upcoming year (see [Annual Work Plan](#))
- Problems or issues identified during implementation and the steps taken or recommended to address them (see [Problems or Issues Identified During Implementation](#))
- Any instances of non-compliance with the terms of either ITP (see [Instances of Non-Compliance](#))

Governance and Implementation Structure

Implementation of the HCP began with execution of the Conservation District's Implementing Agreement (IA) and issuance of the Conservation District's ITP. Primary responsibility for HCP implementation rests with the Conservation District and updates concerning Wash Plan implementation are provided to members of the Conservation District's Board of Directors on a regular basis.

Conservation District Board FY24 Updates:

Updates in FY24 tied to implementation of the HCP were provided to members of the Conservation District Board on the following dates:

- July 12, 2023
- August 9, 2023
- September 13, 2023
- October 11, 2023
- November 8, 2023
- December 13, 2023
- January 10, 2024
- February 14, 2024
- March 13, 2024
- April 10, 2024
- May 15, 2024
- June 12, 2024

In addition to the Conservation District, several other entities participate in the implementation of the HCP through a Certificate of Inclusion (COI) to receive coverage for their planned projects. Recognized as Participating Entities, these entities include the City of Redlands (Redlands), City of Highland (Highland), San Bernardino Valley Municipal Water District (SBVMWD), East Valley Water District (East Valley), Construction Materials Pacific, LLC (CEMEX), and Robertson's Ready-Mix, Ltd. (Robertson's). The San Bernardino County Flood Control District (SBCFCD or Flood Control) has been issued an independent Implementing Agreement (IA) and ITP under the HCP.

Wash Plan Task Force

A task force (Task Force), made up primarily by the Conservation District together with Participating Entities, was formed to create a framework for joint funding and planning for the entities that would participate in the development of land and habitat management plans, including the Wash Plan HCP. The members of the Task Force include Permittee (Conservation District), the United States Department of the Interior Bureau of Land Management (BLM), the County of San Bernardino (County), Highland, Redlands, Redlands Municipal Utility District (RUD), East Valley, SBCFCD, SBVMWD, CEMEX and Robertson's. The eight public agencies and two private entities that make up the Task Force are the parties that signed the Agreement to Form the Upper Santa Ana River Wash Land Management and Habitat Conservation Plan Task Force, dated November 20, 2002, and the Memorandum of Understanding to Implement the Habitat Conservation Plan for the Upper Santa Ana River Wash Plan and Associated Implementing Agreement.

The Task Force also has advisory participation by: USFWS, CDFW, and BLM. The Permittee is the project manager and provides staff support for the Task Force.

The cost of plan implementation is shared by the Permittees (Conservation District and Flood Control) and the Participating Entities, based on a cost-sharing allocation approved by the Task Force. Through

the duration of plan implementation, ongoing costs of the program will be funded directly by the Participating Entities or through income generated by the non-wasting Wash Plan Endowment. The primary purpose of the Wash Plan Endowment is to fund the cost of needed management, monitoring, and administrative activities in perpetuity. Consistent with the Wash Plan (Section 7.1.1), the estimated size of the endowment to fund the ongoing management and monitoring of the HCP Preserve lands is \$11.4 million (in 2016 dollars) with annual returns on endowment fund balances assumed to equal 4%. Nearly all the 1,659.1 acres conserved and managed in the Plan Area are in public ownership, and all the land is owned by members of the Task Force.

Wash Plan Task Force FY24 Updates:

Following approval of the Wash Plan by USFWS in July 2020, through the close of fiscal year 2024, the Wash Plan Task Force has met on the following dates to discuss progress and financial commitments tied to HCP implementation and the awarding of related programmatic permits required of the Clean Water Act, Porter-Cologne Water Quality Control Act, and State Endangered Species Act:

- December 08, 2020
- March 24, 2021
- December 15, 2022

At the last meeting on December 15, 2022, a progress report on the remaining Wash Plan permits was provided by District staff, and the contract amendment allowing AECOM to continue to provide technical consultant services in support of obtaining remaining state and federal permits was approved by all prominent members of the Task Force who were in attendance. Through the close of fiscal year 2024, the contract amendment with AECOM was still in effect.

Preserve Management Committee

Consistent with the Wash Plan (Section 5.2.2), the Preserve Management Committee (PMC), which, at a minimum, includes a representative of the Conservation District, Flood Control (in accordance with its ITP), and one representative each from the USFWS, CDFW, BLM, and Santa Ana River WSPA Management Committee, is to provide technical advice, recommendations, and feedback to the Conservation District's Preserve Manager on activities undertaken in support of implementation of the Wash Plan consistent with the Natural Resource Management Plan, including recommendations for approval of the annual management and monitoring budget and report.

The Preserve Manager is responsible for overseeing development and implementation of the management programs for the HCP Preserve, preparation of annual reports, consultation with the USFWS and CDFW as needed, preparation of annual work programs and the completion of implementation actions in fulfillment of HCP commitments. The Preserve Manager is to oversee all consultant work performed to implement the HCP programs and review all Covered Activities prior to ground-breaking by the Participating Entities to ensure consistency with the HCP and authorized level of take.

Preserve Management Committee FY24 Updates:

The inaugural meeting of the PMC was held on October 13, 2022. Representatives from the USFWS, CDFW, BLM, San Bernardino County Flood Control District, Orange County Flood Control District and San Bernardino Valley Municipal Water District participated. At the meeting, District staff highlighted the roles and responsibilities of committee members and accomplishments occurring over the last fiscal year with regards to implementation of the Wash Plan. The current work plan for the Wash Plan Preserve and major initiatives to be implemented over the next several years were also discussed.

The second meeting of the PMC occurred on November 2, 2023. The principal agenda items included discussion of accomplishments occurring in FY23 with regards to implementation of the Wash Plan as well as presentation of the 2023 Annual Report, Wash Plan Natural Resource Management Plan, and envisioned next steps in the adaptive management and monitoring program for the Wash Plan Preserve.

On January 25, 2024, a working session between the USGS and members of the PMC and invited guests was held to discuss the ongoing analyses performed with the data collected over the first two years of the San Bernardino kangaroo rat monitoring program and implications of the results for management and monitoring of the species within the Wash Plan Preserve. On June 10, 2024, the PMC met to discuss early results of the winter/spring monitoring and management activities and key elements to be funded in FY25 tied to implementation of the Wash Plan.

Wash Plan Implementation Team

In support of activities of the PMC, the Wash Plan recognizes the value of creating an HCP Implementation Team that is to include representatives from the USFWS, CDFW, the Conservation District, and other species and habitat experts as needed. The Implementation Team is to support development of an effective annual work plan based on the guidelines in the Natural Resource Management Plan, prioritizing management and monitoring activities for each year, with focus on habitat management efforts leading to expansion of existing high-quality habitat within the Wash Plan Preserve as well as the protection and establishment of new areas occupied by Covered Species and viable corridors to enhance connectivity between core habitat areas.

The successful implementation of the conservation strategy, monitoring program, Covered Activities, and reporting that are part of the HCP require coordinated actions between the Permittees and the Wildlife Agencies. USFWS, CDFW, and BLM are to provide technical assistance to the HCP Implementation Team and Preserve Management Committee and participate in meeting discussions and program review.

Wash Plan Implementation Team FY24 Updates:

As lead Permittee and entity responsible for coordinating implementation of the Wash Plan HCP, the Conservation District is the administrator for HCP implementation. Throughout FY24, the Conservation District and USFWS met regularly on the following dates:

- July 18, 2023
- August 15, 2023
- September 19, 2023
- October 17, 2023
- November 21, 2023
- December 15, 2023
- January 16, 2024
- February 20, 2024
- March 19, 2024
- April 16, 2024
- May 21, 2024
- June 18, 2024

Regular coordination meetings between the USFWS and Conservation District are expected to continue through FY25 and beyond.

Coordination with San Bernardino Valley Municipal Water District

From completion of the Wash Plan in 2020 through the writing of this report, regular, informal meetings tied to HCP implementation have occurred between the Conservation District and SBVMWD. Topics addressed during the meetings typically focus on issues tied to the management and monitoring of Covered Species and coordination on Covered Activities involving both districts.

2 PHASING OF THE WASH PLAN

- HCP Phasing and Stay-ahead Process
- Conservation Phasing
- “Jump Start” Funding

Phasing of the Wash Plan

Implementation of the Wash Plan was initiated when the Section 10(a)(1)(B) ITP was issued in July 2020. Over the course of the 30-year plan period, the HCP is designed to be implemented in two phases. Details tied to the phasing of conservation and impacts from Covered Activities are highlighted in the table below taken from the HCP.

Phase	HCP Preserve	Conservation	Impacts of Covered Activities
Phase 1 (pre-BLM land exchange)	Total Phase 1 Conservation 1,170.7 acres	Land dedication of all HCP Preserve areas identified as District Conserved Lands that are not part of the BLM land exchange	Mining identified for Phase 1 is 201.3 acres
	District Conserved 482.8 acres	Management and monitoring of all District Conserved Lands that are not part of the BLM land exchange	Construction related to all non-mining Covered Activities
	SBCFCD Conserved 185.8 acres	Management and monitoring of all District Managed Lands that are not part of the BLM land exchange	Ongoing operations and maintenance
	District Managed 502.2 acres	Management and monitoring of all District Managed Lands that are not part of the BLM land exchange	
Phase 2 (post-BLM land exchange)	Total Phase 2 Conservation 488.4 acres	Completion of BLM land exchange	Mining identified for Phase 2 is 200.2 acres
	District Conserved 294.8 acres	Dedication of all HCP Preserve lands obtained by the Conservation District in the BLM land exchange	Ongoing operations and maintenance
	District Managed 193.6 acres	- Management of all District Managed Lands and District Conserved Lands which were part of the BLM land exchange - Ongoing management and monitoring of the whole HCP Preserve	

HCP Phasing and Stay-ahead Process

Tracking impacts and conservation within each phase of the HCP to ensure conservation actions stay ahead of Covered Activity implementation is the responsibility of the Conservation District and Flood Control.

A tabular tracking ledger to ensure the balance of take and conservation is maintained and is to be included in the Annual Report along with reference to a related spatial database where such information is housed (Section 6.2.1). The Conservation District and Flood Control will be responsible for the annual

accounting of the acreage, type, and location of vegetation communities and species habitat conserved and impacted by permitted land uses and other Covered Activities within their respective portions of the Plan Area.

At the end of each annual reporting period, the Conservation District and Flood Control are to tabulate and summarize all impacts that have occurred by vegetation community and species habitat type. The acreage will be accompanied by GIS figures documenting the location of Covered Activity impacts and will be included in the Annual Report to the Wildlife Agencies.

A minimum of 1,170.7 acres will be required to be dedicated and/or under management by the completion of all Covered Activities in Phase 1, or 10 years after the issuance of the ITP, whichever first occurs. The remaining acreage, 488.4 acres, will be dedicated in Phase 2 and under conservation no later than 28 years after the ITP is issued.

Conservation Phasing

Appropriate assurances of long-term conservation are to be provided by the respective public agency within the appropriate phase of plan implementation (and before any impacts on Covered Species are allowed by Covered Activities), either through conservation easements or other agreement acceptable to the Wildlife Agencies. At a minimum, lands placed into conservation are to be identified by the landowner and the phase of Conservation Phasing (either Phase 1, prior to the BLM land exchange, or Phase 2, following the BLM land exchange) will be identified.

San Bernardino County Flood Control District phasing, which involves dedication of SBCFCD Conservation Areas and Future Flood Control Mitigation Area (see Appendix B.3 of the Wash Plan), will also be described in the Annual Report, as appropriate.

In part, to support the Conservation District and Participating Entities in successfully executing the conservation commitments made explicit in the Wash Plan, the San Bernardino Valley Conservation Trust (Trust) was created in 2016. Envisioned roles and responsibilities of the Trust tied to implementation of the Wash Plan include, holding and investing Endowment Funds and serving as an independent third-party holding and enforcing Conservation Easements. The Trust is responsible to the Trust Board of Directors, California Department of Fish and Wildlife, IRS for maintenance of non-profit status, and the public as a Public Benefit non-profit.

Conservation Phasing FY24 Updates:

As of the close of FY24, no land identified for permanent protection under the Wash Plan had been formally enrolled in a conservation easement.

In preparation for eventual enrollment of lands located within the Wash Plan Preserve in a conservation easement, the Trust took significant steps in 2022 to ensure the organization can hold endowments and conservation easements consistent with state policies. In August 2022, at the request of CDFW, and consistent with the Department's policy for approving entities to hold conservation easements or manage and steward mitigation lands updated April 5, 2021, the Conservation District and Trust completed the *"Application for Government Entity, Special District, or Nonprofit Organization Requesting to Hold and Manage Land"*.

At the close of the Calendar Year 2022, the submitted materials were undergoing review by CDFW as part of their accreditation and approval process. The materials provided to CDFW served to reinforce the state's previous finding in the ability of the District and Trust to manage and protect lands, water, and natural resources. The shared information highlights the ability of the Trust to report on land management activities, create baseline information, and guide development of acceptable monitoring practices, procedures, and reporting policies tied to holding and managing Conservation Easements.

In response to the requests for accreditation, on March 30, 2023, the District received approval from CDFW to manage and steward mitigation land, with specific reference to mitigation lands required as compensatory mitigation for the State Route (SR) 210 Mixed Flow Lane Addition Project. Similarly, the Trust received approval from CDFW on April 4, 2023, to hold conservation easements, with specific reference to the same mitigation lands required of SR 210 Mixed Flow Land Addition Project implemented by the San Bernardino County Transportation Authority.

As described in the approval letters, the accreditation and approval process currently employed by CDFW will require the qualifications of the District and Trust to be reviewed on a project-by-project basis. Given the District has been actively working with CDFW in 2023 and 2024 on a phased approach with respect to issuance of needed 2081 ITPs for Covered Activities, the reported findings by CDFW with regards to the needed acreage of mitigation lands associated with those activities will likely be calculated on a project-by-project basis allowing the formal conservation of mitigation lands to be equally phased as the District seeks to stay consistent with the Wash Plan and the described stay-ahead policy.

"Jump Start" Funding and Activities

To stay ahead in the balance of conservation vs. impacts, conservation land is to be designated and actively managed early in Phase 1, as a planned "Jump Start," where 200 acres will be designated for conservation and actively managed, within the first 3 years of Phase 1. Such activity will ensure sufficient conservation has been generated to accommodate Covered Activities early in the HCP implementation.

Jump Start activities to be implemented by the Wash Plan Task Force tied to providing 250 acres of early conservation, including the 200 acres that will become actively managed within the first seven years (Phase 1) are detailed below.

In Years 1–3:

- In year 1 of the ITP, the Conservation District will record a conservation easement approved by the Wildlife Agencies on 200 acres of the identified District Conserved Lands.
- Initiate control of 20 acres of invasive vegetation, primarily non-native annual grasses, in and adjacent to spineflower patches.
- Enhance the quality of the linkage between the Santa River and Plunge Creek, consisting of the 1938 and 1969 flood channels created by the Santa Ana River (breakout area), by controlling non-native annual grasses and other invasive vegetation within the linkage and corridor margins, adding a crossing for SBKR over the “D-Dike,” and thinning shrubs if necessary.
- Initiate general land stewardship on the 200 acres, including installation of fencing and signage where appropriate, trash removal, minimization and clean-up of illegal dumping, restricting unauthorized access, and maintenance of facilities and equipment needed for habitat management.

In Years 4–7:

- Complete the management measures initiated in Years 1–3.

Relatedly, the activity of depositing the identified funds needed to manage the conserved lands is to be recorded (see IA-13) and highlighted in the Annual Report.

“Jump Start” Funding and Activities FY24 Updates:

Jump Start activities implemented by the Conservation District in FY24 include the fourth year of implementation of the land management activities tied to improving conditions across the 200-acre Plunge Creek Conservation Project.

For details concerning management activities implemented in support of meeting Jump Start obligations see information associated with [Plunge Creek Conservation Project](#), [Slender-horned Spineflower Management](#), and [BLM Fuels Management Grant](#) described under Conservation Projects.

Jump Start Funds – Of the \$231,000 in funds required to complete the Jump Start conservation actions as identified in the Conservation District ITP, \$132,000 has been funded through FY24.

Accounting of Total Impact and Mitigation Acreage

By the close of FY24 approximately 402 acres within the Wash Plan Preserve have been identified for permanent conservation and 218.3 acres of the Wash have been or is slated to be impacted consistent with approved Wash Plan Covered Activities and issued Certificate of Inclusion.

Impact Source (Covered Activity No.)	Principal Sponsor	Impact Acreage	Status in FY24	Mitigation (Lands) Source	Mitigation Acreage	Conservation Status in FY24
Enhanced Recharge Project Phase 1B – B Basins (VD.01, CD.07)	San Bernardino Valley Municipal Water District	128.4 56.4 <i>Permanent</i> 72.0 <i>Temporary</i>	Ongoing	San Bernardino Valley Water Conservation District	112.4	In process
Enhanced Recharge Project Phase 1B – A Basins (VD.01, CD.07)	San Bernardino Valley Municipal Water District	89.9 57.1 <i>Permanent</i> 32.8 <i>Temporary</i>	Ongoing	San Bernardino Valley Water Conservation District	175.4	In process
				City of Redlands	114.2	In process
Total Impacts:		218.3 113.5 <i>Permanent</i> 104.8 <i>Temporary</i>		Total District Conserved:	402.0	

Funding Offsets

At the close of FY24 the total amount of funding received from Permittees and Participating Entities for deposit in the non-wasting endowment fund held and managed by the San Bernardino Valley Conservation Trust is just under \$2 million, or about 17% of the total amount (equal to \$11.4 million in 2016 dollars) estimated to be needed to fund the ongoing management and monitoring of the Wash Plan Preserve. Available income to be generated by the endowment for purposes of addressing annual costs of implementing the HCP in perpetuity was assumed to equal 4% of the principal balance of the fund.

Covered Party (Participant)	Received Contributions to HCP Non-wasting Endowment (in 2016 Dollars)	Date of Receipt of Funds
San Bernardino Valley Water Conservation District	\$51,427	April 2017
East Valley Water District	\$49,286	October 2016
City of Highland	\$193,134	April 2017
City of Redlands	\$28,063	February 2018
San Bernardino Valley Municipal Water District	\$1,665,027	March 2018
Total Received (through FY24)	\$1,986,937	

Total Expenditures Tied to Project Implementation

Estimated project-specific expenditures tied to implementation of conservation projects supporting successful implementation of the Wash Plan following approval of the HCP in 2020 include a total estimated \$1,240,785 in contracts and 3,196 staff hours through FY24. The calculated totals do not include realized administrative, planning, data analysis and management, reporting, communication, and coordination costs associated with program implementation.

San Bernardino Valley Conservation Trust Board FY24 Meetings:

Members of the San Bernardino Valley Conservation Trust Board met on the following dates in FY24 to receive and discuss updates regarding the financial position of investments tied to the non-wasting endowment and make decisions regarding appropriate annual budget expenditures supporting implementation of the HCP:

- July 19, 2023
- October 18, 2023
- October 24, 2023
- January 17, 2024
- February 29, 2024

3 COVERED ACTIVITIES

- Certificate of Inclusion
- Status and Progress of Activities

Covered Activities

Covered activities include all the activities in the Plan Area carried out by the Permittee and Participating Entities covered by the authorization for incidental take. Activities are recognized in the HCP as either projects or operations and maintenance (O&M). Projects are well-defined actions that occur once in a discrete location (e.g., aggregate mining, construction of new facilities, infrastructure development, capital improvement projects). O&M activities are actions that occur repeatedly in one area or over a wide area (e.g., bank stabilization, storm-damage repair, maintenance of roads and facilities).

Covered Activities fall into one or more of the following general categories:

- **Aggregate Mining**—the areas in which gravel and rock (aggregate) mining operations by Robertson’s Ready-Mix and Cemex, Inc. will continue (existing mining) and expand (new mining) as delineated in this HCP and the land exchange between Conservation District and BLM.
- **Water Conservation**—activities related to water management for the conservation/recharge or extraction of potable water from groundwater basins as part of the regional water supply.
- **Wells and Water Infrastructure**—activities related to the creation of new wells and access roads and the maintenance of existing wells and access roads.
- **Transportation**—activities related to the construction, operation, and maintenance of planned transportation facilities.
- **Flood Control**—activities related to the construction of new flood control structures and the operation and maintenance of existing and new flood control facilities.
- **Trails**—the development of trails (provisional).
- **Habitat Enhancement and Monitoring**—activities that support the restoration and maintenance of habitat values in the Wash.
- **Agriculture**—the continued operations and maintenance of existing citrus groves.

Certificate of Inclusion

The Conservation District is required to document (and archive) cases where the incidental take authorization granted to the Permittee has been extended to a member of the Task Force for the purpose of carrying out a Covered Activity. The Permittee’s decision to issue a Certificate of Inclusion to a Participating Entity is to be captured together with required documentation from the USFWS noting the project is a Covered Activity and has complied with the requirements of the HCP.

A Certificate of Inclusion Agreement is the document executed by Permittee and a Participating Entity that extends the incidental Take authorization granted to the Permittee to such Task Force member for the purpose of carrying out a Covered Activity on Covered Lands. Execution of a Certificate of Inclusion by the Participating Entity shall place the Participating Entity under the legal control of Permittee for purposes of enforcing and implementing the Permit, including the HCP and the Implementation Agreement.

Certificate of Inclusion Submitted in FY23:

Project Name(s): Santa Ana River Enhanced Recharge, Phase 1B – Phase A and B; New Access Roads for Spreading Basins

Wash Plan Covered Activity ID(s): VD.01 (Enhanced Recharge Project); CD.07 (New Access Roads for Spreading Basins)

Application(s) submitted and approved:

- Approval of issuance of the COI received from USFWS for Phase A and New Access Roads on April 25, 2022
- Approval of issuance of the COI received from USFWS for Phase B and New Access Roads on November 15, 2022

A single Certificate of Inclusion Agreement for Phase A and Phase B of the Enhanced Recharge Project and New Access Roads for Spreading Basins was drafted by SBVWCD and in review with SBVMWD as of December 31, 2022.

On June 7, 2023, a fully executed Certificate of Inclusion Agreement for Enhanced Recharge Project Phase 1B was received from SBVMCD.

Certificate of Inclusion Submitted in FY24:

Project Name(s): Aggregate Mining – Robertson’s Ready Mix

Wash Plan Covered Activity ID(s): CRM.01 (Aggregate Mining)

Application(s) submitted and approved:

- Approval for the issuance of the COI for Aggregate Mining by Robertson’s Ready Mix was received from USFWS on November 22, 2023

On December 19, 2023, District staff submitted to Robertson’s Ready Mix, for their review and approval, a draft COI Agreement and an Amendment to the 2003 Lease Agreement, which extends the Cone Camp Lease to the 50 plus acres Robertson’s is proposing to mine in 2024. The COI Agreement is drawn from the Wash Plan MOU, and the Implementing Agreement the conservation District has with USFWS, which the MOU incorporates.

As of February 2, 2024, the Conservation District understood it was Robertson’s position to wait for finalization of the needed 2081 ITP from CDFW covering the new mining activities prior to signing the COI Agreement.

Status and Progress of Covered Activities

The two types of Covered Activities are recognized in the HCP and include those activities associated with construction of new or expanded facilities planned in the Plan Area, and those activities related to the O&M of existing facilities or associated with new facilities constructed as a Covered Activity. Both types of Covered Activities, either initiated or ongoing, are discussed below.

Construction of New or Expanded Facilities

A total of 20 New Construction projects are recognized as Covered Activities under the Wash Plan.

Construction of New or Expanded Facilities FY24 Updates:

Construction activities implemented under the Wash Plan through the close of FY24 include:

- Santa Ana River Enhanced Recharge, Phase 1B – Phase A and B [VD.01]
- New Access Roads for Spreading Basins [CD.07]

Consistent with the terms and conditions of the Wash Plan and COI, the following **Avoidance and Minimization Measures** were addressed at project onset and through the duration of construction activities, as appropriate, by SBVMWD, as the lead proponent of the Enhanced Recharge, Phase 1B Project, which includes both VD.01 and CD.07:

- | | | | |
|-----------|-----------|----------|----------|
| • SARWS-1 | • SARWS-5 | • SBKR-3 | • CAGN-1 |
| • SARWS-2 | • SARWS-6 | • SBKR-4 | • CAGN-2 |
| • SARWS-3 | • SBKR-1 | • SBKR-5 | |
| • SARWS-4 | • SBKR-2 | • SBKR-6 | |

Additional measures implemented in FY24 tied to construction activities include preconstruction nesting bird surveys, nest monitoring, maintenance and monitoring of wildlife fencing, and measures put in place to avoid impacts streams and drainages. District staff participated in informational environmental and engineering team meetings hosted by Valley District throughout FY24.

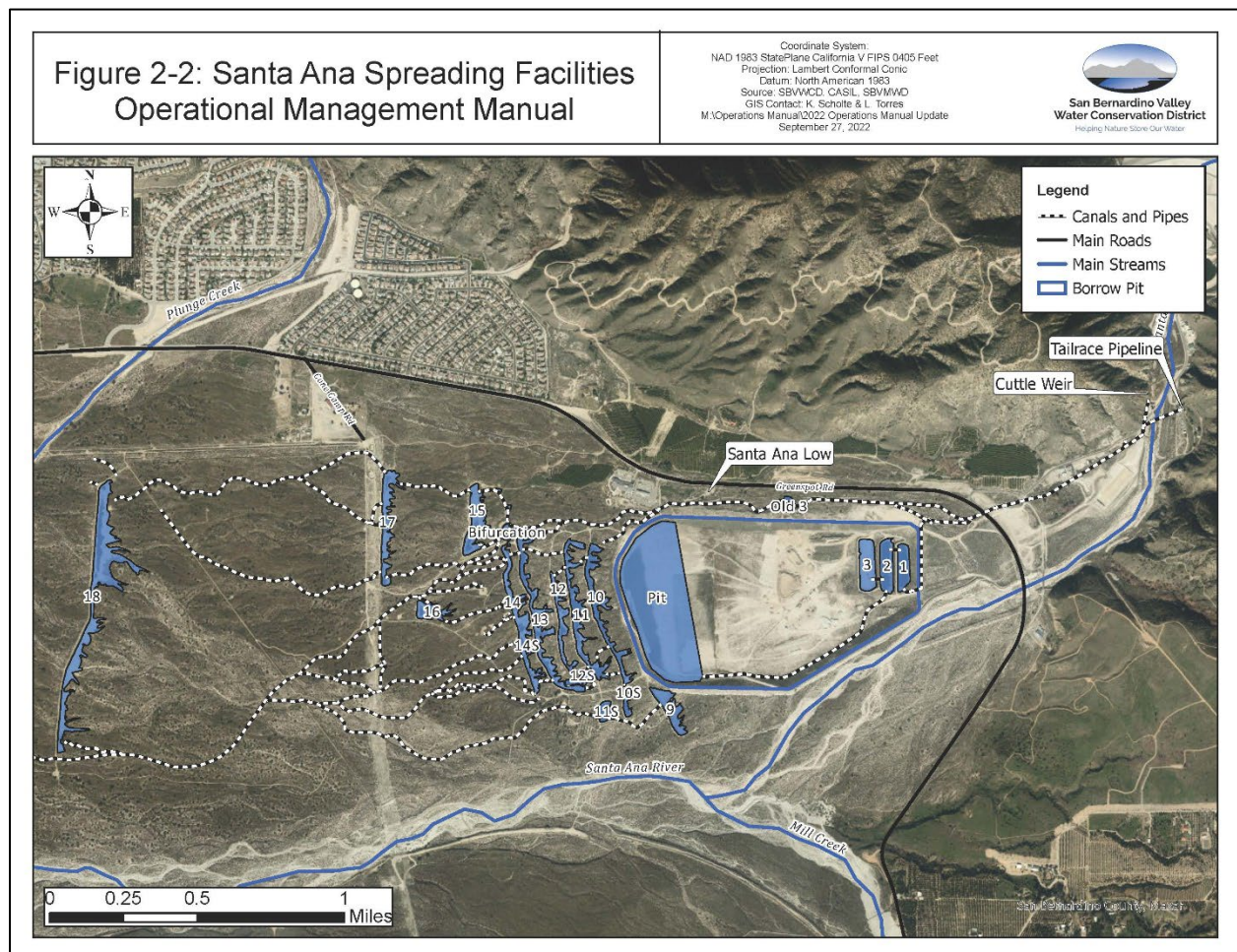
Operations and Maintenance (O&M)

Normal maintenance activities tied to the operation of existing groundwater recharge facilities located within the Plan Area and permitted under the HCP are detailed in the SBVWCD Operations Manual, most recently updated in 2022. Maintenance activities conducted by SBVWCD within the Plan Area occur both outside and within existing percolation basins. These activities generally include maintenance of the spreading basins, canals, access roads, intake structures and weirs/gates.

In general, the District typically performs maintenance of existing facilities on an annual basis. During facility and basin maintenance activities the District usually gains access from roads or the basins and canals themselves, so as not to disturb native habitat. Any remnant water facilities, such as rock walls and gate structures are protected in place.

Within the percolation basins, maintenance is conducted on a less frequent basis, but repairs and general upkeep are of the utmost importance and essential to ensuring efficient groundwater recharge. Basins are restructured and reshaped typically on a 10-year rotational basis as part of ongoing maintenance activities for the purpose of redefining basin boundaries and changing basin dynamics to

The Santa Ana River diversion structures are monitored for debris built up in front of gates in times of heavy flows. Debris can limit the amount of flow for spreading and can potentially cause damage to intake structures. Access gates are inspected for damage, repainted, signage replaced, and fully replaced as necessary as part of ongoing maintenance activity. Culverts are routinely monitored for clogging of debris, vegetation growth and damage.



O&M FY24 Updates:

O&M activities of existing facilities implemented by SBVWCD in FY24 are highlighted in the table below.

Covered Activity	Project Class	Description of Activity	Timing of Activity
Existing Recharge Basins and Access Roads (CD.01)	Water Conservation	Removal of sediment, algae, and silt build-up from Basin Bottoms at Basins 11, 12, 13 & 14	Completed Summer 2023
Conservation District Canal (CD.02)	Wells and Water Infrastructure	Removal of debris from southeast canal to Basin 18	Completed Summer 2023
Existing Recharge Basins and Access Roads (CD.01)	Water Conservation	Repair road ruts in access roads west of Basin 14 and along Burrow Pit	Completed Spring 2024
Existing Recharge Basins and Access Roads (CD.01)	Water Conservation	Removal of sediment, algae, and silt build-up from basin bottoms at Basin 10, 11, 12 & 18	Completed Summer 2024

4 LAND STEWARDSHIP

- General Stewardship Monitoring
- Preserve Management

Land Stewardship

Habitat management includes two general groups of activities: (1) the general land management required to maintain a property in its current state (i.e., general land stewardship), and (2) activities and actions related to the management of habitat for Covered Species through the HCP. Management activities are most effective in supporting the goals and objectives of the HCP when they address the principal threats and stressors impacting, or with the potential to impact, the Wash Plan Preserve and individual Covered Species.

With regard to threats and stressors present within the Santa Ana River Wash, the list is varied and ranges from the presence of invasive plants, largely grasses of Mediterranean origin, that impede movement of listed species and outcompete native plants for limited water resources, to human activity, in the form of illegal trespass, dumping, and/or establishment of unauthorized encampments, leading to the fragmentation and degradation of protected lands and increased fire risk. At a landscape-scale, development pressure over the last century has resulted in habitat loss and fragmentation, further isolating remaining populations of native plants and animals, and challenging the metapopulation dynamics of Covered Species. The construction of Seven Oaks Dam has muted fluvial processes associated with the Santa Ana River and limited the natural disturbance regimes critical to the species and habitat dependent on early and mid-stage successional dynamics for long-term sustainability.

General Stewardship Monitoring and Management

General stewardship monitoring activities supports management of the Wash Plan Preserve. Monitoring helps to identify general land management issues that need to be addressed and documentation of whether management actions are being carried out as planned.

General management activities benefiting from monitoring include trail closures, erosion control, fence and gate repair, signage installation, and routine invasive plant inventory and control. General stewardship monitoring also provides quick feedback on the status of identified threats impacting biological resources on the Preserve (see page B-10 in the HCP) and the success of habitat management treatments considered an important part of the adaptive management of the HCP Preserve (which includes both District Conserved and District Managed Lands).

It is important to note, the primary focus of the envisioned habitat management treatments is to control and reduce the extent of non-native annual grasses and other invasive plants that reduce the habitat quality for SBKR and compete with the spineflower and woolly-star.

Preserve Management

The Wash represents an altered alluvial system. Existing conditions throughout the Wash are a combination of natural conditions existing in a varied state of disturbance due to past and present fluvial processes and areas undergoing active resource extraction and water management.

As District facilities are large open space areas adjacent to densely populated urban areas, the facilities attract trespassers and squatters. Main violators include off-roaders and homeless camping on or near District lands, including the lands enrolled in the Wash Plan Preserve. These users often damage gates to create swimming areas, drive off designated roads harming habitat, or leave debris. As a management response, District staff regularly patrol the facilities for damage to fences, gates and locks as well as

dispose of illegally dumped trash. In addition, warning/ trespassing signs and stencils are constructed and strategically placed throughout the District's facilities to prevent trespassing and vandalism.

Best Management Practices (BMPs) implemented during the reporting period consistent with Section 5.5 of the Wash Plan are listed below. Management actions that fall into this category include stewardship activities such as trash and debris removal, runoff control, fencing and signage installation and repair, routine (minor) weed control, illegal access and encroachment violations, seasonal restrictions and trail closures, trail maintenance, vandalism repair, erosion control, fuel modification, public outreach and education, and enforcement of Preserve regulations.

Land Stewardship FY24 Updates:

BMPs implemented by SBVWCD in FY24 include the following:

- During the summer of 2024, barriers were placed and maintained on the perimeter of the Plan Area at two locations: the east side of Orange Street to the south of CEMEX operations and the north of Greenspot Road to the east of Weaver Street. The barriers, primarily comprised of native boulders, help to prevent unauthorized activities including disposal of dumped trash and off-road vehicle use within the Plan Area and Preserve.
- Repairs were made to a damaged gate located south of Santa Ana Canyon Road to prevent trespass and unauthorized use and access of nearby District facilities utilized in groundwater recharge operations.
- The Permittee, as part of its ongoing operations tied to groundwater recharge and general land stewardship responsibilities, made regular patrols of the HCP Preserve. When encountering unauthorized occupation or trespass, preserve regulations were enforced and, if appropriate, referrals for temporary and permanent housing and wellness programs provided.
- During the reporting period, illegal dumping primarily occurred along road edges in high traffic areas on either side of Orange Street, and when discovered, was cleaned-up or noted for future removal following appropriate municipal and county protocols. Illegal structures or settlements (e.g., encampments used by the unhoused) identified within the HCP Preserve were noted for future removal, however few observations were made following the prior year's extensive clean-up efforts.
- Discoveries of problematic invasive plants, such as stinknet (*Oncosiphon piluliferum*) and stinkwort (*Dittrichia graveolens*), when made within the HCP Preserve and active mining areas, were largely addressed in the spring of 2024 through manual removal or herbicide application.

Wildfire Management

Enhanced Recharge Project Fire – July 2023

For much of the day, on July 14, 2023, District staff were in communication with Valley District and BLM regarding an active wildfire that ultimately burned 16 acres of habitat in the Wash. The fire was started accidentally due to construction activities within the footprint of the Enhance Recharge Project Phase 1B

and ultimately increased in size to cover about 5 acres of the Enhanced Recharge Project and 11 acres of the Wash Plan Preserve and Community Mitigation Area near Cone Camp.

On September 26, 2023, District staff met with BLM to discuss fire management strategies in the Wash Plan Preserve and schedule of construction activities at the A Basins (Enhanced Recharge Project). Staff walked with BLM across the A Basins and within the burn scar of the 16-acre fire to assess conditions.

On October 18, 2023, District staff participated in discussions of the post-fire report provided by Valley District. Meeting participants included CDFW and USFWS. Results of monitoring activities that followed the fire were discussed, as were the next steps to be taken in the next year to aid the recovery of the areas impacted.

Abbey Fire – July 2024

The Abbey Fire started in the Upper Santa Ana River Wash near Opal Avenue north of Redlands Airport during the afternoon of July 19, 2024. BLM Fire Management Coordinator, James Gannon, reported observation of the ignition in the Wash and was the lead agency personnel mapping the expanding boundary of the fire throughout the day and coordinating with District staff and firefighters. A Resource Advisor with the USGS assessed impacts of the fire from a natural resource perspective at the request of BLM and the Conservation District on Saturday (July 20). District staff walked much of the fire footprint on Tuesday, July 23.

On July 31, 2024, District staff shared the READ (Resource Advisor) report prepared by the USGS with the County for the 53-acre Abbey Fire. The fire occurred principally across County property enrolled in the Woolly Star Preserve Area and Wash Plan Preserve.

5 CONSERVATION PROJECTS

- Monitoring Projects
- Management Projects
- Restoration Projects

Conservation Projects

Progress of monitoring, management, and restoration projects undertaken by the Conservation District and Participating Entities in support of biological and preserve-wide objectives identified in the HCP are reported each year in the Annual Report.

Monitoring and Management FY24 Updates:

Principal monitoring and management initiatives implemented in the Wash Plan Preserve in FY24 are highlighted in the table below.

Initiative	Project Type	Species Specific/ Preserve-Wide Objectives Addressed	Timing of Implementation
Vegetation Classification and Mapping	Monitoring	Preserve Objective 10	Winter 2023
SBKR Monitoring Protocol	Monitoring	Preserve Action 10A; SBKR Action 7A, 7C	Fall/Winter 2023, Spring/Summer 2024
SBKR Trapping and Habitat Surveys	Monitoring	Preserve Action 10A; SBKR Action 7A, 7C	Fall 2023, Spring 2024
California Gnatcatcher Monitoring	Monitoring	CAGN Action 4, 6A	Spring/Summer 2024
Slender-horned Spineflower Monitoring Protocol and Monitoring	Monitoring	SHSF Action 9, 10A, 10B	Winter/Spring/Summer 2024
Slender-horned Spineflower Management	Management	SHSF Action 2, 5, 6A, 6B	Winter 2023, Spring 2024
Slender-horned Spineflower Restoration Program	Management	SHSF Action 3, 4	Fall/Winter 2023, Spring/Summer 2024
Management of Trespass, Unauthorized Encampments, and Illegal Dumping	Management	Preserve Action 2A, 2B, 2C, 2D, 2E	Fall/Winter 2023, Spring/Summer 2024
Plunge Creek Conservation Project	Management	Preserve Action 9C; SARWS Action 2, 5; SBKR Action 2	Winter 2023, Spring/Summer 2024
BLM Fuels Management Grant	Management	Preserve Action 4A; SBKR Action 2, 4B	Winter 2023, Spring/Summer 2024

Monitoring Projects

Monitoring actions are those specific actions that are taken to track the status and trend of Covered Species populations and of their habitats within the Wash Plan Preserve and to inform the management strategy and tasks. Monitoring actions are conducted within an adaptive management context so monitoring results can be linked to management actions to inform and improve the efficacy and efficiency of management actions through time.

In the material shared below, we purposefully highlight the general components and characteristics of individual projects to allow for higher-level assessment of the allocation of funding and attention given by Program Area and Program Class. Through biological monitoring, biologists and land managers can measure the effectiveness of the overall conservation approach, support informed adaptive management decisions, assist in defining and modifying biological goals and objectives, and provide the Conservation District and Wildlife Agencies with information to conduct assessments of baseline conditions and species status.

Monitoring Projects FY24 Updates:

Principal monitoring projects implemented in FY24 include the following:

- [Vegetation Classification and Mapping](#) (Preserve Objective 10)
- [SBKR Monitoring Protocol](#) (SBKR Action 7A; Preserve Action 10A)
- [SBKR Trapping and Habitat Surveys](#) (SBKR Action 7A; Preserve Action 10A)
- [California Gnatcatcher Monitoring](#) (CAGN Action 4, 6)
- [Slender-horned Spineflower Monitoring Protocol and Monitoring](#) (SHSF Action 10A, 10B)

Vegetation Classification and Mapping

Project Management: Vegetation Classification and Mapping	
Project ID(s)	2201
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	Project is to result in development of a classification of natural and naturalized vegetation occurring within the Wash Plan Preserve and on lands owned and managed by the Conservation District according to the Manual of California Vegetation. The Conservation District is preparing the classification to provide a consistent system for mapping of vegetation within the Wash Plan Preserve and on its own lands. A decision-making key is to accompany the classification to allow for consistent application of the derived classification. The vegetation classification and key are to be used to prepare an updated vegetation map of the 2,245-acre project area.
Contractor(s)/Researcher	AECOM
Time Period	2021-2024
Total Estimated Project Cost	\$118,950

Project Management: Vegetation Classification and Mapping	
Amount Budgeted in FY	\$118,950
Fund(s)	Wash Plan Endowment; Active Recharge Transfer Project Funds
Matching Contribution(s)	N/A
Landowner Involvement	SBVWCD, BLM
Project Status	Completed
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Monitoring/research
Program Area	Sensitive biological resources
Resource (e.g., Monitoring or Management Target)	Riversidean alluvial fan sage scrub
Wash Plan Conservation Actions	
Species-specific Actions	N/A
Preserve-wide Objectives	Preserve Objective 10
Monitoring Type (if applicable)	Baseline (Inventory) Monitoring, Regional Monitoring
Monitoring Method (if applicable)	Vegetation Mapping
Specific Threat/Stressor	Human activity (development and trespass); Wildfire
Management Treatment	N/A
Intensity of Management	N/A
Available Report(s)	AECOM 2022. <i>Vegetation Classification Report for the San Bernardino Valley Water Conservation District – With Vegetation Key & Descriptions. Unpublished report prepared for San Bernardino Valley Water Conservation District. 64p.</i> AECOM 2023. <i>Vegetation Mapping Report for the San Bernardino Valley Water Conservation District. Unpublished report prepared for San Bernardino Valley Water Conservation District. 12p.</i>
Available Geospatial Product(s)	<i>Aerial Imagery: GIS Data (Flight Boundary, Control Points, Flight Lines, Orthophotographic Title Index, Photo Centers); Orthophotography Data; and Report Data associated with aerial imagery.</i> <i>GIS shapefiles are also available for the following datasets: Vegetation Mapping Survey area; Vegetation Mapping Results</i>

Project Narrative Template: Vegetation Classification and Mapping	
Overview	In 2021, the Conservation District employed AECOM to develop a classification of natural and naturalized vegetation occurring within the Wash Plan Preserve and on lands owned and managed by the Conservation District according to the Manual of California Vegetation (MCV), developed by the California Department of Fish and Wildlife (CDFW) VegCAMP, as informed by the methods for vegetation classification developed by the National Park Service (NPS) Vegetation Inventory. The Conservation District is preparing the classification to provide a consistent system for the mapping of vegetation within the Wash Plan Preserve and on its own lands. A decision-making key

Project Narrative Template: Vegetation Classification and Mapping	
	is to accompany the classification to allow for the consistent application of the derived classification. The defined study area for the vegetation classification is a 2,245-acre portion of the Upper Santa Ana River Wash, including 1,475 acres of the Wash Plan Preserve, 195 acres of Community Mitigation Lands, 280 acres of Mill Creek Lands, and 295 acres of River HCP Preserve. The prepared vegetation classification will classify vegetation in the project area to the alliance and/or association level of the MCV (the association level will be provided wherever data are sufficient to generate such a classification). Based on the completed vegetation classification and key, AECOM will prepare an updated vegetation map of the 2,245-acre project area. Vegetation polygons will be delineated to the alliance or as appropriate to the association level using a combination of photointerpretation and field reconnaissance as appropriate to accurately define ecological boundaries. Vegetation will be mapped with a minimum mapping unit of 0.5 acre and aerial photographs of the project area will be prepared and delivered (at 0.5-foot resolution) by GeoTerra, an approved subcontractor to AECOM. Preparation of the vegetation map will consist of four principal tasks: 1) field reconnaissance; 2) photo interpretation and digitization of vegetation; 3) quality control; and 4) field validation. During field reconnaissance, the ecologists will compare aerial photo “signatures” to ground conditions and collect geo-referenced field notes and ground photographs to assist office-based photointerpretation. The digitization of vegetation polygons will be created by vegetation ecologists in an ArcGIS environment using on-screen digitizing methods over suitable orthophotographs. Quality control steps will include checking tables for complete attribution and performing checks of the map topology. A final validation task will be completed to field verify a sampling of map polygons to assess the accuracy of the mapped vegetation prior to finalization of the vegetation map and creation of the project summary report.
Progress	AECOM scheduled flights (to be completed using manned aircraft) to collect aerial imagery (at 6-inch resolution) of the Wash in late April/early May and initiated complementary field surveys beginning in early May to aid in the classification process. During field reconnaissance, ecologists from AECOM compared aerial photo “signatures” to ground conditions and collected geo-referenced field notes and ground photographs to assist in the office-based photointerpretation. Plant ecologist from AECOM meet with Todd Keeler-Wolf (of CDFW; lead author of the Manual of California Vegetation) to discuss classification of vegetation on June 1. In June, AECOM was reviewing plot data collected in early May and testing its fit with literature describing alluvial scrub vegetation. Aerial imagery of the Wash captured in early May was made available to AECOM on June 20; District obtained the imagery on June 28. District shared the habitat data of the SBKR monitoring plots collected during the spring with AECOM on June 22 to assist with the vegetation mapping effort. AECOM submitted a draft vegetation classification report to the District for review on August 19. A presentation on the project was given by AECOM to District staff on August 23. District reviewed the draft report and submitted comments to AECOM on August 30. AECOM completed review of the updated imagery and preparation of the vegetation map was initiated in August.

Project Narrative Template: Vegetation Classification and Mapping	
	The final amended Vegetation Classification Report was completed by AECOM and shared with the District on September 20. Additional fieldwork supporting the vegetation mapping component of the project was conducted by AECOM on September 22 and 23. On January 13, 2023, the District received the geospatial data and Final Vegetation Mapping Report from AECOM tied to production of the new vegetation map covering the Wash Plan Preserve and additional properties owned by the District, including Mill Creek. On January 18, 2024, the Conservation District, together with BLM, met with AECOM in the field to discuss the results of the vegetation classification and mapping activities completed in 2023. The meeting afforded AECOM the opportunity to showcase examples when discussing the classification and mapping methodologies and results of the mapping effort. Following discussion of the classification and mapping process and relevant background information, the group visited several locations within the Wash mapped by AECOM to ground-truth the results and better understand the full capabilities of the mapping product and its future utility to the District and BLM. Through engaging AECOM staff in the field, District biologists and partners became more familiar with the classification scheme and are more apt to employ the mapping products in their stewardship and planning activities.
Key Milestones Schedule	1. Review existing mapping and regional vegetation classification data to define a preliminary set of alliances and association expected to be present within the project area – <i>Completed</i> 2. Design a vegetation sampling plan for the project area – <i>Completed</i> 3. Perform field reconnaissance and collect vegetation plot data – <i>Completed</i> 4. Conduct a valid analysis to assign each vegetation plot to an MCV alliance/association – <i>Completed</i> 5. Prepare a dichotomous vegetation key to all the vegetation alliances sampled based on physiognomy and quantitative species composition data – <i>Completed</i> 6. Prepare a final vegetation classification report – <i>Completed on September 20, 2022</i> 7. Acquire and review raw aerial imagery of the project area – <i>Completed</i> 8. Prepare and transfer GIS Data, Orthophotography Data, and Report Data associated with aerial imagery to Conservation District – <i>Completed on June 24, 2022</i> 9. Conduct photo interpretation and digitization of vegetation in an ArcGIS environment using on-screen digitizing methods over suitable orthophotographs – <i>Completed</i> 10. Perform quality control and field validation to assess the accuracy of mapped polygons – <i>Completed</i> 11. Prepare a final vegetation mapping report – <i>Completed in January 2023</i> 12. Prepare and transfer final project geodatabase containing the final vegetation feature class – <i>Completed in January 2023</i>
Key Findings	Classification assignments resulted in 14 MCV alliances and 17 associations being determined for District lands. All alliances and associations are well represented in the compiled regional dataset, except for two: the <i>Heterotheca sessiliflora</i> Association and

Project Narrative Template: Vegetation Classification and Mapping	
	<i>Opuntia littoralis</i> - <i>Opuntia oricola</i> - <i>Cylindropuntia prolifera</i> Shrubland Alliance. <i>Heterotheca sessiliflora</i> Association was originally known as a special stand type from plots ($n=8$) collected for a vegetation inventory in Pinnacles National Park (Kittle <i>et al.</i> 2012). This association is currently included in the MCV based on the Pinnacle stands. The plot representation on District lands occupies similar alluvial habitat and with high relative cover of <i>H. sessiliflora</i>, albeit with far less nonnative cover than the plots at Pinnacles National Park. The <i>Opuntia</i> alliance named above is described principally as a coastal vegetation alliance in the MCV and is represented in the western Riverside classification by a single inland plot (CNPS 2005). The single western Riverside plot has been included in the stand table summary for this alliance. Results of vegetation mapping totaled 1,553.4 acres of uplands and 572.4 acres of riparian and wash. California juniper (<i>Juniper californica</i>) woodland comprise one of the more extensive vegetation associations in the Wash Plan Preserve, covering hundreds of acres (that is, 466.9 acres). This finding is consistent with historic records which note the juniper woodland as the most extensive vegetation-type within the Santa Ana River Wash. Other notable alliances mapped include <i>Adenostoma fasciculatum</i> (at 236.8 acres), <i>Encelia farinosa</i> (540.3 acres), <i>Rhus ovata</i> (107.4 acres), and <i>Lepidospartum squamatum</i> (470.7 acres), and <i>Heterotheca</i> spp. (87.0 acres).
Notes	The overall accuracy of the new fine-scale vegetation map may be measured by completing an independent accuracy assessment. An accuracy assessment would include field sampling, analysis of results, and documentation of an overall user's accuracy score. California state standards require a threshold of overall accuracy of 80%. As part of the assessment, it may be beneficial to create a crosswalk and make a comparison between the new map and existing vegetation maps of the project area.

SBKR Monitoring Protocol

Project Management: SBKR Monitoring Protocol	
Project ID(s)	2202
Project Title(s)	See contract file(s)
Project Purpose	The purpose of the project is to develop a scientifically valid, productive, and cost-effective monitoring program for San Bernardino kangaroo (SBKR) rat within the Wash Plan Preserve. The monitoring program is to allow for determination of the status and distribution of SBKR, monitoring of the species long-term trends, and assessment of the effectiveness of management actions in maintaining and increasing the quality of SBKR habitat and population of SBKR in the Wash Plan Preserve consistent with implementation of the Upper Santa Ana River Wash HCP.
Contractor(s)/Researcher	USGS; SJM Biological Services
Time Period	2021-2024
Total Project Cost	\$114,500
Amount Budgeted in FY	--
Fund(s)	Wash Plan Endowment
Matching Contribution(s)	N/A

Project Management: SBKR Monitoring Protocol	
Landowner Involvement	SBVWCD, BLM
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Monitoring/research
Program Area	Sensitive biological resources
Resource (e.g., Monitoring or Management Target)	SBKR
Wash Plan Conservation Actions	
Species-specific Actions	SBKR Action 7A
Preserve-wide Objectives	Preserve Action 10A
Monitoring Type (if applicable)	Baseline (Inventory) Monitoring, Effectiveness Monitoring, Regional Monitoring
Monitoring Method (if applicable)	Occupancy Monitoring Approach
Specific Threat/Stressor	Human activity (development); Absence of disturbance
Management Treatment	N/A
Intensity of Management	N/A
Available Report(s)	<i>Brehme, CS, SJ Montgomery, B. Miller, M. Romich, RN Fisher 2022. San Bernardino Merriam's Kangaroo Rat (Dipodomys merriami parvus) Monitoring Protocol for San Bernadino Valley Water Conservation District. DRAFT FINAL Report to San Bernardino Valley Water Conservation District. 75p.</i> <i>Kingston JM, Montgomery, SJ, Brehme, CS, Clark DR, Romich M, Miller, B and RN Fisher 2022. San Bernardino Merriam's Kangaroo Rat (Dipodomys merriami parvus) Habitat Protocol for San Bernardino Valley Water Conservation District. DRAFT Report to San Bernardino Valley Water Conservation District. 22p.</i> <i>Brehme, C.S., Gould, P., and R. Fisher 2024. Addendum: San Bernardino Merriam's Kangaroo Rat (Dipodomys merriami parvus) Monitoring Protocol for San Bernardino Valley Water Conservation District – 1) Occupancy and Abundance Trend Metrics 2021-2022. 2) Occupancy, N-Mixture, and Spatially-explicit Capture-Recapture Models for 2022. 32p.</i>
Available Geospatial Product(s)	N/A

Project Narrative Template: SBKR Monitoring Protocol	
Overview	SBKR is a Covered Species under the Wash Plan which was accompanied by an Incidental Take Permit (ITP) from the USFWS on July 13, 2020. As the ITP holder for the Wash Plan, and consistent with the requirements of the Wash Plan, SBVWCD retained the U.S. Geological Survey (USGS) and SJM Biological Services in 2021 to develop a scientifically valid, effective, and cost-effective monitoring program for SBKR within the

Project Narrative Template: SBKR Monitoring Protocol	
	Wash Plan Preserve. The Wash Plan requires development and implementation of a monitoring program for SBKR to determine status and distribution of the species in the Preserve, monitor long-term trends, and assess the effectiveness of management actions. Specific objectives of the monitoring program to be developed by the USGS included: • Evaluate detection probabilities, spatial sampling scale(s), and covariate data from existing planning documents, and use them to develop a Percent Area Occupied (PAO) monitoring protocol and occupancy model for SBKR within the Wash Preserve. • Monitoring protocol should allow SBVWCD to meet the monitoring requirements of the Wash Plan. • Monitoring protocol should include a density index. • Monitoring data should strongly support informed use of Wash Plan endowment for land management actions to meet Wash Plan goals for SBKR. • If possible, protocol should allow for combined analyses with existing preserve-level SBKR monitoring and future range-wide SBKR monitoring. • Monitoring results should contribute to answering knowledge gaps related to SBKR where possible (e.g., short and long-term trends in area occupied by SBKR, SBKR densities, and SBKR responses to landscape and environmental factors, habitat management, disturbance). • Utilize the Wash Plan SBKR habitat suitability model to identify the number and location of stratified sampling points across the Wash Preserve, if warranted. • Develop a monitoring program that will accommodate significant restoration in low suitability areas via weeding, substrate addition/modification, flooding and fire over the 30-year term of the Wash Plan ITP. Low suitability areas will be identified using results of habitat modeling and occupancy (or lack thereof) of SBKR. • Incorporate long-term evaluation of the Plunge Creek Conservation Project within the Wash Plan on SBKR occupancy. • Include the minimum amount of survey sites supported by the Wash Plan endowment to generate spatial data to inform land use and management within and adjacent to the Wash Preserve. • Incorporate survey sites for future sampling of SBVWCD Mill Creek Conservation lands and Community Mitigation lands outside of the Preserve. • Incorporate long-term evaluation of the Seven Oaks Dam High Flow projects. The monitoring program includes collection of various habitat covariates that will be used for habitat modeling to help further understand SBKR and their needs for survival. Habitat covariate data has been collected by SBVWCD in the spring of 2022, 2023, and 2024. All habitat characteristics measured as part of this effort are hypothesized to be important for SBKR habitat suitability and were based on the current SBKR habitat characterization protocol for Woolly-star Preserve Area and lands protected under the Western Riverside Multiple Species Habitat Conservation Plan.

Project Narrative Template: SBKR Monitoring Protocol	
Progress	In late summer/early fall of 2021 the USGS completed a draft monitoring protocol allowing for the collection of first year SBKR trapping data in fall of 2021 across the Wash Plan Preserve. An analysis of the first year of trapping data collected under the new sampling protocol was initiated in winter and preliminary results were made available to SBVWCD in spring 2022. On April 7, 2022, SBVWCD hosted a regional coordination meeting discussing the SBKR monitoring approach and early results from the USGS analyses. In addition to the USFWS, CDFW, and the USGS, the meeting participants included representatives from the San Bernardino Valley Municipal Water District, San Bernardino County Flood Control, Bureau of Land Management, San Diego Zoo, Western Riverside MSHCP, and Cajon Creek Conservation Bank. In total, there were 31 people in attendance at the meeting, representing 100% participation of all of those invited. The information shared at the meeting was well-received suggesting there might be opportunities for regional collaboration on monitoring of SBKR moving forward. The Conservation District and USGS met with USFWS in June 2022 to discuss the expansion of the SBKR monitoring program to allow for integration with a regional monitoring effort supporting recovery of the species. In support of this effort, on January 27, the Conservation District and San Bernardino Valley Conservation Trust, working with the USFWS, CDFW, USGS, and other partners, applied for a Section 6 grant funded by the federal Cooperative Endangered Species Conservation Fund to advance development and extend implementation of the SBKR monitoring protocol currently employed in the Wash Plan Preserve to conserved areas located across the full extent of the species range within mapped Critical Habitat Units. Following completion of the analysis of first-year data, the final draft of the monitoring protocol and first-year results were made available in January 2023. In a continued effort to share details surrounding the new protocol with other conservation practitioners, the Conservation District partnered with USGS to make a presentation on the SBKR monitoring program at the National Habitat Conservation Plan Coalition Annual Meeting in Austin, Texas in October 2022. Similarly, on March 20, 2023, District staff spoke at the International Association for Landscape Ecology - North American Annual Meeting, occurring in Riverside. At the meeting in Riverside, District staff shared details about the collaborative work with the USGS using the PAO monitoring approach to inform management of endangered and threatened species at the wildland urban interface. On July 13, 2023, District staff was an invited speaker at the Western Riverside County Multispecies Habitat Conservation Plan Monitoring and Management Coordination Meeting. Staff presented on the PAO Monitoring Protocol being implemented by the District and USGS in support of SBKR management in the Wash Plan Preserve. Early results of the USGS analysis of SBKR trapping data from 2021 and 2022, which included the first documentation of SBKR habitat associations in the Wash made possible by the habitat data collected in 2022 by District staff, were shared with the Preserve Management Committee (PMC) on November 2. A follow-up working session between the USGS and members of the PMC and invited guests was held on January 25, 2024. In total, 29 participants from 10 agencies

Project Narrative Template: SBKR Monitoring Protocol	
	attended the three-hour meeting, with half participating remotely and the other half in person. The working session involved discussion of the ongoing analyses performed with the data collected over the first two years of the monitoring program and implications of results for management and monitoring of the species within the Wash Plan Preserve, going forward. On February 1, 2024, USFWS hosted the annual meeting of the SBKR Partners. Results of the first two years of SBKR monitoring implemented under the Wash Plan, updates tied to the Plunge Creek Conservation Project, and a status update on the development of the SBKR Region-wide Monitoring Program were shared by Conservation District staff and the USGS. The San Diego Zoo was also a key presenter at the half-day meeting, and shared updates on the recent science initiatives being implemented by their institution benefiting SBKR covering the last few years. On April 30, District staff submitted an abstract for a presentation at the 2024 Natural Areas Conference for review and consideration of acceptance to be presented at the Natural Areas Association annual meeting in Manhattan, Kansas in October. The annual meeting attracts conservation and land resource practitioners from across the United States to discuss science and stewardship. An addendum to the approved comprehensive SBKR monitoring protocol report completed by the USGS in 2023, was finalized and delivered by the USGS prior to the close of the fiscal year, June 30. The addendum describes results of the analysis of the first two years of SBKR trapping and habitat conditions data completed by the USGS. Initial results of the work were first shared with members of the Preserve Management Committee in January 2024.
Key Milestones Schedule	1. Literature Review - Review data and reports provided by SBVWCD as well as other scientific and/or unpublished literature available to USGS that may inform development of monitoring program for SBKR – <i>Completed</i> 2. GIS Review - Review GIS data provided by SBVWCD for the Wash Plan and Plunge Creek Conservation Project as well as other GIS data available to USGS that may inform development of monitoring program for SBKR – <i>Completed</i> 3. Site Visit - Visit Wash Plan Preserve with SBVWCD staff – <i>Completed</i> 4. Monitoring Protocol Development - Develop protocol for SBKR monitoring using a percent area occupied methodology for areas within the Wash Plan Preserve (within the Upper Santa Ana River Wash) that complies with the goals of the Wash Plan – <i>Completed</i> 5. Power Analysis for Monitoring Program – Run power analyses to determine appropriate locations and number of monitoring sites to 1) evaluate the effects of the Plunge Creek Conservation Project on SBKR within the project area, 2) inform management actions for SBKR within the Wash Plan Preserve, and 3) allow SBVWCD to meet the Wash Plan monitoring goals for SBKR – <i>Completed</i> 6. Monitoring Protocol Manual - Prepare an SBKR monitoring protocol manual for the Wash Plan, including a component for the Plunge Creek Conservation Project – <i>Completed</i> 7. SBKR Trapping Assistance - Assist permitted biologist hired by SBVWCD with SBKR surveys – <i>Completed</i>

Project Narrative Template: SBKR Monitoring Protocol	
	8. Habitat Survey Protocol – Prepare survey protocol for habitat surveys and assist SBVWCD staff with training allowing for standardization of associated habitat surveys – <i>Completed</i> 9. Presentation of Draft Protocol - Present the draft protocol to SBVWCD staff, species experts, and regulatory agency staff for discussion and feedback – <i>Completed</i> 10. Final Protocol Manual - Revise draft protocol to incorporate feedback and comments where appropriate – <i>Completed</i> 11. Analysis of SBKR Trapping Data collected in 2021 – <i>Completed in December 2022</i> 12. Analysis of Multi-year SBKR Trapping Data (collected in 2021, 2022) and Habitat Survey Data (collected in 2022) - <i>Completed in June 2024</i>
Key Findings	First estimates of the density and abundance of SBKR across the Wash Plan Preserve were created through implementation of the monitoring protocol and analysis of the first two years of collected data from 2021 and 2022. Using repeat captures to estimate abundance, the USGS estimated total number of San Bernardino kangaroo rats estimated within the Wash Preserve is 2,413 in 2021, with a 90% Confidence Interval extending from 2,057 to 2,832 kangaroo rats. In 2022, the estimated abundance is 1,729, with a 90% Confidence Interval extending from 1,448 to 2,074 kangaroo rates. Although the abundance varied across years, the Proportion Area Occupied was stable, estimated at 52% for both years. Equally, the Total Area Occupied was stable across years, estimated at 297.8 ha in 2021 and 298 ha in 2022. Top predictors for SBKR occupancy in 2022 indicated the species preference for low cover of grasses and sandy soils. SBKR are found most often in areas with more compacted and stable coarse sandy areas often associated with open ground. N-Mixture models indicate higher densities of SBKR in areas with 40 to 80 percent open ground and less than 20 percent cover of grass. Spatially Explicit Capture-Recapture models, in addition to providing annual estimates of density/abundance, allowed evaluation of GIS-based habitat suitability maps and modeling of SBKR density predictions. Analysis of available models validated the Habitat Suitability Index developed by the USFWS support of development of the HCP and provided density estimates for each of the main habitat types mapped by the USFWS. Furthermore, analysis of trapping data collected in 2021 and 2022 linked occupancy to vegetation types included within the new vegetation map for the Wash Plan Preserve completed by AECOM in 2023 to improve inference of the density of SBKR by different major vegetation types within the Wash.
Notes	Although the monitoring program is in its early years of implementation and focuses exclusively on the Wash Preserve, the program was developed with the potential for serving as a program model for monitoring trends in SBKR populations over a broader geographic scale, allowing for range-wide trends in spatial distribution and relative density to be assessed. On June 27, 2023, staff received notification the Carlsbad-Palm Springs U.S. Fish and Wildlife Office is going to provide the USGS with \$133,897 through an Interagency Agreement to support development of a range-wide Percent Area Occupied (PAO) monitoring protocol for SBKR in the new federal fiscal year beginning October 1. The

Project Narrative Template: SBKR Monitoring Protocol	
	funded work was first conceptualized and described in the Section 6 grant submitted by the SBV Conservation Trust to CDFW in January 2023. In mid-August 2023, District staff received notice from USFWS that USGS Southwest Region was going to support development of the range-wide monitoring protocol by providing funding to complement the funds contributed by the USFWS to the endeavor, raising the total amount of federal funds available for the project to \$201,159. The Conservation District completed a third year of trapping by the close of October in 2023 and initiated a fourth year of trapping in September 2024. The additional trapping activities in the Wash, coupled with expansion of SBKR trapping in the neighboring Mill Creek Facilities in 2023, with plans to complete a second round in the fall of 2024, will allow for increased refinement of the initial estimates of SBKR occupancy and abundance within the Wash Plan Preserve, and further support interpretation of data collected through the envisioned regional monitoring program.

SBKR Trapping and Habitat Surveys

Project Management: SBKR Trapping and Habitat Surveys	
Project ID(s)	2203
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	The purpose of the project is to conduct fall trapping of SBKR to determine occupancy and local abundance of SBKR within the Wash Plan Preserve consistent with the SBKR monitoring program developed by the USGS. The project is also to result in completion of spring habitat surveys to characterize habitat conditions of locations trapped for SBKR to reinforce species-habitat relationships and inform future management actions. Annual trapping activities and habitat surveys are to allow for determination of the status and distribution of SBKR, monitoring of the species long-term trends, and assessment of the effectiveness of management actions in maintaining and increasing the quality of SBKR habitat and population of SBKR in the Wash Plan Preserve consistent with implementation of the Upper Santa Ana River Wash HCP.
Contractor(s)/Researcher	Origin Biological; SBVWCD
Time Period	2021-2024
Total Project Cost	\$113,140 (Origin Biological); 1,200 hours (SBVWCD Staff)
Amount Budgeted in FY	\$38,410; 400 hours
Fund(s)	Wash Plan Endowment
Matching Contribution(s)	N/A
Landowner Involvement	SBVWCD, BLM
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Monitoring/research
Program Area	Sensitive biological resources
Resource (e.g., Monitoring or Management Target)	SBKR

Project Management: SBKR Trapping and Habitat Surveys	
Wash Plan Conservation Actions	
Species-specific Actions	SBKR Action 7A
Preserve-wide Objectives	Preserve Action 10A
Monitoring Type (if applicable)	Baseline (Inventory) Monitoring, Effectiveness Monitoring, Regional Monitoring
Monitoring Method (if applicable)	Occupancy Monitoring
Specific Threat/Stressor	Human activity (development); Absence of disturbance
Management Treatment	N/A
Intensity of Management	N/A
Available Report(s)	<i>Origin Biological 2022. 2021 Wash HCP San Bernardino Kangaroo Rat Monitoring Results Summary. Unpublished report prepared for San Bernardino Valley Water Conservation District. 9p.</i> <i>Origin Biological 2022. 2022 Wash HCP San Bernardino Kangaroo Rat Monitoring Results Summary. Unpublished report prepared for San Bernardino Valley Water Conservation District. 14p.</i> <i>Origin Biological 2024. 2023 Wash HCP San Bernardino Kangaroo Rat Monitoring Results Summary. Unpublished report prepared for San Bernardino Valley Water Conservation District. 14P.</i>
Available Geospatial Product(s)	<i>GIS shapefiles are available for the following datasets: Sampling Frame; Master Plot Grid & Trap Points; Survey Plot Locations (2022, 2023, 2024); Habitat Survey Results (2022, 2023); Trapping Results (2021, 2022, 2023)</i> <i>Habitat Survey Results 2024 & Trapping Results 2024 are in development.</i>

Project Narrative Template: SBKR Trapping and Habitat Surveys	
Overview	The monitoring program developed by the USGS is to allow for determination of the status and distribution of SBKR in the Preserve, monitoring of long-term trends, and assessment of the effectiveness of management actions. Implementation of the monitoring program requires trapping of SBKR in the fall and the collection of various habitat covariates in the spring used for habitat modeling to help further understand SBKR and their needs for survival. All habitat characteristics to be measured in the spring at the known fall trapping locations are hypothesized to be important for SBKR habitat suitability and were based on the current SBKR habitat characterization protocol for Woolly-star Preserve Area and lands protected under the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP). In 2021, Origin Biological, was hired to work with the USGS and Conservation District in implementing the new protocol with focus on conducting the fall trapping of SBKR within the Wash Plan Preserve. In the spring of 2022, the SBVWCD staff are scheduled to visit all trap

Project Narrative Template: SBKR Trapping and Habitat Surveys	
	locations to characterize local habitat conditions and allow for future analysis of species-habitat relationships.
Progress	Consistent with the new protocol, trapping for SBKR was conducted across 100 sites distributed throughout the Wash Plan Preserve in November and December of 2021. In 2022, SBKR sampling following the same protocol was initiated by Mikael Romich on September 7 and continued through October 28. Like in 2021, one hundred grids were sampled in 2022. Following QA/QC, data was shared with the USGS for analysis. In April of 2022, SBVWCD initiated implementation of the new habitat monitoring protocol, conducting field surveys of habitat conditions of the 92 permanent survey plots and 9 randomly assigned plots used to trap SBKR in fall of 2021. The work focused on describing local conditions of vegetation and soils at each plot to aid in analysis of the collected data describing patterns of occupancy across the Wash Plan Preserve. All 100 of the SBKR plots sampled in fall of 2021 were surveyed for habitat conditions by early June 2022. In summer of 2022, soil samples collected at each plot were shipped to BYU College of Life Sciences Environmental Analytical Lab for composition and texture analysis. On December 28, 2022, the results of soil tests were received. Results of the soil composition and sand texture analyses performed by the university are being treated as additional site covariates that may help to predict SBKR presence and abundance in the Wash as analyses are being conducted by the USGS and District this fall and winter. On May 25, 2023, the second year of implementing the SBKR habitat assessment survey protocol was completed by District staff. In total, staff spent a total of 13 days in the field in spring 2023 conducting assessments surveying 102 of the 102 plots scheduled to be trapped in the fall. Mikael Romich began the third year of trapping efforts in the Wash on September 1, 2023. As of October 15, Mikael completed trapping at 100 of the 100 grids scheduled to be trapped in the Wash in 2023. On March 19, 2024, District staff initiated spring habitat surveys of SBKR monitoring plots within the Wash Plan Preserve and, for the first time, at the Mill Creek Facilities. Expansion of the monitoring activities to include Mill Creek is consistent with the Conservation Benefit Agreement to be approved by the USFWS. As of May 30, staff completed habitat surveys on all 146 plots to be surveyed across the Wash Plan Preserve and Mill Creek Facilities this spring. Completed surveys represented the third year of implementing the SBKR habitat assessment survey protocol across the Wash Plan Preserve and the first year of implementing the protocol at Mill Creek. Surveyed plots at both sites are scheduled to be trapped for SBKR in the fall of 2024.
Key Milestones Schedule	1. Meetings and Coordination (Origin Biological) – Complete pre-field work tasks necessary to implement the San Bernardino kangaroo rat (SBKR) monitoring protocol, including participation in kick-off meeting and coordination with the Conservation District and USGS – <i>Completed in 2021, 2022, 2023</i> 2. SBKR Trapping (Origin Biological) - Trap for SBKR at 100 grids identified by the USGS during the late summer and fall months, with each grid consisting of 25 traps placed in a 5 by 5 trap configuration with 10-meter spacing, for 2-nights

Project Narrative Template: SBKR Trapping and Habitat Surveys	
	per the monitoring protocol developed by the USGS (see Project 2202) – <i>Completed in 2021, 2022, 2023</i> 3. Data Review and Letter Report (Origin Biological) – Review data collected for each trapping session as a quality assurance quality control measure; prepare a letter report describing the trapping methods and results, highlighting the locations of SBKR captures – <i>Completed in 2021, 2022, 2023</i> 4. Habitat Surveys (SBVWCD) – Complete execution of spring habitat survey protocol covering all trapping plots sampled in fall – <i>Completed in 2022, 2023, 2024</i> 5. Soil Data - Screen collected soil data and ship labeled samples to BYU for analysis (SBVWCD) – <i>Completed in 2022 and 2024</i> 6. QA/QC - Perform QA/QC on habitat data collected and transfer clean datasets to USGS for analysis (SBVWCD) – <i>Completed in 2022, 2023, 2024</i> 7. Receive soil composition and texture analyses from BYU and transfer information to USGS for analysis (SBVWCD) – <i>Completed in 2023</i>
Key Findings	In total, 180 unique SBKR were captured across 53 of the 100 sampled plots distributed across the Wash Plan Preserve. Across these same plots, a total of 30 unique Dulzura kangaroo rat individuals were captured. The Dulzura kangaroo rat was noted as present in 10 of the 53 plots containing SBKR. The three plots with the greatest number of captures of SBKR, totaling 10 or more unique SBKR captures, were located within a few hundred yards of the Santa Ana River Channel east of Alabama Street and on either side of Orange Street. In 2022, 146 unique SBKR and 21 unique DKR individuals were captured across 51 plots; these totals are lower than in 2021 when 180 unique SBKR and 30 unique DKR individuals were captured. Unique SBKR captures were highest at 2 plots: 77 and 61 with 10 individuals each. Plot 77 overlaps lands currently managed by the Bureau of Land Management (BLM) east of Orange Street where a burn occurred in September 2020; it was previously mature alluvial fan sage scrub dominated by California juniper woodland in an area that had not flooded since before 1938. Plot 61 occurs in scalebroom scrub in an area that was frequently scoured up until about 1984 when the current State Route 210 bridge substantially altered downstream fluvial processes of the SAR. The total number of SBKR occupied grids was consistent between 2021 and 2022 (53 versus 51, respectively) despite the 18.9% decline in total unique SBKR captures. Of 27 plots trapped in 2021 and 2022 north and south of the Santa Ana River Channel, east and west of Orange Street, 26 plots were occupied by SBKR (96.3%) with an average of 4.4 unique SBKR per plot. These plots also showed good consistency between the years with 19/20 plots SBKR occupied both years. In 2023, SBKR were trapped on 50 of the 100 sampled grids. The number of unique SBKR captured equaled 198 individuals, an increase of 36% compared to 2022. Of 31 plots trapped in 2021, 2022, and 2023 in the mainstem of the Santa Ana River north and south of the river channel, east and west of Orange Street, 31 plots were occupied by SBKR in 2023. These plots have provided the majority of captured SBKR population within the Wash HCP monitoring (58.9% in 2021, 67.8% in 2022, and 73.7% in 2023).

Project Narrative Template: SBKR Trapping and Habitat Surveys	
Notes	Trapping of SBKR consistent with the monitoring protocol is expected to occur each fall across the Wash Plan Preserve for at least the first 10 years of implementation of the Wash Plan. Per the monitoring protocol, a minimum of 100 plots are to be trapped each year, with an estimated 90 of the 100 plots remaining static, and about 10 plots of the 100 being randomly selected each year. Spring habitat surveys are to be implemented each year in which trapping is to occur.

California Gnatcatcher Monitoring

Project Management: California Gnatcatcher Monitoring	
Project ID(s)	2101, 2204
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	The purpose of the project is to perform baselines surveys for the California gnatcatcher (CAGN) within the Wash Plan Preserve consistent with the Upper Santa Ana River Wash Habitat Conservation Plan. Surveys are to be completed in the spring and summer months and follow the guidance provided by the USFWS CAGN breeding survey protocol for areas located inside a Habitat Conservation Plan (HCP). Information on the location of breeding pairs of CAGN is to inform management activities and reinforce habitat protection measures taken to minimize human disturbance in high-value natural-resource areas of the Wash.
Contractor(s)/Researcher	Origin Biological
Time Period	2021-2024
Total Estimated Project Cost	\$31,225
Amount Budgeted in FY	\$10,000
Fund(s)	Wash Plan Endowment
Matching Contribution(s)	N/A
Landowner Involvement	SBVWCD, BLM
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Monitoring/research
Program Area	Sensitive biological resources
Resource (e.g., Monitoring or Management Target)	CAGN
Wash Plan Conservation Actions	
Species-specific Actions	CAGN Action 4, 6
Preserve-wide Objectives	
Monitoring Type (if applicable)	Baseline (Inventory) Monitoring
Monitoring Method (if applicable)	Probability Sampling (Visual Encounter Surveys)
Specific Threat/Stressor	Human activity (development and wildfire)
Management Treatment	N/A

Project Management: California Gnatcatcher Monitoring	
Intensity of Management	N/A
Available Report(s)	<i>Origin Biological 2021. 2021 Wash HCP Monitoring Results for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 18p.</i> <i>Origin Biological 2022. 2022 Wash HCP Monitoring Results for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 21p.</i> <i>Origin Biological 2023. 2023 Wash HCP Monitoring Results for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 15p.</i> <i>Origin Biological 2024. 2024 Wash HCP Monitoring Results for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 15p.</i> <i>Origin Biological 2024. Results of 2024 California Gnatcatcher and Least Bell's Vireo Nest Monitoring, Cowbird Nest Manipulations, and Cowbird Trapping in the Santa Ana River and Mill Creek Washes, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District and San Bernardino Valley Municipal Water District. 22p. – DRAFT REPORT</i>
Available Geospatial Product(s)	<i>GIS shapefiles are available for the following datasets: CAGN Survey Area 2021, 2022, 2023; CAGN Observation Points; 2021, 2022, 2023; CAGN Territory Boundaries 2021, 2022, 2023; Special Status Species Incidental Points 2021 and 2022</i> <i>*2024 CAGN Monitoring Results in Development</i>

Project Narrative Template: California Gnatcatcher Monitoring	
Overview	In 2021, 2022, 2023, and 2024, permitted biologist, Mikael Romich, was contracted to conduct surveys for CAGN consistent with the Wash Plan monitoring program. The survey methodology used for the survey periods is based on the focused protocol breeding surveys for jurisdictions within Natural Communities Conservation Planning interim section 4(d) process, which requires three repeat surveys for every 100 acres within the area to be surveyed (USFWS 1997). The survey area is held constant across years and totals 300 acres in size. Given the size of the area, a total of nine surveys are required to complete the survey protocol. Surveys are performed by slowly traversing each 100-acre survey area between 0600 and 1200 each day of the surveys. Surveys are timed so the entirety of the survey area is surveyed once in April, May, and June each year.

Project Narrative Template: California Gnatcatcher Monitoring	
Progress	Monitoring surveys for CAGN were conducted in the Wash Plan Preserve in the spring of both 2021 and 2022. Consistent with the focused protocol breeding surveys established by the USFWS in 1997, three rounds of breeding surveys were performed by Mikael Romich in 2021, with a single survey occurring in April, May, and June. Each individual survey covered 100 acres, and a total of three days of surveys were completed to cover the 300-acre survey area surveyed each month. In 2022, Mikael implemented the focused protocol breeding surveys in the same survey area during the same months of April, May, and June. Results of the completed annual breeding bird surveys were reported in August of 2021 and 2022. In 2023, surveys for CAGN were conducted in the Wash Plan Preserve in April, May, and June utilizing the same monitoring protocol as was employed in 2021 and 2022, apart from four additional field days dedicated to recording the nesting results of active nests being additionally employed in late July and early August. In 2024, consistent with the Wash Plan, and for the fourth year in a row, three rounds of California gnatcatcher surveys were completed by Mikael Romich in the Wash Plan Preserve in April, May, and June in the same 300-acre survey area surveyed in prior years. Importantly, for the second year in a row, in 2024, Mikael Romich completed three rounds of California gnatcatcher surveys using the same survey protocol at the Mill Creek Facilities consistent with the draft Conservation Benefit Agreement with the USFWS. Protocol monitoring of California gnatcatchers this spring highlighted a high incidence of nest parasitism by brown-headed cowbirds on California gnatcatchers in the Wash Plan Preserve and at the Mill Creek Facilities. Following notification to the Service of the parasitism, emergency permission was granted to the District by the USFWS on June 12 to monitor nests of California gnatcatcher for the purpose of removing and dispatching discovered eggs and nestlings of brown-headed cowbirds. In expanding permitted activities under the incidental take permit awarded to the District through approval of the Wash Plan, the Service took immediate action to assist the District in further protecting California gnatcatchers nesting on District property. Following approval by the USFWS, nest monitoring was initiated by the District in June and continued through August 2024.
Key Milestones Schedule	1. CAGN Surveys – Walk meandering transects within suitable habitat performing call playbacks when needed to document CAGN presence; for positive occurrences, map movements of individual birds to ascertain approximate use areas or breeding territories; record and track nests found during implementation of survey protocol – <i>Completed in 2021, 2022, 2023, 2024</i> 2. Review Data – Perform QA/QC on collected data prior to finalizing the dataset and transferring information to SBVWCD – <i>Completed in 2021, 2022, 2023, 2024</i> 3. Reporting – Complete a letter report summarizing the methods and results of the survey and data collection; report is to provide maps and a database of all positive CAGN occurrences and nests with a discussion of the estimated number of individual territories detected; positive occurrences of all other

Project Narrative Template: California Gnatcatcher Monitoring	
	special-status species detected during the survey are to be included in the shared database – <i>Completed in 2021, 2022, 2023, 2024</i>
Key Findings	Surveys performed in 2021 and 2022 confirmed successful breeding is occurring within the Wash even though both years experienced a relatively low amount of precipitation which often leads to limited productivity in the species. Noted similar levels of reproductive activity between years suggest stability within the population. The estimated number of pairs/territories of CAGN observed within the survey area during the survey period equaled nine territories in 2022 and 8 breeding territories in 2021. The estimated number of pairs with active nests/fledged young equaled five in 2022, with three pairs confirmed with double clutches, and two others suspected. In 2021, six pairs with successful nests were confirmed. In both years, nesting substrates included brittlebush (<i>Encelia farinose</i>), scalebroom (<i>Lepidospartum squamatum</i>), and California juniper (<i>Juniperus californica</i>). In 2021, individual breeding territory size was estimated at 9.1 acres. Surveys completed in 2023 again reinforced successful breeding is occurring within the Wash. Interestingly, the number of estimated territories climbed to 14 in 2023 from the reported 9 territories in 2022, with 11 territories successfully producing fledglings at least once during the survey period, a little more than double the number in 2022. The average minimum breeding territory size was 8.6 acres which is like the 2021 estimate and consistent with the average territory size of 8.4 acres reported for Riverside County by Branden and others in 1997 (see <i>The Auk</i> 114:601-609). In 2023, nesting occurred primarily in brittlebush (87.0 %) with one in hairy yerba santa, one in California buckwheat, and one in chamise (a new confirmed nest substrate). Chamise, sugarbush, and California juniper were regularly observed to support CAGN foraging opportunities and cover for fledglings. Surveys completed in 2024 reinforced breeding continued to occur within the Wash. The survey area partially or wholly supported 19 breeding pairs, which is an increase of five pairs from 2023. Interestingly, comparisons of the number of breeding territories from 2021, the first year formal surveys were performed consistent with the Wash Plan, to 2024, showed an increase from 5 to 19 pairs within the areas repeatedly surveyed each year. Unfortunately, although the number of active breeding pairs has increased each year, nest parasitism by brown-headed cowbirds was recorded for the first time in 2023 and then showed a dramatic increase in 2024. Of the 19 breeding pairs of California gnatcatchers observed in 2024, only 15.8% were recorded as successfully producing gnatcatcher fledglings. This is a drastic decline compared to 2023 when 78.6% of the territories were recorded as successfully producing fledglings. Although only one incidence of nest parasitism was observed in 2023, the number of detections of parasitism increased to 16 in 2024.
Notes	When evaluating information from additional studies of CAGN breeding in addition to the information captured from the 2021, 2022, and 2023 monitoring efforts, nesting substrate selection by CAGN was consistently strongly associated with brittlebush. The leafy structure of brittlebush is hypothesized to provide high levels of cover and concealment for CAGN nests. Based on field observations made in 2021 and 2022, nesting activity was hypothesized to occur both earlier (i.e., March) and later (i.e., July) in the season beyond what is captured when conducting the surveys during the months

Project Narrative Template: California Gnatcatcher Monitoring	
	of April, May, and June. This belief of nesting activity continuing later into the nesting season was confirmed by the additional surveys employed in late July and early August in 2023. In support of the California Regional Monitoring Initiative, on November 17, 2023, District staff participated in the Partner Coordination Meeting hosted by the USGS together with the USFWS. During the meeting USGS researchers highlighted the results of regional surveys completed in 2016 and 2020, and made plans with participating parties, mostly public agencies, interested in contributing labor and staff to support implementation of regional surveys in 2024. The regional monitoring efforts provide the USFWS with a measure of the status and trend of the California gnatcatcher from Ventura to the United States - Mexico border. Regional surveys were initiated in 2016 and are scheduled to occur every four years. District staff participated in the regional monitoring efforts in 2020. As the results of the regional surveys inform California gnatcatcher management and monitoring activities performed by the District within the Wash Plan Preserve, the District participated in surveys on District-owned property in the Wash again in spring 2024. Specifically, on March 19, 20, April 2, 3, 18, and 24, District staff completed three rounds of regional California gnatcatchers surveys per the established protocol. The complementary vegetation monitoring activities were completed at four locations within the Wash Plan Preserve by May 16. On June 13, the USFWS determined removal and dispatching of cowbird eggs and nestlings/fledglings falls under the purview of the Adaptive Management and Monitoring Plan for the Wash Plan. The Service determined the activities to be proactive adaptive management, as an emerging threat had been identified through monitoring efforts in the Plan Area. To this end, this activity was found to fall under Term and Condition 4.1 of the biological opinion for the Wash Plan (FWS-SB-08B0318 - 20F1299), and biologists who have demonstrated experience in identifying and removing cowbirds of all life stages are authorized to perform this activity.

Slender-horned Spineflower Monitoring Protocol and Monitoring

Project Management: Slender-horned Spineflower Monitoring Protocol and Monitoring	
Project ID(s)	2102, 2205
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	Project is to result in development and implementation of a standardized survey methodology and monitoring protocol for locating and measuring trends in the status of slender-horned spineflower (<i>Dodecahema leptoceras</i> ; SHSF) populations present in the Wash Plan Preserve through time. Prior efforts to monitor known populations of SHSF are to be evaluated and subsumed into to the new monitoring program.
Contractor(s)/Researcher	Origin Biological (2102); Dudek (2205); SBVWCD
Time Period	2021-2024
Total Estimated Project Cost	\$2,920 (Origin Biological); \$65,000 (Dudek); 612 hours (SBVWCD)

Project Management: Slender-horned Spineflower Monitoring Protocol and Monitoring	
Amount Budgeted in FY	160 hours (SBVWCD Staff)
Fund(s)	Wash Plan Endowment; Conservation District Funds
Matching Contribution(s)	N/A
Landowner Involvement	SBVWCD, BLM
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Monitoring/research
Program Area	Sensitive biological resources
Resource (e.g., Monitoring or Management Target)	SHSF
Wash Plan Conservation Actions	
Species-specific Actions	SHSF Action 9, 10A, 10B, 10C, 10D
Preserve-wide Objectives	N/A
Monitoring Type (if applicable)	Baseline (Inventory) Monitoring, Targeted Monitoring
Monitoring Method (if applicable)	Full census/total counts
Specific Threat/Stressor	Human activity (development and nitrogen deposition); Invasive grasses
Management Treatment	N/A
Intensity of Management	N/A
Available Report(s)	<i>Origin Biological 2021. Slender-horned Spineflower Results of 2021 Monitoring. Unpublished report prepared for San Bernardino Valley Water Conservation District. 41p.</i> <i>San Bernardino Valley Water Conservation District 2024. Primer on Slender-horned Spineflower (Dodecahema leptoceras) Restoration in the Upper Santa Ana River Wash. Prepared by San Bernardino Valley Water Conservation District. 38p.</i>
Available Geospatial Product(s)	<i>GIS shapefiles are available for the following datasets:</i> <i>SHSF Extant Target Populations; SHSF Monitoring Results; 2022, 2023, 2024; Micro-Meteorological Monitoring Station Locations; 2023 Comprehensive Survey Area & Results.</i>

Project Narrative Template: Slender-horned Spineflower Monitoring Protocol and Monitoring	
Overview	In 2021, the Conservation District employed Dudek to develop and implement a comprehensive survey methodology and monitoring protocol for SHSF across the Wash Plan Preserve. The monitoring protocol and complementary surveys were to be developed and implemented with assistance provided by SBVWCD. Fieldwork was to be initiated in the spring of 2022 and continue through 2023. Depending on weather conditions, with emphasis on the amount of winter precipitation, a single comprehensive survey for SHSF populations was to be implemented in either 2022 or 2023. The comprehensive survey is to result in determination of the location and extent

Project Narrative Template: Slender-horned Spineflower Monitoring Protocol and Monitoring	
	of suitable habitat in the Wash Plan Preserve and definition of the extent and location of discovered SHSF populations. The development of the monitoring program is to build upon previous monitoring efforts implemented by Origin Biological and other entities including the Science Applications International Corporation (SAIC) and ELMT Consulting.
Progress	The SHSF Patch Database prepared in June 2021 was reviewed in March 2022 by Dudek and SBVWCD to assess the conditions and observed trends of historic SHSF populations present within the Wash Plan Preserve. Results of monitoring efforts completed in 2021 by Origin Biological were also reviewed by Dudek and SBVWCD and used to inform baseline conditions of known populations and the establishment of the 17 formally recognized populations of SHSF defined as to anchor the monitoring program for the next several years. On March 16 SBVWCD held a remote project kickoff meeting with the team from Dudek to get acquainted with one another and discuss project logistics. This was followed by a field meeting on April 6 to determine what, within the defined project scope, can be accomplished in 2022 and what was best pushed to next year due to the continued drought and exceptionally dry January and February months. After the field visit, the collective team decided to go forward with monitoring of the known colonies in spring of 2022, initiating the work in May, while pushing the comprehensive Preserve-wide surveys for new populations to 2023. Following the field visit, Dudek, working with SBVWCD, developed the Patch Monitoring Survey Protocol to be implemented during monitoring surveys using the Survey 123 platform. SBVWCD, working with Dudek, completed surveys for SHSF across the 17 recognized populations of SHSF on May 18, 19, and 24. Prospective micro-meteorological monitoring stations used to collect critical data on site conditions at known and/or prospective SHSF population locations were identified in June 2022 with installation initiated in September 2022. Addressing SHSF Objective 9, a single comprehensive survey for SHSF populations was implemented in spring 2023. The comprehensive survey followed the completion of the annual patch monitoring efforts and was designed to identify the location and extent of suitable habitat in the Wash Plan Preserve and define the extent and location of any newly discovered SHSF populations. In 2024, District staff conducted annual monitoring of known patches of SHSF within the Wash Plan Preserve on May 14, 21, 22, and 29. In total, over the four field days, 21 patches were monitored allowing for comparisons across the 2022, 2023, and 2024 field seasons. On May 14 and 23, 2024, staff worked with the California Botanical Garden (CalBG) to collect tissue of SHSF for use in laboratory studies documenting the genetic diversity found within and between known populations of SHSF. Activities performed by CalBG are funded through a contract with BLM and designed to help inform future restoration efforts supporting recovery of the species. On June 20, staff delivered the final plant material to be collected at SHSF out-planting sites to the CalBG facilities in Claremont for genetic testing. During the visit, staff were

Project Narrative Template: Slender-horned Spineflower Monitoring Protocol and Monitoring	
	provided with a tour of the genetics lab, plant anatomy lab, cold-storage facilities, and nursery which all are run by CalBG staff to collectively describe, protect, and enhance native plant species in California.
Key Milestones Schedule	1. Literature Review – Conduct a comprehensive review of existing literature pertaining to SHSF and the results of SHSF Working Group meetings; existing reports highlighting the results of recent monitoring efforts implemented by SBVWCD were to be included in the review (Dudek) – <i>Completed</i> 2. Develop Monitoring Protocol – Establish information to be collected during monitoring of known SHSF patches; formalize patch monitoring data collection form and monitoring methodologies, including methods for collecting spatial information highlighting patch location, size, and shape, completing population counts and population description, collecting covariate data describing conditions in and adjacent to the sampled patches (Dudek/SBVWCD) – <i>Completed</i> 3. Monitor Known Populations – Perform monitoring of known populations implementing the new protocol (Dudek/SBVWCD) – <i>Completed in 2022, 2023, and 2024</i> 4. Comprehensive Survey of the Wash Plan Preserve – Conduct a focused survey for SHSF within the Wash Plan Preserve; through the use of walking transects botanists and biologists are to survey the full extent of suitable habitat with special attention paid to areas associated with historic locations of SHSF (Dudek/SBVWCD) – <i>Completed in spring 2023</i> 5. Environmental Monitoring – Setup and implement a micro-meteorological monitoring program measuring air temperature, relative humidity, soil moisture, soil temperature, and soil electrical conductivity adjacent to occupied patches of SHSF (Dudek/SBVWCD) – <i>Monitoring stations became fully functional at three locations spanning the extent of SHSF communities in the Wash by spring 2023</i> 6. Letter Report – Results of the comprehensive survey, focused surveys, environmental data collected at the monitoring stations, and finalized survey methodology are to be highlighted and memorialized in a brief memorandum (Dudek/SBVWCD) – <i>Memorandum completed as part of development of NRMP in summer 2023</i>
Key Findings	Seventeen known populations were sampled across the Wash Plan Preserve in 2022. Spineflower was detected at seven populations, with population No. 13 being the largest with 1,423 individuals. No other population had more than 100 individuals. A total of 1,739 individuals were counted in 2022. Each of the populations (or colonies) surveyed in 2022 were known and surveyed by various entities in previous years. The only two exceptions are Populations 1A and 1C which were discovered just beyond the established Population 1B (previously identified as Population 1). In the newly developed survey protocol, the team established a 5-meter rule used to distinguish separate populations when boundaries of newly discovered populations are otherwise close to known populations. Following this protocol, Dudek and SBVWCD defined the two new populations as 1A and 1C. Recognizing there was little rain that fell in January, February, and March, seemingly important months for precipitation events for successful germination and growth in the

Project Narrative Template: Slender-horned Spineflower Monitoring Protocol and Monitoring	
	species, the team expected the number of seeds in the seed bank at each of the known populations that attempted to germinate this year to be on the low side. The one exception may be Population 13, which again saw a sizeable number of seeds successfully germinate as recognized by the high number and typically larger size of counted individuals. The lack of observations of SHSF at populations numbered 6 through 11 and 14 through 17 did not come as a surprise. Mikael Romich (Origin Biological), conducting surveys on behalf of the Conservation District in 2021, equally found no individual plants at populations 6 through 11 and 14 through 17 and has noted downward trends with regards to observed numbers in these same populations over the last several years. A total of 20 patches were surveyed in 2023. This number grew from 2022 with the discovery of a new patch just west of Patch 13 during the monitoring period. Equally important to this discovery, after no observations of SHSF just east of Orange Street in both 2021 (surveyed by Mikael Romich) and 2022, the Conservation District discovered a single plant in Patch 16. Interestingly, when comparing numbers from 2022 with numbers from 2023 across all the surveyed patches, although the total area of the mapped patches did not change much between years (1,301 SQFT in 2022 vs 1,292 SQFT in 2023) the total number of individuals observed was about half as many in 2023 (816) relative to 2022 (1,739). The large difference in the number of individuals observed between years is interesting as 2022 was recognized to be an exceptionally dry year (from January on) while 2023 was incredibly wet throughout the winter and early spring. Preliminary data collected in the field suggests the size of individual plants to be much greater in 2023 when compared to 2022. The size difference may translate into a greater number of seeds produced per plant and even potentially more seeds produced in 2023 than 2022 across all the surveyed patches. Conservation District staff performed phenology checks of SHSF beginning in late March 2023, extending through much of April. Information gained from phenology checks assisted Dudek in planning for the comprehensive surveys of the Wash scheduled to occur over an 11-day period in May. Phenology checks, in which the percentage of SHSF plants at a single population exhibiting characteristics of branched stems and floral clusters are noted, also aided the Conservation District staff in scheduling the planned annual monitoring of known populations of SHSF. Comprehensive surveys for new SHSF populations of the Wash Plan Preserve were initiated by Dudek, with Conservation District support, on May 2. The project was implemented over a total of four weeks with District staff participating in field surveys with the team from Dudek on May 3, 9, 10, 11, 16, 17, 18, 23, and 24. Importantly, no new patches of SHSF were discovered during the surveys. Interestingly, a patch of the rare <i>Mucronia californica</i>, California spineflower, originally misidentified as slender-horned spineflower, was discovered in the Upland Mixed Use Management Unit on BLM property. Confirmation of the correct species identification was performed by BLM and SBVWCD on May 15, 2024 when revisiting the mapped patch the following spring. The patch of California spineflower is in the central part of the Wash Plan

Project Narrative Template: Slender-horned Spineflower Monitoring Protocol and Monitoring	
	Preserve just outside of the 1969 breakout area. The patch is 27 square feet in size and contained 12 individuals in 2023. In total, eighty-two (82) potential out-planting locations for SHSF were mapped during the spring surveys. The mapped out-planting locations total 3.7 acres of suitable slender-horned spineflower habitat. Survey 123 data/attributes were collected at each of the mapped polygons to aid future evaluation and selection of potential out-planting locations. In 2024, the total number of patches surveyed increased to 21, as a new patch was discovered just west of Patch 12 during the monitoring period. The Conservation District conducted annual monitoring of known patches of SHSF within the Wash Plan Preserve on May 14, 21, 22, and 29. In total, over the four field days, 21 patches were monitored allowing for comparisons across the 2022, 2023, and 2024 field seasons. In total, 11 of the 21 patches surveyed in 2024 had SHSF noted as present. The number of plants observed in 2024 at the surveyed patches increased to 3,688, or more than four times as many as in 2023, and twice as many as observed in 2022. Interestingly, consistent with 2022 and 2023, the number of plants observed in patch No. 13 in 2024 represented more than 75% of the total plant observed across the entirety of the Wash Plan Preserve.
Notes	Seeds were collected from extant populations by Dudek and the California Botanic Garden in support of the seed-bulking activities in 2022, 2023, and 2024. Following successful implementation of the new monitoring protocol in 2022, SBVWCD kept the protocol largely unchanged in 2023 and 2024 and expects to continuously implement the protocol on an annual basis for at least the first ten years of the monitoring program. It is important to note the rain-year of 2023-24 was the second very productive rain-year in a row. The amount of precipitation falling across the two rain-years (2022-23 and 2023-24) was the highest recorded in southern California (Los Angeles, specifically) since the late 1800s.

California Wildlife Species of Special Concern

Although the species highlighted in this section are not covered by the Wash Plan, each of the profiled species is recognized as a California Wildlife Species of Special Concern and was identified as present within the Wash Plan Preserve during implementation of the Wash Plan management and monitoring activities. Noting the occurrence of these species in the Wash Plan Preserve by citing observations within the Annual Report provides the Wildlife Agencies with assurances the species are present and reinforces the position held by the Conservation District to recognize and manage for all sensitive species present on the conserved lands.

FY24 Updates: Coast horned lizard (CA Designation: S3, S4) – Information pertaining to coast horned lizard (*Phrynosoma blainvillii*) observations made beginning in the spring 2022 follows.

All coast horned lizard sightings occurred in the Santa Ana River Wash near the mainstem of the Santa Ana River on either side of State Route 210. Sightings were made by chance and occurred when walking to established monitoring/trapping locations for San Bernardino kangaroo rat for the purposes of completing habitat surveys. The area covered when walking extended, approximately, west to east, from Alabama Street to Orange Street. Native harvester ants were present in the immediate areas of all three sightings of the horned lizards.

The first horned lizard was found about 300 meters east of Alabama Street (on May 3 at 2:30 PM) on a sandy terrace on the south side of the Santa Ana River south of the bridge. The second discovery was made on May 25 just before 10:00 AM. The lizard fled into a large-scale broom (*Lepidospartum squamatum*) when taking flight and was not captured. Its movement gave away its location and allowed for the discovery, but also the escape. The third discovery was made on May 31 at 4:10 PM. The female lizard's camouflage was very effective. She was discovered by chance observation and did not move but remained still on a small granite cobble until the moment of capture. Harvester ants were in the immediate vicinity.

In spring 2023, one adult horned lizard was located within the Santa Ana River Channel east of SR 210 and west of Orange Street. In 2024, a single adult female horned lizard was found on May 7 just east of SR 210 on a terrace above the Santa Ana River Channel.

With five (5) captures of horned lizards in this general area of the Wash in spring of 2022, 2023 and 2024, the Land Resources Team from SBVWCD is gaining confidence this area of the Santa Ana River Wash is a valuable location for the species. Increased attention and management efforts regarding addressing human trespass in the area are warranted. Details tied to incidental observations made by District staff in 2019, 2022, 2023, and 2024 are being shared with the USGS for publication.

FY24 Updates: Red-diamond rattlesnake (CA Designation: S3) – Information pertaining to red-diamond rattlesnake (*Crotalus ruber*) follows.

The red diamond rattlesnake (*Crotalus ruber*) was observed in two locations in spring 2022. Both locations were within the Riversidean alluvial fan sage scrub habitat associated with the Santa Ana River. One observation fell within the Wash Plan Preserve in the location of the "1969 Breakout" east of D-Dike and the other just south of the Greenspot Levee and west of Greenspot Road. Continued conservation and management actions benefiting the species is recommended.

In 2023, an adult red-diamond rattlesnake was observed by SBVWCD staff near CEMEX mining activities about 1,000 feet east of SHSF seed-bulking site. James Gannon (BLM) identified two adult red-diamond rattlesnakes in late April/early May just off Cone Camp Road in the immediate vicinity of the Animex fencing lining the road running parallel with Enhanced Recharge Project Phase 1B.

In 2024, a large adult red-diamond rattlesnake was observed by James Gannon on March 26 crossing over the concrete weir on Cone Camp Road. An adult red-diamond was observed amongst boulders by SBVWCD staff on April 9 on BLM property east of D-Dike and southwest of Railroad Line Road. On July 20 an adult red-diamond was found dead in the footprint of the Abbey Fire just north of the Santa Ana River Channel by a biologist with the USGS. The snake had been burned by the fire.

FY24 Updates: Western spadefoot (CA Designation: S3) – Information pertaining to western spadefoot (*Spea hammondi*) follows.

Although not identified on SBVWCD property during formal surveys conducted by the USGS in 2022, the larvae of western spadefoot (*Spea hammondi*) were suspected as being present within temporary pools located on SBVWCD property east of SR 210 and west of Orange Street currently leased for mining operations in 2022. Although confirmation of the detection is waiting formal validation by the USGS, the suspected observation is consistent with historic observations of adults of the species along Orange Street (personal communication, James Gannon). The compatibility of species presence with sand and gravel extraction and groundwater recharge operations is being explored by SBVWCD staff.

In 2023, following the exceptionally wet winter and rains of early spring, western spadefoot larvae were found to be present in shallow water conditions of one of the active groundwater basins (D-Dike) within the Wash Plan Preserve. Tadpoles were also found just outside of the Wash Plan Preserve in a seasonal pool along the perimeter road of the Borrow Pit and in a seasonal pool associated with a historic groundwater recharge basin just to the southwest of the Borrow Pit. Additionally, adult spadefoot was noted by James Gannon as being present along Cone Camp Road in late April/early May.

Western Spadefoot Proposed Listing – On December 15, 2023, District staff participated in a discussion with USFWS about the recent proposal by the Service to list the western spadefoot and the implications for implementation of the Wash Plan. On February 5, 2024, District staff submitted a comment letter to the USFWS for inclusion and consideration of the proposed listing of the northern and southern distinct population segments of the western spadefoot as a threatened species. Following a discussion with the USFWS on June 19, staff composed and shared a briefing document with the Service on June 26 highlighting the reasons for inclusion of groundwater recharge as a recognized beneficial activity to the western spadefoot to be considered in an anticipated Final Rule addressing the listing of the species.

FY24 Updates: California glossy snake (CA Designation: S2) – Information pertaining to California glossy snake (*Arizona elegans occidentalis*) follows.

On June 11, 2024, District staff, together with AECOM and the USACE, found and captured an adult glossy snake at the Plunge Creek Conservation Project. The snake was actively crossing the creek bed when discovered at 9:28 AM. There was still water and tadpoles in the creek bed, although much of the creek had already dried up for the season.

Management Projects

The Wash represents a highly altered alluvial system. Existing or baseline conditions throughout the Wash are a combination of natural conditions existing in a varied state of disturbance due to past and present fluvial processes and areas undergoing active, albeit it limited, management.

One of the identified biological objectives of the Wash Plan addresses the need for the permit holder to develop a plan for the management of the Wash Plan Preserve (Section 5.1.2 of HCP; Preserve Objective 3). Consistent with this objective, a draft comprehensive natural resource management plan is to be prepared within two years of the permit issuance and finalized within three years.

Specific actions to be covered within the management plan, including the steps needed to improve habitat conditions and expand suitable habitat for Covered Species, are identified as key elements of the HCP conservation program (see Section 5.2.2, *Approach to Habitat Management*). An Adaptive Management and Monitoring Program (AMMP) has been prepared (See Section 5.3 and Appendix B of the HCP) to provide specific details on the implementation of the habitat and species management actions identified in Section 5.2.2 of the HCP. As the ITP holder for the Wash Plan, and consistent with the requirements of the HCP, the District is developing the resource management plan for implementation within the Wash Plan Preserve. The resource management plan is meant to be a living document. Once the initial draft is approved by the Wildlife Agencies, updates to the plan are expected to be brought forward for review and consideration by the Wildlife Agencies every five years.

Consistent with the Wash Plan, the primary habitat management approach to be highlighted in the resource management plan and employed by the Preserve Manager, working with the Conservation District and other partners, focuses on the maintenance and enhancement of overall habitat quality for Covered Species through: (1) the control of non-native annual grasses and other invasive non-native plants, and (2) the restoration and enhancement of slender-horned spineflower and woolly-star populations. Equally, opportunities to improve habitat conditions for San Bernardino kangaroo rat are to be pursued and implemented. Collectively, the activities implemented in support of these goals are detailed in this section.

FY24 Updates:

Principal management projects implemented in FY24 include the following:

- Slender-horned Spineflower Management (SHSF Action 2, 5, 6A, 6B)
- Slender-horned Spineflower Restoration Program (SHSF Action 3, 4)
- Management of Trespass, Unauthorized Encampments, and Illegal Dumping (Preserve Action 2A, 2B, 2C, 2D, 2E)

Slender-horned Spineflower Management

Project Management: Slender-horned Spineflower Management	
Project ID(s)	2206
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	Purpose of the project is to implement specific management activities consistent with the Wash Plan focused on reducing invasive plant cover in areas of the Wash Plan Preserve recognized as suitable slender-horned spineflower (<i>Dodecahema leptoceras</i> ; SHSF) habitat.
Contractor(s)/Researcher	IERCD
Time Period	2021-2024
Total Estimated Project Cost	\$90,000
Amount Budgeted in FY	\$22,500
Fund(s)	Wash Plan Endowment
Matching Contribution(s)	N/A
Landowner Involvement	SBVWCD, BLM

Project Management: Slender-horned Spineflower Management	
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Land Management
Program Area	Sensitive biological resources
Resource (e.g., Monitoring or Management Target)	SHSF
Wash Plan Conservation Actions	
Species-specific Actions	SHSF Action 2, 5, 6A, 6B
Preserve-wide Objectives	N/A
Monitoring Type (if applicable)	N/A
Monitoring Method (if applicable)	N/A
Specific Threat/Stressor	Human activity (climate change and nitrogen deposition)
Management Treatment	Use of herbicides; manual and/or mechanical removal
Intensity of Management	Partial
Available Report(s)	<i>IERCD 2021. Slender-horned Spineflower Habitat Enhancement Completed Work Summary 2021. Unpublished report prepared for San Bernardino Valley Water Conservation District. 6p.</i> <i>IERCD 2022. Slender-horned Spineflower Habitat Enhancement Completed Work Summary 2022. Unpublished report prepared for San Bernardino Valley Water Conservation District. 15p.</i> <i>IERCD 2023. Slender-horned Spineflower Habitat Enhancement Completed Work Summary 2023. Unpublished report prepared for San Bernardino Valley Water Conservation District. 19p.</i>
Available Geospatial Product(s)	<i>Available GIS data is to be transferred from IERCD to SBVWCD in fall of 2024</i>

Project Narrative Template: Slender-horned Spineflower Management	
Overview	Consistent with the Memorandum of Understanding between SBVWCD and the Inland Empire Resource Conservation District (IERCD) executed in 2019, specific Task Orders were developed by SBVWCD which dedicated funds for IERCD to assist with implementing elements of the Wash Plan focused on enhancement of slender-horned spineflower habitat in 2021, 2022, 2023, and 2024. Enhancement activities focused on the treatment and removal of non-native grasses and broadleaf weeds from areas of the Wash Plan Preserve known to support SHSF. Treatment activities focus on enhancing the immediate vicinity surrounding populations of SHSF.
Progress	In 2021 enhancement areas were delineated and broadleaf weeds and non-native grasses were manually removed from treatment areas. Approximately, fifteen 42-gallon trash bags were filled and removed over the course of four days in March.

Project Narrative Template: Slender-horned Spineflower Management	
	From January through May of 2022, IERCD completed selective removals of nonnative grasses through herbicide applications utilizing a grass specific herbicide within the enhancement areas. Broadleaf weeds, including short-pod mustard and Saharan mustard were removed manually and hauled offsite. In 2023, field work was initiated in January with follow up work performed in February and March. Targeted exotic species treated were invasive annual grasses (<i>Bromus</i> sp.), red-stemmed filaree (<i>Erodium cicutarium</i>), and Sahara mustard. Annual monitoring data and photo collections were performed in each year of treatment across eight fixed 1X1 meter monitoring plots established within SHSF enhancement areas adjacent to four known SHSF populations. Beginning in January and extending through April 2024, IERCD implemented the fourth year of enhancing native patches of SHSF through use of herbicide to treat annual grasses and manually removing broadleaved invasives growing within 30 meters of known locations. All invasive species within the 30-meter polygons were targeted for removal across all but three target treatment areas. Target invasive species that were treated or removed included short-pod mustard (<i>Hirschfeldia incana</i>), Saharan mustard (<i>Brassica tournefortii</i>), Ripgut brome (<i>Bromus diandrus</i>), red brome (<i>Bromus rubens</i>), Mediterranean grass (<i>Schismus barbatus</i>), and cheatgrass (<i>Bromus tectorum</i>)
Key Milestones Schedule	1. Perform invasive species treatments within 15 meters of known extant, historic, and newly observed SHSF populations to achieve less than or equal to 3% invasive species cover – <i>Completed in 2022, 2023, and 2024</i> 2. Perform invasive species treatments within an additional 15-meter buffer immediately outside of the aforementioned 15-meter buffer of known extant, historic, and newly observed SHSF populations to achieve less than or equal to 15% invasive species cover – <i>Completed in 2022, 2023, and 2024</i> 3. Create GPS polygons of work locations with attributes including date, action, etc. – <i>Completed</i> 4. Capture established GPS photo points over select SHSF populations – <i>Completed in 2021, 2022, 2023, and 2024</i> 5. Prepare success criteria monitoring in designated monitoring plots to document invasive species cover reductions – <i>Completed in 2022 and 2023</i> 6. Create summary reports detailing work and monitoring results – <i>Completed in 2021, 2022, and 2023; 2024 summary report is scheduled to be delivered by the close of the Calendar Year</i>
Key Findings	Visible reductions in nonnative plant density have been observed across the enhancement areas between 2021 and 2022. Increasing bare ground cover was also noted between 2021 and 2022, with an almost doubling of the measured area between years. Results from field efforts in 2023 show an increase in native cover and non-native cover together with a decrease in the amount of bare ground. Although the quantitative results for 2024 are still pending at the timing of writing of this report, like other areas of the wash, the 2023-24 rainy season produced

Project Narrative Template: Slender-horned Spineflower Management	
	unexpected landscape-scale flushes of <i>Festuca myuros</i> . <i>Festuca myuros</i> was a common occurrence across most of the treatment polygons.
Notes	The exceptionally dry months of January, February, and March 2022 are expected to have contributed to the observed measured declines in non-native cover and increase in observed bare ground cover making it difficult to determine the effect of management actions alone. Following monitoring activities conducted in 2024, one very big question is whether <i>Festuca</i> grassland is replacing brome grassland or if this only occurs during big, rare rain years.

Slender-horned Spineflower Restoration Program

Project Management: Slender-horned Spineflower Restoration Program	
Project ID(s)	2207
Project Title(s)	See contract file(s)
Project Purpose	Project is to result in development and implementation of a restoration program for the slender-horned spineflower (<i>Dodecahema leptoceras</i> ; SHSF) to be implemented across the Wash Plan Preserve. The restoration program is to be informed by monitoring known populations of the species and existing knowledge of local conditions considered suitable for supporting establishment of new colonies.
Contractor(s)/Researcher	Dudek; California Botanic Garden; SBVWCD
Time Period	2021-2024
Total Estimated Project Cost	\$226,550; 524 hours (SBVWCD Staff)
Amount Budgeted in FY	300 hours (SBVWCD Staff)
Fund(s)	Wash Plan Endowment
Matching Contribution(s)	N/A
Landowner Involvement	SBVWCD, BLM
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Land Management
Program Area	Sensitive biological resources
Resource (e.g., Monitoring or Management Target)	SHSF
Wash Plan Conservation Actions	
Species-specific Actions	SHSF Action 2, 3, 4, 5
Preserve-wide Objectives	N/A
Monitoring Type (if applicable)	N/A
Monitoring Method (if applicable)	N/A
Specific Threat/Stressor	Human activity (development and nitrogen deposition); Invasive grasses

Project Management: Slender-horned Spineflower Restoration Program	
Management Treatment	Seed bulking; seeding
Intensity of Management	Full treatment (at local level)
Available Report(s)	<i>San Bernardino Valley Water Conservation District 2024. Primer on Slender-horned Spineflower (Dodecahema leptoceras) Restoration in the Upper Santa Ana River Wash. Prepared by San Bernardino Valley Water Conservation District. 38p.</i>
Available Geospatial Product(s)	<i>GIS shapefiles are available for the following datasets: 2023 Comprehensive Survey Results (potentially suitable habitat for SHSF Out-planting Location); 2023/2024 Out-planting Locations; Micro-Meteorological Monitoring Station Locations; 2022, 2023, & 2024 Extant Populations</i>

Project Narrative Template: Slender-horned Spineflower Restoration Program	
Overview	In 2021, the Conservation District employed Dudek to develop a restoration program for SHSF to be implemented across the Wash Plan Preserve. The restoration program was to be developed and implemented with assistance provided by SBVWCD. The development of the restoration plan is to be timed to follow initiation of fieldwork tied to a comprehensive Preserve-wide survey and monitoring of known SHSF populations. The comprehensive survey is to result in the mapping and description of the extent of potentially suitable habitat for SHSF in the Wash Plan Preserve and documentation of any discovered SHSF populations. Development of the restoration program is to build upon previous research involving the species and the knowledge shared by members of the SHSF Working Group. In support of the restoration program, the principal activity to be implemented in fall/winter of 2022 involves establishment of an onsite seed bulking practice in which the restoration team, operating under the guidance of Dudek and the California Botanic Garden, are to initiate growing of collected seeds in a controlled nursery setting prior to transferring young plants to an onsite location in the Wash where individual plants can be continually watered and managed throughout the growing season to increase size and flowering output. Plants are to be grown in the Wash following initial germination and establishment to allow them the chance to take advantage of native pollinators. The second principal activity to be implemented under the program involves seeding at one or more out-planting locations in the Wash Plan Preserve. Planned fieldwork associated with the San Bernardino kangaroo rat monitoring program and the Preserve-wide surveys planned for SHSF will provide SBVWCD and Dudek the chance to walk much of the Wash in the spring of 2022 and 2023 surveying vegetation and soils. During these outings the restoration team maps several locations with the potential to support the establishment of new spineflower populations. In at least one of these locations in the fall of 2023, out-planting trials are to be initiated prior to the onset of the new rain year. Once seed is sown at the out-planting trial sites, SBVWCD is to initiate monitoring of the trials throughout the remainder of the growing season with the potential to revisit and re-seed the same areas again in subsequent years.

Project Narrative Template: Slender-horned Spineflower Restoration Program	
Progress	In 2022, seeds were collected on June 6 from monitored populations of SHSF located within the Wash Plan Preserve. Collected seeds were collected and processed (that is, cleaned and counted) by the California Botanic Garden (CalBG). Of the total of 4,014 seeds collected from 390 plants in spring, 500 to 750 were to be made available for bulking and direct seeding activities in the fall/winter of 2022. District staff submitted a 2081(a)-research permit application to conduct seed bulking and direct seeding activities for review and approval by CDFW's Native Plant Program on October 7. Questions from CDFW tied to the submitted application were received on October 28. Responses were provided by the District on November 2. A fully executed copy of the Scientific, Educational, or Management Permit (2081(a)-22-008-RP) was received from CDFW on November 22, allowing planned work tied to bulking activities and out-planting trials to move forward in 2022 and 2023. District staff toured prospective seeding sites for slender-horned spineflower on BLM property with the BLM state botanist on November 18. As a precursor to sowing seeds on federal property, BLM proposed to work with the District and CalBG to conduct genetic testing on monitored extant populations within the Wash to better understand the relatedness among populations and identify potential opportunities and constraints for mixing seed from different colonies during the restoration efforts. In December, District staff visited the proposed seed-bulking site located on District property east of CEMEX operations and coordinated with Dudek and CalBG about the propagation activities needed to take place at the botanic garden prior to the transfer of hundreds of plants from the botanic garden to the bulking site in early spring. On December 20, District staff assisted Dudek Geologist with installation of Microclimate data stations and loggers at 3 sites. The first site is located just east of CEMEX operations, where one of the largest spineflower populations is known to exist, and near where plants established from the germination trials are expected to be transplanted to initiate seed bulking. The second site is on BLM property off Railroad Line Road, where no spineflower have been observed but the area is a suitable location for future seeding efforts. The third site is an area on BLM property just west of Orange Street that is known to support spineflower populations. The microclimate data to be collected includes air temperature, relative humidity, soil moisture, soil temperature and soil electrical conductivity. In April of 2023, spineflower plants growing in the controlled nursery setting were transferred to the seed bulking location where the individual plants were continually watered and managed throughout the growing season to increase size and flowering output of individual plants. As of late June 2023, approximately 400 plants were growing at the bulking site, receiving supplemental water approximately two days a week. On June 22, District staff estimated all the plants at the bulking site had developed floral clusters and about 65 to 70% were flowering. Final watering of the plants growing at the bulking site took place on July 14. Seed collection at the bulking site was initiated in mid to late July and completed on September 20, 2023. Following collection, seeds were transferred from Dudek to CalBG for cleaning, counting, germination testing, and placement in short-term storage

Project Narrative Template: Slender-horned Spineflower Restoration Program	
	On November 1, 2023, an estimated 103,360 seeds collected from bulking activities in 2023 were sown at six (6) out-planting locations in the Wash Plan Preserve as part of the planned out-planting trials. On December 7, District staff revisited a subset of the out-planting locations and SHSF Patch No. 13 to check for early evidence of germination of SHSF. Photos were taken of the new plant growth observed for future identification of species. Activities tied to coordinating the logistics associated with the second year of seed bulking site were initiated with CalBG and Dudek in November and advanced in December 2023. A request, submitted by the District to CDFW, for a three-year extension of the District's 2081(a) research permit from the CDFW Native Plant Program was made in December and approved by CDFW in April 2024. The permit covers activities tied to the restoration program through December 2026, including conducting additional bulking and out-planting trials in 2024, 2025, and 2026. On January 4, 2024, District staff confirmed germination of SHSF at the out-planting locations. Following the discovery, Conservation District staff set up a formal monitoring program of the out-planting sites for 2024. On January 17, District staff conducted the first round of formal monitoring of SHSF growing at the six experimental out-planting locations within the Wash Plan Preserve. In total, 1,136 young SHSF plants were counted growing in January at the out-planting locations following seeding in November. On February 8, District staff conducted the second round of formal monitoring of SHSF growing at out-planting locations, counting a total of 2,961 young SHSF plants growing. On March 12, District staff, together with Dudek, counted a total of 5,205 SHSF growing at the out-planting locations. Importantly, the size and condition of the individual plants at the trial sites was comparable with the size and condition of SHSF growing at the native reference patch of SHSF which served as the source population for the bulked seed. The fourth round of monitoring of SHSF at out-planting locations was conducted on April 16 and 17. The size and condition of the individual plants at the trial sites continued to be comparable with the size and condition of SHSF growing at the native reference patch. A fifth round of surveys were conducted on May 22, 23, and 28. The total number of plants counted at out-planting sites totaled 2,845 during the May surveys. A significant number of plants were noted as flowering and pollinator activity was observed. Natural and incidental mortality was also noted. A sixth and final round of monitoring of the out-planting and reference sites was conducted by staff on June 19 and 20, with assistance provided from the District contractor, Dudek, on June 19. During the final visit to the out-planting sites, seed was collected for future testing of viability to confirm successful pollination of plants growing at the experimental sites.

Project Narrative Template: Slender-horned Spineflower Restoration Program	
	On June 20, 2024, seed collected by staff at the reference site was delivered to CalBG for the purpose of initiating a third year of bulking activities expected to begin later this fall and extend into the summer of 2025.
Key Milestones Schedule	1. Seed Collection – California Botanic Garden (CalBG) is to collect SHSF seeds from 5–10 patches following flowering/seed set during at least two growing seasons to capture the full genetic diversity of the seed bank; additional collection locations may be prioritized in areas that will be disturbed by Covered Activities in consultation with the Wildlife Agencies (CalBG/Dudek) – <i>Initiated in spring of 2022 and continued in spring 2023</i> 2. Germination Testing – Ex-situ germination testing will occur at CalBG in the fall/winter of 2022; germination trials are to be administered on each population collected during the first growing season; a small portion of seeds from each population will be randomly selected along maternal lines for germination trials; results of the trial will be tabulated and analyzed to determine optimal seed germination (CalBG/Dudek) – <i>Completed for seeds collected in 2022</i> 3. Seed Bulking – Propagate SHSF plants in seedling starter trays in a controlled nursery setting prior to transferring and planting them within a field grow plot located within the Wash Plan Preserve; the grow plot is to be established in a location adjacent to extant or historic populations of SHSF (Dudek/SBVWCD) – <i>Work initiated in the winter of 2022 and continued through 2023/24</i> 4. Draft SHSF Restoration Plan – Prepare a draft SHSF restoration plan for the Wash HCP Preserve; the draft restoration plan will include a landscape level analysis of ecological factors within the Wash HCP Preserve area and their probable effects on the success of existing and restored SHSF populations; analysis will lead to descriptions of suitable SHSF habitat and development of a recommended toolkit of methods for enhancement of occupied and unoccupied but potentially suitable habitat (Dudek) – <i>A primer for SHSF restoration was completed in 2024</i> 5. SHSF Working Group – Convene the SHSF Working Group to solicit feedback on the draft SHSF restoration plan within 3 months of review of the draft restoration plan by the Conservation District (Dudek/SBVWCD) – <i>Scheduled to be completed by the close of 2024</i> 6. Final SHSF Restoration Plan – Prepare a final SHSF restoration plan that is to include detailed descriptions of suitable SHSF habitat, recommended methods for enhancement of occupied habitat, prioritized locations for enhancement and out-planting, and protocols for seed germination, seed-bulking, site selection, out-planting, and invasive species treatments in occupied/suitable SHSF habitat (Dudek) – <i>Scheduled to be completed by fall of 2025</i> 7. Outplanting Trials Site Selection – Analyze and prioritize multiple locations for out-planting within 1 year of initiating of seed bulking activities; selection criteria will be based upon assessment of habitat conditions at occupied locations, informed by literature review and discussion with Wildlife Agencies; criteria is anticipated to include vegetation type, slope, microtopography, soil texture, soil compaction, native forb richness, non-native plant cover, total annual plant cover, total perennial plant cover, presence of biotic soil crust,

Project Narrative Template: Slender-horned Spineflower Restoration Program	
	various soil nutrients (Nitrogen, phosphorus, electrical conductivity, cation exchange capacity), and pH (Dudek/SBVWCD) – <i>Completed in the fall of 2023</i> 8. Outplanting Trials – Utilizing a portion of the bulked seeds, the highest ranking outplanting sites selected will be seeded at the onset of the new rain year; plots are expected to be seeded at the same rate; seeded plots will be monitoring and managed as necessary through the growing season; data collection will include recording of the following variables within each plot: number of SHSF germinated (i.e. early season), number of SHSF at maturity (i.e. late season), cover of SHSF, average longest width of SHSF plants, average height of SHSF plants, average flowers produced by SHSF plants, cover of non-native plant species, cover of native plant species, native forb richness, average height of herbaceous plant species, cover of bare ground, cover of soil disturbance, cover of biotic soil crust (Dudek/SBVWCD) – <i>Initiated in fall of 2023</i>
Key Findings	Seeds were collected from six of the extant populations (Patch ID: 1C, 2, 3, 5, 12, 13) by the California Botanic Garden in support of the seed-bulking activities in spring of 2022. Of the total of 4,014 seeds collected from 390 plants in spring, 500 to 750 were made available for bulking and direct seeding activities. In June 2023, seeds were collected from monitored patches of SHSF by Dudek and District Staff. It is estimated that thousands of seeds were collected from the populations of SHSF located in the Wash again in 2023 as was the case in 2022. Collected seeds were used to support new seed bulking activities in the fall of 2023. Multiple potential out-planting locations were identified in spring and summer of 2022. At one of the locations both the leather spineflower (<i>Lastarriaea coriacea</i>) and Parry's spineflower (<i>Chorizanthe parryi parryi</i>) were observed throughout, and many of the conditions of the site resembled habitat elements of what is found in the area supporting the largest known population of SHSF (Population 13). Also of interest, when taking soil samples, the field team noticed the sand still held moisture about 4 inches below the surface at this location. Importantly, this potential outplanting location is located within the Wash Plan Preserve on BLM property lying several hundred meters west of Railroad Line Road and more than a half kilometer north of the main channel of the Santa Ana River. In total, an estimated 280,440 seeds were produced by the plants grown at the bulking site in 2023. Germination testing performed by CalBG showed 72% viability of produced seed. Out-planting trials sited at the mapped potential out-planting locations identified as part of the Wash Plan Preserve-wide surveys that took place in 2023 were successful. Seed bulked in 2022-23 germinated at all six of the out-planting trial sites in 2023-24. Monitoring of the out-planting sites in 2024 revealed that 1,000s of sown spineflower seeds were able to complete their entire life cycle, from seed germination through flowering and pollination, to producing new seeds and dying within a single growing season. Interestingly, in 2024, herbicide treatments at the out-planting trials designed to measure the efficacy of controlling grass resulted in substantial declines in the SHSF plants exposed to the herbicide.

Project Narrative Template: Slender-horned Spineflower Restoration Program	
Notes	Dudek confirmed the California Botanic Garden has 5,288 seeds in cold storage collected in 2010 from a single population located on BLM property in the Wash that may become available for use in bulking and direct seeding activities. In spring of 2023, the Conservation District, working with researchers from the University of Redlands, took the first steps towards developing a pollinator study to inform slender-horned spineflower reproduction and identify the primary pollinators of the species. As currently proposed, the pollinator study will track, identify, and record pollinators at multiple extant spineflower locations during three different surveys per location; one during early bloom, one during mid bloom, and one during late bloom to identify the pollinators that play a vital role in the fruit and seed production of SHSF. This data will inform restoration and out-planting actions included in the Program as well as recommendations that can be used across the species' range. In September 2023, CalBG shared they were awarded funds from BLM to conduct a genetic study of SHSF in the Upper Santa Ana River Wash to understand relatedness among populations and aid in setting restoration priorities on federal properties. CalBG is working with both Dudek and the District to collect tissue samples from live plants in 2024.

Management of Trespass, Unauthorized Encampments, and Illegal Dumping

Project Management: Management of Trespass, Unauthorized Encampments, and Illegal Dumping	
Project ID(s)	2301
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	Purpose of the project is to limit unauthorized use of the Wash Plan Preserve through the construction and use of barriers and signage, regular patrols, coordination among local government entities and social services, and the removal of trash and other debris at illegal dumpsites and abandoned encampments.
Contractor(s)/Researcher	Northwind Construction Services (\$15,500); SBVWCD (800 Hours)
Time Period	2022-24
Total Estimated Project Cost	\$15,500; 800 Hours (SBVWCD)
Amount Budgeted in FY	400 Hours (SBVWCD)
Fund(s)	Wash Plan Endowment; General Fund
Matching Contribution(s)	>\$85,000 BLM Funds for work occurring on ACECs
Landowner Involvement	SBVWCD, BLM
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Land Management
Program Area	Human Activities
Resource (e.g., Monitoring or Management Target)	Alluvial Fan Sage Scrub
Wash Plan Conservation Actions	
Species-specific Actions	N/A
Preserve-wide Objectives	Preserve Action 2A, 2B, 2C, 2D, 2E

Project Management: Management of Trespass, Unauthorized Encampments, and Illegal Dumping	
Monitoring Type (if applicable)	N/A
Monitoring Method (if applicable)	N/A
Specific Threat/Stressor	Human activity (trespass, unauthorized encampments, illegal dumping of debris)
Management Treatment	Construction of gates and barriers to limit vehicular access; clean-up and removal of debris fields; local outreach activities
Intensity of Management	Intensive
Available Report(s)	N/A
Available Geospatial Product(s)	<i>Available geodatabase with photos and short descriptions highlighting the location of known debris fields and incidents of trespass within the Wash Plan Preserve are to be transferred from BLM to SBVWCD</i>

Project Narrative Template: Management of Trespass, Unauthorized Encampments, and Illegal Dumping	
Overview	Consistent with Wash Plan Preserve-wide Objective 2, the District is partnering with the City of Highland, City of Redlands, County of San Bernardino, and BLM to limit potential impacts from unauthorized access and illegal activities otherwise occurring within the Upper Santa Ana River Wash. Unauthorized access, illegal dumping, and other unauthorized activities, once identified, are to be addressed through City or County law enforcement and patrol services provided by BLM law enforcement officers.
Progress	On July 14, 2023, the SBVWCD Land Resources Manager met with SBVWCD Operations Team to discuss issues associated with the repeated use of encampments and unauthorized presence of unhoused on Conservation District property located within the Wash Plan Preserve. Specifically, the Conservation District discussed steps to mitigate the challenges presented by regular trespassing and unauthorized encampments on Conservation District property located within the vicinity of the Santa Ana River Channel on lands to the east of Alabama Street and west of Orange Street. Consistent with District staff performed nesting bird surveys and biological monitoring in support of management activities implemented by the Operations Team on July 26 tied to limiting unauthorized access and illegal dumping of trash and debris on BLM properties located within the Wash Plan Preserve. District staff supported the Operations Team by serving as biological monitors on September 14 and 15 during initial gate construction activities designed to limit unauthorized access and illegal dumping on BLM properties located within the Wash Plan Preserve. On October 20, District staff working together with the Redlands Homeless Outreach Coordinator, Redlands Police Department, San Bernardino County Mental Health, Step-Up Inland Empire Homeless Outreach Hotline, and Veterans Affairs, provided outreach to the unhoused population present on District property located between State Route 210 and Orange Street. The larger team was conducting interviews and distributing outreach material in support of the 30-day notice provided earlier in the month indicating the November 7 deadline to leave District property prior to the scheduled

Project Narrative Template: Management of Trespass, Unauthorized Encampments, and Illegal Dumping	
	clean-up coordinated with BLM of the existing debris fields associated with the illegal dumping that has occurred in the area over the last several years. On October 26, the Operations Team performed additional outreach to members of the unhoused population with Step-Up Inland Empire Homeless Outreach Hotline to assist in getting vouchers to folks for temporary housing. District biologists supported the Operations Team by performing a biological sweep and serving as biological monitors on October 25, 27 and 28 during gate and fencing reinforcement activities performed on either side of Orange Street designed to limit unauthorized access and illegal dumping on BLM properties within the Wash Plan Preserve. On November 7, consistent with the 30-day notice provided in October, District biologists working with the Operations Team assessed the status of the unhoused previously present in encampments located on District property west of Orange Street. Most of the encampments appeared to have been abandoned at that time and further clean-up of existing debris fields was scheduled. On November 15, the Operations Team completed installation of a new gate on BLM property to limit future illegal access to BLM and District property west of Orange Street. Repairs to the fence and rock barrier to the north of the gate were completed on November 30. Clean-up activities coordinated with BLM of the existing debris fields associated with the illegal dumping that occurred in the immediate area was scheduled for December 12 through December 23. Clean-up of existing debris fields associated with the abandoned encampments and illegal dumping that occurred on District property west of Orange Street was initiated on December 12 and continued through the 15. Clean-up activities were conducted by Northwind Construction Services working under contract with the District. Activities were coordinated with BLM and overseen by District staff. Under contract with BLM, and as originally planned, Northwind Construction Services extended the clean-up following completion of activities on Conservation District property to include land to the immediate east of District property, including land on both the west and east side of Orange Street. All work associated with the described clean-up efforts was completed by the close of January 2023. On January 26, 2024, District staff attended a field meeting hosted by BLM highlighting the agency's accomplishments tied to cleanup and reclamation of the former Inland Shooting Range site located just north of CEMEX Operations east of Orange Road. Clean-up activities have been planned and managed over a multi-year period. During the summer of 2024, barriers were placed and maintained by District staff on the perimeter of the Plan Area at two locations: the east side of Orange Street to the south of CEMEX operations and the north of Greenspot Road to the east of Weaver Street. The barriers, primarily comprised of native boulders, help to prevent unauthorized activities including disposal of dumped trash and off-road vehicle use within the Plan Area and Preserve. In 2024, illegal dumping primarily occurred along road edges in high traffic areas on either side of Orange Street, and when discovered, was cleaned-up or noted for future removal following appropriate municipal and county protocols. Illegal structures or

Project Narrative Template: Management of Trespass, Unauthorized Encampments, and Illegal Dumping	
	settlements (e.g., encampments used by the unhoused) identified within the Wash Preserve were noted for future removal, however few observations were made following the prior year's extensive clean-up efforts.
Key Milestones Schedule	1. Perform regular patrols of the Wash Plan Preserve and surrounding public lands on a regular basis – <i>Completed in 2022, 2023, and 2024</i> 2. Work with partnering agencies to identify and map debris fields and incidents of trespass – <i>Completed in 2022, 2023, and 2024</i> 3. Identify unauthorized entry points into the Wash Plan Preserve and construct barriers and put-up signage to discourage and prohibit illegal activity – <i>Completed in 2022, 2023, and 2024</i> 4. Remove debris fields and cleanup abandoned encampments – <i>Partnered with BLM on activities in 2022, 2023, and 2024</i> 5. Work with social services and local government agencies to assist members of the unhoused population present in the Wash to acquire transitional and semi-permanent housing – <i>Completed in 2022, 2023, and 2024</i>
Key Findings	A concerted effort undertaken by BLM and SBVWCD in the summer and fall of 2022 to assess and address illegal encampments and recognized debris fields in the Upper Santa Anna Wash ultimately resulted in the clean-up of 10s of acres of protected lands and the offering of extended social services, including transitional housing to upwards of a dozen people who were otherwise formerly unhoused and living temporarily in the Upper Santa Ana River Wash. Continued patrols and the maintenance of existing barriers by the District's Operations Team in 2023 and 2024 have helped to minimize incidences of illegal trespass into the Wash Preserve and degradation of protected habitat.
Notes	All work performed by Northwind Construction Services for SBVWCD was performed in conjunction with BLM site cleanups on adjacent properties.

Restoration Projects

Plunge Creek Conservation Project

The Plunge Creek Conservation Project, constructed in August and September 2020 and approved by the USFWS and CDFW through the project-specific Biological Opinion (BO) FWS-SB-19B0182-19F1160-R001, California Endangered Species Safe Harbor Agreement (SHA) No. 2089-2020-002-06, and Notification No. 1600-2017-0203-R6 under Fish and Game Code Section 1600, as well as the US Army Corps of Engineers and Santa Ana Regional Water Quality Control Board through RSPL-2017000784-LRS under CWA Section 404, and SARWQCB WDID #362017-41 under CWA Section 401, has had the effect of directing repeated storm flow events into areas of the Wash otherwise dominated by late-stage alluvial fan sage scrub habitat and disturbed annual grassland.

In being able to create and enhance existing braided tributary channels through water management activities, the District's activity at Plunge Creek has highlighted the ability of the District and other water

managers to influence sediment sorting within the Wash, laying shallow sheets of sand and silt over the surface of the Wash in select areas beneficial to San Bernardino kangaroo rat, the Santa Ana River woolly star, and other sensitive species, while coarser sands and gravels are laid down in the main channels where water tends to flow more quickly.

Through the periodic manipulation of flow events, occurring across the spectrum of flow rates acceptable to flood control managers, the District can direct the sedimentation process to different areas of the Wash, influencing the location of sedimentation deposition and scour and, in effect, over time, allowing for increased geographic coverage of disturbed areas within the Wash, lessening the dependence of the larger system exclusively on the effects brought about by singular severe flooding events.

By influencing the direction of low and moderate flows through the strategic and temporary placement of rock diversions in the Wash, the District can mimic natural processes in which alluvial fan sedimentation, typically restricted to one part of the fan surface called a ‘depositional lobe’, eventually fills in the area with sediment making it more efficient for the sedimentation process to jump or ‘avulse’ to a new area of the fan. The demonstration of this process of manipulating the direction of water movement at Plunge Creek under variable flow rates opens the possibility of applying the same procedures to other areas of the Wash when warranted.

FY24 Updates are presented below:

Project Management: Plunge Creek Conservation Project	
Project ID(s)	2208
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	Project is to result in the restoration and enhancement of an approximately 1.05-mile reach of Plunge Creek. The 202.9-acre project area contains a portion of the mainstem Plunge Creek, its existing floodplain, and the historic floodplain of both Plunge Creek and the Santa Ana River. The project implements the Plunge Creek Conservation Project Habitat Maintenance and Monitoring Plan (HMMP), completed in 2018, following construction of the pilot channels and flow diversion and creation of the “as-built” conditions in 2020.
Contractor(s)/Researcher	IERCD, SBVWCD
Time Period	2021-2024
Total Estimated Project Cost	>\$1,383,000, including the cost of construction and permitting (\$1.2 M) and land management activities (\$183,000, IERCD); SBVWCD (60 Hours)
Amount Budgeted in FY	\$58,000 (IERCD); SBVWCD (60 Hours)
Fund(s)	Wash Plan Fund (Jump Start); SBVWCD (\$700,000); Santa Ana Watershed Project Authority (Proposition 84 Grant - \$500,000)
Matching Contribution(s)	---
Landowner Involvement	SBVWCD
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Land Management

Project Management: Plunge Creek Conservation Project	
Program Area	Habitat Restoration
Resource (e.g., Monitoring or Management Target)	Riversidean Alluvial Fan Sage Scrub, SARWS, SBKR
Wash Plan Conservation Actions	
Species-specific Actions	SARWS Action 2, 5; SBKR Action 2
Preserve-wide Objectives	Jump Start Activities, Preserve Action 9C
Monitoring Type (if applicable)	Effectiveness Monitoring
Monitoring Method (if applicable)	Full census/total counts, quadrats
Specific Threat/Stressor	Human activity (urban development and nitrogen deposition); Invasive grasses
Management Treatment	Mechanical, manual, and chemical treatment of invasive plants
Intensity of Management	Full treatment (at local level)
Available Report(s)	<i>ICF 2018. Plunge Creek Conservation Project Habitat Mitigation and Monitoring Report. Report prepared for San Bernardino Valley Water Conservation District. 79p.</i> <i>Inland Empire Resource Conservation District 2020. Plunge Creek Conservation Project - Habitat Maintenance and Monitoring Plan Amendment and Restoration Implementation Plan. Unpublished report prepared for San Bernardino Valley Water Conservation District. 9p.</i> <i>Inland Empire Resource Conservation District 2021. Plunge Creek Completed Work Summary 2021. Unpublished report prepared for San Bernardino Valley Water Conservation District. 19p.</i> <i>Inland Empire Resource Conservation District 2022. Plunge Creek Completed Work Summary 2022. Unpublished report prepared for San Bernardino Valley Water Conservation District. 19p.</i> <i>Inland Empire Resource Conservation District 2023. Plunge Creek Completed Work Summary 2023. Unpublished report prepared for San Bernardino Valley Water Conservation District. 22p.</i> <i>San Bernardino Valley Water Conservation District 2023. Plunge Creek Conservation Project Annual Report. Prepared for Santa Ana Regional Water Quality Control Board. 8p.</i> <i>San Bernardino Valley Water Conservation District 2024. Plunge Creek Conservation Project Annual Report. Prepared for Santa Ana Regional Water Quality Control Board. 8p.</i>
Available Geospatial Product(s)	<i>GIS shapefiles are available for the following datasets:</i> <i>Plunge Creek Conservation Project as built conditions; Total created novel WOTS/WOTUS to date; Invasive grass treatment areas 2021, 2022, 2023; Grass treatment monitoring plots</i>

Project Management: Plunge Creek Conservation Project	
	<i>California Rapid Assessment Method (CRAM) Data (describing conditions of the four principal attributes [Buffer and Landscape Context, Hydrology, Physical Structure, and Biology]) is also available for each of the three Assessment Areas (AAs) established in Plunge Creek from 2018, 2022, and 2024.</i>

Project Narrative Template: Plunge Creek Conservation Project	
Overview	As a result of human disturbance and recent land use modifications, including sand and gravel mining, construction of drainage ditches, bridges, pipeline crossings, and flood control levees, floodwaters within the Plunge Creek Conservation Project Area are generally restricted to the mainstem Plunge Creek and its active floodplain, and are precluded from overtopping steepened channel banks and engaging remnant channels located on the historic floodplains of both Plunge Creek and the Santa Ana River. Through implementation of the Plunge Creek Conservation Project flow splitters and pilot channels are constructed to divert a portion of flows from Plunge Creek into the historic floodplain, creating conditions that will enable natural fluvial processes to create new channels and reoccupy old channel remnants. The result of such an activity is a more complex channel morphology with a network of distributary channels. The overarching goals of the Plunge Creek Conservation Project include reestablishment of suitable habitat for SBKR and woolly star, reestablishment of U.S. and waters of the state under the jurisdiction of USACE, RWQCB, and CDFW, and enhanced groundwater recharge. The work consists of constructing channel restoration features along a segment of Plunge Creek to use fluvial processes to provide suitable habitat for SBKR and increased opportunities for groundwater recharge while maintaining the current level of flood protection on adjacent lands. Specifically, the Project includes construction of pilot channels that are designed to direct portions of the Plunge Creek flow southwest across the existing terrace until they connect with existing remnant channels on the floodplain. The Project also includes the construction of splitter mounds to guide the main channel flow into the pilot channels, and a berm along the northern boundary of the quarry made of material from the pilot channel excavation to prevent the flow from leaving the channel at that location. The Plunge Creek Conservation Project serves to satisfy USFWS mitigation requirements for proposed impacts on federally listed species associated with Covered Activities, as well as address the need for the protection and management of Jump Start Acres consistent with the Wash Plan. In addition, the District proposes utilizing the restoration of waters associated with the project to satisfy USACE, SARWQCB, and CDFW mitigation requirements related to proposed impacts to waters associated with Covered Activities implemented by Wash Plan participants, where feasible.
Progress	Constructed in 2020, the project, in its initial year of operation, over the course of a series of three storm events occurring in 2021, engineered flow dynamics in Plunge Creek that resulted in the manipulation of peak flows of 20 cfs, 300 cfs, and 600 cfs and cumulative creation of 3.5 acres, 8.1 acres, and 11.7 acres, respectively, of novel wetted areas. Substantial erosion and sediment deposition occurring throughout the project footprint allowed for the resetting of conditions favoring the establishment of early

Project Narrative Template: Plunge Creek Conservation Project	
	successional alluvial fan sage scrub vegetation. Estimated amounts of groundwater recharge accomplished by the project through the first three storms totaled 30, 100, and 355 acre-feet, respectively. Consistent with the amended HMMP, management of invasive plants within the 203-acre Plunge Creek Conservation Project has been formally implemented by IERCD with work beginning in January 2021. In 2021, invasive grass treatments were applied across a 13-acre area. In 2022, treatments were expanded to cover 56-acres, including retreatment of the original 13 acres, and addressed both grasses and Sahara mustard. In 2023, an additional 35 acres were treated for invasive annual forbs and grasses, bringing the total acres of invasive grass and forb treatment to 91 for the project. In 2024, invasive plant treatments were not expanded spatially, but instead concentrated in areas treated previously to address patches of missed grass and control secondary invaders like Sahara mustard. Perennial invasive species treatments occurred in the fall of 2021, 2022, and 2023 and targeted Spanish broom (<i>Spartium junceum</i>), salt cedar (<i>Tamarix ramosissima</i>), and castor bean (<i>Ricinus communis</i>). Monitoring plots were established within the treatment areas in 2021, 2022, and 2023 to measure and track changes in species cover over time. In August 2023, District staff participated on a walking tour of Plunge Creek with Aaron Echols (Resource Ecologist with IERCD) to discuss results of monitoring efforts and view the effects of IERCD's work controlling invasive grasses since 2021. Plunge Creek Restoration Areas, totaling 3.3 acres, were first seeded by IERCD with Santa Ana River Woolly Star (SARWS) in January 2021. A total of 18.8 lbs. of associated Riversidean Alluvial Fan Sage Scrub seed was collected within one mile of the Project Area and mixed with SARWS seed prior to being spread over restoration areas in the fall of 2021. A full census of the restoration areas was conducted in 2022 and 2023. Adaptive management activities, as described in approved permits, were not implemented in 2023 but postponed to winter 2024. Management and maintenance activities are to include expanding use of post-storm pathways to increase braiding in future storm events and the bolstering of stockpiled rock at splitter mounds and rock dams in strategic areas of the established channel to encourage both breakouts and the formation of braided conditions. In March 2024, members of the District's Operations Team, Engineers, and Environmental Team walked Plunge Creek to discuss adaptive management measures that can be undertaken in support of the larger Plunge Creek Conservation Project. The focus for the group was on the expansion of the amount of novel wetted areas created by high flow conditions following major storm events consistent with the original permits. Active management of the rock structures (e.g., the splitter mounds and rock dams) is anticipated as being needed to increased braiding and sheet flow across the flood plain connecting the new pilot channel with the main channel of Plunge Creek. California Rapid Assessment Method (CRAM) was used to evaluate the wetland condition of both the main Plunge Creek channel and the installed pilot channels. CRAM is recognized to be a cost-effective and scientifically defensible rapid assessment methodology for monitoring and assessing the ecological conditions of wetlands throughout California. CRAM evaluations provide the needed attributes and metrics

Project Narrative Template: Plunge Creek Conservation Project	
	allowing for comparison of the main Plunge Creek channel and pilot channels against baseline conditions, assessing ecosystem functions and values over time. The baseline CRAM assessment was completed by ICF in 2018, and subsequent assessments were performed by IERCD in 2022 and 2024. Additional CRAM assessments are scheduled to be performed in 2025. In March 2024, District staff hosted one of the five CRAM training sessions at Plunge Creek. The CRAM training session at Plunge Creek served as an example of episodic riverine conditions. The weeklong CRAM training was put on by the San Francisco Estuary Institute CRAM and attended by District Assistant Biologist, Anna Frey.
Key Milestones Schedule	1. Construction of the pilot channels and flow diversion - Two pilot channels are to be excavated from the active channel of Plunge Creek, through the historic floodplain, and back to the active channel, Rock splitter mounds – <i>Completed in 2020</i> 2. Invasive plant species treatments – Invasive perennial plant species, invasive annual forbs, and invasive annual grasses are to be treated on an annual basis throughout the project using mechanical, manual, and chemical means – <i>Treatments were completed in 2021, 2022, 2023, and 2024. Treatments of invasive plants are to continue through 2025.</i> 3. Woolly Star Seeding and Restoration – Utilizing processed and unprocessed Santa Ana River woolly star seed, hand distribute seed in sowing containers and hand broadcast throughout restoration areas together with Riversidean Alluvial Fan Sage Scrub seed mix – <i>Initial seeding completed in January 2021 and full census was conducted in 2022 and 2023</i> 4. Photo Points - Establish photo points to document changes in vegetation cover within the project restoration and enhancement areas and grass reduction monitoring plots – <i>Work initiated in 2021 and completed in 2022, 2023, and 2024</i> 5. California Rapid Assessment Method (CRAM) - CRAM is to be performed to monitor and assess the ecological conditions of the wetlands associated with the project; conditions evaluated based on landscape setting, hydrology, physical and biological structure – <i>CRAM was performed in 2022 and 2024</i> 6. Annual Progress Report - Prepare progress reports on an annual basis through the life of the five-year management period – <i>Progress reports were completed in 2021, 2022, and 2023. The 2024 report is currently in development at the time of writing this report. Progress reports are additionally scheduled to be completed in 2025.</i> 7. Annual Report to Santa Ana Regional Water Quality Control Board (Clean Water Act Section 401 Water Quality Certification and Order) – <i>Report was completed and submitted to the Water Quality Control Board in October of 2023 and 2024</i>
Key Findings	Over the course of a series of three storm events occurring in 2021, engineering of flow dynamics in Plunge Creek by the District resulted in the manipulation of peak flows of 20 cfs (2/12/2021), 300 cfs (12/14/2021), and 600 cfs (12/24/2021) and creation of 3.5 acres, 8.1 acres, and 11.7 acres, respectively, of novel wetted areas in the Wash with substantial erosion and sediment deposition occurring throughout the project footprint allowing for the resetting of conditions favoring the establishment of early successional alluvial fan sage scrub vegetation. Furthermore, estimated amounts of water recharge

Project Narrative Template: Plunge Creek Conservation Project	
	accomplished through this activity total 30, 100, and 355 acre-feet, respectively. In 2023, three storm events, two occurring in January and one in March, resulted in the manipulation of peak flows of 450 cfs (1/3/2023), 560 cfs (1/14/2023), and 520 cfs (3/15/2023), respectively. The measured activity of flow dynamics resulted in an estimated 50, 220, and 154 acre-feet of groundwater recharge and total wetted areas of 8.0 acres, 9.1 acres, and 8.7 across the site, respectively. A storm in February of 2024 with a peak flow of 470 cfs wetted 9.4 acres. In total, the storms of 2021, 2023, and 2024 resulted in a total of 12.76 acres of novel wetted areas being achieved. At monitoring plots established in areas being treated for annual grasses, absolute native cover was noted as increasing over time, and non-native cover principally decreasing, although results were mixed. On the single monitoring plot established in 2021, native cover was recorded at 3% in 2021 (baseline condition), 18% in 2022, 71% in 2023, and 46% in 2024. Absolute non-native cover showed declining values, decreasing from 82% (baseline) in 2021 to 67% in 2022, and 19% in 2023, but increased to 49% in 2024. Bare ground was the same (15%) in 2021 and 2022, but declined to 10% in 2023, and 5% in 2024. Baseline conditions at the second monitoring plot established in 2022 showed absolute native cover increasing from 7% in 2022 (baseline) to 89% in 2023, and then declining to 43% in 2024. At the same plot, non-native cover declined from the baseline condition of 77% in 2022 to 4% in 2023, before rebounding to 52% in 2024. A third plot was established in 2023 and showed declining values in non-native grass cover from baseline (90%) to conditions assessed in 2024 (4%). Following seeding in 2021, a full census was conducted across all restoration areas in 2022 where SARWS seed was distributed in 2021. In total, 2,615 SARWS seedlings and second year plants were documented in spring 2022 within all broadcasted restoration areas. A re-count taken in August 2023 reported 1,028 SARWS second and third-year plants indicating successful establishment and recruitment to maturity of seeded SARWS.
Notes	On February 15, 2024, District staff participated in the Santa Ana River Science Symposium hosted by Valley District at the ESRI Headquarters. As part of the two-day event, District staff hosted a field visit to Plunge Creek on February 16, highlighting the science and management initiatives occurring on the property tied to implementation of the Wash Plan and Plunge Creek Conservation Project. On May 8, 2024, District staff led a tour of Plunge Creek for interested attendees of the California Society for Ecological Restoration's annual conference being held May 8, 9, and 10 at the University of Redlands. On May 15, 2024, District staff led a tour of Plunge Creek for members of the Forecast-Informed Reservoir Operations (FIRO) Environmental Working Group for Seven Oaks Dam (SOD) hosted by Valley District and the Climate, Atmospheric Science & Physical Oceanography Division of the Scripps Institution of Oceanography. The tour was part of an all-day event designed to provide participants with a comprehensive understanding of the environmental conditions associated with the Santa Ana River from above SOD to Prado Basin. On June 11, 2024, in support of the finalization of the individual permit required for Covered Activities under the Wash Plan, District staff and AECOM meet with the U.S.

Project Narrative Template: Plunge Creek Conservation Project	
	Army Corps of Engineers to tour the Plunge Creek Conservation Project and discuss next steps tied to using the project to serve as compensatory mitigation for all Wash Plan Covered Activities impacting Waters of the U.S. The 2024 Line Fire, which was 98% contained and had burned 43,978 acres as of October 25, 2024, 49 days after first being reported, has burned much of the Plunge Creek Watershed and is recognized to have created the threat of debris flow into Plunge Creek, potentially overwhelming the Conservation Project. Emergency measures are being considered by District staff and permitting steps are being discussed with the appropriate resource agencies to be able to act pending winter storm forecasts and increased likelihood of debris movement.

BLM Fuels Management Grant Project

The San Bernardino Valley Conservation Trust submitted a proposal for a California Fuels Management and Community Fire Assistance Program Grant in May 2023 to the Bureau of Land Management (BLM) for federal funding (totaling \$819,500) to address the management of fuels (principally invasive annual grasses) on protected lands within the Wash Plan Preserve. On July 8 the Conservation Trust received notice that the proposal was successful and entered award negotiations with BLM. Work to be funded through this grant will result in reduced fuel loads in the Wash Plan Preserve and improved habitat conditions needed in support of the recovery of San Bernardino kangaroo rat and Santa Ana River woolly-star.

FY24 Updates are presented below:

Project Management: BLM Fuels Management Project	
Project ID(s)	2401
Project Title(s)	<i>See contract file(s)</i>
Project Purpose	The purpose of the project is to reduce wildfire risk to surrounding communities by addressing increased fuel loads and minimizing rates of wildfire ignition within the Upper Santa Ana River Wash located in the San Bernardino Valley. The proposed work accomplishes fuel management activities on federal and non-federal land, reducing hazardous fuel loads and rates of wildfire ignition. Through the active removal and treatment of invasive grasses and broadleaf non-native plants, using mechanical, chemical, and manual means, across hundreds of acres of the Wash, defensible space is created in strategic locations, and the rate of fire spread is slowed. Project benefits the public through reducing hazardous fuels at the wild-land urban interface and limiting rates of wildfire ignition associated with illegal trespass and unauthorized encampments on public lands within the Upper Santa Ana River Wash. Underserved communities present within the San Bernardino Valley are to benefit from reduced wildfire risk and increased protection of neighboring open space. Public will benefit from increased threatened and

Project Management: BLM Fuels Management Project	
	endangered species habitat protection and enhancement in recognized Areas of Critical Environmental Concern (ACE) and Research Natural Areas (RNAs).
Contractor(s)/Researcher	BLM, SBVCT, SBVWCD, Nakae & Associates, Origin Biological
Time Period	2023-2028
Total Estimated Project Cost	\$1,044,500, cost includes federally funded activities (\$819,500) and land management activities funded by SBVWCD (\$225,000)
Amount Budgeted in FY	\$225,500 (BLM Funds); \$55,000 (SBVWCD Funds)
Fund(s)	BLM-CA California Fuels Management and Community Fire Assistance Program (Grant - \$819,500); SBVWCD (\$225,000)
Matching Contribution(s)	---
Landowner Involvement	SBVWCD, BLM
Project Status	Ongoing
Project Progression	Project is on (or ahead of) schedule [Green]
Program Class	Land Management
Program Area	Wildland Fire, Exotic Plant Control, Habitat Restoration, Sensitive Biological Resources
Resource (e.g., Monitoring or Management Target)	Riversidean Alluvial Fan Sage Scrub, SARWS, SBKR
Wash Plan Conservation Actions	
Species-specific Actions	SBKR Action 2, 4B
Preserve-wide Objectives	Preserve Action 4A
Monitoring Type (if applicable)	Effectiveness Monitoring
Monitoring Method (if applicable)	Presence/Absence, Probability Sampling, Grids
Specific Threat/Stressor	Human Activity (development, unauthorized encampments, nitrogen deposition); Invasive grasses
Management Treatment	Use of Herbicide, Mechanical Removal, Sand Spreading
Intensity of Management	Full treatment (at local level)
Available Report(s)	<i>San Bernardino Valley Conservation Trust 2023. San Bernardino Valley Community Wildfire Risk Reduction Measures – Hazardous Fuels Management and Ignition Risk Reduction. Project proposal prepared for Bureau of Land Management by San Bernardino Valley Conservation Trust. 9p.</i> <i>Bureau of Land Management 2023. San Bernardino Valley Community Wildfire Risk Reduction Measures Agreement. Award Notice prepared by BLM for San Bernardino Valley Conservation Trust. 24p.</i>
Available Geospatial Product(s)	<i>GIS shapefiles are available for the following datasets:</i> <i>Invasives Treatment areas Phase 1A and Phase 1B: Phase 2 Habitat Enhancement/ Fuels Management Areas</i>

Project Narrative Template: BLM Fuels Management Project	
Overview	The proposed project is located within Bureau of Land Management (BLM) Areas of Critical Environmental Concern (ACEC) present within the Upper Santa Ana River Wash (Wash) and on lands owned by the San Bernardino Valley Water Conservation District (SBVWCD), many of which are enrolled within the Upper Santa Ana River Wash Habitat Conservation Plan. Bounded by the City of Highland to the north, and the City of Redlands to the south, the ACECs within the project plan area have an additional secondary designation of Research Natural Area (RNA), recognizing the importance of the wildlife resources and natural processes present in the landscape to research and higher education. The greater project area supports several state and federally listed species, including the endangered San Bernardino kangaroo rat (<i>Dipodomys merriami parvus</i>). Creation of open habitat with a reduced fuel load, in addition to minimizing wildfire risk to surrounding communities, also results in conditions favored by the state and federally endangered San Bernardino kangaroo rat, Santa Ana River Woolly Star (<i>Eriastrum densifolium</i>), and Slender-horned spineflower (<i>Dodecahema leptoceras</i>), and federally threatened California gnatcatcher (<i>Polioptila californica</i>), reinforcing the mission of the San Bernardino Valley Conservation Trust (Trust) and complementing the actions taken by key stakeholders such as BLM California, and the SBVWCD. The BLM fuels staff will coordinate with the Trust to develop treatment strategies that meet multiple objectives including fuels and habitat management. The BLM fuels and biological technicians will provide oversight and monitoring of work. The BLM fuels staff will provide training and assistance in planning prescribed fires and serve as the burn boss on prescribed fires on BLM-managed lands. The work will include cooperative efforts in monitoring vegetation management that will benefit the T&E species. These efforts will be coordinated with the U.S. Fish and Wildlife Service. BLM biological staff will participate in surveys and receive training and experience working toward getting their own permit to conduct surveys on BLM lands in the future. BLM staff will review and approve each phase of the project. Reporting of accomplishments will be relayed through the BLM program officer to the fuels program manager for documenting in the National Fire Plan Operations and Reporting System (NFPORS).
Progress	In August 2023, District staff worked with BLM California on final award negotiations tied to the grant proposal submitted by the Conservation Trust in May 2023. In the same month, District staff met within Nakae & Associates to discuss project details and introduce members of the organization to the Wash and operations of the District. District staff participated in federal training on how to make payment requests through the U.S. Department of the Treasury's Automated Standard Application for Payments (ASAP) on August 23 and the most recent annual audit report covering the Conservation Trust financial activities was shared with BLM on August 24. On September 14, 2023, District staff received confirmation from BLM California that the agreement tied to the proposal for a California Fuels Management and Community Fire Assistance Program Grant was fully awarded. With the encouragement of Representative Pete Aguilar, and in partnership with BLM, District staff spent much of the early and mid-part of September planning and preparing

Project Narrative Template: BLM Fuels Management Project	
	to host a visit to the Upper Santa Ana River Wash by the Department of the Interior, Representative Aguilar, the Director of BLM, and State Director of BLM. On December 7, District staff hosted staff from Nakae & Associates in the field to review conditions of annual grasses and mustards and discuss phase one of fuels treatment to be implemented consistent with the BLM grant. Beginning on December 11 and extending through December 18, Nakae & Associates treated approximately 70 acres of grass just west of Railroad Line Road and north and west of D-Dike. On Saturday, December 16, District staff hosted the Secretary of the Interior and Representative Aguilar in the Upper Santa Ana River Wash to recognize the BLM Fuels Management Grant awarded to the San Bernardino Valley Conservation Trust as part of the Biden Administration Bipartisan Infrastructure Law and the congressionally approved Land Exchange between the District and BLM. In addition to Secretary Haaland and Representative Aguilar, Assemblymember Ramos and Chairwoman of the San Manuel Band of Mission Indians, Lynn Valbuena, and BLM California State Director Mouritsen participated on the tour and press conference. On December 21, District staff met with James Gannon (BLM) and Mikael Romich at the Mill Creek Facilities to view the results of past sand spreading activities implemented by the District and discuss the potential benefits of such actions for SBKR and the management of fuels in the Santa Ana River Wash following treatment of grasses. On January 8, 2024, Nakae & Associates visited areas treated to review and confirm the effectiveness of herbicide treatments on approximately 70 acres completed in December. Beginning the week of January 22, Nakae initiated treatment of an additional 55 acres of annual grasses just west and east of D-Dike and east of Railroad Line Road to Cone Camp Road. Treatments of the expanded area continued through February 22. By early March, Nakae had expanded herbicide treatment to include treatment of broadleaved invasives, principally mustard, across the entirety of the 128-acre area treated for annual grasses stretching from Cone Camp Road to the Plunge Creek Conservation Project. In late April, Mikael Romich assessed opportunities for sand spreading and soil scraping supporting fuel management activities within the areas treated by Nakae & Associates. On May 15, staff met with BLM in the field to discuss project progression and plan the next steps. In late May, Nakae made a second pass within the treated areas to address newly emerged broadleaved invasives. In June, Mikael Romich completed a draft white paper on fuel management strategies benefiting SBKR to be considered for application in the fall within the treatment areas.
Key Milestones Schedule	1. Initial project planning and determination of the extent and location of fuels management areas (measurable outcome is mapped acreage identifying targeted areas) – <i>Completed in fall/winter of 2023</i> 2. Implementation of management activities across fuel management areas (projected to total between 250 and 350 acres by the close of the POP; acreage impacted is measurable outcome) – <i>Herbicide treatment of non-native grasses and invasive broadleaved plants initiated in winter of 2023 and continued into spring 2024</i>

Project Narrative Template: BLM Fuels Management Project	
	3. Annual quantitative monitoring of changes in fuel cover values in management areas – <i>Completed in spring 2024</i> 4. Photo Points - Establish photo points to document changes in vegetation cover within the project restoration and enhancement areas and grass reduction monitoring plots – <i>Work initiated in spring 2024</i> 5. Identification of unauthorized access points, debris fields, illegal encampments, coordination with appropriate agencies – <i>Work is ongoing</i> 6. Production of interim and final reports highlighting milestones achieved each year (document to be delivered on an annual basis to BLM) – <i>First annual report is due on December 31, 2024</i>
Key Findings	Consistent with the first year of planned activities under the grant, non-native grasses and broadleaf invasives were treated using herbicide within approximately 128 acres (Phase 1A - 65 acres; Phase 1B - 63 acres) of the Linkage Between the Santa Ana River and Plunge Creek Management Area of the Wash Plan Preserve. Treatments in the project area were initiated in December 2023 and consisted of a single pass targeting non-native grasses and multiple passes addressing broadleaf invasives. Results of these treatments have largely been successful with a noted substantial reduction in cover of non-native grasses (dropping from 55% to 8%) and a corresponding increase in native forbs. Similar results have been noted in the Plunge Creek Management Area where high native forb cover has replaced non-native grasses in areas treatment for invasive plants associated with the Plunge Creek Conservation Project.
Notes	On February 22, 2024, District staff toured the Wash Plan Preserve with BLM, Valley District, and the San Diego Zoo to discuss implementation of the BLM Fuels Management Grant and identify prospective sites for the Zoo to implement research in support of the use of herbicide, mechanical scraping, and sand spreading techniques to enhance habitat in the Wash for SBKR.

6 ADMINISTRATIVE UPDATES

- Data Entry and Storage
- Administrative Corrections
- Amendments to the HCP

Progress Made in Meeting Biological Goals and Objectives

The Wash Plan Natural Resource Management Plan (NRMP), drafted in July 2023 (consistent with Preserve Objective 3 and Preserve Action 3), identified several biological objectives and actions guiding conservation, monitoring, and management activities to be implemented within the Wash Plan Preserve during the initial years of Wash Plan implementation. Progress made with regards to acting on the species-specific objectives and actions identified as near-term priorities in the NRMP relative to the number of overall objectives and actions described in the Wash Plan is highlighted in the table that follows.

Species	Activity Type	# Objectives Initiated/ # Objectives	# Actions Initiated/ # Actions
SBKR	Conservation and Management	1/1	1/1
SBKR	Management	4/5	3/6
SBKR	Monitoring	1/1	2/3
CAGN	Conservation and Management	1/1	2/2
CAGN	Management	2/4	2/3
CAGN	Monitoring	1/1	2/3
CACW	Conservation and Management	1/1	1/2
CACW	Management	2/4	1/4
CACW	Monitoring	0/1	0/3
SHSF	Conservation	1/1	2/2
SHSF	Conservation and Management	1/1	1/1
SHSF	Management	5/6	6/7
SHSF	Monitoring	2/2	4/5
SARWS	Conservation	1/1	2/2
SARWS	Management	1/5	0/5
SARWS	Monitoring	0/1	0/3
Total		24/36	29/52

Annual Work Plan

The HCP Implementation Team working with the Preserve Manager is to develop an annual work plan based on the guidelines in the Natural Resource Management Plan and relevant information contained in the HCP to prioritize management and monitoring activities for each year.

Development of the Annual Work Plan is to use the following:

- HCP species specific objectives and habitat management requirements (See Sections 5.1.2 and 5.2.2 of the HCP)
- Data collected during monitoring and reporting activities
- A GIS-based treatment plan developed for the HCP and updated as additional information becomes available (Section 5.2.2.)
- Funds available for habitat management activities

- Additional site-specific information collected over the previous year, including wildfire and other unanticipated impacts
- Information contained in the 5-year work plans (to be detailed in the Natural Resource Management Plan) identifying administrative, management, monitoring, and other tasks required to be implemented during the period, cost estimates for the work in each year, and funding projections for the period

The Annual Work Plan will guide implementation on a yearly basis, specifying specific tasks for the year and a line-item budget. The Preserve Management Committee will complete an initial review and make a recommendation regarding the proposed Annual Work Plan and accompanying budget prior to the Preserve Manager bringing the plan and budget to the Conservation District Board of Directors for their final review and approval.

The Annual Work Plan is recognized to also provide a mechanism to track habitat enhancement beyond what is required as part of the HCP. Throughout the life of the HCP, there may be other activities undertaken in the Wash Plan Preserve for the benefit of Covered Species or other sensitive species. If the other activities are mitigation, the additional activities must be acknowledged by the Wildlife Agencies as in excess of or otherwise not expected or required under the terms of the HCP or permit before they are undertaken. These additional activities, although tracked in the Annual Work Plan, would be reported on separately by the implementing entity.

Annual Work Plan FY24 Updates:

Principal monitoring and management initiatives planned to be implemented in the Wash Plan Preserve in FY25 are highlighted in the table below. Listed monitoring and management initiatives are consistent with the major management initiatives identified in Version 1.0 of the NRMP.

The NRMP was written to support and document the development and implementation of an effective approach to monitoring and managing the protected natural resources within the Wash Plan Preserve consistent with the conservation program described in Wash Plan. The HCP provides guidance on the structure and framework of the NRMP as well as defines initial conservation, management, and monitoring priorities for the Wash Plan Preserve, highlighting the importance of monitoring and management activities to the successful implementation of the HCP.

Monitoring and Management Initiatives	Species Specific/Preserve-Wide Objectives to be Addressed	Proposed Timing of Implementation
SBKR Monitoring Program	SBKR Action 7A, 7C	Fall 2024, Spring 2025
California Gnatcatcher Monitoring	CAGN Action 4, 6A, 6B	Spring 2025
Slender-horned Spineflower Monitoring	SHSF Action 9, 10A, 10B	Winter 2024, Spring/Summer 2025
California Gnatcatcher Management	CAGN Action 4, 6C	Spring/Summer 2025
Slender-horned Spineflower Restoration Program	SHSF Action 3, 4	Fall/Winter 2024, Spring/Summer 2025
Plunge Creek Conservation Project	Preserve Action 4A, 9C; SARWS Action 2, 5; SBKR Action 2	Winter 2024, Spring/Summer 2025

Monitoring and Management Initiatives	Species Specific/Preserve-Wide Objectives to be Addressed	Proposed Timing of Implementation
BLM Fuels Management Grant	Preserve Action 4A; SBKR Action 2, 4B	Fall/Winter 2024, Spring/Summer 2025
Management of Trespass, Unauthorized Encampments, and Illegal Dumping	Preserve Action 2A, 2B, 2C, 2D, 2E	Fall/Winter 2024, Spring/Summer 2025

Information Storage and Management

To aid in addressing the needs for accountability, project-specific information shared in the Wash Plan Annual Report will be linked to contract files, project reports housed in the Wash Plan document library, and information captured in the geospatial database describing management and monitoring activities occurring throughout the term of the HCP.

In assigning a unique project identification number (Project ID) to each major project implemented through the Wash Plan's management and monitoring program, contracts, reports, and spatial data affiliated with the project can be linked together and readily accessible. Furthermore, through capturing information such as keywords, natural resources benefitting from project implementation, general program area and class, interested parties can search the informational database for projects, reports, GIS files, and associated financial information affiliated with projects addressing like resources, initiatives, and approaches.

Document Library

Consistent with the HCP, and need to address accountability, a digital library of project reports linked to contract files and a geospatial database for management and monitoring activities will be established and maintained for the duration of HCP implementation.

In support of information sharing with stakeholders and members of the public, a running list of project reports generated by work funded under the Wash Plan is provided below. Note, listed reports are organized by the fiscal year in which the work was completed.

FY21

- Inland Empire Resource Conservation District 2021. Slender-horned Spineflower Habitat Enhancement Completed Work Summary 2021. Unpublished report prepared for San Bernardino Valley Water Conservation District. 6p.
- Inland Empire Resource Conservation District 2021. Plunge Creek Completed Work Summary 2021. Unpublished report prepared for San Bernardino Valley Water Conservation District. 19p.
- Origin Biological 2021. Slender-horned Spineflower Results of 2021 Monitoring. Unpublished report prepared for San Bernardino Water Conservation District. 41p.
- Origin Biological 2021. 2021 Wash Plan Monitoring Resulting for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 18p.

FY22

- AECOM 2022. Vegetation Classification Report for the San Bernardino Valley Water Conservation District – With Vegetation Key & Descriptions. Unpublished report prepared for San Bernardino Valley Water Conservation District. 64p.
- Brehme, CS, SJ Montgomery, B. Miller, M. Romich, and RN Fisher 2022. San Bernardino Merriam’s Kangaroo Rat (*Dipodomys merriami parvus*) Monitoring Protocol for San Bernardino Valley Water Conservation District. DRAFT FINAL Report to San Bernardino Valley Water Conservation District. 75p.
- Inland Empire Resource Conservation District 2022. Plunge Creek Completed Work Summary 2022. Unpublished report prepared for San Bernardino Valley Water Conservation District. 19p.
- Inland Empire Resource Conservation District 2022. Slender-horned Spineflower Habitat Enhancement Completed Work Summary 2022. Unpublished report prepared for San Bernardino Valley Water Conservation District. 15p.
- Kingston JM, Montgomery, SJ, Brehme, CS, Clark DR, Romich M, Miller, B and RN Fisher 2022. San Bernardino Merriam’s Kangaroo Rat (*Dipodomys merriami parvus*) Habitat Protocol for San Bernardino Valley Water Conservation District. DRAFT Report to San Bernardino Valley Water Conservation District. 22p.
- Origin Biological 2022. 2021 Wash HCP San Bernardino Kangaroo Monitoring Resulting Summary. Unpublished report prepared for San Bernardino Valley Water Conservation District. 9p.
- Origin Biological 2022. 2022 Wash Plan Monitoring Resulting for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 21p.

FY23

- AECOM 2023. Vegetation Mapping Report for the San Bernardino Valley Water Conservation District. Unpublished report prepared for San Bernardino Valley Water Conservation District. 12p.
- Inland Empire Resource Conservation District 2023. Slender-horned Spineflower Habitat Enhancement Completed Work Summary 2023. Unpublished report prepared for San Bernardino Valley Water Conservation District. 19p.
- Inland Empire Resource Conservation District 2023. Plunge Creek Completed Work Summary 2023. Unpublished report prepared for San Bernardino Valley Water Conservation District. 22p.
- Origin Biological 2023. 2023 Wash HCP Monitoring Results for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 15p.
- San Bernardino Valley Water Conservation District 2023. Plunge Creek Conservation Project Annual Report. Prepared for Santa Ana Regional Water Quality Control Board. 8p.

FY24

- Brehme, C.S., Gould, P., and R. Fisher 2024. ADDEDUM: San Bernardino Merriam’s Kangaroo Rat (*Dipodomys merriami parvus*) Monitoring Protocol for San Bernadino Valley Water Conservation District. Unpublished report prepared for San Bernardino Valley Water Conservation District. 32p.

- Origin Biological 2024. 2023 Wash HCP San Bernardino Kangaroo Rat Monitoring Results Summary. Unpublished report prepared for San Bernardino Valley Water Conservation District. 14p.
- Origin Biological 2024. 2024 Wash HCP Monitoring Results for Breeding California Gnatcatchers, Redlands and Highland, San Bernardino County. Unpublished report prepared for San Bernardino Valley Water Conservation District. 15p.
- San Bernardino Valley Water Conservation District 2024. Primer on Slender-horned Spineflower (*Dodecahema leptoceras*) Restoration in the Upper Santa Ana River Wash. Prepared by San Bernardino Valley Water Conservation District. 38p.
- San Bernardino Valley Water Conservation District 2024. Plunge Creek Conservation Project Annual Report. Prepared for Santa Ana Regional Water Quality Control Board. 8p.

Data Entry and Storage

A geospatial database is to be maintained by the Conservation District in support of implementation of the Wash Plan. Lists of available digital copies of monitoring data, including metadata, spatial data, and photo-documentation of project progression are to be included and searchable.

The described geospatial database will be established and maintained for the duration of HCP implementation. The Wildlife Agencies are to have access to the database and associated document library to assist them in monitoring the progress and effectiveness of HCP implementation.

The geospatial database is to include, but not be limited to:

- Property ownership
- Conservation easements
- Utility and road easements and rights of way
- Existing facilities and land uses
- Watershed boundaries
- Plan Area boundaries
- Boundaries of Plan Area subcomponents
- Vegetation types
- Species occurrence records
- Location of monitoring and study plots with links to monitoring results
- Management treatment areas with links to management treatment results
- Areas where habitat has been removed by Covered Activities

Data Entry and Storage FY24 Update:

By the close of Fiscal Year 2024, the initial stages of creating and organizing the geospatial database were in progress. Updates to the emerging database are expected to be made throughout FY25.

Instances of Non-Compliance

Any instances of non-compliance with the terms of either ITP in FY24:

N/A

Problems or Issues Identified During Implementation

Problems or issues identified during implementation of the Wash Plan and steps taken or recommended to address them in FY24:

N/A

Administrative Corrections

Administrative corrections made to the Wash Plan in FY24:

N/A

Amendments to the HCP

Amendments made to the HCP since approval of the HCP in 2020 through the close of Fiscal Year 2024:

N/A

APPENDIX A

Wash Plan Programmatic Permits

Appendix A. Wash Plan Programmatic Permits

Additional obligations beyond what has been described in the HCP and associated ITP issued by the USFWS will be assigned to the Conservation District and Participating Entities consistent with other state and federal regulatory permits required of Covered Activities approved under the Wash Plan.

Such permits include the Regional Water Quality Control Board (RWQCB) Programmatic 401 Certification; U.S. Army Corps of Engineers (USACE) 404 Programmatic Individual Agreement; California Department of Fish and Wildlife (CDFW) 2081 ITP; CDFW Streambed Alteration Agreement (SAA) Construction Agreement; and CDFW – SAA Maintenance Agreement for Conservation District Activities.

Going forward, progress tied to meeting the additional obligations associated with the individual permits may be highlighted.

Through the end of Fiscal Year 2024 the following reflects the status of the permitting process:

Programmatic Permits Received:

Clean Water Act Section 401 Water Quality Certification and Order – Certification issued by RWQCB on July 29, 2022

Fish and Game Code Section 1602 Routine Maintenance Agreement (RMA) – RMA issued by CDFW on November 9, 2022

Streambed Alteration Agreement (1602) for Construction Permitting – Construction Agreement issued by CDFW on December 13, 2022

Programmatic Permits in Process:

- Clean Water Act Section 404 Programmatic Individual Agreement – Public Notice was provided in July 2022; a draft Environmental Assessment (EA) was completed by AECOM and submitted to USACE in September 2022; beginning in January 2023 and extending through June 2024, District staff and AECOM have continued to meet with USACE weekly in support of completion of the Environmental Assessment (EA) and eventual issuance of the standard individual permit. As of early April, the Corps' cultural resources officer and lead permitting specialist were in the process of engaging both Tribes and the State Historic Preservation Officer prior to finalization of the 404-permit estimated to be completed by the end of 2024. On June 11, 2024, in support of the finalization of the individual permit, District staff and AECOM meet with the Army Corps to tour the Plunge Creek Conservation Project and discuss next steps, including the permitting of adaptive management measures, tied to using the project as compensatory mitigation for all Wash Plan Covered Activities impacting Waters of the U.S and State.
- Fish and Game Code Section 2081 Incidental Take Permit – District submitted a permit application in December 2020; following comments from CDFW a Revised Application was submitted in December 2021 and deemed complete in January 2022; a field meeting with CDFW was conducted in June 2022. In August 2023, CDFW management strongly recommended parties participating in the Wash Plan take a phased approach to permitting Covered Activities, focusing first on permitting activities that are ready to be implemented. In response to CDFW's

recommendation for a phased approach to permitting Wash Plan Covered Activities, District staff organized several meetings beginning in August 2023 with the Department and Robertson's Ready Mix and CEMEX, given the miners' stated readiness to move forward, to facilitate the issuance of 2081 Incidental Take Permits for near-term mining activities covered under the Wash Plan. This resulted in CDFW issuing a draft 2081 Incidental Take Permit, with Robertson's Ready Mix and the District on January 5, 2024, for authorization to incidentally take San Bernardino kangaroo rat and slender-horned spineflower through expansion of the Old Webster Quarry by Robertson's Ready Mix. Given the Incidental Take Permit issued by CDFW to Robertson's had yet to be finalized and the interest expressed by CEMEX in expanding mining operations, District staff continued to meet with CEMEX and Robertson's Ready Mix through the end of FY24 to discuss ongoing communications with CDFW and appropriate next steps for permitting mining activities consistent with the Wash Plan. Given the readiness of the miners to move forward with mining activities in FY25, the permitting of mining activities are likely to be the first activities covered under a phased approach to awarding the 2081 Incidental Take Permit.

APPENDIX B

Project Records Management

Appendix B. Project Records Management

Details tied to individual projects are to be captured using the Project Management Table and associated Project Narrative Template for the monitoring and management projects highlighted in the Wash Plan Annual Report.

Populating and updating the Project Management Table provides the opportunity for higher-level analysis of program progression and funding allocation through time. Equally, the Project Narrative Template, designed to be similar to templates associated with grant reporting, is to provide for quick assimilation of the most important project-specific information by an active reader. Both the Project Management Table and Project Narrative Template are designed to be updated throughout the life of the project, recognizing most conservation projects are expected to be multiyear in duration.

Project Management Table	
Project ID	Unique project identification number (allows project-specific information to be linked to project reports, data, and contracts)
Project Title	Abbreviated project title limited to 31 characters
Project Purpose	Brief description purpose (limited to 100 words)
Contractor(s)/Researcher	Contractors or researchers associated with the project
Time Period	Year(s) project has been active (can be automated, based off entered project initiation date)
Total Project Cost	Total project costs in dollars and/or staff hours (position indicated) allocated
Amount Budgeted in FY	Dollars and/or hours spent or budgeted for the reporting year (that is, the fiscal year covered by the Annual Report)
Fund(s)	Water Conservation District Fund(s) to which work was or is to be billed
Matching Contribution(s)	Agency and dollar amount of committed funds
Landowner Involvement	Landowner(s) whose land is accessed for purposes of conducting the project
Project Status	Project may be funded but not initiated, ongoing, or complete
Project Progression	Project is on (or ahead of) schedule [Green], project requires additional attention by staff and/or contractors [Yellow], project is in jeopardy of not progressing [Red], project is approved (or funded), but not initiated [White]
Program Class	Identify program class from the following categories: monitoring/research, land management, planning, education/training, database management
Program Area	Identify program areas from the following categories: wildland fire, exotic plant control, invasive wildlife control, habitat restoration, human activities (including recreation, illegal dumping, and trespass), sensitive biological resources
Resource (e.g., Monitoring or Management Target)	Principal natural resources expected to benefit from project implementation
Wash Plan Conservation Actions	See below for listing recognized Actions and Objectives

Project Management Table	
Species-specific Actions	List of Species-specific Action(s) being addressed by the project
Preserve-wide Objectives	List of Preserve-wide Objectives addressed by the project
Monitoring Type (if applicable)	Initial Reconnaissance Monitoring, Baseline (Inventory) Monitoring, Effectiveness Monitoring, Targeted Monitoring, Regional Monitoring
Monitoring Method (if applicable)	Presence/absence, full census/total counts, probability sampling (transects, quadrats, trapping lines, grids, visual encounter surveys), mark-recapture surveys
Specific Threat/Stressor	Principal threat/stressor to be addressed or investigated through the work
Management Treatment	Specific treatment implemented in support of management activities (e.g., sheep grazing, prescribed fire, use of herbicides, mechanical removal, water management, sand spreading)
Intensity of Management	Spot, partial, or full treatment
Available Report(s)	
Available GIS Product(s)	

Project Narrative Template	
Overview	Project background limited to 1,000 words (description expected to largely remain static between years)
Progress	Progress made to date (includes a description of past year activities as well as activities to be achieved in the new fiscal year)
Key Milestones Schedule	Project milestones (with due dates identified or dates milestones were achieved listed)
Key Findings	Key findings from the project to be highlighted
Notes	Project-specific notes to be communicated to readers of the Annual Report



**San Bernardino Valley
Water Conservation District**

Helping Nature Store Our Water

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Primer on Slender-horned Spineflower (*Dodecahema leptoceras*) Restoration in the Upper Santa Ana River Wash

Prepared by San Bernardino Valley Water Conservation District

This document is a primer on slender-horned spineflower (*Dodecahema leptoceras*; SHSF) restoration. The primer is to be shared with the San Bernardino Valley Water Conservation District (Conservation District) Board, members of the Upper Santa Ana River Wash Habitat Conservation Plan (Wash Plan) Preserve Management Committee, and members of the SHSF Working Group who collectively support recovery of this state and federally endangered annual plant species known only to be found in the Upper Santa Ana River Wash and a few other locations in southern California.

The primer serves to capture the work completed by the Conservation District in developing a restoration program and principal steps in framing a restoration plan for SHSF since signing of the Wash Plan and issuance of a Federal Incidental Take Permit (ITP; No. TE78703D-0) in 2020. The primer is supported by four appendices that provide detailed documentation of the work:

- Appendix 1. Monitoring of Wild Patches
- Appendix 2. Seed and Tissue Collection
- Appendix 3. Out-planting Trials
- Appendix 4. San Bernardino Valley Water Conservation District Responses to Questions Raised by California Department of Fish and Wildlife Native Plant Program



Slender-horned spineflower (Dodecahema leptoceras)

What is the Wash Plan?

The goal of the Upper Santa Ana River Wash Habitat Conservation Plan (Wash Plan) is to balance ground-disturbing activities of water conservation, aggregate mining, recreational activities, and other public services in the Wash Plan Preserve with the conservation of natural communities and populations of special-status plant and animal species. More information about the Wash Plan and annual reports can be found at: <https://www.sbvacd.org/santa-ana-wash-plan/>.

Restoration Plan

Consistent with the Wash Plan, the restoration plan for the slender-horned spineflower is to be reviewed and approved by the Preserve Management Committee within 2 years of issuance of the ITP in 2020. The plan is to serve as the basis for developing a more comprehensive long-term plan and strategy for recovering the species in the Upper Santa Ana River Wash. Specifically, the restoration plan is to provide a framework for development of a robust science-based restoration program aimed to address issues unique to the maintenance and enhancement of existing slender-horned spineflower populations and the potential establishment of new populations within the Wash Plan Preserve.

Plan Development

The study design for the restoration plan is to initially be developed based on the recommendations prepared by the U.S. Fish and Wildlife Service (USFWS) for the Wash Plan in 2007, with refinements made based on consultations with California Department of Fish and Wildlife (CDFW) and other experts on spineflower.

Consistent with the Wash Plan, the SHSF Working Group is to be reconvened and consulted in the development of the restoration plan and subsequently, as needed, to review and provide input on restoration plan revisions. The working group was last together in 2014 and the information generated from the group helped form the basis for the writing of the section of the Wash Plan that deals specifically with the species. Both the USFWS and CDFW are members of the Working Group and will be represented when the group reconvenes.

The results of applied experimental methods supporting recovery of SHSF are to be evaluated annually by the Preserve Manager, and the restoration methods modified accordingly based on monitoring results. The initial methods included in the restoration plan are to be tested to determine their efficacy beginning in the third year after ITP issuance. Successful methods will be included in the annual work plan for the Wash Plan Preserve.



Monitoring at Plunge Creek out-planting trial block, January 2024

Restoration Program

As described in the Wash Plan, the initial restoration program is to include the following:

- Harvesting of spineflower seeds for an extended period, on the order of several years, to capture full genetic diversity of the seed bank from a given location
- Evaluation of soil composition and chemistry, terrain, vegetation, and other environmental conditions at sites where spineflower is extant to aid in determining potential establishment sites
- Identification and tracking of key environmental factors in the micro-environment of extant patches to provide data that could identify the more suitable environmental conditions for germination and persistence
- In cooperation with Bureau of Land Management (BLM) and the Wildlife Agencies, identification of sites on District Managed and District Conserved Lands for spineflower relocation, establishment, and enhancement

Program Accomplishments

Since approval of the Wash Plan in July 2020, a number of measures supporting development and advancement of the restoration program have been implemented by the Conservation District. Appendices 1, 2, and 3 provide details tied to several of these activities including the monitoring of wild populations, seed and tissue collection, and out-planting trials, respectively.

Scientific Research Permit

Conversations with the CDFW's Native Plant Program in 2022 resulted in a submitted research application and approved scientific research permit [No. 2081(a)-22-008-RP] received on November 22, 2022, covering activities tied to development and expansion of the restoration program. A permit amendment was granted by the CDFW Native Plant Program on April 8, 2024 [No. 2081(a)-22-008-RP Amendment 1] allowing for continuation of scientific studies of SHSF through December 31, 2026. For reference, responses to questions posed by CDFW during the permitting process are provided in Appendix 4.

Accomplishments Summary

Highlights of specific courses of action taken by the Conservation District in support of program advancement since the signing of the HCP in 2020 are provided below.

- Formalized monitoring program of wild patches in spring of 2022, within two years of issuance of the Federal ITP. Completed three years (2022, 2023, and 2024) of baseline monitoring following the established protocol
- Collected seed from wild populations beginning in spring of 2022 under state permit issued to California Botanic Garden (CalBG); seed collection from wild patches was repeated in 2023
- Installed three weather or meteorological stations in 2022 in the Wash in areas historically supporting SHSF; the stations allow the team to measure air temperature, relative humidity, soil moisture, soil temperature, and soil electrical conductivity



Meteorological Station at Wild Patch No. 13

- Received approval from CDFW for 2081(a) research permit in fall of 2022 to initiate restoration activities; Conservation District, Dudek, and CalBG were listed principals on the permit
- Initiated first-ever greenhouse and field seed-bulking enterprise for the species in the fall of 2022; an estimated 280,000 seeds were harvested from the seed-bulking activities in the summer of 2023 and deposited at CalBG for germination testing, processing, and storage



Plant germination at CalBG

- Performed phenology checks of known patches of SHSF in winter/spring 2023 prior to walking surveys. Phenology characteristics were also tracked and recorded with each Annual Monitoring of Wild Patches (2022, 2023, and 2024) and during monitoring of out-planting trial sites from January to June of 2024.

- Completed comprehensive walking surveys for undiscovered patches of SHSF in the Wash Plan Preserve in spring of 2023; although no new patches were found, more than 80 sites with local site characteristics matching conditions found at extant SHSF colonies in the Wash were mapped
- Initiated first-ever out-planting trials for SHSF in fall of 2023 across two sites using >100,000 seeds collected from bulking activities; the location of individual blocks selected to receive seed were informed by mapping completed during spring walking surveys
- Received approval from CDFW in winter of 2023 for a three-year extension on the 2081(a) research permit providing coverage of restoration activities through December 2026. SBVWCD, Dudek, and CalBG are listed principals on the permit
- Initiated second round of seed-bulking activities in winter of 2023. In summer of 2024, completed collection of seed from second round of seed-bulking activities and deposited seed at CalBG for germination testing, processing, and storage
- Between January and June of 2024 collected six months of monitoring data at the out-planting trial blocks and a reference block located within the source patch for the seed used in the seed-bulking exercise
- Collected soil samples from all monitored patches of SHSF and out-planting trial blocks in spring of 2024 to be able to assess and compare differences in soil chemistry and soil texture and sand grain size composition
- Collected plant tissue in May and June of 2024 for use in genetic assays to better understand the genetic diversity among extant patches of SHSF. Genetic analyses are being conducted by CalBG at the request of and with funding provided by BLM
- Collected seed in June 2024 from plants growing at out-planting trial blocks and the reference site (that is, the source patch for seed-bulking activities) to test for rates of germination and, in the case of the source patch, to collect a third year of seed (2022, 2023, 2024) for use in the bulking enterprise in 2025



Monitoring data, including plant growth, was collected over 6 months at out-planting locations



An estimated 280,440 seeds were produced by the 2023 bulking enterprise and showed germination rates over 70%



48 plots were seeded across the 6 out-planting trial blocks within the Wash Plan Preserve

Principal Questions

A list of emerging questions informing discussions of next steps supporting advancement of the restoration program are highlighted below.

- Are there any differences in the observed response of SHSF during out-planting trials to the doubling of the number of seed sown in the individual plots?
- What is the role of edaphic conditions (soil structure, temperature, moisture, pH, Nitrogen, and salinity) in predicting the likelihood of SHSF colony establishment and persistence?
- What combinations of soil texture and sand composition are consistently associated with SHSF colonies in the Wash? Are these conditions emulated at the out-planting sites?
- How does increasing soil aridity challenge long-term sustainability of SHSF colonies in the Upper Santa Ana River Wash? Are there favored local habitat conditions that serve to mitigate increasing temperatures and drying of the local environment?
- What is the role of cryptogamic soil in maintaining increased soil moisture levels in areas conducive to growing SHSF?
- What is the genetic structure of SHSF populations across the species range? How does this compare with the genetic structure within and among colonies of SHSF within the Upper Santa Ana River Wash?
- Are out-planting sites seeded with additional bulked seed collected from the same patch but across different years more productive in any one given year or over a period of multiple years, than sites only seeded from seed bulked from a single year?
- Are there signs of loss of genetic diversity due to habitat fragmentation and increased isolation over the last 25 years?
- Are there recognized benefits to mixing seed sources from multiple colonies located in the Upper Santa Ana River Wash when initiating new out-planting trials?



Spineflower with taproot collected for seed



Seed collection from bulking site, July 2024



After being cleaned at CalBG, bulked seeds are mixed with soil prior to being hand sown

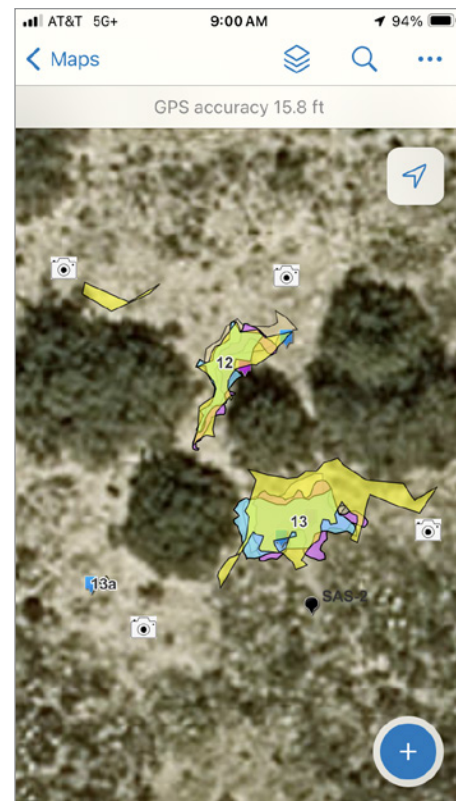
Proposed Next Steps

Immediate next steps supporting advancement of the restoration program and materials supporting completion of a complementary restoration plan, include:

- Sharing this primer and draft framework for the restoration plan with the Preserve Management Committee in summer of 2024
- Reconvening the SHSF Working Group in summer/fall of 2024 to discuss key questions to be answered going forward and methodologies to be employed when advancing development of the restoration program
- Analyzing the results of the first round of out-planting activities and sharing them with members of the Preserve Management Committee and SHSF Working Group in the fall of 2024
- Initiating a second year of out-planting trials in the fall of 2024
- Initiating a third year of seed bulking activities in the fall of 2024
- Considering creation of a second field seed bulking site and use of an additional wild source of seed for bulking in 2024
- Recognizing the relevancy of the management of the Woolly-star Preserve Area and HM Lands associated with the River HCP to the long-term recovery of SHSF
- Testing for differences in soil chemistry and composition among sites presently occupied by SHSF, sites with historic SHSF occurrences, sites experiencing out-planting trials, and randomly selected sites distributed across the Wash
- Continuing germination trials each year associated with bulking activities to have a measure of the viability of seed produced through bulking activities and evidence of successful pollination
- Among other things, through the permit amendment, the Conservation District is permitted to continue seed bulking activities through 2024 and 2025 and afforded the opportunity to initiate new out-planting trials

in the fall of each year through the duration of the permit (2024, 2025, 2026). Additionally, germination trials, supporting bulking and out-planting activities, are permitted to continue through 2026.

- Furthermore, out-planting can occur using seed generated by bulking activities or collected from wild populations. Seed collection from wild populations is recognized to be occurring annually through the duration of the permit. Importantly, the number of active out-planting trial locations can increase each year, with siting of the new locations informed by the new information gained from the walking surveys of the Wash Plan Preserve completed in 2023.
- Lastly, it is understood by CDFW that new patches of SHSF created through successful out-planting trials will be folded into and managed consistent with the terms and conditions of the Wash Plan.



SHSF patch size/location is tracked using an ESRI ArcGIS Field Maps Application designed for the monitoring program

References

California Endangered Species Act Scientific, Educational, or Management Permit No. 2081(a)-22-008-RP [November 22, 2022] – *Slender-horned Spineflower Germination, Seed Bulking, and Direct Seeding Trial*.

California Endangered Species Act Scientific, Educational, or Management Permit No. 2081(a)-22-008-RP Amendment 1 [April 8, 2024] – *Slender-horned Spineflower Germination, Seed Bulking, and Direct Seeding Trial*.

ICF. 2020. *Upper Santa Ana River Wash Habitat Conservation Plan. Final*. April 2020. (ICF 00544.13.) San Diego, CA. Prepared for San Bernardino County Valley Water Conservation District, Redlands, CA.



Slender-horned Spineflower Planting Sites in the Wash Plan Preserve, San Bernardino County, California

Primer on Slender-horned Spineflower (*Dodecahema leptoceras*)
Restoration in the Upper Santa Ana River Wash

Appendix 1. Monitoring of Wild Patches

Patch Monitoring

Beginning in 2021, San Bernardino Valley Water Conservation District (SBVWCD or Conservation District) contracted with Dudek to develop and implement a comprehensive survey methodology and standardized monitoring protocol for SHSF across the Wash Plan Preserve. The primary purpose of the patch monitoring is to develop baseline information on year-to-year fluctuations in patch size/location, habitat characteristics, and SHSF cover/density.

Jake Marcon, Restoration Director at Dudek and Assistant Investigator, oversaw development of the monitoring protocol and survey methodology in early 2022. At the request of the Conservation District, the finalized monitoring protocol for SHSF purposely incorporated many elements of the rare plant inspect and manage (IMG) protocols used by the San Diego Management and Monitoring Program. Annual monitoring data collected as part of protocol were designed by Dudek to be collected in the field using the ESRI ArcGIS FieldMaps and Survey123 platforms. Fieldwork tied to implementation of the monitoring protocol was initiated in the spring of 2022 by the Conservation District and has continued through the spring of 2024.

In 2022, the Conservation District, working with Dudek, completed surveys for SHSF across 17 previously identified patches of SHSF on May 18, 19, and 24 within the Upper Santa Ana River Wash. Slender-horned spineflower was detected at 7 of the historic patches, with Patch 13 being the largest

with 1,423 individuals. No other patch had more than 100 individuals. A total of 1,739 individuals were counted in 2022.

Each of the patches (or colonies) surveyed in 2022 were known and surveyed by various entities in previous years with the two exceptions, Patches 1A and 1C, which were discovered just beyond the established Patch 1B (previously identified as No. 1). In the newly developed survey protocol, the team established a 5-meter rule used to distinguish separate patches when boundaries of newly discovered patches are otherwise close to known patches. Following this protocol, Dudek and SBVWCD defined the two new patches as No. 1A and No. 1C, bringing the number of patches surveyed in 2022 to 19 and the number of patches with SHSF noted as present to 9.

In 2023, a total of 20 patches were surveyed. The number of surveyed patches increased from 2022, as a new patch (No. 13A) was discovered in 2023 just west of Patch 13 during the monitoring period.

Equally important to note, after making no observations of SHSF just east of Orange Street in both 2021 (see Romich 2021) and 2022, the Conservation District discovered a single plant in Patch 16 in 2023. The number of individual SHSF observed in the patches east of Orange Street had once numbered in the 1,000s, but following an unexplained collapse in the patches and subsequent wildfire in 2020 which burned each of the known locations, the single discovered plant is the only evidence the colonies in this location may still be present.

In 2023, SHSF were found on 11 of the patches surveyed. Interestingly, when comparing numbers from 2022 with numbers from 2023 across all the surveyed patches (see **Table 1-1**), although the total area of the mapped patches did not change much between years (1,301 SQFT in 2022 vs 1,292 SQFT in 2023) the total number of individuals observed was about half as many in 2023 (816) relative to 2022 (1,739).

The large difference in the number of individuals observed between years is interesting as 2022 was recognized to be an exceptionally dry year (from January on) while 2023 year was incredibly wet throughout the winter and early spring. Although the number of individuals of SHSF observed at monitored patches was reduced by almost half between years, preliminary data collected in the field suggests the average size of individual plants observed was much greater in the big rain year in 2023 when compared to 2022.

Table 1-1. The number of individual plants and the approximate area of patches monitored in 2022, 2023, and 2024

Patch	2022 Approx Area (SQFT)	2023 Approx Area (SQFT)	2024 Approx Area (SQFT)	2022 SHSF Individuals	2023 SHSF Individuals	2024 SHSF Individuals
1A	2	6	9	1	7	29
1B	17	1	1	5	1	5
1C	170	147	17	39	10	93
2	174	83	119	86	58	330
3	90	1	6	38	1	23
4	23	77	86	9	9	39
5	105	140	147	46	23	21
6	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
7	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
8	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
9	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
10	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
11	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
12	170	253	392	92	96	340
12a**	NA	NA	72	NA	NA	6
13	550	578	1064	1423***	603	2777
13a*	NA	5	5	NA	7	25
14	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
15	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
16	No SHSF Observed	0.03	No SHSF Observed	No SHSF Observed	1	No SHSF Observed
17	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed	No SHSF Observed
Total	1301	1292	1917	1739	816	3688

*Discovered in 2023 **Discovered in 2024 *** May be a slight underestimate

The size difference between individuals growing in 2022 and 2023 appears to have translated into a greater number of seeds produced per plant. Although there were half as many plants counted in 2022, the number of seeds collected in 2023 was dramatically greater across all the surveyed patches using the same collection protocols as in 2022. For more details tied to the results of seed collection activities, see information shared in **Appendix 2**, Seed and Tissue Collection.

In 2024, the total number of patches surveyed increased to 21, as a new patch (No. 12A) was discovered just west of Patch 12 during the monitoring period (see **Figure 1-1**). The Conservation District conducted annual monitoring of known patches of SHSF within the Wash Plan Preserve on May 14, 21, 22, and 29. In total, over the four field days, 21 patches were monitored allowing for comparisons across the 2022, 2023, and 2024 field seasons.

In total, 11 of the 21 patches surveyed in 2024 had SHSF noted as present.

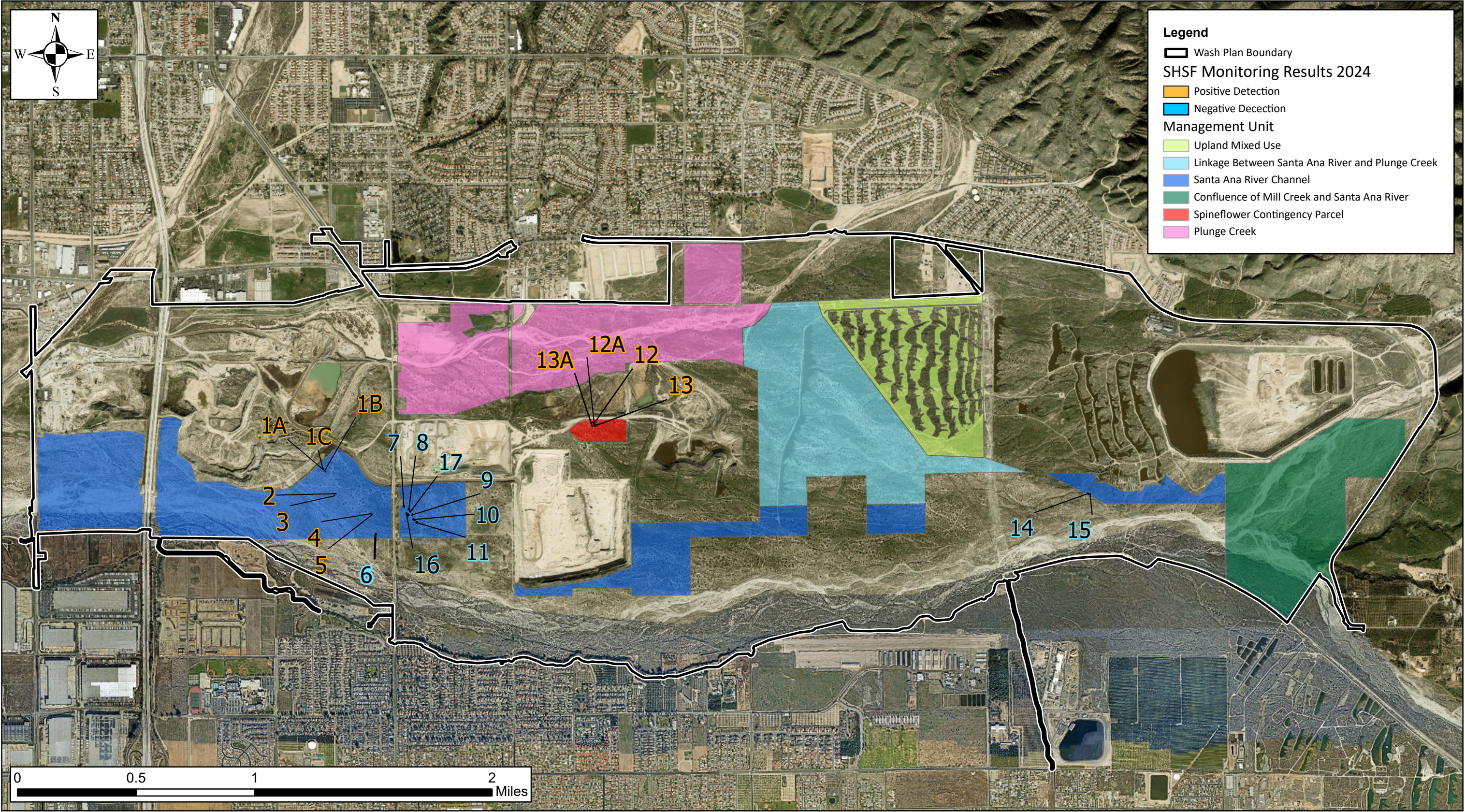
The number of observed plants in 2024 at the surveyed patches increased to 3,688, or more than four times as many as in 2023, and twice as many as observed in 2022. Interestingly, consistent with 2022 and 2023, the number of plants observed in patch No. 13 in 2024 represented more than 75% of the total plant observed across the entirety of the Wash Plan Preserve.

It is important to note the rain-year of 2023-24 was the second very productive rain-year in a row. The amount of precipitation falling across the two rain-years (2022-23 and 2023-24) was the highest recorded in southern California (Los Angeles, specifically) since the late 1800s (Toohey and Smith, 2024).



Large SHSF individuals growing at Patch 13 observed during annual monitoring in 2023

Figure 1-1. Slender-horned Spineflower 2024 Patch Monitoring



Walking Survey

Complementing the annual patch monitoring efforts, a single comprehensive survey for SHSF populations was implemented by Dudek and the Conservation District in spring 2023. The comprehensive survey was designed to support the discovery of new patches of SHSF and identify the extent and location of habitat in the Wash Plan Preserve suitable for out planting trials.

Dudek, with assistance from SBVWCD, led the comprehensive distribution surveys within the Wash Plan Preserve in search of any potential undocumented SHSF patches. During the surveys, surveyors walked parallel transects spaced at 20 meters across the entirety of the Wash Plan Preserve looking for SHSF. While walking transects, if any potential SHSF suitable habitat was encountered (e.g., open bare ground around junipers that have commonly associated species and/or cryptogamic crusts etc.), the applicable information listed below was recorded:

- Native plant cover (integer 0-100)
- Non-native plant cover (integer 0-100)
- Biological crust cover (integer 0-100)
- Bare ground cover (integer 0-100)
- Indicator species (leather spineflower, parry's spineflower, other species)
- Mapping of Patch Perimeter

To assist in identifying the appropriate timing for the walking surveys, as well as aid in scheduling the planned annual monitoring of known populations of SHSF, the Conservation District staff performed phenology checks of known patches of SHSF beginning in late March, extending through April. During phenology checks, the percentage of SHSF plants at a single patch exhibiting characteristics of leaf rosette vs. branched stems and floral clusters were noted.

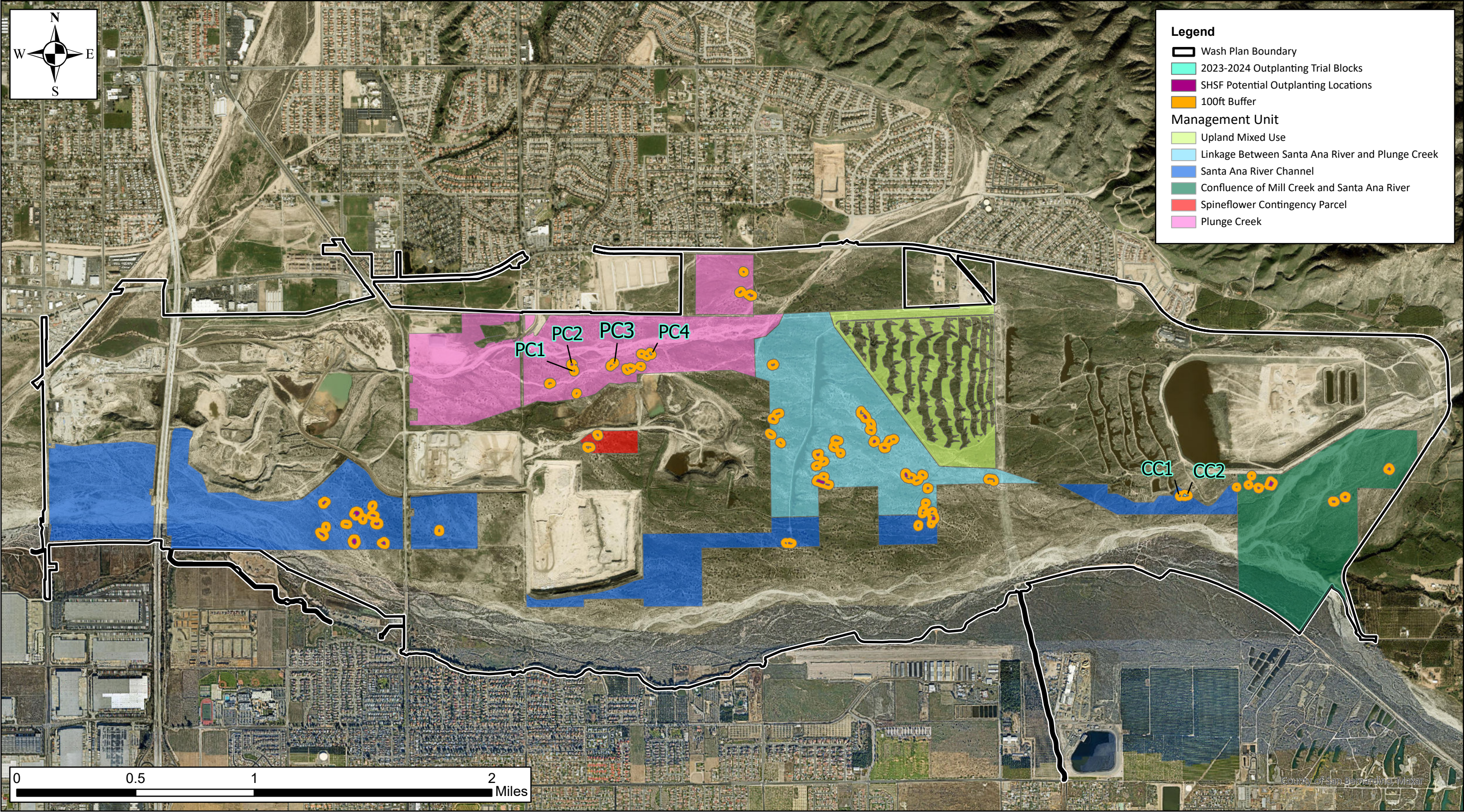
Comprehensive surveys for new SHSF populations of the Wash Plan Preserve were initiated by Dudek on May 2. The project was implemented over a total of 11 field days in May with District staff participating on May 3, 9, 10, 11, 16, 17, 18, 23, and 24.

Although no new patches of slender-horned spineflower were discovered, more than 80 sites with macro-conditions (that is, the presence of sandy soils, presence of cryptogamic crust, association with *Juniperus californica*, open ground largely devoid of invasive grasses, evidence of past fluvial disturbance, and stream terrace habitat with alluvium that was often estimated at being more than a hundred years old) were mapped by Dudek and the Conservation District as suitable habitat for SHSF (see **Figure 1-2**). The mapped habitat totaled 3.7 acres across the Wash Plan Preserve. Survey 123 data/attributes were recorded at each of the mapped polygons to aid future evaluation and selection of potential out-planting locations.



SHSF with branched stems and floral clusters

Figure 1-2. Slender-horned Spineflower Outplanting Trails



Primer on Slender-horned Spineflower (*Dodecahema leptoceras*)
Restoration in the Upper Santa Ana River Wash

Appendix 2. Seed and Tissue Collection

Wild Patches

On June 6, 2022, under permits held by the California Botanic Garden (CalBG), the Conservation District’s contractors from Dudek and CalBG collected seeds across seven wild patches known to have flowering plants based on monitoring activities completed earlier in the season. The number of SHSF plants collected, collection type, total weight and seeds from sampled patches in 2022 are provided **Table 2-1** below.

For seed collection, cleaning, and storage, Dudek and CalBG followed the Center for Plant Conservation’s *Best Practices for Collecting Seeds from Wild Rare*

Plant Populations. Prior to seed collection, the SHSF populations were visited by Conservation District and Dudek staff when plants were in flower to assess population size, sampling strategy, and timing. CalBG then collected specimens in accordance with guidelines provided in their U.S. Fish and Wildlife (USFWS) recovery permit and CDFW collections permit. CalBG employed a random sampling approach to collections to ensure the maximum genetic diversity was captured. Furthermore, populations were distinguished utilizing CDFW’s California Natural Diversity Database (CNDDDB) quarter mile rule and were identified using CNDDDB element occurrence numbers.

Table 2-1. Sampled Patches of Wild SHSF

Patch	Number of Plants Collected	Type of Collection	Total Weight (g)	Total Seeds
Site 1A	1	Wild	0.0015	10
Site 1C	2	Wild	0.006	1
Site 2	25	Wild	0.0212	112
Site 3	15	Wild	0.0149	71
Site 5	10	Wild	0.0069	30
Site 12	12	Wild	0.0313	146
Site 13	325	Wild	0.8328	3644
Totals	390		0.9146	4014

During collection, dry fruits were placed into manila coin envelopes and field forms were completed with information regarding exact location, population status, estimated population size, the number of individuals sampled, existing or potential threats or disturbances, habitat, associated species, and any other relevant information. The information was then used to generate an accession number used to track the population through propagation.

Following a similar protocol as to the seed collecting activities implemented in 2022, seed collecting

in 2023 (which occurred on June 22) resulted in a more than four-fold increase in the number seeds collected across sampled patches when compared to 2022. Interestingly, this substantial increase in production by individual plants was largely consistent across patches, as evident when comparing numbers from the same patches where collections occurred in both years. Changes in the number of SHSF seeds from sampled patches in 2022 and 2023 are evident in the information provided in **Table 2-2** below.

Table 2-2. Number of SHSF Seeds produced from 2022 and 2023 collections

Patch	Type of Collection	# Seeds in 2022	#Seeds in 2023	Total Seeds
Site 1A	Wild	10	318	328
Site 1C	Wild	1	140	141
Site 2	Wild	112	941	1053
Site 3	Wild	71	NA	71
Site 4	Wild	NA	194	194
Site 5	Wild	30	494	524
Site 12	Wild	146	2757	2893
Site 13	Wild	3644	12683	16327
Totals		4014	17527	21541



Collected SHSF Seeds

When contrasting the change in number of individual plants observed at monitored patches, which dropped almost by a factor of two between the incredibly dry winter of 2022 and wet winter and spring of 2023 (see **Appendix 1**), with the reported increase in size of individual plants and substantial increase in productivity of the plants sampled in 2023, the results suggest SHSF colonies exhibited an acutely different response to the different amounts of precipitation falling between the two years during the growing season.

In 2023, seed collection of *Dodecahema leptoceras* was delivered to the California Seed Bank by Dudek on September 20. The 2023 collections were from all the same wild patches collected in 2022, except for patches 3 and 4. Patch 3 was only collected in 2022, and Patch 4 was only collected in 2023. Seed was also collected from the 2023 field-bulking site (described in the section that follows). **Table 2-3** shows the geographic location of individual patches and the bulking site, as well as the dates of the collection for both 2022 and 2023.

Table 2-3. SHSF Sampled Patches

Collection Type	Collection Date(s)	Lat	Long	Patch
Field-bulked	6/22/2023, 7/24/2023, 7/28/2023, 8/12/2023, 8/31/2023, 9/20/2023	34.098511	-117.166825	Bulking Plot (Origin: Patch 13)
Wild	6/6/2022, 6/22/2023	34.095951	-117.187441	1A
Wild	6/6/2022, 6/22/2023	34.096021	-117.187571	1C
Wild	6/6/2022, 6/22/2023	34.094549	-117.186726	2
Wild	6/6/2022	34.093202	-117.184043	3
Wild	6/22/2023	34.093282	-117.184143	4
Wild	6/6/2022, 6/22/2023	34.093201	-117.184017	5
Wild	6/6/2022, 6/22/2023	34.098725	-117.16762	12
Wild	6/6/2022, 6/22/2023	34.098556	-117.167551	13



Mature SHSF at bulking site collected for seed

Materials collected in 2023 were processed by CalBG using a hand debearded, soil sieves and a seed aspirator unit to separate the seeds from the excess plant material. Seed samples to be used in the reintroduction experiment (see **Appendix 3**) were separated from the field-bulked collection and placed in 48 individual packets (with 16 packets containing 3,230 seeds and 32 packets containing 1,615 seeds). Seed packets were picked up by the Conservation District on October 31, 2023, for use in out-planting trials scheduled to take place on November 1.

Prior to being sorted, germination tests were initiated by CalBG on September 25 on field-bulked collection of seed. On October 16, 2023, the test ended with 36 of 50 of the tested seeds germinating (72%). On October 30, a single germination test was started for the wild collections. The test ended on November 13, 2023, with 28 out of 53 (52.8%) germinating.

All remaining seed collections were packaged in heat-sealed foil packets and stored in chest freezers at the California Seed Bank at -23°C. The 2022 and

2023 wild seed collections from the same patch are stored together in the same heat-sealed foil packets but separated in glassine envelopes by collection year within the packets. **Table 2-4** below shows the number of seeds currently organized and stored at CalBG by source patch and bulking activity.



SHSF Seed in Storage at CalBG

Table 2-4. Number of SHSF Seeds Stored at CalBG

Accession #	Patch #	Year	# Seeds
26571	Field Bulking Plot (Origin: Patch 13)	2023	177080
26572	1A	2022	10
		2023	318
26573	1C	2022	1
		2023	140
26574	2	2022	112
		2023	941
26416	3	2022	69
26575	4	2023	194
26576	5	2022	30
		2023	494
26577	12	2022	136
		2023	2757
26578	13	2022	1717
		2023	12683

Continuation of seed collection at the Patch 13 is expected to continue at least through 2026, to better capture a larger portion of the total genetic diversity present within the most prolific colony of SHSF within the Wash Plan Preserve. Multiple years of seed collection are needed across different rain years to capture the greater breadth of genetic diversity present within and between extant native patches. This full genetic diversity is believed to be needed for establishing new colonies of SHSF that are resilient to changing environmental conditions typical of southern California (e.g., years with heavy precipitation followed by years of extended drought, shifts in the timing of precipitation events in and across years, etc.).

germinate from the CalBG Seed Bank Collection with the goal of producing a total of about 500 plants for inclusion in the bulking activities.

Once germination was completed, each seedling was grown in two-inch containers before being transplanted to regeneration beds. For the soil, CalBG used a mix of peat moss, cement sand, perlite, and fertilizer. Moreover, the regeneration beds allowed plants to reach optimal size and have the greatest potential of seed production. All propagated plants were then grown in the CalBG Nursery following all appropriate sanitation protocols that included but were not limited to seed, soil, surface, and pot sterilization in accordance with Phytophthora Working Groups guidelines.

Seed Bulking in 2023

Working under California Endangered Species Act Scientific, Educational, or Management Permit No. 2081(a)-22-008-RP, the Conservation District moved forward in late 2022 and 2023 with implementation of bulking and planning for out-planting activities.

As of spring 2023, the principal activity implemented under the approved 2081(a) permit involved establishing an onsite seed bulking practice in which the restoration team, under the guidance of Dudek and CalBG, initiated growing of collected seeds in a controlled nursery setting prior to transferring plants on site in the Wash where the individual plants were continually watered and managed throughout the remainder of the growing season to increase size and flowering output of individual plants. The Conservation District chose to grow the plants in the Wash, following initial germination and establishment in the nursery at CalBG, so the plants could take advantage of native pollinators and maximize seed set.

Following the successful collection of seeds in the summer of 2022, germination trials were initiated by CalBG on December 2. Trials were conducted directly in soil in a screened lathhouse at CalBG's nursery facility, in a soil medium that is conducive for seed germination. Evidence of successful germination occurred at the nursery setting on December 13. The success of the germination was determined based on the observation of cotyledons. After trials, approximately 750 seeds from a single source patch (No. 13) were made available to



Seedlings grown at CalBG Nursery

After growing throughout January, February, March, and much of April 2023 in a controlled setting, plants were transferred from the nursery to the field for planting in late April. At the field bulking site, SHSF plants were planted in rows to facilitate maintenance. Plants were spaced approximately 12 inches from each other in and between rows and

pollination between different maternal lines was encouraged to maximize genetic diversity of the bulked seed.

The field bulking site, which was approximately 10 meters by 10 meters in size, was established in early April a few weeks prior to the arrival of the plants from the nursery. The outside perimeter of the bulking plot was delineated by a trenched-in silt fence and the soil surface lined with landscape fabric to reduce weed encroachment, weed seed contamination, and to facilitate SHSF seed harvesting. Prior to establishment of the bulking site, any dead grass material and herbaceous growth was removed from the site via mechanical/hand removal under the supervision of Dudek and their restoration contractor, HRS.

Prior to planting the SHSF, a simple watering system was set up to aid in the establishment and growth of the plants in the absence of natural rainfall. The addition of water was expected to extend the growing season and size of the bulked plants. The watering system used consisted of overhead spray irrigation, utilizing MP Rotator 2000 high efficiency spray nozzles to mimic low precipitation. Water was delivered using a 500-gallon water buffalo and the system was charged by a water truck when visited by HRS.

As of late June 2023, an estimated 372 plants were growing at the bulking site, receiving supplemental water approximately two days a week. Final watering of the plants took place on July 14. The first seed harvesting occurred on July 17 and 24, following the first sign of mature fruits in the new plants.

In total, about 10% of the population was hand collected by the Conservation District in the first two days of harvesting. Noting the different plants growing at the bulking site were maturing at different times, CalBG and Dudek varied collection dates to maximize the number of seed by collecting early- and late-maturing seeds over the entire course of the ripening process which lasted almost two months.

Seed collection at the bulking site was completed on September 20. Following collection, seeds were transferred from Dudek to CalBG for cleaning, counting, germination testing, and placement in a cool dry place to address needs for short-term storage. All collected chaff and inert material was made available to Dudek for potential use during out-planting. Any seeds not used in out-planting were dried to less than 25-35% relative humidity at room temperature, packaged in heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -23° C at CalBG.

In total, an estimated 280,440 seeds were produced by the plants grown at the bulking site in 2023. The germination testing of bulked seed performed by CalBG began on September 25 and ended on October 16, 2023. In total, 36 out of the 50 seeds tested showed positive germination (72%).



Bulking Site Ready to Receive Plants in 2023

Pollinators

In spring of 2023, the Conservation District, working with researchers from the University of Redlands, took the first steps towards developing a pollinator study to inform slender-horned spineflower reproduction and identify the primary pollinators of the species. As currently designed, the pollinator study will track, identify, and record pollinators at multiple extant spineflower locations during three different surveys per location; one during early bloom, one during mid bloom, and one during late bloom to identify the pollinators that play a vital role in the fruit and seed production of SHSF. Collected data is expected to inform restoration and out-planting activities as well as recovery strategies to be used across the species' range.

Early results from a pilot study of pollinators initiated in June 2023 aimed at describing pollination activity of SHSF at one of the wild patches (No. 13) produced some of the first high-quality images of observed pollinators, including the image below of a very small (~2 mm) cuckoo wasp in the family Chrysididae. The image was captured and produced by Dr. Dustin VanOverbeke of the University of Redlands.

Recognizing there was a temporal disconnect of more than a month in time between pollination activity at the wild patches of SHSF (in May), and the timing of flowering at the nearby bulking site (July), it was interesting to note the apparent shift in the suite of active pollinators from those observed at the wild population during the pilot study, which appeared to have been made up by a diverse coalition of wasps together with native ants, to a much more simplified group largely made-up by native ants observed at the bulking site in mid-summer in 2023.



Cuckoo Wasp Observed Near Wild Patch No. 13



Native Ant Observed Near Wild Patch No. 13

Images by Dr. Dustin VanOverbeke of the University of Redlands

Seed Bulking in 2024

A second year of field bulking activities were implemented under the permit extension received from the CDFW Native Plan Program [2081(a)-22-008-RP Amendment 1] in early 2024. Following the success of the protocol implemented during the first year of bulking activities, Dudek, CalBG, and the Conservation District largely repeated the same steps taken during the first year in the second year of activities and used the same resources, including the same bulking plot. A few of the notable differences between years included:

- Using seed collected in 2023 instead of seed that was collected in 2022 from the wild source patch (No. 13) to initiate bulking activities
- Using propagation trays to reduce transplantation damage at the nursery
- Including more organics in the pot mix to reduce root damage during transplantation into the field and faster growth in the nursery
- Transferring the first plants from the nursery to the field seed bulking site (on April 9, 2024), a

few weeks earlier than when the first plants were planted in 2023 (which occurred on April 27)

- Ending watering a month earlier in 2024 (on June 11) than in 2023 (which occurred on July 14)
- Ending seed collection on July 22, 2024, after first collecting seed on July 16, versus ending seed collection on August 31, 2023, after first collecting seed on July 24

Interestingly, although the target number of plants to be bulked both in 2023 and 2024 was 500 plants, the total estimated number of plants available for harvesting following completion of the bulking activities in 2023 was 372 and in 2024 it was 464. Also of interest, the average and median size of the harvested plants were substantially bigger, largely in measures of width, in 2024 (height [average, median]: 38.3 mm, 35 mm; width [average, median]: 224.3 mm, 212.5 mm; n = 115) than in 2023 (height: 37.6 mm, 35 mm; width: 138.7 mm, 120 mm; n = 93).

Lastly, it is important to note, on June 20, 2024, seed collected by the Conservation District at Patch No. 13 was delivered to CalBG for purposes of initiating a third year of bulking activities expected to begin in fall of 2024 and extend into the summer of 2025.



Mature SHSF at Bulking Site in July 2024

Tissue Collection

On May 14 and 23 of 2024, the Conservation District worked with CalBG to collect tissue of SHSF for use in laboratory studies documenting the genetic diversity found within and between known wild patches of SHSF (1A, 1B, 1C, 2, 3, 4, 5, 12, and 13) and the SHSF growing at the bulking site and at the out-planting blocks at Plunge Creek and Cone Camp.

Genetic studies performed by CalBG are funded by BLM for the purpose of informing restoration strategies for the species. Specifically, the work by CalBG is designed to build upon earlier research (see Ferguson and Ellstrand, 1999) describing the population structure present within SHSF.

A strong population structure detected within SHSF will require researchers to consider what the structure means for local adaptation and moving seeds around in restoration. However, if there is

more genetic diversity found to be present within populations than between populations and structure between populations is low, then researchers will be able to recommend a strategy where seeds could be mixed between populations.

Additionally, information on population structure will inform managers whether SHSF is suffering from declining genetic variation due to habitat fragmentation and isolation. This decline was not detected in the 1999 study, however, in the 25 years since, following several years of drought and possibly low return to the seed bank, the researchers are interested in whether they will see the impacts of fragmentation and isolation, and, if so, how they might use restoration to buffer against the impacts.

Appendix 2 References

Ferguson, N. J. and N.C. Ellstrand. 1999. Assessment of Seed Bank Buffering of Genetic Change in *Dodecahema leptoceras* (Slender-horned Spineflower). Prepared for California Department of Fish and Game. 36 Pages.

Romich, M. 2021. Slender-horned Spineflower Results of 2021 Monitoring. Prepared for San Bernardino Valley Water Conservation District by Origin Biological. 41 Pages.

Toohey, G., and H. Smith. 2024. 'Way, way, way above normal' rains could set all-time L.A. record as wet weather continues. Article published on April 1, 2024, in the Los Angeles Times.

Primer on Slender-horned Spineflower (*Dodecahema leptoceras*)
Restoration in the Upper Santa Ana River Wash

Appendix 3. Out-planting Trials

Out-planting trials at identified locations believed to support the establishment of new spineflower colonies were initiated in the fall of 2023. Consistent with the Wash Plan, out-planting trials are an essential component of the restoration program being implemented within the Wash Plan Preserve. Details tied to the trials undertaken in 2023, including discussion of site selection, trial block design, plot layout and seeding methodologies are described in the memorandum prepared by Dudek in October 2023 (Marcon 2023).

In 2023, out-planting trials were replicated across six blocks first assessed during the walking surveys of the Wash Plan Preserve completed in spring of 2023. Four of the blocks were established at Plunge Creek (PC1, PC2, PC3, PC4) and two blocks at Cone Camp (CC1, CC2; See Figure 2.). It is important to note, no extant populations of SHSF were known from any of the areas identified to receive seed in the first round of trials.

As part of the trial, and within each individual block, direct seeding activities took place within eight (8) one-by-one-meter permanent plots. Plots were sited within each out-planting trial location in areas with similar characteristics. The plots were used to establish controls and test the effectiveness of hand dispersing and raking in the native seed along with the importance of the presence of cryptogamic soils, sand additions, and the positive associations between SHSF presence with future management actions and other plant species, such as Parry's spineflower. In total, forty-eight (48) one-by-one-meter plots distributed across the six (6) blocks received either 1,615 seeds (32 plots) or 3,230 seeds (16 plots) for a total of 103,360 seeds sown in the first year of out

planting trials. All seeds were sown on November 1 and involved hand seeding, using a stainless-steel shaker or dredge filled with a small mixture of native sand and bulked seed, followed by light raking of the plot. A small subset of plots also received sand addition prior to seeding as an additional treatment.

Following the onset of rains in November (with 0.23 inches recorded at the Ontario International Airport on the 2nd, and 1.86 inches falling over a three-day period from the 7th through the 9th) and a light dusting of 0.05 inches on December 2, the Conservation District revisited a subset of the out-planting locations and the wild SHSF Patch 13 (the source patch for the bulking activities) to check for early evidence of germination of SHSF on December 7. During the visit photos were taken of the new plant growth observed for future identification of species just breaking through the soil. No SHSF were identified during the visit at any of the visited sites or reference patch or following review of the collected photos.

On January 4, following additional storms in December (with 1.3 inches falling over the 11th and 12th and 0.27 inches falling over the 27th and 28th at the Ontario International Airport) and early January (with 0.38 inches falling on the 1st through the 3rd) Conservation District revisited a subset of the out-planting locations and Patch 13 and confirmed germination of SHSF at both the out-planting locations and the reference patch. Following the discovery, a rigorous six-month monitoring schedule and protocol was established requiring monthly visitation and counting of all visible SHSF plants growing at the six out-planting blocks and the reference patch.

The variables collected during each monitoring visit included the following:

- Number of SHSF
- Longest width and height of five randomly selected SHSF
- Cover of SHSF
- Phenology of SHSF
- Cover of native plant species
- Cover of non-native plant species
- Cover of cryptogamic crust
- Cover of bare ground
- Cover of soil disturbance

The first formal monitoring was conducted on January 17, and followed by data collections on February 8, March 12, April 16 and 17, May 22, 23, and 28, and June 19 and 20. The total number of SHSF counted by month across the six (6) blocks and at the reference site (Patch No. 13) are provided below.

- January - 1,136 across the six blocks; 27 at the plots located within the reference site
- February - 2,961 (blocks), 161 (reference)
- March - 5,205 (blocks), 263 (reference)
- April - 3,649 (blocks), 269 (reference)
- May - 2,845 (blocks), 213 (reference)
- June - 2,227 (blocks), 153 (reference)

From the first documentation of SHSF growing at the out-planting blocks on January 4, through monitoring conducted on March 12, the total number of slender-horned spineflower growing across the six blocks continued to increase and individuals counted in prior months continued to get larger with only a small number of mortalities (108) counted across all sites.

The number of SHSF growing at the out-planting sites peaked in March. This is like what was seen at the reference site, although the reference site extended the peak period for two-months from March through April before seeing a drop in numbers, whereas the out-planting blocks showed a significant drop off from March to April.



SHSF individuals in leaf rosette observed during out-planting monitoring, February 2024

During the first few months of the growing season, the plants growing at the out-planting trials locations and the plants growing at the reference site looked to be of similar size and stage of growth. During monitoring in April, the plants across all blocks and the reference site were nearly at 100% with floral bracts, with flowering still rare, estimated at less than 0.1%. The size of SHSF across all sites in April, including the reference, were quite variable with a number of exceptionally small, small, medium, and a few large SHSF present.

During monitoring conducted in May, a significant number of plants were noted as flowering and pollinator activity was observed at both the out-planting sites and the reference patch. Natural and incidental mortality was also noted as occurring at all locations.

On June 19, during the final visit to the out-planting sites, seed was collected for future testing of viability to confirm successful pollination of plants growing at the experimental sites. A similar collection was made on June 20 at the reference site to allow for comparison of germination rates.

Interestingly, when revisiting the situation associated with the timing of the observed drop off in SHSF numbers at the out-planting sites between March and April, it was noted the steepest decline was limited to plots treated during the study with a grass-specific herbicide (Fusilade II). The use of herbicide was a generalized treatment included in the study to measure the effect of treating any non-native grasses encroaching on the experimental plots. The herbicide was applied to half the plots in early March as a one-time pass.

The first appearance of apparent sensitivity of SHSF to the herbicide treatment was first noted on March 12, when incidentally mortality at the out-planting sites was noted as 97 to 11 individuals of SHSF for plots treated with herbicide (n = 24) versus plots that were not treated (n = 24), respectively.

Upon closer review, the drop off in SHSF numbers from March to May for plots treated with herbicide (2,201 to 334) was substantially greater than the numbers seen at the untreated plots (3,004 to 2,551) and reference site (263 to 213). Surprisingly, plots treated with a single pass of the grass-specific herbicide saw an 85% drop in numbers from March to May, whereas untreated plots only saw a drop of 15%, which was mirrored by the reference site at 19%.

Going forward, the study team recognizes it is important to revisit this result, as use of herbicide was recognized an acceptable treatment by the Wash Plan for reducing competition with non-native grasses at wild patches of SHSF by treating grasses early in the new calendar year. Given the noted presence of SHSF at out-planting sites and reference patch as early as January, and the clear sensitivity to the herbicide and/or surfactant employed in this experiment, this practice will need to be revisited.

Additional Notes

It is important to note, the success had in seed bulking in the field during the winter and spring of 2022-2023 allowed for much more seed to be available for use in the seeding trials than what otherwise would have been if only seed collected from wild patches of SHSF was used. Given the timing of receipt of the 2081(a) research permit from CDFW did not line-up with a fall 2022 direct seeding event as originally planned, the seeding or out-planting trials component of the research was pushed to fall 2023. The delay in starting the out-planting trials allowed the Conservation District to utilize the seed that was made available through the bulking activity and the information gained from the walking surveys when considering site placement for the trials.

Overhead watering at the bulking site and the presence of native pollinators (principally ants) allowed for the individual plants involved in the bulking exercise to be very productive and produce a lot of viable seeds. The volume of seed used at the out-planting trials is thought to be comparable to the number of seeds produced at large SHSF

colonies in productive years at wild patches of SHSF. Because counts of seed produced by SHSF had not occurred with this type of detail or intensity of work prior to implementation of the bulking exercise, the Conservation District was naïve to the fact that tens of thousands of seeds are likely to be produced by hundreds of plants in wild populations in productive years. The numbers used in the out-planting trials were informed by what was learned through the seed bulking, cleaning, and counting activities.

Within two of the six blocks involved in the out-planting trials, sand was collected from the immediate area and spread a couple of inches thick on a subset of plots. The placement of the sand on otherwise less permeable soils was used to test the idea of whether sand addition was a method for creating a favorable on-site medium for growing SHSF that had an increased capacity to hold water. Going forward, sand addition is not expected to be a part of future trials. The Conservation District learned from this last year's trials the naturally occurring mosaic of cryptogamic crust and sandy soils with the presence of a modest silt content may be a favored growing medium for SHSF. The Conservation District plans to test this idea in future years at out-planting trial sites and will be collecting and describing the composition and texture of soils at native patches of SHSF and out-planting trial locations this summer, working with a soil lab at BYU to confirm and better describe these observations.

With respect to herbicide application, in working with *Chorizanthe parryi fernandina* (San Fernando Valley spineflower), Dudek has been very successful in both bulking seed and using herbicide and mechanical means to prepare and manage restoration sites seeded with the species. When considering steps to be taken with SHSF, Jake Marcon, who has been overseeing the introduction of San Fernando Valley spineflower for Dudek, was interested in applying some of the same methods used successfully for that species in the restoration plans for SHSF.

Outside of using a grass-specific herbicide to limit grass establishment in areas buffering native patches of SHSF, which is something the Conservation District does today as a required conservation measure identified in the Wash Plan HCP, the Conservation District does not plan to use herbicide as a tool for establishing new patches of SHSF and is confident it does not need to be part of the out-planting trials going forward.

Appendix 3 References

Marcon, J. 2023. Slender-horned Spineflower 2023 Seeding Trials Overview. Prepared by Dudek. 5 Pages.

Slender-horned Spineflower Germination, Seed Bulking, and Direct Seeding Trial 2081(a)-22-008-RP; Research Proposal, Dated October 7, 2022



Plunge Creek Out-planting Site, March 12, 2024

Primer on Slender-horned Spineflower (*Dodecahema leptoceras*)
Restoration in the Upper Santa Ana River Wash

Appendix 4. San Bernardino Valley Water Conservation District Responses to Questions Raised by California Department of Fish and Wildlife Native Plant Program

San Bernardino Valley Water Conservation District Responses to Questions Received by California Department of Fish and Wildlife (CDFW), Dated October 28, 2022:

Q1. Please provide GPS coordinates for the Upper Santa Ana River Wash and the California Botanic Garden facilities referenced in the proposal.

Answer: Upper Santa Ana River Wash: 34 05'33.71" N, 117 09'15.70" W

California Botanic Garden: 34 06'38.70" N, 117 42'50.59" W

Q2. Please provide a more detailed map of where the field outplanting grow plots and direct seeding plots will be located referencing proximity to any historical populations. It would be helpful to delineate where the occupied habitat is currently, where the historical populations were documented and to identify polygons where the different trial blocks will be located.

Figure 4-1. Slender-horned spineflower occurrences within the Plan Area covering the period of 1992 through 1999 (light orange circles) and 2005 through 2016 (darker orange circles). Note, the area captured in the rectangle outlined in black is enlarged in Figure 2.

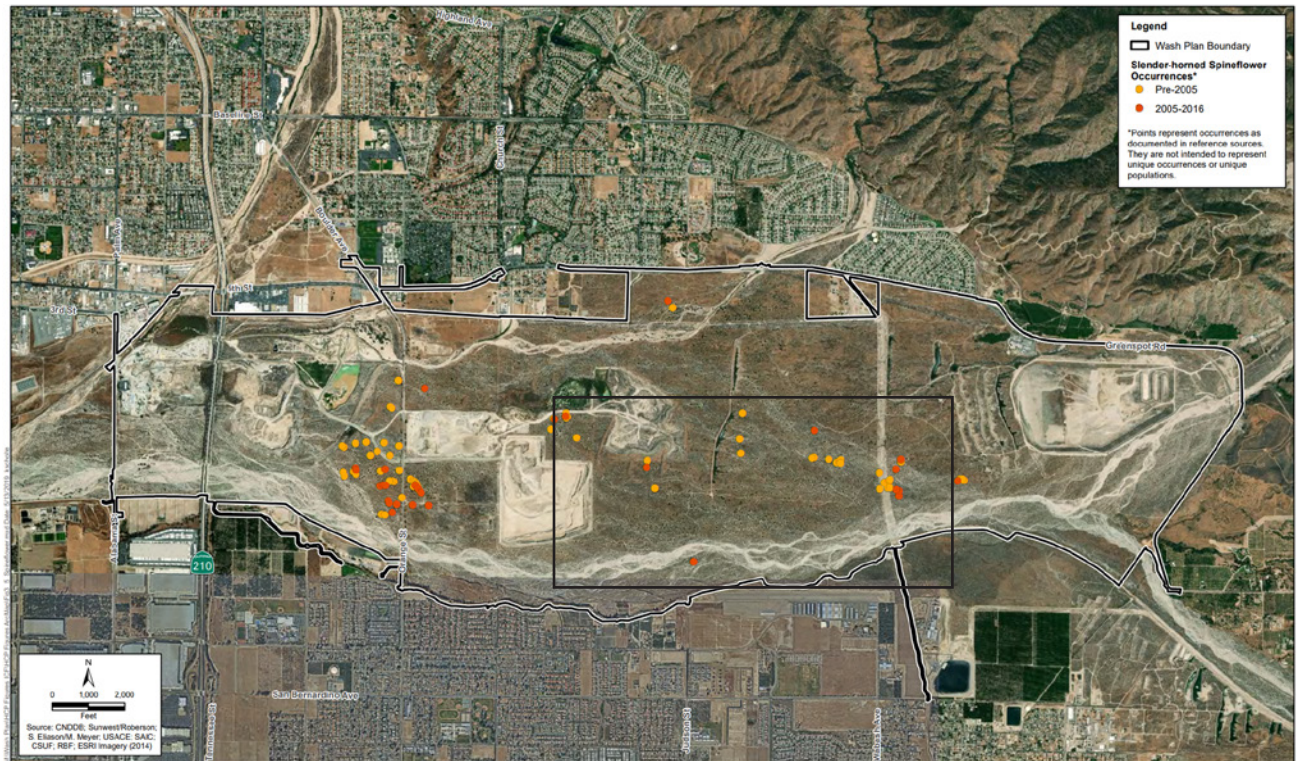


Figure 4-2. Enlarged area of Figure 1., highlighting the location of the in-situ seed bulking activities (located just to the east of numbered patches 33 and 15) and the proposed out-planting location (to the south of numbered patches 22 and 25) relative to historic populations of SHSF. The enlarged area from Figure 1 covers an approximately 1,650-acre area, with dimensions 6,000 ft by 12,000 ft.



Table 4-1. Survey date, estimated population size, and source of spatial data for known historic populations of SHSF identified in Figure 4-2.

Map ID	Map Representation	Survey Date	Population	Source
1	2005-2016	2005/2006	3	Science Applications International Corporation
2	Pre-2005	1992	22	CNDDB
3	Pre-2005	1992	30	CNDDB
4	Pre-2005	1992	31	CNDDB
5	Pre-2005	1992	32	CNDDB
6	Pre-2005	1992	33	CNDDB
7	2005-2016	2006	N/D	CSUF (Unpub 2006) approx
8	2005-2016	2006	N/D	CSUF (Unpub 2006) approx
9	Pre-2005	1997	6	S. Eliason/M.Meyer
10	Pre-2005	1997	7	S. Eliason/M.Meyer
11	Pre-2005	1997	10	S. Eliason/M.Meyer
12	Pre-2005	1997	11	S. Eliason/M.Meyer
13	Pre-2005	1997	39	S. Eliason/M.Meyer
14	Pre-2005	1997	44	S. Eliason/M.Meyer
15	Pre-2005	1997	50	S. Eliason/M.Meyer
16	Pre-2005	1997	61	S. Eliason/M.Meyer
17	Pre-2005	1999	1	USACE
18	Pre-2005	1999	6	USACE
19	Pre-2005	1999	5	USACE
20	Pre-2005	1999	2	USACE
21	Pre-2005	1996/1997	N/D	Sunwest Project
22	Pre-2005	1996/1997	N/D	Sunwest Project
23	Pre-2005	1996/1997	N/D	Sunwest Project
24	Pre-2005	1996/1997	N/D	Sunwest Project
25	Pre-2005	1996/1997	N/D	Sunwest Project
26	Pre-2005	1996/1997	N/D	Sunwest Project
27	Pre-2005	1996/1997	N/D	Sunwest Project
28	Pre-2005	1996/1997	N/D	Sunwest Project
29	Pre-2005	1996/1997	N/D	Robertson's Ready Mix Project
30	2005-2016	2012	5	RBF - Travis McGill
31	2005-2016	2012	20	RBF - Travis McGill
32	2005-2016	5/15/2012	20	RBF - Travis McGill
33	2005-2016	2012	Hundreds	RBF
34	2005-2016	2012	N/D	Science Applications International Corporation
35	2005-2016	2012	N/D	Science Applications International Corporation
36	2005-2016	2012	N/D	RBF

Q3. *Section 3 notes that direct seeding will occur within the vicinity of historical patch locations, but where SHSF is now recognized to be absent based on several years of survey. Can you provide more details on those surveys, timepoints and who completed the monitoring? It would be helpful for us to have some context for how many baseline surveys were completed, in which years, and presence or absence of SHSF in those historic locations that has led to the determination that SHSF is absent.*

Answer: Monitoring on lands within the Woolly Star Preserve Area (WSPA) has been conducted by San Bernardino County Flood Control District over the last several years. On lands enrolled in the Wash Plan Preserve, San Bernardino Valley Water Conservation District has been leading survey efforts from 2016 through the present-day (with ELMT Consulting, Origin Biological, and Dudek covering most of the years from 2016 through 2022). Between the two agencies, surveys for SHSF have been comprehensive with regards to repeat surveys of known historic populations, that is populations identified within the last 30 years. Documented population declines (as measured by the number of observed plants) over the last decade in populations immediately east of Orange Street and near Cone Camp Road, as reported by Origin Biological in 2021 and continuing through 2022, drive home the concern of the long-term sustainability of remaining populations in select areas of the Wash Plan Preserve and need for immediate action from a monitoring and management perspective.

Q4. *Section 4b describes seed available from the CalBG Seed Bank Collection. For clarification purposes, will seed source material for this project be restricted to those that were collected from the identified project area? The statement in the proposal leaves open the possibility of access/use of the larger CalBG Seed Bank Collection that may include seed collected from other locales.*

Answer: All seed source material will be restricted to material collected within the project area, which is recognized as the Upper Santa Ana River Wash, extending from the just east of the confluence of Santa Ana River and Mill Creek to the confluence of City Creek and Santa Ana River. The project area is consistent with the Plan Area (see Figure 4-1) for the

Upper Santa Ana River Wash Habitat Conservation Plan (Wash Plan). Multiple locales within the Plan Area are presently represented in the CalBG Seed Bank Collection. The locations being considered for use in the direct seeding trials and seed bulking activities, are located within the Wash and largely found within 0.5-mile buffer of either side of the north-south trending Orange Street and approximately 750 feet to the west of the proposed seed-bulking area.

Q5. *Please describe any potentially significant ecological differences within the site and between the trial locations (e.g., soil, aspect, drainage, water availability).*

Answer: Trial locations for seeding were selected based on observed similarities in soil, aspect, drainage, and water availability between the most productive colonies of SHSF (see Figures 4-3 and 4-4) based on recently collected monitoring data (that is data collected in the last 3 years) and the prospective trial locations. Both the trial location (see Figure 4-5) and the areas supporting the largest SHSF colonies are largely devoid of annual grasses in the areas to be seeded and areas presently supporting SHSF. Both areas appear to have soil conditions that have increased soil moisture holding capabilities when compared to other areas of the Wash that have supported SHSF populations.

A weather or meteorological station was installed in October in the proposed out-planting to receive seeds. The station (together with the other stations to be installed this year) will allow the team to measure air temperature, relative humidity, soil moisture, soil temperature, and soil electrical conductivity, critical to understanding subtle differences in the microclimates favored by SHSF within the Wash. Having such information will help us to continue to improve our ability to select appropriate out-planting locations where we will bring seed for the purpose of starting a new colony of the endangered SHSF.

Installation of the weather stations is an envisioned activity identified in the HCP. The stations themselves are low-profile and will continuously upload data to the cloud using special data loggers. The equipment is temporary in nature, scheduled to remain in place for upwards of two to three years, but the information gained has the potential to positively influence the trajectory of the recovery program for the species for decades.

Figure 4-3. Population No. 13, with flags denoting the edges of the colony as surveyed in 2022.



Figure 4-4. Slender-horned spineflower with bracts and flowers from population No. 13 in spring 2022.



Figure 4-5. Proposed out-planting location located within the Wash Plan Preserve to receive native seeds from CalBG Collections this fall/winter. In addition to the similarities among soils, the out-planting location has native plants (such as, *Chorizanthe parryi parryi* and *Lastarriaea coriacea*) consistent with those present at other locations with known or historic populations of slender-horned spineflower.



Q6. Please provide more details on expected irrigation schedule for the project and a map that identifies water delivery truck access routes. How will impacts to surrounding habitat and biological resources be minimized during water transport to the site? Will both the direct seeding plots and the transplant plots receive irrigation?

Answer: During the growing season, beginning in January and extending through May, plants participating in the bulking activities are expected to be watered on a regular basis as recommended by the Principal Investigator. Water delivery routes will follow established roads in and out of the *in-situ* seed bulking area. Only the plots involved with seed-bulking activity will receive irrigation.

Q7. In what month(s) will seed be expected to be collected in 2023? Please provide a facility where seeds will be stored after being collected from the field.

Answer: Seed is expected to be collected in May, June, or July depending on the development status of the collective plants. The addition of water is expected to extend the growing season and size of the plants participating in the bulking activities, so seed collection is likely going to be later in the season relative to earlier. Seeds will be stored at CalBG consistent with prior years and their collection permits.

Q8. What is the purpose or benefit of the chaff and inert material for outplanting activities?

Answer: Collection of the seed together with the chaff and inert material more closely mimics the material that is co-distributed with seeds in a natural environment following the drying of the annual plant and dispersion of the above ground material. Future seeding trials (that is, in subsequent years) are likely to compare seeding success between plots seeded with naked seed, and plots seeded with seeds unseparated from associated natural materials.

Q9. *Can you provide more details on why patch 13 was selected for the location to orient field seed bulking activities? Are there specific ecological or logistical considerations for focusing the bulking activities in this patch area? What is the distance from patch 12/13 from the other populations?*

Answer: Establishing seed-bulking activities within the general areas of population No. 13 (or Patch No. 13) was decided because the greater area has been the most productive for SHSF the last several years and for that reason, native pollinators are presumed to be present and abundant. Equally important, the location of Population 12 and 13 are in a secured area with limited access. Nearby mining operations limit any unauthorized travel near Population Nos. 12 and 13. The situation would be similar for the proposed seed-bulking area.

Q10. *Please provide more details on the trial parameters in Section 4d. What are the specific treatments? Will the treatments be performed prior to seeding and will there be any ground disturbance prior to seeding?*

Answer: The only ground disturbance to occur prior to/during seeding activities is hand-raking. The out-planting location selected to receive seeds is free of above ground vegetation that will need to be removed (see Figure 4-5).

Q11. *What are the dimensions of the outplanting grow plots? Can you please clarify how many total outplanting grow plots there will be that include the 5 direct seeding trial sub plots? What is the benefit of the 24-inch spacing between plants? Is there phenological data providing information on root establishment? Do they penetrate deeply?*

Answer: The seed bulking plot will be approximately 2,000 square feet or 0.046 acres, using 24 in spacing within and between rows. This spacing was selected to limit intraspecific competition between planted slender horned spineflower within the bulking plots. While not available for this species directly, it is expected that slender horned spineflower grow a relatively deep taproot.

The out planting plots, or seeding trial, plots are 1x1 meter and there will be one seeding block that includes 5 plots.

Q12. *Please provide more details on what tools will be used for the mechanical thatch removal.*

Answer: Mechanical thatch removal is expected to occur primarily using landscape and bow rakes, however, in limited situations a line trimmer (i.e. weed whip) may be used to cut standing biomass prior to removal.

Q13. *The proposal notes removal of herbaceous growth. Can you please clarify whether the vegetation planned for removal is native or non-native? What weeds are expected or detected in this area?*

Answer: Only non-native vegetation (specifically, annual grasses) is planned to be removed when establishing the out-planting grow plots.

Q14. *Please clarify whether "each population" in Section 4b refers to each identified patch from Table 1.*

Answer: Yes, a small portion of seeds from each population upon CalBG collected seeds may be selected for germination trials. Each population surveyed by the larger team is listed in Table 1. The subset of populations from which CalBG collected seed is identified in the Table found in Section 4a.

Q15. *Are various treatments expected as part of the germination trial? If so, can you provide details on the treatments?*

Answer: No treatments are planned for this first year. CalBG will be staying consistent with the methodologies used to complete successful germination trials with SHSF.

Q16. *What pollinators were present when you initially monitored the natural populations?*

Answer: We identified native ants, beetles, and bees.

Q17. *What are the specific treatments of the direct seeding plots? What are the controls?*

Answer: The only treatments planned for the first year include the addition of seed and raking of topsoil. Native seeds will be hand-raked in two to three plots, the remaining plots will be either left undisturbed or will be hand raked without the addition of seed to serve as a complete control and a procedural control.

Q18. *What monitoring data will be collected for the germination, direct seeding, and bulking trials (i.e., number of individuals germinating, seed heads, irrigation events, rainfall, presence of weeds, weeding events etc.). What is being analyzed and how? Who will do the monitoring?*

Answer: Monitoring data collection for the direct seeding will include: SHSF abundance, absolute cover of SHSF, SHSF average longest diameter, SHSF average shortest diameter, estimated average number of SHSF involucres per plant, absolute cover of associated plant species, absolute cover of bare ground, absolute cover of soil disturbance, absolute cover of thatch, absolute cover of biotic crust. These data will provide a baseline for establishment of SHSF and may be used in a comparison to SHSF data collected within occupied areas.

Monitoring data collection for bulking will include: irrigation event data (date, start time, end time, cloud cover, wind speed, air temperature, non-native species presence) and end of season data (SHSF average longest diameter, SHSF average shortest diameter, estimated average number of SHSF involucres per plant, daily precipitation from a nearby rain gauge). These data will provide a record of this baseline effort to conduct seed bulking of SHSF in the field upon which future efforts can either repeat or improve upon.

Data collection for both efforts will be led by assistant investigator Jake Marcon (Dudek).

Q19. *How will you determine viability of seed produced from the field seed bulking and direct seeding activities?*

Answer: A sample of 50 seeds from both the field seed bulking effort and direct seeding effort will be tested for germination in the lab setting at CalBG.

Q20. *Have you considered a multi-year seed germination, bulking and direct seeding trial? If the long-term goal is to develop a draft restoration plan that includes a landscape level analysis of ecological factors within the Wash Plan Preserve area effecting success of existing and restored SHSF, then the one-year trial may not provide an adequate amount*

of time to determine the range of ecological or generational factors that impact SHSF restoration success particularly if plots are supplemented with irrigation.

Answer: Yes, a multi-year seed germination, bulking and direct seeding trial is planned. We agree a single year is not long enough to determine the range of ecological and generational factors that will impact SHSF success. At present, the investment in restoration program development and implementation is expected to last 10-years or more and to involve collaboration and constant contact with CDFW and USFWS as both are members of the Wash Plan Preserve Management Committee which works to help set the annual work plan and budget each year for activities undertaken in the Wash Plan Preserve consistent with the Wash Plan. More complex trials/activities were considered and included within the approved Wash Plan and are incorporated into the multi-year 2081 ITP application the District submitted to CDFW for review and comment. These current activities are set to occur before issuance of the ITP, and hence require a separate permitting mechanism.

Q21. *The proposal notes that the project will provide a recommended toolkit for enhancement of occupied and unoccupied but potentially suitable habitat. Have you considered integrating the occupied vs. unoccupied trial into this project that would support that project goal? Currently the proposal seems to implement activities into unoccupied habitat only.*

Answer: Yes, in future years as the program is expanded, the team will be focused on enhancing both occupied and unoccupied habitat. Seeding into currently unoccupied areas is a conservative first step of the program that allows for testing of management methodologies with low risk to the existing populations. Lessons learned in these unoccupied areas will be incorporated into the trial approach with occupied locations.

Slender-horned Spineflower Germination, Seed Bulking, and Direct Seeding Trial 2081(a)-22-008-RP; Amendment Request, Dated December 11, 2023

Responses to Questions Received by CDFW, Dated March 7, 2024:

Q1. Are the annual vegetation surveys and site selection metrics expected to continue for the term of the permit? Or will any changes to site selection occur?

Answer: Site selection metrics are expected to be further advanced through the term of the permit. Addressing the need to learn more, the number of sites selected to participate in the out-planting trials over the course of the study is expected to increase.

Surveys for slender-horned spineflower (SHSF) completed in spring of 2023 across the entirety of the Wash Plan Preserve allowed us to identify more than 80 sites with macro-conditions (that is, the presence of sandy soils, presence of cryptogamic crust, association with *Juniperus californica*, open ground largely devoid of invasive grasses, evidence of past fluvial disturbance, and stream terrace habitat with alluvium that was often estimated at several hundred years old) recognized as suitable habitat for SHSF. Going forward, we are planning to revisit a subset of the mapped locations each year to further evaluate local conditions (principally soils and vegetation) at these sites for use in future out-planting trials.

We are increasingly confident, through our experience in 2023 conducting the preserve-wide surveys and time spent in 2022 and 2023 monitoring the native patches of SHSF within the preserve, as well as the lessons learned from the first round of out-planting trials and successful germination of sown seed, that we have a good sense of the macro-conditions where the species can be successful. Our attention in 2024 and 2025 will be spent looking to identify the micro-conditions likely to be essential for the species to be able to form self-sustaining colonies across years, recognizing the variability in weather conditions from one year to the next and increasing soil aridity associated with warming atmospheric temperatures are expected to challenge a newly established patch of SHSF to be reproductively successful enough across years to maintain the patch over time.

In the years ahead, we are largely focusing on learning more about the edaphic conditions supporting SHSF patch establishment, with a keen interest in

soil texture, pH, electrical conductivity (EC) and soil nutrients. Dr. Edith Allen (University of California Cooperative Extension), as a member of the SHSF Working Group in 2014, identified typical SHSF soil conditions as a silt loam with a slightly acidic pH, low electrical conductivity (low salinity), 0.04% total nitrogen, 4 ppm available phosphorus, and less than 1% organic matter. The variance of these values was very tight across the locations where she studied SHSF in 1995, and it is hypothesized the species needs these very narrow conditions to sustain a patch over time.

As we invest effort in 2024 characterizing local soil conditions at native patches of SHSF and present-day out-planting locations, we will be able to compare edaphic conditions at these sites with the numbers shared by Dr. Allen. Furthermore, we will use this new information to guide our selection process for the new locations of out-planting trials, looking to match the soil characteristics at new trial sites with the characteristics that are most consistent across sites known to support SHSF.

Q2. Are there any new experimental growing conditions you plan to test or any new methodology? Can you provide a brief discussion of what has been successful in the project and what are some challenges?

Answer: Yes, we plan to test several new methods associated with site selection and consider the important role temporal genetic variability is likely to play across SHSF populations when providing additional seed at out-planting locations across years. In support of defining new experimental growing conditions to test, in spring 2024, we are expecting to reconvene the Upper Santa Ana River SHSF Working Group to help us as we identify the most important questions to answer over the next several years of the program and the next steps in management and monitoring of the new patches of SHSF created through the out-planting trials.

The working group was last together in 2014 and the information generated from the group helped form the basis for the writing of the section of the Upper Santa Ana River Wash Habitat Conservation Plan

("Wash Plan"; approved in 2020 by the USFWS) that deals specifically with the species. Both the USFWS and CDFW are members of the Working Group and will be represented when the group reconvenes.

Our contractor, and one of our co-lead investigators, Jake Marcon, with Dudek, is charged with drafting a restoration plan to guide much of the activity supporting recovery of the SHSF within the Wash over the next three to five years. Consistent with the Wash Plan, the SHSF Working Group will be consulted in the development of the initial restoration plan and subsequently, as needed, to review and provide input on restoration plan revisions. The results of applied experimental methods will be evaluated annually, and the restoration methods modified accordingly based on monitoring results.

At a minimum, the initial restoration program was always to include: the harvesting of spineflower seeds for an extended period, on the order of several years, to capture full genetic diversity of the seed bank from a given location, and evaluation of soil composition and chemistry, terrain, vegetation, and other environmental conditions at sites where spineflower is extant to aid in determining potential establishment sites.

Recognizing the threat posed by **increasing soil aridity** to native plants, especially small annuals, we will be looking at collecting information under the research permit on soil moisture holding capacity of different soil types, building upon the information already collected through the weather stations we established the last year. The increasingly warmer conditions in the atmosphere may be limiting the amount of moisture available to germinating seeds during the later parts of the growing season, leading to increased rates of mortality prior to flowering and the setting of seed.

One of the tests we would like to employ in our next round of out-planting trials is to stratify seed across different soil conditions, as characterized by their composition and texture. Specifically, we are interested in exploring the importance of the silt content of the soil in maintaining higher rates of soil moisture across the season relative to sandier soils that otherwise are less conducive to supporting invasive grasses but might not hold moisture for long-enough periods to allow SHSF to regularly complete their full life cycle.

Similarly, the importance of **cryptogamic soils** in explaining the presence and absence of growing plants at local sites is a question we would like to further evaluate in 2024. From our time in the field, we recognize the presence of cryptogamic soils is often a requisite when defining the local conditions associated with extant SHSF patches. Dr. Allen also noticed the relationship, although it was not definitive at the time, when conducting her own research on the species, mentioning, where present, SHSF may germinate on the crust, but was more successful in the interstitial spaces between the living soils.

Using the information gained from continuing to monitor the present-day out planting locations, we would like to further explore the spatial relationship of cryptogamic soils and SHSF germination. We believe there could be a moisture holding capacity of the cryptogamic soils that benefit SHSF when growing nearby but not directly on the crust. Locating trial plots within areas with an appreciable amount of cryptogamic soils that also have obvious interstitial spaces consisting of sandy soils that are largely devoid of potentially competing plants is a goal for the next round of out-planting site selection.

Furthermore, we recognize, in the trials thus far, we have seeded only from bulked seed originally collected from a single year (2022) and single source patch. Recognizing **genetic variability within a patch** is unusually high for this exceptionally rare endemic, and potentially more important than variability between patches, as suggested by Dr. Nancy Ferguson, USFWS and former member of the SHSF Working Group, the importance of collecting additional seeds from the source patch across different years and bulking this seed for use in out-planting trials is only amplified. Dr. Ferguson mentioned at past meetings of the Working Group that seed is likely under strong selective pressure to be narrowly adapted to specific environmental conditions experienced locally. Given the inherent variability in weather conditions experienced over the years, the temporal aspects of genetic variability within the colony are likely to be more important than spatial. Recognizing, seed could be present in the soil for decades, the conditions under which the seed was initially grown are likely important to determining the likelihood new seed would be productive growing under different or similar conditions.

In 2024, 2025, and 2026, there is the interest to test whether out-planting sites seeded with additional bulked seed collected from the same patch but across different years with different conditions (such as, dry, warm, cold, wet) would be more productive in any one given year or over a period of multiple years, than sites only seeded from seed bulked collected from a single year. These ideas are inspired by Dr. Ferguson's research from which she found it to be the combination and cycle of precipitation and temperature that determine the number of seeds produced by a given subset of the population. Because the plants that make it to production are the only genotype for that year's regime, input of new seed from multiple years of bulking are needed to provide the genetic diversity within the population needed for a newly established colony to become self-propagating.

Q3. Do you have any initial conclusions that can be made from the weather station data collected?

Much of the data from the weather stations has yet to be analyzed. Throughout the last year we have

continued to oversee the collection of data and maintenance of the three stations.

At present, data has been collected for the following measures at the three locations:

- Water Content
- Air Temperature
- Dew Point
- Relative Humidity
- Electrical Conductivity

Data collected from the last year is expected to be analyzed this summer and used to inform selection of out-planting trial locations planned for the fall of 2024. We will use the data collected from the stations to compare local conditions characteristic of the sites selected for the out-planting trials with the conditions of two extant SHSF populations, one of which is the most prolific of the known patches of SHSF and the one responsible for all the bulked seed used in the out-planting trials.



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